

Water Supply Assessment and

Written Verification of Sufficient Water Supply

Vernola Ranch Specific Plan, SP 22001
City Case No. MA22153

City of Jurupa Valley

Prepared for

Jurupa
COMMUNITY SERVICES DISTRICT
Proudly serving Jurupa Valley and Eastvale

Approved December 12, 2022

ALBERT A. WEBB ASSOCIATES

Corporate Headquarters
3788 McCray Street
Riverside, CA 92506
951.686.1070

Palm Desert Office
74967 Sheryl Avenue
Palm Desert, CA 92260
951.686.1070

Murrieta Office
41870 Kalmia Street #160
Murrieta, CA 92562
951.686.1070

W.O. 2022-0213

November 16, 2022

Seungwon Won, Ph.D., P.E.
Principal Engineer
Jurupa Community Services District
11201 Harrel Street
Jurupa Valley, CA 91752

Re: Water Supply Assessment and Written Verification for the Vernola Ranch Specific Plan Project

Dear Dr. Won,

Pursuant to your Notice to Proceed given on September 28, 2022, transmitted herewith is the Water Supply Assessment of the subject project pursuant to SB 610 and the Written Verification of Sufficient Supply pursuant to SB 221.

Sincerely,

Albert A. Webb Associates

Autumn DeWoody
Senior Analyst

Sam I. Gershon, RCE
Senior Vice President



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ACRONYMS AND UNITS OF MEASURE

AC	Acre
AFY	Acre-feet per year
CBWM	Chino Basin Watermaster
CDA	Chino Basin Desalter Authority
CEQA	California Environmental Quality Act
CVWD	Cucamonga Valley Water District
CWC	California Water Code
CY	Calendar year
DU	Dwelling unit
DWR	California Department of Water Resources
DYY	Dry year yield
eAR	Electronic Annual Report
EIR	Environmental Impact Report
FY	Fiscal year
gpd	Gallons per day
IEUA	Inland Empire Utilities Agency
IXP	Ion-exchange plant
JCSD	Jurupa Community Services District
JPA	Joint Powers Authority
mgd	Million gallons per day
MWD	The Metropolitan Water District of Southern California
MZ	Management zone
OBMP	Optimum Basin Management Plan
OSY	Operating Safe Yield
RCSD	Rubidoux Community Services District
RWQCB	California Regional Water Quality Control Board
SF	Square feet
TTM	Tentative tract map
UWMP	Urban Water Management Plan
WEBB	Albert A. Webb Associates
WMP	Water Master Plan
WMWD	Western Municipal Water District
WRCRWA	Western Riverside County Regional Wastewater Authority
WSA	Water Supply Assessment
WSCP	Water Shortage Contingency Plan
WSH	Water supply history
WSO	Water supply outlook
WV	Written Verification of Sufficient Water Supply

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WATER SUPPLY ASSESSMENT

SECTION 1 - INTRODUCTION

Senate Bill 610 (SB 610) was signed into California state law with an effective date of January 1, 2002. SB 610 amended existing legal requirements for confirmation of water supply sufficiency as a condition of approval for development projects. The confirmation of water supply sufficiency is achieved through an assessment of the water supplier's existing and future water sources, and existing and projected water demand in relation to a "project" as defined by California Water Code (CWC or Water Code) section 10912, resulting in the production of a project-specific Water Supply Assessment ("WSA" or "Assessment"). Additional analysis is required in the WSA if any portion of the water purveyor's water supplies include groundwater. The WSA is prepared and adopted by the water supplier and included in the California Environmental Quality Act (CEQA) analysis for the project. The CEQA Lead Agency must then independently determine, based on the entire record, whether water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses (CWC section 10911).

Law

Water Code section 10910:

> *(a) Any city or county that determines that a project, as defined in Section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.*

Water Code section 10912:

> *For the purpose of this part, the following terms have the following meanings:*
>
> *(a) "Project" means any of the following:*
>
> *(1) A proposed residential development of more than 500 dwelling units.*
>
> *(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.*
>
> *(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.*
>
> *(4) A proposed hotel or motel, or both, having more than 500 rooms.*

(5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.

(6) A mixed-use project that includes one or more of the projects specified in this subdivision.

(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

1.1 Purpose

The purpose of the WSA is to answer the following key question pursuant to SB 610: whether the projected supply for the next 20 years, based on normal, single dry and multiple dry years, will meet the demand projected for the project plus existing and planned future uses, including agricultural and manufacturing uses. Approval of a WSA is not a commitment by the water supplier to provide service to the proposed project.

The City of Jurupa Valley formally requested a WSA from JCSD on July 18, 2022. A revised request was received November 15, 2022. JCSD commissioned this Assessment from Albert A. Webb Associates (WEBB) with a notice to proceed given on September 28, 2022.

1.2 Proposed Project

This WSA has been prepared for the proposed Vernola Ranch Specific Plan ("Project"), which encompasses the Vernola Ranch site of approximately 153 acres at the southeast corner of Bellegrave Avenue and Pats Ranch Road in the City of Jurupa Valley (see **Figure 1** – Regional Map, **Figure 2** – Topographic Map and **Figure 3** – Aerial View, located at the end of this section).

JCSD is the water supplier for the Project site and the Project is located in JCSD's 870 Pressure Zone.

The Project land use plan that was provided by the City for this WSA proposes a maximum of 1,576 residential dwelling units including 604 apartments, as well as 10.23 acres of recreational open space and 9.47 acres of conservation open space (i.e., irrigated stormwater basins) across 20 Planning Areas (PAs) as shown on **Figure 4** – Land Use Plan. The Specific Plan also includes approximately 9 acres of a school overlay on portions of PA-15, PA-16, and PA-20 which is assumed for this analysis would be an elementary school that would displace up to 100 units to be redistributed elsewhere in the Specific Plan planning areas. It is not known at this time whether the school would

be developed or where the units would be redistributed to. The Project land use plan is summarized in **Table 1-1.**

Table 1-1 Project Land Use Summary

Proposed Planning Areas	Proposed Specific Plan Land Uses[1]	Proposed Gross Area (acres)	Proposed Maximum Dwelling Units (du)
PA-9 to PA-14	Medium Density Residential (4 to 8 du/ac)	54.93	351
PA-3 to PA-8, PA-15, PA-16	Medium High Density Residential (8 to 15 du/ac)	44.19	453
PA-1, PA-2	High Density Residential (15 to 23 du/ac)	10.27	168
PA-17	Very High Density Residential (23 to 25 du/ac)	24.1	604
PA-18, PA-19	Open Space Recreational	10.23	-
PA-20	Open Space Conservation (Basin)[2]	9.47	-
	Total	153.19	1,576

Source: November 15, 2022 *Request for Water Supply Assessment for the Vernola Ranch Specific Plan Project (City Case No. MA22153 – SP 22001)* from City of Jurupa Valley to JCSD.
(1) Approx. 9 acres of PA-15, PA-16, and PA-20 are within a School Site Overlay as shown on the land use plan. If the school develops, then up to 100 dwelling units in the school site may be distributed throughout the Specific Plan. Density transfers will be allowed between planning areas with City staff level approval not to exceed 20% of the overall unit count.
(2) PA-20 consists of irrigated stormwater basins.

The Project site is currently zoned for Medium-Density Residential and Industrial Park.

Although recycled water is not available at the Project site at the time of this writing, it is the assumption of this WSA that recycled water will be available for outdoor irrigation at the Project.

1.3 Prior Water Supply Assessment

JCSD has not approved a prior WSA for the Project site. In the event the land use plan for the Project changes in the future, then the thresholds for a subsequent WSA defined in Water Code Section 10910(h) should be considered (below).

Law

CWC Section 10910:

> *(h) Notwithstanding any other provision of this part, if a project has been the subject of a water supply assessment that complies with the requirements of this part, no additional water supply assessment shall be required for subsequent projects that were part of a larger project for which a water supply assessment was completed and that has complied with the requirements of this part and for which the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has concluded that its water supplies are sufficient to meet the projected water demand associated with the proposed project, in addition to the existing and planned future uses, including, but not limited to, agricultural and industrial uses, unless one or more of the following changes occurs:*
>
> > *(1) Changes in the project that result in a substantial increase in water demand for the project.*
> >
> > *(2) Changes in the circumstances or conditions substantially affecting the ability of the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), to provide a sufficient supply of water for the project.*
> >
> > *(3) Significant new information becomes available which was not known and could not have been known at the time when the assessment was prepared.*

1.4 Project Relation to the Urban Water Management Plan

JCSD is the water supplier for the Project and has prepared a 2020 UWMP, a copy of which is provided in Appendix A. The 2020 UWMP was adopted by JCSD Board of Directors on June 28, 2021 and deemed complete by the state Department of Water Resources (DWR) on April 25, 2022.

The water demand projections in the UWMP were based on the District's *2020 Water Master Plan* (WMP) adopted September 13, 2021. At the request of the City of Jurupa Valley while JCSD was preparing its 2020 UWMP, the water demand and supply projections of the UWMP accounted for the subject property 1,026 units on 129 acres (8 units per acre) and 550 units on 24 acres (23 unit per acre) for a total of 1,576 units on 153 acres (UWMP, p. 3-30).

In addition, JCSD's future water demands have been considered in the 2020 UWMP's that have been prepared by other agencies. As discussed further in Section 3 – Water

Supply Analysis, this includes the Chino Basin Desalter Authority (CDA), Rubidoux Community Services District (RCSD), and Western Municipal Water District (WMWD). Copies of each agency's 2020 UWMP are provide in Appendices B, C, and D, respectively.

Law

Water Code Section 10910:

> *(c) (1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code [CEQA], shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).*
>
> *(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).*
>
> *(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.*
>
> *(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.*

1.5 Statewide and Local Water Conservation Efforts

JCSD adopted Ordinance No. 389 on May 26, 2015, containing the Water Conservation Program and water waste ordinance in response to Emergency Conservation Regulations mandated at the time by the State Water Resources Control Board. Ordinance 389 states that water conservation measures shall be in effect at all times and shall be subject to penalties as appropriate (UWMP, p. 9-1).

On July 24, 2017, the JCSD Board of Directors unanimously approved remaining at Stage 2 of the District's Water Conservation Program.

On June 28, 2021, the JCSD Board of Directors approved its 2020 Water Shortage Contingency Plan (WSCP), which is located in Chapter 8 of the 2020 UWMP.

Beginning October 19, 2021, all counties in the state of California including Riverside County were included in the Governor's statewide drought emergency declaration.

In response to ongoing and statewide drought conditions, the State Water Resources Control Board adopted on May 24, 2022, Resolution No. 2022-0018 (*To Adopt an Emergency Regulation to Reduce Water Demand and Improve Water Conservation*), which requires among other things, that each water supplier implement their Stage 2 water conservation actions regardless of actual shortage. To-date, the District remains at Stage 2 which is described below.

Submittal Table 8-1
Water Shortage Contingency Plan Levels

Shortage Level	Percent Shortage Range	Shortage Response Actions (*Narrative description*)
1	Up to 10%	"Drought Watch" (Voluntary per person water use reduction of up to 10%.) District will increase public education and outreach efforts to implement many voluntary water conservation practices.
2	Up to 20%	"Drought Caution" (Mandatory per person water use reduction of 10-20%.) Demand reduction actions expand to limit outdoor water use and all Level 1 actions become mandatory. Beginning at this level, District can pursue administrative, civil, and criminal penalties and remedies, cumulatively, for violation of water conservation measures.

Excerpt from 2020 JCSD Water Shortage Contingency Plan, p. 8-7.

On September 26, 2022, the JCSD Board of Directors approved Ordinance No. 458 to revise existing Ordinance No. 389 in order to update references within its recitals, to eliminate certain redundancies, to clarify certain provisions, and to authorize the District's General Manager to adjust mandatory irrigation schedules as may be necessary in individual circumstances. In addition, Ordinance No. 459 was also approved containing rules and regulations to prevent wasteful water uses related to non-functional turf in accordance with Section 996 of the Water Code. Lastly, a new full-time Community Affairs position of Public Outreach Specialist was approved.

With the signing of Senate Bill 1157 on September 28, 2022, the State requires that from January 1, 2025 to January 1, 2030, the standard for indoor residential water use be 47 gallons per capita per day and beginning January 1, 2030, the standard be 42 gallons per capita per day (CWD section 10609.33(a)).

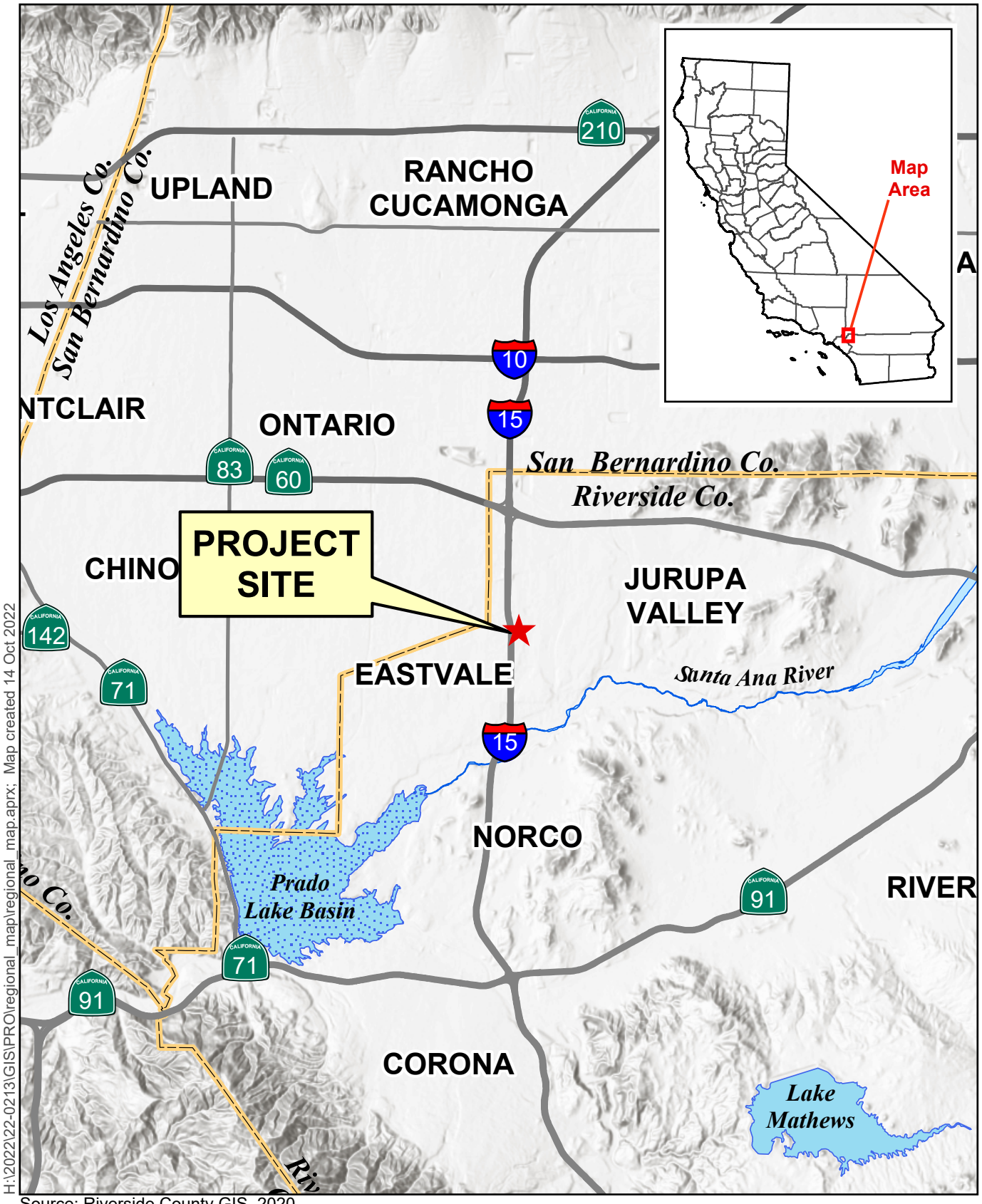
The City of Jurupa Valley adopted the Water Efficient Landscape Ordinance on November 19, 2015, which is codified in Chapter 9.50 of the Jurupa Valley Municipal Code (a copy is provided in Appendix E).

1.6 Methodology of Analysis

This Assessment follows the report outline suggested by the *DWR Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001* (DWR 2003). Water Code citations contained herein are current as of January 1, 2022.

The 2020 UWMP data, which is current through calendar year (CY) 2020, has been incorporated where noted. In addition, CY 2021 production and consumption data from the District is included where noted.

Section 1 of this Assessment describes the existing and proposed land use designations of the project site, the proposed project's relation to the water supplier's most recent UWMP, and a review of statewide conservation requirements. Section 2 provides the water demand analysis of both the project site and the JCSD service area, Section 3 reviews the projected water supplies for the project and the JCSD; Section 4 contains the required discussion of JCSD's groundwater supplies; and Section 5 concludes the Assessment by answering the primary question at hand: whether the projected supply for the next 20 years, based on normal, single dry and multiple dry years, will meet the demand projected for the project plus existing and planned future uses, including agricultural and manufacturing uses.



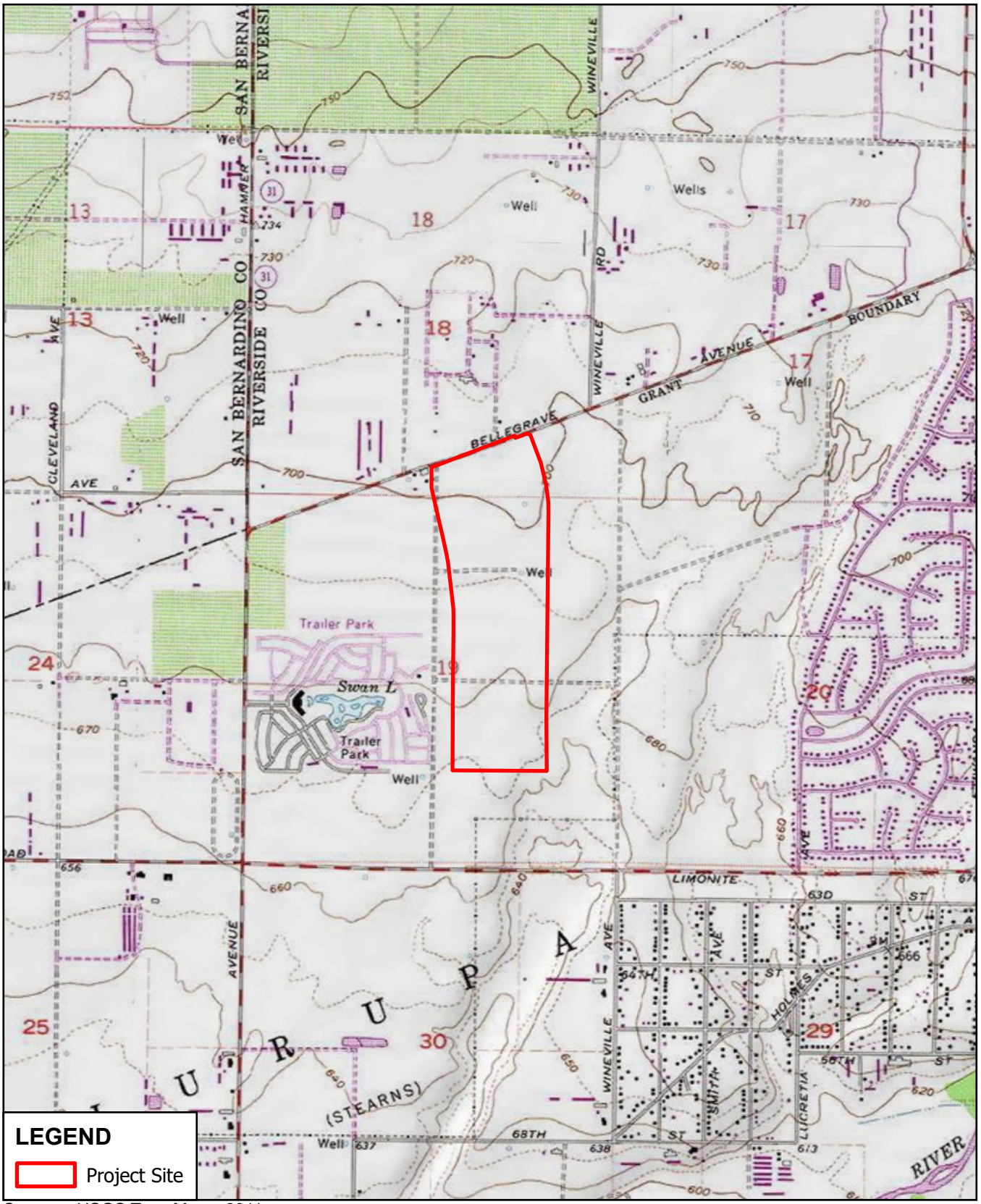
Source: Riverside County GIS, 2020

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Figure 1 - Regional Map

Water Supply Assessment

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Sources: USGS Topo Maps, 2011.

Figure 2 - Topographic Map

Water Supply Assessment

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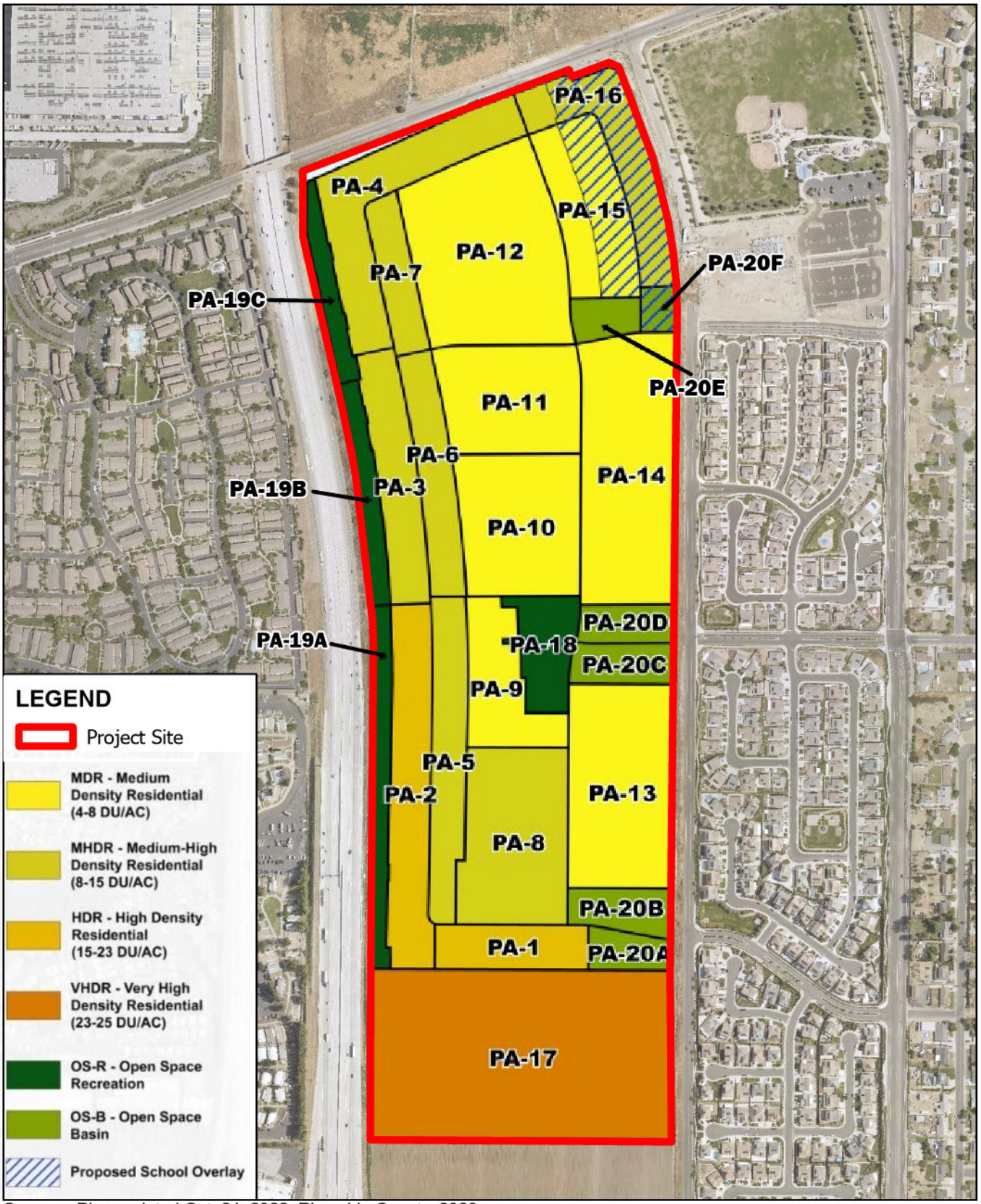
Sources: Riverside County, 2020.

0 400 800 1,200 Feet

Figure 3 - Aerial View

Water Supply Assessment

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Sources: Plan updated Oct. 24, 2022; Riverside County, 2020.

Figure 4 - Land Use Plan

Water Supply Assessment

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SECTION 2 - WATER DEMAND ANALYSIS

This section evaluates whether the proposed Project was considered in the water supplier's planning for water demand. Specifically, this section will: 1) identify the various water use sectors, 2) identify water demand by those sectors for the next twenty years, and 3) compare the calculated water demand of the proposed Project to the water demand assumed in the most recent UWMP for the same property.

2.1 DISTRICTWIDE DEMOGRAPHIC FACTORS

A variety of demographic factors may affect water use. The Urban Water Management Planning Act lists several demographic factors to be detailed in UWMP's including climate, current and projected population, density, and the mix of customer types (CWC sections 10631(e)(1)-(2)). As suggested by DWR, these data are provided in this Assessment and are taken generally from JCSD's 2020 UWMP.

2.1.1 *Climate*

JCSD's service area is located within the greater Chino Basin valley, which is generally semi-arid and warm. Summers are dry with average temperatures as high as 95ºF and maximum daily temperatures that sometimes exceed 100ºF. Winters are cool with average temperatures as low as 40ºF. As stated in the UWMP, average annual rainfall between 1963 to 2020 was approximately 11.4 inches per year (UWMP, p. 3-5). The elevations within the service area vary from 560 feet to 2,230 feet above mean sea level. (UWMP, p. 3-4)

2.1.2 *Population*

The City of Eastvale and approximately 70% of the City of Jurupa Valley make up the JCSD service area. Population projections from the 2020 UWMP are shown in **Table 2-1** (UWMP, p. 3-19).

Table 2-1: JCSD Service Area Population, 2015-2040

	2015	2020	2025	2030	2035	2040 [a]
Service Area Population	119,034	130,546	140,735	150,923	161,112	171,300

Source: UWMP, Table 3-1, p. 3-19.

(a) Service area buildout is estimated to happen by 2040.

JCSD actively tracks the status of properties within its service area as they develop (e.g., whether residential or non-residential; vacant, proceeding through development process, or under construction; undeveloped or inactive) for the primary purpose of forecasting future water demand. At the time, the 2020 UWMP was prepared, there were approximately 846 acres of residential properties and 497 acres of commercial/industrial properties that were actively proceeding through the development process, in plan-check, or under construction. Undeveloped residential and non-residential properties within the service area totaled 1,452 acres and 1,313 acres, respectively. (UWMP, pp. 3-26)

2.2 JCSD's Current and Future Water Demand

The total number of service connections of as of December 31, 2021, is 32,745, which includes 30 non-potable water connections (eAR, p. 6). JCSD delivered to its customers approximately 25,545 acre-feet (AF) of potable water, 580 AF of non-potable water, and 502 AF of potable water sold to another public water system (eAR, p. 9). CY 2021 water demand by customer sector from the 2020 UWMP is shown on **Figure 5**.

Figure 5 – JCSD CY 2021 Water Demand

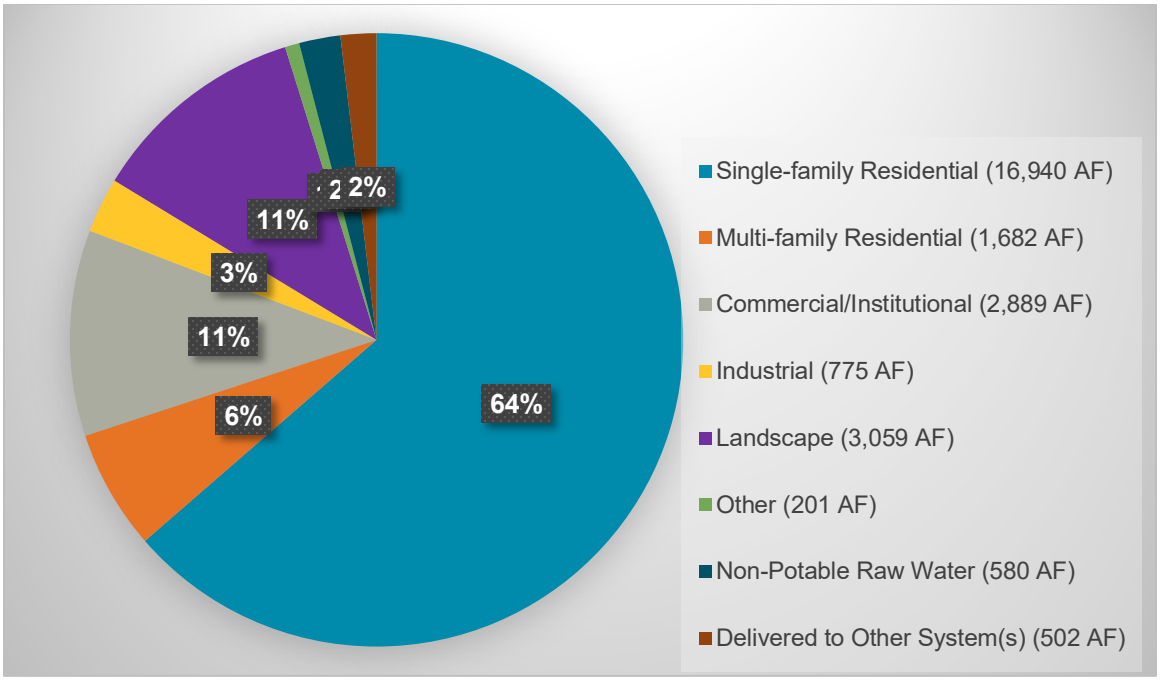
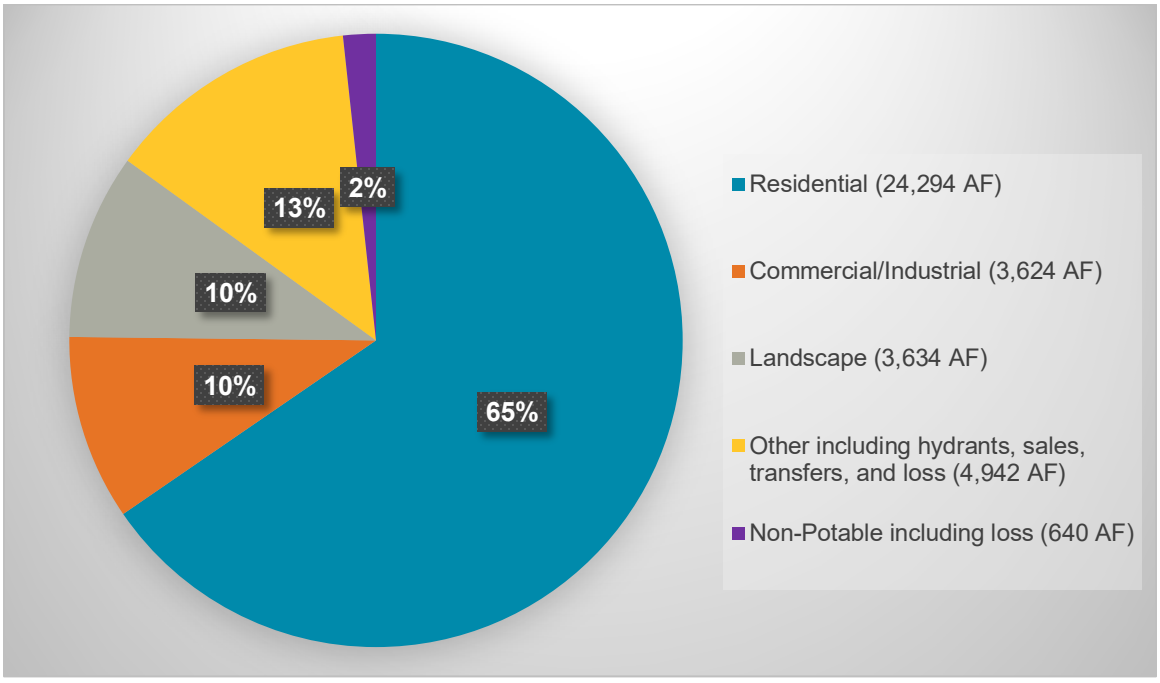


Figure 6 shows projected ultimate water demands for the service area from the 2020 UWMP.

Figure 6 – JCSD Ultimate Water Demand



Recorded and projected water demands by customer type for the JCSD service area are provided in **Table 2-2** (next page).

Table 2-2: Recorded and Projected Water Demand (AFY)

Customer Type	2015	2018	2020	2021	2025	2030	2035	2040
Single Family Residential [a]	14,286	16,869	15,700	16,940	18,551	20,082	21,174	22,375
Multifamily Residential	1,236	1,400	1,359	1,682	1,606	1,731	1,821	1,919
Commercial [b]	2,185	2,505		2,889	2,251	2,451	2,595	2,752
Industrial [c]	653	631	3,119	775	722	782	825	872
Landscape	2,141	2,812	2,353	3,059	3,007	3,258	3,437	3,634
Other [d]	989.6	272	665	201	210	228	241	254
Sales/Transfers	-	-	-	502	1,624	1,759	1,856	1,962
Losses	351.4	--	1,189	-	2,255	2,444	2,578	2,726
Total Potable	**21,842**	**24,489**	**24,385**	**26,048**	**30,225**	**32,735**	**34,524**	**36,495**
Non-Potable Landscape[e]	539	815	592	580	640	640	640	640
Total Demand	**22,381**	**25,304**	**24,977**	**26,628**	**30,865**	**33,375**	**35,164**	**37,135**

Source: UWMP, p. 4-8. (2021 data from 2021 eAR; 2018 data from JCSD 2020.)
(a) Includes water-only customers that do not have sewer service with JCSD.
(b) Includes governmental/institutional and non-billing meters for commercial landscape irrigation.
(c) Commercial, industrial, and institutional (CII) were combined in 2020.
(d) Includes fire hydrants for fire suppression, dust control, and construction, and line breaks.
(e) Includes non-potable loss.
AFY = acre-feet per year

2.2.1 *Agricultural and Manufacturing Uses*

Water Code requires the WSA to address water demands from existing and planned future uses, including agricultural and manufacturing uses (CWC 10910(c)(1)(4)). JCSD does not have an agricultural customer base (UWMP, p. 4-13).

In regard to manufacturing uses, JCSD expects an increase in the water demands from industrial properties (assuming 'industrial' is a proxy for 'manufacturing'), consistent with known projects and approved city land use plans as shown in Table 2-2 (i.e., +12.5% from 2021 to 2040).

2.3 Estimated Project Water Demand

The District expects to have recycled water available to the Project in the future; therefore, it is the assumption of this Assessment that recycled water will be used for outdoor irrigation purposes. Because JCSD's current water duty factors do not account for recycled water being available, this Assessment looked to a neighboring agency with recycled water duty factors, which in this case is the City of Ontario (OMUC) that were subtracted from JCSD's potable duty factors so as not to double-count outdoor water use.

Furthermore, JCSD water duty factors are based on the City's land use plan and how it defines the various residential density ranges. Because the Specific Planhas unique land use designations that are defined differently than the City's definitions, the water duty factors chosen in this analysis are based on equivalent density ranges. For example, the Project defines "Medium Density Residential" (MDR) as 4 to 8 units per acre and the City defines MDR as 2.1 to 5 units per acre; therefore, if the Project has 6 units per acre, the water duty factor for the next density range would be used, Medium High Density Residential (5.1 to 8 units per acre). Using this approach, the Project's potable and recycled water demands are summarized in **Table 2-3** and detailed in **Spreadsheet 1**.

Table 2-3: Water Demand for Vernola Ranch Specific Plan Without School

Proposed Land Use	Projected Potable Water Demand		Projected Recycled Water Demand	
	(gpd)	(AFY)	(gpd)	(AFY)
Medium Density Residential (4 to 8 du/ac)	146,304	164	36,576	41
Medium High Density Residential (8 to 15 du/ac)	83,952	94	26,712	30
High Density Residential (15 to 23 du/ac)	26,702	30	7,703	9
Very High Density Residential (23 to 25 du/ac)	73,505	82	18,075	20
Open Space Recreation	10,230	12	23,529	26
Open Space Conservation (basin)[(a)]	0	0	21,781	24
Total	**340,693**	**382**	**134,376**	**150**

Note: Values shown here are rounded to nearest whole number. Refer to Spreadsheet 1 for detailed calculations.
Gpd = gallons per day; AFY = acre-feet per year; du/ac = dwelling units per acre
(a) Conservation areas are typically not irrigated and JCSD's water duty factor for OS-Conservation is 0 gpd/ac. However, the Specific Plan indicates this will be future stormwater basins that are irrigated; therefore, the same irrigation demand for OS-Recreation has been used for OS-Conservation.

Table 2-4 shows estimated potable and recycled water usage given the inclusion of a 9-acre elementary school within the 153 acres and the same number of units, as detailed in **Spreadsheet 2**.

Table 2-4: Water Demand for Vernola Ranch Specific Plan With School

Proposed Land Use	Projected Potable Water Demand		Projected Recycled Water Demand	
	(gpd)	(AFY)	(gpd)	(AFY)
Medium Density Residential (4 to 8 du/ac)	134,726	151	33,682	38
Medium High Density Residential (8 to 15 du/ac)	74,712	84	23,772	27
High Density Residential (15 to 23 du/ac)	26,702	30	7,703	9
Very High Density Residential (23 to 25 du/ac)	73,505	82	18,075	20
Open Space Recreation	10,230	12	23,529	26
Open Space Conservation (basin)[(a)]	0	0	21,781	24
Elementary School	11,250	13	20,250	23
Total	**331,125**	**371**	**148,791**	**166**

Note: Values shown here are rounded to nearest whole number. Refer to Spreadsheet 2 for detailed calculations.
gpd = gallons per day; AFY = acre-feet per year; du/ac = dwelling units per acre
(a) Conservation areas are typically not irrigated and JCSD's water duty factor for OS-Conservation is 0 gpd/ac. However, the Specific Plan indicates this will be future stormwater basins that are irrigated; therefore, the same irrigation demand for OS-Recreation has been used for OS-Conservation.

2.4 Water Demand Assumed in the 2020 UWMP

The water demand projections of JCSD's 2020 UWMP assumed 129 acres of the Vernola Ranch property as Medium High Density Residential (MHDR) and 24 acres as Highest Density Residential (HHDR) as defined in the City's General Plan Land Use Plan (as of April 2019). The District's potable water duty factors from the 2020 Water Master Plan were used for the calculation. Based on that assumption, the potable water demand accounted for in the 2020 UWMP is 535 AFY as shown in **Table 2-5**.

Table 2-5: Water Demand of Project Assumed in the 2020 UWMP

Land Use Type	Dwelling Units (DU)	Area (AC) [1]	JCSD Potable Water Duty Factor (GPD/AC) [2]	Potable Water Demand (GPD)	Potable Water Demand (AFY) [3]
Medium-High Residential	1,026	129	3,000	387,000	433
Highest Density Residential	550	24	3,800	91,200	102
Total	**1,576**	**153**	-	**478,200**	**535**

[1] Webb Technical Memorandum, Table 1 - Proposed Vernola Ranch Water Demand (proposed land use acres (ac).
[2] From 2020 Water Master Plan (Webb, 2021, Table 3-6)
[3] The JCSD 2020 UWMP (pg. 3-30) total projected water demand for Vernola Ranch is 732 AFY because it included an additional 36-acre planning area that is not a part of the proposed project.

2.5 Conclusion

The proposed Project is different than that which was known to the District when it was preparing the JCSD 2020 UWMP projections for water demand. Based on the land use plan provided for this Assessment however, the Project's total water demand (recycled plus potable) is equivalent to what was accounted for in the 2020 UWMP. Therefore, the Project's water demand was fully accounted for in the 2020 UWMP.

SECTION 3 - WATER SUPPLY ANALYSIS

This section evaluates the sources of water that are available to, and used by JCSD, and those future sources that could be utilized by the proposed Project during normal, single-dry, and multiple-dry water years during a 20-year projection.

JCSD is the water supplier for the proposed Project. JCSD's current sole source of water supply is local groundwater from the Chino Basin and the Riverside South Basin; both of which are adjudicated groundwater basins.

Law

Water Code Section 10910(d)(1):

> *The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.*
>
> *(2) An identification of existing water supply entitlements, water rights, or water service contracts held by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:*
>
> *(A) Written contracts or other proof of entitlement to an identified water supply.*
>
> *(B) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.*
>
> *(C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.*
>
> *(D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.*

3.1 Documenting Wholesale Water Supplies

SB 610 requires this Assessment to document wholesale supplies received, by: i) describing the quantities of water received from each wholesaler in prior years; ii) identifying existing entitlements, water rights, and/or water service contracts held by the District for the wholesale supply; iii) provide proof of entitlements, water rights, service contracts, relevant capital outlay programs, and construction permits for necessary

infrastructure to deliver wholesale supplies, if any; and iv) regulatory approvals required to convey or deliver the wholesale supply.

3.1.1 *Chino Basin Desalter Authority*

JCSD is a member of the Chino Basin Desalter Authority (CDA), a Joint Exercise of Powers Agency, along with Santa Ana River Water Company, Inland Empire Utilities Agency, and the Cities of Chino, Chino Hills, Ontario, and Norco. CDA is a wholesale water supplier and its 2020 UWMP is provided in Appendix B. Each of the retail members of CDA have contractual "take or pay" commitments to purchase water produced by CDA (UWMP, p. 6-1). A copy of the contract between JCSD and CDA is located in Appendix F.

CDA can produce up to approximately 40,000 AF every year for the water quality goals described below, and CDA's member agencies have contract entitlements to receive a total of 35,200 AFY of treated water from CDA. Brine waste from the treatment process is sent to the Inland Empire Brine Line for discharge in the Pacific Ocean. JCSD is currently entitled to 11,733 AFY of potable water from CDA. Recorded deliveries from CDA are shown in **Table 3-1.**

Table 3-1: Recorded CDA Wholesale Deliveries

	2010	2015	2016	2017	2018	2019	2020	2021
Volume (AF)	8,782	8,616	8,073	8,164	8,972	9,575	11,414	11,928

Note: From JCSD Staff, Water Supply History.
AF = acre-feet

The goals of CDA are:

- Achieve hydraulic control of the Chino Groundwater Basin (Chino Basin) to prevent contaminated Chino Basin groundwater from entering Santa Ana River;
- Remove contamination (primarily nitrates, as well as TCE, PCE, and TCP) from groundwater in the southern portion of the Chino Basin; and
- Deliver the treated water to member agencies to offset the need for imported water. (UWMP, p. 6-2)

CDA provides high-quality drinking water from two desalters (salt removers) that were anticipated to treat approximately 35,200 AFY of Chino Basin groundwater in 2020 and thereafter. The Chino I Desalter, located at 6905 Kimball Avenue in Chino, was completed in 2000 and expanded in August 2005 to its current rated capacity of 15,906 AFY (14.2 mgd). However, the Chino I Desalter cannot provide this rated capacity due

to the high total dissolved solids in the raw water supply. The Chino II Desalter, located at 11202 Harrel Street in Jurupa Valley, was completed in 2006 and expanded in 2011 and 2017 for a total capacity of 36,965 AFY (33 mgd) (CDA UWMP, p. 6-8). As of March 2021, Chino I produced 11.97 MGD and Chino II produced 20.3 mgd.

Other Member Agency Allotments

JCSD purchased Western Municipal Water District's allotment of CDA water as follows (Source: WSH):

2021: 2,802 AF

2020: 3,445 AF

2019: 1,025 AF

3.1.2 *Dry Year Yield Storage Program*

The Dry Year Yield (DYY) storage program is a cooperative Conjunctive Use Program Agreement (No. 49960) between The Metropolitan Water District of Southern California (Metropolitan), Inland Empire Utilities Agency (IEUA), Chino Basin Watermaster, Three Valleys Municipal Water District, and the Chino Basin groundwater producers (a copy of the agreement is in Appendix G). Under the DYY Program, Metropolitan can store up to 100,000 AFY of imported water in the Chino Basin during wet years when surplus water is available, and to reduce imported water deliveries up to 33,000 AFY in dry, drought, or emergency periods, but not to exceed the amount of water in the Metropolitan storage account. The DYY program provides Metropolitan the right to store groundwater in the basin, in exchange for paying the costs of developing the facilities that deliver that water.

DYY funds were used by JCSD towards the construction of the Roger D. Teagarden Ion-Exchange Facility. When Metropolitan makes a call for its stored water, JCSD can increase their well production and utilize water from CDA to meet the District's water supply obligation.

Through a Local Agency Agreement with the City of Ontario, JCSD can purchase Ontario's portion of CDA water during years when Metropolitan is not making a call for the stored water (i.e., "wet" or "non-call" years) (a copy of the agreement is in Appendix H). Up to 2,000 AF over 12 months is anticipated. During dry or "call" years, JCSD will stop receiving Ontario's portion of CDA water and return to District well supply (UWMP, p. 6-23). The DYY Program is scheduled to end in 2028 (UWMP, p. 6-30).

Water deliveries received from the DYY Program from CY 2015 to CY 2021 are provided in **Table 3-2**.

Table 3-2: Recorded DYY Program Deliveries

	2015	2016	2017	2018	2019	2020	2021
Volume (AF)	1,677.2	2,030.8	2,001.9	1,805.3	0	1,446	885

Note: From JCSD Staff, Water Supply History.
AF = acre-feet

3.2 Documenting Other Water Supplies

JCSD's water supply is entirely from groundwater production including water from CDA and the DYY program (section 3.1). The majority of the groundwater supply comes from the Chino Basin, with the rest produced from the Riverside South Basin. JCSD does not directly rely on imported water, surface water, stormwater, or recycled water to supplement the water supply. However, these sources can, and are, being used by other agencies in the Chino Basin to recharge the basin supply. JCSD's efforts to bring recycled water to its service area is discussed in Section 3.3.2.

The following is a description of the supplies produced and projected supplies reasonably available to JCSD in addition to the wholesale supplies discussed in Section 3.1.

3.2.1 *JCSD Wells in Chino Basin*

The Chino Basin covers approximately 240 square miles and is one of the largest groundwater basins in Southern California. There is an estimated 12.6 million AF of total water in storage, and an unused storage capacity of approximately one million AF (UWMP, p. 6-5). The Chino Basin has been adjudicated, and pumping activities are closely monitored by the court-appointed Chino Basin Watermaster. A copy of the 1978 Chino Basin Judgment is provided in Appendix I, which is discussed in detail in Section 4.0 – Groundwater Analysis.

JCSD owns and operates 17 potable water wells in the Chino Basin. Currently, eight wells are operational that have an operating potential production rate of approximately 13,185 gallons per minute (gpm) (JCSD Water Supply Outlook (WSO) as of 02/24/2022). The wells fluctuate on and off as demand changes. Most of the wells that are currently inoperable are offline due to water quality constraints and the District is actively working on wellhead treatment projects and well rehabilitation projects to bring wells back online (see Capital Project Budgets for Wells 13, 17, and 30 in Section 3.4). The inability to run all of the active wells that are offline due to water quality constraints has not created a water shortage for the District.

Recorded and current groundwater production are detailed in Section 4.3 and projected use of groundwater is in Section 4.4. In summary, JCSD produced 10,183.464 AF from its potable wells in the Chino Basin during CY 2021 (JCSD Electronic Annual Report (eAR), p. 8). JCSD's current production right to this source is 19,548.3 AF (CBWM, p. 10.1) and well production in the Chino Basin is projected to peak at 18,000 AFY by about 2030 (UWMP, p. 6-29).

JCSD owns four non-potable irrigation wells within the Chino Basin; two of which are currently operational (WSO, 02/24/22). The inoperable non-potable wells are offline waiting for rehabilitation. Although the Project is unlikely to receive water from this source, it is included for completeness. In 2021, the District produced approximately 241 AF from this supply source to serve local park landscape irrigation-only accounts (JCSD 17-18 to 21-22 Water Supply History (WSH)). Future production from these wells is expected to decrease to zero when the District's recycled water system comes online (see Section 3.3.2).

3.2.2 *JCSD Wells in Riverside South Basin*

The Riverside South Basin is the Riverside County portion of the larger Riverside-Arlington Groundwater Basin. This basin has been adjudicated by the 1969 Orange County Judgment located in Appendix J, and basin pumping rights are further defined in the 1969 Western-San Bernardino Judgment located in Appendix K.

JCSD owns two non-potable irrigation-only wells within the Riverside South Basin; one of which is currently offline for repairs (WSO, 02/24/2022). Although the Project is unlikely to receive water from this source, JCSD pumped approximately 504 AF in CY 2021 (WSH). JCSD expects future production from this source will be approximately 500 AFY (UWMP, p. 6-29).

3.2.3 *Rubidoux Community Services District*

From 2000-2017 and starting again in April 2022, JCSD has purchased potable water from RCSD as shown in **Table 3-3**. This water supply is groundwater extracted from the Riverside South Basin. Through an agreement, JCSD can pump potable water from RCSD's system into the District's 1110' Pressure Zone through the Jewel Street Booster Station (a copy of the agreement is located in Appendix L). JCSD anticipates future annual purchases of approximately 2,000 AF from RCSD (UWMP, p. 6-29).

Table 3-3: Recorded Deliveries from Rubidoux Community Services District

	2010	2015	2016	2017	2018	2019	2020	2021
Volume (AF)	743.4	2,249.8	2,029.3	2,322.6	0	0	0	0

Note: From JCSD Staff, Water Supply History.
AF = acre-feet

3.2.4 *Summary of Existing Water Supplies*

The current water supplies reasonably available to JCSD are summarized in **Table 3-4**, including the mechanism by which the District can use the water (e.g. water supply entitlement, water right, or water service contract), pursuant to SB 610 guidance.

Table 3-4: Current Water Supplies Reasonably Available

Supply Type	Supply Method	Water Quality	Form of Right	AFY
Groundwater	JCSD Wells [a]	Potable	Right	19,548.3
Wholesaler	CDA	Potable	Contract	11,733
Groundwater	RCSD	Potable	Contract	2,000
Groundwater	DYY Program [b]	Potable	Contract	2,000
Groundwater	JCSD Wells [c]	Non-Potable	Right	450
			Total	35,731.3

Note: AFY = acre-feet per year
(a) Annual production right in the Chino Basin (CBWM, p. 10.1).
(b) This supply is not available in dry years and expires in 2028.
(c) Within Riverside South Basin.

3.3 Documenting Future Supply

Pursuant to SB 610 guidance, availability must be demonstrated for supply sources that have never been used by the water supplier. This can be done by identifying other water

suppliers or contract holders that receive and have rights, entitlements, or contracts to the same source.

3.3.1 *Western Municipal Water District*

WMWD is a member agency of Metropolitan with responsibility to provide wholesale imported water to the retail agencies within its service area (WMWD, p. 1). WMWD's water supply includes imported water supplies from the Colorado River, State Water Project, recycled water, and local groundwater. WMWD provides supplemental water and/or water resources management to the cities of Norco, Corona, and Riverside and the water agencies of JCSD, Santa Ana River Water Company, Box Springs Mutual, Eagle Valley Mutual, Elsinore Valley, Lee Lake, and Rancho California, and unincorporated areas of El Sobrante, Eagle Valley, Temescal Creek, Woodcrest, Lake Mathews, and March Air Reserve Base (WMWD, p. 1). Metropolitan has provided assurance to its member agencies of supply sufficiency to meet expected demands from 2025 to 2045 in normal, single dry year, and five-consecutive dry year scenarios (MWD, p. ES-6).

JCSD does not receive water directly from WMWD at this time. However, the connection to WMWD is in place, the permit with the state is completed and negotiations with WMWD to purchase Mills Gravity Pipeline water supply are ongoing. WMWD accounted for potential future purchases of water by JCSD in its 2020 UWMP (WMWD, p. 5-2). Further, WMWD's water demand projections in the 2020 UWMP include 10,000 AFY to JCSD starting by 2025 (UWMP, p. 6-24).

Because of the assurance from MWD to its member agencies, WMWD's accounting for potential future demand from JCSD in their UWMP, and WMWD's ability to meet the demands of its other member agencies, the availability of future supply from WMWD is demonstrated.

WMWD is also a member agency of CDA. During calendar year 2020, JCSD negotiated the purchase of WMWD's CDA supply totaling 3,445 AF. A copy of the current agreement dated June 10, 2022, to purchase up to 3,445 AF annually is located in Appendix M.

3.3.2 *Recycled Water Program*

The westerly half of the JCSD service area is tributary to the Western Riverside County Regional Wastewater Authority (WRCRWA) treatment plant. WRCRWA is a Joint Powers Authority consisting of the cities of Norco, Corona, JCSD, Home Gardens Sanitary District, and WMWD. The WRCRWA treatment plant is a tertiary treatment facility with a current treatment capacity of 14 mgd (UWMP, pp. 6-15, 6-16). Currently, the effluent

from the WRCRWA facility is discharged directly to the Santa Ana River immediately upstream of Prado Dam (UWMP, p. 6-15).

As a member of the JPA, JCSD is entitled to the recycled water generated from the District's share of sewage flow into the treatment plant (UWMP, p. 6-15). In 2020, an average of 4.6 mgd of wastewater from the JCSD service area was sent to the WRCRWA Plant for treatment. A Change of Use Order was granted in 2018 and the WRCRWA treatment plant will soon produce recycled water for beneficial use (Petition WW0067).

JCSD is in the process of developing a recycled water system that will deliver irrigation water from WRCRWA to properties in the service area. Funding has been secured by the District for this project (see *Press Releases dated May 26, 2022,* and *August 18, 2022* in Appendix N) and it would convert the irrigation currently being used in said areas from potable water to recycled water (UWMP, p. 6-18). Design of the pipelines and a booster station were recently awarded and as a result, recycled water of approximately 660 AFY is expected to be delivered in 2025.

To demonstrate the availability of this supply source, the City of Norco as a member of the JPA has also designed and constructed the backbone distribution infrastructure to provide recycled water when it becomes available from WRCRWA (Norco, p. 29).

The future availability of this water supply source is demonstrated through the District's right to its share of sewer flow, ongoing efforts by other member agencies to distribute recycled water in their service area from the same source, and the District's ongoing efforts to create a distribution network including securing nearly $33 million from local, State, and Federal grants and a low-interest State loan for $19.4 million (Appendix N). Refer to Section 3.4 for the District's financial commitment to this future recycled water source.

3.3.3 *Etiwanda Intervalley Pipeline*

JCSD is in negotiations with Cucamonga Valley Water District (CVWD) to purchase imported water and groundwater as part of the Etiwanda Intervalley Water Quality and Water Resiliency Project. A Preliminary Design Report has been prepared for JCSD's proposed Etiwanda Pipeline to CVWD. The project is currently being designed and water deliveries are expected in 2026.

This project is expected to provide up to 6,000 AFY to JCSD (UWMP, p. 6-29). Water will be supplied from one of CVWD's surface water treatment plants and new wells to be drilled in the upper portion of the Chino Basin. CVWD operates one surface water treatment plant that treats water from the Rialto Feeder. The Rialto Feeder is a large diameter pipeline owned by Metropolitan that delivers raw water from the State Water

Project to local water purveyors who treat and deliver this water to their customers. The backbone conveyance portion of this project is called the Etiwanda Pipeline and it will be utilized to move water south into JCSD's service area and/or north into CVWD's service area. This project will be able to deliver groundwater and imported water and allow JCSD to complete its water supply portfolio.

CVWD's long-term water supply will be provided through a combination of SWP water coming though the Rialto Feeder, local surface water captured in the local watershed, and groundwater wells in the Chino and Cucamonga Basins. It is anticipated that these sources are adequate to satisfy CVWD's demands. CVWD will benefit from this project through the development of additional groundwater wells, recharge of the aquifer during times of excess water on the SWP, additional storage facilities, enhanced ability to transfer water to multiple pressure zones, and to generate electricity to offset operating costs.

In general, the Etiwanda Intervalley Water Quality and Water Resiliency Project includes the following components:

- Etiwanda Pipeline (63,070 LF in 3 Phases)
- Storage reservoir(s) totaling approximately 10 million gallons
- Pressure reducing / flow control station(s)
- Upgrade existing pumping facilities to deliver water from CVWD's Reservoir 2C to their upper pressure zones
- Five new wells, to be constructed in the northern portion of the Chino Groundwater Basin, including aquifer storage recharge (ASR) capabilities on two of the wells
- Upgrade/Expansion of either the CVWD water treatment plants
- Groundwater treatment of existing JCSD groundwater wells
- Hydroelectric generating facilities on the diversion from the Rialto Feeder to the CVWD treatment plant and Etiwanda Pipeline near the JCSD 1110' and 980' pressure zone tanks

3.3.4 *Summary of Recorded and Future Supplies*

The water supply used by the District is only that which is required to meet actual demand. According to information reasonably available to JCSD during preparation of the 2020 UWMP, as well as the most recently reported data from 2021, Table 3-5 (next page) provides the recorded and projected water supply sources for the District. This includes the supply sources that have not yet been used by JCSD.

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Table 3-5: Actual and Projected Water Supplies

Supply Type	Source	Water Quality	Ever Used?	Past (AF)							Current (AF)	Reasonably Available Future Volume (AF)			
				2011	2012	2013	2014	2015	2018	2020	2021	2025	2030	2035	2040
Ground-water	JCSD Wells[a]	Potable	Yes	15,174	12,599	16,724	16,249	8,993	14,829	11,052	10,183	14,000	18,000	18,000	18,000
Purchased	CDA[b]	Potable	Yes	8,088	8,032	8,642	8,690	8,616	8,972	11,414	11,928	11,733	11,733	11,733	11,733
Purchased	WMWD (CDA)	Potable	Yes	0	0	0	0	0	0	3,446	2,802	4,000	4,000	4,000	4,000
Purchased	RCSD	Potable	Yes	808	702	774	1,062	2,250	0	0	0	2,000	2,000	2,000	2,000
Other	DYY Program	Potable	Yes	0	0	0	457	1,677	1,805	1,446	885	2,000	0	0	0
Purchased	CVWD	Potable	No	-	-	-	-	-	-	-	0	0	6,000	6,000	6,000
Recycled Water	WRC-RWA	Non-Potable	No	0	0	0	0	0	0	0	0	660	660	660	660
Ground-water[C]	JCSD Wells[c]	Non-Potable	Yes	509	532	511	484	464	516	491	503	500	500	500	500
Ground-water[a]	JCSD Wells[a]	Non-Potable	Yes	324	330	295	343	266	304	276	241	0	0	0	0
			Total[d]	24,903	22,195	26,963	26,963	22,381	26,426	28,124	26,542	34,893	42,943	42,943	42,943

Note: From JCSD 2020 UWMP, p. 6-29. AF = acre-feet
(a) Located within Chino Basin.
(b) Wholesale agency.
(c) Located within Riverside South Basin.
(d) Due to rounding, sum of the individual items may not equal the total value.

3.4 Financial Commitment to Water Source Development

JCSD has budgeted $10,800,000 for water source development in fiscal year (FY) 2021-2022, and a total of $102,138,900 from FY 22/23 to FY 24/25, as shown in Table 3-6.

Table 3-6: JCSD Capital Projects Budget for Water Source Development

Capital Projects	Total Proposed Project Cost	Planned 2021-2022	Planned 2022-2023	Planned 2023-2024	Planned 2024-2025	Planned 2025-2026
JCSD Recycled Water Program[a]	$35,000,000	$7,000,000	$16,750,000	$11,250,000	-	-
Well 19/ Well 30 Land, Drill, and Equipping	$6,000,000	$100,000	$2,000,000	$320,000	$3,000,000	-
Etiwanda Intervalley Pipeline Project	$65,416,900	$3,200,000	$28,905,400	$10,924,600	$22,386,900	-
Van Buren Interconnect[b]	$6,000,000	-	-	-	-	-
Roger Teagarden IXP Upgrades	$20,000,000	-	-	-	-	$1,152,000
Well 13 Treatment Plant Expansion (IXP)	$10,200,000	-	-	$50,000	$400,000	$5,000,000
Well 13/17 Wellhead Treatment [c]	$4,500,000	$500,000	-	-	-	-
Total Water Source Development	$147,116,900	$10,800,000	$47,655,400	$22,544,600	$25,786,900	$6,152,000

Source: From JCSD *Operating and Capital Improvement Biennial Budget FY 2021-22 and FY 2022-23, "Water Capital Projects Budget"* p. 228 (Available at www.jcsd.us).
(a) $13.8 million project less $9.8 million grant.
(b) No agreements have been finalized for the Van Buren Interconnect projects with the City of Riverside.
(c) Update: This project is completed as of August 2022 and the wells are operational.
Notes: CDA= Chino Basin Desalter Authority; IEUA = Inland Empire Utilities Agency; IXP = ion-exchange plant.

3.5 Normal Year Water Supply and Demand

JCSD has various sources of water supplies available to meet demands during, normal, single-dry, and multiple-dry years. JCSD expects 100% of its supply to be available in all year types because the District's supply source is groundwater, and in particular the Chino Basin has an estimated 12.6 million AF in storage. Therefore, production of water would be a function of cost and not a lack of supply. Because JCSD does not operate its wells at full capacity, it can be assumed that groundwater pumping could increase to meet demand if drought conditions persisted or worsened. Furthermore, JCSD has

observed in recent years reductions in water demand due to significant water conservation efforts on behalf of customers. Current and future drought regulations could further decrease water demands so that existing supplies meet future demands during single or multiple dry years. (UWMP, p. 7-3)

A normal water year is a year, or an average of years, that most closely represents the average water supply available to the agency. In the 2020 UWMP, JCSD assumed 2010 as its Normal Year (UWMP, p. 7-8). The projected normal year water supplies and demands are compared in Table 3-7.

Table 3-7: Normal Year Water Supply and Demand (AFY)

	2025	2030	2035	2040	2045
Supply [a]	42,093	44,093	44,093	44,093	44,093
Demand	31,525	34,035	35,825	37,795	37,795
Difference	+10,568	+10,058	+8,268	+6,298	+6,298

Note: From JCSD 2020 UWMP, p. 7-9.
(a) Supply and Demand include future water sources, non-potable water, and future recycled water.
AFY = acre feet per year

3.6 Single Dry Year Water Supply and Demand

The single dry year is the year that represents the lowest water supply available to the District. JCSD established in the 2020 UWMP that this is best represented by the dry year in 2018 (UWMP, p. 7-3). The comparisons in Table 3-8 assume the same water supply and demand as the Normal Year scenario shown in Table 3-7; however, climate change factors have been applied to reflect a potential increase in supply due to higher intensity storms and a slightly greater increase in outdoor water use due to higher temperatures.

Table 3-8: Single Dry Year Water Supply and Demand (AFY)

	2025	2030	2035	2040	2045
Supply	42,303	44,534	44,446	44,402	44,313
Demand [a]	31,714	34,477	36,506	38,740	39,004
Difference	+10,589	+10,057	+7,940	+5,662	+5,309

Note: From JCSD 2020 UWMP, p. 7-10. Both supply and demand include single-dry year climate change factors from Tables 6D and 4D in the UWMP.

(a) Includes non-potable water and recycled water from WRCRWA.

AFY = acre feet per year

JCSD expects by 2025 that recycled water will meet some of the irrigation water demand, thus making available several hundred acre-feet of potable groundwater potentially available for urban use.

3.7 Multiple Dry Year Water Supply and Demand

The multiple dry year period would be the driest five-year historical sequence for the District. This was established as 2012 to 2016 in the 2020 UWMP. Notably, JCSD had sufficient supplies to meet demands during the drought period from 2011-2017. In addition, the District decreased water use by about 23% from 2013 to 2015 (UWMP, p. 7-14).

The multiple dry year supply and demand comparisons from the 2020 UWMP are shown in Table 3-9. These projections include climate change factors for potential changes in supply and consumption, and they include demand to gradually decrease in response to drought regulations and water conservation.

Table 3-9: Multiple Dry Year Water Supply and Demand (AFY)

		2025	2030	2035	2040	2045
First Year	Supply	41,883	43,608	43,432	43,255	43,079
	Demand[a]	31,462	34,443	36,470	38,702	38,928
	Difference	+10,420	+9,165	+6,962	+4,554	+4,150
Second Year	Supply	41,883	43,608	43,432	43,255	43,079

		2025	2030	2035	2040	2045
	Demand[a]	28,316	30,999	32,823	34,832	35,036
	Difference	+13,567	+12,609	+10,609	+8,424	+8,043
Third Year	Supply	41,883	43,608	43,432	43,255	43,079
	Demand[a]	25,170	27,554	29,176	30,961	31,143
	Difference	+16,713	+16,054	+14,256	+12,294	+11,936
Fourth Year	Supply	41,883	43,608	43,432	43,255	43,079
	Demand[a]	22,024	24,110	25,529	27,091	27,250
	Difference	+19,859	+19,498	+17,903	+16,164	+15,289
Fifth Year	Supply	41,883	43,608	43,432	43,255	43,079
	Demand[a]	18,877	20,666	21,882	23,221	23,357
	Difference	+23,005	+22,942	+21,550	+20,034	+19,722

Note: From JCSD 2020 UWMP, p. 7-12. Both supply and demand include single-dry year climate change factors from Tables 6D and 4D in the UWMP.

(a) Demand includes non-potable water and recycled water from WRCRWA, and reductions of 10-40% as a result of water conservation beginning in year 2.

AFY = acre-feet per year

As shown in Tables 3-7, 3-8, and 3-9 above, JCSD expects to have adequate water supplies to meet future planned water demands during normal, single-dry, and multiple-dry years through the 20-year planning period.

3.8 Conclusion

Based on the information provided in the 2020 UWMP and updated information provided by JCSD as part of this WSA, the District has sufficient water supply, water production ability, and water rights/entitlements to meet the current customer water demands in normal, single-dry, and multiple-dry year periods. Future water demands will be met with a combination of existing and future supply sources. The District is working to expand existing supply sources with wellhead treatments that are still in the planning stages. Future supply sources include the Recycled Water Program in JCSD's service area for 660 AFY beginning in 2025 that will make available an equal amount of potable water; and the Etiwanda Pipeline for 6,000 AFY beginning in 2026 (Table 3-5). The engineering is underway for both projects, with entitlement secured for the recycled water and a contract being negotiated for the Etiwanda Pipeline project. These future projects were

accounted for in the District's water supply planning projections in the 2020 UWMP and the District's 2020 Water Master Plan to meet buildout around 2040, in normal, single-dry, and multiple-dry year periods. With the ongoing water conservation efforts, JCSD will further ensure its ability to provide sufficient supply. Section 4 will discuss the District's water rights in light of this water supply and capacity analysis.

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SECTION 4 - GROUNDWATER ANALYSIS

SB 610 requires specific groundwater information to be included in the WSA if groundwater will be a source of water for the proposed project. As discussed in Section 3, groundwater is a source of supply for the Vernola Ranch Project.

Law

Water Code Section 10910 (f):

> *If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water supply assessment:*
>
> *(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.*
>
> *(2)(A) A description of any groundwater basin or basins from which the proposed project will be supplied. (B) For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree. (C) For a basin that has not been adjudicated that is a basin designated as high- or medium- priority pursuant to Section 10722.4, information regarding the following: (i) Whether the department has identified the basin as being subject to critical conditions of overdraft pursuant to Section 12924. (ii) If a groundwater sustainability agency has adopted a groundwater sustainability plan or has an approved alternative, a copy of that alternative or plan. (D) For a basin that has not been adjudicated that is a basin designated as low- or very low priority pursuant to Section 10722.4, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.*
>
> *(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied.*

The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. A water supply assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

4.1 Review of Urban Water Management Plan (CWC Section 10910(f)(1))

The District's 2020 UWMP prepared by Albert A. Webb Associates (WEBB) on behalf of JCSD was adopted by the Board of Directors on June 28, 2021 (Appendix A). The UWMP includes information relevant to the identified water supply for the proposed Project and is incorporated herein. Relevant information includes: 1) current and projected water demands through year 2040; 2) a description of the Chino Groundwater Basin; 3) the reliability of the water supply, projected supply and demand comparisons, and water shortage contingency plans; and 4) water demand management efforts.

As part of this Assessment, JCSD determined that the water supply and water demand projections provided in the UWMP are still accurate; however updated CY 2021 customer demand and water supply data was provided for this WSA. Current (2021/2022 and 2022/2023) budget information for water supply development projects was also provided for this WSA.

The UWMP water demand projections are based on an assumption of 129 acres of the Project being medium high density residential (MHDR) and the remaining 24 acres being highest density residential (HDR) for an estimated 535 AFY of potable water demand.

4.2 Groundwater Basin Descriptions (CWC Section 10910(f)(2))

As discussed in Section 3, the Chino Basin is the direct source of potable groundwater for JCSD at this time. The use of groundwater from the Riverside South Basin is limited

to non-potable wells used for irrigation purposes and would not likely serve the Project and therefore not discussed further. **Figure 7 - Groundwater Basin Map** shows the JCSD service area in relation to underlying groundwater basins.

4.2.1 *Chino Basin Description*

The Chino Basin covers approximately 240 square miles in the upper Santa Ana River Watershed, and underlies parts of Los Angeles, San Bernardino, and Riverside Counties. The state Department of Water Resources (DWR) identifies the Chino Basin as No. 8-002.01, a sub-basin of the Upper Santa Ana Valley (Bulletin 118). While still considered a single basin for hydrologic purposes, the Chino Basin is divided by the California Regional Water Quality Control Board – Santa Ana Region (RWQCB) into five management zones based on similar hydrologic conditions, as shown in **Figure 8 - Groundwater Management Zones**.

It is estimated the Chino Basin has approximately 12.6 million AF of water in storage, and an estimated 1 million AF of additional unused storage capacity (UWMP, p. 7-19). Geographically speaking, JCSD's service area covers the southeast corner of the Chino Basin. DWR Bulletin 118 (updated 03/05/18) describes the Chino Basin as follows:

> *The Chino Basin is bound on the northwest by the San Jose fault, on the north by the Cucamonga fault and impermeable rocks of the San Gabriel Mountains, and on the east by the Rialto-Colton fault. The basin is bound on the southeast by the Jurupa Mountains, Pedley Hills, La Sierra Hills, and the approximate location of the Santa Ana River. The Chino fault and impermeable rocks of the Chino Hills and Puente Hills bound the southwest side of the basin. In some areas, the basin boundary coincides with the Chino Basin (1978) groundwater adjudication boundary.*

The Chino Basin is an adjudicated basin and has been extensively studied by the Chino Basin Watermaster (Watermaster), with reports available at www.cbwm.org. The following is an excerpt that describes the basin geology from the Watermaster's management plan called the Optimum Basin Management Program (OBMP) (1999, p. 2-2):

> *Chino Basin was formed when eroded sediments from the San Gabriel Mountains, the Chino Hills, Puente Hills, and the San Bernardino Mountains filled a structural depression. The bottom of the Basin – the effective base of the freshwater aquifer – consists of impermeable sedimentary and igneous rocks. The base of the aquifer is overlain by older alluvium of the Pleistocene period followed by younger alluvium of the Holocene period. The younger alluvium varies in thickeness from over 100 feet near the*

mountains to a just few feet, south of Interstate 10 and generally covers most of the north half of the Basin in undisturbed areas. The younger alluvium is not saturated and thus does not yield water directly to wells. Water percolates readily in the younger alluvium and most of the large spreading basins are located in the younger alluvium. The older alluvium varies in thickness from about 200 feet thick near the southwestern end of the Basin to over 1,100 feet thick southwest of Fontana, and averages about 500 feet throughout the Basin.

4.2.2 *Legal Right to Pump from the Chino Basin*

Water rights to the Chino Basin were adjudicated by the Superior Court of the State of California for the County of San Bernardino in 1978 (a copy of the Judgment is provided in Appendix I). The Judgment created the Chino Basin Watermaster which is comprised of three stakeholder committees (or "pools"): Overlying Agricultural Pool Committee (representing dairymen, farmers, and the State of California); Overlying Non-Agricultural Pool Committee (representing businesses and industries); and Appropriative Pool Committee (representing local cities, public water districts and private water companies). The Watermaster carries out the provisions of the Judgment including monitoring of the basin and files an annual report on pumping and replenishment.

JCSD is a member of the Appropriative Pool and therefore has adjudicated production rights to the basin. The court's original Judgment declared the safe yield of the Chino Basin at 140,000 AFY.[1] The Watermaster may determine that the operating safe yield (OSY) can be higher from year-to-year depending on factors including favorable precipitation and management efforts that maximize the beneficial use of the groundwater Basin.[2] On July 31, 2020, the court ordered that the safe yield be set at 131,000 AFY for the period of July 1, 2020 to June 30, 2030. The Judgment does not limit a Party's groundwater production to its share of safe yield.

[1] Judgment (1978) defines Safe Yield as, "The long-term average annual quantity of groundwater (excluding replenishment or stored water but including return flow to the Basin from use of replenishment or stored water), which can be produced from the basin under cultural conditions of a particular year without causing an undesirable result."

[2] Judgment (1978) defines Operating Safe Yield (OSY) as, "The annual amount of groundwater which Watermaster shall determine, pursuant to criteria specified in Exhibit "I", can be produced from Chino Basin by the Appropriative Pool parties free of replenishment obligation under the physical solution herein."

JCSD is a member of the Appropriative Pool and therefore has adjudicated production rights to the basin. The Judgment established the total Appropriative Right for the Appropriative Pool at 78,763.82 AF. As of June 30, 2021, the District's portion of the Appropriative Right is 2,960.60 AF, which does not change from year to year (CBWM(b), E-1).

The District's annual production right, which is currently 19,548.3 AF, is the sum of the District's assigned share of the OSY, the Net Ag Pool Reallocation, and carryover beginning balance from the prior year (CBWM, p. 10.1), which are described below:

- **Assigned Share of the OSY.** As of July 1, 2020, the total OSY of the Appropriative Pool is 40,834 AF, allocated by percentage of the OSY. Because JCSD has rights to 3.759% of the OSY, the District's current share of the OSY is 1,535 AF (CBWM, p. 10.1). This amount will change from year to year.
- **Net Ag Pool Reallocation.** This amount is the sum of several elements including the District's compensation for Safe Yield reduction, land use conversions in the District's service area, and the District's portion of the Agricultural Pool's Safe Yield that was underproduced and reallocated to the Appropriative Pool. Annual adjustments to this right may be made by the Watermaster as part of their "Reallocation of Agricultural Pool Safe Yield" calculations. The District's current Ag Pool Reallocation amount is 16,328 AF (CBWM p. 16.1).

In addition, JCSD has rights pursuant to the Judgment to store water in the Chino Basin. Currently (Production Year 2020-2021), there is 36,458.5 AF in storage as recorded by the Watermaster (CBWM, p. 11.1). This is enough water in the District's storage account to meet at least one year of total demands.

Table 4-1: JCSD Groundwater Rights Summary

Right	FY 2020/2021
Appropriative Right [a]	2,960.60 AFY
Percent of OSY	3.759%
Carryover Beginning Balance	1,685.3 AFY
Assigned Share of OSY	1,535.0 AFY
Net Ag Pool Reallocation	16,328.0 AFY
Total Annual Production Right (AFY)	19,548.3
Groundwater Storage Accounts [b]	31,861.3 AF (Beginning Balance)

Right	FY 2020/2021
	(22.3) (Storage Loss)
	(2,783.9) (Transfer From)
	7,403.4 (From Underproduction)
Storage Account Subtotal (AF)	36,458.5

Note:
(a) From CBWM(b), p. E-1.
(b) From CBWM, p. 11.1.
OSY = operating safe yield, AFY = acre-feet per year.

4.3 Recorded Use of Groundwater (CWC Section 10910(f)(3))

Recorded groundwater production of potable and non-potable JCSD wells are listed in Table 4-2.

Table 4-2: JCSD Recorded Groundwater Production

Year	Potable Well Production (AFY)	Non-Potable Well Production (AFY)
2000 [a]	16,695	51
2005 [a]	18,913	--
2010 [a]	13,688	591
2015 [b]	8,993	845
2016[c]	10,715	712
2017 [c]	12,905	795
2018 [c]	14,829	750
2019 [c]	13,720	747
2020 [c]	11,029	767
2021 [d]	10,183	744

Note: Values are rounded to nearest whole number.
(a) 2000,2005,2010 from DWR Public Water Systems Statistics (PWSS) reports.
(b) 2015 from JCSD 2015 UWMP, p. 6-4.
(c) 2016-2020 from JCSD 2020 UWMP, p. 6-11.
(d) 2021 from JCSD internal spreadsheet “Water Supply History”

4.4 Projected Use of Groundwater (CWC Section 10910(f)(4))

Projected groundwater use is dependent upon the cost of extracting, treating, and transporting the water to customers. Groundwater from the Chino Basin will be utilized by JCSD either directly by pumping into its distribution system or by obtaining groundwater through the CDA, RCSD, CVWD, and/or through the DYY program.

Table 4-3: JCSD Projected Use of Groundwater

Supply Type	Source	Water Quality	Projected Use (AFY)				
			2025	2030	2035	2040	2045
Groundwater	JCSD Wells[a]	Potable	14,000	18,000	18,000	18,000	18,000
Purchased	CDA[a]	Potable	11,733	11,733	11,733	11,733	11,733
Purchased	WMWD (CDA) [b]	Potable	4,000	4,000	4,000	4,000	4,000
Purchased	RCSD[c]	Potable	2,000	2,000	2,000	2,000	2,000
Purchased	CVWD	Potable	(e)	(e)	(e)	(e)	(e)
Other	DYY Program[d]	Potable	2,000	0	0	0	0
Potable Sub-Total			33,733	35,733	35,733	35,733	35,733
Groundwater	JCSD Wells[a]	Non-Potable	0	0	0	0	0
Groundwater	JCSD Wells[c]	Non-Potable	500	500	500	500	500
Non-Potable Sub-Total			500	500	500	500	500

Notes: From UWMP, p. 6-33. Bold text indicates supply not yet utilized.
(a) Located in the Chino Basin
(b) WMWD's portion of CDA water.
(c) Located in Riverside South Basin
(d) Located in the Chino Basin, not available during dry years, and program will end by 2028.
(e) The portion attributed to groundwater is not yet quantified.

The amount of water that JCSD plans to produce from the Chino Basin as shown in Table 4-3 is well within their rights pursuant to the Chino Basin Judgment (Table 4-1).

Further, projections of groundwater obtained by JCSD from the other sources listed in Table 4-3 are also within the District's rights and agreements.

4.5 Sufficiency of Groundwater Basin (CWC Section 10910(f)(5))

The Judgment allocates safe yield of the Chino Basin according to the three pools as described above (Appendix I, Paragraph 13). The members of each pool are then enjoined from producing water from the Basin in excess of such allocated amount "except pursuant to the provisions of the Physical Solution" (Appendix F, Paragraph 13(a)-(c)).

The Physical Solution of the Judgment is described in broad terms by Paragraphs 39 through 57 of the Judgment. Paragraph 45 provides Watermaster with the authority to levy and collect assessments for the purchase of water necessary to balance the production by any party in excess of that party's allocated share of safe yield of the Chino Basin. Paragraphs 49 and 50 then describe the sources of water which are authorized to function as sources of replenishment water and methods by which water can be replenished to the Chino Basin. Exhibit H, Paragraph 7, of the Judgment describes the way in which costs for replenishment water will spread among the members of the Appropriative Pool.

The afore-cited paragraphs of the Judgment evince a clear expectation that parties, including JCSD, would produce water in excess of their adjudicated production rights. The injunction in Paragraph 13 of the Judgment should thus be interpreted to mean that parties are enjoined from producing water in excess of their adjudicated rights except to the extent that they will pay a replenishment assessment.

The ability to produce water from the Chino Basin is accordingly not a matter of availability, as contemplated and sanctioned by the Judgment for the reasons discussed above, but rather a matter of cost. Water produced in excess of production rights will cost more than water produced within a party's production rights. Thus, the quantity and reliability of groundwater supplies under the Judgment for purposes of this Assessment is a matter of cost of the water produced from the Basin rather than limitations on production which may otherwise operate to reduce the sufficiency of the groundwater supply.

JCSD's legal right to pump water in an amount necessary to meet all demands as sanctioned and protected by the Judgment as discussed above, is buttressed by several programs and projects directed at ensuring the sufficiency of groundwater supplies from the Basin, particularly during dry years. An adjudicated water right has perhaps the most substantial indicia of reliability of any water right that currently exists in California. An adjudicated right is based upon long-term studies whose purpose it is to protect the

long-term functionality of the water source. These rights are coordinated in an established and binding manner with all the other users of the Basin and are overseen by Watermaster which has the authority to mandate and proscribe activities whose purpose is to protect the water source and maximize its long-term beneficial use.

All Watermaster processes are governed by Rules and Regulations and receive active oversight from the Court which, as noted above, retains continuing jurisdiction over the administration of the Judgment. Consequently, the sufficiency of the groundwater is not only directed by rigorous Watermaster management processes but validated and ensured by continuing Court oversight.

The OBMP for the Chino Basin has guided the Chino Basin Watermaster's activities since its adoption in 1998. Watermaster-led basin management activities to ensure the maximization of safe yield and OSY of the Chino Basin include objectives, projects, and programs identified in the Peace Agreement and the OBMP. Progress is reported in annual reports, biennial and triennial reports. The key programs include:

1. a comprehensive monitoring program;
2. a comprehensive recharge program;
3. development and implementation of a water supply plan for impaired areas of the Basin;
4. development and implementation of a comprehensive groundwater management plan for Management Zone 1;
5. development and implementation of a regional supplemental water program;
6. development and implementation of cooperative programs with the RWQCB and other agencies to improve Basin management;
7. development and implementation of a salt management program;
8. development and implementation of a groundwater storage program; and
9. development and implementation of storage and recovery programs.

As stated, the referenced elements of the OBMP collectively comprise a comprehensive regimen directed to ensuring and maximizing the long-term beneficial use of water in the Chino Basin. In particular, and specific to the location of current and future groundwater production facilities upon which JCSD relies or will rely to provide water to meet water demands within its service area, OBMP Program Element No. 3, "Develop and Implement Water Supply Plan for the Impaired Areas of the Basin" and Program Element No. 5, "Develop and Implement Regional Supplemental Water Program", address the sufficiency of groundwater from the Basin. Fundamentally, the goal of Program Elements 3 is:

> *To maintain and enhance Safe Yield with a groundwater desalting program that is designed to replace declining agricultural groundwater pumping in the southern*

> *part of the basin with new pumping to meet increasing municipal water demands in the same area, to minimize groundwater outflow to the Santa River, and to increase Santa Ana River recharge into the basin. (*2020 OBMP, p. 6)

And the goal of Program Element 5 is:

> *To improve the regional conveyance and availability of imported water and recycled waters throughout the basin. (*2020 OBMP, p. 6)

The achievements from implementation of the 2000 OBMP for Elements 3 and 5 are summarized below (2020 OBMP, Appendix A pp. 5 – 6).

> *Program Element 3 Develop and Implement Water Supply Plan for Impaired Areas (Groundwater Desalting): The objectives of this Program Element are to maintain and enhance the Safe Yield of the basin. The groundwater desalting program was designed to replace declining agricultural groundwater pumping in the southern part of the basin with new groundwater pumping to meet increasing municipal water demands in the same area. The new wells used in the groundwater desalting program were constructed in strategic locations to minimize groundwater outflow to the Santa Ana River and to increase the Santa Ana River recharge into the basin. In 2000, the groundwater desalting program included a 6,000 AFY treatment plant and a series of wells constructed in the southern part of the Chino Basin near the Chino Airport. Under the OBMP, as of 2018, the desalting program has grown to two treatment plants and additional wells that in aggregate pump and treat about 30,000 AFY degraded groundwater, and the program will reach the OBMP objective of 40,000 AFY in 2019.[1] The groundwater desalting program facilities are owned by the Chino Basin Desalter Authority (CDA).*
>
> *Program Element 5: Develop and Implement Regional Supplemental Water Program (Recycled Water Reuse): The objective of this Program Element is to improve the regional conveyance and availability of imported and recycled waters throughout the basin. Since 2000, the IEUA has constructed and operated a recycled water conveyance system throughout the basin enabling it to provide recycled water to its member agencies. Recycled water deliveries grew from about 3,400 AFY in 2000 to about 34,000 AFY in 2017. The recycled water provided by the IEUA has replaced a like amount of groundwater and imported water that would have been otherwise been used for non-potable purposes. Much of the*

[1] Update: As of 2020, the two desalting treatment plants pump and treat 35,003 AFY and the program will reach the OBMP objective of 40,000 AFY in 2025 (*Chino Basin Desalter Authority 2020 Urban Water Management Plan dated June 2021, Tables 4-1 and 4-2).*

> *post-2000 increase in supplemental water storage in the Chino Basin is attributable to the increased availability of recycled water. Recycled water is more reliable than imported water, and thus using it in lieu of imported water has improved the sustainability of the Chino Basin and water supply reliability. Improvements in the regional conveyance and availability of imported water were not achieved.*

As indicated in the foregoing OBMP text, the JCSD service area overlies groundwater supplies in the southern part of the Chino Basin which must be pumped for purposes of meeting new demands, maintaining safe yield, and to protect water quality in the Santa Ana River. As agricultural production in the southern part of the Chino Basin has declined, it is necessary for these reasons to increase production for municipal uses. This is being achieved through the Chino I and Chino II Desalters, of which the JCSD has a contractual right to purchase 8,200 AFY pursuant to the original agreement, and 11,733 AFY as a result of subsequent amendments and expanded treatment facilities. Thus, not only was increased Chino Basin water production foreseen in the OBMP but sanctioned and encouraged for purposes of achieving OBMP objectives.

The sufficiency of the groundwater supply that is available to JCSD is assured due to the abundance of groundwater in the central and southern portion of the Chino Basin, OBMP objectives that prioritize and assure production from the southern Chino Basin, coupled with desalting and ion-exchange treatment facilities that enable the use of this abundant supply for municipal (potable) purposes. As indicated in the quoted text of the OBMP, southern basin production, where JCSD is partially located, is the linchpin of several critical OBMP objectives. Thus, the sufficiency of groundwater is heightened and prioritized by the necessity of continued pumping from the southern Chino Basin under the OBMP which is administered by the Watermaster and ultimately enforced by continuing Court jurisdiction over the Judgment.

The other referenced OBMP Program Elements are collectively directed to ensuring the sufficiency of Chino Basin groundwater supplies, particularly during dry years, and comprehensively address water quality and quantity, thus maximizing beneficial use over the long-term. Sufficiency of groundwater from the Chino Basin is further assured for the following reasons:

- IEUA is a member agency of MWD, which provides imported water from the State Water Project for direct use by parties to the Judgment in the Chino Basin and for Chino Basin recharge purposes (when supplies are available). IEUA has also reviewed the sufficiency of supplies for its service territory that includes the Chino Basin in connection with its 2020 UWMP (Appendix O).

- IEUA's UWMP is consistent with, and reiterative of, OBMP projects and programs (see Section 4 of IEUA 2020 UWMP in Appendix O). IEUA anticipates increased limitations for imported water for direct and recharge use while noting reductions during dry years (due to increased reliance on groundwater from the Basin) and in the higher amount otherwise required in the absence of OBMP projects and programs. The UWMP also analyzes the sufficiency of water supplies for single and multiple year drought scenarios and concludes the region is expected to meet 100% of its dry year demand under every scenario. Key assumptions included:
    - Reliance on assurances provided by Metropolitan in its 2020 UWMP that it could meet 100% of projected supplemental full-service water supply demands through 2040;
    - Implementation of Metropolitan's Chino Basin DYY Storage Program consistent with the contractual shift obligations of the participating agencies of up to 33,000 AF in a twelve-month period; and
    - Sustain per capita water use reductions of 20%.

IEUA concluded in its 2020 UWMP that the projected available water supply will meet projected water demand in normal, single dry, and multiple dry years due to diversified water supply and water conservation measures (IEUA 2020 UWMP, p. 7-7).

CWC section 10631(j) provides that urban water suppliers that rely upon a wholesale agency for a source of water may rely upon water supply information provided by the wholesale agency in fulfilling UWMP informational requirements.

IEUA's independent analysis of contemporary regional water conditions in conjunction with Metropolitan's most recent report, provide additional and reliable assurances concerning the sufficiency of imported water supplies that comprise a portion of overall Chino Basin supply sufficiency.

JCSD's participation in the DYY Storage Program described in Section 3, along with future water storage and recovery projects will drought-proof the Chino Basin and all other appropriative pool members from imported water shortages. This program is consistent with OBMP Program Element No. 9, "Develop and Implement Storage and Recovery Program." Benefits to the Chino Basin associated with this program include the construction of facilities to enhance imported water deliveries and the production of water from the Chino Basin. Further demonstrating the sufficiency of Chino Basin groundwater is MWD's program to use the Chino Basin for dry year supply purposes, thus underscoring that sufficient Chino Basin groundwater is available during dry years not only for local use by agencies like JCSD but also in connection with Metropolitan's regional reliability programs.

4.6 Conclusion

In conclusion, the District has rights and contractual entitlements to groundwater and will continue using this resource into the future. The sufficiency of groundwater supplies available to JCSD is assured because of the OBMP programs overseen by the Chino Basin Watermaster and conducted under the auspices of continuing Court jurisdiction that specifically direct and assure the long-term production of water pursuant to the District's legal rights to produce such water necessary to meet ultimate water demands.

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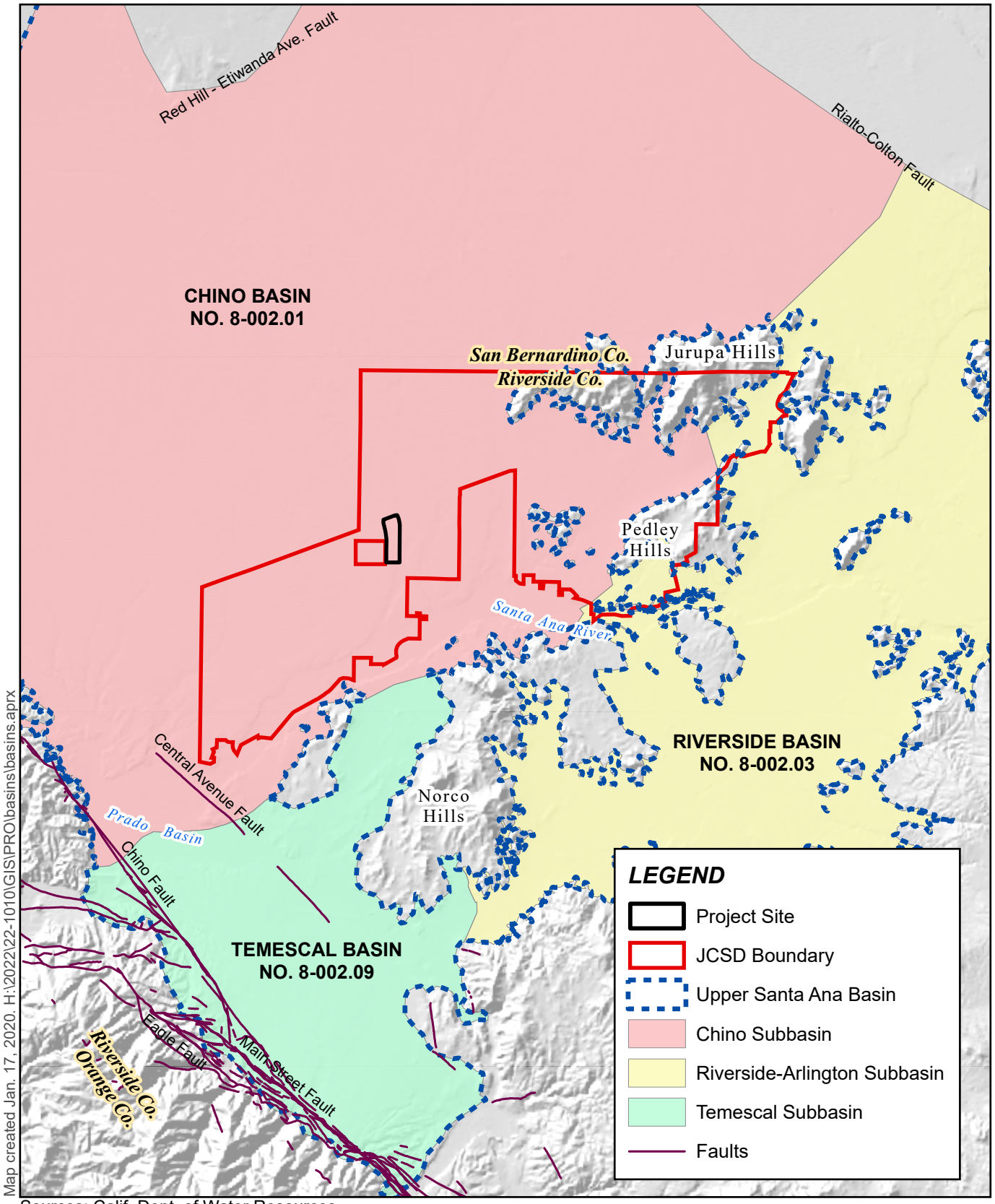
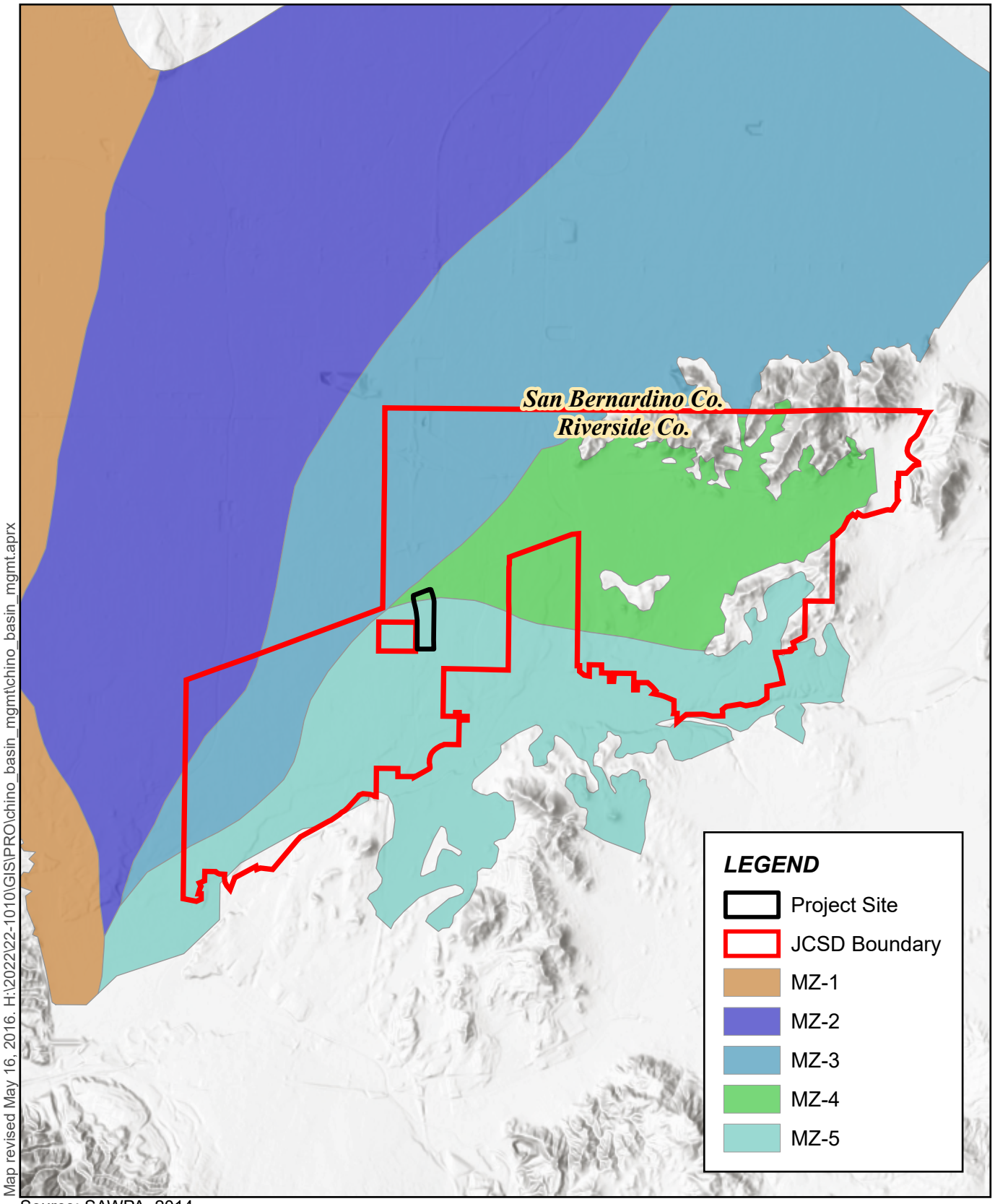


Figure 7 - Groundwater Basin Map
Water Supply Assessment

ALBERT A. WEBB ASSOCIATES



Map revised May 16, 2016. H:\2022\22-1010\GIS\PRO\chino_basin_mgmt\chino_basin_mgmt.aprx

Source: SAWPA, 2014

Figure 8 - Groundwater Management Zone Map

Water Supply Assessment

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ALBERT A. WEBB ASSOCIATES

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SECTION 5 - PRIMARY ISSUE FOR ASSESSMENT

The lead agency, "…shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy demands of the project, in addition to existing and planned future uses" (CWC section 10911). The lead agency is expected to approve or disapprove the project based on several factors, including but not limited to the Water Supply Assessment (WSA).

Law

Water Code Section 10910(g)(1):

> *Subject to paragraph (2), the governing body of each public water system shall submit the assessment to the city or county not later than 90 days from the date on which the request was received. The governing body of each public water system, or the city or county if either is required to comply with this act pursuant to subdivision (b), shall approve the assessment prepared pursuant to this section at a regular or special meeting.*

Water Code Section 10911(b):

> *The city or county shall include the water supply assessment provided pursuant to Section 10910, and any information provided pursuant to subdivision (a), in any environmental document prepared for the project pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code.*
>
> *(c) The city or county may include in any environmental document an evaluation of any information included in that environmental document provided pursuant to subdivision (b). The city or county shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses. If the city or county determines that water supplies will not be sufficient, the city or county shall include that determination in its findings for the project.*

The lead agency is expected to review the WSA and decide whether additional water supply information is needed for its consideration of the proposed project.

5.1 FINDINGS

Whereas:

1. Jurupa Community Services District (JCSD) has been identified as the water supplier for the proposed Vernola Ranch Specific Plan ("Project"). JCSD prepared an Urban Water Management Plan (UWMP) in 2020.
2. The Project is in the City of Jurupa Valley and consists of developing approximately 153 acres of vacant former agricultural land into a maximum of 1,576 residential units on 133.49 acres, with 10.23 acres of open space recreation and 9.47 acres of open space conservation (i.e., irrigated stormwater basins) and an overlay allowing the possibility of 9 acres for a school.
3. Based on the land use plan provided by the City for this Assessment, the estimated potable water demand for the Project with an elementary school is approximately 371 acre-feet per year (AFY) and the recycled water demand is approximately 167 AFY (Table 2-4). The Project water demand projected without the elementary school is 382 and 151 AFY for potable and recycled water respectively (Table 2-3).
4. The water demand projections of the 2020 UWMP considered a land use plan for the subject property that had a water demand of approximately 535 AFY (Table 2-5). Therefore, the most recent UWMP accounted for all of the Project estimated water demand.
5. A statewide drought declaration has been enacted since October 2021 and the District is in Stage 2 of its Water Shortage Contingency Plan.
6. Districtwide potable water demand totaled 25,799 AF in CY 2021, consisting of 10,183 AF from groundwater and purchased 15,616 AF of potable water. During this same time, roughly half of potable wells were temporarily offline; however, no water supply shortage occurred.
7. JCSD has water production rights in the Chino Groundwater Basin that currently total 19,548.3 AF, as well as groundwater storage accounts that total 36,458.5 AF (Table 4-1).
8. JCSD holds a contractual commitment as a member of CDA for potable supplies in the amount of 11,733 AFY, and an agreement with WMWD to purchase its CDA allocation of 3,445 AFY. JCSD also has an agreement to purchase potable water from RCSD in the amount of approximately 2,000 AFY.
9. JCSD has forecasted excess water supplies will be available to meet customer demand during single-dry and multiple dry water years over the next 20 years (Tables 3-8 and 3-9), assuming a new water supply source is brought online around 2025.

Future supply sources include Etiwanda Pipeline that is in final design expected for water beginning in 2026 (Table 3-6). In addition, the District has secured funding and awarded design contracts (August 22, 2022) for a recycled water system in the service area planned to be in operation in 2025 for 660 AFY which will offset an equal amount of potable water.

10. By 2040, ultimate potable water demands of the District are estimated at 36,495 AFY (Table 2-2) and ultimate production capacity will increase accordingly to approximately 40,000 gpm to meet customer demands under buildout conditions.
11. Based on the evidence provided herein, the total projected water supplies available to JCSD during normal, single dry, and multiple dry year periods over a 20-year projection will be sufficient to meet the projected water demand associated with the proposed Project in addition to the water supplier's existing and planned future uses, including agricultural and manufacturing uses.

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REFERENCES

California Drought Monitor	State of California. *California Drought Action* website at drought.ca.gov/current-drought-conditions/, accessed July 20, 2022.
CBWM	Chino Basin Watermaster, *Approved Assessment Package for Assessment Year 2021-2022 (Production Year 2020/2021).* November 18, 2021.
CBWM(b)	Chino Basin Watermaster, *Chino Basin Watermaster 44th Annual Report Fiscal Year 2020-2021.*
CDA 2020	Stetson Engineers, Inc. *Chino Basin Desalter Authority 2020 Urban Water Management Plan.* June 2021. (https://www.chinodesalter.org/DocumentCenter/View/218/UWMP-2020?bidId=)
CDA JCSD Agreement	Chino Basin Desalter Authority. *Amended and Restated Water Purchase Agreement by and between Chino Basin Desalter Authority and The Jurupa Community Services District,* January 1, 2011.
DWR 2003	California Department of Water Resources, *Guidebook for Implementation of Senate Bill 610, and Senate Bill 221 of 2001 to assist water suppliers, cities, and counties in integrating water and land use planning.* October 8, 2003. (Available at https://water.ca.gov/LegacyFiles/pubs/use/sb_610_sb_221_guidebook/guidebook.pdf.)
DWR Bulletin 118	Department of Water Resources. *8-002.01 Upper Santa Ana Valley – Chino Bulletin 118 Basin Boundaries.* Dated March 5, 2018. (Available at https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/B118-Basin-Boundary-Descriptions-2016/B118-Basin-Boundary-Description-2016---8_002_01.pdf)
DYY	*Amendment No. 8 to Groundwater Storage Program Funding Agreement No. 49960 By and Among The Metropolitan Water District of Southern California and Inland Empire Utilities Agency and Chino Basin Watermaster.* September 17, 2014.
eAR	Jurupa Community Services District. *Drinking Water System's 2021 Annual Report to the Division of Drinking Water for the year ending December 31, 2021.* "State Waterboard 2021 EAR."
JCSD RCSD	*Inter-Agency Operating Agreement for Use of the JCSD-RCSD Jewel Street Booster Station and Pipeline Interconnection,* 2015.
Judgment	Judgment, *Chino Basin Municipal Water District v. City of Chino, et al.,* San Bernardino Ct. No. 164327 (filed Jan. 30, 1978). Includes amendments thereto.
JVGP	City of Jurupa Valley General Plan Adopted. September 2017. (Available at https://www.jurupavalley.org/339/General-Plan
JVMC	Jurupa Valley Municipal Code (Available at https://www.jurupavalley.org/168/Municipal-Code)
Local Agency Agreement	*Agreement by and between the City of Ontario and Jurupa Community Services District establishing an operational plan for Metropolitan Water District/Chino Basin Groundwater Storage Program, Providing for Water Supply to Ontario's New Model Colony and Interconnection to Increase Water Supply Reliability*. November 21, 2014.

MWD	The Metropolitan Water District of Southern California, *2020 Urban Water Management Plan*. June 2021.
Norco	City of Norco. *City of Norco 2020 Urban Water Management Plan.* June 2021. (https://www.norco.ca.us/home/showpublisheddocument/988/637731912948230000)
OBMP	Wildermuth Environmental, *Optimum Basin Management Program Phase I report prepared for Chino Basin Watermaster*. August 19, 1999. (Available at http://cbwm.org/docs/engdocs/OBMP%20-%20Phase%20I%20(Revised%20DigDoc).pdf)
OMUC	Stetson Engineers. *City of Ontario Final 2020 Urban Water Management Plan*, June 2021.
Orange County Judgment	Judgment, *Orange County Water District v. City of Chino, et al.,* Superior Court for the State of California for the County of Orange No. 117628 (filed April 17, 1969).
Petition WW0067	State of California, California Environmental Protection Agency, State Water Resources Control Board, Division of Water Rights. *In the Matter of Wastewater Petition WW0067 Western Riverside County Regional Wastewater Authority Order Approving Change in Place of Use, Purpose of Use, and Quantity of Discharge.* Signed February 5, 2018. (https://www.wrcrwa.org/DocumentCenter/View/106/Change-of-Use-Order-PDF)
Press Release	Jurupa Community Services District. *Jurupa Community Services District Secures Nearly $25 Million in State Funding for Recycled Water Project.* May 26, 2022. (https://www.jcsd.us/Home/Components/News/News/1456/158?backlist=%2fhome)
RCSD 2020	Albert A. Webb Associates. Rubidoux Community Services District 2020 Urban Water Management Plan. Revised April 21, 2022. (https://www.rcsd.org/urban-water-management-plan-may-2022)
UWMP	Albert A. Webb Associates, *Jurupa Community Services District 2020 Urban Water Management Plan Final*, June 28, 2021. (https://www.jcsd.us/home/showdocument?id=7229)
VRSP	Albert A. Webb Associates. *Draft Vernola Ranch Specific Plan* (undated), received Nov. 14, 2022.
Western-San Bernardino Judgment	Judgment, *Western Municipal Water District, et al. v. East San Bernardino County Water District, et al.,* Superior Court of the State of California in and for the County of Riverside No. 784726 (filed April 17, 1969).
WMWD 2020	Water Systems Consulting. *Western Municipal Water District 2020 Urban Water Management Plan*. Revised March 30, 2022. (https://www.wmwd.com/215/Urban-Water-Management-Plan)
WMP	Albert A. Webb Associates. *Jurupa Community Services District 2020 Water Master Plan.* Adopted September 13, 2021.
WSH	Jurupa Community Services District Staff, *Water Supply History (WSH) data from 05-06 thru 17-18.* Provided to Albert A. Webb Associates, Jan. 15, 2020.
WSO	Jurupa Community Services District. *Water Supply Outlook (WSO) spreadsheet for 02/24/2022.*

SPREADSHEETS

Vernola Ranch Specific Plan [1]								Potable and Recycled Water Demands (GPD and AFY)					
Planning Area Number	Proposed Project Land use	Proposed Dwelling Units (DU)	Proposed Gross Area (AC)	Calculated Proposed Density (DU/AC)	City of Jurupa Valley General Plan Land Uses that Correspond to Proposed Project Density[2]	City GP Max Density (DU/AC)[2]	JCSD Potable Water Duty Factor	Recycled Water Duty Factor (GPD/AC)	Potable Water Demand (GPD)	Potable Water Demand (AFY)	Recycled Water Demand (GPD)	Recycled Water Demand (AFY)	Total Water Demand (AFY)
PA-1	High Density Residential (15-23 du/ac)	52	3.22	16.1	Very High Density Residential (VHDR) (14.1-20 du/ac)	20	2,600	750	8,372.00	9.38	2,415	2.71	12.08
PA-2	High Density Residential (15-23 du/ac)	116	7.05	16.5	Very High Density Residential (VHDR) (14.1-20 du/ac)	20	2,600	750	18,330.00	20.53	5,288	5.92	26.45
PA-3	Medium High Density Residential (8-15 du/ac)	68	4.89	13.9	High Density Residential (HDR) (8.1-14 du/ac)	14	2,200	700	10,758.00	12.05	3,423	3.83	15.88
PA-4	Medium High Density Residential (8-15 du/ac)	94	7.28	12.9	High Density Residential (HDR) (8.1-14 du/ac)	14	2,200	700	16,016.00	17.94	5,096	5.71	23.65
PA-5	Medium High Density Residential (8-15 du/ac)	47	5.18	9.1	High Density Residential (HDR) (8.1-14 du/ac)	14	2,200	700	11,396.00	12.77	3,626	4.06	16.83
PA-6	Medium High Density Residential (8-15 du/ac)	39	4.12	9.5	High Density Residential (HDR) (8.1-14 du/ac)	14	2,200	700	9,064.00	10.15	2,884	3.23	13.38
PA-7	Medium High Density Residential (8-15 du/ac)	24	2.64	9.1	High Density Residential (HDR) (8.1-14 du/ac)	14	2,200	700	5,808.00	6.51	1,848	2.07	8.58
PA-8	Medium High Density Residential (8-15 du/ac)	81	8.80	9.2	High Density Residential (HDR) (8.1-14 du/ac)	14	2,200	700	19,360.00	21.69	6,160	6.90	28.59
PA-9	Medium Density Residential (4-8 du/ac)	26	4.46	5.8	Medium High Density Residential (MHDR) (5.1-8 du/ac)	8	2,400	600	10,704.00	11.99	2,676	3.00	14.99
PA-10	Medium Density Residential (4-8 du/ac)	42	8.01	5.2	Medium High Density Residential (MHDR) (5.1-8 du/ac)	8	2,400	600	19,224.00	21.53	4,806	5.38	26.92
PA-11	Medium Density Residential (4-8 du/ac)	55	7.09	7.8	Medium High Density Residential (MHDR) (5.1-8 du/ac)	8	2,400	600	17,016.00	19.06	4,254	4.77	23.83
PA-12	Medium Density Residential (4-8 du/ac)	77	13.10	5.9	Medium High Density Residential (MHDR) (5.1-8 du/ac)	8	2,400	600	31,440.00	35.22	7,860	8.80	44.02
PA-13	Medium Density Residential (4-8 du/ac)	61	10.17	6.0	Medium High Density Residential (MHDR) (5.1-8 du/ac)	8	2,400	600	24,408.00	27.34	6,102	6.84	34.18
PA-14	Medium Density Residential (4-8 du/ac)	90	12.10	7.4	Medium High Density Residential (MHDR) (5.1-8 du/ac)	8	2,400	600	29,040.00	32.53	7,260	8.13	40.66
PA-15	Medium High Density Residential 8-15 du/ac)	49	6.03	8.1	Medium High Density Residential (MHDR) (5.1-8 du/ac)	8	2,400	600	14,472.00	16.21	3,618	4.05	20.26
PA-16	Medium High Density Residential 8-15 du/ac)	51	5.25	9.7	High Density Residential (HDR) (8.1-14 du/ac)	14	2,200	700	11,550.00	12.94	3,675	4.12	17.05
PA-17	Very High Density Residential (23-25 du/ac)	604	24.10	25.1	Highest Density Residential (HHDR) (20.1-25 du/ac)	40	3,050	750	73,505.00	82.34	18,075	20.25	102.58
PA-18	Open Space - Recreation[5]	-	3.00	-	Open Space Recreation (OS-R)	-	1,000	2,300	3,000.00	3.36	6,900	7.73	11.09
PA-19	Open Space - Recreation[5]	-	7.23	-	Open Space Recreation (OS-R)	-	1,000	2,300	7,230.00	8.10	16,629	18.63	26.73
PA-20	Open Space - Conservation[6]	-	9.47	-	Open Space Conservation (OS-C)	-	0	2,300	0.00	0.00	21,781	24.40	24.40
Subtotal Residential		**1,576**	**133.49**	**-**	**-**	**-**	**-**	**-**	**330,463.00**	**370.16**	**89,065.50**	**99.77**	**469.93**
Subtotal Open Space-Recreation		**-**	**10.23**	**-**	**-**	**-**	**-**	**-**	**10,230.00**	**11.46**	**23,529.00**	**26.36**	**37.81**
Subtotal Open Space-Conservation		**-**	**9.47**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**21,781.00**	**24.40**	**24.40**
Total		**1,576**	**153.19**	**-**	**-**	**-**	**-**	**-**	**340,693.00**	**381.62**	**134,375.50**	**150.52**	**532.14**

UWMP = Urban Water Management Plan; WMP = Water Master Plan; GP = General Plan; DU = dwelling unit; AC = acre; gpd = gallons per day; AFY = acre-feet per year; FAR = floor-to-area ratio; JCSD = Jurupa Community Services District.

[1] Source: Nov. 15, 2022 WSA request letter from City of Jurupa Valley to Jurupa Community Services District.

[2] The City land use designations and densities that correspond to the proposed densities.

[3] Potable water duty factors are from the "Jurupa Community Services District 2020 Water Master Plan" dated Sept. 2021, Table 3-6 (WEBB).

[4] Recycled water duty factors are from Appendix K of the "City of Ontario 2020 Urban Water Management Plan" dated June 2021, Table 5-3 (Stantec).

(5) For Open Space-Recreation planning areas, it is the assumption of this analysis that potable water use is 1,000 gpd/ac and recycled water use is 2,300 gpd/ac, which is equivalent to JCSD's water duty factor for potable water use at Opne Space-Recreation in Jurupa Valley.

(6) The Specific Plan indicates this will be future stormwater basins that are irrigated; therefore, the same irrigation demand for OS-Recreation has been used for OS-Conservation since conservation areas are typically non-irrigated.

Vernola Ranch Specific Plan [1]							Potable and Recycled Water Demands (GPD and AFY)						
Planning Area Number	Proposed Project Land use	Proposed Dwelling Units (DU)	Proposed Gross Area (AC)	Calculated Proposed Density (DU/AC)	City of Jurupa Valley General Plan Land Uses that Correspond to Proposed Density[2]	City GP Max Density (DU/AC)[2]	JCSD Potable Water Duty Factor (GPD/AC)[3]	Recycled Water Duty Factor (GPD/AC) [4]	Potable Water Demand (GPD)	Potable Water Demand (AFY)	Recycled Water Demand (GPD)	Recycled Water Demand (AFY)	Total Water Demand (AFY)
PA-1	High Density Residential (15-23 du/ac)	52	3.22	16.1	Very High Density Residential (VHDR) (14.1-20 du/ac)	20	2,600	750	8,372.00	9.38	2,415	2.71	12.08
PA-2	High Density Residential (15-23 du/ac)	116	7.05	16.5	Very High Density Residential (VHDR) (14.1-20 du/ac)	20	2,600	750	18,330.00	20.53	5,288	5.92	26.45
PA-3	Medium High Density Residential (8-15 du/ac)	68	4.89	13.9	High Density Residential (HDR) (8.1-14 du/ac)	14	2,200	700	10,758.00	12.05	3,423	3.83	15.88
PA-4	Medium High Density Residential (8-15 du/ac)	94	7.28	12.9	High Density Residential (HDR) (8.1-14 du/ac)	14	2,200	700	16,016.00	17.94	5,096	5.71	23.65
PA-5	Medium High Density Residential (8-15 du/ac)	47	5.18	9.1	High Density Residential (HDR) (8.1-14 du/ac)	14	2,200	700	11,396.00	12.77	3,626	4.06	16.83
PA-6	Medium High Density Residential (8-15 du/ac)	39	4.12	9.5	High Density Residential (HDR) (8.1-14 du/ac)	14	2,200	700	9,064.00	10.15	2,884	3.23	13.38
PA-7	Medium High Density Residential (8-15 du/ac)	24	2.64	9.1	High Density Residential (HDR) (8.1-14 du/ac)	14	2,200	700	5,808.00	6.51	1,848	2.07	8.58
PA-8	Medium High Density Residential (8-15 du/ac)	81	8.80	9.2	High Density Residential (HDR) (8.1-14 du/ac)	14	2,200	700	19,360.00	21.69	6,160	6.90	28.59
PA-9	Medium Density Residential (4-8 du/ac)	26	4.46	5.8	Medium High Density Residential (MHDR) (5.1-8 du/ac)	8	2,400	600	10,704.00	11.99	2,676	3.00	14.99
PA-10	Medium Density Residential (4-8 du/ac)	42	8.01	5.2	Medium High Density Residential (MHDR) (5.1-8 du/ac)	8	2,400	600	19,224.00	21.53	4,806	5.38	26.92
PA-11	Medium Density Residential (4-8 du/ac)	55	7.09	7.8	Medium High Density Residential (MHDR) (5.1-8 du/ac)	8	2,400	600	17,016.00	19.06	4,254	4.77	23.83
PA-12	Medium Density Residential (4-8 du/ac)	77	13.10	5.9	Medium High Density Residential (MHDR) (5.1-8 du/ac)	8	2,400	600	31,440.00	35.22	7,860	8.80	44.02
PA-13	Medium Density Residential (4-8 du/ac)	61	10.17	6.0	Medium High Density Residential (MHDR) (5.1-8 du/ac)	8	2,400	600	24,408.00	27.34	6,102	6.84	34.18
PA-14	Medium Density Residential (4-8 du/ac)	90	12.10	7.4	Medium High Density Residential (MHDR) (5.1-8 du/ac)	8	2,400	600	29,040.00	32.53	7,260	8.13	40.66
PA-15[5]	**Medium High Density Residential 8-15 du/ac)**	**unknown**	***1.21***	***8.1***	**Medium High Density Residential (MHDR) (5.1-8 du/ac)**	**8**	**2,400**	**600**	**2,894.40**	**3.24**	**724**	**0.81**	**4.05**
PA-16[5]	**Medium High Density Residential 8-15 du/ac)**	**unknown**	***1.05***	***9.7***	**High Density Residential (HDR) (8.1-14 du/ac)**	**14**	**2,200**	**700**	**2,310.00**	**2.59**	**735**	**0.82**	**3.41**
PA-17	Very High Density Residential (23-25 du/ac)	604	24.10	25.1	Highest Density Residential (HHDR) (20.1-25 du/ac)	40	3,050	750	73,505.00	82.34	18,075	20.25	102.58
PA-18	Open Space - Recreation[6]		3.00		Open Space Recreation (OS-R)	-	1,000	2,300	3,000.00	3.36	6,900	7.73	11.09
PA-19	Open Space - Recreation[6]		7.23	-	Open Space Recreation (OS-R)	-	1,000	2,300	7,230.00	8.10	16,629	18.63	26.73
PA-20	Open Space - Conservation[7]		9.47	-	Open Space Conservation (OS-C)	-	0	2,300	0.00	0.00	21,781	24.40	24.40
Part of PA-15 and PA-16	**Elementary School**	**100**	**9.00**	**-**	**School (School)**	**-**	**1,250**	**2,250**	**11,250.00**	**12.60**	**20,250**	**22.68**	**35.28**
Subtotal Residential		**1,576**	**124.47**	**-**	**-**	**-**	**-**	**-**	**309,645.40**	**346.85**	**83,231.10**	**93.23**	**440.08**
Subtotal Open Space-Recreation		**-**	**10.23**	**-**	**-**	**-**	**-**	**-**	**10,230.00**	**11.46**	**23,529.00**	**26.36**	**37.81**
Subtotal Open Space-Conservation		**-**	**9.47**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**21,781.00**	**24.40**	**24.40**
Elementary School		**-**	**9.00**	**-**	**-**	**-**	**-**	**-**	**11,250.00**	**12.60**	**20,250.00**	**22.68**	**35.28**
Total		**1,576**	**153.17**	**-**	**-**	**-**	**-**	**-**	**331,125.40**	**370.91**	**148,791.10**	**166.67**	**537.57**

UWMP = Urban Water Management Plan; WMP = Water Master Plan; GP = General Plan; DU = dwelling unit; AC = acre; gpd = gallons per day; AFY = acre-feet per year; FAR = floor-to-area ratio; JCSD = Jurupa Community Services District.

[1] Source: Nov. 15, 2022 WSA request letter from City of Jurupa Valley to Jurupa Community Services District.

(2) The City land use designations and densities that corresponds to the proposed densities.

(3) Potable water duty factors are from the "Jurupa Community Services District 2020 Water Master Plan" dated Sept. 2021, Table 3-6 (WEBB).

(4) Recycled water duty factors are from Appendix K of the "City of Ontario 2020 Urban Water Management Plan" dated June 2021, Table 5-3 (Stantec).

(5) Because it is unknown at this time how the units in PA-15 and PA-16 would be redistributed in the event the school is constructed, we have made certain assumptions: 80% of PA-15 and PA-16 would be school and 20% of PA-15 and PA-16 would be residential units that are in the same density range as proposed without the school but the exact number of units is unknown. Where the units would be redistributed is unknown so we have assumed that they would be redistributed in such a way that density ranges in the other PA's would stay the same.

(6) For Open Space-Recreation planning areas, it is the assumption of this analysis that potable water use is 1,000 gpd/ac and recycled water use is 2,300 gpd/ac, which is equivalent to JCSD's water duty factor for potable water use at Opne Space-Recreation in Jurupa Valley.

(6) The Specific Plan indicates this will be future stormwater basins that are irrigated; therefore, the same irrigation demand for OS-Recreation has been used for OS-Conservation since conservation areas are typically non-irrigated.

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APPENDIX A – JCSD 2020 UWMP

APPENDIX B – CDA 2020 UWMP

APPENDIX C – RCSD 2020 UWMP

APPENDIX D - WMWD 2020 UWMP

APPENDIX E – CITY OF JURUPA VALLEY ORD 2015-17 WATER EFFICIENT LANDSCAPE DESIGN CHAPTER 9.50

APPENDIX F – 2011 PURCHASE AGREEMENT WITH CDA

APPENDIX G – 2003 DYY PROGRAM AGREEMENT NO. 49960

APPENDIX H – 2014 LOCAL AGENCY AGREEMENT WITH CITY OF ONTARIO

APPENDIX I – 1978 CHINO BASIN JUDGMENT

APPENDIX J – 1969 ORANGE COUNTY JUDGMENT

APPENDIX K – 1969 WESTERN-SAN BERNARDINO JUDGMENT

APPENDIX L – 2022 RCSD AND JCSD INTERCONNECTION AGREEMENT

APPENDIX M – 2022 WMWD AND JCSD MEMORANDUM OF UNDERSTANDING

APPENDIX N – 2022 PRESS RELEASES FOR RECYCLED WATER PROGRAM AND FUNDING

APPENDIX O – IEUA 2020 UWMP

WRITTEN VERIFICATION OF SUFFICIENT WATER SUPPLY

FOR

VERNOLA RANCH SPECIFIC PLAN, SP 22001

CITY CASE NO. MA22153, CITY OF JURUPA VALLEY

Approved December 12, 2022

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SB 221 Written Verification of Sufficient Water Supply

1.1 Introduction

Senate Bill 221 (SB 221) was enacted in 2001 and became effective as of January 1, 2002. SB 221 establishes the relationship between the Water Supply Assessment (WSA) prepared for a project pursuant to Senate Bill 610 (SB 610), and the project approval under the Subdivision Map Act. SB 221 amends Section 11010 of the Business and Professional Code, and amends Section 65867.5 to add Sections 66455.3 and 66473.7 to the California Government Code.

Pursuant to Government Code Section 66473.7, the public water supplier must provide a written verification of sufficient water supply (WV) prior to the approval of a tentative subdivision map, or a parcel map for which a tentative map was not required, or a development agreement for a subdivision of property of more than 500 dwelling units, except as specified, including the design of the subdivision or similar type of improvement.

1.2 Purpose

The purpose of the WV is to provide the legislative body of a city, county, or the designated advisory agency with written verification from the applicable public water supplier that a sufficient water supply is available, or, in addition, a specified finding is made by the local agency that sufficient water supplies are, or will be, available prior to completion of the project.

The WV shall be supported by substantial evidence, which may include relevant portions of an applicable Urban Water Management Plan (UWMP) or a WSA prepared per SB 610. Many of the requirements for SB 610 compliance will satisfy the requirements of SB 221. There are four factors to be considered in a WV which are not required in a WSA

as specified by Government Code Section 66473.7. Those four factors, which are specifically addressed in this WV are as follows:

1. Historical water supplies for at least 20 years;

2. Urban Water Shortage Contingency Analysis prepared for the water supplier's UWMP;

3. Supply reduction for "specific water use sector" per water supplier's resolution, ordinance, or contract; and

4. Amount of water that can be reasonably relied upon from specific supply projects, subject to the determinations outlined in Government Code Section 66473.7.

1.3 Project Description and Water Demand

This WV has been prepared in conjunction with a WSA for *Vernola Ranch Specific Plan* ("Project"). The Project encompasses approximately 153 acres within the City of Jurupa Valley. The land use plan provided by the City to the District for this WV plans for up to 1,576 residential dwelling units including 604 apartments, up to 10.23 acres of open space recreation, 9.47 acres of open space conservation and 9 acres of a school overlay.

Jurupa Community Services District (JCSD) is the water supplier for the Project. JCSD commissioned a WSA and WV from Albert A. Webb Associates (WEBB) on September 28, 2022. The purpose of preparing this WV for the Project is to preclude the need for individual "Written Verification" letters being prepared for the individual residential development projects that will qualify for a WV within the Project area. SB 221 applies to the Project because there will be residential subdivisions that exceed the criteria set in Water Code section 66473.7(a) of 500 units.

The key question for this WV to address per SB 221 is whether the water supplier is able to provide a sufficient water supply based upon an analysis as to whether water supplies available during normal, single-dry, and multiple-dry years within a 20-year projection

will meet the projected demand associated with the proposed subdivision(s), in addition to existing and planned future uses, including, but not limited to, agriculture and industrial uses (DWR 2003).

1.4 Verification of Sufficient Water Supply

A detailed evaluation of JCSD's water supply was performed under the attached WSA for the Project. Attached to the WSA is the adopted JCSD 2020 UWMP which addresses normal, single dry, and multiple dry year conditions over the 20-year period from 2020 through 2040 (WSA Appendix A). The 2020 UWMP determined that sufficient water supply exists to support the demands of the JCSD service area. The WSA determined that the water demand of the Project is less than the water demand for the same site that was assumed in the 2020 UWMP; therefore, the Project's water demand was accounted for in the 2020 UWMP and the WSA concludes that sufficient water supply exists to support the Project.

20-Year Water Supply Availability

JCSD has been able to meet all water demands with its available water supplies for the past 20 years despite the ongoing drought and the drought of 2011-2017. Recorded potable water supplies for the last 20 years are shown in Table 1.

Table 1 – 20-Year Water Supply History

Year[a]	Annual Potable Water Supply (AF)[b]
2001	17,551
2002	17,485
2003	19,793
2004	21,314
2005	23,894
2006	26,475
2007	28,848
2008	26,587
2009	24,285

Year[a]	Annual Potable Water Supply (AF)[b]
2010	23,217
2011	24,039
2012	25,179
2013	26,810
2014	26,000
2015	21,536
2016	22,849
2017	25,394
2018	25,623
2019	24,319
2020	27,334
2021	25,799

Notes: AF = acre-feet.

(a) Source: JCSD Public Water System Statistics (PWSS) / Electronic Annual Report forms sent to Dept. of Water Resources. Reported on calendar year basis.

(b) Potable water into the system from all sources only. Values are rounded to nearest whole value.

Table 4-2 of the attached WSA highlights just the groundwater production from 2000-2021. A supply source that is available to JCSD but is not included here is the groundwater storage account to which JCSD has rights to store water in the Chino Basin. The volume held in storage tanks is also not reflected here. As of FY 20/21, the District has approximately 36,458.5 AF held in storage (CBWM, pp. 11.1, 12.1).

Urban Water Shortage Contingency Analysis (Plan)

The urban water shortage contingency analysis (Water Shortage Contingency Plan [WSCP]) prepared with the most recent UWMP is contained within Chapter 8 of JCSD's 2020 UWMP (Appendix A). The WSCP is based on JCSD's Ordinance No. 389 that was adopted on May 26, 2015. The WSCP includes stages of action, prohibitions on end uses, penalties and enforcement measures, determination of water shortage reductions, revenue and expenditure impacts, and catastrophic supply interruption.

The 2020 WSCP is consistent with the stringent emergency conservation regulations mandated by the State Water Resources Control Board in response to statewide drought conditions. The purpose of the WSCP is to minimize the potential for a water shortage through the practice of water conservation, and to minimize the effect of a shortage of water supplies on the customers. In addition, it is the intent of the District to adopt provisions that will significantly reduce the inefficient consumption of water, thereby extending the available water resources necessary for domestic, sanitation, and fire protection of the community to the greatest extent possible.

The 2020 WSCP describe the methods to respond to a water supply shortage of more than 50 percent. Six stages of conservation are described (Stages 1-6) with increasing conservation requirements and penalties depending on the severity of the shortage (UWMP, p. 8-7).

On September 26, 2022, the JCSD Board of Directors approved Ordinance No. 458 to revise existing Ordinance No. 389 in order to update references within its recitals, to eliminate certain redundancies, to clarify certain provisions, and to authorize the District's General Manager to adjust mandatory irrigation schedules as may be necessary in individual circumstances. In addition, Ordinance No. 459 was also approved containing rules and regulations to prevent wasteful water uses related to non-functional turf in accordance with Section 996 of the Water Code. Lastly, a new full-time Community Affairs position of Public Outreach Specialist was approved.

Supply Reduction for Specific Water Use Sector

JCSD's 2020 WSCP and Ordinance No. 389 establish voluntary and mandatory water conservation requirements which shall take effect upon implementation. During a water shortage crisis, certain mandatory restrictions on water use will be imposed on the public. The voluntary water use prohibitions against water waste apply at all times consistent with Article X of the California Constitution. Stage 1 to 6 prohibitions will be progressively implemented according to the severity of the water crisis. The restrictions and prohibitions on end users that correspond to Stages 1 to 6 are outlined in Table 8-

2 of the District's 2020 UWMP (p. 8-13 and 8-14). JCSD does not have a water supply allocation plan and no single water use sector is identified in the 2020 WSCP or Ordinance No. 389 for supply reductions in the event of a water shortage crisis.

Amount of Water That Can Be Reasonably Relied Upon from Specific Supply Project(s)

This requirement of the WV pertains to projected water supplies that the water supplier can reasonably rely on that are not currently available to the public water system. This applies to the following future water supply sources that are not currently available to JCSD but will likely support the Project (refer to WSA Table 3-6 for Capital Project Budgets):

- New JCSD wells: Well 30 at 2,500 gpm. Included in Capital Projects Budget.
- Recycled Water Program in Jurupa Valley: approximately 660 AFY by 2025. Funding has been secured, JCSD has the right to use the treated water, and facilities are currently under design.
- Etiwanda Pipeline: up to approximately 6,000 AFY with water deliveries by 2026. Funding is budgeted, facilities are currently under design, and contracts are under development.

Descriptions of the existing and future water supplies available to JCSD are in Sections 3.1-3.3 of the attached WSA.

1.5 Substantial Evidence of Verification of Sufficient Water Supply

This WV does rely on projected water supplies that are not currently available to JCSD. Therefore, supporting information pursuant to Gov. Code section 66473.7 is provided as noted in the bullet points below, such as written contracts or other proof of valid rights to supplies under development, an adopted capital outlay program to finance delivery of supplies under development, permits to construct supply infrastructure for supplies under development, and regulatory approvals for conveyance or delivery of supplies under development.

- Refer to Section 3.4 of the attached WSA for the capital funding schedule for funding future water supply development.
- Refer to Appendix N of the attached WSA for Press Release of funding secured for the Recycled Water Program.

In addition, copies of the existing rights, contracts, and other entitlements to water supplies available to JCSD are provided in the appendices to the attached WSA.

1.6 Impacts to Agricultural and Industrial Users

Gov. Code section 66473.7 requires this WV to contain a description of reasonably foreseeable impacts of the proposed subdivision on the availability of water resources for agricultural and industrial uses within the water supplier's service area that are not currently receiving water from the water supplier but are utilizing the same sources of water. JCSD does not have an agricultural customer base; therefore, no reasonably foreseeable impacts are expected for that sector. Some industrial facilities in the service area have been known to have private wells onsite that are also pulling from the Chino Basin. The exact number of remaining private industrial wells is unknown. However, reasonably foreseeable impacts to such entities as a result of the Project is not anticipated because the Chino Basin is an adjudicated basin with a court appointed Watermaster who monitors and enforces the provisions of the 1978 Judgment and subsequent orders of the court. As discussed in Section 4 of the attached WSA, the Watermaster develops and implements an Optimum Basin Management Program to sustainably manage the basin for all users.

1.7 Priority to Proposed Lower Income Housing Projects

Pursuant to Gov. Code section 65589.7, the determinations made by the WV shall be consistent with the obligation of a public water system to grant a priority for the provision of available and future water resources or services to proposed housing developments that help meet the City's (or County's) share of the regional housing needs for lower income households. According to Site Inventory Map Grid Area C and Table E-32 of the

City's 2021-2029 Housing Element, a portion of the Project totaling 150 units will help meet the City's share of regional housing needs.

JCSD will not deny nor condition approval of water services or reduce the number of services applied for by a proposed development that includes housing units affordable to low-income households (UWMP, p. 4-15).

1.8 Verification That Relies on Groundwater

Law

Gov. Code Sec. 66473.7 (h)

> *Where a water supply for a proposed subdivision includes groundwater, the public water system serving the proposed subdivision shall evaluate, based on substantial evidence, the extent to which it or the landowner has the right to extract the additional groundwater needed to supply the proposed subdivision. Nothing in this subdivision is intended to modify state law with regard to groundwater rights.*

Section 4 of the attached WSA describes JCSD's legal right to extract groundwater from the Chino Basin.

1.9 Finding of Sufficient Water Supply

As depicted in Table 3-5 of the attached WSA, the District's 2021 water supply and ultimate (2040) total water supply (26,542 AFY in CY 2021 and 42,943 AFY in 2040, respectively) are sufficient to meet the existing and anticipated water demands from its service area including the proposed Project's potable and recycled water demands of 382 AFY and 151 AFY respectively (WSA Table 2-3) as well as potable and recycled water demands of 371 AFY and 167 AFY, respectively with an elementary school included in the Project (WSA Table 2-4). Based on the analysis herein and the attached WSA, JCSD finds that "sufficient water supply" is available to support the projected subdivisions within the Vernola Ranch Specific Plan as it is currently described herein.

References

CBWM	Chino Basin Watermaster. *Approved 2021/2022 Assessment Package for Production Year 2021-2022*. November 18, 2021.
Housing Element	City of Jurupa Valley, *Housing Element 2021-2029 Revised Final Draft Approved by the Jurupa Valley City Council on Dec. 2, 202 (Resolution No. 2021-99) (https://www.jurupavalley.org/DocumentCenter/View/2268/Preliminary-Revised-Jurupa-Valley-HEU-4-20-22-rev-CLEAN) .*
Judgment	Judgment, Chino Basin Municipal Water District v. City of Chino, et al., San Bernardino Ct. No. 164327 (filed Jan. 30, 1978). Includes amendments thereto. (WSA Appendix I)
VRSP	Albert A. Webb Associates. *Draft Vernola Ranch Specific Plan (undated)*, received Nov. 14, 2022.
UWMP	Albert A. Webb Associates. *Jurupa Community Services District 2020 Urban Water Management Plan*. June 28, 2021. (WSA Appendix A)
WSA	Albert A. Webb Associates. *Draft Water Supply Assessment for Vernola Ranch.* Draft October 2022.



ALBERT A. WEBB ASSOCIATES

2020 URBAN WATER MANAGEMENT PLAN

Prepared For

jurupa COMMUNITY SERVICES DISTRICT

Adopted June 28, 2021

www.webbassociates.com

11201 Harrel Street
Jurupa Valley, CA 91752
(951) 685-7434
General Manager: Chris Berch, P.E.

2020 URBAN WATER MANAGEMENT PLAN

ADOPTED JUNE 28, 2021

Prepared by:

3788 McCray Street
Riverside, CA 92506
(951) 686-1070
Principal-in-Charge: Sam I. Gershon, RCE
Project Manager: Autumn DeWoody

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ACRONYMS

AB	(California) Assembly Bill
AMR	Automatic meter reading
AWE	Alliance for Water Efficiency
AWWA	American Water Works Association
BMP	Best Management Practice
CalWEP	California Water Efficiency Partnership
CASGEM	California Statewide Groundwater Elevation Monitoring
CDA	Chino Basin Desalter Authority
CCR	California Code of Regulations
CDP	Census Designated Place
CFD	Community Facilities District
CII	Commercial, Industrial, and Institutional
CIMIS	California Irrigation Management Information System
CUWCC	California Urban Water Conservation Council
CWC	California Water Code
CWSRF	Clean Water State Revolving Fund
DAC	Disadvantaged Community
DDW	Division of Drinking Water
DMM	Demand Management Measure
DRA	Drought Risk Assessment
DWR	Department of Water Resources
DYY	Dry Year Yield
EPA	Environmental Protection Agency
ERP	Emergency Response Plan
GIS	Geographic Information System
HMP	Hazard Mitigation Plan
ICS	Incident Command System
IEBL	Inland Empire Brine Line
IEUA	Inland Empire Utilities Agency
ILI	Infrastructure Leaking Index
ITP	Independent Technical Panel
JCSD	Jurupa Community Services District
JPA	Joint Powers Authority
MCL	Maximum Contaminant Level
MHI	Median Household Income
MOU	Memorandum of Understanding
MWD or Metropolitan	The Metropolitan Water District of Southern California
MZ	Management Zone
N/A	Not Applicable
NPDES	National Pollutant Discharge Elimination System

ACRONYMS

OBMP	Optimum Basin Management Plan
PFAS	Per- and polyfluoroalkyl substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PWS	Public Water System
PWSS	Public Water System Statistics
RCFC	Riverside County Flood Control and Water Conservation District
RCP	Representative concentration pathway
RCSD	Rubidoux Community Services District
RHNA	Regional Housing Needs Assessment
RPU	Riverside Public Utilities
RWQCP	City of Riverside Regional Water Quality Control Plant
SARWC	Santa Ana River Water Company
SAWPA	Santa Ana Watershed Project Authority
SB	(California) Senate Bill
SBCFCD	San Bernardino County Flood Control District
SCAG	Southern California Association of Governments
SWP	State Water Project
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TVMWD	Three Valleys Metropolitan Water District
UCR	University of California, Riverside
UWMP	Urban Water Management Plan
WDR	Waste Discharge Requirement
WEBB	Albert A. Webb Associates
WET	Water Education for Teachers
WMWD or Western	Western Municipal Water District
WRCRWA	Western Riverside County Regional Wastewater Authority
WSCP	Water Shortage Contingency Plan
WUE	Water Use Efficiency

Units of Measurement

AF	Acre Feet
AFY	Acre Feet per Year
°C	Celsius
CY	Calendar Year
EDU	Equivalent Dwelling Unit
ET	Evapotranspiration
°F	Fahrenheit
FY	Fiscal Year

Units of Measurement

GPCD	Gallons per Capita per Day
GPM	Gallons per Minute
HCF	Hundred Cubic Feet
MEU	Meter Equivalent Unit
MGD	Million Gallons per Day
mg/L	Milligrams per Liter (same as parts per million [PPM])
µg/L	Micrograms per liter (same as parts per billion [PPB])

Document Preparation Team

ALBERT A. WEBB ASSOCIATES

Sam I. Gershon, RCE, Senior Vice President
Autumn DeWoody, Senior Environmental Analyst
Eliza Laws, Senior Environmental Analyst
Kris Danielson, PE, Senior Engineer
Nanette Pratini, GISP, GIS Specialist
Chandler Draschlin, EIT, Assistant Engineer
Monica Tobias, Associate Environmental Analyst
Noemi Avila, Assistant Environmental Analyst

JURUPA COMMUNITY SERVICES DISTRICT

Chris Berch, PE, General Manager
Chander Letulle, Director of Engineering & Operations
Steven Popelar, Director of Finance and Administration
Benjamin Armel, Deputy Director of Operations
Bryan Smith, Water Systems Superintendent
Eddie Rhee, PE, Engineering Manager
Keith Backus, Engineering Services Supervisor
April Sturge, Customer Service Manager
Jason Davis, Financial Analyst
Denise Waldie, Operations Assistant
Alison Loukeh, Community Affairs Supervisor
Clover Rogers, Conservation Coordinator
Ahn Nguyen, IT GIS Analyst

CHAPTER 1 INTRODUCTION AND LAY DESCRIPTION

1.1 REGULATORY BACKGROUND

In 1983, the California Legislature enacted the Urban Water Management Planning Act (Act). The Act is codified in California Water Code (CWC or "Water Code") Sections 10610 - 10657. The Act requires an urban water supplier (Supplier) that is providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet (AF) of water annually to adopt an Urban Water Management Plan (UWMP) and update it every five years for the purpose of demonstrating water supply reliability in normal, single dry, and multiple dry years. The Act requires each Supplier to submit their UWMP to the California Department of Water Resources (DWR). DWR staff then reviews the submitted plans to make sure they have satisfied the requirements identified in the Act, including subsequent revisions. DWR will then submit a report to the State Legislature summarizing the status of the UWMPs.

In order for an urban water supplier to be eligible for any water grant or loan administered by DWR, the supplier must have a current UWMP on file that DWR has determined met the current Act requirements. A current UWMP must also be maintained by the supplier throughout the term of any grant or loan administered by DWR. Depending on the conditions that are specified in the funding guidelines, a current UWMP may also be required in order to be eligible for other State funding sources.

With the adoption of the Water Conservation Act of 2009, also known as SB X7-7 (Senate Bill 7 of the Senate's 7th Extraordinary Session), the State is required to reduce urban per person water use by 20 percent by the year 2020. SB X7-7 is codified in CWC sections 10608 – 10608.64. To achieve this goal, each Supplier that prepares an UWMP to also develop an urban water use target to help the state collectively achieve a 20-percent reduction in water use.

Since 2015, the Act has been expanded and revised significantly in response to prolonged drought, groundwater overdraft, regulatory revisions, and changing climatic conditions. Although the exact changes in the Water Code are too numerous to list here, the significant new requirements for the 2020 UWMPs are:

- Water reliability assessment for a drought lasting five consecutive years;
- Drought risk assessment for a five-year period from 2021 to 2025;
- Seismic risk assessment of water system facilities and a mitigation plan;
- Water Shortage Contingency Plan with action items for a drought or catastrophic supply interruption;
- Consistency with Groundwater Sustainability Plans that are currently being prepared in certain groundwater basins; and
- A lay description of the fundamental conclusions of the UWMP, especially regarding water service reliability, challenges ahead, and strategies for managing reliability risks.

DISTRICT MISSION

The mission of JCSD is to provide water, sewer, parks and recreation, graffiti abatement and other essential services to our community.

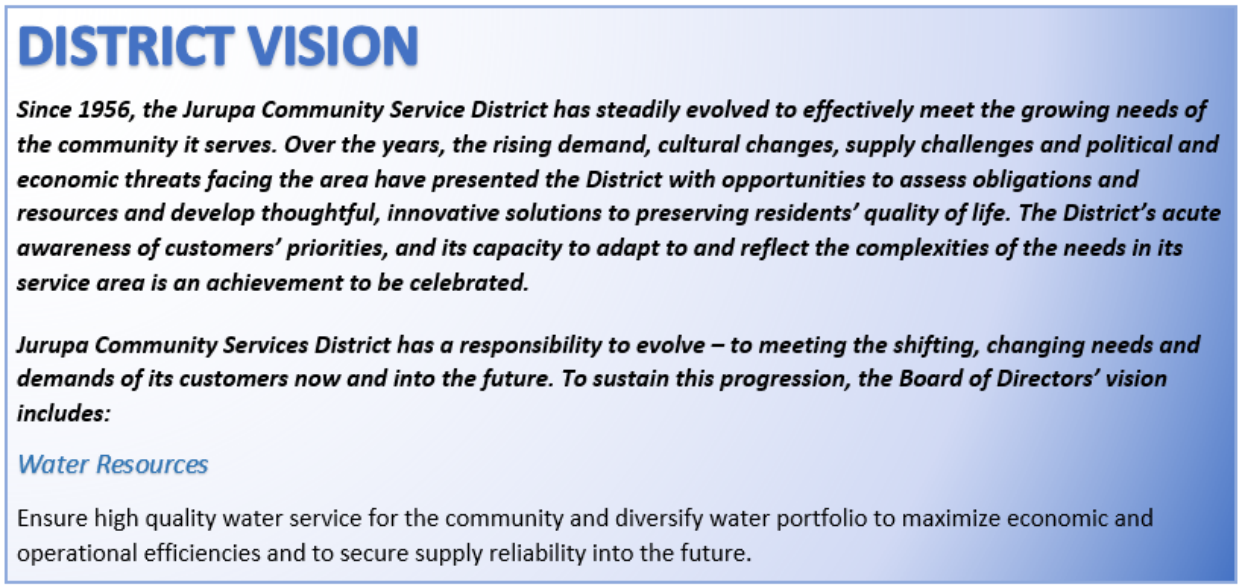
The Jurupa Community Services District (JCSD or "District") is a public retail urban water supplier. It is the stated goal of JCSD to deliver a reliable and high-quality water supply for their customers, even during dry periods. The purpose of the 2020 UWMP is to outline progress toward conservation and supply reliability goals since the District's 2015 UWMP was prepared, as well to outline future long-term opportunities to meet projected water demands while also assessing the impact of long-term drought and climate change. The identification of future opportunities for water supplies in the UWMP neither commits JCSD to any stated endeavor, nor precludes them from exploring a different project that is not identified in the UWMP.

Another purpose of this document is to inform the local wholesale water providers about JCSD's projected population and projected need for water supplies. JCSD is within the service area of the following wholesale water suppliers: Western Municipal Water District (WMWD) and Chino Basin Desalter Authority (CDA).

This document also intends to communicate forecasted growth to the wastewater treatment agencies that provide wastewater treatment services for the District. This includes the City of Riverside at the Regional Water Quality Control Plant (RWQCP), Western Riverside County

Regional Wastewater Authority (WRCRWA) treatment plant, and Santa Ana Watershed Project Authority (SAWPA) for the Inland Empire Brine Line (IEBL).

Albert A. Webb Associates (WEBB) is the District Engineer for JCSD and has prepared this document on their behalf under their advisement and approval. The JCSD Board of Directors held a public hearing on June 28, 2021 to hear public comment on the UWMP and its Water Shortage Contingency Plan. The UWMP and Water Shortage Contingency Plan were adopted by the Board of Directors on June 28, 2021 as recorded in JCSD Resolution Nos. 3133 and 3134 which are provided in **Appendix A**.



From JCSD Strategic Plan, June 2018.

1.2 LAY DESCRIPTION OF 2020 UWMP FINDINGS

JCSD's 2020 Urban Water Management Plan (UWMP) has been prepared in compliance with the California Water Code. This simple description of the report's findings satisfies the requirement in Water Code Section 10630.5 to include a simple lay description of water service reliability and the reasonably foreseeable challenges and corresponding solutions anticipated for the next 20-years.

Jurupa Community Services District (JCSD or District) was founded in 1956 and its service area currently covers 40.8 square miles. Water supplies come entirely from local groundwater. JCSD has always been able to provide its customers with the water they need and fully expects that it will continue to do so for the foreseeable future based on the analysis herein.

Since the adoption of the 2015 Urban Water Management Plan, JCSD has been successful in meeting the goals and intent of the Urban Water Management Planning Act of 1983 and the Water Conservation Act of 2009. The District has accomplished the following items which are discussed further in this document:

- Prepared updates to the JCSD Strategic Plan, Hazard Mitigation Plan, Emergency Response Plan, Water Master Plan, and Wastewater Master Plan.
- Prepared a Water and Wastewater Rate Study, Geohydrologic Analysis of Future Groundwater Production, Water Quality Evaluation Study, and four annual validated water loss audits.
- Participated in the Drought Task Force Workshops conducted by Western Municipal Water District.
- Supplied as of calendar year (CY) 2020 a total of 29,272 acre-feet (AF) of water including 28,505 AF of potable (drinking) water to 33,146 service connections and 767 AF of non-potable water to 30 service connections used for irrigation purposes.
- Initiated several projects to bring new water supplies to the District and conducted many construction projects to repair and improve the existing distribution system.

- Met the 2020 water use target pursuant to the Water Conservation Act of 2009 (or, SB X7-7).

- Coordinated with each city in its service area, Eastvale and Jurupa Valley, to discuss land use matters that may be pertinent to this document.

- Tested the accuracy of approximately 100 customer meters each year and repaired 339 service connection leaks and six main pipeline leaks.

- Installed "flume" devices on more than 500 customer meters in 2018 to provide real-time water use data through a smart phone app, which has reduced water use and identified potential leaks.

- Removed 442,858 square feet of turf between 2016 and 2020 through the turf replacement program. This equates to approximately 17,714,320 gallons of water saved annually.

- Provided rebates to 1,516 residential customers and 25 non-residential customers for installing high efficiency devices. Rebates for customers to offset the cost of drip irrigation continue to be available.

- Monitored high water use customers in the commercial, industrial, and institutional sectors, then contacted each company to review findings and provide conservation advice. Beginning in 2020, staff began providing customized landscaping information to high water-using non-residential customers.

- Participated in approximately 18 public outreach and educational events each year, except for 2020 when in-person activities were postponed due to the COVID-19 pandemic. However, during 2020 JCSD was able to host virtual classes and post videos on the District's YouTube channel, social media, and Web site to continue educating the importance of water conservation and benefits of drought-tolerant landscaping.

- Responded to an annual average of 340 reports of water waste with the "E-Citizen" smart phone application (app) beginning in 2016.

- Participated in the California Water Efficiency Partnership and the nationwide Alliance for Water Efficiency.

Water Supplies

The District's current water supply comes almost entirely from the Chino Groundwater Basin, which is 230 square miles and lies under the greater Chino Valley including the JCSD service area. A very small amount of non-potable irrigation water is pumped from District wells in an adjacent groundwater basin called the Riverside South Basin. The Chino Basin is one of the largest groundwater basins in Southern California and has an estimated 12 million acre-feet of water in storage. The Chino Basin has always been a reliable supply of water to the District and unresponsive to short and long-term drought periods. Rights to the groundwater were established by the California Superior Court in 1975 when individual allocations were set for each individual, company, or water district and a safe yield (basically, a limit) was established in order for the groundwater to continue meeting pumping needs but in a controlled way to avoid undesirable results. In a water shortage situation, the District can access its groundwater held in storage in the Chino Basin and/or pump up to and exceeding, if necessary, the District's allocated share of the safe yield. The District can also access emergency supplies via connections with neighboring water suppliers.

Over the past couple of years, the discovery of a new family of contaminants (PFAS) that is measured in concentrations of parts-per-trillion and turning up in the water at concentrations higher than the current notification level, along with elevated levels of total dissolved solids (TDS) and nitrate has made 40 percent of the District's pumping capacity unavailable until treatment systems are installed over the next couple of years. Nonetheless, the drinking water provided by JCSD continues to meet all drinking water standards set by the U.S. Environmental Protection Agency and California Drinking Water Health Standards, and the remaining wells and purchased water supplies have been able to make up the temporary pumping shortfall. The District is pursuing several projects to drill new wells and install additional treatment systems to bring wells back online. In addition, the District is securing funding to distribute recycled water for the first time to irrigate several parks, school yards, and road medians in Eastvale and southwestern Jurupa Valley. Using recycled water in this way will decrease the use of potable water for irrigation purposes. The District is also pursuing two

projects to make imported water available for use through the year 2045 and beyond. Imported water supplies are assumed for planning purposes to be reliable regardless of drought conditions based on the determination made by the supplying agency (The Metropolitan Water District of Southern California) in their current draft of the 2020 UWMP Drought Risk Assessment, (November 2020).

Customer Demands

The District serves many different types of customers such as industrial, commercial, and landscape irrigation but the majority has consistently been residential. The District also provides water to the City of Norco, Swan Lake Mobile Home Park, and Santa Ana River Water Company. According to DWR's Population Tool developed specifically for UWMPs, the District service area population is 130,546 persons for CY 2020. According to the JCSD *2020 Water Master Plan*, the District's population is predicted to increase to approximately 171,300 persons by 2040 when the District's service area will be "built-out" at a medium (mid-range) residential density (WEBB(a), p. ES-1). Because the population of the District is expected to continue increasing for about the next 20 years as vacant properties are developed and underdeveloped properties are redeveloped, water demands are also expected to increase. The *2020 Water Master Plan* estimates ultimate water demand at buildout will be 36,495 AF per year. The District can monitor water use to identify and help customers that may have a leak, or meter malfunction, or using a significant amount of water that could be reduced with assistance. JCSD customers demonstrated significant water conservation when asked during the statewide drought emergency of 2013-2017. The District has a menu of actions with increasing severity to encourage customers to reduce water use when needed in the event of a water shortage or catastrophic event. These actions can be triggered during a supply shortfall (i.e., when demand exceeds supply) and responded to according to the Water Shortage Contingency Plan located in Chapter 8.

The rate of increasing demand for water and the degree of change from current conditions is contingent on variables like water efficiency standards and the potential effects of climate change. Rainfall measurements taken near the District from the past 57 years show a decreasing trend and similarly, temperature measurements and evapotranspiration rates from the past 20 years show an increasing trend (Chapter 3). According to many widely accepted

models, climate change may cause outdoor water usage to increase gradually over the next 20 years to make up for generally less rainfall and higher temperatures. Based on best information available to date, this report attempts to estimate what those changes may look like in "normal" or average rainfall years, single-dry years (i.e., one year of drought), and five-consecutive drought years over the next 20 years, as well as a five-year drought hypothetically starting in 2021 (the "Drought Risk Assessment" in Chapter 7).

Fundamental Determinations

The groundwater supplies that are currently available to the District are projected to remain a reliable source of water to meet the demands of customers regardless of foreseeable potential constraints. Additional water supplies will be brought online to meet the projected demands of future residents through buildout of the service area. The projections of reliability considered recorded groundwater elevations, the potential effects of climate change, impacted water quality, water shortage, the effectiveness of water conservation and emergency water supplies, and the effects of five-consecutive-year drought periods. The District is continually monitoring customer use and improving the water distribution system to address infrastructure and water quality constraints. The District will continue to evaluate preparedness to respond to the effects of long-term drought and lessen the impacts of catastrophic events to the distribution system and supply sources.

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CHAPTER 2 PLAN PREPARATION

2.1 PLAN PREPARATION

This chapter provides information on the report organization, basic metrics used throughout the entire UWMP, and coordination and outreach conducted by the District.

Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier. This Plan follows the report organization outlined in the State UWMP Guidebook (Final March 2021). DWR has provided tables that are required to be completed by the District as part of the UWMP. Because JCSD is an urban retail water supplier and not a "wholesale" water supplier, the tables and information provided in the UWMP follow the requirements for "retail" water suppliers. The required UWMP tables provided by DWR are in shades of blue and titled "Submittal Table 2-1," for example. The additional tables created during the writing of this report that are not required for DWR are numbered using the chapter number in alphabetical order such as "Table 2A," for example. A checklist to ensure compliance of this Plan with the UWMP Act requirements is provided in **Appendix B**.

During calendar year 2020 (CY 2020), JCSD supplied 28,505 acre-feet (AF) of potable water to 33,146 potable meters and 767 AF of non-potable water to 30 non-potable meters, as shown in **Submittal Table 2-1.**[1] JCSD has just one public water system (PWS). Each PWS is assigned a number and they are regulated by the State Water Resources Control Board (SWRCB or State Water Board), Division of Drinking Water.

[1] One acre-foot (AF) equals 43,560 cubic feet or 325,851.43 gallons.

Submittal Table 2-1 Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020 *
Add additional rows as needed			
CA3310021	Jurupa Community Services District	33,146	28,505
	TOTAL	33,146	28,505
**** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: CY 2020, volume in ACRE-FEET (AF). Potable water only, includes fire service and hydrant meters. JCSD supplied 767 AF of non-potable irrigation water to 30 meters.			

DWR suggests water suppliers engage in *regional* planning to reduce inefficiencies when many agencies are sharing the same water supply source. Although the Water Code provides mechanisms for participating in regional urban water management planning, JCSD has chosen "Individual Reporting" for its UWMP, as identified in **Submittal Table 2-2**.

Submittal Table 2-2: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable* (select from drop down list)
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

Water suppliers must report their water data in the same units consistently throughout the UWMP. The Water Code requires that the water use and planning data for the entire year of 2020 is used, and because JCSD reports on a CY basis, data included in this UWMP is through December 31, 2020. **Submittal Table 2-3** confirms that JCSD is a retailer with the

data provided herein on a CY basis unless otherwise noted, and all units of measure in this UWMP are in acre-feet.

Submittal Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
☐	Supplier is a wholesaler
☑	Supplier is a retailer
Fiscal or Calendar Year (select one)	
☑	UWMP Tables are in calendar years
☐	UWMP Tables are in fiscal years
Units of measure used in UWMP * (select from drop down)	
Unit	AF
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES:	

2.2 PLAN COORDINATION

Retail water suppliers that receive a water supply from one or more wholesale water suppliers are required to provide their wholesaler(s) with projected water demand information. In CY 2020, JCSD received water supplies from the following wholesale agencies: Chino Basin Desalter Authority (CDA) and Western Municipal Water District (via CDA) as listed in **Submittal Table 2-4**. The potential for future partnerships with wholesalers is discussed in Chapter 6.

Submittal Table 2-4 Retail: Water Supplier Information Exchange
The retail Supplier has informed the following wholesale supplier(s) of projected water use in accordance with Water Code Section 10631.
Wholesale Water Supplier Name
Add additional rows as needed
Western Municipal Water District
Chino Basin Desalter Authority
NOTES:

JCSD received a request from Western Municipal Water District on March 23, 2021 for the District's projected imported water needs, local supplies, and total District water demand. This information was provided to Western on May 11, 2021. JCSD subsequently received information from Western Municipal Water District on their water supply projections on May 18, 2021.

JCSD provided CDA copies of Submittal Table 4-2: Use for Potable and Non-Potable Water-Projected and Submittal Table 6-9: Water Supplies-Projected from the public draft UWMP on June 7, 2021. Copies of coordination efforts are provided in **Appendix C.**

The Water Code also requires Suppliers to coordinate the preparation of the UWMP with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable (CWC section 10620(d)(3)). Further, the Water Code requires notices to be sent at least 60 days prior to the public hearing to any city or county within the District's service area (CWC section 10621(b)). There are two cities within the District service area: City of Eastvale and City of Jurupa Valley. JCSD notified and solicited input from the following agencies for preparation of this Plan:

- Chino Basin Desalter Authority;
- Chino Basin Watermaster;
- City of Eastvale (*required*);
- City of Jurupa Valley (*required*);
- City of Norco;
- City of Ontario;
- City of Riverside Public Utilities Department;
- Corona-Norco Unified School District;
- County of Riverside (*required*);
- Cucamonga Valley Water District;
- Inland Empire Utilities Agency;
- Jurupa Unified School District;
- Rubidoux Community Services District;
- Santa Ana River Water Company; and
- Western Municipal Water District.

JCSD sent a notice to the entities listed above on March 4, 2021 notifying them that the District was reviewing and considering updates to the UWMP and Water Shortage Contingency Plan (located in Chapter 8). A second notice to confirm the details of the public hearing was sent to the same agencies on May 13, 2021.

JCSD also posted a public announcement informing customers the UWMP update was underway in the District's Spring 2021 "JCSD Community News" newsletter, which is posted on the District's Web site and mailed to each customer. Lastly, the public draft UWMP including the Water Shortage Contingency Plan was posted to the District Web site and provided in hard copy at the JCSD headquarters beginning June 1, 2021 Chapter 10 includes detailed information on notifications and Plan adoption proceedings. Copies of all notices are provided in **Appendix D.** .

2.2.1 Land Use Agency Coordination

As described in further detail in Chapter 3, JCSD and WEBB met with Planning Department staff from the City of Eastvale on February 11, 2020 and the City of Jurupa Valley on March 2, 2021 pursuant to CWC Section 10631(a). Copies of the meeting request letters are located in Appendix C. These meetings were held for the specific purpose of coordinating on the most appropriate land use data to use for the 2020 UWMP. Further, current information was provided by City staff on demographics, land use plan updates, and accessory dwelling unit applications.

The City of Jurupa Valley submitted a comment letter about the UWMP to JCSD dated June 7, 2021; a copy of which is located in Appendix C and addressed in Chapter 3.5.3 (Vernola Ranch).

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CHAPTER 3 SYSTEM DESCRIPTION

3.1 GENERAL DESCRIPTION

JCSD was formed in 1956 for the purpose of providing a sewer system to the community of Jurupa. Water service with JCSD began in 1966 with the consolidation of three mutual water companies: Jurupa Heights Water Company, La Bonita Mutual Water Company, and the Monte Rue Acres Mutual Water Company. Through the years, JCSD's area expanded along with their services, which include the following:

- Treatment, production, and distribution of safe and reliable water;
- Collecting, transporting, and treating residential, commercial, and industrial wastewater;
- Removing graffiti from public areas;
- Administering the street lighting maintenance program;
- Providing parks and recreation programs in the parks service area of the City of Eastvale; and
- Maintaining landscaping in public areas.

JCSD is a public agency with an elected five-person Board of Directors overseeing the five divisions of the service area. The Board of Directors is the legislative governing body for JCSD and is responsible for developing and implementing laws that govern the services provided within the jurisdiction of its community services. Each of the five Board Members is elected to four-year terms by registered voters who reside within the JCSD service territory. The Board of Directors conducts public meetings on the 2nd and 4th Monday of each month. The Board President appoints each member to serve on Board Committees.

3.2 SERVICE AREA BOUNDARY

The JCSD service area covers 40.8 square miles of northwest Riverside County and includes all of the City of Eastvale, approximately 65 percent of the City of Jurupa Valley, and small portions of the City of Norco and unincorporated Riverside County. The District service area and surrounding cities are shown in **Figure 3-1 – JCSD Service Area** (figures are located at the end of the chapter). The District's service area is demarcated along the northern and western boundaries by the Riverside/San Bernardino County line, beyond which lie parts of the Cities of Chino, Ontario, and Fontana. JCSD is bounded to the east by Rubidoux Community

Services District (RCSD) which is within the City of Jurupa Valley. To the south, JCSD is bounded partially by the City of Norco, the Santa Ana River Water Company, the Santa Ana River, and City of Riverside. The District provides water service to the Jurupa Valley communities of Glen Avon, Jurupa Hills, Indian Hills, Mira Loma, Pedley, and Sunnyslope. The neighboring water suppliers are shown in **Figure 3-2 – Surrounding Water Suppliers.** The portion of Jurupa Valley that is outside of the District boundary is supplied potable water by RCSD and the Santa Ana River Water Company, a mutual water company. Approximately 0.20-acre of the 40.8-acre JCSD service area consists of the Swan Lake Mobile Home Park, which is a master contract water customer that is not within the JCSD service area.

Approximately 110 acres of land designated for parks within the City of Norco is within the District's boundary. There are also approximately 30 acres of land designated for open space in an unincorporated area of Riverside County that is also within the JCSD service area (Figure 3-1). Because the District is not providing water service to these areas, these areas have been excluded from the planning assumptions and water projections of this UWMP.

3.2.1 Annexations

Changes to the JCSD service area since the 2015 UWMP include the following adjustments, which resulted in a net decrease of approximately eight vacant acres to the water service area:

- Tract 31894 in Jurupa Valley
    - Annexation No. 2018-5-2 to JCSD of ±1.21 vacant acres near intersection of Rubidoux Blvd. and Market Street.
    - Detachment No. 2018-5-2 from JCSD of ±1.44 vacant acres along Sierra Avenue.
- Tract 37470 in Jurupa Valley
    - Detachment No. 2018-5-2 from JCSD of ±8 vacant acres southwest corner of 30th Street and Sierra Avenue.

Potential future annexations to JCSD's service area include:

- Paradise Knolls: 30 acres (of the total 113 acres) of residential development, with a small area for commercial development, located along Limonite Avenue between Van Buren Boulevard and Etiwanda Avenue.

3.2.2 Potable Water System Pressure Zones

JCSD's water supply distribution system is made up of seven pressure zones (PZs), as shown in **Figure 3-3 – Water System Pressure Zones**. As shown in Figure 3-3, not all of the District is within a water pressure zone, primarily because of the natural topography of the Jurupa Mountains. As shown in **Table 3A**, the area of the District that is currently within a PZ is 21,476 acres, with the 870 PZ being the largest in size. Eight booster stations pump water into the various zones. The District also has 16 water storage tanks with a total capacity of 58 million gallons, and approximately 460 miles of water transmission and distribution pipelines.

Table 3A Potable Water System Pressure Zone Summary

Pressure Zone	Pressure Zone Area (acres)	Percent of Total
870	12,218	57%
900	220	1%
980	1,946	9%
1100	2,727	13%
1110	3,200	15%
1200	690	3%
1350	475	2%
Total	**21,476**	**100%**

JCSD has 18 active groundwater wells; 9 of which are potable wells and 9 are raw water wells. JCSD operates two ion-exchange plants to treat the raw water wells: Roger D. Teagarden Ion Exchange Facility (Teagarden) and the Well 17/18 Ion Exchange Facility.

Detailed information on the District's water distribution facilities is available in the *2020 JCSD Water Master Plan* (WEBB(a)), which is located on the JCSD Web site, www.jcsd.us.

3.2.3 Non-Potable Water System

JCSD currently maintains seven non-potable wells and short segments of non-potable water main lines that are used for irrigation at parks and two high schools within its service area. The parks served by these non-potable wells are all maintained by JCSD. The following are the District's active non-potable wells:

- Well 21 (with Well 5 as its back-up) for Oak Quarry Golf Club and Nueva Vista High School;
- "High School" Well for Jurupa Valley High School and Big League Dreams Sports Park;
- Well 42 for Limonite Meadows Park and street frontage;
- Well 41 for Providence Ranch Park and street frontage; and
- Well 40 for McCune Family Park, Clara Barton Elementary, and street frontage.

JCSD also obtains non-potable water from the CDA's Chino II-1 Well to irrigate Orchard Park in Eastvale. Pursuant to an agreement, the District and CDA share the well such that JCSD can irrigate Orchard Park and the remainder goes to CDA's treatment facilities.

A short segment of non-potable water main line was installed by the District within the Van Buren Blvd. Bridge crossing of the Santa Ana River. The District installed this segment for a future potential connection with the City of Riverside Regional Water Reclamation Plant to distribute recycled water. This segment could be used instead for potable water. This segment is unconnected and unused at this time.

In 2012, the District installed the "Area B Non-Potable System" with the intention of supplying non-potable water to the area around it; however, the pipelines are currently used to distribute potable water because non-potable was unavailable. The Area B Non-Potable System is located generally along Bellegrave Ave. between Etiwanda Ave. and Hamner Ave., along Pats Ranch Rd. between Bellegrave Ave. and Limonite Ave., and along Goodman Ave. between Bellegrave Ave. and Ontario Ranch Rd. (Cantu-Galleano Ranch Rd.) At such time when non-potable water supplies can reach the Area B Non-Potable System, then the lines will be converted from potable to the original purpose of non-potable water distribution.

3.3 SERVICE AREA CLIMATE

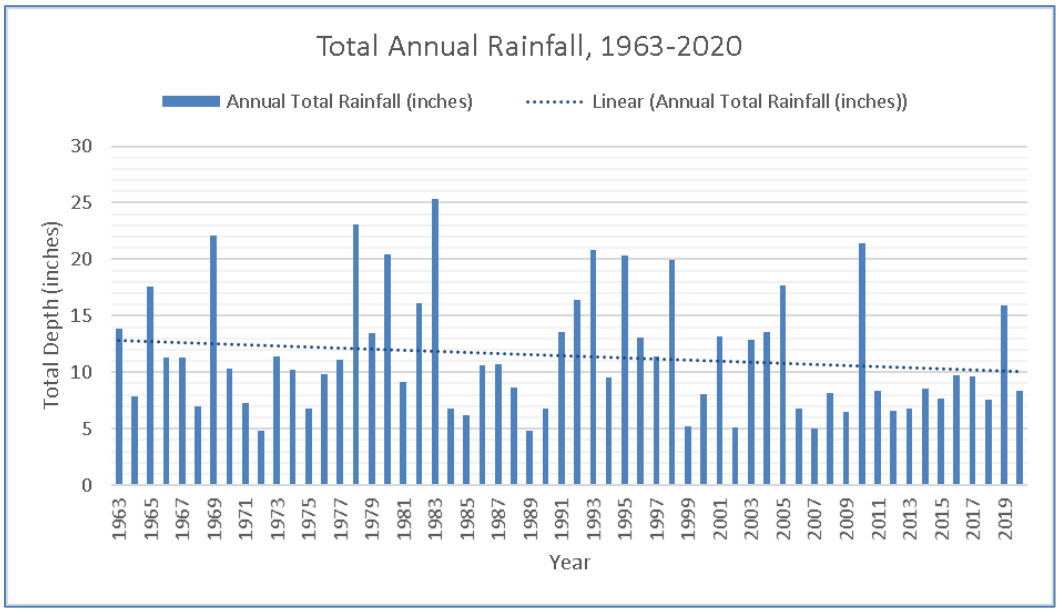
The District contains a variety of topographic features with elevations ranging from 560 feet to 2,230 feet above mean sea level (amsl). Within the District's service area are the Jurupa Mountains in the northern portion of the District and the Pedley Hills, which are located in the eastern portion of the District. The balance of the JCSD service area consists of an alluvial plain, which slopes southwesterly to the Santa Ana River. More than 80 percent of the District

is comprised of land with a natural slope of less than 12 percent; the remainder is divided between the categories of 12-25 percent and above 25 percent. (WEBB(a), p. ES-1)

3.3.1 Rainfall

Rain in the District occurs between fall and spring, primarily in the winter months. Total annual rainfall depths recorded at the Riverside Station No. 178 from 1963 to 2020 (57 years) are shown in **Chart 3-1**. This station is operated by and located at the Riverside County Flood Control and Water Conservation District offices at 1995 Market Street in the City of Riverside, which is located approximately 10 miles east of JCSD headquarters.

Chart 3-1: Total Annual Rainfall 1963-2020 (inches) at Riverside Stn. 178 (Source: RCFC(a))

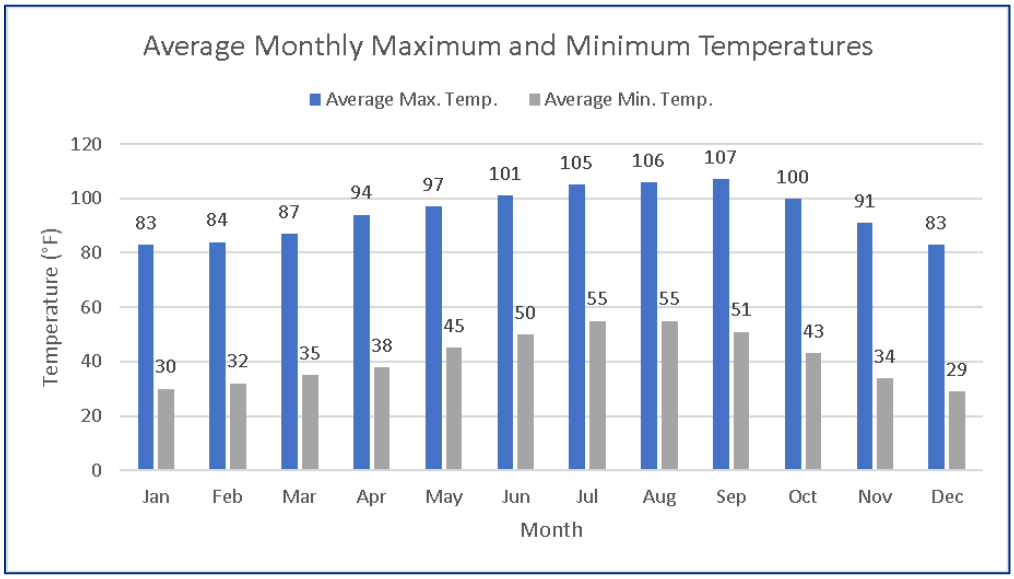


The average annual depth over this 58-year period is 11.4 inches per year. The maximum recorded rainfall was 25.3 inches in 1983 and the lowest was 4.8 inches in 1972. The linear trendline shows a decrease in total annual rainfall depth over the time period.

3.3.2 Temperature

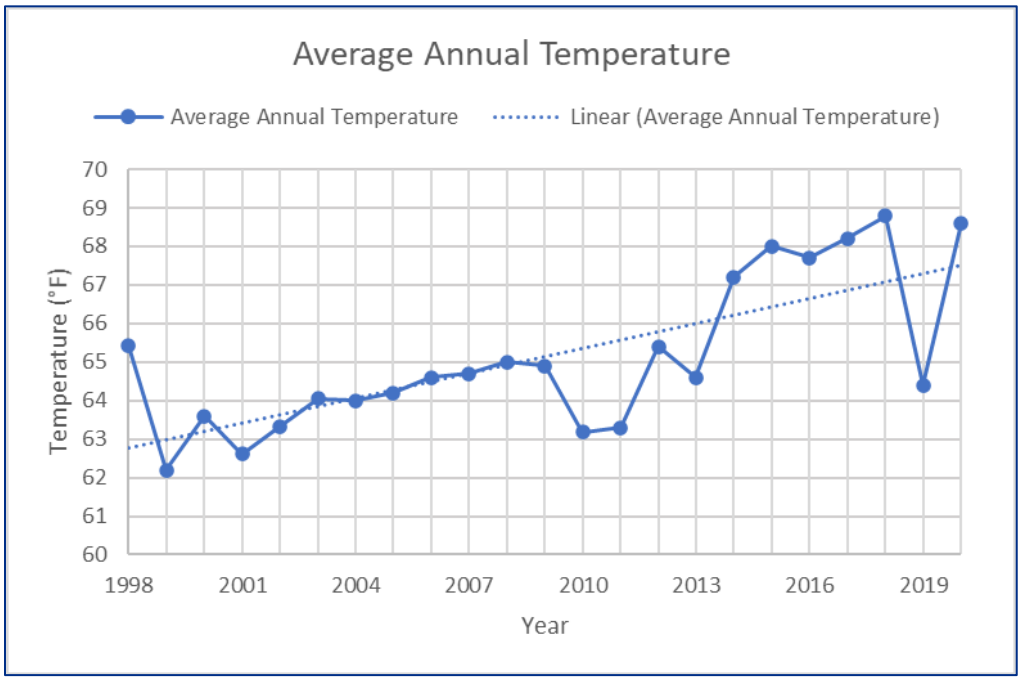
Temperatures in the District are typically mild, with cool winters and hot summers. Maximum temperatures in the District typically occur in summer, consistently exceeding 100ºF on average, as shown in **Chart 3-2** based on monthly data from 1998-2020 recorded at the Chino Airport, located just west of the City of Eastvale.

Chart 3-2: Monthly Average Maximum And Minimum Temperatures from 1998-2020 at Chino Airport Station (Source: AgACIS).



The average annual temperatures from 1998 to 2020 are shown in **Chart 3-3**. The linear trendline suggests a general increase in average temperatures over the time period.

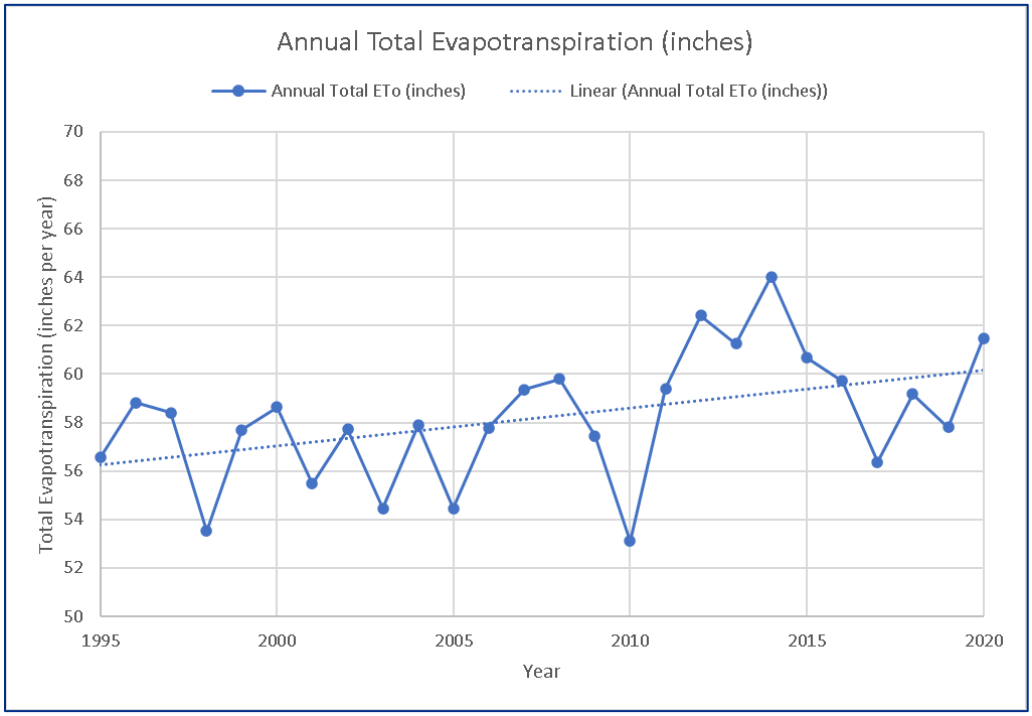
Chart 3-3: Average Annual Temperature (°F) 1998-2020 at Chino Airport Station (Source: AgACIS)



3.3.3 Evapotranspiration

Evapotranspiration (ET) is the combination of two separate processes: water lost from the soil surface by evaporation and lost from plants by transpiration. The evaporation power of the atmosphere is expressed by the reference crop evapotranspiration (ET_o) in units of depth of water over time (e.g., inches/day). Higher ET_o rates result in more water needed for irrigation to maintain soil moisture. Total annual ET_o values from1995 to 2020 measured in proximity to the JCSD service area are shown in **Chart 3-4**.

Chart 3-3 Total Annual Evapotranspiration (inches) in JCSD service area, 1995-2020 (Source: Valley Soil)



The annual average ET_o rate for this time period is 58.2 inches per year. The highest total annual ET_o was measured in 2014 at 64 inches and the lowest total ET_o was in 2010 at 53.1 inches. The linear trendline suggests an increase over the time period.

3.3.4 Summary of Potential Climate Changes

Several sections of the Water Code have been revised since the 2015 UWMP cycle to require that water suppliers account for the impacts of climate change on water supplies and supply reliability in their 2020 UWMPs. Although the Water Code does not specify the technical nor general methods for how to consider climate change in UWMPs, DWR provides guidance on

common approaches that can be used. Detailed discussions of the potential effects of climate change on District water demands, water supplies, and water reliability are provided herein Chapter 4 – Water Use Characterization, Chapter 6 – Water Supply Characterization, and Chapter 7 – Water Service Reliability Assessment. The following is a summary of the anticipated climate changes or scenarios that are discussed in the proceeding chapters.

This discussion is guided by the "Urban Water Management Plan Guidebook 2020" and relies, in part, on the tools and resources available on the Cal-Adapt Website (https://cal-adapt.org/), which synthesizes volumes of downscaled climate change projections and climate impact research from California's scientific community. The default visualizations in the Cal-Adapt projections shown herein are based on the average values from a variety of models and are projections of future climate. They are not weather predictions and should not be treated as such.[1]

Climate projections cannot tell us what will happen on a given date in the future. But they can tell us what to expect from our future climate in general and how much more often (or less often) extreme events such as heat waves and heavy rainfall are likely to occur in the future. However, they cannot predict when those events will actually occur.

The climate models presented here make predictions for the period of 2006 to 2100 and recreate the historical climate for the period 1950 to 2005. Two future climate projections using medium and high greenhouse gas and aerosol emissions scenarios are presented here. These scenarios are known as Representative Concentration Pathways (RCP). Each RCP represents a standardized set of assumptions of humanity's trajectory in the coming years.

The Medium Emissions Scenario (RCP 4.5) represents a mitigation scenario where global carbon dioxide (CO_2) emissions peak by 2040 and then decline. Statewide, temperature is projected to increase 2-4 Celsius (°C) for this scenario by the end of this century.

[1] Weather is the behavior of the atmosphere over short periods, such as days and weeks. Climate is the long-term behavior of the atmosphere, and it is almost always expressed in averages—for example, average annual temperature, average monthly rainfall, or average water equivalent of mountain snowpack at a given time of year. In other words, climate is the statistics of weather.

The High Emissions Scenario (RCP 8.5) represents a scenario where CO_2 emissions continue to rise throughout the 21st century. Statewide, temperature is projected to 4-7 °C by the end of this century. Cal-Adapt does not provide projections for a low emissions scenario.

Cal-Adapt's "Local Climate Change Snapshot" tool provides the following climate projections for temperature, precipitation, and wildfire for the District's service area. The City of Jurupa Valley was selected as the representative location of the District's service area.

Western Municipal Water District (WMWD or Western) conducted an analysis of climate change data as part of Western's 2020 UWMP and provided the results of which to its member agencies, including JCSD on April 22, 2021 (WMWD(a), located in **Appendix E**). The source data were climate models gathered by DWR for water resources planning. Because Western's analysis does not provide a summary of anticipated climate changes for the service area, the following projections of temperature and precipitation trends from Cal-Adapt for the Jurupa Valley are included herein for reference. Said trends from Cal-Adapt of increasing temperatures and decreasing rainfall do not conflict with Western's analysis.

Cal-Adapt Temperature Projections

Overall temperatures are projected to rise in California during the 21st century. While the entire state will experience temperature increases, the local impacts will vary greatly.

Four separate climate indicators are reported by Cal-Adapt for temperature changes: 1) Annual Average Maximum Temperature, 2) Annual Average Minimum Temperature, 3) Extreme Heat Days, and 4) Warm Nights.

Annual Average Maximum Temperature reports the average of all the hottest daily temperatures in a year, shown on **Chart 3-5**, is the most likely outcome and range of future projections of Annual Average Maximum Temperature.

Chart 3-4 – Cal-Adapt Projections for Annual Average Maximum Temperature (°F) (Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley)

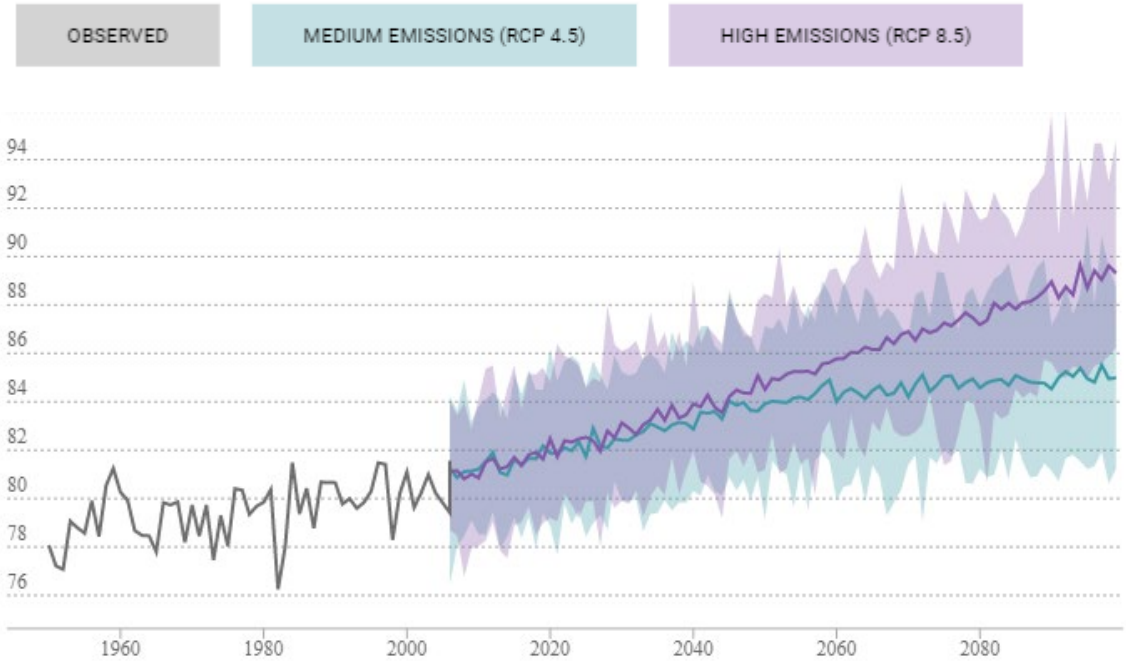


Table 3B below provides a summary of Cal-Adapt's projections for Annual Average Maximum Temperature for baseline (1961-1990) and mid-century (2035-2064) time periods.

Table 3B Cal-Adapt Projections for Annual Average Maximum Temperature

Time Period	Change from Baseline	30-year Average	30-year Range
Baseline (1961-1990)	--	79.3 °F	78.9 - 79.7 °F
Mid-century (2035-2064)			
RCP 4.5	+4.5 °F	83.8 °F	81.6 - 86.3 °F
RCP 8.5	+5.4 °F	84.7 °F	82.1 - 87.0 °F

Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley.
RCP: representative concentration pathway; 4.5: medium emissions scenario; 8.5: high emissions scenario.

Annual Average Minimum Temperature reports the average of all the coldest daily temperatures in a year, shown on **Chart 3-6**, is the most likely outcome and range of future projections of Annual Average Minimum Temperature in the Jurupa Valley area.

Chart 3-5 – Cal-Adapt Projections for Annual Average Minimum Temperature (°F) (Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley)

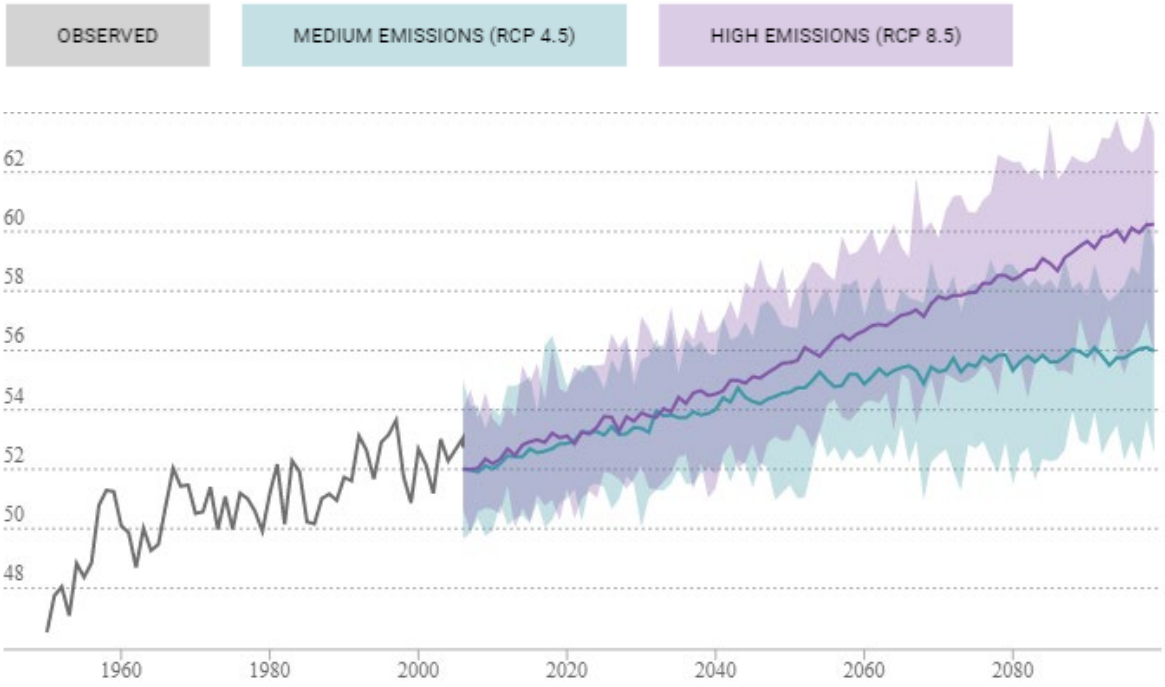


Table 3C below provides a summary of Cal-Adapt's projections for Annual Average Minimum Temperature for baseline (1961-1990) and mid-century (2035-2064) time periods.

Table 3C Cal-Adapt Projections for Annual Average Minimum Temperature

Time Period	Change from Baseline	30-year Average	30-year Range
Baseline (1961-1990)	--	50.7 °F	50.4 – 50.9 °F
Mid-century (2035-2064)			
RCP 4.5	+3.9 °F	54.6 °F	52.9 – 56.0 °F
RCP 8.5	+4.9 °F	55.6 °F	53.9 – 57.2 °F

Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley
RCP: representative concentration pathway; 4.5: medium emissions scenario; 8.5: high emissions scenario.

Extreme Heat Days reports the number of days in a year when daily maximum temperature is above a threshold temperature of 104.1 °F [2], shown on **Chart 3-7**, is the most likely outcome and range of future projections of Extreme Heat Days.

Chart 3-6 – Cal-Adapt Projections for Number of Extreme Heat Days (Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley)

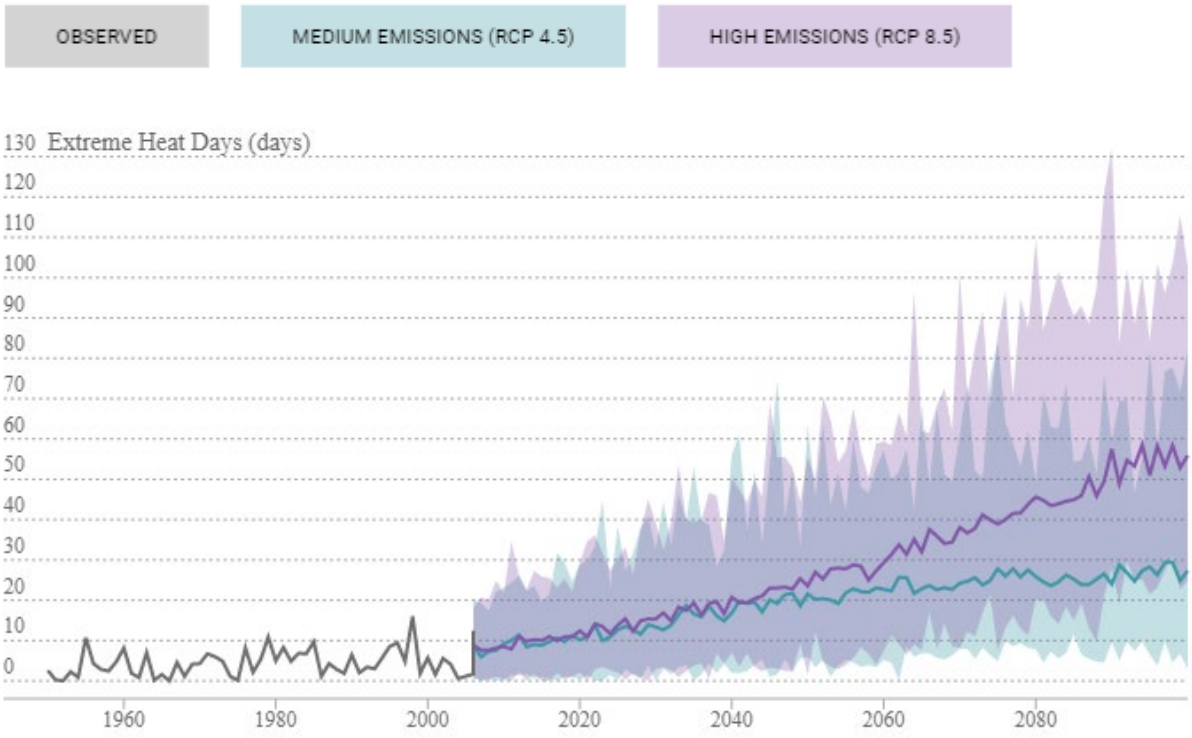


Table 3D below provides a summary of Cal-Adapt's projections for Extreme Heat Days for baseline (1961-1990) and mid-century (2035-2064) time periods.

[2] Note the threshold temperature used in Cal-Adapt is location specific. It is defined as the 98th percentile value recorded daily maximum/minimum temperatures (from 1961–1990, between April and October) observed at a location.

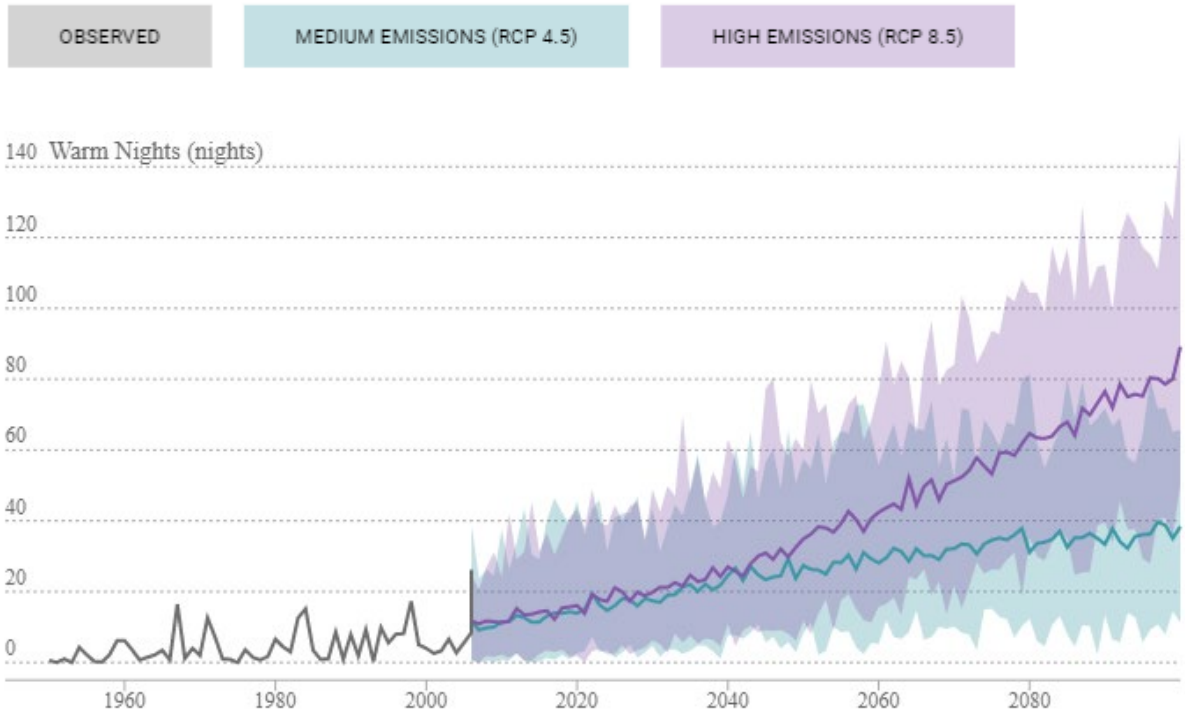
Table 3D Cal-Adapt Projections for Number of Extreme Heat Days

Time Period	Change from Baseline	30-year Average	30-year Range
Baseline (1961-1990)	--	4 days	2 – 5 days
Mid-century (2035-2064)			
RCP 4.5	+16 days	20 days	13 – 45 days
RCP 8.5	+21 days	25 days	14 – 60 days

Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley
RCP: representative concentration pathway; 4.5: medium emissions scenario; 8.5: high emissions scenario.

Warm Nights reports the number of days in a year when daily minimum temperature is above a threshold temperature of 68.7 °F [3], shown on **Chart 3-8**, is the most likely outcome and range of future projections of Warm Nights.

Chart 3-7 – Cal-Adapt Projections for Number of Warm Nights (Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley)



[3] Note the threshold temperature used in Cal-Adapt is location specific. It is defined as the 98th percentile value of historical daily maximum/minimum temperatures (from 1961–1990, between April and October) observed at a location.

Table 3E below provides a summary of Cal-Adapt's projections for Warm Nights for baseline (1961-1990) and mid-century (2035-2064) time periods.

Table 3E Cal-Adapt Projections for Number of Warm Nights

Time Period	Change from Baseline	30-year Average	30-year Range
Baseline (1961-1990)	--	5 days	1 – 11 days
Mid-century (2035-2064)			
RCP 4.5	+21 days	26 days	14 – 46 days
RCP 8.5	+29 days	34 days	20 – 55 days

Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley
RCP: representative concentration pathway; 4.5: medium emissions scenario; 8.5: high emissions scenario.

Cal-Adapt Precipitation Projections

California's climate varies between wet and dry years. Research suggests that for much of the state, wet years will become wetter, and the dry years will become drier. Dry years are also likely to be followed by dry years, increasing the risk of drought. While California does not see the average annual precipitation changing significantly in the next 50-75 years, precipitation will likely be delivered in more intense storms and within a shorter wet season.

Three separate climate indicators are reported for precipitation changes: 1) Maximum 1-day Precipitation, 2) Maximum Length of Dry Spell, and 3) Annual Precipitation.

The maximum daily precipitation amount for each year is the greatest amount of daily rain or snow (over a 24-hour period) for each year, shown on **Chart 3-9** is the most likely outcome and range of future projections of Maximum 1-day Precipitation.

Chart 3-8 – Cal-Adapt Projections for Maximum 1-day Precipitation (Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley)

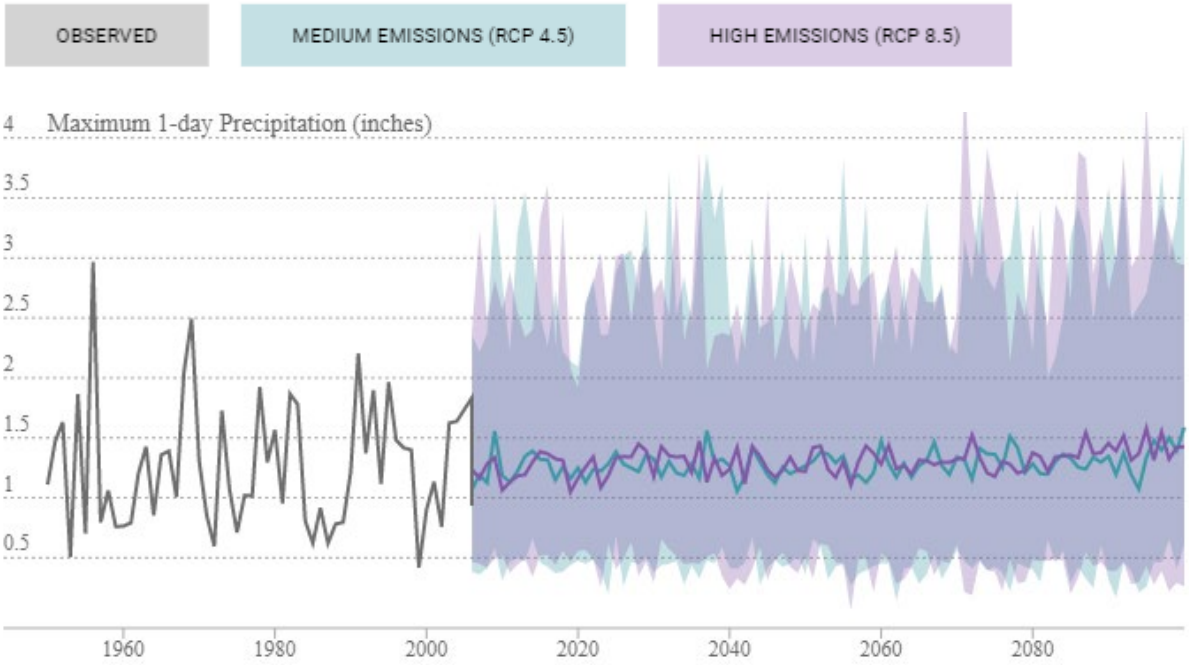


Table 3F, below provides a summary of Cal-Adapt's projections for Maximum 1-day Precipitation for baseline (1961-1990) and mid-century (2035-2064) time periods.

Table 3F Cal-Adapt Projections for Maximum 1-Day Precipitation

Time Period	Change from Baseline	30-year Average	30-year Range
Baseline (1961-1990)	--	1.205 inches	1.014 – 1.359 inches
Mid-century (2035-2064)			
RCP 4.5	+0.058 inches	1.263 inches	1.038 – 1.426 inches
RCP 8.5	+0.079 inches	1.284 inches	1.063 – 1.516 inches

Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley
RCP: representative concentration pathway; 4.5: medium emissions scenario; 8.5: high emissions scenario.

Maximum Length of Dry Spell is the maximum length of dry spell for each year. In other words, the maximum number of consecutive days with precipitation less than one millimeter for each year, shown on **Chart 3-10**, is the most likely outcome and range of future projections of Maximum Length of Dry Spell.

Chart 3-9– Cal-Adapt Projections for Maximum Length of Dry Spell (Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley)

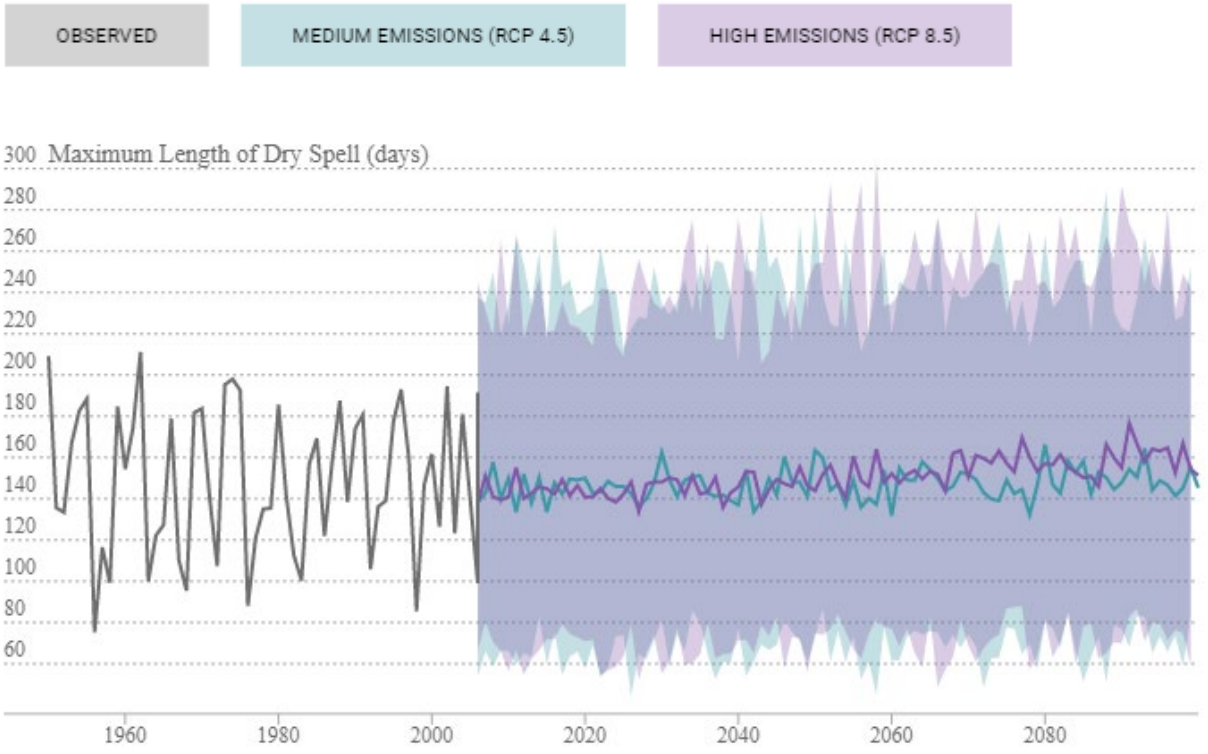


Table 3G, below provides a summary of Cal-Adapt's projections for Maximum Length of Dry Spell for baseline (1961-1990) and mid-century (2035-2064) time periods.

Table 3G Cal-Adapt Projections for Maximum Length of Dry Spell

Time Period	Change from Baseline	30-year Average	30-year Range
Baseline (1961-1990)	--	138 days	123 – 156 days
Mid-century (2035-2064)			
RCP 4.5	+8 days	146 days	125 – 171 days
RCP 8.5	+10 days	148 days	117 – 181 days

Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley
RCP: representative concentration pathway; 4.5: medium emissions scenario; 8.5: high emissions scenario.

Annual Precipitation is the total precipitation projected for a year, shown on **Chart 3-11**, is the most likely outcome and range of future projections of Annual Precipitation.

Chart 3-10– Cal-Adapt Projections for Annual Precipitation (Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley)

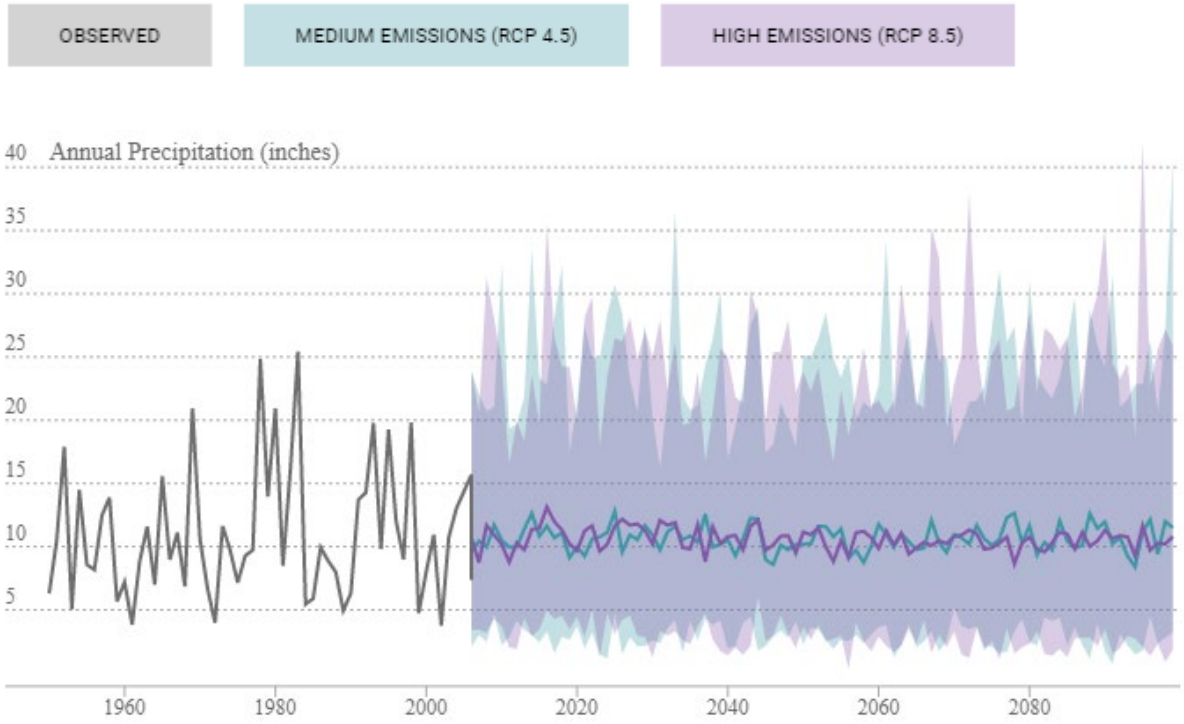


Table 3H, below provides a summary of Cal-Adapt's projections for Annual Precipitation for baseline (1961-1990) and mid-century (2035-2064) time periods.

Table 3H Cal-Adapt Projections for Annual Precipitation

Time Period	Change from Baseline	30-year Average	30-year Range
Baseline (1961-1990)	--	10.9 inches	9.4 – 12.0 inches
Mid-century (2035-2064)			
RCP 4.5	-0.4 inches	10.5 inches	8.1 – 13.8 inches
RCP 8.5	-0.4 inches	10.5 inches	7.9 – 14.2 inches

Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley
RCP: representative concentration pathway; 4.5: medium emissions scenario; 8.5: high emissions scenario.

Cal-Adapt Wildfire Projections

The frequency, severity and impacts of wildfire are sensitive to climate change as well as many other factors, including development patterns, temperature increases, wind patterns,

precipitation change and pest infestations. Therefore, it is more difficult to predict exactly where and how fires will burn. Instead, climate models estimate increased risk to wildfires.

The Cal-Adapt information presented here (Annual Average Area Burned) can help inform at a high level if wildfire activity is likely to increase. However, this information is not complete - many regions across the state have no projections (such as regions outside combined fire state and federal protection responsibility areas), and more detailed analyses and projections are needed for local decision-making. These projections are most robust for the Sierra Nevada given model inputs. However, as we have seen in recent years, much of California can expect an increased risk of wildfire, with a wildfire season that starts earlier, runs longer, and features more extreme fire events.

The Cal-Adapt average of the area projected to be at risk to burning in a year for the modeled baseline (1961-1990) time period for the City of Jurupa Valley and Eastvale is approximately 42 acres. By the mid-century (2035-2064) time period, the annual average risk of wildfire is projected to decrease to 8.5 and 24 acres in the City of Jurupa Valley and Eastvale, respectively. The areas of the District most at risk of wildfire are the Jurupa Mountains and Pedley Hills. Also, small brush fires have taken place along the Santa Ana Riverbed which borders the entire southern boundary of the District (HMP, p. 52).

Uncertainty of Cal-Adapt Projections

Climate projections provided by Cal-Adapt are approximations of future climate, but as with any statement about the future, there is no way to be certain they are accurate. One source of uncertainty in future climate projections is human greenhouse gas emissions. Projected climate data may not prove to be accurate if the actual emissions pathway differs from the scenarios used to make the projections.

Another source of uncertainty in climate projections is the fact that different climate models—the tools used to simulate the climate system and produce future climate data—may produce different outcomes. There are more than 30 global climate models developed by climate modeling centers around the world, and they have different ways of representing aspects of the climate system. In addition, some aspects of the climate system are less well understood than others. Climate scientists are constantly working to improve the theories of the climate system and its representation in climate models. In the meantime, one way to account for

model differences is to look at projections from as many different models as possible to get a range of possible outcomes. An average of the values can be taken across the different models, and this average value is a more likely outcome than the value from any single model.

It is important to note that here the term "uncertainty" is being used in the scientific sense, to acknowledge that there is a range in possible future outcomes. That climate change is occurring and is caused by human activity is the consensus of the overwhelming majority of scientists engaged with the issue. What is less certain is the extent to which the climate will change in the future, and precisely how the changes will affect natural and human systems.

3.4 SERVICE AREA POPULATION AND DEMOGRAPHICS

3.4.1 Service Area Population

The District's service area includes approximately 65 percent of the City of Jurupa Valley (28 square miles) and all of the City of Eastvale (13 square miles). Eastvale is in the western portion of the District and makes up approximately 30 percent of the JCSD service area.

The DWR Population Tool was used for this UWMP to estimate the District's current (2020) population with DWR's acceptable modification. The acceptable modification allows the District to use the 2015 persons-per-connection calculated by the Population Tool if the 2020 persons-per-connection seems inaccurate. Because the population estimate using a 2020 persons-per-connection of 4.10 was less than expected, the 2015 persons-per-connection of 4.18 was used to generate a current 2020 population of 130,546 persons. Current (2020) and projected population estimates for the service area are shown in **Submittal Table 3-1.** The DWR Population Tool output results from 2020 with the acceptable modification and the 2015 Population Tool output results are included in **Appendix F.**

Submittal Table 3-1 Retail: Population - Current and Projected

Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	130,546	140,735	150,923	161,112	171,300	171,300

NOTES: 2020 population from Population Tool with DWR acceptable modification to use 2015 persons-per-connection. Mid-range density buildout of District at 171,300 persons is assumed in 2040.

The Population Tool uses U.S. Census year data (1990, 2000, 2010) with the number of residential meters (combined single-family and multi-family residential) from the JCSD Annual Reports to the State Water Board to calculate a persons-per-connection ratio for each year. The 2020 U.S. Census data was not incorporated into the Population Tool; therefore the 2020 population is an extrapolation from prior census years.

The Water Code does not require a specific method for projecting future population in the UWMP, but it does require that the estimates of future population be based upon data from state, regional, or local service agency population projections. The JCSD service area population projection in Submittal Table 3-1 for District buildout at approximately 171,300 persons is based on buildout of the General Plan Land Use Plans for the Cities of Eastvale and Jurupa Valley (portion within the District) at a medium or "mid-range" density. The buildout projection includes the area of Swan Lake Mobile Home Park at medium-high density residential (MHDR) and the Leal Property tentatively envisioned with 660 dwelling units (see Section 3.5.2 for more information on the Leal Property). The growth projections assume buildout of the City of Eastvale will occur by 2031 and buildout of the City of Jurupa Valley is assumed by 2036, which is consistent with the District's *2020 Water Master Plan.*

3.4.2 Accessory Dwelling Units

Accessory dwelling units (ADUs) are also known as "granny flats," second units, or in-law units. They can be for one or more people and can be detached, attached, existing space converted into an independent living unit, or a Junior ADU contained entirely within an existing or proposed single-family residence. ADUs are being encouraged by the State to increase residential infill and help meet the increasing statewide demand for affordable housing. Because the ADU laws (Gov. Code 65852.2) change each year, readers should refer to the California Department of Housing and Community Development (www.hcd.ca.gov) for the latest changes to the law.

An increase in ADUs in existing residential areas may densify them more than what had been planned for previously by the District. Particularly in areas that are considered currently "built-out" with infrastructure that is already sized at "ultimate" design capacity, an increase in ADUs

may trigger capital projects to upsize existing pipes or replace degrading infrastructure earlier than expected.

JCSD and WEBB met with the Cities of Eastvale and Jurupa Valley for the purposes of this UWMP. As a result, Eastvale shared that they have approved 12 ADU applications between 2019 and 2020, consisting of three applications in 2019 and nine applications in 2020. No applications were approved from 2016 to 2018 (Personal Communication, G. Gonzalez, 02/12/21). The City of Jurupa Valley shared that between 2017 and 2020, they received 23 building permit applications for attached and detached ADUs within the District's boundary: four in 2017, 13 in 2018, one in 2019, and five applications in 2020. Different types of ADUs were proposed, including converted garages and modular homes (Personal Communication, A. Tam, 4/13/21).

Each city has adopted an ordinance to amend their Municipal Codes regulating ADUs consistent with State law; Jurupa Valley City Council adopted Ordinance No. 2020-18 on November 5, 2020 and Eastvale City Council adopted Ordinance No. 2020-03 on April 22, 2020. It is hard to gauge how the ADU laws will play out in the JCSD service area. For example, most residential lots in Eastvale have limited space for attached or detached ADUs. However, the high median household income for Eastvale suggests a greater ability may exist to fund the development of ADUs there. On the other hand, residential properties in Jurupa Valley tend to have the space needed for attached and detached ADUs. However, several census block groups within Jurupa Valley have median household incomes that meet the threshold for "disadvantaged" and "severely disadvantaged" communities.

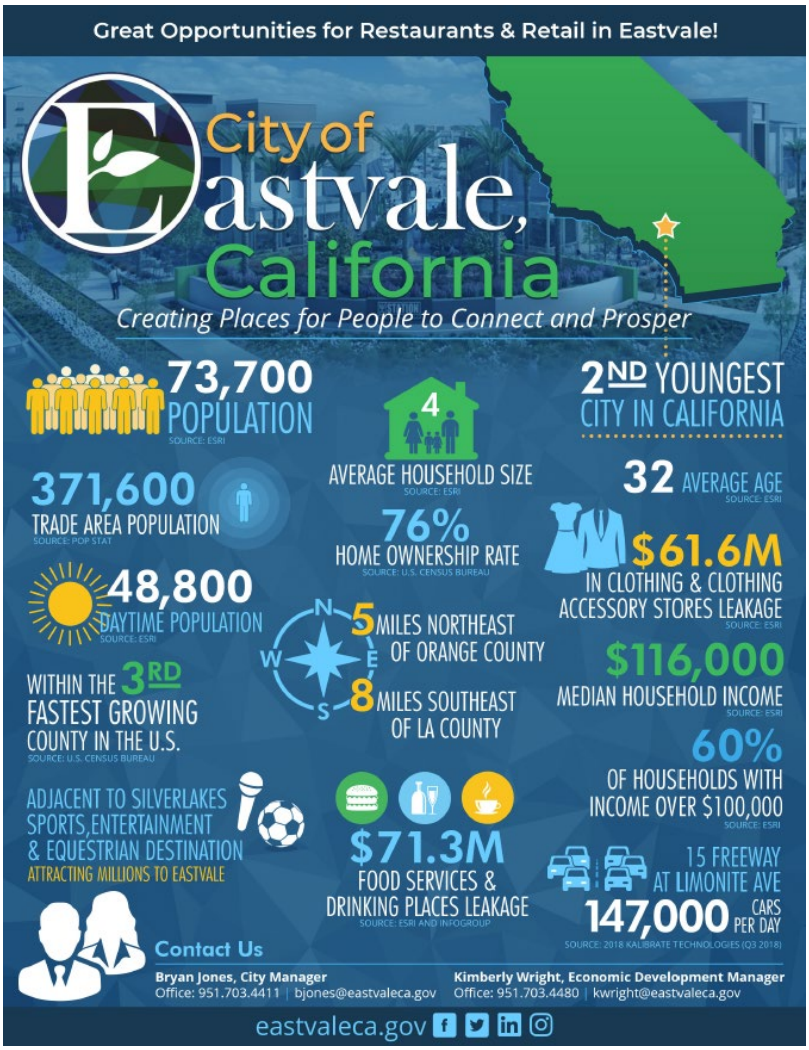
For the planning purposes of this UWMP and consistent with the *2020 JCSD Water Master Plan*, the impact of ADU's in residential areas is expected to be minimal, with limited impact on the District's ability to meet the water service needs of its customers. In response to the continuing evolution of the ADU laws and the recent City ordinances, the JCSD Board of Directors adopted Resolution No. 3116 (*Resolution of the Board of Directors of Jurupa Community Services District Addressing the Issue of Separate Water and Sewer Service Connections and Providing for the Collection of Capacity Charges for the Provision of Water and Sewer Services to Accessory Dwelling Units in Accordance with State Law*) on April 26, 2021 that incorporates, by reference, the requirements and fee calculation set forth in State statute. Resolution No. 3116 creates the ADU new connection and capacity charge in

accordance with state laws to correctly assess and collect appropriate connection fees and capacity charges related to the construction of new ADUs. Resolution No. 3116 also provides consistency throughout the District's service area and serves as an essential mechanism to ensure that new water (and wastewater) service demands from proposed ADUs can be met and funded in accordance with state law. (JCSD(b), p. 4)

3.4.3 Other Social, Economic, and Demographic Factors

The City of Eastvale is a recently incorporated City with relatively new housing, infrastructure, and residents. Eastvale is expected to buildout within the next 10 years. The City provided the following infographic to the District as part of the coordination conducted for this UWMP (next page).

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City of Eastvale Demographic Information (available at https://www.eastvaleca.gov/government/community-development/economic-development)

The City of Jurupa Valley also recently incorporated in 2011 but contains an older housing stock for a larger population and area as compared to Eastvale. According to U.S. Census Bureau data "Quickfacts", the MHI for the City of Jurupa Valley is $70,642 (in 2019 dollars, [USCB]). The City of Jurupa Valley provided the Housing Element of the 2017 General Plan to describe demographic trends for this plan. According to that source, population growth and households continue at a moderate pace similar to the Statewide average but slower than Riverside County averages (HE, pp. 5-32, 5-36). Jurupa Valley is currently experiencing significant residential and industrial growth with a mix of medium- and low-density residential development, equestrian and agricultural activities, and a mix of commercial, office, and

industrial uses. There is significant development interest for more industrial warehousing in Jurupa Valley.

Disadvantaged Communities

U.S. Census data is gathered at three levels of precision: Census Designated Place (CDP), Census Tracts, and Census Block Groups. CDPs are at the broadest level for unincorporated areas followed by Census Tracts that are made up of Block Groups. According to U.S. Census data collected from 2014 to 2018 by the Disadvantaged Communities (DAC) Mapping Tool at DWR, some Community Tracts and Block Groups within the JCSD service area qualify as "disadvantaged" and "severely disadvantaged" as shown in **Figure 3-4 – Disadvantaged Community by Census Block**.

California Code of Regulations Section 596.1(b)(2) defines a "disadvantaged community (DAC)" as: "A community with an annual median household income (MHI) that is less than 80 percent of the statewide annual MHI." The statewide MHI according to the Census American Community Survey (ACS) 2014-2018 dataset is $71,228; thus, 80 percent and 60 percent of that value represents the DAC and Severely DAC (SDAC) thresholds, respectively. Therefore, a community where the MHI is less than $56,982 meets the DAC threshold and a MHI less than $42,737 meets the SDAC threshold (ACS).

The information contained in Figure 3-4 is taken directly from the DWR Web site and DAC Mapping Tool, which is an online reference to assist local agencies to evaluate DAC status, using the definition provided by Proposition 84 Guidelines. Having areas that qualify as a DAC opens the District to the possibility of applying for State grant funding to assist with the implementation, planning, and disadvantaged community involvement efforts through Proposition 1 (Water Quality, Supply, and Infrastructure Improvement Act of 2014), and potentially grant funding through Proposition 84, Chapter 2 (Integrated Regional Water Management). In the event JCSD proceeds with either grant application process, additional research per the grant requirements may be necessary.

3.5 LAND USES WITHIN SERVICE AREA

The District does not have land use authority within its service area. That authority rests with the cities of Eastvale, Jurupa Valley, Norco, and the County of Riverside since the District's

service area encompasses land within each of these agencies. The best guide for future land use within any city or county is that jurisdiction's General Plan Land Use Element; thus, the basis for land use and population projections used in this UWMP are the current General Plan land use plans.

JCSD first met with Planning Department Staff from both the City of Eastvale and the City of Jurupa Valley in 2019 as part of the District's recent *2020 Water Master Plan* effort. The District did not meet with the City of Norco or the County of Riverside for the Water Master Plan because the District does not provide water service to those jurisdictions that are within the District boundary. Meetings were held on April 8, 2019 with Jurupa Valley and April 18, 2019 with Eastvale. Each City provided the District their current land use plan for use in the District's modeling associated with the Water Master Plan. Information related to current and future populations, build-out rates, accessory dwelling units, and upcoming large projects was also shared with the District at that time.

Pursuant to Water Code Section 10631(a), JCSD also met with the Cities of Eastvale and Jurupa Valley to determine the most appropriate land use information to use for water resources planning in the UWMP. As such, JCSD sent formal letters to the City Planning Departments of Jurupa Valley and Eastvale on February 4, 2021 requesting a meeting to coordinate specifically pursuant to Water Code Section 10631(a). The District did not meet with the City of Norco or the County of Riverside for this UWMP because the District does not provide water service to those jurisdictions that are within the District boundary. A summary of said coordination meetings conducted with local land use authorities for the purpose of the UWMP is below and copies of meeting request letters are located in Appendix C.

- JCSD and WEBB met via teleconference with the City of Eastvale on February 11, 2021. Attendees included: Gustavo Gonzalez, Planning Manager, Jimmy Chung, City Engineer, and Bill Hemsley, Contract City Engineer from the City of Eastvale; Keith Backus, Engineering Services Supervisor from JCSD; and Autumn DeWoody, Senior Environmental Analyst from WEBB. As a result of the meeting, the City provided recent changes to the land use plan, statistics on the number of applications received for ADUs, and City socioeconomic data (see Section 3.4.2 herein).
- JCSD and WEBB met via teleconference with the City of Jurupa Valley on March 2, 2021. Attendees included: Annette Tam, Principal Planner from the City of Jurupa

Valley; Keith Backus, Engineering Services Supervisor and Seungwon Won, Ph.D., P.E., Development Engineer from JCSD; and Autumn DeWoody, Senior Environmental Analyst from WEBB. As a result of the meeting, the City provided a current land use plan, data on ADU applications, and information on large projects planned within the District.

3.5.1 Development Status Map

JCSD actively tracks development projects within its service area through a Development Status Map (DS Map), which has been updated and current as of March 29, 2021 (**Figure 3-5 – Development Status Map**). The DS Map reflects active development information on properties that have received water/sewer availability letters from JCSD, undergoing discretionary review by JCSD, going through JCSD plan check, or under construction. The DS Map also identifies vacant parcels with potential for growth. This tracking system helps the District keep an accounting of current and future water demands within each city and pressure zone.

As of March 29, 2021, residential properties with an active approved water/sewer availability letter from the District, were in plan check preparing to construct, or under construction totaled approximately 846 acres. There were approximately 1,452 acres of residential properties with an expired water/sewer availability letter or simply undeveloped. Non-residential properties with an active approved water/sewer availability letter from the District, were in plan check preparing to construct, or under construction totaled approximately 497 acres. There were approximately 1,313 acres of non-residential properties with an expired water/sewer availability letter or simply undeveloped. Because the DS Map is constantly being updated, the information herein is a snapshot in time and current information should be obtained directly from the District.

3.5.2 City of Eastvale

Eastvale was once part of the larger Chino Dairy area, a world-famous concentration of dairies that at its height contained some 400 dairies and 176,000 equivalent dairy cows (WEBB(c), p. 12). In the late 1990s, new residential communities began replacing the dairies and other agricultural-related uses in Eastvale. The City of Eastvale incorporated on October 1, 2010 and adopted its first locally prepared General Plan on June 13, 2012. Eastvale is now predominantly urban area consisting primarily of residential, commercial retail, and industrial

uses. It is approximately 85 percent developed and buildout is estimated to be reached by about 2030 (WEBB(a), p. 2-5). Eastvale can be characterized as a generally modern, dense, and wealthy community with relatively new homes, businesses, and infrastructure. Eastvale is currently undertaking a General Plan Update that is expected to be completed by Winter 2021. The City of Eastvale land use plan on which the District's demand projections herein are based is shown in **Figure 3-6 – City of Eastvale Land Use Map**.

During aforementioned meeting held in 2021 for this UWMP, the City of Eastvale made the District aware of three general plan amendments that occurred after the District's water demand projections were calculated. They are (1) 31.58 acres of Light Industrial changed to Business Park and 16.44 acres of Light Industrial to Commercial Retail; (2) 4.09 acres of Low Density Residential to Commercial Retail; and (3) 13.4 acres of Medium Density Residential to High Density Residential. These changes are not shown on Figure 3-6 since they were not approved at the time the projections were made. Based on the District's most recent water duty factors from the *2020 Water Master Plan*, these changes would result in an increase in overall water demand of 57.3 AF per year, or an increase of 0.16 percent to ultimate buildout water demand. Because this is within the margin of error of the buildout projections for water demand, the effect of these three land use designation changes to future demands is considered negligible.

There are two underdeveloped or undeveloped areas in the City of Eastvale for which the City prepared planning documents that supplement the 2012 Eastvale General Plan: *Chandler Area Community Vision Plan* (178 acres) and *Leal Master Plan* (161 acres). These plans do not identify specific land uses for specific parcels; instead, they set forth the vision and development potential for these areas.

Chandler Area Community Vision Plan

The Chandler Area is one of the oldest parts of Eastvale and contains a mix of uses that reflect the community's agricultural heritage. This area has a mix of large-lot residential, commercial, agricultural, and semi-industrial uses that reflects the area's original use as a place where dairy workers and their families lived, shopped, ate, and worked. To guide the future development of the Chandler Area, Eastvale prepared the *Chandler Area Community Vision Plan* (*Vision Plan*) in May 2015.

The *Vision Plan* covers an area of 178 acres and does not change the Eastvale General Plan land use designations for the Chandler Area that are shown in **Figure 3-7 – Eastvale Future Development Areas**; rather, it identifies "Considerations for Future Decisions" the level of change from current land uses that could occur with implementation of the vision (i.e., major, moderate, some, or no change) as shown in **Table 3I**.

Table 3I Chandler Area Community Vision Plan

Vision Plan **Considerations for Future Development** (1)	**General Plan Land Use Designation**	**Rationale**
Red – Major Change from Current Land Uses (Approx. 30 ac)	Commercial Retail (CR)	The vision for this area is retail, civic, and religious uses or somewhat higher density residential consistent with the surrounding tracts.
Yellow with Cross Hatching – Moderate Change from Current Land Uses (Approx. 33 ac)	Medium Density Residential (MDR)	The vision for this area is to allow for more urban improvement, such as curb and cutter and somewhat higher density residential consistent with surrounding tracts.
Yellow – Some Change from Current Land Uses (Approx. 79 ac)	Low Density Residential (LDR)	This is one of the last areas of Eastvale in which large lot residential uses can occur.
Green – Public Land (Open Space) - No Change from Current Land Uses (Approx. 36 ac)	Open Space Conservation (OS-C)	These parcels are owned by Orange County Flood Control District and are prohibited from including any habitable structure because of flooding potential.

(1) As shown in Figure 3-7.

Sources: *Chandler Area Community Vision Plan*, pp. 4.6-4.11.

Leal Master Plan

The Leal Property is a square-shaped area of approximately 161 acres of vacant, developable land within Eastvale (Figure 3-7). It is centrally located at the northwest corner of Limonite Avenue and Hamner Avenue and represents a significant development opportunity for Eastvale. To guide the long-range planning of this property, the *Leal Master Plan* was adopted by the City of Eastvale on December 13, 2017, which allows for the future development of commercial, office, hotel, civic, and residential uses.

The *Leal Master Plan* does not include a land use map that dictates or directs the location of specific uses on the Leal property. Instead, the *Leal Master Plan* sets forth a land use program that establishes the minimum and maximum amount and type of development allowed but with

no acreages assigned to any of the land use types. It is expected that acreages for specific land use types will be developed as part of future development proposals. Because no land use plan has been developed for the Leal Property, this UWMP assumes for that half of the site is High-Density Residential (HDR), and the other half is Commercial-Retail (CR), which are consistent with surrounding land uses.

3.5.3 City of Jurupa Valley

The City of Jurupa Valley incorporated on July 1, 2011 and adopted its first locally prepared General Plan on September 7, 2017. Jurupa Valley is comprised of nine distinct communities; six of these communities (Glen Avon, Jurupa Hills, Indian Hills, Mira Loma, Pedley, and Sunnyslope) are in the District's service area. Jurupa Hills and Indian Hills have predominantly suburban land uses. Glen Avon, Mira Loma, Pedley, and Sunnyslope, are more semi-rural and low density in character. From an existing land use perspective, Pedley is considered the most diverse community with a combination of old-style, small-town neighborhoods and large lots with animal keeping.

Jurupa Valley is currently experiencing significant residential and industrial growth with a mix of medium- and low-density residential development, equestrian and agricultural activities, and a mix of commercial, office, and industrial uses. There is significant development interest for more industrial warehousing in Jurupa Valley. The City of Jurupa Valley 2017 General Plan assumes build-out will be reached by 2035.

The City is currently implementing its 5th-Cycle Housing Element Housing Program, which addresses the City's regional housing needs from 2013 to 2021. On June 4, 2019, the City's 5th-Cycle Housing Element was certified by the State. The certification was contingent upon the City's inclusion of a Housing Program that established a zoning implementation plan to rezone at least 16 acres with minimum densities of 25 dwelling units per acre anywhere suitable within the City (JV Staff Report). The General Plan Land Use Plan used for the water demand projections in this UWMP is shown in **Figure 3-8 – City of Jurupa Valley Land Use Plan**.

During aforementioned meeting with the City of Jurupa Valley for this UWMP in 2021, the City made the District aware of general plan amendments that had been approved after the District completed its water demand projections. They are (1) 7.25 acres from Low-Density Residential to Medium Density Residential; (2) 9.64 acres from Business Park to Commercial Retail; (3) 6.1

acres from Low Density Residential to Highest Density Residential; (4) 3.2 acres from Medium Density Residential to Highest Density Residential; and (5) 9.77 acres from Business Park to Highest Density Residential. These changes are not shown on Figure 3-8 since they were not approved at the time the projections were made. Based on the District's most recent water duty factors in the *2020 Water Master Plan*, these land use changes would result in an increase in overall water demand of 98.6 AF per year, or an increase of 0.44 percent to ultimate buildout water demand. Because this is within the margin of error of the buildout projections for water demand, the effect to water demand projections from these land use designation changes is considered negligible.

The combined effect of the general plan amendments that have occurred to the City of Eastvale land use plan and City of Jurupa Valley land use plan since the JCSD demand projections were made is a 0.59 percent increase to ultimate buildout water demands, and therefore within the margin of error and considered negligible.

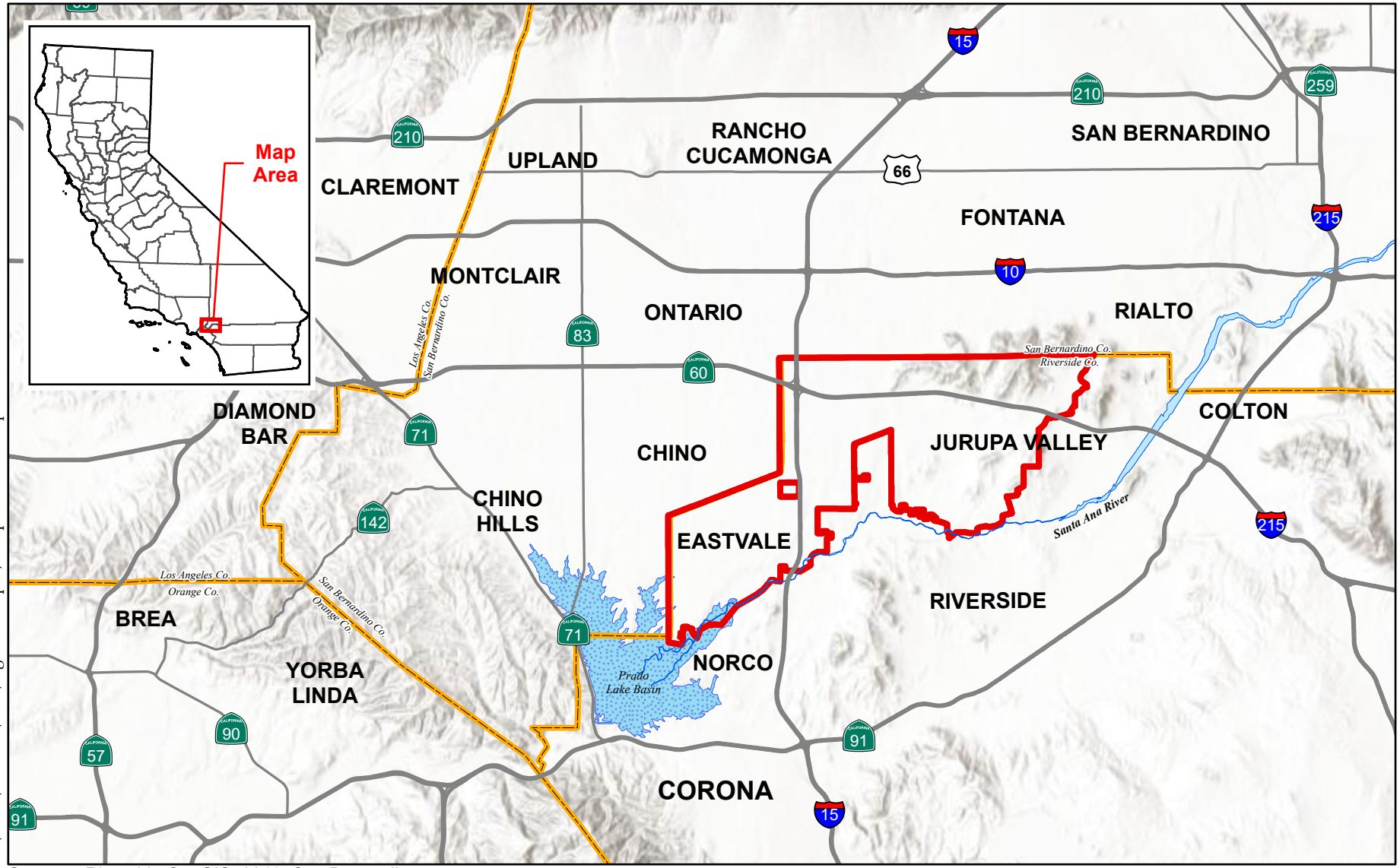
Vernola Ranch Project

The draft UWMP was made publicly available beginning June 1, 2021. Subsequently, a letter dated June 7, 2021 was received by JCSD from the City of Jurupa Valley requesting the inclusion of the proposed Vernola Ranch Project in the land use and water demand assumptions in this UWMP. A copy of said letter is located in Appendix C. At the time this UWMP is adopted, the Vernola Ranch Project site is located east of Interstate 15 and north of Limonite Avenue within the City of Jurupa Valley and encompasses approximately 190 acres. Because the project is not yet approved by the City, the current approved land use designations for the site include 61 acres of Commercial-Retail (CR), 16 acres of Business Park (BP), and 113 acres of Medium Density Residential (MDR). The project proposes to have 36 acres of CR, 24 acres of Highest Density Residential (HHDR) with a 550-unit apartment complex, and 129 acres of Medium-High Density Residential (MHDR) with 1,026 dwelling units.

In response to the City's request, the change in ultimate water demand for the subject property from the current to the proposed land use types was calculated using the water duty factors from the 2020 Water Master Plan. As a result, the proposed project would increase the projected ultimate water demand for the subject property by 155 AF per year to a total demand of 732 AF per year. Therefore, the City's request resulted in the following modifications to this

UWMP: (1) Figure 3-8 shows the Vernola Ranch Project's proposed land use designations; and (2) the water use projections in Table 4-2 (Chapter 4) had a net increase of 155 AF per year beginning in 2025 by increasing Single Family Residential demand by 208 AF, increasing Multi-Family Residential demand by 102 AF, and decreasing Commercial by 155 AF.

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Sources: Riverside Co. GIS, 2019; San Bernardino
USDA NAIP, 2020

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Figure 3-1 Service Area

JCSD Urban Water Management Plan 2020

jurupa COMMUNITY SERVICES DISTRICT

ALBERT A. WEBB ASSOCIATES

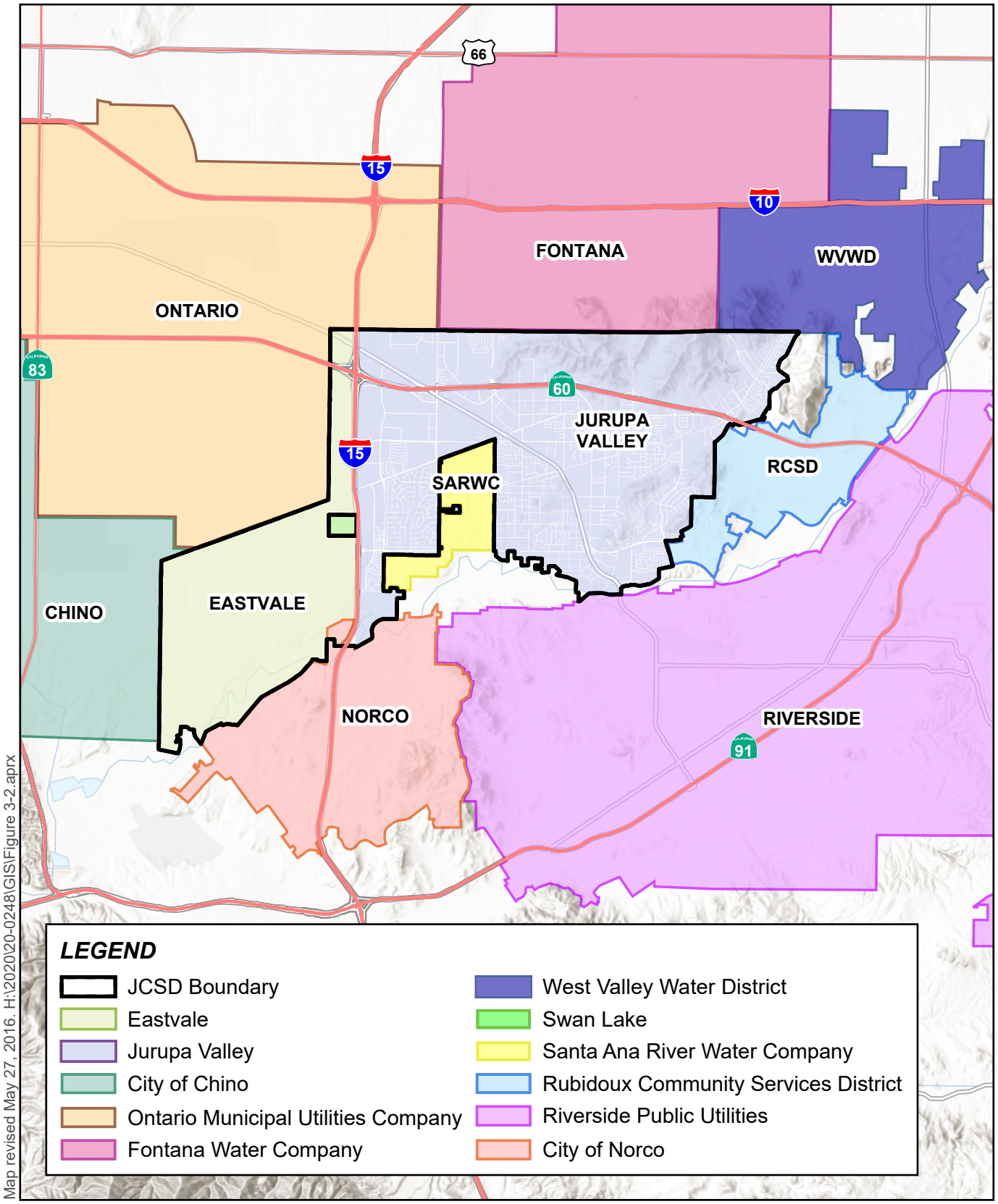
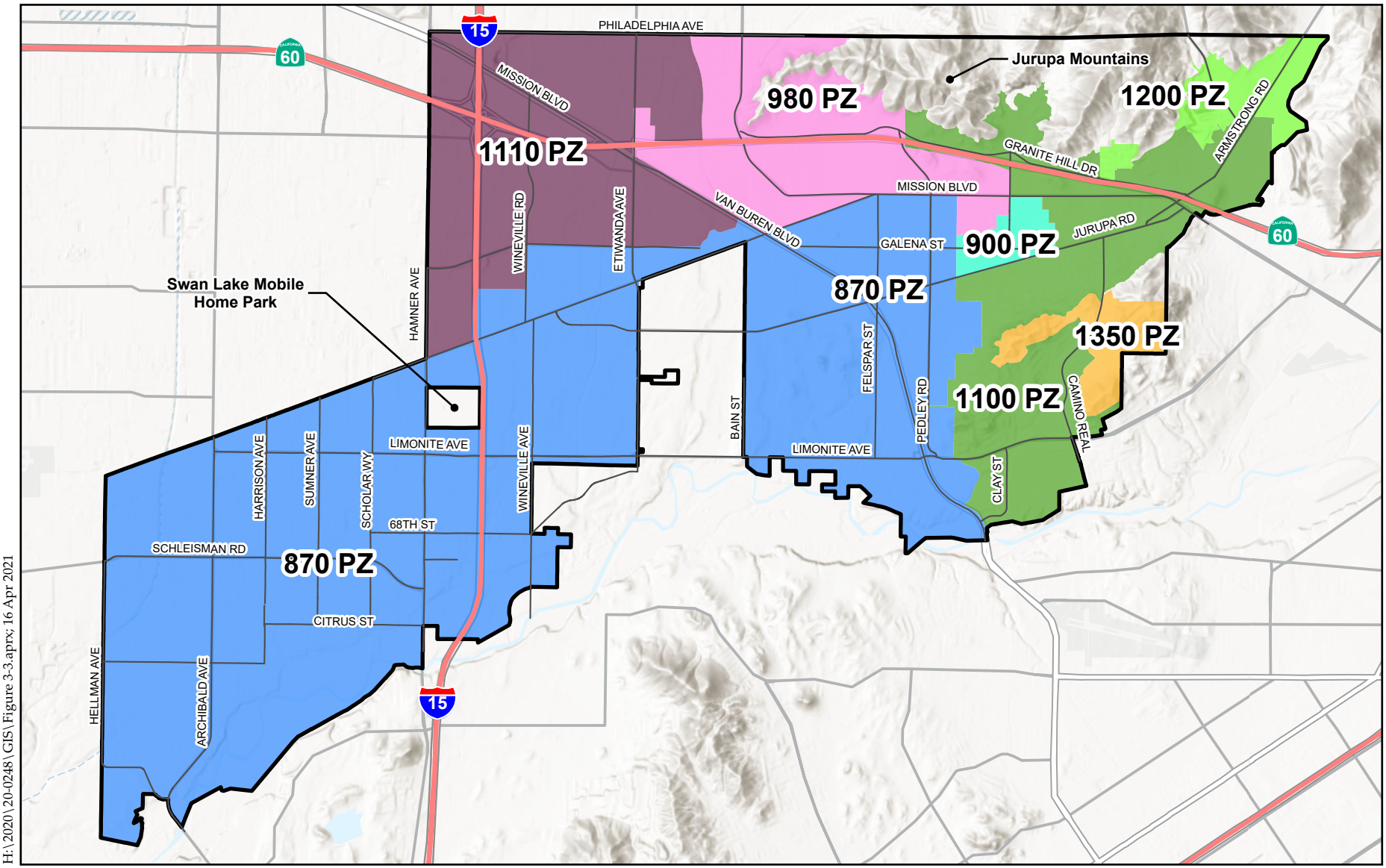


Figure 3-2 Surrounding Water Providers

JCSD Urban Water Management Plan 2020

Jurupa Community Services District

Albert A. Webb Associates



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Sources: JCSD, 2019;
Riverside Co. GIS, 2020.

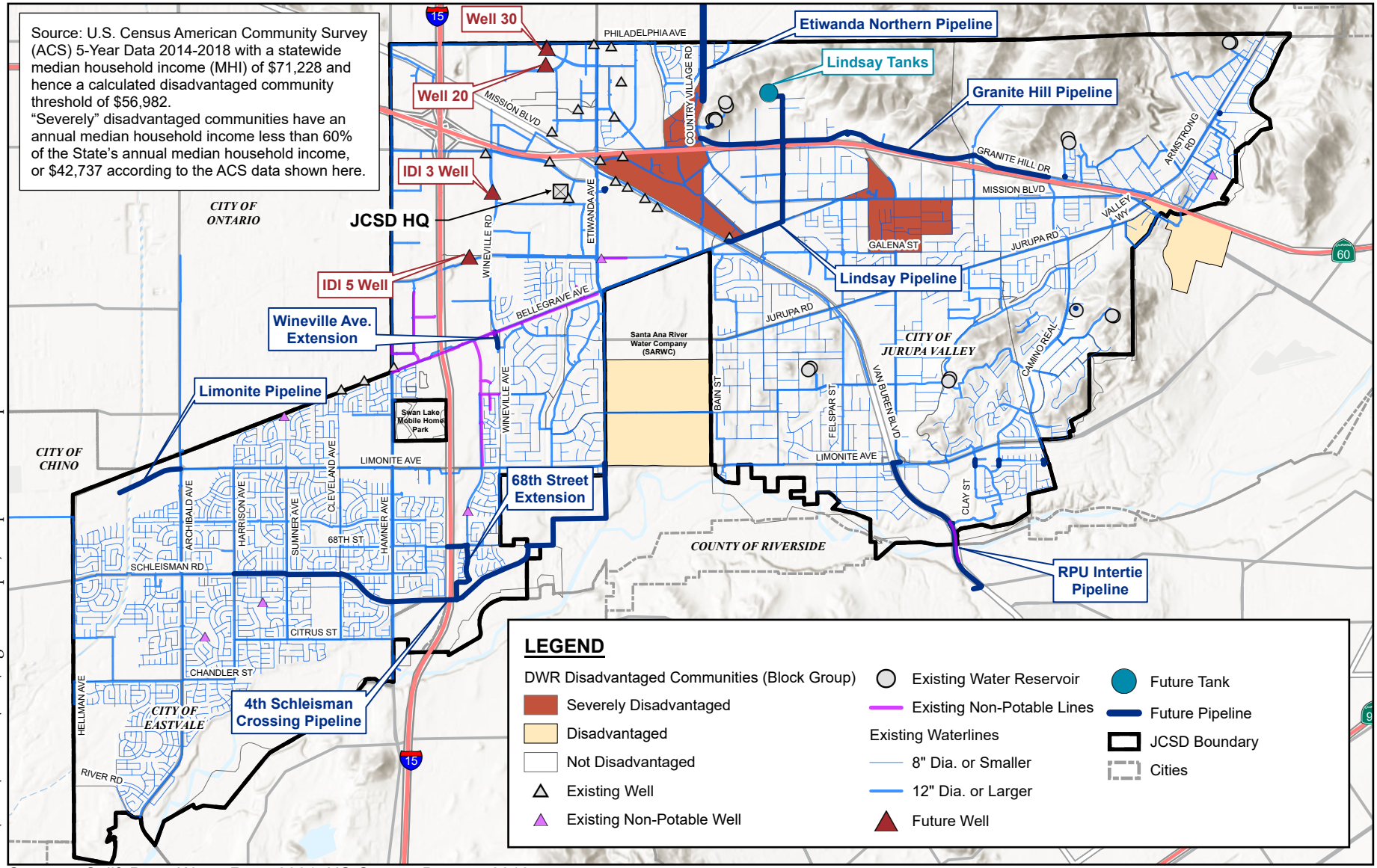
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Figure 3-3 Water System Pressure Zones

JCSD Urban Water Management Plan 2020

Jurupa Community Services District

Albert A. Webb Associates



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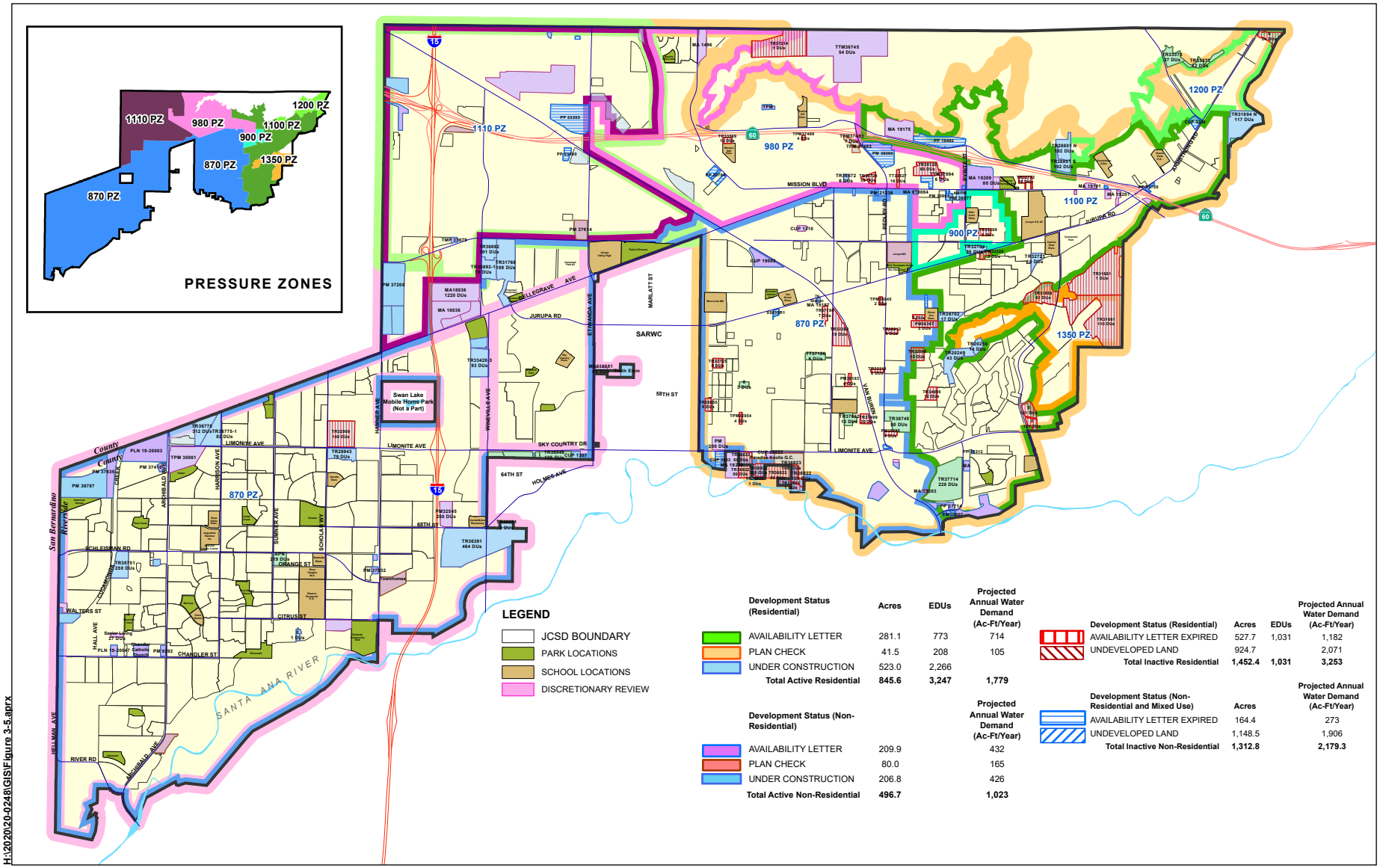
Sources: Calif. Dept. Water Res., 2021; US Census Bureau, 2018; JCSD, 2019; Riverside Co. GIS, 2021; ESRI.

Figure 3-4 Disadvantaged Communities

JCSD Urban Water Management Plan 2020

jurupa COMMUNITY SERVICES DISTRICT

ALBERT A. WEBB ASSOCIATES



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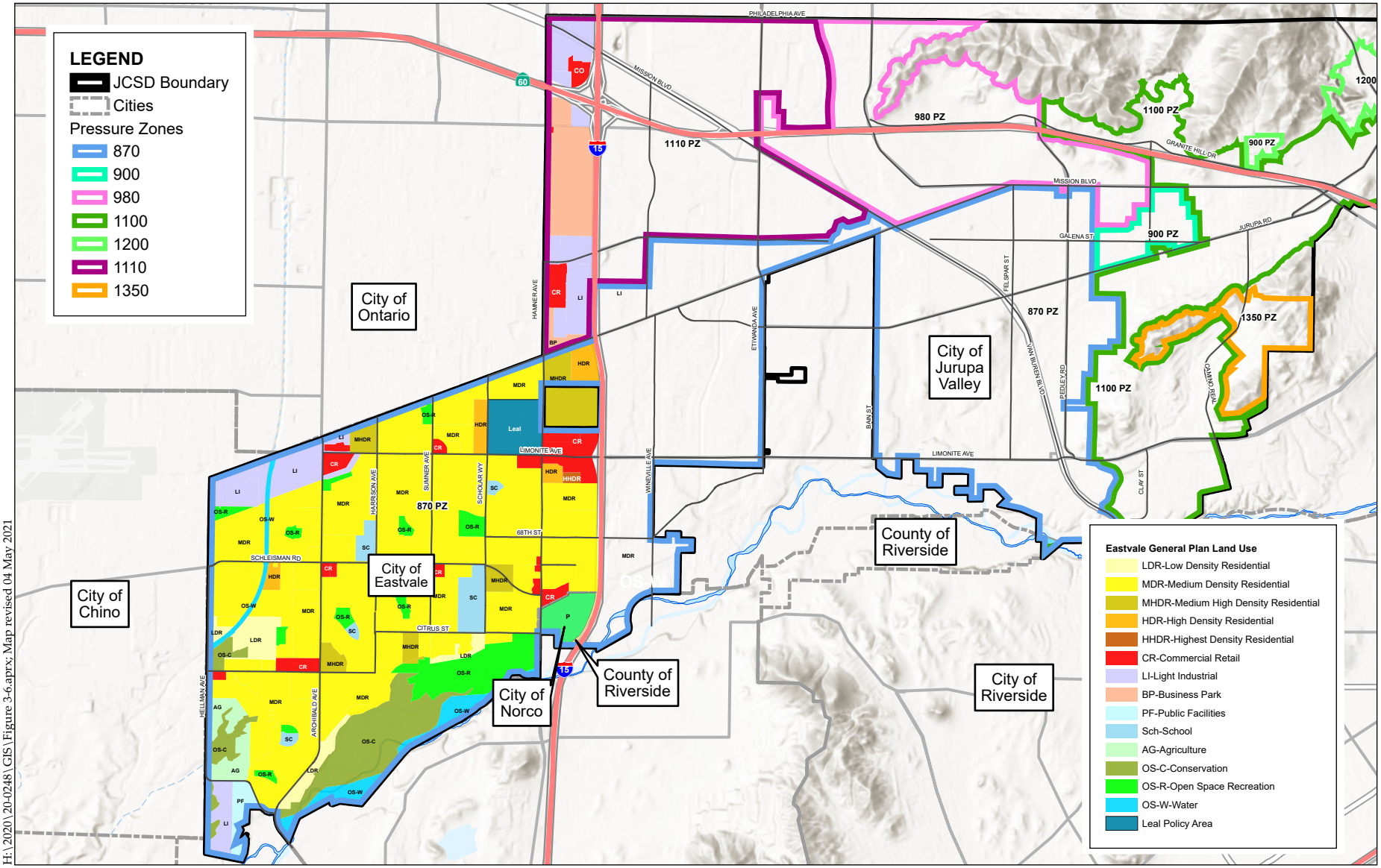
Sources: City of Eastvale, 2019; City of Jurupa Valley, 2019; City of Norco, 2012; JCSD, 2019; Riverside Co. GIS, 2019.

Figure 3-5 Development Status Map (as of March 29th, 2021)

JCSD Urban Water Management Plan 2020

Jurupa COMMUNITY SERVICES DISTRICT

ALBERT A. WEBB ASSOCIATES



H:\2020\20-0248\GIS\Figure 3-6.aprx; Map revised 04 May 2021

Sources: City of Eastvale, 2021; City of Jurupa Valley, 2021; City of Norco, 2012; JCSD, 2021; Riverside Co. GIS, 2021.

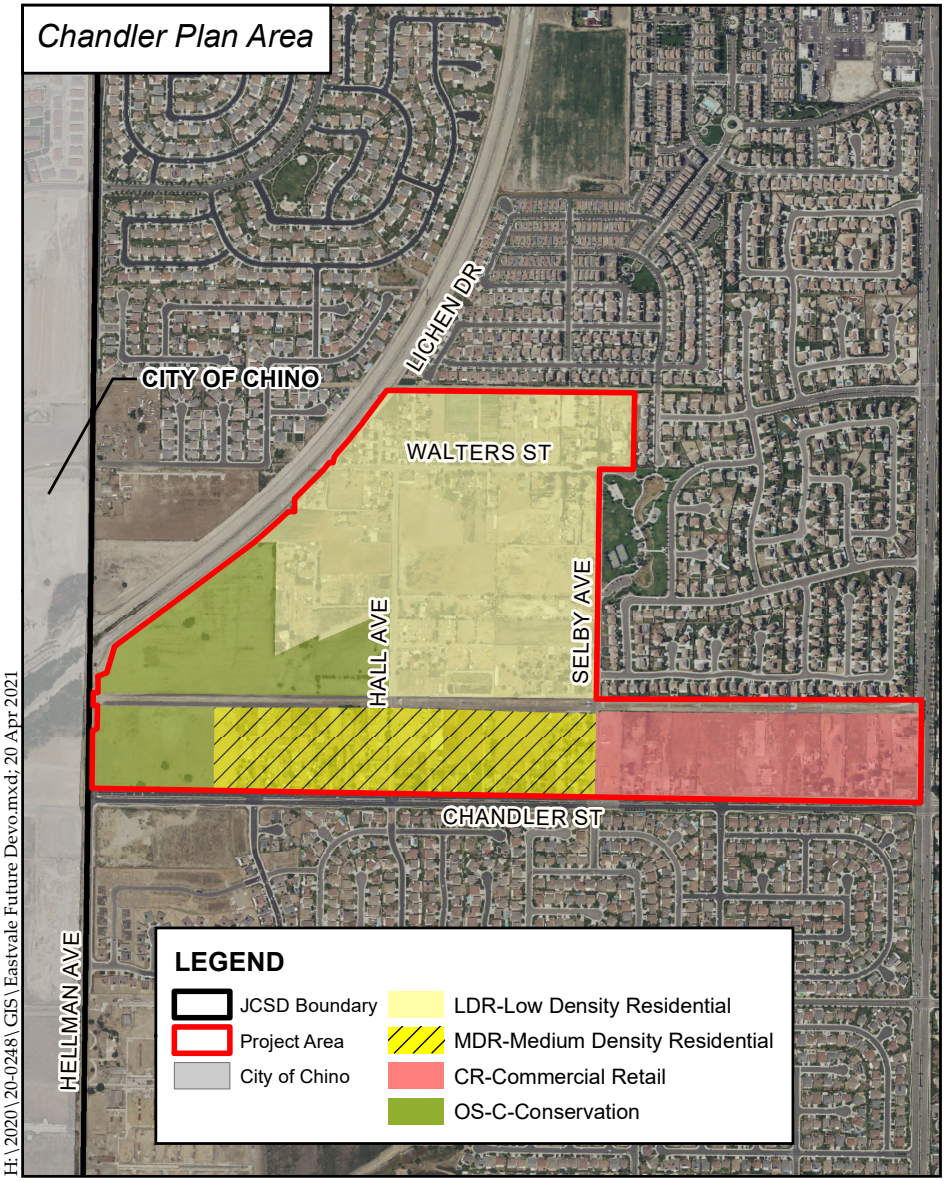
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Figure 3-6 City of Eastvale Land Use Map

JCSD Urban Water Management Plan 2020

Jurupa Community Services District

Albert A. Webb Associates





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Sources: City of Eastvale, 2019; City of Jurupa Valley, 2019; JCSD, 2019; Riverside Co. GIS, 2019.

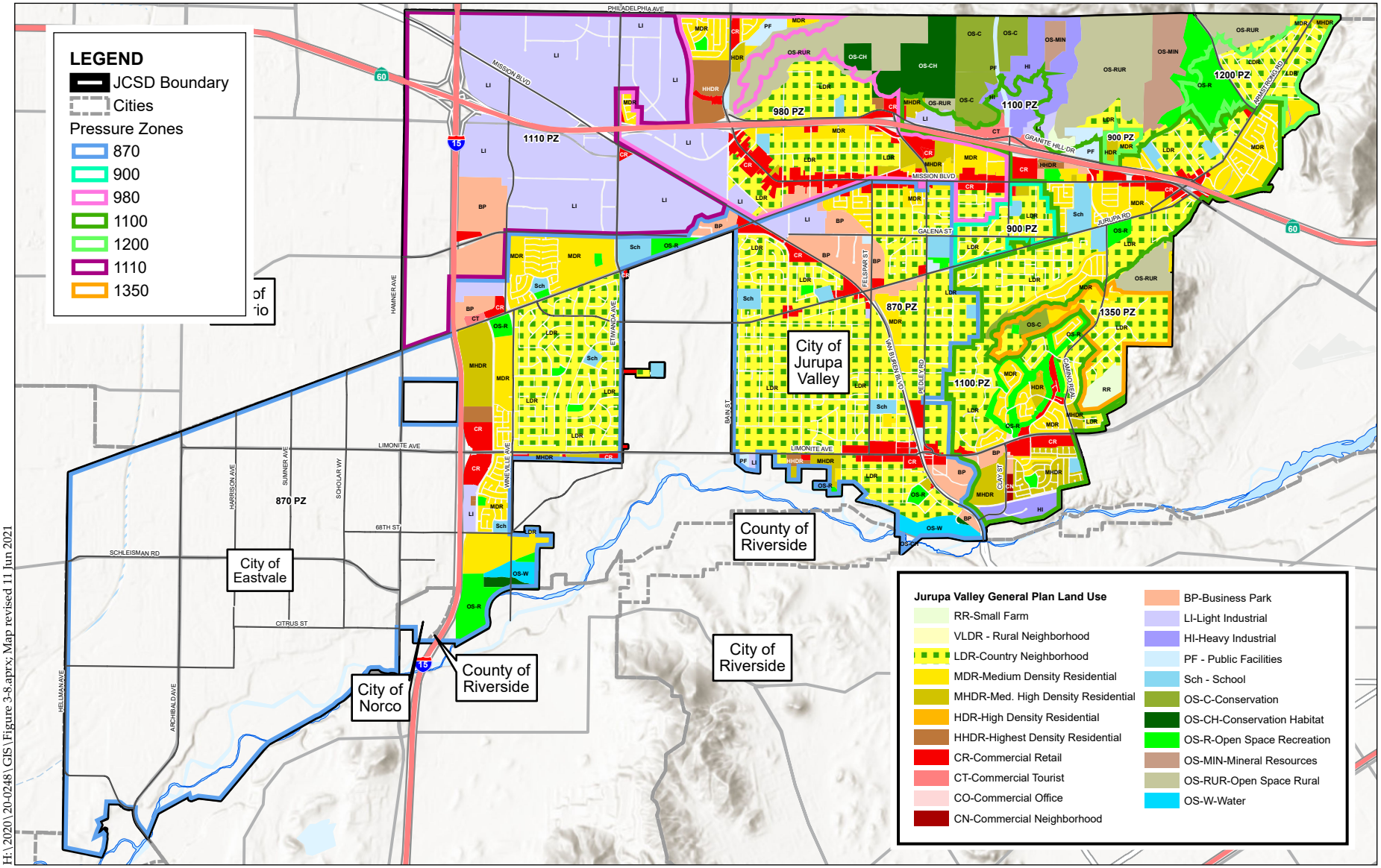
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Figure 3-7 Future Development Areas in Eastvale

JCSD Urban Water Management Plan 2020

Jurupa COMMUNITY SERVICES DISTRICT

ALBERT A. WEBB ASSOCIATES



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Sources: City of Eastvale, 2021; City of Jurupa Valley, 2021; City of Norco, 2012; JCSD, 2021; Riverside Co. GIS, 2021.

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Figure 3-8 City of Jurupa Valley Land Use Map

JCSD Urban Water Management Plan 2020

Jurupa Community Services District

Albert A. Webb Associates

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CHAPTER 4 WATER USE CHARACTERIZATION

This chapter describes how the water that is produced, purchased, and sold within the District is then used, and how water is projected to be used through the year 2045.[1] Demands for potable water and non-potable water within the District are accounted for separately.

4.1 PAST WATER USE

JCSD provides potable water to its urban retail customers, non-potable irrigation water for selected parks and school fields, and potable water to neighboring agencies. Through this process, some water is lost between the point of production and the customer meter due to leaks, metering inaccuracies, and theft (i.e., "Distribution System Losses"). The recorded water use over the four-year period since 2015 is listed in **Table 4A** (next page). These values are reported each year by JCSD to the State Water Resources Control Board. Although sales and transfers to other agencies are considered wholesale demands, JCSD is not considered a wholesale supplier because the amount sold is less than 3,000 AF per year.

[1] For purposes of the UWMP, the terms "water use" and "water demand" will be used interchangeably.

Table 4A - JCSD Metered Water Deliveries (AF), 2016-2019

Water Use Sectors	2016	2017	2018	2019
Single-Family Residential	15,173.19	15,736.8	16,868.85	15,279.76
Multi-Family Residential	1,236.89	1,311.01	1,400.44	1,374.69
Commercial/Institutional	2,173.91	2,288.59	2,505.44	2,253.32
Industrial	630.62	648.57	630.77	607.28
Potable Landscape Irrigation	2,202.75	2,390.46	2,812.2	2,469.98
Other[1]	296.84	279.98	271.7	251.06
Total Urban Retail Customers (AF)	**21,714.2**	**22,655.41**	**24,489.4**	**22,236.09**
Non-Potable Irrigation	653.65	692.61	814.99	876.18
Potable Distribution System Losses[2]	900.722	2,063.867	1,228.989	1,530.08
Water Sold to Other Systems (potable)[3]	264.8	316.715	324.887	302.074
Transfer to Santa Ana River Water Company (potable)	1,088	1,170	1,192	1,166

Source: JCSD *Large Water System Annual Report to the Drinking Water Program [Section 116530 Health & Safety Code]* for years ending December 31, 2016-2019, and JCSD records.

[1] Hydrants or construction water may be included in the "other" category.

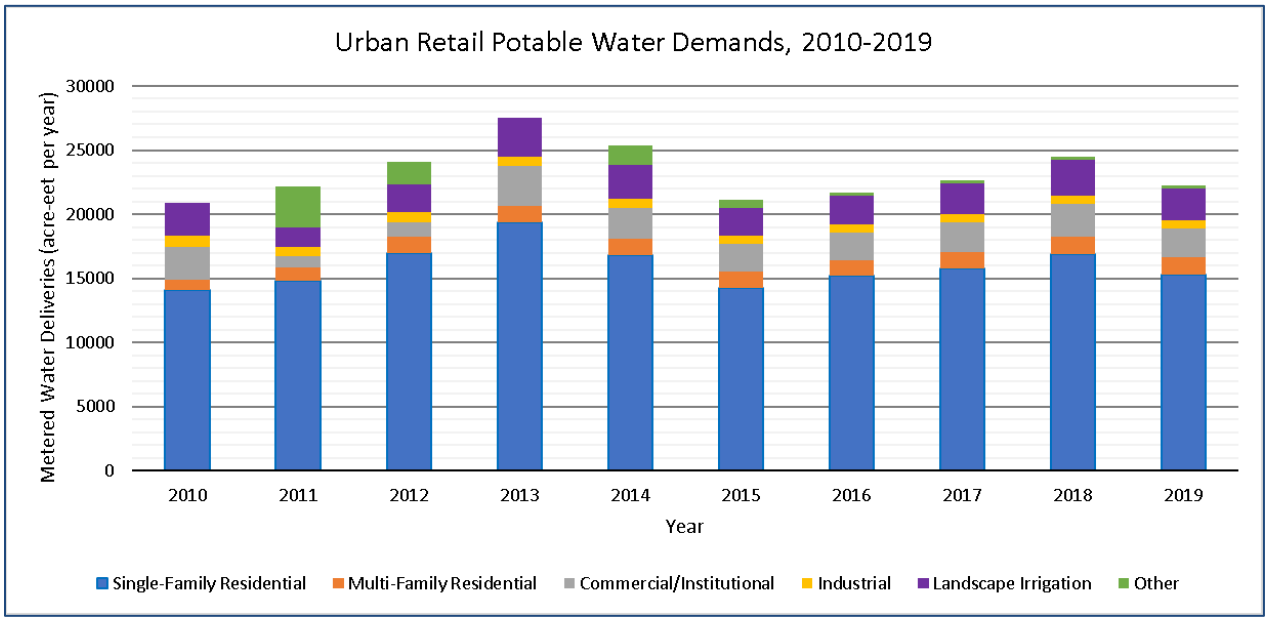
[2] Source: JCSD *Water Audit Report* for CY) 2016-2019; however, 2019 potable system loss is based on revision of 2019 Validated Loss Audit. Original audit reported 507 AF of total loss but omitted 1,074 AF of supply from CDA-Western deliveries. Non-potable system losses are not shown.

[3] Water was sold each year to Swan Lake Mobile Home Park, a JCSD master contract customer. In 2019, water was also sold to City of Norco..

AF = acre-feet

Shown on **Chart 4-1** is the change in total urban retail potable water demand by JCSD customers from 2010 through 2019. Average percent consumption by each customer type over this time period is single family residential, 69%, multi-family residential, 5%, commercial/institutional, 9%, industrial, 3%, landscape irrigation, 10%, and other, 4%.

Chart 4-1 - JCSD Urban Retail Potable Water Demands (2010-2019). "Other" includes hydrants, construction water, or line breaks. (Source: Table 4A herein; 2015 UWMP p. 4-2; 2010 UWMP p. 15)



The number of potable water meters from 2010 to 2019 are shown in **Table 4B.** Residential meters account for 95% of meters on average over this time period, while multi-family residential meters are 1%, and commercial/institutional and landscape irrigation meters are 2% of the total, respectively. Industrial meters and non-potable agricultural irrigation meters account on average for 0.4% and 0.05% of the total, respectively.

Table 4B - Number of Connections, 2010-2019

Customer Meter	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Single-Family Residential [1]	25,523	26,035	26,586	26,815	27,522	28,410	28,990	29,659	30,215	30,672
Multi-Family Residential				251	250	311	278	282	282	284
Commercial / Institutional	636	511	670	686	756	981	914	587	616	627
Industrial	107	106	101	99	101	107	105	113	115	120
Landscape Irrigation [2]	325	519	369	380	409	435	460	486	535	554
Non-Potable Irrigation [3]				10	9	10	28	29	30	30
Total Active Connections	**26,591**	**27,171**	**27,726**	**28,241**	**29,047**	**30,254**	**30,775**	**31,156**	**31,793**	**32,287**
Other – Fire Service	--	--	--	--	--	--	128	377	394	406
Other – Hydrant Meters	--	--	--	--	--	--	--	152	155	159

Source: JCSD *Large Water System Annual Report to the Drinking Water Program [Section 116530 Health & Safety Code]* for years ending December 31, 2010-2017. Counts for 2017-2019 from JCSD Finance Dept. (2021).

(1) Prior to 2013, total number of residential meters was reported.

(2) Prior to 2013, total number of irrigation meters was reported, which presumably included non-potable connections. Excludes non-billing EDU meters.

(3) All non-potable meters.

The number of residential meters grew on average 2.5% each year according to the data in Table 4B, with the largest single year increase between 2016 and 2017 of nearly 5%**.** Further, the number of Commercial/Institutional and Industrial meters grew by an annual average of 2.2% and 1.0%, respectively.

4.2 CURRENT WATER USE

As of December 31, 2020, JCSD served water to 33,146 potable service connections and 30 non-potable service connections as shown in **Table 4C**.

Table 4C - Number of Connections, 2020

Customer Meter	2020
Single-Family Residential [1]	30,947
Multi-Family Residential	284
Commercial / Institutional	636
Industrial	125
Potable Landscape Irrigation[2]	572
Other-Fire Service	422
Other- Hydrant Meter	160
Total Potable	**33,146**
Non-Potable Irrigation	30

Source: JCSD Customer Service Dept.

(1) Includes "no sewer" accounts.

(2) Non-billing EDU meters excluded from irrigation meters.

During CY 2020, JCSD metered water deliveries including loses consisted of 28,505 AF of potable water and 767 AF of non-potable irrigation water for a total of 29,272 AF, as shown in **Submittal Table 4-1**. For reference, the 2015 UWMP estimated a total demand volume of 24,977 AF for CY 2020.

Submittal Table 4-1 Retail: Demands for Potable and Non-Potable Water - Actual			
Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume*
Add additional rows as needed			
Single Family	Includes "no sewer" acounts	Drinking Water	17,300
Multi-Family		Drinking Water	1,323
Commercial	Includes institutional and fire service meters	Drinking Water	2,282
Industrial		Drinking Water	675
Landscape		Drinking Water	2,945
Other Potable	Includes hydrant meters	Drinking Water	190
Sales/Transfers/Exchanges to other Suppliers	Sold to Swan Lake	Drinking Water	325
Sales/Transfers/Exchanges to other Suppliers	Sold to City of Norco	Drinking Water	8
Sales/Transfers/Exchanges to other Suppliers	Transfer and Sale to Santa Ana River Water Company	Drinking Water	1,325
Losses	Potable Losses	Drinking Water	2,133
Landscape	Non-Potable Irrigation	Raw Water	627
Losses	Non-Potable Losses	Raw Water	140
		TOTAL	29,272
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Units in acre-feet(AF). CY 2020 data. Potable demand is 28,505 AF, which differs from the 2020 Water Master Plan which used 2018 consumption data. Total non-potable demand is 767 AF. These amounts match the 2020 Annual Drinking Water Report adjusted for pro-rata used in Dec. 2019 and Dec. 2020. Losses are estimated as the difference between total 2020 potable water supply and total 2020 deliveries.			

The non-potable irrigation demand is satisfied with non-potable well water and is listed separately in the District's Annual Reports to the Drinking Water Program. The system losses that are shown in Submittal Table 4-1 are calculated by subtracting metered deliveries from

total production sources for both potable and non-potable sources separately. The District's distribution system also includes a meter to track pass-through water delivered to the Santa Ana River Water Company consisting of their allotted portion from the Chino Desalter Authority (CDA). When the demand from Santa Ana River Water Company is greater than its CDA allocation, then that becomes a sale of water from JCSD.

4.3 PROJECTED USE

Estimating future water demand allows water agencies to manage their water supply and appropriately plan their infrastructure investments. Factors to consider are current and future land uses, number of occupants or dwelling units, typical water demand generation factors, and climate change effects.

The *2020 Water Master Plan* uses actual water use records from CY 2018 from all of the various land use types to develop updated water duty factors for each land use type in the City of Eastvale and the City of Jurupa Valley portion within the District. Water duty factors (or "unit water demand factors") reflect a typical rate of water consumption (e.g., gallons per day per acre or gallons per day per dwelling unit) that has been observed from actual meter records. Different rates from different land use types were calculated. Using the updated water duty factors and the City General Plan land use plans for ultimate buildout as of April 2019, including the potable water demand from meters located in road rights-of-way, potable irrigation meters for medians, potable water deliveries to Santa Ana River Water Company and Swan Lake Mobile Home Park, the ultimate average day potable demand is approximately 36,495 AFY (WEBB(a), p. 3-8).

This Plan will assume buildout of the City of Eastvale will occur in the next 10 years by 2030, and buildout of the City of Jurupa Valley will occur in 20 years by 2040 based on the remaining vacant and developable land. Because the District's CY 2020 potable water demand was 28,505 AF as shown in Submittal Table 4-1, the ultimate buildout potable water demand of 36,495 AF per year according to the 2020 Water Master Plan would be an increase of 7,990 AF, or 28 percent. As shown in **Submittal Table 4-2**, the rate of increase in projected water demand slows in 2030 with the buildout of Eastvale, and then becomes stable with the buildout of Jurupa Valley in 2040.

Submittal Table 4-2 Retail: Use for Potable and Non-Potable Water - Projected						
Use Type	Additional Description (as needed)	Projected Water Use* *Report To the Extent that Records are Available*				
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Single Family		18,551	20,082	21,174	22,375	22,375
Multi-Family		1,606	1,731	1,821	1,919	1,919
Commercial	Includes Institutional & governmental	2,251	2,451	2,595	2,752	2,752
Industrial		722	782	825	872	872
Landscape	Includes ROW irrigation	3,007	3,258	3,437	3,634	3,634
Other Potable	Hydrant meters	210	228	241	254	254
Sales/Transfers/Exchanges to other Suppliers	Santa Ana River Water Company	1,200	1,200	1,200	1,200	1,200
Sales/Transfers/Exchanges to other Suppliers	Swan Lake Mobile Home Park	328	328	328	328	328
Sales/Transfers/Exchanges to other Suppliers	Other	96	231	328	434	434
Losses	Potable Losses (7.5%)	2,255	2,444	2,578	2,726	2,726
Other Non-Potable	Parks & school yard irrigation with Riverside South Basin groundwater.	500	500	500	500	500
Losses	Non-Potable Losses	140	140	140	140	140
	TOTAL	30,865	33,375	35,165	37,135	37,135
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Units in acre-feet (AF). Assumes buildout by 2040. Ultimate potable water demand is 36,495 AF; equivalent to 2020 Water Master Plan estimate. Total non-potable water demand not including recycled water is 640 AF. "Other" sales/transfers could include sales to City of Norco and additional demand by Santa Ana River Water Company.						

The total potable water demands in Submittal Table 4-2 are equivalent to the projections made in the *2020 Water Master Plan* (i.e., 30,225 AF in 2025, 32,735 AF in 2030, 34,525 AF in 2035, 36,495 AF in 2040 and 2045). To project individual uses over time, the proportions of total 2020 use (i.e. 28,505 AF) that are not held constant through time (i.e., single family residential, multifamily residential, commercial, industrial, landscape, hydrant meters, and losses) were

calculated as follows: 61% for single-family residential, 5% multifamily residential, 8% commercial, 2% industrial, 10% landscape irrigation, and 1% hydrant meters. As described in Chapter 3.5.3, the water demand projections for Single-Family, Multi-Family and Commercial were also modified to reflect a net increase of 155 AF per year to account for the increase in water demand expected from the proposed Vernola Ranch Project. Estimates for the annual transfer to Santa Ana River Water Company and the annual sale to Swan Lake Mobile Home Park are held constant which is consistent with the *2020 Water Master Plan* approach. Potable losses are calculated as 7.5% of total potable annual demand. "Other" sales/transfers/exchanges capture sales to neighboring agencies such as City of Norco and additional demand that may be needed by Santa Ana River Water Company that is more than the annual allotment from CDA (i.e., 1,200 AF).

The non-potable water demand projections in Submittal Table 4-2 are held constant and do not include recycled water demand, which is shown in **Submittal Table 4-3**, below. The total water demand projections in Submittal Table 4-3 begin with 2020 actual water use and the projections planned for future water demand based on a "normal" or non-drought condition with the addition of the recycled water in 2025. Non-potable irrigation demand is based on actual production in the Riverside South Basin and held constant, and non-potable system losses stay constant compared to 2020. Although some non-potable demand was met by Chino Basin non-potable wells in 2020, it is assumed for the future that will be replaced with the use of recycled water beginning by 2025.

Submittal Table 4-3 Retail: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045 (opt)
Potable Water, Raw, Other Non-potable *From Tables 4-1R and 4-2 R*	29,272	30,865	33,375	35,165	37,135	37,135
Recycled Water Demand[1] *From Table 6-4*	0	660	660	660	660	660
Optional Deduction of Recycled Water Put Into Long-Term Storage[2]						
TOTAL WATER USE	29,272	31,525	34,035	35,825	37,795	37,795
[1] Recycled water demand fields will be blank until Table 6-4 is complete *[2] Long term storage means water placed into groundwater or surface storage that is not removed from storage in the same year. Supplier **may** deduct recycled water placed in long-term storage from their reported demand. This value is manually entered into Table 4-3.*						
NOTES: Units in acre-feet (AF).						

The District's potable demand projections in Submittal Table 4-2 have conservatively assumed no reductions in future water use from codes, ordinances, or other water conservation policies. Water demands across all customer sectors are projected to increase over the 20-year period. Further, the projections in Submittal Table 4-2 have accounted for decreasing water duty factors across all land use types (e.g., gallons per person or gallons per acre) during a non-drought time. Notably, this is occurring while overall water demand is increasing due to growth. The cost of water and tiered pricing, widespread public education on water conservation, and restrictions placed by the land use authorities on plant palettes and required water efficiency standards for new- and re-development are believed to all be factors as to why unit water use is decreasing in the District.

4.3.1 Climate Change Considerations

Beginning in the 2020 UWMP, the Water Code requires the District to consider the impacts of climate change in its water use projections, which are shown in Submittal Table 4-2. Considerations for climate change impacts began with using the *Climate Change Vulnerability Screening Form for Urban Water Management Planning* located in Appendix I of the DWR

Guidebook for 2020 UWMPs. Pursuant to Water Code, the District's planning for climate change impacts was commensurate with the number of customers served and the volume of water supplied. The type and degree to which climate change impacts were considered in the District's water use projections, and the basis for those assumptions are described below.

Western prepared a Technical Memorandum dated April 22, 2021 describing an analysis performed as part of their Drought Contingency Plan and Climate Change Vulnerability Assessment and made the results available for use by the District and other retail agencies within Western's service area to use in their UWMPs (WMWD(a)). A copy of said memo is located in Appendix E. The results of the analysis included factors that its retail agencies can apply to water demand and supply projections to represent the projected effects of climate change within Western's service area. JCSD has used these factors herein where noted (**Table 4D**). The results of the analysis that pertain to water demands are provided below:

> *The impacts of climate change on outdoor water demand are projected to be similar during normal and drought years over the next two decades. This is because climate change datasets show that temperatures are projected to increase over time, regardless of hydrologic conditions. These projected increases in temperature are estimated to increase ET rates for landscaping, irrigated agriculture, and native vegetation. For all year types, outdoor water use is projected to increase by about 3 percent during the next two decades. The water demand change factors are applied to outdoor water uses, which have been adjusted for future population growth and conservation measures. Indoor water uses are assumed to respond to future population growth and conservation as well but are not sensitive to climate change.* (WMWD(a), p. 13)

Table 4D - Water Demand Climate Change Factors for Outdoor Water Uses[1]

Beginning Year	Normal Year	Single-Dry Year	Five-Year Dry Period
2020	100.0%	100.0%	100.0%
2025	100.6%	100.6%	99.8%
2030	101.2%	101.3%	101.2%
2035	101.8%	101.9%	101.8%
2040	102.4%	102.5%	102.4%
2045	103.1%	103.2%	103.0%

Source: Western Municipal Water District, *Technical Memorandum: Western Drought Contingency Plan – Climate Change Vulnerability Assessment*, April 22, 2021 (WMWD(a), p. 13).

(1) 2020 is baseline year. Because the District is unable to tease out indoor from outdoor water use for most of its customers at this time, the factors will be applied to all water demands.

To account for the potential effects of climate change to water demands, and the uncertainty therein, JCSD has conservatively applied the normal year factors from Western's analysis in Table 4C to the total demand projections of Submittal Table 4-2 beginning in 2025 through 2045, even though some of that demand is indoor use that is not sensitive to climate change. The results are shown below in **Table 4E**.

Table 4E - Potential Effect of Climate Change to Projected Demands

	2025	2030	2035	2040	2045
TOTAL DEMANDS From Table 4-3 (AF)[1]	31,525	34,035	35,825	37,795	37,795
Water Demand Climate Change Factor[2]	100.6%	101.2%	101.8%	102.4%	103.1%
TOTAL DEMANDS with Climate Change Factor (AF)	31,714	34,443	36,470	38,702	38,966
Potential Increase in Water Demand from Climate Change (AF)	189	408	645	907	1,172

Notes: Units in acre-feet (AF).

(1) Total demands from Submittal Table 4-3. Includes non-potable water and recycled water.

(2) Climate change factors from Table 4D (WMWD(a)).

According to Cal-Adapt and Western's technical memorandum and climate change analysis, higher temperatures and less rainfall are anticipated to occur as a result of climate change, and

these are the factors that may affect water demand the most. Customer demands increase in summer; therefore, an increase in average annual temperatures and the frequency and duration of heat waves as the result of climate change is expected to increase existing customer demands for water, particularly outdoor use. Based on past events, the District anticipates additional restrictions on outdoor water use will occur through Water Code changes and County, City, or District ordinance changes. Because JCSD primarily serves urban water demand and does not have an agricultural customer base, such restrictions are expected to result in changes to the urban environment, such as improvements to indoor water use (i.e., replacing inefficient appliances/fixtures), or changes in public and private landscaping that incorporates more drought tolerant plant species and/or zero-irrigation. Considering that the District's individual water duty factors have decreased due to the cost of water and tiered pricing, widespread public education on water conservation, and regulatory restrictions placed for new development to conserve, the estimated increases in water demand due to climate change are expected to be partially offset but by how much is uncertain.

4.4 DISTRIBUTION SYSTEM WATER LOSSES

Distribution system water loss is the water lost between the point of production and the point of customer delivery. This is a component of the District's overall water demand, as shown previously in Table 4A and Submittal Tables 4-1 and 4-2. System water losses can occur because of leaking or broken pipes, system flushing, theft, metering inaccuracies, or unbilled but authorized consumption.

California Senate Bill No. 1420 (SB 1420) requires water utilities that submit UWMPs to calculate annual system water losses using the water audit methodology developed by the American Water Works Association (AWWA). SB 1420 also requires that utilities submit these audits every five years as part of their respective UWMP. To facilitate user-friendly and consistent water auditing practices, AWWA has developed the AWWA Free Water Audit Software, which is based on the principles of the AWWA M36 Water Audit methodology. Per DWR guidelines, JCSD uses this software for its water loss audits. **Submittal Table 4-4** summarizes the District's reported water losses from 2016 to 2019. Because the 2020 water loss report is not yet due to the state, this is an estimated value. Copies of the 2016-2019

water loss audits are located in **Appendix G**. The steps taken by the District to reduce water loss are described in Chapter 9 – Demand Management Measures.

Submittal Table 4-4 Retail: Last Five Years of Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
01/2016	900.7
01/2017	2063.9
01/2018	1229.0
01/2019	1530.1
01/2020	2133.07
[1] Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet. *[2] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES: Units in acre-feet (AF). 2016-2019 data from District validated water loss audits; however, 2019 loss shown here is based on revision of the 2019 audit that reported 507 AF of loss but omitted 1,074 AF of supply from CDA-Western deliveries. 2020 data estimated as the difference between total potable production and total potable consumption.	

4.4.1 Future Water Loss Performance Standard

Water Code Section 10608.34, subdivision (i) (Senate Bill 555, 2015) requires the State Water Resources Control Board to adopt volumetric performance standards for water loss for urban retail water suppliers. Pursuant to this law, urban retail water suppliers have been annually submitting water loss audits to the Department of Water Resources since October 2017. Copies of JCSD validated water audits are located in Appendix G.

Additionally, urban retail water suppliers are required to calculate an urban water use objective that includes indoor, outdoor, commercial, industrial, and institutional irrigation uses and allowed water loss by 2024 (AB 1668 and SB 606, 2018). These standards are still in the pre-rulemaking process and have not been adopted to-date. However, the Water Code requires

data to be included in this 2020 UWMP that suggests whether the District will meet its water loss performance standard, even though it has yet to be determined.

JCSD is expected to be able to meet its forthcoming water loss performance standard based on the District's aggressive efforts to replace old pipelines and repair leaks, and to dedicate more staff effort towards calibrating and testing meters. Chapter 9 (Metering) discusses these efforts in more detail. According to the proposed regulation, suppliers that have already achieved low levels of real loss (under 16 gallons per connection per day) would not be required to submit responses to the state questionnaires on water loss-specific information or further reduce water loss. These suppliers would be required to maintain losses at or below 16 gallons per connection per day (SWRCB Fact Sheet, pp. 1-2).

4.5 WATER USE FOR LOWER INCOME HOUSEHOLDS

California Senate Bill No. 1087 (SB 1087) requires the water use projections of an UWMP to include the water demands for affordable housing as identified in the housing element of any city, county, or city and county in the service area of the supplier. SB 1087 builds on an existing statutory priority for providing water and sewer services to affordable housing developments.

The Cities of Eastvale and Jurupa Valley have approved Housing Elements and corresponding land use plans that provide various zoning designations to accommodate residential developments for all income levels and densities, including low-income (see Figures 3-6 and 3-8 in Chapter 3).

JCSD will not deny nor condition approval of water services or reduce the number of services applied for by a proposed development that includes housing units affordable to low-income households. Because the demand projections made herein are based on the City land use plans that include residential designations of all types including those that allow for low-income housing, they include the water use for housing needed for lower income households as verified in **Submittal Table 4-5.** Future water conservation (or "Passive Savings") from codes, standards, ordinances, or transportation and land use plans are not included in the District's water demand projections.

Submittal Table 4-5 Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) *Drop down list (y/n)*	No
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, or otherwise are utilized in demand projections are found.	
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes

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CHAPTER 5 SB X7-7 BASELINES AND TARGETS

With the adoption of the Water Conservation Act of 2009, also known as Senate Bill (SB) X7-7, the State of California is required to reduce urban per capita water use by 20 percent by the year 2020. To help the State reach this legislative requirement, each retail urban water supplier (Supplier), including JCSD, is required to also reduce their respective urban per capita (per person) water use by 20 percent. SB X7-7 required each Supplier to determine their baseline water use (Water Use Baseline) during the baseline period and their target water use for the years 2015 (Interim Water Use Target) and 2020 (2020 Water Use Target). The cumulative efforts of each Supplier to meet their respective target water use would result in the State achieving the legislative water reduction requirement by 2020.

In the 2010 UWMP, JCSD calculated the Water Use Baseline, the Interim Water Use Target, and the 2020 Water Use Target using the 2000 U.S. Census. In the 2015 UWMP, the baselines and targets were updated and recalculated using DWR's Population Tool which included the 2010 U.S. Census. The 2015 Interim Water Use Target was 234 gallons per capita per day (GPCD)[1] and the 2020 Water Use Target was 208 GPCD. Because the District's actual water use was 168 GPCD in 2015, the 2015 UWMP determined that JCSD met the Interim Water Use Target and was on track to meet the 2020 Water Use Target by year end 2020. Compliance was verified by DWR reviewing the SB X7-7 Verification Forms submitted with the 2015 UWMP. The complete set of SB X7-7 Verification Forms from 2015 are provided in **Appendix H.**

In this UWMP, JCSD must demonstrate that they met their 2020 Water Use Target by completing the SB X7-7 2020 Compliance Forms which will be verified by DWR. The complete SB X7-7 2020 Compliance Forms are also provided in Appendix H.

[1] Two terms are often used interchangeably; "Daily per Capita Water Use" and "Gallons per Capita per Day" (GPCD). Daily per Capita Water Use is the amount of water used per person per day. In the UWMP, this is total water use within a service area, divided by population and is measured in gallons. GPCD is Daily per Capita Water Use measured in gallons. These are different from R-GPCD, which is solely the residential water use divided by population and is used in drought reporting to the SWRCB.

5.1 RECALCULATION OF BASELINES AND TARGETS

There are some situations where the baselines and targets must, or may be, recalculated including availability of better data, certain service area expansions, contractions, or annexations of already developed areas.

As discussed in Chapter 3, since 2015 the District boundary had one annexation of ±1.21 acres and two detachments totaling ±9.44 acres for a net contraction of approximately 8 acres. All these areas were vacant during baseline years and at the time of the annexation or detachment; therefore, they are not considered to be a previously served portion of the distribution system. Because the land within said detachments is exceedingly small in the scope of the entire service area (26,000 acres) and the land was vacant with zero water use at least until after the detachment was approved in 2018 and therefore no water use from the land was included in the District's baselines and targets, the District has not recalculated the baseline and targets from the 2015 UWMP as a result of said annexation or detachments. Therefore, consistent with *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (Feb. 2016) (*Methodologies*) no revisions to the District's Water Use Baseline, Interim Water Use Target, and 2020 Water Use Target from the 2015 UWMP were made herein.

5.2 BASELINES AND TARGETS

The Water Use Baseline, Interim Water Use Target, and the 2020 Water Use Target calculated in the 2015 UWMP are summarized here, and the complete set of tables are provided in Appendix H.

Since JCSD does not deliver recycled water, the 10-year baseline or the "Baseline GPCD Period" began in 1999 and ended in 2008. The 5-year baseline or the "Target Confirmation Period" began in 2003 and ended in 2007, as shown in **Submittal Table 5-1.**

Submittal Table 5-1 Baselines and Targets Summary From SB X7-7 Verification Form *Retail Supplier or Regional Alliance Only*				
Baseline Period	Start Year *	End Year *	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	*1999*	*2008*	*260*	*208*
5 Year	*2003*	*2007*	*242*	
**All cells in this table should be populated manually from the supplier's SBX7-7 Verification Form and reported in Gallons per Capita per Day (GPCD)*				
NOTES: Units in gallons per capita per day (GPCD). Baseline periods and GPCDs have not changed since 2015 UWMP.				

Once the baseline periods are set, the baseline GPCD is calculated by dividing the volume of water into the system for each baseline year by the service area population in that year (as calculated by the DWR Population Tool). The 2015 SB X7-7 Verification tables located in Appendix H provide the data inputs for the baseline GPCDs.

To calculate the 2020 Water Use Target, the *Target Method 1 – 80 percent of Baseline* methodology was selected in the 2015 UWMP pursuant to Water Code Section 10608.20(b)(1). As shown in Submittal Table 5-1, 80% of the 10-year baseline of 260 GPCD is the 2020 Water Use Target of 208 GPCD.

5.3 2020 SERVICE AREA POPULATION

To correctly calculate the compliance year (2020) GPCD, the population served in 2020 was determined by using DWR's online Population Tool. The DWR Population Tool utilizes U.S. Census year (i.e., 1990, 2000, and 2010)[2] population data, electronic boundary maps of the District service area, and the number of residential meter connections (single-family and

[2] The U.S. Census 2020 decennial data was not available at the time of the 2020 UWMPs.

multifamily residential combined). The District has opted to use DWR's acceptable modification to the 2020 Population Tool estimate by using the 2015 persons-per-connection of 4.18 instead of the 2020 persons-per-connection of 4.10 to arrive at the 2020 population of 130,546 persons (as shown previously in Chapter 3, Table 3-1). See Appendix F for the Population Tool results.

5.4 2020 GROSS WATER USE

Gross water use is a measure of water that enters the distribution system of the Supplier over a 12-month period (calendar year) with certain allowable exclusions. These exclusions are:

- Recycled water delivered within the service area;
- Indirect recycled water;
- Water placed into long term storage (surface or groundwater);
- Water conveyed to another Supplier;
- Water delivered for agricultural use; or
- Process water.

Although JCSD wheels water to another Supplier, this water has not been included in the District's supply source volumes nor the consumption volumes or billing numbers in the baseline calculations or in the 2015 UWMP. Therefore, no exclusions to gross water use will be made for 2020 GPCD calculations.

Gross water use reported for the year 2020 was calculated using *Methodology 1: Gross Water* of the *Methodologies* document, consistent with the way the water use was calculated in the 2015 UWMP for the baseline periods. A 12-month calendar calculation period was used, the water distribution was delineated, and includes District-produced and purchased water. The "Supplier's own water source" for CY 2020 totals 11,796 AF and "a purchased or imported source" for CY 2020 totals 16,306 AF for a total annual gross water use of 28,102 AF (Appendix H, Table 4-A).

No deductions to gross water use were made for exported water, change in the distribution system storage, indirect recycled water, water delivered for agricultural use, or process water.

5.5 2020 COMPLIANCE DAILY PER CAPITA WATER USE (GPCD)

Based on the 2020 population estimate of 130,546 people and 2020 gross water use of 28,102 AF, JCSD's 2020 daily per capita water use is calculated as 192 GPCD as shown in **Submittal Table 5-2**.

Submittal Table 5-2: 2020 Compliance
From SB X7-7 2020 Compliance Form
Retail Supplier or Regional Alliance Only

2020 GPCD			2020 Confirmed Target GPCD*	Did Supplier Achieve Targeted Reduction for 2020? Y/N
Actual 2020 GPCD*	2020 TOTAL Adjustments*	Adjusted 2020 GPCD* *(Adjusted if applicable)*		
192	*0*	*-*	*208*	*Yes*

**All cells in this table should be populated manually from the supplier's SBX7-7 2020 Compliance Form and reported in Gallons per Capita per Day (GPCD)*

NOTES: Units in gallons per capita per day (GPCD).

Because the calculated 2020 Water Use Target was 208 GPCD, the District did achieve their 2020 Water Conservation Target and is compliant with SB X7-7, as shown in Submittal Table 5-2. Pursuant to Water Code Section 10608.24, the District may adjust the actual 2020 GPCD if factors outside the Supplier's control or if special situations occurred. JCSD has determined that no adjustments due to extraordinary events, weather normalization, or economics were warranted.

The complete calculations for the 2020 Water Use Target are located in the SB X7-7 2020 Compliance and Verification Forms located in Appendix H.

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CHAPTER 6 WATER SYSTEM CHARACTERIZATION

As of CY 2020, water supplied to the JCSD service area is entirely from groundwater production. JCSD obtains both potable and non-potable groundwater for use in its service area. All of the District's potable supply comes from the adjudicated portion of the Chino Groundwater Basin (Chino Basin), while the District's small non-potable supply comes from groundwater produced within the Chino Basin and the Riverside County portion of the Riverside-Arlington Basin (aka Riverside South Basin), which is also adjudicated. JCSD does not currently use imported water, surface water, storm water, or recycled water as part of its water supply.

In the future, the District plans to continue utilizing its rights and entitlements to existing groundwater supplies while also pursuing an additional potable water supply from an imported water source and distributing recycled water for non-potable uses.

6.1 PURCHASED OR IMPORTED WATER

6.1.1 Chino Desalter Authority

JCSD purchases treated potable groundwater supplies from CDA, which is a Joint Exercise of Powers Agency created in 2001 by JCSD, Santa Ana River Water Company, Inland Empire Utilities Agency, Western Municipal Water District (WMWD or Western), and the Cities of Chino, Chino Hills, Ontario, and Norco. Currently, CDA operates about 30 wells that pump brackish groundwater from the southern portion of the Chino Basin, two desalter facilities that treat the groundwater with reverse osmosis and ion exchange, a conveyance system to deliver treated water to its member agencies, and brine disposal. CDA is a wholesale supplier and each of the retail members of CDA have contractual "take or pay" commitments to purchase water produced by CDA. The stated goals of the CDA include:

- Achieve hydraulic control of the Chino Basin to prevent contaminated Chino Basin groundwater from entering the Santa Ana River;[1]

[1] Hydraulic control is achieved when groundwater discharge from the Chino-North Management Zone to the Santa Ana River is eliminated or reduced to de minimis levels (less than 1,000 AFY) by pumping at the CDA wells. Hydraulic Control is necessary to maximize the Safe Yield and to prevent degraded groundwater from discharging from the Chino Basin to the Santa Ana River. Four of the nine maximum-

- Reduce TDS (total dissolved solids) and remove contaminants, including nitrates, TCE, PCE, and TCP, from groundwater in the southern portion of the Chino Basin; and

- Deliver the treated water to member agencies to offset the need for imported water.

JCSD is currently entitled to 11,733 AF per year from CDA. As of CY 2020, JCSD received 11,414 AF from CDA. The District's supply obtained from CDA for the last five years are provided in **Table 6A.**

Table 6A Recorded CDA Deliveries (AF), 2016-2020

	2016	2017	2018	2019	2020
Volume (AF)	8,073	8,164	8,971	9,574	11,414

Note: JCSD's current entitlement is 11,733 AF per year.
Source: JCSD Water Operations Dept.
AF = acre-feet

CDA provides high-quality drinking water from two desalters (salt removers) that were anticipated to treat approximately 35,200 acre-feet per year (AFY) of Chino Basin groundwater in 2020 and thereafter. The Chino I Desalter, located at 6905 Kimball Avenue in Chino, was completed in 2000 and expanded in August 2005 to its current rated capacity of 15,906 AFY (14.2 million gallons per day [MGD]). However, the Chino I Desalter cannot provide this rated capacity due to the high concentrations of TDS in the raw water supply. Although Chino Desalter I capacity will not be increased, additional raw water capacity will be provided by five new wells in the Chino Creek Well Field. All five wells have been drilled and equipped. As of March 2021, Chino I Desalter produced 11.97 MGD.

The Chino II Desalter was completed in 2006 and is located at 11202 Harrel Street in the City of Jurupa Valley. The current rated capacity is 11,201 AFY (10 MGD) and permitted capacity is 16,802 AFY (15 MGD), including 5,600 AFY (5 MGD) raw water bypass. The Chino II Desalter is in the process of achieving their permitted capacity as a result of the construction of the South Archibald Plume Cleanup project. CDA is currently expanding the Chino II Desalter to a rated

benefit commitments of the Optimum Basin Management Plan are related to the Chino Desalters and Hydraulic Control. (WEI(d), Exhibit 3-4)

capacity of 25,427 AFY (22.7 mgd). As of March 2021, the Chino II Desalter produced 20.3 MGD.

During calendar year 2020, JCSD negotiated the purchase of Western's CDA supply totaling 3,446 AF.

6.1.2 Rubidoux Community Services District

From 2000 to the end of 2017, JCSD purchased treated groundwater from Rubidoux Community Services District (RCSD) as part of its potable supply. Purchases were stopped beginning January 1, 2018 due to water quality concerns.

An agreement was reached between the two agencies in 2014 to allow JCSD to pump potable water from RCSD into JCSD's 1110' pressure zone through the District's Jewel Street Booster Station. The agencies continue to maintain interties to allow water to flow both ways for sales/purchases or in an emergency. The purchases from RCSD over the past five years is provided in **Table 6B.**

Table 6B Recorded RCSD Deliveries (AF), 2016-2020

	2016	2017	2018	2019	2020
Volume (AF)	2,029	2,322	0	0	0

Source: JCSD Water Operations Dept.
AF = acre-feet

Potable water purchases from RCSD may begin again in the future, although contingent on the water quality concerns being addressed by RCSD.

6.1.3 Imported Water

JCSD does not currently use imported water supplies from the State Water Project.[2] The local distributor of imported water is Western, which is a member agency of The Metropolitan Water District of Southern California (MWD or Metropolitan) who is a State Water Project Contractor. Western can in-turn sell wholesale supplies of imported water that it purchases from Metropolitan to agencies within its service area. Because JCSD is within the Western service

[2] In this plan, the term "imported water" refers only to State Water Project water; it does not refer to any other sources.

area, the District could purchase water from Western in the future contingent on several factors including whether a physical pipeline connection can be made to obtain the water.

State Water Project water comes from Northern California in the Sacramento/San Joaquin Delta. As a State Water Project Contractor, Metropolitan receives an annual allocation that changes each year depending on several factors, including rainfall/snowpack, biological constraints, and various ongoing regulations. Refer to Section 6.2.8 – Future Water Projects.

6.2 GROUNDWATER

The District uses groundwater from the Chino Basin (DWR Bulletin 118 Basin No. 8-002.01) and the Riverside County portion of the Riverside-Arlington Basin (No. 8-002.03) (aka Riverside South Basin). Both are subbasins to the Upper Santa Ana Valley Groundwater Basin (No. 8.2).[3] The Chino Basin is the direct source of groundwater for JCSD, supplying all of the District's potable wells, in addition to CDA's wells. The use of groundwater from the Riverside South Basin is limited to non-potable wells used for irrigation purposes. The groundwater basins in proximity to the District's service area are shown in **Figure 6-1 – Groundwater Basins** (all figures are located at the end of the chapter).

As described in Chapter 3, JCSD currently has 18 active groundwater wells in the Chino Basin, which operate as demand changes. As of August 2020, the District wells have a production rate of 33,090 gallons per minute (gpm) and ultimate well capacity is currently anticipated to be approximately 40,000 gpm (WEBB(a) p. 4-6). JCSD operates two ion-exchange plants to denitrify water from several wells. The Teagarden Ion-Exchange Plant removes nitrates from seven potable wells and the Well 17/18 Ion-Exchange Facility removes nitrates from Wells 17 and 18. Detailed information on the District's water distribution facilities is available in the *2020 JCSD Water Master Plan* (WEBB(a)), which is located on the JCSD Web site, www.jcsd.us.

As described in Section 3.2.3, JCSD maintains five non-potable wells located in the Chino Basin and two non-potable wells in the Riverside South Basin. These wells supply water only for landscape irrigation.

[3] Basin numbering from DWR Bulletin 118. DWR collects, summarizes, and evaluates groundwater data in the "Bulletin 118" series, which defines the boundaries of California's 515 alluvial groundwater basins. Each basin and subbasin is assigned a number code.

6.2.1 Chino Groundwater Basin Description

The Chino Groundwater Basin is one of the largest groundwater basins in Southern California, encompassing approximately 230 square miles of the upper Santa Ana River Watershed. The basin is bounded by the Cucamonga Basin and the San Gabriel Mountains to the north; the Rialto-Colton Basin to the northeast; the chain of Jurupa, Pedley, and La Sierra Hills to the southeast and south; the Temescal Basin to the south; the Chino and Puente Hills to the southwest; the Spadra Basin, San Jose Hills and the Six Basins to the northwest. The Chino Basin lies within the Counties of Los Angeles, Riverside, and San Bernardino and it includes the Cities of Chino, Chino Hills, Eastvale, Fontana, Jurupa Valley, Montclair, Ontario, Pomona, Rancho Cucamonga, and Upland. (WEI(a), p. 1-1)

As of July 1, 2018, the Chino Basin has an estimated 12.6 million AF of total water in storage and an unused storage capacity of approximately 1 million AF (WEI(a), p. 6-15). This large alluvial groundwater basin formed from the eroded sediments of the San Gabriel Mountains, the Chino Hills, Puente Hills, and the San Bernardino Mountains to fill a structural depression. The water-bearing units in the Chino Basin include the Older Alluvium of Pleistocene and Younger Alluvium of Holocene age. (WEI(g), 2003)

Older Alluvium is exposed mainly in the northern part of the Chino Basin and supplies most of the water to wells. It varies in thickness from about 200 feet near the southwestern end of the Chino Basin to over 1,100 feet southwest of Fontana. Pumping capacities of wells completed in the Older Alluvium generally range between 500 and 1,500 gallons per minute (gpm). Capacities exceeding 1,000 gpm are common, with some modern production wells test-pumped at over 4,000 gpm (e.g., southeastern Ontario). In the southern part of the basin where sediments tend to be more clayey, wells generally yield less than 1,000 gpm. (WEI(a), p. 2-3)

While still considered a single basin for hydrologic and legal purposes, the Chino Basin is subdivided into five separate groundwater-flow systems called management zones (MZ), which are shown in **Figure 6-2 – Chino Basin Management Zones**. Each management zone has a unique hydrology, and water resource management activities that occur in one management zone have limited impact on the other management zones. Nearing the southwestern (lowest) part of the basin however, the zones become less distinct as they converge and rise beneath the Prado Basin. Many parties including farmers, overlying industries, cities, and other water

supply entities produce groundwater from the Chino Basin. A discussion of water quality constraints for the Chino Basin is located in Chapter 7.

Chino Basin Management

Water rights to the Chino Basin were adjudicated by the Superior Court of the State of California for the County of San Bernardino on January 27, 1978 (a copy of the Stipulated Judgment and amendments thereto are located in **Appendix I**). The principal function of the Judgment is to control the use of the water source in order to ensure the source is utilized in an optimum manner. Prior to the 1978 adjudication, the Judgment found that the Chino Basin was operating in a continuous state of overdraft. The provisions of the Judgment and the monitoring of the basin are carried out by the court-appointed Chino Basin Watermaster (Watermaster or CBWM). Parties to the Judgment are grouped into three "pools" consisting of the Overlying Agricultural Pool, the Overlying Non-Agricultural Pool, and the Appropriative Pool. JCSD is a member of the Appropriative Pool and therefore has adjudicated production rights to the Chino Basin groundwater. As shown in the Watermaster's *2020/2021 Assessment Package (for Production Year 2019*/2020), the District's annual production right is currently 19,547.9 AF with an additional 31,861.3 AF in storage (CBWM, pp. 10.1, 11.1). Because the Chino Basin and the Riverside-Arlington Basin are adjudicated, groundwater sustainability plans prepared by a groundwater sustainability agency pursuant to the Sustainable Groundwater Management Act of 2014 (SGMA) are not required for these basins.

The 1978 Judgment included a Safe Yield[4] of 140,000 AFY, an allocation of pumping rights among the Parties to the Judgment, and a physical solution that, among other things, requires the Watermaster to offset pumping that occurs in excess of pumping rights. The Safe Yield was reduced to 135,000 AFY for the period of 2015 through 2020. In July 2020, the court ordered that the safe yield be reduced by 3% and reset to 131,000 AFY for the period of July 1, 2020 to June 30, 2030. The Judgment allows parties to pump in excess of their allotted right but must pay a replenishment assessment to the Watermaster to cover the cost to replenish any overdraft caused by the excess pumping. The Watermaster files an annual

[4] Judgment (1978) defines Safe Yield as, "The long-term average annual quantity of groundwater (excluding replenishment or stored water but including return flow to the Basin from use of replenishment or stored water), which can be produced from the basin under cultural conditions of a particular year without causing an undesirable result."

report to the court that addresses pumping and replenishment.[5] Further, the Watermaster files an annual report to DWR pursuant to the Sustainable Groundwater Management Act of 2014 (SGMA) that is required of adjudicated basins. This documents groundwater elevations, extractions, supplies available for recharge, total water use, change in groundwater storage, and the Watermaster's annual report submitted to the court (Water Code Section 10720.8(f)).

Subject to certain localized physical limitations, reductions in Safe Yield with or without augmenting basin management measures affects the cost of groundwater production rather than the reliability of groundwater supplies. The Judgment evinces a clear expectation that parties, including JCSD would produce water in excess of their adjudicated production rights; provided, they pay a replenishment assessment. Therefore, JCSD's ability to produce water from the Basin is thus largely a matter of cost. Water produced in excess of production rights will cost more than water produced within a party's production rights. Thus, the quantity and reliability of water supplies is a matter of cost of the water produced from the Basin rather than limitations on JCSD's access to groundwater supply.

The Chino Basin Watermaster, at the direction of the court, developed the Optimum Basin Management Program (OBMP) as the central planning document for managing the basin. The Peace Agreement was subsequently reached in order to implement the OBMP. The OBMP was updated in 2020 and includes a 2020 Storage Management Plan. The OBMP includes nine program elements (PE) to coordinate stakeholder activities to achieve the management goals, as follows:

- PE 1 – Develop and Implement Comprehensive Monitoring Program.
- PE 2 – Develop and Implement Comprehensive Recharge Program.
- PE 3 – Develop and Implement a Water Supply Plan for Impaired Areas.
- PE 4 – Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1.
- PE 5 – Develop and Implement Regional Supplemental Water Program.

[5] All Chino Basin Watermaster reports and documents are available at www.cbwm.org.

- PE 6 – Develop and Implement Cooperative Programs with the Regional Board and Other Agencies to Improve Basin Management.
- PE 7 – Develop and Implement Salt Management Plan.
- PE 8 – Develop and Implement Groundwater Storage Management Program.
- PE 9 – Develop and Implement Storage and Recovery Programs.

As part of the OBMP, the Watermaster has a groundwater management program comprised of approximately 1,000 wells. This program measures both groundwater quantity and quality throughout the Chino Basin and can be used to monitor groundwater pumping and to identify pollution sources and problems.

To achieve the goal of PE 3 (*Develop and Implement a Water Supply Plan for Impaired Areas)*, municipal groundwater production would need to reach approximately 40,000 AFY in the southern part of the basin. This would replace the decreased agricultural pumping (as the area converts from agricultural to urban uses) and keep groundwater levels from rising and discharging to the Santa Ana River. The potential consequences would be the loss of Safe Yield and the outflow of groundwater with high-TDS and high-nitrate concentrations from the Chino Basin to the Santa Ana River; the latter of which could impair downstream beneficial uses in Orange County. Therefore, the Chino Basin Desalters discussed in Section 6.1 were proposed to maintain and enhance Safe Yield, to pump and treat high salinity groundwater (PE 7), to meet growing municipal demands (PE 5) and to protect beneficial uses of the Santa Ana River. (WEI(b), p. 28)

Beginning September 30, 2011, Metropolitan's delivery of State Water Project water for replenishment of the Chino Basin ended; therefore, two primary sources of recharge are currently pursued by the Watermaster on behalf of the Parties to the Judgment: stormwater recharge and recycled water from wastewater treatment plants.

6.2.2 Riverside Groundwater Basin Description

Some of JCSD's non-potable water supply comes from the Riverside-Arlington Sub-basin (DWR Bulletin 118 Basin No. 8-002.03, aka "Riverside Basin"), which is part of the Upper Santa

Ana Valley Groundwater Basin (No. 8.2). The Riverside County portion of the Riverside Basin is referred to as Riverside South Basin for the purposes of its adjudication and is the focus of the discussion herein (Figure 6-1).

The Riverside Basin encompasses a surface area of 58,600 acres (92 square miles) within portions of Riverside and San Bernardino Counties. The Riverside Basin underlies part of the Santa Ana River Watershed and is bounded by impermeable rocks of Box Springs Mountains to the southeast, Arlington Mountain to the south, La Sierra Heights and Mount Rubidoux to the northwest, and the Jurupa Mountains to the north. (K&S, p. 5-2)

Riverside Basin Management

The Riverside Basin is adjudicated by two Judgments; first, the Judgment in Case No. 117628, Orange County Water District vs. City of Chino, et al., entered April 17, 1969 ("Orange County Judgment"), which is provided in **Appendix J**. Second, the pumping rights to the San Bernardino, Colton, and Riverside Groundwater Basins are set forth in the Judgment in Case No. 78426-County of Riverside, Western Municipal Water District of Riverside County et al., v. East San Bernardino County Water District et al., entered April 17, 1969 ("Western-San Bernardino Judgment"). A copy of the Western-San Bernardino Judgment is provided in **Appendix K** and will be the focus of the remainder of this section. The Western-San Bernardino Judgment provides a physical solution that establishes the entitlements and obligations of the two major water districts overlying said basins, namely San Bernardino Valley Municipal Water District (Valley District) and Western. The court appointed a Watermaster, composed of one person nominated from Valley District and one person nominated from Western to administer and enforce all instruction and orders of the court ("Western-San Bernardino Watermaster"). (WSBW, pp. 1, 5)

The Riverside Basin is bounded by the Rialto-Colton fault to the north, Arlington Basin to the south, Box Spring Mountains to the east, and Chino Basin to the west. The Riverside basin is an alluvial fill, unconfined basin (WSC, p. 7-4). Compliance with the Judgment requires an annual accounting of groundwater and surface water flows and diversions within the various basins in order that the Watermaster may properly report to the court the comparisons of the year-by-year operations with the verified entitlements, and an accounting as to the replenishment obligations or credits indicated by such comparison. (WSBW, p. 5)

Section IX(b) of the Judgment, below, describes the aggregate pumping limit:

> *Over any five year period, there may be extracted from such Basin Area, without replenishment obligation, an amount equal to five times such annual average for the Basin Area; provided, however, that if extractions in any year exceed such average by more than 30 percent, Western* [Municipal Water District] *shall provide replenishment in the following year equal to the excess extractions over such 20 percent peaking allowance.*

The Judgment does not specify the volume of water in the Riverside Basin that the District can extract or is limited to. The base period average production in the Riverside South Basin was 29,633 and this is the base right for use in the basin.[6] If annual production exceeds 20% of this average, or if a five-year period production exceeds five times the amount of 29,633 AF, then Western shall provide replenishment. Pumping in the Riverside Basin has not exceeded the base right since the Judgment was entered into. Because the Judgment allows under-extractions to count as credits and over-extractions to count as obligations, Western has a credit of 544,221 AF as of 2019 that can be used to offset future obligations (WSBW, p. 119). In the event Western is required to provide replenishment water to the Riverside Basin because aggregate pumping exceeded the aggregate pumping limit and no credits were available to offset the obligation, then the District may be responsible for some of the cost of that replenishment, along with other users.

6.2.3 Recorded Groundwater Pumping and Sufficiency of Supply

The total annual groundwater produced by JCSD from 2016-2020 are provided in **Submittal Table 6-1** (next page)**.** Sufficient water supplies have been available from both basins to meet JCSD's needs over the past five years.

[6] Measured as the average extractions from 1959 – 1963 (WSBW, p. 86).

Submittal Table 6-1 Retail: Groundwater Volume Pumped						
☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
☐	All or part of the groundwater described below is desalinated.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
Add additional rows as needed						
Alluvial Basin	Chino Basin - potable (No. 8-2.01)	10,715	12,905	14,829	13,720	11,029
Alluvial Basin	Chino Basin - non-potable (No. 8-2.01)	233	253	304	255	276
Alluvial Basin	Riverside Basin - non-potable (No. 8-2.03)	473	503	516	492	491
	TOTAL	11,421	13,661	15,649	14,467	11,796
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: CY data. Units in acre-feet (AF). Includes groundwater produced by the District. Purchased groundwater produced by others is not included here.						

An adjudicated water right has perhaps the most substantial indicia of reliability of any water right that currently exists in California. An adjudicated right is based upon long-term studies whose purpose it is to protect the long-term functionality of the water source. These rights are coordinated in an established and binding manner with all the other users of the basin and are overseen by a Watermaster which has the authority to mandate and proscribe activities whose purpose is to protect the water source and maximize its long-term beneficial use.

JCSD's legal right to pump water in an amount necessary to meet all demands as sanctioned and protected by the Chino Basin Judgment as discussed above, is buttressed by several programs and projects, including the OBMP, that are directed at ensuring the sufficiency of groundwater supplies from the Chino Basin, particularly during dry years. The sufficiency of the Chino Basin groundwater supply that is available to JCSD is assured due to the abundance of groundwater in the central and southern portion of the Chino Basin, OBMP objectives that prioritize and assure production from the southern Chino Basin coupled with desalting and ion-exchange treatment facilities that enable the use of this abundant supply for municipal (potable) purposes. As indicated previously, southern basin production where JCSD is partially located, is the linchpin of several critical OBMP objectives. Thus, the sufficiency of groundwater is heightened and prioritized by the necessity of continued pumping from the

southern Chino Basin under the OBMP which is administered by the Watermaster and ultimately validated and enforced by continuing Court oversight.

In regard to the sufficiency of the Riverside South Basin, the Western-San Bernardino Watermaster has documented in its *Annual Report for Calendar Year 2020*, "during the five-year period 2015 through 2019, Plaintiffs did not exceed the allowable extractions and that Western [Municipal Water District] credits exceed obligations and therefore is not required to provide replenishment (WSBW, p. iii)."

6.3 SURFACE WATER

JCSD does not use surface water as part of its supply, nor does it have plans to expand supply sources by using surface water.

There are three major creeks that flow through the District's service area; Day Creek, San Sevaine Creek, and Cucamonga Creek which drain from the San Gabriel mountains north of the District to the Santa Ana River along the southern boundary of the District. These waterways are concrete-lined and heavily managed by other entities and not a part of JCSD's activities. Surface water quantity and quality is managed and monitored throughout the Chino Basin as a component of the OBMP. The Watermaster and Inland Empire Utilities Agency (IEUA) continually measure the quantity of storm water and supplemental water entering the recharge basins.

6.4 STORMWATER

JCSD does not have the authority to manage storm water intentionally to divert for beneficial use, but there are other entities in the Chino Basin that are performing this task for the benefit of the region.

Communities are increasingly implementing opportunities to beneficially use storm water to meet local water supply demands. Groundwater recharge with storm water capture and infiltration (or spreading/recharge) basins is an integral part of the Chino Basin Watermaster's OBMP efforts to increase supply and improve groundwater quality ("Program Element 2"). The Watermaster and IEUA are continuing to implement the *2013 Amendment to the 2010 Recharge Master Plan Update*, the goal of which is to increase the basin's sustainability and

decrease reliance on imported water. In FY 2019/2020, progress was made by the Watermaster on several projects to increase stormwater diversion and storage in Lower Day Basin (9,104 acre-feet) and Wineville/Jurupa/RP3 Basins (17,982 acre-feet). (CBWM(b), p.8) Further, the Chino Basin *2018 Recharge Master Plan Update* documents that the Watermaster has sufficient recharge capacity as of FY 2018/2019 to meet expected future replenishment obligations through 2050 (WEI(c), p. iii)

6.5 WASTEWATER AND RECYCLED WATER

JCSD is the responsible agency for collecting and conveying the municipal wastewater generated within its service area to two regional wastewater treatment plants and one brine waste disposal pipeline:

- City of Riverside Regional Water Quality Control Plant (RWQCP);
- Western Riverside County Regional Wastewater Authority's Wastewater Treatment Plant (WRCRWA); and
- Orange County Sanitation District via the Inland Empire Brine Line (IEBL).

Recycled water is currently produced and distributed from the RWQCP. Recycled water will become available from the WRCRWA facility in the near future. Although entitled to recycled water produced from its share of wastewater flows to both of these treatment plants, JCSD currently does not use or distribute recycled water. As discussed herein, the District is in the process of designing a recycled water system. Additional detail on the District's wastewater system is available in the JCSD *2020 Wastewater Master Plan* located at www.JCSD.us.

6.5.1 Recycled Water Coordination

JCSD is actively working to provide its customers recycled water in the future. Utilizing recycled water for irrigation and other non-potable purposes will allow the District to more efficiently allocate its potable water supply and increase the overall reliability of water supplies in the service area.

Recycled water is currently produced and distributed from the City of Riverside RWQCP for use in several locations in the City of Riverside. JCSD is entitled to the recycled water

produced from its share of wastewater flows to the RWQCP; however, the District does not have a connection or an agreement with the City of Riverside to access this supply for use and distribution in its service area.

Recycled water will soon be produced and available from the WRCRWA facility. In 2015, IEUA submitted a Clean Water State Revolving Fund (SRF) loan application to the State Water Board on behalf of IEUA and the District, for the *Joint IEUA-JCSD Regional Water Recycling Program*, including a District-only Recycled Water Service Expansion project. In addition, JCSD has received funding agreements with the State Water Board and Riverside County Flood Control and Water Conservation District.

The Recycled Water Service Expansion project would convey recycled water from the WRCRWA facility to irrigating parks, playgrounds, and other landscaped areas in Eastvale and JCSD's non-potable lines "Area B" in Jurupa Valley (Clean Water State Revolving Fund Project No. 8167-110). Funding from the State is based on a performance requirement to deliver 500 AFY for irrigation; however, the District estimates 660 AFY of demand will be met with the initial system. Design of the system is underway, and construction is estimated to begin in 2022. This project would convert the irrigation currently being used in said areas from potable water to recycled water. JCSD is actively working on securing grants and the SRF loans to fund the project from the following agencies: State Water Resources Control Board, Riverside County Flood Control District, and U.S. Bureau of Reclamation. The finalization of grants and loans will be completed by summer 2021 and presented to the JCSD Board of Directors when available.

This project aims to overcome several challenges to bringing recycled water to the District. One challenge is that most of the demands for this supply are at a higher elevation than the treatment plants where the recycled water is produced, requiring great energy and infrastructure to move the treated water uphill for use. Another challenge is the limited existing infrastructure available to distribute the water; as mentioned in Chapter 3 the District's recycled water system is limited at this time to the "Area B Non-Potable System." Further, the places where recycled water can be used may not be contiguous, thus increasing cost to reach scattered places to irrigate. The primary constraint at this time to delivering recycled water is the cost to do so is so much higher than the cost to utilize the District's other supply sources.

6.5.2 Wastewater Collection, Treatment, and Disposal

JCSD's sewer system is centered on the regional approach to treatment as a cost-effective way to treat wastewater. Currently the District has 10 sewage lift stations, 3 inverted siphons, and 11 diversion structures. JCSD owns approximately 376 miles of gravity pipelines and 8 miles of force mains (WEBB(d), p. ES-4).

As shown on **Figure 6-3 – JCSD Wastewater Tributary Areas**, wastewater generated in the easterly half of the District is tributary to the City of Riverside RWQCP, which is located outside of the District boundary and discharges advanced-treated effluent to the Santa Ana River and distributes recycled water for beneficial use by the City of Riverside outside of the District boundary. JCSD does not have a connection or agreement with the City of Riverside for recycled water supplies.

The north-central area of the District is largely industrial and wastewater generated there is tributary to the Inland Empire Brine Line, which is a regional brine waste disposal pipeline owned and maintained by the Santa Ana Watershed Project Authority (SAWPA, www.sawpa.org). The IEBL starts in the upper Santa Ana River Watershed and terminates at Orange County Sanitation District's Fountain Valley plant for treatment and discharge to the Pacific Ocean. Because brine waste is highly saline containing industrial wastes, potential for re-use is not possible.

The westerly half of the District is tributary to the WRCRWA treatment plant, which is located within the JCSD service area. Tertiary-treated effluent is discharged to the Santa Ana River along the District's southern boundary. WRCRWA is a joint powers authority (JPA) consisting of the cities of Norco and Corona, JCSD, Home Gardens Sanitary District, and Western. Western is the plant's operator. A recent Change of Use Order has been granted and the WRCRWA treatment plant will soon produce recycled water for beneficial use. As a member of the JPA, JCSD will be entitled to the recycled water generated from its share of wastewater flows to the plant. Current and projected wastewater flows and operating details for each treatment plant are provided in **Table 6C.**

Table 6C - Wastewater Treatment Facilities Treating Flows from JCSD

	City of Riverside Regional Water Quality Control Plant (RWQCP)	Western Riverside County Regional Wastewater Authority Treatment Plant (WRCRWA)	Inland Empire Brine Line (IEBL)
Percentage of JCSD Area Served[1]	41%	38%	13%
Treatment and Discharge Within JCSD?	No	Yes	No
Plant Operator	City of Riverside	Western Municipal Water District	Santa Ana Watershed Project Authority
Treatment Services Provided	Primary, secondary, and tertiary treatment. Meets all Title 22 requirements for recycled water and distributes recycled water within the City of Riverside.	Primary, secondary, and tertiary treatment. Meets all Title 22 requirements for recycled water.	Conveys brine waste from upper Santa Ana River Watershed sources to treatment at Orange County Sanitation District (OCSD) and discharge to Pacific Ocean.
2020 Average Flows from JCSD (MGD)[2]	2.9	4.6	0.8
JCSD Capacity Right (MGD)	4 MGD (until 2030) 5 MGD (after 2030)	6 MGD	3.493 MGD (IEBL) 1.155 MGD (OCSD)
JCSD Projected Buildout Contribution (MGD)	4.74	5.22	1.32
Current Maximum Permitted Capacity (MGD)	46	14	17[3]

Source: JCSD *2020 Wastewater Master Plan (Draft)* (WEBB(d)), pp. 4-2, 4-20, 5-32.
MGD = million gallons per day.
(1) Jurupa Mountains currently limit the wastewater service area to approximately 92% of the District.
(2) Flows from JCSD tributary areas to each treatment facility. Based on highest flow value from 12-month running average from January 2020 to December 2020.
(3) Source: SAWPA Staff, 05/06/2021.

In CY 2020, the District contributed wastewater in the amounts of 5,134 AF to WRCRWA, 3,241 AF to RWQCP and 939 AF to the IEBL, as shown in **Submittal Table 6-2.**

Submittal Table 6-2 Retail: Wastewater Collected Within Service Area in 2020						
☐	There is no wastewater collection system. The supplier will not complete the table below.					
92%	Percentage of 2020 service area covered by wastewater collection system *(optional)*					
	Percentage of 2020 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? *Drop Down List*	Volume of Wastewater Collected from UWMP Service Area 2020 *	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? *Drop Down List*	Is WWTP Operation Contracted to a Third Party? *(optional)* *Drop Down List*
JCSD	Metered	5,134	Western Riverside County Regional Wastewater Authority (WRCRWA)	Western Riverside County Regional Wastewater Authority Treatment Plant	Yes	Yes
JCSD	Metered	3,241	City of Riverside	Regional Water Quality Control Plant	No	No
JCSD	Metered	939	Santa Ana Watershed Project Authority	Orange County Sanitation District	No	Yes
Total Wastewater Collected from Service Area in 2020:		9,314				
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3* **.**						
NOTES: CY2020, volume in AF. Brine waste to Orange County Sanitation District is non-reclaimable. City of Riverside treatment plant is on the border of the District service area. Source: JCSD Sewer System Total Flow Summary.						

As of CY 2020, WRCRWA treated and discharge approximately 9,100 AF of wastewater from all sources. In addition, the RWQCP in 2020 treated and discharged approximately 28,000 AF of wastewater from all sources, and produced 185 AF of recycled water, as shown in **Submittal Table 6-3** (next page).

Submittal Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2020											
☐	No wastewater is treated or disposed of within the UWMP service area. The supplier will not complete the table below.										
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)* 2	Method of Disposal *Drop down list*	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level *Drop down list*	2020 volumes [1]				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area [3]	Recycled Outside of Service Area	Instream Flow Permit Requirement
Western Riverside County Regional Wastewater Authority Treatment Plant	Santa Ana River	Santa Ana River		River or creek outfall	Yes	Tertiary	9,100	9,100	0	0	0
Regional Water Quality Control Plant	Santa Ana River	Santa Ana River		River or creek outfall	Yes	Advanced	28,340	27,981	0	185	25,000
						Total	37,440	37,081	0	185	25,000

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.
[2] If the **Wastewater Discharge ID Number** is not available to the UWMP preparer, access the SWRCB CIWQS regulated facility website at https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility

NOTES: Santa Ana River is located along most of the southerly boundary of the District. Sources: (1) RWQCP treated/discharged/recycled flows from "2020 Annual Report, NPDES No. CA0205350, for the City of Riverside's Regional Water Quality Control Plant", (2) Instream flow permit requirement from "Update of the Integrated Master Plan for the Wastewater Collection and Treatment Facilities" (Carollo, Jan. 2020); (3) WRCRWA treated/discharged flows from personal communication with Ddaze Phuong, Sr. Operations Technician I, Western Municipal Water District 04/01/2021.

6.5.3 Recycled Water System Description

JCSD does not operate nor participate in a recycled water system at this time. However, as mentioned previously, recycled water will soon be produced and available from the WRCRWA facility. JCSD is in the process of securing funding and preparing design drawings to construct a system that would convey recycled water from the WRCRWA facility to irrigating parks, playgrounds, and other landscaped areas in Eastvale and JCSD's non-potable "Area B" pipelines in Jurupa Valley (Clean Water State Revolving Fund Project No. 8167-110). Funding from the State is based on a performance requirement to deliver 500 AFY for irrigation; however, the District estimates 660 AFY of demand will be met with the initial system. Design of the system is underway, and construction is estimated to begin in 2022. This project would convert the irrigation currently being used in said areas from potable water to recycled water.

6.5.4 Potential, Current, and Projected Recycled Water Uses

JCSD currently does not put recycled water to beneficial use. The definition of recycled water includes the term "direct beneficial use", which is defined in CCR, Title 22, §60301.200 as "the use of recycled water that has been transported from the point of treatment or production to the point of use without an intervening discharge to waters of the State." In the future as recycled water use becomes a reality for JCSD, beneficial uses could include:

- Landscape irrigation (excluding golf courses);
- Golf course irrigation;
- Commercial use;
- Industrial use; and
- Groundwater recharge.

Future recycled water supplies are expected to come online for beneficial use by 2022 (WEBB(e)), as shown in **Submittal Table 6-4**. At such time that recycled water becomes part of JCSD's supply portfolio, the District expects to see an equal decrease in potable water that was previously used for irrigation purposes.

Submittal Table 6-4 Retail: Recycled Water Direct Beneficial Uses Within Service Area

☐ Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.

Name of Supplier Producing (Treating) the Recycled Water:	Western Riverside County Regional Wastewater Authority (WRCRWA)
Name of Supplier Operating the Recycled Water Distribution System:	Jurupa Community Services District
Supplemental Water Added in 2020 (volume) *Include units*	0
Source of 2020 Supplemental Water	0

Beneficial Use Type *Insert additional rows if needed.*	**Potential** Beneficial Uses of Recycled Water (Describe)	Amount of **Potential** Uses of Recycled Water (Quantity) *Include volume units*[1]	General Description of 2020 Uses	Level of Treatment *Drop down list*	2020[1]	2025[1]	2030[1]	2035[1]	2040[1]	2045[1] (opt)
Agricultural irrigation										
Landscape irrigation (exc golf courses)	JCSD parks, city community center, school fields, median landscaping in road rights-of-way.	626 AF	No recycled water use in 2020	Tertiary	0	660	660	660	660	660
Golf course irrigation										
Commercial use										
Industrial use										
Geothermal and other energy production										
Seawater intrusion barrier										
Recreational impoundment										
Wetlands or wildlife habitat										
Groundwater recharge (IPR)										
Reservoir water augmentation (IPR)										
Direct potable reuse										
Other (Description Required)										
				Total:	0	660	660	660	660	660
				2020 Internal Reuse						

[1] ***Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Volumes in acre-feet (AF). Source: Technical Memorandum - Non-Potable Water Scoping Study - 500 AFY option (Jan. 21, 2021).

The 2020 UWMP must describe the actual use of recycled water compared to predictions of recycled water use made in the 2015 UWMP, which is provided in **Submittal Table 6-5**. Table

6-4 of the District's 2015 UWMP projected that up to 500 AF per year of recycled water would be available from the WRCRWA plant for JCSD irrigation purposes. Work is still ongoing to achieve this goal and recycled water is expected for JCSD by 2022.

Submittal Table 6-5 Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual		
☐	Recycled water was not used in 2015 nor projected for use in 2020. The supplier will not complete the table below. If recycled water was not used in 2020, and was not predicted to be in 2015, then check the box and do not complete the table.	
Beneficial Use Type	**2015 Projection for 2020 [1]**	**2020 Actual Use [1]**
Insert additional rows as needed.		
Agricultural irrigation		
Landscape irrigation (exc golf courses)	500	0
Golf course irrigation		
Commercial use		
Industrial use		
Geothermal and other energy production		
Seawater intrusion barrier		
Recreational impoundment		
Wetlands or wildlife habitat		
Groundwater recharge (IPR)		
Reservoir water augmentation (IPR)		
Direct potable reuse		
Other (Description Required)		
Total	500	0
[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.		
NOTE: From Table 6-4 of the 2015 UWMP		

6.5.5 Actions to Encourage and Optimize Future Recycled Water Use

For more than 10 years, JCSD has been involved with public outreach and coordinating with local entities, local water agencies, regional wastewater agencies, and other planning agencies to discuss the feasibility of using recycled water in lieu of potable or non-potable groundwater that is currently used for irrigation. In this Plan, it is projected that recycled water use will come online and distributed by the District by the next UWMP cycle. However, regional planning and coordination effort will continue to the extent possible as other opportunities develop to take advantage of the recycled water supply to which the District is entitled and put it to beneficial use. Funding availability, securing grant funding, and financial incentives are among the factors

that will play a big role in the future implementation of recommended recycled water projects. The District will weigh the cost-effectiveness of recycled water projects and the current unit cost of producing or purchasing potable and non-potable groundwater. State and federal funding, if available, could offset the cost imposed during project construction which typically makes the project cost prohibitive. Obtaining funding can also help build community support for a project because it results in reduced taxpayer contribution.

As shown previously in Submittal Table 6-2, the District sent approximately 5,134 AF of wastewater for treatment at the WRCRWA treatment plant during CY 2020. An annual amount of recycled water of this volume would be a significant offset of potable water use in the District. As described earlier, JCSD has completed studies to identify both existing and future potential non-potable demands that could be potentially supplied by non-potable sources, thus, freeing up potable supplies currently used to meet portion of irrigation demands.

The expected increase in recycled water (and subsequent decrease in potable and non-potable water demand) by the District's current recycled water project is provided in **Submittal Table 6-6.**

Submittal Table 6-6 Retail: Methods to Expand Future Recycled Water Use			
☐	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use *
Add additional rows as needed			
JCSD Recycled Water Project (CWSRF Project No. 8167-110)	To convert 660 AFY recycled water for irrigating parks, playgrounds, and other landscaped areas in JCSD boundary.	2022	660
		Total	660
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Units in acre-feet (AF)			

6.6 DESALINATED WATER OPPORTUNITIES

The District does not desalinate water (remove salts) but may do so in the future. JCSD currently obtains desalinated water from CDA (refer to Section 6.1.1). CDA owns and operates two desalters, Chino I and Chino II, for the benefit of its member agencies, including JCSD. The desalters treat brackish, or very salty, groundwater from the Chino Basin where there are elevated concentrations of nitrate and TDS resulting from historic dairy and agricultural activities. CDA is a wholesale water supplier and will prepare a 2020 UWMP that describes its production and facilities, which is available at www.chinodesalter.org.

6.7 WATER EXCHANGES AND TRANSFERS

Pursuant to a long-term agreement, JCSD transfers Santa Ana River Water Company's allotment from CDA and delivers it to the Santa Ana River Water Company. If the Santa Ana River Water Company does not use all of its allotment, then the difference stays in JCSD's system. On the other hand, if the Santa Ana River Water Company needs more than its allotment from CDA, then JCSD will sell that water to them pursuant to their agreement.

JCSD participates in a conjunctive use program called the Dry Year Yield (DYY) Program. The DYY Program is a cooperative conjunctive use effort involving Metropolitan, IEUA, Chino Basin Watermaster, Three Valleys Municipal Water District, and Chino Basin groundwater producers including the City of Ontario.[7] Under this Program, Metropolitan is allowed to store up to 100,000 AF per year of water in the Chino Basin when surplus water is available during wet years, and to reduce imported water deliveries up to 33,000 AF per year during dry, drought, or emergency periods. The DYY program provides Metropolitan the right to store groundwater in the basin, as a hedge against drought, in exchange for paying the costs of developing the facilities that deliver that water.

JCSD entered into a Local Agency Agreement on January 12, 2004 with the City of Ontario because Ontario has a direct connection with imported water from Metropolitan at the Water Facilities Authority Treatment Plant in Upland. When Metropolitan makes a "call" for its stored water, the participating agencies will produce up to 33,000 AF per year (i.e., the dry year yield)

[7] Information on the Dry Year Yield Program is available at the Chino Basin Watermaster Web site, http://cbwm.org/rep_engineering.htm.

from Metropolitan's "storage account" in the Chino Basin. In exchange, Metropolitan will provide agencies an operation and maintenance credit per acre-foot for the cost of pumping. During "wet years" or "non-call" years, Ontario will increase Metropolitan deliveries, which JCSD will purchase from Ontario and becomes part of JCSD's supply in the form of Ontario's portion of CDA water. Up to 2,000 AF over 12 months is expected. During a "call year," Ontario will stop deliveries to JCSD to meet the performance requirements of the program. During a "call year," JCSD will stop receiving Ontario's portion of CDA water and return to District well supply to meet demand.

According to the Watermaster's *Fiscal Year 2019-2020 43rd Annual Report*: "The DYY program is currently the only Storage and Recovery Program that is being implemented in the Chino Basin. Following years of drought, Metropolitan has been accumulating water in the storage account since 2017. By December 31, 2019, the volume of groundwater in the DYY program account was 49,510 acre-feet" (CBWM(b), p. 4).

6.8 FUTURE WATER PROJECTS

Future water supply projects or programs that will have a quantifiable increase in JCSD's water supply and can reasonably be expected to be implemented within the 20-year time frame of the UWMP are summarized in **Submittal Table 6-7** (next page)**.** Narrative descriptions of each project (or group of projects) follow in timeline order after the table.

Submittal Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☐	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other suppliers?		Description (if needed)	Planned Implementation	Planned for Use in Year Type	Expected Increase in Water Supply to Supplier*
	Drop Down List (y/n)	*If Yes, Supplier Name*				
Add additional rows as needed						
Well 13	No		Add ion-exchange to bring well back online.	2021	All Year Types	2,500
Well 17	No		Add ion-exchange to bring well back online.	2021	All Year Types	2,500
JCSD Recycled Water Project (CWSRF Project No. 8167-110)	Yes	Western Riverside County Regional Wastewater Authority (WRCRWA)	New recycled water supply for irrigating parks, playgrounds, and other landscaped areas in Eastvale and Area B in Jurupa Valley.	2023	All Year Types	660
La Sierra Pipeline Connection	Yes	Western Municipal Water District	Bring imported water from MWD's Henry J. Mills Water Treatment Plant through WMWD's La Sierra Pipeline through the Sterling Pump Station, under the Santa Ana River to CDA.	2024	Average Year	4,000
Well 30	No		Supply 2500 gpm to 1110 PZ by replacing Well 19, which is at 1,000 gpm.	2025	All Year Types	2,500
Etiwanda Northern Pipeline - Phase 1a	Yes	Cucamonga Valley Water District	Pipeline construction and connection to CVWD and well site acquisitions.	2021-2023	Average Year	2,000
Etiwanda Northern Pipeline - Phase 1b	Yes	Cucamonga Valley Water District	Two new potable wells (2500 gpm each), lateral connections to pipeline, hydroelectric generation at LMWTP intake.	2022-2024	All Year Types	2,000
Etiwanda Northern Pipeline - Phase 2a	Yes	Cucamonga Valley Water District	Pipeline construction and connection to CVWD Resevoir 2C; well and reservoir site acquisitions.	2022-2025	All Year Types	2,000
Etiwanda Northern Pipeline - Phase 2b	Yes	Cucamonga Valley Water District	Drill and equip 3 new wells (2500 gpm each), including aquifer storage and recovery wells for 2 wells. Laterals to connect to Etiwanda Pipeline.	2025-2029	All Year Types	2,000
Etiwanda Northern Pipeline - Phase 2c	Yes	Cucamonga Valley Water District	Construct 10 MG reservoir at CVWD Reservoir 2C; booster upgrades, and hydroelectric generation at JCSD.	2022-2027	All Year Types	0
Etiwanda Northern Pipeline - Phase 3	Yes	Cucamonga Valley Water District	Treatment at JCSD wells in 3 parts to recover an out-of-service supply. This phase is not part of the 10,000 AFY total from Etiwanda Pipeline project.	2022-2027	All Year Types	6,000
Etiwanda Northern Pipeline - Phase 4	Yes	Cucamonga Valley Water District	15,090 LF of pipeline for final connection of pipeline to CVWD LMWTP (or RNWTP). Expansion/upgrade of LMWTP or RNWTP.	2023-2026	All Year Types	2,000
Van Buren Interconnect	Yes	City of Riverside Public Utilities	Complete the potable intertie with RPU. Deliveries from RPU will exclude summers.	Beyond 2026	Average Year	3,000-5,000
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Volume in AF. Etiwanda pIpeline anticipated total yield is 10,000 AF.						

- Well 13 and Well 17 Projects.

  Wells 13 and 17 are currently offline due to water quality concerns. To bring these wells back online as soon as possible, the District is pursuing an emergency project to install wellhead treatment for PFAS at each well site using single-pass ion-exchange resin. Treatment at each well site will be approximately 3,000 gpm. This supply is anticipated to be implemented by the end of 2021. Because the source is Chino Basin groundwater, the project will increase reliability for normal year, single-dry year, and multiple dry-years.

- Recycled Water Expansion Project.

  The JCSD Recycled Water Expansion Project will bring recycled water to landscaped areas where it can be used in Eastvale and southwestern Jurupa Valley ("Area B"). Design is currently underway to bring recycled water from the WRCRWA treatment plant that will replace 660 AFY of potable water demand with 660 AFY of recycled water demand. Implementation is expected in 2023. The project will increase reliability for a normal year and a single-dry year. Because 660 AFY is just 13% of the current average yearly wastewater flow to WRCRWA from JCSD (Submittal Table 6-2; 5,134 AFY), this supply is expected to remain available in multiple-dry years as well, despite expected reductions in wastewater flows to treatment plants during extended droughts.

- La Sierra Pipeline Connection.

  JCSD currently does not have a direct connection to imported water supplies. This project could bring imported State Water Project water that is treated at Metropolitan's Henry J. Mills Water Treatment Plant through Western's La Sierra Pipeline and Sterling Pump Station and delivered to CDA where JCSD can access the supply. Implementation could provide approximately 4,000 AFY in an average year; however, implementation of this project is contingent on continuing discussions and securing an agreement with Western. Based on Metropolitan's determination that no service reliability concerns are projected for imported water during normal and drought periods before 2045 (WMWD(a), p. 3), this supply source would be available in normal, single-dry, and multiple dry years.

- Etiwanda Pipeline Project.

  The Etiwanda Intervalley Water Quality and Water Resiliency (Etiwanda Pipeline) Project will provide a new water supply source for the District from a combination of Cucamonga Valley Water District's (CVWD's) surface water treatment plants and new JCSD wells drilled in CVWD's service area, which is in the upper portion of the Chino Basin. The project will be constructed in seven phases with varying supply volumes coming online as the project proceeds over approximately 10 years. Approximately 10,000 AFY for JCSD is anticipated from the project at completion; however, for planning purposes herein 6,000 AFY is used. The design will allow the water to flow to either agency, as needed. This supply is expected to be met from CVWD's water treatment plants, which treat raw imported State Water Project water from Metropolitan's Rialto Feeder and new JCSD wells developed in the upper portion of the Chino Basin. Based on Metropolitan's determination that no service reliability concerns are projected for imported water during normal and drought periods before 2045 (WMWD(a), p. 3), this supply source would be available in normal, single-dry, and multiple dry years.

- Well 30 Project.

  Well 19 was constructed over 100 years ago and production is declining. Therefore, proposed Well 30 will replace Well 19 and provide an increase in supply of up to 1,500 gpm for a total of 2,500 gpm. Property acquisition and environmental review is currently underway. This project is expected to be completed in 2025 and would supply average year, single-dry, and multiple-dry year demands.

- Van Buren Interconnect Project.

  JCSD prepared for an intertie connection with the City of Riverside by installing a segment of pipe in the Van Buren Blvd. Bridge many years back. This project would finish that connection and provide 3,000-5,000 AFY of potable water to JCSD for approximately 9-10 months out of the year (excluding summer months). This supply is expected to be available in average years only.

6.9 SUMMARY OF EXISTING AND PLANNED SOURCES OF WATER

The potable and non-potable water supplies utilized by the District in CY 2020 are provided in **Submittal Table 6-8** (next page)**.** Water supplied in CY 2020 are all within the terms of the District's rights, contracts, and entitlements.

Submittal Table 6-8 Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2020		
Drop down list May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool		Actual Volume*	Water Quality Drop Down List	Total Right or Safe Yield* (optional)
Add additional rows as needed				
Purchased or Imported Water	CDA desalinated groundwater (Chino Basin No. 8-002.01)	11,414	Drinking Water	
Groundwater (not desalinated)	Potable wells (Chino Basin No. 8-002.01)	11,029	Drinking Water	
Other	Dry-Year Yield desalinated groundwater (Chino Basin No. 8-002.01)	1,446	Drinking Water	
Purchased or Imported Water	Western Municipal Water District via CDA desalinated groundwater (Chino Basin No. 8-002.01)	3,446	Drinking Water	
Transfers	For Santa Ana River Water Company from CDA desalinated groundwater (Chino Basin No. 8-002.01)	1,170	Drinking Water	
Groundwater (not desalinated)	Non-potable wells (Chino Basin No. 8-002.01)	276	Other Non-Potable Water	
Groundwater (not desalinated)	Non-potable wells (Riverside Basin No. 8-002.03)	491	Other Non-Potable Water	
	Total	29,272		0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES: CY 2020 data. Units in acre-feet (AF). Source: JCSD. Total potable supply equals 28,505 AF which is higher than the 2020 Water Master Plan total 2020 supply estimate of 27,357 AF because this table includes transfers (1,170 AF) and a correction of -22 AF in the well production data used in the Master Plan. Total non-potable suppply in CY 2020 is 767 AF.				

The District's planned sources of water supplies are provided in **Submittal Table 6-9**, which are based on information reasonably available to JCSD during preparation of this UWMP.

Submittal Table 6-9 Retail: Water Supplies — Projected

Water Supply	Additional Detail on Water Supply	Projected Water Supply * Report To the Extent Practicable				
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool		**2025** Reasonably Available Volume	**2030** Reasonably Available Volume	**2035** Reasonably Available Volume	**2040** Reasonably Available Volume	**2045** (opt) Reasonably Available Volume
Add additional rows as needed						
Groundwater (not desalinated)	Potable wells (Chino Basin No. 8-02.01)	14,000	18,000	18,000	18,000	18,000
Purchased or Imported Water	Chino Desalter Authority (Chino Basin No. 8-02.01) desalinated groundwater	11,733	11,733	11,733	11,733	11,733
Purchased or Imported Water	Western Municipal Water District	4,000	4,000	4,000	4,000	4,000
Purchased or Imported Water	Cucamonga Valley Water District	6,000	6,000	6,000	6,000	6,000
Purchased or Imported Water	Rubidoux Community Services District (Riverside South Basin No. 8-02.03)	2,000	2,000	2,000	2,000	2,000
Desalinated Water - Groundwater	DYY Program Agreement with City of Ontario (via CDA, Basin No. 8-02.01)	2,000	0	0	0	0
Transfers	Transfer water to Santa Ana River Water Company (from CDA, Basin No. 8-02.01)	1,200	1,200	1,200	1,200	1,200
Recycled Water	JCSD Recycled Water Project (CWSRF Project No. 8167-110)	660	660	660	660	660
Other	Non-Potable Irrigation Water from Riverside Basin (No. 8-02.03)	500	500	500	500	500
	TOTAL SUPPLY (AF)	42,093	44,093	44,093	44,093	44,093

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Volumes in acre-feet (AF).

The supply projections for District well production in Submittal Table 6-9 have incorporated the water rights that are assigned to JCSD from two overlying water rights holders: Mira Loma Space Center (Space Center Mira Loma, Inc.) and Swan Lake Mobile Home Park (Hamner Park Associates, a California Limited Partnership). When the Space Center and Swan Lake stopped producing groundwater from their own wells located on their respective properties and JCSD began providing water service to them, agreements were developed such that the water delivered by JCSD to each entity (and used on their respective properties) will be accounted for as water produced in exercise of each entities' overlying appropriative rights (up to their annual production right) and not as an exercise of the District's water rights.[8] The Space Center's assigned share of safe yield is 104.1 AF and Swan Lake's assigned share of safe yield is 464.2 AF. According to the Chino Basin Watermaster's *Production Year 2019-2020 Report*, JCSD delivered 93.7 AF and 314.8 AF to Space Center and Swan Lake, respectively (p. 3.1). Pursuant to their said agreements, water rights equivalent to these delivered volumes were assigned to JCSD for that year.

Other items of note from Submittal Table 6-9 include the increase in water purchased from Western beginning by 2025. It is assumed this includes purchase of Western's allocation of CDA water to some degree. Supplies from the DYY Program are planned to stop in 2028; renewal of the program is unknown at this time. Purchases of potable water from RCSD is expected to begin again by 2025. Notably, the water supply volumes projected in Submittal Table 6-9 are much higher than the water demand volumes projected in Table 4-2 (Chapter 4). Projected water supply needs to exceed projected demand in order to meet maximum day water demands.

6.10 SPECIAL CONDITIONS

6.10.1 Climate Change Effects

Beginning in the 2020 UWMP, the Water Code requires the District to consider the impacts of climate change in its water supply projections, which are shown in Submittal Table 6-9.

[8] Space Center Agreement: *Water Supply Agreement by and between Jurupa Community Service District and Space Center Mira Loma, Inc.*, entered into April 14, 1997. Swan Lake Agreement: *Notice Regarding Provision of Service to a Non-Agricultural Pool Party by an Appropriative Pool Party by and between Swan Lake and Jurupa Community Services District*, signed October 10, 2014.

Considerations for climate change impacts began with using *Climate Change Vulnerability Screening Form for Urban Water Management Planning* located in the DWR Guidebook for 2020 UWMPs. Pursuant to Water Code, the District's planning for climate change impacts anticipated supply availability under a normal water year, single dry year, and droughts lasting at least five years, as described below.

Western's Technical Memorandum dated April 22, 2021 on climate change effects in its service area was used to apply water supply change factors to projected supplies in Submittal Table 6-9 (WMWD(a), p. 11 [Appendix E]). The water supply factors developed by Western and used herein are provided in **Table 6D**, below. As shown in the factors, Western's analysis found:

> "For normal years, precipitation and natural recharge are initially projected to decrease during the first decade before stabilizing during the second decade. The maximum projected range of decrease for normal year values is 1.7 percent. However, the projections show that droughts will initially be less severe from the perspective of local rainfall and recharge for the single dry year with increases of up to 1 percent. Recharge during 5-year droughts is projected to decrease by up to 2.3 percent by 2045." (WMWD(a), p. 11)

Table 6D - Water Supply Change Factors for Precipitation and Natural Recharge)

Beginning Year	Normal Year	Single-Dry Year	Five-Year Dry Period
2020(1)	100.0%	100.0%	100.0%
2025	99.1%	100.5%	99.5%
2030	98.3%	101.0%	98.9%
2035	98.5%	100.8%	98.5%
2040	98.7%	100.7%	98.1%
2045	98.9%	100.5%	97.7%

Source: Western Municipal Water District, *Technical Memorandum: Western Drought Contingency Plan – Climate Change Vulnerability Assessment*, April 22, 2021 (WMWD(a), p. 11 [Appendix E]).
(1) 2020 is baseline year.

To account for the potential effects of climate change to water supplies, and the uncertainty therein, JCSD has conservatively applied the normal year factors from Western's analysis in Table 6D to the groundwater supply projections of Submittal Table 6-9 beginning in 2025

through 2045, even though the District's groundwater supply has not resulted in a water shortage due to drought in the past. The results are shown below in **Table 6E.**

Table 6E - Potential Effect of Climate Change to Normal Year Projected Supplies

	2025	2030	2035	2040	2045
TOTAL SUPPLY from Table 6-9 (AF)[1]	42,093	44,093	44,093	44,093	44,093
Water Supply Climate Change Factor[2]	99.1%	98.3%	98.5%	98.7%	98.9%
TOTAL SUPPLY with Climate Change Factors (AF)	41,714	43,343	43,432	43,520	43,608
Potential Decrease in Total Supply from Climate Change Effects (AF)	379	750	661	573	485

Notes: Units in acre-feet (AF).
[1] Total supply from Submittal Table 6-9.
[2] Climate change factors from Table 6D (WMWD(a)).

6.10.2 Regulatory Conditions and Project Development

Constraints to the District's water supplies are discussed in Chapter 7.1.2. In summary, additional regulations for yet-to-be determined emerging contaminants in water are expected to continue influencing existing and future water supplies to some degree. Said effects could include how future well sites are located and what wellhead treatment(s) and/or blending are needed and subsequent costs to do so.

6.10.3 Other Locally Applicable Criteria

As discussed previously in Section 6.2, groundwater production in adjudicated basins is limited to a "safe yield" and that annual volume is periodically recalculated based on changes to the overall system. This would be an example of other locally applicable criteria that is entirely outside of the District's control but dictates to some degree how much can be produced from the Chino Basin and Riverside South Basin without replenishment or causing deleterious physical effects (e.g., subsidence, surface cracking, etc.). This constraint is discussed further in Section 7.1.2.

As discussed previously in Section 6.5, the availability of recycled water for the District is dependent on the treatment plant's ability to provide said water, meeting all of its effluent treatment standards and discharge permit requirements. Therefore, the District's planned future supply of recycled water could be constrained if the treatment plant effluent did not meet the discharge requirements.

As discussed previously in Section 6.8, Metropolitan has determined that there are no service reliability concerns projected for imported water during normal and drought periods before 2045 (WMWD(a), p. 3); however, the District remains prepared to use its local supplies, water held in storage, and full utilization of its rights to water to meet demand in the event imported supplies are decreased.

6.11 ENERGY USE

Energy is required to operate a water supply system, including the energy needed to pump, treat, store, and deliver water to the end consumer. Beginning in 2020, UWMPs must report estimates of the energy used for the water distribution system that is within the District's operational control (Water Code Section 10631.2(a)).

JCSD obtained electricity usage data from its electricity supplier, Southern California Edison for calendar year 2020 for each electrical meter located at each of the District's facilities. This includes JCSD water wells, booster stations, reservoirs, treatment systems, and pressure reducing stations. Total electricity used for the water distribution system in CY2020 was 11,648,280 kilowatt hours (kWh), as shown in DWR **Table O-1B**.[9] Energy intensity based on 29,272 AF supplied in CY 2020 (Submittal Table 6-9) was calculated to be approximately 398 kWh per AF supplied. The District does not use solar power or other self-generated renewable energy, nor hydropower.

[9] A kilowatt-hour (kWh) equals the amount of energy used by keeping a 1,000-watt appliance running for one hour.

Table O-1B: Recommended Energy Reporting - Total Utility Approach				
Enter Start Date for Reporting Period	1/1/2020	Urban Water Supplier Operational Control		
End Date	12/30/2020			
☐ Is upstream embedded in the values reported?		Sum of All Water Management Processes	Non-Consequential Hydropower	
Water Volume Units Used	*AF*	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process (volume unit)		*29272*	*0*	*29272*
Energy Consumed (kWh)		*11648280*	*0*	*11648280*
Energy Intensity (kWh/volume)		*397.9*	*0.0*	*397.9*

Quantity of Self-Generated Renewable Energy

0 kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

Metered Data

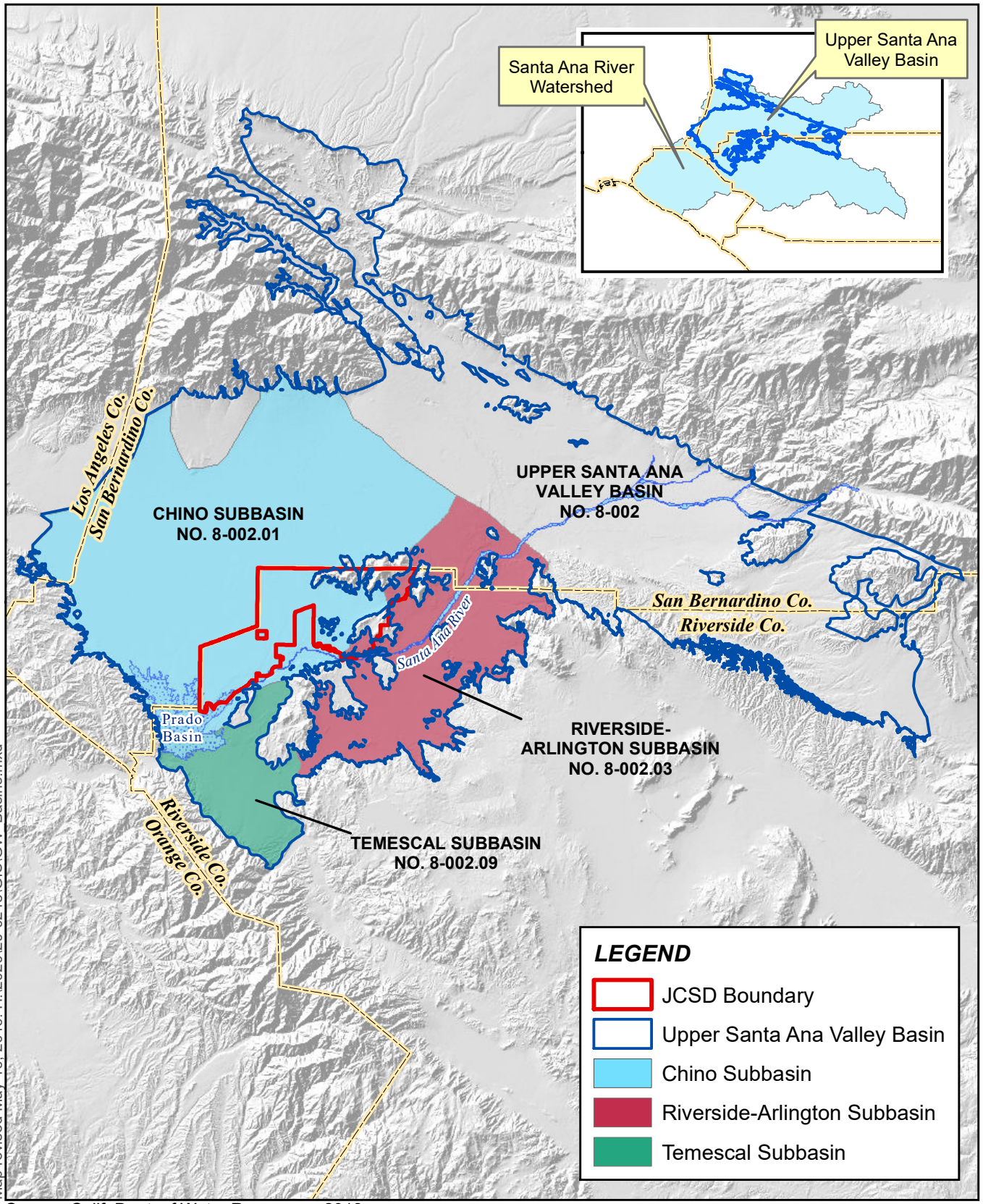
Data Quality Narrative:

Source of data from meter records for CY2020 from Southern California Edison. Sum of Kwh usage.

Narrative:

Data includes JCSD pressure-reducing stations, wells, booster stations, treatment plants,and reservoirs for potable water. Includes pumps for non-potable water.

Based on the data provided by Southern California Edison for this plan, monthly total energy usage that was over one million kWh occurred between June and November, with July 2020 having the highest usage at 1,472,729 kWh. The month with the lowest energy used was May 2020 at 445,612 kWh.



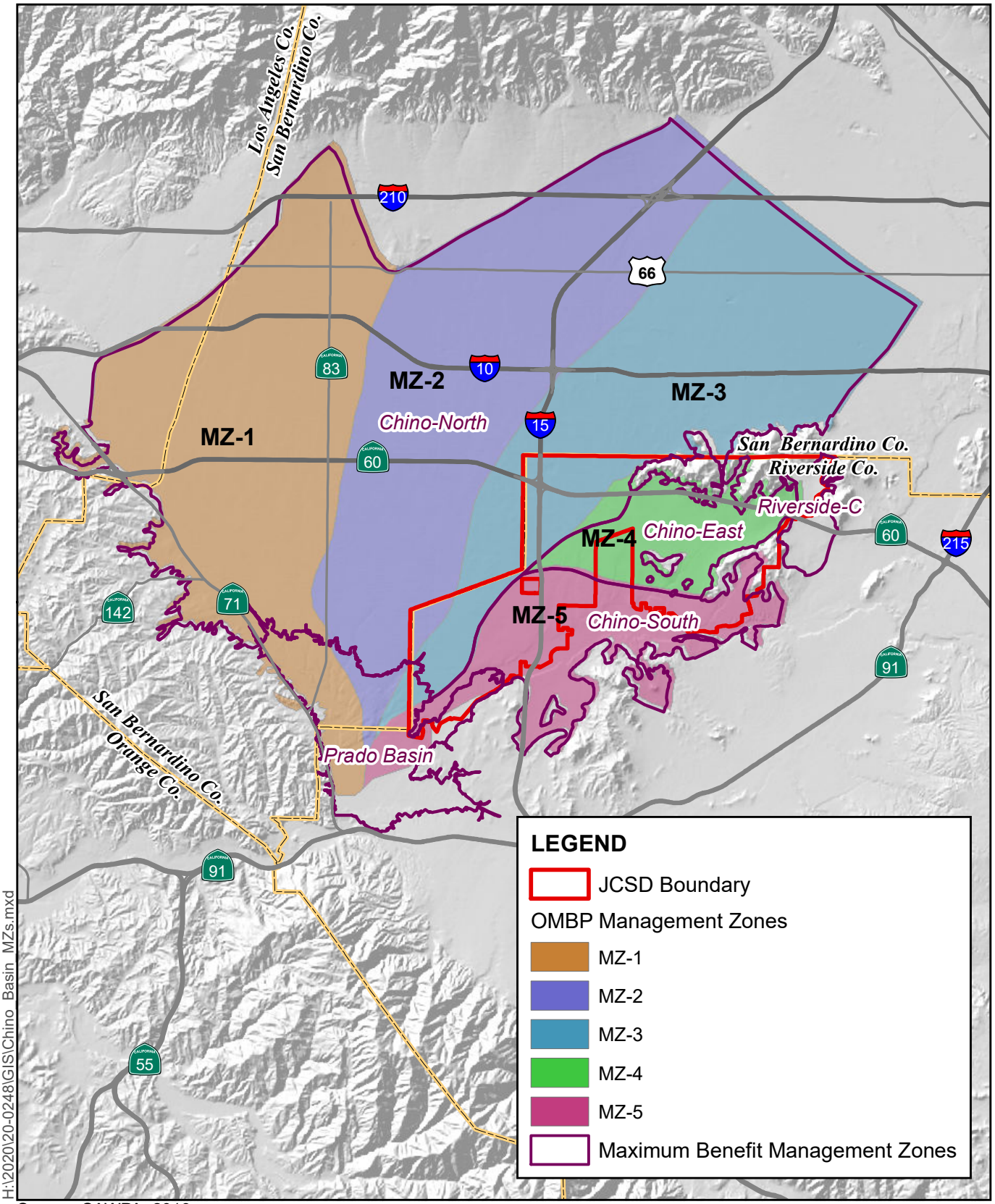
Map revised May 16, 2016. H:\2020\20-0248\GIS\GW Basins.mxd

Source: Calif. Dept. of Water Resources, 2018.

Figure 6-1 – Groundwater Basins
JCSD Urban Water Management Plan 2020

0 5 10 15 Miles

ALBERT A. WEBB ASSOCIATES



H:\2020\20-0248\GIS\Chino Basin MZs.mxd

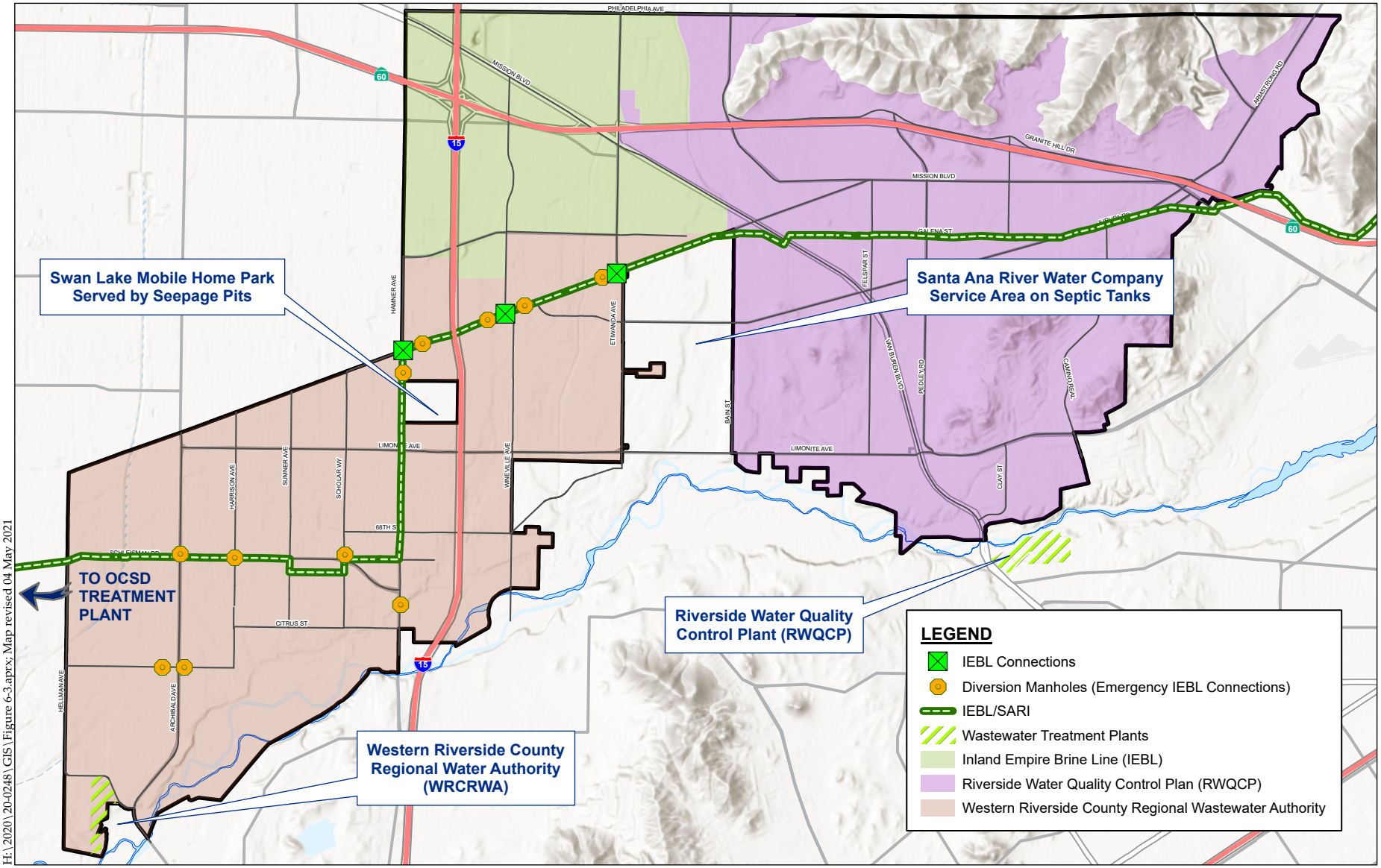
Source: SAWPA, 2019.

Figure 6-2 – Chino Basin Management Zones

JCSD Urban Water Management Plan 2021

0 2 4 6 Miles

ALBERT A. WEBB ASSOCIATES



H:\2020\20-0248\GIS\Figure 6-3.aprx; Map revised 04 May 2021

Sources: Riverside Co. GIS 2020; JCSD GIS 2019; ESRI, 2021.

0 0.5 1 1.5 2 Miles

Figure 6-3 JCSD Wastewater Tributary Areas

JCSD Urban Water Management Plan 2020

Jurupa Community Services District

Albert A. Webb Associates

CHAPTER 7 WATER SERVICE RELIABILITY AND DROUGHT RISK ASSESSMENT

This chapter describes the District's ability to meet the water needs of its customers with its water supplies under varying conditions over the next 20 years. Assessing water service reliability takes into consideration a number of factors, including plausible changes in supplies, regulatory and legal constraints, climate change, and expected growth, among others. This chapter also includes a near-term assessment of a severe drought period lasting for the next five consecutive years.

7.1 WATER SERVICE RELIABILITY ASSESSMENT

Pursuant to Water Code, this reliability assessment will compare the total water supply sources available to the District with the long-term projected water use over the next 20 years, in five-year increments during normal, single-dry, and multiple dry water years. This assessment marries the findings in Chapter 4 – Water Use Characterization and Chapter 6 – Water Supply Characterization to help direct management actions for the future.

7.1.1 Summary of Water Use and Water Supply

As described in Chapter 4, water use attributed to single-family residential customers has been consistently 69% on average of the total potable retail demand for the past 10 years. The next biggest consumers have been Potable Landscape Irrigation and Commercial/Institutional customers at 10% and 9% of the total on average, respectively, followed by multi-family residential at 5%, "other" at 4%, and industrial at 3% on average of the total potable water use for the past 10 years. Other demands such as sales or transfers to other systems and non-potable water irrigation have been fairly consistent for the past five years. Water losses accounted for in the potable system have fluctuated since 2016 but are remain between 4 to 8 percent of production (see Table 4A). As shown in Chart 4-1, total water use was at its lowest in 2015 as a result of mandatory drought restrictions. Current consumption numbers demonstrate customer's continuing efforts to conserve; for example, September 2020 water use was 12.48% less than September 2013, which is a savings of 102,746,379 gallons (JCSD(a), Item No. 2). Future potable water use has been projected in the District's *2020 Water Master Plan* based on full buildout of the service area, which has been incorporated herein with the additions of expected non-potable and recycled water demands (WEBB(a)).

Refer to Submittal Tables 4-1, 4-2, 4-3, and 4-4 for current (2020) and future (2025-2045) water use, as well as water losses.

As described in Chapter 6, JCSD relies on groundwater for its water supply. The majority of the District's water supply comes from the Chino Groundwater Basin, which is produced by District wells (both non-potable and potable), potable desalinated groundwater purchased from CDA, or purchased from Western or the City of Ontario with water delivered to the District via CDA facilities (all potable). The District also produces non-potable groundwater from the Riverside South Groundwater Basin that is used for irrigation. Both basins are adjudicated with court appointed Watermasters. The District stopped purchasing potable water from Rubidoux Community Services District effective January 1, 2018. The District does not use surface water or rely on stormwater to meet customer demands. Because of the Chino Basin's estimated volume in storage and the Chino Basin Watermaster's efforts to monitor production and prevent overdraft of the Chino Basin, this water supply has proven to be stable and reliable, even when environmental conditions are exceptionally dry. Likewise, the efforts of the Western-San Bernardino Watermaster and its oversight of the Riverside South Basin have provided a stable supply there as well. However, to ensure reliability into the future, the District plans to construct new wells, increase treatment facilities, and partner with Cucamonga Valley Water District to construct an interagency connection (i.e., "Etiwanda Pipeline Project") allowing the flow of potable water in either direction. To bring recycled water to the service area for the first time, the District is securing funding to bring recycled water from the WRCRWA treatment plant to parks, medians, and school yards in Eastvale, and the Area B Non-Potable Pipelines for irrigation in southwestern Jurupa Valley. In the long-term, the District is having ongoing discussions with Western to continue purchasing Western's allotment of CDA water and to connect to an imported water supply from the Mills Gravity Feeder pipeline. Refer to Submittal Table 6-6 for planned recycled water supplies, Submittal Table 6-7 for other planned supply projects, Submittal Table 6-8 for current (2020) supplies, and Submittal Table 6-9 for projected water supplies through 2045.

7.1.2 Constraints to Water Supply

Four factors can affect the availability of groundwater for the District: sufficient production capacity (e.g., wells, pumps, pipes, etc.); sustainability of the groundwater to meet pumping

demand on a renewable basis; protection of groundwater wells from contamination, or provisions for treatment in the event of contamination; and catastrophic events.

Water Quality and Production Capacity Constraints

Some groundwater producers in the Chino Basin are challenged with the issue of addressing elevated levels of nitrates, TDS, and other contaminants such as 1,2,3-TCP, 1,1-DCE, and perchlorate. JCSD operates two ion-exchange plants to denitrify water from several wells at the Teagarden Ion-Exchange Plant and Well 17/18 Ion-Exchange Plant, as described in Chapter 6. Water delivered by CDA is treated by the Chino I or Chino II desalters to remove salts (TDS) and nitrate. Since 2005, JCSD has reported that all samples of delivered water have been below the State and Federal maximum contaminant level (MCL) of 45 milligrams per liter (mg/L) of nitrate (or 10 mg/L nitrate as nitrogen). This is a result of JCSD's treatment and blending plan within the service area. JCSD has obtained a permit from the California Department of Health (CDH) that allows high nitrate water to be blended with lower nitrate waters. Blending results in concentrations of nitrates, TDS, 1,2,3-TCP, 1,1-DCE, and perchlorate consistently below the MCL. (WEBB(a), pp. 4-9, 4-11) The District's most recent Consumer Confidence Report (CCR) describing the results of water quality testing performed in 2020 is provided in **Appendix L.**

As reported by the Chino Basin Watermaster, there are currently 13 groundwater plumes in the Chino Basin that are monitored and remediated by various agencies and responsible parties. The Stringfellow Acid Pits site is located within the JCSD service area in the Jurupa Mountains. None of the District's wells have been impacted by the Stringfellow plume. In addition, the District makes a conscious effort to ensure none of its existing and future wells interfere with the cleanup efforts at Stringfellow and that a safe distance is always maintained. (WEBB(a), p. 4-9)

Per- and polyfluoroalkyl substances (PFAS) are a large group of man-made chemicals that includes PFOA, PFOS, and others. After independent review of the available information on the risks, the State Water Board Division of Drinking Water established notification levels at concentrations of 6.5 ppt for PFOS and 5.1 ppt for PFOA. Notification levels are a nonregulatory, precautionary health-based measure for concentrations in drinking water that warrant notification and further monitoring and assessment. Public water systems are

encouraged to test their water for contaminants with notification levels, and in some circumstance may be ordered by the state to test. If the systems do test, they are required to report exceedances to their governing boards and the State Water Board and are urged to report this information to customers via the consumer confidence reports. (Webb(a), pp. 4-9 - 4-10)

JCSD conducted a study from November 2019 to February 2020 to determine PFAS and PFOA levels within water supply wells. According to the study, water produced from District Wells 17, 18, and 27 had concentrations above the established notification level, and concentrations in Well 28 were roughly 25 times higher than the notification level. Wells 12, 13, 14, 15, and 23 were also above the notification limits. As a result, the District authorized two studies: 1) *Final Updated Geohydrologic Analysis of Future Groundwater Production in JCSD* by Geoscience (May 26, 2020); and 2) *Water Quality Evaluation Study* by WEBB and Hazen & Sawyer (forthcoming). (WEBB(a), p. 4-10)

Key findings of the 2020 Geoscience Report are as follows:

1. A local drawdown of 5 to 10 feet is anticipated over the 25-year simulation period;
2. By 2025, 13 of the District's wells' nitrate (as nitrogen) concentrations will exceed 10 mg/L;
3. By 2025, 13 of the District's wells' TDS concentration will exceed 600 mg/L; and
4. Modeling results predict further water quality degradation through the year 2044 for both TDS and nitrates.

The District has 18,905 gpm pumping capacity from its online wells and CDA has a current capacity of 7,375 gpm for a total available to the District of 26,280 gpm. As described in further detail in the District's *2020 Water Master Plan*, District Wells 13, 17, 18, 23, and 28 cannot operate due to water quality issues (one for high nitrate and TDS, three for high PFOA, and one for high PFOS) and Wells 20 and 24 cannot operate due other issues (low production and bent casing) for a total loss of 14,325 gpm. Other wells that had high PFAS and PFOA concentrations are operable because they can be blended with water from the Teagarden Ion-Exchange Plant to concentrations below the notification limit. (WEBB(a), p. 4-11)

The forthcoming *Water Quality Evaluation Study* will outline near-term and long-term projects to get wells back online by adding additional treatment. The first recommended projects from the study would add ion-exchange vessels to Well 13 and Well 17 in summer 2021 (shown in Submittal Table 6-7). This would bring back approximately 4,000 gpm to the system.

As noted previously, JCSD has not purchased water supplies from RCSD since January 1, 2018 as a result of 1,2,3-trichloropropane (1,2,3-TCP) in the RCSD supply. This contamination has placed a constraint on both agencies, with JCSD having to obtain supply elsewhere and RCSD being unable to collect the revenue until adequate treatment is provided. Further, RCSD's supply water is high in TDS; therefore, the District is constrained from purchasing supply from RCSD and utilizing the interagency connection until the supply from RCSD meets certain water quality standards. RCSD is currently in the process of adding the necessary treatment systems.

Water Supply Constraints

A physical constraint to the groundwater resources utilized by JCSD could result from declining groundwater levels. A possible response by JCSD to a decline in groundwater levels might be higher costs as a result of increased energy usage to pump groundwater from deeper in the basin, or the cost to purchase supplies from other sources.

The Chino Basin Watermaster has recently undertaken a safe yield redetermination. In July 2020, the court ordered that the safe yield be reduced by 3% and reset to 131,000 AFY for the period of July 1, 2020 to June 30, 2030. The court previously reset the safe yield from its initial 140,000 AFY to 135,000 AFY in 2017 for the period of 2010 to 2020. Although the District can pump in excess of its rights with payment of a replenishment fee and access its groundwater storage accounts pursuant to the Judgment, smaller safe yields in the future may encourage less production to avoid increased fees.

In 2019/2020, the Chino Basin Watermaster updated its Optimum Basin Management Plan (OBMP) and its Storage Management Plan. The OBMP is the central planning document for managing the basin. The updated OBMP plans for the next 20 years with the core focus shifting from developing the maximum benefit program, implementing hydraulic control, and developing the operations needed to maintain it (e.g., desalters), to managing storage and

water quality. The 2020 Storage Management Plan provides options and information needed by Parties to the Judgment to develop an actionable implementation plan for storage management (CBWM(b), p. 1). Continued implementation of the OBMP and Storage Management Plan by the Watermaster and continued participation in such activities by the District will help maintain the District's ability to fully utilize its water rights.

As a reporting mechanism and pursuant to the OBMP Phase 1 Report, the Peace Agreement, and the associated OBMP Implementation Plan, and the November 15, 2001 Court Order, Chino Basin Watermaster publishes a *State of the Basin* report every two years beginning in 2002 that characterizes basin conditions from groundwater monitoring. The most recent report is the *2018 State of the Basin* which includes data collected through fiscal year (FY) 2017/2018 (WEI(d), 2019). Two JCSD wells with sufficient historical groundwater level records were selected to be part of the groundwater monitoring – Well 14 in Chino Basin Management Zone 3 (MZ3) and Well 10 in Chino Basin Management Zone 4 (MZ4).

According to the *State of the Basin* reports, groundwater elevation contours at JCSD Wells 14 and 10 appear stable in the Spring of 2012, 2014, 2016, and 2018 at approximately 575 feet above msl (WEI(e), Exhibit 4-4). "Water levels at JCSD Well 14 (MZ3) from 2000 to 2010 progressively declined by about 30 feet due to a dry period and increased pumping in MZ3. From 2010 to 2018, groundwater levels stabilized or increased by up to 15 feet, likely due to reduced production and increases in artificial recharge. Groundwater levels in Well 14 fluctuate annually regardless of drought periods" (WEI(d), Exhibit 4-12).

JCSD Well 10 is in the vicinity of the JCSD and Chino-II Desalter well fields. "Water levels at JCSD Well 10 began to decrease around 2000 and notably accelerated in decline around 2006 when pumping at Chino-II Desalter wells commenced in MZ3 and MZ4. From 2000 to 2010, water levels declined by about 35 feet at these wells. The decline of groundwater levels in this portion of the basin was necessary to achieve hydraulic control of the Chino Basin…which was achieved in this area by 2010, and from 2010 to 2018, groundwater levels stabilized" (WEI(d), Exhibit 4-13). Groundwater levels at Well 14 remain constant regardless of season or drought (*ibid).* Although the 2020 State of the Basin report containing FY 2019/2020 data will not be available until June 2021, this data reported to the Watermaster demonstrates stable

groundwater conditions, taking into account the pumping in the CDA well field that maintains hydraulic control.

Catastrophic Events and Interties

Catastrophic events including electrical outages, earthquakes, fire, or any other natural disaster could constrain water supplies. In the event of such an emergency, the District is prepared to purchase emergency water supplies from neighboring agencies over the time required to get the District's system functioning again. The District and RCSD share two interties that can be activated in an emergency to flow in either direction (i.e., JCSD Intertie South and Jewel Street Intertie). The District also has an intertie with CDA to obtain emergency water.

7.1.3 Reliability by Type of Year

JCSD has had a reliable water supply to meet demands during normal, single-dry, and multiple-dry years. Notably, the District had sufficient local water supplies during the statewide drought from 2012 to 2017. The Water Code requires each water supplier to determine three types of years and how much supply was available for each: normal (or average),[1] single dry,[2] and multiple dry years for five years.[3] As shown in **Submittal Table 7-1** below, the District expects all of its average supply from local groundwater sources (District wells and CDA) to be available regardless of the year type. Although the hydrology for imported water supplies differs from local hydrology, the District will also assume, consistent with Western, that imported water supplies are expected to be available in all normal and drought years through 2045 (WMWD(a), p. 3) and therefore a second version of Submittal Table 7-1 for imported water is not provided.

[1] A year, or an averaged range of years, that most closely represents the average water supply available to the agency. The UWMP Act uses the term "normal".
[2] The single-dry year is the year that represents the lowest water supply available to the agency.
[3] The multiple dry year period that represents the lowest average water supply availability to the agency for a consecutive multiple year period (three years or more).

Submittal Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment)			
Year Type (Local Groundwater Supply)	Base Year If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2019-2020, use 2020	Available Supplies if Year Type Repeats	
		☐ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____	
		☐ Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available *	% of Average Supply
Average Year	2010		100%
Single-Dry Year	2018		100%
Consecutive Dry Years 1st Year	2012		100%
Consecutive Dry Years 2nd Year	2013		100%
Consecutive Dry Years 3rd Year	2014		100%
Consecutive Dry Years 4th Year	2015		100%
Consecutive Dry Years 5th Year	2016		100%
Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.			
***Units of measure (AF, CCF, MG**) must remain consistent throughout the UWMP as reported in Table 2-3*			
NOTES: This version of Table 7-1 represents local groundwater supplies.			

The selected baseline water years for local groundwater supplies were based on the rainfall data collected by Riverside County Flood Control and Water Conservation District from five stations scattered around western Riverside County (i.e., Riverside, Corona, Elsinore, Hemet/San Jacinto, and Perris/Moreno Valley) (RCFC(b)). Each year, the Flood Control District determines whether that year was, on average, a very dry, dry, normal, wet, very wet, or record wet year by converting annual total rainfall as a percentage of normal, where normal is calculated as the average per station. Records from these stations range from 63 to 127 years of rainfall data. The Flood Control's data as of FY19/20 suggests 2010 was considered a "normal" rainfall year for western Riverside County; 2018 was "very dry" between two "wet" years (2017 and 2019); and 2012 to 2016 were five consecutive "dry" years (RCFC(b)).

7.1.4 Normal Year Reliability

Normal Year. This condition represents the water supplies a supplier considers available during normal conditions.

JCSD water demands are discussed in Chapter 4 and projections of water use during a Normal Year are provided in Table 4-3. JCSD water supplies are presented in Chapter 6 and water supply projections during a Normal Year are provided in Table 6-9. The Normal Year supply and demand projections are compared in **Submittal Table 7-2**, below**.**

Submittal Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	42,093	44,093	44,093	44,093	44,093
Demand totals *(autofill from Table 4-3)*	31,525	34,035	35,825	37,795	37,795
Difference	10,568	10,058	8,268	6,298	6,298
NOTES: Units in acre-feet (AF). Demand includes 660 AFY of recycled water and 640 AFY of non-potable water.					

According to the assumptions of Submittal Table 7-2, during normal rainfall years, the District has sufficient supply to meet demands to the year 2045. In order to consider the potential effects of climate change on said supply and demand projections, **Table 7A** compares supply and demand totals that have been adjusted using factors developed by Western (WMWD(a)).

Table 7A Comparison of Climate Change-Adjusted Normal Year Supply and Demand

	2025	2030	2035	2040	2045
TOTAL SUPPLY with Climate Change Factors (AF)	41,714	43,343	43,432	43,520	43,608
TOTAL DEMANDS with Climate Change Factors (AF)	31,714	34,443	36,470	38,702	38,966
Difference	10,000	8,900	6,962	4,818	4,642

Notes: Units in acre-feet (AF). Climate change factors from WMWD(a).
(1) From Table 4E.
(2) From Table 6E.

The surplus in supply shown in Table 7A compared to the surplus in Submittal Table 7-2 above is smaller between 2030 and 2045 as a result of incorporating the climate change factors for reductions in precipitation and natural recharge and increased outdoor demand during normal years.

7.1.5 Single Dry Year Reliability

Single Dry Year. The year that represents the lowest water supply available to the Supplier.

The District's single dry year supply and demand comparisons are provided in **Table 7-3**, which show that a surplus of water supply continues through 2045.

Submittal Table 7-3 Retail: Single Dry Year Supply and Demand Comparison

	2025	2030	2035	2040	2045 (Opt)
Supply totals*	42,303	44,534	44,446	44,402	44,313
Demand totals*	31,714	34,477	36,506	38,740	39,004
Difference	10,589	10,057	7,940	5,662	5,309

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Units in acre-feet (AF). Supply includes single-dry year climate change factors from Table 6D. Demand includes recycled water (660 AFY), non-potable (640 AFY) and climate change factors from Table 4D.

The following assumptions have been made to estimate supply and demand during a single dry year (drought stages are described in detailed in Chapter 8):

- The provisions of a Stage 1 "Drought Watch" will be implemented, and customers requested to achieve a 10% voluntary consumption reduction (Ord No. 389).
- There will be no change to the supply of recycled water.

- Water demand and groundwater supply during a single-dry year may increase by the factors shown in Table 4D and Table 6D as a result of the anticipated effects of climate change (WMWD(a), pp. 11, 13). These factors have been imbedded in the calculations of Submittal Table 7-3.

- MWD will make a "call" for stored groundwater in the Chino Basin pursuant to the DYY Program; therefore, JCSD will stop receiving supply from City of Ontario (2,000 AFY) and make up the difference with District wells and treatment facilities.

- Water losses are included in future potable water demands at 7.5% of annual potable demands.

- There will be no decrease in imported water supplies (WMWD(a), p. 3), which would include imported water via Western and/or imported water via Cucamonga Valley Water District.

7.1.6 Multiple Dry Year Reliability

Five-Consecutive-Year Drought. The driest five-year historical sequence for the Supplier.

The District's Multiple Dry Year supply and demand comparisons are provided in **Submittal Table 7-4** (next page).

Submittal Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	41,883	43,608	43,432	43,255	43,079
	Demand totals	31,462	34,443	36,470	38,702	38,928
	Difference	10,420	9,165	6,962	4,554	4,150
Second year	Supply totals	41,883	43,608	43,432	43,255	43,079
	Demand totals	28,316	30,999	32,823	34,832	35,036
	Difference	13,567	12,609	10,609	8,424	8,043
Third year	Supply totals	41,883	43,608	43,432	43,255	43,079
	Demand totals	25,170	27,554	29,176	30,961	31,143
	Difference	16,713	16,054	14,256	12,294	11,936
Fourth year	Supply totals	41,883	43,608	43,432	43,255	43,079
	Demand totals	22,024	24,110	25,529	27,091	27,250
	Difference	19,859	19,498	17,903	16,164	15,829
Fifth year	Supply totals	41,883	43,608	43,432	43,255	43,079
	Demand totals	18,877	20,666	21,882	23,221	23,357
	Difference	23,005	22,942	21,550	20,034	19,722
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Units in acre-feet (AF). Supply includes climate change supply factors for multiple dry years from Table 6D. Demand includes recycled water (660AFY), non-potable demand (640 AFY), climate change demand factors for multiple dry years from Table 4D, and reductions of 10-40% from water conservation beginning in year 2.						

The following assumptions are made to estimate supply and demand during a consecutive five-year multiple dry year period (drought stages are detailed in Chapter 8):

- Water demand and groundwater supply may change for each year in the five-year dry period by the climate change factors for outdoor water use and precipitation/natural recharge shown in Tables 4D and 6D. Each five-year increment has a different factor beginning with normal year supply and demand, which have been imbedded in the calculations of Submittal Table 7-4.

- During the first dry year, the provisions of a Stage 1 "Drought Watch" will be implemented, and customers requested to voluntarily reduce consumption up to 10% (Ord. No. 389).

- During the second dry year, a decrease in water use of 10% in response to water conservation efforts is assumed, using the first year as a baseline. The provisions of a Stage 2 "Drought Caution" will be implemented at the Board of Director's discretion, and customers mandated to conserve between 10% and 20% (Ord. No. 389).

- The third dry year is assumed to have a 20% decrease in demand in response to water conservation efforts, measured from the first year as the baseline. The provisions of a Stage 3 "Drought Alert" will be implemented at the discretion of the Board of Directors, and customers mandated to conserve between 20% and 30% (Ord. No. 389).

- The fourth dry year will have a 30% decrease in demand in response to water conservation efforts, as measured from the first year as the baseline. The provisions of a Stage 4 "Drought Critical" will be implemented at the discretion of the Board of Directors, and customers mandated to conserve between 30% and 40% (Ord. No. 389).

- The fifth dry year will have a 40% decrease in demand in response to water conservation efforts, as measured from the first year as baseline. The provisions of a Stage 5 "Drought Emergency" will be implemented at the discretion of the Board of Directors, and customers mandated to conserve a minimum of 40% (Ord. No. 389).

- There will be no decrease in imported water supplies during any five-year dry period from 2025 to 2045 (WMWD(a), p. 3).

- District wells would only be pumped as needed to meet water demands, and water purchased from CDA only as needed, even though the District's groundwater supply in the Chino Basin could produce more water if needed. Because District wells are not operated at full capacity, it can be assumed as drought conditions worsen, groundwater pumping could increase to continue meeting water demands and be a function of cost rather than supply.

- The supply of recycled water will be the same in multiple dry years 1 through 5, as in normal years.

- MWD will make a "call" for stored water starting in Year 1 and each year thereafter; therefore, the District's supply of 2,000 AF from City of Ontario will cease, and the difference made up by District wells.

- Water losses are included in future potable water demands at 7.5% of annual potable demands.

7.1.7 Management Tools and Options for Reliability

As shown in the tables above, JCSD anticipates having adequate water supplies to meet future demands during normal, single-dry, and multiple-dry years through the 20-year planning period with the potential effects of climate change, future supply projects, and water conservation taken into account. This is mainly because of the reliability of the District's primary water source in the Chino Basin and the ability of customers to conserve when needed. Water conservation will continue to be a key tool for the District to maximize local resources and minimize the need for imported supplies. Between 2013 and 2015, for example, JCSD customers demonstrated a reduction in water use by 23 percent over the two-year period.

JCSD will continue making efforts to maximize the use of local water resources and minimize the need to import water. District actions such as increased implementation of demand management measures, increased use of recycled water, and enhanced groundwater management are anticipated.

Demand management measures implemented by JCSD over the past five years and planned for the next five years are outlined in Chapter 9. Although the District has achieved the 2020

target for water conservation pursuant to SB X7-7 (Chapter 5), it is understood that drought conditions are likely ongoing in the foreseeable future. And therefore, water conservation efforts are planned to continue and expand to reduce potable water use to the maximum extent practicable. To encourage water use reductions during drought conditions, JCSD has developed a multi-level Water Shortage Contingency Plan, as discussed in detail in Chapter 8 of this UWMP.

The District is also pursuing grant funding to replace potable landscape water use with an equal allotment of recycled water from the WRCRWA treatment plant. Notably, using recycled water as groundwater recharge and/or other beneficial uses is expected to expand in the Chino Basin. JCSD aims to continue expanding recycled water supplies into its service area.

The Chino Basin OBMP administered by the Watermaster manages the basin production by way of nine elements. The element that could potentially impact JCSD's supply directly is Program Element 2, which addresses the recharge program. The decisions and infrastructure related to this OBMP element will be used to balance long-term groundwater production. Similarly, JCSD will continue supporting storm water capture and infiltration projects within its service area and the local Chino Basin Management Zone.

Although JCSD will continue utilizing local water supplies to the maximum extent practicable following the intent of Water Code Section 10620 to minimize the need to import water from other regions, the District has chosen to diversify the supply portfolio with participation in projects to access imported water supplies with Western and Cucamonga Valley Water District. Local water supplies will continue to constitute a majority of JCSD's supply portfolio, as previously shown in Submittal Table 6-9.

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7.2 DROUGHT RISK ASSESSMENT

The Drought Risk Assessment (DRA) is a new requirement beginning with the 2020 UWMP. This DRA can be updated before the next UWMP cycle (i.e., 2025); however, the notification and approval procedures in Chapter 10 of the UWMP would be required for any interim changes. An update to the DRA may be needed as result from new information becoming available, water supply or water use changes, or in the event of unforeseen circumstances.

The DRA is based on the five driest consecutive years on record taking into account any extra effects to water supplies from plausible changes in climate, regulations, and other locally applicable criteria. If there is a shortage, the DRA identifies what the effects to the shortage would be from increasing supply and/or reducing demand. Water Code requires that the DRA include a description of the data and methods used, the basis for the supply shortage conditions, determination of the reliability of each source, and comparison of total water supplies and uses during the drought, which are described below.

7.2.1 Data, Methods, and Basis for Water Shortage Conditions

The Recycled Water Expansion Program currently proposed by the District to bring 660 AFY of recycled water from WRCRWA treatment plant to irrigate certain landscaping, parks, and school yards in Eastvale and southwestern Jurupa Valley is assumed to be a reliable source of supply during any of the five drought years from 2021 to 2025. This is based on 660 AFY being a fraction of the annual average volume of wastewater the District sends to the WRCRWA plant; in other words, even if the wastewater volume decreases as a result of customer water conservation efforts during a drought, it is not expected to decrease such that 660 AFY would not continue to be available.

Western prepared a Technical Memorandum dated April 22, 2021 regarding their Drought Contingency Plan and Climate Change Vulnerability Assessment and made it available for use by the District and all other retail agencies to use in their UWMPs (WMWD(a)). A copy of said memo is located in Appendix E. Pertinent data and findings from this memorandum have been referenced in Chapters 3, 4, and 6. In regard to imported water supplies, said memo references the current (November 2020) draft of Metropolitan's 2020 UWMP Drought Risk Assessment which indicates "no service reliability concerns are projected for imported water during normal

and drought periods before 2045." Therefore, for purposes of its 2020 UWMP, Western has assumed deliveries of imported water supplies will be unchanged during normal years, single dry years, and five-year droughts (WMWD(a), p. 3). JCSD will also assume for purposes of this UWMP that imported water supplies will be available in the 20-year planning horizon regardless of normal, single dry, or multiple dry years. In regard to recycled water supplies, Western's analysis suggests that "supplies of recycled water and reclaimed water which are sourced from indoor uses are largely insensitive to changes in climate" (WMWD(a), p. 9).

Western's April 22, 2021 Technical Memorandum also describes an analysis performed that developed factors that its retail agencies can apply to water demand and supply projections to account for the potential effects of climate change to surface water and groundwater within Western's service area, which includes the District (Tables 4D and 6D). Said analysis determined factors for 2020 during a five-year dry period that would not change water demands or groundwater supplies as a result of the effects of climate change. Said factors reflect the following trends and findings from the Technical Memorandum analysis:

- *Projected decreases in water supplies from Santa Ana and Santa Margarita River basins under normal and drought conditions relative to baseline conditions in 2020, due to projected decreases in precipitation and projected increases in surface water evaporation caused by increasing temperatures.*

- *Smaller decreases in projected precipitation and natural recharge under normal and multi-year drought years. However, the single dry year was slightly wetter under future conditions compared to the baseline. Precipitation will occur during shorter rainy seasons with higher intensity.*

- *Outdoor water uses are projected to increase under normal, single dry, and multi-year drought conditions, caused by projected temperature increases, which lead to higher evapotranspiration rates for landscaping, irrigated crops, and native vegetation.*
  (WMWD(a), pp. 1-2)

Supply conditions for the District wells and CDA wells in the Chino Basin during the five driest years (2013-2017) were consistent with non-drought years. Although typical seasonal fluctuations occur in individual wells, overall groundwater level contours between 2012 and

2018 have remained stable despite the implementation of the CDA wells to achieve hydraulic control in the Chino Basin (WEI(d), Exhibit 4-4). Because approximately 12.6 million AF of water is in the Chino Basin (WEI(a), p. 6-15), and hydraulic control will continue for the foreseeable future, it is assumed in this DRA that there would be no decrease in the water supply available to the District from District wells or CDA wells during drought periods, including a drought in the years 2021-2025. This is consistent with Western's climate change analysis and climate change factors (WMWD(a), pp. 11, 13). In addition, new District wells brought online during the drought period are assumed to provide anticipated production volumes, which is approximately 2/3 of pumping capacity.

7.2.2 Individual Water Source Reliability

The following characterizations reflect the expected amount and reliability of the water supply during the first year of a drought beginning in 2021. Based on the climate change analysis performed by Western for its service area, the climate change factors for demand and groundwater supply in a five-year dry period beginning in 2020 are 100% - indicating no change as a result of potential climate change during each year of the five year drought beginning in 2021 (Appendix E).

- Drought Year 1: 2021
    - No decline to customer water use as compared to 2020. The District would be in a Level 2 drought condition with mandatory prohibitions on water use pursuant to Ordinance No. 389.
    - No decline in water supply from District non-potable well water as compared to 2020.
    - No decline in water supply from District potable well water as compared to 2020. This includes seven District wells being offline as of 2020 (40% reduction in pumping capacity).
    - It is conservatively assumed that MWD will make a "call" and the supply from City of Ontario via CDA of up to 2,000 AFY of potable water (as part of the DYY Program) will not be available. The difference would be made up by District

wells and facilities funded in part by the District's participation in the DYY Program.

- Drought Year 2: 2022
    - The District will remain in a Level 2 drought condition with increasing public education, outreach, and enforcement of the mandatory prohibitions to reduce water use 10% as compared to 2020 (reduction of 2,927 AFY).
    - No decline in water supply of District non-potable well water as compared to 2020.
    - No decline in water supply of District potable well water as compared to 2020.
    - MWD will make a "call" and supplies of up to 2,000 AFY will not be available from City of Ontario via CDA pursuant to the DYY Program.
    - District Wells 13 and 17 will be back online and provide at least 2,000 AFY of potable water supplies.
- Drought Year 3: 2023
    - Customer water use could decrease 20% as compared to 2020 (reduction of 5,854 AFY) as a result of demand management measures.
    - No decline in supply of District non-potable well water as compared to 2020.
    - No decline in supply of District potable well water as compared to 2020.
    - MWD will make a "call" and supplies of up to 2,000 AFY will not be available from City of Ontario via CDA pursuant to the DYY Program.
    - District Wells 13 and 17 will provide at least 2,000 AFY of potable water supplies.
    - Recycled water will come online to replace 660 AFY of 2022 potable water use.

  - First phase of Etiwanda Pipeline Project (Phase 1a) will be constructed and an estimated 2,000 AFY may be available to the District.

- Drought Year 4: 2024
  - Customer water use could decrease 30% as compared to 2020 (reduction of 8,782 AFY) as a result of demand management measures.
  - No decline in supply of District non-potable well water as compared to 2020.
  - No decline in supply of District potable well water as compared to 2020.
  - MWD will make a "call" and supplies of up to 2,000 AFY will not be available from City of Ontario via CDA pursuant to the DYY Program.
  - District Wells 13 and 17 will provide at least 2,000 AFY of potable water supplies.
  - Recycled water will replace 660 AFY of potable water use.
  - Second phase of Etiwanda Pipeline Project (Phase 1b) will be constructed and two new JCSD wells providing an estimated 2,000 AFY will be brought online.
  - Negotiations may be complete to make available imported water supply to JCSD from Western via La Sierra Pipeline and CDA.

- Drought Year 5: 2025
  - Customer water use will decrease 40% as compared to 2020 (reduction of 11,709 AFY) as a result of demand management measures.
  - No decline in water supply from District non-potable well water as compared to 2020.
  - No decline in water supply from District potable well water as compared to 2020.

- MWD will make a "call" and supplies of up to 2,000 AFY will not be available from City of Ontario via CDA pursuant to the DYY Program.
- District Wells 13 and 17 will provide at least 2,000 AFY of potable water supplies.
- Recycled water will replace 660 AFY of potable water use.
- Phase 2a of Etiwanda Pipeline Project will provide an estimated 2,000 AFY.
- Third phase of Etiwanda Pipeline Project (Phase 2a) will be completed with an estimated 1,000 AFY.
- JCSD Well 30 will be drilled and equipped providing up to 2,500 AFY of potable water supply.

The uncertainty in the aforementioned assumptions include the water supplied by projects with agreements that have not been completely finalized between all parties. This includes the Etiwanda Pipeline project and the La Sierra Pipeline Connection project. Production rates of new wells are also estimated and have some uncertainty because they have not been drilled, equipped, and tested yet. Lastly, there is uncertainty whether Metropolitan would need to make a "call" for water as part of the DYY Program.

7.2.3 Total Water Supply and Use Comparison

When a water supplier cannot meet the demands of its customers for whatever reason, this DRA assumes two things can happen: the District can mandate customers to conserve water, thus reducing demand; and/or the District can augment or supplement its normal supplies with an emergency source of water.

JCSD customers have shown to be responsive to water conservation mandates. For example, JCSD Resolution No. 2499 was approved by the Board of Directors on August 11, 2014 to elevate the District to Drought Response Level 2. Residential water use at that time was 179.2 gallons per capita per day (R-GPCD). Nine months later, the Board of Directors approved Resolution No. 2542 on May 26, 2015 to elevate the District to Drought Response Level 3. From the time JCSD went from Level 2 to Level 3, residential water use decreased from 179.2

GPCD to 119.6 GPCD (a 33% drop). From May 26, 2015 to April 2016, JCSD residential water use decreased another 14 percent from 119.6 GPCD to 103 GPCD. (WEBB(a), p. 8-6)

Supply augmentation for JCSD comes from the District's water held in storage accounts in the Chino Basin and full utilization of its rights to pump from the Chino Basin. These sources of emergency supply are not expected to be used until the District is in an extreme such as Drought Level 4 or 5. For example, in 2020 the District wells in the Chino Basin produced approximately 11,029 AF (Submittal Table 6-8); however, the District's annual production right is 19,547.9 AF and the District has 31,861.3 AF in storage (CBWM(a), pp. 10.1, 11.1). Should it have been needed, the District could pump another 8,000 AF without paying a replenishment fee, and the District could access its groundwater storage accounts up to said amount.

Assuming the next five years - 2021 through 2025 - are a five-consecutive year drought, and taking into account the assumptions in Section 7.2.2, the District's potential water supply surplus (or shortage) is provided in **Submittal Table 7-5** (next page)**.** If there is a shortage, then the benefit of a supply augmentation or use reduction action is shown to address the shortage. As shown in Submittal Table 7-5, surplus supply is expected in all five years for both potable and non-potable water primarily because the supplies from District wells and CDA wells do not decrease and additional supply projects come online.

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Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)	
2021	**Total**
Total Water Use - *Potable*	29,272
Total Supplies - *Potable*	29,272
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%
2022	**Total**
Total Water Use [Use Worksheet]	26,345
Total Supplies [Supply Worksheet]	29,272
Surplus/Shortfall w/o WSCP Action	2,927
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	2,927
Resulting % Use Reduction from WSCP action	0%
2023	**Total**
Total Water Use [Use Worksheet]	23,418
Total Supplies [Supply Worksheet]	31,272
Surplus/Shortfall w/o WSCP Action	7,854
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	7,854
Resulting % Use Reduction from WSCP action	0%
2024	**Total**
Total Water Use [Use Worksheet]	20,490
Total Supplies [Supply Worksheet]	33,272
Surplus/Shortfall w/o WSCP Action	12,782
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	
Resulting % Use Reduction from WSCP action	0%
2025	**Total**
Total Water Use [Use Worksheet]	17,563
Total Supplies [Supply Worksheet]	37,772
Surplus/Shortfall w/o WSCP Action	20,209
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	20,209
Resulting % Use Reduction from WSCP action	0%

CHAPTER 8 WATER SHORTAGE CONTINGENCY PLAN

Adoption Date and Resolution No.: June 28,2021, JCSD Resolution No. 3134

This Water Shortage Contingency Plan (WSCP) details JCSD's actions in the event of an actual water shortage condition. A water shortage means that the water supply available is insufficient to meet the normally expected customer water use at a given point in time. The State Legislature modified the UWMP laws in 2018 to require a WSCP with the specific elements contained herein. The District may modify this WSCP at any time independent of updates to the UWMP; however, the same steps to notify and hold a public hearing are required with each modification as described herein. This chapter is written as a stand-alone document and therefore repeats many elements from the other chapters in the UWMP.

8.1 WATER SUPPLY RELIABILITY ANALYSIS

Pursuant to Water Code Section 10632(a)(1), the following is a summary of the Water Service Reliability Assessment and Drought Risk Assessment located in Chapter 7 of this UWMP.

The District has assessed the reliability of its water service during normal, single-dry, and multiple-dry years by comparing total projected water supplies with total projected water demand over the next 20 years, in five-year increments. Future water supplies for JCSD include all reasonably foreseeable and quantifiable future water supply projects that the District is either currently undertaking or is in the process of implementing. Future water demands for JCSD reflect a land-use based approach assuming mid-range density buildout of the District's service area and updated water duty factors from 2018-2019 customer meter data prepared separately for each land use type in each City within the District. In summary, the District is projected to have sufficient water supplies to meet expected customer demands in normal years, single-dry years, and multiple-dry years occurring anytime between 2025 and 2045 with the future supply projects coming online and the potential effects of climate change on precipitation/natural recharge and outdoor water use.

The District has prepared a five-consecutive-year Drought Risk Assessment (DRA) for a drought beginning in 2021 and continuing through 2025. The DRA assumes a sequential reduction in customer water use with each passing year to reflect mandated conservation. These projected reductions in water use are deemed realistic given the observed reductions

JCSD customers made during the five-year drought from 2013 to 2017. Further, the DRA assumes imported water supplies would be available to the District beginning in drought year one (2021) through drought year five (2025) (WMWD(a), p. 3). Local groundwater supplies from District wells and Chino Desalter Authority (CDA) wells are assumed to be reliable in all years of the DRA, which is consistent with what was observed during the five-year drought from 2013 to 2017. The available supply in the DRA is bolstered by several water supply projects coming online between 2021 and 2025.

Groundwater reliability is based on recent analyses and observations made by the District and Chino Basin Watermaster. The Chino Basin is currently estimated to have approximately 12.6 million acre-feet of total water in storage (WEI(a), p. 6-15). The CDA well field partially located in the southwestern corner of the District must provide controlled overdraft in the southern part of the basin in order to achieve hydraulic control and maintain the safe yield (WEI(e), p. 1-4). Despite said pumping in the CDA well field, groundwater level contours between 2012 and 2018 in the JCSD area remained stable (WEI(d), Exhibit 4-4). These facts point to the Chino Basin being is of such sufficient size in terms of reliable water in storage regardless of drought conditions that reductions to the District's groundwater supply during drought years is not foreseeable. Further, the District's appropriative rights to groundwater, entitlements to CDA water, and water held in groundwater storage accounts are sufficient to meet demands through the next five years if it were five consecutive drought years.

The ability to produce water from the Chino Basin has been constrained in the last couple of years by the sudden and unexpected appearance of a newly regulated family of contaminants (i.e., PFAS). Several of the District's wells were taken offline in 2020 as a result. The difference in groundwater production has been made up by the District's other wells and purchases from CDA within the existing entitlements. It is plausible that there will be more contaminants being regulated in the future that the District currently is not aware of and unable to fully prepare for. However, the District is currently addressing the known impairments with a plan of targeted projects to bring wells back online (i.e., *Water Quality Evaluation Study* prepared by Hazen & Sawyer and WEBB). The order in which projects are proposed has been optimized to account for several variables, such as the varying concentrations of contaminants in each well (including PFAS, 1,2,3-TCP, 1,1-DCE, nitrates, and TDS), available space for treatment at each well site, minimizing the waste from treatment technologies, minimizing new pipeline lengths,

and the distance to existing blending and/or treatment facilities. Because of said reliability of the Chino Groundwater Basin, the District's demonstrated ability to make-up for nearly 40% of pumping capacity being put offline in 2020 and still meeting water demands, and the plan that has been put in-place to address water quality concerns, the DRA has assumed that availability of groundwater supplies will not be reduced due to water quality constraints.

8.2 ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES

Beginning in 2022, the District will prepare an annual water supply and demand assessment (or, Annual Assessment) and submit an Annual Water Shortage Assessment Report to DWR. The Annual Assessment is a determination of the near-term outlook for supplies and demands and how a perceived shortage may relate to WSCP shortage stage response actions in the next 12-month period; this determination is based on known circumstances and information available to JCSD at the time of analysis.

The Annual Water Shortage Assessment will be due by July 1 of each year pursuant to Water Code Section 10632.1. DWR is currently developing a stand-alone guidance document to help suppliers develop their own procedures but it will not be available before the deadline for this document, which is July 1, 2021. Therefore, the decision-making process and key data inputs for the Annual Assessment shown below are interim and subject to change when the DWR guidance document becomes available.

8.2.1 Decision-Making Process for Annual Assessment

The Annual Assessment and related reporting are to be conducted based on the District's procedures described in the WSCP. At this time, the Annual Assessment is anticipated to be primarily based on the District's ongoing water supply and water demand tracking and monitoring process, the results and analysis of which is presented monthly to the Board of Directors. The Annual Assessment will involve examination of developing demand and supply conditions for the next 12-months, as well as considerations for potential actions consistent with the WSCP. In June when an Annual Assessment is presented to the Board of Directors, it may include a request to trigger specific shortage response actions. Upon approval, JCSD staff will then submit the Annual Assessment to DWR by July 1.

8.2.2 Data and Methodologies for Annual Assessment

The primary data sources that could be used by the District to evaluate the water reliability for the current year and one dry year are detailed below pursuant to Water Code Section 10632(a)(2). The Annual Assessment determination will be based on considerations of available water supplies, unconstrained demand, and infrastructure considerations.[1] Because the WSCP shortage stages are defined in terms of shortage percentages, shortage percentages for current year and one dry year conditions would be calculated for the Annual Assessment. The characteristics of "one dry year" according to the District will be at the discretion of the District, which may be refined and changed over time based on ongoing data collection. The 2020 UWMP suggests the conditions of a single dry year would be consistent with average rainfall in 2018, which was approximately half of average (47%) with average being 11 inches per year (Table 7-1). The District will focus the Annual Assessment based on actual forecasted near-term water supply conditions to ensure appropriate shortage response actions are triggered in a timely manner with expected outcomes.

1. **Evaluation Criteria.**

   For each Annual Assessment, the District will characterize current year and one dry year scenarios based on best-available data. JCSD will consult with the Chino Basin Watermaster with regard to any limitations on groundwater extractions. The District will consult with CDA to confirm whether they will meet their contracted obligations to supply water pursuant to their agreement. Said consults will focus on estimates for the next 12 months and estimates if a single-dry year condition occurs where rainfall is half of average. The District will make an estimation of available core supplies and unconstrained demands for the next 12-month period and a dry-year scenario to calculate shortage percentages. These findings will be given additional context and

[1] For the Annual Assessment and WSCP, Water Code Section 10632(a)(2)(B)(i) directs the District to use current year "unconstrained demand" when assessing water supply reliability. Unconstrained demand is defined as expected water use in the upcoming year, based on recent water use, and before any projected shortage response actions that may be taken under the WSCP. Unconstrained demand may be differentiated from observed demand, which may be constrained by preceding, ongoing, or future actions, such as emergency actions taken as part of a mutli-year drought. Routine activities such as ongoing conservation programs and regular operational adjustments are not considered as constraints on demands.

influenced by infrastructure considerations (discussed below) which will differ from year to year.

2. Water Supply.

For each Annual Assessment, the District will quantify each source of water supply for the next 12 months and in a single-dry year condition based at least in-part on the consultations described in step 1 (Evaluation Criteria). Quantification of supplies will differentiate the District's water supplies in Table 8-3 that are expected to be used in a supply augmentation situation.

3. Current Year Unconstrained Customer Demand.

For each Annual Assessment, the District will gather data to forecast near-term demands, and may take into consideration historical usage trends, weather trends, and water-use efficiency trends. The growth projections from the *Water Master Plan*, the number of service availability letters issued recently, and development rates from the Development Status Map may be referenced to gauge demand. Because these would be "constrained" observed demands rather than unconstrained demands, the District would adjust its near-term demand forecast for the Annual Assessment to account for extraordinary demand management measures that the District may intend or have already put into effect for the current year.

4. Current Year Available Supply.

For each Annual Assessment, the District will make two estimates of the available annual water supply using (1) current year conditions for the next 12 months and (2) one dry year conditions. Because the definition of one dry year is at the discretion of the District, JCSD will be able to refine and update its assumptions for a dry year scenario in each Annual Assessment as information becomes available.

5. Infrastructure Considerations.

For each Annual Assessment, the District will describe infrastructure constraints that would influence the ability to obtain the water supply as expected and/or the ability to distribute normally to customers. Projects in the next 12 months that would influence

capabilities would be quantified with the volume of water becoming available or unavailable and the duration of projects/constraints.

Each year, JCSD regularly carries out preventive and corrective maintenance of its facilities to inspect and repair pipelines and facilities and support capital improvement projects. These shutdowns involve a high level of planning and coordination; they are scheduled to ensure that major portions of the distribution system are not out of service at the same time. Operational flexibility within JCSD's system allow shutdowns to be successfully completed while continuing to meet all system demands.

6. Other Factors.

For each Annual Assessment, the District can describe locally applicable factors that can influence or disrupt supplies, along with other unique local considerations that are considered to be part of the Annual Assessment.

8.3 SIX STANDARD WATER SHORTAGE STAGES

The Water Code requires six standard water shortage stages in the WSCP that correspond to progressive ranges of up to 10%, 20%, 30%, 40%, and 50% shortages and greater than 50% shortage. Each stage represents an increasing gap between JCSD's supplies and demands as determined in the Annual Assessment. As described above, shortage percentages will be calculated as percent shortfall of supplies against demands for anticipated current year conditions and assumed dry year conditions. Shortage levels also apply to catastrophic interruption of water supplies, including but not limited to a regional power outage or earthquake. The District's shortage response actions for each shortage level are shown in **Submittal Table 8-1** (next page) and described in Section 8.4, below.

Submittal Table 8-1 Water Shortage Contingency Plan Levels		
Shortage Level	**Percent Shortage Range**	**Shortage Response Actions** (*Narrative description*)
1	Up to 10%	"Drought Watch" (Voluntary per person water use reduction of up to 10%.) District will increase public education and outreach efforts to implement many voluntary water conservation practices.
2	Up to 20%	"Drought Caution" (Mandatory per person water use reduction of 10-20%.) Demand reduction actions expand to limit outdoor water use and all Level 1 actions become mandatory. Beginning at this level, District can pursue administrative, civil, and criminal penalties and remedies, cumulatively, for violation of water conservation measures.
3	Up to 30%	"Drought Alert" (Mandatory per person water use reduction of 20-30%.) Demand reduction actions expand to further limit outdoor irrigation, including no public median watering. Demand Actions required by level 1 and level 2 stay in-effect.
4	Up to 40%	"Drought Critical" (Mandatory perperson water use reduction of 30-40%.) Demand reduction actions can include suspending new service availability letters, annexations to its service area, and/or may establish water allocations for properties served. Demand reductions in levels 1-3 are in-effect. Supply augmentation may begin with using water in storage.
5	Up to 50%	"Drought Emergency" (Mandatory per person water use reduction of more than 40%.) Demand reduction actions continue and can include a moratorium on new service connections and water allocations. Actions in level 1-4 remain in-effect. Supply augmentation may begin (or continue) with using water in storage and/or fully utilizing rights.
6	>50%	Also "Drought Emergency" (Same requirements apply in this situation as level 5.)
NOTES: Source: JCSD Ordinance. No. 389. Refer to Table 8A for Water Conservation Measures by Drought Response Level and Table 8-2 for restrictions on end uses.		

Water suppliers may continue using their existing water shortage stages as long as a cross-reference relating its existing stages to the six standard levels prescribed by statute (Water Code 10632(a)(3)). The District's crosswalk is provided in **Table 8A** (next page).

Table 8A– Crosswalk Between JCSD Shortage Levels and 2020 Mandated Shortage Levels

Drought Condition	2015 UWMP Stage	Supply Condition/ Shortage	Per Person Water Use Reduction Target		2020 WSCP Level	Shortage Levels Prescribed by Statute
Abnormally Dry	1	Normal (Drought Watch - voluntary)	< 10%	→	1	≤ 10%
Moderate Drought	2	Drought Caution (mandatory)	10-20%	→	2	10-20%
Severe Drought	3	Drought Alert (mandatory)	20-30%	→	3	20-30%
Extreme Drought	4	Drought Critical (mandatory)	(30-40%)	→	4	30-40%
Exceptional Drought	5	Drought Emergency (mandatory)	>40%	→	5	40-50%
				→	6	> 50%

JCSD Ordinance No. 389 describes the District's five-stage Water Conservation Program to be invoked during declared water shortages (a copy of Ordinance No. 389 is located in **Appendix M**). The stages reflect increasing levels of prohibitions and consumption reduction methods. Ordinance No. 389 includes both voluntary and mandatory rationing depending on the causes, severity, and anticipated duration of the water supply shortage. Therefore, the District may declare a drought emergency stage at any time based on the current circumstances, without regard to the drought stage previously in effect. The JCSD shortage stages also apply in the event of catastrophic interruptions of water supplies.

8.4 WATER SHORTAGE RESPONSE ACTIONS

The water shortage response actions the District can take that align with the defined shortage levels in Table 8A include demand reduction actions, supply augmentation actions, operational changes, and additional mandatory prohibitions. The authority to determine shortage conditions and to select appropriate shortage response actions remains with each water supplier. **Table 8B** summarizes the demand reduction actions listed in Ord. No. 389 and in

which stage the action is voluntary or mandatory. Descriptions of each stage are noted after the table.

Table 8B - JCSD Ord. No. 389 Demand Reduction Actions

Prohibition	Voluntary	Prohibition is mandatory			
	Level 1[(1)]	Level 2[(1)]	Level 3	Level 4	Level 5
Do not use water to wash down paved surfaces	X	X	X	X	X
Adjust sprinklers and irrigation systems to avoid overspray, runoff, and waste	X	X	X	X	X
Irrigate all landscapes before dawn, and never between 8:00 AM and 8:00 PM	X	X	X	X	X
Irrigation is prohibited during and 48 hours after measurable rain	X	X	X	X	X
Agricultural users are requested to reduce water usage and consult with local Resource Conservation District as needed for appropriate measures	X	X	X	X	X
Developers and residents are encouraged to design and install water-efficient landscaping and minimize turf areas	X	X	X	X	X
Install water saving devices in indoor plumbing	X	X	X	X	X
Check for and repair leaks both indoors and outdoors	X	X	X	X	X
Use re-circulated water in decorative features	X	X	X	X	X
Wash motor vehicles and other mobile equipment with a bucket or hand-held hose with positive shut-off valve	X	X	X		
Vehicles may only be washed at commercial carwashes				X	X
Restaurants do not serve water unless requested	X	X	X	X	X
Hotels and motels must provide guests with a no-wash option	X	X	X	X	X
Limit all outdoor irrigation to 4 days per week, no more than 10 minutes per station per day; does not apply to functional landscapes.		X			
Limit all outdoor irrigation to 3 days per week, no more than 10 minutes per station per day; functional landscapes watering limited to 4 days per week			X		
Limit all outdoor irrigation to 2 days per week, no more than 10 minutes per station per day; functional landscapes watering limited to 3 days per week				X	X
Irrigation will be limited to odd-numbered addresses on Mondays, Wednesdays, Fridays			X		

Prohibition	Voluntary	Prohibition is mandatory			
	Level 1[1]	Level 2[1]	Level 3	Level 4	Level 5
and even-numbered addresses on Tuesdays, Thursdays, Saturdays					
Irrigation will be limited to odd-numbered addresses on Mondays and Thursdays, even-numbered addresses on Tuesdays and Fridays				X	X
Ornamental landscapes with properly operating water-efficient devices can be irrigated 30 minutes/station/day for drip irrigation or 20 minutes/station/day for stream rotors on the days authorized for landscape irrigation		X	X	X	X
Repair or stop leaks within 72 hours of notification		X			
Repair or stop leaks within 48 hours of notification			X	X	X
No irrigation of turf on public medians			X	X	X
Irrigation with potable water outside newly constructed homes inconsistent with CBSC or DHCD standards is prohibited[2]			X	X	X
Each developer must submit a Water Conservation Plan prior to using water for dust control and grading at construction sites			X	X	X
The District may establish a water allocation for each property served				X	X

Source: JCSD Ord. No. 389.
An "X" indicates the prohibition is applicable.
CBSC: California Building Standards Commission; DHCD: Department of Housing and Community Development.
(1) Level 2 is the lowest the District can declare under current state regulations.

Drought Response Level 1 – Drought Watch Condition

The District cannot declare less than a Level 2 condition under current state regulations, and therefore all Level 1 conditions are currently mandatory. If a Level 1 condition can be declared by the Board of Directors, then all water users would be asked to voluntarily reduce their water use up to 10 percent.

[2] CBSC = California Building Standards Commission, DHCD = Department of Housing and Community Development

Drought Response Level 2 – Drought Caution Condition

Level 2 is the lowest level the District can declare under current statewide regulations. The Board of Directors can declare a Level 2 Drought Caution Condition which mandates all water users to reduce their water use more than 10 percent and up to 20 percent. The water conservation measures required in addition to Level 1 measures are presented in Table 8B. Beginning with Drought Response Level 2, violation of the mandatory water conservation measures shall be subject to civil penalties (see section 8.6, below).

Drought Response Level 3 – Drought Alert Condition

The Board of Directors can declare a Level 3 Drought Alert Condition which mandates all water users to reduce their water use more than 20 percent and up to 30 percent to ensure sufficient supplies. At Level 3, new service availability letters will be issued by JCSD provided that the applicant proves to the satisfaction of the District of an enforceable commitment that water demands for the project will be offset by 100 percent prior to the provision of a new water meter.

Drought Response Level 4 – Drought Critical Condition

The Board of Directors can declare a Level 4 Drought Critical Condition which mandates all water users to reduce their water use more than 30 percent and up to 40 percent to ensure sufficient supplies. Upon declaration of a Level 4 condition, the issuance of new service availability letters shall be suspended, unless already approved, provided the applicant provides proof to the satisfaction of the District of an enforceable commitment that water demands from the project will be offset by 125 percent prior to the provision of a new water meter.[3] New connections and temporary construction meters shall be permitted as necessary under the discretion of the Board of Directors to protect public's health, safety and welfare.

Beginning with Level 4, the District shall also suspend consideration of annexations to its service area, unless the annexation increases the water supply available to the District by more than the anticipated demands of the property to be annexed. Also beginning with a Level 4 condition, the Board of Directors will consider instating Water Allocation Targets for each

[3] Substituting this requirement with imposition of the Water Resources Capacity Charge is at the discretion of the District at such time they enter Drought Level 4.

property served. The calculation would be applied to consumption in excess of the Public Health and Safety threshold of eleven units per monthly billing period.

Drought Response Level 5 – Drought Emergency Condition

In the event of a water shortage of any percentage more than 40 percent, or at any other time the Board of Directors deems necessary, the Board of Directors may declare a Level 5 Drought Emergency Condition and consider a moratorium on new service connections regardless of approved water availability letters. The water conservation measures required in addition to Level 1, Level 2, Level 3, and Level 4 measures would all be mandatory. The Board of Directors can also consider instating water allocation targets for each customer served.

8.4.1 Demand Reduction

There are generally two ways to respond to a water shortage through either demand reduction actions or supply augmentation. The District's Water Conservation Program in Ordinance No. 389 focuses on reducing demand for water to address reductions in water supplies and/or worsening drought conditions. The District demonstrated during the drought of 2013-2017 that demand reduction efforts are achievable and effective; for example, average per-person water use was reduced from 179.2 gallons per capita per day (GPCD) in August 2014 to 103 GPCD in April 2016, which is a 42.5% decrease in use over two years (WEBB(b), p. 8-6). The District's demand reduction actions are provided in **Submittal Table 8-2** (next page) including the estimated proportion of the shortage gap that the demand reduction action is expected to meet at each level. Level 1 actions are not shown in Submittal Table 8-2 because they are currently mandatory per Level 2 conditions. The percentages add up to 100% in Levels 2 and 3.

Submittal Table 8-2: Demand Reduction Actions

Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
Add additional rows as needed				
2	Other - Prohibit use of potable water for washing hard surfaces	5%	Includes sidewalks, driveways, parking areas, tennis courts, patios, or other paved areas, except to alleviate immediate safety or sanitation hazards.	Yes
2	Expand Public Information Campaign	8%		Yes
2	Offer Water Use Surveys	3%		No
2	Increase Water Waste Patrols	8%		Yes
2	Landscape - Restrict or prohibit runoff from landscape irrigation	5%	Adjust sprinklers to avoid overspray, runoff and waste.	Yes
2	Landscape - Limit landscape irrigation to specific days	3%	Avoid watering on windy days.	Yes
2	Landscape - Limit landscape irrigation to specific times	8%	Limited to before 8 AM and 8 PM.	Yes
2	Other - Require automatic shut of hoses	5%	Use hose equipped with a positive shut-off nozzle or bucket to water non-irrigated landscaping	Yes
2	Landscape - Other landscape restriction or prohibition	2%	Prohibited during or 48 hours after measurable rain (0.25-inch).	Yes
2	Other	0% (No agricultural users currently)	Agricultural users are encouraged to meet with the local Resource Conservation District or industry associations to identify water conservation measures and implement as soon as possible.	Yes
2	Landscape - Other landscape restriction or prohibition	15%	Residents and developers are urged to install waterwise landscaping/minimize turf areas	Yes
2	Other	10%	Install water saving devices indoors.	Yes
2	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	5%	Check for leaks indoors/outdoors and repair them immediately.	Yes
2	Water Features - Restrict water use for decorative water features, such as fountains	1%	Use recirculated water in these features.	Yes
2	Other - Require automatic shut of hoses	1%	Wash vehicles, etc. with a hose and shut-off nozzle, or at a commercial site.	Yes
2	Other	0	Avoid washing vehicles during hot conditions.	Yes
2	CII - Restaurants may only serve water upon request	1%	Also applicable in other public places where food is served.	Yes
2	CII - Lodging establishment must offer opt out of linen service	0	Notice of this option should be displayed prominently in each room.	Yes
2	Landscape - Limit landscape irrigation to specific times	13%	Ornamental landcsapes with water-efficient devices may irrigate as follows on authorized days: Drip Irrigation - 30 min per station; and Stream Rotors - 20 minutes per station.	Yes
2	Landscape - Limit landscape irrigation to specific days	5%	Limit all outdoor irrigation to 4 days per week and no more than 10 minutes per station. Does not apply to functional landscape, which shall be limited to 5 days per week as approved by District.	Yes
2	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	2%	All leaks must be repaired/stopped within 72 hours of notification	Yes

Submittal Table 8-2: Demand Reduction Actions

Shortage Level	Demand Reduction Actions *Drop down list* *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? *For Retail Suppliers Only* Drop Down List
Add additional rows as needed				
3	Landscape - Limit landscape irrigation to specific days	20%	Odd and even addresses water on opposite days with no watering on Sunday.	Yes
3	Landscape - Prohibit certain types of landscape irrigation	6%	No irrigation of turf on public medians.	Yes
3	Landscape - Prohibit certain types of landscape irrigation	0%	No irrigation with potable water outside of new construction in a manner inconsistent with regulations established by Building Standards Commission and Dept. of Housing & Community Development.	Yes
3	Other	2%	Use of water for dust control shall only be permitted as set forth in a Water Conservation Plan approved by the District.	Yes
3	Moratorium or Net Zero Demand Increase on New Connections	0		Yes
3	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	2%	Repair or stop leaks within 48 hours.	Yes
4	Other	40%	All Level 2 and Level 3 demand reduction actions	Yes
4	Landscape - Limit landscape irrigation to specific days	3%	Limit outdoor irrigation to 2 days per week, 10 minutes per stations. Functional landscape will be limited to 3 days per week. Exemptions for fire protection and erosion control may allow watering up to 3 days per week.	Yes
4	Landscape - Limit landscape irrigation to specific days	6%	Odd addresses water on Mon. and Thurs., even addresses on Tues. and Fri. and no watering on Sat. or Sun.	Yes
4	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	1%	Vehicles can only be washed at commercial car washes.	Yes
4	Moratorium or Net Zero Demand Increase on New Connections	0		Yes
4	Other	0	Water Allocation Target may be developed for each account. This option is reserved for the most extreme contingency, therefore no demand reduction is provided.	Yes
5	Other	45%	All Level 2, Level 3, and Level 4 demand reduction actions	Yes
5	Other	0%	Water Allocation Target may be developed for each account. This option is reserved for the most extreme contingency, therefore no demand reduction is provided.	Yes
5	Moratorium or Net Zero Demand Increase on New Connections	5%	Moratorium on new service connections regardless of the existence of water availability letters for such connections.	Yes

NOTES: Level 2 is the lowest stage the District can declare under current statewide regulations. Therefore, all previously Level 1 measures are now Level 2 measures. Consistent with Ord. No. 389, this plan assumes a Level 2 reduction goal = 20%, Level 3 reduction goal = 30%, Level 4 reduction goal = 40%, Level 5 reduction goal = 50%. In Level 4 and Level 5, a supply augmentation (Table 8-3) would meet the other half of the shortage gap. Percentages are estimated based on best available information.

8.4.2 Supply Augmentation

The District can augment or supplement its water supplies by utilizing its full rights in the Chino Basin and by using water held in the Chino Basin groundwater storage accounts. These augmentation actions would not be redundant to the supplies discussed in UWMP Chapter 6 because these actions are above and beyond a normal water supply scenario. For example, the District plans to produce up to 14,000 AFY beginning in 2030 (Submittal Table 6-9). The supply augmentation would consist of pumping Chino Basin groundwater in an amount greater than 14,000 AFY up to the District's production right which is currently 19,548 AF (CBWM(a), p. 10.1). And pursuant to the Judgment, the District can pump in excess of its production right with payment of a replenishment fee. The District can also augment supply by using its water held in storage in the Chino Basin, which is currently 31,861.3 AF (CBWM(a), p. 11.1).

As shown in **Submittal Table 8-3**, these supply augmentation measures would occur no sooner than drought stage 4. In drought stage 5, a combination of the two supply augmentation actions would be used to meet half of the shortage gap, with the other half met by demand reductions shown previously in Submittal Table 8-2.

Submittal Table 8-3: Supply Augmentation and Other Actions

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*
Add additional rows as needed			
4	Other Actions (describe)	50%	Utilizing full rights in the Chino Basin.
5	Other Actions (describe)	50%	Utilizing full rights in the Chino Basin.
5	Stored Emergency Supply	50%	Using water held in storage account in Chino Basin.
NOTES: In Level 5, the shortage could be met by either utilizing full rights in the Chino Basin or using water held in storage in the Chino Basin, or a combination thereof to meet at least half of the shortage gap. The remainder would be met with demand reduction actions (Table 8-2).			

8.4.3 Operational Changes

The operational actions that would be undertaken in the various drought scenarios are outlined in Table 8-2. The District already has a program to monitor, analyze, and tracking of customer usage rates and has budgeted a very aggressive pipeline replacement program.

8.4.4 Additional Mandatory Restrictions

All mandatory restrictions developed by the District in addition to state-mandated prohibitions are listed in Table 8C and Submittal Table 8-2. No additional mandatory restrictions are available; however, the Board of Directors has the discretion to develop in the future locally appropriate restrictions as conditions dictate.

8.4.5 Emergency Response Plan

JCSD adopted its Emergency Response Plan (ERP) in September 2020. Applicable excerpts from the document are included herein where noted; the document in its entirety is kept by the District. The ERP includes a Risk and Resilience Assessment for water facilities developed pursuant to America's Water Infrastructure Act of 2018 (AWIA). The ERP also includes Emergency Support Function No. 2 - Public Works and Engineering (ESF #2) to coordinate critical facilities including water treatment and distribution. JCSD has developed the ERP to facilitate resumption of normal operation of their facilities after an emergency including catastrophic supply interruptions. The primary hazards identified for JCSD are natural, infrastructure, and human-caused (ERP, p. 6). The following is a summary of pertinent information from the ERP (2020):

> *The Emergency Response Plan (ERP) is activated when it becomes necessary to mobilize resources of the District and the Mutual Aid Responders and the necessary Officers to save lives, protect property and critical infrastructure, and maintain services. This plan assigns roles and responsibilities to the various departments and Mutual Aid responders, and requires training, planning, and exercising prior to an emergency or incident. Each Department (Engineering, Water Operations, Sewer Operations, Finance, and Administration) is committed to effectively and efficiently coordinating and functioning within their assigned roles while providing mitigation and planning, response, and recovery efforts realized as the result of an incident or emergency. (ERP, p. 5)*
>
> *Jurupa Community Services District operates and maintains several facilities, which provides potable water to several businesses and the public in general including the City of Norco, the City of Ontario, and the Santa Ana River Water Company. It is important to note that none of the agencies that receive water*

from JCSD are solely dependent upon JCSD to provide water to their customers; all have alternative water sources. Therefore, if JCSD'S operation is terminated by a disaster, drinking water supplies will not be jeopardized. However, JCSD is committed to its obligation to provide a reliable source of potable water as soon as possible in the event of an emergency. JCSD recognizes that in the event of a regional disaster, such as an earthquake, other water sources may also be jeopardized; therefore, it is critical to return all facilities to full operation as soon as possible after an emergency. (ERP, p. 6)

JCSD is preparing to adopt its *2020 Water Master Plan,* which includes discussion and analysis of the District's existing water infrastructure in the event of an emergency and design criteria for future infrastructure to prepare for potential emergencies. The following excerpts address emergency water infrastructure situations:

- *JCSD has interties with neighboring water agencies including Santa Ana River Water Company, City of Ontario, City of Norco, Rubidoux Community Services District, and CDA.* (WEBB(a), p. 4-18)

- *JCSD operates 14 pressure reducing (regulating) stations, which allow the transfer of water from a higher-pressure zone to a lower pressure zone without exceeding the allowable pressure of the lower zone or completely draining water out of the higher zone. These ensure that a main break, or similar emergency in the lower pressure zone does not drain too much water from the upper pressure zone.* (WEBB(a), p. 4-17)

- *JCSD has connections (or interties) with neighboring water agencies, including the SARWC, the cities of Norco and Ontario, and RCSD to convey supplies in the event of an emergency.* (WEBB(a), p. 4-19)

- *JCSD has 16 water storage reservoirs located throughout the service area with a total capacity of 57.4 million gallons (MG). Stored water helps to equalize fluctuations between maximum and average daily supply and demand, to supply water for firefighting, and to meet demands during an emergency or unplanned outage of a major source of supply. JCSD design criteria for reservoirs includes an emergency storage volume equivalent to 75% of maximum day demand*. (WEBB(a), pp. 4-12, 5-5)

- *JCSD has eight primary pump stations with 22 electric pumps to provide water to higher elevations* (p. 4-13). *District design criteria requires that pump stations shall be constructed of fireproof materials and in some instances provided with peripheral sprinkler systems to prevent fire damage. Furthermore, power to the pump stations shall be provided through underground service to minimize possibility of damage during fires. Standby generators and automatic transfer switches shall be provided to critical pump stations to maintain operation during power outages*. (WEBB(a), p. 5-6)

- *JCSD has standby pumps at each of the existing pump stations for redundancy. Additionally, there are standby generators at most of the booster stations for electrical outages. Tanks and reservoirs have been dispersed across the distribution system and each has emergency storage if the supply source is out of service. Most of the distribution piping has been looped to create dual source systems. These looped pipe systems provide redundancy which increases the reliability of the system in the event of a waterline rupture, replacement, maintenance, or for some other reason. Reliability and redundancy should be considered in the design of future water facilities. Standby pumps and generators should be incorporated into the design of future booster stations. When possible, distribution piping should be designed with loops and avoid having more than 25 homes on a dead-end line*. (WEBB(a), pp. 5-6, 5-7)

As stated in the District's 2015 UWMP, "JCSD's facilities were designed and built to withstand earthquakes. Most of the District's systems are built of concrete and steel. In addition to causing structural damage, both earthquakes and fires could cause regional power outages. JCSD has installed standby power sources and repair supplies at strategic locations to lessen this risk to service disruption. More than half of JCSD's potable wells are equipped with backup generators." (WEBB(b), p. 8-14)

JCSD is a member of the statewide Water/Wastewater Agency Response Network (CalWARN) that functions in coordination with the State Office of Emergency Services. CalWARN is a network of agencies that support and promote statewide emergency preparedness, disaster response, and mutual assistance for public and private water and wastewater utilities.

JCSD is also a member of the Emergency Response Network of the Inland Empire (ERNIE), which facilitates public agency preparedness for, response to, and recovery from local and

regional disasters. Agencies volunteer to enter into an agreement to provide mutual aid and assistance to other member agencies. ERNIE assists agencies with trainings, communication, documentations for reimbursement, concept of emergency operations, and writing after-action reports and corrective action plans.

8.4.6 Seismic Risk Assessment and Mitigation Plan

Pursuant to Water Code Section 10632.5 beginning January 1, 2020, the UWMP shall include a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities.[4] The District may comply with this requirement by submitting a copy of its most recent Hazard Mitigation Plan (HMP) prepared under the federal Disaster Mitigation Act of 2000 if the HMP addresses seismic risk.

JCSD recently adopted its *2020 Hazard Mitigation Plan* (HMP) that was prepared pursuant to the federal Disaster Mitigation Act of 2000 (Public Law 106-390). Applicable excerpts from the document are included herein where noted, but the entire document is held by the District. Key findings from the 2020 HMP that are pertinent to the UWMP include:

- Earthquake hazards – No known faults are located within the District; however, several major faults are located in close proximity to the District, including the San Andreas Fault and San Jacinto Fault. JCSD has never been severely impacted by an earthquake (HMP, pp. 42-43).

- Wildfire hazards – The most recent wildfire event within JCSD occurred on Nov. 2, 2011 when a 13-acre fire pushed by Santa Ana Winds caused damage to three homes in the Glen Avon community of Jurupa Valley. Bordering areas along the District's boundary to the north and south are prone to wildfires including the Santa Ana River corridor (HMP, p. 52).

- Flooding hazards – The most recent flooding event to affect JCSD occurred in February of 2017 when flooding from the Santa Ana River damaged the Sky Lift Station 1 and 3. Prior to that, a series of storms in 2010 between Dec. 18 and Dec. 23 caused significant

[4] Pursuant to Water Code section 10632.5, the assessment herein is based on other sources, as described below. Albert A. Webb Associates is not qualified to make its own independent seismic risk assessments or recommend mitigation actions and assumes no responsibility for those recommended herein.

flooding damage to District property when the Santa Ana River inundated JCSD property off of Citrus Avenue. (HMP, p. 57)

- Windstorm hazards – High velocity wind events are typically the result of Santa Ana wind conditions (between Oct. and Feb.). Although infrequent, Santa Ana wind conditions and sporadic tornado activity have been known to impact District infrastructure located in isolated locations. (HMP, p. 65)

- Utility-Related hazards – The District has experienced brief power failures but none to the extent they posed a significant threat. The Public Safety Power Shutoff Program began in 2019 to shutoff electric power for reasons of public safety in an effort to prevent a wildfire. To date, no deliberate electricity stoppages have been ordered in the District area. There have been no natural gas pipeline incidents posing a significant threat to the District (HMP, p. 68)

To assess risk in the HMP, each potential type of risk was first prioritized based on probability to occur, magnitude of impact, length of warning time before an event occurs, and duration of the disaster event. Risks are ranked based on these factors, with the highest risk being an earthquake from the San Andreas Fault and an earthquake from the San Jacinto Fault, in addition to flood, wildfire, utility-related risk, and windstorm (HMP, p. 33). Vulnerability to the effects of an earthquake were determined to include the entire service area with likely probability to occur, but no significant previous earthquake events are noted. The magnitude of the event according to the Southern California Earthquake Center in 2007 concluded that there is a 99.7% probability than earthquake of magnitude 6.7 or greater will hit California within 30 years. Said earthquake would most likely originate from the San Andreas Fault (HMP, p. 35). Impacts from an earthquake could affect every JCSD facility (HMP, pp. 37-38) and every land use type in the District (HMP, p. 40).

The HMP contains a Mitigation Actions Matrix to identify actions that have been completed or still needed to address potential hazards, including seismic risk (pp. 83-108). Mitigation Earthquake Action Items include the following to mitigate seismic risk (shown in image below): (1) EQ-1 - Purchase and Installation of Engineered Seismic Retrofits (e.g. Seismic Valves and Couplings) at Water Storage Facilities (Reservoirs); and (2) EQ-2 - Conduct inventory and

identify action plan for retrofitting non-structural equipment and furniture, etc. against seismic activity. (HMP, p. 100)

Action Item	Coordinating Department	Timeline	Plan Goals Addressed					Priority L-Low, M-Medium, H- High	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Funding Source: GF-General Fund, GR-Grant, CIP, STEP-Strategic Plan, WP-Water Plan, SP-Sewer Plan	Planning Mechanism: GF-General Fund, GR-Grant, STEP-Strategic Plan, WP-Water Plan, SP-Sewer Plan	Buildings & Infrastructure: Does the Action Item involve new and/or existing Buildings & Infrastructure? Y=Yes, N=No	2020 Comments and Status: Completed, Revised, Deleted, New, Postponed, and Notes
			Protect Life and Property	Public Awareness	Natural Systems	Partnerships and Implementation	Emergency Services							
MH-57 Earthquake Action Items														
EQ-1 Purchase and Installation of Engineered Seismic Retrofits (e.g. Seismic Valves and Couplings) at Water Storage Facilities (Reservoirs).	Engineering	3 years			X	X	X	H	H	H	GR/GF, CIP,	STEP, WP, SP	Y	Revised
EQ-2 Conduct inventory and identify action plan for retrofitting non-structural equipment and furniture, etc. against seismic activity.	Operations	1-2 years	X	X	X	X	X	H	H	M	GR/GF	STEP	Y	Revised

Excerpt from Mitigation Actions Matrix in the JCSD 2020 Hazard Mitigation Plan.

8.4.7 Shortage Response Action Effectiveness

The District's response actions are shown in Submittal Tables 8-2 and 8-3. Each response action listed has a corresponding percentage of the shortage gap that the action is expected to meet. The percentages in Submittal Table 8-2 are based on the observed effectiveness of demand reduction actions undertaken during the last five years including the drought from 2013-2017. The higher the percentage, the more effective the action is expected to be in reducing demand. Actions that were very prescriptive such as limiting outdoor watering to specific times was effective because that can be monitored real-time in-house and spotted easily during water waste patrols. Instead of limiting watering to just a certain number of days per week, assign which customers using odd/even addresses can water on which days and not just any four days of the week, for example, is much more enforceable and effective.

Because the District has not declared a Level 4 (30-40% reduction) or Level 5 (>40% reduction) drought level, and never required water allocation targets because they are reserved for the most extreme scenario and unlikely at this time to be implemented, percentages of effectiveness were assumed 0% in Submittal Table 8-2.

As described previously, the District demonstrated during the drought of 2013-2017 that demand reduction efforts are achievable and effective; for example, average Districtwide consumption decreased 23 percent from 2013 to 2015. Average per-person water use was reduced from 179.2 gallons per capita per day (GPCD) in August 2014 to 103 GPCD in April 2016, which is a 42.5% decrease in use over two years. (WEBB(b), pp. 8-6, 8-12) During drought periods, the JCSD Operations Department reports weekly production figures to the Conservation Coordinator, who then prepares a monthly report to the Board of Directors to report on progress toward the water conservation target. In doing so, the District does analyze the efficacy of response actions on a monthly basis.

The effectiveness of the supply augmentation actions shown in Submittal Table 8-3 have not been needed to-date and are therefore estimated based on a thorough understanding of pumping capacity, well locations, and expected production rates based on long-term records. Because the District's system has been designed to fully utilize its groundwater rights and water in storage, the supply augmentation actions in Submittal Table 8-3 are estimated to close the water shortage gap by at least half during a Level 4 or Level 5 drought declaration.

8.5 COMMUNICATION PROTOCOLS

In the event of a drought declaration, notifications will proceed pursuant to JCSD Ordinance No. 389, which states in-part:

> *The existence of Drought Response Level 2 "Drought Caution," Level 3 "Drought Alert," or Level 4 "Drought Critical," or Level 5 "Drought Emergency" condition may be declared by resolution of the Board of Directors adopted at a regular or special public meeting held in accordance with State law. The mandatory conservation measures applicable to Drought Response Levels 2, 3, 4 or 5 conditions shall take effect immediately or as otherwise provided by State law. Within ten (10) days following the declaration of the response level, the District*

shall publish a copy of the resolution in a newspaper used for publication of official notices. If the District establishes a water allocation in response to a Drought Response Level 4 or Level 5 condition, it shall provide notice of the allocation by including it in the regular billing statement for the fee or charge or by any other mailing to the address to which the District customarily mails the billing statement for fees or charges for ongoing water service. Water allocation shall be effective on the fifth (5th) day following the date of mailing or at such later date as specified in the notice. The District's Board of Directors may declare an end to a Drought Response Level by the adoption of a resolution at any regular or special meeting held in accordance with State law.

In the event of an emergency, the District's ERP will provide complete guidance on notifications procedure, which states in-part (ERP, p. 27):

Initial notification to Duty Officers, District response departments, county employees, and the public occurs through several primary methods:

- *The Emergency Communications Center (ECC) will follow the Emergency Notification, District Paging Criteria is used to notify the Duty Officer of all responses, and to notify the General Manager.*
- *Involved departments and non-governmental emergency organizations notify their personnel and support through their pre-established individual emergency call procedures.*
- *Employees will be notified through the Employee Alert System (EAS) of the current situation and any response or protective actions necessary. The EAS is an important component in emergency notification, and it is incumbent on all employees to keep contact information up to date.*
- *The public will be informed through the appropriate public notification channel(s).*

Public notification channels can include the JCSD Emergency Communications Center, Nixle and the Employee Alert Systems, JCSD web site, local radio and television stations, NOAA

Weather Radio (National Weather Service), mobile public address systems, outdoor warning system/ Wireless Audio Visual Emergency System (WAVES), telephone/reverse 911, general broadcast over all available radio frequencies, and Social Media (Facebook, Twitter, LinkedIn, Instagram, etc.) (HMP, p. 73). District Staff should refer to Emergency Support Function No. 2 (ESF #2) – Communications within the ERP for detailed procedures, assumptions and available resources related to communications in an emergency (HMP, p. 71).

8.6 COMPLIANCE AND ENFORCEMENT

Pursuant to Water Code Section 10632(a)(6), the following explains the customer compliance, enforcement, appeal, and exemption procedures for triggered shortage response actions as determined by the WSCP.

The District will make a reasonable effort to assist customers with compliance, including personal contact, door hanger, letter, email, or telephone to notify customers of violation. Violation of the mandatory water restrictions associated with Drought Response Levels 2 through 5 will be subject to civil penalties set forth in Section 10.0 of Ordinance No. 389, as well as all other criminal and civil sanctions available under State law. During Drought Response Level 1, all reduction measures are voluntary.

As outlined in Section 10.0 of Ordinance No. 389, each day that a violation occurs is a separate offense. The first violation of any provision will result in a civil penalty fee of $25.00; fees associated with any other provisions within one year of the first violation of any provision of Ordinance No. 389 will be assessed as follows in **Table 8C.**

Table 8C - Penalties for Violations of Drought Level Restrictions

Civil Penalties for Violations of Drought Levels 2-5 Restrictions	
First Violation	$25.00
Second Violation	$50.00
Third Violation	$100.00
Fourth Violation	$200.00
Fifth Violation	$500.00

Source: JCSD Ord. No. 389.

If a water allocation has been imposed by the District during a Drought Response Level 4 or Level 5, water use in excess of the violation shall also constitute a violation. Water use in excess of the water allocation target per equivalent dwelling unit in any monthly period shall constitute a first offense, resulting in written notification. Monthly water use in excess of the water allocation target of any provision in any subsequent monthly billing period within one year of the first violation will constitute subsequent violation and the user will be assessed fees according to the following schedule in **Table 8D**:

Table 8D - Penalties for Violations of Water Allocation Target

Civil Penalties for Violations of Water Allocation Target	
First Violation	Written Notification
Second Violation	$20.00
Third Violation	$50.00
Fourth Violation	$100.00
Fifth Violation	$250.00
Sixth Violation	$500.00

Source: JCSD Ord. No. 389.

When a civil penalty is to be imposed, the customer will be given written notification of the penalty to be imposed. The customer then has seven days to contest the penalty, and the District will hold a hearing within 14 days if requested. Penalty amounts may be separately itemized on the Districts monthly bill for water service and will be due at the same time and in the same manner as charges for water service. Penalties collected will be used solely to implement and enforce water conservation measures.

Violation of a provision of this ordinance (No. 389) is subject to enforcement through installation of a flow-restricting device at the meter and could also be persecuted as a misdemeanor, punishable by imprisonment in the county jail for not more than 30 days or by a fine not exceeding $1,000 or both (Water Code Section 377). Willful violations could also constitute cause for termination of service to the property in violation. Such service shall not be resumed until such time as the Board of Directors receives satisfactory assurances that violations will not recur. The customer shall be responsible for the District's standard fees and charges for termination and resumption of service.

8.7 LEGAL AUTHORITIES

This section of the WSCP discloses the legal authorities that JCSD relies upon to implement the shortage response actions in Section 8.4, and to enforce them relative to Section 8.6.

The District maintains legal authority to implement JCSD Ordinance No. 389 – Water Conservation Program including the demand reduction actions in Section 8.4.1 and enforcement actions in Section 8.6. Ordinance No. 389 was adopted on May 26, 2015 by the JCSD Board of Directors as an Urgency Ordinance to adopt a water conservation program pursuant to Water Code section 375 that took effect immediately pursuant to Water Code section 376 (Appendix M).

The District's legal right to pump in the Chino Basin in order to implement the supply augmentation actions in Table 8-3 is an appropriative right adjudicated pursuant to the 1978 Judgment (Appendix I).

The following statements have been included herein to demonstrate consistency with Water Code Section 10632(a)(7):

1. Water Code Section Division 1, Section 350 - Declaration of a water shortage emergency condition.

> The governing body of the Jurupa Community Services District shall declare a water shortage emergency condition to prevail within the area served by the Jurupa Community Services District whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the Jurupa Community Services District to the extent that there would be insufficient water for human consumption, sanitation, and fire protection.

2. California Government Code, California Emergency Services Act (Article 2, Section 8558).

The Jurupa Community Services District shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency.

The following is a list of contacts for all cities and counties for which the District provides service that can be used in the event of a local emergency as defined in subpart (c) of Gov. Code Section 8558:

a. County of Riverside Emergency Management Dept. (951) 358-7100

b. City of Eastvale City Manager's Office (951) 703-4411

c. City of Jurupa Valley City Manager's Office (951) 332-6161

8.8 FINANCIAL CONSEQUENCES OF THE WSCP

When implementing the WSCP, JCSD's response actions would include supply augmentation, demand management and operational flexibility, all of which could impact JCSD financially. Financial consequences would include a decrease in revenue due to a decrease in water use. Other consequences could include an increase in costs to augment supply as well as increased staffing costs for tracking, reporting, patrol and enforcement actions to implement the WSCP.

Upon implementation of the WSCP, JCSD uses its financial resources to mitigate the impacts of water shortages. Mitigation actions that would be initiated to address revenue reductions and expense increases associated with shortage response actions include use of a graduated fee structure for successive violations of water use restrictions during each Drought Response Level (Section 8.6, above). Any penalties collected under this policy will be used to implement and enforce water conservation measures. In addition, JCSD would consider a reduction of operation and maintenance expenses, deferral of capital improvement projects and use of the District's operations reserve and rate stabilization fund as needed to mitigate any short-term revenue shortfalls. In June 2012, JCSD adopted a Reserve Policy (Policy No. 2007-02) to ensure that the District will have sufficient funding available to meet the District's operating, capital, and debt service obligations. Reserves are managed in a manner that allows JCSD to fund costs consistent with its annually updated Capital Replacement Program as well as other

long-term plans while avoiding significant rate fluctuations due to changes in cash flow requirements.

One component of this Reserve Policy is a Rate Stabilization Fund, established specifically to shield the Water Fund from the financial effects of extraordinary circumstances. This Reserve is in place to ensure that the District can meet costs of necessary services while lessening the impact of otherwise significant changes in user fees, in any one year. Funding is determined at the end of each fiscal year based on analysis of available funds remaining based on the District's operations as presented in the audited financial statements.

8.8.1 Additional Costs from Discouraging Excessive Water Use During a Drought Emergency

During a drought emergency, the District is required to prohibit excessive water use pursuant to Water Code Section 365 et al. Reporting the actions undertaken by the District to do so does not need to be reported in this UWMP; however, reporting the cost of compliance with Section 365 et al. is a required component of this UWMP, pursuant to Water Code Section 10632(a)(8)(C).

For reference, Water Code Section 367 states there are three types of drought emergencies: (1) declared statewide drought emergency; (2) suppliers move to a local stage of requiring mandatory reductions (as part of the WSCP); and (3) declared local drought emergency. During any one of these three types of drought emergencies, Water Code Section 366 states that excessive water use must be prohibited by using either a rate structure or an excessive water use ordinance.

JCSD Ordinance No. 389 prohibits excessive water use by all customers at all times, which includes declared statewide and local drought emergencies, with violations of said prohibition subject to the penalties described therein. Further, each drought response level declared by the District includes the prohibition of excessive water use, also subject to the penalties described therein.

The costs of discouraging excessive water use during the drought emergency would include increased staffing costs for tracking and patrolling, customer notifications, increased customer

education, enforcement warnings and enforcement actions associated with excessive water use.

8.9 MONITORING AND REPORTING

The District will monitor and report on implementation of this WSCP based on key water use metrics to meet state reporting requirements. The District monitors all activities in the water distribution system through a dynamic system control and data acquisition (SCADA) system. The District will continue to monitor and contact high water users and investigate potential leaks. The Operations Department will continue to monitor the system daily and weekly. Reports are provided monthly to the Board of Directors as to the status of water supplies and water demands. At such time the State Water Board provides the regulations for monthly reporting along with associated enforcement metrics, these will be reviewed and incorporated herein as appropriate.

8.10 REFINEMENT PROCEDURES

Water Code Section 10632(a)(10) requires a description of how this WSCP will be reevaluated and improved upon to ensure water shortage risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented as needed.

The WSCP will be periodically reevaluated to ensure that its shortage response actions are effective and up-to-date based on lessons learned from implementing the WSCP. The plan will be revised and updated during the UWMP five-year cycle to incorporate new information. For example, new demand reduction and/or supply augmentation actions may be added. If significant revisions are warranted, then the WSCP will be updated outside of the UWMP five-year update cycle. In the course of preparing the forthcoming Annual Assessments each year, JCSD staff can routinely analyze the functionality of the WSCP and prepare recommendations to modify the WSCP to the Board of Directors for the purpose of improving effectiveness in meeting the intent and goals of the WSCP.

8.11 SPECIAL WATER FEATURE DISTINCTION

Pursuant to Water Code Section 10632(b), water features that are not for human recreation are analyzed and defined separately from swimming pools and spas.

Non-Swimming Pool and Non-Spa Water Features

Water features that are not used for the purpose of human recreation are referred to as "decorative fountains, ponds, lakes, or other similar aesthetic structures" in JCSD Ordinance No. 389. These features must use recirculated water at all times regardless of drought stage. Water waste that is found to be related to such features may be enforced pursuant to the penalties in JCSD Ordinance No. 389. Said water waste can be reported to the District via the E-Citizen smart phone application, email, and telephone, as well as by staff. The District can also spot a malfunctioning meter or water waste through its AMR system. Additional demand reduction actions that are triggered during declared droughts can be developed to address decorative water features and incorporated herein during the next update to the WSCP.

Swimming Pools and Spas

Swimming pools and spas that are intended for human recreation must use potable water for health and safety considerations. JCSD Ordinance 389 does not address swimming pools and spas specifically. Water waste that is found to be related to pools and spas may be enforced pursuant to the penalties in JCSD Ordinance No. 389. Said water waste can be reported to the District via the E-Citizen smart phone application, email, and telephone, as well as by staff. The District can also spot a malfunctioning meter or water waste through its AMR system. Additional demand reduction actions that are triggered during declared droughts can be developed to address swimming pools and spas and incorporated herein during the next update to the WSCP.

8.12 PLAN ADOPTION, SUBMITTAL, AND AVAILABILITY

The following are the steps to adopt, submit, implement, and amend the WSCP. The WSCP may be amended independently of the UWMP, as needed.

8.12.1 WSCP Adoption or Amendment

To adopt a WSCP or amend an adopted WSCP, the District will provide two required notices to customers and each city and county within which it provides service: (1) notice of a public hearing at least 60 days prior to the public hearing stating that the WSCP is being reviewed and adoption (or amendment) of the WSCP is being considered; (2) notice of the time and

place of the public hearing including where the draft document is available for public viewing. Per Government Code Chapter 17.5 (commencing with Section 7290) of Division 7 of Title 1, the District must hold the public hearing consistent with the Dymally-Alatorre Bilingual Services Act. Determination of whether language assistance is needed is at the discretion of the District (per Gov. Code Section 7293). The District shall also place the notice containing the date and location of the public hearing and location of where the plan is available for public viewing in a newspaper once a week for two successive weeks (per Gov. Code Section 6066).

The public hearing for the WSCP may take place at the same meeting as the adoption hearing of the Board of Directors; however, the meeting agenda must include the public hearing as an agenda item. Before the District can submit the WSCP to DWR, the Board of Directors must formally adopt the WSCP. The adoption resolution should be included with the WSCP, either as an attachment or Web address where it can be found online.

8.12.2 WSCP Submittal and Availability

The WSCP (or amended WSCP) must be submitted to DWR within 30 days of adoption. Submittal must be done electronically using the Water Use Efficiency (WUE) data online submittal tool located online at: https://wuedata.water.ca.gov/. Within 30 days of submitting the adopted WSCP to DWR, the District must make the plan available for public review during normal business hours. This can be accomplished by placing a hardcopy at the front desk or by posting copies on the District Web site.

The WSCP (or amended WSCP) must also be submitted to the California State Library within 30 days of adoption. Submittal must be done via compact disc (CD) or hardcopy and mailed to:

California State Library
Government Publications Section
Attn: Coordinator, Urban Water Management Plans
P.O. Box 942837
Sacramento, CA 94237-0001

(If delivered by courier or overnight carrier, the street address should be used instead: 900 N Street, Sacramento, CA 95814.)

The WSCP (or amended WSCP) must also be submitted to each city or county to which the District provides water within 30 days of adoption. It may be submitted in an electronic format. Proof of said submittals to DWR, State Library, cities and county will be kept with the WSCP.

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CHAPTER 9 DEMAND MANAGEMENT MEASURES

Demand management is an integral part of water resources management. Because the demand for water tends to increase as communities grow and available water supplies can change over time, having demand management measures (DMMs) that help lower demands can improve water service reliability. This chapter provides a comprehensive description of the water conservation programs that JCSD has implemented, is currently implementing, and plans to implement in the future to meet future urban water use reduction targets.

9.1 Demand Management Measures for Retail Agencies

The section of the Water Code that addresses DMMs was significantly modified in 2014 to simplify, clarify, and update DMM reporting requirements. The state legislature enacted streamlining of the retail agency requirements from 14 measures to six general requirements plus an "other" category, as follows (CWC §10631(1)(B)):

1. Water waste prevention ordinances;
2. Metering;
3. Conservation pricing;
4. Public education and outreach;
5. Programs to assess and manage distribution system real loss;
6. Water conservation program coordination and staffing support; and
7. Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovating measures, if implemented.

Pursuant to the Water Code, each DMM description includes how the measure has been implemented over the past five years, and how future efforts will help the District to meet future water use targets.

9.1.1 Water Waste Prevention Ordinances

The JCSD Board of Directors adopted Ordinance No. 389 on May 26, 2015, which contains the District's Water Conservation Program and water waste ordinance. The Ordinance is provided in Appendix M. Because the State Water Board adopted additional emergency regulations for urban water suppliers on March 17, 2015 and May 5, 2015, Ordinance No. 389 was prepared

as an update and replacement of JCSD Ordinance No. 387 that was adopted in response to the first emergency regulations adopted by the State Water Board on July 15, 2014.

Article 3.0, Item A of Ordinance No. 389, states: *The water conservation measures set forth in this Article 3.0 shall be in effect at all times and shall be subject to the penalties hereafter set forth*. Item B continues, *It shall be unlawful for any Person to waste water or to use it unreasonably*. Ordinance No. 389 includes the five Drought Response Levels (of which the District is always in one), prohibitions, and penalties.

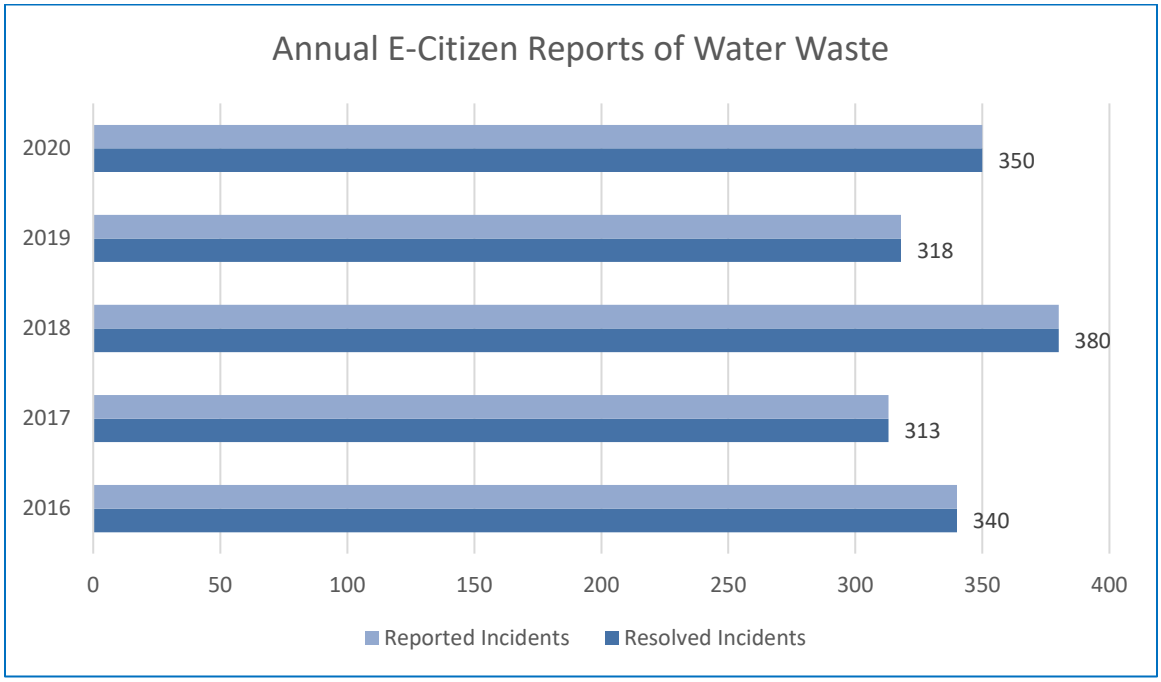
- **Implementation Over the Past Five Years**

  JCSD actively pursues incidents of water waste which are investigated by staff. Depending on the nature of the situation, the property owner may be notified, repairs conducted, or water disconnection in cases of excessive leakage and/or facility failures.

  Beginning in June of 2015, JCSD and the City of Eastvale partnered to offer "E-Citizen," a free smart phone application (app) for the public to report water waste and other non-emergency issues. The app has been particularly useful in identifying water waste activities specifically prohibited in Ordinance No. 389 such as fire hydrant leaks, irrigation runoff, sprinkler/irrigation leaks, washing driveways/sidewalks, water leaks, and watering between the hours of 8 a.m. and 8 p.m. Users can upload a photo or video of the issue and mark the geographic location on a map. Each request can then be tracked for follow-up by the District. Follow-up includes investigating the reported issue and working with the appropriate party to resolve the problem.

  Additional regional partners, including the City of Jurupa Valley and Jurupa Area Recreation and Parks District, have joined the platform. In 2020, the E-Citizen app was revised to create a better experience for the customer. Widely used by customers, JCSD receives multiple reports per day that are automatically routed to the appropriate department. As a result of the E-Citizen app, JCSD's water conservation team has addressed several hundred reports of water waste each year. **Chart 9-1** below, shows the number of reported incidents of water waste that were addressed and resolved by the District for the past five years.

Chart 9-1: JCSD E-Citizen Reports of Water Waste Resolved Annually, 2016-2020.



- **Planned Implementation to Achieve Future Water Use Targets**

Stopping water waste has always been a priority of JCSD and will continue to be a focus of their operations. The District allocates a portion of its annual Capital Improvement Plan budget for waterline replacement projects based on information from the 2020 JCSD Water Master Plan. The pipeline replacement program uses the following criteria to discern which pipes are replaced each year:

1. Leakage: District Water Operations data suggests leaking or ruptured pipes;
2. Size: Pipeline diameters that do not meet minimum State requirements;
3. Fire Flow: Maximum velocities that exceed 10 feet per second;
4. Inefficient System Operations: Old pipes that could rupture when water pumped in from a high-pressure zone is then depressurized;
5. Odd Sizes: Maintenance is problematic with oddly sized pipes (3 inch and 5-inch diameters) due to their nonconformity with standard water system sizes;
6. Age: Pipelines about to reach the age of their useful life; and
7. Material Type: Structural integrity of pipelines rely heavily on the material type and the method of installation used at the time of construction.

As part of the program, JCSD will be replacing aged pipelines and asbestos concrete pipe (ACP) along Reagan Road between El Palomino Drive and Lakaren Lane in the City of Jurupa Valley. The new pipelines will include approximately 2,056 feet of 8-inch diameter waterlines and 2,872 feet of 12-inch diameter waterlines. Construction is expected to begin June 2021.

JCSD is in the process of requesting the preparation of a saturation study to determine whether rebate opportunities are still available. JCSD currently prepares water budgets for commercial customers and sends them on a monthly basis.

9.1.2 Metering

JCSD is fully metered. Since the 2010 UWMP, the District replaced all residential and non-residential (potable and non-potable) water meters. JCSD uses Automatic Meter Reading (AMR) on all their service connections. AMR is a technology of automatically collecting consumption data from water meters and transferring that data to a central database for billing, troubleshooting, and analysis. AMR can reduce the cost of meter reading, provide real-time information, reduce billing errors, monitor tampering, and promotes conservation with time-of-use consumption.

JCSD has 572 dedicated irrigation meters for parks, road medians, playing fields, commercial landscape, and homeowner's associations. A dedicated landscape meter is a water meter that exclusively meters water used for outdoor watering and irrigation. More recently it has become common practice to install a separate meter in homeowner's associations to measure irrigation use in common landscape. JCSD continues its efforts to increase the number of dedicated landscape meters to monitor irrigation demand.

- **Implementation Over the Past Five Years**

  In addition to making sure all service connections are fully metered and a part of the AMR system, the District met its target in 2020 of conducting accuracy testing for 100 customer meters. In addition, more staff time and effort were allocated to the meter testing and meter change out program.

- **Planned Implementation to Achieve Future Water Use Targets**

  Over the next five years, the District plans to increase its meter accuracy testing target to 150 customer meters per year. The District will continue its efforts to ensure that all service connections are fully metered and a part of their AMR system. Meters will continue to be tested, replaced, and repaired as needed per District policy. Lastly, the District is looking into ways that rental hydrant meters can be tracked better and will continue considering the recommendations that come out of the annual water loss audit validation process.

9.1.3 Conservation Pricing

Conservation pricing incentivizes customers to regard their water use. For example, the rates might be tiered at progressively higher prices to encourage efficient water use. Like a water waste ordinance, a conservation pricing structure is always in place and is not dependent upon a water shortage for implementation; although, a conservation rate structure could include drought rate structures that are implemented upon a declaration of a drought.

JCSD Board of Directors adopted Resolution No. 3012 on March 9, 2020 that establishes rates for water service from 2020 through 2024. The complete Resolution is provided in **Appendix N**. A customers' monthly water bill is the combination of the monthly base charge according to the size of their meter(s) plus the volume consumed (Monthly Base Charge + Usage Rate = Monthly Water Charges).

The monthly base charge varies depending on the size of the meter. Most residences in the District have a 3/4-inch meter. Irrigation meters are either 1½-inch or 2-inch and commercial/institutional/industrial (CII) customers vary from the smallest (5/8x3/4-inch) to the largest (10-inch). According to Resolution No. 3012, the monthly service charges for 2020 range from $38.19 for a 5/8-inch meter to $4,355.25 for a 10-inch meter. The rates will receive an additional adjustment each January 1st from 2020 through 2024 (Appendix N).

The second monthly charge is based on the usage rate that is measured in hundred cubic feet (HCF). There are different rates depending on the land use type: a four-tier rate structure for single-family residential; one uniform rate for multi-family residential, institutional, commercial, and industrial customers; one uniform potable irrigation rate; one uniform non-potable irrigation

rate; and one uniform hydrant (construction) rate. The tiered volumetric rate structure for single-family residential reflects conservation pricing in that it charges progressively higher rates with increasing water use. JCSD's water rates currently do not include a drought rate structure.

Customers with private fire protection are also assigned a uniform monthly fixed service charge. These accounts are for emergency use only to provide fire suppression. As shown in Resolution No. 3012, there is an annual adjustment in the fee from 2020 to 2024.

- **Implementation Over the Past Five Years**

  The District engaged the services of a professional rate consultant to perform a study of the District's rates and charges for water and wastewater services. The JCSD *Water and Wastewater Rate Study* dated December 23, 2019 prepared by Raftelis provided recommendations to revise the District's rates and charges for water and wastewater services (a copy of the report is available at www.JCSD.us). This study was posted on the District's Web site beginning Jan. 13, 2020 and workshops were subsequently held to consider changes to the rates. Notices were mailed out to all property owners and customers who would be affected by the rate change. A public hearing was held on March 9, 2020 and the Board of Directors determined that the written protests filed with the District represent less than 50 percent of the affected parcels. As such, the Board of Directors approved Resolution No. 3012 to adjust the rates for water service as necessary to cover actual costs incurred by the District in providing water service to its customers.

- **Planned Implementation to Achieve Future Water Use Targets**

  The District will continue striving for conservation pricing that is on par with industry standard to be effective, yet fair and equitable.

9.1.4 Public Education and Outreach

JCSD continues to educate their customers about the importance of meeting water reduction targets and informs the public about water conservation programs through a number of outreach efforts including the Web site, YouTube channel, and social media, print materials, events, and neighborhood and school presentations. Education and outreach efforts are

typically divided into two groups: Residential/CII Outreach (commercial, industrial, and institutional) and School Outreach.

Residential/CII Outreach: Residential/CII outreach efforts include informational booths at community events including Independence Day and winter holiday celebrations in the City of Jurupa Valley and City of Eastvale, Healthy Jurupa Valley, parade entries, plant sales, neighborhood watch associations, and the Community Fall Festival. Additionally, JCSD's conservation department has hosted free bi-annual landscape classes (including virtual classes), free mulch give-away events, and low-cost rain barrel sales events. Conservation staff have also contacted CII customers and their employees to provide assistance on rebate programs and general water use reduction. This includes presentations to Homeowners Associations, local businesses, and church groups.

JCSD has recently begun a series of online videos hosted on the District's YouTube channel that illustrate some common water conservation issues to residents.[1] Currently, there are 10 "WaterWendy" videos showing some of JCSD's field work including a service line repair, sewer maintenance, fire hydrant painting, water testing, supply line repair, and water distribution. In addition, many videos have been posted about ways to conserve water, understanding where the water comes from, and landscaping tips. To date, a video demonstrating how to read a water meter has been completed in Spanish and English. Additional videos are planned for the future.

While an emphasis has been placed on digital communications, print media is still relevant to our customers. Informational materials are mailed to customers or handed out at outreach events. Newsletters, bill inserts, flyers, and direct mailing pieces are used to inform customers about water conservation and notify customers about water conservation events, projects, and programs including:

- Water conservation information;
- Fats, Oil, Grease (FOG) regulation information;
- Rebates for water-saving devices;
- Free water conservation kits;
- Free water audits;

[1] JCSD YouTube channel: https://www.youtube.com/channel/UCM30pqYN6pnzAvpg8dR-FpA

- Free *Water Wise* landscaping workshops;
- Turf replacement programs;
- EPA WaterSense Partnership;
- *Water Wise* violation door hangers;
- Community events;
- *Water Is Life* Poster Contest;
- Mulch giveaway events; and
- Low-cost rain barrel sale.

JCSD provides select printed materials available in multiple languages including English, Spanish, and Mandarin.

School Outreach: The JCSD Conservation Coordinator works with partners throughout the area to provide unique and meaningful educational content to the students within JCSD's service area. Such efforts include school assembly presentations, classroom presentations, curriculum, grant opportunities, and field trips. Through these school outreach events, JCSD introduces water conservation grants and programs. All programs are design to meet grade specific curriculum standards. In addition, School Outreach includes age-specific events including curriculum availability, programs, the Water Is Life Art Contest, the Santa Ana River Field Trip Program, and the Lois B. Krieger Grants for Educators.

- **Implementation Over the Past Five Years**

  Over the past five years, JCSD has increased its outreach and educational efforts. Except for the year 2020, which resulted in the cancellation of public events in California due to the COVID-19 pandemic, staff participated in approximately 18 events per year. Both printed and digital communication efforts increased effectively reaching all customers. Many of the water conservation outreach efforts and programs reported in the 2015 UWMP that remained successful have been retained, such as Picnic in the Park, mulch giveaways, and utility bill inserts. New outreach efforts and programs such as the Flume Pilot Project and a Drip Irrigation Rebate Program have been implemented since the 2015 UWMP. The public education and outreach conducted by the District between 2016 and 2020 are listed in **Table 9A**.

Table 9A - Public Education and Outreach, 2016-2020

Outreach Event	Status	Total Number Reached
Children's Poster Contest	JCSD has sponsored a *Water is Life* poster contest annually since 2011.	150-350 students annually from District area.
Bill Stuffer	Inserts with water reduction and rebate information	33,000 accounts every other month
JCSD Community News Newsletter	Distributed quarterly to JCSD customers and posted online.	33,000 accounts quarterly
JARPD 3rd of July	Independence Day Celebration annually on July 3rd.	5,000 attendees annually
Picnic in the Park Information Booth	Summer Celebration	3 days, 5,000 people per day
Web site	JCSD Web site continues to prominently display water conservation information.	500 daily online visitors
Social Media	JCSD maintains various social media profiles including Facebook, Twitter, YouTube, and Instagram that are regularly updated.	1,200 weekly reach
E-Citizen	Citizens can report water waste issues using JCSD's E-Citizen Web site and smart phone application.	Between 300 - 400 Annually
Mulch giveaway	Free mulch provided to JCSD customers.	500
Healthy Jurupa Valley	Ongoing quarterly meetings,	Approximately 75 per meeting
Ad in *Eastvale News*	Monthly advertisements	5,000 per month
Direct Mail	Ongoing distribution and postings on JCSD Web site since June 2015.	33,000 accounts
Hold Message	Hold message with water conservation information ongoing since June 2015.	Approximately 500 per day
Eastvale Edition (Parks and Recreation) Brochure	Quarterly distribution with water information since June 2015.	7,000 recipients

Over the past five years, JCSD has developed comprehensive educational programs such as:

- Partnering with Inland Empire Waterkeeper (a local nonprofit) to offer free field trips to schools and community groups within JCSD's service area. These field trips provide educational information on topics such as water-use efficiency, native fish and plants, and the importance of protecting our local resources.

- Offering Lois B. Krieger Water Project Grants for educators seeking to do creative classroom projects or go on field trips.
- Partnering with the Discovery Science Center to provide assembly-style interactive programs promoting water awareness and introducing simple water conservation practices for 4th and 5th grade students.
- Distributing curriculum and activity materials designed by Western to local educators at no cost. These materials correlate with current California state content standards, particularly related to science and history/social science.
- Providing the *Water Is Life* art contest to all students who live or go to school within JCSD's service area. The contest, sponsored by Metropolitan and Western, is a tradition within southern California and more than 500 students participate.
- JCSD staff assisting at local Science Fairs with coaching and judging at both the school and district levels.

➢ **Planned Implementation to Achieve Future Water Use Targets**

JCSD plans to continue core educational services. A new *Water We Reading Program* is in development to provide teacher driven requests for water education books and software.

9.1.5 Programs to Assess and Manage Distribution System Real Loss

System leaks are detected visually and through the AMR system and reported by employees and customers. The majority of leaks occur on water service laterals (i.e., the line between the meter and the main line), which are replaced completely instead of repaired.

JCSD is committed to limiting the amount of water loss and has also required that all temporary sales and construction waters be metered to minimize unaccounted-for water that is attributed to these uses.

➢ **Implementation Over the Past Five Years**

Water Code section 10608.34(i) (Senate Bill 555, 2015) directs the State Water Board to "adopt rules requiring urban retail water suppliers to meet performance standards for the volume of water losses." Pursuant to this law, urban retail water suppliers including

JCSD have been annually submitting water loss audits to DWR since October 2017 (refer to Chapter 4).

The meter and main repairs performed by the District for the past five years are detailed in **Table 9B** as evidence of JCSD's ongoing efforts to detect leaks quickly and minimize water loss.

Table 9B - JCSD Meter and Main Repairs, 2016-2020

Calendar Year	Service Connection Breaks or Leaks	Main Breaks or Leaks
2016	244	23
2017	255	18
2018	293	24
2019	340	15
2020	339	6

Source: JCSD's Large Water System Annual Report to the Drinking Water Program for the year ending (2016- 2020).

- **Planned Implementation to Achieve Future Water Use Targets**

JCSD staff will continue to check for leaks visually and respond to reports from the public to perform repairs quickly. Staff will continue to monitor production and consumption data to quickly detect a spike in loss and respond accordingly to locate the leak or break. JCSD will also continue its annual waterline replacement program described in Chapter 9.1.1 to replace aging main lines.

Pursuant to Water Code section 10608.34(i) (Senate Bill 555, 2015) urban retail water suppliers including JCSD are required to calculate an urban water use objective that includes indoor, outdoor, commercial, industrial and institutional irrigation uses and allowed water loss by 2024 (AB 1668 and SB 606, 2018). JCSD will respond to forthcoming regulations for meeting a future distribution system loss standard.

9.1.6 Water Conservation Program Coordination and Staffing Support

The Conservation Coordinator for JCSD is currently Clover Rogers. She began with the District in 2016 and was previously a Water Conservation Specialist at JCSD. The Conservation

Coordinator currently has assistance from a permanent part-time Conservation Aide. The Board of Director's continues to support conservation efforts by providing a sufficient budget to meet program and staffing needs.

- **Implementation Over the Past Five Years**

  Beginning in 2010, JCSD has made several efforts to implement a robust conservation plan in order to meet water use targets. This included hiring dedicated staff members and securing a sufficient budget to implement programs and projects. Beginning in 2011, JCSD achieved its goal of filling a Conservation Coordinator position and several programs were instituted to reduce water demand. These efforts continued throughout the ensuing years which resulted in a reduction of water demand which reflects the consistent decrease of JCSD's GPCD over the past five years. The current water reduction programs and projects include:

  Irrigation Audit: Residential and CII customers may receive a detailed landscape audit. The landscape audit includes running the irrigation system, checking the irrigation controller, documenting needed scheduling and irrigation changes, and water conservation education.

  Yardscapes: Designed by a local landscape architectural firm, this one-of-a-kind program was designed as a one-stop program to assist homeowners with their landscape. The program includes plant palettes, irrigation designs, landscape designs, how to guides, and troubleshooting guides. The Yardscapes program is hosted on JCSD's Web site and is available free of charge.

  Flume Project: In 2018, the JCSD conservation staff began implementing the Flume Pilot Project which provides real time water use data through a device on the meter and a smart phone app. Over 500 were installed within the first year. Preliminary findings provide evidence that customers saved water and found previously unknown leaks. Designed as a pilot program, sales were suspended in 2020. However, based on JCSD's research as well as the research of additional water purveyors, Metropolitan has adopted the program which will be available to all southern California residents, including JCSD customers. Metropolitan will begin providing rebates through *SoCal Water Smart* in 2021.

Turf Replacement*:* Funded through two different entities (Metropolitan and JCSD), the turf replacement program targets both CII and residential customers. During the five-year period from 2016-2020, 101 turf rebates were processed to remove a total of 442,858 square feet of turf. This equates to 17,714,320 gallons of water (54.4 acre-feet) saved annually when computed by the industry standard of 40 gallons per square foot.

Rebates: Different devices that are available for rebates include High Efficiency Toilets, High Efficiency Clothes Washers, Irrigation controllers, Rain Barrels, and Rotating Nozzles. From 2015 to 2020, a total of 1,516 different rebates were paid to residential customers. The corresponding amount for CII customers is 25. This does not include turf replacement programs.

Grants: JCSD participates in several grant programs. Generally, funding comes from DWR or the Bureau of Reclamation and is administered by Western or the Santa Ana Watershed Project Authority. Additionally, JCSD supports other agencies like the Inland Empire Utilities Agency in their grant process as many water projects are regional in nature. Grant funding received between 2016 and 2020 was used to provide landscape designs to residential customers (SAWPA grant), replace lawn and water fixtures for low-income communities (WECAN Grant), replace or retrofit turf publicly owned, institutional. and homeowner's association areas (High Visibility Grant), and fund creative water classroom projects (Lois B. Krieger Water Project Grant) grant.

CII Account Analysis: Conservation staff began tracking usage from high water users in the CII sector and contacting each company to review the findings and provide conservation advice. This generally led to water conservation methods to reduce demand. In 2020, conservation staff began providing customized information to high water-using CII customers to illustrate the appropriate amount of water use for landscaping. This was done with a water budget calculation that includes ETo, plant type, square footage, and effective precipitation.

Water Waste Procedures: JCSD has a water waste ordinance that remains a priority for the District. To ensure reporting ease, several methods were added:

- E-Citizen: A Web-based app allows anyone to report water waste on their smart phone.

- Email: Numerous residents and employees report water waste directly to the Conservation Coordinator.

Water Waste Reports: Water waste reports are assessed and acted on in the order of urgency. Main line leaks are reported to the maintenance department; all others are investigated and resolved by conservation staff. This is a component of the SWRCB drought report. Refer to Section 9.1, above.

Conservation Garden: To provide an example of a "water wise" landscape, JCSD removed 8,100 square feet of turf at their headquarters and replaced it with drought tolerant and native plants between 2011 and 2015. This area is scheduled for a garden refresh in 2021.

Park Audits: JCSD partnered with Western to audit JCSD parks in an effort to further improve irrigation efficiencies. To date, one park has been audited and the remaining parks are in the process of being scheduled for their respective audits.

Audits: JCSD will continue to offer and prepare water audits to both small residential and large commercial water users.

Drip Irrigation Rebate: JCSD-funded this program to offset the cost of drip irrigation to both CII and residential customers Administered and advertised in-house, it has gained momentum over the last three years.

- **Planned Implementation to Achieve Water Use Targets**

JCSD understands that drought conditions may become the new normal for Southern California and therefore plans to budget additional staff for the water conservation program to assist and expand the efforts of the Conservation Coordinator. Many of the currently existing programs will be continued, however, additional programs are currently in development, such as the Fix-A-Leak Program. The Fix-A-Leak Program will be a new program for JCSD that will provide no-cost irrigation repairs to customers on a limited basis. It is scheduled to begin in summer of 2021.

9.1.7 Other Demand Management Measures

JCSD does not have other DMMs that have a significant impact on water use to report.

9.2 Alliance For Water Efficiency and California Water Efficiency Partnership

JCSD has been an active member of the leading water use efficiency groups. Originally a member of the California Urban Water Conservation Council (CUWCC), the District submitted Best Management Practices reports every two years as required. In March 2018, the CUWCC was reorganized to reflect a new era in water use efficiency. The new organization is comprised of two separate sections: the California Water Efficiency Partnership (CalWEP) and its national partner the Alliance for Water Efficiency (AWE). The AWE is a nationally recognized consensus-based partnership of agencies and organizations concerned with water supply and conservation of natural resources. CalWEP's mission is to maximize urban water efficiency and conservation throughout California by supporting and integrating innovative technologies and practices; encouraging effective public policies; advancing research, training, and public education; and building collaborative approaches and partnerships. JCSD is an active member of both organizations and attends their events, as well as utilizes their resources. The JCSD Conservation Coordinator is currently Vice-Chair of the AWE's Education Committee.

9.3 Future Water Use Objectives

In 2018, Assembly Bill 1668 (AB1668) and Senate Bill 606 (SB606) were signed into law to develop a new framework for statewide long-term water conservation. Together, the programs of these laws are organized around four goals: to use water more wisely; eliminate water waste; strengthen local drought resilience; and improve agricultural water use efficiency and drought planning. Notably, the 2018 legislation applies to the actions of DWR, SWRCB, and water suppliers; it does not set any standards or rules for individual customer use.

DWR and SWRCB developed a handbook for the 2018 legislation entitled, *Making Water Conservation a California Way of Life – Primer of 2018 Legislation on Water Conservation and Drought Planning, Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman)* (November 2018). To fully plan, develop and implement the new framework, DWR and the SWRCB will work closely together over the next few years to develop new standards for indoor residential water use, outdoor residential water use, CII water use for landscape irrigation with dedicated meters, and water loss.

Pursuant to the 2018 legislation, JCSD will develop a Water Shortage Contingency Plan and Drought Risk Assessment as part of the 2020 UWMP that is due July 1, 2021 and every five years thereafter. Further, the District will submit to DWR an annual water shortage assessment report beginning June 1, 2022. Beginning November 1, 2023 and annually thereafter, JCSD will submit a report to DWR on urban water use objectives, actual urban water use, implementation of CII water use performance measures, and progress toward an urban water use objective (yet to be determined). Lastly, by January 1, 2024 the District will submit to DWR a supplement to the 2020 UWMP that describes how demand management measures are implemented to achieve their urban water use objective (which is yet to be determined).

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CHAPTER 10 PLAN ADOPTION, SUBMITTAL & IMPLEMENTATION

This chapter provides guidance to address the Water Code requirements for a public hearing, the Plan adoption process, submitting an adopted Plan to DWR, Plan implementation, and the process for amending an adopted Plan.

Beginning in 2020, the Water Code requires that the Water Shortage Contingency Plan (WSCP) must have the same process for public hearing, adoption, submittal, and amendments as the UWMP.

10.1 INCLUSION OF ALL 2020 DATA

The Water Code requires current year water use and planning data to be included in the UWMP. Since JCSD is reporting on a calendar year basis, this UWMP and WSCP includes data through calendar year 2020 (January 1 through December 31). As such, this UWMP and WSCP could not be completed until after the end of calendar year 2020.

10.2 NOTICE OF PUBLIC HEARING

Water Code requires that a public hearing must be held by the District prior to adopting the UWMP and/or WSCP. All public input shall be considered by the Board of Directors. There are two audiences within the service area that are required to be noticed for the public hearing: cities and counties, and the general public.

10.2.1 Notice to Cities and Counties

60 Day Notification

All cities and counties within which the District provides water supplies must be notified that the District will be reviewing the UWMP and considering amendments or changes to the Plan. This notice must be sent at least 60 days prior to the public hearing. In order to provide ample opportunity to participate in the UWMP process, JCSD sent the first notice on March 4, 2021, well in advance of the required 60 days prior to the public hearing. The first notice included the date and time for the public hearing and when the draft document would become publicly available for review. Copies of all notifications are located in Appendix D. (CWC § 10621(b) and §10642)

Notice of Public Hearing

The District delivered a second notice to cities, the county, and interested entities on May 13, 2021 to reaffirm the time and place of the public hearing. The notice also reaffirmed that the Draft UWMP and Draft WSCP would be publicly available for viewing at the District Web site (www.jcsd.us) and a printed hardcopy at the District Headquarters no less than two weeks prior to the public hearing. The draft documents were posted on the District Web site and the District Headquarters beginning on June 1, 2021. Copies of all notifications are located in Appendix D. Notifications to the cities and the county within the District service area are listed in **Submittal Table 10-1** to confirm receipt of a 60-day notice and notice of public hearing.

Submittal Table 10-1 Retail: Notification to Cities and Counties

City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
City of Eastvale	Yes	Yes
City of Jurupa Valley	Yes	Yes
County Name *Drop Down List*	**60 Day Notice**	**Notice of Public Hearing**
Add additional rows as needed		
Riverside County	Yes	Yes
NOTES: Refer to Appendix D for copies of all notices.		

In addition to the cities and the county, JCSD also notified the following list of interested entities.

- Chino Basin Desalter Authority
- Chino Basin Watermaster
- City of Eastvale
- City of Jurupa Valley
- City of Norco
- City of Ontario
- City of Riverside Public Utilities Department
- Corona-Norco Unified School District
- Inland Empire Utilities Agency
- Jurupa Unified School District
- Rubidoux Community Services District
- Santa Ana River Water Company
- Western Municipal Water District
- Cucamonga Valley Water District

10.2.2 Notice to the Public

The public was notified of the public hearing and availability to review the draft UWMP and draft WSCP in the local newspaper (*The Press Enterprise)* once a week for two successive weeks pursuant to Government Code section 6066, on June 2 and June 9, 2021. The District also placed notifications on their Web site and the Spring 2021 newsletter. The draft UWMP and draft WSCP were posted on the District Web site and the District Headquarters beginning on June 1, 2021. Copies of all notifications are located in Appendix D. (CWC §10642)

10.3 PUBLIC HEARING AND ADOPTION

Pursuant to the Water Code, the JCSD Board of Directors held a public hearing on Monday, June 28, 2021 to receive public comment on the draft UWMP and the draft WSCP (CWC §10608.26(a)). The public hearing was included as an agenda item, which is included in Appendix A.

The Water Code requires the public hearing to accomplish all of the following in order to comply with the Water Conservation Act of 2009 (SB X7-7):

- Allow community input on the District's implementation plan;[1]
- Consider the economic impacts of the District's implementation plan; and
- Adopt a method for determining the District's urban water use target.[2]

Therefore, the public hearing provided information on the District's baseline values, water use targets and compliance, and implementation plan required in the Water Conservation Act of 2009 (SB X7-7).

[1] The term "implementation plan" as mentioned in the Water Conservation Act of 2009 (SB X7-7) is not defined. But according to DWR staff, it is meant to suggest the District's plans, as described in the UWMP, to continue meeting its water conservation target.
[2] The method chosen by JCSD to calculate the 2020 water use target has been, *Method 1: Eighty percent of the water supplier's baseline per capita water use,* as defined in CWC Section 10608.20(a)(1).

10.3.1 Document Adoption

The 2020 UWMP and WSCP were formally adopted by the JCSD Board of Directors on June 28, 2021 following a public hearing on June 28, 2021 (CWC § 10642). A copy of the adoption resolution is included in Appendix A.

10.4 PLAN SUBMITTAL

10.4.1 Document Submittal to DWR

The 2020 UWMP, including the WSCP must be submitted to DWR within 30 days of adoption and by July 1, 2021 (CWC §10621(e)). Document submittal to DWR is done electronically through WUEdata. After the UWMP and WSCP are submitted, DWR will review the plan utilizing the checklist provided in Appendix B and decide as to whether or not the documents address the requirements of the Water Code. The DWR reviewer will contact JCSD as needed during the review process. Upon completion of the Plan review, DWR will issue a letter to the District with results of the review.

10.4.2 Electronic Data Submittal

DWR developed an online submittal tool, WUEdata, which was used for the 2015 UWMPs. This tool has been updated for submitting the 2020 UWMPs. The tool accepts complete UWMPs, as well as tabular data from all the data tables. The WUE data online submittal tool is online at https://wuedata.water.ca.gov/. (CWC § 10644(a)(2))

JCSD submitted its electronic data via the WUEdata online submittal tool as shown in **Appendix O**.

10.4.3 Submittal to the California State Library

No later than 30 days after adoption, JCSD shall submit a CD or hardcopy of the adopted 2020 UWMP, including the adopted WSCP, to the California State Library (CWC § 10644(a)(1)) located at:

California State Library
Government Publications Section
Attention: Coordinator, Urban Water Management Plans

P.O. Box 942837
Sacramento, CA 94237-0001

Or by courier or overnight carrier to the State Library at:

California State Library
Government Publications Section
Attention: Coordinator, Urban Water Management Plans
900 N Street
Sacramento, CA 95814

Proof of submittals is provided in Appendix O.

10.4.4 Submittal to Cities and Counties

No later than 30 days after adoption of the 2020 UWMP, including the WSCP, the District shall submit a hard or electronic copy of the documents to the County of Riverside, City of Jurupa Valley, and the City of Eastvale (CWC §10635(c)). Proof of submittals is provided in Appendix O.

10.5 PUBLIC AVAILABILITY

The adopted 2020 UWMP, including the adopted WSCP, are available for public review at JCSD Headquarters, located at 11201 Harrel Street, Jurupa Valley, CA 91752 during normal business hours Monday through Friday 7:30 AM to 5:30 PM. In addition, a copy of the adopted UWMP and WSCP can be found on JCSD's Web site (www.jcsd.us) for public viewing anytime. (CWC § 10645(a) and 10645(b)) Proof of submittals is provided in Appendix O.

10.6 NOTIFICATION TO PUBLIC UTILITIES COMMISSION

Pursuant to Water Code, those water suppliers that are regulated by the California Public Utilities Commission (CPUC) must submit their UWMP and WSCP to the CPUC as part of its general rate case filings. Because JCSD is not regulated by the CPUC, the District will not be submitting their documents to the CPUC. (CWC §10621(c))

10.7 AMENDING AN ADOPTED PLAN

If JCSD decides to amend the adopted 2020 UWMP, then each of the steps for notification, public hearing, adoption, and submittal must also be followed for the amended plan. This includes providing copies of amendments or changes to the plan to DWR, California State Library, and any city or county within which the supplier provides water within 30 days of adoption. (CWC §10644(a)(1))

10.7.1 Amending a Water Shortage Contingency Plan

If JCSD decides to revise the adopted 2020 WSCP after DWR approves the 2020 UWMP, then JCSD must submit to DWR an electronic copy through the WUE Data Portal of its revised WSCP within 30 days of its adoption. (CWC § 10644(b))

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ALBERT A.
WEBB
ASSOCIATES

Corporate Headquarters
3788 McCray Street
Riverside, CA 92506
951.686.1070

Palm Desert Office
41-990 Cook St., Bldg. I - #801B
Palm Desert, CA 92211
951.686.1070

Murrieta Office
41391 Kalmia Street #320
Murrieta, CA 92562
951.686.1070

CHINO BASIN DESALTER AUTHORITY

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JUNE 2021

FINAL

2020 URBAN WATER MANAGEMENT PLAN

STETSON ENGINEERS INC.

Northern California • Southern California • Arizona • Colorado • Oregon

Chino Basin Desalter Authority (CDA)
2020 Urban Water Management Plan

JUNE 2021

STETSON ENGINEERS INC.

861 Village Oaks Drive, Suite 100 • Covina , California 91724
Phone: (626) 967-6202 • FAX: (626) 331-7065 • Web site: www.stetsonengineers.com

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LIST OF ACRONYMS

AB	Assembly Bill
AF	Acre-Feet
AFY	Acre-Feet per Year
AWWA	American Water Works Association
CY	Calendar Year
CIMIS	California Irrigation Management Information System
CWC	California Water Code
CDA	Chino Basin Desalter Authority
CEQA	California Environmental Quality Act
COCs	Constituents of Concern
Delta	Sacramento- San Joaquin Delta
DOF	California Department of Finance
DMM	Demand Management Measures
DRA	Drought Risk Assessment
DWR	California Department of Water Resources
DYYP	MWD's Dry-Year Yield Program
EOP	San Bernardino County Emergency Operations Plan
ERP	Emergency Response Plan
ETo	Evapotranspiration
FEMA	Federal Emergency Management Agency
FY	Fiscal Year
GAC	Granular Activated Carbon
GPCD	Gallons per Capita per Day
GPM	Gallons per Minute
GIS	Geographical Information Systems
GSP	Groundwater Sustainability Plan
IEUA	Inland Empire Utilities Agency
InSAR	Remote Sensing Techniques
JCSD	Jurupa Community Services District
JPA	Joint Exercise of Powers Agreement
kWh	Kilowatt Hours
MGD	Million gallons per day
MWD	Metropolitan Water District of Southern California
M&I	Municipal and Industrial
MZ	Management Zone
OBMP	Chino Basin Optimum Basin Management Program
PCE	Perchloroethylene
Plan	Urban Water Management Plan
PWS	Public Water System

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RRA	Risk and Resilience Assessment
SARWC	Santa Ana River Water Company
SB	Senate Bill
SBCFCD	San Bernardino County Flood Control District
SB X7-7	The Water Conservation Act of 2009
SCAG	Southern California Association of Governments
SCE	Southern California Edison
SGMA	Sustainable Groundwater Management Act of 2014
SWRCB-DDW	State Water Resources Control Board - Division of Drinking Water
SWP	State Water Project
TCE	Trichloroethylene
1,2,3- TCP	Trichloropropane
TDS	Total Dissolved Solids
USEPA	United States Environmental Protection Agency
UWMP	Urban Water Management Plan
VOCs	Volatile Organic Chemicals
WEWAC	Water Education Water Awareness Committee
WMWD	Western Municipal Water District
WRCC	Western Regional Climate Center
WSCP	Water Shortage Contingency Plan
WUE	Water Use Efficiency

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Chapter 1

URBAN WATER MANAGEMENT PLAN INTRODUCTION AND OVERVIEW

LAY DESCRIPTION - INTRODUCTION

An urban water supplier is defined (pursuant to Section 10617 of the California Water Code1) as "*a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers.*"

The Chino Basin Desalter Authority (CDA) is classified as an urban water supplier because it serves more than 3,000 customers (i.e. individual metered accounts) and it supplies more than 3,000 acre-feet of water annually to its member agency customers for municipal purposes.

In accordance with the "Urban Water Management Planning Act", which was enacted by the California Legislature in 1983, every urban water supplier (including CDA) is required to prepare and adopt an Urban Water Management Plan (UWMP), periodically review its UWMP, and incorporate updated and new information into an updated UWMP at least once every five years.

CDA's most recent update was its 2015 UWMP (or 2015 Plan) which was submitted to, and approved by, the California Department of Water Resources (DWR). Urban water suppliers (including CDA) are required to complete and submit their 2020 UWMPs to DWR by July 1st, 2021.

The current requirements for preparing the UWMP are included in California Water Code (CWC) Sections 10608 through 10657. CDA's 2020 UWMP (or 2020 Plan) was prepared consistent with the CWC and the recommended organization provided in DWR's Final "Urban Water Management Plan Guidebook 2020" (Final 2020 UWMP Guidebook), dated March 2021.

The UWMP provides urban water suppliers (including CDA) with a reliable management action plan for long-term resource planning to ensure adequate water supplies are available to meet existing and future water supply needs. In addition, the 2020 UMWP incorporates water supply reliability determinations resulting from potential prolonged drought, regulatory revisions, and/or changing climatic conditions.

1 References to CWC Sections in this 2020 UWMP were obtained from https://leginfo.legislature.ca.gov/

CDA's 2020 Plan consists of the following Chapters:

Chapter 1 Urban Water Management Plan Introduction and Overview
Chapter 2 Plan Preparation
Chapter 3 System Description
Chapter 4 Water Use Characterization
Chapter 5 SB_X7-7 Baselines, Targets, and 2020 Compliance
Chapter 6 Water Supply Characterization
Chapter 7 Water Service Reliability and Drought Risk Assessment
Chapter 8 Water Shortage Contingency Plan
Chapter 9 Demand Management Measures
Chapter 10 Plan Adoption, Submittal, and Implementation

A lay description is presented at the beginning of each of these Chapters.

LAY DESCRIPTION – CHAPTER 1

URBAN WATER MANAGEMENT PLAN INTRODUCTION AND OVERVIEW

Chapter 1 (Urban Water Management Plan Introduction and Overview) of CDA's 2020 Plan discusses and provides the following:

- An overall lay description of the 2020 Plan, including California Water Code and Urban Water Management Plan Act requirements, is provided. CDA is required to prepare an Urban Water Management Plan.
- CDA's 2020 Plan was prepared consistent with the recommended organization provided in DWR's Final "Urban Water Management Plan Guidebook 2020", dated March 2021. A description regarding the organization of the 2020 Plan, including a summary of each Chapter, is provided. CDA's Water Shortage Contingency Plan (discussed in Chapter 8) is also included in the 2020 Plan.
- The 2020 Plan incorporates DWR's water use and supply tables (standardized tables) for the reporting and submittal of UWMP data. These tables are included within the respective sections of the 2020 Plan and in Appendix A.
- CDA's coordination efforts with other planning agencies are discussed, including coordination efforts with the Inland Empire Utilities Agency and the Southern California Association of Governments.
- CDA's eligibility to receive grants and loans administered by the State of California and/or DWR, as a result of preparing the 2020 Plan, is discussed.
- The checklist developed by DWR and used by CDA to incorporate the specific UWMP requirements is discussed. The completed checklist is provided in Appendix B.

1.1 RECOMMENDED UWMP ORGANIZATION

CDA's 2020 Urban Water Management Plan (2020 Plan) was prepared consistent with the recommended organization provided in DWR's Final "Urban Water Management Plan Guidebook 2020" (Final 2020 UWMP Guidebook), dated March 2021. CDA's 2020 Plan consists of the following Chapters:

Chapter 1	Urban Water Management Plan Introduction and Overview
Chapter 2	Plan Preparation
Chapter 3	System Description
Chapter 4	Water Use Characterization
Chapter 5	SB X7-7 Baselines, Targets, and 2020 Compliance
Chapter 6	Water Supply Characterization
Chapter 7	Water Service Reliability and Drought Risk Assessment
Chapter 8	Water Shortage Contingency Plan
Chapter 9	Demand Management Measures
Chapter 10	Plan Adoption, Submittal, and Implementation

Pursuant to CWC requirements, CDA's 2020 Plan incorporates DWR's water use and supply tables (standardized tables) for the reporting and submittal of UWMP data. DWR's standardized tables are provided within the body of the 2020 Plan text as well as in Appendix A. CDA also submitted the UWMP data (standardized tables) electronically through DWR's Online Submittal Tool.

CDA's 2020 Plan also provides supporting documents (appendices) including notification letters of the Plan update, public notice of the Plan hearing, and adoption resolution from CDA's governing body. Further discussions regarding these supporting documents are provided within the individual Chapters of CDA's 2020 Plan.

1.2 UWMPS IN RELATION TO OTHER EFFORTS

CDA's 2020 Plan was prepared in coordination with planning agencies including the Inland Empire Utilities Agency (IEUA) Planning Division, the San Bernardino County Planning Division, and the Southern California Association of Governments (SCAG). In addition, CDA's 2020 Plan was prepared using management documents including IEUA's "Regional Water Use Efficiency Business Plan 2015 – 2020" and San Bernardino County's 2017 "San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan" and "San Bernardino County Emergency Operations Plan (EOP)".

CDA is a wholesale water agency formed under a Joint Exercise of Powers Agreement by a group of local agencies including the Jurupa Community Services District (JCSD), Santa Ana River

Water Company (SARWC), IEUA, Western Municipal Water District (WMWD), and the Cities of Chino, Chino Hills, Norco, and Ontario. CDA provided its 2020 Plan to its member agencies which includes projections of its water deliveries to CDA's member agencies in five-year increments for a normal year, a single dry year, and a five consecutive year drought conditions over the next 25 years.

1.3 UWMPS AND GRANT OR LOAN ELIGIBILITY

Pursuant to DWR's Final 2020 UWMP Guidebook:

"*In order for a Supplier to be eligible for any water grant or loan administered by DWR, the Supplier must have a current UWMP on file that has been determined by DWR to address the requirements of the Water Code. A current UWMP must also be maintained by the Supplier throughout the term of any grant or loan administered by DWR. A UWMP may also be required in order to be eligible for other state funding, depending on the conditions that are specified in the funding guidelines. Suppliers are encouraged to seek guidance on the specifics of any state funding source from the respective funding agencies. The following sections of the Water Code are pertinent to Suppliers considering pursuit of grants or loans*."

CDA's 2020 Plan has been prepared to meet eligibility requirements for grants and loans administered by the State and/or DWR.

1.4 DEMONSTRATION OF CONSISTENCY WITH THE DELTA PLAN FOR PARTICIPANTS IN COVERED ACTIONS

Pursuant to DWR, an urban water supplier that anticipates participating in or receiving water from a proposed project (or "covered action") such as a multi-year water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Sacramento-San Joaquin Delta (Delta) should provide information in their 2015 and 2020 UWMPs for use in demonstrating consistency with Delta Plan Policy WR P1, "*Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance"*. In addition, pursuant to California Code of Regulations, Title 23, § 5003:

> *(c)(1) Water suppliers that have done all of the following are contributing to reduced reliance on the Delta and improved regional self-reliance and are therefore consistent with this policy:*
>
> > *(A) Completed a current Urban or Agricultural Water Management Plan (Plan) which has been reviewed by the California Department of Water Resources for*

compliance with the applicable requirements of Water Code Division 6, Parts 2.55, 2.6, and 2.8;

(B) Identified, evaluated, and commenced implementation, consistent with the implementation schedule set forth in the Plan, of all programs and projects included in the Plan that are locally cost effective and technically feasible which reduce reliance on the Delta; and

(C) Included in the Plan, commencing in 2015, the expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance. The expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance shall be reported in the Plan as the reduction in the amount of water used, or in the percentage of water used, from the Delta watershed. For the purposes of reporting, water efficiency is considered a new source of water supply, consistent with Water Code section 1011(a).

CDA was formed to treat contaminated groundwater from the southwesterly portion of Chino Basin and provide that treated water to its member agencies. The quantity of groundwater being treated is fixed, regardless of climate change conditions, in order to control contaminant migration. In this context, each member agency's UWMP will describe the agency's reduced regional reliance on imported water supplies from the Delta. However, CDA does not have a demand on the imported water supplies and this section is not applicable.

1.5 TIPS FOR UWMP PREPARERS

CDA's 2020 Plan (which includes CDA's 2020 Water Shortage Contingency Plan (WSCP)) is considered an update to CDA's 2015 Plan. However, the 2020 Plan and the WSCP are considered stand-alone documents. As discussed in Section 1.1, CDA's 2020 Plan was prepared consistent with the recommended organization provided in DWR's Final 2020 UWMP Guidebook.

A checklist of specific UWMP requirements is included in Appendix B. The checklist includes the page number where the required elements are addressed to assist in DWR's review of the submitted Plan.

Chapter 2

PLAN PREPARATION

LAY DESCRIPTION – CHAPTER 2

PLAN PREPARATION

Chapter 2 (Plan Preparation) of CDA's 2020 Plan discusses and provides the following:

- The basis for preparing an Urban Water Management Plan is provided. CDA is required to prepare the 2020 Plan because it is an "urban water supplier" (CDA serves more than 3,000 customers and it supplies more than 3,000 acre-feet of water annually to its customers for municipal purposes).
- CDA's Plan has been prepared as an "individual" plan rather than a "regional" plan in an effort to provide information specific to CDA to best inform its employees, management, and customers.
- Information presented in CDA's 2020 Plan is provided on "Fiscal Year" basis which is from July 1 through June 30 of the following year.
- Water quantities presented in CDA's 2020 Plan are provided on an "acre-foot" basis.
- CDA's coordination and outreach efforts with wholesale water agencies, other retail water agencies, and the community are described. CDA coordinated the preparation of its 2020 Plan with the following:
    - City of Chino
    - City of Chino Hills
    - City of Eastvale
    - City of Jurupa Valley
    - City of Norco
    - City of Ontario
    - County of San Bernardino
    - County of Riverside
    - Jurupa Community Services District
    - Santa Ana Watershed Project Authority
    - Inland Empire Utilities Agency
    - Metropolitan Water District of Southern California
    - Chino Basin Watermaster
- CDA's notification process to the cities and county within which CDA provides water supplies to is discussed.

2.1 PLAN PREPARATION

As discussed in Section 1.1, CDA's 2020 Plan was prepared consistent with the recommended organization provided in DWR's Final 2020 UWMP Guidebook. Pursuant to DWR's Final 2020 UWMP Guidebook:

"*The California Water Code (Water Code) specifies several requirements for preparing a UWMP, including who is required to prepare a UWMP; how to prepare a UWMP, depending on whether the Supplier choses to participate in a regional or individual planning effort; selection of reporting year-type; and coordination, notification, and outreach.*"

Pursuant to CWC requirements, CDA's 2020 Plan incorporates DWR's water use and supply tables (standardized tables) for the reporting and submittal of UWMP data.

2.2 BASIS FOR PREPARING A PLAN

CWC 10617.

"Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

CWC 10620.

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

CWC 10621.

(a) Each urban water supplier shall update its plan at least once every five years on or before July 1, in years ending in six and one, incorporating updated and new information from the five years preceding each update.

CDA's 2020 Plan was prepared in accordance with the UWMP Act which was established in 1983. The UWMP Act requires every "urban water supplier" to prepare and adopt a Plan, to periodically review its Plan at least once every five years and make any amendments or changes which are indicated by the review. An "Urban Water Supplier" is defined as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet (AF) of water annually.

Section 10621(a) of the CWC states, "*Each urban water supplier shall update its plan at least once every five years on or before July 1, in years ending in six and one, incorporating updated and new information from the five years preceding each update".* As a result, DWR requires the 2020 Plans be submitted by July 1, 2021.

CDA is an "urban water supplier" pursuant to Section 10617 of the CWC and indirectly serves potable water to more than 3,000 customers and supplies more than 3,000 acre-feet per year (AFY) at retail for municipal purposes. CDA's 2020 Plan is an update to CDA's 2015 Plan.

2.2.1 PUBLIC WATER SYSTEMS

CWC 10644.

(a)(2) The plan, or amendments to the plan, submitted to the department … shall include any standardized forms, tables, or displays specified by the department.

California Health and Safety Code 116275.

(h) "Public water system" means a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year.

Pursuant to CWC requirements, CDA's 2020 Plan incorporates DWR's standardized tables for the reporting and submittal of UWMP data. The standardized tables are provided within the body of the 2020 Plan text as well as in Appendix A. CDA also submitted the UWMP data (from the standardized tables) electronically through DWR's Online Submittal Tool.

CDA consists of two Public Water Systems (PWS) which are regulated by the State Water Resources Control Board - Division of Drinking Water (SWRCB-DDW). The PWS number for CDA – Desalter 1 is CA3610075 and the PWS number for CDA – Desalter 2 is CA3310083. However, as a wholesale water agency, CDA is not required by DWR to provide PWS information in this Plan, therefore Table 2-1 is not applicable.

Table 2-1 Public Water Systems (Not Applicable)
Table 2-1 is not applicable for wholesalers.

2.2.2 SUPPLIERS SERVING MULTIPLE SERVICE AREAS / PUBLIC WATER SYSTEMS

CDA has developed its 2020 Plan, based solely on its water sales to its member agencies, to address all requirements of the CWC. However, based upon their 2020 water production and imported water deliveries, the following urban water suppliers (or Public Water Systems) receiving CDA water supplies may be required to prepare a Plan:

- Jurupa Community Services District
- Santa Ana River Water Company
- Western Municipal Water District
- City of Chino
- City of Chino Hills
- City of Norco
- City of Ontario

2.3 REGIONAL PLANNING

CDA has developed its 2020 Plan based on water sales to its member agencies to address all requirements of the CWC. CDA's 2020 Plan was not developed as a Regional Plan. However, CDA's Plan is available for use and reference to its member agencies.

CDA coordinated with its member agencies regarding the development of the 2020 Plan. Likewise, IEUA and WMWD's 2020 Plans are available for use and reference by its member agencies and urban water suppliers within those member agencies.

2.4 INDIVIDUAL OR REGIONAL PLANNING AND COMPLIANCE

As shown in Table 2-2, CDA's 2020 Plan is an "Individual UWMP". CDA has developed its 2020 Plan reporting solely on its water sales to its member agencies to address all requirements of the CWC. CDA notified and coordinated with appropriate regional agencies and constituents (See Section 2.6).

Table 2-2 Plan Identification Type

Submittal Table 2-2: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable* (select from drop down list)
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

2.4.1 REGIONAL UWMP

CWC 10620.

(d)(1) An urban water supplier may satisfy the requirements of this part by participation in area wide, regional, watershed, or basin wide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

As indicated in Table 2-2, CDA's 2020 Plan was developed as an "Individual UWMP" and not part of a Regional Plan.

2.4.2 REGIONAL ALLIANCE

CWC 10608.20.

(a)(1) …Urban retail water suppliers may elect to determine and report progress toward achieving these targets on an individual or regional basis, as provided in subdivision (a) of Section 10608.28…

CWC 10608.28.

(a) An urban retail water supplier may meet its urban water use target within its retail service area, or through mutual agreement, by any of the following:

(1) Through an urban wholesale water supplier.

(2) Through a regional agency authorized to plan and implement water conservation, including, but not limited to, an agency established under the Bay Area Water Supply and Conservation Agency Act (Division 31 (commencing with Section 81300)).

(3) Through a regional water management group as defined in Section 10537.

(4) By an integrated regional water management funding area.

(5) By hydrologic region.

(6) Through other appropriate geographic scales for which computation methods have been developed by the department.

(b) A regional water management group, with the written consent of its member agencies, may undertake any or all planning, reporting, and implementation functions under this chapter for the member agencies that consent to those activities. Any data or reports shall provide information both for the regional water management group and separately for each consenting urban retail water supplier and urban wholesale water supplier.

As indicated in Table 2-2, CDA's 2020 Plan was developed as an "Individual UWMP" and not part of a Regional Alliance.

2.5 FISCAL OR CALENDAR YEAR AND UNITS OF MEASURE

CWC 10608.20.

(a)(1) Urban retail water suppliers…may determine the targets on a fiscal or calendar year basis.

2.5.1 FISCAL OR CALENDAR YEAR

The data provided in CDA's 2020 Plan is reported on a fiscal year (FY) basis, unless noted otherwise, as shown in Table 2-3. A FY begins on July 1st of every year.

Table 2-3 Supplier Identification

Submittal Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
☑	Supplier is a wholesaler
☐	Supplier is a retailer
Fiscal or Calendar Year (select one)	
☐	UWMP Tables are in calendar years
☑	UWMP Tables are in fiscal years
If using fiscal years provide month and date that the fiscal year begins (mm/dd)	
07/01	
Units of measure used in UWMP * (select from drop down)	
Unit	AF
**** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES:	

2.5.2 REPORTING COMPLETE 2020 DATA

The data provided in CDA's 2020 Plan is provided on a FY basis through June 30, 2020.

2.5.3 UNITS OF MEASURE

As shown in Table 2-3, the data provided in CDA's 2020 Plan is reported in units of AF, unless noted otherwise.

2.6 COORDINATION AND OUTREACH

CWC 10631.

(h) An urban water supplier that relies upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (f). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (f).

2.6.1 WHOLESALE AND RETAIL COORDINATION

CDA is a wholesale agency comprised of eight (8) member agencies. The following list is a list of CDA's member agencies:

- Jurupa Community Services District
- Santa Ana River Water Company
- Inland Empire Utilities Agency
- Western Municipal Water District
- City of Chino
- City of Chino Hills
- City of Norco
- City of Ontario

CDA provides water supplies to its member agencies, with the exception of Inland Empire Utilities Agency. As indicated in Table 2-4, CDA has provided its 2020 Plan to its member agencies which includes water use projections of its water sales to its member agencies in five-year increments for a normal year, a single dry year, and a five consecutive year drought conditions over the next 25 years.

Table 2-4 Water Supplier Information Exchange

Submittal Table 2-4 Wholesale: Water Supplier Information Exchange (select one)	
☑	Supplier has informed more than 10 other water suppliers of water supplies available in accordance with Water Code Section 10631. Completion of the table below is optional. If not completed, include a list of the water suppliers that were informed.
Section 2.6	**Provide page number for location of the list.**
☐	Supplier has informed 10 or fewer other water suppliers of water supplies available in accordance with Water Code Section 10631. **Complete the table below.**
Water Supplier Name	
Add additional rows as needed	
NOTES:	

2.6.2 COORDINATION WITH OTHER AGENCIES AND THE COMMUNITY

CWC 10620.

(d)(3) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

CWC 10642.

Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of both the plan…

CDA is a wholesale water supplier that provides treated groundwater from the Chino Basin to its member agencies. CDA notified its member agencies (including cities and counties within the area receiving its water supplies) and public agencies that share a common source of supply from the Chino Basin about the preparation of CDA's 2020 Plan. CDA provided copies of the draft plan to the following:

- City of Chino
- City of Chino Hills
- City of Eastvale
- City of Jurupa Valley
- City of Norco
- City of Ontario
- County of San Bernardino
- County of Riverside
- Jurupa Community Services District
- Santa Ana Watershed Project Authority
- Inland Empire Utilities Agency
- Metropolitan Water District of Southern California
- Chino Basin Watermaster

As discussed in Section 10.2, CDA notified these agencies, as well as the cities and counties within which CDA provides water supplies, at least sixty (60) days prior to the public hearing of the preparation of the 2020 Plan and invited them to participate in the development of the 2020 Plan. A copy of the notification letters sent to these agencies is provided in Appendix C.

2.6.3 NOTICE TO CITIES AND COUNTIES

CWC 10621.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days before the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.

As discussed in Section 10.2, notification was provided to the cities and counties within which CDA provides water supplies that CDA was reviewing and considering amendments (updates) to the previous 2015 Plan and as a result, prepare the 2020 Plan. Notification was provided at least 60 days prior to the public hearing (see Appendix C).

Chapter 3

SYSTEM DESCRIPTION

LAY DESCRIPTION – CHAPTER 3

SYSTEM DESCRIPTION

Chapter 3 (System Description) of CDA's 2020 Plan discusses and provides the following:

- A description of the area receiving water supplies from CDA is provided. The area receiving water supplies from CDA is located within the Western Municipal Water District in Riverside County and/or within the Inland Empire Utilities Agency in San Bernardino County. CDA was formed under a Joint Exercise of Powers Agreement to remove salts from brackish groundwater extracted from the lower Chino Basin and distribute it to its member agencies.
- The area receiving water supplies from CDA encompasses an area of approximately 304 square miles. The location of the area receiving water supplies form CDA is provided in Figure 1.
- A description regarding the climate of the area receiving water supplies from CDA is provided. The monthly historical average temperatures (including minimum and maximum), monthly historical average rainfall, and monthly evapotranspiration in the vicinity of the area receiving water supplies from CDA area is summarized. The sources of the climate information are also discussed.
- The population within the area receiving water supplies from CDA is discussed and projected. The sources of the population information are also discussed. CDA provides water service to an area with a current population of 664,270. The area receiving water supplies from CDA is projected to have a population of 963,819 by Fiscal Year 2044-45.
- A discussion of land use information used by CDA to develop the 2020 Plan is provided. CDA reviewed the current and projected land uses within its service area. CDA also reviewed data provided by the Southern California Association of Governments, the Department of Finance, and the United States Census Bureau and prepared for counties, cities, and unincorporated areas within Southern California.

3.1 GENERAL DESCRIPTION

CWC 10631.

(a) Describe the service area of the supplier, including current and projected population, climate, and other social, economic, and demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available. The description shall include the current and projected land uses within the existing or anticipated service area affecting the supplier's water management planning. Urban water suppliers shall coordinate with local or regional land use authorities to determine the most appropriate land use information, including, where appropriate, land use information obtained from local or regional land use authorities, as developed pursuant to Article 5 (commencing with Section 65300) of Chapter 3 of Division 1 of Title 7 of the Government Code.

In June 2000, the Optimum Basin Management Program was adopted by Chino Basin Watermaster and approved by the Superior Court to address water quality problems with the Chino Basin and to increase and improve the water supply. On September 25, 2001, CDA was formed under a Joint Exercise of Powers Agreement to remove salts from brackish groundwater extracted from the lower Chino Basin and distribute it to its member agencies. The CDA member agencies are located within the Western Municipal Water District in Riverside County and/or within the Inland Empire Utilities Agency in San Bernardino County. The area which receives water supplies from CDA is 304 square miles. A map showing the area which receives water supplies from CDA is provided in Figure 1.

CDA removes salts from brackish groundwater extracted from the lower Chino Basin with the Chino I and II Desalter facilities. The Chino I Desalter commenced operation in 2001 and was expanded in 2005. The Chino II Desalter is located in Jurupa Valley began operation in 2006 utilizing ion exchange (IX) and reverse osmosis (RO) treatment to treat brackish groundwater wells that also have elevated nitrate concentration. The original combined IX and RO treatment capacity was 10 million gallons per day (MGD). A 10.5 MGD expansion (6.5-mgd RO, 4.0-mgd IX) was subsequently constructed in 2011, for a total capacity of 20.5 (10 + 10.5) MGD. The expansion was constructed as part of the Phase 3 Expansion Project, to reach the groundwater extraction goal of 40,000 acre-feet per year (AFY) through upgrades to both desalters (Chino I and Chino II), new wells, pipelines, and pumping stations. Product water from the Chino II Desalter meets all state and federal drinking water regulations and provides 21,000 AFY (20.5 MGD) to the Cites of Ontario and Norco, Jurupa Community Services District, Santa Ana River Water Company, and Western Municipal Water District.

The overall RO process at the Chino II Desalter consists of five RO trains that normally operate at a recovery of 83.5 percent. The capacities of these trains are not identical. The permeate and concentrate production capacities of the three original RO trains are 2.0 and 0.04 MGD, respectively. The permeate and concentrate production capacities of the two RO trains added as

part of the Chino II expansion are 3.25 MGD and 0.64 MGD, respectively. There are a total of eight IX vessels. The facility also has the capability to bypass a portion of the raw groundwater flow around the treatment processes to blend with the treated water, while meeting the final product water quality goals of 350 mg/L total dissolved solids (TDS) and 25 mg/L nitrate.

Subsequent to the plant expansion, CDA constructed the Concentrate Reduction Facility in 2017, which utilizes chemical softening to remove the limiting foulants (specifically, calcium and silica) from the RO concentrate. Softened water is then passed through granular media filters to provide particulate removal upstream of a secondary RO (SRO) process. Treated water (SRO permeate) is blended with the primary RO permeate, and SRO concentrate is disposed of into the Inland Empire Brine Line (IEBL), that conveys the concentrate to Orange County Sanitation District. Using this approach, total water recovery from the RO system at the Chino II Desalter is increased from 83.5 percent to as high as 95 percent, substantially reducing the volume of brine disposed into the IEBL while increasing permeate production.

The Chino II Desalter's original wellfield consisted of eight wells that supplied groundwater to the Chino II Desalter through a PVC pressure raw water pipeline. An additional three wells have been constructed for a total of eleven groundwater wells supplying the Desalter system. The wells are primarily located within the Cities of Ontario, Eastvale, and Jurupa Valley.

Additional components of the Chino II Desalter System were constructed as part of the South Archibald Plume Project to be operational in 2021, with the goal of removing and treated trichloroethylene (TCE) from groundwater wells impacted by the South Archibald Plume. The project entails integrating additional improvements into the Chino II system, including construction of dedicated transmission pipeline to convey impacted groundwater to the Desalter, and treating the high TCE ground water using CDA's existing reverse osmosis (RO) system, and a new air stripper system.

These Desalter systems collectively include 30 groundwater extraction wells, pumps, and pipelines that produce and convey untreated groundwater to treatment facilities. Waste process water is discharged to the Inland Empire Brine Line and conveyed to the Orange County Sanitation District for treatment and discharge to the Pacific Ocean.

3.2 SERVICE AREA BOUNDARY MAPS

As discussed in Section 3.1, the area which receives water supplies from CDA covers approximately 304 square miles, encompassing portions of the Counties of San Bernardino and Riverside. The area which receives water supplies from CDA relative to the municipal boundaries within the Counties of San Bernardino and Riverside is provided in Figure 2. The location of the service areas for CDA's member agencies is provided in Figure 3.

The map of the area receiving water supplies from CDA was submitted online through DWR's Population Tool in a "KML" file format (i.e. Google Earth format). The KML file was originally

created in a Geographical Information Systems (GIS) shape file format and converted into a KML format. To the extent information was available, metadata was included in the KML file (including map projection, contact information, start and end dates for which the map is valid, constraints, attribute table definitions, and digitizing base).

3.3 SERVICE AREA CLIMATE

CWC 10631.

(a) Describe the service area of the supplier, including … climate…

CWC 10630.

It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied, while accounting for impacts from climate change.

The monthly historical average temperatures (including minimum and maximum), monthly historical average rainfall, and monthly evapotranspiration (ETo) in the vicinity of the area receiving water supplies from CDA is summarized in the tabulation below. Historical climate information was obtained from the Western Regional Climate Center (WRCC), the National Oceanic and Atmospheric Administration, and from DWR's California Irrigation Management Information System (CIMIS).

Service Area Climate Information

Month	Average Temperature (F)	Average Minimum Temperature (F)	Average Maximum Temperature (F)	Average Total Precipitation (Inches)	ETo (Inches)
January	55.5	44.1	67.6	2.2	1.95
February	55.1	44.9	67.4	2.7	2.41
March	58.8	48.2	58.8	1.3	3.75
April	60.9	51.0	74.8	0.9	4.55
May	67.9	55.6	79.6	0.3	5.19
June	71.2	59.8	86.2	0.0	5.97
July	77.8	64.7	93.1	0.1	6.60
August	78.9	65.2	94.2	0.0	6.41
September	75.4	62.9	90.7	0.1	4.88
October	67.8	56.6	82.0	0.5	3.46
November	58.9	48.6	73.9	0.8	2.31
December	54.7	43.2	66.2	1.9	1.72
Annual	65.2	53.7	77.9	10.7	49.20

Source:

Historical average monthly precipitation and temperature information was obtained from the National Oceanic and Atmospheric Administration (https://search.usa.gov/search?utf8=%E2%9C%93&affiliate=noaa.gov&query=ontario+ca) from 1998 through 2020 (for Ontario International Airport). Historical monthly average ETo information was obtained from the California Irrigation Management Information Systems (http://wwwcimis.water.ca.gov) and is based on data collected from Station 255 (Chino).

The historical average rainfall in the vicinity of the area receiving CDA's water supplies is 10.7 inches. This area has a dry climate and summers can reach average maximum daily temperatures of over 90 degrees Fahrenheit. Although changes in climatic conditions may have an impact (as discussed in Section 4.5) on the total demands of CDA's member agencies, the projected water supply sales to CDA's member agencies will be constant to control groundwater contamination regardless of an average year, a single dry year, and five consecutive year drought conditions. Precipitation within the vicinity of the area receiving water supplies from CDA is discussed further in Section 7.2.

3.4 SERVICE AREA POPULATION AND DEMOGRAPHICS

3.4.1 SERVICE AREA POPULATION

CWC 10631.

(a) Describe the service area of the supplier, including current and projected population… The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

The area receiving water supplies from CDA has a current population of 664, 270. Table 3-1 presents the current and projected population of the area receiving water supplies from CDA from FY 2019-20 to FY 2044-45. The area receiving water supplies from CDA is projected to have a population of 963, 819 by FY 2044-45.

The projected population in the areas receiving water supplies from CDA was based on growth rate projections obtained from data provided by the Southern California Association of Governments. The data provided by SCAG was based on their "The 2020-2045 Regional Transportation Plan / Sustainable Communities Strategy of the SCAG", dated September 2020, and incorporates demographic trends, existing land use, general plan land use policies, and input and projections through the year 2045 from the Department of Finance (DOF) and the U.S. Census Bureau for counties, cities, and unincorporated areas within Southern California.

Table 3-1 Population – Current and Projected

Submittal Table 3-1 Wholesale: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	664,270	715,607	770,912	830,491	894,675	963,819
NOTES: The 2020 population and the populations projected through 2045 were based on ACS population data (2019 Census) and an average between CDA's historical annual population growth rate and IEUA's current projected growth rate (See Section 3.4.1 and Section 5.4.1).						

3.4.2 OTHER SOCIAL, ECONOMIC, AND DEMOGRAPHIC FACTORS

CWC 10631.

(a) Describe the service area of the supplier, including… other social, economic, and demographic factors affecting the supplier's water management planning.

No other demographic factors affect CDA's water management planning. However, increased population will have an impact on water demand.

3.5 LAND USES WITHIN SERVICE AREA

CDA is a wholesale water agency which provides treated groundwater water to its retail member agencies. Therefore, CDA does not provide water directly to retail customers. As discussed in Section 3.4, CDA obtained data from the SCAG document entitled "The 2020-2045 Regional Transportation Plan / Sustainable Communities Strategy of the SCAG", dated September 2020. Projected populations in the area receiving water supplies from CDA were based on growth rate projections developed by SCAG. The data provided by SCAG incorporates demographic trends, existing land use, general plan land use policies, and input and projections through the year 2045 from the Department of Finance and the U.S. Census Bureau for counties, cities, and unincorporated areas within Southern California. The projected population was used to project future demand from its member agencies through the year 2045. As discussed in Section 2.6, CDA coordinated the preparation of the 2020 Plan with the Cities of Chino, Chino Hills, Eastvale, Jurupa Valley, Norco, Ontario, the Counties of San Bernardino and Riverside, and other agencies.

Chapter 4

WATER USE CHARACTERIZATION

LAY DESCRIPTION – CHAPTER 4

WATER USE CHARACTERIZATION

Chapter 4 (Water Use Characterization) of CDA's 2020 Plan discusses and provides the following:

- CDA provides water service to an individual water use category. This water use category is sales to other agencies. A description for this water use category is provided in Section 4.2.1.
- CDA's total water demands from its member agencies over the past 10 years have ranged from 27,098 AFY to 35,003 AFY, with an average of 29,673 AFY. CDA currently measures its water use through meter data and billing records.
- CDA's current and projected water demands from its member agencies are provided in five-year increments over the next 25 years are provided (through Fiscal Year 2044-45) as shown on Table 4-3.

4.1 NON-POTABLE VERSUS POTABLE WATER USE

Chapter 4 addresses CDA's potable water demands. Recycled water is not served by CDA, as shown in Table 4-3. Raw water is also not served by CDA and is not applicable.

4.2 PAST, CURRENT, AND PROJECTED WATER USES BY SECTOR

CWC 10635.

(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the long-term total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and a drought lasting five consecutive water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

CWC 10631.

(d)(1) For an urban retail water supplier, quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, based upon information developed pursuant to subdivision (a), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following…

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

(4)(A) Water use projections, where available, shall display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area.

(B) To the extent that an urban water supplier reports the information described in subparagraph (A), an urban water supplier shall do both of the following:

(i) Provide citations of the various codes, standards, ordinances, or transportation and land use plans utilized in making the projections.
(ii) Indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall be noted of that fact.

CDA's current and projected water demands are provided in five-year increments over the next 25 years (through FY 2044-45) in Tables 4-1, 4-2, and 4-3. CDA's total water demands for sale to its member agencies were projected based on the current capacity of the desalters.

CDA provides water service to one individual water use category. The water use category supplied by CDA is discussed in Section 4.2.1. The water use for this category during FY 2019-20 is provided in Table 4-1. The projected water use for this water use category is provided in Table 4-2 and is based on the water use from the water use sector in FY 2019-20.

4.2.1 WATER USE SECTORS LISTED IN WATER CODE

CWC 10631.

(d)(1) For an urban retail water supplier, quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, based upon information developed pursuant to subdivision (a), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.
(J) Distribution system water loss.

As shown in Table 4-1, CDA includes the following water use category listed in the CWC:

- Sales to Other Agencies
  (Water sales made to another agency. Projected sales may be based on projected demand provided by the receiving agency. There is inherent uncertainty in future projections, therefore, any projected sales reported in the Plan are for planning purposes only and are not considered a commitment on the part of the seller. This is a wholesale demand.)

4.2.2 WATER USE SECTORS IN ADDITION TO THOSE LISTED IN WATER CODE

CDA does not include other water demand categories which are not listed in the CWC (including exchanges, surface water augmentation, transfers, and wetlands or wildlife habitat).

4.2.3 PAST WATER USE

Chapter 6 provides a discussion of the source of water supply CDA uses to meet its water demands from its member agencies. Section 6.1 provides a tabulation of CDA's historical annual water demands for the source of water supply. Over the past ten years, CDA's water demands have ranged from 27,098 AFY to 35,003 AFY, with an average of 29,673 AFY.

4.2.4 DISTRIBUTION SYSTEM WATER LOSS

CWC 10631.

(d)(1) For an urban retail water supplier, quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, based upon information developed pursuant to subdivision (a), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following…

(J) Distribution system water loss.

CWC 10631.

(3)(A) The distribution system water loss shall be quantified for each of the five years preceding the plan update, in accordance with rules adopted pursuant to Section 10608.34.

(B) The distribution system water loss quantification shall be reported in accordance with a worksheet approved or developed by the department through a public process. The water loss quantification worksheet shall be based on the water system balance methodology developed by the American Water Works Association.

(C) In the plan due July 1, 2021, and in each update thereafter, data shall be included to show whether the urban retail water supplier met the distribution loss standards enacted by the board pursuant to Section 10608.34.

As a wholesale supplier, CDA is not required by DWR to perform water loss audits and report distribution system water loss.

4.2.5 CURRENT WATER USE

CDA currently measures its water use through meter data and billing records. The water use for CDA's individual water use category during FY 2019-20 is provided in Table 4-1. CDA does not produce recycled water as shown in, Table 4-3.

DWR has created an optional "Planning Tool Worksheet" for water suppliers to review and assess monthly water use trends. However, DWR has deemed the tool as optional and CDA is not required by DWR to use the tool. However, Section 6.1 provides a tabulation of CDA's historical annual water use. During the past 10 years, CDA's member agencies experienced a five consecutive year drought from FY 2011-12 to FY 2015-16.

4.2.6 PROJECTED WATER USE

CWC 10635.

(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the long-term total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and a drought lasting five consecutive water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

CWC 10631.

(h) An urban water supplier that relies upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (f). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (f).

CWC 10631.

(d)(4)(A) Water use projections, where available, shall display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area.

(d)(4)(B) To the extent that an urban water supplier reports the information described in subparagraph (A), an urban water supplier shall do both of the following:

(i) Provide citations of the various codes, standards, ordinances, or transportation and land use plans utilized in making the projections.
(ii) Indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall be noted of that fact.

CDA's projected water demands are provided in five-year increments over the next 25 years (through FY 2044-45) in Table 4-3. CDA's projected water demands during a normal year, a single dry year, and a five consecutive year drought are provided in Chapter 7. The projected water demands for CDA's water use category is provided in Table 4-2.

As a wholesale supplier, CDA's water demand projections are not required by DWR to incorporate water savings, or "passive savings", which are the result of implementation of new plumbing codes along with consumer awareness of the need to conserve water.

4.2.7 CHARACTERISTIC FIVE-YEAR WATER USE

CWC 10635.

(b) Every urban water supplier shall include, as part of its urban water management plan, a drought risk assessment for its water service to its customers as part of information considered in developing the demand management measures and water supply projects and programs to be included in the urban water management plan. The urban water supplier may conduct an interim update or updates to this drought risk assessment within the five-year cycle of its urban water management plan update. The drought risk assessment shall include each of the following:

(3) A comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.

(4) Considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.

CDA's projected water demands are provided in five-year increments over the next 25 years (and through FY 2044-45) in Table 4-3. CDA's projected water demands and water supplies during a normal year, a single dry year, and a five consecutive year drought over the next 25 years (and through FY 2044-45) are provided in Chapter 7.

CDA's "Drought Risk Assessment" (DRA) for the next five years (from FY 2020-21 through FY 2024-25) is discussed in Section 7.3. The DRA includes CDA's projected annual water demands and supplies for each of the next five years and was prepared based on the five driest consecutive years on record. The DRA provides an assessment of CDA's water service reliability during a drought lasting five years.

4.3 WORKSHEETS AND REPORTING TABLES

CDA's current and projected water demands from its member agencies, including the water demands from its member agencies for CDA's water use category, are provided in five-year increments over the next 25 years (and through FY 2044-45) in Tables 4-1, 4-2, and 4-3.

4.3.1 OPTIONAL PLANNING TOOL USE ANALYSIS WORKSHEET

As discussed in Section 4.2.5, DWR has deemed the "Planning Tool Worksheet" as optional and CDA is not required by DWR to use the tool. A further discussion regarding the reliability of CDA's water supply source is provided in Chapter 7.

4.3.2 DWR 2020 UWMP SUBMITTAL TABLES

CDA's current water demands for its water use category during FY 2019-20 are provided in Table 4-1. CDA's projected total water demands for the water use sector, in five-year increments over the next 25 years (and through FY 2044-45), are provided in Table 4-2. CDA's total projected water demands for potable water, in five-year increments over the next 25 years (and through FY 2044-45), are summarized in Table 4-3. As a wholesale supplier, CDA is not required by DWR to perform water loss audits and report distribution system water loss.

Table 4-1 Demands for Potable and Non-Potable Water – Actual

Submittal Table 4-1 Wholesale: Demands for Potable and Non-Potable[1] Water - Actual			
Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only use types that will be recognized by the WUE data online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume[2]
Add additional rows as needed			
Sales to other agencies		Drinking Water	30,247
Other Non-Potable	Waste Process Water	Raw Water	4,756
		TOTAL	35,003
[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.* [2] *Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES:			

Table 4-2 Use for Potable and Non-Potable Water – Projected

Submittal Table 4-2 Wholesale: Use for Potable and Raw Water [1] - Projected						
Use Type		Projected Water Use [2] Report To the Extent that Records are Available				
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool.	Additional Description (as needed)	2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Sales to other agencies		35,200	35,200	35,200	35,200	35,200
Other Non-Potable		4,800	4,800	4,800	4,800	4,800
TOTAL		40,000	40,000	40,000	40,000	40,000

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.* [2] *Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2.

Table 4-3 Total Gross Water Use (Potable and Non-Potable)

Submittal Table 4-3 Wholesale: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045 (opt)
Potable and Raw Water From Tables 4-1W and 4-2W	35,003	40,000	40,000	40,000	40,000	40,000
Recycled Water Demand* From Table 6-4W	0	0	0	0	0	0
TOTAL WATER DEMAND	35,003	40,000	40,000	40,000	40,000	40,000

**Recycled water demand fields will be blank until Table 6-4 is complete.*

NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2.

Table 4-4 12 Month Water Loss Audit Report (Not Applicable)

Table 4-4 is not applicable for wholesalers.

4.4 WATER USE FOR LOWER INCOME HOUSEHOLDS

CWC 10631.1.

(a) The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.

California Health and Safety Code 50079.5.

(a) "Lower income households" means persons and families whose income does not exceed the qualifying limits for lower income families… In the event the federal standards are discontinued, the department shall, by regulation, establish income limits for lower income households for all geographic areas of the state at 80 percent of area median income, adjusted for family size and revised annually.

As a wholesale supplier, CDA is not required by DWR to report projected water demands for lower income single-family and multi-family households.

Table 4-5 Inclusion in Water Use Projections (Not Applicable)
Table 4-5 is not applicable for wholesalers.

4.5 CLIMATE CHANGE CONSIDERATIONS

CWC 10630.

It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied, while accounting for impacts from climate change.

CWC 10635.

(b) Every urban water supplier shall include, as part of its urban water management plan, a drought risk assessment for its water service to its customers as part of information considered in developing the demand management measures and water supply projects and programs to be included in the urban water management plan. The urban water supplier may conduct an interim update or updates to this drought risk assessment within the five-year cycle of its urban water management plan update. The drought risk assessment shall include each of the following…

(4) Considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.

CDA removes salts from brackish groundwater extracted from the lower Chino Basin with the Chino I and II Desalter facilities. The Chino I Desalter commenced operation in 2001 and was expanded in 2005. The Chino II Desalter became operational in 2006. These systems include 30 groundwater extraction wells, pumps, and pipelines that produce and convey untreated groundwater to treatment facilities. CDA produces approximately 35,200 AF from the Chino Basin every year for the purpose of groundwater cleanup and control of contaminant migration. This production is fixed to achieve the desired groundwater cleanup goal and is not impacted by climate change. Impacts of climate change to CDA's member agencies and their sources of supply are included in their respective UWMPs.

Chapter 5

SB X7-7 BASELINES, TARGETS, AND 2020 COMPLIANCE

LAY DESCRIPTION – CHAPTER 5

SB X7-7 BASELINES, TARGETS, AND 2020 COMPLIANCE

Chapter 5 (SB X7-7 Baselines, Targets, and 2020 Compliance) of CDA's 2020 Plan discusses and provides the following:

- The Water Conservation Act of 2009 (or SB X7-7) required the State of California achieve a 20 percent reduction in urban water use by the year 2020.
- SB X7-7 required urban water suppliers to develop a "2020 Water Use Target" to assist the State of California to achieve the 20 percent reduction. The 2020 Water Use Target represents the amount of water each person should use per day (i.e. gallons per capita per day or GPCD) by the year 2020.
- As a wholesale water agency, CDA is not required to calculate a 2020 Water Use Target or show compliance with the 2020 Water Use Target. However, an assessment regarding CDA's present and proposed future measures, programs, and policies to assist the retail water suppliers in CDA's service area achieve their individual 2020 Water Use Targets is provided (in Chapter 9).

5.1 GUIDANCE FOR WHOLESALE AGENCIES

CWC 10608.12.

(I) "Urban wholesale water supplier," means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes.

CDA is a wholesale agency and is not required by DWR to complete Section 5.2 through 5.8.

5.2 SB X7-7 FORMS AND SUMMARY TABLE

CWC 10608.20.

(g) An urban retail water supplier may update its 2020 urban water use target in its 2015 urban water management plan required pursuant to Part 2.6 (commencing with Section 10610).

CDA is a wholesale agency and is not required by DWR to complete Section 5.2.

5.2.1 SB X7-7 VERIFICATION FORM (BASELINES AND TARGETS)

5.2.2 SB X7-7 COMPLIANCE FORM

5.2.3 SUBMITTAL TABLES 5-1 AND 5-2

5.2.4 REGIONAL UWMP/ REGIONAL ALLIANCE

Table 5-1 Baselines and Targets Summary from SB X7-7 Verification Form (Not Applicable)
Table 5-1 is not applicable for wholesalers.

Table 5-2 2020 Compliance from SB X7-7 2020 Compliance Form (Not Applicable)
Table 5-2 is not applicable for wholesalers.

5.3 BASELINE AND TARGET CALCULATIONS FOR 2020 UWMPS

CDA is a wholesale agency and is not required by DWR to complete Section 5.3.

5.3.1 SUPPLIER SUBMITTED 2015 UWMP, NO CHANGE TO SERVICE AREA

5.4 METHODS FOR CALCULATING POPULATION AND GROSS WATER USE

CWC 10608.20.

(e) An urban retail water supplier shall include in its urban water management plan due in 2010 pursuant to Part 2.6 (commencing with Section 10610) the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.

(f) When calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections.

CWC 10644.

(a)(2) The plan… shall include any standardized forms, tables, or displays specified by the department.

CDA is a wholesale agency and is not required by DWR to complete Section 5.4.

5.4.1 SERVICE AREA POPULATION

5.4.2 GROSS WATER USE

5.5 2020 COMPLIANCE DAILY PER CAPITA WATER USE (GPCD)

CWC 10608.12.

(h) "Gross water use" means the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:

(1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier.
(2) The net volume of water that the urban retail water supplier places into long-term storage.
(3) The volume of water the urban retail water supplier conveys for use by another urban water supplier.
(4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24.

California Code of Regulations Title 23 Division 2 Chapter 5.1 Article 1, Section 596.

(a) An urban retail water supplier that has a substantial percentage of industrial water use in its service area is eligible to exclude the process water use of existing industrial water customers from the calculation of its gross water use to avoid a disproportionate burden on another customer sector.

CDA is a wholesale agency and is not required by DWR to complete Section 5.5.

5.5.1 2020 ADJUSTMENTS FOR FACTORS OUTSIDE OF SUPPLIER'S CONTROL

5.5.2 SPECIAL SITUATIONS

5.5.3 IF SUPPLIER DOES NOT MEET 2020 TARGET

5.6 REGIONAL ALLIANCE

CDA is a wholesale agency and is not required by DWR to complete Section 5.6.

Chapter 6

WATER SUPPLY CHARACTERIZATION

LAY DESCRIPTION – CHAPTER 6

WATER SUPPLY CHARACTERIZATION

Chapter 6 (Water Supply Characterization) of CDA's 2020 Plan discusses and provides the following:

- CDA's water supply source consists of groundwater from the southwesterly portion of the Chino Basin which is treated at its treatment facilities. A tabulation of CDA's historical water supplies is provided in Section 6.1.
- A discussion regarding CDA's groundwater supplies from the Chino Basin is provided. Information regarding basin location, adjudication, management, water levels, water quality, water rights, and historical production is provided.
- CDA's proposed future projects to maximize its water supply resources are discussed.
- CDA's "energy intensity" is discussed and represents the quantity of energy consumed, measured in kilowatt hours, divided by the volume of water, measured in acre-feet over a one-year period. The total energy intensity associated with CDA's water management processes was estimated during FY 2019-20.

In this Chapter, CDA will identify and describe its source of water supply. In addition, CDA will describe the following:

- Management of the water supply source;
- Current provisions of a basin adjudication or Groundwater Sustainability Plan (GSP), as applicable, pertaining to management of groundwater supplies;
- Measures CDA is taking to develop potential new sources of water supply (as applicable); and
- Opportunities for exchanges and transfers on a long- or short-term basis.

The characterization of CDA's water supply source will account for the anticipated availability during a normal year, a single dry year, a five consecutive year drought, along with projections through FY 2044-45.

6.1 WATER SUPPLY ANALYSIS OVERVIEW

CWC 10631.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a), providing supporting and related information, including all of the following:

(1) A detailed discussion of anticipated supply availability under a normal water year, single dry year, and droughts lasting at least five years, as well as more frequent and severe periods of drought, as described in the drought risk assessment. For each source of water supply, consider any information pertinent to the reliability analysis conducted pursuant to Section 10635, including changes in supply due to climate change.

(2) When multiple sources of water supply are identified, a description of the management of each supply in correlation with the other identified supplies

CWC 10631.

(h) An urban water supplier that relies upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (f). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (f).

CDA's water supply source consists of groundwater from the southwesterly portion of the Chino Basin which is treated at its treatment facilities. A tabulation of CDA's historical water supply is provided below.

Fiscal Year	System Water Supply Sources (AF)	Total
	Groundwater	
	Chino Basin	
2010-11	29,349	29,349
2011-12	28,381	28,381
2012-13	27,098	27,098
2013-14	29,282	29,282
2014-15	30,022	30,022
2015-16	28,191	28,191
2016-17	28,284	28,284
2017-18	29,918	29,918
2018-19	31,199	31,199
2019-20	35,003	35,003

Source: Data provided by the Chino Basin Desalter Authority

6.1.1 SPECIFIC ANALYSIS APPLICABLE TO ALL WATER SUPPLY SOURCES

The section below provides a discussion of the following information to the extent practical:

- CDA's existing and planned sources of water supply are identified;
- The source of supply is quantified in five-year increments through FY 2044-45;
- The anticipated supply availability under normal, single dry, and five consecutive dry years, and any other water year conditions included in the DRA (see Chapter 7) are described;
- The management of the water supply in correlation with other identified supplies is described; and,
- Information pertinent to the reliability analysis is considered.

CDA has historically relied on groundwater supplies from the Chino Basin to serve its member agencies. The following descriptions summarize CDA's source of supply (detailed descriptions are provided in Section 6.2).

Existing and Planned Sources of Supply

Purchased Imported Water

CDA does not purchase imported water supplies to meet its water demands.

Groundwater

CDA has historically pumped groundwater directly from the Chino Basin as described in Section 6.2.2. In addition, Section 6.2.2 provides a detailed discussion of the existing and planned supply of the groundwater, including a description of the management and reliability of those groundwater supplies. Table 6-8 summarizes the actual groundwater supplies for FY 2019-20. In addition, Table 6-9 summarizes the projected water supply, in five-year increments, through FY 2044-45 under varying water supply conditions.

Surface Water

CDA does not use surface water supplies to meet its water demands.

Storm Water

CDA has historically treated groundwater from the Chino Basin. Management and use of the stormwater runoff from the groundwater basin watershed, which is crucial to groundwater management, is described in Section 6.2.4. However, CDA currently does not have its own program to beneficially use stormwater runoff as a direct source of supply.

Wastewater and Recycled Water

CDA does not use wastewater and recycled water supplies to meet its water demands.

6.1.2 OTHER CHARACTERIZATION CONSIDERATIONS

A description of CDA's water system along with a map of the area which receives water supplies from CDA is included in Chapter 3. In addition, the agencies which manage the water supplies treated by CDA are identified in Section 6.2.1 (imported water), 6.2.2 (groundwater), 6.2.3 (surface water), 6.2.4 (stormwater), and 6.2.5 (recycled water).

6.1.3 OPTIONAL PLANNING TOOL

As discussed in Section 4.2.5, DWR has created an optional "Planning Tool Worksheet" for water suppliers to review and assess monthly water use trends. However, DWR has deemed the tool as optional and CDA is not required by DWR to use the tool. However, Section 6.1 provides a

tabulation of CDA's historical annual water use. During the past 10 years, CDA's member agencies experienced a five consecutive year drought from FY 2011-12 to FY 2015-16.

6.2 NARRATIVE SECTIONS FOR SUPPLIER'S UWMP WATER SUPPLY CHARACTERIZATION

6.2.1 PURCHASED OR IMPORTED WATER

CDA does not use purchased or imported water supplies to meet its water demands.

6.2.2 GROUNDWATER

CWC 10631.

(b)(4) If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information:

(A) The current version of any groundwater sustainability plan or alternative adopted pursuant to Part 2.74 (commencing with Section 10720), any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management for basins underlying the urban water supplier's service area.

(B) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For basins that a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For a basin that has not been adjudicated, information as to whether the department has identified the basin as a high- or medium-priority basin in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to coordinate with groundwater sustainability agencies or groundwater management agencies listed in subdivision (c) of Section 10723 to maintain or achieve sustainable groundwater conditions in accordance with a groundwater sustainability plan or alternative adopted pursuant to Part 2.74 (commencing with Section 10720).

(C) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(D) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

CHINO BASIN

Chino Basin - Sustainable Groundwater Management Act

The Chino Basin is a sub-basin of the Upper Santa Ana Valley Groundwater Basin pursuant to DWR Bulletin 118, Basin Number 8-2.01. Pursuant to the Sustainable Groundwater Management Act of 2014 (SGMA), the Chino Basin was named as an adjudicated groundwater basin and is exempt from the requirements of developing a GSP and subsequently was designated a very-low-priority basin in DWR's 2019 SGMA Basin Prioritization report. In compliance with SGMA, the Chino Basin Watermaster submits its Annual Report to DWR.

Chino Basin - Adjudication

The Chino Basin was adjudicated under the Chino Basin Judgment, entered on January 27, 1978 by the Superior Court for the County of San Bernardino. A copy of the Chino Basin Judgment is provided in Appendix D. The provisions of the Judgment are administered and managed by the court-ordered Chino Basin Watermaster.

The Chino Basin Judgment originally established a Safe Yield for the Chino Basin of 140,000 AFY. Pursuant to the most recent Safe Yield reset effective in 2020, the Safe Yield in the Chino Basin is currently 131,000 AFY (July 1 to June 30). The Safe Yield is recalculated every 10 years and is defined in the Chino Basin Judgment as "the long-term average annual quantity of ground water (excluding replenishment of stored water but including return flow to the Basin from use of replenishment or stored water) which can be produced from the Chino Basin under conditions of a particular year without causing an undesirable result". The Chino Basin Judgment's allocation of the Safe Yield includes three separate Pools: (1) the "Overlying Agricultural Pool"; (2) the "Overlying Non-Agricultural Pool"; and (3) the "Appropriative Pool".

Appropriators who are Parties to the Chino Basin Judgment, are authorized to produce groundwater in excess of their rights. Appropriators pay assessments for such production to the Chino Basin Watermaster. The assessments are used to replenish the Chino Basin through replenishment of imported surface water. The Chino Basin Watermaster purchases water from Metropolitan Water District of Southern California through Inland Empire Utilities Agency and Three Valleys Municipal Water District, on behalf of the Parties, to replenish the Chino Basin. Occasionally, Watermaster has purchased water from storage accounts from Parties within the Chino Basin.

The Chino Basin Watermaster can reallocate the unused portion of the Chino Basin Safe Yield from the Overlying Agricultural Pool to the Appropriative Pool members as a supplement to the Appropriative Pool share of Operating Safe Yield rights in any year. These transfers are permanent if agricultural land has been converted to non-agricultural use, or temporary if agricultural pool

extractions are less than their share of the Safe Yield. From FY 2000-01 to FY 2019-20, the annual quantity of the Agricultural Pool share available for reallocation to Appropriative Pool members[2] ranged from 40,822 AF to 61,014 AF, with an annual average of approximately 50,457 AF. As Agricultural Pool production declines within the Chino Basin, the reallocation of water to the Appropriative Pool will increase.

Chino Basin - Description

The Chino Basin is located within the Upper Santa Ana Valley, which is located in San Bernardino County and is bounded on the east by the Rialto-Colton fault; on the southeast by the contact with impermeable rocks forming the Jurupa Mountains; on the south by impermeable rocks of the Puente Hills and by the Chino fault; on the northwest by the San Jose fault; and on the north by the impermeable rocks of the San Gabriel Mountains and by the Cucamonga fault. The location of the Chino Basin is provided in Figure 4. The surface area of the Chino Basin is approximately 154,000 acres (or 240 square miles). The San Antonio Creek and Cucamonga Creek drain the Chino Basin area southward and flow into the Santa Ana River. Pursuant to DWR Bulletin 118 (for Basin Number 8-2.01), the total storage capacity of the Chino Basin is approximately 18,300,000 AF.

The water-bearing units in the Chino Basin includes Holocene and Upper Pleistocene alluvium. This Holocene alluvium consists mainly of alluvial-fan deposits, with maximum thickness of 150 feet that are coarsest in and near the mouths of the canyons and are finer away from canyon mouths in the southern part of the Chino Basin. The Pleistocene alluvium is exposed mainly in the northern part of the subbasin and supplies most of the water to wells located within the Chino Basin. The Pleistocene alluvium is about 600 to 700 feet thick throughout most of the Chino Basin. The alluvium contains interfingering finer, alluvial-fan deposits and coarser, fluvial deposits.

The Chino Basin is bounded by three major fault systems. Many of the faults within the Chino Basin form groundwater barriers marked by discontinuities in groundwater elevations. The Rialto-Colton fault forms the eastern boundary of the Chino Basin. Although it has no surface expression, it forms a major barrier to groundwater movement. The San Jose fault forms the northwest boundary of the Chino Basin. The Cucamonga
fault zone forms part of the northern boundary of the Chino Basin. Displacement on the Cucamonga fault amounts to about 1,000 feet on its west end to 4,000 feet at its east end.

2 Pursuant to the Chino Basin Watermaster "*Fiscal Year 2019-20, 43rd Annual Report*", Appendix G

Chino Basin - Management

Basin Production

Over the past 20 years, total groundwater production from the Chino Basin has ranged from approximately 133,275 AFY to 188,910 AFY[3]. A majority of production currently is pumped for municipal and agricultural purposes and the remaining production is pumped by non-agricultural Parties.

Groundwater Level Monitoring

Groundwater elevation contours in the Chino Basin Watermaster's 2018 State of the Basin Report show a regional depression of groundwater surrounding the Chino-II Desalter well field and the eastern half of the Chino-I Desalter well field. Hydraulic Control of the Chino Basin is achieved east of Chino Desalter Well I-20. The contours also indicate groundwater flowing past the desalter wells west of Chino Desalter Well I-20, indicating only partial Hydraulic Control.

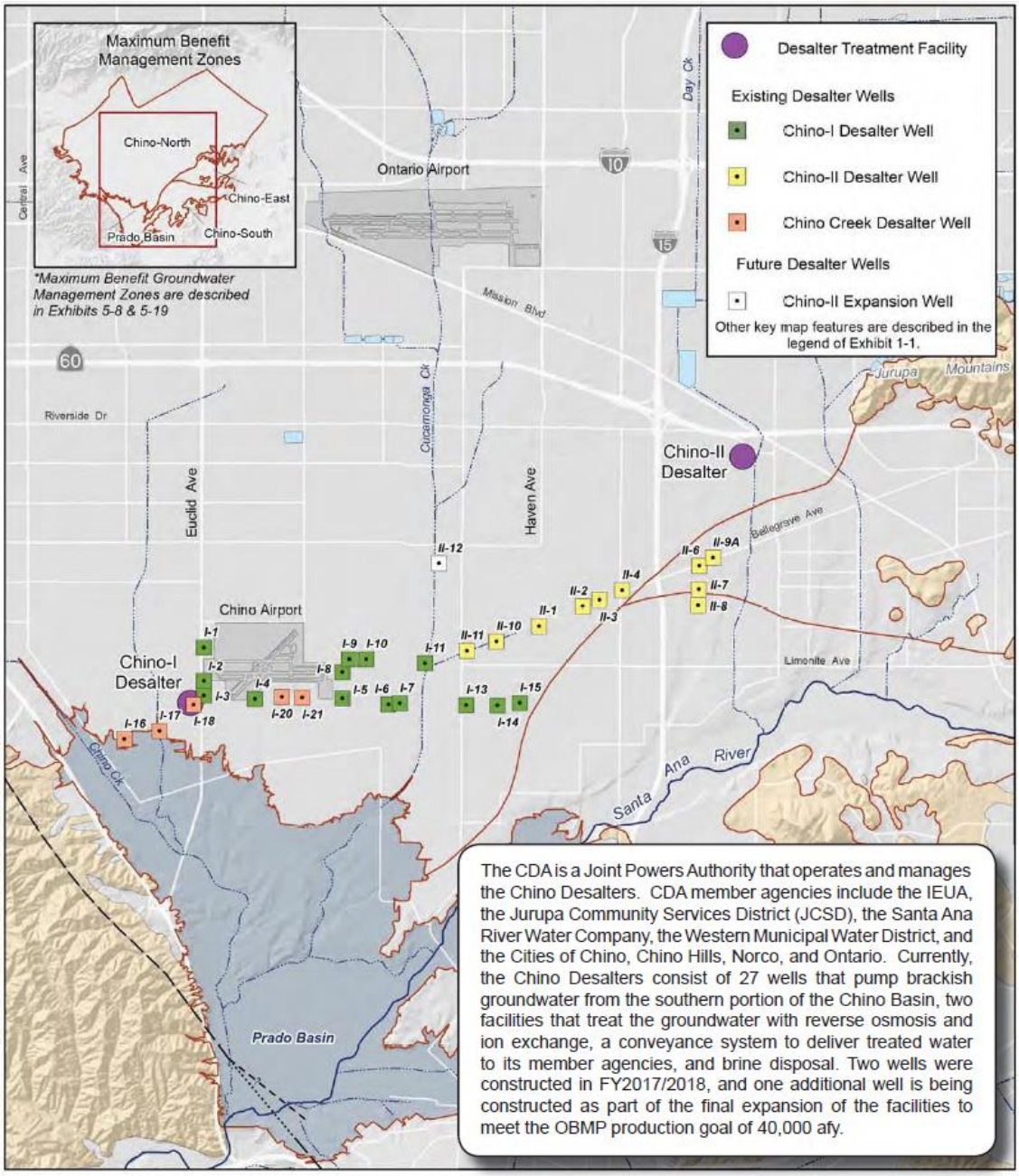
Chino Basin Desalter Authority

On September 25, 2001, CDA was formed under a Joint Exercise of Powers Agreement to remove salts from brackish groundwater extracted from the lower Chino Basin. The area which receives water supplies from CDA is 304 square miles. A map showing CDA Desalter facilities and associated wells is provided below.

CDA removes salts from brackish groundwater extracted from the lower Chino Basin through the Chino I and II Desalter facilities. The Chino I Desalter is located in the City of Chino and commenced operation in 2001 and was expanded in 2005 to have a total capacity of 14.2 MGD. The Chino I Desalter includes reverse osmosis, ion exchange, and air stripper treatment for treating brackish water and removing nitrate and volatile organic chemicals (VOCs). The Chino II Desalter is located in Jurupa Valley and began operation in 2006 and was expanded in 2011 and again in 2017 to have a total capacity of 33 MGD. The Chino II Desalter includes reverse osmosis and ion exchange treatment for treating brackish water and removing nitrate. Following the expansion, CDA constructed the Concentrate Reduction Facility in 2017, which utilizes chemical softening to remove the limiting foulants (specifically, calcium and silica) from the reverse osmosis concentrate. Additional components of the Chino II Desalter were constructed as part of the South Archibald Plume Project which will be operational in 2021, with the goal of removing and treated trichloroethylene (TCE) from groundwater wells impacted by the South Archibald Plume.

3 Pursuant to the Chino Basin Watermaster "*Fiscal Year 2019-20, 43rd Annual Report*", Appendix H http://www.cbwm.org/rep_annual.htm

Location of CDA Facilities



(source: Chino Basin Optimum Basin Management Program 2018 State of the Basin Report)

Treated water is distributed to CDA's member agencies which include the City of Chino, City of Chino Hills, City of Norco, City of Ontario, Inland Empire Utilities Agency, Jurupa Community

Services District, Santa Ana River Water Company, and Western Municipal Water District. The CDA's member agencies provide water service within Riverside County and San Bernardino County. The member agencies have contract entitlements to receive a total of 35,200 AFY of treated water from CDA.

A portion of the production is in-lieu of those CDA member agencies producing an equal amount of groundwater from their own groundwater wells using their individual water rights. An additional portion of the production is temporarily assigned as "controlled overdraft". Pursuant to the Chino Basin Judgment, a total of 200,000 AF was authorized for controlled overdraft between the period of 1978 through 2017. In 2007, the Peace II Agreement was adopted to establish measures for achieving hydraulic control of the Chino Basin. One of the measures put forth included increasing the authorized controlled overdraft to 600,000 AF. This increase in controlled overdraft is separate from, and in addition to, the 200,000 AF authorized in the Chino Basin Judgment and is available for utilization until December 31, 2030. For the balance of the production, the Chino Basin Watermaster levies an annual Replenishment Assessment to purchase replenishment water to replace that overproduced water. The untreated imported water demands are shared proportionally amongst CDA's member agencies.

Chino Basin Optimum Basin Management Program

In 2000, the Chino Basin Watermaster developed the Chino Basin Optimum Basin Management Program (OBMP). The OBMP was developed in a collaborative process that identified the needs of the stakeholders, described the physical state of the basin, defined a set of management goals, identified impediments to these goals, and established a series of actions that would remove these impediments and achieve the management goals. The goals identified in the 2000 OBMP included: (1) Enhance Basin Water Supplied; (2) Protect and Enhance Water Quality; (3) Enhance Management of the Basin; and (4) Equitably Finance the OBMP.

In September 2018, the Chino Basin Watermaster initiated the process to update the OBMP and its Implementation Plan. Throughout 2019, the Chino Basin Watermaster held a series of public listening sessions to support the development process of the 2020 OBMP Update. The purpose of the listening sessions was to confirm the need to update the OBMP, to identify the issues, needs, and wants of the stakeholders, to define the goals for the 2020 OBMP Update, and to identify new and revised actions that could be included in to 2020 OBMP Update to remove the impediments to achieving the 2020 OBMP Update goals. After an assessment of the basin, the stakeholders concluded that the four (4) goals defined in the 2000 OBMP are unchanged and still relevant for the 2020 OBMP Update.

In 2019, the stakeholders identified and described 12 management activities that, if implemented, would address their issues, needs, and wants. The 12 management activities addressed 55 of the 57 needs identified by the stakeholders. Nine of the activities (A, B, C, D, E, F, G, K, and L) were combined into seven basin management activities and the remaining three activities (H, I, and J)

were identified as actions that can be accomplished by incorporating them into the scope of work of every activity or were more appropriate for inclusion within an implementation agreement. The seven basin management activities selected to help achieve the goals of the 2020 OBMP Update are:

- *Activity A – Increase the capacity to store and recharge storm and supplemental water*
- *Activity B – Develop, implement, and optimize Storage and Recovery Programs*
- *Activity C and G – Identify and implement regional conveyance and treatment projects/ programs and optimize the use of all water supply sources*
- *Activity D – Maximize the reuse of recycled water produced by the IEUA and others*
- *Activity E and F – Develop and implement a groundwater-quality management plan to address contaminants of emerging concern*
- *Activity K – Develop a management strategy within the maximum-benefit salt and nutrient management plan to ensure compliance with recycled water recharge dilution requirements*
- *Activity L – Perform the appropriate amount of monitoring and reporting required to fulfill basin management and regulatory requirements*

Each activity is a management process to optimize some aspect of basin management. The actions defined by the stakeholders to remove the impediments to the four OBMP goals were grouped into Program Elements, each of which included a list of implementation actions and an implementation schedule. The nine Program Elements defined in the 2000 OBMP were retained for the 2020 OBMP Update. Each of the seven activities, and the associated implementation actions, were incorporated into Program Elements, which were updated based on feedback from the stakeholders. The Program Elements defined in the 2020 OBMP Update include:

- Program Element 1 - Develop and Implement Comprehensive Monitoring Program
- Program Element 2 - Develop and Implement Comprehensive Recharge Program
- Program Element 3 - Develop and Implement a Water Supply Plan for Impaired Areas
- Program Element 4 - Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1
- Program Element 5 - Develop and Implement Regional Supplemental Water Program
- Program Element 6 - Develop and Implement Cooperative Programs with the Regional Board and Other Agencies to Improve Basin
- Program Element 7 - Develop and Implement Salt Management Plan
- Program Element 8 - Develop and Implement Groundwater Storage Management Program
- Program Element 9 - Develop and Implement Storage and Recovery Programs

Chino Basin Storage Management Plan

The Chino Basin Storage Management Plan was created to mitigate adverse impacts to the Chino Basin from factors including reductions in net recharge and Safe Yield, and increased groundwater discharge to the Santa Ana River contributing to the loss of Hydraulic Control. The Chino Basin Storage Management Plan identifies technical storage management issues within the Chino Basin, establishes storage management activities for producers, and outlines key measures for the Storage and Recovery Programs.

Since the Chino Basin Judgment came into effect in 1978, the Chino Basin Watermaster developed rules and regulations, standard storage agreements, and related forms. Since 2000, Chino Basin Watermaster administered groundwater storage in the Chino Basin pursuant to the storage management plan described in Program 8 of the 2000 OBMP and evaluated in the Programmatic Environmental Impact Report. Since then, Parties have indicated that they will likely exceed the storage space initially estimated in the OBMP Implementation Plan. Thus, Chino Basin Watermaster found it necessary to develop a new storage management plan.

The three types of storage agreements that result in five types of storage accounts: Excess Carryover, Local Supplemental-Recycled, Local Supplemental-Imported, Pre-2000 Quantified Supplemental, and Storage and Recovery. An Excess Carryover account includes a Party's unproduced rights in the Safe Yield and Basin Water purchased or transferred from other Parties. A Local Supplemental Water account includes any imported and/or recycled water that is recharged by a producer and similar water acquired from other Parties. A Storage and Recovery Account includes Supplemental Water and is intended to produce a broad and mutual benefit to the Parties of the Judgement." The Chino Basin Watermaster tracks the puts, takes, losses, and end-of-year storage totals for all storage accounts and reports on this accounting on an annual basis. The Chino Basin Watermaster assesses losses by considering water in managed storage (excluding Carryover) and offsets the increases in groundwater discharge to the Santa Ana River and from the Chino Basin attributable to managed storage (excluding Carryover). Chino Basin Watermaster also considers losses due to evaporation on the puts when water is recharged in spreading basins.

The individual Parties are involved in water transfers of annual unproduced rights in the Safe Yield and water in their storage accounts. Chino Basin Watermaster has an application and review process for these transfers. The Parties engage in conjunctive-use activities individually by storing Chino Basin and Supplemental Water that are in excess of their demands and recover that water as necessary. These activities collectively cause a temporary increase in the managed storage. The Parties' aggregate amount of water in managed storage was 541,845 AF as of June 30, 2020.

The Metropolitan Water District's Dry-Year Yield Program (DYYP) is an active storage and Recovery Program in Chino Basin. The DYYP can store up to 100,000 AF with maximum replenishment of 25,000 AFY and maximum extraction of 33,000 AFY. As of June 30, 2020, there was 45,961 AF within the DYYP account, resulting in a total managed storage volume of 587,806 AF (541,845 AF + 45,961 AF). The agreement that authorized the DYYP will expire in

2028. The combined volume of managed storage by Metropolitan's DYYP and the Parties is projected to have a maximum of 790,000 AF in 2028, assuming DYYP has 100,000 AF in storage and that MWD removes the contract rate of 33,000 AFY starting in 2029.

Of the first 1,000,000 AF of managed storage, 800,000 AF is reserved for the Parties' conjunctive-use activities (including Carryover, Excess Carryover, and Supplemental Accounts) and MWD's DYYP. This 800,000 AF is referred to as the "First Managed Storage Band". The managed storage between 800,000 AF and 1,000,000 AF is reserved for Storage and Recovery Programs. Allocation of storage space reservations may be revised in subsequent updates of the Storage Management Plan. Use of managed storage greater than 1,000,000 AF is allowed if the storing entity submits a Storage and Recovery Program application, demonstrates that the program will have broad mutual benefits, ensure there will be no adverse impacts, meets mitigation requirements of the Chino Basin Watermaster, complies with the California Environmental Quality Act (CEQA), and obtains approval from the Chino Basin Watermaster.

The Parties and IEUA, through the OBMP, have substantially increased the amount of storm and supplemental water recharge capacity in the Chino Basin. The increase in supplemental water recharge capacity was done to ensure that the Chino Basin Watermaster is able to meet replenishment requirements pursuant to Regional Board and Court orders. The Chino Basin Watermaster indicates that it will prioritize the use spreading basins to satisfy replenishment obligations over the use of spreading basins for other uses.

Storage and Recovery programs are applied in Management Zone 2 and Management Zone 3 to avoid new land subsidence and interfering with land subsidence management in Management Zone 1, to minimize the impact of storage and recovery operations on solvent plumes, to retain hydraulic control, and to utilize the larger groundwater storage capacity of Management Zone 2 and Management Zone 3. The Chino Basin Watermaster reviews each Storage and Recovery Program application, estimates the surface and groundwater level response, prepares a report that describes potential adverse impacts, and develops mitigation requirements.

Chino Basin Watermaster will periodically and review the Storage Management Plan on no less than a five-year frequency, when the Safe Yield is recalculated, or when the Chino Basin Watermaster determines an update is warranted based on new information or needs of the Parties or the Chino Basin.

The Storage Management Plan was prepared in parallel with the 2020 OBMP Update. Chino Basin Watermaster published the final Storage Management Plan report and it was incorporated into Program Elements 8 and 9 (Storage and Recovery Programs) of the OBMP update process and was approved in June 2020.

Chino Basin Subsidence Management Plan

The Chino Basin Subsidence Management Plan was developed in 2015 and its purpose was to: minimize subsidence and fissuring; collect information necessary to understand the extent, rate, and mechanisms of subsidence and fissuring; and establish a management plan to reduce tolerable levels or abate future subsidence and fissuring.
From 2001 to 2005, Chino Basin Watermaster developed, coordinated, and conducted the MZ-1 Interim Monitoring Program and the main conclusions derived were:

1. Groundwater production from the deep, confined aquifer system in the southwestern region of MZ-1 causes the greatest stress to the aquifer system.
2. Groundwater-level decline due to pumping of the deep aquifer can cause irreversible compaction of the aquifer-system sediments, resulting in land subsidence.
3. The state of aquifer-system deformation in southern MZ-1 (in the vicinity of Ayala Park) was essentially elastic. Very little non-recoverable compaction was occurring in MZ-1, which contrasted historical measurements when about 2.2 feet of land subsidence occurred from about 1987 to 1995 and was accompanied by ground fissuring.
4. During this study, a previously undetected barrier to groundwater flow, the "Riley Barrier," was identified. The Riley Barrier is located within the deep aquifer system and aligned with the historical zone of ground fissuring. Pumping from the deep aquifer system was limited to the area west of the barrier, and the resulting groundwater-level decline did not propagate eastward across the barrier.
5. InSAR and ground-level survey data indicated that subsidence had occurred in the central region of MZ-1 in the past and was continuing to occur. The InSAR data also suggested that the groundwater barrier extends northward into central MZ-1.

The Chino Basin Watermaster currently conducts the monitoring program as described below:

- Production - Production data will be collected from the owners of wells.
- Recharge - The volumes of imported, storm, and recycled waters that are artificially recharged at basins in the Area, and of recycled water that is used for direct use will be collected from IEUA for each fiscal year.
- Piezometric Levels - Piezometric levels will be measured and recorded once every 15 minutes using pressure transducers at select wells. The wells used in the monitoring program will be periodically assessed, and transducers in wells will be removed or added as deemed necessary by the Ground-Level Monitoring Committee.
- Vertical Aquifer-System Deformation - Watermaster will measure and record the vertical component of aquifer-system deformation at the Ayala Park Extensometer (MZ-1 Managed Area) and the Chino Creek Extensometer (Southeast Area) once every 15 minutes.

- Vertical Ground-Surface Deformation - Watermaster will measure vertical ground motion via traditional leveling surveys and remote sensing techniques (InSAR). The Ground-Level Monitoring Committee will annually recommend the scope and frequency of leveling surveys and InSAR measurements within the Area.
- Horizontal Ground-Surface Deformation - Watermaster will measure horizontal ground motion across areas that are susceptible to ground fissuring in the MZ-1 Managed Area and Northwest MZ-1 Area via EDMs.

At the beginning of each calendar year, Chino Basin Watermaster staff and engineers will analyze the data generated during the prior calendar year. Results and interpretations generated from the analysis will be documented in an annual report and is used to prepare recommendations for future planning.

Groundwater Clean-up

Groundwater in areas of the Chino Basin is currently contaminated with Perchlorate and VOCs, including 1,2,3-Tricholropropane (1,2,3-TCP), trichloroethylene (TCE), and perchloroethylene (PCE). In addition, nitrates and TDS concentrations in areas of the Chino Basin exceed drinking water quality standards. Wellhead treatment is necessary in these areas to allow delivery of the groundwater for potable purposes.

Chino Basin - Historical and Projected Basin Production

CDA can produce approximately 40,000 AF from the Chino Basin every year for the purpose of groundwater cleanup and control of contaminant migration. This production is fixed to achieve the desired groundwater cleanup goal. CDA's member agencies have contract entitlements to receive a total 35,200 AFY of treated water from CDA. CDA's treatment process also results in waste process water (i.e. brine) which is discharged to the Inland Empire Brine Line and conveyed to the Orange County Sanitation District for treatment and disposal to the Pacific Ocean. Over the past five years, CDA has produced 28,191 AFY to 35,003 AFY, with an average of 30,519 AFY from the Chino Basin.

Table 6-1 Groundwater Volume Pumped

Submittal Table 6-1 Wholesale: Groundwater Volume Pumped						
☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
☑	All or part of the groundwater described below is desalinated.					
Groundwater Type	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
Add additional rows as needed						
Alluvial Basin	Chino Basin	28,191	28,284	29,918	31,199	35,003
	TOTAL	28,191	28,284	29,918	31,199	35,003
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES:						

6.2.3 SURFACE WATER

CDA does not use surface water supplies to meet its water demands.

6.2.4 STORMWATER

CDA does not use stormwater to meet its water demands.

6.2.5 WASTEWATER AND RECYCLED WATER

CWC 10633.

The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands,

industrial reuse, potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

As a wholesale water supplier, CDA provides treated groundwater to its member agencies which in turn provides water to their retail customers. Wholesale suppliers are not required to summarize wastewater generation or treatment within their service area. CDA does not provide supplemental treatment to recycled water prior to distribution.

CDA does not have a service area, but rather provides potable water supplies within the service areas of its member agencies. Recycled water is not used by CDA and there are no plans for use within the planning horizon of this UWMP.

6.2.5.1 RECYCLED WATER COORDINATION

CWC 10633.

The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area…

CDA does not have a service area, but rather provides potable water supplies within the service areas of its member agencies. Recycled water is not used by CDA and there are no plans for use within the planning horizon of this UWMP. This section is not applicable to CDA.

6.2.5.2 WASTEWATER COLLECTION, TREATMENT, AND DISPOSAL

CWC 10633.

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

CDA does not have a service area, but rather provides potable water supplies within the service areas of its member agencies. Recycled water is not used by CDA and there are no plans for use within the planning horizon of this UWMP. This section is not applicable to CDA.

Table 6-2 Wastewater Collected Within Area in 2020 (Not Applicable)

Table 6-2 is not applicable for wholesalers.

Table 6-3 Wastewater Treatment and Discharge within Service Area in 2020

Submittal Table 6-3 Wholesale: Wastewater Treatment and Discharge Within Service Area in 2020											
☑	Wholesale Supplier neither distributes nor provides supplemental treatment to recycled water. The Supplier will not complete the table below.										
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)* [2]	Method of Disposal *Drop down list*	Does This Plant Treat Wastewater Generated Outside the Service Area? *Drop down list*	Treatment Level *Drop down list*	2020 volumes [1] Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
Add additional rows as needed											
						Total	0	0	0	0	0

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.
[2] If the **Wastewater Discharge ID Number** is not available to the UWMP preparer, access the SWRCB CIWQS regulated facility website at https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility

NOTES:

6.2.5.3 RECYCLED WATER SYSTEM DESCRIPTION

CWC 10633.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

CDA does not have a service area, but rather provides potable water supplies within the service areas of its member agencies. Recycled water is not used by CDA and there are no plans for use within the planning horizon of this UWMP. This section is not applicable to CDA.

6.2.5.4 POTENTIAL, CURRENT, AND PROJECTED RECYCLED WATER USES

CWC 10633.

(b) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use. A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

CDA does not have a service area, but rather provides potable water supplies within the service areas of its member agencies. Recycled water is not used by CDA and there are no plans for use within the planning horizon of this UWMP. This section is not applicable to CDA.

Table 6-4 Current and Projected Recycled Water Direct Beneficial Uses Within Service Area

Submittal Table 6-4 Wholesale: Current and Projected Retailers Provided Recycled Water Within Service Area							
☑	Recycled water is not directly treated or distributed by the Supplier. The Supplier will not complete the table below.						
Name of Receiving Supplier or Direct Use by Wholesaler	Level of Treatment *Drop down list*	2020*	2025*	2030*	2035*	2040*	2045* *(opt)*
Add additional rows as needed							
	Total	0	0	0	0	0	0
*** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.							
NOTES:							

Table 6-5 2015 Recycled Water Use Projection Compared to 2020 Actual

Submittal Table 6-5 Wholesale: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual		
☑	Recycled water was not used or distributed by the supplier in 2015, nor projected for use or distribution in 2020. The wholesale supplier will not complete the table below.	
Name of Receiving Supplier or Direct Use by Wholesaler	2015 Projection for 2020*	2020 Actual Use*
Add additional rows as needed		
Total	0	0
Units of measure (AF, CCF, MG) *must remain consistent throughout the UWMP as reported in Table 2-3.*		
NOTES:		

6.2.5.5 ACTIONS TO ENCOURAGE AND OPTIMIZE FUTURE RECYCLED WATER USE

CWC 10633.

The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

CDA does not have a service area, but rather provides potable water supplies within the service areas of its member agencies. Recycled water is not used by CDA and there are no plans for use within the planning horizon of this UWMP. This section is not applicable to CDA.

Table 6-6 Methods to Expand Future Recycled Water Use (Not Applicable)
Table 6-6 is not applicable for wholesalers.

6.2.6 DESALINATED WATER OPPORTUNITIES

CWC 10631.

(g) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

Chino Basin

As discussed in Section 6.2.2, CDA removes salts from brackish groundwater extracted from the lower Chino Basin through the Chino I and II Desalter facilities. The Chino I Desalter is located in the City of Chino and commenced operation in 2001 and was expanded in 2005 to have a total capacity of 14.2 MGD. The Chino I Desalter includes reverse osmosis, ion exchange, and air stripper treatment for treating brackish water and removing nitrate and VOCs. The Chino II Desalter is located in Jurupa Valley and began operation in 2006 and was expanded in 2011, and again in 2017 to have a total capacity of 33 MGD. The Chino II Desalter includes reverse osmosis and ion exchange treatment for treating brackish water and removing nitrate. Following the expansion, CDA constructed the Concentrate Reduction Facility in 2017, which utilizes chemical softening to remove the limiting foulants (specifically, calcium and silica) from the reverse osmosis concentrate. Additional components of the Chino II Desalter were constructed as part of

the South Archibald Plume Project which will be operational in 2021, with the goal of removing and treated TCE from groundwater wells impacted by the South Archibald Plume. Information regarding the Chino I and II Desalter facilities is provided in Table 6-8ds.

OPTIONAL Table 6-8ds: Source Water Desalination

☐	Neither groundwater nor surface water are reduced in salinity prior to distribution.									
Plant Name or Well ID	Plant Capacity	Intake Type *Drop down list*	Source Water Type *Drop down list*	Influent TDS	Brine Discharge *Drop down list*	Volume of Water Desalinated				
						2016	2017	2018	2019	2020
Chino I Desalter	14.2 MGD	vertical well	groundwater	1,330 mg/L	Brine Line	28191	28284	29918	31199	35003
Chino II Desalter	33 MGD	vertical well	groundwater	640 mg/L	Brine Line	0	0	0	0	0
					Total	28191	28284	29918	31199	35003

**Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

Notes: "Brine Discharge" is to the Santa Ana River Interceptor. "Volume of Water Desalinated" for Chino 1 Desalter is based on the combined volume for both the Chino I and Chino II Desalters

Treated water is distributed to CDA's member agencies which include the City of Chino, City of Chino Hills, City of Norco, City of Ontario, Inland Empire Utilities Agency, Jurupa Community Services District, Santa Ana River Water Company, and Western Municipal Water District. The member agencies have contract entitlements to receive a total of 35,200 AFY of treated water from CDA. A portion of the production is in-lieu of those CDA member agencies producing an equal amount of groundwater from their own groundwater wells from the Chino Basin using their individual water rights.

6.2.7 WATER EXCHANGES AND TRANSFERS

CWC 10631.

(c) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

6.2.7.1 EXCHANGES

Pursuant to DWR's 2020 Final Guidebook, "*Water exchanges are typically water delivered by one water user to another water user, with the receiving water user providing water in return at a specified time or when the conditions of the parties' agreement are met. Water exchanges can be strictly a return of water on a basis agreed upon by the participants or it can include payment and the return of water.*"

CDA does not have any current or planned water exchange opportunities. CDA's purpose is to produce treated groundwater for its member agencies. However, CDA's member agencies participate in MWD's Dry-Year Yield Program. The DYYP is a groundwater storage and recovery program where supplemental water is stored in the Chino Basin during surplus years and could be recovered in-lieu of imported water from MWD through IEUA. The DYYP allows maximum use of imported water supplies available during wet years and stored groundwater in the Chino Basin during dry years. The DYYP can store up to 100,000 AF with maximum replenishment of 25,000 AFY and maximum extraction of 33,000 AFY. During FY 2019-20, there was 45,961 AF within the DYYP account. The agreement that authorized the DYYP will expire in 2028.

6.2.7.2 TRANSFERS

Pursuant to DWR's 2020 Final Guidebook, "*The Water Code defines a water transfer as a temporary or long-term change in the point of diversion, place of use, or purpose of use due to a transfer, sale, lease, or exchange of water or water rights.*"

Transfers are not generally available to CDA from a supplier because CDA's purpose is to produce treated groundwater for its member agencies. However, CDA's member agencies are able to make transfers between each other pursuant to the Optimum Basin Management Plan and the Peace Agreement which provide for interagency transfer of water rights.

6.2.7.3 EMERGENCY INTERTIES

Emergency interconnections are distribution system interconnections between water agencies for use during critical situations where one system or the other is temporarily unable to provide sufficient potable water to meet its water demands and/or fire protection needs. An emergency interconnection will allow a water system to continue serving water during critical situations such as local water supply shortages as a result of earthquakes, fires, prolonged power outages, and droughts.

Emergency interconnections are not available to CDA because CDA is a wholesale water agency that provides treated groundwater supplies to its member agencies. However, CDA has multiple connections with several of its member agencies to provide these agencies with water supplies during emergency situations.

6.2.8 FUTURE WATER PROJECTS

CWC 10631.

(f) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use, as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in normal and single-dry water years and for a period of drought lasting five consecutive water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

The water supply potential of the Chino Basin has been limited over the years due to multiple contamination threats from historical agricultural and industrial operations, leading to basin-wide concerns with total dissolved solids and nitrate, as well as localized plumes of multiple constituents of concern (COCs). CDA is now facing challenges from new COCs stemming from the nearby Chino Airport Plume. In July 2020, CDA proposed Granular Activated Carbon (GAC) treatment to provide groundwater treatment for existing and proposed CDA and County-owned wells. The North GAC Treatment expansion of the Chino I Desalter facility would be designed to accommodate a total flow of 1,255 gallons per minute (GPM). The South GAC Treatment would be designed to treat a total flow of 3,125 GPM. An additional 800 GPM of GAC absorption capacity can be acquired should more wells be added.

Table 6-7 quantifies the increase in CDA's water supply reliability per completion of these projects.

Table 6-7 Expected Future Water Supply Projects or Programs

Submittal Table 6-7 Wholesale: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☐	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
Section 6.2.8	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other suppliers?		Description *(if needed)*	Planned Implementation Year	Planned for Use in Year Type *Drop Down list*	Expected Increase in Water Supply to Supplier*
	Drop Down Menu	*If Yes, Supplier Name*				
Add additional rows as needed						
Chino I Desalter VOC Treatment Facilities Project	*Yes*	San Bernardino County	Install Granular Activated Carbi treatment to to treat existing CDA and proposed County-owned wells	2023	All Year Types	3,000
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Information obtained from CDA's "Chino I Desalter VOC Treatment Facilities Project Final Draft Basis of Design Report (BODR)", dated July 2020						

6.2.9 SUMMARY OF EXISTING AND PLANNED SOURCES OF WATER

CWC 10631.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a), providing supporting and related information, including all of the following…

(b)(2) When multiple sources of water supply are identified, a description of the management of each supply in correlation with the other identified supplies.

(h) An urban water supplier that relies upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (f). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (f).

6.2.9.1 DESCRIPTION OF SUPPLIES

As discussed in Section 6.2, CDA's water supply source consists of groundwater from the Chino Basin (see Section 6.2.2). CDA's member agencies have contract entitlements to receive a total of 35,200 AFY of treated water from CDA. However, additional groundwater must be produced by CDA to account for waste process water which is discharged. The actual quantity of the water supply source produced by CDA during FY 2019-20 is summarized in Table 6-8. The reliable quantity of projected water supply source available to CDA in five-year increments through FY 2044-45 during normal or average years are summarized in Table 6-9. The reliability of this source of supply are addressed in Section 7.2.3, including during normal years, single dry years, and five consecutive year droughts.

6.2.9.2 QUANTIFICATION OF SUPPLIES

The actual quantity of the water supply source produced by CDA during FY 2019-20 are summarized in Table 6-8. The reliable quantity of projected water supply source produced by CDA in five-year increments through FY 2044-45 during average years are summarized in Table 6-9. The reliability of this source of supply are addressed in Section 7.2.3, including during normal years, single dry years, and five consecutive year droughts.

CDA's projected quantities of groundwater supplies from the Chino Basin are based on the requirement to pump and treat contaminated groundwater to control contaminant migration.

Table 6-8 Water Supplies – Actual

Submittal Table 6-8 Wholesale: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2020		
Drop down list May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool		Actual Volume*	Water Quality Drop Down List	Total Right or Safe Yield* (optional)
Add additional rows as needed				
Desalinated Water - Groundwater		35,003	Drinking Water	
	Total	35,003		0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES:				

Table 6-9 Water Supplies – Projected

Submittal Table 6-9 Wholesale: Water Supplies — Projected											
Water Supply	Additional Detail on Water Supply	Projected Water Supply* Report To the Extent Practicable									
		2025		2030		2035		2040		2045 (opt)	
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Add additional rows as needed											
Desalinated Water - Groundwater		40,000		40,000		40,000		40,000		40,000	
Total		40,000	0	40,000	0	40,000	0	40,000	0	40,000	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*											
NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2.											

6.2.10 SPECIAL CONDITIONS

6.2.10.1 CLIMATE CHANGE EFFECTS

CDA removes salts from brackish groundwater extracted from the lower Chino Basin with the Chino I and II Desalter facilities. The Chino I Desalter commenced operation in 2001 and was

expanded in 2005. The Chino II Desalter became operational in 2006 and was expanded in 2011 and again in 2017. These systems include 30 groundwater extraction wells, pumps, and pipelines that produce and convey untreated groundwater to treatment facilities. CDA produces approximately 40,000 AF from the Chino Basin every year for the purpose of groundwater cleanup and control of contaminant migration. This production is fixed to achieve the desired groundwater cleanup goal and is not impacted by climate change. Impacts of climate change to CDA's member agencies and their sources of supply are included in their respective UWMPs.

6.2.10.2 REGULATORY CONDITIONS AND PROJECT DEVELOPMENT

CDA has considered the implications of changing regulatory conditions and project development on the availability of planned water supplies.

6.2.10.3 OTHER LOCALLY APPLICABLE CRITERIA

There are no locally applicable criteria which applies to CDA.

6.3 SUBMITTAL TABLES COMPLETION USING THE OPTIONAL PLANNING TOOL

As discussed in Section 4.2.5, DWR has created an optional "Planning Tool Worksheet" for water suppliers to review and assess monthly water use trends. However, DWR has deemed the tool as optional and CDA is not required by DWR to use the tool. However, Section 6.1 provides a tabulation of CDA's historical annual water use. During the past 10 years, CDA's member agencies experienced a five consecutive year drought from FY 2011-12 to FY 2015-16.

6.4 ENERGY USE

CWC 10631.2.

(a) In addition to the requirements of Section 10631, an urban water management plan shall include any of the following information that the urban water supplier can readily obtain:

(1) An estimate of the amount of energy used to extract or divert water supplies.

(2) An estimate of the amount of energy used to convey water supplies to the water treatment plants or distribution systems.

(3) An estimate of the amount of energy used to treat water supplies.

(4) An estimate of the amount of energy used to distribute water supplies through its distribution systems.

(5) An estimate of the amount of energy used for treated water supplies in comparison to the amount used for nontreated water supplies.

(6) An estimate of the amount of energy used to place water into or withdraw from storage.

(7) Any other energy-related information the urban water supplier deems appropriate.

"Energy intensity" is defined as the quantity of energy consumed, measured in kilowatt hours (kWh), divided by the volume of water, measured in AF for a water management process over a one-year period. The information used to calculate the estimated energy intensity associated with CDA's water system is provided below. The energy intensity information is based on readily obtainable energy and water use data for the following water management processes: 1) extraction or diversion of water supplies; 2) placement into storage; 3) conveyance to distribution; 4) treatment; and 5) water system distribution.

CDA has tabulated its energy intensity using readily obtainable energy consumption data obtained from monthly electricity bills from Southern California Edison (SCE) for the whole water system and the corresponding water use data obtained from available water meter readings. CDA has reported the energy intensity associated with the water management processes which occur within its operational control. Because CDA does not track individual energy usage for each water management process identified above, CDA has estimated the energy intensity using the a "total utility approach" (i.e. sum of all water management processes). The total energy consumed was approximately 48,998,850 kWh during FY 2019-20. The total energy consumption reported does not include electricity usage for general administration (e.g. at CDA's headquarters) which is not associated with any water management processes.
The total volume of water entering the potable water system was approximately 35,003 AF during FY 2019-20 and is consistent with the total volume of water provided in Table 4-1.

The total energy intensity associated with CDA's water management processes is estimated at 1,400 kWh/AF. The energy intensity data and calculations based on the "total utility approach" are provided in Table O-1B below.

CDA's water management processes do not include "consequential hydropower generation" where the energy generation is a direct consequence of water delivery (i.e. all water passing through the energy generation devices is delivered to users). CDA's water management processes do not include "non-consequential hydropower generation" where the energy generation is not a direct consequence of water delivery (i.e. energy could be generated even if no water was being delivered to water users). In addition, CDA's water management processes do not include any substantial "self-generated energy sources" including solar, wind, geothermal, biomass, co-generation, and diesel generator sources.

Table O-1B. Recommended Energy Reporting — Total Utility Approach

Urban Water Supplier: *Chino Basin Desalter Authority*

Water Delivery Product (If delivering more than one type of product use Table O-1C)

Wholesale Potable Deliveries

Table O-1B: Recommended Energy Reporting - Total Utility Approach				
Enter Start Date for Reporting Period	7/1/2019	**Urban Water Supplier Operational Control**		
End Date	6/30/2020			
☐ Is upstream embedded in the values reported?		**Sum of All Water Management Processes**	**Non-Consequential Hydropower**	
Water Volume Units Used	*AF*	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process (volume unit)		*35003*	*0*	*35003*
Energy Consumed (kWh)		*48998850*	*0*	*48998850*
Energy Intensity (kWh/volume)		*1399.8*	*0.0*	*1399.8*

Quantity of Self-Generated Renewable Energy

0 kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

Combination of Estimates and Metered Data

Data Quality Narrative:

The total energy consumed was identified based on Southern California Edison (SCE) billing records. The total energy consumption reported does not include electricity usage for general administration (e.g. at CDA's headquarters) which is not associated with any water management processes.

Narrative:

The total energy consumption includes energy associated with operating groundwater production wells and booster pumps to deliver water in the distribution system. Energy consumption is associated with operating groundwater treatment. Energy consumption is also associated with plant lighting and air conditioning, and operating the Supervisory Control and Data Acquisition (SCADA) system and chlorination injection pumps.

Chapter 7

WATER SERVICE RELIABILITY AND DROUGHT RISK ASSESSMENT

LAY DESCRIPTION – CHAPTER 7

WATER SERVICE RELIABILITY AND DROUGHT RISK ASSESSMENT

Chapter 7 (Water Service Reliability and Drought Risk Assessment) of CDA's 2020 Plan discusses and provides the following:

- FY 2019-20 represents an "average" or "normal" water year for CDA in which the total amount of rainfall was similar to the historical average rainfall.
- A "single dry" year for CDA was represented in FY 2017-18, in which the total amount of rainfall was below the historical average rainfall.
- A "five consecutive year drought" period for CDA is represented from FY 2011-12 to FY 2015-16, where the total amount of rainfall during each of these years was less than the historical average rainfall.
- CDA's current and projected water supplies available during normal years in five-year increments over the next 25 years are provided (through Fiscal Year 2044-45) as shown on Table 7-2.
- CDA's current and projected water supplies available during single dry years in five-year increments over the next 25 years are provided (through Fiscal Year 2044-45) as shown on Table 7-3.
- CDA's current and projected water supplies available during each year of a five consecutive year drought in five-year increments over the next 25 years are provided (through Fiscal Year 2044-45) as shown on Table 7-4.
- The reliability of CDA's water supply source, including a review of water supply constraints, is provided. A single dry year or a five consecutive year drought period will not compromise CDA's ability to provide a reliable supply of water to its member agencies.
- A Drought Risk Assessment is provided which includes an assessment of CDA's water supply reliability over a five consecutive year drought period. CDA's DRA assumes a five consecutive year drought from FY 2020-21 through FY 2024-25 and includes a review of water supplies, water uses, and water supply reliability during this period. CDA's water system has experienced a prior five consecutive year drought with no limitation to its water supplies CDA has the ability to enact varying water shortage levels (see Chapter 8) to help educate its customers and provide an economic incentive for the retail customers to reduce their water consumption.

7.1 INTRODUCTION

CDA serves a dual purpose of providing reliable water supply and improving groundwater quality in the Chino Basin. Member agencies are required to purchase a minimum amount of treated water production to support this function. This section of CDA's UWMP describes CDA's ability to meet member agency water demands, including minimum purchase allocations, from its member agencies. This section assesses CDA's water service reliability during average years, single dry years, and during a five consecutive year drought period to meet the water needs of its member agencies' customers. This section also includes the discussion of a DRA which provides a mechanism for CDA to evaluate the risk to its water supply under a drought lasting for the next five consecutive years.

7.2 WATER SERVICE RELIABILITY ASSESSMENT

CWC 10635.

(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the long-term total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and a drought lasting five consecutive water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

Information regarding the reliability of CDA's water supplies is based on the historical precipitation data in the Chino Basin area. Historical annual precipitation in the Chino Basin area is discussed in Section 3.3 and is based on historical data collected from Station 255 (Chino, California). Furthermore, Section 4.5 of this Plan notes that potential future climate change impacts may result in an increase in the average annual precipitation within the area receiving water supplies from CDA, thus indicating use of historical data is a reasonable and conservative approach. As indicated in Section 3.3, the historical average rainfall in the area receiving water supplies from CDA is 10.7 inches. FY 2019-20 represents an average or normal water year for CDA in which the total amount of rainfall was similar to the historical average rainfall. A single dry year for CDA was represented in FY 2017-18, in which the total amount of rainfall was below the historical average rainfall. A five consecutive year drought period for CDA is represented from FY 2011-12 to FY 2015-16, where the total amount of rainfall during each of these years was less than the historical average rainfall. Table 7-1 summarizes these "base years" for average, single dry, and five consecutive year drought and provides the total amount of water supplies available to CDA during those base years. The following discussion assesses the water service reliability of CDA's water supply sources.

Water Service Reliability - Groundwater

Chino Basin

The Chino Basin groundwater supplies are managed by the Chino Basin Watermaster, as discussed in Section 6.2.2. During a normal year (FY 2019-20), CDA pumped 35,003 AF of groundwater supplies to meet the demands from its member agencies with its supplies from the Chino Basin. During a single dry year (FY 2017-18), CDA pumped 29,918 AF of groundwater supplies to meet the demands from its member agencies with its supplies from the Chino Basin. During a five consecutive year drought multiple dry year period (FY 2011-12 to FY 2015-16), CDA pumped between 27,098 AF and 30,022 AF of groundwater supplies to meet the demands from its member agencies with its supplies from the Chino Basin.

Water Service Reliability Summary

Table 7-1 shows the water supplies during the base years (for average year, single dry year, and a five consecutive year drought). As a result of CDA's water supply , water supplies are expected to be sufficient during a five consecutive year drought to meet CDA's water demands from its member agencies.

7.2.1 SERVICE RELIABILITY - CONSTRAINTS ON WATER SOURCES

CWC 10631.

(b)(1) A detailed discussion of anticipated supply availability under a normal water year, single dry year, and droughts lasting at least five years, as well as more frequent and severe periods of drought, as described in the drought risk assessment. For each source of water supply, consider any information pertinent to the reliability analysis conducted pursuant to Section 10635, including changes in supply due to climate change.

CDA's source of supply consists of contaminated groundwater pumped from the Chino Basin which is then treated and provided to its member agencies, as described in Section 6.2. Although this supply is managed, the following constraints may occur which CDA has considered in this reliability analysis.

Chino Basin

CDA produces contaminated groundwater from the Chino Basin which is then treated and provided to its member agencies. The groundwater historically had been impacted by contamination. However, CDA has developed and implemented appropriate treatment (blending and/or treatment facilities) which have been approved by SWRCB-DDW. These groundwater supplies are considered reliable both from a water quality and quantity standpoint.

7.2.2 SERVICE RELIABILITY - YEAR TYPE CHARACTERIZATION

7.2.2.1 TYPES OF YEARS

CDA's base years for an average year, a single dry year, and a five consecutive year drought are discussed in Section 7.2 and are summarized in Table 7-1. As indicated in Chapter 6, CDA's water supplies sources have been sufficient in meeting CDA's historical water demands from its member agencies during an average year, a single dry year, and a five consecutive year drought. An average year was based on a historical year during the past 10 years with a total precipitation similar to the historical average precipitation in the area receiving water supplies from CDA. Because a single dry year or a five consecutive year drought period will not compromise CDA's ability to provide a reliable supply of water to its member agencies, a single dry year in this Plan was selected based on one of the driest years during the past 10 years. The five consecutive year drought period was based on a period of five consecutive dry years during the past 10 years.

As indicated in Section 3.3, the historical average rainfall in the area receiving water supplies from CDA is 10.7 inches. FY 2019-20 represents an average or normal water year for CDA in which the total amount of rainfall was similar to the historical average rainfall. A single dry year for CDA was represented in FY 2017-18, in which the total amount of rainfall was less than the historical average rainfall. A five consecutive year drought period for CDA is represented from FY 2011-12 to FY 2015-16, where the total amount of rainfall during each of these years was less than the historical average rainfall. Table 7-1 summarizes these "base years" for an average year, a single dry year, and a five consecutive year drought period and provides the total amount of water supplies available to CDA during those base years.

Table 7-1 Basis of Water Year Data (Reliability Assessment)

Submittal Table 7-1 Wholesale: Basis of Water Year Data (Reliability Assessment)			
Year Type	**Base Year** If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 1999-2000, use 2000	**Available Supplies if Year Type Repeats**	
		☐ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____	
		☑ Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available *	**% of Average Supply**
Average Year	2020	40,000	100%
Single-Dry Year	2018	40,000	100.0%
Consecutive Dry Years 1st Year	2012	40,000	100.0%
Consecutive Dry Years 2nd Year	2013	40,000	100.0%
Consecutive Dry Years 3rd Year	2014	40,000	100.0%
Consecutive Dry Years 4th Year	2015	40,000	100.0%
Consecutive Dry Years 5th Year	2016	40,000	100.0%

Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a supplier uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table. Suppliers may create an additional worksheet for the additional tables.

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2.

7.2.2.2 SOURCES FOR WATER DATA

The monthly historical average temperatures (including minimum and maximum), monthly historical average rainfall, and monthly ETo in the vicinity of the area receiving water supplies from CDA are discussed in Section 3.3 Historical climate information was obtained from the WRCC, the National Oceanic and Atmospheric Administration, and from DWR's CIMIS.

7.2.3 WATER SERVICE RELIABILITY – SUPPLY AND DEMAND COMPARISON

CWC 10635.

(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the long-term total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and a drought lasting five consecutive water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

CDA obtains its water supplies from groundwater wells located in the Chino Basin. As previously discussed in Section 7.2.1, a single dry year or a five consecutive year drought period will not compromise CDA's ability to provide a reliable supply of water to its member agencies' customers.

As previously discussed in Section 4.2.6, CDA's projected normal year water demands from its member agencies over the next 25 years, in five-year increments is provided in Table 4-3. Table 7-2, Table 7-3, and Table 7-4 summarize CDA's projected groundwater demands and supplies over the next 25 years in five-year increments, including during normal years, single dry years, and a five consecutive year drought period. These tables indicate CDA can meet water demands from its member agencies during normal years, single dry years, and a five consecutive year drought period over the next 25 years.

7.2.3.1 WATER SERVICE RELIABILITY – NORMAL YEAR

Table 7-2 summarizes CDA's projected groundwater demands to meet the demands from its member agencies and supplies over the next 25 years in five-year increments during normal years. Table 7-2 indicates CDA can meet water demands from its member agencies during normal years over the next 25 years.

Table 7-2 Normal Year Supply and Demand Comparison

Submittal Table 7-2 Wholesale: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	40,000	40,000	40,000	40,000	40,000
Demand totals *(autofill fm Table 4-3)*	40,000	40,000	40,000	40,000	40,000
Difference	0	0	0	0	0
NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2.					

7.2.3.2 WATER SERVICE RELIABILITY – SINGLE DRY YEAR

Table 7-3 summarizes CDA's projected groundwater demands to meet the demands from its member agencies and supplies over the next 25 years in five-year increments during single dry years. Table 7-3 indicates CDA can meet water demands from its member agencies during single dry years over the next 25 years.

Table 7-3 Single Dry Year Supply and Demand Comparison

Submittal Table 7-3 Wholesale: Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 (Opt)
Supply totals*	40,000	40,000	40,000	40,000	40,000
Demand totals*	40,000	40,000	40,000	40,000	40,000
Difference	0	0	0	0	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2.					

7.2.3.3 WATER SERVICE RELIABILITY – FIVE CONSECUTIVE DRY YEARS

Table 7-4 summarizes CDA's projected groundwater demands to meet the demands from its member agencies and supplies over the next 25 years in five-year increments during five consecutive year drought periods. Table 7-4 indicates CDA can meet water demands from its member agencies during five consecutive year drought periods over the next 25 years.

Table 7-4 Multiple Dry Years Supply and Demand Comparison

Submittal Table 7-4 Wholesale: Multiple Dry Years Supply and Demand Comparison						
		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	40,000	40,000	40,000	40,000	40,000
	Demand totals	40,000	40,000	40,000	40,000	40,000
	Difference	0	0	0	0	0
Second year	Supply totals	40,000	40,000	40,000	40,000	40,000
	Demand totals	40,000	40,000	40,000	40,000	40,000
	Difference	0	0	0	0	0
Third year	Supply totals	40,000	40,000	40,000	40,000	40,000
	Demand totals	40,000	40,000	40,000	40,000	40,000
	Difference	0	0	0	0	0
Fourth year	Supply totals	40,000	40,000	40,000	40,000	40,000
	Demand totals	40,000	40,000	40,000	40,000	40,000
	Difference	0	0	0	0	0
Fifth year	Supply totals	40,000	40,000	40,000	40,000	40,000
	Demand totals	40,000	40,000	40,000	40,000	40,000
	Difference	0	0	0	0	0
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
***Units of measure (AF, CCF, MG) m** ust remain consistent throughout the UWMP as reported in Table 2-3.*						

NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2.

7.2.4 DESCRIPTION OF MANAGEMENT TOOLS AND OPTIONS

CWC 10620.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

Chino Basin

As noted in Section 6.2.2, the Chino Basin is managed by the Chino Basin Watermaster. During the period of management under the Judgment, significant drought events have occurred. In each drought cycle, the Chino Basin has been managed to maintain water levels. Therefore, based on historical and on-going management practices, CDA will be able to rely on the Chino Basin for adequate supply over the next 25 years under single dry years and a five consecutive year drought periods.

Section 6.2.2 provides a description of the management of groundwater resources in the Chino Basin, as well as information on basin management. Chapter 6 also demonstrates the management structure of the Chino Basin which provides a reliable source of groundwater supply for CDA during a normal year, a single-dry year and a five consecutive year drought. Historical data indicates the Chino Basin has been well managed for the full period of the adjudication, resulting in a stable and reliable water supply. Basin management changes are discussed in Section 6.2.2, and include increased direct use of recycled water (see Section 6.5) and the continued use of recycled water for groundwater replenishment in the Chino Basin to reduce the need to import water from other regions. Therefore, the groundwater supplies in the Chino Basin are deemed reliable.

7.3 DROUGHT RISK ASSESSMENT

CWC 10635.

(b) Every urban water supplier shall include, as part of its urban water management plan, a drought risk assessment for its water service to its customers as part of information considered in developing the demand management measures and water supply projects and programs to be included in the urban water management plan. The urban water supplier may conduct an interim update or updates to this drought risk assessment within the five-year cycle of its urban water management plan update. The drought risk assessment shall include each of the following:

(1) A description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts five consecutive water years, starting from the year following when the assessment is conducted.

(2) A determination of the reliability of each source of supply under a variety of water shortage conditions. This may include a determination that a particular source of water supply is fully reliable under most, if not all, conditions.

(3) A comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.

(4) Considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.

CDA's source of supply consists of contaminated groundwater pumped from the Chino Basin which is then treated and provided to its member agencies. The following discussion provides a DRA which assesses CDA's water supply reliability over a five consecutive year drought period. CDA's DRA incorporates a five consecutive year drought from FY 2020-21 through FY 2024-25 and includes a review of water supplies, water uses, and water supply reliability.

7.3.1 DRA DATA, METHODS, AND BASIS FOR WATER SHORTAGE CONDITIONS

CDA's DRA was prepared using historical production data from CDA's water supply source. The following assumptions were considered during the preparation of CDA's DRA for each year of the five consecutive year drought.

- The five consecutive year drought period associated with the 2020 UWMP is based on five consecutive dry years from FY 2020-21 through FY 2024-25.
- The projected water supplies available during each year of this five consecutive year drought are assumed to be equal to the amount of groundwater pumped by CDA for water quality management purposes and for maintaining hydraulic control within Chino Basin.
- The projected demands during this five consecutive year drought is assumed to be equal to the projected water supplies.

- The projected demands were compared to the projected supplies to identify potential water supply deficits which may require implementation of the Water Shortage Contingency Plan (discussed further in Chapter 8).

The following methodologies were considered during the preparation of CDA's DRA during for each year of the five consecutive year drought:

- Drought Year 1: The region receiving water supplies from CDA had experienced an average to above average year of precipitation in the prior year. Member agencies' retail water use in the prior year had been below average due to a reduced need for outdoor water use, the groundwater basin had been replenished from above average local stormwater runoff, and imported water supplies were not restricted.
- Drought Year 2: The region receiving water supplies from CDA experienced a second year of below average precipitation and runoff. Member agencies' retail customers increased water use for outdoor irrigation to compensate for lack of precipitation. Groundwater and imported water supplies have not been impacted. Local surface water supplies have not been impacted.
- Drought Year 3: The region receiving water supplies from CDA experienced a third year of below average precipitation and runoff. Member agencies' retail customers increase water use for outdoor irrigation to compensate for lack of precipitation. Groundwater and imported water supplies have not been impacted. However, there is an increased demand on both groundwater and treated imported water because local surface water supplies have been significantly impacted.
- Drought Year 4: The region receiving water supplies from CDA experienced a fourth year of below average precipitation and runoff. Groundwater supplies have not been impacted. However, there is an increased demand on groundwater because member agencies' local surface water supplies continue to be significantly impacted.
- Drought Year 5: Fifth year of below average precipitation and runoff. Groundwater supplies have not been impacted. However, there is an increased demand on groundwater because member agencies' local surface water supplies continue to be significantly impacted.

7.3.2 DRA INDIVIDUAL WATER SOURCE RELIABILITY

CDA pumps up to 40,000 AFY of contaminated groundwater from the Chino Basin and provides up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2 of the 2020 UWMP. The groundwater production is required to maintain groundwater cleanup priorities and is not subject to interruption. However, for the purposes of the DRA, CDA has incorporated a five consecutive year drought based on five consecutive dry years commencing in FY 2021-22. The quantity of water supplies available for each year during this five consecutive year drought period included in CDA's DRA is assumed to be the same as the projected quantity of water supplies produced by CDA (to meet its member agency demands). Production data for those years have

been tabulated in Section 6.1. The following describes the anticipated reliability of the water source for each year of the five consecutive year drought based on recent experience.

Groundwater – Chino Basin

CDA receives water supplies from the Chino Basin, which is actively managed by the Chino Basin Watermaster, as described in Section 6.2.2. Each year, the Chino Basin Watermaster reviews water supply conditions including local rainfall, groundwater levels, local stormwater runoff available for replenishment, imported water availability, and the amount of imported water stored in the groundwater basin for future demands. The Watermaster identifies the annual amount of groundwater which may be pumped (such as an Operating Safe Yield) before more expensive imported water would need to be purchased from MWD through IEUA to replenish the Basin for all production in excess of the water rights. Regardless of the annual safe yield adopted, there is never a restriction on the amount of water which may be pumped from the Chino Basin, only the cost of producing the groundwater is impacted. The Chino Basin Watermaster is not restricted as to when or how much untreated imported water be delivered to the Chino Basin, only that it ultimately be delivered. The quantity of groundwater used (and reliably available) during the most recent and historical five consecutive year drought period have been tabulated in Section 6.1. During this period, CDA was able to maintain its production of its groundwater supplies from an adjudicated and managed groundwater basin. As a result of these collective actions (and experience during and prior to five consecutive year droughts), CDA does not anticipate a water supply shortage from the Chino Basin.

Summary

CDA's water system has previously experienced a five consecutive year drought with no limitation to its water supplies. CDA's member agencies have the ability to enact varying water shortage levels (see Chapter 8) to help educate its customers and provide an economic incentive for the member agency retail customers to reduce their water consumption.

7.3.3 DRA TOTAL WATER SUPPLY AND USE COMPARISON

Gross water use for the projected five consecutive year drought is shown on Table 7-5. Section 7.3.2 describes the water source reliability for the source of supply CDA will rely on during a five consecutive year drought. CDA pumps up to 40,000 AFY of contaminated groundwater from the Chino Basin and provides up to 35,200 AFY of treated water to its member agencies. The groundwater production is required to maintain groundwater cleanup priorities and is not subject to interruption. However, when necessary, CDA's member agencies can implement various water shortage levels of their respective Water Shortage Contingency Plans (discussed in Chapter 8) in order to reduce water demands. For the purposes of the DRA, the total water supplies available to CDA are based on the quantity of supplies pumped by CDA during the most recent historical five consecutive drought period (from FY 2011-12 through FY 2015-16). As shown in Table 7-5, assuming no additional water supply benefits will be available from groundwater supplies, CDA's member agencies will implement various stages of its Water Shortage Contingency Plan to balance water demands with available supplies during years 1, 2, 3, 4, and 5 of the projected five consecutive year drought.

Table 7-5 Five-Year Drought Risk Assessment Tables to Address Water Code Section 10635(b)

Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)	
2021	**Total**
Total Water Use	40,000
Total Supplies	40,000
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%
2022	**Total**
Total Water Use	40,000
Total Supplies	40,000
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%
2023	**Total**
Total Water Use	40,000
Total Supplies	40,000
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%
2024	**Total**
Total Water Use	40,000
Total Supplies	40,000
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%
2025	**Total**
Total Water Use	40,000
Total Supplies	40,000
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

7.3.4 OPTIONAL PLANNING TOOL WORKBOOK

DWR has deemed the "Planning Tool Worksheet" as optional and CDA is not required by DWR to use the tool. CDA has provided sufficient water supplies to its member agencies, including during long-term droughts and years with historically high water demands from its member agencies. CDA has also been able to provide water service to meet maximum day water demands from its member agencies for these years, including during the summer months. CDA obtains its water supplies from a managed groundwater basin which is not subject to seasonal fluctuation. Consequently, an evaluation regarding water supplies on a monthly basis was not considered.

Chapter 8

WATER SHORTAGE CONTINGENCY PLAN

LAY DESCRIPTION – CHAPTER 8

WATER SHORTAGE CONTINGENCY PLAN

Chapter 8 (Water Shortage Contingency Plan) of CDA's 2020 Plan discusses and provides the following:

- CDA pumps up to 40,000 AFY of contaminated groundwater from the Chino Basin and provides up to 35,200 AFY of treated water to its member agencies. The groundwater production is required to maintain groundwater cleanup priorities and is not subject to interruption. Consequently, development of a Water Shortage Contingency Plan by CDA is not required; however, CDA coordinates its activities with its member agencies, and CDA's member agencies are required to develop a Water Shortage Contingency Plan. Preparation of CDA's "Annual Water Supply and Demand Assessment" (or Annual Assessment) is discussed. Commencing July 1, 2022, CDA is required to submit the Annual Assessment. The Annual Assessment will include a review of CDA's "unconstrained" water demands from its member agencies for the current year and for a potential upcoming single dry year.
- For each declared water supply shortage level, CDA's member agencies' customers will be required to reduce their consumption by the percentage specified in the corresponding water supply shortage level. These demand reduction actions include irrigation and other outdoor use restrictions, rate structure changes, and other water use prohibitions.
- The operational changes CDA will consider in addressing water shortages on a short-term basis are discussed to enforce demand reduction measures.
- CDA's Emergency Response Plan is summarized. The Emergency Response Plan provides the management, procedures, and designated actions CDA and its employees will implement during emergency situations (including catastrophic water shortages) resulting from natural disasters, system failures, and other unforeseen circumstances.
- The preparation of CDA's seismic risk assessment and mitigation plan is discussed. The locations of earthquake faults in the vicinity of the area receiving water supplies from CDA are provided.

The following Water Shortage Contingency Plan includes references to Chapters and Sections from the Chino Basin Desalter Authority's 2020 Urban Water Management Plan:

8.1 WATER SUPPLY RELIABILITY ANALYSIS

CWC 10632.

(a)(1) The analysis of water supply reliability conducted pursuant to Section 10635.

CDA pumps up to 40,000 AFY of contaminated groundwater from the Chino Basin and provides up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2 of the 2020 UWMP. The groundwater production is required to maintain groundwater cleanup priorities and is not subject to interruption. Consequently, development of a WSCP by CDA is not required; however, CDA coordinates it activities with its member agencies, and CDA's member agencies are required to develop a WSCP. The Chino Basin is adjudicated and groundwater supplies are managed. The reliability of this source of supply is discussed in Chapter 7 of this UWMP.

8.2 ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES

CWC 10632.

(a)(2) The procedures used in conducting an annual water supply and demand assessment that include, at a minimum, both of the following:

(A) The written decision-making process that an urban water supplier will use each year to determine its water supply reliability.

(B) The key data inputs and assessment methodology used to evaluate the urban water supplier's water supply reliability for the current year and one dry year, including all of the following:

(i) Current year unconstrained demand, considering weather, growth, and other influencing factors, such as policies to manage current supplies to meet demand objectives in future years, as applicable.

(ii) Current year available supply, considering hydrological and regulatory conditions in the current year and one dry year. The annual supply and demand assessment may consider more than one dry year solely at the discretion of the urban water supplier.

(iii) Existing infrastructure capabilities and plausible constraints.

(iv) A defined set of locally applicable evaluation criteria that are consistently relied upon for each annual water supply and demand assessment.

(v) A description and quantification of each source of water supply.

CWC 10632.1.

An urban water supplier shall conduct an annual water supply and demand assessment pursuant to subdivision (a) of Section 10632 and, on or before July 1 of each year, submit an annual water shortage assessment report to the department with information for anticipated shortage, triggered shortage response actions, compliance and enforcement actions, and communication actions consistent with the supplier's water shortage contingency plan. An urban water supplier that relies on imported water from the State Water Project or the Bureau of Reclamation shall submit its annual water supply and demand assessment within 14 days of receiving its final allocations, or by July 1 of each year, whichever is later.

Commencing July 1, 2022, CDA is required to submit an "Annual Water Supply and Demand Assessment" (Annual Assessment) in accordance with DWR's guidance and requirements. The Annual Assessment will include a review of CDA's unconstrained water demands from its member agencies (i.e. water demands from its member agencies prior to any projected response actions CDA may trigger under this WSCP) for the current year and the upcoming (potential single dry) year. . CDA pumps up to 40,000 AFY of contaminated groundwater from the Chino Basin and provides up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2 of the 2020 UWMP. The groundwater production is required to maintain groundwater cleanup priorities and is not subject to interruption.
For each Annual Assessment, CDA plans to prepare a preliminary assessment of its water supplies for the current and upcoming years by April of each year. The groundwater production is required to maintain groundwater cleanup priorities and is not subject to interruption. The preliminary assessment will include a review of water supplies for at least a single dry year.

The components of an Annual Assessment consist of the following:

- A written decision-making process
- Key data inputs and assessment methodology

8.2.1 DECISION MAKING PROCESS

CDA produces contaminated groundwater from the Chino Basin which is then treated and provided to its member agencies. The groundwater production is required to maintain groundwater cleanup priorities and is not subject to interruption. The Chino basin is managed on a fiscal year basis. Consequently, during the third quarter of each fiscal year CDA will review its water demands from its member agencies from the initial six months along with the current groundwater basin conditions and local hydrology. Member agencies also have minimum purchase commitments from CDA. This information will be used to help develop the Annual Assessment. A draft of the Annual Assessment will be circulated internally within CDA for peer review and comment. Based on comments received, a redraft will be prepared and provided to CDA managers

during the Spring of each year. The draft will subsequently be provided to the General Manager for final review. Subsequently, a final draft of the Annual Assessment will be provided to CDA's Board of Directors for review and included in the agenda as part of a Board meeting such that it can be approved and any recommended specific shortage response actions may be enacted. The final Annual Assessment will be provided to DWR no later than July 1 of each year.

8.2.2 DATA AND METHODOLOGIES

The key data inputs and methodologies which will be evaluated by CDA during the preparation of the preliminary assessment will include the following. However, the groundwater production is required to maintain groundwater cleanup priorities and is not subject to interruption.:

1) Evaluation Criteria: The locally applicable evaluation criteria used to prepare the Annual Assessment will be identified. The evaluation criteria will include, but is not limited to, an analysis of current local hydrology (including rainfall and groundwater levels) within the area receiving water supplies from CDA, current water demands from its member agencies, and water quality regulations which may impact groundwater availability.

2) Water Supply: A description of the available water supply source will be provided. The description will include a quantification of the available water supply source and will be based on review of current production capacities, historical production, Urban Water Management Plans, and prior water supply studies (including Water Supply Assessments and/or Master Plans).

3) Unconstrained Water Demand: The potential unconstrained water demands from its member agencies during the current year and the upcoming (potential single dry) year, prior to any special shortage response actions, will be reviewed. The review will include factors such as weather, existing and projected land uses and populations, actual customer consumption and the water use factor, and monthly Urban Water Supplier Monthly Reports.

4) Planned Water Use for Current Year Considering Dry Subsequent Year: The water supplies available to meet the demands, including the minimum demand pursuant to the purchase agreements of its member agencies during the current year and the upcoming (potential single dry) year will be considered and identified by each type of supply. The evaluation will include factors such as weather, water quality, existing available pumping capacities, contractual obligations, and regulatory issues.

5) Infrastructure Considerations: The capabilities of the water distribution system infrastructure to meet the water demands from its member agencies during the current year and the upcoming (potential single dry) year will be considered. Available production capacities (e.g. groundwater well capacities) and distribution system water losses (see

Section 4.2.4) will be reviewed. In addition, capital improvement and replacement projects will be considered.

6) Other Factors: Additional local considerations, if any, which can affect the availability of water supplies will be described.

8.3 SIX STANDARD WATER SHORTAGE LEVELS

CWC 10632.

(a)(3)(A) Six standard water shortage levels corresponding to progressive ranges of up to 10, 20, 30, 40, and 50 percent shortages and greater than 50 percent shortage. Urban water suppliers shall define these shortage levels based on the suppliers' water supply conditions, including percentage reductions in water supply, changes in groundwater levels, changes in surface elevation or level of subsidence, or other changes in hydrological or other local conditions indicative of the water supply available for use. Shortage levels shall also apply to catastrophic interruption of water supplies, including, but not limited to, a regional power outage, an earthquake, and other potential emergency events.
(a)(3)(B) An urban water supplier with an existing water shortage contingency plan that uses different water shortage levels may comply with the requirement in subparagraph (A) by developing and including a cross reference relating its existing categories to the six standard water shortage levels.

CDA serves a dual purpose of providing reliable water supply and improving groundwater quality in the Chino Basin. Member agencies are required to purchase a minimum amount of treated water production to support this function. These minimum purchase agreements form a fixed portion of the water supply portfolios of each of the CDA retail member agencies. The groundwater production is required to maintain groundwater cleanup priorities and is not subject to interruption.

However, depending on their individual water supply constraints, member agencies may employ plans for water usage appropriate to their water shortage levels. The standard shortage levels for each member agency can be found in their individual 2020 UWMPs. These standard shortage levels and corresponding response actions are executed by the individual member agency, independent of CDA. CDA's member agencies plans for water usage during periods of shortage is designed to incorporate six standard water shortage levels corresponding to progressive ranges from up to 10, 20, 30, 40, and 50 percent shortages, and greater than 50 percent shortage.

CDA member agencies are located within the Western Municipal Water District in Riverside County and/or within the Inland Empire Utilities Agency in San Bernardino County. IEUA member agencies are subject to IEUA's "Regional Drought Contingency Plan", adopted in April 2020, which previously established five (5) water shortage levels. WMWD member agencies are subject to WMWD's Ordinance 386 "Updated Retail Customer Water Supply Shortage Contingency Program," which previously established five (5) water shortage levels. In accordance with the CWC in which urban water suppliers are required to define six standard water shortage

levels, CDA has provided the crosswalks illustrated below that translates IEUA's and WMWD's previously established shortage levels to the mandated standard shortage levels for their respective member agencies.

Corresponding Relationships Between IEUA's 2015 Shortage Levels and the 2020 WSCP Mandated Shortage Levels

Established Level	Supply Condition/ Shortage
0	0%
1	1 to 5%
2	6 to 15%
3	16 to 25%
4	26 to 50%
5	> 50%

2020 Standard Level	Shortage Level
1	≤10%
2	10 to 20%
3	20 to 30%
4	30 to 40%
5	40 to 50%
6	> 50%

Corresponding Relationships Between WMWD's 2015 Shortage Levels and the 2020 WSCP Mandated Shortage Levels

Established Level	Supply Condition/ Shortage
1	0%
2	Up to 4%
3	5 to 15%
4	16 to 50%
5	> 50%

2020 Standard Level	Shortage Level
1	≤10%
2	10 to 20%
3	20 to 30%
4	30 to 40%
5	40 to 50%
6	> 50%

Table 8-1 provides a description of the six stages of action, or water shortage levels, which may be triggered by a shortage in CDA's member agencies' water supply, depending on the severity of the shortage and its anticipated duration.

Table 8-1 Water Shortage Contingency Planning Levels

Submittal Table 8-1 Water Shortage Contingency Plan Levels		
Shortage Level	**Percent Shortage Range**	**Shortage Response Actions** (*Narrative description*)
1	Up to 10%	IEUA member agencies may be subject to implement direct installation programs, hold more landscape workshops, consider escalation of local water waste prohibitions, etc. WMWD member agencies' customers may be subject to a 5 to 15% water use reduction.
2	Up to 20%	In addition to Shortage Level 1; IEUA member agencies may expand micro-targeting customers and increase marketing efforts. WMWD member agencies may be subject to prohibition of new water service and reductions in water budgets.
3	Up to 30%	In addition to Shortage Level 2; IEUA member agencies may increase penalties, implement emergency alerts, etc. WMWD member agencies may be subject to additional requirements deemed necessary by individual member agencies.
4	Up to 40%	In addition to Shortage Level 3; IEUA member agencies may be subject to additional requirements deemed necessary by individual member agencies. WMWD member agencies may be subject to additional requirements deemed necessary by individual member agencies.
5	Up to 50%	In addition to Shortage Level 4; IEUA member agencies may be subject to additional requirements deemed necessary by individual member agencies. WMWD member agencies may be subject to additional requirements deemed necessary by individual member agencies.
6	>50%	In addition to Shortage Level 5; IEUA member agencies may be subject to additional requirements deemed necessary by individual member agencies. WMWD member agencies may be subject to additional requirements deemed necessary by individual member agencies.
NOTES:		

8.4 SHORTAGE RESPONSE ACTIONS

CWC 10632.

(a)(4) Shortage response actions that align with the defined shortage levels and include, at a minimum, all of the following:

(A) Locally appropriate supply augmentation actions.

(B) Locally appropriate demand reduction actions to adequately respond to shortages.

(C) Locally appropriate operational changes.

(D) Additional, mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions and appropriate to the local conditions.

(E) For each action, an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of the action.

The wholesale members of IEUA and WMWD have approved WSCP's with shortage response actions, which are outlined in each of their 2020 UWMPs. A summary of these shortage response actions imposed on CDA's member agencies is provided in this section.

8.4.1 DEMAND REDUCTION

CDA recognizes IEUA and WMWD water shortage response actions for its member agencies to reduce demand on water supplies. Member agencies may employ their own demand reduction actions and/or IEUA or WMWD demand reduction actions at their own discretion. Demand reduction actions include irrigation and other outdoor use restrictions, rate structure changes, public outreach strategies, other water use prohibitions. Many demand reduction actions are applicable to all levels of water shortages while others are exclusive to certain levels of shortage. The structure of demand reduction actions under a specific water shortage level are designed to encourage those customers with high gallon per capita usage to achieve proportionally greater reduction than those with low use. Violations of these demand reduction actions will be considered waste and an unreasonable use of water. Table 8-2 describes each demand reduction action and its effect on reducing the shortage gap.

STANDARD DEMAND REDUCTION ACTIONS

The following demand reduction actions are in effect at all times, regardless of a declared standard water shortage level:

IEUA Member Agencies

- Implement the following programs:
  - SoCal WaterSmart Residential and Commercial Rebates
  - Turf Replacement Program
  - Residential Irrigation Tune-up
  - Home Surveys
  - Landscape Workshops
  - Design Services
- Promote water efficient properties.

WMWD Member Agencies

The following permanent prohibitions shall be continually in effect at all levels of standard water shortage level declarations in addition to the requirements specific to each level:

- All irrigators shall ensure automatic irrigation times are adjusted according to changing weather patterns and landscape requirements.
- All open hoses shall be equipped with automatic, positive shut-off nozzles.
- Watering of lawns and/or groundcovers and irrigating landscaping is permitted only between the hours of 8:00 PM and 8:00 AM.
- All swimming pools, spas, ponds, and fountains shall be equipped with re-circulating pumps.
- All plumbing leaks, improperly adjusted sprinklers, or other water conduits/ fixtures that require repair or adjustment shall be corrected to the satisfaction of WMWD within 96 hours of notification by MWMD.
- No person shall use water to wash down sidewalks, driveways, parking areas, except to alleviate immediate fire or sanitation hazards, and then only by use of a hand-held bucket or similar container, a hand-held hose equipped with an automatic, positive self-closing shut-off device, or a low volume, high-pressure cleaning machine.
- No person shall allow water to leave his or her property by drainage onto adjacent properties or public or private roadways or streets due to excessive irrigation and/ or uncorrected leaks.
- The washing of automobiles, trucks, trailers, boats, airplanes, and other types of mobile equipment is permitted at any time with a hand-held bucket or a hand-held hose equipped with an automatic, positive shut-off nozzle. Provided, however, such washing may be done at any time on the immediate premises of a commercial service station or a car dealership with commercial car washing equipment, or by a licensed mobile detailing/ car wash professional using low volume, high pressure washing equipment. Further, such washings are exempted from these regulations where the health, safety, and welfare of the public is

contingent upon frequent vehicle cleanings, such as garbage trucks and vehicles used to transport food and perishables.

- Construction operations receiving water from a construction meter, hydrant meter, or water truck shall not use water for any purpose other than those required by regulatory agencies. Construction projects requiring watering for new landscaping materials shall adhere to the designated irrigation requirements set forth in this WSCP.

STANDARD WATER SHORTAGE LEVEL 1

The following are implemented during a Standard Water Shortage Level 1:

IEUA Member Agencies

- Implement direct installation programs including the Residential Smart Irrigation Direct Installation and the School Smart Irrigation Direct Installation.
- Hire additional landscape designers to expand landscape design services.
- Hold more frequent landscape workshops.
- Increase the volume of home surveys performed.
- Utilize general customer messaging to communicate need to increase water efficiency levels.
- Profile customers and micro-target high potential customers, utilizing messaging that will best resonate with those customers.
- Consider escalation of local water waste prohibitions.
- Introduce influencer marketing (role models and respected community members)
- Prepare IEUA WEFlex funding proposal and plans for expanded customer communication and enforcement administration.
- Additional requirements deemed necessary by individual member agencies.

WMWD Member Agencies

- Potable water customers in areas directly served by WMWD that do not have water budgets shall reduce water use by 5 to 15% from the Base Period during declarations of any Sub-level under Standard Water Shortage Level 1.
- Sub-levels under Standard Water Shortage Level
    - Sub-level 1A: WMWD shall eliminate all adjustments to existing residential customer's outdoor Water Budgets including, but not limited to, increases for landscape size, and/or swimming pool, spa, or pond maintenance adjustments. New water using features or expanded landscapes shall not quality for a Water Budget adjustment.
    - Sub- level 1B: Tier 4 water rates shall be eliminated. Customers with Water Budgets, and whose water use exceeds one hundred and twenty-five percent (125%) of their total water Budget during a Billing Period will be charged the applicable Tier 5 water rates.
    - Sub-level 1C: Tier 3 water rates shall be eliminated. Customers who have Water Budgets, and whose water use exceeds 100% of their total Water Budgets during a Billing Period, shall be charged the applicable Tier 5 water rates.

STANDARD WATER SHORTAGE LEVEL 2

In addition to tasks implemented in Standard Water Shortage Level 1, the following applies to Standard Water Shortage Level 2:

IEUA Member Agencies

- Continue base programs and incentive amounts for turf replacement, high efficiency nozzles, smart controllers, laminar flow restrictor, and plumbing control valves.
- Continue smart irrigation direct installation programs.
- Expand profiling and micro-targeting to include mid-range water users as well as high-water use customers.
- Increase influencer marketing.
- Hire additional local staff and set up operations for expanded customer communication and enforcement administration.
- Additional requirements deemed necessary by individual member agencies.

WMWD Member Agencies

- No new potable water service connections shall be provided, no new temporary meters or permanent meters shall be provided, and no statements of immediate ability to serve or provide potable water service (such as will serve letters, certificates, or letters of availability) shall be issued, except under the following circumstances:
    - A valid, unexpired building permit has been issued for the project; or
    - The project is necessary to protect the public's health, safety, and welfare; or
    - The applicant provides a Conservation Offset or pays a Conservation Offset Fee established by WMWD in an amount necessary to cover the cost of implementing such conservation techniques or acquiring alternative water sources, to offset the new demand. The fee will be based on the Conservation Offset required to meet the projected demand of the proposed project. Such fee shall apply to residential as well as commercial and industrial building and may be adjusted from time to time as determined by WMWD. The existence and application of a Conservation Offset, and the amount of Conservation Offset Fee and other terms and conditions for any Conservation Offset, shall be determined at WMWD's sole discretion. The existence and application of any water meter moratorium or other similar restrictions shall be determined by separate and subsequent action of the Board of Directors, or;
    - Where an existing service connection exists and an existing water meter is inoperable and cannot be repaired. In such an instance, the size of the new water meter shall be the same or smaller than the water meter being replaced.
- Sub-levels under Standard Water Shortage Level 2
    - Sub-level 2A
        - All landscape water budgets shall be reduced by 10%. Residential customers who have Water Budgets, and whose water use exceeds 100% of their Tier 1 and 90% of their Tier 2 Water Budgets during a Billing Period, shall be charged at the applicable Tier 5 water rates. Landscape customers who have Water Budgets, and whose water use exceeds 90% of their Water

Budget during a Billing Period shall be charged the applicable Tier 5 water rates.
    - Commercial or industrial customers who are served through mixed-use meter, and who have Water Budgets, shall reduce landscape and non-essential outdoor water use by 25%.
    - Potable water customers in areas directly served by WMWD and who do not have Water Budgets shall reduce their outdoor water use by 10% from the Base Period.
- Sub-level 2B
    - All outdoor Water Budgets shall be reduced be 40%. Residential customers who have Water Budgets, and whose water use exceeds 100% of their Tier 1 and 40% of their Tier 2 Water Budgets during a Billing Period, shall be charged at the applicable Tier 5 water rates. Landscape customers who have Water Budgets, and whose water use exceeds 40% of their Water Budget during a Billing Period shall be charged the applicable Tier 5 water rates.
    - Commercial or industrial customers who are served through dedicated or mixed-use meter, and who have Water Budgets, shall reduce landscape and non-essential outdoor water use by 10%.
    - Potable water customers in areas directly served by WMWD and who do not have Water Budgets shall reduce their outdoor water use by 40% from the Base Period.
- Sub-level 2C
    - All outdoor Water Budgets shall be reduced be 65%. Residential customers who have Water Budgets, and whose water use exceeds 100% of their Tier 1 and 35% of their Tier 2 Water Budgets during a Billing Period, shall be charged at the applicable Tier 5 water rates. Landscape customers who have Water Budgets, and whose water use exceeds 35% of their Water Budget during a Billing Period shall be charged the applicable Tier 5 water rates.
    - Installation of new landscapes shall be prohibited unless irrigated with recycled water. Exceptions may be provided for projects with prior approval by the appropriate jurisdiction.
    - Commercial or industrial customers who are served through dedicated or mixed-use meters, and who have Water Budgets, shall water use by 20%.
    - Potable water customers in areas directly served by WMWD and who do not have Water Budgets shall reduce their outdoor water use by 65% from the Base Period.
    - No new construction or hydrant meters will be issued. Potable water shall not be used for earth work, road construction purposes, dust control, compaction, or trenching jetting. Construction projects necessary to maintain the health, safety, and welfare of the public are exempt from these regulations.

- WMWD shall develop a public information campaign to provide customers with options for achieving demand reduction goals and complying with their applicable allocation. WMWD may explore increased customer incentives for conservation measures.

STANDARD WATER SHORTAGE LEVEL 3

In addition to tasks implemented in Standard Water Shortage Level 2, the following applies to Standard Water Shortage Level 3:

IEUA Member Agencies

- Increase penalties.
- Implement emergency alerts.
- Implement news media coverage.
- Additional requirements deemed necessary by individual member agencies.

WMWD Member Agencies

- Additional requirements deemed necessary by individual member agencies.

STANDARD WATER SHORTAGE LEVEL 4

In addition to tasks implemented in Standard Water Shortage Level 3, the following applies to Standard Water Shortage Level 4:

IEUA Member Agencies

- Additional requirements deemed necessary by individual member agencies.

WMWD Member Agencies

- Additional requirements deemed necessary by individual member agencies.

STANDARD WATER SHORTAGE LEVEL 5

In addition to tasks implemented in Standard Water Shortage Level 4, the following applies to Standard Water Shortage Level 5:

IEUA Member Agencies

- Additional requirements deemed necessary by individual member agencies.

WMWD Member Agencies

- Additional requirements deemed necessary by individual member agencies.

STANDARD WATER SHORTAGE LEVEL 6

In addition to tasks implemented in Standard Water Shortage Level 5, the following applies to Standard Water Shortage Level 6:

IEUA Member Agencies

- Only offer indoor plumbing and property leak detection programs.
- Suspend all landscape and irrigation programs.
- Conduct stringent enforcement of restrictions.
- Additional requirements deemed necessary by individual member agencies.

WMWD Member Agencies

- All landscape and non-essential outdoor water use for all customers in all areas of WMWD's retail water service area shall be prohibited.
- Except as to property for which a building permit has been heretofore issued, no new water meter(s) shall be provided, except in the following circumstances:
    - For projects necessary to protect the public's health, safety, and welfare; or
    - When using recycled water
- Sub-levels under Standard Water Shortage Level 6
    - Sub-level 6A
        - All indoor residential Water Budgets shall be reduced by 10% to 54 GPCD. Residential customers who have Water Budgets and whose water use exceeds 90% of their modified Tier 1 Water Budget and 0% of Tier 2 Water Budget during a Billing Period, or 50 GPCD, shall be charged at the applicable Tier 5 water rates.
        - Commercial and industrial customers who are served through dedicated or mixed-use meters, and who have Water Budgets, shall reduce their water consumption by 30%.
        - Potable water customers in areas directly served by WMWD that do not have Water Budgets shall reduce their indoor water use by 10%
    - Sub-level 6B
        - All indoor residential Water Budgets shall be reduced by 15% to 51 GPCD. Residential customers who have Water Budgets and whose water use exceeds 85% of their modified Tier 1 Water Budget and 0% of Tier 2 Water Budget during a Billing Period, or 51 GPCD, shall be charged at the applicable Tier 5 water rates.
        - Commercial and industrial customers who are served through dedicated or mixed-use meters, and who have Water Budgets, shall reduce their water consumption by 40%.
        - Potable water customers in areas directly served by WMWD that do not have Water Budgets shall reduce their indoor water use by 15% from the Base Period. All non-essential outdoor and landscape water use shall be prohibited.
    - Sub-level 6C

  - All residential customers who have Water Budgets shall have their indoor Water Budgets reduced by 20% to 48 GPCD. Residential customers who have Water Budgets and whose water use exceeds 80% of their modified Tier 1 Water Budget and 0% of Tier 2 Water Budget during a Billing Period, or 48 GPCD, shall be charged at the applicable Tier 5 water rates.
  - Commercial and industrial customers who are served through dedicated or mixed-use meters, and who have Water Budgets, shall reduce their water consumption by 50%.
  - Potable water customers in areas directly served by WMWD that do not have Water Budgets shall reduce their indoor water use by 20% from the Base Period.
- The use of water for commercial, manufacturing, or processing purposes may be further reduced in volume than is indicated in the sub-stages of this section if it is determined to be in the best interest of the health, sanitation, and fire flow protection in the communities served by WMWD. This determination may be made by the WMWD Board of Directors, the General Manager, or his or her authorized designee.
- All dedicated irrigation meters will be locked off by WMWD personnel.
- Customers with a WMWD authorized Medical Adjustment to their Tier 1 allocation will be permitted 100% of their Tier 1 Water Budget.
- WMWD shall develop a public information campaign to provide customers with options for achieving Level 6 demand reduction goals and complying with their allocation. WMWD may explore increased customer incentives for conservation measures.

Table 8-2 Demand Reduction Actions

Submittal Table 8-2: Demand Reduction Actions				
Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
Add additional rows as needed				
1	Expand Public Information Campaign	Collective reduction from all Shortage Level 1 actions is up to 596 AFY	Applicable to IEUA member agencies	No
1	Increase Frequency of Meter Reading	Collective reduction from all Shortage Level 1 actions is up to 596 AFY	Applicable to IEUA member agencies	No
1	Increase Water Waste Patrols	Collective reduction from all Shortage Level 1 actions is up to 596 AFY	Applicable to IEUA member agencies	Yes
1	Implement or Modify Drought Rate Structure or Surcharge	Collective reduction from all Shortage Level 1 actions is up to 596 AFY	Applicable to WMWD member agencies	Yes
2	Other	Collective reduction from Shortage Level 1 plus all Shortage Level 2 actions is up to 1,193 AFY	All actions under Shortage Level 1	Yes
2	Moratorium or Net Zero Demand Increase on New Connections	Collective reduction from all Shortage Level 2 actions is up to 1,193 AFY	Applicable to IEUA member agencies	Yes
2	Implement or Modify Drought Rate Structure or Surcharge	Collective reduction from all Shortage Level 2 actions is up to 1,193 AFY	Applicable to WMWD member agencies	Yes
3	Other	Collective reduction from Shortage Level 2 plus all Shortage Level 3 actions is up to 1,789 AFY	All actions under Shortage Level 2	Yes
4	Other	Collective reduction from Shortage Level 3 plus all Shortage Level 4 actions is up to 2,386 AFY	All actions under Shortage Level 3	Yes
5	Other	Collective reduction from Shortage Level 4 plus all Shortage Level 5 actions is up to 2,982 AFY	All actions under Shortage Level 4	Yes
6	Other	Collective reduction from Shortage Level 5 plus all Shortage Level 6 actions is greater than 2,982 AFY	All actions under Shortage Level 5	Yes
NOTES: CDA promotes IEUA and WMWD water shortage response actions for its member agencies to reduce demand on their individual water supplies. Member agencies may employ their own demand reduction actions and/or IEUA or WMWD demand reduction actions at their own discretion.				

8.4.2 SUPPLY AUGMENTATION

CDA's purpose is to produce treated groundwater for its member agencies. The groundwater production is required to maintain groundwater cleanup priorities and is not subject to interruption.CDA does not anticipate augmenting water supplies. However, CDA's member agencies may consider increased supplies from existing sources. Table 8-3 reflects this approach and does not identify any new supplies. Instead, CDA's member agencies will focus on demand reduction measures in the event existing sources of supply are not sufficient to meet customer demands. As discussed in Chapter 6, CDA's source of water supply is groundwater produced from the Chino Basin. As noted in Section 8.2, beginning July 1, 2022, CDA will prepare and submit an Annual Assessment which will include a review of the water supply available to help meet water demands for the current and upcoming years.

As noted in Section 6.2.2, the Chino Basin is managed by the Chino Basin Watermaster. During the period of management under the Chino Basin Judgment, significant drought events have occurred. In each drought cycle, the Chino Basin has been managed to maintain water levels. Groundwater quality is carefully monitored and managed by the Chino Basin Watermaster. Treatment facilities, including CDA, and/or blend plans have been developed by water agencies to meet potable water standards and to prevent the spread of any groundwater contamination. Groundwater quality in the Chino Basin is not expected to impact potable supplies or constrain supply reliability. Based on historical and on-going management practices, CDA continue to provide potable water to its member agencies from the Chino Basin.

Table 8-3 Supply Augmentation and Other Actions

Submittal Table 8-3: Supply Augmentation and Other Actions			
Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*
Add additional rows as needed			
1	Transfers	Not applicable (see Notes)	
2	Transfers	Not applicable (see Notes)	
3	Transfers	Not applicable (see Notes)	
4	Transfers	Not applicable (see Notes)	
5	Transfers	Not applicable (see Notes)	
6	Transfers	Not applicable (see Notes)	
NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2. CDA does not anticipate augmenting water supplies. However, CDA's member agencies will consider increased production from the Chino Basin (through potential transfer of water rights) using existing facilities to address increased demands. As noted on Table 8-2, CDA's member agencies plan to implement demand reduction measures in the event water supplies from existing sources are not sufficient to meet anticipated demands.			

8.4.3 OPERATIONAL CHANGES

During a water supply shortage situation, CDA will manage its water supply resource to provide water supplies capable of meeting a portion of the demands of its member agencies. Section 8.4.1 describes CDA's member agencies' demand reduction actions such as rate structure changes, public outreach strategies, other operational changes. Section 8.4.2 describes CDA's water supply source.

As noted in Section 8.2, beginning July 1, 2022, CDA will prepare and submit an Annual Assessment which will include a review of the water supplies available to meet a portion of the water demands from its member agencies for the current and upcoming years. Preparation of the Annual Assessment will assist CDA in determining any potential operational changes. The operational changes CDA will consider in addressing non-catastrophic water shortages on a short-term basis include the following:

- Improved monitoring, maintenance, and repairs to reduce water distribution system losses.

8.4.4 ADDITIONAL MANDATORY RESTRICTIONS

The mandatory restrictions which are promoted by CDA to reduce member agencies' customer demands are discussed in Section 8.4.1. There are no additional mandatory restrictions planned at this time.

8.4.5 EMERGENCY RESPONSE PLAN

Catastrophic water shortages are incorporated in CDA's member agencies' standard water shortage levels (identified in Section 8.3) and the associated demand reduction measures (described in 8.4.1). In addition to potential operational changes (Section 8.4.3) which CDA may consider in order to continue providing water supplies, CDA will review and implement any necessary steps included in its "Emergency Response Plan".

As part of the "America's Water Infrastructure Act of 2018", community water systems serving a population greater than 3,300 people, including CDA, are required to review and update their "Risk and Resilience Assessment" (RRA) and the associated "Emergency Response Plan" (ERP) every five (5) years. However, due to security concerns regarding the submitting of these reports, water systems are required to submit certifications to the United States Environment Protection Agency (USEPA), from March 31, 2020 and December 30, 2021, confirming the current RRA and ERP have been reviewed and updated.

CDA's RRA, which is currently being prepared, evaluates the vulnerabilities, threats, and consequences from potential hazards to CDA's water system. CDA is preparing its RRA (which is incorporated by reference) by evaluating the following items:

- Natural hazards and malevolent acts (i.e., all hazards);
- Resilience of water facility infrastructure (including pipes, physical barriers, water sources and collection, treatment, storage and distribution facilities, and electronic, computer and other automated systems);
- Monitoring practices;
- Financial systems (e.g., billing systems);
- Chemical storage and handling; and
- Operation and maintenance.

CDA's RRA evaluated a series of potential malevolent acts, natural hazards, and other threats in order to estimate the potential "monetized risks" (i.e. associated economic consequences to both the water system and surrounding region, and the likelihood of occurrence) associated with CDA's water facility assets. The cost-effectiveness of implementing potential countermeasures to reduce risks was also reviewed.

CDA's ERP, which is currently being prepared, provides the management, procedures, and designated actions CDA and its employees will implement during emergency situations (including catastrophic water shortages) resulting from natural disasters, system failures and other unforeseen circumstances. CDA's ERP (which is incorporated by reference) provides the guidelines for evaluating an emergency situation, procedures for activating an emergency response, and details of the different response phases in order to ensure that customers receive a reliable and adequate supply of potable water. The scope of the ERP includes emergencies which directly affect the water system and the ability to maintain safe operations (such as a chlorine release, and earthquake or a threat of contamination). The ERP also incorporates the results of CDA's RRA and includes the following:

- Strategies and resources to improve resilience, including physical and cybersecurity
- Plans and procedures for responding to a natural hazard or malevolent act
- Actions and equipment to lessen the impact of a natural hazard or malevolent act
- Strategies to detect natural hazards or malevolent act

CDA will review the ERP for procedures regarding the utilization of alternative water supply sources in response to water supply shortages, including during the standard water shortage levels. CDA will also review applicable procedures described in the ERP regarding any necessary temporary shutdown of water supply facilities, including appropriate regulatory and public notifications.

8.4.6 SEISMIC RISK ASSESSMENT AND MITIGATION PLAN

CWC 10632.5.

(a) In addition to the requirements of paragraph (3) of subdivision (a) of Section 10632, beginning January 1, 2020, the plan shall include a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities.

(b) An urban water supplier shall update the seismic risk assessment and mitigation plan when updating its urban water management plan as required by Section 10621.

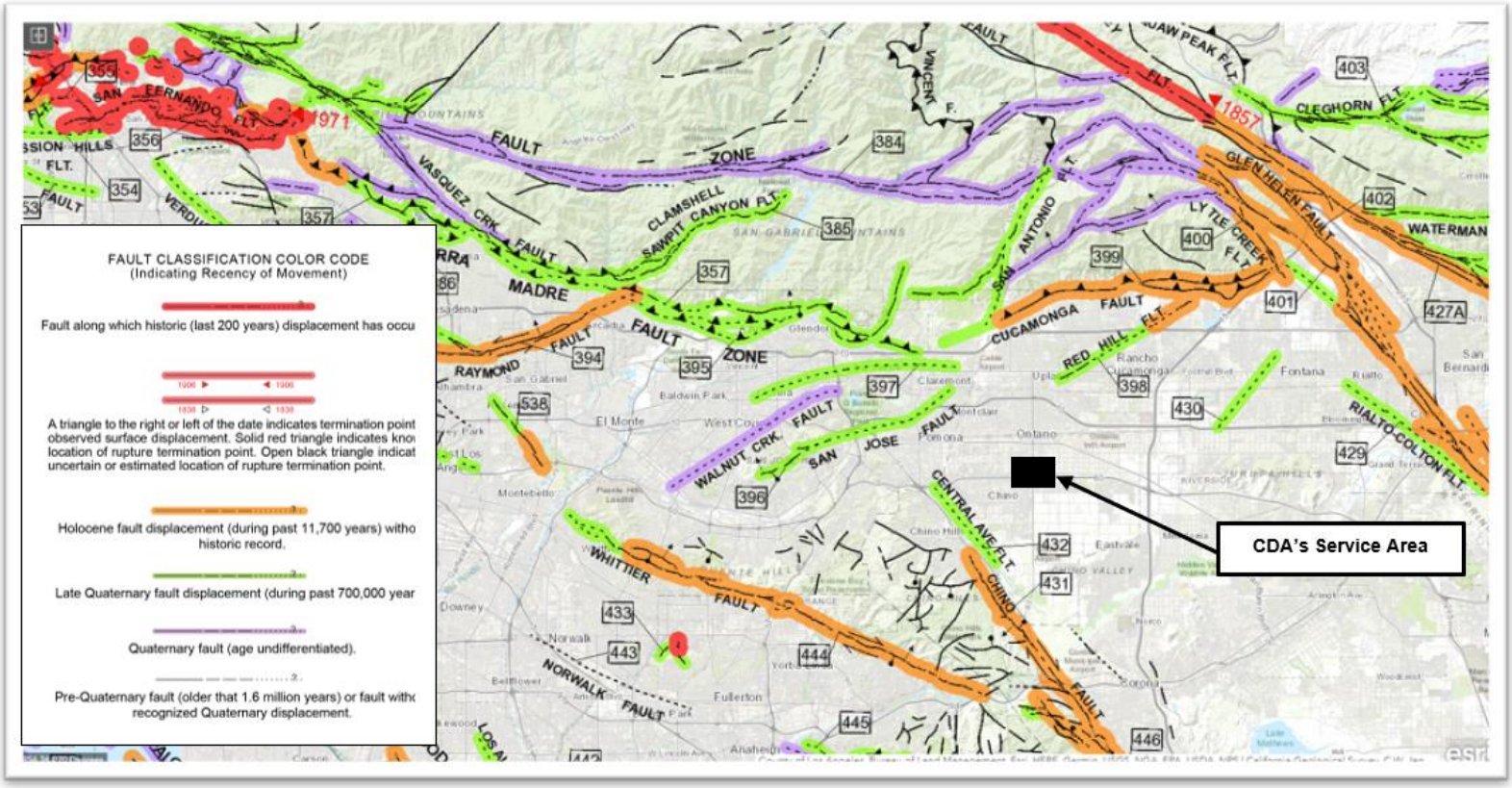
(c) An urban water supplier may comply with this section by submitting, pursuant to Section 10644, a copy of the most recent adopted local hazard mitigation plan or multihazard mitigation plan under the federal Disaster Mitigation Act of 2000 (Public Law 106-390) if the local hazard mitigation plan or multihazard mitigation plan addresses seismic risk.

The County of San Bernardino prepared a "Multi-Jurisdictional Hazard Mitigation Plan" which was approved by the Federal Emergency Management Agency (FEMA) in June 2017. The County's Multi-Jurisdictional Hazard Mitigation Plan identified methods to assess significant natural hazards (including earthquakes) affecting areas throughout San Bernardino County, and the mitigation strategies necessary to reduce risks, including seismic risk. The County's Multi-Jurisdictional Hazard Mitigation Plan is provided in Appendix E.

The County of Riverside prepared a "Multi-Jurisdictional Local Hazard Mitigation Plan" which was approved by FEMA in June 2018. The County's Multi-Jurisdictional Local Hazard Mitigation Plan identified methods to assess significant natural hazards (including earthquakes) affecting areas throughout Riverside County, and the mitigation strategies necessary to reduce risks, including seismic risk. The County's Multi-Jurisdictional Local Hazard Mitigation Plan is provided in Appendix F.

The California Geological Survey has published the locations of numerous faults which have been mapped in the Southern California region. Although the San Andreas fault is the most recognized and is capable of producing an earthquake with a magnitude greater than 8 on the Richter scale, some of the lesser-known faults have the potential to cause significant damage. The locations of these earthquake faults in the vicinity of the area receiving water supplies form CDA are provided in the figure below. The faults that are located in close proximity to and could potentially cause significant shaking in the area receiving water supplies from CDA include the San Andreas fault, the San Jose fault, the Red Hill fault, the Cucamonga fault, the Chino fault, the Central Avenue fault, and the Sierra Madre fault.

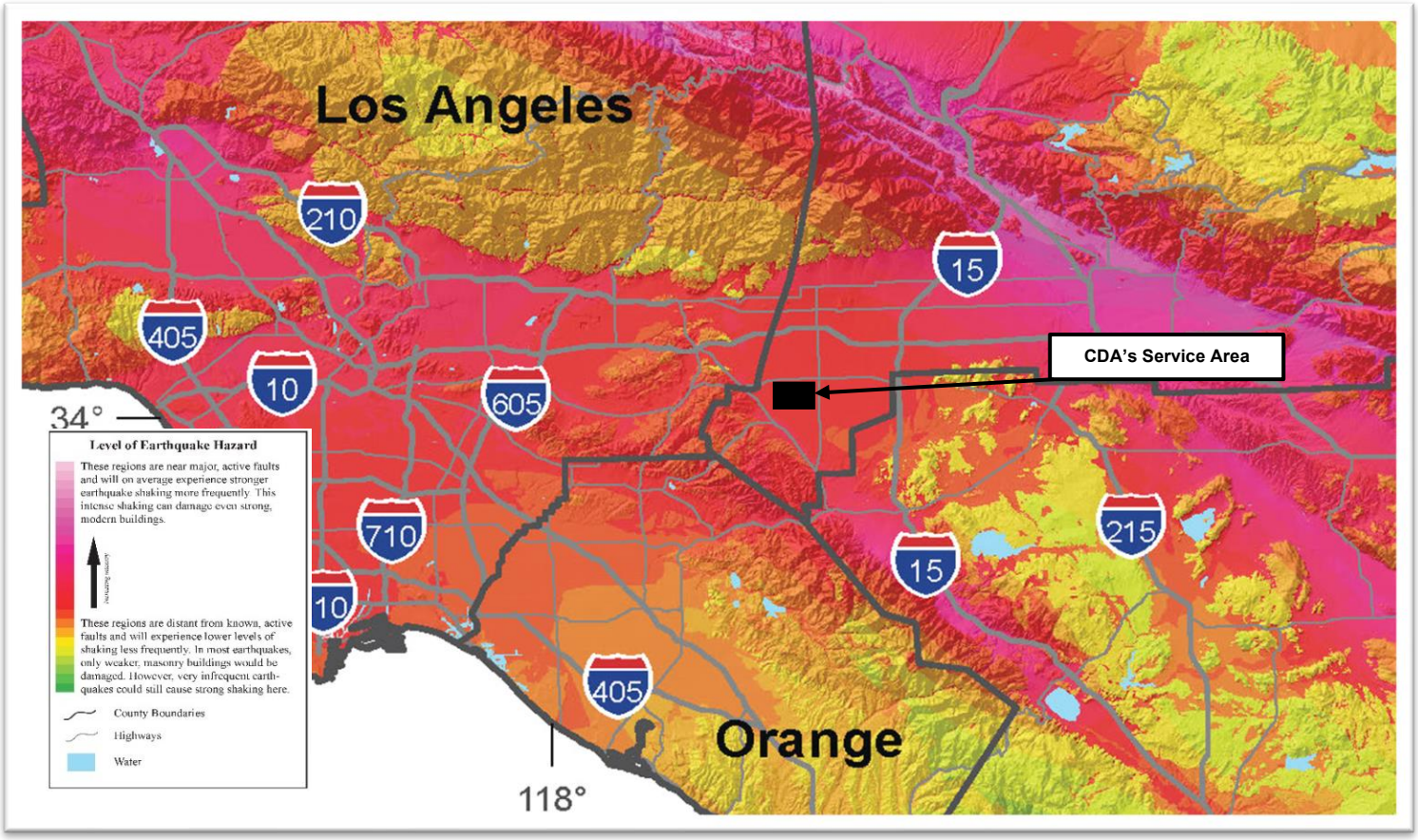
Location of Earthquake Faults



Source: https://maps.conservation.ca.gov/cgs/fam/App/

The following figure provides the relative intensity of ground shaking in the vicinity of the area receiving water supplies from CDA from anticipated future earthquakes. The locations of relatively long-period (1.0 second) earthquake shaking, including the are receiving water supplies from CDA, are provided. Long-period shaking affects tall, relatively flexible buildings, but also correlates with earthquake damage. The shaking potential is calculated based on the level of ground motion that has a 2 percent chance of being exceeded in 50 years (or the level of ground-shaking with an approximate 2,500-year average repeat time). As discussed in Section 8.4.5, CDA has prepared an Emergency Response Plan which provides the management, procedures, and designated actions CDA and its employees will implement during emergency situations resulting from natural disasters, including during earthquakes, to ensure that member agencies receive a reliable and adequate supply of potable water. CDA's ERP is incorporated by reference.

Earthquake Shaking Potential



Source: "Earthquake Shaking Potential for California", 2016, California Geological Survey and United States Geological Survey

8.4.7 SHORTAGE RESPONSE ACTION EFFECTIVENESS

CDA serves a dual purpose of providing reliable water supply and improving groundwater quality in the Chino Basin. CDA's member agencies are required to purchase a minimum amount of treated water production to support this function. The groundwater production is required to maintain groundwater cleanup priorities and is not subject to interruption. Nonetheless, CDA supports local agencies in efforts to enforce regulations and prohibitions on water use. The effectiveness of each of CDA's member agencies' shortage response actions, designed in support of IEUA's and WMWD's shortage response actions for its member agencies to reduce any potential gaps between their individual portfolios of supply and demand, has been quantified in Table 8-2 and Table 8-3. These tables are representative of CDA's member agencies' expected demand reduction pursuant to IEUA's and/or WMWD's shortage response actions described in Section 8.4.1.

Section 6.1 provides a tabulation of CDA's historical annual water demands from its member agencies for its water supply source. During the past 10 years, CDA experienced a five consecutive year drought within the area receiving its water supplies from FY 2011-12 to FY 2015-16. Throughout this extended dry year period, CDA's annual water production ranged from 27,098 AF to 30,022 AF, with an average of approximately 28,595 AF. In addition, historical records indicate CDA previously produced a maximum of up to 35,003 AF during FY 2019-20.

CDA's water demands from its member agencies during the most recent five years (from FY 2015-16 to FY 2019-20) averaged approximately 30,519 AFY. As discussed in Section 8.4.2, based on historical and on-going management practices, CDA will be able to continue providing potable water to its member agencies from the Chino Basin in response to each of the standard water shortage levels identified in Section 8.3.

8.5 COMMUNICATION PROTOCOLS

CWC 10632.

(a)(5) Communication protocols and procedures to inform customers, the public, interested parties, and local, regional, and state governments, regarding, at a minimum, all of the following:

(A) Any current or predicted shortages as determined by the annual water supply and demand assessment described pursuant to Section 10632.1.

(B) Any shortage response actions triggered or anticipated to be triggered by the annual water supply and demand assessment described pursuant to Section 10632.1.

(C) Any other relevant communications.

Pursuant to CWC 10632.1, CDA's Annual Assessment will be submitted to DWR by July 1 of each year or within 14 days of receiving its final allocation, whichever is later. The Annual Assessment will include a review of CDA's unconstrained water demands from its member agencies (i.e. water demands from its member agencies prior to any projected response actions CDA may trigger under this WSCP) for the current year and the upcoming (potential single dry) year. However, the groundwater production is required to maintain groundwater cleanup priorities and is not subject to interruption. See Section 8.2 for more information regarding the Annual Assessment.

IEUA Member Agencies

IEUA's communication protocols and procedures to inform its customers, the public, interested parties, and local, regional, and state governments, of current or predicted shortages and any triggered shortage response actions can be found in IEUA's 2020 UWMP, including:

- The IEUA Drought Response Taskforce to gain consensus on appropriate regional response actions. The taskforce is comprised of representatives from each of the eight IEUA member agencies and regional personnel from IEUA. These recommendations will be brought to each agency's respective management for approval. CDA will utilize broad messaging through IEUA (news stories, radio/tv ads, billboards, etc.) to communicate water scarcity, urgency to act, and commitment to continue to provide safe, reliable supply. Additionally, CDA will utilize targeted action messaging through IEUA aimed towards specific customers via phone, letter, email, etc.

WMWD Member Agencies

WMWD's communication protocols and procedures to inform its customers, the public, interested parties, and local, regional, and state governments, of current or predicted shortages and any triggered shortage response actions can be found in WMWD's 2020 UWMP, including:

- WMWD shall provide written notice by mail of:
    - Proposed increases to such rates and charges to the record owner of each parcel upon which the rates and charges are proposed for imposition and any tenant directly liable for payment of the rates.
    - The amount of the rates and charges proposed to be implemented on each parcel.
    - The basis upon which the rates and charges were calculated.
    - The reason for the rates and charges.
    - And the date, time, and location of a public hearing on the proposed rates and charges.

  Such notice is required to be provided to the affected property owners and any tenant directly liable for the payment of the rates and charges no less than 45 days prior to the public hearing on the proposed rates and charges.
- The declaration of any water shortage level or sub-level shall be made by resolution of the Board of Directors. Within 10 calendar days of the adoption of the resolution declaring the applicable level or sub-level, WMWD shall make a public announcement and provide notice of the applicable standard water shortage level. Such declaration and notice shall provide the extent, terms, and conditions as well as the associated water budget allocations and fines and/or penalties respecting the use and consumption of water in accordance with the applicable water shortage level. Upon such declaration and publication of such notice, due and proper notice shall be deemed to have been given to each and every person supplied water with WMWD. The water shortage level designated shall become effective immediately upon announcement.

8.6 COMPLIANCE AND ENFORCEMENT

CWC 10632.

(a)(6) For an urban retail water supplier, customer compliance, enforcement, appeal, and exemption procedures for triggered shortage response actions as determined pursuant to Section 10632.2.

As a wholesale supplier, CDA is not required by DWR to complete Section 8.6.

8.7 LEGAL AUTHORITIES

CWC 10632.

(a)(7)(A) A description of the legal authorities that empower the urban water supplier to implement and enforce its shortage response actions specified in paragraph (4) that may include, but are not limited to, statutory authorities, ordinances, resolutions, and contract provisions.

(B) A statement that an urban water supplier shall declare a water shortage emergency in accordance with Chapter 3 (commencing with Section 350) of Division 1.

(C) A statement that an urban water supplier shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code.

CWC Division 1, Section 350

The governing body of a distributor of a public water supply, whether publicly or privately owned and including a mutual water company, shall declare a water shortage emergency condition to prevail within the area served by such distributor whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection.

CDA's groundwater production is required to maintain groundwater cleanup priorities and is not subject to interruption.

CDA's member agencies may declare a water shortage emergency and may immediately enact the response actions of any of the levels designated in this WSCP and their own individual WSCP's. The required measures of the designated water shortage level determined by the member agency will be communicated to the public within their service area.

CDA shall coordinate with any city, county, or agency within which it provides water supply services for the possible proclamation of a local emergency.

8.8 FINANCIAL CONSEQUENCES OF WSCP

CWC 10632.

(a)(8) A description of the financial consequences of, and responses for, drought conditions, including, but not limited to, all of the following:

(A) A description of potential revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4).

(B) A description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4).

(C) A description of the cost of compliance with Chapter 3.3 (commencing with Section 365) of Division 1.

CDA serves a dual purpose of providing reliable water supply and managing groundwater quantity and quality in the Chino Basin. CDA member agencies are required to purchase a minimum amount of production to support this function. These minimum purchase agreements form a fixed portion of the water supply portfolios of each of the CDA retail member agencies. Implementation of the provisions of this WSCP does not pose any impending financial consequences to CDA, due to member agencies' minimum purchase agreements. Revenues are constant, as are the expenditures.

Expenditures may be impacted only in the event of a catastrophic interruption of water supplies. Damages would increase expenditures in case of necessary emergency repairs. Expenditures on power, water treatment chemicals, and operational costs would decrease during emergency repairs, where CDA would pump less water.

8.9 MONITORING AND REPORTING

CWC 10632.

(a)(9) For an urban retail water supplier, monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance and to meet state reporting requirements.

As a wholesale supplier, CDA is not required by DWR to complete Section 8.9.

8.10 WSCP REFINEMENT PROCEDURES

CWC 10632.

(a)(10) Reevaluation and improvement procedures for systematically monitoring and evaluating the functionality of the water shortage contingency plan in order to ensure shortage risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented as needed.

CDA's groundwater production is required to maintain groundwater cleanup priorities and is not subject to interruption. Nonetheless, CDA's Water Shortage Contingency Plan has been prepared as an adaptive management plan in support of CDA's member agencies' requirement to reduce demand on water supplies during designated water shortage levels. CDA's member agencies will review the implementation results for any current or potential shortage gaps between water supplies and demands. CDA will evaluate the need for revising the Water Shortage Contingency Plan, as necessary, based on IEUA and/or WMWD's implementation results of their WSCPs. CDA will consider the following potential revisions made by IEUA and/or WMWD in the event of a potential shortage gap:

- Implementation of additional public outreach, education, and communication programs (in addition to the programs discussed in Chapter 9).
- Incorporation of additional actions recommended by CDA, IEUA, and/or WMWD staff or other interested parties.

This Water Shortage Contingency Plan is adopted as part of CDA's 2020 Urban Water Management Plan adoption process discussed in Section 10.3. It is anticipated CDA will review, revise, and adopt an updated Water Shortage Contingency Plan as part of preparing its 2025 Urban Water Management Plan as necessary. However, CDA may update the Water Shortage Contingency Plan, as necessary. Any updates to CDA's Water Shortage Contingency Plan will include a public hearing and adoption process by CDA's Board (see Section 8.12).

8.11 SPECIAL WATER FEATURE DISTINCTION

CWC 10632.

(b) For purposes of developing the water shortage contingency plan pursuant to subdivision (a), an urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

As a wholesale supplier, CDA is not required by DWR to complete Section 8.11.

8.12 PLAN ADOPTION, SUBMITTAL, AND AVAILABILITY

CWC 10632.

(c) The urban water supplier shall make available the water shortage contingency plan prepared pursuant to this article to its customers and any city or county within which it provides water supplies no later than 30 days after adoption of the water shortage contingency plan.

CDA's Water Shortage Contingency Plan is adopted as part of CDA's 2020 Urban Water Management Plan adoption process discussed in Chapter 10. The process for adopting CDA's Water Shortage Contingency Plan includes the following:

- CDA will conduct a public hearing and make the Water Shortage Contingency Plan available for public inspection.
- CDA will provide notification of the time and place of the public hearing to any city or county in which water is provided.
- CDA will publish notice of public hearing in a newspaper once a week, for two successive weeks (with at least five days between publication dates).
- CDA's Board will adopt the 2020 Urban Water Management Plan and the Water Shortage Contingency Plan.
- As part of submitting the 2020 Urban Water Management Plan to DWR, CDA will also submit the Water Shortage Contingency Plan (electronically through DWR's online submittal tool) within 30 days of adoption and by July 1, 2021. CDA will submit a copy of the Water Shortage Contingency Plan to the California State Library and to any city or county in which water is provided within 30 days of adoption. In addition, CDA will make the Water Shortage Contingency Plan available for public review within 30 days of adoption.

If there are any subsequent amendments required, the process for adopting an amended Water Shortage Contingency Plan includes the following:

- CDA will conduct a public hearing and make the amended Water Shortage Contingency Plan available for public inspection.
- CDA's Board will adopt the amended Water Shortage Contingency Plan.
- CDA will submit the amended Water Shortage Contingency Plan to DWR (electronically through DWR's online submittal tool) within 30 days of adoption.

Additional information regarding the adoption, submittal, and availability of CDA's Water Shortage Contingency Plan (and 2020 Urban Water Management Plan) is provided in Chapter 10.

Chapter 9

DEMAND MANAGEMENT MEASURES

LAY DESCRIPTION – CHAPTER 9

DEMAND MANAGEMENT MEASURES

Chapter 9 (Demand Management Measures) of CDA's 2020 Plan discusses and provides the following:

- CDA has implemented "Demand Management Measures" to reduce its water demands and achieve its water use targets (discussed in Chapter 5).
- CDA's Demand Management Measures include metering of all its water supply connections with its retail member agencies.
- CDA's Demand Management Measures include public education and outreach programs regarding water conservation.
- CDA's Demand Management Measures include staffing of its water conservation program.
- Additional Demand Management Measures including rebate, conservation, asset management, and wholesale supplier assistance programs are discussed.
- A summary of the Demand Management Measures CDA has implemented over the past five (5) years is provided.

9.1 DEMAND MANAGEMENT MEASURES FOR WHOLESALE SUPPLIERS

CWC 10631.

(e) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1)(B) The narrative pursuant to this paragraph shall include descriptions of the following water demand management measures:

(ii) Metering.

(iv) Public education and outreach.
(vi) Water conservation program coordination and staffing support.

(vii) Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovative measures, if implemented.

(2) For an urban wholesale water supplier, as defined in Section 10608.12, a narrative description of the items in clauses (ii), (iv), (vi), and (vii) of subparagraph (B) of paragraph (1),

and a narrative description of its distribution system asset management and wholesale supplier assistance programs.

CDA delivers desalinated Chino Basin groundwater to its member agencies which in turn, participate in conservation efforts made by IEUA or WMWD.

9.1.1 METERING

CDA fully meters its connections to its member agencies. All agency connections are administered by purchasing agreements with CDA and its member agencies.

9.1.2 PUBLIC EDUCATION AND OUTREACH

CDA's member agencies' customers have access to IEUA and WMWD public information programs which promote water conservation. IEUA and WMWD provide marketing and outreach materials by using social media platforms, websites, community events, education training, monthly newsletters, and direct communication to retail consumers regarding water use. Retail consumers learn about rebates and additional programs through the IEUA and WMWD websites.

WMWD provides customer support programs such as free efficiency evaluations for irrigation systems and tips for efficient landscaping. WMWD also promotes regional programs such as Riverside County gardening workshops, national green plumbing training programs, and water efficient landscape training programs.

IEUA provides water use efficiency programs, water saving tips, and rebates to retail consumers. Water use efficiency programs include free landscape design training, consultations, and design renderings; irrigation auditing; and pressure regulation valve installation, repair, and maintenance. IEUA also offers a residential automatic water softener rebate. IEUA also hosts and sponsors a wide range of community events including Earth Day Celebration, compost giveaways, Days at the LA Fair, and a Landscape Water Conservation Fair.

IEUA and WMWD conduct water conservation school education programs to the regional elementary schools. Programs include school assemblies and lesson materials to educate students on water conservation. IEUA and WMWD are members of the Water Education Water Awareness Committee (WEWAC) which provides water education to local schools, including schools within CDA's member agencies' service areas. WEWAC hosts art and essay contests and provides financial support for lesson plan materials about water issues.

9.1.3 WATER CONSERVATION PROGRAM COORDINATION AND STAFFING SUPPORT

CDA's member agencies maintain staff who are responsible for setting policies and priorities of their respective agencies. Monthly board and city council meetings are conducted to adopt programs contributing to water reliability which the CDA member agency staff then implement through conservation programs. Key objectives include promoting education and water use efficiency to enhance water supplies. CDA's member agency staff are responsible for marketing, outreach, and possible augmentation programs within their individual service areas.

9.1.4 OTHER DEMAND MANAGEMENT MEASURES

In addition to the Demand Management Measures (DMMs) discussed above, IEUA and WMWD participate in MWD's SoCal Water$mart Program, a regional rebate program available to residential and commercial customers. There are rebates available for indoor plumbing including high efficiency clothes washers and toilets. Rebates are also available for outdoor plumbing, including those for weather-based irrigation controllers, rotating sprinkler nozzles, and replacement of irrigated lawn with drought tolerant plants or other approved landscape options. IEUA and WMWD plan to continue implementation of these programs to promote water conservation for CDA's member agencies.

9.1.5 ASSET MANAGEMENT

CDA manages long-term assets through its Capital Improvement Program. Renewal and replacement activities are anticipated and budgeted through annual budget planning and financial reports. Short-term asset management is addressed through preventative and corrective maintenance programs for the desalter facilities.

9.1.6 WHOLESALE SUPPLIER ASSISTANCE PROGRAMS

Wholesale supplier assistance programs are administered by IEUA and WMWD for CDA's member agencies. As discussed in the introduction to Chapter 9, CDA promotes conservation through IEUA and WMWD, who provide marketing and outreach materials to its retail consumers using social media platforms, their websites, community events, education training, monthly newsletters, and direct communication to consumers regarding their water use.

9.2 EXISTING DEMAND MANAGEMENT MEASURES FOR RETAIL SUPPLIERS

CWC 10631.

(e) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1)(A) For an urban retail water supplier, as defined in Section 10608.12, a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years. The narrative shall describe the water demand management measures that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.20.

(B) The narrative pursuant to this paragraph shall include descriptions of the following water demand management measures:

(i) Water waste prevention ordinances.

(ii) Metering.

(iii) Conservation pricing.

(iv) Public education and outreach.

(v) Programs to assess and manage distribution system real loss.

(vi) Water conservation program coordination and staffing support.

(vii) Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovative measures, if implemented.

As a wholesale agency, CDA is not required by DWR to complete Section 9.2.

9.3 REPORTING IMPLEMENTATION

9.3.1 IMPLEMENTATION OVER THE PAST FIVE YEARS

CWC 10631.

(e) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) (A) ...a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years.

CDA is committed to implementing water conservation programs through IEUA and WMWD to provide water conservation programs for their member agencies' customers. The highlights of DMM implementation over the past five years are described below.

As discussed in Section 9.1.1, CDA fully meters its connections to its member agencies. All agency connections are administered by purchasing agreements between the member agencies and CDA.

As discussed in Section 9.1.2, CDA customers have access to IEUA and WMWD public information programs to promote water conservation. IEUA and WMWD provide marketing and outreach materials by using social media platforms, their websites, community events, education training, monthly newsletters, and direct communication to retail consumers regarding their water use. Customers learn about rebates and additional programs through the IEUA and WMWD websites. IEUA and WMWD are also members of the WEWAC that promotes the education of water issues to local schools, including schools within CDA's member agency service areas.

As discussed in Section 9.1.3, CDA's member agency staff are responsible for setting policies and priorities of the agencies. Monthly board and city council meetings are conducted to adopt programs contributing to water reliability which CDA member agency staff then implement through conservation programs. Key objectives include promoting education and water use efficiency to enhance water supplies and reduce demand on imported water supply.

As discussed in Section 9.1.4, in addition to the DMMs discussed above, IEUA and WMWD participate in MWD's regional rebate program, the SoCal Water$mart Program, which is available to residential and commercial customers.

As described in Section 9.1.5, CDA manages long-term assets through the Capital Improvement Program. Renewal and replacement activities are anticipated and budgeted through annual budget planning and financial reports. Short-term asset management is handled through preventative and corrective maintenance programs for the desalter facilities.

As described in Section 9.1.6, wholesale supplier assistance programs are administered by IEUA and WMWD for CDA's member agencies.

9.3.2 IMPLEMENTATION TO ACHIEVE WATER USE TARGETS

CWC 10631.

(F)(1)(A) For an urban retail water supplier, as defined in Section 10608.12, a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years. The narrative shall describe the water demand management measures that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.20.

The Demand Management Measures implemented by CDA are discussed in Section 9.2. Descriptions regarding the nature and extent of these Demand Management Measures implemented by CDA over the past five years are discussed in Section 9.3. CDA will continue to implement these Demand Management Measures and other water conservation programs and work collaboratively with IEUA and WMWD to provide water conservation programs for CDA's member agencies' residents.

9.4 WATER USE OBJECTIVES (FUTURE REQUIREMENTS)

Retail water agencies are currently working with DWR to develop Water Use Objectives pursuant to Assembly Bill (AB) 1668 and Senate Bill (SB) 606. Beginning in 2024, retail water agencies are required to begin reporting compliance of their Water Use Objectives consisting of indoor residential water use, outdoor residential water use, commercial, industrial and institutional, irrigation with dedicated meters, water loss, and other unique local uses.

CDA is not a retail water agency and is not required to comply with the Water Use Objectives. However, CDA will continue to implement the Demand Management Measures discussed in Section 9.2.

Chapter 10

PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

LAY DESCRIPTION – CHAPTER 10

PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

Chapter 10 (Plan Adoption, Submittal, and Implementation) of CDA's 2020 Plan discusses and provides the following:

- The steps CDA has performed to adopt and submit its 2020 Plan are detailed.
- The steps CDA has performed to adopt and submit its Water Shortage Contingency Plan are detailed.
- CDA coordinated the preparation of its 2020 Plan with Cities of Chino, Chino Hills, Eastvale, Jurupa Valley, Norco, Ontario, the Counties of San Bernardino and Riverside, and other agencies. CDA notified these agencies at least sixty (60) days prior to the public hearing of the preparation of the 2020 Plan and invited these agencies to participate in the development of the 2020 Plan.
- CDA provided a notice of the public hearing to the same agencies regarding the time, date, and place of the public hearing.
- CDA published a newspaper notification of the public hearing, once a week for two successive weeks
- CDA conducted a public hearing to discuss and adopt CDA's 2020 Plan and CDA's Water Shortage Contingency Plan.
- Within 30 days of adoption, CDA submitted the 2020 Plan and Water Shortage Contingency Plan to the California Department of Water Resources.
- Within 30 days of adoption, CDA submitted all data tables associated with the 2020 Plan to the California Department of Water Resources.
- Within 30 days of adoption, CDA submitted a copy of the 2020 Plan to the State of California Library.
- Within 30 days of adoption, CDA submitted a copy of the 2020 Plan (and Water Shortage Contingency Plan) to the County of San Bernardino Assessor- Recorder/ Clerk's office and the County of Riverside Assessor- County Clerk-Recorder's office.
- Within 30 days after submittal of the 2020 Plan to the California Department of Water Resources, CDA made the 2020 Plan (including the Water Shortage Contingency Plan) available at CDA's headquarters and on CDA's website.
- The steps CDA will perform to amend the 2020 Plan and/or the Water Shortage Contingency Plan, if necessary, are provided.

10.1 WSCP INCLUSION OF ALL 2020 DATA

The data provided in CDA's 2020 Plan and the WSCP is provided on a FY basis through June 30, 2020 (as discussed in Section 2.5).

10.2 NOTICE OF PUBLIC HEARING

CDA's public hearing notification process for its 2020 Plan and the WSCP is discussed below.

10.2.1 NOTICE TO CITIES AND COUNTIES

CWC 10621.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days before the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.

CWC 10642.

…The urban water supplier shall provide notice of the time and place of a hearing to any city or county within which the supplier provides water supplies. Notices by a local public agency pursuant to this section shall be provided pursuant to Chapter 17.5 (commencing with Section 7290) of Division 7 of Title 1 of the Government Code. A privately owned water supplier shall provide an equivalent notice within its service area…

10.2.1.1 60 DAY NOTIFICATION

As discussed in Section 2.6.2., CDA coordinated the preparation of the 2020 Plan with the Cities of Chino, Chino Hills, Eastvale, Jurupa Valley, Norco, Ontario, the Counties of San Bernardino and Riverside, and other agencies. CDA notified these agencies, as well as to the cities and county within which CDA provides water supplies, at least sixty (60) days prior to the public hearing of the preparation of the 2020 Plan and invited them to participate in the development of the Plan. A copy of the notification letters sent to these agencies is provided in Appendix C.

10.2.1.2 NOTICE OF PUBLIC HEARING

CDA provided a notice of the public hearing to the Cities of Chino, Chino Hills, Eastvale, Jurupa Valley, Norco, Ontario, the Counties of San Bernardino and Riverside, and other agencies. The notice includes the time and place of the public hearing. To ensure that the Plan and the WSCP were available for review, CDA placed a copy of the draft 2020 Plan and the draft WSCP at the

CDA headquarters and made a copy available for review on its website. Copies of the notice of the public hearing are provided in Appendix C.

10.2.1.3 SUBMITTAL TABLES

Table 10-1 summarizes the agencies which were provided notifications by CDA.

Table 10-1 Notification to Cities and Counties

Submittal Table 10-1 Wholesale: Notification to Cities and Counties (select one)		
☐	Supplier has notified more than 10 cities or counties in accordance with Water Code Sections 10621 (b) and 10642. **Completion of the table below is not required. Provide a separate list of the cities and counties that were notified.**	
	Provide the page or location of this list in the UWMP.	
☑	Supplier has notified 10 or fewer cities or counties. **Complete the table below.**	
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Chino	Yes	Yes
Chino Hills	Yes	Yes
Eastvale	Yes	Yes
Jurupa Valley	Yes	Yes
Norco	Yes	Yes
Ontario	Yes	Yes
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Riverside County	Yes	Yes
San Bernardino County	Yes	Yes
NOTES:		

10.2.2 NOTICE TO THE PUBLIC

CDA encouraged the active involvement of the population within the area which receives water supplies from CDA prior to and during the preparation of the Plan. Pursuant to Section 6066 of the Government Code, CDA published a notice of public hearing in the newspaper during the weeks of May 12, 2021 and May 19, 2021. A notice of public hearing was CDA's website. A copy of the published notice is provided in Appendix C. To ensure that the draft 2020 Plan and the draft WSCP were available for review, CDA placed a copy at the CDA's headquarters and made a copy available for review on its website.

CWC 10642.

...Prior to adopting either, the urban water supplier shall make both the plan and the water shortage contingency plan available for public inspection and shall hold a public hearing or hearings thereon. Prior to any of these hearings, notice of the time and place of the hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of a hearing to any city or county within which the supplier provides water supplies.

Government Code 6066.

Publication of notice pursuant to this section shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. The period of notice commences upon the first day of publication and terminates at the end of the fourteenth day, including therein the first day.

10.3 PUBLIC HEARING AND ADOPTION

CWC 10642.

...Prior to adopting either, the urban water supplier shall make both the plan and the water shortage contingency plan available for public inspection and shall hold a public hearing or hearings thereon.

CWC 10608.26.

(a) In complying with this part, an urban retail water supplier shall conduct at least one public hearing to accomplish all of the following:

(1) Allow community input regarding the urban retail water supplier's implementation plan for complying with this part.

(2) Consider the economic impacts of the urban retail water supplier's implementation plan for complying with this part.

(3) Adopt a method, pursuant to subdivision (b) of Section 10608.20, for determining its urban water use target.

10.3.1 PUBLIC HEARING

Prior to adopting the draft 2020 Plan and the WSCP, CDA held a public hearing on July 3, 2021 which included input from the community regarding CDA's draft 2020 Plan and the draft WSCP. In addition, CDA considered the economic impacts of meeting these water use targets; including measures described in Section 8.8.

10.3.2 ADOPTION

CWC 10642.

... After the hearing or hearings, the plan or water shortage contingency plan shall be adopted as prepared or as modified after the hearing or hearings.

Following the public hearing, CDA adopted both the draft 2020 Plan and the draft WSCP (included in Chapter 8). A copy of the resolution adopting the 2020 Plan and the WSCP is provided in Appendix G.

10.4 PLAN SUBMITTAL

CWC 10621.

(e) Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.

CWC 10644.

(a) (1) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption.

CWC 10635.

(c) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

CDA's submittal process for its 2020 Plan and the WSCP is discussed below.

10.4.1 SUBMITTING A UWMP AND WATER SHORTAGE CONTINGENCY PLAN TO DWR

CDA's Board of Directors adopted the 2020 Plan on June 3, 2021 and within 30 days of adoption, CDA submitted the adopted 2020 Plan (including the WSCP) to DWR. The 2020 Plan and WSCP were submitted through DWR's "Water Use Efficiency (WUE) Data Portal" website.

DWR developed a checklist which was used by CDA to assist DWR with its determination that CDA's 2020 Plan has addressed the requirements of the CWC. CDA has completed the DWR checklist by indicating where the required CWC elements can be found within CDA's 2020 Plan (See Appendix B).

10.4.2 ELECTRONIC DATA SUBMITTAL

CWC 10644.

(a)(2) The plan, or amendments to the plan, submitted to the department …shall be submitted electronically and shall include any standardized forms, tables, or displays specified by the department.

Within 30 days of adoption of the 2020 Plan, CDA submitted all data tables associated with the 2020 Plan through DWR's "Water Use Efficiency Data Portal" website.

10.4.3 SUBMITTING A UWMP, INCLUDING WSCP, TO THE CALIFORNIA STATE LIBRARY

Within 30 days of adoption of the 2020 Plan by the Board of Directors, a copy (CD or hardcopy) of the 2020 Plan was submitted to the State of California Library. A copy of the letter to the State Library will be maintained in CDA's file. The 2020 Plan will be mailed to the following address if sent by regular mail:

California State Library
Government Publications Section
Attention: Coordinator, Urban Water Management Plans
P.O. Box 942837
Sacramento, CA 94237-0001

The 2020 Plan will be mailed to the following address if sent by courier or overnight carrier:

California State Library
Government Publications Section
Attention: Coordinator, Urban Water Management Plans
900 N Street
Sacramento, CA 95814

10.4.4 SUBMITTING A UWMP TO CITIES AND COUNTIES

Within 30 days of adoption of the 2020 Plan (including the WSCP) by the Board of Directors, a copy of the 2020 Plan was submitted to the County of San Bernardino Assessor- Recorder/ Clerk's office and the County of Riverside Assessor- County Clerk-Recorder's office. A copy of the letters to the County of Riverside and San Bernardino will be maintained in CDA's file.

10.5 PUBLIC AVAILABILITY

CWC 10645.

(a) Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

(b) Not later than 30 days after filing a copy of its water shortage contingency plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

Within 30 days after submittal of the 2020 Plan to DWR, CDA made the 2020 Plan (including the WSCP) available at the CDA headquarters during normal business hours and on CDA's website.

10.6 NOTIFICATION TO PUBLIC UTILITIES COMMISSION

CWC 10621.

(c) An urban water supplier regulated by the Public Utilities Commission shall include its most recent plan and water shortage contingency plan as part of the supplier's general rate case filings.

CDA is not regulated by the California Public Utilities Commission.

10.7 AMENDING AN ADOPTED UWMP OR WATER SHORTAGE CONTINGENCY PLAN

CWC 10621.

(d)The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

CWC 10644.

(a)(1) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

CDA's amendment process for its 2020 Plan is discussed below.

10.7.1 AMENDING A UWMP

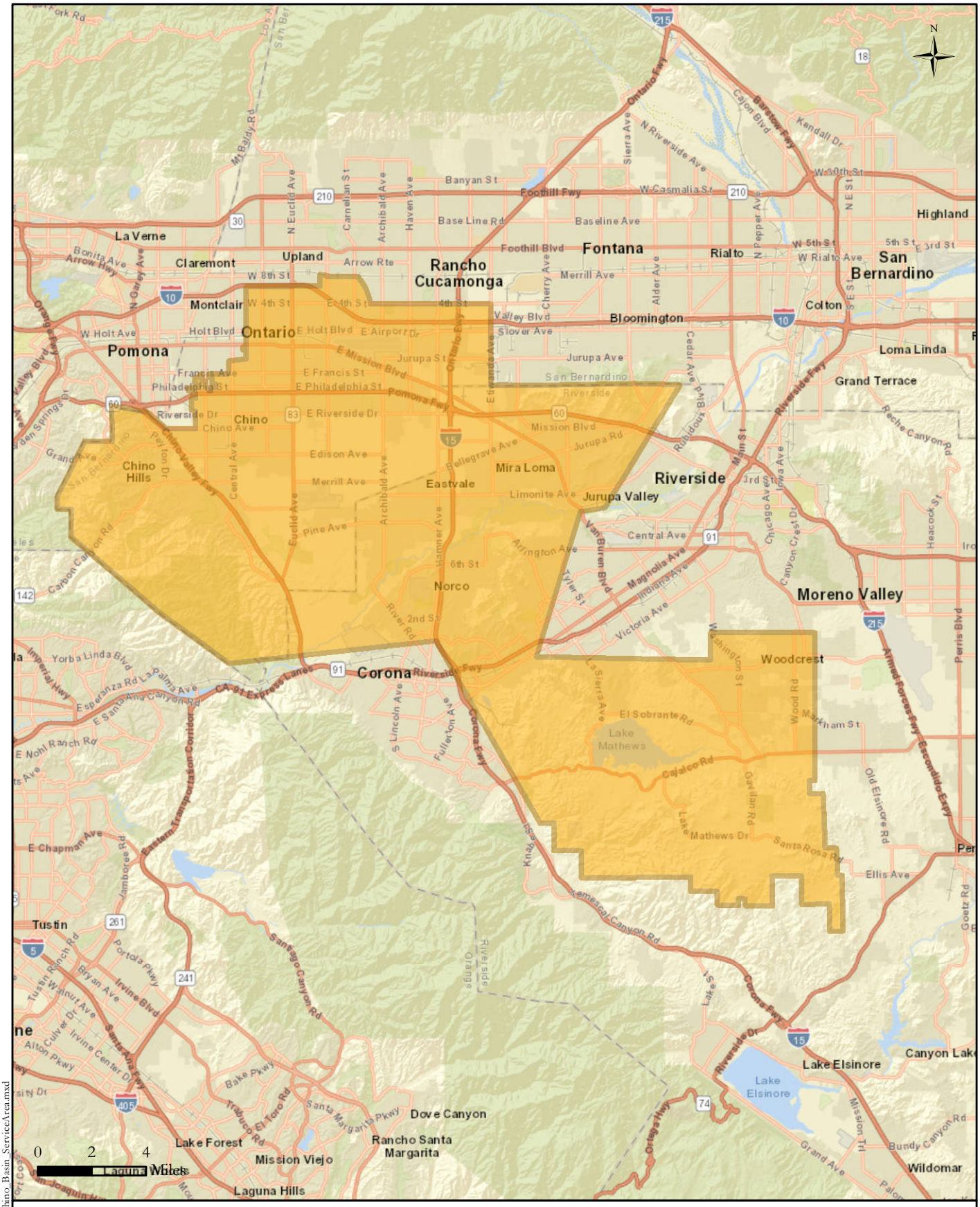
If CDA amends the adopted 2020 Plan, the amended Plan will undergo adoption by CDA's governing board. Within 30 days of adoption, the amended Plan will then be submitted to DWR, the State of California Library, the County of San Bernardino Assessor- Recorder/ Clerk's office and the County of Riverside Assessor- County Clerk-Recorder's office.

10.7.2 AMENDING A WATER SHORTAGE CONTINGENCY PLAN

CWC 10644.

(b) If an urban water supplier revises its water shortage contingency plan, the supplier shall submit to the department a copy of its water shortage contingency plan prepared pursuant to subdivision (a) of Section 10632 no later than 30 days after adoption, in accordance with protocols for submission and using electronic reporting tools developed by the department.

If CDA amends the adopted 2020 Plan (including the WSCP), the amended Plan (and WSCP) will undergo adoption by CDA's governing board. Within 30 days of adoption, the amended Plan (and WSCP) will then be submitted to DWR, the State of California Library, the County of San Bernardino Assessor- Recorder/ Clerk's office and the County of Riverside Assessor- County Clerk-Recorder's office.

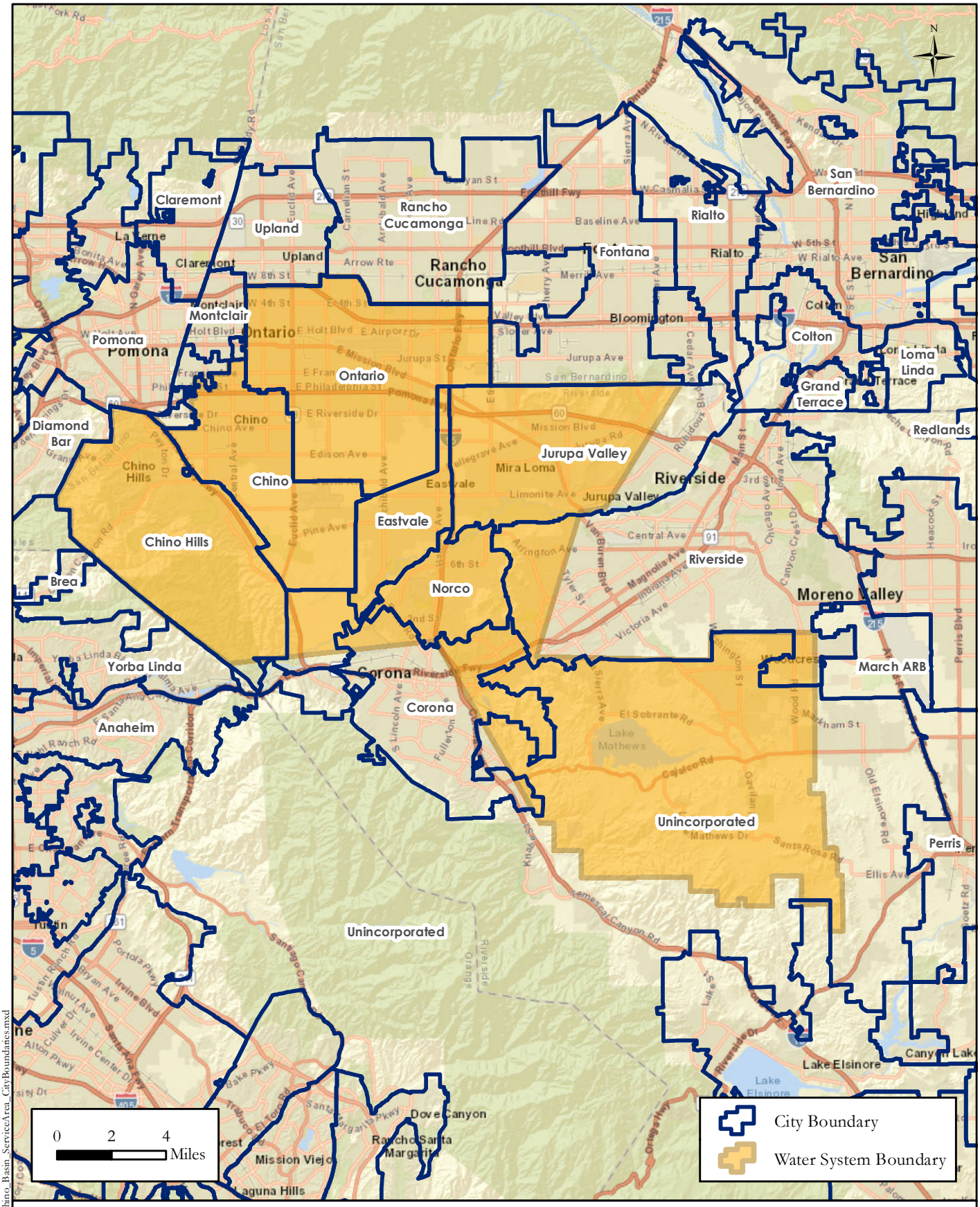


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STETSON ENGINEERS INC.

CHINO BASIN DESALTER AUTHORITY
WATER SERVICE AREA

FIGURE 2

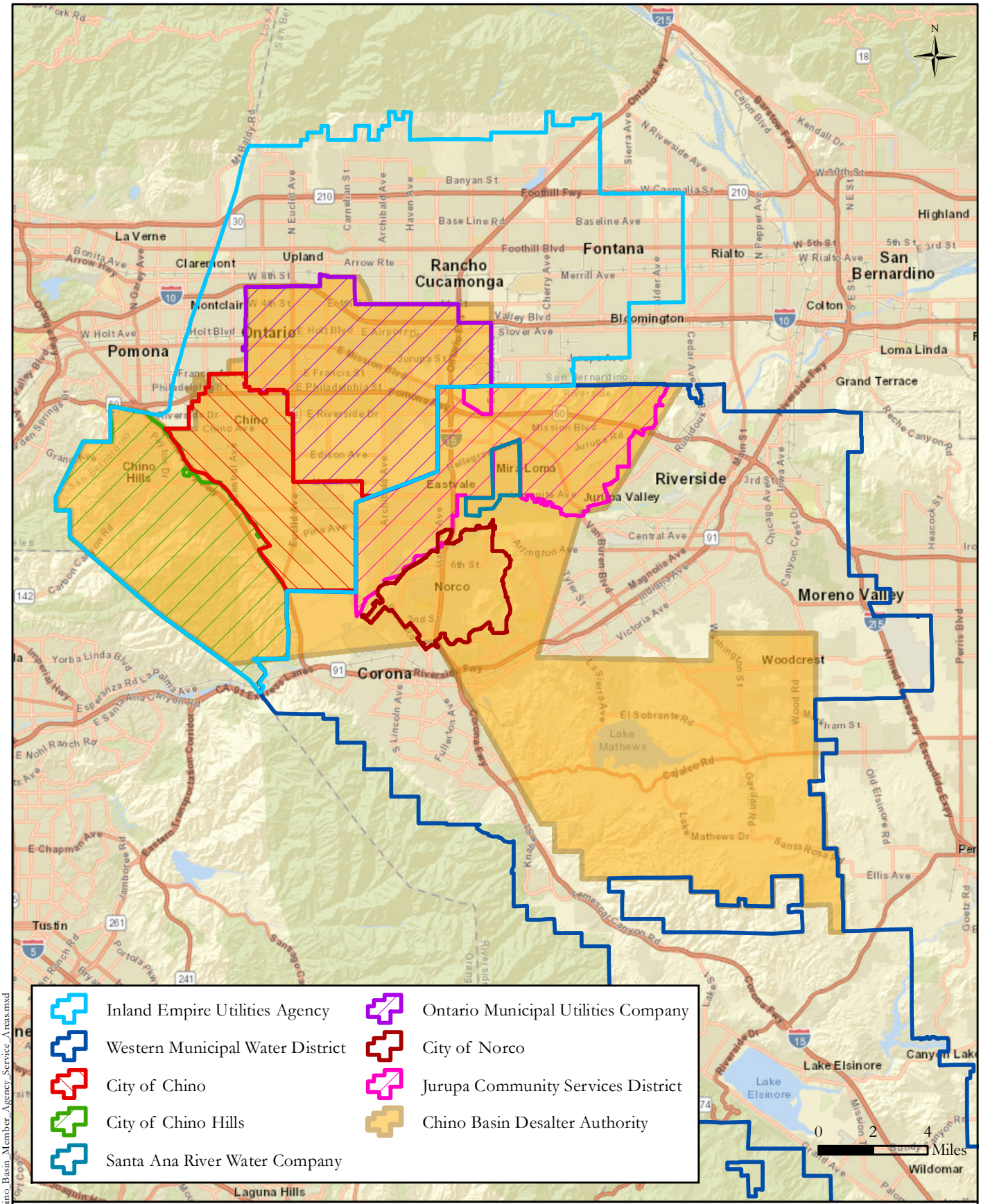


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STETSON ENGINEERS INC.

CHINO BASIN DESALTER AUTHORITY
SERVICE AREA
AND CITY BOUNDARIES

City Boundaries Source:
Census 2010 (TIGER 2011)

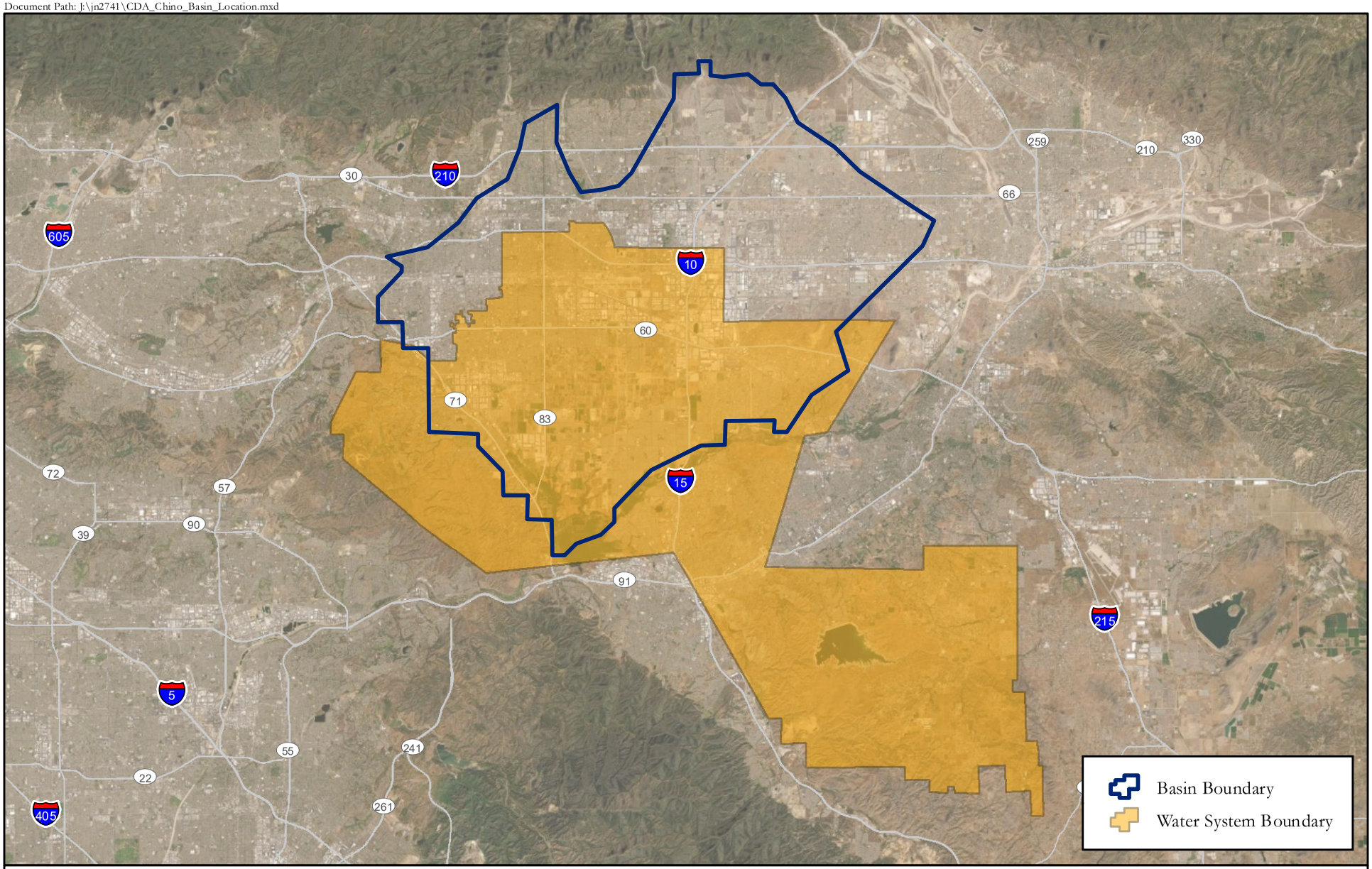


CHINO BASIN DESALTER AUTHORITY
MEMBER AGENCY SERVICE AREAS

STETSON ENGINEERS INC.

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STETSON ENGINEERS INC.

CHINO BASIN DESALTER AUTHORITY
CHINO BASIN LOCATION

0 2.5 5 Miles

N

FIGURE 4

2020 URBAN WATER MANAGEMENT PLAN

APPENDIX A

DWR STANDARDIZED TABLES

Submittal Table 2-2: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable* (select from drop down list)
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

Submittal Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
☑	Supplier is a wholesaler
☐	Supplier is a retailer
Fiscal or Calendar Year (select one)	
☐	UWMP Tables are in calendar years
☑	UWMP Tables are in fiscal years
If using fiscal years provide month and date that the fiscal year begins (mm/dd)	
07/01	
Units of measure used in UWMP * (select from drop down)	
Unit	AF
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES:	

Submittal Table 2-4 Wholesale: Water Supplier Information Exchange (select one)	
☑	Supplier has informed more than 10 other water suppliers of water supplies available in accordance with Water Code Section 10631. Completion of the table below is optional. If not completed, include a list of the water suppliers that were informed.
Section 2.6	**Provide page number for location of the list.**
☐	Supplier has informed 10 or fewer other water suppliers of water supplies available in accordance with Water Code Section 10631. **Complete the table below.**
Water Supplier Name	
Add additional rows as needed	
NOTES:	

Submittal Table 3-1 Wholesale: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	664,270	715,607	770,912	830,491	894,675	963,819
NOTES: The 2020 population and the populations projected through 2045 were based on ACS population data (2019 Census) and an average between CDA's historical annual population growth rate and IEUA's current projected growth rate (See Section 3.4.1 and Section 5.4.1).						

Submittal Table 4-1 Wholesale: Demands for Potable and Non-Potable[1] Water - Actual			
Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only use types that will be recognized by the WUE data online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume[2]
Add additional rows as needed			
Sales to other agencies		Drinking Water	30,247
Other Non-Potable	Waste Process Water	Raw Water	4,756
		TOTAL	35,003

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.*

[2] *Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

Submittal Table 4-2 Wholesale: Use for Potable and Raw Water [1] - Projected						
Use Type		Projected Water Use [2] Report To the Extent that Records are Available				
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool.	Additional Description (as needed)	2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Sales to other agencies		35,200	35,200	35,200	35,200	35,200
Other Non-Potable		4,800	4,800	4,800	4,800	4,800
TOTAL		40,000	40,000	40,000	40,000	40,000

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.*
Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3. [2]

NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2.

Submittal Table 4-3 Wholesale: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045 (opt)
Potable and Raw Water From Tables 4-1W and 4-2W	35,003	40,000	40,000	40,000	40,000	40,000
Recycled Water Demand* From Table 6-4W	0	0	0	0	0	0
TOTAL WATER DEMAND	35,003	40,000	40,000	40,000	40,000	40,000
**Recycled water demand fields will be blank until Table 6-4 is complete.*						
NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2.						

Submittal Table 6-1 Wholesale: Groundwater Volume Pumped						
☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
☑	All or part of the groundwater described below is desalinated.					
Groundwater Type Drop Down List	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
Add additional rows as needed						
Alluvial Basin	Chino Basin	28,191	28,284	29,918	31,199	35,003
	TOTAL	28,191	28,284	29,918	31,199	35,003
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES:						

Submittal Table 6-3 Wholesale: Wastewater Treatment and Discharge Within Service Area in 2020

☑ Wholesale Supplier neither distributes nor provides supplemental treatment to recycled water.
The Supplier will not complete the table below.

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)* [2]	Method of Disposal ***Drop down list***	Does This Plant Treat Wastewater Generated Outside the Service Area? ***Drop down list***	Treatment Level ***Drop down list***	2020 volumes [1] Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
Add additional rows as needed											
						Total	0	0	0	0	0

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.

[2] If the **Wastewater Discharge ID Number** is not available to the UWMP preparer, access the SWRCB CIWQS regulated facility website at https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility

NOTES:

Submittal Table 6-4 Wholesale: Current and Projected Retailers Provided Recycled Water Within Service Area							
☑	Recycled water is not directly treated or distributed by the Supplier. The Supplier will not complete the table below.						
Name of Receiving Supplier or Direct Use by Wholesaler	Level of Treatment *Drop down list*	2020*	2025*	2030*	2035*	2040*	2045* *(opt)*
Add additional rows as needed							
	Total	0	0	0	0	0	0
*** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.							
NOTES:							

Submittal Table 6-5 Wholesale: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual		
☑	Recycled water was not used or distributed by the supplier in 2015, nor projected for use or distribution in 2020. The wholesale supplier will not complete the table below.	
Name of Receiving Supplier or Direct Use by Wholesaler	2015 Projection for 2020*	2020 Actual Use*
Add additional rows as needed		
Total	0	0
Units of measure (AF, CCF, MG) *must remain consistent throughout the UWMP as reported in Table 2-3.*		
NOTES:		

Submittal Table 6-7 Wholesale: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☐	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
Section 6.2.8	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other suppliers?		Description *(if needed)*	Planned Implementation Year	Planned for Use in Year Type *Drop Down list*	Expected Increase in Water Supply to Supplier*
	Drop Down Menu	*If Yes, Supplier Name*				
Add additional rows as needed						
Chino I Desalter VOC Treatment Facilities Project	*Yes*	San Bernardino County	Install Granular Activated Carbi treatment to to treat existing CDA and proposed County-owned wells	2023	All Year Types	3,000
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Information obtained from CDA's "Chino I Desalter VOC Treatment Facilities Project Final Draft Basis of Design Report (BODR)", dated July 2020						

Submittal Table 6-8 Wholesale: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2020		
Drop down list May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool		Actual Volume*	Water Quality Drop Down List	Total Right or Safe Yield* (optional)
Add additional rows as needed				
Desalinated Water - Groundwater		35,003	Drinking Water	
	Total	35,003		0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES:				

Submittal Table 6-9 Wholesale: Water Supplies — Projected

Water Supply	Additional Detail on Water Supply	Projected Water Supply* Report To the Extent Practicable									
		2025		2030		2035		2040		2045 (opt)	
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Add additional rows as needed											
Desalinated Water - Groundwater		40,000		40,000		40,000		40,000		40,000	
Total		40,000	0	40,000	0	40,000	0	40,000	0	40,000	0

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2.

Submittal Table 7-1 Wholesale: Basis of Water Year Data (Reliability Assessment)

Year Type	Base Year If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 1999-2000, use 2000	Available Supplies if Year Type Repeats	
		☐ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____	
		☑ Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available *	% of Average Supply
Average Year	2020	40,000	100%
Single-Dry Year	2018	40,000	100.0%
Consecutive Dry Years 1st Year	2012	40,000	100.0%
Consecutive Dry Years 2nd Year	2013	40,000	100.0%
Consecutive Dry Years 3rd Year	2014	40,000	100.0%
Consecutive Dry Years 4th Year	2015	40,000	100.0%
Consecutive Dry Years 5th Year	2016	40,000	100.0%

Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a supplier uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table. Suppliers may create an additional worksheet for the additional tables.

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2.

Submittal Table 7-2 Wholesale: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	40,000	40,000	40,000	40,000	40,000
Demand totals *(autofill fm Table 4-3)*	40,000	40,000	40,000	40,000	40,000
Difference	0	0	0	0	0
NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2.					

Submittal Table 7-3 Wholesale: Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 (Opt)
Supply totals*	40,000	40,000	40,000	40,000	40,000
Demand totals*	40,000	40,000	40,000	40,000	40,000
Difference	0	0	0	0	0
Units of measure (AF, CCF, MG) *must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2.					

Submittal Table 7-4 Wholesale: Multiple Dry Years Supply and Demand Comparison						
		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	40,000	40,000	40,000	40,000	40,000
	Demand totals	40,000	40,000	40,000	40,000	40,000
	Difference	0	0	0	0	0
Second year	Supply totals	40,000	40,000	40,000	40,000	40,000
	Demand totals	40,000	40,000	40,000	40,000	40,000
	Difference	0	0	0	0	0
Third year	Supply totals	40,000	40,000	40,000	40,000	40,000
	Demand totals	40,000	40,000	40,000	40,000	40,000
	Difference	0	0	0	0	0
Fourth year	Supply totals	40,000	40,000	40,000	40,000	40,000
	Demand totals	40,000	40,000	40,000	40,000	40,000
	Difference	0	0	0	0	0
Fifth year	Supply totals	40,000	40,000	40,000	40,000	40,000
	Demand totals	40,000	40,000	40,000	40,000	40,000
	Difference	0	0	0	0	0
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
***Units of measure (AF, CCF, MG) m** ust remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2.						

Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)

2021	Total
Total Water Use	40,000
Total Supplies	40,000
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use	40,000
Total Supplies	40,000
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use	40,000
Total Supplies	40,000
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2024	Total
Total Water Use	40,000
Total Supplies	40,000
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2025	Total
Total Water Use	40,000
Total Supplies	40,000
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

Submittal Table 8-1 Water Shortage Contingency Plan Levels		
Shortage Level	**Percent Shortage Range**	**Shortage Response Actions** (*Narrative description*)
1	Up to 10%	IEUA member agencies may be subject to implement direct installation programs, hold more landscape workshops, consider escalation of local water waste prohibitions, etc. WMWD member agencies' customers may be subject to a 5 to 15% water use reduction.
2	Up to 20%	In addition to Shortage Level 1; IEUA member agencies may expand micro-targeting customers and increase marketing efforts. WMWD member agencies may be subject to prohibition of new water service and reductions in water budgets.
3	Up to 30%	In addition to Shortage Level 2; IEUA member agencies may increase penalties, implement emergency alerts, etc. WMWD member agencies may be subject to additional requirements deemed necessary by individual member agencies.
4	Up to 40%	In addition to Shortage Level 3; IEUA member agencies may be subject to additional requirements deemed necessary by individual member agencies. WMWD member agencies may be subject to additional requirements deemed necessary by individual member agencies.
5	Up to 50%	In addition to Shortage Level 4; IEUA member agencies may be subject to additional requirements deemed necessary by individual member agencies. WMWD member agencies may be subject to additional requirements deemed necessary by individual member agencies.
6	>50%	In addition to Shortage Level 5; IEUA member agencies may be subject to additional requirements deemed necessary by individual member agencies. WMWD member agencies may be subject to additional requirements deemed necessary by individual member agencies.
NOTES:		

Submittal Table 8-2: Demand Reduction Actions

Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
Add additional rows as needed				
1	Expand Public Information Campaign	Collective reduction from all Shortage Level 1 actions is up to 596 AFY	Applicable to IEUA member agencies	No
1	Increase Frequency of Meter Reading	Collective reduction from all Shortage Level 1 actions is up to 596 AFY	Applicable to IEUA member agencies	No
1	Increase Water Waste Patrols	Collective reduction from all Shortage Level 1 actions is up to 596 AFY	Applicable to IEUA member agencies	Yes
1	Implement or Modify Drought Rate Structure or Surcharge	Collective reduction from all Shortage Level 1 actions is up to 596 AFY	Applicable to WMWD member agencies	Yes
2	Other	Collective reduction from Shortage Level 1 plus all Shortage Level 2 actions is up to 1,193 AFY	All actions under Shortage Level 1	Yes
2	Moratorium or Net Zero Demand Increase on New Connections	Collective reduction from all Shortage Level 2 actions is up to 1,193 AFY	Applicable to IEUA member agencies	Yes
2	Implement or Modify Drought Rate Structure or Surcharge	Collective reduction from all Shortage Level 2 actions is up to 1,193 AFY	Applicable to WMWD member agencies	Yes
3	Other	Collective reduction from Shortage Level 2 plus all Shortage Level 3 actions is up to 1,789 AFY	All actions under Shortage Level 2	Yes
4	Other	Collective reduction from Shortage Level 3 plus all Shortage Level 4 actions is up to 2,386 AFY	All actions under Shortage Level 3	Yes
5	Other	Collective reduction from Shortage Level 4 plus all Shortage Level 5 actions is up to 2,982 AFY	All actions under Shortage Level 4	Yes
6	Other	Collective reduction from Shortage Level 5 plus all Shortage Level 6 actions is greater than 2,982 AFY	All actions under Shortage Level 5	Yes

NOTES: CDA promotes IEUA and WMWD water shortage response actions for its member agencies to reduce demand on their individual water supplies. Member agencies may employ their own demand reduction actions and/or IEUA or WMWD demand reduction actions at their own discretion.

Submittal Table 8-3: Supply Augmentation and Other Actions			
Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*
Add additional rows as needed			
1	Transfers	Not applicable (see Notes)	
2	Transfers	Not applicable (see Notes)	
3	Transfers	Not applicable (see Notes)	
4	Transfers	Not applicable (see Notes)	
5	Transfers	Not applicable (see Notes)	
6	Transfers	Not applicable (see Notes)	

NOTES: CDA will pump up to 40,000 AFY of contaminated groundwater from the Chino Basin for water quality management purposes, groundwater cleanup, and hydraulic control required by the Regional Water Quality Control Board. CDA will provide up to 35,200 AFY of treated water to its member agencies, as discussed in Section 6.2. CDA does not anticipate augmenting water supplies. However, CDA's member agencies will consider increased production from the Chino Basin (through potential transfer of water rights) using existing facilities to address increased demands. As noted on Table 8-2, CDA's member agencies plan to implement demand reduction measures in the event water supplies from existing sources are not sufficient to meet anticipated demands.

Submittal Table 10-1 Wholesale: Notification to Cities and Counties (select one)		
☐	Supplier has notified more than 10 cities or counties in accordance with Water Code Sections 10621 (b) and 10642. **Completion of the table below is not required. Provide a separate list of the cities and counties that were notified.**	
	Provide the page or location of this list in the UWMP.	
☑	Supplier has notified 10 or fewer cities or counties. **Complete the table below.**	
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Chino	Yes	Yes
Chino Hills	Yes	Yes
Eastvale	Yes	Yes
Jurupa Valley	Yes	Yes
Norco	Yes	Yes
Ontario	Yes	Yes
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Riverside County	Yes	Yes
San Bernardino County	Yes	Yes
NOTES:		

APPENDIX B

COMPLETED PLAN CHECKLIST

Retail	Wholesale	2020 Guidebook Location	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Chapter 1	A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities.	Introduction and Overview	Chapter 1 Lay Description
x	x	Chapter 1	Each plan shall include a simple description of the supplier's plan including water availability, future requirements, a strategy for meeting needs, and other pertinent information. Additionally, a supplier may also choose to include a simple description at the beginning of each chapter.	Summary	Beginning of each Chapter
x	x	Section 2.2	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.2
x	x	Section 2.6	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 2.6
x	x	Section 2.6.2	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan and contingency plan.	Plan Preparation	Section 2.6.2
x		Section 2.6, Section 6.1	Retail suppliers will include documentation that they have provided their wholesale supplier(s) - if any - with water use projections from that source.	System Supplies	Not applicable
	x	Section 2.6	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	Section 2.6
x	x	Section 3.1	Describe the water supplier service area.	System Description	Section 3.1
x	x	Section 3.3	Describe the climate of the service area of the supplier.	System Description	Section 3.3
x	x	Section 3.4	Provide population projections for 2025, 2030, 2035, 2040 and optionally 2045.	System Description	Section 3.4
x	x	Section 3.4.2	Describe other social, economic, and demographic factors affecting the supplier's water management planning.	System Description	Section 3.4.2
x	x	Sections 3.4 and 5.4	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4
x	x	Section 3.5	Describe the land uses within the service area.	System Description	Section 3.5
x	x	Section 4.2	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2
x	x	Section 4.2.4	Retail suppliers shall provide data to show the distribution loss standards were met.	System Water Use	Not applicable
x	x	Section 4.2.6	In projected water use, include estimates of water savings from adopted codes, plans and other policies or laws.	System Water Use	Section 4.2.6
x	x	Section 4.2.6	Provide citations of codes, standards, ordinances, or plans used to make water use projections.	System Water Use	Section 4.2.6
x	optional	Section 4.3.2.4	Report the distribution system water loss for each of the 5 years preceding the plan update.	System Water Use	Not applicable
x	optional	Section 4.4	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Not applicable
x	x	Section 4.5	Demands under climate change considerations must be included as part of the drought risk assessment.	System Water Use	Section 4.5
x		Chapter 5	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	Not applicable
x		Chapter 5	Retail suppliers shall meet their water use target by December 31, 2020.	Baselines and Targets	Not applicable
	x	Section 5.1	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	Section 5.1

Retail	Wholesale	2020 Guidebook Location	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x		Section 5.2	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Not applicable
x		Section 5.5	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Not applicable
x		Section 5.5 and Appendix E	Retail suppliers shall report on their compliance in meeting their water use targets. The data shall be reported using a standardized form in the SBX7-7 2020 Compliance Form.	Baselines and Targets	Not applicable
x	x	Sections 6.1 and 6.2	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought.	System Supplies	Sections 6.1, 6.2, 7.1, and 7.2
x	x	Sections 6.1	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought, *including changes in supply due to climate change.*	System Supplies	Section 6.1
x	x	Section 6.1	When multiple sources of water supply are identified, describe the management of each supply in relationship to other identified supplies.	System Supplies	Section 6.1
x	x	Section 6.1.1	Describe measures taken to acquire and develop planned sources of water.	System Supplies	Section 6.1.1
x	x	Section 6.2.8	Identify and quantify the existing and planned sources of water available for 2020, 2025, 2030, 2035, 2040 and optionally 2045.	System Supplies	Section 6.2.8
x	x	Section 6.2	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2
x	x	Section 6.2.2	Indicate whether a groundwater sustainability plan or groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	Section 6.2.2
x	x	Section 6.2.2	Describe the groundwater basin.	System Supplies	Section 6.2.2
x	x	Section 6.2.2	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.2.2
x	x	Section 6.2.2.1	For unadjudicated basins, indicate whether or not the department has identified the basin as a high or medium priority. Describe efforts by the supplier to coordinate with sustainability or groundwater agencies to achieve sustainable groundwater conditions.	System Supplies	Not applicable
x	x	Section 6.2.2.4	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	System Supplies	Section 6.2.2
x	x	Section 6.2.2	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Section 6.2.2
x	x	Section 6.2.7	Describe the opportunities for exchanges or transfers of water on a short-term or long- term basis.	System Supplies	Section 6.2.7
x	x	Section 6.2.5	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	Section 6.2.5
x	x	Section 6.2.5	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.2.5
x	x	Section 6.2.5	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.2.5
x	x	Section 6.2.5	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	Section 6.2.5
x	x	Section 6.2.5	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	Section 6.2.5
x	x	Section 6.2.5	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.2.5
x	x	Section 6.2.6	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.2.6
x	x	Section 6.2.5	Describe the wastewater collection and treatment systems in the supplier's service area with quantified amount of collection and treatment and the disposal methods.	System Supplies (Recycled Water)	Section 6.2.5
x	x	Section 6.2.8, Section 6.3.7	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and for a period of drought lasting 5 consecutive water years.	System Supplies	Sections 6.2.8 and 6.2.9

Retail	Wholesale	2020 Guidebook Location	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 6.4 and Appendix O	The UWMP must include energy information, as stated in the code, that a supplier can readily obtain.	System Suppliers, Energy Intensity	Section 6.4
x	x	Section 7.2	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Section 7.2
x	x	Section 7.2.4	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.2.4
x	x	Section 7.3	Service Reliability Assessment: Assess the water supply reliability during normal, dry, and a drought lasting five consecutive water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.3
x	x	Section 7.3	Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects.	Water Supply Reliability Assessment	Section 7.3
x	x	Section 7.3	Include a description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts 5 consecutive years.	Water Supply Reliability Assessment	Section 7.3
x	x	Section 7.3	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Water Supply Reliability Assessment	Section 7.3
x	x	Section 7.3	Include a comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.	Water Supply Reliability Assessment	Section 7.3
x	x	Section 7.3	Include considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.	Water Supply Reliability Assessment	Section 7.3
x	x	Chapter 8	Provide a water shortage contingency plan (WSCP) with specified elements below.	Water Shortage Contingency Planning	Chapter 8
x	x	Chapter 8	Provide the analysis of water supply reliability (from Chapter 7 of Guidebook) in the WSCP	Water Shortage Contingency Planning	Chapter 8
x	x	Section 8.10	Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Water Shortage Contingency Planning	Section 8.10
x	x	Section 8.2	Provide the written decision-making process and other methods that the supplier will use each year to determine its water reliability.	Water Shortage Contingency Planning	Section 8.2
x	x	Section 8.2	Provide data and methodology to evaluate the supplier's water reliability for the current year and one dry year pursuant to factors in the code.	Water Shortage Contingency Planning	Section 8.2
x	x	Section 8.3	Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and greater than 50 percent shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic interruption of supply.	Water Shortage Contingency Planning	Section 8.3
x	x	Section 8.3	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Water Shortage Contingency Planning	Section 8.3
x	x	Section 8.4	Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation actions.	Water Shortage Contingency Planning	Section 8.4.2
x	x	Section 8.4	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Water Shortage Contingency Planning	Section 8.4.1
x	x	Section 8.4	Specify locally appropriate operational changes.	Water Shortage Contingency Planning	Section 8.4.3
x	x	Section 8.4	Specify additional mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions are appropriate to local conditions.	Water Shortage Contingency Planning	Section 8.4.4
x	x	Section 8.4	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Water Shortage Contingency Planning	Section 8.4.7
x	x	Section 8.4.6	The plan shall include a seismic risk assessment and mitigation plan.	Water Shortage Contingency Plan	Section 8.4.6
x	x	Section 8.5	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Water Shortage Contingency Planning	Section 8.5

Retail	Wholesale	2020 Guidebook Location	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 8.5 and 8.6	Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other relevant communications.	Water Shortage Contingency Planning	Section 8.5
x		Section 8.6	Retail supplier must describe how it will ensure compliance with and enforce provisions of the WSCP.	Water Shortage Contingency Planning	Not applicable
x		Section 8.7	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Water Shortage Contingency Planning	Not applicable
x	x	Section 8.7	Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3.	Water Shortage Contingency Planning	Section 8.7
x	x	Section 8.7	Provide a statement that the supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency.	Water Shortage Contingency Planning	Section 8.7
x	x	Section 8.8	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.8
x	x	Section 8.8	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.8
x		Section 8.8	Retail suppliers must describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought	Water Shortage Contingency Planning	Section 8.8
x		Section 8.9	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Water Shortage Contingency Planning	Section 8.9
x		Section 8.11	Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.	Water Shortage Contingency Planning	Not applicable
x	x	Sections 8.12 and 10.4	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 30 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	Sections 8.12 and 10.4
x	x	Section 8.12	Make available the Water Shortage Contingency Plan to customers and any city or county where it provides water within 30 after adopted the plan.	Water Shortage Contingency Planning	Section 8.12
	x	Sections 9.1 and 9.3	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Sections 9.1 and 9.3
x		Sections 9.2 and 9.3	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Not applicable
x		Chapter 10	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets (recommended to discuss compliance).	Plan Adoption, Submittal, and Implementation	Not applicable
x	x	Section 10.2.1	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Reported in Table 10-1.	Plan Adoption, Submittal, and Implementation	Section 10.2.1
x	x	Section 10.4	Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.	Plan Adoption, Submittal, and Implementation	Section 10.4
x	x	Sections 10.2.2, 10.3, and 10.5	Provide supporting documentation that the urban water supplier made the plan and contingency plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan and contingency plan.	Plan Adoption, Submittal, and Implementation	Sections 10.2, 10.3, and 10.5
x	x	Section 10.2.2	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Section 10.2.2
x	x	Section 10.3.2	Provide supporting documentation that the plan and contingency plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.2
x	x	Section 10.4	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4.3
x	x	Section 10.4	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4
x	x	Sections 10.4.1 and 10.4.2	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Sections 10.4.1 and 10.4.2
x	x	Section 10.5	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5

Retail	Wholesale	2020 Guidebook Location	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 10.5	Provide supporting documentation that, not later than 30 days after filing a copy of its water shortage contingency plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5
x	x	Section 10.6	If supplier is regulated by the Public Utilities Commission, include its plan and contingency plan as part of its general rate case filings.	Plan Adoption, Submittal, and Implementation	Section 10.6
x	x	Section 10.7.2	If revised, submit a copy of the water shortage contingency plan to DWR within 30 days of adoption.	Plan Adoption, Submittal, and Implementation	Section 10.7.2

APPENDIX C

60 – DAY NOTIFICATION LETTERS AND PUBLIC HEARING NOTIFICATIONS

CHINO BASIN DESALTER AUTHORITY

Tom Haughey, Chairperson
Betty Anderson, Vice Chairperson
Jim Bowman, Secretary
Kati Parker, Director
Greg Newton, Director
Peter J. Rogers, Director
Vicki Rupe, Director
Gracie Torres, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 Thomas M. O'Neill, General Manager/CEO

November 10, 2020

Mr. Leonard Hernandez
Chief Executive Officer
County of San Bernardino
385 N. Arrowhead Avenue
San Bernardino, CA 92415

SUBJECT: 2020 Urban Water Management Plan Update

Dear Mr. Hernandez:

The Chino Basin Desalter Authority is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. The Chino Desalter Authority is currently in the process of preparing the 2020 UWMP Update.

As an urban water supplier, the Chino Basin Desalter Authority is required pursuant to Section 10620(d)(3) of the California Water Code to coordinate with water management agencies, relevant public agencies, and other water suppliers regarding the preparation of the UWMP. Pursuant to Section 10621(b) of the California Water Code, the Chino Basin Desalter Authority will be reviewing the UWMP and will make amendments or changes, as appropriate. The Chino Basin Desalter Authority invites you to submit comments in anticipation of the development of our 2020 UWMP Update. Please provide written comments within the next 30 days to the Chino Basin Desalter Authority.

Sincerely,

Thomas O'Neill
General Manager/CEO

CHINO BASIN DESALTER AUTHORITY

Tom Haughey, Chairperson
Betty Anderson, Vice Chairperson
Jim Bowman, Secretary
Kati Parker, Director
Greg Newton, Director
Peter J. Rogers, Director
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Gracie Torres, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 Thomas M. O'Neill, General Manager/CEO

November 10, 2020

Mr. George Johnson
County Executive Officer
County of Riverside
4080 Lemon Street – 4th Floor
Riverside, CA 92501

SUBJECT: 2020 Urban Water Management Plan Update

Dear Mr. Johnson:

The Chino Basin Desalter Authority is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. The Chino Desalter Authority is currently in the process of preparing the 2020 UWMP Update.

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Sincerely,

Thomas O'Neill
General Manager/CEO

CHINO BASIN DESALTER AUTHORITY

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Betty Anderson, Vice Chairperson
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Vicki Rupe, Director
Gracie Torres, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

November 10, 2020

Mr. Andy Okoro
City Manager
City of Norco
2870 Clark Avenue
Norco, CA 92860

SUBJECT: 2020 Urban Water Management Plan Update

Dear Mr. Okoro:

The Chino Basin Desalter Authority is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. The Chino Desalter Authority is currently in the process of preparing the 2020 UWMP Update.

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Sincerely,

Thomas O'Neill
General Manager/CEO

CHINO BASIN DESALTER AUTHORITY

Tom Haughey, Chairperson
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Vicki Rupe, Director
Gracie Torres, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

November 10, 2020

Mr. Scott Ochoa
City Manager
City of Ontario
303 E. "B" Street
Ontario, CA 91764

SUBJECT: 2020 Urban Water Management Plan Update

Dear Mr. Ochoa:

The Chino Basin Desalter Authority is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. The Chino Desalter Authority is currently in the process of preparing the 2020 UWMP Update.

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Sincerely,

Thomas O'Neill
General Manager/CEO

CHINO BASIN DESALTER AUTHORITY

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Vicki Rupe, Director
Gracie Torres, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

November 10, 2020

Mr. Matthew Ballantyne
City Manager
City of Chino
13220 Central Avenue
Chino, CA 91710

SUBJECT: 2020 Urban Water Management Plan Update

Dear Mr. Ballantyne:

The Chino Basin Desalter Authority is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. The Chino Desalter Authority is currently in the process of preparing the 2020 UWMP Update.

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Sincerely,

Thomas O'Neill
General Manager/CEO

CDA | CHINO BASIN DESALTER AUTHORITY

Tom Haughey, Chairperson
Betty Anderson, Vice Chairperson
Jim Bowman, Secretary
Kati Parker, Director
Greg Newton, Director
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Vicki Rupe, Director
Gracie Torres, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

November 10, 2020

Mr. Benjamin Montgomery
City Manager
City of Chino Hills
14000 City Center Drive
Chino Hills, CA 91709

SUBJECT: 2020 Urban Water Management Plan Update

Dear Mr. Montgomery:

The Chino Basin Desalter Authority is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. The Chino Desalter Authority is currently in the process of preparing the 2020 UWMP Update.

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Sincerely,

Thomas O'Neill
General Manager/CEO

CHINO BASIN DESALTER AUTHORITY

Tom Haughey, Chairperson
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Vicki Rupe, Director
Gracie Torres, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 Thomas M. O'Neill, General Manager/CEO

November 10, 2020

Mr. Bryan Jones
City Manager
City of Eastvale
12363 Limonite Avenue, Suite 910
Eastvale, CA 91752

SUBJECT: 2020 Urban Water Management Plan Update

Dear Mr. Jones:

The Chino Basin Desalter Authority is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. The Chino Desalter Authority is currently in the process of preparing the 2020 UWMP Update.

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Sincerely,

Thomas O'Neill
General Manager/CEO

CDA | CHINO BASIN DESALTER AUTHORITY

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Vicki Rupe, Director
Gracie Torres, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

November 10, 2020

Mr. Rod Butler
City Manager
City of Jurupa Valley
8930 Limonite Avenue
Jurupa Valley, CA 92509

SUBJECT: 2020 Urban Water Management Plan Update

Dear Mr. Butler:

The Chino Basin Desalter Authority is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. The Chino Desalter Authority is currently in the process of preparing the 2020 UWMP Update.

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Thomas O'Neill
General Manager/CEO

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3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

November 10, 2020

Mr. Jeffrey Kightlinger
General Manager
Metropolitan Water District
PO Box 54153
Los Angeles, CA 90054

SUBJECT: 2020 Urban Water Management Plan Update

Dear Mr. Kightlinger:

The Chino Basin Desalter Authority is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. The Chino Desalter Authority is currently in the process of preparing the 2020 UWMP Update.

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Sincerely,

Thomas O'Neill
General Manager/CEO

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3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 Thomas M. O'Neill, General Manager/CEO

November 10, 2020

Mr. Peter Kavounas
General Manager
Chino Basin Watermaster
9641 San Bernardino Road
Rancho Cucamonga, CA 91730

SUBJECT: 2020 Urban Water Management Plan Update

Dear Mr. Kavounas:

The Chino Basin Desalter Authority is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. The Chino Desalter Authority is currently in the process of preparing the 2020 UWMP Update.

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3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 Thomas M. O'Neill, General Manager/CEO

November 10, 2020

Mr. Scott Burton
Utilities Manager
City of Ontario
1425 South Bon View Avenue
Ontario, CA 91761

SUBJECT: 2020 Urban Water Management Plan Update

Dear Mr. Burton:

The Chino Basin Desalter Authority is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. The Chino Desalter Authority is currently in the process of preparing the 2020 UWMP Update.

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General Manager/CEO

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3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

November 10, 2020

Mr. Shivaji Deshmukh, P.E.
General Manager
Inland Empire Utilities Agency
6075 Kimball Avenue
Chino, CA 91708

SUBJECT: 2020 Urban Water Management Plan Update

Dear Mr. Deshmukh:

The Chino Basin Desalter Authority is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. The Chino Desalter Authority is currently in the process of preparing the 2020 UWMP Update.

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General Manager/CEO

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3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

November 10, 2020

Mr. Chris Berch
General Manager
Jurupa Community Services District
11201 Harrel Street
Jurupa Valley, CA 91752

SUBJECT: 2020 Urban Water Management Plan Update

Dear Mr. Berch:

The Chino Basin Desalter Authority is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. The Chino Desalter Authority is currently in the process of preparing the 2020 UWMP Update.

As an urban water supplier, the Chino Basin Desalter Authority is required pursuant to Section 10620(d)(3) of the California Water Code to coordinate with water management agencies, relevant public agencies, and other water suppliers regarding the preparation of the UWMP. Pursuant to Section 10621(b) of the California Water Code, the Chino Basin Desalter Authority will be reviewing the UWMP and will make amendments or changes, as appropriate. The Chino Basin Desalter Authority invites you to submit comments in anticipation of the development of our 2020 UWMP Update. Please provide written comments within the next 30 days to the Chino Basin Desalter Authority.

Sincerely,

Thomas O'Neill
General Manager/CEO

CDA | CHINO BASIN DESALTER AUTHORITY

Tom Haughey, Chairperson
Betty Anderson, Vice Chairperson
Jim Bowman, Secretary
Kati Parker, Director
Greg Newton, Director
Peter J. Rogers, Director
Vicki Rupe, Director
Gracie Torres, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

November 10, 2020

Mr. Rich Haller
General Manager
Santa Ana Watershed Project Authority
11615 Sterling Avenue
Riverside, CA 92503

SUBJECT: 2020 Urban Water Management Plan Update

Dear Mr. Haller:

The Chino Basin Desalter Authority is currently in the process of reviewing its Urban Water Management Plan (UWMP) for the upcoming 2020 Update. The Urban Water Management Planning Act requires every urban water supplier, which provides water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an UWMP and periodically update that plan at least once every five years. The UWMP is a planning document and a source document to direct urban water suppliers to evaluate and compare their water supply and reliability to their existing water conservation efforts. The Chino Desalter Authority is currently in the process of preparing the 2020 UWMP Update.

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Sincerely,

Thomas O'Neill
General Manager/CEO

THE PRESS-ENTERPRISE

1825 Chicago Ave, Suite 100
Riverside, CA 92507
951-684-1200
951-368-9018 FAX

PROOF OF PUBLICATION
(2010, 2015.5 C.C.P)

Publication(s): The Press-Enterprise

PROOF OF PUBLICATION OF

Ad Desc.: 2020 UWMP Hearing Notice /

I am a citizen of the United States. I am over the age of eighteen years and not a party to or interested in the above entitled matter. I am an authorized representative of THE PRESS-ENTERPRISE, a newspaper in general circulation, printed and published daily in the County of Riverside, and which newspaper has been adjudicated a newspaper of general circulation by the Superior Court of the County of Riverside, State of California, under date of April 25, 1952, Case Number 54446, under date of March 29, 1957, Case Number 65673, under date of August 25, 1995, Case Number 267864, and under date of September 16, 2013, Case Number RIC 1309013; that the notice, of which the annexed is a printed copy, has been published in said newspaper in accordance with the instructions of the person(s) requesting publication, and not in any supplement thereof on the following dates, to wit:

05/12, 05/19/2021

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date: May 19, 2021
At: Riverside, California

Legal Advertising Representative, The Press-Enterprise

CHINO BASIN DESALTER AUTHORITY
3550 E. PHILADELPHIA STREET, SUITE 170
ONTARIO, CA 91761

Ad Number: 0011461427-01

P.O. Number:

Ad Copy:

NOTICE OF PUBLIC HEARING
BY THE BOARD OF DIRECTORS OF
CHINO BASIN DESALTER AUTHORITY
REGARDING THE DRAFT CHINO BASIN DESALTER AUTHORITY
2020 URBAN WATER MANAGEMENT PLAN,
SAN BERNARDINO COUNTY/RIVERSIDE COUNTY, STATE OF CALIFORNIA

NOTICE IS HEREBY GIVEN that the Board of Directors of the Chino Basin Desalter Authority (CDA) has scheduled a public hearing to receive comments and testimony regarding the Draft Chino Basin Desalter Authority 2020 Urban Water Management Plan (CDA 2020 UWMP), San Bernardino County/Riverside County, State of California.

NOTICE IS FURTHER GIVEN that said public hearing will be held at the following date, time and place for the purpose of hearing any and all public testimony and comments, for, against, or neutral, regarding the draft CDA 2020 UWMP.

According to the directives from the California Department of Public Health and Executive Order issued by Governor Gavin Newsom, members of the public are invited to participate via video or teleconference:

DATE: Thursday, June 3, 2021

TIME: 2:00 p.m.

VIDEO CONFERENCE: https://zoom.us Meeting ID: 813 5205 9101 Passcode: 380557

TELECONFERENCE: (669) 900 6833 Meeting ID: 813 5205 9101 Passcode: 380557

NOTICE IS FURTHER GIVEN that all interested persons are invited and encouraged to attend the public hearing and provide testimony and written comments regarding the draft CDA 2020 UWMP. Oral statements will be heard; however, to ensure the accuracy of the record, all important testimony and comments relating to the draft CDA 2020 UWMP should be submitted in writing to Casey Costa, CDA Executive Assistant, at the address below, prior to the time set for the public hearing or directly to the CDA Board of Directors during the public hearing. If you challenge the Final CDA 2020 Urban Water Management Plan in court, you may be limited to raising only those issues you or someone else raised at the public hearing described in this Notice, or in written correspondence delivered to CDA prior to or at the public hearing.

NOTICE IS FURTHER GIVEN that a copy of the draft CDA 2020 UWMP can be found online at http://chinodesalter.org. A hard copy of the draft CDA 2020 UWMP is also available for inspection at the Chino Basin Desalter Authority office located at 3550 E. Philadelphia Street, Suite 170, Ontario, CA 91761. Please direct comments and questions to Casey Costa, CDA Executive Assistant, at (909) 218-3730; ccosta@chinodesalter.org.

Press-Enterprise: 5/12, 5/19

Advertising Order Confirmation

Ad Number	Ad Size	Color	Production Color	Ad Attributes	Production Method	Production Notes
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External Ad Number	Pick Up	Ad Type	Released for Publication
		Legal Liner	

NOTICE OF PUBLIC HEARING
BY THE BOARD OF DIRECTORS OF
CHINO BASIN DESALTER AUTHORITY
REGARDING THE DRAFT CHINO BASIN DESALTER AUTHORITY
2020 URBAN WATER MANAGEMENT PLAN,
SAN BERNARDINO COUNTY/RIVERSIDE COUNTY, STATE OF CALIFORNIA

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NOTICE IS FURTHER GIVEN that said public hearing will be held at the following date, time and place for the purpose of hearing any and all public testimony and comments, for, against, or neutral, regarding the draft CDA 2020 UWMP.

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Published: May 11, 18 2021 Inland Valley Daily Bulletin Ad#11462800

Product	Requested Placement	Requested Position	Run Dates	# Inserts
Daily Bulletin	Legals CLS LA-SB-PE	General IE - 1076~	05/18/21	1
SB Sun	Legals CLS NP	General NP - 1076~	05/18/21	1
PE Riverside:Full Run	Legals CLS LA-SB-PE	General IE - 1076~	05/18/21	1

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Please note: To meet our printer's deadline, we must have your proof returned by the published deadline, and as indicated by your sales rep.

Advertising Order Confirmation

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Ken McLaughlin, Chairperson
Jim Bowman, Vice Chairperson
Greg Newton, Director
Peter J. Rogers, Director
Vicki Rupe, Director
Gracie Torres, Director
Marco Tule, Director
Eunice Ulloa, Director

CHINO BASIN DESALTER AUTHORITY

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

May 6, 2021

Mr. Leonard Hernandez
Chief Executive Officer
County of San Bernardino
385 N. Arrowhead Avenue
San Bernardino, CA 92415

SUBJECT: Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Dear Mr. Hernandez,

The Chino Basin Desalter Authority (CDA) will hold a PUBLIC HEARING on July 3, 2021 for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. The CDA's 2020 Urban Water Management Plan incorporates the CDA's Water Shortage Contingency Plan.

The 2020 Urban Water Management Plan and Water Shortage Contingency Plan were prepared pursuant to the "Urban Water Management Planning Act" and the California Water Code. The California Department of Water Resources requires every urban water supplier to prepare and adopt an Urban Water Management Plan, including the Water Shortage Contingency Plan, and periodically update the Urban Water Management Plan at least once every five years, in years ending in six and one.

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CDA invites all interested entities to attend and present their comments. A copy of the draft 2020 Urban Water Management Plan and Water Shortage Contingency Plan will be available at the CDA's website. Please provide written comments by 5 p.m. on June 14, 2021 to the Chino Basin Desalter Authority.

Ken McLaughlin, Chairperson
Jim Bowman, Vice Chairperson
Greg Newton, Director
Peter J. Rogers, Director
Vicki Rupe, Director
Gracie Torres, Director
Marco Tule, Director
Eunice Ulloa, Director

CHINO BASIN DESALTER AUTHORITY

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

May 6, 2021

Mr. George Johnson
County Executive Officer
County of Riverside
4080 Lemon Street – 4th Floor
Riverside, CA 92501

SUBJECT: Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Dear Mr. Johnson,

The Chino Basin Desalter Authority (CDA) will hold a PUBLIC HEARING on July 3, 2021 for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. The CDA's 2020 Urban Water Management Plan incorporates the CDA's Water Shortage Contingency Plan.

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Jim Bowman, Vice Chairperson
Greg Newton, Director
Peter J. Rogers, Director
Vicki Rupe, Director
Gracie Torres, Director
Marco Tule, Director
Eunice Ulloa, Director

CHINO BASIN DESALTER AUTHORITY

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

May 6, 2021

Mr. Andy Okoro
City Manager
City of Norco
2870 Clark Avenue
Norco, CA 92860

SUBJECT: Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Dear Mr. Okoro,

The Chino Basin Desalter Authority (CDA) will hold a PUBLIC HEARING on July 3, 2021 for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. The CDA's 2020 Urban Water Management Plan incorporates the CDA's Water Shortage Contingency Plan.

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Ken McLaughlin, Chairperson
Jim Bowman, Vice Chairperson
Greg Newton, Director
Peter J. Rogers, Director
Vicki Rupe, Director
Gracie Torres, Director
Marco Tule, Director
Eunice Ulloa, Director

CHINO BASIN DESALTER AUTHORITY

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

May 6, 2021

Mr. Scott Ochoa
City Manager
City of Ontario
303 E. "B" Street
Ontario, CA 91764

SUBJECT: Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Dear Mr. Ochoa,

The Chino Basin Desalter Authority (CDA) will hold a PUBLIC HEARING on July 3, 2021 for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. The CDA's 2020 Urban Water Management Plan incorporates the CDA's Water Shortage Contingency Plan.

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Ken McLaughlin, Chairperson
Jim Bowman, Vice Chairperson
Greg Newton, Director
Peter J. Rogers, Director
Vicki Rupe, Director
Gracie Torres, Director
Marco Tule, Director
Eunice Ulloa, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

May 6, 2021

Mr. Matthew Ballantyne
City Manager
City of Chino
13220 Central Avenue
Chino, CA 91710

SUBJECT: Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Dear Mr. Ballantyne,

The Chino Basin Desalter Authority (CDA) will hold a PUBLIC HEARING on July 3, 2021 for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. The CDA's 2020 Urban Water Management Plan incorporates the CDA's Water Shortage Contingency Plan.

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Ken McLaughlin, Chairperson
Jim Bowman, Vice Chairperson
Greg Newton, Director
Peter J. Rogers, Director
Vicki Rupe, Director
Gracie Torres, Director
Marco Tule, Director
Eunice Ulloa, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

May 6, 2021

Mr. Benjamin Montgomery
City Manager
City of Chino Hills
14000 City Center Drive
Chino Hills, CA 91709

SUBJECT: Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Dear Mr. Montgomery,

The Chino Basin Desalter Authority (CDA) will hold a PUBLIC HEARING on July 3, 2021 for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. The CDA's 2020 Urban Water Management Plan incorporates the CDA's Water Shortage Contingency Plan.

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Jim Bowman, Vice Chairperson
Greg Newton, Director
Peter J. Rogers, Director
Vicki Rupe, Director
Gracie Torres, Director
Marco Tule, Director
Eunice Ulloa, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

May 6, 2021

Mr. Bryan Jones
City Manager
City of Eastvale
12363 Limonite Avenue, Suite 910
Eastvale, CA 91752

SUBJECT: Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Dear Mr. Jones,

The Chino Basin Desalter Authority (CDA) will hold a PUBLIC HEARING on July 3, 2021 for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. The CDA's 2020 Urban Water Management Plan incorporates the CDA's Water Shortage Contingency Plan.

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Jim Bowman, Vice Chairperson
Greg Newton, Director
Peter J. Rogers, Director
Vicki Rupe, Director
Gracie Torres, Director
Marco Tule, Director
Eunice Ulloa, Director

CHINO BASIN DESALTER AUTHORITY

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

May 6, 2021

Mr. Rod Butler
City Manager
City of Jurupa Valley
8930 Limonite Avenue
Jurupa Valley, CA 92509

SUBJECT: Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Dear Mr. Butler,

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Jim Bowman, Vice Chairperson
Greg Newton, Director
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Vicki Rupe, Director
Gracie Torres, Director
Marco Tule, Director
Eunice Ulloa, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

May 6, 2021

Mr. Jeffrey Kightlinger
General Manager
Metropolitan Water District
PO Box 54153
Los Angeles, CA 90054

SUBJECT: Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Dear Mr. Kightlinger,

The Chino Basin Desalter Authority (CDA) will hold a PUBLIC HEARING on July 3, 2021 for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. The CDA's 2020 Urban Water Management Plan incorporates the CDA's Water Shortage Contingency Plan.

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Ken McLaughlin, Chairperson
Jim Bowman, Vice Chairperson
Greg Newton, Director
Peter J. Rogers, Director
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Marco Tule, Director
Eunice Ulloa, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

May 6, 2021

Mr. Peter Kavounas
General Manager
Chino Basin Watermaster
9641 San Bernardino Road
Rancho Cucamonga, CA 91730

SUBJECT: Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Dear Mr. Kavounas,

The Chino Basin Desalter Authority (CDA) will hold a PUBLIC HEARING on July 3, 2021 for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. The CDA's 2020 Urban Water Management Plan incorporates the CDA's Water Shortage Contingency Plan.

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Ken McLaughlin, Chairperson
Jim Bowman, Vice Chairperson
Greg Newton, Director
Peter J. Rogers, Director
Vicki Rupe, Director
Gracie Torres, Director
Marco Tule, Director
Eunice Ulloa, Director

CHINO BASIN DESALTER AUTHORITY

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

May 6, 2021

Mr. Scott Burton
Utilities Manager
City of Ontario
1425 South Bon View Avenue
Ontario, CA 91761

SUBJECT: Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Dear Mr. Burton,

The Chino Basin Desalter Authority (CDA) will hold a PUBLIC HEARING on July 3, 2021 for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. The CDA's 2020 Urban Water Management Plan incorporates the CDA's Water Shortage Contingency Plan.

The 2020 Urban Water Management Plan and Water Shortage Contingency Plan were prepared pursuant to the "Urban Water Management Planning Act" and the California Water Code. The California Department of Water Resources requires every urban water supplier to prepare and adopt an Urban Water Management Plan, including the Water Shortage Contingency Plan, and periodically update the Urban Water Management Plan at least once every five years, in years ending in six and one.

Information regarding CDA's PUBLIC HEARING follows:

Date:	Thursday, June 3, 2021	
Time:	2:00 p.m.	
Place:	VIDEO CONFERENCE:	https://zoom.us Meeting ID: 813 5205 9101 Passcode: 380557
	TELECONFERENCE:	(669) 900 6833 Meeting ID: 813 5205 9101 Passcode: 380557

The meeting link will be posted on the CDA's website at the following address: https://www.chinodesalter.org/

CDA invites all interested entities to attend and present their comments. A copy of the draft 2020 Urban Water Management Plan and Water Shortage Contingency Plan will be available at the CDA's website. Please provide written comments by 5 p.m. on June 14, 2021 to the Chino Basin Desalter Authority.

Ken McLaughlin, Chairperson
Jim Bowman, Vice Chairperson
Greg Newton, Director
Peter J. Rogers, Director
Vicki Rupe, Director
Gracie Torres, Director
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Eunice Ulloa, Director

CHINO BASIN DESALTER AUTHORITY

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

May 6, 2021

Mr. Shivaji Deshmukh
General Manager
Inland Empire Utilities Agency
6075 Kimball Avenue
Chino, CA 91708

SUBJECT: Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Dear Mr. Deshmukh,

The Chino Basin Desalter Authority (CDA) will hold a PUBLIC HEARING on July 3, 2021 for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. The CDA's 2020 Urban Water Management Plan incorporates the CDA's Water Shortage Contingency Plan.

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Marco Tule, Director
Eunice Ulloa, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

May 6, 2021

Mr. Chris Berch
General Manager
Jurupa Community Services District
11201 Harrel Street
Jurupa Valley, CA 91752

SUBJECT: Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Dear Mr. Berch,

The Chino Basin Desalter Authority (CDA) will hold a PUBLIC HEARING on July 3, 2021 for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. The CDA's 2020 Urban Water Management Plan incorporates the CDA's Water Shortage Contingency Plan.

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Eunice Ulloa, Director

3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230 *Thomas M. O'Neill, General Manager/CEO*

May 6, 2021

Mr. Jeffrey Mosher
General Manager
Santa Ana Watershed Project Authority
11615 Sterling Avenue
Riverside, CA 92503

SUBJECT: Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan

Dear Mr. Haller,

The Chino Basin Desalter Authority (CDA) will hold a PUBLIC HEARING on July 3, 2021 for the purposes of adopting its 2020 Urban Water Management Plan and its Water Shortage Contingency Plan. The CDA's 2020 Urban Water Management Plan incorporates the CDA's Water Shortage Contingency Plan.

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CDA invites all interested entities to attend and present their comments. A copy of the draft 2020 Urban Water Management Plan and Water Shortage Contingency Plan will be available at the CDA's website. Please provide written comments by 5 p.m. on June 14, 2021 to the Chino Basin Desalter Authority.

CHINO BASIN DESALTER AUTHORITY

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3550 E. Philadelphia Street, Suite 170 • Ontario, CA 91761 • (909) 218-3230

Thomas M. O'Neill, General Manager/CEO

City of Chino • City of Chino Hills • City of Norco • City of Ontario • Inland Empire Utilities Agency
Jurupa Community Services District • Santa Ana River Water Company • Western Municipal Water District

APPENDIX D

CHINO BASIN JUDGMENT

Rec'd Jan 27, 1978 TD

DONALD D. STARK
A Professional Corporation
Suite 201 Airport Plaza
2061 Business Center Drive
Irvine, California 92715
Telephone: (714) 752-8971

CLAYSON, ROTHROCK & MANN
601 South Main Street
Corona, California 91720
Telephone: (714) 737-1910

Attorneys for Plaintiff

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FILED - West District
San Bernardino County Clerk
OCT 25 1989

SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO

MICROFILMED

CHINO BASIN MUNICIPAL WATER DISTRICT,

Plaintiff,

v.

CITY OF CHINO, et al.

Defendants.

No. 164327

RCN 51019

JUDGMENT

LAW OFFICES
DONALD D. STARK
A PROFESSIONAL CORPORATION
SUITE 201
2061 BUSINESS CENTER DRIVE
IRVINE, CALIFORNIA 92715
(714) 752-8971

Routing ..... Appeal Briefs
Date ..... Exhibits
Judge ..... Supervisor
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Index ..... Other

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A PROFESSIONAL CORPORATION
SUITE 201
2061 BUSINESS CENTER DRIVE
IRVINE, CALIFORNIA 92715
(714) 752-8971

JUDGMENT
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A PROFESSIONAL CORPORATION
SUITE 201
2061 BUSINESS CENTER DRIVE
IRVINE, CALIFORNIA 92715
(714) 752-8971

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A PROFESSIONAL CORPORATION
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IRVINE, CALIFORNIA 92715
(714) 752-8971

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DONALD D. STARK
A Professional Corporation
Suite 201 Airport Plaza
2061 Business Center Drive
Irvine, California 92715
Telephone: (714) 752-8971

CLAYSON, ROTHROCK & MANN
601 South Main Street
Corona, California 91720
Telephone: (714) 737-1910

Attorneys for Plaintiff

SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO

CHINO BASIN MUNICIPAL WATER DISTRICT, Plaintiff, v. CITY OF CHINO, et al. Defendants.	No. 164327 JUDGMENT

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DONALD D. STARK
A PROFESSIONAL CORPORATION
SUITE 201
2061 BUSINESS CENTER DRIVE
IRVINE, CALIFORNIA 92715
(714) 752-8971

I. INTRODUCTION

1. Pleadings, Parties and Jurisdiction. The complaint herein was filed on January 2, 1975, seeking an adjudication of water rights, injunctive relief and the imposition of a physical solution. A first amended complaint was filed on July 16, 1976. The defaults of certain defendants have been entered, and certain other defendants dismissed. Other than defendants who have been dismissed or whose defaults have been entered, all defendants have appeared herein. By answers and order of this Court, the issues have been made those of a full inter se adjudication between the

parties. This Court has jurisdiction of the subject matter of this action and of the parties herein.

2. Stipulation For Judgment. Stipulation for entry of judgment has been filed by and on behalf of a majority of the parties, representing a majority of the quantitative rights herein adjudicated.

3. Trial; Findings and Conclusions. Trial was commenced on December 16, 1977, as to the non-stipulating parties, and findings of fact and conclusions of law have been entered disposing of the issues in the case.

4. Definitions. As used in this Judgment, the following terms shall have the meanings herein set forth:

(a) Active Parties. All parties other than those who have filed with Watermaster a written waiver of service of notices, pursuant to Paragraph 58.

(b) Annual or Year -- A fiscal year, July 1 through June 30, following, unless the context shall clearly indicate a contrary meaning.

(c) Appropriative Right -- The annual production right of a producer from the Chino Basin other than pursuant to an overlying right.

(d) Basin Water -- Ground water within Chino Basin which is part of the Safe Yield, Operating Safe Yield, or replenishment water in the Basin as a result of operations under the Physical Solution decreed herein. Said term does not include Stored Water.

(e) CBMWD -- Plaintiff Chino Basin Municipal Water District.

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A PROFESSIONAL CORPORATION
SUITE 201
2061 BUSINESS CENTER DRIVE
IRVINE, CALIFORNIA 92715
(714) 752-8971

(f) Chino Basin or Basin -- The ground water basin underlying the area shown as such on Exhibit "B" and within the boundaries described in Exhibit "K".

(g) Chino Basin Watershed -- The surface drainage area tributary to and overlying Chino Basin.

(h) Ground Water -- Water beneath the surface of the ground and within the zone of saturation, i.e., below the existing water table.

(i) Ground Water Basin -- An area underlain by one or more permeable formations capable of furnishing substantial water storage.

(j) Minimal Producer -- Any producer whose production does not exceed five acre-feet per year.

(k) MWD -- The Metropolitan Water District of Southern California.

(l) Operating Safe Yield -- The annual amount of ground water which Watermaster shall determine, pursuant to criteria specified in Exhibit "I", can be produced from Chino Basin by the Appropriative Pool parties free of replenishment obligation under the Physical Solution herein.

(m) Overdraft -- A condition wherein the total annual production from the Basin exceeds the Safe Yield thereof.

(n) Overlying Right -- The appurtenant right of an owner of lands overlying Chino Basin to produce water from the Basin for overlying beneficial use on such lands.

(o) Person. Any individual, partnership, association, corporation, governmental entity or agency, or other organization.

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A PROFESSIONAL CORPORATION
SUITE 201
2061 BUSINESS CENTER DRIVE
IRVINE, CALIFORNIA 92715
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(p) PVMWD -- Defendant Pomona Valley Municipal Water District.

(q) Produce or Produced -- To pump or extract ground water from Chino Basin.

(r) Producer -- Any person who produces water from Chino Basin.

(s) Production -- Annual quantity, stated in acre feet, of water produced.

(t) Public Hearing -- A hearing after notice to all parties and to any other person legally entitled to notice.

(u) Reclaimed Water -- Water which, as a result of processing of waste water, is suitable for a controlled use.

(v) Replenishment Water -- Supplemental water used to recharge the Basin pursuant to the Physical Solution, either directly by percolating the water into the Basin or indirectly by delivering the water for use in lieu of production and use of safe yield or Operating Safe Yield.

(w) Responsible Party -- The owner, co-owner, lessee or other person designated by multiple parties interested in a well as the person responsible for purposes of filing reports hereunder.

(x) Safe Yield -- The long-term average annual quantity of ground water (excluding replenishment or stored water but including return flow to the Basin from use of replenishment or stored water) which can be produced from the Basin under cultural conditions of a particular year without causing an undesirable result.

(y) SBVMWD -- San Bernardino Valley Municipal Water

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A PROFESSIONAL CORPORATION
SUITE 201
2061 BUSINESS CENTER DRIVE
IRVINE, CALIFORNIA 92715
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District.

(z) State Water -- Supplemental Water imported through the State Water Resources Development System, pursuant to Chapter 8, Division 6, Part 6 of the Water Code.

(aa) Stored Water -- Supplemental water held in storage, as a result of direct spreading, in lieu delivery, or otherwise, for subsequent withdrawal and use pursuant to agreement with Watermaster.

(bb) Supplemental Water -- Includes both water imported to Chino Basin from outside Chino Basin Watershed, and reclaimed water.

(cc) WMWD -- Defendant Western Municipal Water District of Riverside County.

5. List of Exhibits. The following exhibits are attached to this Judgment and made a part hereof:

"A" -- "Location Map of Chino Basin" showing boundaries of Chino Basin Municipal Water District, and other geographic and political features.

"B" -- "Hydrologic Map of Chino Basin" showing hydrologic features of Chino Basin.

"C" -- Table Showing Parties in Overlying (Agricultural) Pool.

"D" -- Table Showing Parties in Overlying (Non-agricultural Pool and Their Rights.

"E" -- Table Showing Appropriators and Their Rights.

"F" -- Overlying (Agricultural) Pool Pooling Plan.

"G" -- Overlying (Non-agricultural) Pool Pooling Plan.

"H" -- Appropriative Pool Pooling Plan.

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DONALD D. STARK
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2061 BUSINESS CENTER DRIVE
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"I" -- Engineering Appendix.

"J" -- Map of In Lieu Area No. 1.

"K" -- Legal Description of Chino Basin.

II. DECLARATION OF RIGHTS

A. HYDROLOGY

6. Safe Yield. The Safe Yield of Chino Basin is 140,000 acre feet per year.

7. Overdraft and Prescriptive Circumstances. In each year for a period in excess of five years prior to filing of the First Amended Complaint herein, the Safe Yield of the Basin has been exceeded by the annual production therefrom, and Chino Basin is and has been for more than five years in a continuous state of overdraft. The production constituting said overdraft has been open, notorious, continuous, adverse, hostile and under claim of right. The circumstances of said overdraft have given notice to all parties of the adverse nature of such aggregate over-production.

B. WATER RIGHTS IN SAFE YIELD

8. Overlying Rights. The parties listed in Exhibits "C" and "D" are the owners or in possession of lands which overlie Chino Basin. As such, said parties have exercised overlying water rights in Chino Basin. All overlying rights owned or exercised by parties listed in Exhibits "C" and "D" have, in the aggregate, been limited by prescription except to the extent such rights have been preserved by self-help by said parties. Aggregate preserved overlying rights in the Safe Yield for agricultural pool use, including the rights of the State of California, total 82,800 acre feet per year. Overlying rights for non-agricultural pool use

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A PROFESSIONAL CORPORATION
SUITE 201
2061 BUSINESS CENTER DRIVE
IRVINE, CALIFORNIA 92715
(714) 752-8971

total 7,366 acre feet per year and are individually decreed for each affected party in Exhibit "D". No portion of the Safe Yield of Chino Basin exists to satisfy unexercised overlying rights, and such rights have all been lost by prescription. However, uses may be made of Basin Water on overlying lands which have no preserved overlying rights pursuant to the Physical Solution herein. All overlying rights are appurtenant to the land and cannot be assigned or conveyed separate or apart therefrom.

9. Appropriative Rights. The parties listed in Exhibit "E" are the owners of appropriative rights, including rights by prescription, in the unadjusted amounts therein set forth, and by reason thereof are entitled under the Physical Solution to share in the remaining Safe Yield, after satisfaction of overlying rights and rights of the State of California, and in the Operating Safe Yield in Chino Basin, in the annual shares set forth in Exhibit "E".

(a) Loss of Priorities. By reason of the long continued overdraft in Chino Basin, and in light of the complexity of determining appropriative priorities and the need for conserving and making maximum beneficial use of the water resources of the State, each and all of the parties listed in Exhibit "E" are estopped and barred from asserting special priorities or preferences, inter se. All of said appropriative rights are accordingly deemed and considered of equal priority.

(b) Nature and Quantity. All rights listed in Exhibit "E" are appropriative and prescriptive in nature. By reason of the status of the parties, and the provisions of Section

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A PROFESSIONAL CORPORATION
SUITE 201
2061 BUSINESS CENTER DRIVE
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1007 of the Civil Code, said rights are immune from reduction or limitation by prescription.

10. Rights of the State of California. The State of California, by and through its Department of Corrections, Youth Authority and Department of Fish and Game, is a significant producer of ground water from and the State is the largest owner of land overlying Chino Basin. The precise nature and scope of the claims and rights of the State need not be, and are not, defined herein. The State, through said departments, has accepted the Physical Solution herein decreed, in the interests of implementing the mandate of Section 2 of Article X of the California Constitution. For all purposes of this Judgment, all future production by the State or its departments or agencies for overlying use on State-owned lands shall be considered as agricultural pool use.

C. RIGHTS TO AVAILABLE GROUND WATER STORAGE CAPACITY

11. Available Ground Water Storage Capacity. There exists in Chino Basin a substantial amount of available ground water storage capacity which is not utilized for storage or regulation of Basin Waters. Said reservoir capacity can appropriately be utilized for storage and conjunctive use of supplemental water with Basin Waters. It is essential that said reservoir capacity utilization for storage and conjunctive use of supplemental water be undertaken only under Watermaster control and regulation, in order to protect the integrity of both such Stored Water and Basin Water in storage and the Safe Yield of Chino Basin.

12. Utilization of Available Ground Water Capacity. Any person or public entity, whether a party to this action or not, may make reasonable beneficial use of the available ground water

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A PROFESSIONAL CORPORATION
SUITE 201
2061 BUSINESS CENTER DRIVE
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storage capacity of Chino Basin for storage of supplemental water; provided that no such use shall be made except pursuant to written agreement with Watermaster, as authorized by Paragraph 28. In the allocation of such storage capacity, the needs and requirements of lands overlying Chino Basin and the owners of rights in the Safe Yield or Operating Safe Yield of the Basin shall have priority and preference over storage for export.

III. INJUNCTION

13. Injunction Against Unauthorized Production of Basin Water. Each party in each of the respective pools is enjoined, as follows:

(a) Overlying (Agricultural) Pool. Each party in the Overlying (Agricultural) Pool, its officers, agents, employees, successors and assigns, is and they each are ENJOINED AND RESTRAINED from producing ground water from Chino Basin in any year hereafter in excess of such party's correlative share of the aggregate of 82,800 acre feet allocated to said Pool, except pursuant to the Physical Solution or a storage water agreement.

(b) Overlying (Non-Agricultural) Pool. Each party in the Overlying (Non-agricultural) Pool, its officers, agents, employees, successors and assigns, is and they each are ENJOINED AND RESTRAINED from producing ground water of Chino Basin in any year hereafter in excess of such party's decreed rights in the Safe Yield, except pursuant to the provisions of the Physical Solution or a storage water agreement.

(c) Appropriative Pool. Each party in the

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DONALD D. STARK
A PROFESSIONAL CORPORATION
SUITE 201
2061 BUSINESS CENTER DRIVE
IRVINE, CALIFORNIA 92715
(714) 752-8971

Appropriative Pool, its officers, agents, employees, successors and assigns, is and they are each ENJOINED AND RESTRAINED from producing ground water of Chino Basin in any year hereafter in excess of such party's decreed share of Operating Safe Yield, except pursuant to the provisions of the Physical Solution or a storage water agreement.

14. Injunction Against Unauthorized Storage or Withdrawal of Stored Water. Each party, its officers, agents, employees, successors and assigns is and they each are ENJOINED AND RESTRAINED from storing supplemental water in Chino Basin for withdrawal, or causing withdrawal of, water stored by that party, except pursuant to the terms of a written agreement with Watermaster and in accordance with Watermaster regulations. Any supplemental water stored or recharged in the Basin, except pursuant to such a Water-master agreement, shall be deemed abandoned and not classified as Stored Water. This paragraph has no application, as such, to supplemental water spread or provided in lieu by Watermaster pursuant to the Physical Solution.

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DONALD D. STARK
A PROFESSIONAL CORPORATION
SUITE 201
2061 BUSINESS CENTER DRIVE
IRVINE, CALIFORNIA 92715
(714) 752-8971

IV. CONTINUING JURISDICTION

15. Continuing Jurisdiction. Full jurisdiction, power and authority are retained and reserved to the Court as to all matters contained in this judgment, except:

(a) The redetermination of Safe Yield, as set forth in Paragraph 6, during the first ten (10) years of operation of the Physical Solution;

(b) The allocation of Safe Yield as between the several pools as set forth in Paragraph 44 of the Physical Solution;

(c) The determination of specific quantitative rights and shares in the declared Safe Yield or Operating Safe Yield herein declared in Exhibits "D" and "E"; and

(d) The amendment or modification of Paragraphs 7(a) and (b) of Exhibit "H", during the first ten (10) years of operation of the Physical Solution, and thereafter only upon affirmative recommendation of at least 67% of the voting power (determined pursuant to the formula described in Paragraph 3 of Exhibit "H"), but not less than one-third of the members of the Appropriative Pool Committee representatives of parties who produce water within CBMWD or WMWD; after said tenth year the formula set forth in said Paragraph 7(a) and 7(b) of Exhibit "H" for payment of the costs of replenishment water may be changed to 100% gross or net, or any percentage split thereof, but only in response to recommendation to the Court by affirmative vote of at least 67% of said voting power of the Appropriative Pool representatives of parties who produce ground water within CBMWD or WMWD, but not less than one-third of their number. In such event, the Court shall act in conformance with such recommendation unless there are compelling reasons to the contrary; and provided, further, that the fact that the allocation of Safe Yield or Operating Safe Yield shares may be rendered moot by a recommended change in the formula for replenishment assessments shall not be deemed to be such a "compelling reason."

Said continuing jurisdiction is provided for the purpose of enabling the Court, upon application of any party, the Watermaster, the Advisory Committee or any Pool Committee, by motion and, upon

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at least 30 days' notice thereof, and after hearing thereon, to make such further or supplemental orders or directions as may be necessary or appropriate for interpretation, enforcement or carrying out of this Judgment, and to modify, amend or amplify any of the provisions of this Judgment.

V. WATERMASTER

A. APPOINTMENT

16. Watermaster Appointment. CBMWD, acting by and through a majority of its board of directors, is hereby appointed Watermaster, to administer and enforce the provisions of this Judgment and any subsequent instructions or orders of the Court hereunder. The term of appointment of Watermaster shall be for five (5) years. The Court will by subsequent orders provide for successive terms or for a successor Watermaster. Watermaster may be changed at any time by subsequent order of the Court, on its own motion, or on the motion of any party after notice and hearing. Unless there are compelling reasons to the contrary, the Court shall act in conformance with a motion requesting the Watermaster be changed if such motion is supported by a majority of the voting power of the Advisory Committee.

B. POWERS AND DUTIES

17. Powers and Duties. Subject to the continuing supervision and control of the Court, Watermaster shall have and may exercise the express powers, and shall perform the duties, as provided in this Judgment or hereafter ordered or authorized by the Court in the exercise of the Court's continuing jurisdiction.

18. Rules and Regulations. Upon recommendation by the

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Advisory Committee, Watermaster shall make and adopt, after public hearing, appropriate rules and regulations for conduct of Watermaster affairs, including meeting schedules and procedures, and compensation of members of Watermaster at not to exceed $25 per member per meeting, or $300 per member per year, whichever is less, plus reasonable expenses related to activities within the Basin. Thereafter, Watermaster may amend said rules from time to time upon recommendation, or with approval of the Advisory Committee after hearing noticed to all active parties. A copy of said rules and regulations, and of any amendments thereof, shall be mailed to each active party.

19. Acquisition of Facilities. Watermaster may purchase, lease, acquire and hold all necessary facilities and equipment; provided, that it is not the intent of the Court that Watermaster acquire any interest in real property or substantial capital assets.

20. Employment of Experts and Agents. Watermaster may employ or retain such administrative, engineering, geologic, accounting, legal or other specialized personnel and consultants as may be deemed appropriate in the carrying out of its powers and shall require appropriate bonds from all officers and employees handling Watermaster funds. Watermaster shall maintain records for purposes of allocation of costs of such services as well as of all other expenses of Watermaster administration as between the several pools established by the Physical Solution.

21. Measuring Devices. Watermaster shall cause parties, pursuant to uniform rules, to install and maintain in good operating condition, at the cost of each party, such necessary measuring

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devices or meters as Watermaster may deem appropriate. Such measuring devices shall be inspected and tested as deemed necessary by Watermaster, and the cost thereof shall constitute an expense of Watermaster.

22. Assessments. Watermaster is empowered to levy and collect all assessments provided for in the pooling plans and Physical Solution.

23. Investment of Funds. Watermaster may hold and invest any and all Watermaster funds in investments authorized from time to time for public agencies of the State of California.

24. Borrowing. Watermaster may borrow from time to time amounts not exceeding the annual anticipated receipts of Watermaster during such year.

25. Contracts. Watermaster may enter into contracts for the performance of any powers herein granted; provided, however, that Watermaster may not contract with or purchase materials, supplies or services from CBMWD, except upon the prior recommendation and approval of the Advisory Committee and pursuant to written order of the Court.

26. Cooperation With Other Agencies. Subject to prior recommendation or approval of the Advisory Committee, Watermaster may act jointly or cooperate with agencies of the United States and the State of California or any political subdivisions, municipalities or districts or any person to the end that the purpose of the Physical Solution may be fully and economically carried out.

27. Studies. Watermaster may, with concurrence of the Advisory Committee or affected Pool Committee and in accordance with Paragraph 54(b), undertake relevant studies of hydrologic

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conditions, both quantitative and qualitative, and operating aspects of implementation of the management program for Chino Basin.

28. Ground Water Storage Agreements. Watermaster shall adopt, with the approval of the Advisory Committee, uniformly applicable rules and a standard form of agreement for storage of supplemental water, pursuant to criteria therefor set forth in Exhibit "I". Upon appropriate application by any person, Watermaster shall enter into such a storage agreement; provided that all such storage agreements shall first be approved by written order of the Court, and shall by their terms preclude operations which will have a substantial adverse impact on other producers.

29. Accounting for Stored Water. Watermaster shall calculate additions, extractions and losses and maintain an annual account of all Stored Water in Chino Basin, and any losses of water supplies or Safe Yield of Chino Basin resulting from such Stored Water.

30. Annual Administrative Budget. Watermaster shall submit to Advisory Committee an administrative budget and recommendation for each fiscal year on or before March 1. The Advisory Committee shall review and submit said budget and their recommendations to Watermaster on or before April 1, following. Watermaster shall hold a public hearing on said budget at its April quarterly meeting and adopt the annual administrative budget which shall include the administrative items for each pool committee. The administrative budget shall set forth budgeted items in sufficient detail as necessary to make a proper allocation of the expense among the several pools, together with Watermaster's proposed allocation. The budget shall contain such additional comparative information

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or explanation as the Advisory Committee may recommend from time to time. Expenditures within budgeted items may thereafter be made by Watermaster in the exercise of powers herein granted, as a matter of course. Any budget transfer in excess of 20% of a budget category during any budget year or modification of such administrative budget during any year shall be first submitted to the Advisory Committee for review and recommendation.

31. Review Procedures. All actions, decisions or rules of Watermaster shall be subject to review by the Court on its own motion or on timely motion by any party, the Watermaster (in the case of a mandated action), the Advisory Committee, or any Pool Committee, as follows:

(a) Effective Date of Watermaster Action. Any action, decision or rule of Watermaster shall be deemed to have occurred or been enacted on the date on which written notice thereof is mailed. Mailing of copies of approved Watermaster minutes to the active parties shall constitute such notice to all parties.

(b) Noticed Motion. Any party, the Watermaster (as to any mandated action), the Advisory Committee, or any Pool Committee may, by a regularly noticed motion, apply to the Court for review of any Watermaster's action, decision or rule. Notice of such motion shall be served personally or mailed to Watermaster and to all active parties. Unless otherwise ordered by the Court, such motion shall not operate to stay the effect of such Watermaster action, decision or rule.

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(c) Time for Motion. Notice of motion to review any Watermaster action, decision or rule shall be served and filed within ninety (90) days after such Watermaster action, decision or rule, except for budget actions, in which event said notice period shall be sixty (60) days.

(d) De Novo Nature of Proceedings. Upon the filing of any such motion, the Court shall require the moving party to notify the active parties, the Watermaster, the Advisory Committee and each Pool Committee, of a date for taking evidence and argument, and on the date so designated shall review de novo the question at issue. Watermaster's findings or decision, if any, may be received in evidence at said hearing, but shall not constitute presumptive or prima facie proof of any fact in issue.

(e) Decision. The decision of the Court in such proceeding shall be an appealable supplemental order in this case. When the same is final, it shall be binding upon the Watermaster and all parties.

C. ADVISORY AND POOL COMMITTEES

32. Authorization. Watermaster is authorized and directed to cause committees of producer representatives to be organized to act as Pool Committees for each of the several pools created under the Physical Solution. Said Pool Committees shall, in turn, jointly form an Advisory Committee to assist Watermaster in performance of its functions under this judgment. Pool Committees shall be composed as specified in the respective pooling plans, and the Advisory Committee shall be composed of not to exceed ten (10) voting representatives from each pool, as designated by the

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respective Pool Committee. WMWD, PVMWD and SBVMWD shall each be entitled to one non-voting representative on said Advisory Committee.

33. Term and Vacancies. Members of any Pool Committee, shall serve for the term, and vacancies shall be filled, as specified in the respective pooling plan. Members of the Advisory Committee shall serve at the will of their respective Pool Committee.

34. Voting Power. The voting power on each Pool Committee shall be allocated as provided in the respective pooling plan. The voting power on the Advisory Committee shall be one hundred (100) votes allocated among the three pools in proportion to the total assessments paid to Watermaster during the preceding year; provided, that the minimum voting power of each pool shall be

(a) Overlying (Agricultural) Pool 20,

(b) Overlying (Non-agricultural) Pool 5, and

(c) Appropriative Pool 20.

In the event any pool is reduced to its said minimum vote, the remaining votes shall be allocated between the remaining pools on said basis of assessments paid to Watermaster by each such remaining pool during the preceding year. The method of exercise of each pool's voting power on the Advisory Committee shall be as determined by the respective pool committees.

35. Quorum. A majority of the voting power of the Advisory Committee or any Pool Committee shall constitute a quorum for the transaction of affairs of such Advisory or Pool Committee; provided, that at least one representative of each Pool Committee shall be required to constitute a quorum of the Advisory Committee. No Pool Committee representative may purposely absent himself or

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herself, without good cause, from an Advisory Committee meeting to deprive it of a quorum. Action by affirmative vote of a majority of the entire voting power of any Pool Committee or the Advisory Committee shall constitute action by such committee. Any action or recommendation of a Pool Committee or the Advisory Committee shall be transmitted to Watermaster in writing, together with a report of any dissenting vote or opinion.

36. Compensation. Pool or Advisory Committee members may receive compensation, to be established by the respective pooling plan, but not to exceed twenty-five dollars ($25.00) for each meeting of such Pool or Advisory Committee attended, and provided that no member of a Pool or Advisory Committee shall receive compensation of more than three hundred ($300.00) dollars for service on any such committee during any one year. All such compensation shall be a part of Watermaster administrative expense. No member of any Pool or Advisory Committee shall be employed by Watermaster or compensated by Watermaster for professional or other services rendered to such Pool or Advisory Committee or to Watermaster, other than the fee for attendance at meetings herein provided, plus reimbursement of reasonable expenses related to activities within the Basin.

37. Organization.

(a) Organizational Meeting. At its first meeting in each year, each Pool Committee and the Advisory Committee shall elect a chairperson and a vice chairperson from its membership. It shall also select a secretary, a treasurer and such assistant secretaries and treasurers as may be appropriate, any of whom may, but need not, be members of

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such Pool or Advisory Committee.

(b) Regular Meetings. All Pool Committees and the Advisory Committee shall hold regular meetings at a place and time to be specified in the rules to be adopted by each Pool and Advisory Committee. Notice of regular meetings of any Pool or Advisory Committee, and of any change in time or place thereof, shall be mailed to all active parties in said pool or pools.

(c) Special Meetings. Special meetings of any Pool or Advisory Committee may be called at any time by the Chairperson or by any three (3) members of such Pool or Advisory Committee by delivering notice personally or by mail to each member of such Pool or Advisory Committee and to each active party at least 24 hours before the time of each such meeting in the case of personal delivery, and 96 hours in the case of mail. The calling notice shall specify the time and place of the special meeting and the business to be transacted. No other business shall be considered at such meeting.

(d) Minutes. Minutes of all Pool Committee, Advisory Committee and Watermaster meetings shall be kept at Watermaster's offices. Copies thereof shall be mailed or otherwise furnished to all active parties in the pool or pools concerned. Said copies of minutes shall constitute notice of any Pool or Advisory Committee action therein reported, and shall be available for inspection by any party.

(e) Adjournments. Any meeting of any Pool or Advisory Committee may be adjourned to a time and place specified in the order of adjournment. Less than a quorum may so adjourn

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from time to time. A copy of the order or notice of adjournment shall be conspicuously posted forthwith on or near the door of the place where the meeting was held.

38. Powers and Functions. The powers and functions of the respective Pool Committees and the Advisory Committee shall be as follows:

(a) Pool Committees. Each Pool Committee shall have the power and responsibility for developing policy recommendations for administration of its particular pool, as created under the Physical Solution. All actions and recommendations of any Pool Committee which require Watermaster implementation shall first be noticed to the other two pools. If no objection is received in writing within thirty (30) days, such action or recommendation shall be transmitted directly to Watermaster for action. If any such objection is received, such action or recommendation shall be reported to the Advisory Committee before being transmitted to Watermaster.

(b) Advisory Committee. The Advisory Committee shall have the duty to study, and the power to recommend, review and act upon all discretionary determinations made or to be made hereunder by Watermaster.

[1] Committee Initiative. When any recommendation or advice of the Advisory Committee is received by Watermaster, action consistent therewith may be taken by Watermaster; provided, that any recommendation approved by 80 votes or more in the Advisory Committee shall constitute a mandate for action by Watermaster consistent therewith. If Watermaster is unwilling or unable to act

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pursuant to recommendation or advice from the Advisory Committee (other than such mandatory recommendations), Watermaster shall hold a public hearing, which shall be followed by written findings and decision. Thereafter, Watermaster may act in accordance with said decision, whether consistent with or contrary to said Advisory Committee recommendation. Such action shall be subject to review by the Court, as in the case of all other Watermaster determinations.

[2] Committee Review. In the event Watermaster proposes to take any discretionary action, other than approval or disapproval of a Pool Committee action or recommendation properly transmitted, or execute any agreement not theretofore within the scope of an Advisory Committee recommendation, notice of such intended action shall be served on the Advisory Committee and its members at least thirty (30) days before the Watermaster meeting at which such action is finally authorized.

(c) Review of Watermaster Actions. Watermaster (as to mandated action), the Advisory Committee or any Pool Committee shall be entitled to employ counsel and expert assistance in the event Watermaster or such Pool or Advisory Committee seeks Court review of any Watermaster action or failure to act. The cost of such counsel and expert assistance shall be Watermaster expense to be allocated to the affected pool or pools.

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VI. PHYSICAL SOLUTION

A. GENERAL

39. Purpose and Objective. Pursuant to the mandate of Section 2 of Article X of the California Constitution, the Court hereby adopts and orders the parties to comply with a Physical Solution. The purpose of these provisions is to establish a legal and practical means for making the maximum reasonable beneficial use of the waters of Chino Basin by providing the optimum economic, long-term, conjunctive utilization of surface waters, ground waters and supplemental water, to meet the requirements of water users having rights in or dependent upon Chino Basin.

40. Need for Flexibility. It is essential that this Physical Solution provide maximum flexibility and adaptability in order that Watermaster and the Court may be free to use existing and future technological, social, institutional and economic options, in order to maximize beneficial use of the waters of Chino Basin. To that end, the Court's retained jurisdiction will be utilized, where appropriate, to supplement the discretion herein granted to the Wastermaster.

41. Watermaster Control. Watermaster, with the advice of the Advisory and Pool Committees, is granted discretionary powers in order to develop an optimum basin management program for Chino Basin, including both water quantity and quality considerations. Withdrawals and supplemental water replenishment of Basin Water, and the full utilization of the water resources of Chino Basin, must be subject to procedures established by and administered through Watermaster with the advice and assistance of the Advisory and Pool Committees composed of the affected producers. Both the

quantity and quality of said water resources may thereby be preserved and the beneficial utilization of the Basin maximized.

42. General Pattern of Operations. It is contemplated that the rights herein decreed will be divided into three (3) operating pools for purposes of Watermaster administration. A fundamental premise of the Physical Solution is that all water users dependent upon Chino Basin will be allowed to pump sufficient waters from the Basin to meet their requirements. To the extent that pumping exceeds the share of the Safe Yield assigned to the Overlying Pools, or the Operating Safe Yield in the case of the Appropriative Pool, each pool will provide funds to enable Watermaster to replace such overproduction. The method of assessment in each pool shall be as set forth in the applicable pooling plan.

B. POOLING

43. Multiple Pools Established. There are hereby established three (3) pools for Watermaster administration of, and for the allocation of responsibility for, and payment of, costs of replenishment water and other aspects of this Physical Solution.

(a) Overlying (Agricultural) Pool. The first pool shall consist of the State of California and all overlying producers who produce water for other than industrial or commercial purposes. The initial members of the pool are listed in Exhibit "C".

(b) Overlying (Non-agricultural) Pool. The second pool shall consist of overlying producers who produce water for industrial or commercial purposes. The initial members of this pool are listed in Exhibit "D".

(c) Appropriative Pool. A third and separate pool shall

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consist of owners of appropriative rights. The initial members of the pool are listed in Exhibit "E".

Any party who changes the character of his use may, by subsequent order of the Court, be reassigned to the proper pool; but the allocation of Safe Yield under Paragraph 44 hereof shall not be changed. Any non-party producer or any person who may hereafter commence production of water from Chino Basin, and who may become a party to this physical solution by intervention, shall be assigned to the proper pool by the order of the Court authorizing such intervention.

44. Determination and Allocation of Rights to Safe Yield of Chino Basin. The declared Safe Yield of Chino Basin is hereby allocated as follows:

Pool	Allocation
Overlying (Agricultural) Pool	414,000 acre feet in any five (5) consecutive years.
Overlying (Non-agricultural) Pool.	7,366 acre feet per year.
Appropriative Pool	49,834 acre feet per year.

The foregoing acre foot allocations to the overlying pools are fixed. Any subsequent change in the Safe Yield shall be debited or credited to the Appropriative Pool. Basin Water available to the Appropriative Pool without replenishment obligation may vary from year to year as the Operating Safe Yield is determined by Watermaster pursuant to the criteria set forth in Exhibit "I".

45. Annual Replenishment. Watermaster shall levy and collect assessments in each year, pursuant to the respective pooling plans, in amounts sufficient to purchase replenishment water to replace production by any pool during the preceding year which exceeds that

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pool's allocated share of Safe Yield in the case of the overlying pools, or Operating Safe Yield in the case of the Appropriative Pool. It is anticipated that supplemental water for replenishment of Chino Basin may be available at different rates to the various pools to meet their replenishment obligations. If such is the case, each pool will be assessed only that amount necessary for the cost of replenishment water to that pool, at the rate available to the pool, to meet its replenishment obligation.

46. Initial Pooling Plans. The initial pooling plans, which are hereby adopted, are set forth in Exhibits "F", "G" and "H", respectively. Unless and until modified by amendment of the judgment pursuant to the Court's continuing jurisdiction, each such plan shall control operation of the subject pool.

C. REPORTS AND ACCOUNTING

47. Production Reports. Each party or responsible party shall file periodically with Watermaster, pursuant to Watermaster rules, a report on a form to be prescribed by Watermaster showing the total production of such party during the preceding reportage period, and such additional information as Watermaster may require, including any information specified by the affected Pool Committee.

48. Watermaster Reports and Accounting. Watermaster's annual report, which shall be filed on or before November 15 of each year and shall apply to the preceding year's operation, shall contain details as to operation of each of the pools and a certified audit of all assessments and expenditures pursuant to this Physical Solution and a review of Watermaster activities.

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D. REPLENISHMENT

49. Sources of Supplemental Water. Supplemental water may be obtained by Watermaster from any available source. Watermaster shall seek to obtain the best available quality of supplemental water at the most reasonable cost for recharge in the Basin. To the extent that costs of replenishment water may vary between pools, each pool shall be liable only for the costs attributable to its required replenishment. Available sources may include, but are not limited to:

(a) Reclaimed Water. There exist a series of agreements generally denominated the Regional Waste Water Agreements between CBMWD and owners of the major municipal sewer systems within the basin. Under those agreements, which are recognized hereby but shall be unaffected and unimpaired by this judgment, substantial quantities of reclaimed water may be made available for replenishment purposes. There are additional sources of reclaimed water which are, or may become, available to Watermaster for said purposes. Maximum beneficial use of reclaimed water shall be given high priority by Watermaster.

(b) State Water. State water constitutes a major available supply of supplemental water. In the case of State Water, Watermaster purchases shall comply with the water service provisions of the State's water service contracts. More specifically, Watermaster shall purchase State Water from MWD for replenishment of excess production within CBMWD, WMWD and PVMWD, and from SBVMWD to replenish excess production within SBVMWD's boundaries in Chino Basin, except to the

extent that MWD and SBVMWD give their consent as required by such State water service contracts.

(c) Local Import. There exist facilities and methods for importation of surface and ground water supplies from adjacent basins and watersheds.

(d) Colorado River Supplies. MWD has water supplies available from its Colorado River Aqueduct.

50. Methods of Replenishment. Watermaster may accomplish replenishment of overproduction from the Basin by any reasonable method, including:

(a) Spreading and percolation or Injection of water in existing or new facilities, subject to the provisions of Paragraphs 19, 25 and 26 hereof.

(b) In Lieu Procedures. Watermaster may make, or cause to be made, deliveries of water for direct surface use, in lieu of ground water production.

E. REVENUES

51. Production Assessment. Production assessments, on whatever basis, may be levied by Watermaster pursuant to the pooling plan adopted for the applicable pool.

52. Minimal Producers. Minimal Producers shall be exempted from payment of production assessments, upon filing of production reports as provided in Paragraph 47 of this Judgment, and payment of an annual five dollar ($5.00) administrative fee as specified by Watermaster rules.

53. Assessment Proceeds -- Purposes. Watermaster shall have the power to levy assessments against the parties (other than minimal pumpers) based upon production during the preceding period

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of assessable production, whether quarterly, semi-annually or annually, as may be determined most practical by Watermaster or the affected Pool Committee.

54. Administrative Expenses. The expenses of administration of this Physical Solution shall be categorized as either (a) general Watermaster administrative expense, or (b) special project expense.

(a) General Watermaster Administrative Expense shall include office rental, general personnel expense, supplies and office equipment, and related incidental expense and general overhead.

(b) Special Project Expense shall consist of special engineering, economic or other studies, litigation expense, meter testing or other major operating expenses. Each such project shall be assigned a Task Order number and shall be separately budgeted and accounted for.

General Watermaster administrative expense shall be allocated and assessed against the respective pools based upon allocations made by the Watermaster, who shall make such allocations based upon generally accepted cost accounting methods. Special Project Expense shall be allocated to a specific pool, or any portion thereof, only upon the basis of prior express assent and finding of benefit by the Pool Committee, or pursuant to written order of the Court.

55. Assessments -- Procedure. Assessments herein provided for shall be levied and collected as follows:

(a) Notice of Assessment. Watermaster shall give written notice of all applicable assessments to each party on

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or before ninety (90) days after the end of the production period to which such assessment is applicable.

(b) Payment. Each assessment shall be payable on or before thirty (30) days after notice, and shall be the obligation of the party or successor owning the water production facility at the time written notice of assessment is given, unless prior arrangement for payment by others has been made in writing and filed with Watermaster.

(c) Delinquency. Any delinquent assessment shall bear interest at 10% per annum (or such greater rate as shall equal the average current cost of borrowed funds to the Watermaster) from the due date thereof. Such delinquent assessment and interest may be collected in a show-cause proceeding herein instituted by the Watermaster, in which case the Court may allow Watermaster its reasonable costs of collection, including attorney's fees.

56. Accumulation of Replenishment Water Assessment Proceeds. In order to minimize fluctuation in assessment and to give Watermaster flexibility in purchase and spreading of replenishment water, Watermaster may make reasonable accumulations of replenishment water assessment proceeds. Interest earned on such retained funds shall be added to the account of the pool from which the funds were collected and shall be applied only to the purchase of replenishment water.

57. Effective Date. The effective date for accounting and operation under this Physical Solution shall be July 1, 1977, and the first production assessments hereunder shall be due after July 1, 1978. Watermaster shall, however, require installation of

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meters or measuring devices and establish operating procedures immediately, and the costs of such Watermaster activity (not including the cost of such meters and measuring devices) may be recovered in the first administrative assessment in 1978.

VII. MISCELLANEOUS PROVISIONS

58. Designation of Address for Notice and Service. Each party shall designate the name and address to be used for purposes of all subsequent notices and service herein, either by its endorsement on the Stipulation for Judgment or by a separate designation to be filed within thirty (30) days after Judgment has been served. Said designation may be changed from time to time by filing a written notice of such change with the Watermaster. Any party desiring to be relieved of receiving notices of Watermaster or committee activity may file a waiver of notice on a form to be provided by Watermaster. Thereafter such party shall be removed from the Active Party list. Watermaster shall maintain at all times a current list of active parties and their addresses for purposes of service. Watermaster shall also maintain a full current list of names and addresses of all parties or their successors, as filed herein. Copies of such lists shall be available, without cost, to any party, the Advisory Committee or any Pool Committee upon written request therefor.

59. Service of Documents. Delivery to or service upon any party or active party by the Watermaster, by any other party, or by the Court, of any item required to be served upon or delivered to such party or active party under or pursuant to the Judgment shall be made personally or by deposit in the United States mail, first

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class, postage prepaid, addressed to the designee and at the address in the latest designation filed by such party or active party.

60. Intervention After Judgment. Any non-party assignee of the adjudicated appropriative rights of any appropriator, or any other person newly proposing to produce water from Chino Basin, may become a party to this judgment upon filing a petition in intervention. Said intervention must be confirmed by order of this Court. Such intervenor shall thereafter be a party bound by this judgment and entitled to the rights and privileges accorded under the Physical Solution herein, through the pool to which the Court shall assign such intervenor.

61. Loss of Rights. Loss, whether by abandonment, forfeiture or otherwise, of any right herein adjudicated shall be accomplished only (1) by a written election by the owner of the right filed with Watermaster, or (2) by order of the Court upon noticed motion and after hearing.

62. Scope of Judgment. Nothing in this Judgment shall be deemed to preclude or limit any party in the assertion against a neighboring party of any cause of action now existing or hereafter arising based upon injury, damage or depletion of water supply available to such party, proximately caused by nearby pumping which constitutes an unreasonable interference with such complaining party's ability to extract ground water.

63. Judgment Binding on Successors. This Judgment and all provisions thereof are applicable to and binding upon not only the parties to this action, but also upon their respective heirs, executors, administrators, successors, assigns, lessees and

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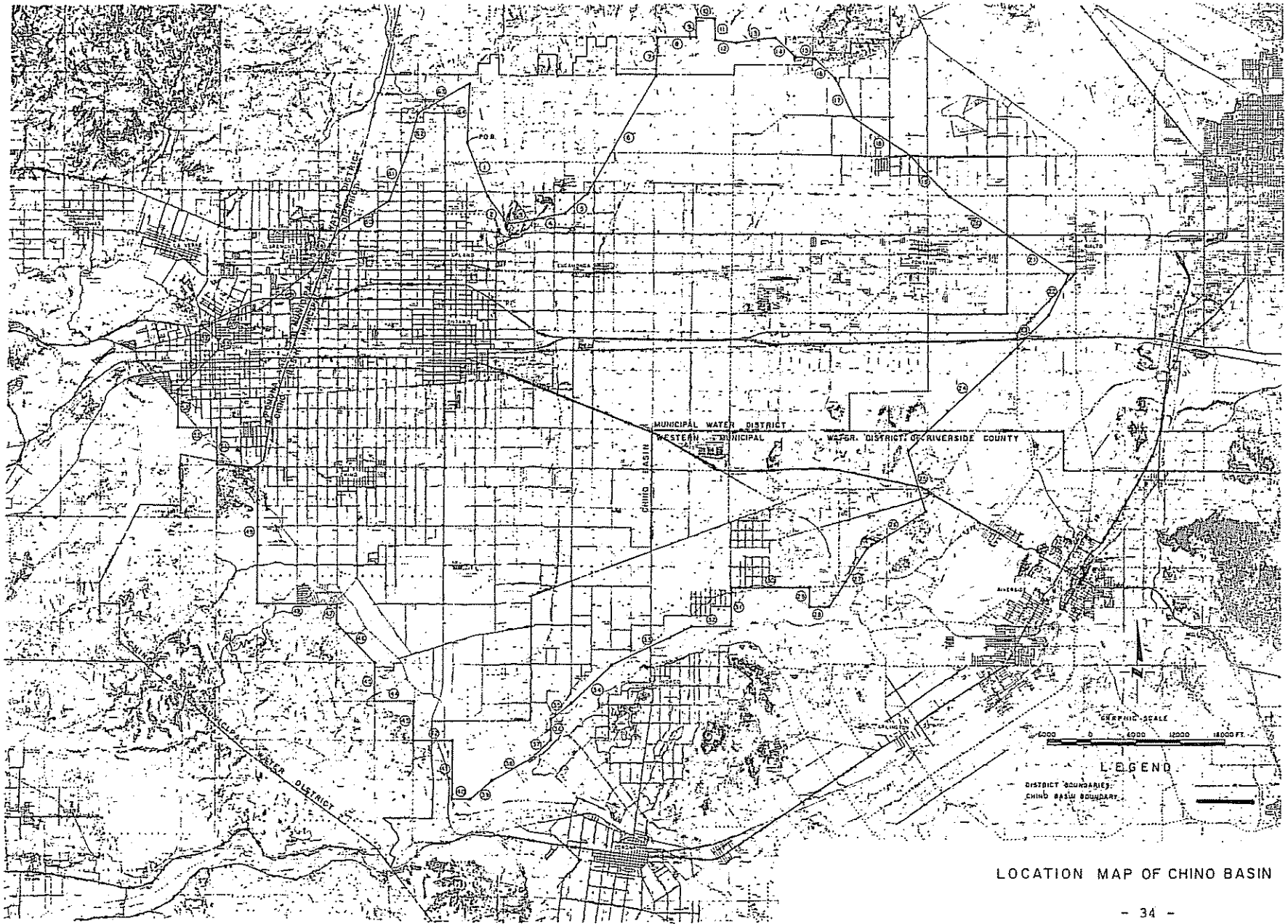
licensees and upon the agents, employees and attorneys in fact of all such persons.

64. Costs. No party shall recover any costs in this proceeding from any other party.

Dated: JAN 27 1978.

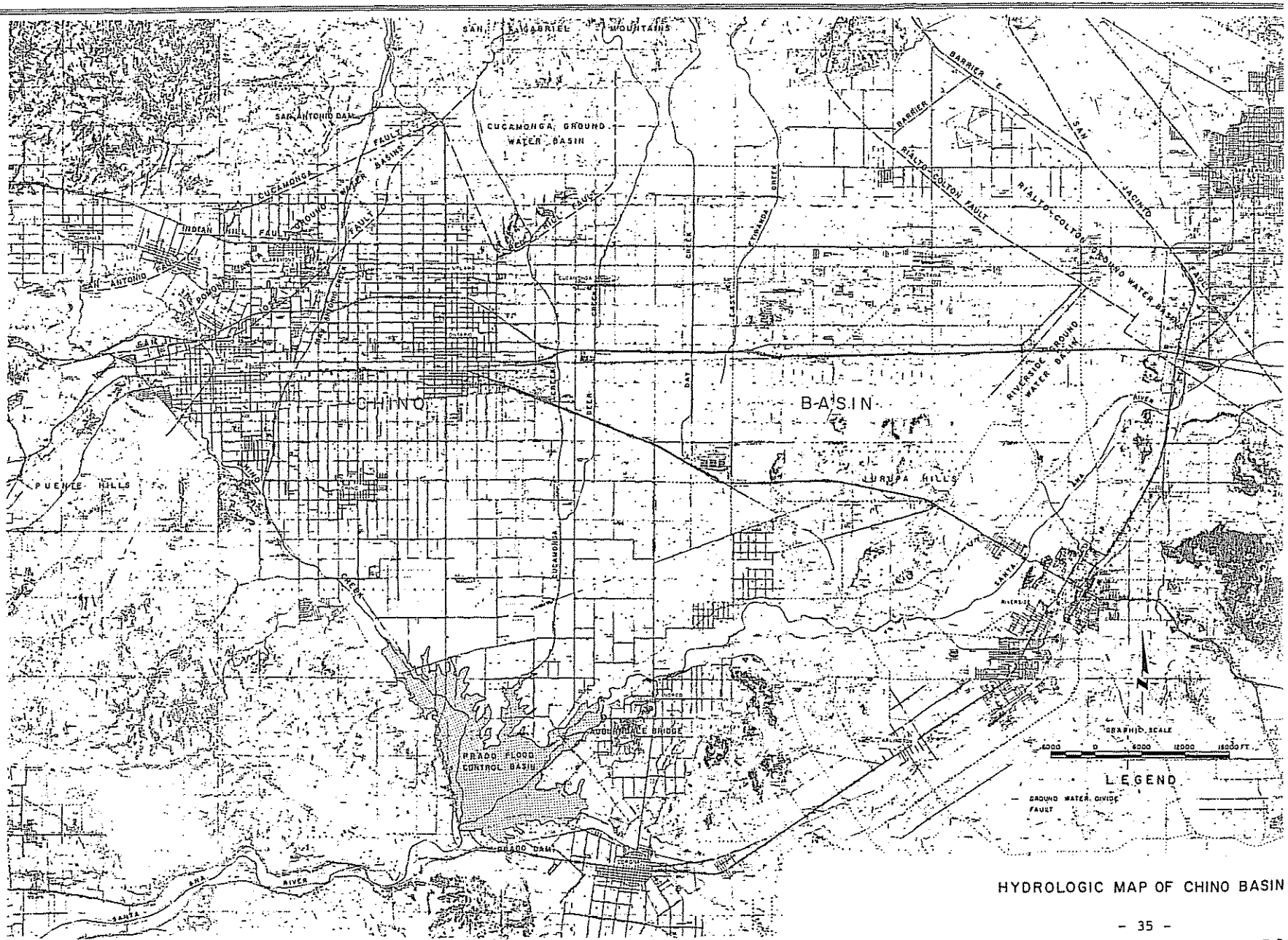
Judge

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LOCATION MAP OF CHINO BASIN

EXHIBIT A



HYDROLOGIC MAP OF CHINO BASIN

EXHIBIT B

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STIPULATING OVERLYING AGRICULTURAL PRODUCERS

STATE OF CALIFORNIA
COUNTY OF SAN BERNARDINO

Abacherli Dairy, Inc.
Abacherli, Frank
Abacherli, Shirley
Abbona, Anna
Abbona, James
Abbona, Jim
Abbona, Mary
Agliani, Amelia H.
Agman, Inc.
Aguerre, Louis B.
Ahmanson Trust Co.
Akiyama, Shizuye
Akiyama, Tomoo
Akkerman, Dave
Albers, J. N.
Albers, Nellie
Alewyn, Jake J.
Alewyn, Normalee
Alger, Mary D.
Alger, Raymond
Allen, Ben F.
Allen, Jane F.
Alta-Dena Dairy
Anderson Farms
Anguiano, Sarah L. S.
Anker, Gus
Aphessetche, Xavier
Arena Mutual Water Assn.
Armstrong Nurseries, Inc.
Arretche, Frank
Arretche, Jean Pierre
Arvidson, Clarence F.
Arvidson, Florence
Ashley, George W.
Ashley, Pearl E.
Atlas Farms
Atlas Ornamental Iron Works, Inc.
Aukeman, Carol
Aukeman, Lewis
Ayers, Kenneth C., aka
Kelley Ayers
Bachoc, Raymond
Baldwin, Edgar A.
Baldwin, Lester
Banbury, Carolyn
Bangma Dairy
Bangma, Arthur
Bangma, Ida
Bangma, Martin
Bangma, Sam
Barba, Anthony B.
Barba, Frank
Barcellos, Joseph
Barnhill, Maurine W.

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Barnhill, Paul	Boersma, Angie
Bartel, Dale	Boersma, Berdina
Bartel, Ursula	Boersma, Frank
Bartel, Willard	Boersma, Harry
Barthelemy, Henry	Boersma, Paul
Barthelemy, Roland	Boersma, Sam
Bassler, Donald V., M.D.	Boersma, William L.
Bates, Lowell R.	Bohlander & Holmes, Inc.
Bates, Mildred L.	Bokma, Peter
Beahm, James W.	Bollema, Jacob
Beahm, Joan M.	Boonstoo, Edward
Bekendam, Hank	Bootsma, Jim
Bekendam, Pete	Borba, Dolene
Bello, Eugene	Borba, Dolores
Bello, Olga	Borba, Emily
Beltman, Evelyn	Borba, George
Beltman, Tony	Borba, John
Bergquist Properties, Inc.	Borba, John & Sons
Bevacqua, Joel A.	Borba, John Jr.
Bevacqua, Marie B.	Borba, Joseph A.
Bidart, Bernard	Borba, Karen E.
Bidart, Michael J.	Borba, Karen M.
Binnell, Wesley	Borba, Pete, Estate of
Black, Patricia E.	Borba, Ricci
Black, Victor	Borba, Steve
Bodger, John & Sons Co.	Borba, Tom
Boer, Adrian	Bordisso, Alleck
Boersma and Wind Dairy	Borges, Angelica M.

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Borges, Bernadette
Borges, John O.
Borges, Linda L.
Borges, Manual Jr.
Borges, Tony
Bos, Aleid
Bos, Gerrit
Bos, John
Bos, John
Bos, Margaret
Bos, Mary
Bos, Mary Beth
Bos, Tony
Bosch, Henrietta
Bosch, Peter T.
Boschma, Betty
Boschma, Frank
Boschma, Greta
Boschma, Henry
Bosma, Dick
Bosma, Florence G.
Bosma, Gerrit
Bosma, Jacob J.
Bosma, Jeanette Thea
Bosman, Frank
Bosman, Nellie
Bosnyak, Goldie M.
Bosnyak, Martin
Bothof, Roger W.
Bouma, Cornie
Bouma, Emma
Bouma, Henry P.
Bouma, Martin
Bouma, Peter G. & Sons Dairy
Bouma, Ted
Bouman, Helen
Bouman, Sam
Bower, Mabel E.
Boys Republic
Breedyk, Arie
Breedyk, Jessie
Briano Brothers
Briano, Albert
Briano, Albert Trustee for
Briano, Albert Frank
Briano, Lena
Brink, Russell N.
Brinkerhoff, Margaret
Brinkerhoff, Robert L.
Britschgi, Florence
Britschgi, Magdalena Garetto
Britschgi, Walter P.
Brommer, Marvin
Brookside Enterprizes, dba
Brookside Vineyard Co.
Brothers Three Dairy

Brown, Eugene
Brun, Martha M.
Brun, Peter Robert
Buma, Duke
Buma, Martha
Bunse, Nancy
Bunse, Ronnie L.
Caballero, Bonnie L.
Caballero, Richard F.
Cable Airport Inc.
Cadlini, Donald
Cadlini, Jesse R.
Cadlini, Marie Edna
Cambio, Anna
Cambio, Charles, Estate of
Cambio, William V.
Cardoza, Florence
Cardoza, Olivi
Cardoza, Tony
Carnesi, Tom
Carver, Robt M., Trustee
Cauffman, John R.
Chacon Bros.
Chacon, Elvera P.
Chacon, Joe M.
Chacon, Robert M.
Chacon, Virginia L.
Chez, Joseph C.
Chino Corona Investment
Chino Water Co.
Christensen, Leslie
Christensen, Richard G.
Christian, Ada R.
Christian, Harold F.
Christy, Ella J.
Christy, Ronald S.
Cihigoyenetche, Jean
Cihigoyenetche, Leona
Cihigoyenetche, Martin
Clarke, Arthur B.
Clarke, Nancy L.
Clarke, Phyllis J.
Coelho, Isabel
Coelho, Joe A. Jr.
Collins, Howard E.
Collins, Judith F.
Collinsworth, Ester L.
Collinsworth, John E.
Collinsworth, Shelby
Cone Estate (05-2-00648/649)
Consolidated Freightways Corp.
of Delaware
Corona Farms Co.
Corra, Rose
Costa, Dimas S.
Costa, Laura

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Costa, Myrtle	De Boer, L. H.
Costamagna, Antonio	De Boer, Sidney
Costamagna, Joseph	De Bos, Andrew
Cousyn, Claus B.	De Graaf, Anna Mae
Cramer, Carole F.	De Graaf, Gerrit
Cramer, William R.	De Groot, Dick
Crossroads Auto Dismantlers, Inc.	De Groot, Dorothy
Crouse, Beatrice I.	De Groot, Ernest
Crouse, Roger	De Groot, Henrietta
Crowley, Juanita C.	De Groot, Jake
Crowley, Ralph	De Groot, Pete Jr.
Cucamonga Vintners	De Haan, Bernadena
D'Astici, Teresa	De Haan, Henry
Da Costa, Cecilia B.	De Hoog, Adriana
Da Costa, Joaquim F.	De Hoog, Joe
Daloisio, Norman	De Hoog, Martin
De Berard Bros.	De Hoog, Martin L.
De Berard, Arthur, Trustee	De Hoog, Mitch
De Berard, Charles	De Hoog, Tryntje
De Berard, Chas., Trustee	De Jager, Cobi
De Berard, Helan J.	De Jager, Edward D.
De Berard, Robert	De Jong Brothers Dairy
De Berard, Robert, Trustee	De Jong, Cornelis
De Bie, Adrian	De Jong, Cornelius
De Bie, Henry	De Jong, Grace
De Bie, Margaret M.	De Jong, Jake
De Bie, Marvin	De Jong, Lena
De Boer, Fred	De Leeuw, Alice

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De Leeuw, Sam	Dirkse, Catherine
De Soete, Agnes	Dirkse, Charles C.
De Soete, Andre	Dixon, Charles E.
De Vries, Abraham	Dixon, Geraldine A.
De Vries, Case	Doesberg, Hendrica
De Vries, Dick	Doesburg, Theodorus P.
De Vries, Evelyn	Dolan, Marion
De Vries, Henry, Estate of	Dolan, Michael H.
De Vries, Hermina	Dominguez, Helen
De Vries, Jack H.	Dominguez, Manual
De Vries, Jane	Donkers, Henry A.
De Vries, Janice	Donkers, Nellie G.
De Vries, John	Dotta Bros.
De Vries, John J.	Douma Brothers Dairy
De Vries, Neil	Douma, Betty A.
De Vries, Ruth	Douma, Fred A.
De Vries, Theresa	Douma, Hendrika
De Wit, Gladys	Douma, Herman G.
De Wit, Peter S.	Douma, Narleen J.
De Wyn, Evert	Douma, Phillip M.
De Zoete, Hattie V.	Dow Chemical Co.
De Zoete, Leo A.	Dragt, Rheta
Decker, Hallie	Dragt, William
Decker, Henry A.	Driftwood Dairy Farm
Demmer, Ernest	Droogh, Case
Di Carlo, Marie	Duhalde, Marian
Di Carlo, Victor	Duhalde, Lauren
Di Tommaso, Frank	Duits, Henrietta

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Duits, John	Excelsior Farms
	F.D.I.C.
Dunlap, Edna Kraemer,	Fagundes, Frank M.
Estate of	Fagundes, Mary
Durrington, Glen	Fernandes, Joseph Jr.
Durrington, William F.	Fernandes, Velma C.
Dusi, John, Sr.	Ferraro, Ann
Dykstra, Dick	Ferreira, Frank J.
Dykstra, John	Ferreira, Joe C. Jr.
Dykstra, John & Sons	Ferreira, Narcie
Dykstra, Wilma	Filippi, J. Vintage Co.
Dyt, Cor	Filippi, Joseph
Dyt, Johanna	Filippi, Joseph A.
E and S Grape Growers	Filippi, Mary E.
Eaton, Thomas, Estate of	Fitzgerald, John R.
Echeverria, Juan	Flameling Dairy Inc.
Echeverria, Carlos	Flamingo Dairy
Echeverria, Pablo	Foss, Douglas E.
Eilers, E. Myrle	Foss, Gerald R.
Eilers, Henry W.	Foss, Russel
El Prado Golf Course	Fred & John Troost No. 1 Inc.
Ellsworth, Rex C.	Fred & Maynard Troost No. 2 Inc.
Engelsma, Jake	Freitas, Beatriz
Engelsma, Susan	Freitas, Tony T.
Escojeda, Henry	Gakle, Louis L.
Etiwanda Grape Products Co.	Galleano Winery, Inc.
Euclid Ave. Investment One	Galleano, Bernard D.
Euclid Ave. Investment Four	Galleano, D.
Euclid Ave. Three Investment	Galleano, Mary M.

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Garcia, Pete
Gardner, Leland V.
Gardner, Lola M.
Garrett, Leonard E.
Garrett, Patricia T.
Gastelluberry, Catherine
Gastelluberry, Jean
Gilstrap, Glen E.
Gilstrap, Marjorie J.
Godinho, John
Godinho, June
Gonsalves, Evelyn
Gonsalves, John
Gorzeman, Geraldine
Gorzeman, Henry A.
Gorzeman, Joe
Govea, Julia
Goyenetche, Albert
Grace, Caroline E.
Grace, David J.
Gravatt, Glenn W.
Gravatt, Sally Mae
Greydanus Dairy, Inc.
Greydanus, Rena
Griffin Development Co.
Haagsma, Dave
Haagsma, John
Hansen, Mary D.
Hansen, Raymond F.
Hanson, Ardeth W.
Harada, James T.
Harada, Violet A.
Haringa, Earl and Sons
Haringa, Herman
Haringa, Rudy
Haringa, William
Harper, Cecilia de Mille
Harrington, Winona
Harrison, Jacqueline A.
Hatanaka, Kenichi
Heida, Annie
Heida, Don
Heida, Jim
Heida, Sam
Helms, Addison D.
Helms, Irma A.
Hermans, Alma I.
Hermans, Harry
Hettinga, Arthur
Hettinga, Ida
Hettinga, Judy
Hettinga, Mary
Hettinga, Wilbur
Heublein, Inc., Grocery Products Group
Hibma, Catherine M.

Hibma, Sidney
Hicks, Kenneth I.
Hicks, Minnie M.
Higgins Brick Co.
Highstreet, Alfred V.
Highstreet, Evada V.
Hilarides, Bertha as Trustee
Hilarides, Frank
Hilarides, John as Trustee
Hindelang, Tillie
Hindelang, William
Hobbs, Bonnie C.
Hobbs, Charles W.
Hobbs, Hazel I.
Hobbs, Orlo M.
Hoekstra, Edward
Hoekstra, George
Hoekstra, Grace
Hoekstra, Louie
Hofer, Paul B.
Hofer, Phillip F.
Hofstra, Marie
Hogeboom, Jo Ann M.
Hogeboom, Maurice D.
Hogg, David V.
Hogg, Gene P.
Hogg, Warren G.
Hohberg, Edith J.
Hohberg, Harold C.
Hohberg, Harold W.
Holder, Arthur B.
Holder, Dorothy F.
Holmes, A. Lee
Holmes, Frances P.
Hoogeboom, Gertrude
Hoogeboom, Pete
Hoogendam, John
Hoogendam, Tena
Houssels, J. K. Thoroughbred Farm
Hunt Industries
Idsinga, Ann
Idsinga, William W.
Imbach Ranch, Inc.
Imbach, Kenneth E.
Imbach, Leonard K.
Imbach, Oscar K.
Imbach, Ruth M.
Indaburu, Jean
Indaburu, Marceline
Iseli, Kurt H.
Ito, Kow
J & B Dairy Inc.
Jaques, Johnny C. Jr.
Jaques, Mary
Jaques, Mary Lou

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Jay Em Bee Farms	Knevelbaard, John
Johnson Bro's Egg Ranches, Inc.	Knudsen, Ejnar
Johnston, Ellwood W.	Knudsen, Karen M.
Johnston, George F. Co.	Knudsen, Kenneth
Johnston, Judith H.	Knudson, Robert
Jones, Leonard P.	Knudson, Darlene
Jongsma & Sons Dairy	Koel, Helen S.
Jongsma, Diana A.	Koetsier, Gerard
Jongsma, Dorothy	Koetsier, Gerrit J.
Jongsma, George	Koetsier, Jake
Jongsma, Harold	Koning, Fred W.
Jongsma, Henry	Koning, Gloria
Jongsma, John	Koning, J. W. Estate
Jongsma, Nadine	Koning, James A.
Jongsma, Tillie	Koning, Jane
Jordan, Marjorie G.	Koning, Jane C.
Jordan, Troy O.	Koning, Jennie
Jorritsma, Dorothy	Koning, John
Juliano, Albert	Koning, Victor A.
Kamper, Cornelis	Kooi Holstein Corporation
Kamstra, Wilbert	Koolhaas, Kenneth E.
Kaplan, Lawrence J.	Koolhaas, Simon
Kasbergen, Martha	Koolhaas, Sophie Grace
Kasbergen, Neil	Koopal, Grace
Kazian, Angelen Estate of	Koopal, Silas
Kingsway Const. Corp.	Koopman, Eka
Klapps Market	Koopman, Gene T.
Kline, James K.	Koopman, Henry G.

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Koopman, Ted
Koopman, Tena
Koot, Nick
Koster, Aart
Koster, Frances
Koster, Henry B.
Koster, Nellie
Kroes, Jake R.
Kroeze, Bros
Kroeze, Calvin E.
Kroeze, John
Kroeze, Wesley
Kruckenberg, Naomi
Kruckenberg, Perry
L. D. S. Welfare Ranch
Labrucherie, Mary Jane
Labrucherie, Raymond F.
Lako, Samuel
Landman Corp.
Lanting, Broer
Lanting, Myer
Lass, Jack
Lass, Sandra L.
Lawrence, Cecelia, Estate of
Lawrence, Joe H., Estate of
Leal, Bradley W.
Leal, John C.
Leal, John Craig
Leck, Arthur A.
Leck, Evelyn M.
Lee, Harold E.
Lee, Helen J.
Lee, Henrietta C.
Lee, R. T. Construction Co.
Lekkerkerk, Adriana
Lekkerkerk, L. M.
Lekkerkerker, Nellie
Lekkerkerker, Walt
Lewis Homes of California
Livingston, Dorothy M.
Livingston, Rex E.
Lokey, Rosemary Kraemer
Lopes, Candida A.
Lopes, Antonio S.
Lopez, Joe D.
Lourenco, Carlos, Jr.
Lourenco, Carmelina P.
Lourenco, Jack C.
Lourenco, Manual H.
Lourenco, Mary
Lourenco, Mary
Luiten, Jack
Luiz, John M.
Luna, Christine I.
Luna, Ruben T.
Lusk, John D. and Son
a California corporation

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Lyon, Gregory E.
Lyon, Paula E.
M & W Co. #2
Madole, Betty M.
Madole, Larry B.
Marquez, Arthur
Marquine, Jean
Martin, Lelon O.
Martin, Leon O.
Martin, Maria D.
Martin, Tony J.
Martins, Frank
Mathias, Antonio
Mc Cune, Robert M.
Mc Masters, Gertrude
Mc Neill, J. A.
Mc Neill, May F.
Mees, Leon
Mello and Silva Dairy
Mello and Sousa Dairy
Mello, Emilia
Mello, Enos C.
Mello, Mercedes
Mendiondo, Catherine
Mendiondo, Dominique
Meth. Hosp. - Sacramento
Metzger, R. S.
Metzger, Winifred
Mickel, Louise
Miersma, Dorothy
Meirsma, Harry C.
Minaberry, Arnaud
Minaberry, Marie
Mistretta, Frank J.
Mocho and Plaa Inc.
Mocho, Jean
Mocho, Noeline
Modica, Josephine
Montes, Elizabeth
Montes, Joe
Moons, Beatrice
Moons, Jack
Moramarco, John A. Enterprises
Moreno, Louis W.
Moss, John R.
Motion Pictures Associates, Inc.
Moynier, Joe
Murphy, Frances V.
Murphy, Myrl L.
Murphy, Naomi
Nanne, Martin Estate of
Nederend, Betty
Nederend, Hans
Norfolk, James
Norfolk, Martha
Notrica, Louis

Nyberg, Lillian N.
Nyenhuis, Annie
Nyenhuis, Jim
Occidental Land Research
Okumura, Marion
Okumura, Yuiche
Oldengarm, Effie
Oldengarm, Egbert
Oldengarm, Henry
Oliviera, Manuel L.
Oliviera, Mary M.
Olson, Albert
Oltmans Construction Co.
Omlin, Anton
Omlin, Elsie L.
Ontario Christian School Assn.
Oord, John
Oostdam, Jacoba
Oostdam, Pete
Oosten, Agnes
Oosten, Anthonia
Oosten, Caroline
Oosten, John
Oosten, Marinus
Oosten, Ralph
Orange County Water District
Ormonde, Manuel
Ormonde, Pete, Jr.
Ormonde, Viva
Ortega, Adeline B.
Ortega, Bernard Dino
Osterkamp, Joseph S.
Osterkamp, Margaret A.
P I E Water Co.
Palmer, Eva E.
Palmer, Walter E.
Parente, Luis S.
Parente, Mary Borba
Parks, Jack B.
Parks, Laura M.
Patterson, Lawrence E. Estate of
Payne, Clyde H.
Payne, Margo
Pearson, Athelia K.
Pearson, William C.
Pearson, William G.
Pene, Robert
Perian, Miller
Perian, Ona E.
Petrissans, Deanna
Petrissans, George
Petrissans, Jean P.
Petrissans, Marie T.
Pickering, Dora M.
(Mrs. A. L. Pickering)
Pierce, John

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Pierce, Sadie
Pietszak, Sally
Pine, Joe
Pine, Virginia
Pires, Frank
Pires, Marie
Plaa, Jeanne
Plaa, Michel
Plantenga, Agnes
Plantenga, George
Poe, Arlo D.
Pomona Cemetery Assn.
Porte, Cecelia, Estate of
Porte, Garritt, Estate of
Portsmouth, Vera McCarty
Ramella, Mary M.
Ramirez, Concha
Rearick, Hildegard H.
Rearick, Richard R.
Reinalda, Clarence
Reitsma, Greta
Reitsma, Louis
Rice, Bernice
Rice, Charlie E.
Richards, Karin
(Mrs. Ronnie Richards)
Richards, Ronald L.
Ridder, Jennie Wassenaar
Righetti, A. T.
Riley, George A.
Riley, Helen C.
Robbins, Jack K.
Rocha, John M.
Rocha, Jose C.
Rodrigues, John
Rodrigues, Manuel
Rodrigues, Manuel, Jr.
Rodrigues, Mary L.
Rodriquez, Daniel
Rogers, Jack D.
Rohrer, John A.
Rohrer, Theresa D.
Rohrs, Elizabeth H.
Rossetti, M. S.
Roukema, Angeline
Roukema, Ed.
Roukema, Nancy
Roukema, Siebren
Ruderian, Max J.
Russell, Fred J.
Rusticus, Ann
Rusticus, Charles
Rynsburger, Arie
Rynsburger, Berdena, Trust
Rynsburger, Joan Adele
Rynsburger, Thomas

S. P. Annex, Inc.

Salisbury, Elinor J.

Sanchez, Edmundo

Sanchez, Margarita O.

Santana, Joe Sr.

Santana, Palmira

Satragni, John B. Jr.

Scaramella, George P.

Schaafsma Bros.

Schaafsma, Jennie

Schaafsma, Peter

Schaafsma, Tom

Schaap, Andy

Schaap, Ids

Schaap, Maria

Schacht, Sharon C.

Schakel, Audrey

Schakel, Fred

Schmid, Olga

Schmidt, Madeleine

Schoneveld, Evert

Schoneveld, Henrietta

Schoneveld, John

Schoneveld, John Allen

Schug, Donald E.

Schug, Shirley A.

Schuh, Bernatta M.

Schuh, Harold H.

Scott, Frances M.

Scott, Linda F.

Scott, Stanley A.

Scritsmier, Lester J.

Serl, Charles A.

Serl, Rosalie P.

Shady Grove Dairy, Inc.

Shamel, Burt A.

Shelby, Harold E.

Shelby, John A.

Shelby, Velma M.

Shelton, Alice A.

Sherwood, Robert W.

Sherwood, Sheila J.

Shue, Eva

Shue, Gilbert

Sieperda, Anne

Sieperda, James

Sigrist, Hans

Sigrist, Rita

Silveira, Arline L.

Silveira, Frank

Silveira, Jack

Silveira, Jack P. Jr.

Simas, Dolores

Simas, Joe

Singleton, Dean

Singleton, Elsie R.

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Sinnott, Jim	Staal, John
Sinnott, Mildred B.	Stahl, Zippora P.
Slegers, Dorothy	Stampfl, Berta
Slegers, Hubert J.	Stampfl, William
Slegers, Jake	Stanley, Robert E.
Slegers, Jim	Stark, Everett
Slegers, Lenwood M.	Stellingwerf, Andrew
Slegers, Martha	Stellingwerf, Henry
Slegers, Tesse J.	Stellingwerf, Jenette
Smith, Edward S.	Stellingwerf, Shana
Smith, Helen D.	Stellingwerf, Stan
Smith, James E.	Stelzer, Mike C.
Smith, Keith J.	Sterk, Henry
Smith, Lester W.	Stiefel, Winifred
Smith, Lois Maxine	Stiefel, Jack D.
Smith, Marjorie W.	Stigall, Richard L.
Soares, Eva	Stigall, Vita
Sogioka, Mitsuyoshi	Stockman's Inn
Sogioka, Yoshimato	Stouder, Charlotte A.
Sousa, Sam	Stouder, William C.
Southern Pacific Land Co.	Struikmans, Barbara
Southfield, Eddie	Struikmans, Gertie
Souza, Frank M.	Struikmans, Henry Jr.
Souza, Mary T.	Struikmans, Henry Sr.
Spickerman, Alberta	Struikmans, Nellie
Spickerman, Florence	Swager, Edward
Spickerman, Rudolph	Swager, Gerben
Spyksma, John	Swager, Johanna

Swager, Marion
Swierstra, Donald
Swierstra, Fanny
Sybrandy, Ida
Sybrandy, Simon
Sytsma, Albert
Sytsma, Edith
Sytsma, Jennie
Sytsma, Louie
Te Velde, Agnes
Te Velde, Bay
Te Velde, Bernard A.
Te Velde, Bonnie
Te Velde, Bonnie G.
Te Velde, George
Te Velde, George, Jr.
Te Velde, Harm
Te Velde, Harriet
Te Velde, Henry J.
Te Velde, Jay
Te Velde, Johanna
Te Velde, John H.
Te Velde, Ralph A.
Te Velde, Zwaantina, Trustee
Ter Maaten, Case
Ter Maaten, Cleone
Ter Maaten, Steve
Terpstra, Carol
Terpstra, Theodore G.
Teune, Tony
Teunissen, Bernard
Teunissen, Jane
Thomas, Ethel M.
Thommen, Alice
Thommen, Fritz
Tillema, Allie
Tillema, Harold
Tillema, Klaas D.
Timmons, William R.
Tollerup, Barbara
Tollerup, Harold
Trapani, Louis A.
Trimlett, Arlene R.
Trimlett, George E.
Tristant, Pierre
Tuinhout, Ale
Tuinhout, Harry
Tuinhout, Hilda
Tuls, Elizabeth
Tuls, Jack S.
Tuls, Jake
Union Oil Company of California
United Dairyman's Co-op.
Urquhart, James G.
Usle, Cathryn
Usle, Faustino

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V & Y Properties
Vaile, Beryl M.
Valley Hay Co.
Van Beek Dairy Inc.
Van Canneyt Dairy
Van Canneyt, Maurice
Van Canneyt, Wilmer
Van Dam, Bas
Van Dam, Isabelle
Van Dam, Nellie
Van Den Berg, Gertrude
Van Den Berg, Joyce
Van Den Berg, Marinus
Van Den Berg, Marvin
Van Der Linden, Ardith
Van Der Linden, John
Van Der Linden, Stanley
Van Der Veen, Kenneth
Van Diest, Anna T.
Van Diest, Cornelius
Van Diest, Ernest
Van Diest, Rena
Van Dyk, Bart
Van Dyk, Jeanette
Van Foeken, Martha
Van Foeken, William
Van Hofwegan, Steve
Van Hofwegen, Adrian A.
Van Hofwegen, Clara
Van Hofwegen, Jessie
Van Klaveren, A.
Van Klaveren, Arie
Van Klaveren, Wilhelmina
Van Klaveren, William
Van Leeuwen, Arie C.
Van Leeuwen, Arie C.
Van Leeuwen, Arlan
Van Leeuwen, Clara G.
Van Leeuwen, Cornelia L.
Van Leeuwen, Harriet
Van Leeuwen, Jack
Van Leeuwen, John
Van Leeuwen, Letie
Van Leeuwen, Margie
Van Leeuwen, Paul
Van Leeuwen, William A.
Van Ravenswaay, Donald
Van Ryn Dairy
Van Ryn, Dick
Van Surksum, Anthonetta
Van Surksum, John
Van Veen, John
Van Vliet, Effie
Van Vliet, Hendrika
Van Vliet, Hugo
Van Vliet, Klaas

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Vande Witte, George	Vander Laan, Katie
Vanden Berge, Gertie	Vander Laan, Martin Jr.
Vanden Berge, Gertie	Vander Laan, Tillie
Vanden Berge, Jack	Vander Leest, Anna
Vanden Berge, Jake	Vander Leest, Ann
Vanden Brink, Stanley	Vander Meer, Alice
Vander Dussen, Agnes	Vander Meer, Dick
Vander Dussen, Cor	Vander Poel, Hank
Vander Dussen, Cornelius	Vander Poel, Pete
Vander Dussen, Edward	Vander Pol, Irene
Vander Dussen, Geraldine Marie	Vander Pol, Margie
Vander Dussen, James	Vander Pol, Marines
Vander Dussen, John	Vander Pol, William P.
Vander Dussen, Nelvina	Vander Schaaf, Earl
Vander Dussen, Rene	Vander Schaaf, Elizabeth
Vander Dussen, Sybrand Jr.	Vander Schaaf, Henrietta
Vander Dussen, Sybrand Sr.	Vander Schaaf, John
Vander Dussen Trustees	Vander Schaaf, Ted
Vander Eyk, Case Jr.	Vander Stelt, Catherine
Vander Eyk, Case Sr.	Vander Stelt, Clarence
Vander Feer, Peter	Vander Tuig, Arlene
Vander Feer, Rieka	Vander Tuig, Sylvester
Vander Laan, Ann	Vander Veen, Joe A.
Vander Laan, Ben	Vandervlag, Robert
Vander Laan, Bill	Vander Zwan, Peter
Vander Laan, Corrie	Vanderford, Betty W.
Vander Laan, Henry	Vanderford, Claud R.
Vander Laan, James	Vanderham, Adrian

Vanderham, Cornelius	Vestal, J. Howard
Vanderham, Cornelius P.	Visser, Gerrit
Vanderham, Cory	Visser, Grace
Vanderham, E. Jane	Visser, Henry
Vanderham, Marian	Visser, Jess
Vanderham, Martin	Visser, Louie
Vanderham, Pete C.	Visser, Neil
Vanderham, Wilma	Visser, Sam
Vasquez, Eleanor	Visser, Stanley
Veenendaal, Evert	Visser, Tony D.
Veenendaal, John H.	Visser, Walter G.
Veiga, Dominick Sr.	Von Der Ahe, Fredric T.
Verbree, Jack	Von Euw, George
Verbree, Tillie	Von Euw, Marjorie
Verger, Bert	Von Lusk, a limited partnership
Verger, Betty	Voortman, Anna Marie
Verhoeven, Leona	Voortman, Edward
Verhoeven, Martin	Voortman, Edwin J.
Verhoeven, Wesley	Voortman, Gertrude Dena
Vermeer, Dick	Wagner, Richard H.
Vermeer, Jantina	Walker, Carole R.
Vernola Ranch	Walker, Donald E.
Vernola, Anthonietta	Walker, Wallace W.
Vernola, Anthony	Wardle, Donald M.
Vernola, Frank	Warner, Dillon B.
Vernola, Mary Ann	Warner, Minnie
Vernola, Pat F.	Wassenaar, Peter W.
Vestal, Frances Lorraine	Waters, Michael

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Weeda, Adriana
Weeda, Daniel
Weeks, O. L.
Weeks, Verona E.
Weidman, Maurice
Weidman, Virginia
Weiland, Adaline I.
Weiland, Peter J.
Wesselink, Jules
West, Katharine R.
West, Russel
West, Sharon Ann
Western Horse Property
Westra, Alice
Westra, Henry
Westra, Hilda
Westra, Jake J.
Weststeyn, Freida
Weststeyn, Pete
Whitehurst, Louis G.
Whitehurst, Pearl L.
Whitmore, David L.
Whitmore, Mary A.
Whitney, Adolph M.
Wiersema, Harm
Wiersema, Harry
Wiersma, Ellen H.
Wiersma, Gladys J.
Wiersma, Jake
Wiersma, Otto
Wiersma, Pete
Winchell, Verne H., Trustee
Wind, Frank
Wind, Fred
Wind, Hilda
Wind, Johanna
Woo, Frank
Woo, Sem Gee
Wybenga, Clarence
Wybenga, Gus
Wybenga, Gus K.
Wybenga, Sylvia
Wynja, Andy
Wynja, Iona F.
Yellis, Mildred
Yellis, Thomas E.
Ykema-Harmsen Dairy
Ykema, Floris
Ykema, Harriet
Yokley, Betty Jo
Yokley, Darrell A.
Zak, Zan
Zivelonghi, George
Zivelonghi, Margaret
Zwaagstra, Jake
Zwaagstra, Jessie M.
Zwart, Case

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NON-PRODUCER WATER DISTRICTS

Chino Basin Municipal Water District

Chino Basin Water Conservation District

Pomona Valley Municipal Water District

Western Municipal Water District of Riverside County

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DEFAULTING OVERLYING AGRICULTURAL PRODUCERS

Cheryl L. Bain	Roy W. Lantis
Warren Bain	Sharon I. Lantis
John M. Barcelona	Frank Lorenz
Letty Bassler	Dagney H. MacDonald
John Brazil	Frank E. Martin
John S. Briano	Ruth C. Martin
Lupe Briano	Connie S. Mello
Paul A. Briano	Naldiro J. Mello
Tillie Briano	Felice Miller
Arnie B. Carlson	Ted Miller
John Henry Fikse	Masao Nerio
Phyllis S. Fikse	Tom K. Nerio
Lewellyn Flory	Toyo Nerio
Mary I. Flory	Yuriko Nerio
L. H. Glazer	Harold L. Rees
Dorothy Goodman	Alden G. Rose
Sidney D. Goodman	Claude Rouleau, Jr.
Frank Grossi	Patricia M. Rouleau
Harada Brothers	Schultz Enterprises
Ellen Hettinga	Albert Shaw
Hein Hettinga	Lila Shaw
Dick Hofstra, Jr.	Cathy M. Stewart
Benjamin M. Hughey	Marvin C. Stewart
Frieda L. Hughey	Betty Ann Stone
Guillaume Indart	John B. Stone
Ellwood B. Johnston, Trustee	Vantoll Cattle Co., Inc.
Perry Kruckenberg, Jr.	Catherene Verburg

Martin Verburg

Donna Vincent

Larry Vincent

Cliff Wolfe & Associates

Ada M. Woll

Zarubica Co.

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EXHIBIT "D"

OVERLYING NON-AGRICULTURAL RIGHTS

Party	Total Overlying Non-Agricultural Rights (Acre Feet)	Share of Safe Yield (Acre Feet)
Ameron Steel Producers, Inc.	125	97.858
County of San Bernardino	171	133.870
Conrock Company	406	317.844
Kaiser Steel Corporation	3,743	2,930.274
Red Star Fertilizer	20	15.657
Southern California Edison Co.	1,255	982.499
Space Center, Mira Loma	133	104.121
Southern Service Co., dba Blue Seal Linen	24	18.789
Sunkist, Orange Products Division	2,393	1,873.402
Carlsberg Mobile Home Properties, Ltd. '73	593	464.240
Union Carbide Corporation	546	427.446
Quaker Chemical Co.	0	0
Totals	9,409	7,366.000

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EXHIBIT "E"
APPROPRIATIVE RIGHTS

Party	Appropriative Right (Acre Feet)	Share of Initial Operating Safe Yield (Acre Feet)	Share of Operating Safe Yield (Percent)
City of Chino	5,271.7	3,670.067	6.693
City of Norco	289.5	201.545	0.368
City of Ontario	16,337.4	11,373.816	20.742
City of Pomona	16,110.5	11,215.852	20.454
City of Upland	4,097.2	2,852.401	5.202
Cucamonga County Water District	4,431.0	3,084.786	5.626
Jurupa Community Services District	1,104.1	768.655	1.402
Monte Vista County Water District	5,958.7	4,148.344	7.565
West San Bernardino County Water District	925.5	644.317	1.175
Etiwanda Water Company	768.0	534.668	0.975
Felspar Gardens Mutual Water Company	68.3	47.549	0.087
Fontana Union Water Co.	9,188.3	6,396.736	11.666
Marygold Mutual Water Co.	941.3	655.317	1.195
Mira Loma Water Co.	1,116.0	776.940	1.417
Monta Vista Irr. Co.	972.1	676.759	1.234
Mutual Water Company of Glen Avon Heights	672.2	467.974	0.853
Park Water Company	236.1	164.369	0.300
Pomona Valley Water Co.	3,106.3	2,162.553	3.944
San Antonio Water Co.	2,164.5	1,506.888	2.748
Santa Ana River Water Company	1,869.3	1,301.374	2.373
Southern California Water Company	1,774.5	1,235.376	2.253
West End Consolidated Water Company	1,361.3	947.714	1.728
TOTAL	78,763.8	54,834.000	100.000

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EXHIBIT "F"
OVERLYING (AGRICULTURAL) POOL
POOLING PLAN

1. Membership in Pool. The State of California and all producers listed in Exhibit "C" shall be the initial members of this pool, which shall include all producers of water for overlying uses other than industrial or commercial purposes.

2. Pool Meetings. The members of the pool shall meet annually, in person or by proxy, at a place and time to be designated by Watermaster for purposes of electing members of the Pool Committee and conducting any other business of the pool. Special meetings of the membership of the pool may be called and held as provided in the rules of the pool.

3. Voting. All voting at meetings of pool members shall be on the basis of one vote for each 100 acre feet or any portion thereof of production from Chino Basin during the preceding year, as shown by the records of Watermaster.

4. Pool Committee. The Pool Committee for this pool shall consist of not less than nine (9) representatives selected at large by members of the pool. The exact number of members of the Pool Committee in any year shall be as determined by majority vote of the voting power of members of the pool in attendance at the annual pool meeting. Each member of the Pool Committee shall have one vote and shall serve for a two-year term. The members first elected shall classify themselves by lot so that approximately one-half serve an initial one-year term. Vacancies during any term shall be filled by a majority of the remaining members of the Pool Committee.

5. Advisory Committee Representatives. The number of

representatives of the Pool Committee on the Advisory Committee shall be as provided in the rules of the pool from time to time but not exceeding ten (10). The voting power of the pool on the Advisory Committee shall be apportioned and exercised as determined from time to time by the Pool Committee.

6. Replenishment Obligation. The pool shall provide funds for replenishment of any production by persons other than members of the Overlying (Non-agricultural) Pool or Appropriator Pool, in excess of the pool's share of Safe Yield. During the first five (5) years of operations of the Physical Solution, reasonable efforts shall be made by the Pool Committee to equalize annual assessments.

7. Assessments. All assessments in this pool (whether for replenishment water cost or for pool administration or the allocated share of Watermaster administration) shall be in an amount uniformly applicable to all production in the pool during the preceding year or calendar quarter. Provided, however, that the Agricultural Pool Committee, may recommend to the Court modification of the method of assessing pool members, inter se, if the same is necessary to attain legitimate basin management objectives, including water conservation and avoidance of undesirable socio-economic consequences. Any such modification shall be initiated and ratified by one of the following methods:

(a) Excess Production. In the event total pool production exceeds 100,000 acre feet in any year, the Pool Committee shall call and hold a meeting, after notice to all pool members, to consider remedial modification of the assessment formula.

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(b) Producer Petition. At any time after the fifth full year of operation under the Physical Solution, a petition by ten percent (10%) of the voting power or membership of the Pool shall compel the holding of a noticed meeting to consider revision of said formula of assessment for replenishment water.

In either event, a majority action of the voting power in attendance at such pool members' meeting shall be binding on the Pool Committee.

8. Rules. The Pool Committee shall adopt rules for conducting meetings and affairs of the committee and for administering its program and in amplification of the provisions, but not inconsistent with, this pooling plan.

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EXHIBIT "G"
OVERLYING (NON-AGRICULTURAL) POOL
POOLING PLAN

1. Membership in Pool. The initial members of the pool, together with the decreed share of the Safe Yield of each, are listed in Exhibit "D". Said pool includes producers of water for overlying industrial or commercial (non-agricultural) purposes, or such producers within the Pool who may hereafter take water pursuant to Paragraph 8 hereof.

2. Pool Committee. The Pool Committee for this pool shall consist of one representative designated by each member of the pool. Voting on the committee shall be on the basis of one vote for each member, unless a volume vote is demanded, in which case votes shall be allocated as follows:

The volume voting power on the Pool Committee shall be 1,484 votes. Of these, 742 votes shall be allocated on the basis of one vote for each ten (10) acre feet or fraction thereof of decreed shares in Safe Yield. (See Exhibit "D".) The remaining 742 votes shall be allocated proportionally on the basis of assessments paid to Watermaster during the preceding year.*

3. Advisory Committee Representatives. At least three (3) members of the Pool Committee shall be designated by said committee to serve on the Advisory Committee. The exact number of such representatives at any time shall be as determined by the Pool Committee. The voting power of the pool shall be exercised in the

*Or production assessments paid under Water Code Section 72140 et seq., as to years prior to the second year of operation under the Physical Solution hereunder.

Advisory Committee as a unit, based upon the vote of a majority of said representatives.

4. Replenishment Obligation. The pool shall provide funds for replenishment of any production in excess of the pool's share of Safe Yield in the preceding year.

5. Assessment. Each member of this pool shall pay an assessment equal to the cost of replenishment water times the number of acre feet of production by such producer during the preceding year in excess of (a) his decreed share of the Safe Yield, plus (b) any carry-over credit under Paragraph 7 hereof. In addition, the cost of the allocated share of Watermaster administration expense shall be recovered on an equal assessment against each acre foot of production in the pool during such preceding fiscal year or calendar quarter; and in the case of Pool members who take substitute ground water as set forth in Paragraph 8 hereof, such producer shall be liable for its share of administration assessment, as if the water so taken were produced, up to the limit of its decreed share of Safe Yield.

6. Assignment. Rights herein decreed are appurtenant to the land and are only assignable with the land for overlying use thereon; provided, however, that any appropriator who may, directly or indirectly, undertake to provide water service to such overlying lands may, by an appropriate agency agreement on a form approved by Watermaster, exercise said overlying right to the extent, but only to the extent necessary to provide water service to said overlying lands.

7. Carry-over. Any member of the pool who produces less than its assigned water share of Safe Yield may carry such unexercised

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right forward for exercise in subsequent years. The first water produced during any such subsequent year shall be deemed to be an exercise of such carry-over right. In the event the aggregate carry-over by any pool member exceeds its share of Safe Yield, such member shall, as a condition of preserving such surplus carry-over, execute a storage agreement with Watermaster.

8. Substitute Supplies. To the extent that any Pool member, at the request of Watermaster and with the consent of the Advisory Committee, takes substitute surface water in lieu of producing ground water otherwise subject to production as an allocated share of Safe Yield, said party shall nonetheless remain a member of this Pool.

9. Rules. The Pool Committee shall adopt rules for administering its program and in amplification of the provisions, but not inconsistent with, this pooling plan.

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EXHIBIT "H"
APPROPRIATIVE POOL
POOLING PLAN

1. Qualification for Pool. Any city, district or other public entity and public utility -- either regulated under Public Utilities Commission jurisdiction, or exempt therefrom as a non-profit mutual water company (other than those assigned to the Overlying [Agricultural] Pool) -- shall be a member of this pool. All initial members of the pool are listed in Exhibit "E", together with their respective appropriative rights and acre foot allocation and percentage shares of the initial and subsequent Operating Safe Yield.

2. Pool Committee. The Pool Committee shall consist of one (1) representative appointed by each member of the Pool.

3. Voting. The total voting power on the Pool Committee shall be 1,000 votes. Of these, 500 votes shall be allocated in proportion to decreed percentage shares in Operating Safe Yield. The remaining 500 votes shall be allocated proportionally on the basis of assessments paid to Watermaster during the preceding year.* Routine business of the Pool Committee may be conducted on the basis of one vote per member, but upon demand of any member a weighted vote shall be taken. Affirmative action of the Committee shall require a majority of the voting power of members in attendance, provided that it includes concurrence by at least one-third of its total members.

4. Advisory Committee Representatives. Ten (10) members of

*Or production assessments paid under Water Code Section 72140 et seq., as to years prior to the second year of operation under the Physical Solution hereunder.

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the Pool Committee shall be designated to represent this pool on the Advisory Committee. Each major appropriator, i.e., the owner of an adjudicated appropriative right in excess of 3,000 acre feet, shall be entitled to one representative. The remaining members representing the Appropriative Pool on the Advisory Committee shall be elected at large by the remaining members of the pool. The voting power of the Appropriative Pool on the Advisory Committee shall be apportioned between the major appropriator representatives in proportion to their respective voting power in the Pool Committee. The remaining two representatives shall exercise equally the voting power proportional to the Pool Committee voting power of all remaining appropriators; provided, however, that if any representative fails to attend an Advisory Committee meeting, the voting power of that representative shall be allocated among the representatives of the Appropriator Pool in attendance in the same proportion as their own respective voting powers.

5. Replenishment Obligation. The pool shall provide funds for purchase of replenishment water to replace any production by the pool in excess of Operating Safe Yield during the preceding year.

6. Administrative Assessment. Costs of administration of this pool and its share of general Watermaster expense shall be recovered by a uniform assessment applicable to all production during the preceding year.

7. Replenishment Assessment. The cost of replenishment water required to replace production from Chino Basin in excess of Operating Safe Yield in the preceding year shall be allocated and recovered as follows:

(a) For production, other than for increased export, within CBMWD or WMWD:

(1) Gross Assessment. 15% of such replenishment water costs shall be recovered by a uniform assessment against all production of each appropriator producing in said area during the preceding year.

(2) Net Assessment. The remaining 85% of said costs shall be recovered by a uniform assessment on each acre foot of production from said area by each such appropriator in excess of his allocated share of Operating Safe Yield during said preceding year.

(b) For production which is exported for use outside Chino Basin in excess of maximum export in any year through 1976, such increased export production shall be assessed against the exporting appropriator in an amount sufficient to purchase replenishment water from CBMWD or WMWD in the amount of such excess.

(c) For production within SBVMWD or PVMWD:

By an assessment on all production in excess of an appropriator's share of Operating Safe Yield in an amount sufficient to purchase replenishment water through SBVMWD or MWD in the amount of such excess.

8. Socio-Economic Impact Review. The parties have conducted certain preliminary socio-economic impact studies. Further and more detailed socio-economic impact studies of the assessment formula and its possible modification shall be undertaken for the Appropriator Pool by Watermaster no later than ten (10) years from the effective date of this Physical Solution, or whenever total

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production by this pool has increased by 30% or more over the decreed appropriative rights, whichever is first.

9. Facilities Equity Assessment. Watermaster may, upon recommendation of the Pool Committee, institute proceedings for levy and collection of a Facilities Equity Assessment for the purposes and in accordance with the procedures which follow:

(a) Implementing Circumstances. There exist several sources of supplemental water available to Chino Basin, each of which has a differential cost and quantity available. The optimum management of the entire Chino Basin water resource favors the maximum use of the lowest cost supplemental water to balance the supplies of the Basin, in accordance with the Physical Solution. The varying sources of supplemental water include importations from MWD and SBVMWD, importation of surface and ground water supplies from other basins in the immediate vicinity of Chino Basin, and utilization of reclaimed water. In order to fully utilize any of such alternate sources of supply, it will be essential for particular appropriators having access to one or more of such supplies to have invested, or in the future to invest, directly or indirectly, substantial funds in facilities to obtain and deliver such water to an appropriate point of use. To the extent that the use of less expensive alternate sources of supplemental water can be maximized by the inducement of a Facilities Equity Assessment, as herein provided, it is to the long-term benefit of the entire basin that such assessment be authorized and levied by Watermaster.

(b) Study and Report. At the request of the Pool

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Committee, Watermaster shall undertake a survey study of the utilization of alternate supplemental supplies by members of the Appropriative Pool which would not otherwise be utilized and shall prepare a report setting forth the amount of such alternative supplies being currently utilized, the amount of such supplies which could be generated by activity within the pool, and the level of cost required to increase such uses and to optimize the total supplies available to the basin. Said report shall contain an analysis and recommendation for the levy of a necessary Facilities Equity Assessment to accomplish said purpose.

(c) Hearing. If the said report by Watermaster contains a recommendation for imposition of a Facilities Equity Assessment, and the Pool Committee so requests, Watermaster shall notice and hold a hearing not less than 60 days after distribution of a copy of said report to each member of the pool, together with a notice of the hearing date. At such hearing, evidence shall be taken with regard to the necessity and propriety of the levy of a Facilities Equity Assessment and full findings and decision shall be issued by Watermaster.

(d) Operation of Assessment. If Watermaster determines that it is appropriate that a Facilities Equity Assessment be levied in a particular year, the amount of additional supplemental supplies which should be generated by such assessment shall be estimated. The cost of obtaining such supplies, taking into consideration the investment in necessary facilities shall then be determined and spread equitably among the producers within the pool in a manner so that those

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producers not providing such additional lower cost supplemental water, and to whom a financial benefit will result, may bear a proportionate share of said costs, not exceeding said benefit; provided that any producer furnishing such supplemental water shall not thereby have its average cost of water in such year reduced below such producer's average cost of pumping from the Basin. In so doing, Watermaster shall establish a percentage of the total production by each party which may be produced without imposition of a Facilities Equity Assessment. Any member of the pool producing more water than said percentage shall pay such Facilities Equity Assessment on any such excess production. Watermaster is authorized to transmit and pay the proceeds of such Facilities Equity Assessment to those producers who take less than their share of Basin water by reason of furnishing a higher percentage of their requirements through use of supplemental water.

10. Unallocated Safe Yield Water. To the extent that, in any five years, any portion of the share of Safe Yield allocated to the Overlying (Agricultural) Pool is not produced, such water shall be available for reallocation to members of the Appropriative Pool, as follows:

(a) Priorities. Such allocation shall be made in the following sequence:

(1) to supplement, in the particular year, water available from Operating Safe Yield to compensate for any reduction in the Safe Yield by reason of recalculation thereof after the tenth year of operation hereunder.

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(2) pursuant to conversion claims as defined in Subparagraph (b) hereof.

(3) as a supplement to Operating Safe Yield, without regard to reductions in Safe Yield.

(b) Conversion Claims. The following procedures may be utilized by any appropriator:

(1) Record of Land Use Conversion. Any appropriator who undertakes, directly or indirectly, during any year, to permanently provide water service to lands which during the immediate preceding five (5) consecutive years was devoted to irrigated agriculture may report such change in land use or water service to Watermaster. Watermaster shall thereupon verify such change in water service and shall maintain a record and account for each appropriator of the total acreage involved and the average annual water use during said five-year period.

(2) Establishment of Allocation Percentage. In any year in which unallocated Safe Yield water from the Overlying (Agricultural) Pool is available for such conversion claims, Watermaster shall establish allocable percentages for each appropriator based upon the total of such converted acreage recorded to each such appropriator's account.

(3) Allocation and Notice. Watermaster shall thereafter apply the allocated percentage to the total unallocated Safe Yield water available for special allocation to derive the amount thereof allocable to

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each appropriator; provided that in no event shall the allocation to any appropriator as a result of such conversion claim exceed 50% of the average annual amount of water actually applied to the areas converted by such appropriator prior to such conversion. Any excess water by reason of such limitation on any appropriator's right shall be added to Operating Safe Yield. Notice of such special allocation shall be given to each appropriator and shall be treated for purposes of this Physical Solution as an addition to such appropriator's share of the Operating Safe Yield for the particular year only.

(4) Administrative Costs. Any costs of Watermaster attributable to administration of such special allocations and conversion claims shall be assessed against appropriators participating in such reporting.

11. In Lieu Procedures. There are, or may develop, certain areas within Chino Basin where good management practices dictate that recharge of the basin be accomplished, to the extent practical, by taking surface supplies of supplemental water in lieu of ground water otherwise subject to production as an allocated share of Operating Safe Yield.

(a) Method of Operation. Any appropriator producing water within such designated in lieu area who is willing to abstain for any reason from producing any portion of such producer's share of Operating Safe Yield in any year may offer such unpumped water to Watermaster. In such event, Watermaster shall purchase said water in place, in lieu of spreading replenishment water, which is otherwise required to

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make up for over production. The purchase price for in lieu water shall be the lesser of:

(1) Watermaster's current cost of replenishment water, whether or not replenishment water is currently then obtainable, plus the cost of spreading; or

(2) The cost of supplemental surface supplies to the appropriator, less

a. said appropriator's average cost of ground water production, and

b. the applicable production assessment were the water produced.

Where supplemental surface supplies consist of MWD or SBVMWD supplies, the cost of treated, filtered State water from such source shall be deemed the cost of supplemental surface supplies to the appropriator for purposes of such calculation.

In any given year in which payments may be made pursuant to a Facilities Equity Assessment, as to any given quantity of water the party will be entitled to payment under this section or pursuant to the Facilities Equity Assessment, as the party elects, but not under both.

(b) Designation of In Lieu Areas. The first in lieu area is designated as the "In Lieu Area No. 1" and consists of an area wherein nitrate levels in the ground water generally exceed 45 mg/l, and is shown on Exhibit "J" hereto. Other in lieu areas may be designated by subsequent order of Watermaster upon recommendation or approval by Advisory Committee. Said in lieu areas may be enlarged, reduced or

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eliminated by subsequent orders; provided, however, that designation of In Lieu Areas shall be for a minimum fixed term sufficient to justify necessary capital investment. In Lieu Area No. 1 may be enlarged, reduced or eliminated in the same manner, except that any reduction of its original size or elimination thereof shall require the prior order of Court.

12. Carry-over. Any appropriator who produces less than his assigned share of Operating Safe Yield may carry such unexercised right forward for exercise in subsequent years. The first water produced during any such subsequent year shall be deemed to be an exercise of such carry-over right. In the event the aggregate carry-over by any appropriator exceeds its share of Operating Safe Yield, such appropriator shall, as a condition of preserving such surplus carry-over, execute a storage agreement with Watermaster. Such appropriator shall have the option to pay the gross assessment applicable to such carry-over in the year in which it accrued.

13. Assignment, Transfer and Lease. Appropriative rights, and corresponding shares of Operating Safe Yield, may be assigned or may be leased or licensed to another appropriator for exercise in a given year. Any transfer, lease or license shall be ineffective until written notice thereof is furnished to and approved as to form by Watermaster, in compliance with applicable Watermaster rules. Watermaster shall not approve transfer, lease or license of a right for exercise in an area or under conditions where such production would be contrary to sound basin management or detrimental to the rights or operations of other producers.

14. Rules. The Pool Committee shall adopt rules for

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administering its program and in amplification of the provisions, but not inconsistent with, this pooling plan.

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EXHIBIT "I"

ENGINEERING APPENDIX

1. Basin Management Parameters. In the process of implementing the physical solution for Chino Basin, Watermaster shall consider the following parameters:

(a) Pumping Patterns. Chino Basin is a common supply for all persons and agencies utilizing its waters. It is an objective in management of the Basin's waters that no producer be deprived of access to said waters by reason of unreasonable pumping patterns, nor by regional or localized recharge of replenishment water, insofar as such result may be practically avoided.

(b) Water Quality. Maintenance and improvement of water quality is a prime consideration and function of management decisions by Watermaster.

(c) Economic Considerations. Financial feasibility, ecnomic impact and the cost and optimum utilization of the Basin's resources and the physical facilities of the parties are objectives and concerns equal in importance to water quantity and quality parameters.

2. Operating Safe Yield. Operating Safe Yield in any year shall consist of the Appropriative Pool's share of Safe Yield of the Basin, plus any controlled overdraft of the Basin which Watermaster may authorize. In adopting the Operating Safe Yield for any year, Watermaster shall be limited as follows:

(a) Accumulated Overdraft. During the operation of this Judgment and Physical Solution, the overdraft accumulated from and after the effective date of the Physical

Solution and resulting from an excess of Operating Safe Yield over Safe Yield shall not exceed 200,000 acre feet.

(b) Quantitative Limits. In no event shall Operating Safe Yield in any year be less than the Appropriative Pool's share of Safe Yield, nor shall it exceed such share of Safe Yield by more than 10,000 acre feet. The initial Operating Safe Yield is hereby set at 54,834 acre feet per year. Operating Safe Yield shall not be changed upon less than five (5) years' notice by Watermaster.

Nothing contained in this paragraph shall be deemed to authorize, directly or indirectly, any modification of the allocation of shares in Safe Yield to the overlying pools, as set forth in Paragraph 44 of the Judgment.

3. Ground Water Storage Agreements. Any agreements authorized by Watermaster for storage of supplemental water in the available ground water storage capacity of Chino Basin shall include, but not be limited to:

(a) The quantities and term of the storage right.

(b) A statement of the priority or relation of said right, as against overlying or Safe Yield uses, and other storage rights.

(c) The procedure for establishing delivery rates, schedules and procedures which may include

[1] spreading or injection, or

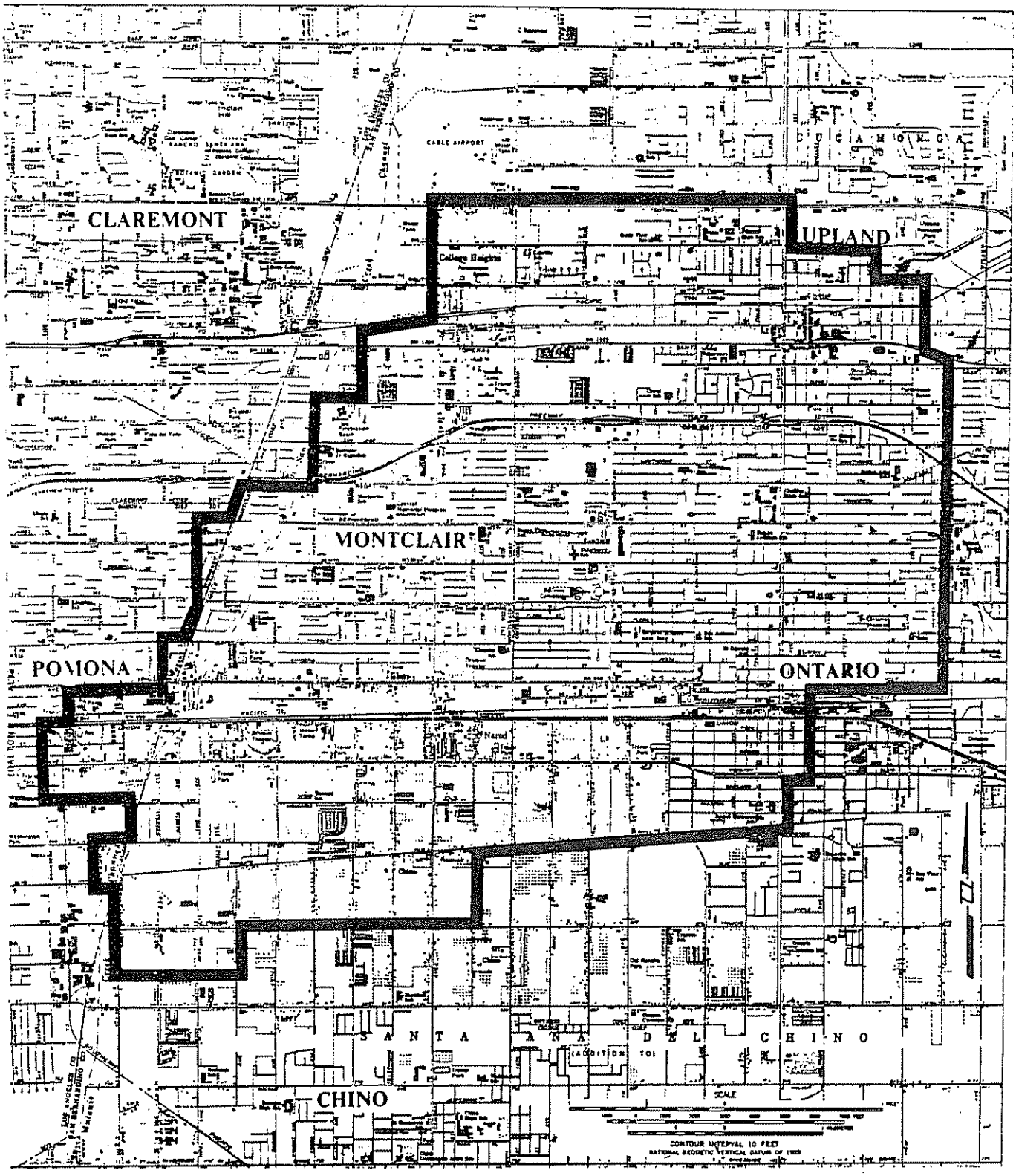
[2] in lieu deliveries of supplemental water for direct use.

(d) The procedures for calculation of losses and annual accounting for water in storage by Watermaster.

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(e) The procedures for establishment and administration of withdrawal schedules, locations and methods.

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CHINO BASIN

IN LIEU AREA NO. 1

EXHIBIT "J"

LEGAL DESCRIPTION

OF CHINO BASIN

Preamble

All of the townships and ranges referred to in the following legal description are the San Bernardino Base and Meridian. Certain designated sections are implied as the System of Government Surveys may be extended where not established. Said sections are identified as follows:

Section 20, T1N, R8W is extended across Rancho Cucamonga;

Section 36, T1N, R8W is extended across the City of Upland;

Sections 2, 3, and 4, T1S, R7W are extended across Rancho Cucamonga;

Section 10, T1S, R8W is extended across the City of Claremont;

Sections 19, 20, 21, 30, 31 and 32, T1S, R8W are extended across the City of Pomona;

Sections 4, 5, and 28, T2S, R8W are extended across Rancho Santa Ana Del Chino;

Sections 15 and 16, T3S, R7W are extended across Rancho La Sierra; and

Sections 17 and 20, T3S, R7W are extended across Rancho El Rincon.

Description

Chino Basin is included within portions of the Counties of San Bernardino, Riverside and Los Angeles, State of California, bounded by a continuous line described as follows:

BEGINNING at the Southwest corner of Lot 241 as shown on Map of Ontario Colony Lands, recorded in Map Book 11, page 6, Office of the County Recorder of San Bernardino County, said corner being the Point of Beginning;

1. Thence Southeasterly to the Southeast corner

of Lot 419 of said Ontario Colony Lands;

2. Thence Southeasterly to a point 1300 feet North of the South line and 1300 feet East of the West line of Section 4, T1S, R7W;

3. Thence Easterly to a point on the East line of Section 4, 1800 feet North of the Southeast corner of said Section 4;

4. Thence Easterly to the Southeast corner of the Southwest quarter of the Northeast quarter of Section 3, T1S, R7W;

5. Thence Northeasterly to a point on the North line of Section 2, T1S, R7W, 1400 feet East of the West line of said Section 2;

6. Thence Northeasterly to the Southwest corner of Section 18, T1N, R6W;

7. Thence Northerly to the Northwest corner of said Section 18;

8. Thence Easterly to the Northeast corner of said Section 18;

9. Thence Northerly to the Northwest corner of the Southwest quarter of Section 8, T1N, R6W;

10. Thence Easterly to the Northeast corner of said Southwest quarter of said Section 8;

11. Thence Southerly to the Southeast corner of said Southwest quarter of said Section 8;

12. Thence Easterly to the Northeast corner of Section 17, T1N, R6W;

13. Thence Easterly to the Northeast corner of Section 16, T1N, R6W;

14. Thence Southeasterly to the Northwest corner of the Southeast quarter of Section 15, T1N, R6W;

15. Thence Easterly to the Northeast corner of said Southeast quarter of said Section 15;

16. Thence Southeasterly to the Northwest corner of the Northeast quarter of Section 23, T1N, R6W;

17. Thence Southeasterly to the Northwest corner

of Section 25, T1N, R6W;

18. Thence Southeasterly to the Northwest corner of the Northeast quarter of Section 31, T1N, R5W;

19. Thence Southeasterly to the Northeast corner of the Northwest quarter of Section 5, T1S, R5W;

20. Thence Southeasterly to the Southeast corner of Section 4, T1S, R5W;

21. Thence Southeasterly to the Southeast corner of the Southwest quarter of Section 11, T1S, R5W;

22. Thence Southwesterly to the Southwest corner of Section 14, T1S, R5W;

23. Thence Southwest to the Southwest corner of Section 22, T1S, R5W;

24. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 6, T2S, R5W;

25. Thence Southeasterly to the Northeast corner of Section 18 T2S, R5W;

26. Thence Southwesterly to the Southwest corner of the Southeast quarter of Section 13, T2S, R6W;

27. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 26, T2S, R6W;

28. Thence Westerly to the Southwest corner of the Northwest quarter of said Section 26;

29. Thence Northerly to the Northwest corner of said Section 26;

30. Thence Westerly to the Southwest corner of Section 21, T2S, R6w:

31. Thence Southerly to the Southeast corner of Section 29, T2S, R6W;

32. Thence Westerly to the Southeast corner of Section 30, T2S, R6W;

33. Thence Southwesterly to the Southwest corner of Section 36, T 2 S, R 7 W;

34. Thence Southwesterly to the Southeast corner

of Section 3, T3S, R7W;

35. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 10, T3S, R7W;

36. Thence Southerly to the Northeast corner of the Northwest quarter of Section 15, T3S, R7W;

37. Thence Southwesterly to the Southeast corner of the Northeast quarter of Section 16, T3S, R7W;

38. Thence Southwesterly to the Southwest corner of said Section 16;

39. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 20, T3S, R7W;

40. Thence Westerly to the Southwest corner of the Northwest quarter of said Section 20;

41. Thence Northerly to the Northwest corner of Section 17, T3S, R7W;

42. Thence Westerly to the Southwest corner of Section 7, T3S, R7W;

43. Thence Northerly to the Southwest corner of Section 6, T3S, R7W;

44. Thence Westerly to the Southwest corner of Section 1, T3S, R8W;

45. Thence Northerly to the Southeast corner of Section 35, T2S, R8W;

46. Thence Northwesterly to the Northwest corner of said Section 35;

47. Thence Northerly to the Southeast corner of Lot 33, as shown on Map of Tract 3193, recorded in Map Book 43, pages 46 and 47, Office of the County Recorder of San Bernardino County;

48. Thence Westerly to the Northwest corner of the Southwest quarter of Section 28, T2S, R8W;

49. Thence Northerly to the Southwest corner of Section 4, T2S, R8W;

50. Thence Westerly to the Southwest corner of Section 5, T2S, R8W;

51. Thence Northerly to the Southwest corner of Section 32, T1S, R8W;

52. Thence Westerly to the Southwest corner of Section 31, T1S, R8W;

53. Thence Northerly to the Southwest corner of Section 30, T1S, R8W;

54. Thence Northeasterly to the Southwest corner of Section 20, T1S, R8W;

55. Thence Northerly to the Northwest corner of the Southwest quarter of the Southwest quarter of said Section 20;

56. Thence Northwesterly to the Northeast corner of the Southeast quarter of the Southeast quarter of the Northwest quarter of Section 19, T1S, R8W;

57. Thence Easterly to the Northwest corner of Section 21, T1S, R8W;

58. Thence Northeasterly to the Southeast corner of the Southwest quarter of the Southwest quarter of Section 10, T1S, R8W;

59. Thence Northeasterly to the Southwest corner of Section 2, T1S, R8W;

60. Thence Northeasterly to the Southeast corner of the Northwest quarter of the Northwest quarter of Section 1, T1S, R8W;

61. Thence Northerly to the Northeast corner of the Northwest quarter of the Northeast quarter of Section 36, T1N, R8W;

62. Thence Northerly to the Southeast corner of Section 24, T1N, R8W;

63. Thence Northeasterly to the Southeast corner of the Northwest quarter of the Northwest quarter of Section 20, T1N, R7W; and

64. Thence Southerly to the Point of Beginning.

Sections Included

Said perimeter description includes all or portions of the following Townships, Ranges and Sections of San Bernardino Base and Meridian:

T1N, R5W - Sections: 30, 31 and 32

T1N, R6W - Sections: 8, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36

T1N, R7W - Sections: 19, 20, 24, 25, 26, 29, 30, 31, 32, 35 and 36

T1N, R8W - Sections: 25 and 36

T1S, R5W - Sections: 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 28, 29, 30, 31 and 32.

T1S, R6W - Sections: 1 through 36, inclusive

T1S, R7W - Sections: 1 through 36, inclusive

T1S, R8W - Sections: 1, 2, 10, 11, 12, 13, 14, 15, 16, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36

T2S, R5W - Sections: 6, 7 and 18

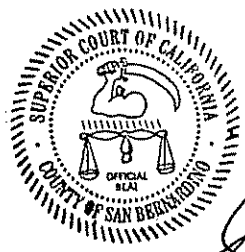
T2S, R6W - Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 29, 30 and 31

T2S, R7W - Sections: 1 through 36, inclusive

T2S, R8W - Sections: 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 35 and 36

T3S, R7W - Sections: 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17 and 20

T3S, R8W - Section: 1.



THE DOCUMENT TO WHICH THIS CERTIFICATION IS ATTACHED IS A FULL, TRUE AND CORRECT COPY OF THE ORIGINAL ON FILE AND OF RECORD IN MY OFFICE.

ATTEST OCT 2 9 2002

Clerk of the Superior Court of the State of California, in and for the County of San Bernardino

By _____ Deputy

Terry Wittenborn

92 pages

APPENDIX E

SAN BERNARDINO COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

SAN BERNARDINO COUNTY

MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

FEMA Approved: July 13, 2017

San Bernardino County Unincorporated Area
San Bernardino County Fire Protection District
San Bernardino County Flood Control District
San Bernardino County Special Districts Department



This document was supported by HSGP Grant No. 2015-0078 awarded by the U.S. Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA). Points of view, opinions, findings, and conclusions expressed in this document are those of the authors and do not necessarily represent the official position of policies of FEMA or DHS. DHS/FEMA reserves a royalty-free, non-exclusive, and irrevocable license to reproduce, publish, and use these materials and to authorize others to do so.

2017

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RESOLUTION NO. 2017-_____

A RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ADOPTING THE SAN BERNARDINO COUNTY UNINCORPORATED AREA MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN DATED MARCH 2017, AND AUTHORIZING FUTURE NON-SUBSTANTIVE AMENDMENTS TO THE PLAN

On Tuesday, _____, 2017, on motion of Supervisor _____, duly seconded by Supervisor _____ and carried, the following resolution is adopted by the Board of Supervisors of San Bernardino County, State of California.

WHEREAS, the preservation of life and property is an inherent responsibility of local, state and federal government, including the County of San Bernardino, and the San Bernardino County Office of Emergency Services, to prepare a local Multi-Jurisdictional Hazard Mitigation Plan (HMP) for the unincorporated area of San Bernardino County to define hazard mitigation measures to reduce or eliminate loss of life and/or property; and

WHEREAS, this HMP represents a comprehensive description of the County's commitment to reducing, preventing or eliminating potential impacts of disasters caused by natural hazards; and

WHEREAS, the HMP is a Federal requirement under the Disaster Mitigation Act of 2000 for the County to be eligible to apply for federal funds for disaster recovery and mitigation assistance; and

WHEREAS, the HMP established a coordinated effort to support mitigation activities, identifies measures to combat natural hazards within our County; and

WHEREAS, the HMP is an extension of the State of California Multi-Hazard Mitigation Plan, and will be reviewed periodically and revised as necessary to meet changing conditions; and

WHEREAS, the Board of Supervisors agrees to adopt this HMP and urges all officials, employees, public and private organizations, and citizens, individually and collectively, to do their share in furthering the preparation of hazard mitigation within the County of San Bernardino;

NOW, THEREFORE, BE IT RESOLVED THAT:

The Board of Supervisors of the County of San Bernardino, a public entity established under the laws of the State of California, hereby authorizes this HMP to be adopted, that the San Bernardino County Fire Protection District Office of Emergency Services Division Manager is hereby authorized to implement future non-substantive amendments, recommended by the Federal Emergency Management Agency upon their review, to the HMP, that a copy of the Board of Supervisors' approved San Bernardino County Unincorporated Area Hazard Mitigation Plan be forwarded to the Federal Emergency Management Agency and CalOES, that once approved the HMP will be considered to be incorporated into the County's General Plan, and this plan become effective immediately.

PASSED AND ADOPTED by the Board of Supervisors of the County of San Bernardino, State of California, by the following vote:

AYES: SUPERVISORS:

NOES: SUPERVISORS:

ABSENT: SUPERVISORS:

* * * * *

STATE OF CALIFORNIA)
) ss.
COUNTY OF SAN BERNARDINO)

I, **LAURA H. WELCH,** Clerk of the Board of Supervisors of the County of San Bernardino, State of California, hereby certify the foregoing to be a full, true and correct copy of the record of the action taken by the Board of Supervisors, by vote of the members present, as the same appears in the Official Minutes of said Board at its meeting of _____, 2017.

LAURA H. WELCH
Clerk of the Board of Supervisors

By _____
Deputy

RESOLUTION NO. 2017-_____

A RESOLUTION OF THE BOARD OF SUPERVISORS OF THE SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT, STATE OF CALIFORNIA, ADOPTING THE SAN BERNARDINO COUNTY UNINCORPORATED AREA MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN DATED MARCH 2017, AND AUTHORIZING FUTURE NON-SUBSTANTIVE AMENDMENTS TO THE PLAN

On Tuesday, _____, 2017, on motion of Supervisor _____, duly seconded by Supervisor _____ and carried, the following resolution is adopted by the Board of Supervisors of the San Bernardino County Flood Control District, State of California.

WHEREAS, the preservation of life and property is an inherent responsibility of local, state and federal government, including the County of San Bernardino, and the San Bernardino County Office of Emergency Services, to prepare a local Multi-Jurisdictional Hazard Mitigation Plan (HMP) for the unincorporated area of San Bernardino County to define hazard mitigation measures to reduce or eliminate loss of life and/or property; and

WHEREAS, this HMP represents a comprehensive description of the County's commitment to reducing, preventing or eliminating potential impacts of disasters caused by natural hazards; and

WHEREAS, the HMP is a Federal requirement under the Disaster Mitigation Act of 2000 for the County to be eligible to apply for federal funds for disaster recovery and mitigation assistance; and

WHEREAS, the HMP established a coordinated effort to support mitigation activities, identifies measures to combat natural hazards within our County; and

WHEREAS, the HMP is an extension of the State of California Multi-Hazard Mitigation Plan, and will be reviewed periodically and revised as necessary to meet changing conditions; and

WHEREAS, the Board of Supervisors agrees to adopt this HMP and urges all officials, employees, public and private organizations, and citizens, individually and collectively, to do their share in furthering the preparation of hazard mitigation within the County of San Bernardino

NOW, THEREFORE, BE IT RESOLVED THAT:

The Board of Supervisors of the San Bernardino County Flood Control District, a public entity established under the laws of the State of California, hereby authorizes this HMP to be adopted, that the San Bernardino County Fire Protection District Office of Emergency Services Division Manager is hereby authorized to implement future non-substantive amendments, recommended by the Federal Emergency Management Agency upon their review, to the HMP, that a copy of the Board of Supervisors' approved San Bernardino County Unincorporated Area Hazard Mitigation Plan be forwarded to the Federal Emergency Management Agency and the CalOES, that once

approved the HMP will be considered to be incorporated into the County's General Plan, and this plan become effective immediately.

PASSED AND ADOPTED by the Board of Supervisors of the San Bernardino County Flood Control District, State of California, by the following vote:

AYES: SUPERVISORS:

NOES: SUPERVISORS:

ABSENT: SUPERVISORS:

* * * * *

STATE OF CALIFORNIA)
) ss.
COUNTY OF SAN BERNARDINO)

I, **LAURA H. WELCH,** Clerk of the Board of Supervisors of the San Bernardino County Flood Control District, State of California, hereby certify the foregoing to be a full, true and correct copy of the record of the action taken by the Board of Supervisors, by vote of the members present, as the same appears in the Official Minutes of said Board at its meeting of _____, 2017.

LAURA H. WELCH
Clerk

By _____
Deputy

RESOLUTION NO. 2017-

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE BOARD GOVERNED COUNTY SERVICE AREAS ADOPTING THE SAN BERNARDINO COUNTY UNINCORPORATED AREA MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN DATED MARCH 2017, AND AUTHORIZING FUTURE NON-SUBSTANTIVE AMENDMENTS TO THE PLAN

On Tuesday, , 2017, on motion of Director , duly seconded by Director and carried, the following resolution is adopted by the Board of Directors of the Board Governed County Service Areas and their Zones.

WHEREAS, the preservation of life and property is an inherent responsibility of local, state and federal government, including the County of San Bernardino, and the San Bernardino County Office of Emergency Services, to prepare a local Multi-Jurisdictional Hazard Mitigation Plan (HMP) for the unincorporated area of San Bernardino County to define hazard mitigation measures to reduce or eliminate loss of life and/or property; and

WHEREAS, this HMP represents a comprehensive description of the County's commitment to reducing, preventing or eliminating potential impacts of disasters caused by natural hazards; and

WHEREAS, the HMP is a Federal requirement under the Disaster Mitigation Act of 2000 for the County to be eligible to apply for federal funds for disaster recovery and mitigation assistance; and

WHEREAS, the HMP established a coordinated effort to support mitigation activities, identifies measures to combat natural hazards within our County; and

WHEREAS, the HMP is an extension of the State of California Multi-Hazard Mitigation Plan, and will be reviewed periodically and revised as necessary to meet changing conditions; and

WHEREAS, the Board of Directors agrees to adopt this HMP and urges all officials, employees, public and private organizations, and citizens, individually and collectively, to do their share in furthering the preparation of hazard mitigation within the County of San Bernardino;

NOW, THEREFORE, BE IT RESOLVED THAT:

The Board of Directors of the Board Governed County Service Areas and their Zones, a public entity established under the laws of the State of California, hereby authorizes this HMP to be adopted, that the San Bernardino County Fire Protection District Office of Emergency Services Division Manager is hereby authorized to implement future non-substantive amendments, recommended by the Federal Emergency Management Agency upon their review, to the HMP, that a copy of the Board of Directors' approved San Bernardino County Unincorporated Area Hazard Mitigation Plan be forwarded to the Federal Emergency Management Agency and CalOES, that

once approved the HMP will be considered to be incorporated into the County's General Plan, and this plan become effective immediately.

PASSED AND ADOPTED by the Board of Directors of the Board Governed County Service Areas and their Zones by the following vote:

AYES: DIRECTORS:

NOES: DIRECTORS:

ABSENT: DIRECTORS:

* * * * *

STATE OF CALIFORNIA)
) ss.
COUNTY OF SAN BERNARDINO)

I, **LAURA H. WELCH,** Secretary of Board of Directors of the Board Governed County Service Areas and their Zones, hereby certify the foregoing to be a full, true and correct copy of the record of the action taken by the Board of Directors, by vote of the members present, as the same appears in the Official Minutes of said Board at its meeting of Tuesday, , 2017.

LAURA H. WELCH
Secretary

By _____
Deputy

RESOLUTION NO. 2017-

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE SAN BERNARDINO COUNTY FIRE PROTECTION DISTRICT ADOPTING THE SAN BERNARDINO COUNTY UNINCORPORATED AREA MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN DATED MARCH 2017, AND AUTHORIZING FUTURE NON-SUBSTANTIVE AMENDMENTS TO THE PLAN

On Tuesday, , 2017, on motion of Director , duly seconded by Director and carried, the following resolution is adopted by the Board of Directors of San Bernardino County Fire Protection District.

WHEREAS, the preservation of life and property is an inherent responsibility of local, state and federal government, including the County of San Bernardino, and the San Bernardino County Office of Emergency Services, to prepare a local Multi-Jurisdictional Hazard Mitigation Plan (HMP) for the unincorporated area of San Bernardino County to define hazard mitigation measures to reduce or eliminate loss of life and/or property; and

WHEREAS, this HMP represents a comprehensive description of the County's commitment to reducing, preventing or eliminating potential impacts of disasters caused by natural hazards; and

WHEREAS, the HMP is a Federal requirement under the Disaster Mitigation Act of 2000 for the County to be eligible to apply for federal funds for disaster recovery and mitigation assistance; and

WHEREAS, the HMP established a coordinated effort to support mitigation activities, identifies measures to combat natural hazards within our County; and

WHEREAS, the HMP is an extension of the State of California Multi-Hazard Mitigation Plan, and will be reviewed periodically and revised as necessary to meet changing conditions; and

WHEREAS, the Board of Directors agrees to adopt this HMP and urges all officials, employees, public and private organizations, and citizens, individually and collectively, to do their share in furthering the preparation of hazard mitigation within the County of San Bernardino;

NOW, THEREFORE, BE IT RESOLVED THAT:

The Board of Directors of the San Bernardino County Fire Protection District, a public entity established under the laws of the State of California, hereby authorizes this HMP to be adopted, that the San Bernardino County Fire Protection District Office of Emergency Services Division Manager is hereby authorized to implement future non-substantive amendments, recommended by the Federal Emergency Management Agency upon their review, to the HMP, that a copy of the Board of Directors' approved San Bernardino County Unincorporated Area Hazard Mitigation Plan be forwarded to the Federal Emergency Management Agency and CalOES, that once approved

the HMP will be considered to be incorporated into the County's General Plan, and this plan become effective immediately.

PASSED AND ADOPTED by the Board of Directors of the San Bernardino County Fire Protection District by the following vote:

AYES: DIRECTORS:

NOES: DIRECTORS:

ABSENT: DIRECTORS:

* * * * *

STATE OF CALIFORNIA)
) ss.
COUNTY OF SAN BERNARDINO)

I, **LAURA H. WELCH,** Secretary of Board of Directors of the San Bernardino County Fire Protection District, hereby certify the foregoing to be a full, true and correct copy of the record of the action taken by the Board of Directors, by vote of the members present, as the same appears in the Official Minutes of said Board at its meeting of Tuesday, , 2017.

LAURA H. WELCH
Secretary

By _____
Deputy

Section 1. Introduction

The Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) update is a "living document" that should be reviewed, monitored, and updated to reflect changing conditions and new information. As required, the MJHMP must be updated every five (5) years to remain in compliance with regulations and Federal mitigation grant conditions. In that spirit, this MJHMP is an update of the San Bernardino County Unincorporated Area MJHMP approved by FEMA on October 11, 2011. This MJHMP presents updated information regarding hazards being faced by the County, the San Bernardino County Fire Protection District, the San Bernardino County Flood Control District, and those Board-governed Special Districts administered by the San Bernardino County Special Districts Department.

These Board-Governed Special Districts were formed by the Board of Supervisors to provide a specific service for a specific area of San Bernardino County. Additionally, these Special Districts are treated as an all-inclusive County Organization, not as separate or independent entities. Each Special District is governed cooperatively by the San Bernardino County Board of Supervisors acting as the Board of Supervisors for each of the individual districts.

The County of San Bernardino is governed by five (5) Supervisors; one for each supervisorial district who collectively make up the County Board of Supervisors. The Board of Supervisors is responsible for the County department and agencies, including Board Governed Special Districts, providing services to the unincorporated area.

The Board of Supervisors acts as the Board of Directors for the County Fire Protection District, the County Flood Control District, and the Special Districts Department as part of their responsibilities as an elected member of the County of San Bernardino Board of Supervisors.

The San Bernardino County Organizational Chart clearly shows the relationships between these Board-governed Special Districts and other County departments as one of equal relationship Departments/Districts. See Figure 1-1.

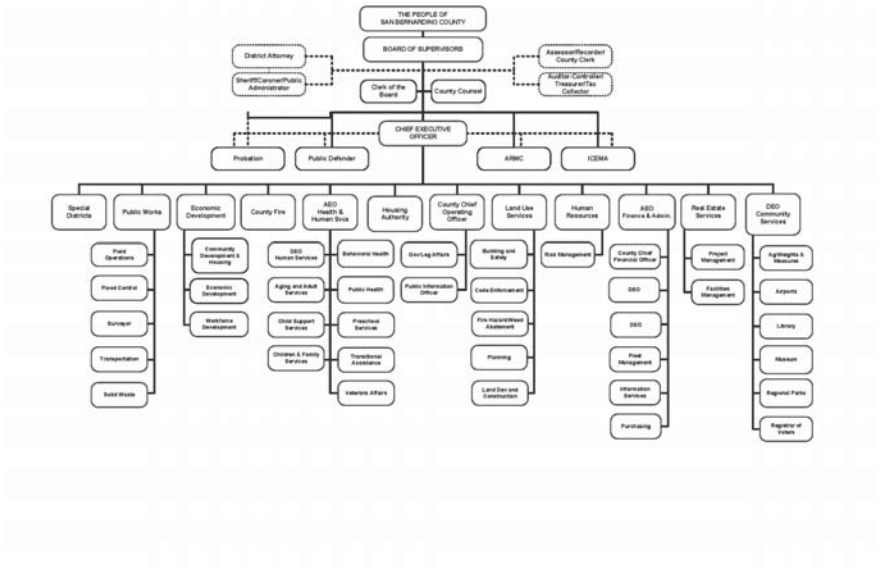


Figure 1-1: Organizational Chart for San Bernardino County

1.1 San Bernardino County Unincorporated Area

The Unincorporated Area of San Bernardino County has a population of 309,759 persons (14.48%) of the entire County Population) and covers 19,233 square miles (95.67% of the entire County land area). There are approximately 61 unincorporated communities within the unincorporated County. San Bernardino County is the largest County in the continental United States. San Bernardino County provides basic services to the residents and citizens of the unincorporated areas. These services include Law Enforcement, Fire Protection, Building and Safety Services, Public Health Services, Library, and Human Services (social services). Five Interstate Highways and four inter-continental railroad lines cross the County, providing vital transportation links from southern California to the remainder of the United States.

1.1.1 San Bernardino County Fire Protection District

San Bernardino County Fire Protection District is a community based all-risk emergency services organization dedicated to the health and well-being of the citizens of San Bernardino County through a balance of regionalized services delivery and accountability to the local community. On July 1, 2008, twenty-seven separate fire districts were merged into one single board governed fire protection district with four regional service zones. The reorganization was not only an administrative advancement but also a significant advancement in operations and delivery of emergency response services.

It has resulted in simplified budgeting and fiscal operations, greater flexibility in the use in the use of department resources and assets and more effective use of day-to-day operations. The reorganization will continue to improve the delivery of fire services and overall operating efficiency.

The San Bernardino County Fire Protection District (County Fire) covers 19,278 square miles, operates 85 fire stations and facilities within 6 Regional Service Zones (Mountain, North Desert, South Desert, High Desert, West Valley and East Valley), and serves 64 unincorporated communities, the City of Grand Terrace, and the Town of Yucca Valley. There are also 6 ambulance enterprise operations that provide service within these Regional Service Zones. In addition, 7 cities are Independent Fire Protection Districts that contract with County Fire: Adelanto, Fontana, Hesperia, Needles, Twentynine Palms, San Bernardino and Victorville. County Fire's executive management is provided by the Fire Chief/County Fire Warden, Deputy Chief, Assistant Chief of Operations as well as Division Managers and Division Chiefs.

County Fire is an all-risk department providing emergency mitigation and management for fire suppression, emergency medical services (paramedic and non-paramedic), ambulance services, HAZMAT response, arson investigation, technical rescue including water borne, flooding and mudslide, winter rescue operations, terrorism and weapons of mass destruction. As part of disaster preparation, response, and mitigation, the department's Office of Emergency Services specifically provides support and assistance to the 24 cities and towns, as well as, all the unincorporated portions of the county. The field functions are supported by a countywide management system that includes organizational business practices, human resources, financial and accounting services, vehicles services and support, and equipment warehousing and distribution. County Fire also provides for the management of community safety services such as: fire prevention, building construction plans and permits, household hazardous waste, Local Oversight Program for hazardous materials, HAZMAT facility inspections, planning and engineering, and public education and outreach.

San Bernardino County Fire Protection District
San Bernardino County, California



Figure 1-2: San Bernardino County Fire Protection District

1.1.2 San Bernardino County Flood Control District

1.1.2.1 Description of Major Services

The San Bernardino County Flood Control District (District) was created in 1939 under special state legislation. Since its inception, the District has developed a very extensive system of flood control and water conservation facilities, including dams, conservation basins, debris basins, channels and storm drains. The purpose of these facilities is to intercept and convey flood flows through and away from developed areas of the county, as well as to promote water conservation and improved water quality.

The District covers the entire county, including all of the incorporated cities. The District is divided into six geographic flood zones (in recognition of the different characteristics and flood control needs in various areas).

- Zone 1 encompasses the county's West End, from the Los Angeles and Riverside County lines to West Fontana.
- Zone 2 encompasses the central area of the San Bernardino Valley easterly of Zone 1 to approximately the Santa Ana River and City Creek demarcations.
- Zone 3 covers the east end of San Bernardino valley, east of Zone 2.

- Zone 4 covers the Mojave River valley region, from the San Bernardino Mountains to Silver Lakes.
- Zone 5 primarily includes the San Bernardino Mountains.
- Zone 6 encompasses the remainder of the county not covered by other zones.

The District has also established a countywide administrative zone (Zone 7)

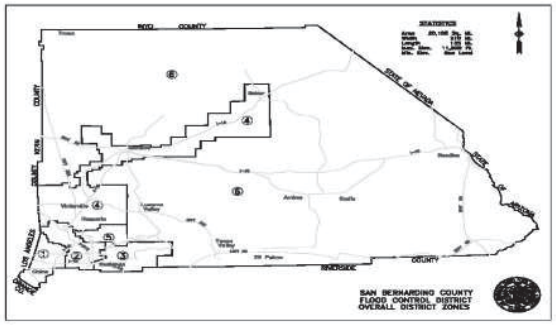


Figure 1-3: Map of San Bernardino County Flood Control District

The District's funding is primarily derived from property taxes, federal and state aid on specific projects, subdivision and permit fees, rents and royalties, and revenue from local water agencies for water spreading services. The District's principal functions are as follows:

- **Flood Protection on Major Streams:** In cooperation with the federal government, the District conducts programs for channel and levee construction, floodwater retention, and debris basin maintenance. Programs or projects are often done in cooperation with the incorporated cities, the U.S. Army Corps of Engineers, and the U.S. Bureau of Reclamation.

- **Water Conservation:** The District operates and maintains water conservation basins and spreading grounds. Water from the local mountains and northern California is spread and percolated into the groundwater basins underlying the county. The District has numerous joint use agreements with water districts allowing use of District facilities for groundwater recharge.

- **Storm Drain Construction:** The District is active in comprehensive storm drain master

planning/construction and cooperates with incorporated cities and other agencies in storm drain projects.

- **Facility Maintenance:** The District has a proactive maintenance program for its facilities. Regular inspections of the storm drains, channels, and basins are made as required by various state and federal agencies.

- **National Pollution Discharge Elimination System (NPDES):** The District is the lead permittee in the San Bernardino valley area-wide NPDES permit with 16 cities as co-permittees. The NPDES program, through the State Water Quality Management Board, regulates storm water quality through very detailed and complex permits, which affect everyone within the Santa Ana River Watershed and is expanding into the high desert area of the Victor Valley under Phase II of the permit.

- **State Water Quality Management Board:** regulates storm water quality through very detailed and complex permits, which affect everyone within the Santa Ana River Watershed and is expanding into the high desert area of the Victor Valley under Phase II of the permit.

- **Flood Operations:** During the flood season, the District maintains telemetry systems for monitoring rainfall and runoff and dispatches storm patrols as dictated by the projected severity of a storm. The District has access to a weather satellite data delivery system to provide state-of-the-art weather information. The system provides advance warning of major storm activity.

- **Flood Area Safety Task Force (FAST):** As a result of the October/November fires of 2003, the FAST organization was created. The District is a key component of this task force, which is meant to respond to the elevated flood risk associated with the aftermath of these devastating fires.

1.1.3 Special Districts Department

The Special Districts Department promotes safe, healthy, enjoyable and dynamic communities by providing essential programs and municipal services that meet the current and future needs of the communities served.

The San Bernardino County Board of Supervisors is the governing body for all Board governed Districts, County Service Areas (CSA), and Improvement Zones. The day-to-day management and administration is done through the Special Districts Department. The County Board of Supervisors and the Special Districts Department depend quite heavily on input from the community. The successful operation of a District, CSA and Improvement Zone is a team effort between County staff and property owners. Where needed, the Board of Supervisors will set up a

property owner Advisory Commission or Municipal Advisory Council (MAC) to work with and make recommendations to the Board and County staff.

The formation process begins with a request from property owners and then involves a feasibility study performed by the Special District Department with the assistance of many other County Departments. The final approval of the District, CSA and Improvement Zone is done by the County Board of Supervisors at a public hearing. Depending on the complexity of the issues, the process can take from three (3) months to one (1) year to complete.

There are various forms of financial mechanisms that can be used to fund services such as fees, special taxes, assessments, etc. Prior to a new funding source being implemented, it must receive approval from either the property owners or the registered voters in the area. It is important to understand that all funding is generated through the Districts, CSAs, and Improvement Zones. No County general funds are used or are available.

Special Districts Department is responsible for operating the Board-governed Special Districts within San Bernardino County. There are 102 special districts managed by the Special Districts Department:

Table 1-1: Special Districts Department District Listing

	District Type	Number
1	Special Revenue Districts	11
2	Enterprise Funds (Airport and Refuse)	3
3	Parks Districts	19
4	Road Districts	41
5	Enterprise Funds (Sewer)	9
6	Street Light Districts	11
7	Enterprise Funds (Water)	8
Total Special Districts		102

- **Special Revenue Districts** were created to provide a service to the property owners within the Special Revenue District.
- **Enterprise Funds Districts** derive their funds through fees collected for delivery of a service or good such as water, sewer, refuse or airport fees from the users within the individual District.
- **Parks Districts** derive their funds through property taxes levied on property owners

within the individual Park District.

- **Road Districts** derive their funds through property taxes levied on property owners within the Road District.
- **Street Light Districts** derive their funds through property taxes levied on property owners within the Street Light District.

The two Special Districts listed below were formed differently than the other special districts listed above managed by the Special Districts Department. These two districts were formed with a Board of Directors. (San Bernardino County Board of Supervisors) and are not independently elected. All governance actions are by the elected members of the Board of Supervisors acting as the Board of Directors for the Recreation and Park District.

Big Bear Valley Recreation and Parks District

Big Bear Valley Recreation and Park District currently maintains 6 developed parks, 2 undeveloped parks, several community buildings including the Big Bear Valley Senior Center, 3 ball fields, and a swim beach. Moonridge Animal Park is administered by the Big Bear Valley Recreation and Park District. The Zoo is open year round for visitors to see alpine species on exhibit. The Zoo receives approximately 99,600 visitors annually.

Bloomington Recreation and Parks District

Bloomington Recreation and Park District maintains two community parks, an equestrian arena, sports fields, and a community center.

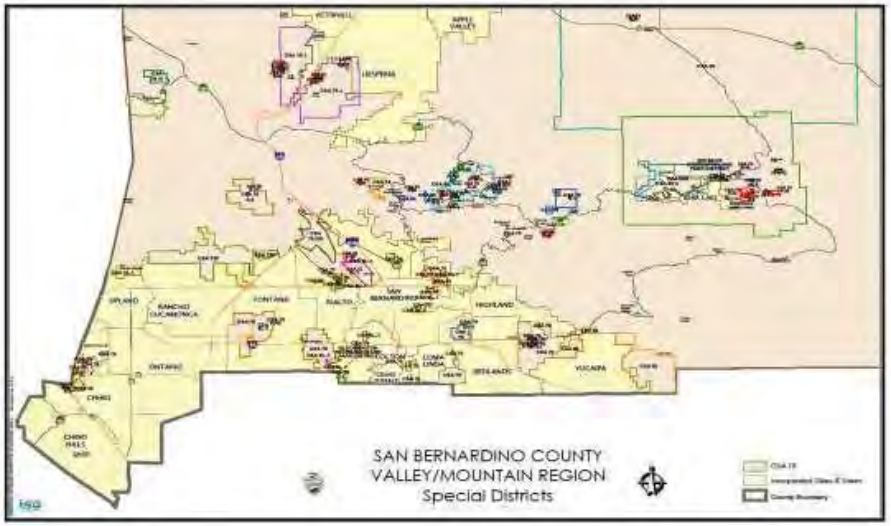


Figure 1-4: Map of Special District Department Districts



Figure 1-5: Special Districts Valley/Mountain Region

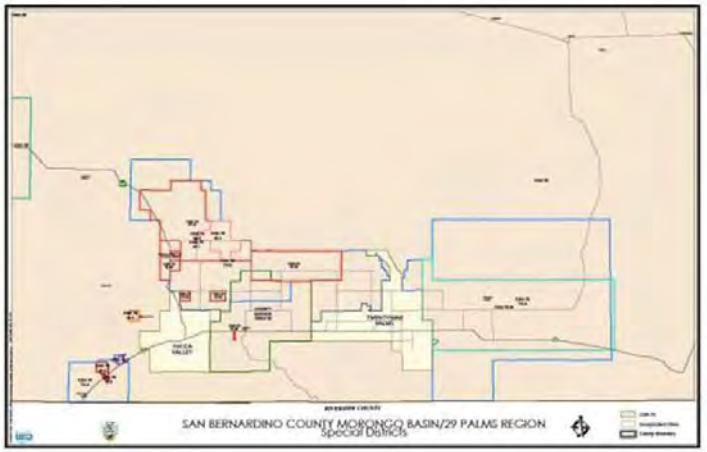


Figure 1-6: Morongo Basin/Twentynine Palms Region



Figure 1-7: Special Districts Victor Valley/Barstow Region

1.2 Purpose of the Plan

The intent of hazard mitigation is to reduce and/or eliminate loss of life and property. Hazard mitigation is defined by FEMA as "any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards." A "hazard" is defined by FEMA as "any event or condition with the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, environmental damage, business interruption, or other loss."

The purpose of the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) is to demonstrate the plan for reducing and/or eliminating risk in the unincorporated area of the County and within areas overseen or managed by the Flood Control District, Fire District and Special Districts Department. The MJHMP process encourages communities within the unincorporated county to develop goals and projects that will reduce risk and build a more disaster resilient community by analyzing potential hazards. By cooperatively and jointly together as a Multi-Jurisdictional Planning team, the partners were able to develop common goals and objectives for mitigation efforts. The individual stakeholders can then take the goals and objectives back to their individual Special Districts for discussion, ranking and project development, and then bring the resulting projects back to the Multi-Jurisdictional Planning Team. The Multi-Jurisdictional Planning Team can then

integrate all projects into the appropriate project listing to be acted upon by the most appropriate managing department or district for the listed projects.

After disasters, repairs and reconstruction are often completed in such a way as to simply restore to pre-disaster conditions. Such efforts expedite a return to normalcy; however, the restoring of things to pre-disaster conditions sometimes result in feeding the disaster cycle; damage, reconstruction, and repeated damage. Mitigation is one of the primary phases of emergency management specifically dedicated to breaking the cycle of damage. Hazard mitigation is distinguished from other disaster management functions by measures that make County development and the natural environment safer and more disaster resilient. Mitigation generally involves alteration of physical environments, significantly reducing risks and vulnerability to hazards by altering the built environment so that life and property losses can be avoided or reduced. Mitigation also makes it easier and less expensive to respond to and recover from disasters.

1.3 Authority

In 2000, FEMA adopted revisions to the Code of Federal Regulations. This revision is known as "Disaster Mitigation Act (DMA)." DMA 2000, Section 322 (a-d) requires that local governments, as a condition of receiving federal disaster mitigation funds, have a Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) that describes the process for assessing hazards, risks and vulnerabilities, identifying and prioritizing mitigation actions, and engaging/soliciting input from the community (public), key stakeholders, and adjacent jurisdictions/agencies.

With an approved (and adopted) MJHMP, the County and participating jurisdictions are eligible for federal disaster mitigation funds/grants (Hazard Mitigation Grant Program, Pre-Disaster Mitigation, and Flood Management Assistance) aimed to reduce and/or eliminate risk.

1.4 What's New

The 2011 San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) contained a detailed description of the planning process, a risk assessment of identified hazards for the San Bernardino County Planning Area and an overall mitigation strategy for reducing the risk and vulnerability from these hazards. Since approval of the plan by FEMA, much progress has been made by San Bernardino County and the participating County Districts on implementation of the mitigation strategy. As part of this 2016 MJHMP Update, a thorough review and update of the 2011 plan was conducted to ensure that this update reflects current community conditions and priorities in order to realign the overall mitigation strategy for the next five-year planning period. This section of the plan includes the following:

- **What's New in the Plan Update** This section provides an overview of the approach to updating the plan and identifies new analyses, data and information included in this Plan Update to reflect current community conditions. This includes a summary of new hazard and risk assessment data as it relates to the San Bernardino Planning Area as well as information on current and future development trends affecting community vulnerability

and related issues. The actual updated data, discussions, and associated analyses are contained in their respected sections within this 2016 MJHMP Update.

- **Summary of Significant Changes to Current Conditions and Hazard Mitigation Program Priorities.** This section provides a summary of significant changes in current conditions, changes in vulnerability, and any resulting modifications to the community's mitigation program priorities.

- **2011 Mitigation Strategy Status and Successes.** This section provides a description of the status of mitigation actions from the 2011 plan and also indicates whether a project is no longer relevant or is recommended for inclusion in the updated 2016 mitigation strategy. This section also highlights key mitigation success stories of the County and participating jurisdictions since the 2011 MJHMP.

This What's New section provides documentation of San Bernardino County Planning Area's progress or changes in their risk and vulnerability to hazards and their overall hazard mitigation program. Completion of this 2016 MJHMP Update further provides documentation of the San Bernardino County community's continued commitment and engagement in the mitigation planning process.

1.4.1 Updates to the Current Plan

This MJHMP update involved a comprehensive review and update of each section of the 2011 plan and includes an assessment of the success of the participating County Districts in evaluating, monitoring and implementing the mitigation strategy outlined in the initial plan. Only the information and data still valid from the 2011 plan was carried forward as applicable into this MJHMP update. In fact, based in part on the issuance of new 2011 and 2013 planning guidance, this 2016 plan has been significantly updated and rewritten.

The San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan (2011) focused on integrating the MJHMP with the County General Plan goals and policies as well as incorporating specific flood mitigation projects that were programmed for completion over the five (5) year period. The Plan did not clearly identify mitigation projects the County would focus on for all priority hazards identified in the plan. However, the County has been very active and engaged in implementing and supporting projects and programs designed to reduce and/or eliminate risk in the County. The list of successful projects in this section represents the activities that the County has undertaken and/or supported to reduce the risks from Wildfire, Earthquake, Flood, Drought, Terrorism, and Climate Change.

1.4.2 New Jurisdictional Annexes

Newly refined and reconfigured Jurisdictional Annexes detail the hazard mitigation planning elements specific to the participating jurisdiction to the San Bernardino County MJHMP Update.

The Annexes are not intended to be a standalone document, but appends to and supplements the information contained in the 2016 base plan document. As such, all sections of the base plan, including the planning process and other procedural requirements apply to and were met by the participating jurisdictions. The newly refined Jurisdictional Annexes provide additional information specific to county participating special district or departments, with a focus on providing additional details on the mitigation strategies for the Fire Protection District, Flood Control District and Special Districts Department. The three annexes provide more detail on mitigation strategies, mitigation projects and existing implementation mechanism for each participating jurisdiction.

The 2011 MJHMP included the Big Bear Valley Recreation and Parks District and Bloomington Recreation and Parks District as standalone jurisdictions. For purposes of this 2016 plan update, Big Bear Valley Recreation and Parks District, and Bloomington Recreation and Parks District hazard mitigation planning efforts are included under the supervision of the Special Districts hazard mitigation planning efforts.

1.4.3 New Risk Assessment

As part of its comprehensive review and update of each section of the plan, San Bernardino County and participating jurisdictions recognized that updated data, if available, would enhance the analysis presented in the risk assessment and utilized in the development of the updated mitigation strategy. Highlights of new data used for this Plan Update is identified below in this Section and is also sourced in context within Chapter 4, Risk Assessment. Specific data used is sourced throughout this plan document. This new data and associated analysis provided valuable input for the development of the mitigation strategy presented in Chapter 5 of this plan. A highlight of new information and analyses contained in this plan update includes the following:

- A new assessment of updated hazards affecting the San Bernardino Planning Area was completed resulting in additional hazards added to planning documents the new hazards include climate change, drought and terrorism.

- The drought hazard was expanded to include water shortage impacts to the County, to better align with the State of California Hazard Mitigation Plan and to reflect the significant issues related to drought conditions resulting from the current and ongoing drought within the County and State of California.

- The climate change hazard was added to include to comply and align with the State of California Hazard Mitigation Plan and to reflect recent SB 379 initiatives. Climate change is affecting and will continue to affect the frequency and severity of natural hazard events, a trend that is of concern across the United States.

- An entire rework of the risk assessment for each identified hazard. This included reworking the hazard profile and adding new hazard event occurrences; redoing the entire vulnerability analysis to add items identified below and updating the vulnerability assessment based on more recent hazard data as well as using the most current parcel and assessor data for the existing built environment.

- An update of the flood hazard analysis to include an updated analysis of the 100-year flood, an analysis of the 500-year flood, including the use the new and updated DFIRMs.
- Utilizing updated critical facility GIS mapping for the Planning Area to provide an updated inventory of critical facilities by jurisdiction (including all municipalities) and a GIS analysis of critical facilities vulnerable to hazards with spatial footprints which include: flood, wildfire, and earthquake.
- An enhanced vulnerability assessment which added a GIS analysis of updated future development areas in the Planning Area and specific to each of the mapped hazards.
- Incorporation and analysis of the new 2010 Census data was utilized for this LHMP update. Census data was used in an intersect analysis to determine how much of the population is exposed to flood, wildfire and earthquake hazards.
- Also, as required by current FEMA planning guidance, an analysis of the County's ongoing and continued compliance with the NFIP is included in the Flood Hazard profile.
- Terrorism is now a reoccurring possibility within the United States, due to the terror attack in San Bernardino County in December of 2015, a hazard profile on this matter has been added to this plan.

1.4.4 Successful Wildfire Mitigation Implementation

1.4.4.1 Fire Safe Councils (FSC) Fuel Reduction Program Success

Fire Safe Councils have received and implemented millions of dollars in grant money for fuels reduction and for public education. Of note recently the Arrowhead Communities FSC developed a grant that did fuels reduction but used the existing staff at the County Tree Removal Program rather than pay additional consultants to do the same work. The benefit of this is that the FSC was able to maximize their expenditure and give the contractor a check upon completion of the project. This way 100% of their grant money went directly to the contractor and none went to administrative overhead.

1.4.4.2 Red Cross Grant Fuel Reduction Success

Although this grant was just recently started, the ARC has successfully removed and reduced fuels on several properties. They have also met with County Roads Sign Division and created the correct number of evacuation directional signs. Fifty signs will be posted in the Moon Ridge area of Big Bear Lake in 2010 and 2011. During an emergency, these directional signs will direct people out of a very confusing network of streets.

1.4.4.3 USFS Grants ARRA and Otherwise and Chipping Program Success

San Bernardino County and its Special Districts were successful in obtaining $3 million in American Recovery and Reinvestment Act funding to support ongoing fuel reduction programs and to create new jobs for the recovering economy. The USFS also funded an additional $13 million to carry on after the NRCS projects were closed out.

Project design, contracting and operations are managed by the County's Public Works Department but the priorities are set by local fire chiefs in monthly MAST Operations Meetings. It is the oldest and most significant program for reducing wildfire threat on a mountain wide basis. Table 1-2 shows current and planned fuels reduction Projects for the San Bernardino County Mountain areas.

Table 1-2: Hazardous Tree Removal Project and Fuel Modification Projects

Project Name	Contract No	Funding	Cost	Project Stage
Mojave view	FM179USFS	USFS	$23,840.00	Complete 2013
Strawberry Lodge	n/a	USFS	n/a	Complete 2013
Harich	n/a	USFS	n/a	Complete 2013
Camp Oaks	n/a	USFS	n/a	Complete 2013
Swinson/Arrowbear	n/a	USFS	n/a	Complete 2013
Osito Rancho/Cedar	n/a	USFS*	n/a	Complete 2013
BBV286SP	n/a	USFS	n/a	Complete 2013
BBV287SP	n/a	USFS	n/a	Complete 2013
BBV280SP	n/a	USFS	n/a	Complete 2013
FF288SP	n/a	USFS	n/a	Complete 2013
LA291SP	n/a	USFS	n/a	Complete 2013
RS292SP	n/a	USFS	n/a	Complete 2013
GVL293SP	n/a	USFS	n/a	Complete 2013
AB294SP	n/a	USFS	n/a	Complete 2013
BBV295SP	n/a	USFS	n/a	Complete 2013
Green Briar	FM100ARRA	ARRA**	$88,000.00	Complete 2013
West Hook Creek	n/a	ARRA	$14,700.00	Complete 2013
Silverwood Lake	n/a	ARRA	$21,000.00	Complete 2013
Weesha	n/a	ARRA	n/a	Complete 2013
Erwin Lake	n/a	ARRA	n/a	Complete 2013
Wrightwood	n/a	ARRA	n/a	Complete 2013
Camp Tahquitz	n/a	ARRA	n/a	Complete 2013

Project Name	Contract No	Funding	Cost	Project Stage
West Cajon	n/a	ARRA	n/a	Complete 2013
LA285SP	n/a	ARRA	n/a	Complete 2013
WW290SP	n/a	ARRA	n/a	Complete 2013
CL289SP	n/a	ARRA	n/a	Complete 2013
Rob Roy	n/a	ARRA	n/a	Complete 2013
Santa's Village	n/a	ARRA	n/a	Complete 2013
Saw Pitt II	n/a	ARRA	n/a	Complete 2013
Oak Hills	n/a	ARRA	n/a	Complete 2013
Fawnskin	n/a	ARRA	n/a	Complete 2013
Heaps Peak	n/a	ARRA	n/a	Complete 2013
Houston	n/a	ARRA	n/a	Complete 2013
Calvary	n/a	ARRA	n/a	Complete 2013
WW298SP	n/a	ARRA	n/a	Complete 2013
LG299SP	n/a	ARRA	n/a	Complete 2013
Project Name	**Contract No**	**Funding**	**Cost**	Complete 2013
Waterman Canyon	n/a	ARRA	n/a	Complete 2013
Willow Creek	FM6501AFSC	ACFSC***	$11,900.00	Complete 2013
LA191EVA	EVA191AFSC	ACFSC	n/a	Complete 2013
NorthBay	FM192AFCS	ACFSC	n/a	Complete 2013
LA215EVA	**n/a**	**ACFSC**	**n/a**	**Complete 2013**

** Funded by United States Forest Service*
*** Funder by American Reinvestment and Recovery Act of 2009*
**** Funded by Arrowhead Communities Fire Safe Council*

1.4.4.4 NRCS Fuel Reduction Project Success

San Bernardino County was the recipient of 72 million dollars that were granted from the National Resource Conservation Service (NRCS) to San Bernardino County Fire Protection District to reduce the amount of fuel and the potential for ignitability. In February of 2010, the grant was successfully closed out one month in advance of the target date. The $72,000,000 provided for almost 1,000 projects substantially reducing heavy fuels on tens of thousands of properties at risk across all mountain communities. Within that grant, $6.7million was provided to the USFS to conduct fuel modifications on Federal land and $7.2 million was provided to Cal Trans to remove fuels along evacuation routes. An additional $2 million was forwarded to San Diego to assist them. The activities funded under this program represent the first of their kind to be accomplished by local/state governments with federal grant funding.

To date the Fuel Management Program has removed over 450,000 trees, improving the overall health of the forested areas in the San Bernardino Mountains and reduced the overall fire threat. On several occasions completed projects have resulted in assisting fire suppression efforts and allowing fire to be contained before it threatens a local community, including Deer Lodge Park in Lake Arrowhead and Nob Hill in Running Springs during the Grass Valley and Slide Fires of 2007.

1.4.5 Flood Hazard Mitigation Success

1.4.5.1 2011 General Plan Amendments

A General Plan Amendment to the Safety Element of the County of San Bernardino 2007 General Plan amended the Flood Plain Overlay District, which became effective on March 11, 2010. The Safety Element includes several layers of hazard overlays that are included in the General Plan mapping system to inform the public of potential hazards to development of property within certain areas of the County and to enable the County to mitigate the risks presented to property owners by these hazards. These overlays include potential flood hazards. Over the past twenty years, certain federal and state agencies have been in the process of digitizing much of this hazard data. The digitization of this data has allowed for greater accuracy as well as more timely updates. In recognition of the new data from various federal and state agencies, the County updated the Flood Hazard Overlay Maps contained within the Safety Element of the General Plan. The Flood Plain Safety Overlay District is amended to incorporate revised FEMA (Federal Emergency Management Agency) Flood Plain data, modifying 47 detail and seven regional General Plan Quad Maps. The FEMA Digital Flood Insurance Rate Map database was adopted in the General Plan Amendment as released by FEMA as it exists as of February 9, 2010 and will updated in the future for the County, by integrating automatic map updates as new data is published by FEMA.

Below is a list of the updated Flood Plain Safety Overlay District Maps effective March 11, 2010.

Map	Quad Name	Map #	Quad Name	Map	Quad Name
DI16B	Baker	FH12B	Telegraph Peak	FH21	Devore
EH07	Hinkley	FH13B	Cajon	FH22	San Bernardino N.
EH14	Wild Crossing	FH14B	Silverwood Lake	FH23	Harrison Mtn.
EH15	Hodge	/FJ B	S Portion of County	FH28	Guasti
EH16	Barstow SE	FH11B	Mt. San Antonio	FH29	Fontana
EH22	Helendale	CK/DK	NE Portion of County	FH30	San Bernardino S.
EH29	Adelanto	EH/FH	SW Portion of County	FH31	Redlands
EH30	Victorville	EI/FI B	S Portion of County	FH32	Yucaipa
EH31	Apple Valley N.	EK/FK B	SW Portion of County	FI09B	Fawnskin
EI01B	Nebo	FH06B	Hesperia	FI10B	Big Bear City
EI02B	Yermo	FH07B	Apple Valley S.	FI17B	Big Bear Lake

Map	Quad Name	Map #	Quad Name	Map	Quad Name
EI03B	Harvard Hill	CH/DH	NW Portion of County	FI18B	Moonridge
EI04B	Manix	CI/DI B	N Portion of County	FH15	Lake Arrowhead
EI09B	Daggett	FH03B	Mescal Creek	FH19	Mt. Baldy
EK03	Needles NW	FH04B	Phelan	FH20	Cucamonga Peak
EK11	Needles SW	FI30B	Joshua Tree S.	FI23B	Sunfair
EK12	Needles	FI32B	Queen Mountain	FI25B	Forest Falls
EK20	**Whale Mountain**	**FI28B**	**Morongo Valley**		

Completed Flood Control Projects with Mitigation Characteristics

Table 1-3: Completed Flood Control Projects

Project Number	Completion Date	Total Cost	Total Funding
F02527	2016	$392,885	$392,885
F00282	2016	$4,100,000	$4,100,000
1-	2010	$7,770,000	$7,700,000
F01761	2016	$4,000,000	$4,000,000
F02234	2016	$1,100,000	$1,100,000
F01767	2014	$3,700,000	$3,700,000
F01389-	2008	$1,300,000	$1,300,000
F01545	2009	$1,500,000	$1,500,000
F01566-	2010	$3,300,000	$3,300,000

1.4.5.2 F02527 29TH Street Basin Levee Certification Restoration Project - Completed

Ensure that the surrounding residential and commercial areas will not be re-mapped as floodplain areas.
Status: Completed
Completion Date: March 2016
Local Priority: High
Total Cost: $392,885
Funding Description: From Flood Control District Budget through Property Tax
Project Selected for: Public safety: history of flood damage at this location
Hazard Mitigated: Potential flooding
Resources to Implement: High

Cost to Implement: High
Time to Implement: High

1.4.5.3 F00282 Alabama at City Creek - Completed

Construct RCB and channel improvements to increase capacity and minimize the possibility of road closures and flood damage.
Status: Completed
Completion Date: January 2016
Local Priority: High
Total Cost: $4.1 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Public safety & convenience
Hazard Mitigated: Flooding, flood damage, road closures and road damage
Resources to Implement: Low
Cost to Implement: High
Time to Implement: Medium

1.4.5.1 F02234 Wilson Creek - Completed

Status: Completed June, 2016
Local Priority: Low
Total Cost: $1.1 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Yucaipa
Project Selected for: public safety and infrastructure protection
Hazard Mitigated: attenuation of high velocities (50 fps); slope protection
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

1.4.5.2 F01767 Lytle Cajon – Completed

Replacement of damaged concrete invert
Status: completed
Completion Date: 2014
Local Priority: High
Total Cost: $3.7million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety and to prevent additional channel damage
Hazard Mitigated: Additional damage to invert and walls; potential flooding and washouts of nearby area
Resources to Implement: Medium
Cost to Implement: High
Time to Implement: High

1.4.5.3 F01761 Kitchen Wash – Completed

To intercept flows upstream of Rimrock Road to capture headwaters and re-route them to the Mojave River
Status: In preliminary design process
Completion Date: Estimated 2017/2018
Local Priority: Low
Total Cost: $4.0 million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: Public safety; protection of commercial center
Hazard Mitigated: local flooding, road damage
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

1.4.5.4 Successful "Finalization" of Drainage Feasibility Study Report

The final Drainage Feasibility Study has been completed to evaluate the continuing landslide hazard within Rimforest and the role of concentrated storm runoff in propagating slope failure. The village of Rimforest has eroding cliff-side property and bluff retreat in the Southern part of the village.

This problem is primarily caused by storm runoff from either rainstorms or snowmelt after winter storms. The runoff flows to the south side of Rimforest and is discharged over the cliff at two principal locations. This study report evaluated a number of options to re-direct the majority of the runoff to other discharge locations for the purpose of reducing and mostly eliminating the cliff-side erosion. Two options presented the study appear to be feasible if new conventional storm drain systems are installed. One of the options is now included as potential future mitigation action presented in Section 6 of this plan.

1.4.6 Geologic Hazard Mitigation Success

1.4.6.1 Successful Geologic Hazard Prevention General Plan Amendments

Twenty two overlay maps were completed as part of the 2007 General Plan Amendment which became effective on March 11th, 2010. For more information on the overlay maps, see Section 6.2.2.3.

1.4.6.2 Amendment to Title 6 County Code to Adopt by Reference the 2010 Editions of the California Building Standards Codes

An amendment to Title 6 of the County of San Bernardino Code to adopt by reference the 2010 Editions of the California Building Standards Codes went before the Board of Supervisors on November 2, 2010 and was continued for a second reading on November 16, 2010 and approved unanimously. The amendment became effective on January 1, 2011.

The County of San Bernardino amendment to Title 6 of the County Code to adopt by reference the 2010 Editions of the California Building Standards Codes repealed the current chapters of Division 3 of Title 6 that reflect the 1994/1995 editions of the California Building Standards Codes and adopt the 2010 editions of these codes by reference.

The California Building Standards Commission approved the California Building Standards Code (Code) for a statewide effective date of January 1, 2011 and requires this Code apply in all parts of the state. This Code consists of the California Building, Residential, Plumbing, Mechanical, Electrical, Energy, Historical Buildings, Existing Building (Unreinforced Masonry) and the Green Building Standards Codes. Since this 2010 Edition was adopted by local ordinance, the prior editions of this code will be repealed and the most recent editions of the codes with applicable amendments requiring express findings and certain appendices necessary for the health and safety of the citizens of this County will be in effect within the unincorporated areas of San Bernardino County. The benefit of adopting this Code is that it provides consistency and clarification for the building community as well as building inspectors and plans examiners. State law (Health & Safety Code 18941.5 and 17958.7) requires the local government make express findings in order to amend building standards and the amendments must be necessary due to local climatic, geological, or topographical conditions.

Those amendments and findings are included in the County's ordinance and were filed with the California Building Standards Commission.

The recommended modifications not requiring express findings are administrative or procedural in nature and concern the local implementation issues that are not covered by building standards.

An example of this type of modification is to the California Residential Code, Section R105.3.1.1 which requires the Board of Appeals to confirm substantial valuations in the flood plain. The traditional purpose of the Board of Appeals has been reserved for a contested decision of the Building Official, and it is felt that it should remain as such.

With respect to grading and excavation regulations found in Appendix J of the 2010 State published code, the 2001 California Building Code dealt with grading with more clarity in regards to what activities require a permit and set forth rules to ensure large grading projects are scrutinized in greater detail than smaller projects by requiring more reporting and inspection of such work. The grading chapter in the 2001 Code has been trusted and in use in its primary form for years. The 2010 Appendix J grading chapter needs substantial amendment and modification to address all grading issues and is not recommended for adoption in its present form. The Board adopted the 2001 Appendix Chapter 33 regulations as part of this proposed ordinance. Relocation permit requirements have been moved to a new section of the Code, and it retains specific standards for relocation procedures in details not found in the 2010 State-published code. Clarification of the types of buildings affected by the new regulations has also been made.

Administrative changes to the 2010 California Existing Building Code (Part 10 of Title 24) were approved to outline the procedures required to set allowable time limits for the retrofit and repair

of unreinforced masonry buildings. Staff is also recommending that authorization be given to the Building and Safety Division of the Land Use Services Department to issue Administrative Citations as an alternative means of enforcement of the County Code provisions.

Express findings are made for changes to the California Plumbing Code, Appendix K regarding the soil conditions that exist in this county. These changes are supported by the Environmental Health Division. These express findings are iterated in the ordinance and will be filed with the Building Standards Commission as required by law in order to become effective.

1.5 Community Profile

1.5.1 Physical Setting

The County is bounded by the states of Arizona and Nevada on the east, Inyo County on the north, Kern and Los Angeles Counties on the west, and Orange and Riverside Counties on the south.

San Bernardino County covers 20,102 square miles and is geographically the largest county in the continental United States. The States of Hawaii, Connecticut, Delaware, and Rhode Island and the District of Columbia could all fit inside the County boundary at the same time. The unincorporated area of San Bernardino County covers approximately 19,848 square miles; this is 98.7% of the entire County.

The remaining 1.3% of acreage (254 square miles) is under the jurisdiction of incorporated cities or towns. Figure 7 displays the unincorporated area and the cities/towns. The cities/towns on the map are concentrated in the south/west portion of the county and are color-coded.

San Bernardino County is characterized by three (3) distinct geographic areas: Valley, Mountains, and Desert: the Valley Region contains the majority of the county's incorporated areas and is the most populous region; the

Mountain Region is primarily comprised of public lands owned and managed by federal and state agencies; and, the Desert Region is the largest region (over 93% of the county's land area) and includes parts of the Mojave Desert.4 Aside from open or undeveloped land, the largest land use in the county is for military purposes.

The mountains stretch across the south end of the county. The mountain elevations range from 2,000 feet along the foothills to the 11,502-foot summit of Mount San Gorgonio, the highest peak in Southern California. Figure 8 displays the terrain/topographic features throughout San Bernardino County.

The San Bernardino Mountains feature four (4) large lakes (Big Bear Lake, Silverwood Lake, Lake Arrowhead, and Lake Gregory), and many smaller lakes. The majority of the lakes are the headwaters of the Santa Ana River and the Mojave River.

The Santa Ana River originates in the San Bernardino Mountains and flows southwest to the ocean. The Santa Ana Watershed includes streams flowing south from the San Gabriel Mountains and streams flowing north and west from the San Jacinto Mountains in Riverside County.

The desert area contains low mountains, valleys, and dry lakebeds. The elevations within the valley range of the County is from about 500 feet on the valley floor to 1,700 feet in Live Oak Canyon, and to about 5,400 feet in the hills in Yucaipa. The desert area is an assemblage of mountain ranges interspersed with long, broad valleys that often contain dry lakes. Many of these mountains rise from 1,000 to 4,000 feet above the valleys. Due to the persistent winds that blow throughout the year, large portions of the desert surface have been modified into a mosaic of pebbles and stones known as desert pavement.

A major physical resource of the desert area is the Mojave River, a critical water source for many of its residents. Among the few rivers that both flow north and do not empty into an ocean, the Mojave River travels north and east away from its watershed in the San Bernardino Mountains. The major part of it is over 100-mile length is marked by a dry riverbed that only on occasion reveals the water within it. Except in exceedingly wet years, the Mojave River ends its flow at Soda Dry Lake near Baker. The Colorado River, at the California and Arizona border, borders the County on the east. Streams in the eastern areas of the County area flow into the Colorado River which eventually ends at the Gulf of California.

The densely urban southern part of the County is at the headwaters of the Santa Ana River with its tributaries crossing the valley floor. With the construction of the Seven Oaks Dam the main river source has been controlled. However, Mill Creek, City Creek, Lytle Creek, and Cajon Creek still have the potential to flood areas of the valley if levees fail. A similar potential occurs with the high desert portion of the County with the Mojave River, which is controlled by the Mojave River Falls Dam that flows north from the San Bernardino Mountains to the city of Barstow. The San Antonio Dam on the southwest side of the county provides more than 100-year flood protection to the west end of the San Bernardino Valley. The Colorado River is on the eastern border of the County. The dams along the river have controlled the flow but bank erosion and damage to roads in the area have been experienced during periods of high water.

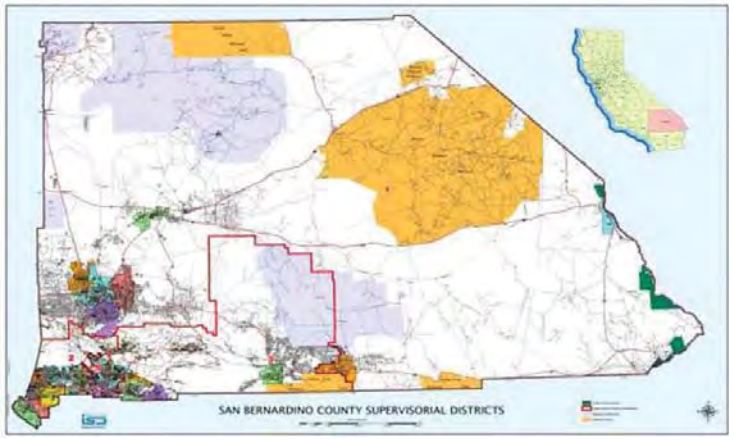


Figure 1-8: Unincorporated and Corporate Areas in San Bernardino County



Figure 1-9: Topographic Features in San Bernardino County

1.5.2 History

Paleo-Indian sites dating from c. 10,000 BC show that the San Bernardino County area has been inhabited for at least 12,000 years. Artifacts in the Calico area suggest much earlier human occupation, but this has not been confirmed. In the past three thousand years, various Indian tribes flourished in the area: the Gabrielenos occupied the West Valley; the Serranos lived in the foothills of the San Bernardino Mountains; the Vanyumes lived along the Mojave River; the Mohave lived along the Colorado River; and the Chemehuevi occupied the Mojave Desert.

The first European explorers to enter the area were Pedro Fages, Military Commander of California, in 1772 and Fr. Francisco Garces, a missionary priest, in 1774. On May 20, 1810, Franciscan missionary Francisco Dumatz, of the San Gabriel Mission, led his company into a valley. In observance of the feast day of St. Bernardine of Siena, Dumatz named the valley San Bernardino. This name was later given to the nearby mountain range, and later the city and county.

In 1842 the Lugo family was granted the Rancho San Bernardino, a holding of 37,700 acres encompassing the entire San Bernardino Valley. Captain Jefferson Hunt, of the Mormon Battalion, led a group of settlers into San Bernardino and founded a Mormon Colony. In 1851 the Mormon Colony purchased the Rancho from the Lugo family.

In 1850 California was admitted into the United States. On April 26, 1853, San Bernardino County was created from parts of Los Angeles, San Diego, and Mariposa Counties. In 1854 the City of San Bernardino was incorporated as the county seat.
In 1857, three orange trees were set out on a farm in Old San Bernardino. By 1882 a rail car load of oranges and lemons grown in the East Valley was shipped to Denver, Colorado. As early as the 1840s, vineyards were planted in the Cucamonga area and in the 1870 census; San Bernardino County was credited with producing 48,720 gallons of wine.

In 1860, gold was discovered in Holcomb and Bear Valleys in the San Bernardino Mountains, and placer mining began in Lytle Creek. Silver was being mined at Ivanpah in 1870, and the rich silver mines of the Calico district were developed in the 1880s. Borax was first discovered in 1761 at Searles Dry Lake near Trona, and transported out by twelve-, eighteen- or twenty-mule team wagons.

As a county, San Bernardino has been uniquely endowed with rich mineral deposits. Large deposits of gold have been mined at Stedman and Vanderbilt, with smaller but still important deposits at Alvord, Oro Grande, Old Dad Mountain, Dale and Nantan, Calico, Ivanpah, Waterman and Providence were the largest silver deposits, with lesser, but important deposits in the Mescal Mountains and at the Death Valley Mine. The most important copper mines are the Copper World and the Bagdad Chase (known usually for its gold production).

Except for a brief period after World War I when silver prices were high, low metal prices and inflation put a damper on mining in the 1920s. However, with the Great Depression of the 1930's

and an increase in the price of gold by nearly $15 an ounce, many small operators reactivated old mines. The region around Barstow, Vanderbilt, Stedman, and Dale were the principal centers of mining activity until World War II.

During World War II, iron was extracted from the Vulcan Mine in the Providence Mountains, and the Bagdad Chase Mine remained active. Since the war, there has been sporadic mining of gold, silver, and tungsten in the county. A major new mine opened during the 1950s, the Mountain Pass rare earth mine. Recently, exploration has outlined potential large tonnage molybdenum properties in the New York and Ord Mountains, copper in the Cooper Basin area of the Whipple Mountains and gold in the Clark Mountains.

After World War II, the citrus industry slowly declined. However, dairies relocating out of Los Angeles County settled in the Chino Valley area, creating a robust dairy industry in San Bernardino County.

Elsewhere in the Valley region, suburbs grew as moderate priced housing developments were built. By the late 1980's, the county had grown into bedroom communities and warehousing for southern California.

1.5.3 Climate

The valleys between mountain ranges experience very high temperatures, while the adjacent mountains often experience much cooler temperatures, particularly at their summits. Rainfall and humidity are low. The annual average precipitation for the area is approximately 30 inches. The differences in elevation and topography are in part responsible for variations in temperature and precipitation from the Valley and Desert areas.

Winter temperatures in some areas of the Desert range near zero, the cold often compounded by the wind-chill factor. In the summer, temperatures can reach as high as 134°F in the lower elevations and along the Colorado River area. Temperatures in the San Bernardino valley area range from an average high of 80ºF and an average low of 53ºF. The record high for the area is 117ºF and the record low is 17ºF. The annual average rainfall for the area is 15.6 inches. During the fall and winter months, strong "Santa Ana" winds blow across the area.

The mountains experience a four-season climate. Temperatures in the Mountain area range from an average high of 62ºF and an average low of 36ºF. The record high for the area is 106ºF and the record low is -25ºF. With the possible exception of some of the higher elevations in the mountains, precipitation throughout the Desert area is less than four inches per year, usually of short duration and high intensity. The resulting flash floods rapidly modify the terrain that is exposed to the erosive surface runoff. Unusually heavy or persistent rains often result in the temporary filling of a number of dry lakes until the surface water evaporates or infiltrates the soil. Persistent winds blow throughout the year

1.5.4 Demographics

The total population of San Bernardino County is approximately 2,139,570 people *(State of California, Department of Finance, E-4 Population Estimates for Cities, Counties, and the State, 2011-2016, with 2010 Census Benchmark. Sacramento, California, May 2016)*. Most of the County's population is in the valley areas located in the south west portion of the County. The County's population has grown by 4.13%, 84,835 people, since 2011 (population in 2011 was 2,054,735 people).

The population of the unincorporated area of the County in 2011 was 294,753 people. In 2016, the population is 309,759; an increase of 14,976 persons (or 1.05%) *(State of California, Department of Finance, E-4 Population Estimates for Cities, Counties, and the State, 2011-2016, with 2010 Census Benchmark. Sacramento, California, May 2016)*

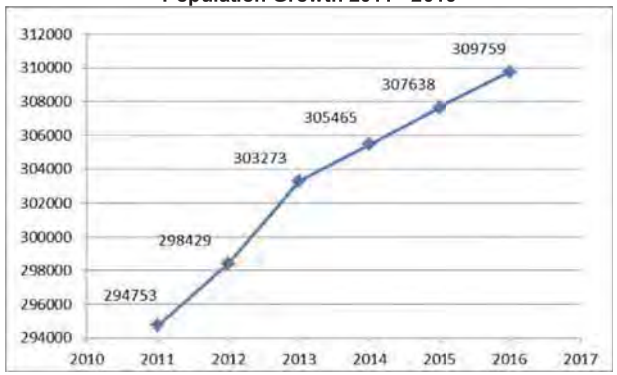


Figure 1-10: San Bernardino County Unincorporated Area Population Changes 2011 - 2016

Source: California Department of Finance E-4

Ethnic composition includes Hispanics (48%) who form the largest share of the County's population, followed by Whites (34%). Blacks (9%) and Asians (5%) form a relatively lower share of the total population. It should be noted that the Hispanic population is growing at the fastest rate among all ethnic groups. From 2000 to 2010, the Hispanic population increased by 44%. This trend is consistent with that of the neighboring counties of Riverside and Orange, where the

Latino population grew by 63% and 24%, respectively. During this period, the Asian population grew by 38%, whereas the Black population grew by 15%. The population of Whites declined in

all the six counties in Southern California; San Bernardino County experienced a decline of 7% in its White population. Changes in Ethnicity are from the California Department of Finance, Demographics Unit.

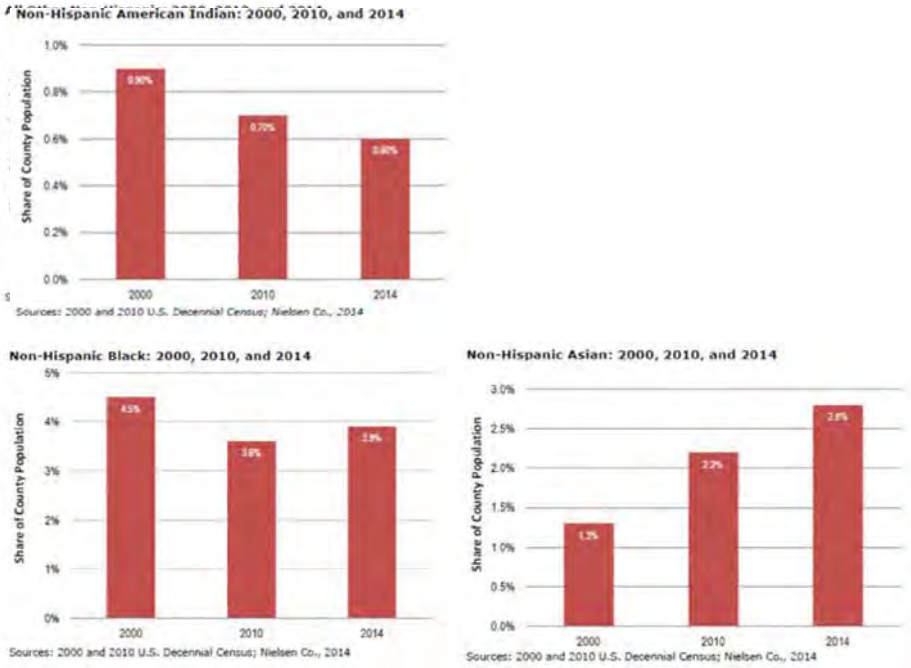


Figure 1-11: San Bernardino County Unincorporated Area 2014 Population by Ethnicity

1.5.5 Existing Land Use

The County has adopted a “one-map approach.” The “one-map approach” permits the use of a single map showing both General Plan land use designations and zoning classifications. The one-map approach assures that there will always be land use consistency between the County's General Plan and its Zoning Code.

There are 18 land use zoning districts that apply only to privately owned lands in the County and not to the lands controlled by other jurisdictions. Lands that are controlled by other jurisdictions, including lands controlled by federal and state agencies as well as incorporated cities, are mapped to identify the public agencies that control them. The 18 land use zoning districts are as follows:

- Resource Conservation (RC)
- Agriculture (AG)
- Rural Living (RL),
- Single Residential (RS),
- Multiple Residential (RM),
- Office Commercial (CO),
- Neighborhood Commercial (CN),
- Rural Commercial (CR),
- Highway Commercial (CH),
- General Commercial (CG),
- Service Commercial (CS),
- Community Industrial (IC),
- Regional Industrial (IR),
- Institutional (IN),
- Special Development (SD),
- Floodway (FW),
- Specific Plan (SP), and
- Open Space (OS).

Resource Conservation (RC) comprises the majority (55.98 percent) of the designated land uses in the County. This land use designation covers over 1 million acres, or about 1,500 square miles of land. Most of the land within this designation is publicly owned (federal and state) and includes national parks, military bases, conservation areas, and lands owned by other federal and state agencies. The County has designated approximately 681,500 acres or 1,065 square miles (37.92 percent) for residential uses. Out of this, about 587,535 acres (32.76 percent of total unincorporated area) are designated Rural Living, 67,691 acres are designated Single Residential, while 4,986 acres are designated Multiple Residential.

Commercial land use zoning districts (Office Commercial, Neighborhood Commercial, Rural Commercial, Highway Commercial, General Commercial, and Service Commercial) occupy a total of 12,177 acres or 0.68 percent of the total unincorporated area. Industrial land use zoning districts (including Community Industrial and Regional Industrial) occupy 21,834 acres or 1.21

percent of the total unincorporated area. Other land use designations include Agriculture occupying 41,793 acres (2.32 percent), Institutional occupying 8,567.51 acres (0.48 percent), Floodway occupying 20,281 acres (1.13 percent), and Specific Plan occupying 4,861.37 acres (0.27 percent).

Because of the size of the County, the San Bernardino County General Plan divides the county into 8 quadrants (Figure 1-12). The "one-map approach" allows the quadrant maps to be used for many different planning and development purposes. Figure 1-13 presents the Land Use Zoning for each quadrant. The Land Use Zoning identifies the type of construction and growth that exists or may occurs in area.

County designated Land Use Zoning Districts do not apply to Federal, State, or incorporated owned property.

The County's General Plan can be found at: http://countywideplan.com/home/about/

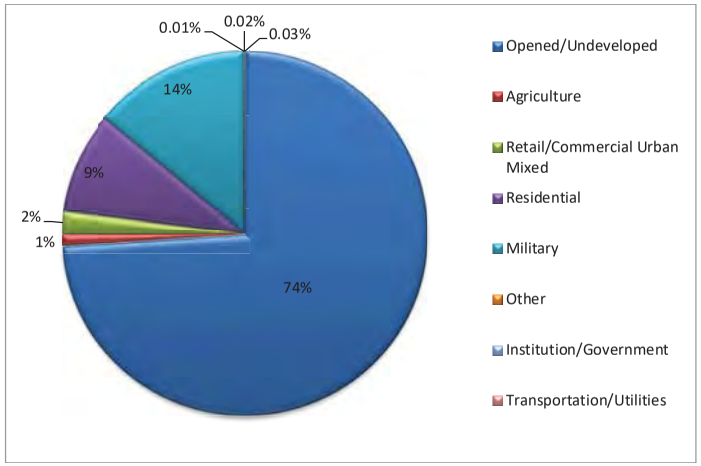


Figure 1-12: San Bernardino County Land Use

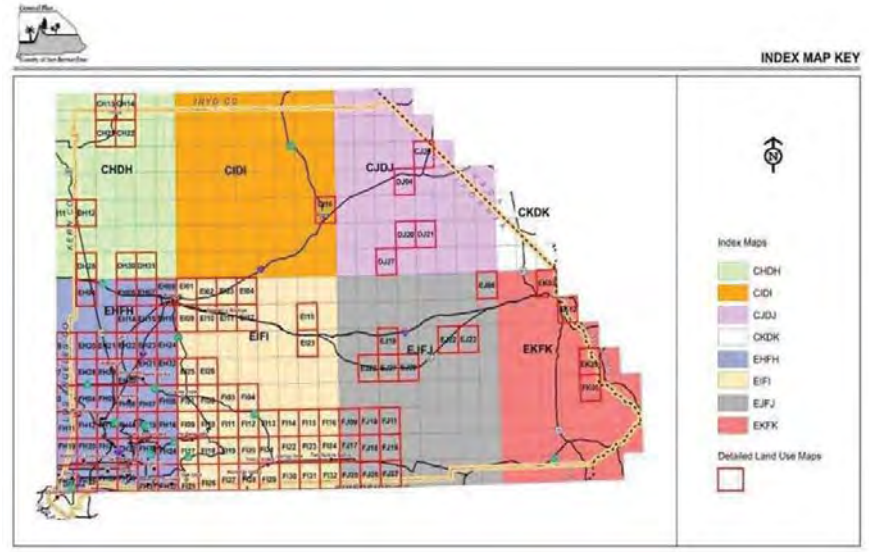


Figure 1-13: San Bernardino County Land Use Map

1.5.6 Development Trends

No major developments occurred in the unincorporated area of the county since the 2010 MJHMP was adopted. The limited development that did occur was scattered throughout the unincorporated area; with no one area being singled out. All development was in accordance with the pre-designated Land Use Zones development zones and complied with all Fire, Flood, and Seismic codes of the County and State at the time of development. This includes commercial, industrial, and residential developments.

The County is optimistic about the potential for future development. The High Desert area of San Bernardino County is one of the best places in the world for solar energy development because of its high altitude, the number of sunny days each year and existing power infrastructure.

- Many large solar energy projects are being proposed in California's desert area on federal Bureau of Land Management (BLM) land. BLM has received right-of-way requests encompassing more than 300,000 acres for the development of approximately 34 large solar thermal power plants totaling approximately 24,000 megawatts. This number of projects has not yet reached the stage of an Application for Certification (AFC) with the California Energy Commission.
- California's electric utility companies are required to use renewable energy to produce 20 percent of their power by 2010 and 33 percent by 2020. A main source of renewable power will be solar energy. Within the County of San Bernardino a Hybrid Power Project has been approved in the Victor Valley area. As of August 2010, three large Solar Projects to be placed in the County are in review by the California Energy Commission.

Once built, these projects will not impact the area to a great extent. Minimal staffing is required to operate these facilities and their very nature places them in remote locations of the County.

Additionally, with the completion of the Alameda Corridor and the emergence of the Ports of Los Angeles and Long Beach as the largest ports in the U.S., shipping trans-Pacific goods from the booming Asian economies, San Bernardino County has evolved as the logistics and distribution hub for the 20 million resident Southern California market and into the rest of the nation. As the international economy recovers amidst tightening land availability for warehousing and transit, San Bernardino County is better positioned than other areas in the region to harness the opportunity to become an even more important logistics hub.

The County has also started development of a bullet train. The bullet train will connect Victorville, CA and Las Vegas NV generally following the I-15 corridor (NOTE: There are discussions of additional bullet trains connecting San Bernardino with Los Angeles and San Diego and San Bernardino County and San Francisco/Sacramento).

While all of these development trends may not be recognized over the next 5 years, all future development that will take place is planned to occur in accordance with the General Plan Land Use Zones and will consider all potential hazards identified within this plan. Additionally, all development will be in compliance with all Fire, Flood, and Seismic codes of the County and State at the time of development.

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Section 2. Plan Adoption

2.1 Adoption by Local Governing Body

The San Bernardino County Board of Supervisors created "districts" to provide a specific service to an area / population of San Bernardino County. These Districts are Board Governed in that the Board of Supervisors has direct control and legislative oversight of the Districts. The Board of Supervisors acts on behalf of each District whenever governance items are necessary. The participating jurisdictions listed in this plan are separate legal entities from the County of San Bernardino. For tax/revenue purposes the Board of Supervisors, acting as the Board of Directors for each participating jurisdiction or "District", will be adopting the Multi-Jurisdictional Hazard Mitigation Plan on behalf of each District. The Districts are not independent from San Bernardino County but are controlled and administered as any other County Department is administered.

This plan represents mitigation efforts for the unincorporated portions of the County and the efforts of three jurisdictions participating in this Multi-Jurisdictional Hazard Mitigation planning effort. The participating jurisdictional special districts include:

San Bernardino County Fire District
San Bernardino County Flood Control District
San Bernardino County Special Districts Department

San Bernardino County Board of Supervisors is responsible for the review, approval, and adoption of the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) update for the unincorporated area of San Bernardino County, the San Bernardino County Fire Protection District, the San Bernardino County Flood Control District, and for the County's Board Governed Special Districts Department. It is also the intent of the San Bernardino County Board of Supervisors to take appropriate actions to incorporate the MJHMP update into the San Bernardino County General Plan.

2.2 Promulgation Authority

The Promulgator Authority for the adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the unincorporated area of San Bernardino County, the San Bernardino County Fire Protection District, the San Bernardino County Flood Control District, and for the County's Board Governed Special Districts Department and incorporation of the MJHMP into the San Bernardino County General Plan is:

- Chairman Robert A. Lovingood First District
- Janice Rutherford Second District Supervisor
- James Ramos Third District Supervisor
- Vice Chairman Curt Hagman Fourth District Supervisor
- Josie Gonzales Fifth District Supervisor

The Point of Contact for information regarding this MJHMP is:

Michael Antonucci, Emergency Services Manager
San Bernardino County Fire
Office of Emergency Services
1743 Miro Way
Rialto, CA 92376
(909) 356-3998

Section 3. Planning Process

3.1 Preparing the Plan

Multi-Jurisdictional Hazard Mitigation Planning is a process State, Tribal, and local governments use to identify risks and vulnerabilities associated with natural disasters, and to develop long-term strategies for protecting people and property from future hazard events.

Planning creates a way to solicit and consider input from diverse interests. Involving stakeholders is essential to building community-wide support for the plan. In addition to emergency managers, the planning process involves other government agencies (e.g., zoning, floodplain management, public works, community, and economic development), businesses, civic groups, environmental groups, and schools.

To assist with the updating of the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP), a Multi-Jurisdictional Planning Team (Planning Team) was established. The Planning Team was the lynchpin for all activities to update the MJHMP. The Planning Team was established to define and identify the strategies, goals, activities, and development of the MJHMP. The Planning Team represents a comprehensive team of subject matter experts from a range of areas that the team felt was affected by the plan or could provide great benefit to the team. Members of the Planning Team were drawn from San Bernardino County Departments, the San Bernardino County Fire Protection District, the San Bernardino County Flood Control District, and the San Bernardino County Special Districts Department.

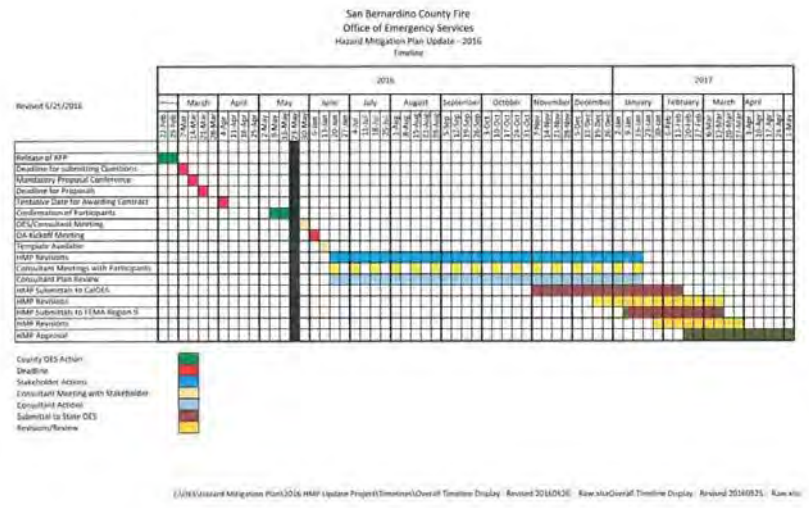
The Multi-Jurisdictional Planning Team members worked together to jointly determine and rank the risks facing the six participating agencies, develop goals and objectives to mitigate the risks, and identify which of the participating jurisdictions would be most appropriate for leading any particular project area identified by the Multi-Jurisdictional Planning Team. The individual Planning Team members then returned to their respective Special Districts where discussions were held, input sought, and potential projects developed and ranked for each of the Planning Team identified risks and projects relevant to the Special District. The Planning Team members then returned to the Multi-Jurisdictional Planning Team and provided the Planning Team with their vetted, prioritized list of potential projects and budgets to include in the Multi-Jurisdictional Hazard Mitigation Plan. These projects and budgets were integrated into the Multi-Jurisdictional Hazard Mitigation Plan. Upon approval, each participating jurisdiction would then be able to apply for grant funding for their prioritized projects without interference from another participating jurisdiction as funding became available.

The Planning Team was led by a representative from the San Bernardino County Fire Protection District-Office of Emergency Service. This representative took on the responsibilities of a Project Manager and facilitated and coordinated activates.

The Project Manager also represented the Unincorporated County at the San Bernardino County Operational Area (OA) Stakeholder meetings. San Bernardino County OES led the effort to coordinate Stakeholder in the Operational Area update their local MJHMP. This effort included: proving technical support, establishing a platform to encourage the exchange of ideas, and help coordination among neighboring stakeholders. The Project Manager was responsible for attending these meetings and incorporating the material into their planning process. One of the resource materials provided through the OA Stakeholder meetings was a suggested Table of Contents (TOC) the purpose of the TOC was to ensure all aspect of the MJHMP requirements were being met and could be found in similar sections in each of the Stakeholders updated MJHMPs.

This sample TOC was reviewed by the Planning Team and incorporated into the unincorporated county's MJHMP update efforts. Using the TOC, the Planning Team decided to conduct a section by section; page by page review of the 2016 MJHMP. To assist with this effort, a proposed project timeline was developed. The proposed Project Timeline illustrates the windows when each section of the 2016 MJHMP will be reviewed and the section revised.

Table 3-1: Proposed Project Timeline



Based on the TOC, the Planning Team divided the update process into seven (7) phases; one for each section of the TOC. This approach allowed for a much focused review of the material and

provided an organized method to introduce new or updated material. The Project Manager led the discussion, solicited comments, took notes, and incorporated results in the MJHMP. Additionally, the Project Manager collected and summarized material provide by Planning Team members. During the Planning Team meetings some members were assigned tasks or action items which were to be completed prior to the next meeting.

Staff assigned to the MJHMP Update reviewed the 2016 MJHMP and provided comments referencing updated information such as current population statistics, new HAZUS-MH MR3 analysis of floods and earthquakes, and provide suggestions for updating the MJHMP. The Planning Team then reviewed the update information and validated/identified Goals, Objectives, and Projects. This step included discussion of how the projects would be prioritized.

3.1.1 Project Prioritization Involved Comprehensive Consideration of Criteria/Factors

While there is not a standard process followed by each of San Bernardino County Departments, and Districts; they all considered social, technological, administrative, political, legal, economic, and environmental factors. The County and each district participated on the Planning Team, and then took the risks, goals, objectives and projects back to their respective jurisdiction for discussion and vetting. After vetting, the individual Planning Team members returned to the Multi-Jurisdictional Planning Team where the individual materials were combined into a single Multi-Jurisdictional Hazard Mitigation Plan. This Multi-Jurisdictional effort resulted in goals, objectives and projects for all participants being listed under the appropriate hazard sections and not by individual participants. This reflects the overall County philosophy of allowing the department/district with the most expertise to suggest and/or manage a project that may affect another participant who does not have expertise in the hazard.

3.1.2 Planning Team

Much of the Planning Team is composed of representatives who were part of the development of the 2010 Unincorporated Area County MJHMP. This provided added value to the team in that they were familiar with the process and provided continuity in the updating of the 2010 MJHMP.

The Planning Team is comprised of representatives from San Bernardino County Departments, the San Bernardino County Fire Protection District, the San Bernardino County Flood Control District, and the San Bernardino County Special Districts Department who specialize in mitigation type activities/planning.

The Planning Team members represented select aspects of the community and were thought of as liaisons to the greater community. Each Planning Team member was responsible for communicating the direction and status of the planning effort to their outside members and in return they are expected to bring to the team outside perspectives. Additionally, the individual Planning Team members acted as liaisons for their respective Special Districts and were responsible for ensuring that the Special Districts provide appropriate input from their respective internal planning processes. Potential projects/budget meetings were held where alternative mitigation actions were discussed and potential mitigation projects were developed and prioritized along with budget development for the individual participating Special Districts and Departments. Additional prioritization after budgets were developed to ensure proper Benefit Cost Analysis (BCA) techniques were applied.

Representation was present on the Multi-Jurisdictional Planning Team from various County Departments and the three participating jurisdictional departments. Planning Team included representatives from all the participating San Bernardino County Special Districts and Departments. See Table 3-2 and Table 3-3.

Table 3-2: Multi-Jurisdictional Planning Team

Multi-Jurisdictional Planning Team Members	Title / Role
Unincorporated County	
Suzanne Peterson	*Countywide Plan Coordinator / Land Use Services / Mitigation Review*
Jerry Blum	*Countywide Plan Coordinator /*
Brent Rolf	*County GIS / Hazus Data Coordinator / Information Services*
Frank Jordan	*Land Use Services / Mitigation Review*
Jim Sowers	*Building and Safety / Risk Assessment Review and Mitigation Action Plan Development*
Patricia Cole	*Economic Development Agency / Implementation and Funding Review*
Carl Alban	*Architecture and Engineering Department*
John Amrhein	*Sherriff's Corner Department Rep. / Mitigation Action Review*
Mazin Kasey	*Public Works Dept. /Transportation Division*
Art Rivera	*Solid Waste Management Division*
Norma Spencer	*Superintendent of Schools*
Fire Protection District	
Michael Antonucci	*OES Director / MJHMP Plan Representative*
Cindy Serrano,	*Project Manager for Planning Process*
Miles Wagner	*Emergency Services Officer, GIS Representative and Stakeholder Coordination.*
David Davis	*Emergency Services Officer / Fire District Representative and Technical Writer*
Mary Barnett	*Technical Writer / Plan Update and Edits*

Multi-Jurisdictional Planning Team Members	Title / Role
Cheryl Nagy	*Emergency Services Officer*
Carrie Cruz	*Emergency Services Officer*
Elli Maldonado	*Elli Maldonado – Office Assistant*
Michael Horton	*Michael Horton – Fire Marshal*
Flood Control District	
Kevin Blakeslee, Deputy Director – Flood Control	*Deputy Director – Flood Control*
Kenneth Eke, Chief, Flood Control Planning/ Water Resources Division	*Chief, Flood Control Planning/ Water Resources Division*
Michael Fam	*Flood Control Planning*
Mona Sadek	*Flood Control Planning*
Marjorie Schrage	*Flood Control Planning*
Special Districts Department	
Jeff Rigney	*Special Districts Dept. Director*
Steve Samaras	*Special Districts Dept. Acting Deputy Director*
Erin Opliger	*Big Bear Valley Recreation and Parks District Rep.*
Erin Opliger	*Bloomington Recreation and Parks District Rep.*

Table 3-3: Stakeholder List

Stakeholder Members	Name	Title / Role
Municipal Partners		
City of Barstow	*Jamie Williams*	*Fire Chief*
City of San Bernardino	*Eric Fyvie*	*Sergeant*
City of Chino	*Chris Wolff*	*Administrative Services Manager*
City of Chino Hills	*Bonnie Michaels*	*Emergency Services Analyst*
City of Colton	*Shannon Kendall*	*Emergency Services Coordinator*
City of Fontana	*Cheryl Nagy/ Mary*	*Emergency Services Officer*
City of Grand Terrace	*Haide Aguirre*	*Management Analyst*
City of Hesperia	*Rachel Molina*	*Public Information Officer*
City of Loma Linda	*Shannon Kendall*	*Emergency Services Coordinator*
City of Montclair	*Angelic Bird*	*Emergency Services Coordinator*
City of Ontario	*Raymond Cheung*	*New Emergency Manager*
City of Rancho Cucamonga	*Breanna Medina/ Denise School*	*Emergency Manager*
City of Redlands	*Fay Glass/ Wanda Viser*	*Emergency Operations Manager*

Stakeholder Members	Name	Title / Role
City of Rialto	*Art Podeska*	*Battalion Chief*
City of Upland	*Angelic Bird*	*Emergency Services Coordinator*
City of Victorville	*Dana Wellborn*	*Emergency Services Manager*
Town of Apple Valley	*Joseph Ramos*	*Emergency Services Officer*
Town of Yucca Valley	*Jessica Rice*	*Management Analyst*
School District Partners		
Apple Valley Unified School District	*Janet Gould*	*Director, Risk Management*
Chino Valley Unified School District	*Dr. Grace Park*	*Assistant Superintendent*
San Bernardino County Superintendent of Schools	*Norma Spencer*	*Risk Management Analyst*
Snowline Joint Unified School District	*Robert Chacon*	*Director of Risk Management*
Special District Partners		
Inland Empire Utilities Agency District Headquarters	*Claudia Neighbors/ Tony Arellano*	*Safety Officer*
Newberry Community Services District	*Stephen Miller*	*Fire Chief- Barstow Fire Protection District*
Omnitrans	*Mark Crosby*	*Security and Emergency Preparedness Coordinator*
Santa Ana Watershed Project Authority	*Richard Haller/ Carlos Quintero*	*Exec. Manager of Engineering and Operations*
Water District Partners		
Crestline Village Water District	*Larrie Ann Davis*	*Office Manager*
Cucamonga Valley Water District	*Rosanna Ammari / Maria Kennedy*	*Maria Kennedy Consultant Representative*
East Valley Water District	*Cecilia Contreras / Gary Sturdivan*	*Administrative Assistant*
Monte Vista Water District	*Jonathon Dizon*	*Engineering Technician*
San Bernardino Valley Municipal Water District	*Dan Borrell/ Brent Adair*	*Project manager- Construction*
Twenty-nine Palms Water District	*Gary Sturdivan*	*Consultant Rep.*
Yucaipa Valley Water District	*John Hull*	*Public Works Management*
CERT Teams		
Wrightwood		*CERT Citizens*
Phelan/Pinion Hills		*CERT Citizens*
Angelus Oaks		*CERT Citizens*
Big Bear Valley		*CERT Citizens*
Helendale		*CERT Citizens*
Lucerne Valley		*CERT Citizens*
Lytle Creek		*CERT Citizens*
Mill Creek Canyon		*CERT Citizens*

Stakeholder Members	Name	Title / Role
Morongo Basin		*CERT Citizens*
Mountain		*CERT Citizens*
Oak Hills		*CERT Citizens*
Rosena Ranch		*CERT Citizens*
San Antonio Heights		*CERT Citizens*
Silver Valley		*CERT Citizens*
Public Representatives		
-	*Destiny Davis*	*Interested Citizen*
-	*John Ferdon*	*Interested Citizen*
Other Partner Agencies		
San Manuel Band of Mission Indians	*Michael Russ*	*Disaster Services Manager*
Arrowhead Regional Medical Center	*Weston Scott Smith*	*Emergency Preparedness*
United States Forest Service	*Marc Stamer*	*San Bernardino National Forest and Angeles National Forest Rep.*
Wrightwood Fire Safe Council	*John Aziz*	*Fire Safe Council*
Rim of the World Mountain Mutual Aid Association	*Aaron Scullin*	*President*

There were a series of meetings held with the Planning Team. Each meeting had a primary focus and provided an opportunity to discuss updates and exchange ideas. Below is a list of the Planning Team meetings:

Table 3-4: Planning Team Meetings

Date	Activity
February 4, 2016	In person meeting to discuss revisions and additions to the Planning Process, Risk Assessment, Community Capability Assessment, Mitigation Strategies, Plan Maintenance, Fiscal Resources, and Public Outreach. Each section was reviewed and discussed by the Team. Additions and corrections will be forwarded to OES for inclusion into the plan.
June 23, 2016	Organizational Meeting for County Unincorporated Area Planning team. Planning Team members were introduced to the project and assigned to review 2016 MJHMP and update risks and mitigation projects as needed.
July 19,2016	Conference Call with participants to discuss revisions and additions to the Planning Process, risk Assessment, Community capability Assessment, Mitigation Strategies, Plan maintenance, fiscal Resources, and Public Outreach. Each section was reviewed and discussed by the Team. Additions and corrections will be forwarded to OES for inclusion into the plan.
August 4, 2010	In person meeting to discuss revisions and additions to the Planning Process, risk Assessment, Community capability Assessment, Mitigation Strategies, Plan maintenance, fiscal Resources, and Public Outreach. Each section was reviewed and discussed by the Team. Additions and corrections will be forwarded to OES for inclusion into the plan
August 30, 2016	In person meeting to discuss revisions and additions to the Planning Process, risk Assessment, Community Capability Assessment, Mitigation Strategies, Plan Maintenance, Fiscal Resources, and Public Outreach. Each section was reviewed and discussed by the Team. Additions and corrections will be forwarded to OES for inclusion in the plan.
September 14, 2016	In Person meeting of the Morongo Basin COAD Community Organizations Active in Disaster. Hazard Mitigations Plan Discussion and outreach for public input on the update of the Hazard Mitigation Plan, and contact information given to the public.
September 20, 2016	In person meeting to discuss changes suggestions with the Fire Safe Council for the following communities: Wrightwood, Phelan, Pinion hills, West Cajon Valley, and Baldy Mesa. The first item on the agenda was the discussion of the LHMP update and explained how to review the current HMP and instructions were given on who and how to contact OES and about 79 persons of the public were present
September 21, 2016	Rim of the World Mountains Mutual Aid Association in Person meeting to discuss Planning Team Goals and Objectives, and any public concerns and contact information was given and it was the first item on the agenda for the meeting. And continuing fire fuel thinning programs (MAST) and Bark Beetle tree removal.
September 24, 2016	In Person meeting of CERT Training on Terrorism, The hazard Mitigation Plan was brought up and discussed and contact information given to the public, a few topics and subjects were brought up.

3.2 Coordination with Other External Jurisdictions, Agencies and Organizations

3.2.1 Internal Coordination

Because of the size and geographical location of Unincorporated County area, there are many jurisdictions, agencies, and organizations that are affected by or have influence on the county and the mitigation planning process. As part of the planning process, the Planning Team, and particularly the Project Manager, took great efforts to engage and include as many members as possible. These members were drawn from San Bernardino County Departments, the San Bernardino County Fire Protection District, the San Bernardino County Flood Control District, and the San Bernardino County Special Districts Department.

One of the first efforts that were made was when the Planning Team was being established. The Planning Team members gave special considerations as to what they thought needed to be in the MJHMP and attempted to identify a person who could representative that area. This consideration went beyond the county departments.

As mentioned above, in addition to being required to participate in the Planning Team meetings, the Planning Team members were also required to liaison with other groups including their own

department/districts planning and project staff and with cooperating agencies to provide updates on the project and to bring to the team the different perspectives and comments. The Planning Team conducted a very extensive outreach effort.

This was done mostly through leveraging of existing meetings and efforts. In this liaison role, the Planning Team members coordinated with CalFire; the United States Forest Service, San Bernardino National Forest and Angeles National Forest; Natural Resource Conservation Service, Special Districts, and the 24 cities and towns within the County. This allowed for the Planning Team to capture a larger perspective; while keeping the Planning Team at a manageable level. The information was then brought back to the Multi-Jurisdictional Planning Team by the individual Planning Team members. At these meeting, potential cooperative projects were discussed, categorized, and prioritized for inclusion in the Multi-Jurisdictional Hazard Mitigation Plan.

As previously mentioned, the Unincorporated County and special districts were also active members of the San Bernardino OA Stakeholder Group meetings. These meetings provided an opportunity to coordinate with all cities/towns and special districts in the county. Through this venue, the Planning Team and the Project Manager reached out to adjacent jurisdictions and associated special districts to ensure that their efforts and findings were not in conflict. Stakeholder Meetings include the primary, alternate, and any consultants for all the participating jurisdictions.

As part of this effort, an OA Stakeholder Web Portal was developed to assist the jurisdictions update their MJHMPs, and encouraged sharing information, resources, and ideas necessary to complete the update process. Meetings, attended by the County Project Manager, were both in person and by conference call; many including a webinar. The Project Manager then brought the materials and discussions held at these meetings back to the Planning Team for review and action wherever applicable to the MJHMP effort. Participating Stakeholders are listed in Annex 5. A list of the OA Stakeholder Meetings is listed below:

- September 21, 2016
  Stakeholders Conference Call/Webinar at OES Headquarters
  1:30 p.m. to 2:30 p.m.

  8 participants in MJHMP Update Project Portal Rollout participated in the Conference Call and Webinar to introduce MJHMP Update Portal. Portal has public and stakeholder sections. During this conference call participants were shown the portal and walked through the log-in process to access the stakeholders' side of the website. Also discussed having weekly and some occasions office calls to update plan progress and needs for information.

- September 28, 2016
  Production team conference call OES Headquarters
  1:30 p.m. to 2:30 p.m.

  This meeting presented the website updates, progress chart and needs from other stakeholder departments to provide data such as proposed, in progress and completed hazard mitigating projects. The MJHMP Resource material was also reviewed. The tentative schedule of Production group meetings was reviewed.

- October 5, 2016
  Production Group Conference Call
  1:30 p.m. to 2:30 a.m.

  Stakeholders discussed MJHMP progress of the MJHMP updates. Revised timelines for updates were presented. New Reference Materials now available on the Web Portal were presented. Questions from the participants were discussed and answered.

- October 12, 2016
  Production team conference call
  OES Headquarters
  1:30 p.m. to 2:30 p.m.

  This meeting presented the website updates, progress chart and needs from other stakeholder departments to provide data such as proposed, in progress and completed hazard mitigating projects. The MJHMP Resource material was also reviewed. The tentative schedule of Production group meetings was reviewed.

- October 19, 2016
  OES Headquarters
  1:30 p.m. to 2:30 p.m.

  This meeting presented the website updates, progress chart and needs from other stakeholder departments to provide data such as proposed, in progress and completed hazard mitigating projects. The MJHMP Resource material was also reviewed. The tentative schedule of Production group meetings was reviewed.

- October 26, CISN
  Project Management Team Meeting
  San Bernardino County Government Center Community Room,
  10:00 a.m. to 12:00 a.m.

  This meeting was with 12 county members and any public to go over changes in the general plan and updates the County Hazard Mitigation plan with current and proposed and approved projects as well as code updates and ordinance changes and draft safety proposals.

- October 26, 2016
  Entire project Teams representatives via in person or video and voice call in
  Video Conference Call
  2 p.m. to 4 p.m.

  All project team stakeholder representatives discussed progress of the MJHMP updates. And timelines were discussed. Questions from the participants were discussed and answered. Also a live meeting in conjunction with Land Use representatives and Fire also consultant staff. 32 in attendance and 108 called in or video linked. Internal and External groups

3.2.2 External Coordination

The unincorporated county also had representation on the OA Working Group team. The Working Group is a small group of OA Stakeholders with experience in developing Multi-Jurisdictional Hazard Mitigation Plans. Members are drawn from the 24 cities/towns, 33 special districts, and the County. The goal of the Working Group is to vet the direction and material being provided to the larger Stakeholder Group such as crosswalk, Web Portal, use of maps, and a method to prioritize and rank the existing and any new hazards. The Working Group also discusses problems and solutions that arise during the MJHMP update process. Meetings were either in person or by conference call.

- June 23, 2016
  Stakeholders Meeting
  San Bernardino Unified School District Community Room, San Bernardino, CA
  2:00 p.m. to 4:00 p.m.

  54 Participants representing 24 cities/towns, 30 special districts, and the unincorporated area of participated. This Stakeholders Meeting introduced the Web Portal and the process to develop a current MJHMP from the 2010 MJHMP. Timelines were presented as well as templates for use in updating the project. Copies of the 2010 MJHMP for the jurisdictions were made available on the Web Portal to use as a starting point in the update process.

- August 30, 2016
  Stakeholders Meeting at OES Headquarters 1:30 p.m. to 2:30 p.m.

  In person meeting to discuss revisions and additions to the Planning Process, risk Assessment, Community capability Assessment, Mitigation Strategies, Plan maintenance, fiscal Resources, and Public Outreach. Each section was reviewed and discussed by the Team. Additions and corrections will be forwarded to OES for inclusion in the plan.

- October 26, 2016
  Entire project Teams representatives via in person, video or voice call in
  Video Conference Call
  2 p.m. to 4 p.m.

  All project team stakeholder representatives discussed progress of the MJHMP updates.
  Timelines were discussed.
  Questions from the participants were discussed and answered. Also a live meeting in conjunction with Land Use representatives and Fire also consultant staff. 32 in attendance and 108 called in or video linked.

3.3 Public Involvement/Outreach

Public involvement was solicited throughout the process. Since the 2016 MJHMP approval, the County and its special districts have taken several steps to educate the public on the hazards facing the county and had several public forums where mitigation projects were discussed and identified. At all events, public opinion and comments are solicited.

The Planning Team also considered the possibility of including public members on the Planning Team. However, because of the vast size of the county and the volume of possibilities, it was determined that having the Planning Team members liaison with the public would better serve and capture the public interest.

During this process, the County and Special Districts also used several platforms to reach out and inform the public of the MJHMP update. Wherever possible, a joint effort was made by the Planning Team members to include discussion for each participating jurisdictions hazards, goals, and objectives. These joint meetings of the Special Districts and County resulted in joint leverage of the planning effort and a resulting joint benefit of goals/objectives, and project development for the MJHMP development. Public Involvement consisted of meetings for County Departments or Special Districts which gave the public the direct opportunity to comment on the County Unincorporated Area MJHMP, meetings of County Department or Special District advisory committees where hazard specific information and possible projects were discussed, updates on the County website, press releases regarding the MJHMP, and public hearing regarding the MJHMP. All participants collectively supported the following public outreach meetings. Below is a summary list of the public outreach:

3.3.1 Public Meetings

- Wrightwood Fire Safe Council
  Wrightwood Museum, Wrightwood, CA
  July 19, 2016
  7:00 p.m. to 9:00 p.m.

17 community members and 7 Wrightwood Fire Safe Council members attended. A demonstration of Thermo-Gel and various application methods was demonstrated by a private vendor.

Reports of activities were given by the Angeles National Forest and the San Bernardino National Forest.
San Bernardino County Fire Protection District Office of Emergency Services presented a PowerPoint presentation on the effort to update the MJHMP for the unincorporated area of the County. A copy of this PowerPoint is in Annex 9 of the MJHMP.

- Rim of the World Mutual Aid Association
  100 W. Meadow Lane, Big Bear City, CA
  August 21, 2016
  6:00 p.m. to 7:30 a.m.

  24 representatives of local agencies, special districts, utilities, and the public in the Big Bear Valley attended the meeting. The City of Big Bear Lake and the Big Bear City CSD reported on the status of their MJHMP Update efforts. Both are proceeding with the goal of submitting the plan following the Group 1 timelines. Both agencies made presentations to their residents explaining the MJHMP Update Process, public involvement, and timelines.

  San Bernardino County Fire Protection District Office of Emergency Services presented a PowerPoint presentation on the effort to update the MJHMP for the unincorporated area of the County.

- Morongo Basin COAD Community Organizations Active in Disasters
  September 14, 2016
  10:00 a.m. to 12:00 p.m.

  This was a public meeting to discuss volunteers in disasters and the Local Hazard Mitigation Plan and the future of volunteer organizations in active disasters in the areas of Morongo and the entire county of San Bernardino County.

- Wrightwood Fire Safe Council
  Wrightwood Elementary School, Wrightwood, Ca
  September 20, 2016

  Community meeting of the fire safe council for the communities of Wrightwood, Pinion Hills, Phelan, West Cajon Valley, Baldy mesa the meeting covered topics of Emergency Alert System and notifications, repopulation and evacuation pans as well as the Local Hazard Mitigation Plan Update

- Rim of the World Mountain Mutual Aid Association
  September 21, 2016

  Rim of the World Mountains Mutual Aid Association in Person meeting to discuss Planning Team Goals and Objectives, and any public concerns and contact information was given and it was the first item on the agenda for the meeting; continuing on with fire fuel thinning programs (MAST) and Bark Beetle tree removal.

- CERT Terrorism Meeting/Training
  Victoria Gardens Community Center Rancho Cucamonga, CA
  September 24, 2016
  8:00 a.m. to 4:00 p.m.

  This was a CERT Symposium on Terrorism that covered the December 2nd Terror Attack and mass shooting incidents and how to react. An Active Shooter Awareness Course and discussion on the Local Hazard Mitigation Plan Update and Counter Terrorism Awareness courses were all presented to 100 CERT Members and public attendees.

3.3.2 Ready SB County Preparedness App Message/Web Postings

An App message was sent out to alert the public about the hazard mitigation process. The message was sent to over 15,000 people via the SB County Preparedness Mobile App and it is attached to the San Bernardino County Fire Website https://sbcfire.org as referenced in Annex 6. Ready SB County Preparedness Mobile App can be used on either an Android or iPhone. This app provides multiple resources for our residents that will assist them in preparing for a disaster and enhancing the recovery process. Protect yourself and your loved ones before, during and after a disaster.

In addition to hazard mitigation plan updates the public can get the Latest News from SBCounty.gov, CalTrans, National Weather Service, and San Bernardino County Fire Office of Emergency Services. This app provides the public with emergency supply kit lists, grocery lists and checklists tailored to an individual. The public can access and update preparedness plans as needed. Learn all you need to plan for and respond to natural disasters, terrorism and pandemic flu in San Bernardino County.

3.3.3 CERT Teams

The Press Release and Executive Summary were forwarded to the CERT Team leaders for those CERT Teams located in the unincorporated County area. The Team Leaders forwarded the MJHMP Press Release and Executive summary to their team members with the request for comments on the MJHMP. The fourteen (14) CERT Teams within the unincorporated County include:

Angelus Oaks CERT	Big Bear Valley CERT	Helendale CERT
Lucerne Valley CERT	Lytle Creek CERT	Mill Creek Canyon CERT
Morongo Basin CERT	Mountain CERT	Oak Hills CERT
Phelan/Pinon Hills CERT	Rosena Beach CERT	San Antonio Heights CERT
Silver Valley CERT	Wrightwood CERT	

3.3.4 Public Hearing Process (to be completed upon FEMA Approval)

Once FEMA "approval pending adoption" notification is received, the Board of Supervisors reviewed, approved, and adopted the Unincorporated Area Multi-Jurisdictional Hazard Mitigation Plan for the County and its Special Districts at the Public Hearing meeting **(date to be determined)**. The Board of Supervisors issued a Letter of Promulgation and Resolution denoting approval of the Multi-Jurisdictional Hazard Mitigation Plan for the County and its special Districts.

Prior to the Public Adoption Hearing Date (date to be determined), the Plan will be posted on the San Bernardino County website as part of the Agenda for the meeting. The Agenda with all attachments is posted the Wednesday prior to the hearing date as a public review requirement. Members of the public were invited to review and make comments at the meeting on (date to be determined). The Multi-Jurisdictional Hazard Mitigation Plan for the County and its Special Districts was on the Board of Supervisors agenda for review and adoption at their regularly scheduled meeting on (date to be determined).Residents of the County were requested to make comments or request information on the Multi-Jurisdictional Hazard Mitigation Plan during the regularly scheduled meeting. After the public had an opportunity to review and comment on the Plan the Board of Supervisors took action on the Board Agenda items.

3.4 Planning Process

As discussed, the planning process followed FEMA How to guides which includes; organizing resources, conducting the risk assessment, developing a capabilities assessment, developing a mitigation strategy and providing implementation measures for continued mitigation success, The Risk Assessment process includes four (4) basic step; 1) hazard identification and screening; 2) hazard profiling; 3) hazard exposure; and, 4) hazard vulnerability. The Project Manager, working with the Planning Team, facilitated discussions around these steps.
The first step in this process was to identify all natural hazards present in the community. The Planning Team started with the 2010 MJHMP and augmented as necessary. This augmentation

considered both adding and removing of hazards to develop a list of potential natural hazards in the community. The Planning Team utilized several sources to ensure they were considering all potential hazards. Material reviewed included the following: 2010 San Bernardino County Operational Area MJHMP, State of California MJHMP, FEMA "How-to Guides," and several surround community MJHMPs. After the list of potential hazards in the community is generated, the hazards were screened. For a full listing of documents see Section 5.1.1

3.4.1 Hazard Screening

The intent of screening hazards is to help prioritize which hazard creates the greatest concern in the community. In 2010, the MJHMP process used Critical Priority Risk Index (CPRI) software to evaluate hazards. In 2016 an alternative approach was implemented. The Planning Team agreed to utilize a non-numerical ranking system for the MJHMP update process. This process consists of generating a qualitative ranking (High, Medium, or Low) rating for: 1) probability; and, 2) impact from each hazard. To further assist with the process, the following definition of "High", "Medium", and "Low" probability and impacts are being provided (NOTE: these definitions we utilized in the 2010 MJHMP process):

Probability
High-Highly Likely/Likely
Medium-Possible
Low-Unlikely
Impact
High-Catastrophic/Critical
Medium-Limited
Low-Negligible

The hazards were then placed into a matrix with the appropriate/corresponding box/cell. The table below is an example of how the process will capture the results.

		Impact		
		High	Medium	Low
Probability	High			
	Medium			
	Low			

After all hazards had been analyzed, the Planning Team then determined which Probability and Impact category (i.e., High Impact; High Probability, Medium Impact) the community will focus on over the next five (5) years. An example of how the hazards may be prioritized is below (Red equaling high priority):

		Impact		
		High	Medium	Low
Probability	High			
	Medium			
	Low			

After identifying the "higher" priority hazards in the community, each of the "high" priority hazards were profiled. The hazard profiling include the incorporation of all new information, material, and reports to better help the Planning Team and the community understand the hazard.

Additionally, for each of the profiled hazards, the Planning Team then analyzed the community's exposure to each hazard (inventory of assets) and the potential impact under scenario events. The Planning Team used HAZUS and hazards intersect analyses recently completed within San Bernardino County to produce this information. See Section 4 for more information.

3.4.2 Set Goals

Goal setting was approached by the Planning Team as a two layered process. The first layer involved the stakeholders acting together as the Planning Team. The second layer involved the individual Special Districts working internally to coordinate those goals identified by the Planning Team with the goals identified internally by the Special Districts. The Planning Team validated and identified new Goals and Objectives for the MJHMP update in 2016. The Planning Team reviewed the hazard exposure and scenario impacts developed during the Risk Assessment portion of the process. With a firm understanding of the risk the community is potentially facing, the Planning Team then re-evaluated the 2010 Multi-Jurisdictional Hazard Mitigation Plan Goals and Objectives; assessed their status and effectiveness in meeting the 2010 Mitigation Measures and identified new Goals and Objectives.

As part of this process, the Planning Team also reviewed the County's General Plan, the State of California MJHMP, Floodplain Management Plans, Task Force After Action, and/or documents, and adjacent local jurisdiction MJHMPs to ensure the Goals and Objectives were comprehensive and compatible with those outlined in this plan.

3.4.3 Review and Propose Mitigation Measures

After the Goals and Objectives were established, the Planning Team then turned to identifying projects under each Goal and Objective that could be implemented to help reduce and/or eliminate the impacts from the priority hazards. As part of this process, the Planning Team reviewed the projects in the 2010 MJHMP to determine which are completed, which are ongoing, and which were deferred. For projects that were not completed the Planning Team validated whether or not the project was necessary.

With a firm understanding of past accomplishments and a good understanding of the potential exposure and scenario impacts from the Risk Assessment section, the Planning Team then started to identify projects that will help reduce and/or eliminate the risk for the high priority hazards. Again, a two-layer approach was used. The Planning Team as a whole identified common projects. These common projects were then coordinated internally by the Special Districts and the County to develop a common list of projects. After a list of all possible projects has been identified, the Planning Team then went through the process of prioritizing the projects.

To assist with this effort the Planning Team adopted the STAPLEE methodology. STAPLEE stands for:

- Social - The public must support the overall implementation strategy and specific mitigation actions. Therefore, the projects will have to be evaluated in terms of community acceptance.
- Technology - It is important to determine if the proposed action is technically feasible, will help to reduce losses in the long term, and has minimal secondary impacts. Determine whether the alternative action is a whole or partial solution, or not a solution at all.
- Administrative - Under this part of the evaluation criteria, examine the anticipated staffing, funding, and maintenance requirements for the mitigation action to determine if the jurisdiction/special district has the personnel and administrative capabilities necessary to implement the action or whether outside help will be needed
- Political - Understanding how your current community and State political leadership feel's about issues related to the environment, economic development, safety, and emergency management. This will provide valuable insight into the level of political support you may have for the mitigation activities and programs. Proposed mitigation objectives sometimes fail because of a lack of political acceptability.
- Legal - Without the appropriate legal authority, the action cannot lawfully be undertaken. When considering this criterion, determine whether your jurisdiction has the legal authority at the State, or local level to implement the action, or whether the jurisdiction must pass new laws or regulations. Each level of government operates under a specific source of delegated authority. As a general rule, most local governments operate under enabling legislation that gives them the power to engage in different activities. Identify the unit of government undertaking the mitigation action, and include an analysis of the interrelationships between local, regional, State, and Federal governments. Legal authority is likely to have a significant role later in the process when your State, or community will

have to determine how mitigation activities can best be carried out, and to what extent mitigation policies and programs can be enforced.

- Economic - Every local government experiences budget constraints at one time or another. Cost effective mitigation actions that can be funded in current or upcoming budget cycles are much more likely to be implemented than mitigation actions requiring general obligation bonds or other instruments that would incur long-term debt to a community. Local communities with tight budgets or budget shortfalls may be more willing to undertake a mitigation initiative if it can be funded, at least in part, by outside sources. "Big ticket" mitigation actions, such as large-scale acquisitions and relocation, are often considered for implementation in a post-disaster scenario when additional Federal and State funding for mitigation is available.
- Environmental - Impact on the environment is an important consideration because of public desire for sustainable and environmentally healthy communities and the many statutory considerations, such as NEPA, to keep in mind when using Federal funds. The Planning Team needed to evaluate whether, when implementing mitigation actions, there would be negative consequences to environmental assets such as threatened and endangered species, wetlands, and other protected natural resources.

In addition to the STAPLEE methodology, the Planning Team incorporated other criteria/factor questions into the process to help engage and solicit input from members. Examples of these criteria/factor questions are:

- Does the Action:
  - Solve the problem?
  - Address Vulnerability Assessment?
  - Reduce the exposure or vulnerability to the highest priority hazard?
  - Address multiple hazards?
  - Address more than one (1) Goal/Objective?
  - Benefits equal or exceed costs?

- Can the Action:
  - Be implemented with existing funds?
  - Be implemented by existing state or federal grant programs?
  - Be completed within the 5-year life cycle of the LMJHMP?
  - Be implemented with currently available technologies?

- Will the Action:
  - Be accepted by the community?
  - Be supported by community leaders?
  - Adversely impact segments of the population or neighborhoods?
  - Require a change in local ordinances or zoning laws?
  - Result in legal action such as a lawsuit?
  - Positively or negatively impact the environment?
  - Comply with all local, state, and federal environmental laws and regulations?

- Is there:
  - Sufficient staffing to undertake the project?
  - Existing authority to undertake the project?

After going through the above mentioned process for each project, the Planning Team identified higher priority projects.

3.4.4 Draft the Multi-Jurisdictional Hazard Mitigation Plan

The Multi-Jurisdictional Hazard Mitigation Plan Update was drafted by the Project Manager, based on input and comments provided by the Planning Team. As indicated previously, the Planning Team used the 2010 MJHMP as a starting point but revised it to reflect updated information). The 2016 MJHMP format and is similar to the 2010 plan with slight heading changes and differences in content. In addition to the heading changes and improved risk assessment information, the Planning Team also uses the FEMA Guidance and materials provided by the consultant hired to coordinate the Operational Area MJHMP and Stakeholder groups. This material aided in the Planning Team's understanding of the level of detail and type of information that is excepting in each section.

This process started with the Special Districts and County providing information to the Planning Team through their liaison on the planning team. After the Planning Team ranked and prioritized the materials, the liaisons returned to their respective Special Districts to vet the Planning Team's work. The Planning Team then worked together with the vetted materials to produce the draft MJHMP. As mentioned earlier, each section was reviewed and updated as necessary. While some Planning Team members are responsible for the updating select sections, all members are responsible for reviewing and commenting on the entire MJHMP. The Planning Team Project Manager was responsible for version control and distribution of the final MJHMP for review.

Once the MJHMP update was drafted, the Planning Team provided opportunities for the public to review and comment on the plan. After the public comment period was closed, the Planning Team finalized the plan and forwarded to Cal EMA and FEMA for approval.

3.4.5 Adopt the Plan

The San Bernardino County Board of Supervisors created each of the Special Districts to provide a specific service to a particular area/population of San Bernardino County. These Special Districts are Board Governed in that the Board of Supervisors has direct control and legislative oversight of the Special Districts. The Board of Supervisors takes action on behalf of each Special District whenever governance items are necessary. As the Five special districts are separate legal entities from the County of San Bernardino for tax/revenue purposes the Board of supervisors, acting as the Board of Directors for each Special District, will be adopting the Multi-

Jurisdictional Hazard Mitigation Plan on behalf of each Special District. The Special Districts are not independent from San Bernardino County but are controlled and administered as any other County Department is administered. In order to comply with legal requirement for each of the five Special Districts, separate resolutions are required. Copies of these resolutions are attached at the front of this MJHMP.

San Bernardino County Board of Supervisors is responsible for the review, approval, and adoption of the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) update for the unincorporated area of San Bernardino County, the San Bernardino County Fire Protection District, the San Bernardino County Flood Control District, the Big Bear Valley Recreation and Park District, Bloomington Recreation and Park District and for the County's board governed Special Districts Department. It is also the intent of the San Bernardino County Board of Supervisors to take appropriate actions to incorporate the MJHMP update into the San Bernardino County General Plan.

After Cal EMA and FEMA have approved the HMP update, it will be adopted by the San Bernardino County Board of Supervisors. Currently, the adoption process is scheduled for **(date to be determined)**. The item will be part of the consent calendar subject to a public hearing if necessary. The HMP will be listed on the agenda with the plan being made available electronically to the general public for at least three (3) business days prior to the Board of Supervisor's meeting date. Any member of the public can make comments on the Plan during the meeting prior to any action by the Board of Supervisors.

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Section 4. Risk Assessment

The goal of mitigation is to reduce and/or eliminate the future impacts of a hazard including property damage, disruption to local and regional economies, and the amount of public and private funds spent to assist with recovery. However, mitigation should be based on an assessment of the risk.

This Risk Assessment Section evaluates the potential loss from a hazard event by assessing the vulnerability of buildings, infrastructure, and people. It identifies the characteristics and potential consequences of hazards, how much of the unincorporated areas of the County could be affected by a hazard, and the impact on unincorporated County area assets. The Risk Assessment approach consists of three (3) components:

- ***Hazard Identification*** *– Identification and screening of hazards (Section 4.1)*
- ***Hazard Profiles*** *– Review of historic occurrences and assessment of the potential for future events (Section 4.2)*
- ***Vulnerability Assessment*** *– Determination of potential losses or impacts to buildings, infrastructure and population (Section 4.3)*

4.1 Hazard Identification

4.1.1 Hazard Screening Criteria

Per FEMA Guidance, the first step in developing the Risk Assessment is identifying the hazards. The County's HMP Planning Team reviewed a number of previously prepared hazard mitigation plans and other relevant documents to determine the universe of natural hazards that have the potential to affect the County and the nearby region. Table 4-1 provides a crosswalk of hazards identified in the 2010 San Bernardino County Multijurisdictional Hazard Mitigation Plan Update, the County of San Bernardino 2007 General Plan Safety Element, Single Jurisdictional Plans and the 2013 CA State Hazard Mitigation Plan. Seventeen different hazards were identified based on a thorough document review. The crosswalk was used to develop a preliminary hazards list providing a framework for County HMP Planning Team members to evaluate which hazards were truly relevant to the County and which ones are not. For example, volcanic activity was considered to be of little relevance to the County, while earthquake, flooding, and wildfire were indicated in almost all hazard documentation.

Table 4-1: Document Review Crosswalk

Hazards	2010 San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan	County of San Bernardino 2007 General Plan Safety Element	Single Jurisdictional Plans	2013 CA State Hazard Mitigation Plan
Climate Change				■
Dam Inundation			■	■
Drought			■	■
Earthquake/ Geologic Hazards	■	■	■	■
Extreme Heat				■
Extreme Cold				■
Flood	■	■	■	■
Hazardous Waste		■	■	■
High Winds/ Straight Line Winds		■	■	
Hail				
Infestation				
Lightning				
Terrorism			■	■
Tornado				
Volcanic Activity		■		■
Wildfire	■	■	■	■
Winter Storm (Heavy Snowfall)				■

In addition to a document review, previous hazard occurrences were used to identify hazards for this hazard mitigation plan. Previous hazard occurrences provide a historical view of hazards that have affected the County in the past, and thus provide a window into the potential hazards that can affect the County in the future. Information about federal and state disaster declarations in San Bernardino County (declarations are declared by County) was compiled from FEMA and Cal EMA's databases, as shown in Table 4-2. Though not a complete snapshot of hazard incidences in the County (since not all hazard events are federally or state declared), Table 4-2 provided the County HMP Planning Team with solidified accounts of the types and extent of disasters that have affected the County dating back to 1965 when flooding affected entire regions of San Bernardino County. As indicated in Table 4-2 large regional incidents have affected San Bernardino County, including the California Wildfires of 1999. Most recently, disasters for terrorist attacks (2015), flood (2011) and severe storms (2010) were declared in San Bernardino County. The disaster declarations in Table 4-2 provide a baseline for consideration in the hazard prioritization process.

Table 4-2: Federal, State and County Declared Disasters

Disaster Number	Declaration Date	Disaster Type	Incident Type	Title
Federal Declarations				
Major Disaster Declarations				
1952	1/26/2011	DR	Flood	Severe Winter Storms, Flooding, and Debris and Mud Flows
1884	3/8/2010	DR	Severe Storm(s)	Severe Winter Storms, Flooding, and Debris and Mud Flows
1731	10/24/2007	DR	Fire	Wildfires, Flooding, Mud Flows, and Debris Flows
1689	3/13/2007	DR	Freezing	Severe Freeze
1585	4/14/2005	DR	Severe Storm(s)	Severe Storms, Flooding, Landslides, and Mud and Debris Flows
1577	2/4/2005	DR	Severe Storm(s)	Severe Storms, Flooding, Debris Flows, and Mudslides
1498	10/27/2003	DR	Fire	Wildfires, Flooding, Mudflow and Debris Flow Directly Related T
1203	2/9/1998	DR	Severe Storm(s)	Severe Winter Storms and Flooding
1046	3/12/1995	DR	Severe Storm(s)	Severe Winter Storms, Flooding Landslides, Mud Flow
1044	1/10/1995	DR	Severe Storm(s)	Severe Winter Storms, Flooding, Landslides, Mud Flows
1005	10/28/1993	DR	Fire	Fires, Mud/Landslides, Flooding, Soil Erosion
979	2/3/1993	DR	Flood	Severe Winter Storm, Mud & Land Slides, & Flooding
947	7/2/1992	DR	Earthquake	Earthquake & Aftershocks
935	2/25/1992	DR	Flood	Rain/Snow/Wind Storms, Flooding, Mudslides
894	2/11/1991	DR	Freezing	Severe Freeze
872	6/30/1990	DR	Fire	Fires
690	9/22/1983	DR	Flood	Flash Flooding
687	7/1/1983	DR	Flood	Flooding
677	2/9/1983	DR	Coastal Storm	Coastal Storms, Floods, Slides & Tornadoes
635	11/27/1980	DR	Fire	Brush & Timber Fires
615	2/21/1980	DR	Flood	Severe Storms, Mudslides & Flooding
547	2/15/1978	DR	Flood	Coastal Storms, Mudslides & Flooding
521	9/21/1976	DR	Flood	Flooding, Tropical Storm Kathleen
295	9/29/1970	DR	Fire	Forest & Brush Fires
253	1/26/1969	DR	Flood	Severe Storms & Flooding
223	1/2/1967	DR	Flood	Severe Storms & Flooding
211	12/7/1965	DR	Flood	Heavy Rains & Flooding
Fire Management Assistance Declarations				
2955	9/2/2011	FM	Fire	Hill Fire
2841	10/4/2009	FM	Fire	Sheep Fire
2836	9/1/2009	FM	Fire	Pendleton Fire
2833	8/31/2009	FM	Fire	Oak Glen Fire
2792	11/15/2008	FM	Fire	Freeway Fire Complex
3279	10/23/2007	EM	Fire	Wildfires
2738	10/22/2007	FM	Fire	Grass Valley Fire
2728	9/15/2007	FM	Fire	Butler 2 Fire
2653	7/12/2006	FM	Fire	Sawtooth Fire Complex

Disaster Number	Declaration Date	Disaster Type	Incident Type	Title
3248	9/13/2005	EM	Hurricane	Hurricane Katrina Evacuation
2503	10/25/2003	FM	Fire	Old Fire
2501	10/23/2003	FM	Fire	Ca-Grand Prix Fire-10-23-2003
2497	9/6/2003	FM	Fire	Ca-Bridge Fire-09-05-2003
2491	8/19/2003	FM	Fire	Ca-Locust Wildfire-08-19-2003
Emergency Declarations				
3140	9/1/1999	EM	Fire	Ca-Wildfires-08/25/1999
CALOES Emergency and Disaster Proclamations/ Executive Orders				
Other Disasters				
2464	9/24/2002	FS	Fire	Williams Fire
2433	6/27/2002	FS	Fire	Louisiana Fire
2425	6/17/2002	FS	Fire	Blue Cut Fire
###	12/18/2015	EM	Terrorist Attack	Mass Shooting
State Declarations				
145	2/14/1963		Severe Storms	California Severe Storms, Heavy Rains, & Flooding
47	12/22/1955		Flood	California Flood
15	2/5/1954		Flood	California Flood & Erosion
County Declarations				
	3/13/1990		Earthquake	Upland Earthquake
	10/31/1988		Fire	Texas Fire (Watershed Damage)
	9/3/1987		Fire	Wildland Fires
	7/13/1984		Weather	Unstable Weather Conditions (City of Big Bear Lake, CSD, Co. Flood Control, Victor Valley Waste Water Authority, Juniper Riviera County Water District)
	9/29/1979		Gasoline Shortage	Gasoline Shortage Emergency
	6/28/1979		Water Shortage	Water Shortage (Lake Gregory)
	7/22/1960		Fire	Major and Widespread Fires

4.1.2 Hazard Prioritization

The Planning Team determined that the County and its Special Districts should focus over the next five (5) years on hazards that fell within the HIGH and MEDIUM "Probability" and "Impact" categories. While all the hazards present a potential problem in the County, the Planning Team felt that if they were able to reduce or eliminate the risk from these hazards, it would provide a greater service to the people within the jurisdiction. Table 4-3 illustrates how the final prioritization of the hazard; the "Green" colored box represents the highest priority hazards; and the "White" colored boxes represent lower (second and third tier) priority hazards.

		Impact		
		High	Medium	Low
Probability	High	Wildfire Flood Earthquake/ Geologic Hazards	Drought	
	Medium	Terrorism	Climate Change (Extreme Heat and other)	Hail Infestation
	Low		Dam Inundation	Tornado High Winds Winter Storm Lightning Extreme Cold

Table 4-3: Prioritized Hazard Assessment Matrix

4.2 Hazard Profiles

Although the County faces the risk of experiencing many natural and manmade hazards, this section profiles only the County's highest priority natural hazards the unincorporated County areas and Special District areas are expected to experience; earthquake, wildfire, flood, drought, terrorism and climate change. The priority hazards are based on the Calculated Priority Risk Index (CPRI) explained in Section 4.1.2.

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4.3 Earthquake Geologic Hazards



An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped the earth as the huge plates that form the earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free, causing the ground to shake. Most earthquakes occur at the boundaries where the plates meet; however, some earthquakes occur in the middle of plates.

Ground shaking from earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge, destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill and other unstable soil, and trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake. When an earthquake occurs in a populated area, it may cause deaths and injuries and extensive property damage.
Earthquakes can strike suddenly, without warning. Earthquakes can occur at any time of the year and at any time of the day or night. On a yearly basis, 70 to 75 damaging earthquakes occur throughout the world.

4.3.1 Regulatory Environment

The Alquist-Priolo Earthquake Fault Zoning (AP) Act was passed into law following the destructive February 9, 1971 San Fernando earthquake. The AP Act provides a mechanism for reducing losses from surface fault rupture on a statewide basis. The intent of the AP Act is to ensure public safety by prohibiting the siting of most structures for human occupancy across traces of active faults that constitute a potential hazard to structures from surface faulting or fault creep.

The 2013 California Building Standards Code (also known as Title 24) became effective for the County on January 1st, 2014. Title 24 includes CBC Section 3417: Earthquake Evaluation and Design for Retrofit of Existing Buildings which can be viewed at http://www.bsc.ca.gov/codes.aspx

Changes or additions to the seismic provisions come from many different sources, including new research results and documentation of performance in past earthquakes. A primary resource is the National Earthquake Hazard Reduction Program (NEHRP) Recommended Seismic Provisions for New Buildings and Other Structures (FEMA P-750: http://www.fema.gov/media-library/assets/documents/18152). FEMA's companion document Earthquake Resistant Design

Concepts (FEMA P-749: http://www.fema.gov/media-library/assets/documents/21866) provides a nontechnical background explanation.

4.3.2 Past Occurrences

Table 4-4 shows earthquakes greater than Magnitude 4.0 that have been felt within the San Bernardino County area in the last five years.

Table 4-4: Earthquakes: 2010-2015 San Bernardino County

Date	Name
9/14/2011	Calimesa 4.1
1/15/2014	Fontana 4.4
7/5/2014	Running Springs 4.6
3/29/2014	Brea 5.1
7/25/2015	Fontana 4.2
9/16/15	Big Bear Lake 4.0
12/30/2015	Muscoy 4.4
1/6/2016	Banning 4.4

There are hundreds more small (M<4.0) earthquakes that have occurred within San Bernardino County during this same time frame. Those with a magnitude of below 4.0 are not listed.

4.3.3 Location/Geographic Extent

Figure 4-1 shows the locations of major faults in California, including the four (4) major faults in Southern California in relation to San Bernardino County. These faults are the Southern San Andreas, the San Jacinto, the Elsinore, and the Garlock Faults. There are also many smaller faults within San Bernardino County capable of producing significant earthquakes. However, these four faults are considered by the United States Geological Survey (USGS) and the California Geological Survey (CGS) to be the most dangerous in the County. (California Geological Survey Special Publication 42, Interim Revision 2007, "Fault-Rupture Hazard Zones in California" - Alquist-Priolo Earthquake Fault Zoning Act). Other geologic hazards include liquefaction and landslides. Both occur during and after earthquakes.

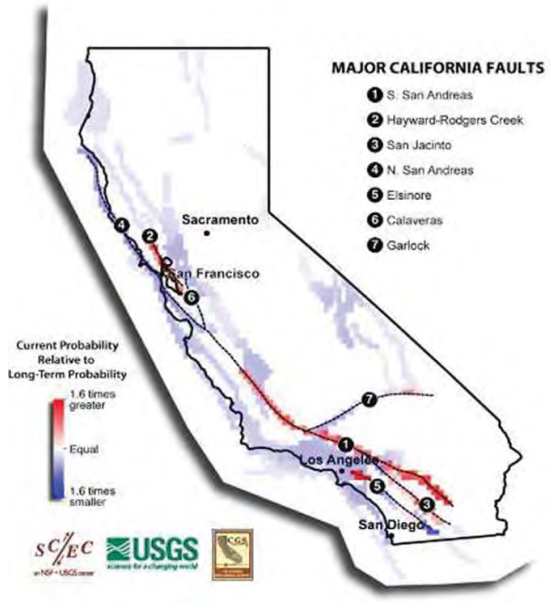


Figure 4-1: Major California Faults

Liquefaction of the ground occurs when the groundwater table is high and soil conditions are favorable. Liquefaction Susceptibility Zones as mapped by the USGS for the 2008 ShakeOut Scenario1 shows areas of the County susceptible to liquefaction during an earthquake. See Figure 4-2

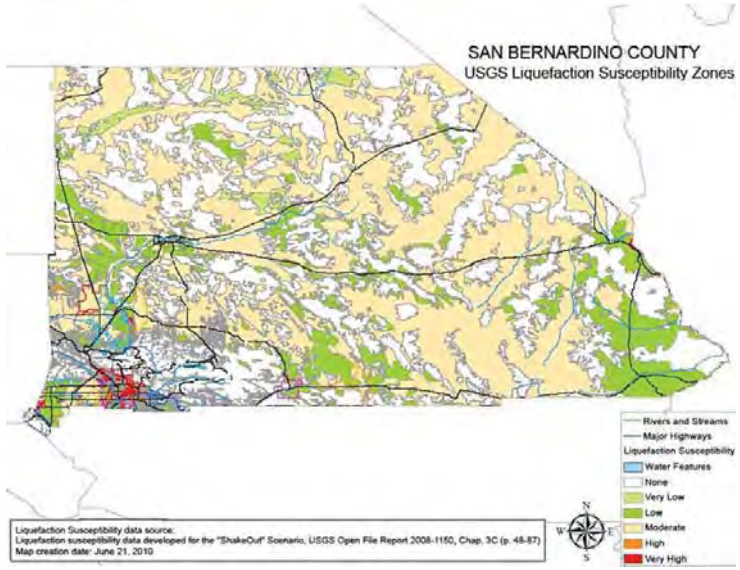


Figure 4-2: USGS Liquefaction Susceptibility Zone

4.3.4 Magnitude/Severity

The MMI Scale measures earthquake intensity as shown in Table 4-5. The MMI Scale has 12 intensity levels. Each level is defined by a group of observable earthquake effects, such as ground shaking and/or damage to infrastructure. Levels I through VI describe what people see and feel during a small to moderate earthquake. Levels VII through XII describe damage to infrastructure during a moderate to catastrophic earthquake.

See Section 4.3.5 to see how magnitude and severity are linked to the probability of earthquake occurrences.

Table 4-5: MMI Scale

Earthquake Magnitude and Intensity		
Magnitude (M_w)	**Intensity (Modified Mercalli Scale)**	**Description**
1.0 – 3.0	I	I. Not felt except by very few people under especially favorable conditions.
3.0 – 3.9	II – III	II. Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
		III. Felt quite noticeably indoors. Many do not recognize it as an earthquake. Standing motorcars may rock slightly.
4.0 – 4.9	IV – V	IV. Felt by many who are indoors; felt by a few outdoors. At night, some awakened. Dishes, windows and doors rattle.
		V. Felt by nearly everyone; many awakened. Some dishes and windows broken; some cracked plaster; unstable objects overturned.
5.0 – 5.9	VI – VII	VI. Felt by everyone; many frightened and run outdoors. Some heavy furniture moved; some fallen plaster or damaged chimneys.
		VII. Most people alarmed and run outside. Damage negligible in well-constructed buildings; considerable damage in poorly constructed buildings.
6.0 – 6.9	VII – IX	VIII. Damage slight in special designed structures; considerable in ordinary buildings; great in poorly built structures. Heavy furniture overturned. Chimneys, monuments, etc. may topple.
		IX. Damage considerable in specially designed structures. Buildings shift from foundations and collapse. Ground cracked. Underground pipes broken.
7.0 and Higher	VIII and Higher	X. Some well-built wooden structures destroyed. Most masonry structures destroyed. Ground badly cracked. Landslides on steep slopes.
		XI. Few, if any, masonry structures remain standing. Railroad rails bent; bridges destroyed. Broad fissure in ground.
		XII. Virtually total destruction. Waves seen on ground. Objects thrown into the air.

4.3.5 Frequency and Probability of Occurrence

Several of the major Southern California faults have a high probability of experiencing a Magnitude 6.7 or greater earthquake within the next 30 years (Figure 4-2); 59% probability of a M6.7 or greater on the Southern San Andreas Fault, 31% probability on the San Jacinto Fault, and 11% probability on the Elsinore Fault. These probabilities were determined by the USGS and CGS in a 2008 study (2007 Working Group on California Earthquake Probabilities, 2008, The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2): U.S. Geological Survey Open-File Report 2007-1437 and California Geological Survey Special Report 203 http://pubs.usgs.gov/of/2007/1437/).

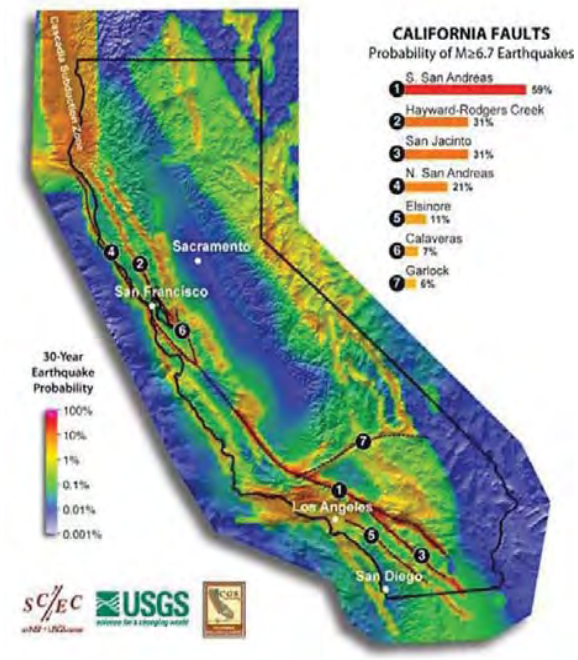


Figure 4-3: California Faults Probability of ≥ M 6.7 Earthquake

As shown in Figure 4-3 the probability of an earthquake with a Magnitude 6.7 or greater occurring somewhere in Southern California within the next 30 years is estimated to be 97% (2007 Working Group on California Earthquake Probabilities, 2008). As can be seen in the table, earthquake probabilities in Southern California are higher than those for Northern California.

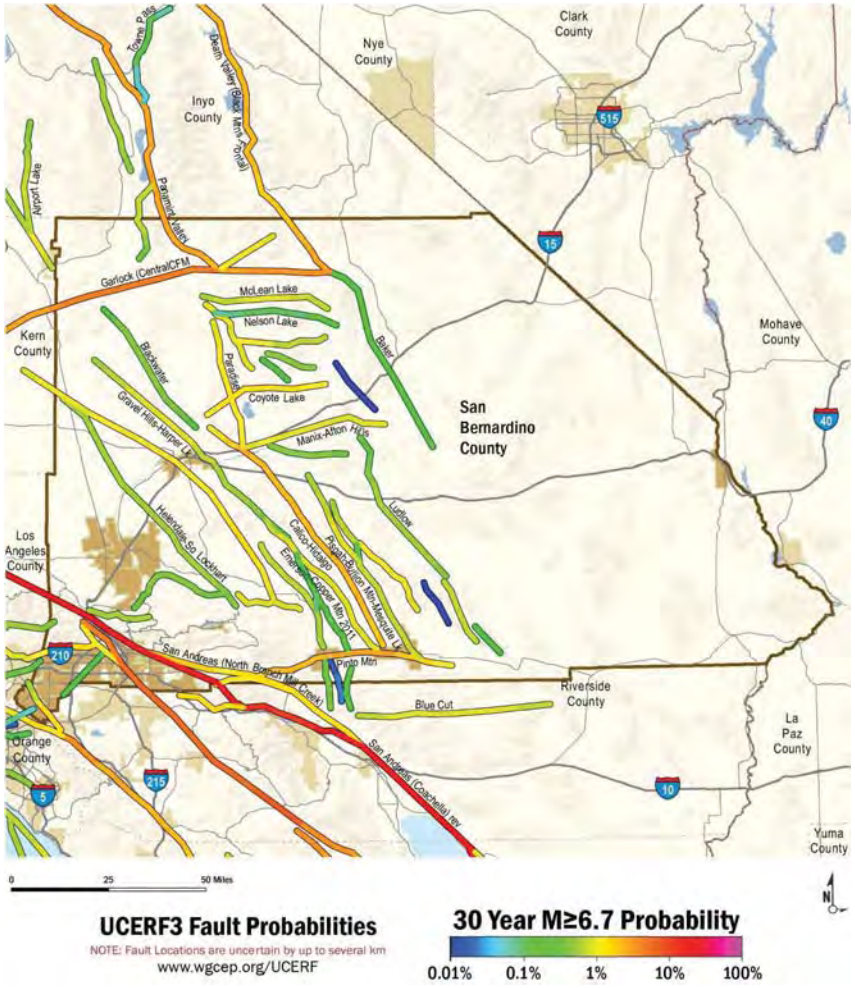


Figure 4-4: California Area Earthquake Probabilities by Magnitude

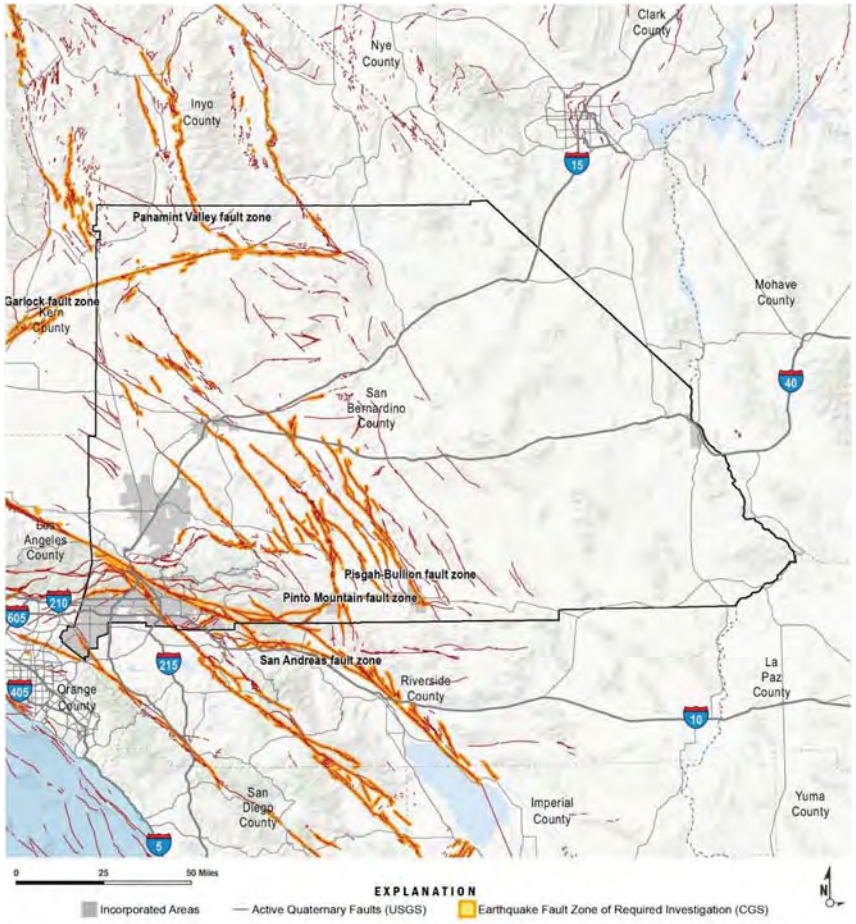


Figure 4-5: Earthquake Fault Zone

4.4 Wildfire



Wildfires present a significant potential for disaster in the County, a region of relatively high temperatures, low humidity, and low precipitation during the summer. This long summer season is followed by a fall season that is famous for high velocity, very dry winds that come out of the desert. The Santa Ana winds very consistently arrive from the middle of October to the end of November. In and of themselves, these weather patterns would be of little significance without the un-naturally dense forest and the dense undergrowth that has been allowed to grow unabated for the last several decades. Compounding the vegetative growth that has occurred is the unchecked development of substantial housing and businesses in mountain communities. This urbanized growth has required parallel growth and sophistication in the fire service that responds to wildfires in the wild land urban interface. With immediate responses to initial fire starts, the vast majority of fires are successfully extinguished in short order. In doing so, this eliminates nature's way of thinning the forest through smaller fires.

Another factor that is a potential for disaster is the number of dead trees in the mountain region. Due to the over densification of the forest combined with drought conditions during the past ten years, trees in the local mountains have become weakened, creating a perfect environment for Bark Beetles to proliferate from 2003 to 2008. Combine these severe burning conditions with people or lightning and the stage is set for the occurrence of large, destructive wildfires. In addition, the forested areas of the County are not only the most popular, with the most visitors in the Nation, but are also the most populated in residences and businesses in the Nation as well. The final element in this catastrophe waiting to happen is that because of the steep mountain terrain, there are only five routes in and out for almost 60,000 residents. On a holiday weekend though, this population can dramatically increase by 50,000 to 100,000 people as weekend vacationers.

4.4.1 Regulatory Environment

4.4.1.1 State

Wildfire State Responsibility Area (SRA) Fire Safe Regulations outline basic wildland fire protection standards for local jurisdictions. SRA Fire Safe Regulations (if policed) can decrease the risk of wildfire events in the wildland interface. SRA Fire Safe Regulations do not supersede local regulations, which equal or exceed minimum state regulations. The State statute for wildfire protection is Public Resources Code, Section 4290. Requirements in the code include information on the following (CA Fire Alliance):

- Road Standards for Fire Equipment Access
- Standards for Signs Identifying Streets, Roads and Buildings
- Minimum Private Water Supply Reserves for Emergency Fire Use
- Fuel Breaks and Greenbelts

4.4.1.2 Local

4.4.1.2.1 Fire Hazard Abatement Program

In an effort to reduce the threat of wild fires, the San Bernardino County Fire Hazard Abatement (FHA) Program enforces the fire hazard requirements outlined in San Bernardino County Code Section 23.0301–23.0319. The primary function of the Fire Hazard Abatement Program is to reduce the risk of fires within communities by pro-actively establishing defensible space and reduction/removal of flammable materials on properties.

The Fire Hazard Abatement Program conducts surveys to identify fire hazards throughout the year. Fire hazards are identified and notices to abate the hazard(s) are mailed to property owners. Property owners are given 30 days to abate the violations. Failure to abate may result in citations, penalties, and/or fees for abatement by the County. The Fire Hazard Abatement Program responds to complaints year round in the unincorporated areas and contracting Cities and Fire Districts.

4.4.2 Past Occurrences

Wildfire locations from 1900 – 2016 are shown in Figure 4-6. In the past five years (since the 2010 MJHMP was approved) there have been 13 significant wildland fires within San Bernardino County. These fires are listed in Table 4-7, and several of the more damaging fires are discussed below.

Table 4-6: Wildfire Occurrences 2010-2016

Number	Date	Name	**Acres**
1.	9/5/2011	Hill Fire	1,158
2.	11/5/2012	Devore Fire	335
3.	6/28/2013	Mill Fire	534
4.	8/8/2013	Sharp Fire	243
5.	9/24/2013	Sierra Fire	200
6.	4/30/2014	Etiwanda Fire	2,143
7.	5/13/2014	Rancho Incident	1,548
8.	3/31/2015	River Bottom Fire	185
9.	6/17/2015	Lake Fire	31,359
10.	7/17/2015	North Fire/ Pines Fire	4,250
11.	8/23/2015	Summit Fire	555
12.	8/7/2016	Pilot Fire	8,110
13.	8/16/2016	Blue Cut Fire	36,274
			86,894

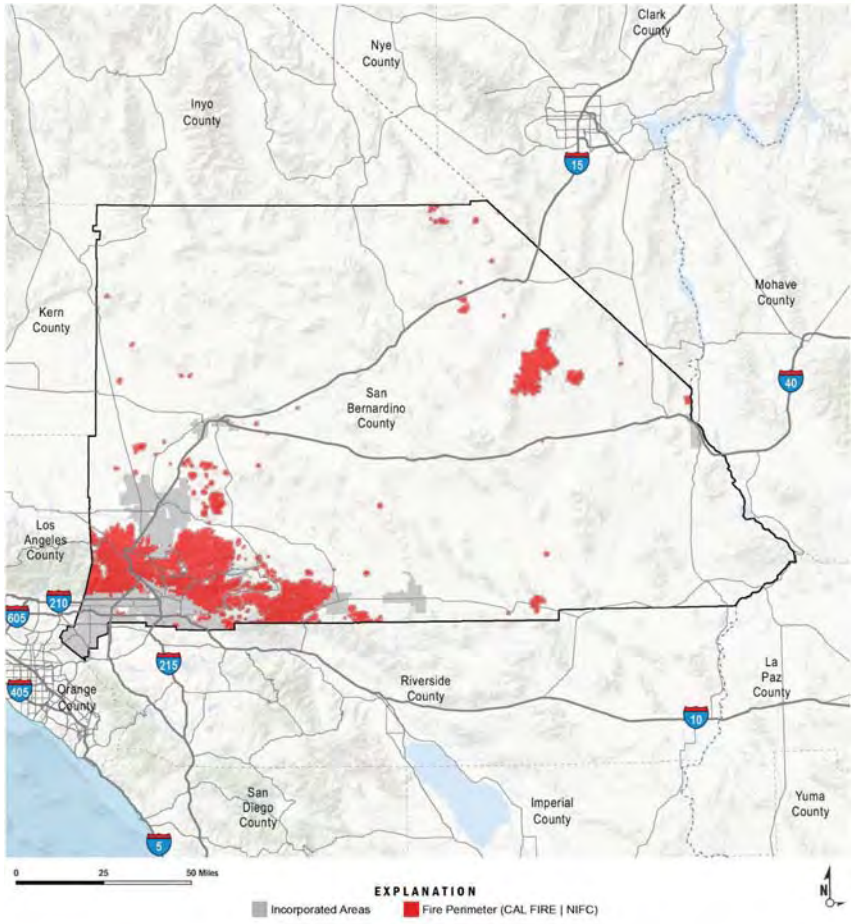


Figure 4-6: Wildfire History 1900 – 2016 (CalFire and USFS Data 2010)

The 2016 Blue Cut Fire was a reminder that wildfires are a significant threat to lives and property in the unincorporated San Bernardino County area. The Blue Cut Fire burned 36,274 acres, destroying an estimated 105 single family residences and 216 outbuildings. In addition, 3 single family residences and 5 other structures were damaged.

In 2015 The Lake Fire burned 31,359 acres and was the cause of 6 minor firefighter injuries and 1 residence and 3 outbuildings were destroyed.

North Fire/Pines Fire in 2015 burned a total of 4,250 acres, destroying 7 homes, 16 outbuildings and 44 vehicles in the community of Baldy Mesa. No injuries were reported.

The Blue Cut Fire, Lake Fire, and North Fire/ Pines Fire all occurred in the County's mapped Very High Fire Severity Zone. Mitigation efforts have reduced but not eliminated the threat from wildfire. The strong fall winds that are capable of creating firestorms cannot be controlled. Drought cannot be controlled. Fuels reduction programs reduce the potential spread of fire, upgraded Building Codes make structures more fire resistant, and public education prepares residents for wildfires. However, the threat of wildfire remains. The continuing goal is to reduce the threat from wildfire wherever possible.

4.4.3 Location/Geographic Extent

Using information from the California Department of Forestry (CAL FIRE) Figure 4-8, illustrates the areas at risk to a wildfire event. The areas with the highest risk of wildfire are the in the southwestern portions of County in the mountainous region.

Figure 4-7 illustrates vegetation mortality due to bark beetle infestation, drought, and other factors in San Bernardino County. These conditions create extreme fire hazards.

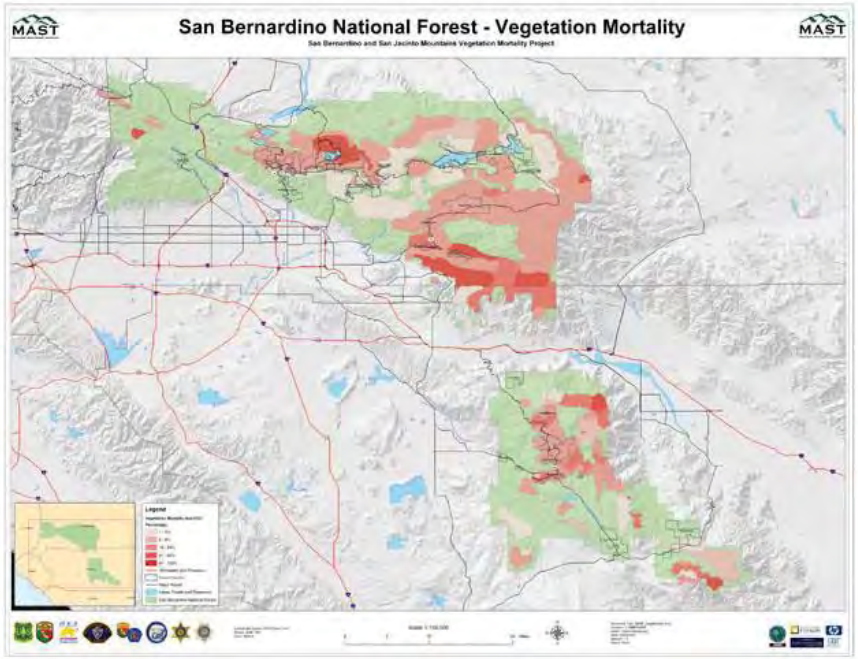


Figure 4-7: San Bernardino National Forest – Vegetation Mortality

4.4.4 Magnitude/Severity

Fire Severity Zones are used in determining additional protective measures required when building new structures or remodeling older structures within the particular zone. Additional measures must be taken on the property around a structure in the higher ranked fire Severity Zones.

CAL FIRE adopted Fire Hazard Severity Zone maps for LRA in June 2008. The Fire Severity Zones for County identifies areas of Very High, High, and Moderate fire hazard severity throughout the County and are mapped in Figure 4-8.

Fire Severity Zones are used in determining additional protective measures required when building new structures or remodeling older structures within the particular zone. Additional measures must be taken on the property around a structure in the higher ranked fire Severity Zones.

Fire hazard mapping is a way to measure the physical fire behavior to predict the damage a fire is likely to cause. Fire hazard measurement includes vegetative fuels, probability of speed at which a wildfire moves the amount of heat the fire produces, and most importantly, the burning fire brands that the fire sends ahead of the flaming front.

The model used to develop the information in accounts for topography, especially the steepness of the slopes (fires burn faster as they burn up-slope.). Weather (temperature, humidity, and wind) also has a significant influence on fire behavior. The areas depicted as moderate and high in are of particular concern and potential fire risk in these are constantly increasing as human development, and the wildland urban interface areas expand.

4.4.5 Frequency/Probability of Future Occurrences

In San Bernardino County, wildfire season commences in the summer when temperatures are high, humidity is low, and conditions remain dry. The season continues into the fall, when the County experiences high velocity, very dry winds coming out of the desert. A statewide drought beginning in 2011 has caused the state to be the driest it's been since record keeping began back in 1895 (California 2016). This has caused extremely dry conditions in unincorporated areas of the County creating plentiful fuel sources for wildfires.

USGS LANDFIRE (Landscape Fire and Resource Management Planning Tools), is a shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior, providing landscape scale geo-spatial products to support cross-boundary planning, management, and operations. Historical fire regimes, intervals, and vegetation conditions are mapped using the Vegetation Dynamics Development Tool (VDDT). This USGS data supports fire and landscape management planning goals in the National Cohesive Wildland Fire Management Strategy, the Federal Wildland Fire Management Policy, and the Healthy Forests Restoration Act.

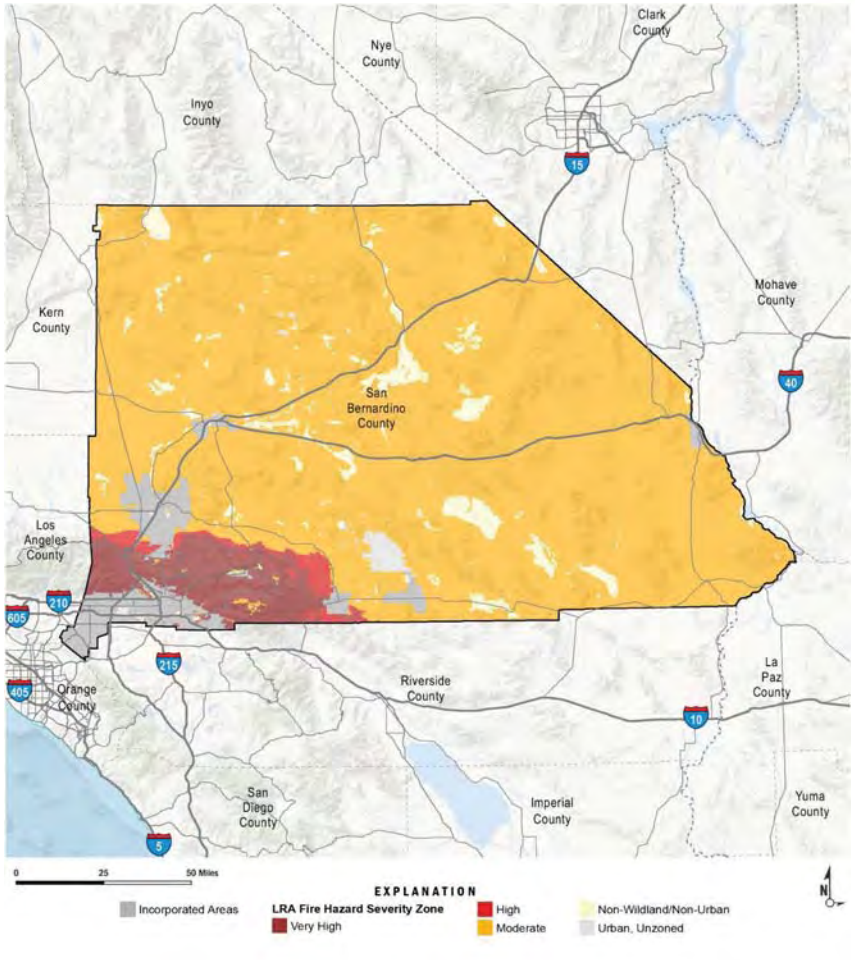


Figure 4-8: Fire Hazard Severity Zone

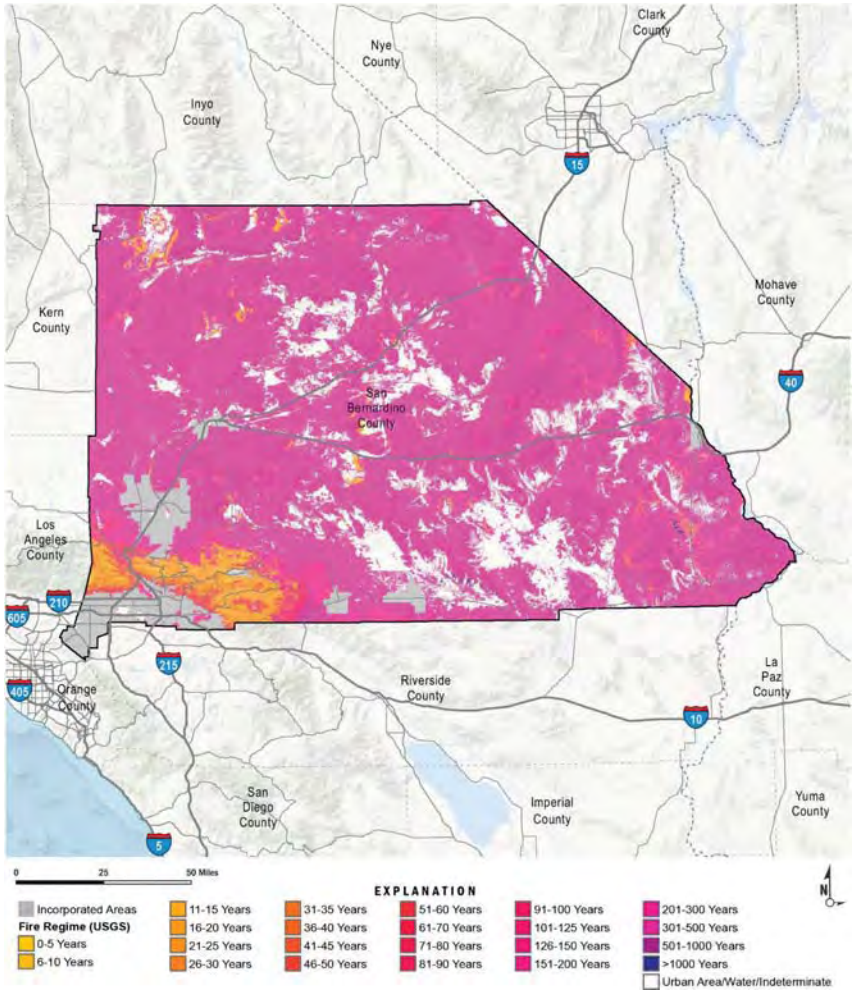


Figure 4-9: USGS Mean Fire Return Interval Map

As part of the USGS Landfire data sets, the Mean Fire Return Interval (MFRI) layer quantifies the average period between fires under the presumed historical fire regime. MFRI is intended to describe one component of historical fire regime characteristics in the context of the broader historical time period represented by the LANDFIRE Biophysical Settings (BPS) layer and BPS Model documentation.

MFRI is derived from the vegetation and disturbance dynamics model VDDT (Vegetation Dynamics Development Tool) (LF_1.0.0 CONUS only used the vegetation and disturbance dynamics model LANDSUM). This layer is created by linking the BpS Group attribute in the BpS layer with the Refresh Model Tracker (RMT) data and assigning the MFRI attribute. This geospatial product should display a reasonable approximation of MFRI, as documented in the RMT. See Figure 4-9 for predicted fire return interval for the jurisdictional area.

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4.5 Flood



Floods are the second most common and widespread of all natural disasters faced by the County and its Special Districts. Most communities in the United States have experienced some kind of flooding during or after spring rains, heavy thunderstorms, winter snow thaws, or summer thunderstorms.

A flood, as defined by the National Flood Insurance Program is: "A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties (at least one of which is the policyholder's property) from:

- Overflow of inland or tidal waters, or
- Unusual and rapid accumulation or runoff of surface waters from any source, or
- Mudflow, or
- Collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels."

Floods can be slow or fast rising but generally develop over a period of hours or days. Mitigation includes any activities that prevent an emergency, reduce the chance of an emergency happening, or lessen the damaging effects of unavoidable emergencies. Investing in mitigation measures now, such as: engaging in floodplain management activities, constructing barriers such as levees, and purchasing flood insurance will help reduce the amount of structural damage to structures and financial loss from building and crop damage should a flood or flash flood occur.

The standard for flooding is the 1% annual chance flood, commonly called the 100-year flood, the benchmark used by the Federal Emergency Management Agency (FEMA) to establish a standard of flood control in communities throughout the country. The 1% annual chance flood is also referred to as the base flood.

The 1% annual chance flood is the flood that has a 1% chance of being equaled or exceeded in any given year and it could occur more than once in a relatively short period of time. By comparison, the 10% flood (10-year flood) means that there is a 10% chance for a flood of its size to occur in any given year.

4.5.1 Regulatory Environmental

4.5.1.1 County of San Bernardino 2007 Development Code and Zoning Ordinances

One of the purposes of this Development Code is to create a comprehensive and stable pattern of land uses upon which to plan drainage/flood control and other public facilities and utilities. The follow chapters of the development code address floodways, flood control and development near such:

Chapter 82.14 Flood Plain Safety (FP) Overlay
Chapter 85.07 Flood Hazard Development Review
Chapter 86.04 Flood Plain Management Administrator

The County has also adopted Zoning Ordinances that are not part of the County Code but are part of the General Plan. These ordinances regulate land use; map the official land use and hazard overlay districts to include safety hazard and environmental protection areas.

4.5.1.2 National Flood Insurance Program

The National Flood Insurance Program (NFIP) makes federally backed flood insurance available to homeowners, renters, and business owners in participating communities. As a participating member of the NFIP, San Bernardino County is dedicated to protecting homes with more than 1,000 policies currently in force. Like most communities participating in NFIP, FEMA has prepared a detailed Flood Insurance Study (FIS) for areas of San Bernardino County. The study presents water surface elevations for floods of various magnitudes, including the 1-percent annual chance of flood (the 100-year flood) and the 0.2-percent annual chance of flood (the 500-year flood). Base flood elevations and the boundaries of the 100 and 500 year floodplains are shown on the Flood Insurance Rate Maps (FIRM). More information on location and geographic extent of the FIRMs are provided in this section.
The County of San Bernardino entered the regular phase of the NFIP on September 09, 1978; in 2016 the County Floodplain Administrator is Marlene Mioyshi. As a participant in the NFIP, San Bernardino County is dedicated to regulating development in the FEMA regulated floodplain areas in accordance with NFIP criteria. Before a permit to build in a floodplain area is issued, San Bernardino County ensures that two basic criteria are met:

- All new buildings and developments undergoing substantial improvements must, at a minimum, be elevated to protect against damage by the 100-year flood.
- New floodplain developments must not aggravate existing flood problems or increase damage to other properties.

Structures permitted or built in the County/City before the NFIP regulatory requirements were incorporated into the San Bernardino County ordinances (before the effective date of the San Bernardino County FIRM) are called "pre-FIRM" structures. For the San Bernardino County, pre-FIRM structures are those permitted or built before September 09, 1978

Extensive FEMA NFIP databases are used to track claims for every participating community including San Bernardino County. NFIP insurance data provided by FEMA indicates that as of September 02, 2016, there were 1,772 policies in San Bernardino County, resulting in $403,874,500 of insurance in force; this amounts to $1,758,534 in total premiums. Of the 1,772 policies, only 1,070 are for structures located within the 1% annual chance flood zones, while the remaining 701 policies are for structures located outside of the FEMA identified floodplain.

Based on this analysis of insurance coverage, San Bernardino County has significant assets at risk to the 100-year flood. Of the 3,426 improved parcels within the 100-year floodplain, only 1,070 of those parcels maintain flood insurance[1]. That means approximately 2,356 improved parcels are without flood insurance in high risk areas according to FEMA. This condition could exist for a number of different reasons. Ground floor elevations are one foot above the 100-year floodplain and home owners and business that wish not to purchase floodplain insurance (non-federally backed loans, home with no mortgage, homes that are "grandfathered" into the NFIP). The 2,356 uninsured structures located in mapped floodplain areas are especially vulnerable.

Currently, San Bernardino County contains 12 Repetitive Loss (RL) properties under their jurisdictional umbrella. The total dollar amount of claims paid to date by the NFIP is $2,606,098. San Bernardino County also contains zero (0) Severe Repetitive Loss (SRL) structure.

Most of the RL properties that have experienced flooding are in the High Desert and Mountain areas of San Bernardino County are due to debris flow in localized areas. Every loss claim is seasonal in nature as all loss claims have been in December, January or February. Some mitigation on these properties has been conducted and San Bernardino County is currently tracking mitigation actions through standardized forms as required by FEMA.

NOTE: A property does not have to be currently carrying a flood insurance policy to be considered a RL or SRL property. Often homes in communities are not carrying flood insurance but are still on the community's repetitive loss list. The "repetitive loss" designation follows a property from owner to owner; from insurance policy to no insurance policy, and even after the property has been mitigated. Having an insurance policy and making claims that fall into the repetitive loss criteria will put a property on the RL list. Even after the policy on a property has lapsed or been terminated, the property will remain on San Bernardino County RL list.

NOTE: The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of certain types of data to the public. Flood insurance policy and claims data are included in the list of restricted information. FEMA can only release such data to state and local governments, and only if the data are used for floodplain management, mitigation, or research purposes. Therefore, this plan does not identify the repetitive loss properties or include claims data for any individual property.
For more information on California Regulation and the NFIP, please see California's Department of Water Resources Quick Guide here: http://www.water.ca.gov/floodmgmt/lrafmo/fmb/docs/CAQG-screen.pdf

4.5.2 Past Occurrences

Severe weather events leading to flooding are listed in Table 4-7; several major events are discussed below.

[1] An improved property owner may not carry flood insurance for a number of reasons; not everyone is required to carry flood insurance. Structures carrying federally-backed mortgages that are in a SFHA are required to carry flood insurance in the County of San Bernardino. Owners who have completed the terms of the mortgage or who purchased their property outright may not choose to carry flood insurance and instead bear the costs of recovery on their own.

Table 4-7: Severe Weather Events 2010-Present

Date	Type
1/18/2010	January 2010 Winter Storms
12/17/2010	Highland Flooding Incident
8/25/2013	Flooding- Remnants of Tropical Storm Ivo
11/21/2013	Winter Storms
2/28/2014	Winter Storm
8/3/2014	Thunderstorms, heavy rain, flash flooding, mudslides
7/6/2015	Flash flooding resulting from Lake Fire
7/30/2015	Severe Thunderstorms
1/6/2016	Strong rain, flooding and mudslides
8/22/16	Flash flooding from storm system

4.5.3 Location/Geographic Extent

Table 4-8 shows the number of acres and square miles that lie in flood hazard areas within the County. Figure 4-10 provides flood hazard data for San Bernardino County as mapped in FEMA's National Flood Hazard Layer for California (April, 2010). Mapped areas include areas subject to inundation by the 1% Annual Chance Flood (also referred to as the 100-year flood), and areas subject to inundation in the 0.2% Annual Chance Flood (500-year flood).

Table 4-8: San Bernardino County Flood Hazard Area

Flood Hazard Type	Sum of Acres	Sum of Square Miles
100-Year Flood	65,209	101.89
100-Year, Floodway	13,968	21.83
500-Year Flood	13,838	21.62
500-Year, Protected by Levee	4,336	7
Total	**97,351**	**152.11**

Table 4-9 shows a land use compatibility chart for 100 year flood plains.

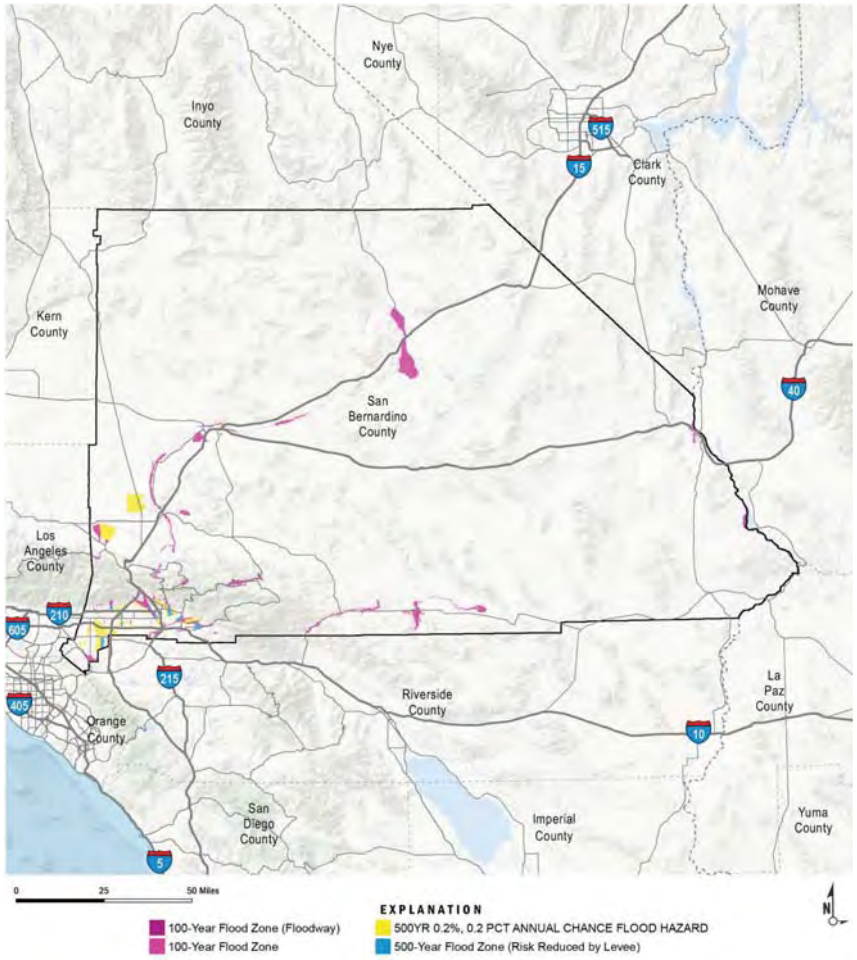


Figure 4-10: Flood Hazard Severity Zone Map

Table 4-9: Land Use Compatibility Chart for 100 Year Flood Plains (General Plan Table S-1)

Land Uses	Compatibility in 100-Year Floodplains
Critical Nuclear related systems; explosives or hazardous materials/ manufacturing, handling or storage; hospitals and other emergency medical facilities.	Restricted
Essential Police, fire and communications systems; Emergency Operations Centers (EOC's); electric power inter-tie systems; power plants; utility substations; sewage treatment plants; water-works; local gas and electric distribution lines; aqueducts; major pipelines; major highways, bridges and tunnels; ambulance services; public assembly sites with 300 or more capacity; schools.	Restricted
High Occupancy Multi-family residential of 20 or more units; major commercial including large shopping centers; office buildings; large hotels; health care clinics and convalescent homes; heavy industry; gas stations.	Generally Incompatible
Normal-Low Risk Single-family and two-family residential; multi-family of less than 20 units; small scale commercial; small hotels, motels; light industry; warehousing.	Generally Incompatible

Restricted unless alternative sites are not available or feasible and it is demonstrated that, although mitigation may be difficult, hazards will be adequately mitigated. Generally Incompatible Restricted unless site investigation demonstrates that site is suitable or that hazards will be adequately mitigated.

4.5.4 Magnitude/Severity

4.5.4.1 Flash Flooding

Flash flooding tends to occur in the summer and early fall because of the monsoon rains and is typified by increased humidity and high summer temperatures.

The desert area contains many mountain ranges that are steep and experience summer thunder storms causing flash floods in many dry washes on the desert floor. The water collects in dry lake beds throughout the desert area.

Environmental permit processing has delayed or prohibited work in the washes to provide flow lines to many bridges on county highways. Many highways do not have bridges but convey water across the road with dip crossings. Flash flooding cause's road and bridge wash outs and erosion of earthen channels and basins when they occur near these facilities.

Cities and towns often experience street closures for several days due to sediment transport and road damage. Because of the sheet flow character of the desert, many private properties experience erosion and sediment deposits. The urban valley also can experience flash flooding in its narrow canyons and within the many unimproved creeks and interim channels feeding the Santa Ana River. The valley floor in many areas is very flat so even minor rain events can produce flooding of roads and private property. In coordination with local jurisdictions, the County of San Bernardino Flood Control District has prepared Master Drainage plans for many cities and towns to provide a plan for reducing flooding due to minor storms. Maps can be found on the County's Department of Public Works website here: http://cms.sbcounty.gov/dpw/FloodControl/Planning/MPD.aspx

However, local resources are not sufficient to cover the cost of the construction of the drainage systems. The densely populated (75% of the county population) urban valley region contains the headwaters of the Santa Ana River. The San Gabriel and San Bernardino Mountains border the North side of the valley are steep reaching 5,000 feet with alluvial fans which are developed and densely populated.

4.5.5 Frequency/Probability of Future Occurrences

The Flood Insurance Rate Map (FIRM) not only identifies the flood hazard zones for insurance and floodplain management purposes, but also provides a statement of probability of future occurrence.

A 500-year flood has a 0.2-percent chance of occurring in any given year; a 100-year flood has a 1-percent chance, a 50-year flood has a 2-percent chance, and a 10-year flood has a 10-percent chance of occurrence. Although the recurrence interval represents the long-term average period between floods of specific magnitude, significant floods could occur at shorter intervals or even within the same year. The FIRM maps typically identify components of the 500-year and 100-year floodplains

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4.6 Drought



Drought is a normal, recurrent feature of climate. It occurs almost everywhere, although its features vary from region to region. Drought severity depends on numerous factors, including duration, intensity, and geographic extent, as well as regional water supply demands by humans and vegetation. The severity of drought can be aggravated by other climatic factors, such as prolonged high winds and low relative humidity.

Drought originates from a deficiency of precipitation over an extended period, usually one or more seasons. Drought can result in a water shortage for some activity, group, or environmental sector. Drought is a complex natural hazard, which is reflected in the following four definitions commonly used to describe it:

- Agricultural – drought is defined principally in terms of naturally occurring soil moisture deficiencies relative to water demands of plant life, usually arid crops.
- Hydrological – drought is related to the effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
- Meteorological – drought is defined solely on the degree of dryness, expressed as a departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
- Socioeconomic – drought associates the supply and demand of economic goods or services with elements of meteorological, hydrologic, and agricultural drought. Socioeconomic drought occurs when the demand for water exceeds the supply as a result of weather-related supply shortfall. It may also be called a water management drought.

Although climate is a primary contributor to hydrological drought, other factors such as changes in land use (e.g., deforestation), land degradation, and the construction of dams all affect the hydrological characteristics of the basin. Since regions are interconnected by hydrologic systems, the impact of meteorological drought may extend well beyond the borders of the precipitation-deficient area. Similarly, changes in land use upstream may alter hydrologic characteristics such as infiltration and runoff rates, resulting in more variable streamflow and a higher incidence of hydrologic drought downstream. Land use change is one of the ways human actions alter the frequency of water shortage even when no change in the frequency of meteorological drought has been observed.

4.6.1 Regulatory Environment

The County and participating jurisdictions have a number of regulatory requirements and documents to address planning for drought in the County. This includes Watershed Water Quality Management Plans (WQMP) for San Bernardino County and the Mojave and Santa Ana Watersheds. On June 21st, 2013, the Executive Officer approved the revised Technical Guidance Document for Water Quality Management Plan (TGD-WQMP).

The 1972 Federal Water Pollution Control Act, also known as the Clean Water Act (CWA) provides the basis for the protection of all inland surface waters, estuaries, and coastal waters. California's Porter-Cologne Water Quality Control Act of 1970 established the Regional Water Quality Control Board as the agency responsible for implementing the CWA and Porter-Cologne requirements in the Santa Ana Watershed.

In 2006, California State lawmakers adopted AB 1881. This provided guidelines and timelines for the revision of the State's Model Water Efficient Landscape Ordinance (MWELO) and mandated that every city, county or other agency within the State adopt MWELO or be in compliance with it through their own ordinance by January 2010. On January 1, 2010 the San Bernardino County Water Efficient Landscape Ordinance was implemented. It can be obtained on the county website.

4.6.1.1 Watershed Water Quality Management Plan

San Bernardino County's WQMP draft was written in 2013 and final approval was given on June 21, 2013.

4.6.1.2 Technical Guidance Document for Water Quality Management Plan (TGD-WQMP)

Approved on June 21, 2013, this document provides direction to project proponents on the regulatory requirements applicable to a private or public development activity, including public works transportation projects, from project conception to completion.

4.6.2 Past Occurrences

- The 2013 California State MHMP states that from 1950 to 2012, there has been eight-drought State Emergency Proclamations in California. Specifically for San Bernardino County, there have been six drought events since 1896. Previous occurrences of drought are described as follows:

- **1975 to 1977:** California experienced the two driest years (1976 and 1977) in the State's history in 1976 and 1977. The drought was declared an Emergency (FEMA-EM-3023) on January 20, 1977. Total crop damages statewide totaled $2.67 billion dollars for both years ($888.5 million in 1976 and $1.8 billion in 1977).

- **2006 to 2009:** A California State-declared three-year drought of below-average rainfall, low snowmelt runoff, and the largest court-ordered water restricting in state's history. The dry conditions damaged crops, deteriorated water quality, and caused extreme wildfire danger. Approximately $300 million in agricultural revenue loss, and a potential $3 billion in economic losses over time.

- **2012 to 2016:** San Bernardino County first declared a local drought emergency in 2014. As of May 23rd, 2016, San Bernardino County and the City of Rancho Cucamonga had both submitted local Emergency Proclamations. This ongoing drought is the most severe drought in over 100 years. In order to abide by the State Water Resources Control Board's mandatory water reductions, the San Bernardino Municipal Water Department Board of Water Commissioners authorized implementation of Stage IIA of the department's Water Supply Contingency Plan on June 1, 2015. The State Water Board will adjust emergency water conservation regulations through the end of January 2017, in recognition of the differing water supply conditions across the state, and develop proposed emergency water restrictions for 2017 if the drought persists.

Additional information about previous occurrences of droughts in California (in general) can be obtained from the California DWR.

4.6.3 Location/Geographic Extent

Drought can affect the County, region, and the State of California as a whole. The County's primary source of water is imported by the San Bernardino Valley Municipal Water District (http://www.sbvmwd.com/about-us/what-we-do) through participation in the State Water Project (SWP). It is received at the Devil Canyon Power Plant Afterbay. This supply is supplemented by groundwater basins in the County. Drought has no defined geographical boundaries and cannot be depicted in map form. As such, the entire County is subject to drought.

4.6.4 Magnitude/Severity

The magnitude of drought is usually measured in time and the severity of the hydrologic deficit. There are several resources available to evaluate drought status and estimate future expected conditions. The National Integrated Drought Information System (NIDIS) Act of 2006 (Public Law 109-430) prescribes an interagency approach for drought monitoring, forecasting, and early warning. The NIDIS maintains the U.S. Drought Portal (www.drought.gov) which is a web-based

access point to several drought related resources. Resources include the U.S. Drought Monitor (USDM) and the U.S. Seasonal Drought Outlook (USSDO).

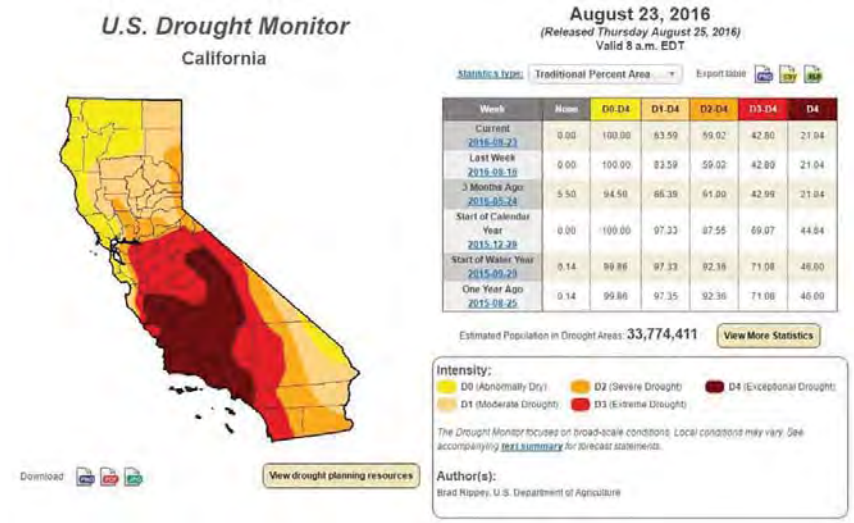


Figure 4-11: US Drought Monitor Map for the State of California on August 23, 2016

The USDM provides a summary of drought conditions across the United States and Puerto Rico and is developed and maintained by the National Drought Mitigation Center (www.drought.unl.edu). USDM includes the U.S. Drought Monitor Map. This map is updated weekly by combining a variety of drought database and indicators, and local expert input into a single composite drought indicator. The map denotes four levels of drought intensity (ranging from D1 - D4) and one level of "abnormal dryness" (D0). In addition, the map depicts areas experiencing agricultural (A) or hydrological (H) drought impacts. These impact indicators help communicate whether short or long-term precipitation deficits are occurring. An example Drought Monitor Map for the State of California for August 23, 2016 is illustrated in Figure 4-11.

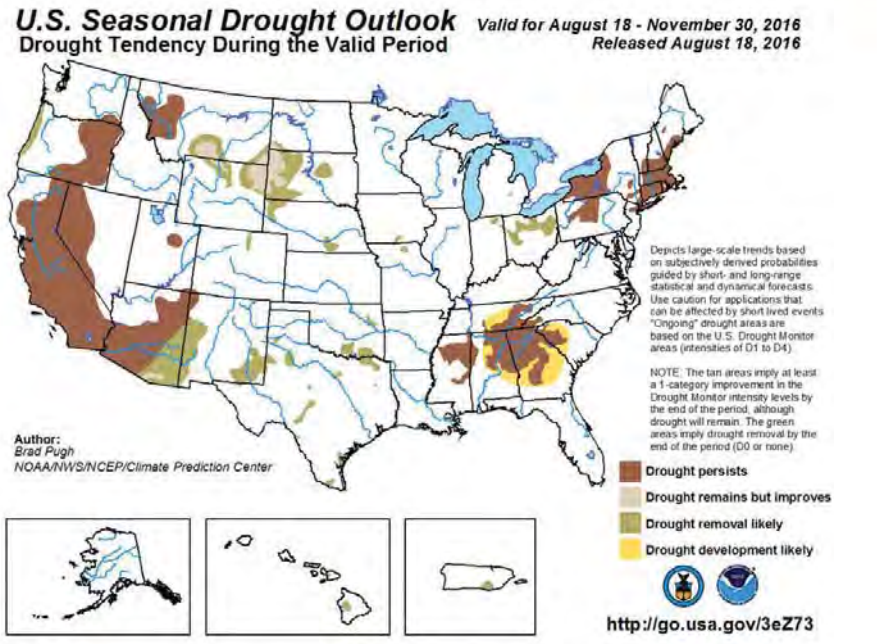


Figure 4-12: USSDO Drought Tendency Map (Valid August 18-November 30, 2016

For western States with mountainous terrain and complex regional microclimates, it is also useful to supplement the PDSI values with other indices such as Surface Water Supply Index and Standardized Precipitation Index (SPI). The Surface Water Supply Index takes snowpack and other unique conditions into account. The National Drought Mitigation Center (NDMC) uses the SPI to identify emerging drought months sooner than the PDSI. It is computed on various time scales to monitor moisture supply conditions. The SPI is the number of standard deviations that precipitation value would deviate from the long-term mean. As shown in Figure 4-13 the 72-month SPI through the end of August 2016 for San Bernardino County is low.

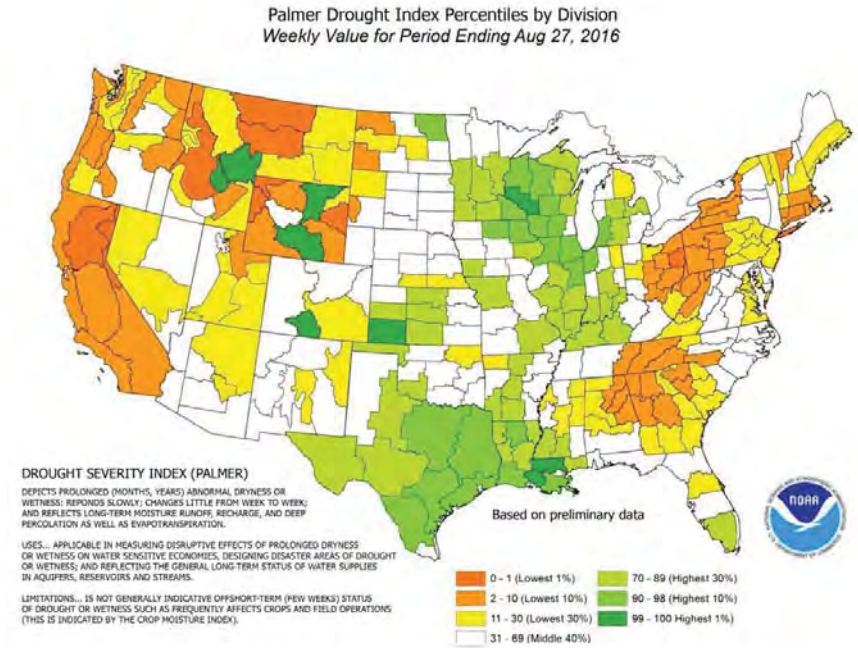


Figure 4-13: Month SPI through the end of August 2016 for San Bernardino County

A number of indices measure how much precipitation for a given period has deviated from historically established norms. The primary indicator for the USDM and USSDO for the western United States is the Palmer Drought Severity Index (PDSI). The PDSI is widely used by the USDA to determine when to grant emergency drought assistance to affected areas. PDSI is a commonly used index that measures the severity of drought for agriculture and water resource management. It is calculated from observed temperature and precipitation values and estimates soil moisture. However, the PDSI is not considered consistent enough to characterize the risk of drought on a nationwide basis (FEMA, 1997) and is not well suited to the dry, mountainous areas in the western U.S.

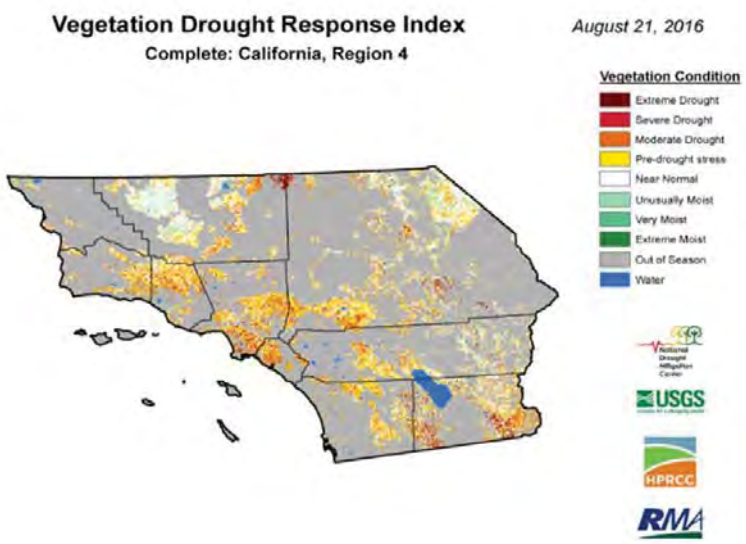


Figure 4-14: Vegetation Drought Response Index – California Region 4 for August 21, 2016

The Vegetation Drought Response Index, or VegDRI, is a bi-weekly depiction of vegetation stress across the contiguous United States. VegDRI is a fine resolution (1-km^2) index based on remote sensing data, and incorporates climate and biophysical data to determine the cause of vegetation stress. Development of the VegDRI map and associated products is a joint effort by the National Drought Mitigation Center (NDMC), the U.S. Geological Survey's (USGS) National Center for Earth Resources Observation and Science (EROS), and the High Plains Regional Climate Center (HPRCC). Figure 4-14 illustrates the VegDRI results for Southern California for August 21, 2016.

4.6.5 Frequency/Probability of Future Occurrences

Currently there is no data on the probability of drought that would be comparable to the USGS effort on earthquakes in the region, or how 100-year flood maps are created.

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4.7 Terrorism

This section was added due to the December 2, 2015 terror attack in San Bernardino County. There is no single, universally accepted definition of terrorism; however, FEMA defines "terrorism" as intentional, criminal, malicious acts. FEMA document 386-7 refers to terrorism specifically as the use of Weapons of Mass Destruction (WMD), including biological, chemical, nuclear, and radiological weapons; arson, incendiary, explosive, and armed attacks; industrial sabotage and intentional hazardous materials releases; and "cyberterrorism."



FEMA developed the Integrated Emergency Management System (IEMS) using an all-hazards approach. While the IEMS was established as an "all-hazard" approach, responding to the threat of terrorism (referred to as counterterrorism) came to be viewed as the responsibility of law enforcement, defense, and intelligence agencies. Furthermore, defensive efforts to protect people and facilities from terrorism (referred to as antiterrorism) were generally limited to the government sector, the military, and some industrial interests.

While the term "mitigation" refers generally to activities that reduce loss of life and property by eliminating or reducing the effects of disasters, in the terrorism context it is often interpreted to include a wide variety of preparedness and response actions. For the purposes of this document, the traditional meaning will be assumed; that mitigation refers to specific actions that can be taken to reduce loss of life and property from manmade hazards by "modifying the built environment" or antiterrorism to reduce the risk and potential consequences of these hazards.

4.7.1 Antiterrorism Regulatory Environment

Adopted on February 9, 2012 and updated on October 1, 2013, United Facilities Criteria (UFC) 4-010-01 defines the United States Department of Defense's (DoD) minimum antiterrorism standards for both new and existing buildings. The document applies to DoD buildings, National Guard buildings, visitor centers and museums, visitor control facilities and expeditionary structures. Historic preservation compliance for implementation of anti-terrorism standards, philosophy, design strategies and assumptions are all taken into account. Site planning, structural design, architectural design, and electrical and mechanical design are discussed in detail in Appendix B.
https://www.fema.gov/news-release/2004/01/13/dhs-announces-new-building-science-guidelines-enhance-terrorism-resistance

4.7.2 Counterterrorism Regulatory Environment

After the 12/2/15 mass shooting, two full time positions with a regional FBI-led terrorist task force (FBI's Joint Terrorism Task Force) were created. These task force officers have the clearance to conduct terrorism investigations in the County. The Task Force includes partners from Homeland Security Investigations (HSI), the San Bernardino Police Department, the San Bernardino County Sheriff's Department, the Riverside County Sheriff's Department, the Ontario Police Department, the Riverside Police Department, the Corona Police Department and the Chino Police Department. For more information regarding the positions, contact the San Bernardino Police Department at (909) 384-5742. Read more here: http://www.pe.com/articles/task-789539-force-san.html

The State of California Department of Justice's Anti-terrorism program works with federal, state and local law enforcement agencies to detect, investigate, prosecute, dismantle, prevent and respond to domestic and international terrorist activities. Read more here: https://oag.ca.gov/bi/atp

The State of California Bureau of Security and Investigative Services' Power to Arrest Course includes a Weapons of Mass Destruction (WMD) & Terrorism Awareness section. Read More Here: http://www.bsis.ca.gov/about_us/laws/bsis_regulations.pdf

4.7.3 Past Occurrences

There have been two terrorist attacks recorded in San Bernardino County. Table 4-10 describes both attacks.
Source: https://www.start.umd.edu/gtd/search/Results.aspx?search=san+bernardino&sa.x=0&sa.y=0&sa=Search

Table 4-10: Terrorist Attacks in San Bernardino County

Date	Perpetrator Group	Fatalities	Injured	Target Type
3/16/1970	White Extremists	0	1	Government (General)
12/2/2015	Unaffiliated Individuals	16	17	Government (General)

The state of California has experienced 574 terrorist attacks from 1970-2011 (Integrated United States Security Database (IUSSD): Data on the Terrorist Attacks in the United States Homeland, 1970-2011 2012). Figure 4-17 shows the types of terrorist attacks in the state of California from 1970 to the present.

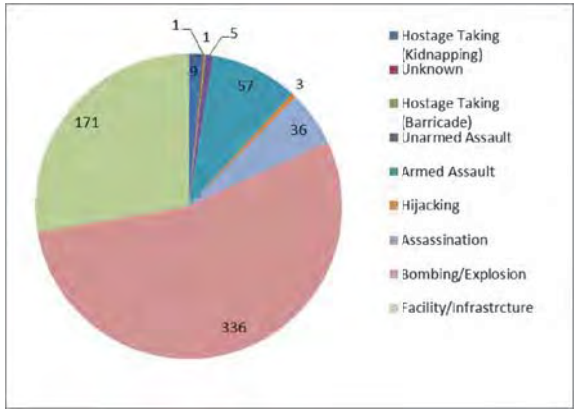
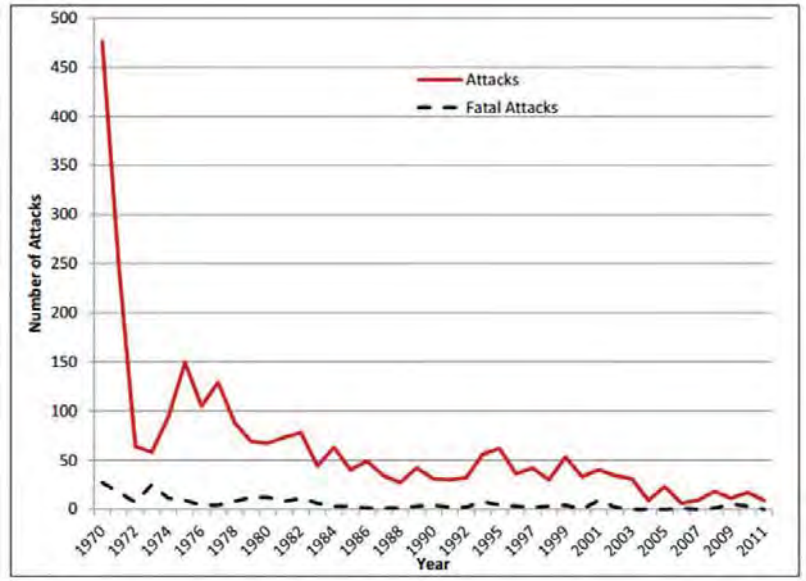


Figure 4-15: Types of Terrorist Attacks in California from 1970-Present

As seen in Figure 4-15 since 1970, the number of terrorist attacks in the United States has steadily decreased. According to http://www.heritage.org most terrorist attacks on America happen outside our nation's borders. The number of international terrorist attacks against the United States from 1970-2011 is shown in Figure 4-16 and Figure 4-17.



Note: There were 2,608 total attacks and 226 fatal attacks between 1970 and 2011.

Figure 4-16: Total and Fatal Terrorist Attacks in the United States by Year

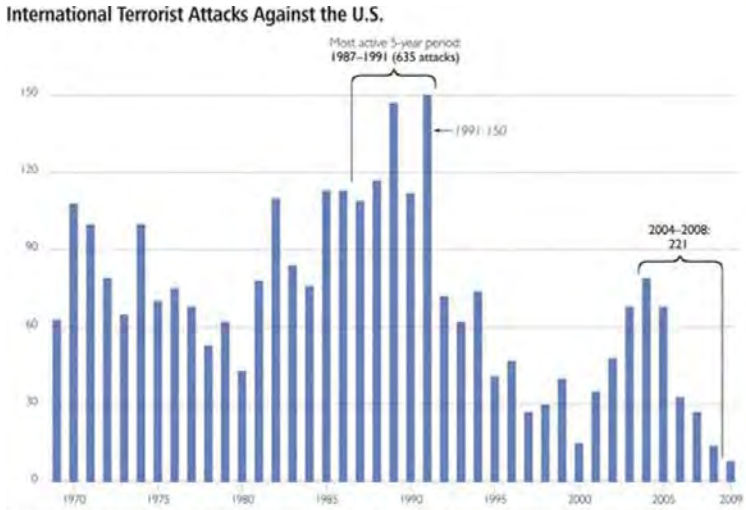


Figure 4-17: International Terrorist Attacks Against the United States

4.7.4 Location/Geographic Extent

Unlike natural hazards, which often follow patterns and can be forecasted, manmade hazards such as acts of terrorism are much more unpredictable. Terrorists have the ability to choose targets and tactics and can often adjust conditions to achieve their objective. Terrorist attacks are often in a more specific location rather than a widespread, more predictable area such as a flood plain. As demonstrated in the 12/2/15 mass shooting, "homegrown terrorists" (self-radicalizing and pulls off their attacks without any help or communication with people in other countries) are even harder to detect and predict.

Translating most manmade hazard profiles into meaningful geospatial information is difficult at best. Instead, the planning team will use an asset-specific approach, identifying potentially at-risk critical facilities and systems in the community. Once a comprehensive list of assets has been developed, it will be prioritized so that the community's efforts can be directed to protect the most

important assets first. Then, beginning with the highest priority assets, the vulnerabilities of each facility or system to each type of hazard will be assessed (FEMA 2003).

4.7.5 Magnitude/Severity

As previously discussed, predicting terrorist attacks cannot be done with the same level of accuracy as predicting a natural hazard and its potential impacts on the community. However, we can learn from past terrorist incidents. Table 4-11 profiles 10 different types of terrorist attacks and technological hazards.

Table 4-11: Event Profiles for Terrorism and Technological Hazards

Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
Conventional Bomb/ Improvised Explosive Device	Detonation of explosive device on or near target; delivery via person, vehicle, or projectile.	Instantaneous; additional "secondary devices" may be used, lengthening the time duration of the hazard until the attack site is determined to be clear	Extent of damage is determined by type and quantity of explosive. Effects generally static other than cascading consequences, incremental structural failure, etc.	Overpressure at a given standoff is inversely proportional to the cube of the distance from the blast; thus, each additional increment of standoff provides progressively more protection. Terrain, forestation, structures, etc. can provide shielding by absorbing and/or deflecting energy and debris. Exacerbating conditions include ease of access to target; lack of barriers/shielding; poor construction; and ease of concealment of device
Chemical Agent *	Liquid/aerosol contaminants can be dispersed using sprayers or other aerosol generators; liquids vaporizing from puddles/ containers; or munitions.	Chemical agents may pose viable threats for hours to weeks depending on the agent and the conditions in which it exists.	Contamination can be carried out of the initial target area by persons, vehicles, water and wind. Chemicals may be corrosive or otherwise damaging over time if not remediated.	Air temperature can affect evaporation of aerosols. Ground temperature affects evaporation of liquids. Humidity can enlarge aerosol particles, reducing inhalation hazard. Precipitation can dilute and disperse agents but

Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
				can spread contamination. Wind can disperse vapors but also cause target area to be dynamic. The micro-meteorological effects of buildings and terrain can alter travel and duration of agents. Shielding in the form of sheltering in place can protect people and property from harmful effects.
Arson/ Incendiary Attack	Initiation of fire or explosion on or near target via direct contact or remotely via projectile.	Generally minutes to hours.	Extent of damage is determined by type and quantity of device/ accelerant and materials present at or near target. Effects generally static other than cascading consequences, incremental structural failure, etc.	Mitigation factors include built-in fire detection and protection systems and fire-resistive construction techniques. Inadequate security can allow easy access to target, easy concealment of an incendiary device and undetected initiation of a fire. Non-compliance with fire and building codes as well as failure to maintain existing fire protection systems can substantially increase the effectiveness of a fire weapon.
Armed Attack	Tactical assault or sniping from remote location.	Generally minutes to days.	Varies based upon the perpetrators' intent and capabilities	Inadequate security can allow easy access to target, easy concealment of weapons and undetected initiation of an attack.
Biological Agent *	Liquid or solid contaminants can be dispersed using sprayers/aerosol generators or by point or line	Biological agents may pose viable threats for hours to years depending on the agent and the	Depending on the agent used and the effectiveness with which it is deployed, contamination can	Altitude of release above ground can affect dispersion; sunlight is destructive to many bacteria and viruses; light to

Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
	sources such as munitions, covert deposits and moving sprayers.	conditions in which it exists	be spread via wind and water. Infection can be spread via human or animal vectors.	moderate wind will disperse agents but higher winds can break up aerosol clouds; the micro-meteorological effects of building and terrain can influence aerosolization and travel of agents.
Cyberterrorism	Electronic attack using one computer system against another.	Minutes to days	Generally no direct effects on built environment.	Inadequate security can facilitate access to critical computer systems, allowing them to be used to conduct attacks.
Agriterrorism	Direct, generally covert contamination of food supplies or introduction of pests and/or disease agents to crops and livestock.	Days to months	Varies by type of incident. Food contamination events may be limited to discrete distribution sites, whereas pests and diseases may spread widely. Generally no effects on built environment.	Inadequate security can facilitate adulteration of food and introduction of pests and disease agents to crops and livestock.
Radiological Agent **	Radioactive contaminants can be dispersed using sprayers/aerosol generators, or by point or line sources such as munitions, covert deposits and moving sprayers.	Contaminants may remain hazardous for seconds to years depending on material used.	Initial effects will be localized to site of attack; depending on meteorological conditions, subsequent behavior of radioactive contaminants may be dynamic.	Duration of exposure, distance from source of radiation, and the amount of shielding between source and target determine exposure to radiation.
Nuclear Bomb **	Detonation of nuclear device underground, at the surface, in the air or at high altitude.	Light/heat flash and blast/shock wave last for seconds; nuclear radiation and fallout hazards can persist for years. Electromagnetic pulse from a high altitude detonation lasts for seconds and affects only	Initial light, heat and blast effects of a subsurface, ground or air burst are static and are determined by the device's characteristics and employment; fallout of radioactive contaminants may	Harmful effects of radiation can be reduced by minimizing the time of exposure. Light, heat and blast energy decrease logarithmically as a function of distance from seat of blast. Terrain, forestation, structures, etc. can provide shielding by

Hazard	Application Mode	Hazard Duration	Extent of Effects; Static/Dynamic	Mitigating and Exacerbating Conditions
		unprotected electronic systems.	be dynamic, depending on meteorological conditions.	absorbing and/or deflecting radiation and radioactive contaminants.
Hazardous Material Release (fixed facility or transportation)	Solid, liquid and/or gaseous contaminants may be released from fixed or mobile containers.	Hours to days	Chemicals may be corrosive or otherwise damaging over time. Explosion and/or fire may be subsequent. Contamination may be carried out of the incident area by persons, vehicles, water and wind.	As with chemical weapons, weather conditions will directly affect how the hazard develops. The micro-meteorological effects of building and terrain can alter travel and duration of agents. Shielding in the form of sheltering in place can protect people and property from harmful effects. Non-compliance with fire and building codes as well as failure to maintain existing fire protection and containment features can substantially increase the damage from a hazardous materials release.

* Source: Jane's Chem-Bio Handbook
** Source: FEMA, Radiological Emergency Management Independent Study Course

4.7.6 Frequency/Probability of Future Occurrences

We can usually forecast the type, frequency and location of a natural hazard thanks to the laws of physics and nature. However, when dealing with manmade hazards such as terrorism, we are often dealing with functions of the human mind-malevolence, incompetence, carelessness and other behaviors. These actions cannot be predicted with any accuracy; therefore, there is the potential for an act of terrorism to occur anywhere, at any time.

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4.8 Climate Change



Climate change refers to any distinct change in measures of climate lasting for a long period of time, more specifically major changes in temperature, rainfall, snow, or wind patterns. Climate change may be limited to a specific region, or may occur across the whole Earth. Climate change may result from:

- Natural factors (e.g., changes in the Sun's energy or slow changes in the Earth's orbit around the Sun);
- Natural processes within the climate system (e.g., changes in ocean circulation); and
- Human activities that change the atmosphere's make-up (e.g., burning fossil fuels) and the land surface (e.g., cutting down forests, planting trees, building developments in cities and suburbs, etc.).

The effects of climate change are varied: warmer and more varied weather patterns, melting ice caps, and poor air quality, for example. As a result, climate change impacts a number of natural hazards.

The 2013 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing.

4.8.1 Regulatory Environment

California's response to climate change is directed by Legislation and Regulations and by other Mandates such as executive orders.

4.8.1.1 The Sustainable Communities and Climate Protection Act of 2008

The Sustainable Communities and Climate Protection Act of 2008 (Sustainable Communities Act, SB 375, Chapter 728, Statutes of 2008) looks to reduce GHG emissions through coordinated transportation and land use planning with the goal of more sustainable communities. Regional targets are established for GHG emissions reductions from passenger vehicle use by the sustainable communities strategy (SCS) established by each metropolitan planning organization (MPO). The SCS is an integral part of the regional transportation plan (RTP) and contains land use, housing, and transportation strategies to meet GHG reductions targets. In San Bernardino County, the South Coast Air Quality Management District facilitates compliance with the federal Clean Air Act and implements the state's air quality program.

The Office of Planning and Research's General Plan Guidelines and SB 375 builds upon Assembly Bill 162 (flood protection) and Senate Bill 1241 (fire protection) and supports Safeguarding California implementation.

SB 375 also supports Assembly Bill 2140 which requires that a City/County General Plan contains a safety element in addition to a Hazard Mitigation Plan. AB 2140 also requires a vulnerability assessment, adaptation goals, policies and objectives, and a set of feasible implementation measures.

4.8.1.2 California Adaptation Planning Guide (APG)

The State of California has been taking action to address climate change for over 20 years, focusing on both greenhouse gas emissions reduction and adaptation. The California Adaptation Planning Guide (APG) continues the state's effort by providing guidance and support for communities addressing the unavoidable consequences of climate change.

Based on upon specific factors, 11 Climate impact regions were identified. Some of the regions were based on specific factors particularly relevant to the region. As illustrated in Figure 4-18 San Bernardino County is located in the Desert Region.

The Desert is a heavily urbanized inland region (4.3+ million people) made up of sprawling suburban development in the west near the South Coast region and vast stretches of open, largely federally owned desert land to the east. Prominent cities within the desert portion include Palm Springs (44,500+) and El Centro (42,500+). The region's character is defined largely by the San Gabriel Mountains, San Gorgonio Mountains, San Jacinto Mountains, and smaller inland mountains reaching through the desert to the Colorado River, which borders the region on the east. Communities in the Desert region should consider evaluating the following climate change impacts:

- Reduced water supply
- Increased temperature
- Reduced precipitation
- Diminished snowpack
- Wildfire risk
- Public health and social vulnerability
- Stress on special-status species



Figure 4-18: Climate Impact Regions

4.8.2 Past Occurrences

Climate change has never been directly responsible for any declared disasters. Past flooding, wildfire, levee failure, and drought disasters may have been exacerbated by climate change, but it is impossible to make direct connections to individual disasters. In addition, unlike earthquake and floods that occur over a finite time period, climate change is an on-going hazard the effects of which some are already experiencing. Other effects may not be seriously experienced for decades, or may be avoided altogether by mitigation actions taken today.

4.8.3 Location/Geographic Extent

The effects of climate change are not limited by geographical borders. San Bernardino County, the State of California, the United States, and the rest of the world are all at risk to climate change. As such, the entire County is at risk to the effects of climate change.

Figure 4-19 and Figure 4-20 provide Cal Adapt[2] modeled decadal July high temperature averages for 2010 and 2090. These figures provide current decade-long July temperature averages and possible annual high heating trends for the remaining portion of the century. The data presented in the figures represent a "projection" of potential future climate scenarios, they are not predictions. These figures illustrate how the climate may change based on a variety of different potential social and economic factors. The visualizations are comprised of average values from Coupled Climate model 2.1 (GFDL), Community Climate System Model Version 3 (CCSM3), Coupled Global Climate Model Version 3 (CNRM) and Parallel Climate Model 1 (PCM1). During the next few decades, scenarios project average temperature to rise between 1° and 2.3°F; however, the projected temperature increases begin to diverge at mid-century so that, by the end of the century, the temperature increases projected in the higher emissions scenario (A2) are approximately twice as high as those projected in the lower emissions scenario (B1). Customizable maps can be viewed at http://cal-adapt.org/temperature/decadal/

[2] Cal-Adapt has been funded to provide access to data and information that has been produced by the State's scientific and research community. The data available in this site offer a view of how climate change might affect California at the local level.



Figure 4-19: July Decadal Average High Temperature Map; 2010

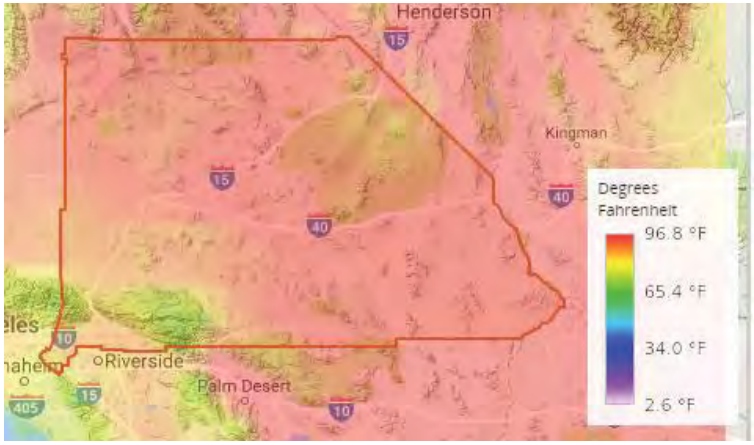


Figure 4-20: July Decadal Average High Temperature Map; 2090

4.8.4 Magnitude/Severity

The California Climate Adaptation Strategy (CAS), citing a California Energy Commission study, states that "over the past 15 years, heat waves have claimed more lives in California than all other declared disaster events combined." This study shows that California is getting warmer, leading to an increased frequency, magnitude, and duration of heat waves. These factors may lead to increased mortality from excessive heat, as shown in Figure 4-21: California Historical and Projected Temperature Increases 1961 to 2099

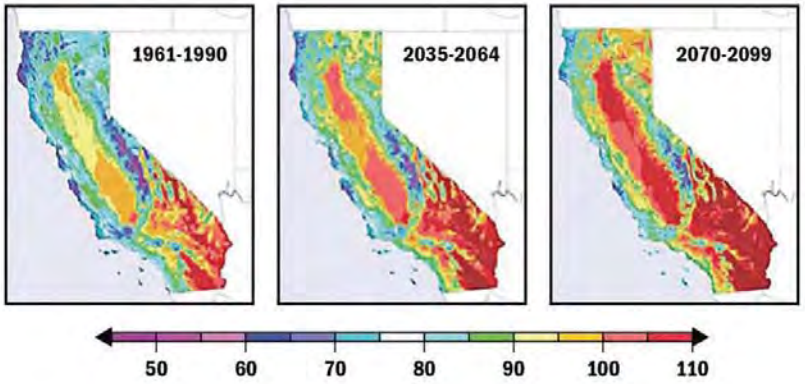


Figure 4-21: California Historical and Projected Temperature increases 1961-2099

Source: Dan Cayan; California Climate Adaptation Strategy

4.8.5 Frequency/Probability of Future Occurrences

According to the ABAG 2010 Local Hazard Mitigation Plan (LHMP), climate change is one of the few natural hazards where the probability of occurrence is influenced by human action. In addition, unlike earthquake and floods that occur over a finite time period, climate change is an on-going hazard.

The 2009 Climate Adaptation Strategy (CAS) delineated how climate change may impact and exacerbate natural hazards in the future, including wildfires, extreme heat, floods, drought, and levee failure:

Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in San Bernardino County and the rest of California, which

are likely to increase the risk of mortality and morbidity due to heat-related illness and exacerbation of existing chronic health conditions. Those most at risk and vulnerable to climate-related illness are the elderly, individuals with chronic conditions such as heart and lung disease, diabetes, and mental illnesses, infants, the socially or economically disadvantaged, and those who work outdoors.

- Higher temperatures will melt the Sierra snowpack earlier and drive the snowline higher, resulting in less snowpack to supply water to California users.
- Droughts are likely to become more frequent and persistent in the 21st century.
- Intense rainfall events, periodically ones with larger than historical runoff, will continue to affect California with more frequent and/or more extensive flooding.
- Storms and snowmelt may coincide and produce higher winter runoff from the landward side, while accelerating sea-level rise will produce higher storm surges during coastal storms. Together, these changes will increase the probability of levee and dam failures in the Sacramento-San Joaquin Delta.
- Warmer weather, reduced snowpack, and earlier snowmelt can be expected to increase wildfire through fuel hazards and ignition risks. These changes can also increase plant moisture stress and insect populations, both of which affect forest health and reduce forest resilience to wildfires. An increase in wildfire intensity and extent will increase public safety risks, property damage, fire suppression and emergency response costs to government, watershed and water quality impacts, vegetation conversions and habitat fragmentation.

4.8.6 El Niño Effect

El Niño is defined as an abnormal weather pattern that is caused by the warming of the Pacific Ocean near the equator, off the coast of South America. This occurs when the normal trade winds weaken (or even reverse), which lets the warm water that is usually found in the western Pacific flow instead towards the east. This warm water displaces the cooler water that is normally found near the surface of the eastern Pacific, setting off atmospheric changes that affect weather patterns in many parts of the world.

As a result of the predicted El Niño in 2015 the following meetings were held during the months of January – December 2015:

El Niño Awareness Program

- **January - December 2015**

- **October 28, 2015** (Two meetings) two separate meetings one with the Public with 200 High Desert residents attending, the other meeting was at the same location of the Victor Ville City Council Chambers of 80 operators
- **November 9, 2015** South Desert Meeting at the Town of Yucca Valley Community Center, with 50 Operators and 235 general public ,residents
- **November 12, 2015** 2:30pm-4:30pm Valley Cooperators Meeting, City of Rancho Cucamonga, Victoria Gardens, 90 Operators and 2nd Meeting at the same location held at 530pm-730pm meeting with 205 public and residents
- **November 16, 2015** Public Meeting at Upland city Hal l for San Antonio heights, Mt. Baldy and local residents 110 Public and Residents in attendance .
- **November 23, 2015** Wrightwood Community Center, 80 Operators and 330 Public and Residents
- **November 24, 2015** City of Yucaipa 40 operators at Yucaipa City Hall
- **December, 2015** 5000 English pamphlets and 5000 Spanish pamphlets distributed Winter Weather Workshop meetings (discuss long term weather models and predictions as far as estimated rain fall anticipated. and Extreme Heat Program meetings (stakeholder and Red Cross and SCE and other responders/operators meetings on anticipated overly hot days and local assistance plans. program in place by OES.

4.8.7 Extreme Weather

The Extreme Weather – Excessive Heat Standard Operating Guidelines (SOG) were developed in response to the potential for Excessive Heat and heat related Power Outage events in San Bernardino County. The following objectives and activities have been established to prevent the harmful effects of excessive heat on at-risk populations and the potential for life-threatening repercussions of power outages during excessive heat events.

The Extreme Weather – Excessive Heat SOG describe the County operations during heat related emergencies and provide guidance for local jurisdictions in their preparation for heat emergencies and other related activities.

The information included in this document is “situation” and/or “incident” driven and subject to revision by the Extreme Weather Committee as conditions warrant. Notifications are information dependent and modification of the activities in these guidelines may be required in response to changing conditions, situations and/or inaccurate weather predictions.
The Extreme Weather – Excessive Heat Standard Operating Guidelines (SOG) were developed through the collaborative efforts of the “Extreme Weather Committee”. The committee consists of

representatives from key County Departments and private sector partners who have a shared interest, responsibility and/or expertise in the County's preparation for an Excessive Heat event. It is designed to protect all of the County's population especially the most vulnerable populations.

For the last ten years the annual Winter Weather Workshop and Meeting brings together San Bernardino County Fire Office of Emergency Services with The San Bernardino County Special Districts key stakeholders and first responders as well as weather experts. The annual meeting is an accumulation of meetings with NOAA and other Meteorological experts on the possible winter weather outlook and forecast including possible precipitation levels and wide ranging forecasts.

The meeting includes discussions on possible plans of actions and response to flooding emergencies and or snow or white out events and the other possibility of continuing long duration droughts.

4.9 Other Hazards

As mentioned earlier, lower priority hazards are addressed at a lesser level of detail due to their relatively fewer impacts, as identified in the preceding hazard assessment section. The lower priority hazards for the unincorporated area are:

- Severe Thunderstorm
- Infestation
- Drought
- High Winds/Straight Line Winds
- Lightning
- Extreme Heat
- Hail
- Tornado

Although not part of the MJHMP, the remaining hazards are a part of the San Bernardino County 2007 General Plan and are addressed in the County Building Codes and Ordinance.

The information in this section provides an explicit representation of what a community stands to lose in a disaster. This is useful for county officials and other decision makers who will need to balance the costs of mitigation against the potential harm to citizens and damage to property. It provides comparable measurements of community natural hazard exposure and assists in determining which hazards and/or what parts of San Bernardino County to focus on making resilient to disaster first. Based upon possible assets at risk, hazard mitigation resources can be directed where need be, in-part, by a vulnerability assessment and information found in hazard profiles presented in Section 4.8.

4.10 Vulnerability Assessment

The information in this section provides an explicit representation of what a community stands to lose in a disaster. This is useful for county officials and other decision makers who will need to balance the costs of mitigation against the potential harm to citizens and damage to property. It provides comparable measurements of community natural hazard exposure[3] and assists in determining which hazards and/or what parts of San Bernardino County to focus on making resilient to disaster first. Based upon possible assets at risk, hazard mitigation resources can be directed where need be, in-part, by a vulnerability assessment and information found in hazard profiles presented in Section 4.2.

The vulnerability assessment is developed by providing the hazard mitigation analysts with quantitative and qualitative information for each hazard identified by the HMP Planning Team Through an exposure analysis, quantitative data is developed for each hazard. An exposure analysis provides quantities of people and assets at risk to particular hazards. Qualitative data has been developed and presented in this section for hazards without measurable data. Qualitative data provides information beyond quantities of people and assets at risk, but rather a description of how the hazard could affect a region like San Bernardino County.

Note: The hazard exposure analysis has been developed with best available data and follows methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses.

Note: There are other intangible losses that could result from a natural hazard event, such as losses of historic or cultural integrity or damage to the environment that are difficult to quantify. Other costs, including response and recovery costs, are often unrecoverable and are not addressed in this document.

4.10.1 Methodology

A vulnerability assessment was conducted for each of the identified priority hazards. Geospatial data is essential in determining population and assets exposed to particular hazards. Geospatial analysis can be conducted if a natural hazard has a particular spatial footprint that can be overlaid against the locations of people and assets. In San Bernardino County, wildfire, flood, earthquake, and landslides have known geographic extents and corresponding spatial information about each hazard.

Several sources of data are necessary to conduct a vulnerability analysis. Figure 4-22provides an exhibit of the data inputs and outputs used to create the vulnerability analysis results presented in this section. U.S. Census data is the primary source in determining natural hazard exposure to residents. Census data has been used to determine the population at risk, which is generally referred to as population exposure. Population exposure is provided for wildfire, flooding, earthquakes and landslides as potential hazards later in this section.

[3] Elements at risk; Risk inventory; Exposure encompasses all elements, processes, and subjects that might be affected by a hazardous event. Consequently, exposure is the presence of social, economic, environmental or cultural assets in areas that may be impacted by a hazard.

Together with the U.S. Census data, asset data was used to provide a snapshot of how City assets are affected by natural hazards. For purposes of this vulnerability analysis, asset data includes parcels and critical infrastructure within the San Bernardino County boundaries. Critical infrastructure is described as assets that are essential for people and a community to function. Critical infrastructure includes such as utilities, San Bernardino County owned facilities, bridges, schools, and other community facilities that provide essential services to residents.

Critical facilities data was developed from a variety of sources including San Bernardino County owned and maintained data, state and federal government datasets, and private industry datasets. A critical infrastructure spatial database was developed to translate critical facilities information into georeferenced[4] points. Critical facility points are intersected with the spatial hazard layers to develop a list of "at risk" critical facilities. The San Bernardino County critical facilities that intersect with natural hazards are referred to as facilities with hazard "exposure". Exposure results are presented later in this section.

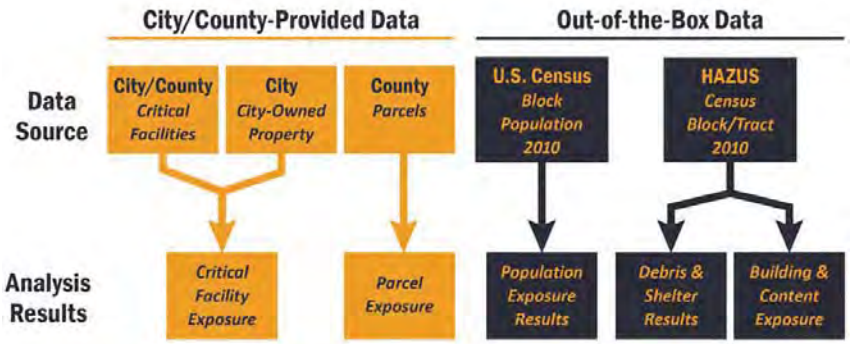


Figure 4-22: Data Source and Methodology

Lastly, FEMA's Hazus-MH MR5 (Hazus) software was implemented to conduct detailed loss estimation for flood and earthquake. Hazus is a nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. HAZUS uses Geographic Information Systems (GIS) technology to estimate physical, economic, and social impacts of disasters. For purposes of this planning effort, Hazus was used to graphically illustrate the limits of identified high-risk locations due to possible earthquakes and floods.

[4] To georeference something means to define its existence in physical space. That is, establishing its location in terms of map projections or coordinate systems. The term is used both when establishing the relation between raster or vector images and coordinates, and when determining the spatial location of other geographical features.

The vulnerability and potential impacts from priority hazards that do not have specific mapped areas nor the data to support additional vulnerability analyses are discussed in more general terms in alphabetical order following the discussion on wildfire, flooding and earthquake hazards.

4.10.2 Hazus MH Inputs

FEMA's loss estimation software, Hazus MH, was used to analyze the San Bernardino County building risk to flood and earthquake hazards. Hazus contains a database of economic, demographic, building stock, transportation facilities, local geology, and other information that can be used for several steps in the risk assessment process. Hazus software operates on structure square footage, structure replacement, and content replacement costs aggregated to the census block and tract levels depending on type of hazard analysis. The following table provides value data for building categories at the census block and census tract levels. Census block and census tracts are used to provide input information for the Hazus analysis presented in this report.

The project team used the San Bernardino County Essential Facilities Risk Assessment (SBEFRA) project and incorporated the newly updated DFIRM data into HAZUS to assess potential losses in the mapped 100-year (with and without levee protection) and 500-year flood zones.

Note: The Hazus software utilizes different census level information inputs to develop loss estimates depending on the hazard module. The flood module uses census block information while the earthquake module uses census track information. It is important to understand the total values of each as estimated damage to the community is presented on a percent of total value basis.

Table 4-12: Hazus Flood Census Block Input Values

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (%)	Content Replacement Cost ($000)	Content Replacement Cost (%)	Total Value ($000)	Total Value (%)
Agricultural	$ 70,841	0.3%	$ 70,841	0.3%	$ 141,682	1%
Commercial	$ 1,208,163	4.4%	$ 1,231,690	4.5%	$ 2,439,853	9%
Education	$ 120,017	0.4%	$ 127,161	0.5%	$ 247,178	1%
Governmental	$ 34,216	0.1%	$ 43,192	0.2%	$ 77,408	0%
Industrial	$ 452,710	1.6%	$ 610,063	2.2%	$ 1,062,773	4%
Religion	$ 176,012	0.6%	$ 176,012	0.6%	$ 352,024	1%
Residential	$ 15,483,634	56.2%	$ 7,744,650	28.1%	$ 23,228,284	84%
Total	**$ 17,545,593**	**64%**	**$ 10,003,609**	**36%**	**$ 27,549,202**	**100 %**

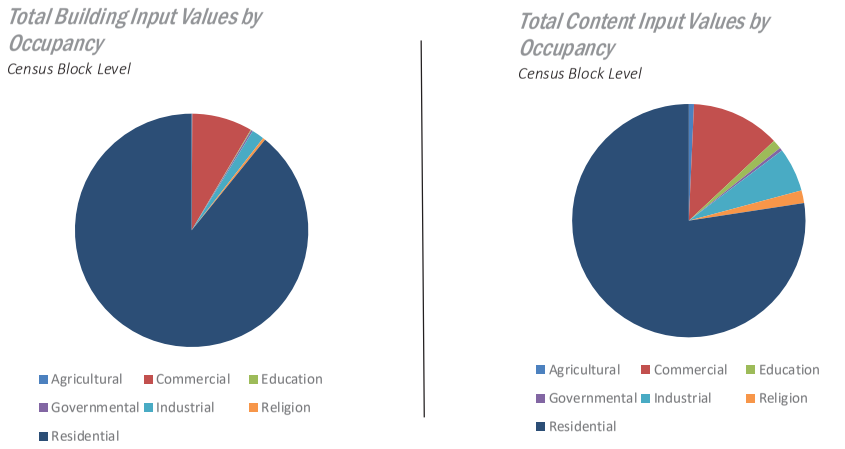


Figure 4-23: Census Block Building and Content Exposure Values

Table 4-13: Hazus Earthquake Census Tract Input Values

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (%)	Content Replacement Cost ($000)	Content Replacement Cost (%)	Total Value ($000)	Total Value (%)
Agricultural	$ 264,949	50.0%	$ 264,949	50.0%	$ 529,898	1%
Commercial	$ 11,056,871	48.5%	$ 11,756,479	51.5%	$ 22,813,350	9%
Education	$ 819,946	48.4%	$ 874,703	51.6%	$ 1,694,649	1%
Governmental	$ 265,933	45.6%	$ 316,930	54.4%	$ 582,863	0%
Industrial	$ 3,733,265	41.4%	$ 5,276,431	58.6%	$ 9,009,696	4%
Religion	$ 958,122	50.0%	$ 958,122	50.0%	$ 1,916,244	1%
Residential	$ 84,302,884	66.7%	$ 42,159,954	33.3%	$ 126,462,838	84%
Total	**$ 101,401,970**	**62%**	**$ 61,607,568**	**38%**	**$ 163,009,538**	**100 %**

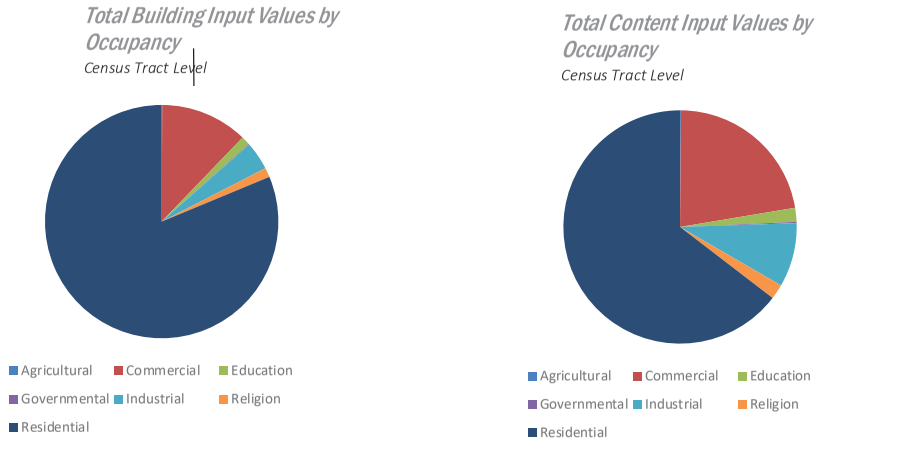


Figure 4-24: Census Tract Building and Content Exposure Values

4.11 Population and Assets

To describe vulnerability for each hazard, it is important to understand the "total" population and "total" assets at risk. The exposure for each hazard described in this section will refer to the percent of total population or percent of total assets. This provides the possible significance or vulnerability to people and assets for the natural hazard event and the estimated damage and losses expected during a "worst case scenario" event for each hazard. Sections below provide a description of the total population, critical facilities, and parcel exposure inputs.

Table 4-12 and Table 4-13 provide an estimate of the number and size of buildings in the County's unincorporated areas and its Special Districts, as well as the replacement value of the buildings and their contents. The table provides information by occupancy class (e.g., residential, commercial, etc.), as well as by construction type (e.g., concrete, wood frame, etc.).

4.11.1 Population

To develop hazard-specific vulnerability assessments, population near natural hazard risks should be determined to understand the total "at risk" population. We can understand how geographically defined hazards may affect San Bernardino County by analyzing the extent of the hazard in relation to the location of population. For purposes of the vulnerability assessment approximately 292,152 (100 %) of the San Bernardino County's population is exposed to one or more hazards within or near the County of San Bernardino boundaries. Each natural hazard scenario affects the San Bernardino County residents differently depending on the location of the hazard and the population density of where the hazard could occur. Vulnerability assessment sections presented later in this section summarize the population exposure for each natural hazard.

4.11.1.1 Vulnerable Populations

The severity of a disaster depends on both the physical nature of the extreme event and the socioeconomic nature of the populations affected by the event. Important socioeconomic factors tend to influence disaster severity. A core concept in a vulnerability analysis is that different people, even within the same region, have a different vulnerability to natural hazards.

4.11.1.2 Income and Housing Condition

Income or wealth is one of the most important factors in natural hazard vulnerability. This economic factor affects vulnerability of low income populations in several ways. Lower income populations are less able to afford housing and other infrastructure that can withstand extreme events. Low income populations are less able to purchase resources needed for disaster response and are less likely to have insurance policies that can contribute to recovery efforts. Lower income elderly populations are less likely to have access to medical care due to financial hardship. Because of these and other factors, when disaster strikes, low income residences are far more likely to be injured or left without food and shelter during and after natural disasters.

Figure 4-25 shows the median household income distribution for the County of San Bernardino in 2012. The "median" is the value that divides the distribution of household income into two equal parts (e.g., the middle). The average median household income in the County of San Bernardino between 2010 and 2014 was $54,100, in the United States during the same period the median house household income was $51,759.

4.11.1.3 Age

Children and the elderly tend to be more vulnerable during an extreme natural disaster. They have less physical strength to survive disasters and are often more susceptible to certain diseases. The elderly often also have declining vision and hearing and often miss reports of upcoming natural hazard events. Children, especially young children, have the inability to provide for themselves. In many cases, both children and the elderly depend on others to care for them during day to day life.

Finally, both children and the elderly have fewer financial resources and are frequently dependent on others for survival. In order for these populations to remain resilient before and after a natural hazard event, it may be necessary to augment city residents with resources provided by the City, state and federal emergency management agencies and organizations. See Figure 4-26 and Figure 4-27 for location of vulnerable population by age within the County of San Bernardino.



Figure 4-25: Median Household Income Distribution Maps

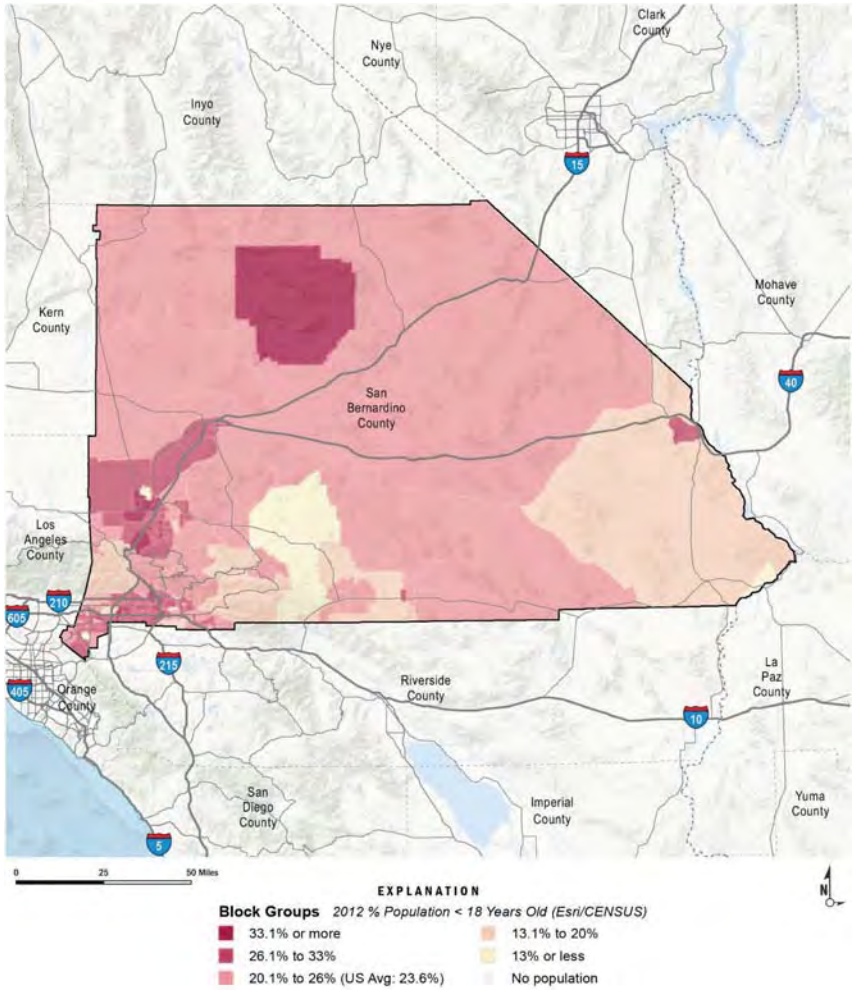


Figure 4-26: Population Under Age 18

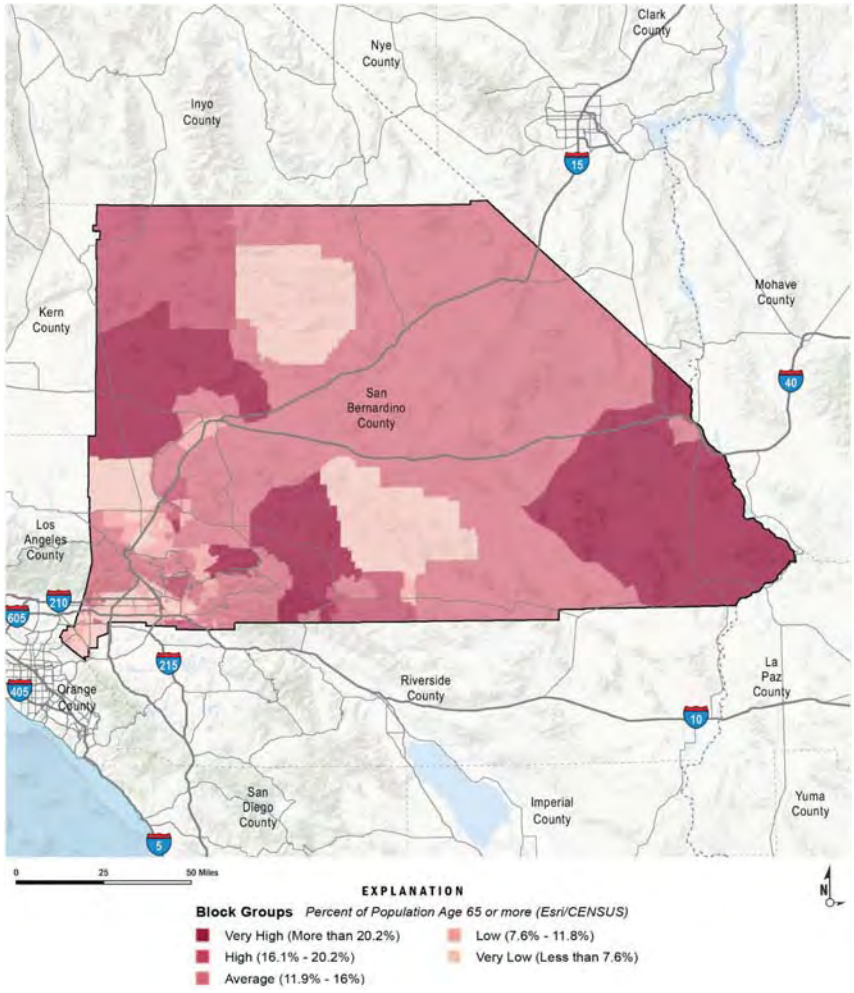


Figure 4-27: Population Over Age 65

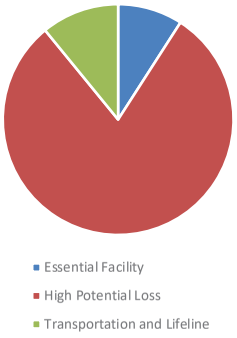
4.11.1.4 Critical Facility List

As stated in the San Bernardino County Emergency Operations Plan (EOP), the San Bernardino County Sheriff's Department (Sheriff) is the lead County agency in identifying critical infrastructure in the County and its Special Districts. A Sheriff's Department Working Group was established to identify Critical Facilities throughout San Bernardino County. Due to Homeland Security and issues related to terrorism, this list is not included in the MJHMP, but is available through the Sheriff's Department.

The Sheriff's Department maintains a Critical Infrastructure Database listing the site name, location, critical level, threat level, site type, and contact information. This database was created for the 2010 MJHMP and has been updated regularly by the Intelligence Division. The Sheriff's Intelligence Division has created Emergency Response Folders (Folders) on each of the locations. The Folders contain site-specific information needed by emergency personnel to respond to any type of emergency. The Folders contain floor plans, photographs, entry/exit points, utility locations, ingress and egress locations, known hazardous materials on site, and emergency contact information for the responsible persons of the site. The Sheriff's Department maintains control and transport of this information to an Incident Command Post/Department Operations Center/Emergency Operations Center when needed.

Table 4-14: Critical Facility Points

Infrastructure Type	Feature Count
Essential Facility	**268**
EOC	2
Fire Station	99
Hospital	9
Police Station	28
School	130
High Potential Loss	**1,155**
Child Care Center	91
Child Residential Care - 24 hour	2
Foster Family Agency	2
Adult Residential Care	52
Home Care Organization	2
Elder Residential Care	35
Communication Facility	40
Dam	24
Waste Water Facility	2



Infrastructure Type	Feature Count
HAZMAT	51
EPA FRS Facility	731
FCC ASR	107
Electric Power Facility	6
Natural Gas Facility	7
Potable Water Facility	3
Transportation and Lifeline	**636**
Airport	34
Runway	36
Bus Facility	2
Highway Bridge	553
Railway Bridge	11
Grand Total	**2,059**

Table 4-15: Linear Utilities

Infrastructure Type	Total Linear Mileage
Transportation and Lifeline	**16,992**
Railway	**719**
Roads	**16,273**
Interstate Highway	587
State / County Highway	1,259
Primary Highway	308
Local Road, Major	2,928
Local Road	6,530
Other Minor Road	4,031
Vehicular Trail	543
Cul-de-Sac / Traffic Circle	11
Ramp	68
Service Road	8
Grand Total	**16,992**

4.11.1.5 Utility Agencies

The utilities and transportation infrastructure is another significant concern for the County and its Special Districts. Various laws, ordinances, regulations, standards, and guidelines have been established to ensure proper and thorough mitigation measures to decrease the effects of hazards.

The following are two of the major utility agencies:

Southern California Edison (SCE) has undertaken an all-hazards approach to planning for an emergency event. SCE has developed an Emergency Response and Recovery Plan to provide a safe and reliable electric service. SCE also has a long-standing relationship with the County and is an active member of several local, state, and federal organizations. According to SCE they have acted to mitigate the impacts of hazards on their electrical system.

Southwest Gas Corporation (SWG) has also coordinated with the County, maintains a natural gas high-pressure system within the County, and consists of approximately 100 miles of underground pipelines. The system also includes some above ground facilities. The total replacement cost for the entire system is approximately $40,000,000. Southwest Gas conducts annual training for the first responders within their service territories to teach the proper methods of responding to and working with natural gas leaks. Staff from SWG serves on local emergency management committees within their service territory.

4.12 Hazard Specific Vulnerabilities

This section summarizes the possible impacts and quantifies, where data permits, the County's vulnerability to each of the priority hazards identified in the hazard profiles earlier in this section.

An estimate of the vulnerability of the County to each identified hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, geographic extent, and damage and casualty potential. It is categorized into the following classifications:

Low: Minimal potential impact the occurrence and potential cost of damage to life and property is minimal.

Medium: Moderate potential impact this ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.

High: Widespread potential impact this ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.

Extremely High: Very widespread with catastrophic impact.

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of buildings subject to the identified hazard can be inventoried and their values tabulated. Other information can be collected in regard to the hazard area, such as the location of critical community facilities, historic structures, and valued natural resources. Together, this information conveys the vulnerability of that area to a hazard.

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4.13 Earthquake



Major Impacts from earthquakes are primarily the probable number of casualties and damage to infrastructure occurring from ground movement along a particular fault (USGS, 2016). The degree of infrastructure damage depends on the magnitude, focal depth, distance from fault, duration of shaking, type of surface deposits, presence of high groundwater, topography, and the design, type, and quality of infrastructure construction.

To analyze the risk to San Bernardino County residents, the Great Shakeout scenario was chosen modeled by the California Integrated Seismic Network (CISN). The 2016 Great Southern California ShakeOut was based on a potential magnitude 7.8 Earthquake on the southern San Andreas Fault approximately 5,000 times larger than the magnitude 5.4 earthquake that shook southern California on July 29, 2008. Such an earthquake will cause unprecedented damage to Southern California greatly dwarfing the massive damage that occurred in Northridge's 6.7-magnitude earthquake in 1994. The hazard foot print for this scenario was used to develop exposure results for population, critical facilities, and single family residential parcel values. FEMA Hazus analyses was used to conducted loss estimation for both scenarios and include building and content loss estimation results based on peak ground acceleration, peak ground velocity, and peak spectral acceleration modeled for the 7.8 earthquake on the San Andreas Fault.

4.13.1 Population at Risk

According to the 2010 US Census, the population of jurisdiction is 297,425. Though rural residential construction is not particularly vulnerable to earthquakes, the chosen earthquake scenarios will directly or indirectly expose the entire population of San Bernardino County to ground shaking. Depending on the time of day (the population differs based on employment opportunities) and exact location of the modeled epicenter, the earthquake scenarios could be experienced differently. Figure 4-28 exhibit the population totals in each modeled earthquake severity zone. Population location is based upon information taken during the 2010 U.S. Census.

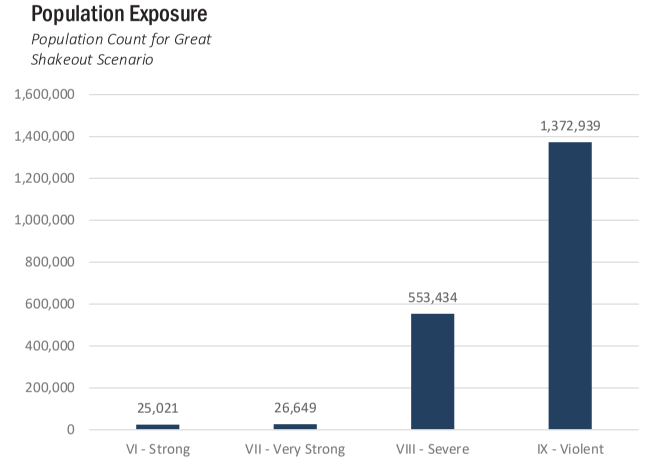


Figure 4-28: Population Exposure to the Great Shakeout EQ Shake Severity Zone

4.13.2 Improved Parcel Value at Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels. GIS was used to create centroids, or points, to represent the center of each parcel polygon this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the shake severity zones to determine the at-risk structures. Only improved parcels greater than $20,000 were analyzed. The analysis indicates residential parcels the chosen scenario will experience similar, but different shaking patterns. The type and year of construction will greatly influence damage for structures subject to similar shaking. Table 4-16 shows the count of at-risk structures and their associated improvement and land exposure values.

Table 4-16: Improved Parcel Value Exposure from Southern California Great ShakeOut

Shake Severity Zone	Improved Parcel Count	Improvement Value Exposure ($000)	Land Value Exposure ($000)	Total Exposure ($000)
IV - Light	1,099	$ 181,952	$ 64,548	$ 246,499
V - Moderate	4,382	$ 485,082	$ 215,875	$ 700,956

Shake Severity Zone	Improved Parcel Count	Improvement Value Exposure ($000)	Land Value Exposure ($000)	Total Exposure ($000)
VI - Strong	1,340	$ 142,763	$ 63,941	$ 206,704
VII - Very Strong	7,669	$ 824,794	$ 206,725	$ 1,031,519
VIII - Severe	46,889	$ 8,741,904	$ 3,039,484	$ 11,781,388
IX - Violent	46,974	$ 9,068,446	$ 3,591,379	$ 12,659,825
Grand Total	**108,353**	**$ 19,444,940**	**$ 7,181,951**	**$ 26,626,891**

4.13.3 Critical Facilities with Damage Potential

Earthquakes pose numerous risks to critical facilities and infrastructure. Seismic risks, or losses, that are likely to result from exposure to seismic hazards include:

- Casualties (fatalities and injuries).
- Utility outages.
- Economic losses for repair and replacement of critical facilities, roads, buildings, etc.
- Indirect economic losses such as income lost during downtime resulting from damage to private property or public infrastructure.

Roads or railroads that are blocked or damaged can prevent access throughout the area and can isolate residents and emergency service providers needing to reach vulnerable populations or to make repairs.

Linear utilities and transportation routes are vulnerable to rupture and damage during and after a significant earthquake event. The cascading impact of a single failure can have affects across multiple systems and utility sectors. Degrading infrastructure systems and future large earthquakes with epicenters near critical regional infrastructure could result in system outages that last weeks for the most reliable systems, and multiple months for others.
Table 4-17provides an inventory of critical facility locations (points only) with earthquake exposure to the Great Shakeout Scenario. The building codes have been amended to include provisions for seismic safety at various bench marks years. Depending on “year built”, each critical facility presented in the tables may have varying damage potential.

Table 4-17: Critical Facilities with Earthquake Risk Southern California Great ShakeOut

Infrastructure Type	Violent Shake Zone (IX)	Severe Shake Zone (VIII)	Very Strong (VII)	Strong Shake Zone (VI)	Feature Count
Essential Facility	3	12	80	122	217
EOC	-	-	2	-	2
Fire Station	3	7	31	34	75
Hospital	-	-	9	-	9
Police Station	-	-	3	24	27
School	-	5	35	64	104

Infrastructure Type	Violent Shake Zone (IX)	Severe Shake Zone (VIII)	Very Strong (VII)	Strong Shake Zone (VI)	Feature Count
High Potential Loss	31	56	213	484	784
Child Care Center	1	3	25	56	85
Child Residential Care – 24 hour	-	-	-	2	2
Foster Family Agency	-	-	-	2	2
Adult Residential Care	2	5	10	34	51
Home Care Organization	-	-	1	1	2
Elder Residential Care	-	1	9	25	35
Communication Facility	1	9	9	8	27
Dam	1	-	11	4	16
Electric Power Facility	1	-	-	-	1
Natural Gas Facility	2	-	-	-	2
Waste Water Facility	-	2	-	-	2
HAZMAT	-	-	6	16	22
EPA FRS Facility	21	27	115	307	470
FCC ASR	2	9	27	29	67
Transportation and Lifeline	16	20	41	131	208
Airport	5	5	8	-	18
Runway	5	6	7	1	19
Bus Facility	-	-	1	-	1
Highway Bridge	6	8	24	124	162
Railway Bridge	-	1	1	6	8
Grand Total	**50**	**88**	**334**	**737**	**1,209**

HazMat Fixed Facilities

Although earthquakes are low probability events, they produce hazardous materials (HazMat) threats at very high levels when they do occur. Depending on the year built and construction of each facility containing HazMat, earthquake initiated hazardous material releases (EIHR) potential will vary. HazMat contained within masonry or concrete structures built before certain benchmark years reflecting code improvements may be of particular vulnerability.

Transportation

Earthquake events can significantly impact bridges which often provide the only access to some neighborhoods. Since soft soil regions generally follow floodplain boundaries, bridges that cross water courses are considered vulnerable. Since most of the San Bernardino County bridges provide access across water courses, most are at least somewhat vulnerable to earthquakes. Key factors in the degree of vulnerability are the bridge’s age and type of construction which indicate the standards to which the bridge was built. Special attention will be paid to the multiple bridges that cross interstates. Interstates would serve as major emergency response and evacuation routes.

Utilities

Linear utilities and transportation infrastructure would likely suffer considerable damage in the event of an earthquake. Due to the amount of infrastructure and sensitivity of utility data, linear utilities are difficult to analyze without further investigation of individual system components. Table 4-18 provides the best available linear data and it should be assumed that these systems are exposed to breakage and failure.

Table 4-18: Lifeline with Earthquake Risk Southern California Great ShakeOut

Facility Type	Strong	Very Strong	Severe	Violent	Total Mileage
Transportation and Lifeline	1,324	1,951	2,796	2,624	8,697
Railway	47	22	22	99	191
Roads	1,277	1,929	2,774	2,525	8,506
Interstate Highway	22	7	-	48	77
State / County Highway	57	90	263	233	644
Primary Highway	34	15	19	27	95
Local Road, Major	102	207	625	792	1,726
Local Road	540	1,153	1,728	1,128	4,550
Other Minor Road	494	423	109	96	1,122
Vehicular Trail	25	32	26	178	261
Cul-de-Sac / Traffic Circle	-	1	2	2	5
Ramp	2	1	2	20	25
Service Road	-	-	-	1	1
Grand Total	**1,324**	**1,951**	**2,796**	**2,624**	**8,695**

4.13.4 Loss Estimation Results

The Hazus Level 2 analysis was used to assess the risk from and vulnerability to earthquake shaking within San Bernardino County. Hazus buildings data is aggregated to the census tract level for earthquake models, known as the general building stock (GBS), which has a level of accuracy acceptable for planning purposes. Where possible the GBS was enhanced using GIS data from the county as described previously. The following sections describe risk to and vulnerability of the GBS within the San Bernardino County Hazus calculates losses to structures from earthquake shaking by considering the amount of ground displacement and type of structure. The software estimates the percentage of damage to structures and their contents by applying established building fragility curves. Damage estimates are then translated to estimated dollar losses.

For each Great ShakeOut Scenario ground shaking data (shakemaps) were acquired from CISN and imported into Hazus. The shakemap data consist of peak ground velocity, peak

ground acceleration, peak spectral acceleration at 0.3 seconds, and peak spectral acceleration at 1.0 seconds. The earthquake module operates on census tracts that often include population and structures in the incorporated cities and the unincorporated area within a single tract. Due to this fact the results include census tracts that have a substantial portion of land within the incorporated area (loss estimates for some tracts will include structures in incorporated cities).

The results are summarized in Table 4-17 for the Great ShakeOut Scenario. It is important to understand that the Hazus earthquake module uses the census tract as its enumeration unit rather than the more detailed census block. The loss estimation values for earthquakes are much higher than those of the flooding and dam failure due to this fact. The portions of incorporated areas included within boundary census tracts elevate the values due to the inclusion of additional GBS. Though the difference between census tracts and census blocks are extremely disparate, the most important summary information is the percent of loss estimation against the total value.

Residential building and content loss estimation from the Great ShakeOut Scenario is *$9.3* billion dollars and 57 percent of the total value of the residential buildings. In Great ShakeOut Scenario, residential damage will be the greatest. While there are several limitations to the FEMA Hazus model, it does allow for potential loss estimation. It is important to remember that the replacement costs are well below actual market values, thus, the actual value of assets at risk may be significantly higher than those included herein.

Table 4-19: Estimated Building and Content Loss Great ShakeOut Scenario Earthquake

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (% of Total Value)	Content Replacement Cost ($000)	Content Replacement Cost (% of Total Value)	Total Estimated Loss ($000)	Total Loss Estimation (% of Total Value)
Agricultural	$ 51,431	9.7%	$ 17,215.68	3.2%	$ 68,646.80	13.0%
Commercial	$ 3,286,331	14.4%	$ 1,110,422.84	4.9%	$ 4,396,754.29	19.3%
Educational	$ 175,987	10.4%	$ 56,822.89	3.4%	$ 232,810.20	13.7%
Government	$ 53,348	9.2%	$ 20,298.84	3.5	$ 73,647.28	12.6%
Industrial	$ 1,179,339	13.1%	$ 590,913.81	6.6%	$ 1,770,253.41	19.6%
Religious	$ 243,891	12.7%	$ 80,862.72	4.2%	$ 324,754.33	16.9%
Residential	$ 7,841,645	6.2%	$ 1,525,181.65	1.2%	$ 9,366,826.84	7.4%
Grand Total	**$ 12,831,972**	**7.9%**	**$ 3,401,718.42**	**2.1%**	**$ 16,233,693.14**	**10.0%**

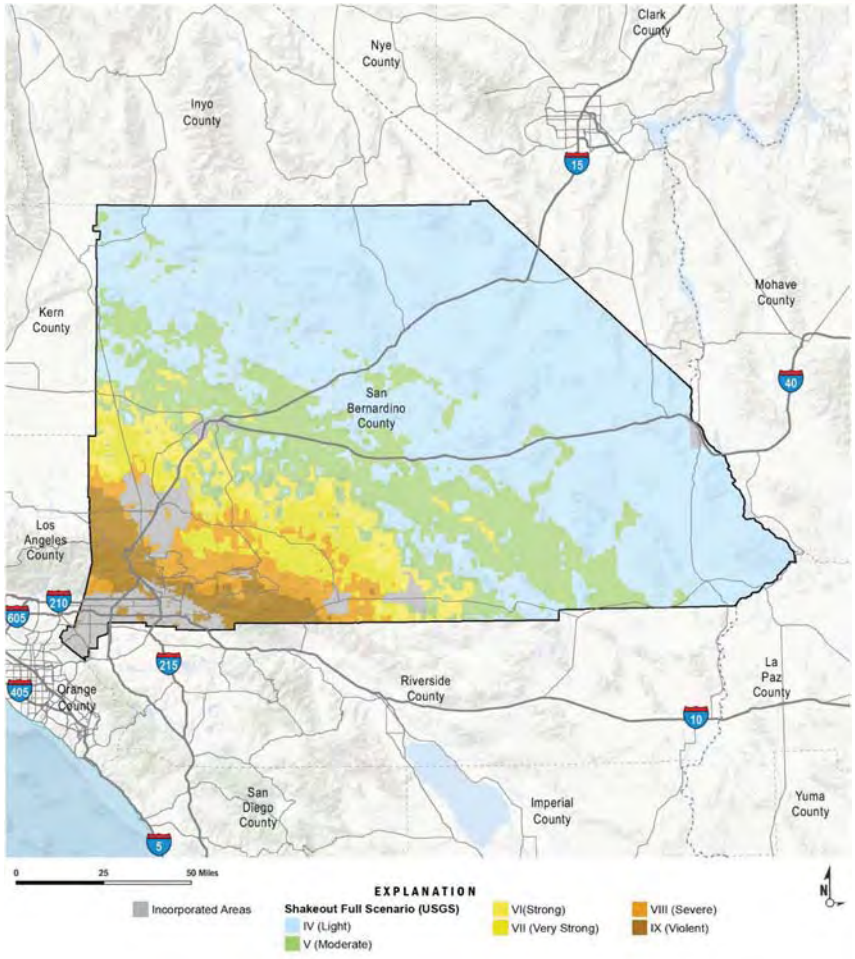


Figure 4-29: Great Shakeout Scenario MMI Classes

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4.14 Wildfire

Risk to the County of San Bernardino from wildfire is of significant concern. High fuel loads in the hills, along with geographical and topographical features, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. During the May to October fire season the dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become large and out-of-control.

Potential losses from wildfire include human life, structures and other improvements, natural and cultural resources, quality and quantity of water supplies, cropland, timber, and recreational opportunities. Short and long-term economic losses could also result due to loss of business and other economic drivers associated with San Bernardino County summer season activities. Smoke and air pollution from wildfires can be a severe health hazard. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

Generally, there are three major factors that sustain wildfires and predict a given area's potential vulnerability to burn. These factors are fuel, topography, and weather.

- Fuel – Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and volume. Fuel sources are diverse and include everything from dead tree leaves, twigs, and branches, to dead standing trees, live trees, brush, and cured grasses. Manmade structures are also considered a fuel source, such as homes and other associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Fuel is the only factor that is under human control. Development in the mountain region currently possesses the highest vulnerability to wildfire.

- The residents of this region are also considered to be the most vulnerable due to their age and income levels. This area is comprised of lower income (that is, lower than the US median income) homes as well as a higher than average amount of residents under age 18 and an average amount of residents 65 or older.
- Topography – An area's terrain and slope affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.

- Weather – Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out fuels that feed wildfires, creating a situation where fuel will ignite more readily and burn more intensely. Thus, during periods of drought the threat of wildfire increases. Wind is the most treacherous weather factor. The greater the wind, the faster a fire can spread and the more intense it can be. Wind shifts, in addition to wind speed, can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. As part of a weather system, lightning also ignites wildfires, often in difficult to reach terrain for firefighters.

Factors contributing to the high, widespread wildfire risk in San Bernardino County include:

- Narrow and often one-lane and/or dead-end roads complicating evacuation and emergency response.
- Nature and frequency of ignitions; and increasing population density leading to more ignitions.
- Slope of the foothills;
- Residential development along the foothills;

4.14.1 Population at Risk

Wildfire risk is of greatest concern to populations residing in the moderate, high, and very high wildfire hazard zones. The San Bernardino County census block data was used to estimate populations within the hazard zones. There are a significant number of people living within the WUI described in the wildfire profiles. More than 34,000 residents in the unincorporated county live within areas considered very high fire hazard and more than 63,000 residents live within a very high hazard

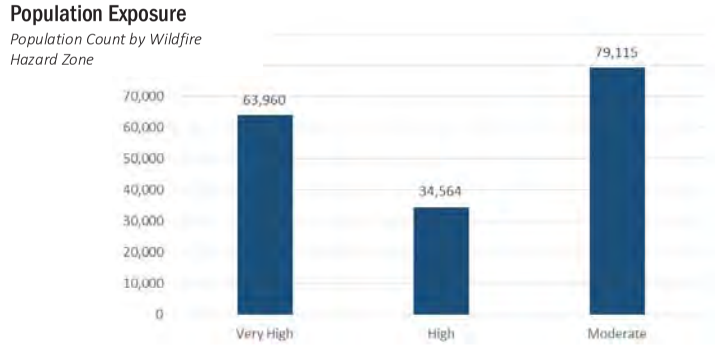


Figure 4-30: Population at Risk from Wildfire Hazards

4.14.2 Improved Parcel Value at Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels. In some cases, a parcel will be within in multiple fire threat zones. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the fire threat layer to determine the risk for each structure. The fire threat zone in which the centroid was located was assigned to the entire parcel. This methodology assumed that every parcel with a square footage value greater than zero was developed in some way. Only improved parcels were analyzed. Table 4-20 exhibits portions of San Bernardino County that have significant assets at risk to wildfire in the Moderate, High and Very High fire severity zones.

Table 4-20: Residential Buildings and Content at Risk from Wildfire

Fire Hazard Severity Hazard Zone	Improved Parcel Count	Improvement Value Exposure ($000)	Land Value Exposure ($000)	Total Exposure ($000)
Very High	43,794	$ 8,602,590	$ 3,075,148	$ 11,677,739
High	11,512	$ 1,822,731	$ 551,160	$ 2,373,892
Moderate	25,477	$ 3,221,982	$ 950,044	$ 4,172,026
Non-Wildland/Non-Urban	621	$ 573,866	$ 294,283	$ 868,148
Urban Un-zoned	26,974	$ 5,223,286	$ 2,310,932	$ 7,534,219
Grand Total	**108,378**	**$ 19,444,456**	**$ 7,181,567**	**$ 26,626,023**

Note:
1-The table above does not display loss estimation results; the table exhibits total value at risk based upon the hazard overlay and San Bernardino County Assessor data.
2- Parcel information is for all county parcels with greater than $20,000 in assessed parcel improvement value only. The San Bernardino County Assessor's roles only provide spatial information on assessed improvement and land values.

4.14.3 Critical Facilities at Risk

Critical facilities data were overlain with fire hazard severity zone data to determine the type and number of facilities within each risk classification. Tables 4-21 and 4-22 list the critical facilities in the High and Very High wildfire hazard zones for San Bernardino County.

Table 4-21: Critical Facilities at Risk from Wildfire

Infrastructure Type	High	Very High	Feature Count
Essential Facility	11	105	116
EOC	2	0	2
Fire Station	4	45	49
Hospital	0	5	5
Police Station	0	24	24
School	5	31	36
High Potential Loss	72	177	249
Child Care Center	3	29	32
Child Residential Care - 24 hour	1	0	1
Foster Family Agency	0	0	0
Adult Residential Care	11	4	15
Home Care Organization	0	0	0
Elder Residential Care	8	5	13
Communication Facility	2	13	15
Dam	0	14	14
Electric Power Facility	0	0	0
Natural Gas Facility	0	0	0
Potable Water Facility	0	0	0
Waste Water Facility	0	0	0
HAZMAT	0	2	2
EPA FRS Facility	37	83	120
FCC ASR	10	27	37
Transportation and Lifeline	10	103	113
Airport	1	0	1
Runway	1	0	1
Bus Facility	1	0	1
Highway Bridge	7	101	108
Railway Bridge	0	2	2
Grand Total	**93**	**385**	**478**

Table 4-22: Lifelines with Wildfire Risk

Facility Type	High	Very High	Total Mileage
Transportation and Lifeline	819	1,906	2,725
Railway	19	47	66
Roads	800	1,859	2,659
Interstate Highway	4	37	41
State / County Highway	33	226	259
Primary Highway	17	13	30
Local Road, Major	311	521	832
Local Road	389	806	1,195
Other Minor Road	34	56	91
Vehicular Trail	10	184	195
Cul-de-Sac / Traffic Circle	1	2	3
Ramp	2	12	13
Service Road	0	1	1
Grand Total	**819**	**1,906**	**2,725**

4.14.4 Loss Estimation Results

Wildland fire cost impacts of damage done to land and structures and also to critical infrastructure

It is impossible to estimate the possible cost in dollars to replace and pay for actual firefighting as the damage costs that incur from wildland fires varies so greatly. One of the varied costs is the replacement and repair of structures and remediate of the damaged properties. Then the rebuilding costs and replacing of the structures with laws requiring new buildings to meet new criteria as a result of state laws that may require more stringent building and construction practices far greater than the original building of the said structure. Also the estimate of damages to critical infrastructures such as power lines and delivery systems as it is difficult the collateral loses to businesses and individuals losing power for and unknown time. Also damages to railroads and bridges also to road way, freeways as it is impossible to gauge the actual lose amounts from commerce being impeded.

Many of the County's landfills, transfer stations, and closed disposal sites are situated in areas subject to wildfires. In 2003, the Old Fire burned through three separate sites and caused major damage at the Heaps Peak Transfer Station when the fire burned through the office building and Transfer Station site.

None of this takes into account the costs of labor and retardants, vehicle damages and fuel and wear and tear as well as equipment expended and used and or damaged. Along with replace any safety gear or injuries to any persons working to mitigate the wildland fire

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4.15 Flooding

The County has experienced severe and widespread flooding throughout its history. Several major drainage basins have the potential to subject residents and structures to a high risk of flooding. In addition, the cumulative increase in impervious surfaces has increased problems related to surface run- off. While complete avoidance or protection through control facilities is not practical, considerable improvement can be made through structural and non-structural methods.



The County currently utilizes land use zoning districts to prohibit habitable structures in floodways as defined by the federal requirements necessary to participate in the National Flood Insurance Program. The consistent adoption of overlays is needed to require special review, conditions, and the prohibition of some uses in floodplain areas (areas subject to 100-year floods), including dry lakes. In addition, there are land use policies and development standards that can be implemented, including reduction of impervious surfaces; increase of percolation, infiltration, and recharge; and the control of urban run-off. There is a need for the County to identify all areas of flood and drainage hazards, especially in the Desert Region where mapping is sparse, as well as areas with a heavy concentration of debris or the potential for dam inundation. Flood hazards are more comprehensively discussed in the Safety Background Report.

The vulnerable areas are addressed in the County's General Plan. See Sections 5 and 6 for additional information. San Bernardino County has seven (7) properties listed in the Repetitive Loss and Severe Repetitive Loss properties. All of the properties are single-family residences. The properties are located in:

- Barstow – 2 properties (1999 and 2005)
- Crestline (1980 and 1982)
- Forest Falls (1995 and 1999)
- Lake Arrowhead (1998 and 2005)
- Lytle Creek (1998 and 2005)
- Sugarloaf (1993 and 1995)

These properties were damaged during unusual storms and/or immediately after a wildfire in the area and are isolated properties in widely scattered areas of the County. The properties were not damaged during the 2009 or 2010 winter storm events. Property addresses are not listed to comply with privacy laws.

The areas are now covered by the County General Plan and County Ordinance. These are in compliance with the National Flood Insurance Program.

4.15.1 Population at Risk

Of greatest concern in the event of a flood is the potential for loss of life. Using 2012 population data aggregated by census blocks, an estimate was made of the population exposed to the 100 and 500-year floodplain. To account for census blocks that were partially within the floodplain, a weighted average was employed to calculate the proportion of the population within the floodplain. The results of the population overlay are shown in Figure 4-31. More than 9,500 residents live near or within the 100-year floodplain and approximately 13,346 county residents live within the 500-year floodplain. Approximately 18,816 county residents live within areas protected by levees.

Population Exposure

Population Count within Unincorporated San Bernardino County by Flood Hazard Zone

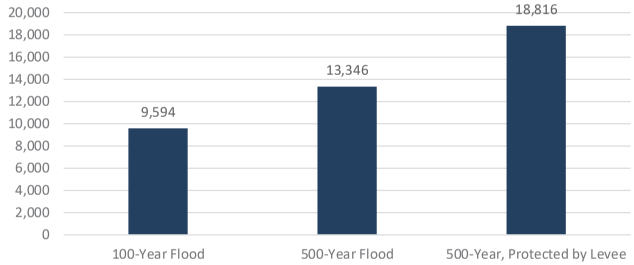


Figure 4-31: Population Exposed to NFIP Flood Zones

4.15.2 Residential Parcel Value with Flood Risk

The County's parcel layer was used as the basis for the inventory of improved residential parcels within the FEMA NFIP flood zones. In some cases, a parcel will be within in multiple flood zones. GIS was used to create centroids, or points, to represent the center of each parcel polygon – this is assumed to be the location of the structure for analysis purposes. The centroids were then overlaid with the floodplain layer to determine the flood risk for each structure. The flood zone in which the centroid was located was assigned to the entire parcel. This methodology assumed that every parcel with a square footage value greater than zero was developed in some way. Only improved parcels greater than $20,000 were analyzed.

Table 4-23 shows the count of at-risk parcels and their improvement and land exposure values.

Table 4-23: Parcels Exposed to NFIP Flood Zones

Flood Hazard Zone	Improved Parcel Count	Improvement Value Exposure ($000)	Land Value Exposure ($000)	Total Exposure ($000)
100-Year Flood	3,426	$ 518,483	$ 368,058	$ 886,541
500-Year Flood	3,397	$ 833,287	$ 338,728	$ 1,172,014
500-Year, Protected by Levee	4,608	$ 1,327,942	$ 527,317	$ 1,855,259
Grand Total	11,431	$ 2,679,711	$ 1,234,103	$ 3,913,814

While there are several limitations to this methodology, it does allow for potential loss estimation. It should be noted that the analysis may include structures in the floodplain that are elevated at or above the level of the base flood elevation, which will most likely decrease potential flood damage to these structures. Also, it is important to remember that the County Assessor's values are well below actual market values; thus, the actual value of assets at risk may be significantly higher than those included herein.

4.15.3 Critical Facilities Exposure

Critical facilities data were overlain with flood hazard data to determine the type and number of facilities within the 100- and 500-year floodplain. Flooding poses numerous risks to critical facilities and infrastructure:

- Roads or railroads that are blocked or damaged can prevent access throughout the area and can isolate residents and emergency service providers needing to reach vulnerable populations or to make repairs.
- Bridges washed out or blocked by floods or debris from floods also can cause isolation.
- Creek or river floodwaters can back up drainage systems causing localized flooding.
- Floodwaters can get into drinking water supplies causing contamination.
- Sewer systems can be backed up causing waste to spill into homes, neighborhoods, rivers, and streams.
- Underground utilities can also be damaged.

Tables 4-24 and 4-25 provide an inventory of critical facilities in the floodplain for San Bernardino County and it provides the location of lifelines relative to the floodplain in the areas of the San Bernardino County. With a total of 810 essential facilities, high potential losses, and transportation and lifeline structures located in either the 100 or 500-year flood zone, the impact to the community could be devastating if these critical facilities were damaged or destroyed during a flood event.

Table 4-24: Critical Facility Exposed to NFIP Flood Zones

Infrastructure Type	100 Year Flood Zone	500 Year Flood Zone	500 Year Flood Zone, Protected by Levee	Feature Count
Essential Facility	21	114	5	140
EOC	0	1	0	1
Fire Station	4	27	2	33
Hospital	0	4	0	4
Police Station	2	23	0	25
School	15	59	3	77
High Potential Loss	52	458	52	562
Child Care Center	13	57	3	73
Child Residential Care - 24 hour	0	2	0	2
Foster Family Agency	0	2	0	2
Adult Residential Care	0	37	3	40
Home Care Organization	0	2	0	2
Elder Residential Care	0	24	8	32
Communication Facility	0	7	0	7
Dam	2	3	0	5
Waste Water Facility	1	0	0	1
HAZMAT	0	16	1	17
EPA FRS Facility	33	286	35	354
FCC ASR	3	22	2	27
Transportation and Lifeline	26	77	5	108
Airport	2	5	0	7
Runway	2	5	0	7
Bus Facility	1	1	0	2
Highway Bridge	20	65	5	90
Railway Bridge	1	1	0	2
Grand Total	**99**	**649**	**62**	**810**

Table 4-25: Lifelines Exposure to NFIP Flood Zones

Facility Type	100 Year	500 Year Flood Zone	500 Year Flood Zone, Protected by Levee	Total Mileage
Transportation and Lifeline	204	1,952	69	2,225
Railway	9	44	6	59
Roads	195	1,908	63	2,166
Interstate Highway	1	34	1	36
State / County Highway	20	189	9	218
Primary Highway	7	20	-	28

Facility Type	100 Year	500 Year Flood Zone	500 Year Flood Zone, Protected by Levee	Total Mileage
Local Road, Major	32	377	38	447
Local Road	115	1,168	13	1,295
Other Minor Road	18	86	2	107
Vehicular Trail	2	15	-	17
Cul-de-Sac / Traffic Circle	0	1	-	1
Ramp	0	18	0	19
Grand Total	**204**	**1,952**	**69**	**2,225**

4.15.4 Loss Estimation Results

The Hazus analysis was used to assess the risk from and vulnerability to flooding within San Bernardino County. Hazus buildings data is aggregated to the census block level, known as the general building stock (GBS), which has a level of accuracy acceptable for hazard mitigation planning purposes. The following sections describe risk to and vulnerability of the GBS within the San Bernardino County mapped regulatory floodplain. The total value of exposed buildings and content within the San Bernardino planning area was generated using Hazus and is previously summarized.

Hazus calculates losses to structures from flooding by considering the depth of flooding and type of structure. Using historical flood insurance claim data, the software estimates the percentage of damage to structures and their contents by applying established depth-damage curves. Damage estimates are then translated to estimated dollar losses. The results are summarized in Tables 4-26 and 4-27 and Figure 4-32. While there are several limitations to the FEMA Hazus model, it does allow for potential loss estimation. It should be noted that the analysis may include structures in the floodplain that are elevated at or above the level of the base flood elevation, which will likely mitigate flood damage. Also, it is important to remember that the replacement costs are well below actual market values, thus, the actual value of assets at risk may be significantly higher than those included herein.

Table 4-26: Flood Loss Estimation (Based on Depth) in NFIP Flood Zones

Flood Hazard Zone	Building Loss ($000)	Building Loss (% of Total Value)	Content Loss ($000)	Content Loss (% of Total Value)	Total Estimated Loss ($000)	Total Estimated (% of Total Value)
100-Year	$ 34,749.00	0.1%	$ 24,858.00	0.1%	$ 59,849.00	0.2%
500-Year	$ 218,454.00	0.8%	$ 173,304.00	0.6%	$ 396,336.00	1.4%

Table 4-27: 100 Year Flood Los Estimation (Based on Depth) in NFIP Flood Zones by Occupancy Type

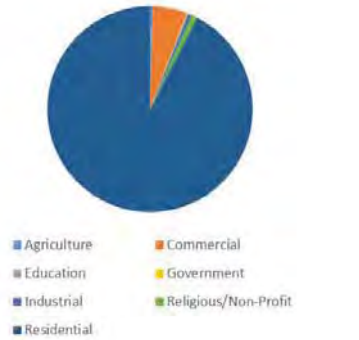
Building Type	Building Replacement Costs ($000)	Building Replacement Cost (% of Total Value)	Content Replacement Cost ($000)	Content Replacement Cost (% of Total Value)	Total Estimated Loss ($000)	Total Loss Estimation (% of Total Value)
Agriculture	$ 147.00	0.10%	$ 246.00	0.17%	$ 427.00	0.30%
Commercial	$ 1,874.00	0.08%	$ 4,458.00	0.18%	$ 6,463.00	0.26%
Education	$ 46.00	0.02%	$ 271.00	0.11%	$ 319.00	0.13%
Government	$ 56.00	0.07%	$ 304.00	0.39%	$ 370.00	0.48%
Industrial	$ 201.00	0.02%	$ 389.00	0.04%	$ 624.00	0.06%
Religious/Non-Profit	$ 326.00	0.09%	$ 1,946.00	0.55%	$ 2,279.00	0.65%
Residential	$ 32,099.00	0.14%	$ 17,244.00	0.07%	$ 49,367.00	0.21%
Grand Total	**$ 34,749**	**0.13%**	**$ 24,858**	**0.09%**	**$ 59,849**	**0.22%**

100 YR Flood Hazard

Estimated Content Loss by Occupancy Type

100 YR Flood Hazard

Estimated Building Loss by Occupancy Type



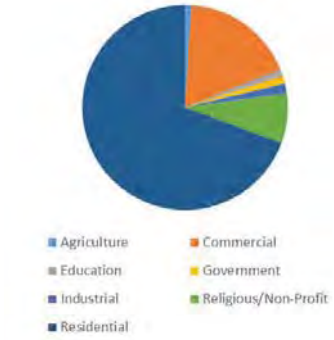
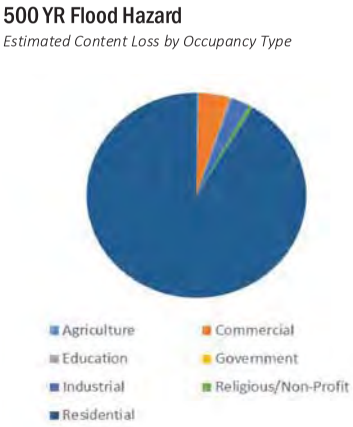


Figure 4-32: Total Building and Content Loss by Occupancy Type for 100 Year Flood

Table 4-28: 500 Year Flood Loss Estimation (Based on Depth) In NFIP Flood Zones by Occupancy Type

Building Type	Building Replacement Costs ($000)	Building Replacement Cost (% of Total Value)	Content Replacement Cost ($000)	Content Replacement Cost (% of Total Value)	Total Estimated Loss ($000)	Total Loss Estimation (% of Total Value)
Agriculture	$ 674.00	0.48%	$ 981.00	0.69%	$ 1,781.00	1.26%
Commercial	$ 10,080.00	0.41%	$ 27,640.00	1.13%	$ 39,179.00	1.61%
Education	$ 720.00	0.29%	$ 3,563.00	1.44%	$ 4,355.00	1.76%
Government	$ -	0.00%	$ 2.00	0.00%	$ 9.00	0.01%
Industrial	$ 6,036.00	0.57%	$ 13,975.00	1.31%	$ 22,438.00	2.11%
Religious/Non-Profit	$ 1,210.00	0.34%	$ 6,070.00	1.72%	$ 7,332.00	2.08%
Residential	$ 199,734.00	0.86%	$ 121,073.00	0.52%	$321,242.00	1.38%
Grand Total	**$ 218,454**	**0.79%**	**$ 173,304**	**0.63%**	**$ 396,336**	**1.44%**



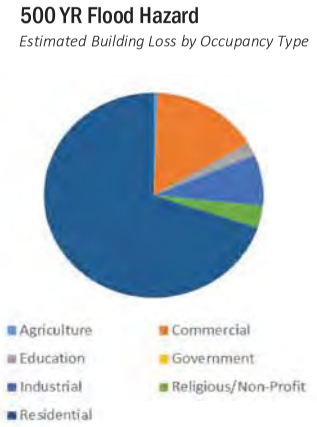


Figure 4-33: Total Building and Content Loss by Occupancy Type for 500 Year Flood

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4.16 Drought



Drought should not be viewed as merely a physical phenomenon or natural event. Its impacts on society result from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demand people place on water supply.

Due to the lack of defined geographical boundaries, the vulnerability assessment for drought differs from other natural hazards. The impacts of drought can be categorized as economic, environmental, or social. Many economic impacts occur in agriculture and related sectors, including forestry and fisheries, because of the reliance of these sectors on surface and subsurface water supplies. In addition to obvious losses in yields in crop and livestock production, drought is associated with increases in insect infestations, plant disease, and wind erosion. Droughts also bring increased problems with insects and diseases to forests and reduce growth. The incidence of forest and range fires increases substantially during extended droughts, which in turn places human and wildlife populations, buildings, infrastructure and critical facilities, at higher levels of risk.

Income loss is another indicator used in assessing the impacts of drought because so many sectors are affected. Reduced income for farmers has a ripple effect. Retailers and others who provide goods and services to farmers face reduced business. This leads to unemployment, increased credit risk for financial institutions, capital shortfalls and loss of tax revenue for local, state and federal government. Less discretionary income affects the recreation and tourism industries. Prices for food, energy and other products increase as supplies are reduced. In some cases, local shortages of certain goods result in the need to import these goods from outside the stricken region.

4.16.1 Loss Estimation Results

No standardized methodology exists for estimating losses due to drought. Drought does not generally have a direct impact on critical and non-critical facilities and building stock. Instead, drought vulnerability is primarily measured by its potential impact to sectors of the County's economy and natural resources. In San Bernardino County some of the potential impacts to the economy include the following:

- Reduced agricultural and livestock production;
- Loss of timber from increased wildfires;
- Decreased municipal and industrial water supply;
- Loss of recreation/tourism; and
- Decreased wildlife and wildlife habitat.

4.16.2 Statewide Mandatory Water Reductions

Recognizing persistent, yet less severe, drought conditions throughout California, on May 18, 2016 the State Water Resources Control Board adopted an emergency water conservation

regulation requiring locally developed conservation standards based upon each water supplier's specific circumstances. It replaces the prior percentage reduction-based water conservation standard. In San Bernardino County, each water wholesaler (Mojave Water Agency) was required to calculate the supply of water for the next three years, considering drought conditions persist. Each water supply retailer subsequently self-certified the expected demand on water resources, determining whether or not there is sufficient supply to meet demand. Our Department certified that there is sufficient water supply to meet the demand over the next three years; however due to ongoing drought conditions in the region, water conservation efforts should continue. The County has developed a watering schedule, watering hour restrictions and additional end user watering restrictions which can be viewed here: http://www.specialdistricts.org/index.aspx?page=548

4.17 Terrorism



Translating most manmade hazard profiles into meaningful geospatial information is difficult at best. Instead, the planning team will use an asset-specific approach. Population, facilities, systems and assets will be prioritized and assessed in this vulnerability assessment.

Special consideration should be given to areas with high density and those containing vulnerable populations (young, old, and those whose primary language is not English).

Facilities at high risk may include gathering places, critical facilities/ transportation and lifelines and utilities.

4.17.1 Population at Risk

Since terrorism can happen anytime, anywhere, 100% of the population is vulnerable to terrorism. In particular, people with access and functional needs, the elderly and the very young are especially vulnerable because they often rely heavily on others in their daily lives. Persons with English as a second language are also vulnerable as they may not receive warnings or notifications related to an incident in their primary language.

4.17.2 Critical Facilities Exposure

Critical facilities may include essential facilities (such as hospitals, police and fire stations, evacuation centers, etc.), transportation systems, lifeline utility systems, high potential loss facilities (such as nuclear power plants, dams and military installations, etc.), and hazardous material facilities.

Gathering facilities should also receive special attention. Places of mass gathering not only present terrorists with potential opportunities for mass casualties, symbolism and high impact media coverage, they pose a broad range of security challenges for their owners and operators. The National Counter Terrorism Committee has noted that places of mass gathering have been specifically identified by religious and political extremists as attractive targets.

Places of mass gathering incorporate a diverse range of facilities including, but not limited to, sporting venues, shopping and business precincts, tourism/entertainment venues/attractions, hotels and convention centers, major events and public transport hubs. This also includes significant one off events.

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4.18 Climate Change



The vulnerability assessment for climate change is different from other natural hazards discussed in this HMP due to the lack of defined geographical boundaries. This section provides a summary of San Bernardino County's vulnerability to climate change.

The most serious threats to the public health of Californians will stem primarily from the higher frequency of extreme conditions, principally more frequent, more intense, and longer heat waves. A heat wave is defined as 5 or more consecutive extreme heat days. An increase in heat waves may increase the risk of directly related conditions such as heat stroke and dehydration.

In the desert areas of the County, the Extreme Heat Day Threshold temperatures are around 110°F and in the mountainous regions it is in the mid 80's. According to the Cal-Adapt Extreme Heat Tool, the number of extreme heat days (a day in April through October where the maximum temperature (Tmax) exceeds the 98th historical percentile of maximum temperatures based on daily temperature data between 1961 and 1990) will continue to increase rapidly from the present day to 2090.

Projections by Scripps Institution of Oceanography show little change in total annual precipitation in San Bernardino County. However, even modest changes would have a significant impact because California ecosystems are conditioned to historical precipitation levels and water resources are nearly fully utilized. The Mediterranean seasonal precipitation pattern is expected to continue, with most precipitation falling during winter from North Pacific storms. In the mountainous areas of the County, it is projected that the decadal average of snowpack will continue to decrease until 2090. As shown in Figure 4-34 the sharpest decreases in snowpack are projected to begin around 2030. The area projected to be burnt by wildfire toward the end of the century will not increase substantially in the County. The most change will be experienced in the mountainous regions.

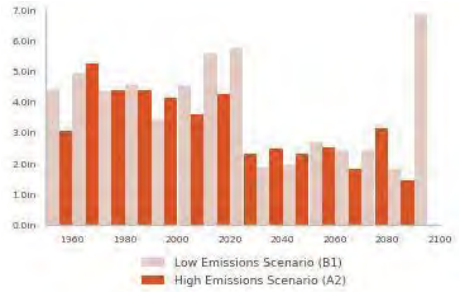


Figure 4-34: Decadal Snowpack Averages 1960-2090

Source: cal-adapt.org/snowpack/decadal

4.18.1 Population at Risk

Vulnerable populations should receive special attention when assessing the community's vulnerability to climate change. For example, care and sheltering during extreme heat conditions must be provided for vulnerable populations such as the elderly. Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. According to the National Weather Service (NWS), among natural hazards, only the cold of winter—not lightning, hurricanes, tornados, floods, or earthquakes—takes a greater toll. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980, more than 1,250 people died.

Section 5. Community Capability Assessment

5.1 Existing Plans, Policies and Programs

San Bernardino County is encouraging all departments, special districts, and agencies to share reports and common information. This sharing and exchanging of ideas has led to more coordinated efforts and better planning. The driving document in the County of San Bernardino is the County's General Plan. The County General Plan provides the foundation on which all development and future programs are built upon.

5.1.1 San Bernardino County General Plan

The State of California recommends that the General Plan is updated every 10-20 years; depending mostly on whether or not the plan is meeting the community's needs. The San Bernardino County General Plan was last updated and adopted in 2007. There are seven (7) mandatory elements in a General Plan:

- Circulation Element,
- Conservation Element,
- Housing Element,
- Land Use Element,
- Noise Element,
- Open Space Element, and
- Safety Element.

However, there are several optional elements. The County of San Bernardino General Plan includes an optional element, the Economic Development Element.

The Land Use Element of the General Plan establishes 18 land use zoning districts that apply only to lands governed by the County; not for lands controlled by other jurisdictions or lands controlled by federal and state government (see Section 1.3.5, page 8 for a listing of the 18 Land Use districts in the Land Use Element). The Land Use Element also describes land use compatibility for the primary three (3) hazards: Geologic; Flood; and, Wildfire. Because of these commonalities between the General Plan and the MJHMP, the county Board of Supervisors has adopted the MJHMP as part of the County's General Plan.

5.1.2 Regulations, Code, Policies and Ordinances

The following titles of the San Bernardino County Code include regulations and ordinances on the following issues and topics related to hazard mitigation:

Table 5-1: County Development Code Hazard Crosswalk

Hazard	Plan/Program/ Regulation	Description
Multi-Hazard	**Title 2**	Emergency Services Uniform Fire Code and related miscellaneous fire regulations Police Regulations and Public Protection
Multi-Hazard	**Title 3**	Emergency Medical Services Domestic Water Sources and Systems Hazardous Materials and Toxics Control Waste Management
Multi-Hazard	**Title 6**	California Building Code California Electrical Code California Plumbing Code California Mechanical Code
Multi-Hazard	**Title 7**	Airport Rules and Regulations
Multi-Hazard	**Title 8**	Development Code includes regulations relative to Land Use, Development Standards, Safety Standards, and Environmental Protection.
Multi-Hazard	**Zoning Ordinances**	The County has also adopted Zoning Ordinances that are not part of the County Code but are part of the General Plan. These ordinances regulate land use; map the official land use and hazard overlay districts to include safety hazard and environmental protection areas.

5.1.3 Local Programs for Mitigation Implementation

The information in Table 5-2 is used to construct mitigation actions aligned with existing planning and regulatory capabilities of the County. Planning and regulatory tools typically used by local jurisdictions to implement hazard mitigation activities are building codes, zoning regulations, floodplain management policies, and other County programs or planning documents.

Table 5-2: Planning and Regulatory Mitigation Capabilities Summary

Hazard	Plan/Program/ Regulation	Responsible Agency	Comments
Multi-Hazard	Mountain Mutual Aid	Fire District	Mountain Mutual Aid is an operational group of emergency responders. It is comprised of all of the agencies and volunteer relief groups that would be and have been involved in any and all disasters on the mountain. It is of note to that their main and most frequent call to service is in response to a wildfire. They meet monthly and maintain themselves in a constant state of readiness.
Wildfire	Forest Care	Cal Fire	Forest Care is a program dedicated to creating a healthier forest. This program provides foresters to assess individual properties for thinning the vegetation and then provides 75% of the funding to do so. Funding originates at the Federal level but is passed through Cal Fire and it employs Cal Fire Foresters as well as staff from the National Forest Association

5.1.3.1 Public Education and Alert Programs

Table 5-3: Public Education and Alert Programs

Hazard	Program	Responsible Agency	Comments
Multi-Hazard	MAST	Multiple	Mountain Area Safety Taskforce (MAST) has a substantial public education component. All agencies participate with the goal to have no one on the mountain uneducated about creating a thinner forest which is a more fire safe forest. For more information on MAST, see Annex A Section A.6 Fire Protection District Mitigation Project .
Multi-Hazard	CERT	Fire District	The Community Emergency Response Team (CERT) Program educates people about disaster preparedness and trains them in basic response

Hazard	Program	Responsible Agency	Comments
			skills. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
Multi-Hazard	Listos	Fire District	Listos, which means "ready" in Spanish, is a twelve-hour disaster preparedness course created specifically for the Spanish-speaking community and is delivered entirely in Spanish. The program is intended to be adaptable, flexible and culturally relevant. This means participants are encouraged to involve the entire family and accommodations are made for young children. San Bernardino County Fire, Office of Emergency Services currently partners with the Cities of Fontana and Rialto to bring Listos to their communities
Multi-Hazard	California Disaster Corps	Fire District	The Disaster Corps is a first-in-the-nation effort to professionalize, standardize and coordinate highly trained disaster volunteers statewide. This program initiative was built collaboratively in partnership with California Volunteers from the ground up through public-private partnerships and with a wide range of subject matter experts. See Annex A Section A.6 Fire Protection District Mitigation Project .
Multi-Hazard	TENS	Fire District	Telephone Emergency Notification Systems (TENS) During an emergency, public safety can be a direct function of the speed and accuracy of the dissemination of information. This is particularly important during emergencies that require evacuations. To that end the Board of Supervisors dedicated General Fund money in 2003 to the implementation of an automated phone dialing system that calls telephones in specific geographic areas of concern. All areas of San Bernardino County have all been preprogrammed so that during an emergency, the specific target group can be notified as quickly as possible.

Hazard	Program	Responsible Agency	Comments
Multi-Hazard	ECS	Fire District	The Emergency Communications Service (ECS) is a volunteer group providing front-line communications, technical and logistical support to the San Bernardino County Fire Department and Office of Emergency Services. Their primary mission is to support County Fire, County Government and other local agencies in time of disaster. In addition, ECS has provided telecommunications and event support to other County departments including Public Health, Behavioral Health, Public Works, Pre-School Services, Sheriff's Search and Rescue and other County Departments.
Multi-Hazard	AM Radio	Fire District	Community Based AM Radio Transmitters The Fire Safe Councils discovered the existence of very inexpensive but very effective community based AM radio transmitters. The transmitters are very effective for providing information and updates to a community that is either preparing for a community emergency or just had one. As a delivery modality they are extremely reliable because in most all emergencies the AM radio in your car is likely to be operational particularly when the electricity is out in your house.
Multi-Hazard	IPAWS	Fire District	During an emergency, alert and warning officials need to provide the public with life-saving information quickly. The Integrated Public Alert and Warning System (IPAWS) is a modernization and integration of the nation's alert and warning infrastructure and will save time when time matters most, protecting life and property. Federal, State, Territorial, Tribal, and local alerting authorities can use IPAWS and integrate local systems that use Common Alerting Protocol (CAP) standards with the IPAWS infrastructure. IPAWS provides public safety officials with an effective way to alert and warn the public about serious emergencies using the Emergency Alert System (EAS), Wireless Emergency Alerts (WEA), the

Hazard	Program	Responsible Agency	Comments
			National Oceanic and Atmospheric Administration (NOAA) Weather Radio, and other public alerting systems from a single interface.

5.1.3.2 Wildfire Mitigation Programs

San Bernardino County has one of the most comprehensive set of programs to mitigate the potential for catastrophic wildfires in the Nation. There is no other jurisdiction that has the comprehensive, multi-agency cooperation and coordination as is found in San Bernardino County. See Annex A Section A.6 Fire Protection District Mitigation Project to see how the Fire Protection District will implement the following programs:

Table 5-4: Wildfire Mitigation Programs

Hazard	Program	Responsible Agency	Comments
Wildfire	MAST	Multiple	The mission of the MAST is to facilitate a coordinated effort by cities, county, state, federal, and non-profit agencies to provide for protection from wildfire. For more information on MAST, see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	Community Based Fuels Reduction program	Fire District	This program is designed to create community based fuel modification programs across the mountain communities. For more information see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	Cal Fire	Cal Fire	Cal Fire provides programs to increase fire safety in high fire hazard severity zones. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	County Fire Hazard Abatement	Fire District	Fire Hazard Abatement works to reduce the potential for an individual's property to be the source of fire and structural ignitability. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .

Hazard	Program	Responsible Agency	Comments
Wildfire	Contractor Certification	City of Big Bear Lake Fire Department	This program trains and certifies landscape contractors to provide a qualified workforce to conduct fuels reduction activities on individual properties. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	Southern California Edison (SCE)	Southern California Edison (SCE)	SCE removes dead trees near power lines to reduce fire hazards. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	Wood Shake Roof Replacement	County	This code requires that all Wood Shake Roofs in the Fire Safety Overlay, as defined in the Development Code, ongoing effort.
Wildfire	Inland Empire Fire Safe Alliance	Inland Empire Fire Safe Alliance	The Alliance was created to act as a forum for all Fire Safe Councils in San Bernardino County. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	Community Wildfire Protection Plans (CWPP)	Fire District	CWPPs are designed to provide a means for a community to have input into and actively participate in the planning, strategy, goals, and objectives of creating a fire safe community. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	Organized Group Volunteer Activities	Fire District	There are several volunteer citizen groups throughout the County that are capable of providing significant resources that are not provided by traditional governmental agency services. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .

5.1.3.3 Earthquake/Geologic Mitigation Programs

San Bernardino County's seismic mitigation programs focus on two areas that have historically resulted in the greatest amount of damage and life loss from major earthquakes in California.

5.1.3.3.1 Bridge Retrofit Program

Caltrans inspects County and City bridges yearly every 2 years for structural sufficiency (which applies to earthquake) and functional obsolescence (which applies to floods). Caltrans provides reports that include recommended repairs or replacement. The County and Cities make the repairs and/or apply for bridge replacement funds thru the Federal Highway Bridge Program (HBR). Currently the County has 5 funded HBR replacements due to structural deficiencies:

- Dola Ditch, (out for bid to construct)
- Lanzit Ditch, (out for bid to construct)
- Garnett at Mill Creek (under construction)
- Yermo Rd at Manix Wash.(waiting for SCAG approval for additional funds to move forward with the Design & Environmental)
- Baker Blvd west of SR127. (waiting for HBP fund for Design & Environmental)
- National Trails Hwy at Kalmia Bridge (waiting for HBP funds)
- National Trails HWY @ Adena Ditch (Received HBP funds for design phase)
- Bridge Management (consultant on board that has prioritized all timber bridges on National Trails Highway and DPW is submitting groups of bridges for funding over a ten year period)

The design and environmental work has been started for Rock Springs Road (functionally obsolete bridge) using DPW funds, waiting for HBP funds for R/W phase.

The County has completed the construction of the Alabama Street at Plunge Creek bridge replacement using Federal Emergency Relief funds.

5.1.3.3.2 Unreinforced Masonry Building Program

In the 1990's, the County of San Bernardino compiled a master list of suspected Unreinforced Masonry Buildings within the unincorporated areas. Since that time, several sites have been incorporated and therefore, are now removed from County jurisdiction. In addition, several appear to have been demolished or retrofitted since the 1990's. The Land Use Services Department's Building and Safety Division is currently in the process of re-evaluating the URM list. Re-evaluation will include a field visit to each site photographing structures and verifying the occurrence of unreinforced masonry. This process is scheduled to be completed by the end of the 2010.The program would be an inspection program and maintenance and inspections as warranted.

There are no large publically utilized URM structures currently on the list. These types of structures are typically restricted to the incorporated areas of the County. There are only twenty-two (22) structures remaining on the list.

5.1.3.3.3 Geologic Hazard Mapping

The Seismic Hazards Mapping Act (Public Resources Code, Chapter 7.8 Section 2690-2699.6) directs the Department of Conservation, California Geological Survey (CGS) to identify and map areas prone to liquefaction, earthquake-induced landslides and amplified ground shaking. Although the San Bernardino area has a full spectrum of geologic hazards, CGS does not have adequate funding to complete the hazard mapping within the County.

5.1.3.4 Flood Mitigation Programs

The flood mitigation projects are programs that were established by San Bernardino County Flood Control District to protect life and property. These projects are typically designed to convey 1% annual chance or greater storm flows in order to mitigate danger to life and property, and critical infrastructure consisting of existing, new and future structures. Also, these projects include revisions to local land use and building codes where analysis or experience shows the need for code revisions or amendments to meet previously unidentified circumstances.

Hazard	Program	Responsible Agency	Comments
Flood	Flood Area Safety Taskforce(FAST)	Flood Control District	The FAST Organization stresses liaison with the communities, provides for community education and information, and places emphases on Community and city partnerships. For more information on FAST, see Annex B Section B.6 Flood Project Prioritization and Implementation.
Flood	Alluvial Fan Task Force	Alluvial Fan Task Force	The Task Force reviews the state of knowledge regarding alluvial fan floodplains, determine future research needs, and, if appropriate, develop recommendations relating to alluvial fan floodplain management, with an emphasis on alluvial fan floodplains that are being considered for development. For more information, see Annex B Section B.6 Flood Project Prioritization and Implementation.
Flood	StormReady	Flood Control District	San Bernardino County is a StormReady County. For more information, see Annex B Section B.6 Flood Project Prioritization and Implementation.

5.1.3.5 Climate Change Programs

5.1.3.5.1 Extreme Heat, Extreme Cold Programs

This document is a contingency plan supporting the San Bernardino County Emergency Operations Plan (EOP).

Excessive Cold events are commonplace in San Bernardino County and most often warrant monitoring activities only. These Standard Operating Guidelines provide GUIDANCE based on the most likely scenario, and can be expanded to meet the parameters of a "disaster" scenario if necessary.

The Extreme Weather – Excessive Cold Standard Operating Guidelines (SOG) were developed in response to the potential for Excessive Cold and cold related Power Outage events in San Bernardino County. The following objectives and activities are to prevent the harmful effects of excessive cold on at-risk populations and the potential for life-threatening repercussions of power outages during excessive cold events.

The information included in this plan is "situation" and/or "incident" driven and subject to revision by the Extreme Weather Committee as conditions warrant. Notifications are information dependent and modification of the activities in these guidelines may be required in response to changing conditions, situations and/or inaccurate weather predictions

5.1.3.5.2 San Bernardino County Fire Office of Emergency Services Heat Plan

This document is a contingency plan supporting the San Bernardino County Emergency Operations Plan (EOP). The Extreme Weather – Excessive Heat Standard Operating Guidelines (SOG) were developed in response to the potential for Excessive Heat and heat related Power Outage events in San Bernardino County. The following objectives and activities have been established to prevent the harmful effects of excessive heat on at-risk populations and the potential for life-threatening repercussions of power outages during excessive heat events. The Extreme Weather – Excessive Heat SOG describe the County operations during heat related emergencies and provide guidance for local jurisdictions in their preparation for heat emergencies and other related activities. The information included in this plan is "situation" and/or "incident" driven and subject to revision by the Extreme Weather Committee as conditions warrant. Notifications are information dependent and modification of the activities in these guidelines may be required in response to changing conditions, situations and/or inaccurate weather predictions.

5.2 Fiscal Resources

The 2016-17 recommended budgets of $5.4 Billion are balanced and consistent with policy and direction received from the Board of Supervisors. The 2016-17 Recommended Budgets address the following key issues:

- Ongoing funding for neglected raises for County employees
- Ongoing funding for maintenance of County roads
- Continues investment in facilities, infrastructure and operating systems.
- Ongoing funding of mental health and medical services for County residents.
- Maintains fiscal responsibility through contributions to the reserves of $62.8 million.

The budget represents the County General Fund and County restricted general funds .It also presents capitol project funds, special revenue funds, enterprise funds, internal service funds and permanent funds for all entities in the 2016-17 Recommended Budget including the County Board Governed County Service Areas, San Bernardino County Fire Protection District, San Bernardino County Flood Control District. Other agencies presented in the budget include County Industrial Development Authority, Inland Counties Emergency Medical Agency and the recently added Housing Authority of the County of San Bernardino. The total requirements for these funds in the 2016-17 are $5.4 billion, which includes amounts budgeted as contingencies or contributions to reserves. Excluding these amounts, total projected expenditures for the 2016-17 are $5.3 billion. The General fund Requirements total $2.9 billion and are funded by countywide discretionary revenues (primary property taxes), departmental revenues and other funding sources of the General Fund, of this $2.9 billion, only $558.3 million is truly discretionary.

5.2.1 The Budget in Brief

This budget book collectively presents the general fund, special revenue funds, capital project funds, internal service funds, and enterprise funds for the county and its Special Districts. The total spending authority for these funds in 2016– 2017 is $5.4 billion. The general fund spending authority totals $5.3 billion and is funded by countywide discretionary, and the beginning fund balance of the General Fund. Of this $2.9 billion, only $558.5 million is truly discretionary.

Table 5-5: Spending Authority for San Bernardino County

	Spending Authority (in Millions)		
	2015-16	2016–2017	Change
General Fund	$ 2,984.3	$ 2,911.1	$ (73.2)
Restricted Funds	49.3	49.7	(.4)
Capital Project Funds	1169.	911.3	(258.4)
Special Revenue Funds	257.6	298.4	40.7
Enterprise Funds	984.9	1001.	16.5
Internal Service Funds	1.6	0.0	(1.6)
	$ 5,692.0	**$ 5,420.0**	**272.0**

There is a $73.2 million net decrease in General Fund requirements due to a $106.1 million reduction in contributions to General Fund reserves, as the Board of Supervisors approved an increase to multiple County General Fund operational groups' requirements are increasing by $32.9 million. There are Law and Justice ($12.5 million). The Human Services Operational Group is anticipating increased State and Federal funding that will support Department of Behavioral Health services, including inpatient hospitalization, indigent hospital care, general mental health services, and services for children, youth, and families .The County is also continuing to allocate additional resources to meet the growing need for augmented health and mental health correctional services associated with Public Safety Realignment.

The net reduction of $258.4 Million is Special Revenue Funds is associated with the County's shift in 2015-16 from budgeting contingencies to instead placing unallocated resources in reserves. This technical change resulted in a large one-time contribution to reserves in 2015-16 that is not required in 2016-17. This reduction in contributions to reserves totaling $289.6 million is offset by increased operational costs of $31.2 million. This is due to increases within the Department of Behavioral Health's Mental Health Services Act (MHSA) budget unit and the County Fire Protection budget is increasing as a result of the pending annexation of fire prevention and suppression services from the City of San Bernardino (429.6 million) and Twentynine Palms ($1.7 million).

The $40.7 million increase in Capital Project Funds is primarily due to the planned construction of two Department of Behavioral funded Crisis Stabilization Centers and four Crisis Residential Treatment Centers totaling $36.5 million. This will enable Community Crisis Response Team (CCRT) clinics throughout the County to be expanded to provide 24 hour services and to respond to request by law enforcement for support during the night hours.

Enterprise Funds requirements are increasing a net $16.5 million. Notably, the Housing Authority of the County of San Bernardino has been added to the budget book and is contributing to the overall increase in Enterprise Fund requirements, including additional assumed payments for Housing Assistance and increased Capital Expenditures.

Table 5-6: 2015-2017 Staffing Budget

	Budgeted Staffing		
	2015–2016	2016–2017	Change
General Fund	14,332	14,425	93
Other Funds	6,375	6,508	133
Special Districts and Other Agencies	1402	15601	159
Total:	**22,109**	**36,534**	**385**

5.2.2 Budget Highlights (2016 – 2017)

Create and Maintain and Grow Jobs and Economic Value in the County

- The Real Estate Services Department of Project Management Division (formerly Architecture and Engineering) Capital improvement budget includes 355 active projects with total requirements of $295.2 million, including $128.2 million in new projects funded with $57.7 million of Discretionary General Funding includes an ongoing base budget of $12.0 million for maintenance and non-major Capital Improvement Plan (CIP) projects ,and $45.7 million for construction and major CIP projects .These major projects include $26.4 million for the 800 Megahertz Upgrade Project ,$12.2 million for various Sheriff's facility improvements ,$8.0 million for the County Buildings Acquisition and Retrofit Project including the upgrade of the County Government Center parking lots and grounds ,and $7.6 million for a variety of other projects.

Improve County Government Operations

- Enterprise Financial Management System: Implementation of the new system began in May 2016 with the first phase (out of two phases) continuing into 2016-17 at an estimated cost of $7.1 million. The total cost for the financial system is estimated to be $25.0 million and will streamline business processes and provide better management information.

- Public Health will continue its efforts to achieve and maintain National Accreditation, through the Public Health Accreditation Board (PHAB). Accreditation ensures the Department's continued focus on quality and performance improvement, transparency and accountability to all stakeholders, and the capacity to deliver core Public Health functions. The department will be submitting the required application to PHAB in December 2016.

- The County Library continues its plans to enhance service by replacing outdated computer hardware and software. Funding has been included in the Library's material's budget, which adds high demand items to the collection, including an expanded digital book collection.
- Land Use Services, in conjunction with Public Works, Information Services, and other County departments, continues to upgrade to a new enterprise permit solution, Accela. The new system will include a shared database, precise digital maps, and satellite images of land data that are linked to the County's GIS database. It will also provide field staff remote real-time access to the database. This solution will streamline the permitting process, offering the public access to a web portal to manage and monitor applications and permits online.

Operate in a Fiscally-Responsible and Business-like Manner

- The County Museum's budget of $3.8 million demonstrates the County's commitment to support the Museum through a time of transition. The budget includes $1.1 million in one-time Discretionary General Funding which includes bridge funds to support current operations and funding for activities related to re-accreditation. The County Museum continues to implement the consultant study recommendations as approved by the Board of Supervisors, to address organizational and financial challenges.

- The Transitional Assistance Department is in the second of a four year reduction to the State's CalFresh Match Waiver pursuant to the phase-out agreement adopted in the prior year State budget. This wavier allowed the County to draw additional Federal and half of the State funding without increasing the County's Maintenance of Effort. The budget includes the use of $2.5 million of the original $5.0 million general fund reserve that the Board approved in 2014-15 for this phase-out period.

Ensure Development of a Well-Planned, Balanced, and Sustainable County

- The County continues work on a complete overhaul of the County's General Plan, referred to as the Countywide Plan. This Countywide Plan will be a comprehensive web-based system to document land use planning and organizational governance policies. It will be comprised of three basic components: The Policy Plan (a comprehensive general plan); the County Business Plan (a system that will define and guide how the County government operates and manages itself); and the Regional Issues Forum (a web-based resource center containing information regarding shared Countywide issues). Additionally, the County is updating and expanding the community plans. When completed, there will be 27 web-based community plans involving 49 communities.

- A team of County departments will continue to monitor the drought and develop ways to reduce water usage at County facilities to show good stewardship of this valuable resource. The Special Districts Department, in collaboration with other County

departments, will continue to implement water conservation programs/strategies at various County Service Areas and Districts throughout the County.

- The Registrar of Voters budget fluctuates based on the 4-year election cycle, with the Presidential Election being the largest and most costly of the major elections. The Department is transitioning from a one minor and two major election cycles in 2015-16 to a one minor and one major election cycle for 2016-17. The budget includes provisions for the following: November 8, 2016 Presidential General Election (major); December 6, 2016 San Bernardino County Employees' Retirement Association Election (minor); and three anticipated, but unscheduled special elections (minor). The minor elections are 100% reimbursable; however, the November Presidential General Election is only 30% reimbursable and thus requires one-time Discretionary General Funding (Net County Cost) of $3.7 million for the year.

- The Public Works – Transportation budget includes over $35.0 million in major infrastructure projects, funded in part with Discretionary General Funding. Budgeted activities include design, right of way and/or construction for major projects including:
  - Bridge replacements on: Glen Helen Parkway, Baker Boulevard, Garnet Street, Rock Springs Road, Dola Ditch Bridge, Lanzit Ditch Bridge, Yermo Road and Arrowbear Drive;
  - New bridge on Shadow Mountain Road;
  - Widening of Slover Avenue in the Bloomington Area;
  - Installation of raised pavement markers on National Trails Highway in the Amboy area;
  - Reconstruction of Institution Road to improve access to the Sheriff facility in San Bernardino;
  - National Trails Highway Bridges: Bridge management plan for the repair, rehabilitation or replacement of 127 bridges on National Trails Highway and starting the design phase for replacement of 10 bridges:
  - Rehabilitation and re-profiling at various locations on Needles Highway in the Needles area;
  - Improvements to alleviate congestion and improve circulation of the interchange on Interstate 10 at Cedar Avenue

- The Public Works – Transportation budget includes $31.5 million worth of pavement improvement projects, funded in part with ongoing Discretionary General Funding, to preserve the County's roadways by investing enough to keep the system from deteriorating further.

- The Public Works – Solid Waste Management Division plans to complete $8.9 million of capital improvement projects, which includes the following:
  - $2.0 million for resurfacing the entrance and haul roads at the San Timoteo Landfill;
  - $957,000 for construction of Groundwater Treatment Systems at the closed Lenwood-Hinkley Landfill and Yucaipa Disposal Site;

- $1.5 million for the East Slope Stabilization and Mitigation project at the closed Heaps Peak Disposal Site;
- $1.5 million for construction of Landfill Gas Extraction Systems at the Barstow and Big Bear Landfills which includes $300,000 to bring electrical power to the Barstow Landfill

- The Public Works – Flood Control District (District) budget includes $37.6 million in capital improvement projects. The District anticipates completion of the following projects: Cactus Basin # 3, Wilson Creek Channel, Santa Ana River Flood Wall Repair, and the waterline relocations for Bandicoot Basin and Amethyst Basin. The District also plans to start construction on the following projects: Levee Certification Restoration for Patton Basin, Mojave River Levee, and Sand Creek/Warm Creek Confluence.

- Land Use Services Planning budget includes $150,000 of Discretionary General Funding for the preparation of a Morongo Basin Cultural Plan.

- The Special Districts department's budget includes $45.3 million capital improvement projects including the design and construction of the Big Bear Alpine Zoo relocation, rehabilitation of the Lake Gregory Dam, and construction of Snow Drop Road. Water and sanitation infrastructure projects of $19.2 million include pipeline replacements; water system improvements, and design and construction of a pipeline, a 75,000-gallon water reservoir, and a pump station in CSA 70 W-4 – Pioneertown.

- Community Development & Housing is constructing Phase 2 of the Bloomington Community and Neighborhood Revitalization. A total of 190 multi-generational affordable housing units include 120 family units and 70 senior units and the Bloomington Branch Library. The Bloomington Branch Library and the first phase of housing are completed. The second phase is currently under construction and will be completed by spring 2017.

Provide for the Safety, Health and Social Service Needs of County Residents

- The County is expanding efforts to provide homeless support to County residents through the flowing allocations included in the 2016-17 budget:
  - The Department of Behavioral Health is investing $4.0 million by providing basic needs, case management, outreach services, and additional built and supportive housing opportunities.
  - The Sheriff/Coroner/Public Administrator is continuing to fund the HOPE Program (Homeless Outreach Proactive Enforcement) Team ($620,000), which provides services to the homeless population by connecting them to the appropriate agencies for much needed services that help in the transition from homelessness.
  - The Probation Department has included $3.2 million towards transitional housing for adult offenders requiring Probation Department supervision.

- The Department of Behavioral Health is expanding Mental Health Treatment Services, notable in the following areas:
  - $1.0 million towards staffing Community Crisis Response Team clinics, which will now provide 24 hour services to departmental consumers and respond to requests by law enforcement for support during night hours. The department has also allocated $36.5 million towards the construction of new CCRT clinics throughout the County to expand these services.
  - $8.5 million for the Mental Health Act (MHSA) Comprehensive Children and Family Support Services program to support expanded mental health services for children.
  - $4.3 million for the MHSA Regional Adult Full Service Partnership (FSP) program support expanded mental health services to adults.
  - $1.0 million for the MHSA Forensic Integrated Mental Health Partnership program to expand services to develop peer support and mentoring strategies for individuals who have been released early from County jail or State prison.

- The Sheriff/Coroner/Public Administrator budget included $1.1 million of existing departmental resources for a program authorized by the Board as a pilot on December 15, 2015 (Item No. 72) related to the delivery of law enforcement services to unincorporated areas of the West End including the North Rancho/Etiwanda Preserve and the Mission Corridor, respectively. The program was successful and is now being incorporated as an ongoing service beginning in 2016-17 ,

- The Sheriff/Coroner/Public Administrator budget includes $9.0 million of one-time Discretionary General Funding (Net County Cost) to replace 2 aging and obsolete patrol helicopters: including equipment, travel and training for pilots and mechanics, installation of equipment, and delivery charges. The helicopter replacements will provide newer more reliable aircraft.
- The Public Defender Proposition 47 program will use media resources to reach all potential citizens who have convictions eligible for reclassification to further enhance their ability to rehabilitate within the community.

- County Fire is assuming fire, rescue, Emergency Medical Services (EMS), and prevention responsibilities within the Cities of San Bernardino ($29.6 million) and Twentynine Palms ($1.7 million) as a result of the pending annexations. This continued expansion of a regional approach will provide a more effective and efficient delivery of fire services for County residents.

- Land Use Services Code Enforcement is continuing to pilot various strategic initiatives to address issues with short-term rentals, particularly in the mountain areas. For 2016-17, a pilot program for a short-term rental hotline will be established where the public can report illegal or disruptive activities at short-term rental properties.

- The Information Services Department Telecommunication Services division is in the process of upgrading the County's Regional Public Safety Radio System (800 Mhz Upgrade Project). The project is currently on schedule, with an estimated completion date of 2020-21. The estimated cost of the project is $158.2 million primarily funded with Discretionary General Funding.

- The Department of Aging and Adult Services (DAAS) budget of $8.3 million will supplement programs such as the Elderly Nutrition, Supportive Services, Medicare Improvements for Patients and Providers Act, and Family Caregiver.

- The Arrowhead Regional Medical Center (ARMC) budget includes the addition of 14 positions to strengthen the Sterile Processing division to meet operational needs and ensure compliance with regulatory standards.

- The Department of Children and Family Services is implementing an After Hours Response Center (ARC) in June 2016 to provide optimal customer services to our community partners, children and families. The Center will enhance the departments critical after hour function of responding to child abuse, neglect and exploitation referrals called into the Child and Adult Abuse Hotline (CAAHL).

Pursue County Goals and Objectives by Working with Other Agencies

- ARMC is participating in California's 1115 waiver Renewal (Medi-Cal 2020), working alongside the California Association of Public Hospitals, the State of California, The Centers for Medicare & Medicaid Services, and multiple County departments focusing on improved patient outcomes, efficiencies and access in patient care integrated care models and procuring maximum reimbursement for performance of prescriptive clinical measures. The budget includes $52.5 million in revenues related to the Medicaid Waiver programs.

Focus on Recovery and Resiliency Following the December 2, 2015 Terrorist Attack (SB Strong)

- The County Administrative Office has commenced a countywide effort to document the impact and ongoing response to the December 2, 2015 terrorist attack while pursuing multiple sources of potential cost-reimbursement and to create a historic and best-practices document.

- The County has allocated approximately $10.2 million in funds towards improving security at County facilities. This includes $8.2 million in immediate improvements to facilities, such as expanded security guard services, upgraded security camera and key card access installations, and $2.0 million to conduct a security assessment of all County facilities.

Challenges in Fiscal Year 2016-17 and Beyond

Although the balancing of future costs with projected revenue has improved compared to prior County five year forecasts, broad economic challenges remain. The current economic expansion will be 7 years at the end of June 2016, which is the fourth longest in the history of the United States and cannot be assumed to last indefinitely. In addition, the fiscal uncertainly inherent in the State budget process continues to present a major challenge to the County's fiscal planning efforts.

Economic Challenges

The County's Five Year Financial Forecast covers July 2016 through June 2021 and includes moderate growth of major revenue streams throughout the period. Not included in the forecast are the impacts of a potential recession or the unknown economic impacts of the coming statewide $15 minimum wage.

By the end of the third year of the County's forecast the current economic expansion would match the longest expansion in history. Although the weakness of the current recovery and quantitative easing may have pushed off the next recession temporarily, it would be without precedent for the economy to expand throughout the County's entire five year forecast. In response to these unknown variables, the County has taken the approach of budgeting revenue growth in a conservative fashion over the entire five year forecast rather than assuming greater potential revenue increase in the immediate future with reductions in the later part of the forecast.

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Section 6. Mitigation Strategy

6.1 Mitigation Goals and Objectives

Goals and objectives discussed in this section help describe what actions should occur, using increasingly narrow descriptors. Long-term goals are developed which can be accomplished by objectives. To achieve the stated objectives "mitigation actions" provide specific measurable descriptors on how to accomplish the objective. The goals, objectives, and actions form the basis for the development of a Mitigation Action Strategy and specific mitigation projects to be considered for implementation.

The process consists of 1) setting goals and objectives, 2) considering mitigation alternatives, 3) identifying strategies or "actions", and 4) developing a prioritized action plan resulting in a mitigation strategy.

The following section provides an overview of the Mitigation Goals and Objectives for profiled hazards, Wildfire, Earthquake, Flood, Drought, Terrorism, and Climate Change for the County Unincorporated Area and the County's Special Districts. These goals were compiled from various sources including the County of San Bernardino 2007 General Plan. (See Section 3.5 for a detailed description of the process used by the County Planning Team)

6.1.1 All Hazard (AH)

AH GOAL: Increase readiness for all hazards in the unincorporated areas of San Bernardino County.

OBJECTIVE 1: Construct All-Hazard Response Facilities: Construct facilities to increase operational readiness to reduce impacts of natural hazards.

> **AH Action 1.1: Construct Valley Dispatch and Operations Center.** Construct facility and ensure cohesive working and response to any scale emergency and operations in a secure complex
>
> **AH Action 1.2: Construct Shelter Operations Compound (SHOC).** This shelter concept provides a new one-stop shelter concept. The SHOC combines a shelter, a Local Assistance Center (LAC) and a Non-LAC Unit in one easy location.

OBJECTIVE 2: Special District Funding: Continue Special Districts Projects relating to all hazards.

AH Action 2.1: Continue funding and support for Special Districts Projects relating to water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big

Bear Valley Recreation Park District and Bloomington Recreation and Park District for all hazards.

AH Action 2.2: Install Generators at Critical Facilities Retrofit existing buildings and facilities with connectors/ ATS for emergency generators and/or install permanent emergency generators at critical facilities, including wells and booster station locations.

AH Action 2.3: Water Systems Repair Plan Develop a plan for speeding the repair of and functional restoration of water and wastewater systems through stockpiling of shoring materials, temporary pumps, surface pipelines, portable hydrants, and other supplies.

AH Action 2.4: Smart Water Meters and SCADA Utilization of SCADA and Smart Water Meters to get real time data on problems with the system and reduce drive time emissions as a result of traditional meter reading.

AH Action 2.5: Provide Employees with Emergency Supplies Provide emergency supplies of food, water, and portable generators for employees at office and field locations.

AH Action 2.6: Annual Tower and Guide Wire Inspections Conduct annual tower and guide wire inspections to mitigate storm/wind/earthquake hazards from knocking out communications.

AH Action 2.7: **Maintain Tower Lighting** Maintain lights on all tower locations.

AH Action 2.8: Designate Emergency Operations Sites Conduct an inventory or list of County Park Facilities and Community Centers to establish a list of pre-designated emergency operations or disaster relief sites. Not all Community Centers are an appropriate size to accommodate large numbers of evacuees and may only serve as command and control centers or distribution centers.

AH Action 2.9: Establish Power Sources for Emergency Operations Sites Establish small solar energy fields or other forms of renewable power at County Community Centers to
facilitate stand-alone emergency operations for the community.

AH Action 2.10: Connect Water Systems to Generators Connect water systems to generators to ensure delivery even in disaster situations.

AH Action 2.11: Establish a Centralized Communications Network Establish a centralized communications network to monitor channel output for TV Districts and provide emergency information by way of character generator tied to channel transmissions.

AH Action 2.12: Incorporate as appropriate requirements from the State of California's most recent land use regulations regarding the hazard mitigation planning process (Government Code 65302 and 8685.9).

6.1.2 Wildfire (WF)

WF GOAL: Continue to reduce fire hazards in the unincorporated areas of San Bernardino County.

WILDFIRE OBJECTIVE 1: **Mountain Area Safety Taskforce.** Continue the cooperation and coordination of Fire Hazard Mitigation efforts with all stakeholders in the mountain areas of San Bernardino County through participation in MAST.

WF Action 1.1: Continue Mountain Area Safety Taskforce (MAST) funding to support mitigation activity.

WILDFIRE OBJECTIVE 2: Support Mountain Mutual Aid Objectives. Continue development of and continue the mission of mutual aid between the first responders in the County mountain areas through County Mitigation Planning.

WF Action 2.1: Update Mountain Mutual Aid Mapbook to document.

WF Action 2.2: Update Community Structure Protection Plans as necessary.

WILDFIRE OBJECTIVE 3: Community Based Fuels Reduction Program. Continue the community based Fuels Reduction Program through community based programs, both volunteer and government funded.

WF Action 3.1: Implement identified community based fuels reduction projects.

WF Action 3.2: Develop fuels reduction "maintenance program" by obtaining participation from citizens and/or homeowners associations.

WF Action 3.3: Vegetation Removal Clear vegetation from Road District facilities/yards.

WILDFIRE OBJECTIVE 4: Forest Care. Continue providing assistance to homeowners by expanding services to all communities in the Mountain areas of the County.

WF Action 4.1: Increase homeowner assistance services to mountain residents for fuel reduction.

WF Action 4.2: Continue working with Southern California Edison to remove dead trees near power lines.

WILDFIRE OBJECTIVE 5: County Fire Hazard Abatement. Overcome funding shortfalls while improving service delivery.

WF Action 5.1: Inspect every residence in the mountain communities within the next two years to enforce the new Fire Hazard Abatement code that addresses green fuels.

WF Action 5.2: Continue to collaborate with Forest Care, Red, Cross and Cal Fire to overcome increased costs of enforcement.

WILDFIRE OBJECTIVE 6: Decrease Wildfire Hazards at Private Property through the Fire Hazard Abatement Programs

WF Action 6.1: Train and Certify landscape contractors to comply with the new Fire Hazard Abatement Code.

WF Action 6.2: Continue wildfire mitigation efforts under the Wood Shake Roof Replacement Program.

WF Action 6.3: Protect Property in Wilderness Areas Rockscape or pave property grounds which have structures located in wilderness and or areas prone to wildfires. Double the width of external fire breaks.

WILDFIRE OBJECTIVE 7: Support Mitigation Strategies in Community Wildfire Protection Plans. Continue to improve CWPP's in cooperation with Cal Fire, the IEFSA and individual Fire Safe Councils.

WF Action 7.1: Modify independent and unique CWPPs into a more common framework making them similar but leaving room to provide specific hazard characteristics and mitigation actions for each community.

WILDFIRE OBJECTIVE 8: Improve Emergency Access. Improve and maintain emergency access for wildfire protection.

WF Action 8.1: Construct Arrowbear Drive Realignment and Widening

WF Action 8.2: Construct Cedar Glen Fire Access Road

WF Action 8.3: Structural Fire Breaks Widening Double the width of external fire breaks on grounds which have structures located in wilderness and or areas prone to wildfires.

WILDFIRE OBJECTIVE 9: Special District Funding: Continue Special Districts Projects relating to wildfire.

WF Action 9.1: Continue funding and support for Special Districts Projects relating to wildfire in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District.

WF Action 9.2: Emergency Water Supplies Purchase emergency water supply or water purification devices to ensure uninterrupted supply of water to emergency response personal. (completed with continuous fresh of supplies and rotation)

6.1.3 Earthquake/Geologic Hazards (EQ)

GOAL: Minimize exposure to structural and contents damage from geologic and seismic conditions. (Complements General Plan, Section VIII, Safety Element (Goal S 7)

EARTHQUAKE OBJECTIVE 1: Educate the public on reducing earthquake risk.

EQ Action 1.1: Improve public education programs and practices to residents for earthquake risk.

EARTHQUAKE OBJECTIVE 2: Protect occupants and structures in proposed developments from high levels of risk caused by rupture of the ground surface during an earthquake (Complements General Plan, Section VIII Safety Element Policy S 7.4).

EQ Action 2.1: Evaluate single family homes for Earthquake hazard when conducting permit applications and plan reviews.

EQ Action 2.2: Seismic Strapping for existing water tanks and future construction.

EQ Action 2.3: Employee Emergency Sheltering Develop a plan for short-term and intermediate-term sheltering of employees.

EARTHQUAKE OBJECTIVE 3: Continue geologic hazard mapping projects to minimize and prevent damage caused by earthquakes and other geologic hazards.

EQ Action 3.1: Identify liquefaction hazard areas outside the currently designated Geologic Hazard Overlay Districts.

EARTHQUAKE OBJECTIVE 4: Protect life and property from risks resulting from gravity-derived and/or earthquake-triggered landslides, expansive soils and/or other poor soil conditions. (Complements General Plan, Section VIII, Safety Element Policy § 7.6)

EQ Action 4.1: Require development on hillsides to minimizes the extent of topographic alteration and erosion, to maintain slope stability, and to reduce the potential for offsite sediment transport (Complements General Plan, Section VIII, Safety Element Policy § 6.1).

EQ Action 4.2: Generator Installation Install generators at all road facilities. This will allow uninterrupted communications and provide power to refuel critical emergency response equipment.

EARTHQUAKE OBJECTIVE 5: Reduce runoff over the cliffs in the Rimforest neighborhood. (Complements Rimforest Drainage Feasibility Study)

EQ Action 5.1: Divert runoff to Little Bear Creek.

EARTHQUAKE OBJECTIVE 6: Special District Funding: Continue Special Districts Projects relating to earthquake hazards.

EQ Action 6.1: Continue funding and support for Special Districts Projects relating to earthquake hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District.

6.1.4 Flood (FL)

GOAL: Provide adequate flood protection to minimize hazards and structural damage. (General Plan, Safety Element, Goal S 5)

FLOOD OBJECTIVE 1: National Flood Insurance Program. Participate in the National Flood Insurance Program (NFIP), which provides flood insurance within designated floodplains. (General Plan, Safety Element, Policy S 5)

FL Action 1.1: Update NFIP data and maps with newly identified flood hazard areas in the County, as new information becomes available.

FLOOD OBJECTIVE 2: Alluvial Task Force. Review and analyze the findings and recommendations from the recently released Alluvial Fan Task Force reports, as funding permits.

FL Action 2.1: Determine whether or not additional amendments to development standards or policies are merited, based on the completed analysis.

FLOOD OBJECTIVE 3: Flood Hazard Reduction. Reduce flood hazards through development standards and policies stated in the County of San Bernardino General Plan and County of San Bernardino 2010 Development Code.

FL Action 3.1: Amend the Flood Plain Safety Overlay District through automatic map updates as new data is released and published by FEMA.

FL Action 3.2: Review development plans to ensure compliance with ordinances.

FL Action 3.3: Inspect construction to ensure compliance with approved development plans.

FL Action 3.4: Soil Stabilization on Roadways and Along Roadway Shoulders Soil stabilization on roadway shoulders and dirt roads. This will prevent erosion caused by flood conditions.

FL Action 3.5: Encasing Pipelines Encase water pipelines with specific sized rock, gravel, and road base in natural waterways to prevent continual washout or exposure during heavy storm events/floods.

FLOOD OBJECTIVE 4: Future Flood Mitigation Projects. Improve existing facilities and construct new facilities to mitigate flooding with the County.

FL Action 4.1: In each flood control zone, construct facilities identified in those zones by the Flood Control Advisory Committee. See Flood Control District Annex for a listing of projects.

FLOOD OBJECTIVE 5: Special District Funding: Continue Special Districts Projects relating to flood hazards.

FL Action 6.1: Continue funding and support for Special Districts Projects relating to flood hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District.

FL Action 6.2: On Call Contractors Employ on call contractors to assist in emergency situations.

6.1.5 Drought (DR)

GOAL: Minimize the effects of drought on the County in all aspects including economically and socially.

DROUGHT OBJECTIVE 1: Educate the public on water conservation methods.

DR Action 1.1: Create a public awareness campaign advising citizens, business owners and farmers on water conservation.

DR Action 1.2: Provide incentives for farmers to grow crops that are less water intensive.

DR Action 1.3: Continue to coordinate with the San Bernardino Valley Water Conservation District to provide Qualified Water Efficient Landscaper (QWEL) training.

DR Action 1.4: Continue to enforce the watering schedule and watering restrictions throughout the County.

DROUGHT OBJECTIVE 2: Protect the quality of the County's watersheds.

DR Action 2.1: Approve the County's Watershed Water Quality Management Plan written in 2013.

DROUGHT OBJECTIVE 3: Special District Funding: Continue Special Districts Projects relating to drought hazards.

DR Action 3.1: Continue funding and support for Special Districts Projects relating to drought hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District.

6.1.6 Anti-Terrorism (AT)

GOAL: Use antiterrorism strategies to discourage terrorism and protect the people, infrastructure and assets in San Bernardino County from the effects of terrorism.

ANTI-TERRORISM OBJECTIVE 1: Use anti-terrorism design strategies to discourage / prevent acts of terrorism.

AT Action 1.1: Identify and prioritize mitigation activities (anti-terrorism force protection) at critical facilities and gathering places that are vulnerable to terrorist attacks.

ANTI-TERRORISM OBJECTIVE 2: Special District Funding: Continue Special Districts Projects relating to terrorism hazards.

AT Action 2.1: Continue funding and support for Special Districts Projects relating to terrorism hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District.

6.1.7 Climate Change (CC)

GOAL: Reduce the impacts of climate change on the County and limit human activities that change the atmosphere's makeup.

CLIMATE CHANGE OBJECTIVE 1: Meet greenhouse gas (GHG) reductions targets set forth by the Clean Air Act.

CC Action 1.1: Continue working with the South Coast Air Quality Management District and the Mojave Desert AQMD to meet GHG reductions targets.

CC Action 1.2: Continue implementing the energy conservation and efficiency measures identified in the County of San Bernardino Greenhouse Gas Emissions Reduction Plan. (San Bernardino County Renewable Energy and conservation Element)

CLIMATE CHANGE OBJECTIVE 2: Educate the public on the effects of climate change and reducing our impact.

CC Action 2.1: Encourage carpooling and the use of public/ alternative transportation methods.

CC Action 2.2: Optimize energy efficiency in the built environment and promote the local economic benefits of energy efficiency retrofits. (San Bernardino County Renewable Energy and conservation Element)

CC Action 2.3: Encourage residents and businesses to conserve energy. (San Bernardino County Renewable Energy and conservation Element)

CLIMATE CHANGE OBJECTIVE 3: Special District Funding: Continue Special Districts Projects relating to climate change hazards.

CC Action 3.1: Continue funding and support for Special Districts Projects relating to climate change hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District.

6.2 Mitigation Strategy

To narrow mitigation alternatives for inclusion, FEMA's six broad categories of mitigation alternatives were used. Each FEMA category is listed below. The HMP Planning Committee developed several mitigation alternatives for implementation under each mitigation category.

- Prevention (PRV)

- Property Protection (PPRO)
- Public Education and Awareness (PE&A)
- Natural Resource Protection (NRP)
- Emergency Services (ES)
- Structural Projects (SP)

Table 6-1 summarizes the mitigation alternatives for categories of projects addressing the hazards in the San Bernardino County Unincorporated Area Multi-Jurisdictional Hazard Mitigation Plan. The Table includes implementation strategies for the wildfire, earthquake/geologic hazards, flood, drought, climate change and terrorism.

Table 6-1: Mitigation Alternative Summary

Action	Lead Agency	Hazard	Funding Source
Prevention (PRV): **Preventative activities are intended to keep hazard problems from getting worse, and are typically administered through government programs or regulatory actions that influence the way land is developed and buildings are built. This includes the development of additional code requirements to further reduce or eliminate damages from the identified hazards.**	County Land Use Services	All Hazards	General Fund
Natural Resource Protection (NRP): **To locate and protect natural and cultural resources at risk from the identified hazards.**	Fire Protection District / Flood Control District	Wildfire and Flood	General Fund, Grants
Property Protection (PPRO): **Property protection measures involve the modification of existing buildings and structures to help them better withstand the forces of a hazard, or removal of the structures from hazardous locations.**	Fire Protection District.	Wildfire	General Fund, Grants
Public Education and Awareness (PE&A): **To continue and develop new public education programs targeting the top identified hazards.**	Fire Protection District.	All Hazards	General Fund, Grants

Action	Lead Agency	Hazard	Funding Source
Emergency Services (ES): **Although not typically considered a "mitigation" technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples include:**	Fire Protections District	All Hazards	General Fund, Special District Funds, Grants
Structure Protection (SP) – Flooding **To continue to identify, fund, and build projects that reduce or eliminate flood hazards in the County.**	Flood Control District	Flooding Hazards	General Fund, Special District Funds, Grants
Structure Protection (SP)– Geological Hazards **To identify unknown hazards and develop additional new and retrofit requirements or programs to reduce or eliminate damage from geological hazards.**	Land Use Services	Geological Hazards	General Fund Grants
Structure Protection (SP) – Wildfire **To further protect structures at risk from wildfire through education, building, and enforcement codes and actions.**	Fire Protections District	Wildfire	General Fund, Special District Funds, Grants

6.2.1 Mitigation Action Plan

This section serves to identify *on-going* actions and projects in the County Unincorporated Area. With the results of the hazard risk assessment finalized, mitigation goal established, and capabilities assessed, the County and participating districts then set out to identify new mitigation actions that would reduce the outlined in the vulnerability assessment.

Not all identified mitigation actions are implementable in the 5-year plan cycle, due to technical feasibility, political acceptance, lack of funding, or other constraints. Once the mitigation actions for each participating jurisdiction were identified, they were evaluated and prioritized (by providing a time frame) to identify the most suitable mitigation actions for each participating jurisdiction to implement.

Cost effectiveness of each measure was a primary consideration when developing mitigation actions. Because mitigation is an investment to reduce future damages, it is important to select measures for which the reduced damages over the life of the measure are likely to be greater than the project cost. For structural projects, the level of cost effectiveness is primarily based on the likelihood of damages occurring in the future, the severity of the damages when they occur, and the level of effectiveness of the selected measure. While detailed analysis was not conducted during the mitigation action development process, these factors were of primary concern when selecting measures. For measures that do not result in a quantifiable reduction of damages, such as public education and outreach, the relationship of the probable future benefits and the cost of each measure was considered when developing the mitigation actions.

Based upon the participating jurisdiction capabilities, Table 6-2 shows primary actions selected for further implementation and development during the next planning cycle. Table 6-2 provides details for each mitigation action with mitigation action descriptions, FEMA mitigation category, responsible party, and timeframe.

Important to Note: See Jurisdictional Annexes for more information on implementation mechanisms and mitigation projects for each participating jurisdiction. If a participating jurisdiction is identified as a primary lead for implementation, the mitigation actions are also contained the corresponding jurisdictional annex.

Table 6-2: Mitigation Action Descriptions

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
ALL Hazard	**AH Action 1.1:** Valley Dispatch and Operations Center.	Update and maintain the operations of the facility and ensure cohesive working and response to any scale emergency and operations in a secure complex	ES	Budgetary Items from County and Federal Grant Funding. EMPG, HMPG, UASI.	Fire Protection District.	1-3 Years	See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project.
ALL Hazard	**AH Action 1.2:** Maintain Shelter Operations Compound (SHOC). This shelter concept provides a new one-stop shelter concept. The SHOC combines a shelter, a Local Assistance Center (LAC) and a Non-LAC Unit in one easy location.	After the 2003 Wildland Fires, the County and American Red Cross recognized the need to provide services beyond basic care and short-term sheltering, especially during large fires, floods, and earthquakes The Mass Care & Shelter Plan and Concept of Operations, outlines the framework of a new one-stop shelter concept; Shelter Operations Compound (SHOC). It combines a shelter, a Local Assistance Center (LAC) and a Non-LAC Unit in one easy location. Residents can access public information and referral services through the LAC, and then take a short walk to the Non-LAC Unit for communication, postal services, and other private organizations/business at little to no cost. The completion of the Plan in 2012 will help to sync local resources, encourage local self-sufficiency, foster partnership between public and private agencies, and serve as a reference document for the region. By June 2017, the program will have 32 trailers/caches equipped with mass care and shelter supplies, strategically placed throughout the County and ready for rapid deployment. It is expected to serve over 12,000 residents. In addition to enhancing the comfort levels of shelter residents, the program will produce standardized documents and protocols for procuring and maintaining Mass Care and Shelter trailers/caches. These plans and programs will help the County prepare for and mitigate damages from hazards. This is an update and expansion of the plan and done without more grant funds.	ES	To increase Mass Care and Shelter capability of the county, grants from 2008-2009 Homeland Security Grant Program (HSGP) and 2009 Riverside Regional Urban Area Security Initiative (UASI) funded the Mass Care and Shelter Trailer/Cache Program.	Fire Protection District/	1-5 Years	See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project.
All-Hazard	**AH Action 2.1:** Continue funding and support for Special Districts Projects relating to all hazards.	Continue funding and support for Special Districts Projects relating to water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District for all hazards. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	
All-Hazard	**AH Action 2.2:** Install Generators at Critical Facilities	Retrofit existing buildings and facilities with connectors/ ATS for emergency generators and/or install permanent emergency generators at critical facilities, including wells and booster station locations.	ES, SP	TBD	Water Systems	TBD	Critical sites are already set up for connection or has a permanently installed generator

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
All-Hazard	**AH Action 2.3:** Water Systems Repair Plan	Develop a plan for speeding the repair of and functional restoration of water and wastewater systems through stockpiling of shoring materials, temporary pumps, surface pipelines, portable hydrants, and other supplies.	PRV	SDD WAS	Water Systems	TBD	We have a warehouse and inventory. Add'l inventory would need to be purchased from local wholesaler
All-Hazard	**AH Action 2.4:** Smart Water Meters and SCADA	Utilization of SCADA and Smart Water Meters to get real time data on problems with the system and reduce drive time emissions as a result of traditional meter reading.	PRV	Individual CSAs	Water Systems	Ongoing	Both SCADA and Smart Meters have been installed and continue to be installed
All-Hazard	**AH Action 2.5:** Provide Employees with Emergency Supplies	Provide emergency supplies of food, water, and portable generators for employees at office and field locations.	ES	SDD/WAS	Water Systems	Ongoing	WAS has a stock of emergency food supplies, water, and generators.
All-Hazard	**AH Action 2.6:** Annual Tower and Guide Wire Inspections	Conduct annual tower and guide wire inspections to mitigate storm/wind/earthquake hazards from knocking out communications.	PRV	TBD	TV Districts	7/1/2016-7/1/2017	All Districts
All-Hazard	**AH Action 2.7**: Maintain Tower Lighting	Maintain lights on all tower locations.	SP	TBD	TV Districts	June-17	
All-Hazard	**AH Action 2.8:** Designate Emergency Operations Sites	Conduct an inventory or list of County Park Facilities and Community Centers to establish a list of pre-designated emergency operations or disaster relief sites. Not all Community Centers are an appropriate size to accommodate large numbers of evacuees and may only serve as command and control centers or distribution centers.	PRV	TBD	Park Districts	April-17	All Districts
All-Hazard	**AH Action 2.9:** Establish Power Sources for Emergency Operations Sites	Establish small solar energy fields or other forms of renewable power at County Community Centers to facilitate stand-alone emergency operations for the community.	PRV, SP	TBD	Park Districts	12/1/2016-7/1/2018	Lucerne Valley Joshua Tree
All-Hazard	**AH Action 2.10:** Connect Water Systems to Generators	Connect water systems to generators to ensure delivery even in disaster situations.	PRV, SP	TBD	Park Districts	TBD	
All-Hazard	**AH Action 2.11:** Establish a Centralized Communications Network	Establish a centralized communications network to monitor channel output for TV Districts and provide emergency information by way of character generator tied to channel transmissions.	PRV	TBD	TV Districts	7/1/2017-12/1/2017	All districts
All-Hazard	**AH Action 2.12** Incorporate as appropriate requirements from the State of California's	Government Code 65302.6 requires the following elements to be included in the hazard mitigation plan: (1) An initial earthquake performance evaluation of public facilities that provide essential services, shelter, and critical governmental functions.	PRV, NRP	TBD	Primary: Land Use Services	1-3 years	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
	most recent land use regulations regarding the hazard mitigation planning process (Government Code 65302 and 8685.9).	(2) An inventory of private facilities that are potentially hazardous, including, but not limited to, multiunit, soft story, concrete tilt-up, and concrete frame buildings. (3) A plan to reduce the potential risk from private and governmental facilities in the event of a disaster. Government Code 8685.9 requires that the state share shall not exceed 75 percent of total state eligible costs unless the local agency is located within a city, county, or city and county that has adopted a local hazard mitigation plan as part of the safety element of its general plan. In that situation, the Legislature may provide for a state share of local costs that exceeds 75 percent of total state eligible costs.			Secondary: Fire Protection District/		
All-Hazard	**AH Action 3.1:** Continue funding and support for Special Districts Projects relating to all hazards.	Continue funding and support for Special Districts Projects relating to water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District for all hazards. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	On-Going	
Wildfire	**WF Action 1.1** Continue Mountain Area Safety Taskforce (MAST) funding to support mitigation activity.	MAST was formed to mitigate the region wide risk of a catastrophic wildfire due to dead and dying trees in the mountain communities. The mission of the MAST is to facilitate a coordinated effort by cities, county, state, federal, and non-profit agencies to provide for the protection of property owners, residents, and property subject to the risk of catastrophic wildfire that could occur in San Bernardino County with an initial emphasis on the threat resulting from the Old and Grand Prix fires in 2003. MAST priorities are to continue reducing fire hazards through fuel reduction programs and hazard abatement though enforcement of county ordinances. The Mountain Area Safety Taskforce (MAST) Operations Section meets monthly. MAST Operations Section determines project priorities based on the benefit cost analysis of the projects and the effect of the project on the overall goals of the MAST organization. Goals can change as detailed Benefit Cost Analysis is conducted and CEQA/NEPA reviews are completed.	NRP, PPRO	Seeking additional funding through HMPG.	San Bernardino County Fire Protection District	On-Going	See Implementation plan on more information on MAST. See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project .
Wildfire	**WF Action 2.1:** Update Mountain Mutual Aid Map Book to document updated information contained in 2016 HMP.	The Map Book portion of the Community Safety and Structure Protection Plan provides not only a street network of the area but more importantly it provides the locations of strategic and critical resources for fire fighters. These include but are not limited to safe zones, open areas, locations for refuge. They also identify areas within communities that have narrow and steep winding streets and or with limited ingress and egress. The document is handed out to all responding strike teams from out of the area and has proved invaluable in directing and coordinating an effective firefighting response and reduces the potential for life loss and property damage.	ES	Seeking additional funding through HMPG.	San Bernardino County Fire Protection District	On-Going	See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project .

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Wildfire	**WF Action 2.2** Update Community Structure Protection Plans as necessary.	This is an on-going action (from the 2011 MJHMP) with the goal to continue development of and continue the mission of mutual aid between first responders in the County mountain areas.	PPRO		Fire Protection District	On-Going	
Wildfire	**WF Action 3.1:** Implement identified community based fuels reduction projects.	The Fuels Reduction Program is designed to create community based fuel modification programs across the mountain communities. These projects are selected specifically to reduce the potential for catastrophic wildfires and the damage that they can do to the communities. Project design, contracting, and operations are managed by the County's Public Works Department with priorities set by local fire chiefs in monthly MAST Operations Meetings. This program is the oldest and most significant for reducing wildfire threat on a mountain wide basis.	PPRO	Current Funding: Seeking additional funding through HMPG.	Primary: San Bernardino Public Works Department Secondary: County Fire Protection District	On-Going	
Wildfire	**WF Action 3.2:** Develop fuels reduction "maintenance program" by obtaining participation from citizens and/or homeowners associations.	To survive a wildfire, property owners need to manage the land surrounding their homes and communities effectively. Removing fuels in the wildland fuel reduction zone beyond the defensible space can reduce the speed and intensity of an oncoming wildfire. But if these areas aren't regularly **maintained**, they lose their effectiveness. Plants grow back, and flammable vegetation needs to be routinely removed and disposed of properly. This guide provides tips on how to create and maintain defensible space and wildland fuels treatments around your property.	PPRO, PE&A	Seeking additional funding through HMPG	Primary: Public Works Secondary: Fire Protection District	On-Going	
Wildfire	**WF Action 4.1** Increase homeowner assistance services to mountain residents for fuel reduction.	This is an ongoing wildfire mitigation action (from the 2011 MJHMP) for the group Forest Care to achieve the goal of providing assistance to homeowners by expanding services to all communities in the Mountain areas of the County. Forest Care is a program dedicated to creating a healthier forest. This program provides foresters to assess individual properties for thinning the vegetation and then provides 75% of the funding to do so.	PPRO, PE&A	Seeking additional funding through HMPG	San Bernardino County Fire Protection District	On-Going	
Wildfire	**WF Action 4.2** Continue working with Southern California Edison (SCE) to remove dead trees near power lines.	A significant number of fires across the State are caused by trees falling into power lines. When the forests in the mountain communities became infested with bark beetles the pine tree die off was unprecedented. Thousands of these dead trees were standing precariously close to power lines. Early in the Bark Beetle Emergency in 2004, Southern California Edison swiftly initiated a program to remove all trees that were dead, dying, and/or diseased that had the potential to fall into any SCE power lines.	PRV, PPRO	As of July of 2010 Southern California Edison (SCE) has spent $179,758,978 to remove dead dying and diseased trees.	San Bernardino County Fire Protection District	On-Going	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
		The role of Southern California Edison was critical to the success of MAST both operationally and financially. Edison still removes the most difficult trees, the most costly trees; and the ones that are most likely to be the source of ignition for a wild land fire. They are also removing the trees that are immediately threatening homes. They have removed 118,305 trees since the inception of the program in 2004. They also provided reimbursements to people that removed their own trees.					
Wildfire	**WF Action 5.1:** Inspect every residence in the mountain communities throughout the year to enforce the Fire Hazard Abatement code that addresses green fuels.	The Fire Hazard Abatement Program conducts surveys to identify fire hazards throughout the year. Fire hazards are identified and notices to abate the hazard(s) are mailed to property owners. Property owners are given 30 days to abate the violations. Failure to abate may result in citations, penalties, and/or fees for abatement by the County. The Fire Hazard Abatement Program responds to complaints year round in the unincorporated areas and contracting Cities and Fire Districts. The Division completes more than 430,000 inspections, issues more than 45,000 Notices to Abate Fire Hazards, issues over 4,000 citations for non-compliance, and abates the fire hazards on more than 2,000 parcels annually. Within the last 5 years, the Fire Hazard Abatement Division has received even more financial resources that enable them to abate all properties declared a fire hazard.	PRV, PPRO, PE&A	Seeking additional funding through HMPG	Primary: Land Use Services Secondary: Fire Protection District	On-Going	For more information on Contractor Certification, see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	**WF Action 5.2:** Continue to collaborate with Forest Care, Red, Cross and Cal Fire to overcome increased costs of enforcement.	This is an on-going action from the 2011 MJHMP with the goal of overcoming funding shortfalls for the County Fire Hazard Abatement Program.	PRV		San Bernardino County Fire Protection District	On-Going	
Wildfire	**WF Action 6.1** Train and Certify landscape contractors to comply with the Fire Hazard Abatement Code.	The City of Big Bear Lake created a program to train and certify landscape contractors to provide a qualified workforce to conduct fuels reduction activities on individual properties. The contractors are trained to comply with the new Fire Hazard Abatement Code that exists both in the City of Big Bear and the County unincorporated area. The City of Big Bear Lake Fire Department conducts the classes for landscapers and handy persons. This provides an incentive for the contractors and provides a level of certification that the homeowner can rely on when they are deciding to hire a landscape contractor to conduct fuels abatement around their home.	PRV, PPRO	Seeking additional funding through HMPG	San Bernardino County Fire Protection District	On-Going	On-Going

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Wildfire	**WF Action 6.2:** Continue wildfire mitigation efforts under the Wood Shake Roof Replacement Program.	The County successfully passed an ordinance that requires the replacement of wood shake roofs by 2014. MAST has successfully mapped all of the wood shake roofs in the fire safety overlay and has created a strategy as to which roofs will be selected to participate in the FEMA funded project. This is an on-going project in cooperation with Big Bear Lake Fire Protection District in order to provide more funding for wood shake roof replacements by property owners.	PRV, PPRO, SP		Primary: MAST Secondary: San Bernardino County Fire Protection District	On-Going	
Wildfire	**WF Action 6.3:** Protect Property in Wilderness Areas	Rockscape or pave property grounds which have structures located in wilderness and or areas prone to wildfires. Double the width of external fire breaks.	PPRO, PRV, SP	TBD	Sewer Systems	January-17	All sewer pump stations have paving
Wildfire	**WF Action 7.1:** Modify independent and unique CWPPs into a more common framework making them similar but leaving room to provide specific hazard characteristics and mitigation actions for each community.	Community Wildfire Protection Plans are designed to provide a means for a community, usually through the Fire Safe Council, to have input into and actively participate in the planning, strategy, goals, and objectives of creating a fire safe community.	PRV	Seeking additional funding through HMPG	San Bernardino County Fire Protection District	On-Going	On-Going For more information on CWPP see Annex A Section A.6 Fire Protection District Mitigation Project .
Wildfire	**WF Action 8.1:** Construct Arrowbear Drive Realignment and Widening.	The Arrowbear community off State Highway 18 has limited access to State Highway 138. The existing bridge/spillway and road needs to be realigned and widened to facilitate access by emergency personnel during wildfires and flooding. Mitigation strategy for this is to remove and replace existing bridge/spillway, realign and widen the road.	SP	Seeking grant funding Total Cost: $3,000,000 Approx.	Primary: Public Works Secondary: San Bernardino County Fire Protection District	1-3 Years	
Wildfire	**WF Action 8.2:** Construct Cedar Glen Fire Access Road.	Lack of paved roads inhibits traffic circulation and the ability to enter and exit the area without backtracking during wildfire emergencies. Strategy is to Construct road and drainage improvements to Little Bear Creek Road and Elder Drive.	SP	Seeking grant funding **Total Cost:** $2,500,000	Public Works	1-3 Years	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Wildfire	**WF Action 8.3:** Structural Fire Breaks Widening	Double the width of external fire breaks on grounds which have structures located in wilderness and or areas prone to wildfires.	SP, PRV	Individual CSAs	Water Systems	7/1/2017-7/19/2019	
Wildfire	**WF Action 9.1:** Continue funding and support for Special Districts Projects relating to wildfire.	Continue funding and support for Special Districts Projects relating to wildfire in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	On-Going	
Wildfire	**WF Action 9.2:** Emergency Water Supplies	Purchase emergency water supply or water purification devices to ensure uninterrupted supply of water to emergency response personal.(completed with continuous fresh of supplies and rotation)	ES	TBD	Roads	TBD	
Earthquake	**EQ Action 1.1:** Improve public education programs and practices to residents for earthquake risk.	Public education and outreach programs are an efficient and cost-effective way to promote meaningful changes within a community. A Program for Public Information (PPI) for earthquake awareness and mitigation could significantly reduce injury and property damage to earthquake. Use a suite of partnerships, activities, and products to educate the public about earthquake science and motivating homeowners to become prepared for earthquakes.	PE&A		Human Resources	5-10 Years	
Earthquake	**EQ Action 2.1:** Evaluate single family homes for Earthquake hazard when conducting permit applications and plan reviews.	82.15.040 Development Standards states that a structure used for human occupancy shall be located 50 feet or farther from any active earthquake fault traces. Lesser setbacks may be applicable in certain situations as determined by an appropriate geologic investigation and approved by the County Geologist or other engineering geologist designated by the Building Official. Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code Section 2621 et seq.) requires the delineation of potential damage areas along known active faults throughout California. It requires local governments to withhold approval of construction permits in those zones until geologic investigation has determined that the site is not threatened by surface displacement from future faulting.	PRV		Land Use Services	TBD	On-Going
Earthquake	**EQ Action 2.2:** Seismic Strapping	Seismic strapping for existing water tanks and future construction.	SP, PRV	CSA 64	Water Systems	7/17/2017-7/1/2019	Ongoing currently
Earthquake	**EQ Action 2.3:** Employee Emergency Sheltering	Develop a plan for short-term and intermediate-term sheltering of employees.	PRV	WAS	Sewer Systems	7/17/2017-7/19/2019	To purchase cots, small portable generators, tents, etc.

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Earthquake	**EQ Action 3.1:** Identify liquefaction hazard areas outside the currently designated Geologic Hazard Overlay Districts.	Supported by General Plan mechanism (General Plan, Section VIII, Safety Element Policy § 7.5; California Building Code §1803.5.11); Seismically- induced lateral spreading, and/or seismically-induced lateral flow, can cause devastating structural damage and a high potential for saturation exists when the groundwater level is within the upper 50 feet of alluvial material.	PRV		Land Use Services	5-10 Years	
Earthquake	**EQ Action 4.1**: Require development on hillsides to minimizes the extent of topographic alteration and erosion, to maintain slope stability, and to reduce the potential for offsite sediment transport (Complements General Plan, Section VIII, Safety Element Policy § 6.1).	This mitigation action is especially important in the San Bernardino and San Gabriel Mountains which have high slope failure / erosion potential. Typical slope mitigation techniques that are used include: Drainage Improvements - Since water is the biggest culprit in failing slopes, drainage improvements should be the first priority. Some drainage improvements may include: ▪ Collect or divert surface water from the problem slope. This may include catch basins, swales, or sealing tension cracks to prevent infiltration. ▪ Collect and remove subsurface water. This may include drains constructed within the subsurface to remove excess seepage, or lower ground water. Some earthwork mitigation techniques are as follows: ▪ Remove the upper soils of the slope to create a flatter slope. ▪ Buttress the slope toe by filling with rock, gravel, or soil. ▪ Benching the slope if each bench is on competent subgrade. ▪ Structural Improvements - Structural improvements include: ▪ Friction Piles ▪ Retaining walls ▪ Geo Grid ▪ Sheet Piles ▪ Rock Bolts ▪ Vegetative Cover Complements General Plan, Section VIII, Safety Element Policy § 7.6 Complements General Plan, Section VIII, Safety Element Policy § 6.1)	PRV	N/A	Land Use Services	On-Going	Provide enhanced information during the development review process to address slope failure concerns.
Earthquake	**EQ Action 4.2:** Generator Installation	Install generators at all road facilities. This will allow uninterrupted communications and provide power to refuel critical emergency response equipment.	SP, PPRO	TBD	Roads	TBD	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Earthquake	**EQ Action 5.1:** Divert runoff to Little Bear Creek.	To reduce the runoff over the cliff(s) in the Rimforest neighborhood, the runoff must be diverted to another path. This will be accomplished over three phases: • Phase 1: Reduce Runoff Tributary Area by 64%- 50.35 AC • Phase 2: Reduce Runoff Tributary Area by 30%- 23.79 AC • Phase 3: Reduce Runoff Tributary Area by 5%- 3.99 AC	SP, NRP, PRV		Primary: Public Works Secondary: Flood Control District		
Earthquake	**EQ Action 6.1:** Continue funding and support for Special Districts Projects relating to earthquake hazards.	Continue funding and support for Special Districts Projects relating to earthquake hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	On-Going	
Flood	**FL Action 1.1:** Update NFIP data and maps with newly identified flood hazard areas in the County, as new information becomes available.	As required by the State of California, National Flood Insurance Program (NFIP) maps published by FEMA must be included in the HMP or General Plan Safety Element. Keeping this information current is an important mitigation action.	PRV, PPRO		San Bernardino County Flood Control District	On-Going	
Flood	**FL Action 2.1:** Determine whether or not additional amendments to development standards or policies are merited, based on the Alluvial Fan Task Force Recommendation.	This is an on-going mitigation action from the 2011 MJHMP.	PRV		Primary: San Bernardino County Flood Control District Secondary: Land Use Services	On-Going	
Flood	**FL Action 3.1:** Amend the Flood Plain Safety Overlay District through automatic map updates as new data is released and published by FEMA.	Current San Bernardino County Hazard Maps can be found at: http://cms.sbcounty.gov/lus/Planning/ZoningOverlayMaps/HazardMaps.aspx.	PRV, NRP		Primary: San Bernardino County Flood Control District Secondary: Land Use Services	On-Going	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Flood	**FL Action 3.2:** Review development plans to ensure compliance with ordinances.	This is an on-going mitigation action from the 2011 MJHMP in order to reduce the flood hazards through development standards and policies stated in the General Plan and San Bernardino 2077 Development Code.	PRV		Primary: Land Use Services Secondary: San Bernardino County Flood Control District	On-Going	
Flood	**FL Action 3.3:** Inspect construction to ensure compliance with approved development plans.	This is an on-going mitigation action from the 2011 MJHMP in order to reduce the flood hazards through development standards and policies stated in the General Plan and San Bernardino 2077 Development Code.	PRV, PPRO, SP		Primary: Public Works Secondary: Flood Control District	On-Going	
Flood	**FL Action 3.4:** Soil Stabilization on Roadways and Along Roadway Shoulders	Soil stabilization on roadway shoulders and dirt roads. This will prevent erosion caused by flood conditions.	SP, PRV	TBD	Roads	TBD	
Flood	**FL Action 3.5:** Encasing Pipelines	Encase water pipelines with specific sized rock, gravel, and road base in natural waterways to prevent continual washout or exposure during heavy storm events/floods.	SP, PRV	CSA 70 J	Water Systems	7/17/2017-7/1/2027	
Flood	**FL Action 4.1:** In each flood control zone, construct facilities identified in those zones by the Flood Control Advisory Committee. See Flood Control District Annex for a listing of projects.	This is an ongoing mitigation action from the 2011 MJHMP to achieve the goal of improving existing facilities and construct new facilities to mitigate flooding within the County.	SP		Primary: Public Works Secondary: San Bernardino County Flood Control District	On-Going	
Flood	**FL Action 6.1:** Continue funding and support for Special Districts Projects relating to flood hazards.	Continue funding and support for Special Districts Projects relating to flood hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	On-Going	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Flood	**FL Action 6.2:** On Call Contractors	Employ on call contractors to assist in emergency situations.	PRV, ES	TBD	Roads	TBD	
Drought	**DR Action 1.1:** Create a public awareness campaign advising citizens, business owners and farmers on water conservation.	Public education and outreach programs are an efficient and cost-effective way to promote meaningful changes within a community. A program to raise awareness on the importance of water conservation could significantly reduce the amount of water used by the public.	PE&A, NRP		Human Resources	TBD	
Drought	**DR Action 1.2:** Provide incentives for farmers to grow crops that are less water intensive.	Farmers use 80% of the State's water. By offering incentives to produce less water intensive foods (such as beets, carrots and potatoes) as opposed to more water intensive foods such as almonds, beef and pork) would make a substantial difference in water consumption.	NRP, PRV,		DAO Community Services?	On-Going	
Drought	**DR Action 1.3:** Continue to coordinate with the San Bernardino Valley Water Conservation District to provide Qualified Water Efficient Landscaper (QWEL) training.	The Qualified Water Efficient Landscaper training presents an affordable proactive local approach to reducing landscape water demand. QWEL provides graduates with knowledge in water efficient and sustainable landscape practices including water management and preservation of other valuable resources.	PE&A		Economic Development Agency?	On-Going	
Drought	**DR Action 1.2:** Approve the County's Watershed Water Quality Management Plan.	The County's Watershed Water Quality Management Plan written in 2013.	PRV, NRP			On-Going	
Drought	**DR Action 1.4:** Continue to enforce the watering schedule and watering restrictions throughout the County.	In response to the State Water Resources Control Board's 2016 emergency water conservation regulation, the County enforces a watering schedule for residential and commercial addresses.	PRV, NRP		Land Use Services	On-Going	
Drought	**DR Action 3.1:** Continue funding and support for Special Districts Projects relating to drought hazards.	Continue funding and support for Special Districts Projects relating to drought hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7	VARIES	VARIES	VARIES	On-Going	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Anti-Terrorism	**AT Action 1.1:** Identify and prioritize mitigation activities (anti-terrorism force protection) at critical facilities and gathering places that are vulnerable to terrorist attacks.	Critical facilities may include essential facilities (such as hospitals, police and fire stations, evacuation centers, etc.), transportation systems, lifeline utility systems, high potential loss facilities (such as nuclear power plants, dams and military installations, etc.), and hazardous material facilities. Gathering facilities should also receive special attention. Places of mass gathering not only present terrorists with potential opportunities for mass casualties, symbolism and high impact media coverage, they pose a broad range of security challenges for their owners and operators.	PRV, PPRO		Land Use Services	On-Going	
Anti-Terrorism	**AT Action 2.1:** Continue funding and support for Special Districts Projects relating to terrorism hazards.	Continue funding and support for Special Districts Projects relating to terrorism hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	On-Going	
Climate Change	**CC Action 1.1:** Continue working with the South Coast Air Quality Management District to meet GHG reductions targets.	The San Bernardino County General Plan Amendment and Greenhouse Gas Reduction Plan addresses the environmental effects specific to the proposed General Plan Amendment, Greenhouse Gas Reduction Plan, and associated Development Code Amendment and can be found here: http://www.sbcounty.gov/Uploads/lus/Countywide/GreenhouseGas/Full-Vol-1.pdf	PRV, NRP		Land Use Services	On-Going	
Climate Change	**CC Action 1.2:** Continue implementing the energy conservation and efficiency measures identified in the County of San Bernardino Greenhouse Gas Emissions Reduction Plan.	According to the San Bernardino County Renewable Energy and conservation Element, San Bernardino County's commercial, institutional and residential communities will continue to grow in the foreseeable future. Access to dependable and affordable energy sources is critical to maintaining and enhancing the quality of life enjoyed by San Bernardino residents and businesses. As energy needs grow, so do the needs to develop new energy sources.	PRV, NRP		Land Use Services	On-Going	
Climate Change	**CC Action 2.1:** Encourage carpooling and the use of public/ alternative transportation methods.	Reduction Measure R2T1 of the County of San Bernardino Greenhouse Gas Emissions Reduction Plan establishes an Employment Based Trip and VMT Reduction Policy. Some features include a compressed work week, car/vanpools, employee bicycle/pedestrian programs, and shuttle/ transit programs.	PE&A, PRV, NRP		Human Resources	On-Going	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Climate Change	**CC Action 2.2:** Optimize energy efficiency in the built environment and promote the local economic benefits of energy efficiency retrofits. (San Bernardino County Renewable Energy and Conservation Element)	This is an on-going mitigation policy from the San Bernardino County Renewable Energy and Conservation Element.	SP, PE&A, PRV		Public Works	On-Going	
Climate Change	**CC Action 2.3:** Encourage residents and businesses to conserve energy. (San Bernardino County Renewable Energy and conservation Element)	This is an on-going mitigation policy from the San Bernardino County Renewable Energy and Conservation Element.	PE&A, NRP, PRV		Human Resources	On-Going	
Climate Change	**CC Action 3.1:** Continue funding and support for Special Districts Projects relating to climate change hazards.	Continue funding and support for Special Districts Projects relating to climate change hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	On-Going	

Section 7. Plan Maintenance

7.1 Monitoring Evaluating and Updating the HMP

The San Bernardino County Fire Protection District Office of Emergency Services (OES) is the custodian of the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). In the 2010 MJHMP, County of San Bernardino indicated that the MJHMP would be reviewed annually. Although no formal meetings were held, OES reviewed the plan annually and collected new hazard mitigation information and mitigation efforts throughout the county. Additionally, OES referenced/reviewed the MJHMP before submitting grant applications to ensure the project was captured in the plan when applying for all grants to assist their mitigation efforts.

There are three (3) main components to the MJHMP: hazards, projects, and stakeholder involvement (public, as well as, county staff). The County and its Special Districts have focused on these components and over the last 5 years have made steady improvements in all areas. The County and its Special Districts participated and facilitated several meetings and established several tasks forces to help advance the understanding of hazards in the community. This information was shared with other county personnel and the general public. OES believes that this sharing of information leads to a more informed community, thus a more robust MJHMP.

Departments and Special Districts with projects track the status of the projects through the entire life cycle from concept to completion. Projects in progress are tracked to ensure all milestones are met and payments are made in a timely manner. Each year proposed projects are reviewed during budget development every spring and selected projects are submitted for funding to the appropriate funding source. These funding sources include but are not limited to grant funding, General Fund funding, and Special District funding.

Because the MJHMP is a living document that reflects ongoing hazard mitigation activities, the process of monitoring, evaluating, and updating will be critical to the effectiveness of hazard mitigation within the County Unincorporated Area. The County and its Special Districts will hold internal planning meetings to discuss current projects and evaluate newly proposed projects resulting from internal staff meetings and input from the public. The results of these Departmental/Special District meetings will be presented to the Multi-Jurisdictional Planning Team meetings at their annual meetings. To facilitate the Multi-Jurisdictional Hazard Mitigation Planning process, OES is proposing to conduct these annual meeting with the Multi-Jurisdictional County Planning Team where the Team Members will discuss the projects, priorities, and goals in the current plan and from individual Special District meetings and suggest any necessary changes. Results of the annual meeting will be retained and compiled for the 2016 update. The County Planning Team will continue to support focused outreach for county Departments and Districts as well as support Countywide activities.

7.1.1 Plan Adoption

To comply with DMA 2000, the San Bernardino County Board of Supervisors has officially adopted the 2016 San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan. The adoption of the 2016 MJHMP recognizes the County's commitment to reducing the impacts of natural hazards within the County limits. A copy of the 2016 MJHMP adoption resolution is included after the table of contents in this document.

7.1.2 Implementation

The knowledge gained from the MJHMP has helped the county enhance other planning efforts. One of the biggest results from the 2010 MJHMP efforts was the incorporation of the MJHMP into the 2007 General Plan's Safety Element. This merging of plans has help ensure development decisions are considering the most recent hazard information. It is the County's intent to incorporate by reference the updated MJHMP into the County General Plan upon approval from FEMA.

The MJHMP has also led to the strengthening and improvement of several County Ordinances, which are designed to ensure proper fuels reduction was completed in the Severe Fire Hazard Zones. Two new ordinances were passed requiring replacement of wood shake roofs in the Severe Fire Hazard Severity Zones by 2014 and the reduction of live fuel loads around structures in the Very High Fire Hazard zone.

The MJHMP goals and actions will be incorporated into various general operations of government. For example, much of the information from the MJHMP will be included in the County Operational Area Emergency Operation Plan (EOP). As any future County plans are developed, the Multi-Jurisdictional Hazard Mitigation Plan will be a great asset in any plan development efforts. As noted earlier, much of the information contained in this MJHMP is from the County General Plan and is already part of the planning process.

Additional benefit is gained from the County and its Special Districts reviewing existing mitigation projects and development of additional mitigation projects at their internal annual Planning Team meetings. This input includes comments and suggestions from the public as well as from the internal planning process of each County department and District.

7.1.2.1 Implementation through Existing County Mechanisms

7.1.2.1.1 All Hazards

7.1.2.1.2 Amendment to Title 6 County Code

An amendment to Title 6 of the County of San Bernardino Code to adopt by reference the 2010 Editions of the California Building Standards Codes went before the Board of Supervisors on

November 2, 2010 and was continued for a second reading on November 16, 2010 and approved unanimously. The amendment became effective on January 1, 2011.

The County of San Bernardino amendment to Title 6 of the County Code to adopt by reference the 2010 Editions of the California Building Standards Codes repealed the current chapters of Division 3 of Title 6 that reflect the 1994/1995 editions of the California Building Standards Codes and adopt the 2010 editions of these codes by reference.

The California Building Standards Commission approved the California Building Standards Code (Code) for a statewide effective date of January 1, 2011 and requires this Code apply in all parts of the state. This Code consists of the California Building, Residential, Plumbing, Mechanical, Electrical, Energy, Historical Buildings, Existing Building (Unreinforced Masonry) and the Green Building Standards Codes. Since this 2010 Edition was adopted by local ordinance, the prior editions of this code will be repealed and the most recent editions of the codes with applicable amendments requiring express findings and certain appendices necessary for the health and safety of the citizens of this County will be in effect within the unincorporated areas of San Bernardino County. The benefit of adopting this Code is that it provides consistency and clarification for the building community as well as building inspectors and plans examiners. State law (Health & Safety Code 18941.5 and 17958.7) requires the local government make express findings in order to amend building standards and the amendments must be necessary due to local climatic, geological, or topographical conditions.

Those amendments and findings are included in the County's ordinance and were filed with the California Building Standards Commission.

The recommended modifications not requiring express findings are administrative or procedural in nature and concern the local implementation issues that are not covered by building standards.

An example of this type of modification is to the California Residential Code, Section R105.3.1.1 which requires the Board of Appeals to confirm substantial valuations in the flood plain. The traditional purpose of the Board of Appeals has been reserved for a contested decision of the Building Official, and it is felt that it should remain as such.

With respect to grading and excavation regulations found in Appendix J of the 2010 State published code, the 2001 California Building Code dealt with grading with more clarity in regards to what activities require a permit and set forth rules to ensure large grading projects are scrutinized in greater detail than smaller projects by requiring more reporting and inspection of such work. The grading chapter in the 2001 Code has been trusted and in use in its primary form for years. The 2010 Appendix J grading chapter needs substantial amendment and modification to address all grading issues and is not recommended for adoption in its present form. The Board adopted the 2001 Appendix Chapter 33 regulations as part of this proposed ordinance. Relocation permit requirements have been moved to a new section of the Code, and it retains specific standards for relocation procedures in details not found in the 2010 State-published code. Clarification of the types of buildings affected by the new regulations has also been made.

Administrative changes to the 2010 California Existing Building Code (Part 10 of Title 24) were approved to outline the procedures required to set allowable time limits for the retrofit and repair of unreinforced masonry buildings. Staff is also recommending that authorization be given to the Building and Safety Division of the Land Use Services Department to issue Administrative Citations as an alternative means of enforcement of the County Code provisions.

Express findings are made for changes to the California Plumbing Code, Appendix K regarding the soil conditions that exist in this county. These changes are supported by the Environmental Health Division. These express findings are iterated in the ordinance and will be filed with the Building Standards Commission as required by law in order to become effective.

7.1.2.2 Wildfire

7.1.2.2.1 Inland Empire Fire Safe Alliance (IEFSA)

The Inland Empire Fire Safe Alliance (IEFSA) was created to act as a forum for all Fire Safe Councils in San Bernardino County. Some of the benefits are developing a consistent and comprehensive message to citizens about fire safety; coordinating efforts for grant administration, writing, and reporting; a one-stop shop for information, resources and research; and a centralized source for sharing of updates from cooperating governmental agencies. There are approximately 20 Fire Safe Councils active in San Bernardino County.

IEFSA has held bimonthly meetings for over 5 years and have been the focal point for all regional Fire Safe Councils including some from Riverside County. They have also held numerous workshops and seminars regarding fire resistive construction, and materials, BAER reports, CWPPs and grant writing. The IEFSA was the focal point for Fire Safe Councils (FSCs) that were working on completing their CWPPs and created a focus group and a steering committee to accomplish these critical plans. To support public education and involvement,

IEFSA created the web site www.fireinformation.com as well as participated in countless safety fairs and fire wise awareness activities. They also conducted a Public Education Media Exchange where all FSC and Agencies got together to share educational modalities and create common thought and educational threads. They have reached out to thousands of mountain residents in preparing them for wildfires.

7.1.2.2.2 Mountain Area Safety Taskforce (MAST)

MAST was formed to mitigate the region wide risk of a catastrophic wildfire due to dead and dying trees in the mountain communities. The mission of the MAST is to facilitate a coordinated effort by cities, county, state, federal, and non-profit agencies to provide for the protection of property owners, residents, and property subject to the risk of catastrophic wildfire that could occur in San Bernardino County with an initial emphasis on the threat resulting from the Old and Grand Prix fires in 2003. MAST priorities are to continue reducing fire hazards through fuel reduction programs and hazard abatement though enforcement of county ordinances.

The Mountain Area Safety Taskforce (MAST) Operations Section meets monthly. MAST Operations Section determines project priorities based on the benefit cost analysis of the projects and the effect of the project on the overall goals of the MAST organization.

The MAST Unified Command identified the following objectives as their focus and direction:

- Provide for Community Safety.
- Develop Coordinated Public Information Dissemination Between Cities, County, Special Districts, State, Federal, and Non-Profit Agencies.
- Develop Immediate, Mid-range and Long-range Coordinated Agency Plans.
- Identify and Secure Potential Funding Resources to Provide Protective Measures.
- Document Task Force Activities Including Mission, Goals and Objectives, Policies, Procedures, and Outcomes. Prior to any type of flood threat, the following precautionary measures may be taken by MAST members to reduce the impact of impending fires:
- Review mutual aid agreements
- Define evacuation areas and trigger points
- Review the use of alert and warning systems
- Provide information to the public of fire prone areas and protective measures in progress or planned for those areas
- Educate public on emergency self-help and preparedness
- Develop and maintain emergency notification procedures and checklists

MAST is the central point of coordination for all projects related to the reduction of the potential for catastrophic wildfires. There are numerous participants and all levels of government. MAST partners collaborate to provide multi-agency technical support to ensure project success. Economic impacts are considered and the result has been significant increase in economic activity through thoughtful application of grant funding. MAST has been so successful in the environmental management of projects that all of the local environmental groups including national affiliates are now supporters of MAST fuels projects.

The MAST group includes:

- San Bernardino County Board of Supervisors
- County Administrative Office
- County Public Works-Flood Control/Transportation/Solid Waste

- County Fire Protection District
- County Fire Protection District/Office of Emergency Services (OES)
- County Sheriff's Department
- Southern California Edison
- Bear Valley Electric
- Arrowbear Lake Fire Department
- Big Bear City Fire Protection District
- City of Big Bear Lake Fire Department
- Crest Forest Fire Protection District
- Running Springs Fire Department
- USFS
- San Bernardino National Forest Association
- Forest Care
- Cal Fire
- Caltrans
- California Highway Patrol
- Inland Empire Fire Safe Alliance
- Angelus Oaks Fire Safe Council
- Arrowhead Communities Fire Safe Council
- Bear Valley Fire Safe Council
- Lytle Creek Fire Safe Council
- Mill Creek Fire Safe Council
- Mountain Rim Fire Safe Council
- Wrightwood Fire Safe Council

Since its beginnings, MAST has been the Unified Command that has successfully implemented and completed numerous programs leading to safer communities, a more educated public and an improved environment.

MAST provides an extensive Fuels Reduction Program. The Fuels Reduction Program began with removal of dead hazardous trees from areas threatening electrical transmission lines, evacuation routes, and structures within the San Bernardino Mountains. Dead and dying trees pose an extreme fire danger, and MAST members began removing these trees under state and federal grants, including a $70 million grant from the USDA Natural Resources Conservation Service. At the height of the program, Southern California Edison contractors were taking out 650 trees a day. As the program developed, additional hazards were identified, such as green fuel load density and wood shake roofs on structures within the San Bernardino Mountains

The MAST mission has expanded to include reducing green fuel by thinning live trees in densely wooded areas. Property owners also are being urged to thin the live trees and vegetation on their property to gain an upper hand on the bark beetle infestation and reduce the risk of catastrophic wildfires like the Grand Prix and Old fires in 2003.

Other MAST Achievements include:

- Increasing awareness of the drought-related bark beetle emergency and the threat of catastrophic wildfires
- Distributing fire safety and prevention information to the public
- Developing evacuation plans and distributing emergency planning information to the public
- Developing commercial use or disposal options for waste wood products.

The Mountain Area Safety Taskforce (MAST) Operations Section meets monthly. MAST Operations Section determines project priorities based on the benefit cost analysis of the projects and the effect of the project on the overall goals of the MAST organization.

Goals can change as detailed Benefit Cost Analysis is conducted and CEQA/NEPA reviews are completed.

7.1.2.2.3 Fire Safety Overlay District Mitigation

A General Plan Amendment to the Safety Element of the County of San Bernardino 2007 General Plan updated the Fire Safety Overlay District effective March 11, 2010. The Safety Element includes several hazard overlays that are included in the General Plan mapping system to inform the public of potential hazards to development of property within certain areas of the County and to enable the County to mitigate the risks presented to property owners by these hazards, by requiring fire resistant building construction methods. The overlays include potential fire hazards within the mountain regions as well as the valley and desert "interface". Over the past twenty years, certain federal and state agencies have been in the process of digitizing much of this hazard data. The digitization of this data has allowed for greater accuracy as well as more timely updates. In recognition of the new data from various federal and state agencies, the County updated the Fire Safety Overlay District contained within the Safety Element of the General Plan. The Fire Safety Overlay District is amended by modifying four General Plan Quad Maps to incorporate updated fire safety mapping published by Cal Fire for the Valley area.

As new information is received, the overlay maps are updated to reflect changes. These updates are made by the Land Use Services Department in collaboration with County Fire Protection District. More areas have been added through annexation and contract for services and so there has been large growth and the overlay will be updated. The future 2018 CountyWide Plan will replace the General Plan, and will contain more update maps and regulations that will allow development to occur but ensure safety and sustainability within the Fire Safety Overlay District.

7.1.2.2.4 Public Education Programs

The County through MAST conducted a comprehensive mountain-wide multi-modality Public Outreach Program from 2006 to 2008. It can be found at www.CalMAST.org. The program in both English and Spanish created and presented multiple public educational meetings, newsletters,

brochures, calendars, and posters. Because of the large number of visitors to the forest, MAST also created Emergency Information Visitors brochure and glove box sized Emergency Response Evacuation maps for the mountain communities. The program won national awards for advertising and public relations. Other jurisdictions initiated their own public education activities but brought them back through MAST so that the entire group could receive the benefit. The City of Big Bear Lake Fire Department was the most prolific in developing innovative and creative educational programs. They developed the Thin-Is-In website at (www.thinisin.org) that is an excellent site for citizens and agencies as well. Since the Big Bear Valley is served by an excellent radio station KBHR (k-bear) they have posted numerous public safety messages. Also during the Butler, Butler II and Slide Fires, KBHR provided constant updates to the community regarding the fire.

7.1.2.2.5 County Fire Hazard Abatement

Land Use Services Department, Environmental Health Division is responsible for Fire Hazard Abatement (FHA). Fire Hazard Abatement works to reduce the potential for an individual's property to be the source of fire and structural ignitability. Failing to maintain private property in a fire safe condition is seen as a fire threat and is considered a threat to neighbor's property rights. To obtain compliance, FHA issues notices of violation to properties that have dry vegetation and flammable green vegetation. If the property owner doesn't comply with the notice, FHA then obtains a warrant to go onto the property and abate the fire hazard.

The Fire Hazard Abatement portion of the County Code was completely rewritten and redesigned around real flammable fuels. The most significant change was to include certain types of green fuels as flammable vegetation.

Following in the City of Big Bear Lake's path, the County adopted the new code in the fall of 2008. In January of 2010 the County amended the Hazard Overlay maps.

The Fire Hazard Abatement Division of the Land Use Services Department conducts annual inspections of all parcels of land in mountain regions for the purpose of identifying exterior fire hazards. Biannual inspections are completed in valley and desert serviced areas. The targeted hazards include high energy release shrubs, dead and hazardous trees, flammable vegetation, weeds, grasses and combustible rubbish. The Division completes more than 430,000 inspections, issues more than 45,000 Notices to Abate Fire Hazards, issues over 4,000 citations for non-compliance, and abates the fire hazards on more than 2,000 parcels annually. Within the last 5 years, the Fire Hazard Abatement Division has received even more financial resources that enable them to abate all properties declared a fire hazard.

7.1.2.2.6 Countywide Fuels Management Program

In May of 2005 the San Bernardino County Fire Protection District and the San Bernardino County Flood Control District formed a partnership to implement the Hazardous Tree Removal Program, later the Fuels Management Program. In this endeavor the Flood Control District

formed the Hazardous Tree Removal Operations Division which was tasked with developing, bidding and administering Tree Removal and Fuel Reduction Contracts funded by various grants. Contracts originally focused on removing dead, dying, and diseased trees caused by the drought conditions and the bark beetle infestation. The program has evolved to include fuel modification projects which remove hazardous vegetative fuels through the thinning of live vegetation. In addition the location of the fuel reduction projects are moving beyond the limits of the San Bernardino Mountains and into the interface between the Mountain foothills and the high desert.

The following are the types of programs/projects included in the Fuels Management Program:

- Emergency Tree Removal Projects consist of the removal of a tree (or trees) that poses an immediate threat to safety, a structure, or the public right-of-way.
- Block Projects are dead dying diseased tree removal projects on multiple parcels which are located in close proximity to one another.
- Large Urban Parcel Projects are dead dying diseased tree removal projects on a single or multiple large parcels.
- Fuel Modification Projects focus on the removal of hazardous fire fuels in the wildland/urban interface. The fuels removed in these projects are both live and dead vegetation. The goal of these projects is to reduce a future forest fire's intensity as well as the removal of ladder fuels which carry the fire from the forest floor to the forest canopy and result in a crownfire.

In addition to the Hazardous Tree Removal Operations Division, the San Bernardino County Fire Fuels Management Crews are also funded by the same grant sources. The primary focus of the crews is to create and maintain fuel modification projects in the vicinity of communities at risk and construct fuel breaks. In addition the crews assist the public with curb side chipping programs throughout local partner jurisdictions.

7.1.2.2.7 Fireworks Interdiction

The unlawful transport of dangerous fireworks continues to be enforced by several local and state fire and law enforcement agencies, The program continues ensures that thousands of pounds of fireworks per year are seized and properly disposed of, preventing fires, fire injuries and fire deaths.

7.1.2.2.8 Programs Listed in Fire District Annex

Table 7-1: Wildfire Mitigation Implementation Methods

Mitigation type	Description
PPRO	SCE removes dead trees near power lines to reduce fire hazards. For more information, see Annex A Section A.6 Mitigation Project Prioritization and Implementation.
ES	Mountain Mutual Aid is an operational group of emergency responders.
PRV	The Alliance was created to act as a forum for all Fire Safe Councils in San Bernardino County. For more information, see Annex A Section A.6 Mitigation Project Prioritization and Implementation.
PRV	Fire Hazard Abatement works to reduce the potential for an individual's property to be the source of fire and structural ignitability. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
PE&A	Cal Fire provides programs to increase fire safety in high fire hazard severity zones. For more information, see Annex A Section A.6 Mitigation Project Prioritization and Implementation.
PRV, PPRO	The Contractor Certification program trains and certifies landscape contractors to provide a qualified workforce to conduct fuels reduction activities on individual properties. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .
PRV, PPRO	CWPPs are designed to provide a means for a community to have input into and actively participate in the planning, strategy, goals, and objectives of creating a fire safe community. For more information, see Annex A Section A.6 Fire Protection District Mitigation Project .

7.1.2.3 Earthquake / Geologic

A General Plan Amendment to the Safety Element of the County of San Bernardino 2007 General Plan updated the Geologic Hazard Overlay Maps which became effective on March 11, 2010. The Safety Element includes several layers of hazard overlays that are included in the General Plan mapping system to inform the public of potential hazards to development of property within certain areas of the County and to enable the County to mitigate the risks presented to property owners by these hazards. These overlays include potential geologic hazards. Over the past twenty years, certain federal and state agencies have been in the process of digitizing much of this hazard data. The digitization of this data has allowed for greater accuracy as well as more timely updates. In recognition of the new data from various federal and state agencies, the County updated the geologic hazard overlay maps, specifically the Generalized Liquefaction

Susceptibility layer and the Generalized Landslide Susceptibility layer, contained within the Safety Element of the General Plan.

The Generalized Liquefaction Susceptibility layer was amended to modify four General Plan Quad Maps to incorporate new liquefaction data in the Big Bear Lake area designated by the County Geologist for the Big Bear Lake Valley. This information was then incorporated into the County-designated Geologic Hazard Overlay District.

The Generalized Landslide Susceptibility layer was amended by modifying 17 General Plan Quad Maps and one regional Quad Map, to incorporate updated existing landslide data published by the U. S. Geological Survey for the Mountain area. The County Geologist updated the landslide inventory within the Geologic Hazard Overlay District by incorporating new geologic mapping by the U.S. Geological Survey.

The following is a list of the updated General Plan Geologic Hazard Overlay Maps effective on March 11, 2010:

Table 7-2: General Plan Geologic Hazard Overlay Maps

Map #	Quad Name
FH08C	Fifteen Mile Valley
FH11C	Mt. San Antonio
FH12C	Telegraph Peak
FH13C	Cajon
FH14C	Silverwood Lake
FH15C	Lake Arrowhead
FH16C	Butler Peak
FH19C	Mt. Baldy
FH20C	Cucamonga Peak
FH21C	Devore
FH22C	San Bernardino North.
FH24C	Keller Peak
FH27C	Ontario
FH30C	San Bernardino South
FH31C	Redlands
FH32C	Yucaipa
FI09C	Fawnskin
FI10C	Big Bear City

Map #	Quad Name
FI17C	Big Bear Lake
FI18C	Moonridge
EH/FH C	SW Portion of County
FH23C	**Harrison Mtn.**

7.1.2.4 Flood

7.1.2.4.1 Existing Drainage Studies

Drainage studies including review of upstream properties, site drainage area, potential upstream development, and site-specific development will help to mitigate damage from future storm events. San Bernardino County owns landfill sites, transfer stations and closed disposal sites where combined site property totals several hundred acres. Landfills and disposal site properties include acreage that has been constructed to design grades and may include improved drainage systems. Also, within most landfill and disposal site properties there are many acres of property that remain in its natural state including native vegetation and natural grades. During severe weather events, both engineered areas and undisturbed areas are subject to erosion from storm run-off. The erosion can range from minor to severe depending on the storm event and amount of precipitation. Most sites where engineered drainage systems are in place hold up well experiencing only minor erosion and debris flow. However, during major storm events, runoff from native and unimproved areas carrying solids and debris flow may compromise downstream drainage systems and overwhelm system facilities. Much of the damage to landfill and disposal sites during the December 2010 Winter Storm event was caused by erosion with sediment carried from undeveloped/undisturbed areas or where no improved drainage system is in place.

Other events that may cause damage to property and structures include earthquakes, wildfires, high winds, extreme freezes, and lightning storms.

- Earthquakes have the potential of causing damage to site roadways, structures, and systems including concrete drainage systems, Landfill Gas systems (LFG) and Leachate Collection Recovery Systems (LCRS). With earthquakes, there is always the potential of slope failure and slides on the landfill surface. Damage to any of these facilities has the potential to result in an inability to temporarily service the community.
- High Winds can cause damage to temporary drainage structures, fencing, and metal structures. During past high wind events, Transfer Stations have experienced roof panels being torn from the beams. Landfill sites with exposed geo-synthetic liners may experience damage if the winds lift and tear the liners.
- In January 2007, the County experienced a loss of over $21,000 in damage when water pipes at three separate Transfer Stations froze, then burst, causing damage to offices and electrical equipment.

- Lightning storms have the potential to damage electrical components in scale houses, in-ground scales, LFG, and LCRS.

7.1.2.4.2 NFIP Program and County General Plan Policies

Because the County has entered into an agreement to participate in the National Flood Insurance Program (NFIP) which provides flood insurance within designated floodplains, the following goals, policies and programs shall apply:

As stated in the San Bernardino County General Plan Safety Element:

GOAL S 5
The County will provide adequate flood protection to minimize hazards and structural damage.

Policy S 5.1: Participate in the National Flood Insurance Program (NFIP), which provides flood insurance within designated floodplains.

Programs

1) Designate Floodway and Floodplain areas, as identified by the Federal Emergency Management Agency (FEMA) on flood insurance rate maps and flood boundary maps, as Floodway (FW) on the Land Use Maps and Floodplain Overlays on the Hazards Overlay Maps.

2) Designated floodway areas will be preserved for non-structural uses through restrictions of the FW Land Use Zoning District

3) All new development, including filling, grading, and construction, proposed within designated floodplains, will require submission of a written assessment prepared by a qualified hydrologist or engineer, in accordance with the latest "San Bernardino County Hydrology Manual" and the various detention basin policies (see Existing Policy FL-11), to determine whether the development will significantly increase flood hazard and to show that all new structures will be adequately protected. Development will be conditioned on receiving approval of this assessment by the San Bernardino County Surveyor Division of the Public Works Department. All new construction in a Floodplain Overlay area will be required to be flood-proofed, located, and designed to allow unrestricted flow of floodwaters.

4) The Land Use Compatibility Chart for 100-Year Flood Plains Table 5-1 will apply to County reviews of all discretionary and ministerial actions in County designated floodplains.

5) Lands within floodplain areas may be developed with non-critical and non-essential uses if mitigation measures are incorporated to ensure that the proposed development will not be hazardous, increase flood depths or velocities downstream, or degrade water quality, especially uses such as parks, trails, and open space.

6) Provide known flood hazard information with every discretionary or ministerial application.

7) When no mapped data exist, existing topographical, watershed, and drainage course data will be evaluated for a determination of potential flood hazard for every discretionary and ministerial action.

Policy S 5.2: Update data and maps with newly identified flood hazard areas in the County, as new information becomes available.

Programs

1) As new overflow studies and mapping are completed and approved by either the County's Land Development Engineer or the San Bernardino County Flood Control District, they will supplement the FEMA mapping and will be incorporated into Flood Hazard Overlay mapping.

2) Initiate and finance programs for the continuous evaluation and designation of floodway, floodplain, and drainage areas.

3) Timely application for FEMA mapping changes will be initiated to reflect any additions to or alterations in identified Floodways or Floodplains by the County Floodplain Management Administrator.

7.1.2.5 Drought

7.1.2.5.1 Water Efficient Landscape Ordinance

Over the years, the State of California has been promoting water conservation for all new development within the State. In a drought-prone California, where approximately 60 percent of all residential water is used in landscape applications, California lawmakers have adopted such legislation as Assembly Bill (AB) 325 (1990), AB 2717 (2004), and AB 1881 (2006) that outline, and in some instances mandate, the practice of water conservation in landscape applications. As part of AB 325, the Department of Water Resources (DWR) was charged to assemble a task force of stakeholders representing the landscape, water, and building industries as well as cities, counties, and other agencies that would help DWR prepare and promote the State's first Model Water Efficient Landscape Ordinance (MWELO).

While AB 325 did not require cities, counties, and other agencies within the State to comply with the first adopted MWELO, it did encourage local agencies to implement water conservation techniques into their local ordinances and codes. The County adopted Administrative Guidelines

that were amended several times and ultimately given the status of "regulation" when they were incorporated into the Development Code (Chapter 83.10) during the 2007 General Plan Update process.

In 2006, State lawmakers adopted AB 1881, which gave guidelines and timelines for revision of the State's MWELO and mandated that every city, county, or other agency within the State of California adopt the State's revised MWELO, or be in compliance with it through their own ordinance, by January 2010. Local agencies are required to report their final action, along with findings of ordinance effectiveness, to DWR by January 2011. While this process was underway, Senate Bill X7-7 was enacted (2009). This bill requires the State of California to achieve a 20 percent reduction in urban per capita water use by December 31, 2020; additionally, it requires the State to make incremental progress towards this goal by reducing per capita water use by at least 10 percent by December 31, 2015. These requirements were incorporated into the MWELO and, in February 2008, DWR made a draft of the State's revised MWELO available to all cities, counties, and other agencies within the State. The final version of the revised MWELO was released in September 2009.

Upon review of the final version of the State's MWELO and the provisions of AB 1881, staff determined the County would need to revise Development Code Chapter 83.10 which sets forth landscaping and irrigation standards within the unincorporated areas of the County. This would in part, become a mitigation measure to assist with any drought hazard the County may encounter. In the meanwhile, the County began enforcing the State's revised MWELO in January 2010, as required by law.
Once the proposed changes to the Development Code have been adopted by the Board of Supervisors, staff will notify and forward all required information regarding the adoption and effectiveness of the County's Water Efficient Landscaping Ordinance to the State DWR as required by January 2011.

The proposed Development Code Amendment will revise the landscaping standards to reflect the changes governed by and to be as effective as, the State of California's revised Model Water Efficient Landscape Ordinance, while continuing to recognize the unique character of the regions that make up the County of San Bernardino.
The ***proposed revisions*** will require the applicant/developer to:

- Design and install systems that meet more effective and efficient water conservation standards in all landscaped areas on a project site, including residential;
- Comply with the revised standards for all new and rehabilitated landscape areas regardless of square footage for projects that are not homeowner installed and for all new and rehabilitated landscape areas, that are homeowner installed, that are 5,000 square feet or greater. This includes the following:
    - Submit a comprehensive Landscape Documentation Package, which has been prepared by a landscape architect licensed to work in the State of California or other licensed professional authorized to design and prepare Landscape Plans within the State of California;

    - Submit estimated annual water budget calculations for compliance with water conservation practices and the efficient use of water for each new or rehabilitated landscape. Calculations for the annual water budget for a project/site specific landscape shall use the formulas for the Maximum Applied Water Allowance (MAWA) and the Estimated Annual Water Use (EAWU) outlined in the ordinance;
    - Submit a Landscape Certificate of Compliance prepared by the landscape professional who prepared the Landscape Documentation Package conveying the project's compliance with the requirements of Development Code prior to final inspection;
    - Planting material within landscaped areas shall be chosen based on the information found in the Water Use Classification of Landscape Species, third edition (WUCOLS III) and the climate zone for the region based on information found in Sunset Western Garden Book;
    - Irrigation systems shall be equipped with a "smart" irrigation controller, which automatically adjusts the frequency and/or duration of irrigation events in response to changing environmental conditions.
    - Submit a rough and/or precise grading plan on all projects proposing more than 50 cubic yards of grading;
    - Submit a soil management report, that includes recommendations for soil modification and/or amendment;
    - Submit a project-specific regular maintenance schedule and two project-specific irrigation schedules for those projects subject to the ordinance.

Other provisions of the new regulations include standards for non-potable/recycled water use where it is available and new enforcement standards for compliance with water conservation practices.

Since the State law became effective on January 1, 2010, the Landscape Plan Review Fee was adjusted (Ordinance #4412, June 22, 2010) to reflect the increase in staff time necessary to meet these additional requirements.

The Planning Commission considered this ordinance on October 21, 2010. There was no one at the hearing who wished to address the Commission on this issue. The Commission recommended that the Board adopt the ordinance as presented on a vote of four commissioners in favor and one absent.

The proposed amendment is exempt from the California Environmental Quality Act (CEQA) in accordance with Section 15061(b) (3) of the CEQA Guidelines as the proposed change does not have the potential to cause a significant effect on the environment.

The proposed Ordinance is to be presented to the County of San Bernardino Board of Supervisors for adoption in the first quarter of 2011. Utilizing either the State Water Efficient Landscape Ordinance, which is in effect currently, or the County's specific Water Efficient Landscape Ordinance; the drought mitigation for this hazard is positive.

7.1.2.5.2 San Bernardino County Desert Area Groundwater Inventory and Atlas

As of January 2011, the California Department of Water Resources anticipates releasing the Final Local Groundwater Assistance (LGA) Guidelines later this calendar year. In December 2009, the draft LGA Guidelines and Proposal Solicitation Package (PSP) was available for public comment. The comment period ended on January 12, 2010.

Local public agencies with authority to manage groundwater resources are encouraged to apply Examples of projects that may be considered are: Groundwater data collection, modeling, monitoring and management studies; monitoring programs and installation of equipment; basin management; development of information systems; and other groundwater related work.

The County of San Bernardino Board of Supervisors may consider an action directing staff to apply for the grant when it becomes available for a Desert Area Groundwater Inventory (DGI) and Atlas. The DGI falls within the scope of the Local Groundwater Assistance (LGA) Program, which is funded with Prop 84 IRWM funds anticipated to be available for fiscal year 2010-2011. Grants are limited to $250,000 per recipient, and total funding is $4.7 million.

California Department of Water Resources will give priority to local agencies with adopted groundwater management plans (SB1938 compliant), and which demonstrate collaboration with other local agencies in managing groundwater basins. County's groundwater management ordinance satisfies this requirement.

By having a Desert Area Groundwater Inventory and Atlas, this would enable the County to have a database providing locational and water depth information for specific regions of the County that currently do not have a groundwater inventory. This Inventory and Atlas would provide information applicable for flood mitigation or ground water availability for usage during severe drought. The location and water depth in the inventory are important for an earthquake hazard analysis, if liquefaction potential exists.

Since there is not a Desert Area Groundwater Inventory currently, and if liquefaction is a concern in a specific region of the County, then the water depth data would estimate the vertical distance from the land surface to the top of the groundwater aquifer (i.e., the groundwater-saturated layer.)

Table 7-3: Tentative Schedule for the LGA Grant

Date	Event	
TBD	Release Final LGA Guidelines and PSP	Dependent upon Grant approval
TBD	Proposal Applications Due	Dependent upon Grant approval
TBD	Public Release of Draft Award Recommendations	Dependent upon Grant approval

Fund Source: Proposition 84

7.1.3 Continued Public Involvement

As indicated earlier, the County will continue to engage the general public and seek input on the mitigation and preparedness planning process. In addition to the San Bernardino County Board of Supervisor meetings, the actions include:

- Municipal Advisory Communities throughout the unincorporated County area,
- Flood Zone Advisor Committees,
- Special District Advisory Committees,
- Public hearings for County General Plan updates held four times a year,
- MAST and FAST meetings,
- Fire Safe Council meetings,
- Community Emergency Response Team meetings, and
- Public events where educational efforts are undertaken in the unincorporated areas.

Additionally, the public is kept involved through annual programs such as the Great Shakeout held annually in October, SKY Warn events sponsored by the National Weather Service, and other monthly safety programs. The County will continue to use several different methods to reach out to the public: mailers, cable TV, website, social networks, e-mail, posting in public libraries, and fairs.

Section 8. Works Cited

USGS. (2009).

USGS. (2016, April 7). *USGS Earthquake Hazards Program*. Retrieved from https://earthquake.usgs.gov/learn/glossary/?term=earthquake

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Appendix A. Outreach Documentation

A.1 Ready SB County Preparedness App Message

An App message was sent out to over 15,000 persons with the App and it is attached to the San Bernardino County Fire Website. .Ready SB County Preparedness Mobile App can be used on either an Android or iPhone. This app provides multiple resources for our residents that will assist them in preparing for a disaster and enhancing the recovery process. Protect yourself and your loved ones before, during and after a disaster.

Get the Latest News from SBCounty.gov, CalTrans, National Weather Service, and San Bernardino County Fire Office of Emergency Services. This app will provide you with an emergency supply kit list, grocery list and checklists tailored to your needs. You can access and update your plan as needed. Learn all you need to plan for and respond to natural disasters, terrorism and pandemic flu in San Bernardino County

A.2. San Bernardino County Fire Public Input Requested

San Bernardino County Fire Department/Office of Emergency Services (OES) is coordinating the update of the San Bernardino County Unincorporated Area Multi Hazard Mitigation Plan. Hazard Mitigation Plans are updated every five years and must be approved by Cal OES and FEMA. The purpose of the public input and comment is to show progress being made and elimination of hazards since the last plan. Your input is appreciated by reviewing and commenting on the current plan (link below) by calling OES at 909-356-3998 – ask for David Davis. Comment period **closed at 5:00 p.m., Wednesday, November 3, 2016.**
http://www.sbcfire.org/oes/Documents.aspx



A.3. MJHMP PowerPoint Presentation









Annex A. Fire Protection District

A.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Fire Protection District, a previously participating jurisdiction to the 2011 San Bernardino County Hazard Mitigation Plan Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the base plan document. As such, all sections of the base plan, including the planning process and other procedural requirements apply to and were met by the Fire Protection District. This Annex provides additional information specific to the Fire Protection District, with a focus on providing additional details on mitigation actions and projects.

The Board of Supervisors acts as the Board of Directors for the County Flood Control District, and as part of their responsibilities as an elected member of the County of San Bernardino Board of Supervisors.

A.2 Fire District Profile

The San Bernardino County Fire Department is an all-risk/full-service fire department committed to providing the highest level of service in the most efficient and cost effective manner to the citizens and communities that we serve. At 20,160 square miles, San Bernardino County is the largest county in the continental United States. Our jurisdiction encompasses 19,278 square miles of extremely diverse environments that stretch from the Los Angeles County line on the west, to the Colorado River on the east, to the Nevada State line and Kern and Inyo counties on the north. We provide services to more than 60 communities/cities and all unincorporated areas of the county.

Mission Statement
Community-based all-risk emergency services organization dedicated to the health and well-being of the citizens of San Bernardino County through a balance of regionalized services delivery and accountability to the local community supported by centralized management and services.

Service Motto
Duty, Honor, Community.

Standard of Commitment
"Where Courage, Integrity, and Service Meet."

Vision Statement
Committed to Providing Premier Fire Services.

Hazard Mitigation Planning Group:
Michael Antonucci – Emergency Services Manager

A.3 Planning Process

As described above, the County Fire District followed the planning process detailed in Section 3 of the base plan. In addition to providing representation on the San Bernardino County Hazard Mitigation Planning Committee (HMPC), the District formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table A-1. Additional details on plan participation and District representatives are included in Appendix A.

Table A-1: Fire District Planning Team

Name	Title / Role
Michael Antonucci	Emergency Services Manager
Cindy Serrano	Assistant Emergency Services Manager
David Davis	Emergency Services Officer
Miles Wagner	Emergency Services Officer
Cheryl Nagy	Emergency Services Officer
Carrie Cruz	Emergency Services Officer
Elli Maldonado	Office Assistant
Mary Barnett	Technical Writer / Plan Update and Edits
Michael Horton	Fire Marshal

Weekly meetings held every Tuesday since July 2016 with conference calls to the consultant group and other stakeholders plus all meetings listed in this document.

A.4 Hazard Identification and Prioritization

The County Fire Protection District Planning Team participated in the County hazard identification and prioritization process described in the base plan. The Fire District Planning Team assisted to summarize the extent, probability of future occurrences, potential magnitude/severity, and significance specific to the Fire District in the base plan.

The Planning Team (all participating jurisdictions) determined that the County and its Special Districts should focus over the next five (5) years on hazards that fell within the HIGH and MEDIUM “Probability” and “Impact” categories. While all the hazards present a potential problem in the County, the Planning Team felt that if they were able to reduce or eliminate the risk from “fire related” hazards, it would provide a greater service to the people within the jurisdiction. Table 4-3 illustrates how the final prioritization of the hazard; the “Green” colored box represents the highest priority hazards; and the “White” colored boxes represent lower (second and third tier) priority hazards.

Table A-2: Fire District Hazard Priority Matrix

		Impact		
		High	Medium	Low
Probability	High	**Wildfire** Flood Earthquake/ Geologic Hazards	Drought	
	Medium	Terrorism	Climate Change (Extreme Heat and other)	Hail Infestation
	Low		Dam Inundation	Tornado High Winds Winter Storm Lightning Extreme Cold

A.5 Coordination with existing Fire District Mechanisms

Coordination with other District planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the Fire Protection District integrated the previously-approved 2011 Plan into existing planning mechanisms and programs.

While not designed or proposed specifically as mitigation projects, the County Fire Protection District undertakes many activities that incorporate mitigation elements and integrate risk reduction as an additional benefit. The following describes a number of these projects which exemplify how the County integrates hazard mitigation into county-wide programs.

A.5.1 Critical Route Planning Committee

San Bernardino County Fire Protection District Office of Emergency Services has a “Critical Route Planning Committee” that is developing countywide routes and alternate routes for use in evacuating residents from a disaster area while simultaneously allowing first responders’ access into a disaster area without congestion and gridlock. The Committee members are from County departments, City and Town representatives, and key state and federal agencies. The Critical Route Planning effort is being coordinated with surrounding counties to prevent congestion and gridlock at the County boundaries.

A.5.2 Public Alert and Education Programs

A.5.2.1 Wireless Emergency Alerts (WEA)

During threatening emergencies in your area, authorized government agencies can send Wireless emergency Alerts to your mobile device. Messages regarding extreme weather, life threatening emergencies, AMBER alerts, and Presidential Alerts during a national emergency are all sent through the WEA system

A.5.2.2 Emergency Alert System (EAS)

The Emergency Alert Systems: national public warning system that requires TV and radio broadcasters, cable television systems, wireless cable systems, satellite digital audio radio service providers, direct broadcast satellite service providers and wireline video service providers to offer to the President the communications capability to address the American public during a national emergency. The FCC works with the Federal Emergency Management Agency and the National Oceanic and Atmospheric
Administration's National Weather Service to implement the EAS at the national level. Only the President determines when the EAS will be activated at the national level, and has delegated the administration of this function to FEMA.
Accordingly, FEMA activates the national EAS, and directs national EAS tests and exercises. The NWS uses the EAS on a local and statewide basis to provide the public with alerts and warnings regarding dangerous weather and other emergency conditions.

The EAS allows participating providers to send and receive emergency information quickly and automatically, even if their facilities are unattended. If one link in the system for spreading emergency alert information is broken, members of the public have multiple alternate sources of warning. EAS equipment also provides a method for automatic interruption of regular programming, and in certain instances is able to relay emergency messages in languages other than English.

A.5.2.3 Integrated Public Alert & Warning System (IPAWS)

During an emergency, alert and warning officials need to provide the public with lite-saving Information quickly. The Integrated Public Alert and Warning System (IPAWS) is a modernization and integration of the nation's alert and warning infrastructure and will save time when time matters most, protecting life and property. Federal, State, territorial, tribal and local alerting authorities can use IPAWS and integrate local systems that use Common Alerting Protocol (CAP) standards with the IPAWS infrastructure. IPAWS provides public safety officials with an effective way to alert and warn the public about serious emergencies using the Emergency Alert System {EAS}, Wireless Emergency Alerts (WEA), the National Oceanic and Atmospheric Administration (NOAA) Weather Radio and other public alerting systems from a single interface.

A.5.2.4 Telephone Emergency Notification System (TENS) Implementation

Emergency service agencies like the Sheriff's Office have implemented TENS on numerous occasions to notify residents in specified areas to evacuate. Most recently it was used to evacuate hundreds of homes in the eastern portion of Yucaipa during the Pendleton Fire and in Wrightwood during the Sheep Fire when the entire community was ordered evacuated.

A.5.2.5 Emergency Communications Services (ECS)

In the last 10 year the ECS program has continually provided support to all major and minor incidents. The more recent events were the Pilot Fire and the Blue Cut Fire in 2016. ECS provides communications and logistical support to public safety and disaster preparedness events. They have also set up a training program for other County Departments that are not typical emergency responders but provided support in an emergency. ECS delivered and set up amateur radio equipment for Department of Public Works, Department of Public Health, Preschool Services Department, and Department of Behavioral Health and provided training for the employees.

A.5.2.6 Fire Safe Council/CERT Community Based AM Radio Transmitters

The Wrightwood Fire Safe Council and the Big Bear City CSD set up and operates a local AM radio transmitter. It has been brought into use during local incidents including a power outage where it is very useful. In power outages, the AM radio in a person's car still works. It was also used to provide preparatory information to the citizens of Wrightwood as the Station Fire was approaching the community from the west. It is also used extensively during the Wrightwood Fire Wise Awareness Days to keep citizens apprised of community events.

A.5.3 OES Volunteer Programs

The San Bernardino County Fire, Office of Emergency Services (County OES) is proud to provide residents of San Bernardino County with meaningful disaster-related volunteer opportunities. Recognizing that during disasters and other emergencies professional responders may be overwhelmed or need assistance County OES trains residents to integrate with and support professional responders during incidents. County OES currently does these through three volunteer programs; the Community Emergency Response Team (CERT), Emergency Communications Service (ECS) and California Disaster Corps programs. Please visit the links below to learn about the programs offered.

A.5.3.1 Community Emergency Response Team (CERT)

The Community Emergency Response Team (CERT) Program educates people about disaster preparedness and trains them in basic response skills. Following a catastrophic event CERT

Members can assist themselves, their families, and others in their neighborhood or workplace until professional responders arrive. Fourteen (14) CERT programs are in the communities of:

- Angelus Oaks
- Big Bear Valley
- Helendale
- Lucerne Valley
- Lytle Creek
- Mill Creek Canyon
- Morongo Basin
- Mountain
- Oak Hills
- Phelan/Pinon Hills
- Rosena Ranch
- San Antonio Heights
- Silver Valley
- Wrightwood CERT

San Bernardino County Fire Protection District Office of Emergency Services has sworn in over 1000 CERT participants as California Disaster Service Workers. These participants have gone on to receive a Sheriff's Department background check to become members of their community's CERT.

The program receives guidance and resources from Department of Homeland Security, FEMA, Citizen Corps, and California Volunteers. The program is administered locally by the San Bernardino County Fire Protection District Office of Emergency Services.

A.5.3.2 LISTOS

Listos, which means "ready" in Spanish, is a twelve-hour disaster preparedness course created specifically for the Spanish-speaking community and is delivered entirely in Spanish. The program is intended to be adaptable, flexible and culturally relevant. This means participants are encouraged to involve the entire family and accommodations are made for young children. San Bernardino County Fire, Office of Emergency Services currently partners with the Cities of Fontana and Rialto to bring Listos to their communities

A.5.3.3 California Disaster Corps

The Disaster Corps is a first-in-the-nation effort to professionalize, standardize and coordinate highly trained disaster volunteers statewide. This program initiative was built collaboratively in partnership with California Volunteers from the ground up through public-private partnerships and with a wide range of subject matter experts including representatives from all levels of government, local emergency managers, state agency volunteer coordinators, and leaders in non-governmental volunteer programs.

Disaster Corps programs reside only in San Bernardino, San Francisco and Riverside Counties. San Bernardino County Disaster Corps volunteers are those volunteers participating in the volunteer programs residing within the unincorporated communities of San Bernardino County and have demonstrated commitment to their volunteer program and strive to continue developing their skills and training to better support their program and their community.

Within San Bernardino County Disaster Corps volunteers are set aside from regular CERT (Community Emergency Response Team) and ECS (Emergency Communication Services) volunteers by having the ability to be deployed throughout other areas of San Bernardino County and the state. They have received specialized training in SEMS and NIMS, plus have completed many other ICS courses and First Aid and CPR training. In addition there are additional training opportunities not offered to the regular CERT and ECS volunteers.

A.5.3.4 ECS Emergency Communications Service

The Emergency Communications Service (ECS) is a volunteer group providing front-line communications, technical and logistical support to the San Bernardino County Fire Department and Office of Emergency Services. Their primary mission is to support County Fire, County Government and other local agencies in time of disaster. In addition, ECS has provided telecommunications and event support to other County departments including Public Health, Behavioral Health, Public Works, Pre-School Services, Sheriff's Search and Rescue and other County Departments.

ECS coordinates disaster communications between city and county agencies, provides a communication link to Cal OES and ensures backup communication channels are kept open in times of a major disaster.

In an average calendar year, ECS supports approximately two-dozen events and incidents throughout the County. These events range from parades and community events, to major public safety incidents including fires and floods. The 200 ECS volunteers donate an average of 9,100 hours per year to the County of San Bernardino.

ECS currently provides multiple HAM licensing classes to County Departments and the residents of San Bernardino County each year.

A.5.4 ROPE Plan (Responders Organized For Pass Emergencies)

ROPE Field Operations Guide (FOG) and Standard Operating Guide (SOG) for use by participating Federal, State, County, and Municipal agencies and industries for day-to-day incidents in the Cajon Pass, as well as for larger regional incidents requiring coordinated and unified multi agency response. The ROPE FOG contains; communications information, emergency contact information, critical infrastructure mapping and ICS planning tools.

A.5.5 Great ShakeOut County Drill in all Disciplines (held annually)

The San Bernardino County Operational Area will be participating in the annual The Great ShakeOut drill which will focus on the Southern California Regional Catastrophic Plan (SCRCP). This plan is based on a large scale magnitude earthquake scenario along the southern section of the San Andres Fault. The purpose for participation in the Great ShakeOut Exercise is to address the County's potential to respond to a catastrophic earthquake event based on the plan, and to better prepare for such an occurrence. The goal of the exercise will be to conduct an effective multiagency/multi-jurisdictional evaluation of the Regional Catastrophic Plan with our Operational Area response partners.

A.5.6 "Ready SB" Smart Phone App for Disaster Preparedness Program

The new mobile app, Ready SB, provides residents with multiple resources that will assist them in preparing for a disaster. Ready SB is now available as a free download from the Apple App Store and the Google Play Store it can immediately help residents prepare themselves for emergencies.

Ready SB features include: "My Plan", an individual emergency plan and/or a family or group plan. The person that downloads the application will receive county wide alerts and notifications of emergency situations in that person's area. There is a feature called "Share My Status" it is a place to update your status via text or email.

The app also includes information about areas that need to be evacuated, where to go, what routes are open and also what resources are available during that emergency.
The app features include: Evacuation Routes and Shelters, Need to Know, and has a Resources List.

A.5.7 Cal Fire

Cal Fire provides programs to increase fire safety in high fire hazard severity zones. It funds and staffs programs from public education activities to performing fuel modifications with inmate crews. One example is the active Re-Leaf program where mountain residents are educated about drought tolerant and fire resistive landscaping that is available and sustainable. Cal Fire is also the lead agency on reforestation after a wildfire to ensure the stability of the environment. Cal Fire Foresters are active participants in the MAST process helping educate citizens and leading forestry activities on private lands within the USFS boundary.

Numerous fuels projects have been completed by State inmate crews that do significant hand work in dense fuels adjacent to communities. Cal Fire has also led the way in countless re-forestation projects that ensure that new stands of the same trees will repopulate an area and that the original forest won't be overtaken by a different type of replacement forest.

A.5.8 Organized Group Volunteer Activities

Mountain communities are populated by several volunteer citizen groups that are capable of providing significant resources that are not provided by traditional governmental agency services.

Volunteer groups particularly “Mountain Hearts and Lives” (MHL) responded to numerous emergencies particularly of note the Grass Valley and Slide Fires. These groups have also spent significant time working to prepare citizens for disasters. MHL has coordinated CERT training as well as HAM radio operator training. Other activities can be found at www.heartsandlives.org. Other partners that assist in coordinated endeavors for disaster preparedness and disaster relief are Rim Family Services and the Rim Resource Community Network. Members of these and other groups work very closely with MAST, Mountain Mutual Aid and the American Red Cross.

A.6 Fire Protection District Mitigation Project Prioritizing

Cost effectiveness of each measure was a primary consideration when developing mitigation actions. Because mitigation is an investment to reduce future damages, it is important to select measures for which the reduced damages over the life of the measure are likely to be greater than the project cost. For structural projects, the level of cost effectiveness is primarily based on the likelihood of damages occurring in the future, the severity of the damages when they occur, and the level of effectiveness of the selected measure. While detailed analysis was not conducted during the mitigation action development process, these factors were of primary concern when selecting measures. For measures that do not result in a quantifiable reduction of damages, such as public education and outreach, the relationship of the probable future benefits and the cost of each measure was considered when developing the mitigation actions.

Based upon the Fire Districts capabilities, Table A-3: Mitigation Project Prioritization and Implementation shows primary actions selected for further implementation and development during the next planning cycle. Table A-3 provides details for each mitigation action with mitigation action descriptions, FEMA mitigation category, responsible party, and timeframe.

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A.7 Fire Protection District Mitigation Project Actions

Table A-3: Mitigation Project Prioritization and Implementation

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
ALL Hazard	**AH Action 1.1:** Valley Dispatch and Operations Center.	Update and maintain the operations of the facility and ensure cohesive working and response to any scale emergency and operations in a secure complex	ES	General Fund and HMP Grant	Fire Protection District/	1-3 Years	See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project .
ALL Hazard	**AH Action 1.2:** Maintain Shelter Operations Compound (SHOC). This shelter concept provides a new one-stop shelter concept. The SHOC combines a shelter, a Local Assistance Center (LAC) and a Non-LAC Unit in one easy location.	After the 2003 Wildland Fires, the County and American Red Cross recognized the need to provide services beyond basic care and short-term sheltering, especially during large fires, floods, and earthquakes The Mass Care & Shelter Plan and Concept of Operations, outlines the framework of a new one-stop shelter concept, Shelter Operations Compound (SHOC). It combines a shelter, a Local Assistance Center (LAC) and a Non-LAC Unit in one easy location. Residents can access public information and referral services through the LAC, and then take a short walk to the Non-LAC Unit for communication, postal services, and other private organizations/business at little to no cost. The completion of the Plan in 2012 will help to sync local resources, encourage local self-sufficiency, foster partnership between public and private agencies, and serve as a reference document for the region. By June 2017, the program will have 32 trailers/caches equipped with mass care and shelter supplies, strategically placed throughout the County and ready for rapid deployment. It is expected to serve over 12,000 residents. In addition to enhancing the comfort levels of shelter residents, the program will produce standardized documents and protocols for procuring and maintaining Mass Care and Shelter trailers/caches. These plans and programs will help the County prepare for and mitigate damages from hazards. This is an update and expansion of the plan and done without more grant funds.	ES	To increase Mass Care and Shelter capability of the county, grants from 2008-2009 Homeland Security Grant Program (HSGP) and 2009 Riverside Regional Urban Area Security Initiative (UASI) funded the Mass Care and Shelter Trailer/Cache Program.	Fire Protection District/	1-5 Year	See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project .
All-Hazard	**AH Action 2.1** Incorporate as appropriate requirements from the State of California's most recent land use regulations regarding the hazard mitigation planning process (Government Code 65302 and 8685.9).	Government Code 65302.6 requires the following elements to be included in the hazard mitigation plan: (1) An initial earthquake performance evaluation of public facilities that provide essential services, shelter, and critical governmental functions.	PRV, NRP	General Fund	Primary: Land Use Services Secondary: Fire Protection District/	1-3 years	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
		(2) An inventory of private facilities that are potentially hazardous, including, but not limited to, multiunit, soft story, concrete tilt-up, and concrete frame buildings. (3) A plan to reduce the potential risk from private and governmental facilities in the event of a disaster. Government Code 8685.9 requires that the state share shall not exceed 75 percent of total state eligible costs unless the local agency is located within a city, county, or city and county that has adopted a local hazard mitigation plan as part of the safety element of its general plan. In that situation, the Legislature may provide for a state share of local costs that exceeds 75 percent of total state eligible costs.					
Wildfire	**WF Action 1.1** Continue Mountain Area Safety Taskforce (MAST) funding to support mitigation activity.	MAST was formed to mitigate the region wide risk of a catastrophic wildfire due to dead and dying trees in the mountain communities. The mission of the MAST is to facilitate a coordinated effort by cities, county, state, federal, and non-profit agencies to provide for the protection of property owners, residents, and property subject to the risk of catastrophic wildfire that could occur in San Bernardino County with an initial emphasis on the threat resulting from the Old and Grand Prix fires in 2003. MAST priorities are to continue reducing fire hazards through fuel reduction programs and hazard abatement though enforcement of county ordinances. The Mountain Area Safety Taskforce (MAST) Operations Section meets monthly. MAST Operations Section determines project priorities based on the benefit cost analysis of the projects and the effect of the project on the overall goals of the MAST organization. Goals can change as detailed Benefit Cost Analysis is conducted and CEQA/NEPA reviews are completed.	NRP, PPRO	Seeking additional funding through HMPG.	San Bernardino County Fire Protection District	On-Going	See Implementation plan on more information on MAST. See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project .
Wildfire	**WF Action 2.1:** Update Mountain Mutual Aid Map Book to document updated information contained in 2016 HMP.	The Map Book portion of the Community Safety and Structure Protection Plan provides not only a street network of the area but more importantly it provides the locations of strategic and critical resources for fire fighters. These include but are not limited to safe zones, open areas, locations for refuge. They also identify areas within communities that have narrow and steep winding streets and or with limited ingress and egress. The document is handed out to all responding strike teams from out of the	ES	Seeking additional funding through HMPG.	San Bernardino County Fire Protection District	On-Going	See Fire Protection District Annex A. Section A.6 Fire Protection District Mitigation Project .

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
		area and has proved invaluable in directing and coordinating an effective fire-fighting response and reduces the potential for life loss and property damage.					
Wildfire	**WF Action 2.2** Update Community Structure Protection Plans as necessary.	This is an on-going action (from the 2011 MJHMP) with the goal to continue development of and continue the mission of mutual aid between first responders in the County mountain areas.	PPRO	HMP Grant Funding	Primary: San Bernardino County Fire Protection District Secondary: Land Use Services	On-Going	
Wildfire	**WF Action 3.1:** Implement identified community based fuels reduction projects.	The Fuels Reduction Program is designed to create community based fuel modification programs across the mountain communities. These projects are selected specifically to reduce the potential for catastrophic wildfires and the damage that they can do to the communities. Project design, contracting, and operations are managed by the County's Public Works Department with priorities set by local fire chiefs in monthly MAST Operations Meetings. This program is the oldest and most significant for reducing wildfire threat on a mountain wide basis.	PPRO	Current Funding: Seeking additional funding through HMPG.	Primary: San Bernardino Public Works Department Secondary: County Fire Protection District	On-Going	
Wildfire	**WF Action 3.2:** Develop fuels reduction "maintenance program" by obtaining participation from citizens and/or homeowners associations.	To survive a wildfire, property owners need to manage the land surrounding their homes and communities effectively. Removing fuels in the wildland fuel reduction zone beyond the defensible space can reduce the speed and intensity of an oncoming wildfire. But if these areas aren't regularly **maintained**, they lose their effectiveness. Plants grow back, and flammable vegetation needs to be routinely removed and disposed of properly. This guide provides tips on how to create and maintain defensible space and wildland fuels treatments around your property.	PPRO, PE&A	Seeking additional funding through HMPG	Primary: Public Works Secondary: Fire Protection District	On-Going	
Wildfire	**WF Action 4.1** Increase homeowner assistance services to mountain residents for fuel reduction.	This is an ongoing wildfire mitigation action (from the 2011 MJHMP) for the group Forest Care to achieve the goal of providing assistance to homeowners by expanding services to all communities in the Mountain areas of the County. Forest Care is a program dedicated to creating a healthier forest. This program provides foresters to assess individual properties for thinning the vegetation and then provides 75% of the funding to do so.	PPRO, PE&A	Seeking additional funding through HMPG	San Bernardino County Fire Protection District	On-Going	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Wildfire	**WF Action 4.2** Continue working with Southern California Edison (SCE) to remove dead trees near power lines.	A significant number of fires across the State are caused by trees falling into power lines. When the forests in the mountain communities became infested with bark beetles the pine tree die off was unprecedented. Thousands of these dead trees were standing precariously close to power lines. Early in the Bark Beetle Emergency in 2004, Southern California Edison swiftly initiated a program to remove all trees that were dead, dying, and/or diseased that had the potential to fall into any SCE power lines. The role of Southern California Edison was critical to the success of MAST both operationally and financially. Edison still removes the most difficult trees, the most costly trees; and the ones that are most likely to be the source of ignition for a wild land fire. They are also removing the trees that are immediately threatening homes. They have removed 118,305 trees since the inception of the program in 2004. They also provided reimbursements to people that removed their own trees.	PRV, PPRO	As of July of 2010 Southern California Edison (SCE) has spent $179,758,978 to remove dead dying and diseased trees.	San Bernardino County Fire Protection District	On-Going	
Wildfire	**WF Action 5.1:** Inspect every residence in the mountain communities throughout the year to enforce the Fire Hazard Abatement code that addresses green fuels.	The Fire Hazard Abatement Program conducts surveys to identify fire hazards throughout the year. Fire hazards are identified and notices to abate the hazard(s) are mailed to property owners. Property owners are given 30 days to abate the violations. Failure to abate may result in citations, penalties, and/or fees for abatement by the County. The Fire Hazard Abatement Program responds to complaints year round in the unincorporated areas and contracting Cities and Fire Districts. The Division completes more than 430,000 inspections, issues more than 45,000 Notices to Abate Fire Hazards, issues over 4,000 citations for non-compliance, and abates the fire hazards on more than 2,000 parcels annually. Within the last 5 years, the Fire Hazard Abatement Division has received even more financial	PRV, PPRO, PE&A	Seeking additional funding through HMPG	Primary: Land Use Services Secondary: San Bernardino County Fire Protection District	On-Going	For more information on Contractor Certification, see Annex A Section A.6 Fire Protection District Mitigation Project .

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
		resources that enable them to abate all properties declared a fire hazard.					
Wildfire	**WF Action 5.2:** Continue to collaborate with Forest Care, Red, Cross and Cal Fire to overcome increased costs of enforcement.	This is an on-going action from the 2011 MJHMP with the goal of overcoming funding shortfalls for the County Fire Hazard Abatement Program.	PRV	HMP Grant Funding	San Bernardino County Fire Protection District	On-Going	
Wildfire	**WF Action 6.1** Train and Certify landscape contractors to comply with the Fire Hazard Abatement Code.	The City of Big Bear Lake created a program to train and certify landscape contractors to provide a qualified workforce to conduct fuels reduction activities on individual properties. The contractors are trained to comply with the new Fire Hazard Abatement Code that exists both in the City of Big Bear and the County unincorporated area. The City of Big Bear Lake Fire Department conducts the classes for landscapers and handy persons. This provides an incentive for the contractors and provides a level of certification that the homeowner can rely on when they are deciding to hire a landscape contractor to conduct fuels abatement around their home.	PRV, PPRO	Seeking additional funding through HMPG	San Bernardino County Fire Protection District	On-Going	On-Going
Wildfire	**WF Action 6.2:** Continue wildfire mitigation efforts under the Wood Shake Roof Replacement Program.	The County successfully passed an ordinance that requires the replacement of wood shake roofs by 2014. MAST has successfully mapped all of the wood shake roofs in the fire safety overlay and has created a strategy as to which roofs will be selected to participate in the FEMA funded project. This is an on-going project in cooperation with Big Bear Lake Fire Protection District in order to provide more funding for wood shake roof replacements by property owners.	PRV, PPRO, SP	Various Grant Funding from Edison, FEMA, Cal Fire	Primary: MAST Secondary: San Bernardino County fire Protection District	On-Going	
Wildfire	**WF Action 7.1:** Modify independent and unique CWPPs into a more common framework making them similar but leaving room to provide specific hazard characteristics and mitigation actions for each community.	Community Wildfire Protection Plans are designed to provide a means for a community, usually through the Fire Safe Council, to have input into and actively participate in the planning, strategy, goals, and objectives of creating a fire safe community.	PRV	Seeking additional funding through HMPG	San Bernardino County Fire Protection District	On-Going	On-Going For more information on CWPP see Annex A Section A.6 Fire Protection District Mitigation Project .

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Wildfire	**WF Action 8.1:** Construct Arrowbear Drive Realignment and Widening.	The Arrowbear community off State Highway 18 has limited access to State Highway 138. The existing bridge/spillway and road needs to be realigned and widened to facilitate access by emergency personnel during wildfires and flooding. Mitigation strategy for this is to remove and replace existing bridge/spillway, realign and widen the road.	SP	Seeking grant funding Total Cost: $2,000,000	Primary: Public Works Secondary: San Bernardino County Fire Protection District	1-3 Years	
Wildfire	**WF Action 8.2:** Construct Cedar Glen Fire Access Road.	Lack of paved roads inhibits traffic circulation and the ability to enter and exit the area without backtracking during wildfire emergencies. Strategy is to Construct road and drainage improvements to Little Bear Creek Road and Elder Drive.	SP	Seeking grant funding **Total Cost:** $2,500,000	Primary: Public Works Secondary: San Bernardino County Fire Protection District	1-3 Years	
Wildfire	**WF Action 9.1:** Continue funding and support for Special Districts Projects relating to wildfire.	Continue funding and support for Special Districts Projects relating to wildfire in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	On-Going	
Wildfire	**WF Action 9.2:** Emergency Water Supplies	Purchase emergency water supply or water purification devices to ensure uninterrupted supply of water to emergency response personal.(completed with continuous fresh of supplies and rotation)	ES	TBD	Roads	TBD	

Annex B. Flood Control District

B.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Flood Control District, a previously participating jurisdiction to the 2010 San Bernardino County Hazard Mitigation Plan Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the base plan document. As such, all sections of the base plan, including the planning process and other procedural requirements apply to and were met by the Flood Control District. This Annex provides additional information specific to the Flood Control District, with a focus on providing additional details on mitigation actions and projects.

The Board of Supervisors acts as the Board of Directors for the County Flood Control District, and as part of their responsibilities as an elected member of the County of San Bernardino Board of Supervisors.

B.2 Flood District Profile

Flood Control District Functions:
The Flood Control functions are handled through the San Bernardino County Flood Control District under State legislation enacted in 1939. The District has developed a very extensive system of facilities, including dams, conservation basins, channels, and storm drains. The purpose of these facilities is to intercept and convey flood flows through and away from the major developed areas of the County. The principle functions are:

- Flood protection on major streams.
- Water conservation.
- Storm Drain construction.

Mission:
To enhance the quality of life for our communities by developing and maintaining public infrastructure, and providing a variety of municipal services that complements our natural resources and environment.

Vision:
Lead the way to a thriving community through innovation in public works, fiscal responsibility, and environmental stewardship.

B.3 Planning Process

As described above, the County Flood Control District followed the planning process detailed in Section 3 of the base plan. In addition to providing representation on the San Bernardino County Hazard Mitigation Planning Committee (HMPC), the District formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table B-4. Additional details on plan participation and District representatives are included in Appendix A.

Table B-4: Flood Control District Hazard Mitigation Planning Team

Name	Title	Role
Kevin Blakeslee	Deputy Director – Flood Control	Public Works Deputy Director
Kenneth Eke	Chief Flood Control Planning/ Water Resources Division	Public Works Engineer
Michael Fam	Flood Control Planning	Public Works Engineer
Mona Sadek	Flood Control Planning	Flood Control Planner
Marjorie Schrage	Flood Control Planning	Public Works Engineer Technician

B.4 Hazard Identification and Prioritization

The Flood Control District Planning Team participated in the County hazard identification and prioritization process described in the base plan. The Flood Control District Planning Team assisted to summarize the extent, probability of future occurrences, potential magnitude/severity, and significance specific to the Flood Control District (See Section 4).

The Planning Team determined that the County and its Special Districts should focus over the next five (5) years on hazards that fell within the HIGH and MEDIUM "Probability" and "Impact" categories. While all the hazards present a potential problem in the County, the Planning Team felt that if they were able to reduce or eliminate the risk from "food and drought related" hazards, it would provide a greater service to the people within the jurisdiction. Table 4-3 illustrates how the final prioritization of the hazard; the "Green" colored box represents the highest priority hazards; and the "White" colored boxes represent lower (second and third tier) priority hazards.

Table B-5: Prioritized Hazard Assessment Matrix

		Impact		
		High	Medium	Low
Probability	High	Wildfire **Flood**[x] Earthquake/ Geologic Hazards	Drought	
	Medium	Terrorism	Climate Change (Extreme Heat and other)	Hail Infestation
	Low		Dam Inundation	Tornado High Winds Winter Storm Lightning Extreme Cold

[x] = Flood District Area of Concentration

B.5 Coordination with Existing Flood District Mechanisms

Coordination with other County planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the Flood Control District integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Specifically, the District incorporated into or implemented the 2011 MJHMP through other plans and programs shown below.

B.5.1 Flood Area Safety Taskforce (FAST)

During the devastating fires in the fall of 2003, there was great concern of what the ramifications might be for flooding in the burned areas, as well as in the valleys. In response to these concerns, an organization was established that mirrored the Mountain Area Safety Taskforce (MAST), mentioned above, which played a key role in minimizing damage.

While the fires were ravishing the countryside, representatives from multiple agencies met often to address potential issues associated with flood, mud and debris flows develop a strategy and to protect communities from flooding incidents. These agencies united together to become the Flood Area Safety Taskforce (FAST). FAST is structured as an ICS/SEMS Organization for managing incident activities both readiness and response. The FAST Organization stresses liaison with the communities, provides for community education and information, and places emphases on Community and city partnerships.

The FAST group includes:

- Elected State officials
- Representatives from all five (5) County Supervisorial Districts
- State Office of Emergency Services
- County Administrative Office
- County Public Works-Flood Control/ Transportation/Solid Waste
- County Fire Protection District
- County Fire Protection District/Office of Emergency Services (OES)
- County Sheriff's Department
- Representatives from the cities of Fontana, Highland Rancho Cucamonga, Rialto, and San Bernardino.
- USFS
- Caltrans
- CHP

The mission of the FAST is to facilitate a coordinated effort by cities, county, state, federal, and non-profit agencies to provide for the protection of property owners, residents, and property subject to the risk of erosion, mudflows, and flooding that could occur in San Bernardino County with an initial emphasis on the threat resulting from the Old and Grand Prix fires in 2003.

The FAST Unified Command identified the following objectives as the focus and direction of the FAST:

- Provide for Community Safety.
- Develop Coordinated Public Information Dissemination between Cities, County, State, Federal and Non-Profit Agencies.
- Develop Immediate, Mid-range and Long-range Coordinated Agency Plans.
- Identify and Secure Potential Funding Resources to Provide Document Task Force Activities Including Mission, Goals and Objectives, Policies, Procedures, and Outcomes.

Prior to any type of flood threat, the following precautionary measures may be taken by FAST members to reduce the impact of impending flooding:

- Review mutual aid agreements
- Define evacuation areas and trigger points
- Review the use of alert and warning systems
- Provide information to the public of potentially susceptible flooding areas and protective measures in progress or planned for those areas
- Educate public on emergency self-help and preparedness
- Develop and maintain emergency notification procedures and checklists.

A FAST Concept of Operations (CONOPS) was developed to provide activity guidelines for pre-flood activities related to National Weather Service (NWS) watches and warnings. Due to the unstable condition of the burned areas, activities and coordination needed to be established and implemented between departments.

The CONOPS is "situation" and "incident" driven and subject to revision by the Unified Command which includes County Flood Control District & Co Roads, County Fire Protection District, United States Forest Service (USFS), California Department of Transportation (Caltrans), California Highway Patrol (CHP), County Sheriff, City of Fontana, City of Highland, City of Rancho Cucamonga, City of Rialto, and City of San Bernardino. The Unified Command has the ability to modify activities in these guidelines in response to current situations and predicted changes. Currently, the CONOPS includes both summer and Winter Storm Event Readiness.

In addition, the CONOPS includes the San Bernardino County Flood Area Safety Taskforce Paging Network and a draft of the Alert Communication Matrix by Rain Amount/NWS Warning.

Over the past 10 years, the County has used the FAST CONOPS many times, greatly enhancing the County's ability to respond to flash flood in the desert and foothill areas. The CONOPS activity coordination between the agencies has been very successful. Because of the great success of the CONOPS, State Emergency Management Agency (Cal EMA) is using the CONOPS as a model for other agencies throughout the State.

In addition, San Bernardino County the CONOPS and FAST Plan is updated every two years and has done so since been put in to action the latest update being May of 2015.

B.5.2 Alluvial Fan Task Force

In December of 2002, the California Floodplain Management Task Force Report recommended that "The State should convene a task force specifically for alluvial fans, with stakeholder participation, to review the state of knowledge regarding alluvial fan floodplains, determine future research needs, and, if appropriate, develop recommendations relating to alluvial fan floodplain management, with an emphasis on alluvial fan floodplains that are being considered for development."

In September of 2004, Governor Arnold Schwarzenegger signed Assembly Bill 2141, which recommended the creation of the Alluvial Fan Task Force (Task Force). The Director of the Department of Water Resources (DWR) convened the Task Force in December of 2007 after funding to support Task Force activities was secured from a Pre-Disaster Mitigation Planning Grant from the Federal Emergency Management Agency (FEMA) and a state match was authorized by Assembly Bill 466. Funding supported the tasks charged to the Task Force including:

- Review the state of knowledge regarding alluvial fan floodplains;
- Determine future research needs;
- Develop a voluntary locally-adopted model ordinance for communities subject to alluvial fan flooding that supports land use decisions on alluvial fans;
- Develop local planning tools to assist local communities evaluate development on alluvial fans;
- Prepare recommendations relating to alluvial fan floodplain management.

Appointments to the Task Force by DWR Director Lester Snow represented a broad range of interests. Members included elected officials, represented by five Supervisors from Kern, Los Angeles, Riverside, San Diego and San Bernardino County where future alluvial fan development is projected. Appointments also included representatives of the development and environmental community, local floodplain managers and associated state and federal agencies, including the Federal Emergency Management Agency (FEMA), plus at-large members representing other issues related to future development on alluvial fans. The entire process was coordinated by the Water Resources Institute at California State University San Bernardino.

Primarily, the purpose of the Alluvial Fan Taskforce *Findings and Recommendations Report* (July 2010) and *The Integrated Approach for Sustainable Development on Alluvial Fans* (July 2010) documents are to provide a non-prescriptive and flexible model that local governments can use at their own discretion adapting to local conditions and needs that supports wise future land use decisions associated with development on alluvial fans.

As one of the ten Southern California counties studied by the Task Force, the County may review the development of the suite of local planning tools for pre-project screening for future development proposals on alluvial fans. If funding allows for the review, these planning tools may be useful as an optional database reference for project management. Additionally, the flood management tools designed to analyze alluvial fan flood hazards and formulate flood hazard protection, which were developed to be consistent with FEMA guidelines, may provide an optional data source for project development. Long term funding for updating and maintaining the pre-project screening tools database is a concern regarding the reliability for current data.

If funding exists, for the implementation of the *Integrated Approach for Sustainable Development on Alluvial Fans*, the methods contained therein may be used as some of the approaches for planning and evaluating the suitability of development on alluvial fans. During the analysis and review, if budgets allow, the long term ecological and financial sustainability issues would also be evaluated.

Based on the Findings from the Alluvial Fan Task Force process, recommendations were made for specific future actions that the State and other public agencies should consider regarding alluvial fans. The San Bernardino County Departments of Land Use, Special Districts and the Flood Control District are all coordinating on the below recommendations:

Recommendation 1: *on-going*

In February 2010, a General Plan Amendment (GPA) to the Safety Element of the 2007 General Plan was adopted to amend the Flood Plain Safety Overlay District to incorporate revised FEMA (Federal Emergency Management Agency) Flood Plain data, modifying 47 detail and seven regional General Plan Quad Maps. The GPA also adopted the FEMA Digital Flood Insurance Rate Map database as released by FEMA as it currently exists and as updated in the future for the County allowing for automatic map updates as new data are published by FEMA. This action by the County of San Bernardino Board of Supervisors implements the portion of the first recommendation from the Alluvial Fan Task Force by working with FEMA to continue updating flood insurance rate maps.

In addition, the GPA for the Safety Element in 2010 (a) amended the Generalized Landslide Susceptibility layer, modifying 17 General Plan Quad Maps and one regional Quad Map, to incorporate updated existing landslide data published by the U. S. Geological Survey for the Mountain area; (b) amended the Fire Safety Overlay District, modifying four General Plan Quad Maps to incorporate updated fire safety mapping published by Cal Fire for the Valley area; and (c) amended the Generalized Liquefaction Susceptibility layer, modifying four General Plan Quad Maps to incorporate new liquefaction data in the Big Bear Lake area designated by the County Geologist for the Big Bear Lake area.

Recommendation 2: *on-going*

The County will coordinate with the California Geological Survey (CGS) and the United States Geological Survey (USGS) to review any newly developed Quaternary geologic maps in alluvial fan areas in order to identify potential hazards in areas projected for future development.

Recommendation 4: *on-going*

Historical, documentation of flooding occurrences are preserved by the County's Flood Control District that would review the recommendation to identify flooding events that were associated with alluvial fans.

Recommendation 6: *on-going*

The increased severity and intensity of wildfires in Southern California increase flood risk because the same structures subject to fire risk are also prone to post-fire debris flows. Many of the debris basins that were constructed some time ago did not anticipate the increased severity and intensity of wildfires or the additional developments that would follow. The CalOES projects that climate change will further increase the severity of storms, wildland fires, flooding, mudslides and landslides in areas of Southern California where existing debris basins are located.

All of San Bernardino County Flood Control District's Debris Basins in the valley area; from the Los Angeles County Line to Yucaipa, were analyzed after the Grand Prix and Old Fires. Flood Control District Safety Assessment Teams utilized the Corps of Engineers' Los Angeles District methodology to determine debris production, the same methodology the Corps uses when designing debris basins. In many cases basins were physically expanded and additional measures such as K-rails and debris racks were installed. The understanding of post-fire debris flows continues to evolve; we work closely with the USGS as they develop Post Wildfire Debris Flow Hazard Assessments. The rainfall "Trigger Points" in our FAST CONOPS is a result of the USGS assessments. All Flood Control Basins are also studied on an annual basis to determine existing capacity.

Any additional funding to support our efforts will meet the intent of recommendation #6 which states that the State and local agencies should conduct assessments of the adequacy of strategically located debris basins under a range of scenarios in urbanized areas in light of increased fire and post-fire debris-flow events.

Recommendation 8: *on-going*

When funding sources become available for the maintenance and further development of the database for the web-based portal; which would be utilized as a pre-project screening and flood management tool for special alluvial fan areas, the County may evaluate the benefits of its use in the planning process.

Recommendation 9: future proposal

As financial resources are allocated, the County will consider the analysis of the Integrated Approach tools to be studied for use in land use planning for development on alluvial fans.

Recommendation 10: f*uture proposal*

If funding is provided, the County will review and propose for adoption a model ordinance tailored for the specific needs of the County.

Recommendation 12: *future proposal*

The County's Office of Legislative Affairs, after consulting with the appropriate departments and staff, may explore supporting the economic strategies recommended in the Integrated Approach regarding future maintenance of flood management infrastructure.

B.5.3 StormReady

On July 29, 2009, the National Weather Service recognized San Bernardino County as a "StormReady County". This recognition is valid until July 29, 2012 and has been renewed in use (2016) when the National Weather Service will review the County's weather related planning and notification procedures prior to renewing the "StormReady County" status.

San Bernardino County is the only StormReady jurisdiction in the United States covered by three Weather Forecast Offices. The NWS Offices are:

- San Diego, CA;
- Las Vegas, NV; and
- Phoenix, AZ.

This NWS Recognition may provide the County residents with a discount on their Flood Insurance premiums.

B.6 Mitigation Project Prioritization and Implementation

Flood Project Prioritization and Implementation

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Earthquake	**EQ Action 5.1:** Divert runoff to Little Bear Creek.	To reduce the runoff over the cliff(s) in the Rimforest neighborhood, the runoff must be diverted to another path. This will be accomplished over three phases: • Phase 1: Reduce Runoff Tributary Area by 64%- 50.35 AC • Phase 2: Reduce Runoff Tributary Area by 30%- 23.79 AC • Phase 3: Reduce Runoff Tributary Area by 5%- 3.99 AC	SP, NRP, PRV	TBD	Primary: Public Works Secondary: San Bernardino County Flood Control District		
Flood	**FL Action 1.1:** Update NFIP data and maps with newly identified flood hazard areas in the County, as new information becomes available.	As required by the State of California, National Flood Insurance Program (NFIP) maps published by FEMA must be included in the HMP or General Plan Safety Element. Keeping this information current is an important mitigation action.	PRV, PPRO	TBD	San Bernardino County Flood Control District	On-Going	
Flood	**FL Action 2.1:** Determine whether or not additional amendments to development standards or policies are merited, based on the Alluvial Fan Task Force Recommendations.	This is an on-going mitigation action from the 2011 MJHMP.	PRV	TBD	Primary: San Bernardino County Flood Control District Secondary: Land Use Services	On-Going	
Flood	**FL Action 3.1:** Amend the Flood Plain Safety Overlay District through automatic map updates as new data is released and published by FEMA.	Current San Bernardino County Hazard Maps can be found at: http://cms.sbcounty.gov/lus/Planning/ZoningOverlayMaps/HazardMaps.aspx.	PRV, NRP	TBD	Primary: San Bernardino County Flood Control District Secondary: Land Use Services	On-Going	
Flood	**FL Action 3.2:** Review development plans to ensure compliance with ordinances.	This is an on-going mitigation action from the 2011 MJHMP in order to reduce the flood hazards through development standards and policies stated in the General Plan and San Bernardino 2077 Development Code.	PRV	TBD	Primary: Land Use Services Secondary: San Bernardino	On-Going	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
					County Flood Control District		
Flood	**FL Action 3.3:** Inspect construction to ensure compliance with approved development plans.	This is an on-going mitigation action from the 2011 MJHMP in order to reduce the flood hazards through development standards and policies stated in the General Plan and San Bernardino 2077 Development Code.	PRV, PPRO, SP	TBD	Primary: Public Works Secondary: San Bernardino County Flood Control District	On-Going	
Flood	**FL Action 4.1:** In each flood control zone, construct facilities identified in those zones by the Flood Control Advisory Committee. See the following pages for a listing of projects.	This is an ongoing mitigation action from the 2011 MJHMP to achieve the goal of improving existing facilities and construct new facilities to mitigate flooding within the County.	SP	TBD	Primary: Public Works Secondary: San Bernardino County Flood Control District	On-Going	

B.7 Flood Project Prioritization and Implementation

The Flood District project rankings utilize the same format as the 2011 Multi-Jurisdictional Hazard Mitigation Plan, and rankings are based on the current project funding status as shown on the County Flood Control District's 10 year Plan. A 'High' Local Priority, or (3), indicates that project funding is expected to be complete within about the next three years, depending on the Flood Zone and its' available revenue. A 'Medium' Local Priority (2) indicates that project funding is expected to be complete within about four to seven years. A 'Low' Local Priority (1) indicates that the project is on the 10-Year Plan but complete funding is likely eight to ten years or more in the future.

The task of determining local project priority is the responsibility of the County Flood Control District's staff and City Engineers. Each of the six zones of the District is represented by a Citizens Advisory Committee, composed of eleven members and serving by appointment of the Board of Supervisors without compensation. Each committee is formed of spirited citizens and public officials with unselfish and devoted interests, organized to meet annually or on call to afford recommendations to the Board of Supervisors on matters of tax levies, budgets, work programs, priority of projects, ventures and other counsel. The Mayor of each incorporated city in the District is a committee member with full standing for the appropriate zone.

County Flood Control District staff and the City Engineers for each zone meet twice per year to discuss future project needs and current project status. Projects are proposed based on the public safety needs within the particular zone. In addition to public safety, other issues are considered in the prioritization process such as grant funding, environmental reviews and approvals, and other impediments that may cause construction of the project to be delayed. (See Annex 1 for examples of how these prioritization factors are applied to proposed projects.)

Almost without reservation, the recommendations of these organized committees have been accepted by the Board of Supervisors in its administration of County Flood Control District functions.

Each flood control zone constructs facilities identified in those zones by the Flood Control Advisory Committee. The City Engineers for each zone along with the Flood Control District I Advisory Committee establishes Project Priorities based on Benefit Cost Analysis, Community input, and fiscal resources available for the project in addition to any other noted factors. The following three tables illustrate priority rankings based on three key factors: Total Cost, Hazard Assessment, and Potential Fatalities.

Table B-6: Priority Flood Control Projects

Project No	Completion Date	Total Cost	Total Funding	Status
1-112	5 Year Plan	$10,000,000	$10,000,000	Priority
1-114	10 Year Plan	$15,000,000	$1,000,000	Priority

Project No	Completion Date	Total Cost	Total Funding	Status
1-701	5 Year Plan	$1,100,000	$1,100,000	Priority
1-806	10 Year Plan	$5,000,000	$1,000,000	Priority
1-809	5 Year Plan	$8,500,000	$1,000,000	Priority
1-910	10 Year Plan	$10,000,000	$2,000,000	Priority
2-113	10 Year Plan	$3,100,000	$500,000	Priority
2-308	10 Year Plan	$27,000,000	$500,000	Priority
F01272	10 Year Plan	$31,600,000	$600,000	Priority
F01336	2017-2018	$12,800,000	$13,740,000	Priority
F01389-2	10 Year Plan	$2,700,000	$1,430,000	Priority
F01417	10 Year Plan	$39,500,000	$21,150,000	Priority
F01452-2	2017-2018	$38,400,000	$1,170,000	Priority
F01473	10 Year Plan	$8,100,000	$5,001,000	Priority
F01650	2017-2018	$5,200,000	$3,440,000	Priority
F01667	10 Year Plan	$26,900,000	$16,000,000	Priority
F01911	2018-2019	$8,700,000	$3,140,000	Priority
F02129	10 Year Plan	$16,700,000	$1,024,000	Priority
F02228	10 Year Plan	$8,700,000	$7,600,000	Priority
F02243	10 Year Plan	$2,400,000	$400,000	Priority
Totals:		$281,400,000	$91,795,000	

B.7.1 Priority Project Descriptions

B.7.1.1 1-112 West State Storm Drain – Priority

Channel Invert Repair
Status: Proposed
Completion Date: 5-year plan
Total Cost: 11.4 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Public Safety; protection of local and downstream infrastructure
Hazard Mitigated: Downstream flooding

B.7.1.2 1-114 Carbon Canyon Channel – Priority

Channel improvement
Status: Proposed
Completion Date: 10-year plan
Total Cost: 15 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Public Safety; protection of local and downstream infrastructure
Hazard Mitigated: Downstream flooding

B.7.1.3 1-701 Etiwanda Channel Invert Repair – Priority

Channel Invert Repair
Status: Proposed
Completion Date: 5-year plan
Total Cost: 1.1 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Public Safety; protection of local and downstream infrastructure
Hazard Mitigated: Downstream flooding

B.7.1.4 1-806 Hawker Crawford Channel and Rich Basin – Priority

Channel / Basin improvement
Status: Proposed
Completion Date: 10-year plan
Total Cost: 5 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Public Safety; protection of local and downstream infrastructure by reducing peak Q
Hazard Mitigated: Downstream flooding

B.7.1.5 1-809 West Fontana Channel (From Banana Basin to Hickory Basin) – Priority

Channel Repair
Status: Proposed
Completion Date: 5-year plan
Total Cost: 8.5 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Public Safety; protection of local and downstream infrastructure
Hazard Mitigated: Downstream flooding

B.7.1.6 1-910 Grove Basin-Priority

Basin out improvement
Status: Proposed
Completion Date: 10-year plan
Total Cost: 10 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Public Safety; protection of local and downstream infrastructure by reducing peak Q
Hazard Mitigated: Downstream flooding

B.7.1.7 2-113 Randal Basin outlet improvement – Priority

Outlet improvements D/S of the Basin
Status: Proposed
Completion Date: On 10-year plan

Local Priority: Medium
Total Cost: $3.1 million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: Public Safety
Hazard Mitigated: Potential failure & flooding downstream
Resources to Implement: Medium
Cost to Implement: High
Time to Implement: High

B.7.1.8 2-308 Cable Creek Channel – Priority

Channel improvements
Status: Proposed
Completion Date: On 10-year plan
Local Priority: Low
Total Cost: $27 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Compliance with FEMA Levee Certification program
Hazard Mitigated: Reduction of floodplain; reduction of potential for major flooding
Resources to Implement: High
Cost to Implement: High
Time to Implement: High

B.7.1.9 F01272 Rialto Channel, Etiwanda Avenue to Willow Avenue – Priority

Construct Rialto channel to ultimate condition
Status: Proposed
Completion Date: On 10-year plan
Local Priority: Low
Total Cost: $31.6 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Rialto
Project Selected for: Public Safety & convenience Hazard Mitigated: Residential area flooding and road closures due to wash-outs
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.1.10 F01336 Amethyst Detention Basin – Priority

Construct a detention basin at Amethyst and Sycamore
Status: Design completed, Permits In process
Completion Date: Estimated 2017/2018
Local Priority: High
Total Cost: $12.8 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Victorville
Project Selected for: Public Safety; protection of local and downstream infrastructure by reducing peak Q
Hazard Mitigated: downstream flooding

Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.1.11 F01389-2 Mojave River Phase II – Priority

Construct earthen levee lined with 1/2 ton rock slope protection between Oro Grande Wash and Mojave River Phase I
Status: Proposed
Completion Date: On 10-year plan
Local Priority: Low
Total Cost: $2.7million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: To finalize levee improvement construction; protection of Amtrak station
Hazard Mitigated: Local flooding, railroad flooding
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.1.12 F01417 Bandicoot Detention Basin (Phase I&II) – Priority

Construction of detention basin, inlet/outlet facilities, fencing to attenuate 10-year storm flows adjacent to California Aqueduct and downstream residential and commercial properties developments.
Status: Proposed
Completion Date: On 10-year plan
Local Priority: Low
Total Cost: $39.5 million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: To protect the State water aqueduct
Hazard Mitigated: Flood damage to aqueduct & local area
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.1.13 F01452-2 West Fontana Channel, Phase I – Priority

Construction of concrete channel from Juniper to Banana Basin
Status: In process
Completion Date: Estimated 2017/2018
Local Priority: Medium
Total Cost: $38.4 million
Funding Description: San Bernardino County Flood Control Taxes, City of Fontana
Project Selected for: Public safety & convenience
Hazard Mitigated: Flooding of railroad & Metrolink tracks; road damage & closure
Resources to Implement: Medium
Cost to Implement: High

Time to Implement: High

B.7.1.14 F01473 Rialto Channel – Priority

Construct channel improvements south of Interstate 10
Status: Proposed
Completion Date: On 10-year plan
Local Priority: Medium
Total Cost: $8.1 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Rialto
Project Selected for: Public Safety
Hazard Mitigated: Existing channel is interim and undersized
Resources to Implement: Medium
Cost to Implement: High
Time to Implement: High

B.7.1.15 F01650 Sand Creek/ Warm Creek Channels – Priority

Improve existing confluence of Sand Creek and Warm Creek Channels
Status: In process
Completion Date: Estimated 2017/2018
Local Priority: Medium
Total Cost: $5.2 million
Funding Description: San Bernardino County Flood Control
Project Selected for: channel improvements to interim storm drain system
Hazard Mitigated: Potential damage to infrastructure
Resources to Implement: High
Cost to Implement: High
Time to Implement: High

B.7.1.16 F01667 Cactus Basins #4 & 5 – Priority

Construction of detention basins to mitigate downstream flooding of Rialto Channel Work includes inlet/outlet structures
Status: Proposed
Completion Date: 10-year plan
Local Priority: Low
Total Cost: $26.9 million
Funding Description: San Bernardino County Flood Control, City of Rialto
Project Selected for: Ability to reduce downstream peak Q
Hazard Mitigated: flooding of nearby area

B.7.1.17 F01911 Elder Gulch – Priority

Construct trapezoidal rock-lined channel
Status: Proposed
Completion Date: Estimated FY 18/19
Local Priority: High

Total Cost: $8.7 million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: Public safety
Hazard Mitigated: Flooding of local area
Resources to Implement: Low
Cost to Implement: High
Time to Implement: Medium

B.7.1.18 F02129 Wildwood Channel – Priority

Channel improvement
Status: In preliminary design process
Completion Date: On 10-year plan
Local Priority: High
Total Cost: $16.7 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Yucaipa
Project Selected for: History of flooding due to high debris flows
Hazard Mitigated: reduction in size of floodplain; minimized flooding
Resources to Implement: Low
Cost to Implement: High
Time to Implement: Low

B.7.1.19 F02228 Plunge Creek Spillway – Priority

Repair of severe damage caused by storms in 2005
Status: Proposed
Completion Date: On 10-year plan
Local Priority: High
Total Cost: $3 million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: Necessary repairs due to previous flood damage
Hazard Mitigated: Potential failure & flooding downstream
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.1.20 F02243 Rialto Channel Priority Crossings – Priority

Status: In preliminary design process
Completion Date: On 10-year plan
Local Priority: Low
Total Cost: $2.4 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Rialto

Project Selected for: Public Safety & convenience
Hazard Mitigated: Elimination of flooding at intersections
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.2 Projects with Mitigation Benefits

Table B-7 is a list of the proposed projects to mitigate the Flood hazard within the County Unincorporated Area.

Table B-7: In Progress Flood Control Mitigation Projects

Project No	Completion Date	Total Cost	Total Funding	Status
F01312	2017/2018	4,400,000	2,200,000	Under Construction
F01666	2017/2018	17,800,000	17,800,000	Under Construction
F02094	2017	4,000,000	4,000,000	Under Construction
F02126	2017/2018	8,300,000	6,180,000	Under Construction
	Totals:	34,500,000	30,180,000	

B.7.2.1 F01312 English Channel/ Peyton Drive (Under Construction)

Construct triple RCB and channel upstream and downstream of Peyton Drive.
Status: In preliminary design process
Completion Date: Estimated 2017/2018
Local Priority: High
Total Cost: $4.4 million
Funding Description: San Bernardino County Flood Control Property Taxes, 50% and City of Chino Hills 50%
Project Selected for: Public safety & convenience
Hazard Mitigated: Flooding of roads in residential area
Resources to Implement: High
Cost to Implement: High
Time to Implement: Medium

B.7.2.2 F01666 Cactus Basin #3/ Expansion of Basin #3 – (Under Construction)

Status: In process
Completion Date: Estimated 2017/2018
Local Priority: High
Total Cost: $17.8 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Rialto

Project Selected for: Public safety & improved future development; protection of water filtration plant across the street; reduction of peak Q downstream.
Hazard Mitigated: Flooding of immediate area and downstream along Rialto Channel
Resources to Implement: Low
Cost to Implement: High
Time to Implement: Medium

B.7.2.3 F02094 Cucamonga Basin #6, Phase II – (Under Construction)

Landscaping improvements
Status: Partial Completed
Completion Date: Mid-2011 – (Landscaping Phase Completion date end of 2017)
Local Priority: High
Total Cost: $4.0 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Environmental compliance & aesthetics
Hazard Mitigated:
Resources to Implement: Low
Cost to Implement: High
Time to Implement: Low

B.7.2.4 F02126 Francis Street Storm Drain (Under Construction)

Construct ultimate storm drain improvements from Sultana Avenue east to beyond Grove Avenue
Status: In preliminary design process
Completion Date: Estimated 2017/2018
Local Priority: Low
Total Cost: $8.3 million
Funding Description: San Bernardino County Flood Control Property Taxes 75% and City of Ontario 25%
Project Selected for: Public safety & convenience
Hazard Mitigated: Existing storm drain is undersized/interim; local flooding
Resources to Implement: Medium

B.7.3 Future Year Projects

Table B-8: Future Year Projects

Project Number/Name	Completion Date	Total Cost	Status
2-509 Little Sand Creek	10 Year Plan	$10,500,000	Future
3-501 Mission Channel	10 Year Plan	$28,800,000	Future
3-601 Wilson Creek (10th St-I-10)	10 Year Plan	$38,800,000	Future
CSDP Drain Project	10 Year Plan	$18,500,000	Future
Extension of VV Line E-01	10 Year Plan	$2,000,000	Future
F01284	10 Year Plan	$7,200,000	Future
F01582	10 Year Plan	$19,000,000	Future
F01584	2018/2019	$11,700,000	Future
F01609	10 Year Plan	$32,500,000	Future

Project Number/Name	Completion Date	Total Cost	Status
F02225	10 Year Plan	$33,100,000	Future
F02475	10 Year Plan	$9,000,000	Future
F02476	10 Year Plan	$32,300,000	Future
H1458	2021	$3,000,000	Future
Institution Road	2021	$30,000,000	Future
Line C-01 Hesperia	10 Year Plan	$5,300,000	Future
Line D-01 Hesperia	10 Year Plan	$32,500,000	Future
Line E-01 Apple Valley	10 Year Plan	$36,300,000	Future
Lone Pine Canyon Road Culvert	TBD	$25,000,000	Future
National Trails Hwy Bridge	TBD	$40,000,000	Future
Old Waterman Canyon Rd Culvert	TBD	$2,500,000	Future
Pine View Dr. Storm Drain	TBD	$6,000,000	Future
Piute Wash	2021	$34,500,000	Future
Rimforest Drainage Project	10 Year Plan	$6,900,000	Future
Rock Springs Rd Bridge Replacement	TBD	$32,876,000	Future
Tussing Ranch-Juniper Basin	10 Year Plan	$6,500,000	Future
Yermo Rd/National Trails Hwy Bridge	TBD	$40,000,000	Future
	Totals:	$544,776,000	

B.7.3.1 2-509 Little Sand Creek

Creek improvements between Date Street and Del Lemon basin
Status: Proposed
Completion Date: 10-year plan
Local Priority: Medium
Total Cost: $10.5 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety; residential area with school nearby
Hazard Mitigated: Flooding and pedestrian hazards
Resources to Implement: Medium
Cost to Implement: High
Time to Implement: High

B.7.3.2 3-501 Mission Channel

Channel Repair, Construct concrete channel improvements
Status: Proposed
Completion Date: 10-year plan
Local Priority: Medium
Total Cost: $28.8 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety; residential area with school nearby
Hazard Mitigated: Flooding and pedestrian hazards
Resources to Implement: Medium

Cost to Implement: High
Time to Implement: High

B.7.3.3 3-601 Wilson Creek (from 10st Street to I-10)

Channel Repair, between 10st Street to I-10
Status: Proposed
Completion Date: 10-year plan
Local Priority: Medium
Total Cost: $38.8 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety; residential area with school nearby
Hazard Mitigated: Flooding and pedestrian hazards
Resources to Implement: Medium
Cost to Implement: High
Time to Implement: High

B.7.3.4 CSDP -- Storm Drain Project – Colton

Construction of storm drains from Randall Basin to the Santa Ana River according to Comprehensive Storm Drain Plan (CSDP) 3-5 and 3-8
Status: Proposed
Completion Date: On 10-year plan
Local Priority: Medium
Total Cost: $18.5 million
Funding Description: San Bernardino County Flood Control Property Taxes
Hazard Mitigated: Existing channel is interim and undersized
Resources to Implement: Medium
Cost to Implement: High
Time to Implement: High

B.7.3.5 Extension of Victorville Line E-01

Construct Storm Drain line E-01
Status: In preliminary design process
Completion Date: On 10-year plan
Local Priority: High
Total Cost: $2.0 million
Funding Description: San Bernardino County Flood Control Property Taxes, City of Victorville
Project Selected for: Public safety of commercial area
Hazard Mitigated: local flooding; road closure/road damage (State Hwy)
Resources to Implement: High
Cost to Implement: High
Time to Implement: Low

B.7.3.6 FO1284 Donnell Basin (Phase I&II)

Construct detention basin.
Status: Proposed
Completion Date: 10-year plan
Local Priority: Medium
Total Cost: $7.2 million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: Public Safety; roadway protection; Safe Routes to School Program (SR2S)
Hazard Mitigated: Flood protection for homes, infrastructure, and pedestrians
Resources to Implement: Low

B.7.3.7 FO1582 Desert Knolls II

Construct flood control channel from Apple Valley Road to Tuscola Road
Status: Proposed
Completion Date: On 10-year plan
Local Priority: High
Total Cost: $19 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety/future development
Hazard Mitigated: Potential localized flooding due to increased development
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.3.8 FO1584 Desert Knolls

Construct channel improvements from the Mojave River to Phase I
Strategy: Construct concrete lined channel to provide for 100 year storm flows and debris flows.
Status: Proposed
Completion Date: Estimated FY 18/19
Local Priority: High
Total Cost: $11.7 million
Funding Description: San Bernardino County Flood Control Tax Revenues
Project Selected for: Environmental requirements
Hazard Mitigated: This project is the mitigation aspect of Phase II
Resources to Implement: Low
Cost to Implement: High
Time to Implement: Medium

B.7.3.9 FO1609 Ranchero Basin

Construct detention basin
Status: Proposed

Completion Date: 10-year plan
Local Priority: High
Total Cost: $32.5 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety and reduction of peak Q
Hazard Mitigated: Potential damage to bridges and roads downstream due to high flows
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.3.10 F02225 Del Rosa

Channel Repair, Construct concrete channel improvements between Pacific Street and Del Rosa Avenue
Status: Proposed
Completion Date: 10-year plan
Local Priority: Medium
Total Cost: $33.1 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety; residential area with school nearby
Hazard Mitigated: Flooding and pedestrian hazards
Resources to Implement: Medium
Cost to Implement: High
Time to Implement: High

B.7.3.11 F02475 Seneca Basin

Construct detention basin
Status: Proposed
Completion Date: 10-year plan
Local Priority: High
Total Cost: $9 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety and reduction of peak Q
Hazard Mitigated: Potential damage to bridges and roads downstream due to high flows
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.3.12 F02476 Oak Hills Basin

Construct detention basin
Status: Proposed
Completion Date: 10-year plan
Local Priority: High
Total Cost: $32.3 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety and reduction of peak Q
Hazard Mitigated: Potential damage to bridges and roads downstream due to high flows
Resources to Implement: Low

Cost to Implement: High
Time to Implement: High

B.7.3.13 H1458 Arrowbear Dr. Bridge Replacement

Replacement of bridge crossing on Arrowbear Drive and increase spillway flow capacity to prevent flooding
Status: Proposed
Completion Date: 2021
Total Cost: $3,000,000.00
Funding Description: Major Local Highway Project Funds
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.14 Institution Road

Construction of bridge crossing along Institution Road on Cajon Wash
Status: Proposed
Completion Date: 2021
Total Cost: $30,000,000.00
Funding Description: seeking grant funding
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.15 Line C-01 Hesperia

Construction of concrete trapezoidal channel improvements, short reach of levee along the channel, 96 inch RCP and reconstruction of the existing deficient reach as a concrete trapezoidal channel with a portion of riprap channel
Status: Proposed
Completion Date: 10-year plan
Total Cost: $5.3 million
Funding Description: San Bernardino County flood Control
Project selected for: Public safety and roadway protection
Hazard Mitigated: Flooded roads and residential area
Resources to implement: High
Cost to implement: High
Time to implement: High

B.7.3.16 Line D-01 Hesperia

Improve the storm drain facility.
Status: Proposed
Completion Date: 10-year plan
Total Cost: $32.5 million
Funding Description: San Bernardino County flood Control
Project selected for: Public safety and roadway protection
Hazard Mitigated: Flooded roads and residential area
Resources to implement: High
Cost to implement: High

Time to implement: High

B.7.3.17 Line E-01 Apple Valley

Improve the storm drain facility.
Status: Proposed
Completion Date: 10-year plan
Total Cost: $36.3 million
Funding Description: San Bernardino County flood Control
Project selected for: Public safety and roadway protection
Hazard Mitigated: Flooded roads and residential area
Resources to implement: High
Cost to implement: High
Time to implement: High

B.7.3.18 Lone Pine Canyon Road Culvert

Construction of Culvert on Long Pine Canyon Road
Status: Proposed
Completion Date: No date until funding is available
Total Cost: $2,500,000.00
Funding Description: TBD
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.19 National Trails Highway Bridge Replacement

Removal of approximately 31 old timber bridges and construction of replacement bridges spanning Under 20' on National Trails Highway
Status: Preliminary engineering and environmental study only
Completion Date: No date until funding is available
Total Cost: $40,000,000.00
Funding Description: TBD
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.20 Old Waterman Canyon Road Culvert

Removal of approximately 31 old timber bridges and construction of replacement bridges spanning less than 20' on National Trails Highway
Status: Preliminary engineering and environmental study only
Completion Date: No date until funding is available
Total Cost: $2,500,000.00
Funding Description:
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.21 Pine View Dr. Storm Drain

Construction of storm drain on Pine View Drive
Status: Proposed
Completion Date: Shelf ready but no date until funding is available
Total Cost: $6,000,000.00
Funding Description: TBD
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.22 Piute Wash

Construction of bridge crossing along Needles highway road on Piute washes to prevent flooding and washing the road out.
Status: Proposed
Completion Date: 2021
Total Cost: $34,500,000
Funding Description: seeking grant funding
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.23 Rimforest Drainage Project – Rimforest Area

Capture the surface water within Rimforest and convey it to Little Bear Creek, away from the escarpment.
Status: In preliminary design process
Completion Date: On 10-year plan
Local Priority: High
Total Cost: $6.9 million
Funding Description: San Bernardino County Flood Control Property Taxes
Project Selected for: Public safety of commercial area
Hazard Mitigated: Public safety and reduction of peak Q
Resources to Implement: High
Cost to Implement: High
Time to Implement: Low

B.7.3.24 Rock Springs Road Bridge Replacement

Construct Replacement Bridge on Glen Helen Parkway over Cajon Wash It will increase flow capacity with a longer span and reduce flooding of the roadway.
Status: Proposed
Completion Date: No date until full funding is available
Total Cost: $32,876,000
Funding Description: Partially funded with General Fund Money
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

B.7.3.25 Tussing Ranch – Juniper Basin

Construct detention basin
Status: Proposed
Completion Date: 10-year plan
Local Priority: High
Total Cost: $6.5 million
Funding Description: San Bernardino County Flood Control
Project Selected for: Public safety and reduction of peak Q
Hazard Mitigated: Potential damage to bridges and roads downstream due to high flows
Resources to Implement: Low
Cost to Implement: High
Time to Implement: High

B.7.3.26 Yermo Road and National Trails Highway Bridge Replacement

Removal of approximately 11 old timber bridges and construction of replacement bridges spanning under 20' on National Trails Highway and Yermo Road. The military is using high load tractors and trailers warranting the need to increase the load capacity of the bridges.
Status: Preliminary engineering and environmental study only
Completion Date: No date until funding is available
Total Cost: $40,000,000.00
Funding Description: TBD
Project Selected for: Public Safety and convenience
Hazard Mitigated: flood damage, road closures and road damage

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Annex C. Special Districts Department

C.1 Introduction

Special Districts Department, under the direction of the San Bernardino County Board of Supervisors, provides administrative oversight and manages the operation of over 100 special districts throughout San Bernardino County. Through the formation of County Service Areas (CSAs) and Improvement Zones, these special districts provide a variety of municipal-type services to unincorporated areas of the county.

C.2 Special Districts Profile

Special District Functions:
The County Service Areas (CSAs) and Improvement Zones can provide one or all of the following services to meet the individual needs of communities, neighborhoods and new developments depending on needs and financial feasibility:

- Cemetery
- Dam Operation
- Detention Basin
- Engineering and Construction
- Landscaping
- Open Spaces
- Park and Recreation
- Public Financing
- Refuse
- Roads
- Streetlights
- Television Translator
- Water and Sanitation

Mission:
The Special Districts Department works to ensure safe, healthy, and enjoyable communities by providing customizable programs and municipal services for those who work, play and stay in San Bernardino County.

Vision:
To be recognized as the preeminent provider of customized municipal services focusing on improved quality of life for the residents and visitors of San Bernardino County.

C.3 Planning Process

As described above, the County Flood Control District followed the planning process detailed in Section 3 of the base plan. In addition to providing representation on the San Bernardino County Hazard Mitigation Planning Committee (HMPC), the District formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table C-9. Additional details on plan participation and District representatives are included in Appendix A.

Table C-9: Special District Hazard Mitigation Planning Team

Name	Title
Jeffrey Rigney	Director of Special Districts
Steve Samaras	Water and Sanitation Division Manager
Tim Millington	Engineering Division Manager,
Reese Troublefield	Operations Division Manager
Erin Opliger	Districts Services Coordinator

The Special Districts Department has attending the following planning meetings:

Meeting Date	Meeting Type	Attendees	Additional Details
6/23/16	LHMP Update - Kickoff Meeting	Steve Samaras, Erin Opliger	
8/30/16	LHMP Group Meeting	Erin Opliger	
10/26/16	LHMP Blue Jeans Meeting	Erin Opliger	

The County of San Bernardino Special Districts Department (Department) has historically identified goals, objectives, and projects to mitigate the negative effects of hazards. The Department continues to work with various Advisory Commissions and the public to identify and mitigate the impacts of hazards to the various services that the Department provides, including: cemetery operations, dam operations, detention basin operations, landscaping services, open space, parks and recreation, refuse services, roads, streetlights, television translator, water distribution and treatment system operations, sewer collection system operations, and wastewater treatment plant operations.

The Department diligently identifies the hazards that each service district or County Service Area (CSA) and its zones face, and has assessed the vulnerability according to the potential event. Hazards, whether they are technological or natural, affect CSAs with varying frequency and can cause injury, impose monetary losses, and the disruption of services, affecting the Department's mission as a public agency service provider. Losses can be substantially reduced or eliminated through comprehensive pre- disaster planning and mitigation actions.

Many groups and individuals have contributed to the Department's planning for Disasters and the necessary hazard mitigation efforts. Advisory Committees, located in the Department's various CSAs, provide on-going input and support for the various aspects of hazard mitigation, including identifying persistent hazards that develop after storm events and options for mitigation.

Department staff participates in the hazard mitigation process by completing semi-annual audits of various CSAs, recommending temporary fixes and/or permanent solutions. CSA customers and the public have also participated in hazard mitigation planning by approaching staff in the field, contacting the office, and/or attending public meetings to identify temporary and ongoing hazards that need to be addressed. These resources have proved valuable to the Department in identifying and mitigating potential hazards. The Department also uses the following process to prepare hazard mitigation plans:

- Identify and prioritize disaster events that are most probable and destructive;
- Identify critical facilities;
- Identify areas within communities that are most vulnerable;
- Develop goals and objectives for reducing the effects of a disaster event;
- Develop specific projects to be implemented for each goal;
- Identify funding sources;
- Develop procedures for monitoring progress;
- Mitigate identified potential hazards.

The Department has identified areas for mitigation projects within the Special Districts of San Bernardino County as a result of their internal planning processes. These projects, shown below, are organized by type of special district these proposed projects are in the conceptual stage and detailed planning will be done in the future as funding becomes available. Prioritization of projects will be done in the planning stages, based on the risk prioritizations developed for the current Multi-Jurisdictional Hazard Mitigation Plan.

C.4 Hazard Identification and Prioritization

The Special Districts Planning Team participated in the County hazard identification and prioritization process described in the base plan. The Special Districts Planning Team assisted to summarize the extent, probability of future occurrences, potential magnitude/severity, and significance specific to the Special Districts (See Section 4).

C.5 Coordination with County Planning Efforts

Coordination with other County planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the Special Districts integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Specifically, the District incorporated into or implemented the 2011 MJHMP through other plans and programs shown below.

C.5.1 3.2 Water Systems (Distribution Systems):

Fire:

- Rockscape or paved property grounds which have structures located in wilderness and or areas prone to wildfires. Double the width of external fire breaks.
- Re-roof buildings and structures with tile, metal or fire resistant material.

Flood:

- Add drainage, elevate facilities and adjust sloping for facilities in low-lying areas and in natural waterways or floodplains. (Recent Completion)
- Conduct hydrologic and hydraulic studies for all facilities located near flood plains/natural waterways.
- Encase water pipelines with specific sized rock, gravel, and road base in natural waterways to prevent continual washout or exposure during heavy storm events/floods.

Earthquake:

- Retrofit structures to higher seismic standards.
- Purchase portable containers (Conex containers) to stage emergency supplies and equipment for the first responders (i.e. water, food, small off road vehicles, fuel, cots, toiletries, communication devices, blankets, wet weather gear, etc.) at strategic water system locations throughout County of San Bernardino. Conex containers can be relocated if necessary to assist field staff during a disaster to maintain the operations of water systems. (Recent Completion and in implementation phase)

General Hazard (Fire/Flood/Earthquake):

- Retrofit existing buildings and facilities with connectors/ATS for emergency generators and/or install permanent emergency generators at critical facilities, including wells and booster station locations.
- Develop a plan for speeding the repair of and functional restoration of water and wastewater systems through stockpiling of shoring materials, temporary pumps, surface pipelines, portable hydrants, and other supplies.
- Develop a plan for areas subject to high ground shaking, earthquake-induced ground failure, and surface fault rupture to determine a replacement schedule for pipelines (along with importance, age, type of construction material, size, condition, and maintenance or repair history).(Project now in effect)
- Develop a plan for short-term and intermediate-term sheltering of employees.
- Develop a plan to work with local agencies that handle hazardous materials to coordinate mitigation efforts for the possible release of these materials due to a natural disaster such as an earthquake, flood, fire, or landslide.

- Utilization of SCADA and Smart Water Meters to get real time data on problems with the system and reduce drive time emissions as a result of traditional meter reading.
- Provide emergency supplies of food, water, and portable generators for employees at office and field locations.
- Install emergency generators at district facilities

C.5.2 3.3 Sewer Systems (Collection Systems):

Fire:

- Rockscape or pave property grounds which have structures located in wilderness and or areas prone to wildfires. Double the width of external fire breaks.(Completion and program implementation by January 2017 estimated)
- Re-roof buildings and structures with tile or fire resistant material.

Flood:

- Add drainage, elevate facilities and adjust sloping for facilities in low-lying areas and in natural waterways or floodplains.
- Encase sewer pipelines with specific sized rock, gravel, and road base in natural waterways to prevent continual washout or exposure during heavy storm events/floods.

Earthquake:

- Develop a plan for short-term and intermediate-term sheltering of employees.
- Retrofit structures to higher seismic standards.

General Hazard (Fire/Flood/Earthquake):

- Retrofit existing buildings and facilities with connectors/ATS for emergency generators and/or install permanent emergency generators.

- Develop a plan for speeding the repair and functional restoration of water and wastewater systems through stockpiling of shoring materials, temporary pumps, surface pipelines, portable hydrants, and other supplies.
- Develop a plan for areas subject to high ground shaking, earthquake-induced ground failure, and surface fault rupture to determine a replacement schedule for pipelines (along with importance, age, type of construction material, size, condition, and maintenance or repair history).
- Install emergency power generators at district facilities.

C.5.3 3.4 Wastewater Treatment Plant

Fire:

- Rockscape or pave property grounds which have structures located in wilderness and or areas prone to wildfires. Double the width of external fire breaks.
- Purchase and store water pumps capable of suppressing fire.

Flood

- Add drainage, elevate facilities and adjust sloping for facilities in low-lying areas and in natural waterways or floodplains.

Earthquake:

- Develop a plan for short-term and intermediate-term sheltering of employees.

C.5.4 3.5 Roads

Fire:

- Install generators at all road facilities. This will allow uninterrupted communications and provide power to refuel critical emergency response equipment.
- Purchase emergency water supply or water purification devices to ensure uninterrupted supply of water to emergency response personal.(completed with continuous fresh of supplies and rotation)
- Clear vegetation from Road District facilities/yards

Flood:

- Upgrade culverts in all flood prone areas. Most existing culvert sizes were never designed for high water volume. Upgrading will prevent roadway washouts caused by water bypassing existing culverts.(Complete and continuous maintenance)
- Upgrade culvert sizes in Main Channels and replace old culverts in Main Channels as required.(complete and continuous maintenance)
- Slope stabilization at water crossing areas along roadways. This will prevent the loss of the roadways at these areas by preventing undermining by the water.
- Install generators at all road facilities. This will allow uninterrupted communications and provide power to refuel critical emergency response equipment.
- Purchase emergency water supply or water purification devices to ensure uninterrupted supply of water to emergency response personal.
- Soil stabilization on roadway shoulders. This will prevent erosion caused by flood conditions.

- Soil stabilization of dirt roadways. This will help mitigate the loss of material from the roadway during flooding conditions.
- Employ on call contractors to assist in emergency situations.

Earthquake:
Install generators at all road facilities. This will allow uninterrupted communications and provide power to refuel critical emergency response equipment.
Purchase emergency water supply or water purification devices to ensure uninterrupted supply of water to emergency response personal. (Completed and refresh of supplies as needed)

C.5.5 3.6 Television Translator Districts

General Hazard (Fire, Flooding, Earthquake):

- Install and maintain emergency generators at all TV Translator sites. Newberry Springs, Lucerne Valley, and Morongo Valley TV Transmitter sites are in need emergency generators. Pinto and Elephant Mountain sites have existing generators. Installing emergency generators at these sites will enable emergency information to be disseminated to the residents living in these remote locations.(Complete and maintenance of upgrades)
- Establish a centralized communications network to monitor channel output for TV Districts and provide emergency information by way of character generator tied to channel transmissions.
- Conduct annual tower and guide wire inspections to mitigate storm/wind/earthquake hazards from knocking out communications.
- Install poly insulators on power poles with high voltage power lines for Pinto Mountain. Establish an open purchase order for a High Voltage Electrician to provide annual inspections of power poles and service lines.(Completed and continuous maintenance)
- Maintain roadways on mountaintops and within washes leading to remote tower sites. Earthquakes and flash floods can block roadways, making them impassable to restore emergency communications.
- Maintain lights on all tower locations.

C.5.6 3.7 Parks Districts

- Trim large trees in parks to avert limb breakage and toppling during storm events.
- Establish emergency centers to ration drinking water at various County Park Community Centers.
- Establish community garden plots in designated County Park areas as an ongoing and emergency food source, including planting fruit bearing trees.
- Conduct an inventory or list of County Park Facilities and Community Centers to establish a list of pre-designated emergency operations or disaster relief sites. Not all Community

Centers are an appropriate size to accommodate large numbers of evacuees and may only serve as command and control centers or distribution centers.
- Establish small solar energy fields or other forms of renewable power at County Community Centers to facilitate stand-alone emergency operations for the community.
- Conduct repair and replacement of old roofs, and clearing of gutters and roof drains to minimize potential damage from major storm events.(Completed and continuous maintenance)
- Conduct an evaluation or study of County Park and Community Center facilities to install curbs, retaining walls, and drains to carry or divert water away from buildings.
- Connect water systems to generators to ensure delivery even in disaster situations.
- Provide emergency supply of food and water for employees in disaster situations.

C.6 Special Districts Mitigation Project Prioritizing

Cost effectiveness of each measure was a primary consideration when developing mitigation actions. Because mitigation is an investment to reduce future damages, it is important to select measures for which the reduced damages over the life of the measure are likely to be greater than the project cost. For structural projects, the level of cost effectiveness is primarily based on the likelihood of damages occurring in the future, the severity of the damages when they occur, and the level of effectiveness of the selected measure. While detailed analysis was not conducted during the mitigation action development process, these factors were of primary concern when selecting measures. For measures that do not result in a quantifiable reduction of damages, such as public education and outreach, the relationship of the probable future benefits and the cost of each measure was considered when developing the mitigation actions.

Based upon the Special Districts capabilities, Table C-10 shows primary actions selected for further implementation and development during the next planning cycle. Table C-10 provides details for each mitigation action with mitigation action descriptions, FEMA mitigation category, responsible party, and timeframe.

C.7 Special Districts Mitigation Actions

Table C-10: Mitigation Project Prioritization and Implementation

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
All-Hazard	**AH Action 2.1:** Continue funding and support for Special Districts Projects relating to all hazards.	Continue funding and support for Special Districts Projects relating to water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District for all hazards. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	
All-Hazard	**AH Action 2.2:** Install Generators at Critical Facilities	Retrofit existing buildings and facilities with connectors/ ATS for emergency generators and/or install permanent emergency generators at critical facilities, including wells and booster station locations.	ES, SP	TBD	Water Systems	TBD	Critical sites are already set up for connection or has a permanently installed generator
All-Hazard	**AH Action 2.3:** Water Systems Repair Plan	Develop a plan for speeding the repair of and functional restoration of water and wastewater systems through stockpiling of shoring materials, temporary pumps, surface pipelines, portable hydrants, and other supplies.	PRV	SDD WAS	Water Systems	TBD	We have a warehouse and inventory. Add'l inventory would need to be purchased from local wholesaler
All-Hazard	**AH Action 2.4:** Smart Water Meters and SCADA	Utilization of SCADA and Smart Water Meters to get real time data on problems with the system and reduce drive time emissions as a result of traditional meter reading.	PRV	Individual CSAs	Water Systems	Ongoing	Both SCADA and Smart Meters have been installed and continue to be installed
All-Hazard	**AH Action 2.5:** Provide Employees with Emergency Supplies	Provide emergency supplies of food, water, and portable generators for employees at office and field locations.	ES	SDD/WAS	Water Systems	Ongoing	WAS has a stock of emergency food supplies, water, and generators.
All-Hazard	**AH Action 2.6:** Annual Tower and Guide Wire Inspections	Conduct annual tower and guide wire inspections to mitigate storm/wind/earthquake hazards from knocking out communications.	PRV	TBD	TV Districts	7/1/2016-7/1/2017	All Districts
All-Hazard	**AH Action 2.7**: Maintain Tower Lighting	Maintain lights on all tower locations.	SP	TBD	TV Districts	June-17	
All-Hazard	**AH Action 2.8:** Designate Emergency Operations Sites	Conduct an inventory or list of County Park Facilities and Community Centers to establish a list of pre-designated emergency operations or disaster relief sites. Not all Community Centers are an appropriate size to accommodate large numbers of evacuees and may only serve as command and control centers or distribution centers.	PRV	TBD	Park Districts	April-17	All Districts
All-Hazard	**AH Action 2.9:** Establish Power Sources for Emergency Operations Sites	Establish small solar energy fields or other forms of renewable power at County Community Centers to facilitate stand-alone emergency operations for the community.	PRV, SP	TBD	Park Districts	12/1/2016-7/1/2018	Lucerne Valley Joshua Tree
All-Hazard	**AH Action 2.10:** Connect Water Systems to Generators	Connect water systems to generators to ensure delivery even in disaster situations.	PRV, SP	TBD	Park Districts	TBD	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
All-Hazard	**AH Action 2.11:** Establish a Centralized Communications Network	Establish a centralized communications network to monitor channel output for TV Districts and provide emergency information by way of character generator tied to channel transmissions.	PRV	TBD	TV Districts	7/1/2017-12/1/2017	All districts
Wildfire	**WF Action 3.3:** Vegetation Removal	Clear vegetation from Road District facilities/yards	PRV	TBD	Roads	TBD	
Wildfire	**WF Action 6.3:** Protect Property in Wilderness Areas	Rockscape or pave property grounds which have structures located in wilderness and or areas prone to wildfires. Double the width of external fire breaks.	PPRO, PRV, SP	TBD	Sewer Systems	January-17	All sewer pump stations have paving
Wildfire	**WF Action 8.3:** Structural Fire Breaks Widening	Double the width of external fire breaks on grounds which have structures located in wilderness and or areas prone to wildfires.	SP, PRV	Individual CSAs	Water Systems	7/1/2017-7/19/2019	
Wildfire	**WF Action 9.1:** Continue funding and support for Special Districts Projects relating to wildfire.	Continue funding and support for Special Districts Projects relating to wildfire in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	
Wildfire	**WF Action 9.2:** Emergency Water Supplies	Purchase emergency water supply or water purification devices to ensure uninterrupted supply of water to emergency response personal.(completed with continuous fresh of supplies and rotation)	ES	TBD	Roads	TBD	
Earthquake	**EQ Action 2.2:** Seismic Strapping	Seismic strapping for existing water tanks and future construction.	SP, PRV	CSA 64	Water Systems	7/17/2017- 7/1/2019	Ongoing currently
Earthquake	**EQ Action 2.3:** Employee Emergency Sheltering	Develop a plan for short-term and intermediate-term sheltering of employees.	PRV	WAS	Sewer Systems	7/17/2017-7/19/2019	To purchase cots, small portable generators, tents, etc.
Earthquake	**EQ Action 4.2:** Generator Installation	Install generators at all road facilities. This will allow uninterrupted communications and provide power to refuel critical emergency response equipment.	SP, PPRO	TBD	Roads	TBD	
Earthquake	**EQ Action 6.1:** Continue funding and support for Special Districts Projects relating to earthquake hazards.	Continue funding and support for Special Districts Projects relating to earthquake hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	
Flood	**FL Action 3.4:** Soil Stabilization on Roadways and Along Roadway Shoulders	Soil stabilization on roadway shoulders and dirt roads. This will prevent erosion caused by flood conditions.	SP, PRV	TBD	Roads	TBD	

Hazard	Mitigation Action	Description / Background	Mitigation Strategy Type	Funding	Responsible Agency	Time Frame	Status / Comments / Implementation Mechanisms
Flood	**FL Action 3.5:** Encasing Pipelines	Encase water pipelines with specific sized rock, gravel, and road base in natural waterways to prevent continual washout or exposure during heavy storm events/floods.	SP, PRV	CSA 70 J	Water Systems	7/17/2017-7/1/2027	
Flood	**FL Action 6.1:** Continue funding and support for Special Districts Projects relating to flood hazards.	Continue funding and support for Special Districts Projects relating to flood hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	
Flood	**FL Action 6.2:** On Call Contractors	Employ on call contractors to assist in emergency situations.	PRV, ES	TBD	Roads	TBD	
Drought	**DR Action 3.1:** Continue funding and support for Special Districts Projects relating to drought hazards.	Continue funding and support for Special Districts Projects relating to drought hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	
Anti-Terrorism	**AT Action 2.1:** Continue funding and support for Special Districts Projects relating to terrorism hazards.	Continue funding and support for Special Districts Projects relating to terrorism hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	
Climate Change	**CC Action 3.1:** Continue funding and support for Special Districts Projects relating to climate change hazards.	Continue funding and support for Special Districts Projects relating to climate change hazards in the categories of water systems, sewer systems, wastewater treatment, roads, TV districts, park districts, Big Bear Valley Recreation Park District and Bloomington Recreation and Park District. For more information regarding these projects, see Annex C Section C.7.	VARIES	VARIES	VARIES	Ongoing	

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APPENDIX F

RIVERSIDE COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

COUNTY OF RIVERSIDE

Multi-Jurisdictional

Local Hazard Mitigation Plan

July 2018





Bruce Barton, Director

County of Riverside Emergency Management Department

Contact Information

Name:	Bruce Barton
Title:	Director, Riverside County EMD
Address:	4210 Riverwalk Parkway
City, State, and Zip:	Riverside, CA 92505
Office:	(951) 358-7100
Email:	BBarton@rivco.org

Name:	Ramon Leon
Title:	Deputy Director, Riverside County EMD
Address:	4210 Riverwalk Parkway
City, State, and Zip:	Riverside, CA 92505
Office:	(951) 358-7100
Email:	raleon@rivco.org

Name:	Melanie Gonzalez
Title:	Health Education Assistance II, Riverside County EMD
Address:	4210 Riverwalk Parkway
City, State, and Zip:	Riverside, CA 92505
Office:	(951) 355-5505
Email:	Melanie.gonzalez@rivco.org

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

Executive Summary

The purpose of the Riverside County Operational Area Multi-Jurisdictional Local Hazard Mitigation Plan is to identify the County's hazards, review and assess past disaster occurrences, estimate the probability of future occurrences and set goals to mitigate potential risks to reduce or eliminate long-term risk to people and property from natural and man-made hazards.

The plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 to achieve eligibility and potentially secure mitigation funding through Federal Emergency Management Agency (FEMA) Flood Mitigation Assistance, Pre-Disaster Mitigation, and Hazard Mitigation Grant Programs.

Riverside County's continual efforts to maintain a disaster-mitigation strategy is on-going. Our goal is to develop and maintain an all-inclusive plan to include all jurisdictions, special districts, businesses and community organizations and to promote consistency, continuity and unification.

The County's planning process followed a methodology presented by FEMA and Cal-OES which included conducting meetings with the Operational Area Planning Committee (OAPC) coordinated by Riverside County Emergency Management Department comprised of participating Federal, State and local jurisdictions agencies, special districts, school districts, non-profit communities, universities, businesses, Tribal Leaders, Healthcare Facilities and general public.

The plan identifies vulnerabilities, provides recommendations for prioritized mitigation actions, evaluates resources and identifies mitigation shortcomings, provides future mitigation planning and maintenance of existing plan.

The plan will be implemented upon FEMA approval.

Plan Adoption/Resolution

The County and its participating jurisdictions will submit plans to Cal OES for review prior to being submitted to FEMA and will adhere to the recommended process. In addition, the County and its participants will wait to receive an "Approval Pending Adoption" before taking the plan to the local governing bodies for adoption. Upon approval, County and participating jurisdictions will insert signed resolution.

(See Appendix A for Draft Resolution)

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

Acknowledgments

County Board of Supervisors:
District 1 – Kevin Jeffries
District 2 – John F. Tavaglione
District 3 – Chuck Washington
District 4 – Manuel Perez
District 5 – Marion Ashley

Riverside County EMD:
Bruce Barton, Director - EMD
Victoria Burns, Deputy Director - EMD
Ramon Leon, Program Chief II - EMD
Mark Bassett, Emergency Services Manager - EMD

Planning Team:
Laronte Groom, Program Coordinator II
Sarah Bruns, Emergency Services Coordinator
Melanie Gonzalez, Health Education Assistant II
Brooke Federico, Senior Public Information Specialist
Shane Reichardt, Emergency Services Coordinator

Support Staff:
Angie Johnson, Administrative Services Analyst II
Nicole Foust, Office Assistant III
Christina Rich, Secretary I
Verna Liles, Office Assistant III
Dennis Day, Emergency Services Coordinator
Ralph Mesa, Emergency Services Coordinator
Jerry Hagen, Emergency Services Coordinator
Martin Baxter, Senior Health Educator
Dan Bates, Sr. EMS Specialist
Nick Ritchey, EMS Specialist
Patricia Uematsu, Supervising Account Technician
Renee Poselski, Contracts and Grants Analyst
Sandy Olinga, Administrative Services Analyst I

Local Hazard Mitigation Plan External Steering Committee (OAPC)
Federal, State and Local Government, Special Districts, Tribal Leaders, Healthcare Facilities, Non-Governmental Organizations, Faith- based organizations, businesses, Emergency Services Coordinators and other key Stakeholders.

Local Hazard Mitigation Internal Planning Steering Committee
Cal OES
Agricultural Commissioner's Office
Environmental Health
Riverside County Animal Services
Riverside County Fire- CAL FIRE
Riverside County Flood Control
Riverside County Human Resources
Riverside County Office of Education
Riverside County University Health System
Riverside County Sheriff's Office
Riverside County Information Technology
Riverside County Transportation and Land Management Agency
SoCal Edison
SoCal Gas
NOAA

Jurisdictional Participation
Special thanks to the participating local jurisdictions and special districts for collecting and compiling historical disaster information, providing area hazard identification summaries and completing their stand-alone local hazard mitigation plans. The local hazard assessments and insight are very instrumental to incorporate mitigation actions in the Riverside County Multi-Jurisdictional Hazard Mitigation Plan

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Participant Annexes for 2017 Plan

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A-1	City of Banning		Agua Caliente Band of Cahuilla Indians - DROPPED OUT
A-2	City of Beaumont		
A-3	City of Blythe	A-27	Morongo Band of Mission Indians
A-4	City of Calimesa		Ramona Band of Indians - DROPPED OUT
A-5	City of Canyon Lake		
A-6	City of Cathedral	**Special Districts**	
A-7	City of Coachella	A-28	Beaumont Unified
A-8	City of Corona	A-29	Desert Sands USD
A-9	City of Desert Hot Springs	A-30	Eastern Municipal Water
A-10	City of Eastvale	A-31	Hemet Unified School District
A-11	City of Hemet	A-32	High Valley Water
A-12	City of Indian Wells	A-33	Idyllwild Fire Protection
A-13	City of Indio	A-34	Imperial Irrigation District
A-14	City of Jurupa Valley	A-35	Kaiser Hospital - Riverside
A-15	City of La Quinta	A-36	Lake Elsinore USD
A-16	City of Lake Elsinore		March Air Force Base – DROPPED OUT
A-17	City of Murrieta	A-37	Moreno Valley USD
A-18	City of Norco	A-38	Perris Union HSD
A-19	City of Palm Desert	A-39	Rancho California Water
A-20	City of Palm Spring	A-40	Riverside Community Colleges
A-21	City of Perris	A-41	Riverside County Office of Education
A-22	City of Rancho Mirage	A-42	Riverside Unified School District
A-23	City of Riverside	A-43	San Jacinto USD
A-24	City of Temecula	A-44	Santa Ana Watershed
A-25	City of San Jacinto	A-45	Western Municipal Water
A-26	City of Wildomar		

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Section 1.0 – Local Hazard Mitigation Plan

1.1 Plan Description

The 2017 Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP) was written with the assistance and cooperation of multiple departments within the County of Riverside and multiple cities, tribes and special districts. This plan is an update to the 2012 LHMP and reaffirms the commitment of the Riverside County Operational Area to reduce risks from natural and other hazards.

Since 1965, Riverside County has had 44 Federal Disaster Declarations. The most recent Federally Declared Disaster was in March, 2017 and was the result of winter storms and flooding. In addition, the county has experienced 22 Governor-Proclaimed State Disasters, with the most recent in February 2017. In 2016, Riverside County was impacted by earthquakes, floods, high winds, high heat and fires. These natural disasters will occur again, many on a yearly basis.

Riverside County cities, tribes, communities and special districts share the common goal of becoming a disaster resistant county.

1.2 Purpose of Plan and Authority

Disaster Mitigation Act of 2000 (DMA 2000) (Public Law 106-390) provides the legal basis for FEMA mitigation planning requirements for State, local and Indian Tribal governments as a condition of mitigation grant assistance. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act by repealing the previous mitigation planning provisions and replacing them with a new set of requirements that emphasize the need for State, local, and Indian Tribal entities to closely coordinate mitigation planning and implementation efforts. The requirement for a State Hazard Mitigation Plan (SHMP) is continued as a condition of disaster assistance, adding incentives for increased coordination and integration of mitigation activities at the State level. DMA 2000 also established a new requirement for local mitigation plans and authorized up to seven (7) percent of Hazard Mitigation Grant Program (HMPG) funds available to a State for development of State, local, and Indian Tribal mitigation plans.

The FEMA Mitigation and Insurance Strategic Plan for 2014-2018 identifies critical goals, objectives, and strategies to enhance the way FEMA carries out its mitigation and insurance mission. The plan is designed to help build and sustain collaboration with Federal, State, Tribal, Territorial, and community partners through a strategic framework that guides day-to-day work leading to more resilient communities nationwide.

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The County of Riverside Emergency Management Department shares many of FEMA's goals and objectives including the following:

FEMA Objective 1.2: Provide support to local leaders and tribal officials to strengthen recovery and mitigation core capabilities

"Pursue a proactive approach in building stakeholder relationships FEMA Strategic Plan 2014–2018 with local leaders to help them better identify and address their disaster recovery challenges."

FEMA Objective 1.3: Increase disaster awareness and action by improving communication

"Pre-disaster preparedness communication aims to make the public aware of potential hazard risks and the steps they should take to stay safe when a disaster strikes."

FEMA Objective 4.3: Enhance the effectiveness, financial stability, and affordability of the National Flood Insurance Program

"The National Flood Insurance Program (NFIP) serves as a keystone for national efforts to reduce the loss of life and property from flood disasters…NFIP will explore ways to develop and implement more accurate methods of calculating risk, and place a greater emphasis on cost-effective mitigation as a way of lowering long-term expenses"

1.3 Grant Programs with Mitigation Plan Requirements

The Hazard Mitigation Grant Program (HMGP) is authorized by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (the Stafford Act), Title 42, United States Code (U.S.C.) 5170c. The key purpose of HMGP is to ensure that the opportunity to take critical mitigation measures to reduce the risk of loss of life and property from future disasters is not lost during the reconstruction process following a disaster. HMGP is available, when authorized under a Presidential major disaster declaration, in the areas of the State requested by the Governor. The amount of HMGP funding available to the Applicant is based upon the total Federal assistance to be provided by FEMA for disaster recovery under the Presidential major disaster declaration.

The Flood Mitigation Assistance (FMA) program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended (NFIA), 42 U.S.C. 4104c, with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FEMA requires that the state, tribal, or local government applying for this form of assistance have adopted a hazard mitigation plan as a condition of receiving funding.

The Pre-Disaster Mitigation (PDM) program is authorized by Section 203 of the Stafford Act, 42 U.S.C. 5133. The PDM program is designed to assist States, Territories, Indian

Tribal governments, and local communities in implementing a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and mitigate structures during future hazard events, reducing reliance on Federal assistance during future disasters.

See section 7.4 for Fiscal Mitigation Capabilities

Section 322 of DMA 2000 specifically addresses mitigation planning at the state and local levels. It identifies new requirements that allow HMGP funds to be used for planning activities, and increases the amount of HMGP funds available to states that have developed a comprehensive, enhanced mitigation plan prior to a disaster. States and communities must have an approved mitigation plan on file prior to receiving post-disaster HMGP funds. Local and tribal mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to and the capabilities of the individual communities.

State governments have certain responsibilities for implementing Section 322, including:

- Preparing and submitting a standard or enhanced state mitigation plan
- Reviewing and updating the state mitigation plan every five years

Providing technical assistance and training to local governments to assist them in applying for HMGP grants and in developing local mitigation plans; and reviewing and approving local plans if the state is designated a managing state and has an approved enhanced plan.

DMA 2000 is intended to facilitate cooperation between state and local authorities. It encourages and rewards local and state pre-disaster planning and promotes sustainability as a strategy for disaster resistance. This enhanced planning network is intended to enable local and state governments to articulate accurate needs for mitigation, resulting in faster allocation of funding and more effective risk reduction projects.

FEMA prepared an Interim Final Rule, published in the Federal Register on February 26, 2002 (44 CFR Parts 201 and 206), which establishes planning and funding criteria for states and local communities.

The Riverside County Operational Area Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP) supports the values and goals of the Federal Emergency Management Agency, and the California Office of Emergency Services. The 2013 State Hazard Mitigation Plan was used as a reference and source for relevant information and changes in the State of California Hazard Mitigation Planning process. The County of Riverside Emergency Management Department is also participating in the 2018 State Hazard Mitigation update planning process.

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The 2013 State Hazard Mitigation Plan – An Enhanced State Mitigation Plan

The document is a comprehensive update of the 2010 SHMP. It performs the following functions:

1. Documents statewide hazard mitigation systems implemented in California
2. Describes strategies and priorities for future mitigation activities
3. Highlights new hazard mitigation initiatives since the 2010 SHMP
4. Describes and illustrates mitigation progress and success stories
5. Facilitates integration of local, state, tribal, and private sector hazard mitigation activities into a comprehensive statewide effort
6. Meets state and federal statutory and regulatory requirements for an enhanced State Mitigation Plan

Goals Shared with State Multi-Hazard Mitigation Plan

The Riverside Operational Area's LHMP goals are shared with the State of California 2018 Multi- Hazard Mitigation Plan.

Goal 1: Significantly reduce life loss and injuries

Goal 2: Minimize damage to structures and property, as well as interruption of essential services and activities

Goal 3: Protect the Environment

Goal 4: Promote hazard mitigation and community resilience as both integrated public policy and standard business practice

While the Disaster Mitigation Act of 2000 ("DMA 2000") requires that local communities address only natural hazards, the Federal Emergency Management Agency (FEMA) recommends that local comprehensive mitigation plans address man-made and technological hazards to the extent possible. In the 2012 Plan, Riverside OA addressed an expansive set of hazards. Upon review of the hazards since 2012, and the numbers of man-made incidents, the OA will continue to address the large set of man-made, technological and natural hazards. Communication Failure and Cyber Attacks have been added to the 2017 list of hazards.

In developing the original 2005 hazard list, the goal was to create a list by identifying as many hazards as could be found in the county. This list was used as part of the planning process. Some of the disasters identified on the list were found to have a limited amount of

supporting information about the potential impact, specific locations in the county where the hazard might arise, and the magnitude of that hazard on the economy, infrastructure, and residents of the County.

The 2012 update used the 2005 hazard list as a reference. The hazards were reassessed to ensure that the threat of the hazard was still viable. The same process was used for the 2017 plan update. The 2017 LHMP Steering Committee met to address each hazard individually. Probability, severity, health systems impact, and mitigation capabilities were all taken into consideration while reorganizing the hazard ranking.

Support of Broader County Vision

The Riverside County Operational Area Multi-Jurisdictional LHMP supports the broader vision and values of the County of Riverside, along with the cities, special districts, and Tribal Leaders within the County. As stated in Riverside County General Plan of December 2015, Riverside County's vision is summarized by saying:

"Riverside County is a family of special communities in a remarkable environmental setting."

The values embodies in the General Plan vision are:

"Our vision is based on values that provide the foundation for common ground that, in turn; underpin the General Plan's goals, policies, and actions. The people of Riverside County declare that they join together in holding the following values and seeking a community future based on them. It can be argued that our values are optimistic and very ambitious: that they require our best instincts to prevail. Of course-why would we seek less in shaping our communities? So, with that theme in mind, let us express the values that have motivated our community building and that will continue to do so in the future."

- Community
- Health
- Inter-relatedness
- Rights
- Responsibilities
- Risks
- Diversity
- Equity
- Valued Contributions
- Varied Communities
- Balance
- Participation
- Volunteerism
- Decision Making
- Creativity and Innovation
- Distinctiveness
- Livable Centers
- Housing
- Natural Environment
- Man-made Environment
- Multi-Modal Transportation
- Employment

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- Safety
- Planning Integration
- Communication and Information
- Quality Management
- Sustainability
- Recreation
- Healthy Food
- Costs
- Governmental Cooperation
- Youth in the Community

Riverside County Emergency Management Department Mission

The Riverside County Operational Area Multi-Jurisdictional LHMP supports the mission of the Emergency Management Department, through focusing efforts on mitigation actions intended to lessen the impact of natural, man-made, and technological disasters.

EMD Mission:

The mission of the Riverside County Emergency Management Department is to be a leader in emergency management to ensure the safety and security of the residents and visitors of Riverside County and to facilitate and support County Government and stakeholder efforts to mitigate, prepare for, respond to, and recover from natural and human caused emergencies and disasters.

The EMD Director expands on this Mission by stating:

"The Riverside County Emergency Management Department is comprised of dedicated personnel who strive to ensure the safety and security of the residents, businesses and visitors of Riverside County"

1.4 Multi-Jurisdictional Participants

Table 2: Multi-Jurisdictional Participants

Local City Jurisdictions	*City of San Jacinto
*City of Banning	*City of Temecula
*City of Beaumont	*City of Wildomar
*City of Blythe	**Tribes**
*City of Calimesa	Morongo Band of Mission Indians
*City of Canyon Lake	**Special Districts**
*City of Cathedral	*Beaumont Unified School District
*City of Coachella	Desert Sands Unified School District
*City of Corona	Eastern Municipal Water District
*City of Desert Hot Springs	*Hemet Unified School District
*City of Eastvale	*High Valley Water District
*City of Hemet	*Idyllwild Fire Protection District
*City of Indian Wells	*Imperial Irrigation District
*City of Indio	Kaiser Hospital - Riverside
*City of Jurupa Valley	*Lake Elsinore Unified School District
*City of La Quinta	Moreno Valley Unified School District
*City of Lake Elsinore	*Perris Union High School District
*City of Murrieta	*Rancho California Water District
*City of Norco	*Riverside Community College
*City of Palm Desert	*Riverside County Office of Education
*City of Palm Spring	*Riverside Unified School District
*City of Perris	*San Jacinto Unified School District
*City of Rancho Mirage	Santa Ana Watershed
*City of Riverside	*Western Municipal Water District

*Participated in 2012 Plan

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2017 Cities, Tribes and Special Districts

In the 2005 plan we had a total of 53 cities and special districts that participated: 24 Cities, 1 Tribe, 10 Hospitals, 8 School Districts and 10 special districts.

In the 2012 plan we had a total 53 cities and special districts that participated: 27 Cities, 1 Community Service District, 14 School District/Education, 1 Fire Protection District, 1 Hospital, 1 Sanitary District and 8 Water Districts.

In the 2017 plan, we have a total of 45 cities, special districts and tribes that participated: 26 Cities, 1 Tribe, 10 School District/Education, 1 Hospital, 1 Fire Protection District and 7 Special Districts.

The decrease in participation for the 2017 plan is primarily economic. Several previous participants had expressed that budget cuts have affected their staff and level of dedication participating mitigation efforts with in their jurisdictions.

Section 2.0 – Community Profile

2.1 History

Taking its name from the City of Riverside, the county was formed in 1893 from a small portion of San Bernardino County and a larger part of San Diego County.

Although the county marks its political beginnings in 1893, the land was occupied long before Europeans and their descendants entered the areas, by several Native American groups including the Serranos, the Luisenos, the Cupenos, the Chemehuevi, and the Cahuillas.

When Spain claimed California from the Native Americans the Spaniards began putting a series of missions in what was then called Alta California. The San Gabriel mission claimed lands in what are now Jurupa, Riverside, San Jacinto, and the San Gorgonio Pass, while the San Luis Rey mission claimed land in what are now Lake Elsinore, Temecula, and Murrieta. These lands were used for grazing of the large herds of cattle and sheep that belonged to the missions. In 1776, and again in 1778, Juan Bautista de Anza, an army captain charged with discovering an overland route from the Mexican state of Sonora to San Gabriel and Los Angeles, passed through much of Riverside County and described fertile valleys, lakes, and sub-desert areas.

In 1822, Mexico successfully revolted against Spain, and California came under Mexican jurisdiction. The missions and their lands were secularized beginning in 1834 and the land was transferred as "grants" to Californians who were citizens of Mexico. The "grants" were called ranchos, and many of the ranchos in Riverside County have lent their names to modern-day locales - Jurupa, San Jacinto, San Gorgonio, Temecula, and La Laguna (Lake Elsinore). The first land grant in what is now Riverside County, Rancho Jurupa, was given to Juan Bandini in 1838.

With the advent of the transcontinental railroad in 1869, land speculators, developers, and colonists came to Southern California. The first colony in what would become Riverside County was Riverside itself. Judge John Wesley North brought a group of associates and co-investors out to Southern California, and founded Riverside on part of the Jurupa Rancho.

By the late 1880's and early 1890's, there was growing discontent between Riverside and San Bernardino, its neighbor 10 miles to the north. There were many differences between the two towns. San Bernardino was predominantly Democratic in nature, allowed saloons, and had been a hot-bed of secessionist sympathy during the Civil War. Riverside was temperance minded (few saloons if any were allowed in Riverside proper) and Republican. After a series of charges about unfair use of tax monies to the benefit

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of the City of San Bernardino only, several people from Riverside decided to investigate the possibility of a new county. Joined by San Diego County residents in the Temecula and San Jacinto Valleys and the desert region who were tired of living so far from their county seat, they petitioned the State legislature, held an election, and on May 9, 1893 the County of Riverside officially formed.

The County's early years were linked to the agriculture industry. The navel orange tree was planted and found to be such a success that full-scale planting started. By the time of Riverside County's formation, Riverside had grown to become the wealthiest city per capita in the country, due to the riches of the navel orange.

Further residential developments in Riverside County included Banning and Beaumont in the San Gorgonio Pass; Hemet south of San Jacinto; Moreno Valley east of Riverside; Perris, Lake Elsinore, Murrieta and Temecula along the California Southern Railroad; Palm Springs, Palm Desert, Indio and Coachella along the Southern Pacific route to Yuma; and Blythe on the Colorado River.

The last 35 years have brought dramatic population growth to Riverside County. Between 1980 and 1990, the number of residents grew by over 76% making Riverside the fastest-growing County in California. By 1992, the County was "home" to over 1.3 million residents. The County experienced a growth rate of 7.8 percent from 2010-2015.

The U.S. Census Bureau 2016 estimates show that the County has nearly doubled its population in the last 25 years with the current population at 2.4 million residence. The County population is now larger than that of 16 states, among them, Alaska, Hawaii, Maine, New Mexico, and West Virginia.

2.2 Geography and Climate

Riverside County is the fourth largest county in the State of California, stretching nearly 200 miles west to east and comprising over 7,200 square miles of fertile river valleys, low deserts, mountains, foothills, and rolling plains. Riverside County shares borders with densely populated Orange, San Diego, San Bernardino and Imperial Counties. The County extends from within 14 miles of the Pacific Ocean, as the crow flies, to the Colorado River and La Paz County, Arizona.

Geographically

Riverside County is mostly desert in the central and eastern portions of the county, and has a Mediterranean climate in the western portion of the County. The County lies inland of Los Angeles County and is bordered by Orange County to the west, San Bernardino County to the north, and San Diego County and Imperial County to the south.

Riverside County extends from the Santa Ana River at the eastern end of the Los Angeles basin, eastward to the Colorado River. It includes the desert regions of the Coachella Valley and Palm Springs, as well as the San Jacinto, Little San Bernardino and Santa Rosa mountains. It contains portions of Anza-Borrego Desert State Park and Salton Sea State Recreation Area, as well as most of Joshua Tree National Park. Riverside County has five nationally protected areas: the Cleveland National Forest, Coachella Valley National Wildlife Refuge, and Joshua Tree National Park, a portion of the San Bernardino National Forest and the Santa Rosa and San Jacinto Mountains National Monument. The county has visitors all year round because of the varied climates and ability to visit mountains and deserts all in one day.

The county has a total area of 7,303.13 square miles (18,915.0 km2), of which 7,207.37 square miles (18,667.0 km2) (or 98.69%) is land and 95.76 square miles (248.0 km2) (or 1.31%) is water. At roughly 180 miles (290 km) wide in the east-west dimension, the area of the county is massive. Riverside County is roughly the size of the State of New Jersey in total area. The Colorado River town of Blythe is a three-hour drive from the county seat, Riverside.

There are at least three geomorphic provinces: the Inland Empire western portion, the Santa Rosa Mountains communities and the desert region. Other possible subdivisions include tribal lands, the Colorado River communities, and the Salton Sea. The Inland Empire area of southern California is made up of the western portion of Riverside County.

Geographically from east to west, Riverside County is mostly desert, with high heat in the summer and comfortable weather in the winter. Most of Joshua Tree National Park is located in the eastern part of the county. Elevations range from 11,499 feet (3,505 m) at the top of the San Gorgonio Mountain to 220 ft. (-67.1 m) below sea level at the Salton Sea. As you move towards the west, the San Jacinto Mountains separate the desert from the valleys. The summit of Mount San Jacinto stands 10,834 feet above sea level, and the San Jacinto Mountains are the second highest mountain range in Southern California. The Santa Ana River travels from Mt. San Gorgonio for nearly 100 miles (160 km) through San Bernardino, Riverside, and Orange counties before it eventually spills into the Pacific Ocean at Newport Beach and Huntington Beach. The western portion of the county has a Mediterranean climate and is the most densely populated area. The Santa Rosa Mountains, as well as the Southern California portion of the Sonoran Desert, physically divide Riverside County from San Diego County.

Riverside County is home to a variety of endangered and protected species. Skillful planning and negotiation have resulted in the creation of several large habitat preserves, and the development of a multi-species habitat protection plan (MSHCP) for the western County area. The Plan protects 146 native species of plants, birds and animals and

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covers 1.26 million acres. The County is also participating in a MSHCP with the Coachella Valley Association of Governments in the Coachella Valley and surrounding mountains.

Famous resort cities of the Coachella Valley such as Indian Wells, La Quinta, Rancho Mirage, Palm Springs and Palm Desert are located in Riverside County. Riverside County is also home to many famous concerts and tournaments. The Coachella Valley Music and Arts Festival is a two weekend event that attracts 198 thousand attendees and affects the local economy by over 84 million dollars a year. Stagecoach is a country music festival that attracts about 190 thousand over a three day period. The BNP Paribas Open is the largest professional combined ATP and WTA tennis tournament in the world. It houses 96 single players and 32 teams within the two stadiums.

Another factor that brings people into Riverside County is the agriculture. There is an influx of farm workers according to the crop. Indio is the center of an important date growing region.

In the Desert areas, there is an increase in population during the winter by “Snow Birds”. Many of the desert visitors are elderly or retired, and may have Access and Functional Needs requirements. The term snowbird is used to describe people from the U.S. Northeast, U.S. Midwest, or Canada who spend a large portion of winter in warmer locales such as California, Arizona, Florida, Texas, the Carolinas, or elsewhere along the Sun Belt region of the southern and southwest United States, Mexico, and areas of the Caribbean.

Snowbirds are typically retirees, and business owners who have a second home in a warmer location or whose business can be easily moved from place to place, such as flea market and swap meet vendors. Some snowbirds carry their homes with them, as campers (mounted on bus or truck frames) or as boats following the east coast Intracoastal water-way.

Climate

On average, there are 272 sunny days per year in Riverside County. The County average July high is around 95 degrees and the January low is 43. Riverside County has on average 10 inches of rain per year. The US average is 37. Riverside County average snowfall is one (1) inch. The average US city gets 25 inches of snow per year. The number of days with any measurable precipitation is 30.

Figure 1: Riverside County Climate

Climate	Riverside, CA	United States
Rainfall (in.)	10.3	36.5
Snowfall (in.)	0.003	25
Precipitation Days	20	100
Sunny Days	277	205
Avg. High	92.8	86.5
Avg. Low	41.6	20.5
UV Index	5.7	4.3
Elevation ft.	1,231	1,060

*Chart is current as of December 2016

The information regarding the averages of the county does not accurately reflect the drastic differences in climate between the East and West portions of the county. The East County climate is a hot desert atmosphere. It faces average highs in the summer months that reach into the 100's. The West County however, stays closer to the low 90's. The following charts represent the two sides of the county:

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Figure 2: East County Average Annual Temperature

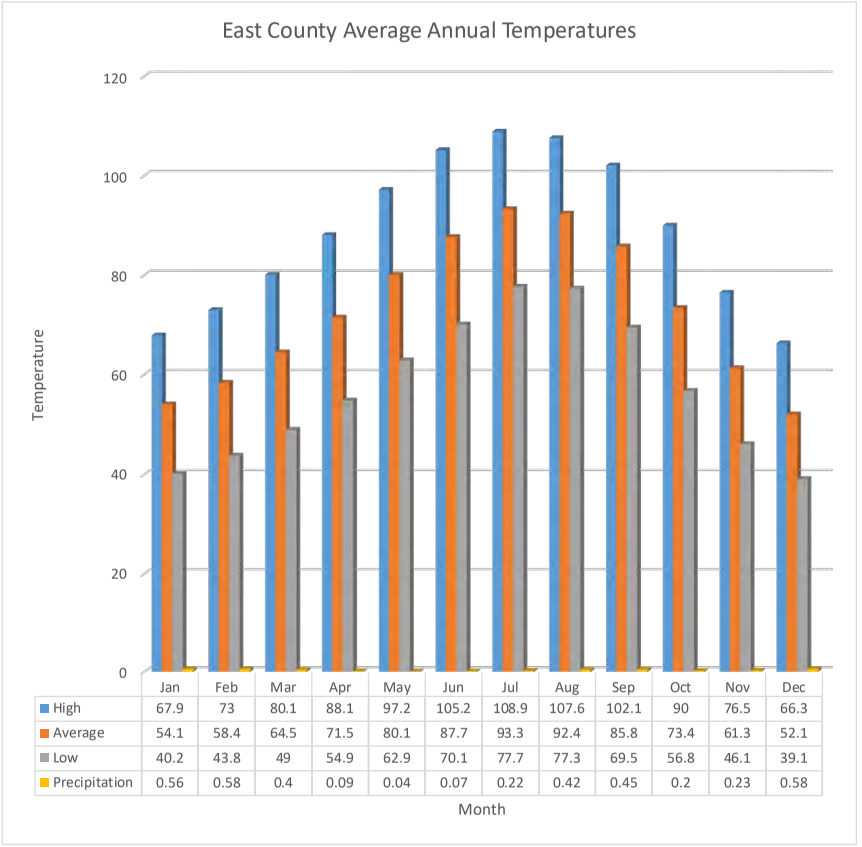
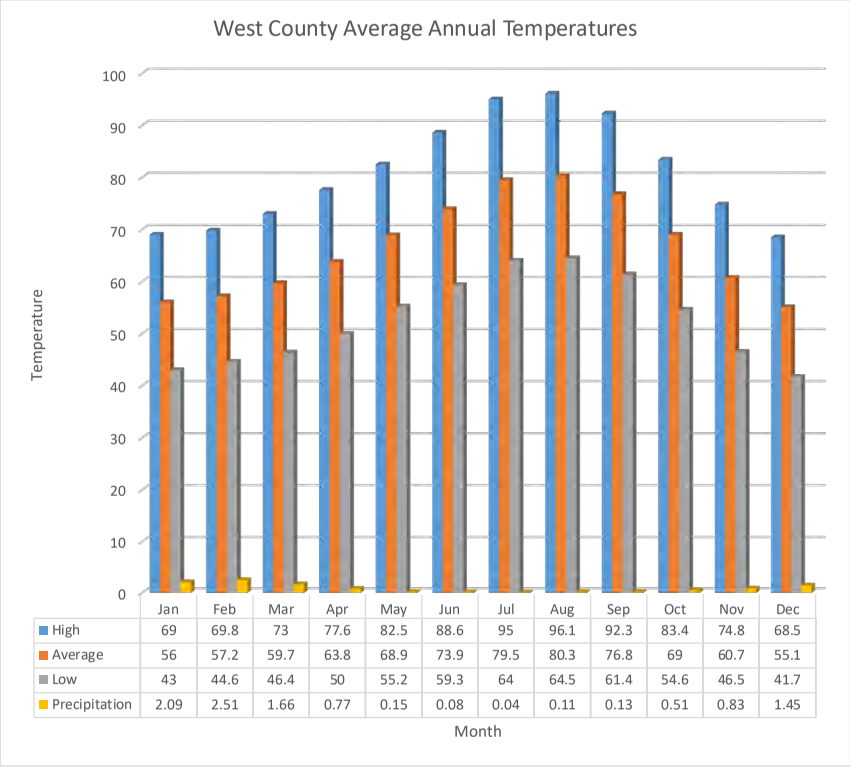


Figure 3: West County Average Annual Temperature



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High	69	69.8	73	77.6	82.5	88.6	95	96.1	92.3	83.4	74.8	68.5
Average	56	57.2	59.7	63.8	68.9	73.9	79.5	80.3	76.8	69	60.7	55.1
Low	43	44.6	46.4	50	55.2	59.3	64	64.5	61.4	54.6	46.5	41.7
Precipitation	2.09	2.51	1.66	0.77	0.15	0.08	0.04	0.11	0.13	0.51	0.83	1.45

*Charts are based on the most current information gathered from NOAA as of May 2017
Source:
http://www.bestplaces.net/climate/city/california/riverside
https://www.ncdc.noaa.gov/cdo-web/datatools/normals

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2.3 Population Trends

Population growth in Riverside County has been quite rapid over the past two decades as can be seen in Figure 3 on the next page. According to the California Department of Finance, the population grew from approximately 1.2 million 1990 to nearly 2.3 million as of January 1, 2016. During this period, the county's population nearly doubled, making it one of the fastest growing counties in California.

Figure 4: Unincorporated Area Population

RIVERSIDE COUNTY

7,295.6 sq.miles — Incorporated in 1893

POPULATION CHARACTERISTICS

Population

1970	459,074 (*1)
1980	663,166 (*1)
1990	1,170,413 (*1)
1995	1,365,500 (*2)
1996	1,391,800 (*2)
1997	1,420,600 (*2)
1998	1,451,400 (*2)
1999	1,490,500 (*2)
2000	1,545,387 (*1)
2001	1,589,708 (*2)
2002	1,655,291 (*2)
2003	1,730,219 (*2)
2004	1,814,485 (*2)
2005	1,895,695 (*2)
2006	1,975,913 (*2)
2007	2,049,902 (*2)
2008	2,102,741 (*2)
2009	2,140,626 (*2)
2010	2,189,641 (*1)
2011	2,205,731 (*2)
2012	2,227,577 (*2)
2013	2,255,059 (*2)

Projections

2020	2,595,259 (*3)
2035	3,354,958 (*3)

2013 Racial & Ethnic Population (*4)

	Number	Percent
White	904,279	40.1%
African American	135,304	6.0%
Asian	130,793	5.8%
Amer Indian/Alaska Native	11,275	0.5%
Hawaiian and Pac Islander	6,765	0.3%
Some Other Races	6,765	0.3%
Two or More Races	45,101	2.0%
Hispanic*	1,014,777	45.0%
Total	2,255,059	100.0%

* Hispanic can be of any race

Vital Statistics (*5)

Year	Total Births	Birth Rate*	Total Death	Death Rate*
2009	31,512	14.7	13,747	6.4
2010	29,417	11.2	13,971	6.3
2011	30,609	13.9	14,638	6.6
2012	30,427	13.6	14,739	6.6

* Rates per 1,000 population

2013 Voter Registration (*6)

	Number	Percent
Democrat	340,932	35.9%
Republican	377,774	41.7%
Other	45,466	4.6%
No Party Preference	169,784	17.7%
Total Registered	933,956	100.0%

2013 Population by Age (*4)

	Number	Percent
< 5	170,643	7.6%
5-9	172,958	7.7%
10-14	184,825	8.2%
15-19	191,278	8.5%
20-24	157,741	7.0%
25-34	291,743	12.9%
35-44	308,615	13.7%
45-54	298,117	13.2%
55-59	116,524	5.2%
60-64	98,312	4.4%
65-74	142,726	6.3%
75-84	90,836	4.0%
85+	30,740	1.4%
Total	2,255,059	100.0%
Median Age:		33.5

2013 Population by Sex (*4)

	Number	Percent
Male	1,123,019	49.8%
Female	1,132,040	50.2%
Total	2,255,059	100.0%

Sources: (*1) Decennial Census, US Census Bureau
(*2) January Estimate, CA State Department of Finance
(*3) Riverside County Projections 2010 (RCP10)
(*4) American Community Survey 2007-2011 5-Year Estimates and CA State Department of Finance
(*5) Riverside County Department of Public Health
(*6) California Secretary of State, February 2013
Note: Totals might not add up due to rounding.

*Chart was developed by Riverside County GIS in 2013 and is the most current information available

Source:
http://gis.rivcoit.org/Portals/0/Documents/rcd/progress_reports/pr_2013/riverside_county.pdf

Figure 5: Historical Population Estimates for Riverside County Cities

RIVERSIDE COUNTY CENTER FOR DEMOGRAPHICS

Riverside County Economic Development Agency
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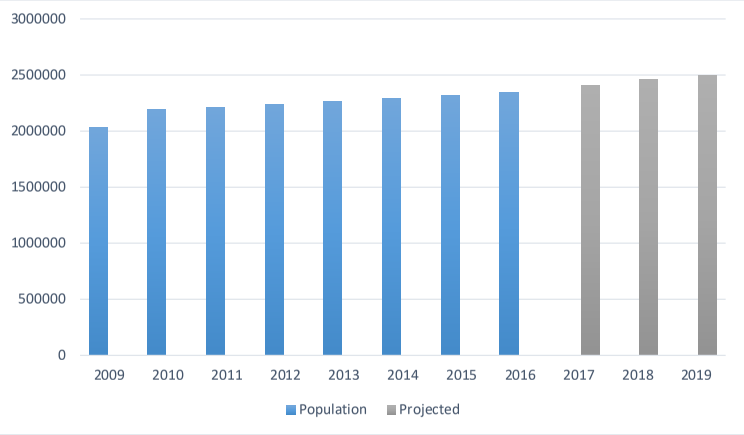
RIVERSIDE COUNTY
Historical Population Estimates, with 2010 Census Counts

City	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Banning	29,603	29,818	30,133	30,332	30,483	30,659	30,834			
Beaumont	36,877	38,201	39,359	40,666	41,864	43,601	45,118			
Blythe	20,817	20,121	20,570	19,894	19,305	19,254	19,813			
Calimesa	7,879	7,923	7,956	7,932	8,040	8,138	8,289			
Canyon Lake	10,561	10,623	10,629	10,543	10,564	10,608	10,681			
Cathedral City	51,200	51,604	52,485	53,163	53,480	53,859	54,261			
Coachella	40,704	41,517	42,426	43,676	44,614	45,001	45,407			
Corona	152,374	153,665	156,178	159,469	162,000	163,317	164,659			
Desert Hot Springs	25,938	27,393	27,973	28,385	28,605	28,794	29,048			
Eastvale	*	54,263	55,881	57,458	59,375	60,825	63,162			
Hemet	78,657	79,412	79,489	78,842	79,176	79,548	80,070			
Indian Wells	4,958	5,012	5,103	5,199	5,265	5,336	5,412			
Indio	76,036	77,168	79,185	83,450	84,655	86,683	88,058			
Jurupa Valley	*	*	95,970	95,731	96,025	96,898	98,177			
Lake Elsinore	51,821	52,484	53,457	56,039	57,368	59,142	61,006			
La Quinta	37,467	37,784	38,100	38,156	38,720	39,311	39,977			
Menifee	77,519	79,472	81,540	83,885	85,455	87,286	89,004			
Moreno Valley	193,365	195,200	198,353	200,889	202,191	203,696	205,383			
Murrieta	103,466	104,636	107,214	110,183	111,226	112,576	113,795			
Norco	27,063	27,062	27,314	27,048	27,037	26,392	26,896			
Palm Desert	48,445	48,957	48,924	48,282	48,494	48,835	49,335			
Palm Springs	44,552	44,943	45,326	45,465	45,818	46,204	46,654			
Perris	68,386	69,693	70,307	70,700	71,743	72,476	73,722			
Rancho Mirage	17,218	17,454	17,583	17,685	17,783	17,920	18,070			
Riverside	303,871	307,207	311,332	316,162	318,511	321,655	324,696			
San Jacinto	44,199	44,616	45,385	46,216	46,649	47,087	47,656			
Temecula	100,097	101,507	103,133	104,145	105,368	107,794	109,064			
Wildomar	32,176	32,543	33,050	33,685	34,271	34,758	35,168			
Incorporated	1,685,249	1,760,278	1,884,355	1,913,280	1,934,085	1,957,653	1,983,415			
Unincorporated	504,392	452,596	355,360	353,269	357,008	360,271	364,413			
County Total	2,189,641	2,212,874	2,239,715	2,266,549	2,291,093	2,317,924	2,347,828			

Source: California Department of Finance

*Current as of May 2017

Figure 6: Riverside County Population Growth - 2009 – 2019



Source: Riverside County Center for Demographics 2017

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Table 3 below displays Riverside County's population change and the components of this population change from 1971 through a projection of 2020. Net migration (in-migration minus out-migration) has accounted for the majority of the of the population growth for Riverside County for the past four (4) decades.

Population growth has slowed in recent years, but remained relatively high in 2016 at roughly 1.3 percent. Migration continues to be positive in the County, though at slower rates than early in the decade. Population growth will accelerate over the forecast, but does not approach the previous peak levels.

Table 3: Riverside County Population Change (1971-2020)

RIVERSIDE COUNTY

AVERAGE ANNUAL COMPONENTS OF POPULATION CHANGE

YEAR 1971 - 2010

Years	Change	Births	Deaths	Natural Increase	Net Migration	Net Migration % of Change
1971-75	14580	7602	4960	2642	11938	82%
1976-80	27060	9657	5844	3812	23248	86%
1981-85	33320	13436	7001	6435	26885	81%
1986-90	70380	19310	8691	10679	59761	85%
1991-95	38108	25154	10205	14949	23159	61%
1996-00	36055	23597	11538	12060	23995	67%
2001-05	72862	27475	13088	14387	58475	80%
2006-10	47529	32969	14145	18824	28705	60%
2011-15	23460	30538	15777	14761	22530	96%
2016-20	31471	30303	16474	13829	24883	79%

Source: CA Department of Finance 2016

2.4 Economy

California Department of Transportation Long-Term Social-Economic Forecast: Riverside

Riverside County is the fourth largest county in California in terms of total land area. Riverside County has a population of 2.3 million people and a total of 649,700 wage and salary jobs. The income per capita is $35,495, and the average salary per worker is $52,144.

In 2015, total employment increased by 2.6 percent across Southern California. Riverside County added a total of 27,200 jobs, representing a growth rate of 4.4 percent. The unemployment rate improved rapidly, falling from 8.3 percent in 2014 to 6.7 percent in 2015.

In 2015, job growth was strongest in construction (+4,600 jobs), education and healthcare (+4,500 jobs), leisure and hospitality (+3,800 jobs), and transportation and warehousing (+3,300 jobs). Job losses were not observed in any major sector.

Over the past five years, the population has increased at an average annual rate of 1.2 percent. A substantial portion of this growth was the result of net migration, as an average of 12,200 each year.

Forecast Highlights

- In 2016, total wage and salary employment will increase by 3.0 percent. From 2016 to 2021, total employment will grow at an annual average rate of 1.6 percent.
- Average salaries are currently below the California state average, and will remain so over the foreseeable future. In Riverside County, inflation-adjusted salaries are forecasted to rise by an average of 1.0 percent per year between 2016 and 2021.
- From 2016 to 2021, employment growth will be broad-based, as most sectors will increase by at least 1.5 percent per year. The strongest growth will be observed in education and healthcare, retail trade, and professional services. Combined, these industries will account for 54 percent of net job growth.
- The population is expected to increase by 1.3 percent in 2016. Annual growth in the 2016-2021 period is expected to average 1.5 percent.
- Net migration will gradually increase. An average of 24,883 net migrants are projected to enter the county each year between 2016 and 2021.

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- Real per capita income is expected to rise by 2.0 percent in 2016, and increase by an average of 0.9 percent per year between 2016 and 2021.
- Total taxable sales are projected to increase by an average of 2.6 percent per year over the next five years.
- Industrial production will rise by 3.3 percent in 2016. From 2016 to 2021, the growth rate of industrial production is expected to average 2.5 percent per year.

Source: http://www.dot.ca.gov/hq/tpp/offices/eab/index_files/2016/Riverside2016.pdf

Figure 7: Riverside County Economic and Labor Force Characteristics

RIVERSIDE COUNTY

ECONOMIC AND LABOR FORCE CHARACTERISTICS

Labor Force Participation (*1)

Year	Labor Force	Employed	Unemployed	Unemployment Rate
2007	903,800	849,400	54,300	6.0%
2008	912,100	834,700	77,400	8.5%
2009	916,600	793,600	123,000	13.4%
2010	913,800	779,500	134,300	14.7%
2011	938,400	810,600	127,800	13.6%
2012	937,300	824,500	112,700	12.0%
2013*	944,500	828,800	115,600	12.2%

* Preliminary August 2013

Employment/Jobs Projections (*3)

2020	927,300
2035	1,285,284

* Jobs within county

2011 Employment/Jobs by Industry Sector (*2)

Agriculture, Forestry, Fishing and Hunting	13,783
Mining, Quarrying, and Oil and Gas Extraction	405
Utilities	4,488
Construction	33,602
Manufacturing	39,733
Wholesale Trade	22,625
Retail Trade	82,169
Transportation and Warehousing	20,453
Information	7,105
Finance and Insurance	10,944
Real Estate and Rental and Leasing	7,613
Professional, Scientific, and Technical Services	18,789
Management of Companies and Enterprises	2,937
Administration & Support, Waste Mngt and Remediation	35,130
Educational Services	67,761
Health Care and Social Assistance	61,087
Arts, Entertainment, and Recreation	19,543
Accommodation and Food Services	68,997
Other Services (excluding Public Administration)	29,384
Public Administration	34,922
Total All Jobs	**581,470**

*Jobs within county

Median Household Income

2000	$ 42,887 (*4)
2011	$ 58,365 (*5)

Taxable Sales in 1,000s of Dollars (*6)

Year	Total
2003	$21,709,135
2004	$25,237,148
2005	$28,256,491
2006	$29,816,237
2007	$29,023,609
2008	$26,003,595
2009	$22,227,877
2010	$23,152,780
2011	$25,641,497

Sources: (*1) CA Employment Development Department (County residents working anywhere. Data are not seasonally adjusted)
(*2) U.S. Census Bureau Local Employment Dynamics
(*3) Riverside County Projections 2010 (RCP10)
(*4) Decennial Census, US Census Bureau (in 1999 inflation-adjusted dollars)
(*5) 2007-2011 American Community Survey 5-Year Estimates (in 2011 inflation-adjusted dollars)
(*6) State Board of Equalization
Note: Totals might not add up due to rounding.

*Chart was developed by Riverside County GIS in 2013 and is the most current information available
Source:
http://gis.rivcoit.org/Portals/0/Documents/rcd/progress_reports/pr_2013/riverside_county.pdf

Figure 8: Annual Labor Force and Employment Averages

Riverside County Economic Development Agency
P.O. Box 1180 * Riverside, CA 92502 * (951) 955-8916

ANNUAL LABOR FORCE AND EMPLOYMENT AVERAGES
County of Riverside

Year	Civilian Labor Force	Employment	Unemployment Number	Unemployment Percent
1999	691,500	653,600	37,900	5.5
2000	680,700	644,200	36,500	5.4
2001	711,100	672,000	39,100	5.5
2002	750,400	701,800	48,600	6.5
2003	781,700	730,700	51,100	6.5
2004	820,900	771,600	49,300	6
2005	854,300	808,100	46,100	5.4
2006	886,300	841,700	44,600	5
2007	907,400	852,900	54,500	6.0
2008	916,700	838,800	77,900	8.5
2009	916,600	793,600	123,000	13.4
2010	913,400	779,100	134,300	14.7
2011	938,400	810,600	127,800	13.6
2012	944,500	828,800	115,600	12.2
2013	953,200	855,300	97,900	10.3
2014	1,011,500	928,200	83,400	8.2
2015	1,035,200	965,500	69,600	6.7
2016	1,047,800	983,800	64,000	6.1

2016 Monthly Labor Force and Employment Data **
County of Riverside

Month	Civilian Labor Force	Employment	Unemployment Number	Unemployment Percent
January	1,041,000	979,400	61,600	5.9
February	1,041,100	979,600	61,400	5.9
March	1,041,400	980,000	61,400	5.9
April	1,036,500	977,300	59,300	5.7
May	1,033,500	978,000	55,500	5.4
June	1,044,300	974,500	69,800	6.7
July	1,049,600	974,600	75,000	7.1
August	1,050,500	978,300	72,200	6.9
September	1,053,800	985,800	68,000	6.5
October	1,059,800	993,200	66,600	6.3
November	1,062,500	1,002,300	60,200	5.7
December*	1,059,400	1,002,900	56,500	5.3

* Preliminary data

** Labor force data for all geographic areas now reflect the March 2012 benchmark and Census 2010 population controls at the state level.

Source: State of California Employment Development Department.

https://www.rivcoeda.org/LinkClick.aspx?fileticket=POJLaM6rSMQ%3d&tabid=1110

Figure 9: County of Riverside Major Employers

Riverside County Economic Development Agency
P.O. Box 1180 * Riverside, CA 92502 * (951) 955-8916

Major Employers
County of Riverside

Employer	Number of Employees	Location	Description
County of Riverside	21,984	Countywide	County Government
March Air Reserve Base	8,500	March ARB	Military Reserve Base
University of California, Riverside	8,306	Riverside	University
Amazon	7,500	Moreno Valley	E-retalier
Stater Bros. Markets	6,900	Countywide	Supermarkets
Kaiser Permanente Riverside Medical Center	5,300	Riverside	Hospital
Corona-Norco Unified School District	5,098	Corona	School District
Desert Sands Unified School District	4,202	La Quinta	School District
Riverside Unified School District	3,973	Riverside	School District
Pechanga Resort & Casino	3,931	Temecula	Resort Casino
Riverside University Health System - Medical Center	3,600	Moreno Valley	Hospital
Hemet Unified School District	3,468	Hemet	School District
Moreno Valley Unified School District	3,454	Moreno Valley	School District
Eisenhower Medical Center	3,365	Rancho Mirage	Hospital
Morongo Casino, Resort & Spa	3,359	Cabazon	Resort Casino
Temecula Valley Unified School District	2,951	Temecula	School District
Lake Elsinore Unified School District	2,539	Lake Elsinore	School District
City of Riverside	2,500	Riverside	City Government
JW Marriott Desert Springs Resort & Spa	2,304	Palm Desert	Resort & Spa
Palm Springs Unified School District	2,243	Palm Springs	School District
Coachella Valley Unified School District	2,209	Thermal	School District
Agua Caliente Band of Cahuilla Indians	2,152	Palm Springs	Tribal Government/Casinos
Jurupa Unified School District	2,144	Jurupa Valley	School District
Murrieta Valley Unified School District	2,128	Murrieta	School District
Alvord Unified School District	2,113	Riverside	School District
Riverside Community Hospital	2,017	Riverside	Hospital
Abbot Vascular	2,000	Temecula	Medical & Surgical Instruments Manufacturer
Riverside Community College District	1,965	Riverside	Community College District
Desert Regional Medical Center	1,906	Palm Springs	Hospital
Riverside County Office of Education	1,555	Riverside	Education
Naval Surface Warfare Center	1,450	Norco	Naval Weapons Research
Parkview Community Hospital Medical Center	1,439	Riverside	Hospital
Professional Hospital Supply	1,300	Temecula	Medical & Surgical Supplies Distributor
La Quinta Resort & Club	1,233	La Quinta	Resort
Ironwood State Prison	1,150	Blythe	Level I & III Prison
California Rehabilitation Center	1,139	Norco	Level II Prison
Fantasy Springs Resort Casino	1,100	Indio	Resort Casino
Corona Regional Medical Center	1,059	Corona	Hospital
Mt. San Jacinto College	1,016	San Jacinto	Community College District

Source: Employers Listed, Websites & Public Records, 2015

Figure 10: Employment Growth Projections

Industry sector	Thousands of jobs			Change		Percent distribution			Annual rate of change	
	2002	2012	2022	2002–2012	2012–2022	2002	2012	2022	2002–2012	2012–2022
Total[1]	142,294.9	145,355.8	160,983.7	3,060.9	15,627.9	100.0	100.0	100.0	0.2	1.0
Nonagriculture wage and salary[2]	131,028.3	134,427.6	149,751.3	3,399.3	15,323.7	92.1	92.5	93.0	.3	1.1
Goods producing, excluding agriculture	22,486.7	18,360.3	19,554.2	–4,126.4	1,193.9	15.8	12.6	12.1	–2.0	.6
Mining	512.3	800.5	921.7	288.2	121.2	.4	.6	.6	4.6	1.4
Construction	6,715.7	5,640.9	7,263.0	–1,074.8	1,622.1	4.7	3.9	4.5	–1.7	2.6
Manufacturing	15,258.7	11,918.9	11,369.4	–3,339.8	–549.5	10.7	8.2	7.1	–2.4	–.5
Service providing	108,541.6	116,067.3	130,197.1	7,525.7	14,129.8	76.3	79.9	80.9	.7	1.2
Utilities	596.3	554.2	497.8	–42.1	–56.4	.4	.4	.3	–.7	–1.1
Wholesale trade	5,652.4	5,672.8	6,143.2	20.4	470.4	4.0	3.9	3.8	.0	.8
Retail trade	15,025.1	14,875.3	15,966.2	–149.8	1,090.9	10.6	10.2	9.9	–.1	.7
Transportation and warehousing	4,223.8	4,414.7	4,742.0	190.9	327.3	3.0	3.0	2.9	.4	.7
Information	3,394.6	2,677.6	2,612.4	–717.0	–65.2	2.4	1.8	1.6	–2.3	–.2
Financial activities	7,847.1	7,786.3	8,537.3	–60.8	751.0	5.5	5.4	5.3	–.1	.9
Professional and business services	15,976.2	17,930.2	21,413.0	1,954.0	3,482.8	11.2	12.3	13.3	1.2	1.8
Educational services	2,642.8	3,346.9	4,022.2	704.1	675.3	1.9	2.3	2.5	2.4	1.9
Health care and social assistance	13,555.6	16,971.8	21,965.9	3,416.2	4,994.1	9.5	11.7	13.6	2.3	2.6
Leisure and hospitality	11,986.0	13,745.8	15,035.0	1,759.8	1,289.2	8.4	9.5	9.3	1.4	.9
Other services	6,129.0	6,174.5	6,823.4	45.5	648.9	4.3	4.2	4.2	.1	1.0
Federal government	2,766.0	2,814.0	2,406.5	48.0	–407.5	1.9	1.9	1.5	.2	–1.6
State and local government	18,746.7	19,103.2	20,032.2	356.5	929.0	13.2	13.1	12.4	.2	.5
Agriculture, forestry, fishing, and hunting[3]	2,245.4	2,112.7	1,889.2	–132.7	–223.5	1.6	1.5	1.2	–.6	–1.1
Agriculture wage and salary	1,217.4	1,306.9	1,281.8	89.5	–25.1	.9	.9	.8	.7	–.2
Agriculture self-employed and unpaid family workers	1,028.0	805.8	607.4	–222.2	–198.4	.7	.6	.4	–2.4	–2.8
Nonagriculture self-employed and unpaid family workers	9,021.2	8,815.5	9,343.2	–205.7	527.7	6.3	6.1	5.8	–.2	.6

Source: U.S. Bureau of Labor Statistics, Employment Projections Program.

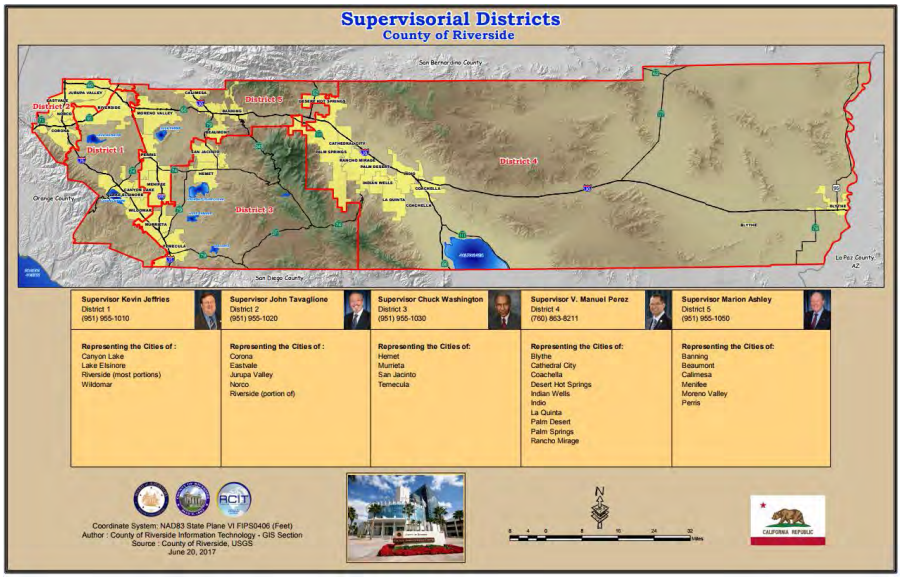
Governing Body

Riverside County is governed by a five-member Board of Supervisors. By law, Supervisorial district boundaries are adjusted every ten years based on population changes reported by the U.S. Census Bureau. Map 1 outlines the current Supervisorial Districts.

In 2016, the population by districts is the following:

- District 1 (Kevin Jeffries): 458,407
- District 2 (John Tavaglione): 458,372
- District 3 (Chuck Washington): 477,763
- District 4 (Manuel Perez): 467,430
- District 5 (Marion Ashley): 480,820

Map 1: Riverside County Supervisor Districts



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2.5 Land Use and Development Trends

Existing land use within Riverside County is a mosaic of varying types of uses, ownership, character, and intensity. Uses include:

- Rural residential
- Single family detached
- Single family attached
- High-density residential (apartments)
- Mobile homes
- Recreational open space
- Other open space
- Heavy industrial
- Warehouse
- Vacant
- Agriculture
- Water
- Utilities
- Public facilities
- Schools
- Retail / Office
- Tourism / Commercial recreation
- Light industrial /Business Park
- Mineral extraction

While population growth continues, so does the need for further development. There are Land Use policies and elements within the Riverside County General Plan to help assure orderly development.

In addition, the Local Agency Formation Commission (LAFCO) of Riverside County is tasked with the mission to provide an orderly pattern of growth that reconciles the varied needs of the County. One of the fundamental principles of LAFCO is to ensure the

establishment of an appropriate and logical municipal government structure for the distribution of efficient and appropriate public services.

LAFCO Land Use Objectives include:

- Discouragement of urban sprawl;
- Preservation of the physical and economic integrity of agricultural lands;
- Preservation of open space within urban development patterns;
- Orderly formation and development of agencies by shaping local agency boundaries;
- Minimization of agencies providing services to a given area; and
- Utilization of Spheres of Influence to guide future development of agency boundaries.

Examples of development in Riverside County are:

Keller Crossing was approved on October 9, 2013. This "Green Concept" environment set to create a mixed-use pedestrian-friendly community that is based on sustainability. This 200-acre property is located in western Riverside County, near Murrieta.

Completed in July 2013, Temecula added a new hospital with in its city limits to accommodate the needs of its residents. The medical facility sits on a 35-acre parcel and holds a total of 320 beds.

Belle Terre is a 342.3- acre residential community located in Riverside's French Valley. This development proposed a community of up to 1,282 homes. The Zoning Ordinance was approved on December 1, 2014.

The Wine Country on the outskirts of Temecula is continuing to see a lot of development activity. Recognizing this, the Board of Supervisors adopted the Wine Country Community Plan in 2014, which consisted of revisions to the County General Plan, new design guidelines, and new zone classifications. The area has been classified as a Wine County Zone with the purpose of encourage agricultural cultivation, vineyards, wineries, equestrian uses, preserve the wine-making atmosphere, estate living, equestrian life-style and protect this area and its residents from incompatible uses which could result in reduced agricultural productivity and increased urbanization within the policy area.

The Cabazon Outlet Mall in has expanded to add an additional 50 stores, an increase of 30%. The expansion was completed in 2014 and it included: 50 new retail stores, a 1,100 parking space structure, wider walkways and improved landscaping. The Cabazon Outlet

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Mall is now a 650,000 square foot complex with a total of 180 stores, making it one of the largest outlet centers in the state.

In February 2015, the Colina del Oro housing plan was initiated and approved by Riverside County Local Agency Formation Commission (LAFCO). It is a master-planned community consisting of both single and multi-family residential units. Within the community an array of recreational facilities would be built such as a community park, community center, trails, and an open space park. 490 dwellings were planned within the 11.4 acre community.

A new Kaiser Permanente health care facility is expected to open in 2023 in Murrieta. The plan is set to develop a 37-acre parcel of land. A press release from Kaiser Permanente, dated April 29, 2016, stated that they have broken ground for the new medical center.

Figure 11: Housing and Household Characteristics

RIVERSIDE COUNTY

HOUSING & HOUSEHOLD CHARACTERISTICS

Housing Units

1970	169,757	(*1)
1980	295,069	(*1)
1990	483,847	(*1)
2000	584,674	(*1)
2001	595,606	(*2)
2002	613,338	(*2)
2003	633,749	(*2)
2004	659,388	(*2)
2005	689,340	(*2)
2006	721,699	(*2)
2007	753,286	(*2)
2008	772,480	(*2)
2009	779,077	(*2)
2010	800,707	(*1)
2011	804,913	(*2)
2012	807,970	(*2)
2013	812,234	(*2)
Projections		
2020	955,853	(*3)
2035	1,228,188	(*3)

Housing Units by Type

	2010 (*1)	Percent	2013 (*2)	Percent
Single Detached	543,209	67.8%	551,857	67.9%
Single Attached	50,784	6.3%	51,041	6.3%
Multi-Family: 2 to 4	38,409	4.8%	38,530	4.7%
Multi-Family: 5 Plus	89,577	11.2%	91,784	11.3%
Mobile Homes	78,728	9.8%	79,022	9.7%
Total Units	800,707	100.0%	812,234	100.0%
Occupancy	686,260	85.7%	696,290	85.7%
Vacancy	114,447	14.3%	115,944	14.3%

Median Home Price (*4)

2002	$202,914
2003	$248,780
2004	$331,106
2005	$400,000
2006	$420,000
2007	$395,000
2008	$260,000
2009	$190,000
2010	$200,000
2011	$195,000
2012	$210,000
2013*	$264,750

*August 2013

Persons Per Household

2000	2.98	(*1)
2010	3.14	(*1)
2013	3.19	(*2)

Housing Unit Building Permits (*5)

Year	Single-Family Structure	All Multi-Family Structure	Total Units
1995	7,378	182	7,560
1996	7,127	472	7,599
1997	8,042	938	8,980
1998	9,671	1,868	11,539
1999	11,823	1,472	13,295
2000	13,323	1,702	15,025
2001	16,778	2,234	19,012
2002	20,912	1,343	22,255
2003	25,424	4,929	30,353
2004	29,182	4,264	33,446
2005	30,350	4,023	34,373
2006	20,882	3,883	24,765
2007	9,717	2,617	12,334
2008	3,820	1,943	5,763
2009	3,406	666	4,072
2010	4,027	520	4,547
2011	2,275	989	3,264
2012	3,107	945	4,052
2013*	2,840	858	3,698

* Preliminary August 2013

Sources: (*1) Decennial Census, US Census Bureau
(*2) January Estimate, CA State Dept. of Finance.
(*3) Riverside County Projections 2010 (RCP10)
(*4) DataQuick Reports
(*5) US Department of Housing & Urban Development, State of the Cities Data Systems
Note: Totals might not add up due to rounding.

*Chart was developed by Riverside County GIS in 2013 and is the most current information available
Source:http://gis.rivcoit.org/Portals/0/Documents/rcd/progress_reports/pr_2013/riverside_county.pdf

Table 4: Housing Projections by City

Housing Units					
Jurisdiction	**2015**	**2020**	**2025**	**2030**	**2035**
Banning	14,611	17,260	20,416	23,177	25,202
Beaumont	17,267	20,787	24,276	27,982	28,958
Blythe	5,947	6,537	6,798	7,046	7,303
Calimesa	5,300	6,804	8,135	9,984	11,858
Canyon Lake	4,549	4,641	4,733	4,825	4,917
Cathedral City	23,627	25,127	26,627	28,127	29,627
Coachella	13,200	19,010	25,200	31,349	36,542
Corona	47,368	48,162	48,974	49,894	50,891
Desert Hot Springs	18,149	20,229	22,251	24,341	26,501
Hemet	45,313	50,507	55,211	60,724	66,199
Indian Wells	5,296	5,450	5,603	5,653	5,706
Indio	32,027	34,321	36,552	38,857	41,240
La Quinta	22,719	23,353	23,913	24,462	24,978
Lake Elsinore	20,833	24,141	27,240	30,092	32,663
Menifee	35,226	40,259	43,870	47,442	51,461
Moreno Valley	59,797	64,427	69,011	74,467	78,065
Murrieta	36,162	37,512	38,861	40,210	41,560
Norco	7,849	8,362	8,719	8,888	9,083
Palm Desert	35,867	37,011	37,954	39,113	40,143
Palm Springs	35,190	36,381	37,671	38,912	40,153
Perris	20,816	24,468	27,845	31,220	34,747
Rancho Mirage	13,834	14,922	16,010	17,098	18,186
Riverside	107,325	113,000	116,883	122,659	126,968
San Jacinto	21,055	26,422	30,142	32,775	35,053
Temecula	35,270	36,321	37,979	38,690	39,400
Wildomar	12,722	14,537	15,837	17,124	18,573
Unincorporated County	186,938	221,346	255,534	286,562	324,571
Riverside County Total	884,258	981,297	1,072,247	1,161,671	1,250,549

Source: Western Riverside Council of Government Council (WRCOG)

2.6 Cities of Riverside County

Riverside County has 28 cities and multiple special districts. All cities, with the exception of Moreno Valley and Menifee are participants in the 2017 LHMP. The City of Jurupa Valley is our newest city and the Planning Commission held its inaugural meeting January 23, 2012.

All of the participating cities, tribes, special districts and school districts attended the workshops, several meetings and assisted with the hazard analysis for the region. The cities and special districts cooperated during the LHMP process, sharing information and discussing the issues that impacted their areas. The discussions increased the knowledge base of all participants in regards to hazards in their areas and across Riverside County. The participants provided insight on additional hazards and concerns their jurisdictions face, but are not “disasters” and are not common across the county.

Participating jurisdictions in the Riverside County LHMP have their own governing bodies (e.g., city councils, tribal councils, water district boards, hospital boards, etc.) and upon Cal OES and FEMA approval they will formally adopt the plan via resolution through their governing body.

2.6.1 Banning

The City of Banning is a corporate city in Riverside County in the San Gorgonio Pass area of California. It is approximately twenty-three (23) square miles in area and is 30 miles east of the County seat in the City of Riverside. Banning is 80 miles east of Los Angeles, 23 miles west of Palm Springs, 25 miles north of the resort mountain community of Idyllwild, and is immediately adjacent to Beaumont to the west and the Morongo Indian Reservation to the east.

The Union Pacific Railroad and California State Highway 10 both run through the middle of the City. Smith Creek, a waterway that starts in the mountains and runs through the lower part of the valley, is close to Banning’s southern and eastern boundaries.

Banning enjoys a yearly average daily temperature of approximately 79 degrees. Average temperatures are in the high 90’s during the summer and low 40’s during the winter. The average rainfall for Banning is about 3 inches per year.

Incorporated in 1913, the City of Banning has a rich and colorful history. Initially, Banning served as a stagecoach and railroad stop between the Arizona territories and Los Angeles. Today, Banning is home to nearly 30,000 residents and features clean air, ample water supplies and the memorable and inspiring scenic vistas of Mt. San Gorgonio

and Mt. San Jacinto. Its signature community event is Stagecoach Days, an annual rodeo and parade that celebrates Banning’s Western heritage.

2.6.2 Beaumont

The City of Beaumont is located in the westernmost portion of Riverside County and is bounded by City of Calimesa and unincorporated County areas, on the north by the unincorporated County areas (Cherry Valley), on the south by unincorporated County areas and the City of San Jacinto, and on the east by the City of Banning. The City straddles the San Gorgonio Pass, the only easterly link with the greater Los Angeles Metropolitan area. Beaumont is located approximately 70 miles northeast of Los Angeles, 21 miles northeast of Riverside, and 21 miles southeast of San Bernardino. The geographic area governed by the Beaumont General Plan includes the City's corporate boundaries as the existed in 2005 and the City's established Sphere of Influence. Because there is considerable variation within the area governed by the General Plan, the larger Beaumont Planning Area has been subdivided into eight smaller planning areas: 1) Town Center Planning Area, 2) Oak Valley Planning Area, 3) North Beaumont Planning Area, 4) East Beaumont Planning Area, 5) 6th Street Corridor Planning Area, 6) Southeast Beaumont Planning Area, Southwest Planning Area, 8) West Beaumont Planning Areas.

The City of Beaumont was incorporated in November 1912. Founded at the turn of the twentieth century, Beaumont is proud of its rich history and rural charm. The town served as a welcome “stopping-off point” for early travelers making their way from the Mohave desert to Los Angeles, and later for L.A. residents eager to vacation in Palm Springs. Some, however, set down roots, drawn by the beautiful mountain vistas, clean, crisp air, and the abundance of cherry and apple orchards. Beaumont is proud of these early settlers and their families, many of whom continue to live and thrive in Beaumont.

Population- City of Beaumont is estimated to have 45,118. (2015) The City of Beaumont provided specific information regarding extreme wind events, and the public notices that are sent during a wind event.

2.6.3 Blythe

The City of Blythe is a corporate city in Riverside County in the Palo Verde Valley of California. The City of Blythe comprises approximately 16,400 acres (approximately 27 square miles) in area and is 145 miles east of the County seat, the City of Riverside. The City’s sphere of influence (SOI) surrounds the incorporated city limits and comprises approximately 12,800 acres (approximately 20 square miles). The jurisdiction sits directly adjacent to La Paz County, Arizona on its eastern boundary and Imperial County along its southern boundary. The Colorado River is a waterway that forms the eastern boundary

of the City. Regional access to the City is provided by Interstate-10 (I-10), State Highway 78 (SR-78), and State Route 95 (US 95). The Greyhound bus line also provides access to and from Blythe.

Jurisdiction's climate can be described as moderate. Temperatures and rainfall for jurisdiction are typical of that of the rest of Riverside County.

The City of Blythe is a General Law city which was incorporated in 1916. It is located 225 miles east of Los Angeles and 150 miles west of Phoenix Arizona. The Colorado River embraces the east side of the Palo Verde Valley. The City has a Council-Manager form of municipal government. The City Council appoints the City Manager who is responsible for the day to day administration of City business and the coordination of all departments. The City Council is composed of five members elected biannually to alternating four-year terms. The City of Blythe encompasses an area of approximately 26.8 square miles and is situated 265 feet above sea level. Blythe enjoys a comfortable California desert climate with winter temperatures averaging 55-75 degrees, and summer temperatures averaging 85-110 degrees. Annual rainfall is approximately 3 inches per year.

2.6.4 Calimesa

The City is located in the northwestern portion of Riverside County, between the cities of Yucaipa and Beaumont, between San Bernardino and Palm Springs. Calimesa is located in the region known as the Inland Empire, which covers all of San Bernardino and Riverside Counties and is between the foothills of the San Bernardino and San Jacinto Mountains. The city's elevation ranges between 2,300 to 3,500 feet above sea level. According to the United States Census Bureau, the city has a total area of 14.8 square miles, all of it land.

Climatic Conditions: Generally, Calimesa has an arid climate. Annual rainfall varies from ten (10) to twenty three (23) inches within the San Gorgonio Pass area of Riverside County and the City. Hot, dry Santa Ana winds are common to areas within the City. These winds constitute a contributing factor, which causes small fires originating in rural and urban development to spread quickly and create the need for an increased level of fire protection.

The City of Calimesa was incorporated on December 1, 1990, soon after the incorporation of its northern neighbor, the City of Yucaipa. Prior to its incorporation, the City of Calimesa existed as an unincorporated town that straddled the Riverside–San Bernardino County line at the location where Interstate 10 climbs the San Gorgonio Pass going eastward from Redlands, California.

Historically, Calimesa is divided from the City of Yucaipa by the Wildwood Canyon Wash; but politically, "County Line Road" divides the two towns. Much of what was originally

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known as "Calimesa" actually lies within the city boundaries of Yucaipa, including "I-Street" (Calimesa) Park, and Calimesa Elementary School. Because State of California law prohibits the incorporation or annexation of cities over county lines, the City was unable to adjoin what was considered the town of Calimesa when it finally incorporated. When Yucaipa incorporated, they included the area outside of the Yucaipa Valley on the "hilltop" or "mesa" that was traditionally known as Calimesa within its city boundaries, so as not to leave a gap of unincorporated area between the two towns. And although the two cities are in separate counties, both Yucaipa and Calimesa share same basic street grid system and addressing, including many named and alphabetical street which extend from Yucaipa well into Calimesa. The general boundary between the two cities is County Line Road, which ironically does not follow the exact county line in some places due to the alignment of Calimesa Creek, which meanders in and out of both Yucaipa and Calimesa.

The City Limits of Calimesa also extend southwest to the City of Beaumont, California. Although much less refined, the boundaries between Beaumont and Calimesa fall generally along the Southern California Edison (SCE) right-of-way that extends from the El Casco electrical sub-station facility near Moreno Valley, eastward. Near the I-10 freeway, Champions Drive is the common boundary between the two Cities. The City of Calimesa has an estimated population of 8,173.

2.6.5 Canyon Lake

The City of Canyon Lake is an incorporated city in Riverside County. It is approximately four and a half square miles in area and is 31 miles south of the County seat, the City of Riverside. The City of Canyon Lake sits directly adjacent to the City of Menifee on its eastern boundary, City of Lake Elsinore on its Western and southern boundaries. The City of Canyon Lake lies between the I-15 and I-215. Railroad Canyon Road, an arterial highway, bisects the community and provides the major connection to these freeways. The San Jacinto River, a waterway that starts in the Mountains and runs over 75 miles through the County, feeds into Canyon Lake and flows into Lake Elsinore.

The City of Canyon Lake climate in winter is rarely extreme, low temperatures almost never go below freezing. In the summer the high temperatures will hover in the high 90's but during heat waves can exceed 100 degrees. Rainfall is typical of that of the rest of Riverside County.

The City of Canyon Lake was established in March of 1968 as a relaxed private gated community offering recreational opportunities. Canyon Lake is primarily a bedroom community of mature and newer homes. As a private gated community, Canyon Lake has an equestrian center, campground, and many other amenities. The City of Canyon Lake incorporated on December 1, 1990 to become more responsive to its residents.

2.6.6 Cathedral City

The City of Cathedral City is a corporate city in Riverside County in the Coachella Valley of California. It is approximately 20 square miles in area and is 64 miles east of the County seat, the City of Riverside. All borders of Cathedral City are within Riverside County. The Union Pacific Railroad and Interstate Highway 10 both run through the northern-most portion of the City. The Santa Rosa Mountains border the southern-most portion of the city.

Cathedral City's climate can be described as arid most of the year, with summer heat in excess of 110 degrees Fahrenheit anytime from June through September, and colder winter evening temperatures as low as 25 degrees Fahrenheit from December through February.

The average rainfall is less than three inches per year. Temperatures and rainfall for Cathedral City are typical of the rest of the Coachella Valley (eastern Riverside County).

Cathedral City was established in 1925 and incorporated in 1981. Strategically located, with city limits on both sides of Interstate 10, Cathedral City is a haven for expanding and relocating businesses. Cathedral City's population ranks in the top three cities in the Coachella Valley.

Businesses view the region as a triangle of opportunity between Los Angeles and San Diego. Coachella Valley is situated inland, approximately equal distances from each metropolitan area. This triangle of commercial businesses, light industry, and professional services is expanding and becoming one metropolis of continued growth.

2.6.7 Coachella

Coachella is a city in Riverside County, California; it is the easternmost city in the region collectively known as the Coachella Valley. It is located 28 miles east of Palm Springs, 72 miles east of Riverside, and 130 miles east of Los Angeles.

The eastern half of the Coachella valley is below sea level, and the area's average elevation is 68 feet (35 m) below sea level. The Salton Sea, a saltwater lake located about 10 miles (16 km) South of Coachella, lies 227 feet (69 m) below sea level.

The city also lends its name to the Coachella grapefruit; the town's stretch of State Route 111 is named Grapefruit Boulevard in its honor. Harrison Street or State Route 86 is declared historic U.S. Route 99, the major thoroughfare that connects with Interstate 10 a few miles north of town.

Known as the "City of Eternal Sunshine", Coachella is largely a rural, agricultural, family-oriented community in the desert and one of the state's fastest growing cities in the late

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20th century. When it first incorporated back in 1946, it had 1,000 residents, but the population was 45,407 at the 2010 census.

The city was originally founded as Woodspur in 1876, when the Southern Pacific Railroad built a rail siding on the site. In the 1880s the indigenous Cahuilla tribe sold their land plots to the railroads for new lands east of the current town site, and in the 1890s, a few hundred traqueros took up settlement along the tracks.

The origin of the name Coachella is unclear, but in 1901 the citizens of Woodspur voted on a new name for their community; at their town hall meeting, the homeowners settled on "Coachella". Some locals believe it was a misspelling of Conchilla, a Spanish word for the small white snail shells found in the valley's sandy soil, vestiges of a lake which dried up over 3,000 years ago.

Coachella began as a 2.5-square-mile (6.5 km2) territory gridded out on the mesquite covered desert floor. Not until the 1950s did Coachella begin to expand into its present range, about 32 square miles (83 km2), an area which contained large year-round agricultural corporate farms and fruit groves, particularly of citrus (lemons, oranges, grapefruit) and date palms.

Coachella became a city in 1946. During the incorporation voting process, the first city council was tentatively elected: Lester C. Cox, T. E. Reyes, John W. Westerfield, Lester True, and Paul S. Atkinson. Also elected on November 26, 1946, were City Clerk Marie L. Johnson and City Treasurer John C. Skene. John Westerfield was appointed mayor at the first meeting.

2.6.8 Corona

The City of Corona is located approximately 45 miles southeast of Los Angeles in western Riverside County. It is located in a valley, framed by mountains and the Prado Basin. Original settlements focused development in an area within and adjacent to Grand Boulevard. As the City grew, the geographic limitations imposed by the Cleveland National Forest to the south and the Prado Basin to the northeast created natural barriers that confined the City. The City is bordered by the City of Norco to the north, the City of Riverside to the east, and Riverside County to the west and south.

The City limits encompass 39.2 square miles and the population is approximately 159,132. A city whose heritage spans more than a century, Corona has emerged as an ethnically diverse community, where a significant percentage of the population is made up of young, well-educated families. The Corona community boasts many amenities that provide a first-rate quality of life for residents. The City has more than 394 acres of parks, with sports fields, basketball courts, playgrounds, tennis courts, two skate parks and an outdoor pool.

Two major freeways and one railroad transect Corona. The Riverside Freeway (SR-91) runs east/west directly north of the City's center, Interstate 15 (I-15) runs north/south near the eastern edge of the City, and the railroad parallels SR-91. These corridors are major transportation routes to the economic center of Orange County from the Inland Empire. Two geographical areas are considered to be within the boundaries of the City of Corona General Plan Planning area: lands within the City's corporate limits, and lands within its Sphere of Influence (SOI). .

The SOI was defined by the City, the Southern California Association of Governments (SCAG), and the Riverside County Local Agency Formation Commission (LAFCO). It represents the areas likely to be served by and potentially annexed to the City. The SOI includes three geographically distinct areas including the West, East and South Spheres. The West Sphere encompasses three geographic areas: the Prado Basin, Coronita and the Foothill area. The East Sphere includes the areas of Home Gardens, Eagle Valley East, and El Cerrito. Temescal Canyon makes up the South Sphere.

The City of Corona Planning area is within the South Coast Air Basin of California. The air basin is a 6,600-square mile area encompassing the non-desert portions of Riverside, Los Angeles, and San Bernardino Counties and all of Orange County. Bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east, the South Coast Air Basin is an area of high air pollution poten0tial.

The climate of the South Coast Air Basin is dominated by the strength and position of the semi-permanent high-pressure center over the Pacific Ocean near Hawaii. It creates the climate conditions typical of Southern California, (i.e., relatively cool summers, mild winters, infrequent rainfall, cool daytime sea breezes, comfortable humidity, and ample sunshine). Periods of extremely hot weather, winter storms, or Santa Ana wind conditions interrupt this pattern. Unfortunately, the same atmospheric processes that create the desirable living climate combine to restrict the ability of the atmosphere to disperse the air pollution generated by the region's population.

The location of the Planning Area, east of the Chino Hills and Santa Ana Mountains, insulates it from the moderating effect of the ocean. Temperatures and precipitation in Corona varies more dramatically than coastal areas of the basin. Average summertime high temperatures range between about 85 to 92 degrees Fahrenheit from June through September, and average wintertime low temperatures are generally near 40 degrees in December and January. Rainfall is highly variable and confined almost exclusively to the winter months. Rainfall in Corona averages about 12.6 inches annually.

Predominating winds travel from the ocean, across the urbanized coastal areas of Orange and Los Angeles Counties, to Corona through the Santa Ana River Canyon. The canyon

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acts as a funnel for air masses moving across the basin. Daytime winds are typically channeled through the canyon to create steady, abnormally high (greater than 12mph) wind velocities from the west. Typical nighttime conditions reverse, and light winds (less than 1 mph) drift back towards the ocean. Exceptions to this pattern occur when a high-pressure center forms over the western United States and creates the strong, hot, dry, gusty Santa Ana winds, which move through Corona from the eastern deserts into the canyon.

Corona's historic resources are those physical elements, both structural and natural, which define Corona's past. They help give the City its unique identity, charm, and orientation. These resources, when well preserved and maintained, provide the community with a sense of permanence, which fosters civic pride and stewardship among its residents and businesses. Information describing the historic and cultural resources were derived from the California Environmental Resources Evaluation Systems (CERES) website, as well as the Riverside County Integrated Project (RCIP) (March 2000) existing setting conditions. Corona's history is an evolution of Native American inhabitation, Missionary influence, agricultural development, and eventual rapid urbanization. The City's growth and development is typical of many other areas in Southern California.

In the early 1700s, prior to the arrival of the Spanish, the Gabrieleno and Luiseno Indians occupied the Corona area. These Native Americans used the hot waters in Temescal Canyon for bathing and religious ceremonies. Current residents and visitors still enjoy the rejuvenating mud baths and hot springs at the Glen Ivy Springs resort. Luiseno religious ceremonies were strictly followed, and remnants of some of their artistic pictographs and petroglyphs can still be found on rocks in undeveloped areas.

In the early 1800s, the agricultural and cattle ranching base developed and portions of Corona became part of the Mexican land grants (Rancho La Sierra Yorba, Rancho Jurupa, Rancho El Rincon, and Rancho El Sobrante de San Jacinto). With the Treaty of Guadalupe Hidalgo (1846), Mexico ceded the Corona area as part of California to the United States. The Yorba, Serrano, Sepulveda, Cot, and Botiller families' ranched sheep and cattle on the original ranchos in the area. Remnants of the Serrano tanning vats are still found on Old Temescal Canyon Road. In 1849, the California gold rush brought prospectors, settlers, and new development to southern California. The Butterfield Stage stops and the Serrano adobes are found along this road.

In 1886, developer Robert Taylor persuaded his partners: Rimpau, Joy, Garretson and Merrill to form the South Riverside Land and Water Company. Together they raised approximately $110,000 to purchase approximately 12,000 acres of good agricultural land. Taylor realized the importance of water for the soon to be developed community, and additional funds were used to ensure that sufficient water rights were obtained. Taylor hired Anaheim engineer H. C. Kellogg to design a circular Grand Boulevard three miles

round. Early residents used to parade their fancy buggies on this circular street that enclosed the main functions of the community: schools, churches, residences and stores. To the north along the railroad tracks were the manufacturing plants and packing houses. The southern end of town was left to the citrus industry, and the mining companies were established just outside the city's southeastern and eastern city limits.

The town's founders initially named their development South Riverside after the successful citrus community of Riverside, just a few miles away. Almost all of the new settlers planted orange and lemon trees in hopes of gaining future profits. New groves continued to spring up and, by 1912, there were 5,000 acres of established lemon and orange groves. By 1913, Corona shipped more fruit than any other town in Southern California. In 1961, citrus was still considered the backbone of Corona's economy and the largest source of revenue. In that year, citrus covered 7,500 acres. The labor force fluctuated between 400 and 1,800 workers at the peak of the harvest. An additional 500 people worked at the Exchange Lemon Products plant. By 1982, Corona's agricultural industry faced a bleak future as production costs made the economics of farming financially unsuccessful. Plans were begun to replace the groves with approximately 12,500 dwelling units.

On July 13, 1896 residents voted to incorporate and change the name of the community to Corona, which is Spanish for crown, in honor of the City's circular Grand Boulevard. By 1900, the population had reached 1,434 people. On September 9, 1913, in observance of California's Admission's Day, Corona residents celebrated with an international automobile race on the Boulevard. The event attracted such auto racing greats as: Ralph DePalma, Barney Oldfield, Terrible Teddy Tetzlaff and Earl Cooper. More than 100,000 people came to the town of 4,000 to watch Cooper win the race and a prize of $8,250. It was so successful that races were held again in 1914 and 1916. The demise of the Corona road races was due not only to tragic deaths, which occurred in 1916, but also because of the cost and local effort needed to continually stage such an extravagant event.

2.6.9 Desert Hot Springs

Desert Hot Springs is located approximately 112 miles from Los Angeles, in the center of Riverside County. The City sits in the foothills of the San Bernardino Mountains, and overlooks the entire Coachella Valley. The southern city boundaries are adjacent to Palm Springs and Cathedral City, divided by Interstate 10. To the east of the city is the unincorporated community of Sky Valley. To the west are the unincorporated areas of North Palm Springs and White Water. To the north of the city is predominately Joshua Tree National Park and lands governed by the Department of Interior, Bureau of Land

Management (BLM). The City also sits at two entry points of the recently recognized, Sand to Snow National Monument.

The area has sparse vegetation, which is consistent with the Southern California lower desert. Annual grass and desert flowers are dependent on annual precipitation averaging just over 5 inches a year. Temperatures during the summer can reach 115 degrees during the peak day and the high 80's during the night. Winter temperatures are in the high 70's to low 80's and lows at night average in the 50's. Summers tend to produce occasional monsoonal thunder storms, while the winter tends to be windy, depending on the low pressures systems reacting with the local mountain ranges.

In 1913 Cabot Yerxa arrived in the City. He was the first Homesteader and discovered hot water on Miracle Hill. Due to the San Andreas Fault bisecting the hill, one side has cold water, the other has hot. His large adobe, hand built by Yerxa, is one of the oldest adobe structures in Riverside County and is listed on the Nation Register of Historic Places.

The town was founded by L. W. Coffee on July 12, 1941. The original site was centered on the intersection of Palm Drive and Pierson Blvd. and was only a square mile in area. He named it Desert Hot Springs in honor of the waters Yerxa had discovered.

The City of Desert Hot Springs incorporated in 1963, with 1,000 residents.

Since that time, Desert Hot Springs has solidified itself as a tourist destination through its small spa hotels. In its early days the city's seclusion appealed to urban "escapees".

Desert Hot Springs experienced periods of dizzying growth in the 1980s and 1990s when most of the vacant lots were filled with new houses and duplex apartments. The city's population doubled in the 1980s and increased by another 5,000 in the 2000 census. Between 2000 and 2010 the population grew by 9000 residents resulting in a final population count of 25,938 full time residents following the 2010 census.

With much of the City's land undeveloped, development in the city and population is expected to steadily grow for many years to come.

The City is the home to (5) Elementary Schools, (2) Middle Schools and (1) High School, (3) Parks and a Health and Wellness Center serving residents of the Community.

In 2014 the City Council adopted Ordinances allowing for Medical Marijuana Dispensaries and the large scale Cultivation of Medical Marijuana. Development of this rapidly growing industry is permitted in the Industrial Zone of the City.

2.6.10 Eastvale

Eastvale is one of the newest cities in Western Riverside County. Eastvale incorporated on October 1, 2010 since then it has grown to a population of over 63,162 residents. Eastvale is 13.2 square miles strategically poised between Interstate 15 and California State Routes 91, 60, and 71, making access easy for residents, visitors and businesses alike. Residents and visitors find the close proximity of Ontario International Airport to be a metropolitan advantage yet enjoy the small-town, neighborly charm of our young community.

2.6.11 Hemet

The City of Hemet is located in the San Jacinto Valley in Riverside County, approximately 80 miles southeast of Downtown Los Angeles. The city covers about half of the valley, which it shares with the neighboring City of San Jacinto to the north and Diamond Valley Lake to the south. The San Jacinto Mountains to north provide a beautiful natural backdrop to the City.

The average annual rainfall in Hemet is approximately 12 inches. The annual high temperature is 82 degrees while the annual low is 46 degrees. Average temperature in Hemet is 65 degrees. During the 19th century the land in Hemet was used for cattle ranching by Mission San Luis Rey. On January 20, 1910 the City of Hemet was incorporated and maintains a Council-Manager form of government. The incorporation helped to serve the growing city which also became a trading center for the San Jacinto Valley agriculture of citrus, apricots, peaches, olives and walnuts. During WWII the City of Hemet hosted the Ryan School of Aeronautics, training over 6,000 fliers for the Army Air Force. Hemet-Ryan Airport still exists today in the same location.

2.6.12 Indian Wells

Indian Wells is a small-scale residential-resort community located within the Coachella Valley in Riverside County. The City of La Quinta and the City of Palm Desert, along with unincorporated areas of Riverside County, adjoin the City. The current City limits encompass approximately 9,240 acres, or 14.4 square miles. Primary access to the City is from State Highway 111. Primary access to the region is by Interstate 10. State Route 74 also provides access to the Coachella Valley region from the south. Unincorporated lands to the northeast of the City are included within the Indian Wells sphere of influence.

Indian Wells is best known for its world class resorts, catering to golf and tennis enthusiasts, and quality residential lifestyle. Residents of the City enjoy an ideal climate, with over 330 days of sunshine each year. The City's beautiful surroundings include views of the Santa Rosa and San Jacinto Mountains.

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Indian Wells officially became a city on July 14, 1967. At that time, Indian Wells was the 16th city to incorporate in Riverside County and the 400th in California. It was the fourth city, after Indio, Coachella, and Palm Springs, to incorporate in the Coachella Valley. The election for incorporation was held on June 27, 1967 and, according to the League of California Cities, had the largest percentage of approval for incorporation of any city in California. The voter turnout was 87 percent of the 285 registered voters with 93 percent in favor of becoming a city. At incorporation, there were an estimated 855 legal residents and 585 homes. The Indian Wells area was inhabited long before incorporation, however. The name Indian Wells originated from a Cahuilla Indian hand-dug well, documented on the earliest maps of California prior to 1850. The original well was generally located north of present day Highway 111 and east of Miles Avenue. The well serves as a stage station until a public well was established around 1870, and remained in use until 1910. Like most communities that were established in the Coachella Valley, Indian Wells' origins are based on travelers' needs for water and a place to rest. Both wells were destroyed by a massive flood in 1916.

2.6.13 Indio

The City of Indio is a corporate city located in Riverside County, within the Coachella Valley of Southern California's Colorado Desert region, approximately 70 miles east of the County seat (City of Riverside), and 125 miles east of Los Angeles. The City limits encompass approximately 29.2 square miles in area. The City of Indio sits directly adjacent to the City of La Quinta, the City of Coachella and the unincorporated areas of Riverside County. The Union Pacific Railroad, State Highway 111, and Interstate 10 run through the length of the City. The Coachella Valley Water District operates an aqueduct which conveys water from the Colorado River into the Coachella Valley and bisects the City from east to west and north to south.

The climate of the City of Indio is influenced by the surrounding mountain ranges that contribute to the unique year-round warm and dry climate, with some of the warmest winters west of the Rocky Mountains. Indio experiences warm winters and hot summer climates with average annual high temperatures of 89.5 degrees Fahrenheit, and average annual low of 62.1 Fahrenheit. Summer highs above 110 degrees Fahrenheit are common while summer night lows often stay above 90 degrees Fahrenheit. The City of Indio is adjacent to the geologic Salton Sink and within the site of historic Lake Cahuilla. Indio is an official National Bird Sanctuary, as seasonal bird migration flight routes cross the city en route to and from the Salton Sea.

Indio began as an Indian Village and winter home for Native Americans who regularly migrated from the surrounding mountains in the winter to the palm oases along the San Andreas Fault zone and other locations providing water, vegetation and shelter. The

Villages were located throughout the Coachella Valley and along the shores of ancient Lake Cahuilla. The discovery of gold in California in 1848 and the resulting Gold Rush brought a stream of miners and settlers through the Coachella Valley, providing a southern route to California less hazardous than crossing the Sierras. In 1872, Indio was selected as a division point for the Southern Pacific Railroad with the first train arriving in 1876 from Los Angeles and the completed southern transcontinental route in 1877. Indio's first settlers were mainly railroad employees and local shopkeepers. By 1909, the Indio School census indicated that the school district had 43 families and 82 children within its boundaries. In 1914 the Southern Sierras Power Company completed an electric power line to the Coachella Valley to provide power for pumping water and powering homes. In 1930, Indio became the Coachella Valley's first incorporated city.

2.6.14 Jurupa Valley

The City of Jurupa Valley is the newest city to incorporate within the State of California, in the County of Riverside, with an incorporation date of July 1, 2011. Jurupa Valley is approximately 44 square miles in area and is approximately 5 miles west of the County seat, the City of Riverside. Jurupa Valley is approximately 60 miles east of the City of Los Angeles and approximately 90 miles north of San Diego. It covers the area north and west of the Santa Ana River, south of the Riverside-San Bernardino County line, and east of Interstate 15 with CA Hwy 60 intersecting the length of the city from the east to the west.

The City of Jurupa Valley has a moderate climate with annual rainfall at approximately 2 – 3.5 inches per year. Vegetation is green and bountiful in the winter but can become dry and dense during the summer months. Summers are warm and can reach temperatures above 109 degrees during the peak of the day and remain in the high 80's during the evenings. Winter weather is mild averaging 65 – 76 degrees during the day and dropping down into the mid 30's or 40's in the evenings. Throughout most of the year, you can usually count on warm sunny days, with occasional mild to gusty winds throughout the late summer, fall, and early winter seasons. The population of Jurupa Valley was incorporated after the 2010 US State Census. Currently, the city's population is 100,314 according to the 2015 US State Census.

2.6.15 Lake Elsinore

The City of Lake Elsinore is a corporate city nestled at the foot of the Cleveland National Forest, within the southwest portion of Riverside County. The City boasts that Lake Elsinore is the largest natural recreational lake in Southern California and is bounded by wetlands. City of Lake Elsinore is located on the I-15 corridor at the intersection of State Route 74, 20 miles south of State Route 91. We are approximately a one-hour drive east from metropolitan Orange County and forty-five minutes southwest from Riverside. San

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Diego is approximately a one-hour-and-fifteen-minute drive south on I-15. Highway 74 connects westward over the Ortega Mountains to Orange County beach communities and eastward to mountain and desert cities in Riverside County. Lake Elsinore is 73 miles southeast of Los Angeles and 74 miles northeast of San Diego. The average rainfall per year is less than 12 inches total. The average winter low temperature is 35.8 degrees, while the average summer high is 98.4 degrees. The community enjoys a yearly average daily temperature of 78.5 degrees.

The City of City of Lake Elsinore was organized, formed and incorporated under the laws of the State of California on April 9, 1888. From earliest times, the 300 natural Sulphur springs that fed Lake Elsinore were believed to have curative and magical properties by its Native American Indian inhabitants. These first inhabitants were called the Lake Entengvo Wumoma, which meant "Hot Springs by the Little Sea."

Joining the Native American Indian inhabitants, the Spanish missionaries, soldiers, ranchers and American trappers came to the valley. The Spanish padres renamed the lake "Laguna Grande."

Early settlers established a town site around the lake, which they renamed Elsinore, representing the immortality given the town of Elsinore in Denmark by Shakespeare in "Hamlet." In the 1920s and 1930s, the City became a playground for movie stars and the lake a destination for world-record-setting boat races and Olympic swim team training. Sportsmen hunted duck on the lake and deer in the hills.

Lake Elsinore has a "Council-Manager" general law form of government where the City Manager is appointed by the City Council and is the Chief Executive Officer of the Municipal Corporation. The Council acts as the board of directors of the municipal corporation and meets in a public forum where citizens may participate in the governmental process. The City Council consists of five members elected at-large, on a non-partisan basis. Residents elect the Mayor and four Council members, making each accountable to the entire citizenry.

2.6.16 La Quinta

The City of La Quinta is a corporate city in Riverside County. La Quinta is situated approximately 150 miles northeast of San Diego and 130 miles east of Los Angeles on the desert floor of the Coachella Valley. The valley is flanked on three sides by the Little San Bernardino, Santa Rosa, and San Jacinto Mountains. The protection afforded by the mountains contributes to the arid climate. Average rainfall per year is less than 5 inches total. Low temperatures rarely drop below freezing, while highs during the summer are usually in the triple digits and can reach into the 120 F degrees; however, it's a "dry" heat. Visitors from colder climates flock to La Quinta and surrounding cities in the Coachella

Valley from November to May because of our extremely mild winters. La Quinta's climate can be described as Lower California desert.

The City of La Quinta was organized, formed and incorporated under the laws of the State of California on May 1, 1982. It has a "Council-Manager" general law form of government where the City Manager is appointed by the City Council and is the Chief Executive Officer of the Municipal Corporation. The Council acts as the board of directors of the municipal corporation and meets in a public forum where citizens may participate in the governmental process. The City Council consists of five members elected at-large, on a non-partisan basis. Residents elect the Mayor and four Council members, making each accountable to the entire citizenry.

2.6.17 Menifee (Not Participating)

The City of Menifee is located in southwestern Riverside County approximately 30 miles southeast of the City of Riverside, California. The City encompasses approximately 50 square miles with an overall population of 83,447.

On June 3, 2008, the residents of the communities encompassing the City of Menifee voted to incorporate Menifee into Riverside County's twenty-sixth city. The new City of Menifee was officially established on October 1, 2008.

Interstate 215 traverses north and south through the center of Menifee, with existing community commercial areas located primarily along Newport, Bradley, and McCall Roads off of I-215.

2.6.18 Moreno Valley (Not Participating)

The City of Moreno Valley was officially incorporated on December 3, 1984 as a California general law municipality. Moreno Valley is comprised of three once-rural communities (Sunnymead, Edgemont and Moreno) and is located in the northwestern portion of Riverside County, approximately 66 miles east of Los Angeles, 42 miles west of Palm Springs and 100 miles north of San Diego. Moreno Valley is situated in a crescent of land bounded by the Box Springs Mountains to the north, the hills of the Badlands to the east and the mountains of Lake Perris State Recreation Area. The surrounding jurisdictions include the City of Riverside, the City of Perris, March Air Reserve Base, the San Jacinto Wildlife Area and Lake Perris State Recreation Area. The population of Moreno Valley is estimated at 201,175.

2.6.19 Murrieta

The City of Murrieta is an incorporated city in Riverside County. It is approximately 34 square miles in area and is 50 miles south of the County seat, the City of Riverside. The

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City of Murrieta sits directly adjacent to the City of Temecula on the south, City of Menifee on the east, and the City of Wildomar on the northern boundaries. Murrieta is served by two major interstate freeways. I-215 runs through the eastern portion of the city, and I-15 runs through the western portion of the city. The Santa Margarita Watershed runs through the southwest portion of the City. Storm water runoff from portions of Lake Elsinore and Murrieta collects in the Murrieta & Temecula creeks and forms the Santa Margarita River south of the City.

The City of Murrieta's winters are almost never extreme, low temperatures rarely go below freezing. In the summer the high temperatures will hover in the 90's, but some days may go over 100 during heat waves. Rainfall for City of Murrieta is typical of that of the rest of Riverside County.

In 1980, Murrieta population was estimated to be 2,200. When Murrieta officially became a city on July 1, 1991, it was already home to more than 24,000 residents. By 2016, more than 113,000 people had moved into the City of Murrieta community, making it one of the five largest in Riverside County. The natural scenic beauty of the area and what is still by California standards reasonably priced housing continues to attract significant numbers of residents and businesses who are finding Murrieta a great place to grow. Those living in the community find distinguished schools, abundant recreation, excellent medical facilities, expanding employment opportunities and one of the lowest crime rates in Southern California. Entrepreneurs find a market growing larger by the day, above average household incomes, a skilled labor force and a business-friendly City Hall. It's a community with a past and vision for its future. One that welcomes challenges embraces opportunity. More and more people are discovering what the Murrieta fathers envisioned more than a century ago: Murrieta is, indeed, a great place to grow.

2.6.20 Norco

The City of Norco is located in the northwestern portion of Riverside County, near the convergence of Los Angeles, Orange, and Riverside Counties, approximately 45 miles southeast of the City of Los Angeles. It is located in a valley, framed by mountains and the Prado Basin. Original Settlements focused development in an area within and adjacent to Hamner Avenue, Highway. As the City grew, the geographic limitations imposed by the Norco Hills to the east and the Santa Ana River and the Prado Basin to the north and west created natural barriers that confined the City. The City is bordered by the City of Corona to the south and southwest, the City of Riverside to the east, and the cities of Eastvale and Jurupa Valley to the north and northeast.

One major freeway transects Norco with no railroads. Interstate 15 (I-15) runs north/south through the middle of the City. This corridor is the major north-south transportation route in Southern California between Las Vegas and San Diego with nearby direct freeway

interconnects to Los Angeles and Orange counties and the rest of the Inland Empire. The current City corporate limits are fairly congruous with the City's Sphere of Influence (SOI). The City currently includes 15 square miles, with less than 50 acres currently in Riverside County remaining within the SOI.

The SOI was defined by the City, the Southern California Association of Governments (SCAG), and the Riverside County Local Agency Formation Commission (LAFCO). It represents those areas likely to be served by and potentially annexed to the City. The SOI includes two small geographically distinct areas including a single row of mostly developed single-family homes along Bluff Street at the City's southwestern edge along the river bluffs and undeveloped property largely in the river floodplain in the northeast corner of the City. The City currently manages approximately 690 acres of open space within its Park Lands and an internal trail system throughout the City and its public right away of approximately 120 miles.

The City of Norco Planning area is within the South Coast Air Basin of California. The air basin is a 6,600-square mile area encompassing the non-desert portions of Riverside, Los Angeles, and San Bernardino Counties and all of Orange County. Bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east, the South Coast Air Basin is an area of high air pollution potential. The climate of the South Coast Air Basin is dominated by the strength and position of the semi-permanent high-pressure center over the Pacific Ocean near Hawaii. It creates the climate conditions typical of Southern California, (i.e., relatively cool summers, mild winters, infrequent rainfall, cool daytime sea breezes, comfortable humidity, and ample sunshine). Periods of extremely hot weather, winter storms, or Santa Ana wind conditions interrupt this pattern. Unfortunately, the same atmospheric processes that create the desirable living climate combines to restrict the ability of the atmosphere to disperse the air pollution generated by the region's population.

The location of the Planning Area, east of the Chino Hills and Santa Ana Mountains farther south, insulates it from the moderating effect of the ocean. Temperatures and precipitation in Norco vary more dramatically than coastal areas of the basin. Average summertime high temperatures range between about 85 to 92 degrees Fahrenheit from June through September, and average wintertime low temperatures are generally near 40 degrees in December and January. Rainfall is highly variable and confined almost exclusively to the winter months. Rainfall in Norco averages about 12.6 inches annually. Predominating winds travel from the ocean, across the urbanized coastal areas of Orange and Los Angeles Counties, to Norco through the Santa Ana River Canyon. The canyon acts as a funnel for air masses moving across the basin. Daytime winds are typically channeled through the canyon to create steady, abnormally high (greater than 12mph) wind velocities from the west. Typical nighttime conditions reverse, and light winds (less

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than 1 mph) drift back towards the ocean. Exceptions to this pattern occur when a high-pressure center forms over the western United States and creates the strong, hot, dry, gusty Santa Ana winds, which move through Norco from the eastern deserts into the canyon.

The pre-European history of Norco is much like the rest of Southern California where various tribes of Indians occupied the different portions of the region. The Luiseno Indians used and occupied a region that included the Norco-Corona area. The main village was in Temescal Canyon, and the Norco area was used as a hunting-gathering location. In 1846 the Norco area became part of the Mexican land grant, part of which was eventually purchased for the purposed of growing orange trees. That was not successful and the land was sold and subdivided as part of the Riverside Orange Heights Tract.

The concept of "Norco" began as a subdivision of the North Corona Land Company in 1910, which again attempted to develop the area with orchard citrus crops, avocados, olives, etc. Years of experimentation showed the area was not suited to that purpose due to high winds, frost, and poor soil conditions. In 1921 the property was sold to the North Corona Land Company. At that time, fewer than 100 families resided in the area which was mainly a small farming community. The farmers gradually ventured into animal raising, especially poultry and rabbits, some of which are still active today.

By the mid-1920's, the North Corona Land Company owned 5,409 acres in the area. When the first school and the Norconian Club were constructed, the Norconian Club was constructed at hot sulfur well discovered while digging for irrigation water. It occupied a 700- acre site and was for years a favorite of Hollywood celebrities. Its use declined during the 1930's and in 1941 the U.S. Navy bought the hotel and expanded it into a premier World War II-era hospital. Today, its grounds are divided between a weapons research facility and a state prison. Most of the resort remains intact, and its history and architecture have earned it a listing on the National Register of Historic Places. Today local leaders and organizations are working to ensure its recognition and preservation.

The community's first public recreational facility was developed in 1948 when the old Norco School was acquired as a community center. The Norco Recreation and Park District was then formed to maintain and operate the property. During the 1950's and 1960's Norco began to experience more growth, resulting from the population explosion occurring throughout the Southern California metropolitan area. The San Bernardino and Riverside freeways made the area more accessible from Los Angeles and Orange Counties, and Norco's animal keeping lifestyle came within commuting distance from major centers of employment. Because of rapid growth in surrounding communities, and the previous loss of other animal keeping communities in the Los Angeles and Orange Counties when development pressures increased there, the City of Norco was

incorporated in 1964 to preserve the animal keeping community that had established roots here.

The development of the 130 acres of Silverlakes Equestrian and Sports Park along Hamner Avenue, between Norco and Eastvale, is currently attracting over 1 million visitors annually to the city and the region. The dominant activities in the park is soccer supplemented by equestrian horse competition.

City of Norco is located in the northwestern portion of Riverside County. The City of Norco is surrounded by the City of Eastvale, Corona and Riverside. During the late 50's and early 60's, southern California experienced rapid growth and due to the previous loss of other animal keeping communities in the Los Angeles and Orange Counties areas, the City of Norco was incorporated in 1964 to preserve the animal keeping community. The City of Norco currently includes 14.3 square miles. The current population is approximately 27,336.

2.6.21 Palm Desert

The City of Palm Desert is a charter city in Riverside County. The City of Palm Desert is a business, resort, and residential community centrally located in the heart of the Coachella Valley, in southeastern Riverside County, California. Known as the cultural and retail center of the desert communities, the City is 125 miles east of Los Angeles and just 15 miles east of Palm Springs. The valley is flanked on three sides by the Little San Bernardino, Santa Rosa, and San Jacinto Mountains. The protection afforded by the mountains contributes to the arid climate. Average rainfall per year is less than four inches. Low temperatures rarely drop below freezing, while highs during the summer are usually in the triple digits and can reach 115-120 degrees Fahrenheit; however, it's a "dry" heat, with occasional periods of high humidity in the late summer months. Visitors from colder climates flock to Palm Desert and surrounding cities in the Coachella Valley from November to May because of the extremely mild winters.

The City of Palm Desert incorporated as a charter city on November 26, 1973. It has a "Council-Manager" charter city form of government where the City Manager is appointed by the City Council and is the Chief Executive Officer of the Municipal Corporation. The Council acts as the board of directors of the municipal corporation and meets in a public forum where citizens may participate in the governmental process. The City Council consists of five members elected at-large, on a non-partisan basis.

2.6.22 Palm Springs

The City of Palm Springs is a charter city in Riverside County located in the State of California. The City is nestled at the base of the San Jacinto and Santa Rosa Mountains,

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approximately 60 miles east of Riverside. Serving as the "gateway city" for the Coachella Valley, the City of Palm Springs comprises an incorporated area that encompasses 60,440 acres, or nearly 95 square miles. Palm Springs has a residential population of approximately 47,371 and an estimated seasonal population of over a 100,000 residents and guests.

The City of Palm Springs is located within Riverside County Region VI Southern Administrative Region of the California Office of Emergency Services Agency (Cal OES). Primary access to the City is provided by Interstate 10 and California State Highway 111; north–south access to the City is provided via Indian Canyon Drive and Gene Autry Trail. The Southern Pacific Railroad and Kinder Morgan natural gas pipeline run through the Coachella Valley and specifically through the City's northern boundary.

Palm Springs has an arid desert climate with annual rainfall of less than six inches. There are more than one hundred days a year when temperatures are 100°F or more. Hot, dry winds during the summer months along with seasonal Santa Ana winds are common to Palm Springs.

The San Andreas Fault is a major earthquake fault located only a few miles north of Palm Springs. In addition, there are numerous minor faults located throughout Riverside County which are subject to earthquakes.

The area encompassing the present City of Palm Springs was discovered centuries ago by the Agua Caliente Band of Cahuilla Indians, who established their village around the natural hot mineral springs (current site of the Spa Resort Casino) known for their medicinal and healing capabilities. Throughout the 19th century, many explorers, colonizers, and soldiers came through the desert, but it wasn't until 1853 that United States Topographical Engineers described the combination of palm trees and warm springs they encountered as "Palm Springs." The name became more commonly used several years later.

In 1877, the Southern Pacific Railroad completed its line through the desert to the Pacific Ocean. A Congressional policy established that every odd section of land for 10 miles on either side if the track become the property of the railroad. Early development in Palm Springs was associated with attempts to establish agricultural activity in the area and in the southern portions of the Coachella Valley.

In the 1920s, the region became a retreat for successful business and movie personalities, who took advantage of the warm weather, the remote location, and the hot water spas. The tourist and resort community of Palm Springs developed over the following decades and dramatically changed the character and economy of the Coachella Valley. In 1938, the City of Palm Springs was officially incorporated.

In the 1950s, about 3000 sections of land were transferred to the Agua Caliente Band of Cahuilla Indians in a checkerboard pattern. The checkerboard pattern is divided into Indian and non-Indian property holdings, based upon a grid pattern of square-mile sections of alternating ownerships. Indian land which has been subdivided into sections, half sections, and sometimes even smaller areas—is controlled by the Tribal Council or by individual allottees of the Agua Caliente Band of Cahuilla Indians (the Tribe). Over time, this checkerboard land-ownership pattern has led to inconsistent patterns of development, since the majority of development has occurred on non-Indian and non-Tribal owned lands.

The City has one hospital and the only trauma center for the Coachella Valley, Desert Regional Medical Center. The Medical Center is a 385-bed full service acute care facility that includes a Level II trauma center. There are four public full service elementary schools, one middle school, one high school, and one alternative school within the City of Palm Springs that are administered by the Palm Springs Unified School District. The city has a regional airport (Palm Springs International Airport), numerous large and small hotels, shopping centers, and commercial/industrial zones. Interstate 10 and State Highway 111 traverse the City as well as several main arterial roadways.

The City operates its own police and fire departments and also relies on local volunteer organizations for assistance in emergency response, communications, and other necessary emergency services.

2.6.23 Perris

The Jurisdiction is a corporate city in Riverside County in the Coachella Valley of California. The City of Perris is 35 Square Miles in size with a population of 77,000 people and is 10 miles southeast of the County seat, the City of Riverside. Jurisdiction sits directly adjacent to San Bernardino County on its southern boundaries, and San Bernardino County is ten miles to the north. The Burlington Northern and Santa Fe Railway Railroad and California State Highway 215 both run through the middle of the City. State Highway 74 is runs through 4th Street, continues as part of CA State Highway 215 then continues along Pincante Rd through Romoland on the west. Lake Perris is located on the northeast outside City of Perris. Perris Valley Airport is privately owned. It lies in the lower center of the city off Goetz Road. March Air Force Base is located just north of the city and its jurisdiction connects to City of Perris.

Jurisdiction's climate can be described as sunny, mild Mediterranean climate. On average, Perris gets only 10 inches of rain per year. The humidity is quite low all year. The July high temperatures average 97 degrees, while January low temperatures average 35 degrees. There are 275 sunny days per year.

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City of Perris was incorporated in 1911. The California Southern Railroad connected through the city in the 1880s to build a rail connection between the present day cities of Barstow and San Diego. This is how the City of Perris began to form. While the railroad had played an important part in establishing the new town, the people now turned to agriculture for their future development. Because of limited groundwater, dry grain farming was the main crop before water was brought to the valley by the Eastern Municipal Water district in the early 1950's. Alfalfa, the King potato (which would produce two crops a year), and still later, sugar beets became the mainstay of farming the Perris Valley.

With the construction of Lake Perris in the late 60's and early 70's - Perris once again became attractive - this time as a recreational area. In addition to the lake's activities Perris' hot air ballooning, Orange Empire Railway Museum and skydiving activities attract international recognition.

2.6.24 Rancho Mirage

The City of Rancho Mirage is located in Riverside County in the Coachella Valley of California. Rancho Mirage is approximately 24.8 square miles in area and is 70 miles east of the County seat, the City of Riverside. Riverside County covers 7,208 square miles (approximately the same size as the state of New Jersey) and stretches from Orange County to the Colorado River which forms the border with the state of Arizona. Adjacent counties include San Bernardino County to the north, La Paz county Arizona to the east, Imperial and San Diego counties to the south and Orange County to the west.

Rancho Mirage is located within the Coachella Valley, which extends for approximately 45 miles (72 km) in Riverside County southeast from the San Bernardino Mountains to the saltwater Salton Sea, the largest lake in California. The Valley is approximately 15 miles (24 km) wide along most of its length, bounded on the west by the San Jacinto Mountains, the south by the Santa Rosa Mountains and on the north and east by the Little San Bernardino Mountains. These mountains peak at around 11,000 feet (3,400 m) and tend to average between three to five thousand feet. This effectively blocks the marine layer familiar to most other Southern Californian areas. The Salton Sea is located to the southeast of the Coachella Valley with a surface elevation of 227 feet below sea level.

Regional geomorphology is largely due to the San Andreas Fault which enters the valley at the Chocolate Mountains and Salton Sea in the southeast corner and then follows the centerline of the Little San Bernardino Mountains on the north side of the Coachella Valley. The fault is easily visible along its northern length as a strip of intermittent green against an otherwise bare mountain.

Geographically, the county is mostly desert in the central and eastern portions of the county which includes the Coachella Valley and the City of Rancho Mirage. The Coachella Valley is considered the northwestern portion of the Sonoran Desert. In the summer months daytime temperatures range from 104 °F (40 °C) to 118 °F (48 °C) and nighttime lows from 77 °F (25 °C) to 86 °F (30 °C). During winter, the daytime temperatures range from 70 °F (21 °C) to 90 °F (32 °C) and corresponding nights range from 46 °F (8 °C) to 68 °F (20 °C) making it a popular winter resort destination. Due to its warm year-round climate, the region is well known for the production of tropical fruits such as mangoes, figs and dates. According to the Coachella Valley Water District, average annual rainfall is approximately three inches. The mountains that flank the west and south sides of the Valley are often covered in snow during the winter months, and it is not uncommon for snow levels to dip to 2000'.

The primary arterial to the Coachella Valley is Interstate 10, which runs east-west; while State Route 111 runs for about 30 miles along the southwestern rim of the valley and serves as the main arterial highway between almost all Coachella Valley cities. A four-lane expressway, State Highway 86S opened in the early 1990s as a "special" bypass (hence the "S" designation) of two-lane Highway 86 and connects with Imperial and San Diego counties. The rail right-of-way that parallels the I-10 freeway between San Bernardino and Indio is operated by the Union Pacific Railroad (UPRR). There are no surface roads crossing the railroad tracks within the City. One older two lane bridge (Ramon Road) and one newly constructed six lane bridge crosses the railroad and Interstate 10.

Currently the only passenger rail service in the Coachella Valley is a three times per week long distance train operated by Amtrak between Los Angeles and Florida. This train is known as the "Sunset Limited". The Sunset Limited train operates through this area in the very early hours of the morning in both directions and primarily serves the leisure and tourism market. The Riverside County Transportation Commission (RCTC) and the State of California have been evaluating the feasibility of establishing an intercity passenger rail route between Los Angeles, Fullerton, Riverside, Palm Springs, and Indio. The Union Pacific Railroad (UPRR) continues its firm opposition to any new passenger service on its tracks through this area. Notwithstanding this opposition, the California Department of Transportation (Caltrans) continues to propose such service in the California State Rail Plan. Caltrans has no unilateral powers to compel the UPRR to permit the operation of this train. Nevertheless, for intercity trains (as opposed to a commuter or Metrolink train), there are certain federal processes in place that can ultimately lead to an order compelling the railroad to operate the service.

The public agencies requesting the intercity service may be required to invest large sums in the physical infrastructure of the railroad. Some estimates place the capital investment

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requirement at a minimum of $500 million for a new set of tracks. RCTC is working closely with the Coachella Valley and the Pass Areas on this issue and supports the expansion of rail service to additional areas of Riverside County.

Public transportation in the valley, including Rancho Mirage, is provided by the SunLine Transit Agency based in Thousand Palms, which was among the country's first transit agencies to totally convert to alternate fuel vehicles, including full-sized buses powered by fuel cells.

Aviation in the area is served by the Palm Springs International Airport in Palm Springs, Jacqueline Cochran Regional Airport in Thermal and Bermuda Dunes Municipal Airport in Bermuda Dunes. Palm Springs International airport (PSP) is currently served by ten airlines. In 2015, there were a total of 1,888,657 passengers embarking or disembarking at PSP. Although Alaska, SkyWest and American have the largest share of passenger travel; WestJet has grown significantly with the influx of Canadians purchasing vacation homes in the valley. Currently, WestJet serves Vancouver, Calgary, Edmonton, Winnipeg and Toronto (seasonally). Seasonal flights from PSP to New York (Virgin), San Jose (Horizon), Stockton (Allegiant), Denver (Frontier) and Houston (Continental).

The City of Rancho Mirage is a well-known desert resort and residential community in the Coachella Valley. With major regional medical facilities, the Valley's most vibrant and attractive commercial centers, and world-class resort hotels, Rancho Mirage is a desirable destination for residents and visitors alike.

The City has taken shape in a beautiful valley setting surrounded by dramatic views of the Santa Rosa and San Jacinto Mountains to the south and west and the Little San Bernardino Mountains to the north. Lushly landscaped golf course communities and broad arterial streets on the Coachella Valley floor have created a "garden in the desert".

The City of Rancho Mirage was incorporated on August 3, 1973, bringing autonomy to residents and businesses over land use and development on approximately 15.6 square miles of land. Since City incorporation, expansion has occurred without sacrificing the quality of life that originally attracted residents and the City now comprises approximately 16,070 acres or 25 square miles. Its Sphere of Influence (SOI) – County managed lands over which the City has an advisory role – total another 1,202 acres or 1.9 square miles. The City of Rancho Mirage has a Council/Manager form of government and became a Charter City in 1997.

From the beginning, Rancho Mirage was primarily a residential community. Succeeding decades brought new assets and resources. In the 1960s, commercial businesses expanded and "Restaurant Row" developed. The 1970s saw the introduction of the Eisenhower Medical Center as well as five of the City's country clubs. Residential construction boomed in the 1970s and 1980s and that period also saw the addition of

world class destination resorts – Marriott's Rancho Las Palmas (now KSL's Rancho Las Palmas Resort & Spa), the Westin Mission Hills and The Lodge (now the Ritz Carlton Rancho Mirage).

Development in past years has focused along Highway 111 with the majority of future development expected to be near Interstate 10. From the 1990s to present day, the City has added entertainment and shopping venues such as The River (a 250,000 square foot mixed use entertainment/commercial development) and Monterey Marketplace (a 400,000 square foot "big-box" retail center); worked with the Annenberg Trust to transform the Sunnylands Estate and Visitors Center into a world class educational/conference facility, and completed the state-of-the-art Rancho Mirage Public Library. In addition, the recent completion of the Section 19 Specific Plan will permit a large scale mixed use development adjacent to the 16 story Agua Caliente Casino Resort and proposed multi-modal transit station.

2.6.25 Riverside

The City of Riverside is located in Riverside County, California, United States, and is the county seat. Named for its location beside the Santa Ana River, it is located at the center of the Inland Empire and is the largest city in the Riverside-San Bernardino-Ontario metropolitan area of Southern California, the 4th largest inland California City and is located approximately 60 miles (97 km) east of Los Angeles. Riverside is the 59th most populous City in the United States and the 12th most populous city in California. The City of Riverside is currently 81 square miles according to the 2015 U.S. Census Quick Facts, and has an estimated population of 322,424.

2.6.26 San Jacinto

The City of San Jacinto is a corporate city in Riverside County in the San Jacinto Valley of California. It is approximately 27 square miles in area and is approximately 30 miles east of the County seat, the City of Riverside. San Jacinto is approximately 90 miles east of the City of Los Angeles and approximately 90 miles north of San Diego. The City of San Jacinto sits directly north of City of Hemet on its southern boundary and approximately 10 miles southeasterly of City of Moreno Valley. California State Highway 79 runs north and south through the City. The San Jacinto River, normally a dry riverbed that begins in the San Jacinto Mountains, runs through the northern part of the San Jacinto Valley in a north westerly direction, sitting on the north-easterly boundary of the City. The Soboba Band of Luiseño Indians Tribe is also located northeasterly and adjacent to the City of San Jacinto.

The climate in San Jacinto is considered moderate. Summers are warm and winters are mild. You can usually count on a nice sunny day since San Jacinto averages 342 days of

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sunshine each year, and are typical of that of the rest of Riverside County. Winter weather is mild averaging 70-75 degrees daytime, and summers are typically warm with highs averaging 90-95 degrees. The average rainfall is approx. 12.5 inches per year.

Founded in 1870, and incorporated in April 1888, San Jacinto is one of Riverside County's oldest communities, with roots that stretch back to the earliest days of California. Because of its mild climate and fertile land, the region became home to Native Peoples, Spaniards, Mexicans and Americans - all of whom have made a unique and indelible imprint on the character of the valley. Tourism also had an impact on the Valley, beginning around 1900.

Natural hot springs along the north side of the Valley stimulated the development of several tourist resorts with hotels, guest cabins and bath houses. Gilman Hot Springs was the best-known resort. It was originally developed in the 1880s, and was acquired in 1913 by the Gilman family, who ran the resort for 65 years. Soboba Hot Springs was also popular, with its Indian-style cottages scattered along the hillside. Further west was Eden Hot Springs.

The Estudillo Mansion is currently owned by the City of San Jacinto. The City of San Jacinto successfully completed the interior and exterior Estudillo Mansion Restoration project. There has also been the addition of a Water Conservation Garden, parking lot and landscape improvements with a dedication event on May 16, 2009

The City of San Jacinto is a general-law form of government with Council-Manager administration. Council members are elected, with the City Manager appointed by the five council-members elected at-large. The City of San Jacinto is not a participant in the Riverside County Operational Area Multi-Jurisdictional Local Hazard Mitigation Plan. The city has an estimated population of 45,563.

2.6.27 Temecula

The City of Temecula is an incorporated city in Riverside County in the Southwestern portion of the County. It has a population of approximately 106,780. Since incorporation in 1989, as a General Law City, the City has created a desirable community with exceptional public safety, community services, recreational amenities, and a robust commerce.

It is 30.17 square miles and is 30 miles south of the County seat, the City of Riverside. Temecula sits north of and adjacent to San Diego County. The City's eastern and western boundaries are with Riverside County Jurisdictions and to the north is the City of Murrieta. Interstate Highway 15 travels north and south through the western portion of the City. State Highway 79 travels east from the City on both the southern and northern portions of the city. Murrieta Creek which is a pathway from Lake Skinner Reservoir is on the western portion of the City and Temecula Creek which is a pathway from the Vail Lake

Reservoir is on the southern portion of the City. They combine to form the Santa Margarita River in the extreme southwest portion of the jurisdiction. The Santa Margarita Mountains run along the western portion of the jurisdiction.

The City of Temecula's mean yearly temperature 64.7°F with an average high temperature of 76.5°F and an average low of 52.9°F. The average annual rainfall is 11.11 inches.

2.6.28 Wildomar

The City of Wildomar is a corporate city in Riverside County in the Southwest County of California. It is approximately 24 square miles in area and is 41 miles south of the County seat, the City of Riverside. City of Wildomar sits directly adjacent to the City of Murrieta on the south, City of Menifee on the east, and the City of Lake Elsinore on the northern boundaries. The 15 freeway runs through the middle of the City. The Santa Margarita Watershed runs through the southwest portion of the City. Stormwater runoff from portions of Lake Elsinore and Wildomar collects in the Murrieta & Temecula creeks and forms the Santa Margarita River south of the City.

City of Wildomar's climate in winter is almost never extreme, low temperatures rarely go below freezing. In the summer the high temperatures will hover in the 90's, but some days may go over 100 during heat waves. Rainfall for City of Wildomar is typical of that of the rest of Riverside County.

Wildomar is a community of old and new, more mature homes and acreages with horses and other animals mixed with more modern housing tracts. Nestled between the cities of Murrieta and Lake Elsinore, Wildomar officially became a city on July 1, 2008, at that time home to about 28,000 residents.

The name Wildomar was coined from the names of its three founders -- the WIL from William Collier, the DO from Donald Graham and the MAR from Margaret Collier Graham.

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2.7 Tribes of Riverside County

Riverside County has 12 Indian Tribes within or bordering the County.

2.7.1 Agua Caliente Indian Reservation

The Agua Caliente Band of Cahuilla Indians is a federally-recognized Indian Tribe located in Palm Springs, Calif., with 32,000 acres of reservation lands that spread across Palm Springs, Cathedral City, Rancho Mirage, and into the Santa Rosa and San Jacinto mountains. The Tribe's developments include two Palm Springs golf courses, the Spa Resort Casino in downtown Palm Springs, and the Agua Caliente Casino Resort Spa in Rancho Mirage, which includes the 2,000 seat concert venue, The Show. It also operates the Indian Canyon and Tahquitz Canyon parks, both open to the public.

The Tribal Government employs approximately 200 employees, in addition to over 2,000 employees directly associated with its gaming and hospitality operations. The majority of these employees do not live on the Reservation, but commute from outlying communities, such as, Banning, Palm Desert, Desert Hot Springs, and the high desert mountains, increasing the population on the Reservation during the normal business hours.

Tribal employees work in Tribal offices or in the field. Normal business hours are between the hours of 7:00 a.m. to 6:00 p.m. Monday through Friday. It is common for certain employees (Rangers, Maintenance Crew) to work in remote areas of the Reservation where communications may prove difficult.

2.7.2 Augustine Indian Reservation

The Augustine Band of Cahuilla Indians (Tribe) is a federally recognized Indian tribe located in the County of Riverside, California. It was established by Executive Order in 1891. The Augustine Reservation is part of an area occupied for the last 1,000 years by the Cahuilla Indians. The Reservation consists of approximately 602 acres located in the Coachella Valley in southern California, adjacent to the City of Coachella and approximately thirty miles from the City of Palm Springs.

2.7.3 Cabazon Indian Reservation

The members of the Cabazon Band of Mission Indians (Tribe), a federally recognized Native American Indian tribe, are descendants of the Cahuilla Indians who have occupied the desert region of southern California for 2,500 to 3,000 years. As one of approximately a dozen independent clans of the Cahuilla, the Tribe claims its own name, territory and common ancestry. Although the Tribe numbered 600 in the mid-1800s, the population had dwindled to less than 50 by the start of the 1980's. Since that time, under a

reorganized tribal government, the Tribe had increased their economic base by taking advantage of opportunities in the "Desert Resorts" area of California's Coachella Valley.

The Tribe is a sovereign nation under the laws of the United States of America and is operated under a democratic form of government. As a sovereign nation, the entire Cabazon community consists of tribal members. Tribal authority resides in the General Council, which meets every three months to confer and make decisions on tribal issues. All tribal members, age eighteen or older, sit on the General Council, which elects a Business Committee every four years. The Business Committee manages the day-to-day operations of the tribe, including making decisions about new business ventures. As Cabazon is a relatively small tribe, this organizational strategy assures that all viewpoints of the tribal community are considered and that the skills and resources of all community members are incorporated into all facets of formulation and implementation of tribal decision making.

The Cabazon Band of Mission Indians' Reservation was established by an act of Congress in 1876 and occupies three separate areas of land consisting of 1,701 acres in the eastern end of the Coachella Valley. This land is held in trust by the federal government for the benefit of the tribe under the jurisdiction of the tribal government.

2.7.4 Cahuilla Indian Reservation

The Cahuilla Reservation is located in Riverside County near the town of Anza. It is 18,884 acres in total, but 16,884 acres of the reservation belongs to individual members of the tribe. 2,000 acres belong to the entire tribe in common. It was founded in 1875. The Cahuilla Band of Mission Indians is headquartered in Anza, California. They are governed by a democratically elected tribal council. Their current tribal chairman is Daniel Salgado and the Vice-Chairwoman is Andrea Candelaria.

2.7.5 Colorado River Indian Reservation

The Colorado River Indian Tribes include four distinct Tribes - the Mohave, Chemehuevi, Hopi and Navajo. There are currently about 4,277 active Tribal members.

The CRIT Reservation was created in 1865 by the Federal Government for "Indians of the Colorado River and its tributaries," originally for the Mohave and Chemehuevi, who had inhabited the area for centuries. People of the Hopi and Navajo Tribes were relocated to the reservation in later years.

The reservation stretches along the Colorado River on both the Arizona and California side. It includes almost 300,000 acres of land, with the river serving as the focal point and lifeblood of the area.

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The primary community in the CRIT Reservation is Parker, Arizona, which is located on a combination of Tribal land, leased land that is owned by CRIT and land owned by non-Native Americans. There are other, smaller communities on the reservation, including Poston, located 10 miles south of Parker.

2.7.6 Morongo

The Morongo Reservation is located in the northern and western half of Riverside County, California, approximately 90 miles east of Los Angeles. The Reservation, with an area of approximately 54 square miles, covers portions of the southern flank of the San Gorgonio Mountains, the northern flank of the San Jacinto Mountains, and the valley floor of the San Gorgonio River. It has contiguous boundaries with the City of Banning and the unincorporated community of Cabazon (the only city in California to unincorporated) in the San Gorgonio Pass Area.

The Tribe is one of 107 federally recognized Indian tribes in California. The Tribla Hazard Mitigation Plan (THMP) addresses all the property, infrastructure, and natural environment of the Reservation and under the authority and control of the Tribe. The plan is purposely exclusive of specific sites in its address to protected historical, religious, and cultural resources outside of the Reservation, as the interest in their protection is greater than the potential benefit of identifying their location in this plan.

The Morongo Tribal Council functions as legislative body of the Tribe and additionally manages tribal economic enterprise functions that are normally outside the scope of other governmental agencies. The Tribe provides full municipal like services to its residents including, security, fire, public work functions, water and wastewater treatment, environmental protection, waste management and recycling, natural and cultural resource preservation, emergency management, and other functions typical of a functioning community. According to the United States Census Bureau's "Profile of General Demographic Characteristics: 2010 the population on the Reservation is 1,353 persons.

2.7.7 Pechanga Indian Reservation

The Pechanga Indian Reservation borders the City of Temecula to the northwest, the Town of Rainbow to the southwest, and the Cleveland National Forest to the south and east. The General Council of the Tribe is made up of the adult voting members of the band and elects the Pechanga Tribal Council. The Pechanga Indian Reservation encompasses over 6,700 acres with the most recent lands added in 2008. The current land use is mostly rural residential, with homes generally located along the central portion of the reservation along Pechanga Creek.

2.7.8 Ramona Band of Cahuilla

The Ramona Band of Cahuilla is a southern California Indian tribe whose reservation is located approximately thirty miles east of Temecula and four miles north of the unincorporated town of Anza, off Highway 371 in Riverside County. The Ramona Reservation was set aside by Executive Order in 1891 and a trust patent for the Reservation was issued in 1893.

The Ramona Reservation encompasses approximately 560 acres. The Reservation is situated at the southwestern base of Thomas Mountain in the southern San Jacinto Mountains. Hog Lake Road provides the only access to the Ramona Reservation.

There are 3 homes on the Reservation and seven residents. There are also several additional buildings, including a maintenance yard, a power house and 5 yurts associated with the Band's Eco-tourism project. All electricity for the homes/buildings is provided by hybrid electrical systems consisting of solar and wind generation with generator back-ups. None of the homes/buildings on the reservation are connected to the "grid".

In early 2017, approximately 82 acres of land were transferred from fee simple into trust status by the Ramona Band of Cahuilla. Thus, the lands are now tribal lands under the jurisdiction of the Ramona Band of Cahuilla. The lands transferred include approximately 75 acres along Bautista Road just south of the Ramona Reservation and approximately 6.73 acres along SR 371 in Anza.

There are three (3) buildings located on the lands in Anza. The buildings included the Ramona Band's administrative offices and library. Each of the buildings has access to the power grid. Water is provided to the buildings via wells located on the property, and each of the buildings has a septic system. Moreover, a tiger tank of 5000 gallons provides water storage for use, if needed, for fire suppression.

The lands located along Bautista Road are all unimproved. One of the parcels lies at the junction of Bautista Road and Hog Lake Road and is the access point to the Ramona Reservation. The other parcels are covered with vegetation.

2.7.9 Santa Rosa Indian Reservation

The Santa Rosa Band of Cahuilla Indians Reservation is part of an area, which has been occupied by the Cahuilla for the past 1,000 years. The Reservation consists of 11,021 acres in four separate parcels and is located in the Santa Rosa Mountains near the community of Anza in Riverside California.

They are descendants from the Mountain Cahuilla Band, which historically occupied the mountains south of San Jacinto Peak. The largest parcel is called the Santa Rosa Parcel

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and is located 1.25 miles east of the junction of SR –74 and SR – 371. Three separate parcels completely occupy Sections 32, 34, and 36 of T7S, R5E and are one-mile southeast of the main Santa Rosa Parcel. The parcel in Section 34 is called the Old Village Parcel, where their ancestors first settled and the parcel in section 36 is called the Toro Parcel, which is leased out as a microwave relay communications site.

The Santa Rosa Reservation was established on February 2, 1907, under authority of the Act of 1891 as amended. The Act of April 17, 1937 authorized the Secretary of the interior to purchase 640 acres to be held in trust for the Tribe. All reservation land is tribally owned and un-allotted, though some of the land is under assignment and has been passed from generation to generation.

Currently there are approximately 70 people living on the reservation. They are a customs and traditions tribe with a total of 118 members. A tribal council governs with members elected to two-year terms. Because of the very limited size of the band, the Tribal Council also acts as the Planning Committee.

2.7.10 Soboba Band of Mission Indians

The Soboba Band of Luiseno Indians ancestral home is the Soboba Reservation located on the San Jacinto River at the base of the western foothills of the San Jacinto Mountains in Riverside County, California. The Tribal trust lands consist of approximately 7,877 acres of reservation including a large parcel of adjoining undeveloped property called the "Jones Ranch". The current population on the Soboba Reservation is approximately 1,200.

2.7.11 Torres-Martinez Indian Reservation (partly in Imperial County, California)

The Torres Martinez Desert Cahuilla Indians (Tribe) is a Sovereign Indian Nation and a federally recognized Indian Tribe located in Southern California. Its Tribal land base was established by Executive Order of the United States Federal government on May 15, 1876 as the Torres Martinez Reservation. The Tribal land base consists of 24,822 acres of harsh rugged desert terrain in a checkerboard pattern located in the most rural parts of the Coachella Valley in Southern California. A portion of the Tribal area is submerged under the Salton Sea. The Reservation lands straddle Imperial and Riverside Counties and lie about 50 miles north of the US – Mexico International Border. Temperatures reach 120 degrees Fahrenheit in the summer.

The majority of those living on the reservation live in the Tribe's housing development project which was funded by HUD (36 homes) located about 6 miles away from the Tribe's headquarters (boundaries: Avenue 62 North, Avenue 64 South, Monroe St./Wilma Jean Way West, and Jackson St. East).

The Tribal school-age children who live on the reservation for primarily attend public schools (Grades K-12th) administered by the Coachella Valley School Unified District (CVUSD) or the Desert Sands Unified School District (DSUSD). Several public schools are located within or near the reservation boundaries of the Tribe.

2.7.12 Twenty-Nine Palms Indian Reservation (partly in San Bernardino County)

The Twenty-Nine Palms Band of Mission Indians is a United States federally recognized Tribe located in Southern California. The Tribe's members are descendants of the Chemehuevi, who are indigenous people that migrated from the Colorado River area. Geographically, the Tribe has two Reservation sections located near the City of Twenty-nine Palms in San Bernardino County and near the City of Coachella in Riverside County. The San Bernardino County section contains 150 acres of undeveloped land which is adjacent to the Joshua Tree National Park. The Riverside County section contains 242 acres, which has rights-of-way for the Interstate 10 freeway and State Highway 86. On this section, the Tribe has an operating Class 3 Gaming Facility, Tribal Administrative Offices, and Tribal Environmental Protection Agency, which accounts for more than 700 employees. Currently, there is no residential development on either Reservation section.

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2.8 Special Districts

2.8.1 Participating School Districts

Beaumont Unified School District

The Beaumont Unified School District is located in the westernmost portion of Riverside County and is located at the intersection of Interstate 10 and Interstate 60. The District is west of the city of the Banning, North of the city San Jacinto, east of the city of Calimesa and unincorporated areas of Riverside lie to the north and east. The student population of the school district is 9,719.

Desert Sands Unified School District

The Desert Sands Unified School District is a pre K-12 grade school district located in the heart of Riverside County's Coachella Valley. DSUSD currently has 34 school sites. Included here are 20 elementary schools, 7 middle schools, 6 high schools, and 1 Early Childhood Education Center. Alternative education and continuation programs are offered at two of the district's high schools, Summit/Horizon and Amistad. DSUSD serves the communities of La Quinta, Palm Desert, Indio, Indian Wells, Bermuda Dunes, and portions of Rancho Mirage and Coachella, California. The combined student population of DSUSD is approximately 30,000 students. In addition to the schools, DSUSD also has a District Education Center complex, and Maintenance and Transportation facilities located in the City of La Quinta.

Hemet Unified School District

The HUSD is a public school district in Riverside County in the San Jacinto Valley of California. Broken down into 3 categories of schools, with it is approximately 1,250 certificated staff are employed by the district, along with approximately 1,480 classified employees plus approximately 960 substitutes, the district employs over 3,690. These employees work from our 28 sites and district offices to serve our student enrollment of over 21,700. The District serves the cities of Hemet, Anza, Aguanga, Winchester, and Idyllwild.

Lake Elsinore Unified School District

The Lake Elsinore Unified School District (LEUSD) was formed in 1989 when Elsinore Union High and Elsinore Elementary merged and unified. It covers 140 square miles including the city of Lake Elsinore, Canyon Lake, Wildomar, as well as a portion of North Murrieta including the communities in and around Ortega Highway and Horsethief

Canyon. Lake Elsinore Unified serves several communities with a combined population of approximately 100,000 and specifically educates 22,000 students.

Moreno Valley Unified School District

The Moreno Valley Unified School District is located in the western portion of Riverside County. The District is bound by the City of Perris to the south, and the City of Riverside to west. The District is bounded by the unincorporated areas to the north and east. The student population of the school district is 34,000.

Perris High Unified School District

The Perris Union High School District (PUHSD) is located in the City of Perris, a community fifteen miles southeast of the City of Riverside. PUHSD covers approximately 184 square miles and includes the City of Perris, City of Menifee and the unincorporated communities of Romoland as well as a portion of Nuview.

PUHSD currently educates approximately 9,000 students residing through (1) 7-8 middle school, (3) comprehensive high schools, (2) alternative high school programs and (1) dependent charter military school. The school district also provides adult educational services.

Riverside Community College District (RCCD)

Riverside Community College District is a three-college higher education system serving residents of Riverside and surrounding counties in California. It is the seventh oldest community college in the state and the fifth largest. RCCD colleges are located in the cities for Riverside, Moreno Valley and Norco. The District's service area is over 450 square miles with a wide range of social, economic, and ethnic diversity in one of the most rapidly growing counties in the nation. Colleges and Annex sites sit within 1/2 mile of major California Freeways and Railroad tracks. Riverside Community College District's average enrollment exceeded 35,000.

Riverside County Office of Education (RCOE)

RCOE directly serves over 8,368 students; over 2,100 of those students are classified as special needs students.

RCOE has a total of 138 sites: (4) School of Career Education campuses (Accredited post-secondary occupational training programs); (14) Career Technical Education sites at district school locations; (40) RCOE Alternative Education program sites on school district sites, independent RCOE sites, and detentions; (40) Special Education program sites located on school districts sites, RCOE sites as well as youth/adult Jails/detention

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centers; and (22) Head Start / Migrant Head Start sites. Three of which are located in Imperial County with one site approximately 1-mile from the Mexico border.

RCOE provides support and professional development opportunities to (23) school districts comprised of (4) Elementary Districts; (1) High School District; and (18) Unified school districts (totaling over 407 K-12 school sites and representing over 427,000 students, 30,000 of those students are classified as special needs students). In addition to providing services to county school districts, RCOE provides support to: one (1) Tribal school; one (1) California School for the Deaf; four (4) community colleges; and twenty-seven (27) charter schools.

Riverside Unified School District

Riverside Unified School District (RUSD) covers just over 92 square miles and encompasses most of the City of Riverside from Van Buren Blvd. and La Sierra Ave. to the west, the Santa River and County line to the north, the city limits to the east and the unincorporated areas of Lake Mathews and Woodcrest to the south.

Riverside Unified is currently the 15th largest school district in the state serving approximately 42,300 K-12 students. The district has 30 elementary schools, 7 middle schools, 5 comprehensive high schools, two continuation schools, one virtual school, and one special education school. The school district also provides pre-school and adult educational services.

San Jacinto School District

San Jacinto School District is in the City of San Jacinto that encompasses seven (7) elementary schools, three (3) middle schools, one (1) traditional high school, one (1) continuation high school and two (2) pre-schools for a total of 14 schools. The jurisdiction also includes a District Office, Facilities and Operations Department, and Nutrition Services. The San Jacinto Unified School District has a staff number of 1,522 and student population of 9,825. San Jacinto School District has a total population of 11,347.

2.8.2 Fire Protection

Idyllwild Fire District

The Jurisdiction is a Special Fire District located in the unincorporated mountain community of Idyllwild, located in Riverside County. It is approximately 5 square miles in area located about 60 miles east of the county seat, the City of Riverside. The community of Idyllwild is surrounded on all sides by the San Bernardino National Forest and is transected from NE to SW by Strawberry Creek. Even though there is a creek running through the community, there is no land that would be considered "flood plain".

The "District" is in mountainous terrain running from 5,000' to 6,500' elevation in a mixed conifer forest fuel type. The Clark section of the San Jacinto Fault runs NW to SE and is SW of the community approximately 7 miles at the closest point. The San Jacinto Fault is considered to be the most active fault in Southern California (D.M. Morton and J.C. Matti, USGS 2005, revised 2008)

Idyllwild averages 26 inches of rain per year with some of that falling as snow in three to four storms per winter. Summer thunderstorms also contribute to the rainfall total as well as wildland fires from lightning.

2.8.3 Health Care Facilities

Kaiser

Kaiser Permanente, as a whole, had 10.2 million health plan members, 186,497 employees, 18,652 physicians, 51,010 nurses, 38 medical centers, and 622 medical offices reported in 2015. The non-profit Kaiser Foundation Health Plan and Kaiser Foundation Hospitals entities reported a combined $1.9 billion in net income on $60.7 billion in operating revenues. Each Permanente Medical Group operates as a separate for-profit partnership or professional corporation in its individual territory, and while none publicly reports its financial results, each is primarily funded by reimbursements from its respective regional Kaiser Foundation Health Plan entity. KFHP is one of the largest not for profit organizations in the United States.

Kaiser Permanente Riverside Medical Center is a general medical and surgical hospital in Riverside, CA. Kaiser Permanente Riverside Medical Center has 226 beds and was opened in 1989. Currently, we provide care for over 500,000 members throughout Riverside County.

2.8.4 Water Districts

Eastern Municipal Water District

Eastern Municipal Water District (EMWD), headquartered in Perris, California provides water, wastewater and recycled water service to nearly 800,000 people across a 555 square mile service area from Moreno Valley to Temecula and east to the San Jacinto Valley. EMWD is California's sixth largest water provider and the largest in Riverside County and was established in 1950 through a public vote. It is one of 26 member agencies of The Metropolitan Water District of Southern California. EMWD owns and operates two potable water filtration plants, two groundwater desalination facilities, four regional water reclamation facilities, more than 2,400 miles of potable water pipeline, 1,800 miles of sewer pipeline and 200 miles of recycled water pipeline. EMWD's water

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supply sources include local groundwater (potable and desalinated), imported water from the Colorado River and State Water Project systems and recycled water. EMWD also wholesales to seven water agencies within or adjacent to its service area boundaries.

Imperial Irrigation District

Imperial Irrigation District (IID) was formed under the State Water Code and is considered a Special District under the governance structure of the State of California. IID is the energy provider to all of Imperial County and portions of Riverside and San Diego Counties, and is also the raw water provider to all municipalities and agricultural users in Imperial County. Throughout the past several years, the district's water and energy operations have been impacted by severe storms (micro bursts), floods and earthquakes varying in magnitude, with the largest being 7.2 on the Richter scale. Imperial Irrigation District provides service to 100,000 customers in the County of Riverside.

Rancho California Water District

The Rancho California Water District (RCWD) serves the area known as Temecula/Rancho California, which includes the City of Temecula, portions of the City of Murrieta and unincorporated areas of southwest Riverside County. The area served is approximately 156 square miles in area and is 42 miles east of the County seat, the City of Riverside. The population of the RCWD service area was estimated 108,920 in 2015.

High Valleys Water District

The High Valleys Water District, Banning, CA, is located in an unincorporated area known as Twin Pines/Poppet Flats, in Riverside County in the Coachella Valley of California. It is approximately 5 square miles in area and is 44 miles east of the County seat, the City of Riverside. The High Valleys Water District was founded in 1971 and serves the Poppet Flats, Twin Pines and Mt. Edna communities. Since they do not have any natural water resources, they purchase our water (which is already treated) from the City of Banning. The water is pumped up eight (8) miles to the mountain through three separate booster stations, into three storage tanks and 40 miles of pipe and delivered to approximately 225 customers. They have five (5) elected Board members, a Board Secretary, Office Administrative Assistant, a General Manager, two Field Techs, and an on-call/as-needed office assistant. There is no sewer service as the communities are all on septic tanks. Some residents have well-systems, which annual backflow testing is done at those locations.

Santa Ana Watershed

The Santa Ana Watershed Project Authority is a Joint Powers Authority formed in 1969 by Eastern Municipal Water District, Inland Empire Utilities Agency, Orange County Water District, San Bernardino Valley Municipal Water District and the Western Municipal Water District. One of SAWPA's main functions is to operate the Inland Empire Brine Line, a 73-mile large diameter regional brine disposal system created to protect water quality in the Santa Ana River and its tributaries. The Brine Line is located in both San Bernardino and Riverside Counties. The Brine Line collects high salt discharges from municipal groundwater treatment plants, power plants, various industries and it serves as an emergency connection to several municipal wastewater treatment plants. Currently, there are a total of 32 active facilities discharging to the Brine Line. All flows collected by the Inland Empire Brine Line are conveyed to Orange County Sanitation District Facilities for treatment and disposal.

The Inland Empire Brine Line serves the portion of the Santa Ana River Watershed within Riverside (1,244 sq. miles) and San Bernardino (1,014 sq. miles) Counties. According to the 2010 U.S. Census, the total population within the Inland Empire Brine Line service area is 3,415,953 inhabitants: 1,686,024 in Riverside County and 1,729,929 in San Bernardino County.

Western Municipal Water District

Western Municipal Water District is a Special District in Riverside County in the Inland Empire of California. It services approximately 510 square miles in area and serves portions of the Cities of Riverside, Corona, Perris, Murrieta, and Norco, as well as unincorporated areas of Western Riverside County. The District has areas adjacent to Orange County on its western boundary, San Bernardino County on its north and eastern boundaries, and San Diego County to the south. The Burlington Northern & Santa Fe Railroad and California State Highways 90 and 215 both run alongside sections of the perimeter of the District in Riverside and Perris. Interstate Highway 15 runs along a section of the District's service areas near Murrieta and Corona. The Santa Ana River, a waterway that starts in the Mountains and runs through the cities of Riverside, Corona and Norco, is close to the District's northern boundary. Murrieta Creek runs through the District's service area in Murrieta.

Western Municipal Water District was established on January 19, 1954. On November 12, 1954 Western was annexed to and became a member of Metropolitan Water District of Southern California providing water for mostly agricultural use. In the early 1960's Western began retail water service to domestic water customers. Western originally depended on Colorado River water and in 1979 it changed its primary source of water to

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the State Water Project drawing water from Northern California. Today the District serves over 25,000 retail and eight wholesale customers.

Section 3.0 - The Planning Process

While the Disaster Mitigation Act of 2000 ("DMA 2000") requires that local communities address only natural hazards, the Federal Emergency Management Agency (FEMA) recommends that local comprehensive mitigation plans address man-made and technological hazards to the extent possible. In the 2012 Multi-Jurisdictional Local Hazard Mitigation Plan, the Riverside County Operational Area (RCOA) addressed an expansive set of hazards. Upon review of the hazards since 2012 and the number of incidents that had man-made causes, the Riverside County OA will continue to address the large set of man-made and technological hazards.

The 2017 Riverside County Multi-Jurisdictional Local Hazard Mitigation Plan update review process initially started August 2016.

3.1 Planning Process Overview

The Riverside County Emergency Management Department (EMD) formed an internal EMD Planning Team, a Local Hazard Mitigation Plan Steering Committee and continued to utilize the Operational Area Planning Committee (OAPC) as an external planning committee.

Each Planning Team was comprised of various EMD personnel, Riverside County Department leaders, emergency managers and key personnel to discuss the most practical methodology to review and update Riverside County's 2017 plan.

A plan template and other various tools were developed and sent to participants to assist them with creating a new plan or to review and update their existing plan. The County held multiple meetings, workshops and conference calls to assist participants with drafting or updating plans.

(See Appendix B for Participants).

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3.2 Hazard Mitigation 2017 Planning

Riverside County recognizes the importance of involving all of the stakeholders and utilized the following planning methodologies:

- Reviewed the process of risk assessments and hazard identification with all submitting participants
- Reviewed mitigation actions that are proposed, pending and completed
- Encouraged participation with the planning process by holding community meetings, individual workshops and conference calls
- Coordinated staffing resources to cities and special districts to assist with plan development and provided pertinent detailed information specific to jurisdictions
- Posted information on official Riverside County Emergency Management Department websites
    - RivCoEMD.org
    - RivCoReady.org
- Provided a list of upcoming mitigation training information on Riverside County Public Health Emergency Preparedness and Response (PHEPR) website
    - RivCoPHEPR.org

Project Pre-Plan Research:

- Reviewed the 2012 LHMP, Crosswalk and Comments from Reviewer
- Reviewed the 2013 Local Mitigation Planning Handbook (FEMA)
- Reviewed the 2011 Local Mitigation Plan Review Guide
- Reviewed the 2013 State of California Multi-Hazard Mitigation Plan
- Identified gaps and discuss findings with management team
- Determined resolutions for gaps and discuss what updates are necessary

Project Plan

- Continually update the Operational Area Plan
- Perpetual maintenance of Local Hazard Mitigation Plan
- Engage all participants through outreach efforts
- Submittal of participant annex and worksheets

3.3 2012 LHMP Tools

The LHMP Steering Committee determined the best approach was to use the tools that were developed in 2009 to assist in updating the LHMP. The following worksheets and

tools were utilized as a reference for each jurisdiction to evaluate its capabilities, determine its need and to assist in developing goals and strategies:

- Local Jurisdiction Contact Information worksheet
- Hazard Identification Questionnaire
- Specific Hazards Summary Worksheet
- Jurisdiction Vulnerability Worksheet/ Severity Table
- Local Jurisdiction Proposed Mitigation Action and Strategy Proposal
- Local Development Trends Questionnaire
- Provided website: http://myplan.calema.ca.gov
- EMD personnel assigned to assist with the development of the plan and provide additional information when necessary
- Hosted and provided facilities for workshops
- Developed and provided step by step instruction guides
- Provided assistance via email, phone calls and one-on-one meetings
- Assisted jurisdictions obtain/create maps
- Provided maps for individual jurisdictions
- Provided incident information for their jurisdiction or authority
- Provided information on mitigation trainings and seminars

3.4 Participating Jurisdictions Planning Process

The 2017 LHMP has a variety of participants and parties with vested interest across the County. The submitting participants include cities, education, fire protection, hospital, and water districts.

The Participants List is found in Section 1.4 or Appendix B: Participants.

The goals of the Operational Area are to ensure the plan is comprehensive and easy to utilize and implement. The final 2017 Multi-Jurisdictional Local Hazard Mitigation Plan consists of the Riverside County Operational Area Plan and the individual Annexes. Each annex is designed to be a stand-alone Local Hazard Mitigation Plan for the cities and special districts, yet clearly show a linkage to the Operational Area Plan, other County Plans (e.g. County General Plan) and the State Hazard Mitigation Plan. (See Annexes A1-46)

The 2017 LHMP outreach presentations were given in 12 community outreach meetings, 12 LHMP workshops and 32 meetings were held with individual cities or special districts. (See Appendix D)

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During the LHMP process, participants were provided directions on how to complete the "Annex" and other templates. Resources provided to participants included: worksheets, templates, examples, websites, mapping sites and other resources to assist in the process. Riverside County Emergency Management Department personnel were available to assist each participating jurisdiction during the LHMP process.

Additional information and resources were emailed to the participants as they became available through "E-Blasts" (mass email sent to every participant). An example is the "My Plan" mapping website on the Hazard Mitigation Portal for Cal OES.

A flexible timeline was presented in the meetings, and sent out via email as changes occurred. The review process of the draft annexes is outlined as follows:

- Participants submitted draft LHMP via email to EMD for review and comments.
- EMD reviewed plans, crosswalks and inventory worksheet to ensure completeness
- Checklists were utilized to document all components of the plans were complete and accompanied with all worksheets and attachments referenced in the plan
- Acknowledgement and checklists were sent back to the participants noting identified gap findings and comments. We requested additional information as necessary
- After revisions were completed by participants, the draft was resubmitted to EMD for adoption into the Multi-Jurisdictional Local Hazard Mitigation Plan
- All correspondence, meetings, and conference calls were recorded in a database to track status of plan

3.5 Regional Planning Process (Riverside County Operational Area)

The Operational Area began the regional planning process by creating the EMD Planning Team who has extensive experience in Emergency Management and vast knowledge of the hazards and mitigation efforts in Riverside County.

EMD's external LHMP Steering Committee included EMD Management and the Operational Area Planning Committee (OAPC). The committee includes representatives from EMD, the Board of Supervisors, city emergency managers, city elected officials, tribal representatives, school districts and special districts. The initial coordination of the LHMP update process was presented to the OAPC attendees and letters of commitment and participation were sent via email to reginal stakeholders through the Operational Area Planning Committee distribution list.

The quarterly Operational Area Planning Committee (OAPC) meetings are intended to engage:

- local jurisdictions
- businesses
- non-profit organizations
- faith-based organizations
- governmental agencies
- tribal communities
- special districts
- educational institutions
- utility companies
- public transportation
- healthcare facilities

The Operational Area Planning Committee (OAPC) Mission:

- To provide facilities, systems, and emergency management training for the officials of the Riverside County Operational Area, including County and City government personnel and participating special districts.
- To effectively and efficiently manage a disaster affecting jurisdictions within the Riverside County Operational Area (Govt. Code 8550 et. seq.).

The Riverside County Operational Area is governed by the Board of Supervisors and the Operational Area Planning Committee (OAPC). OAPC meets quarterly.

OAPC has several subcommittees who are responsible for determining the use and distribution of funds from grants channeled directly through the Operational Area, i.e., Homeland Security, Buffer Zone Protection Plan grant programs, Local Hazard Mitigation Steering Committee, Mass Care and Shelter Task Force and Community Emergency Response Team (CERT) Program Manager Committee.

Please see Appendix D: Meetings for list of OAPC attendees and sign-in sheets.

3.6 EMD Planning Team

The internal EMD Planning Team consists of the EMD Management and key personnel of EMD. The job classifications of the committee included:

- Director
- Deputy Director
- Program Chief II

- Emergency Services Manager
- Program Coordinator II
- Emergency Services Coordinators (7)
- Emergency Medical Services Specialist (3)
- Senior Health Educator
- Health Education Assistant
- Volunteer Services Program Manager
- Grants Personnel (Administrative Services Analyst II, Contracts and Grants Analyst and Account Technician II)
- Office Assistant III
- Secretary

EMD as a whole department is structured to resemble the Incident Command System (ISC) Organizational Chart. There are four divisions; Preparedness, Operations, Business and Finance, and Emergency Medical Services. The Department is able to expand or contact similarly to ICS and places an importance on Span of Control. The following pages have figures of the Emergency Management Department Organizational Chart.

Figure 12: Riverside County Emergency Management Department Organizational Chart:

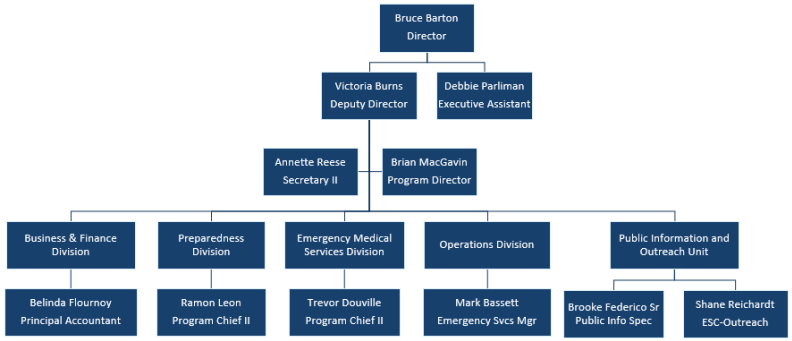


Figure 13: EMD Preparedness Division

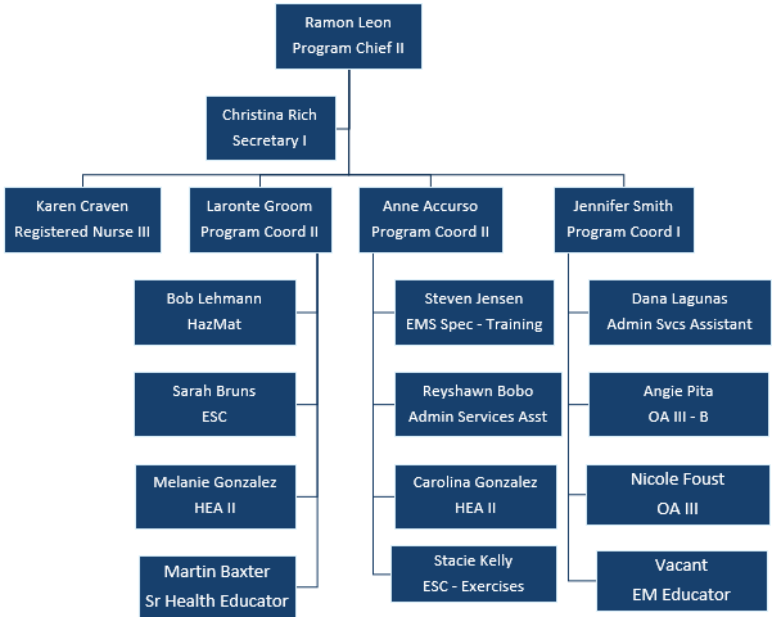


Figure 14: EMD Operations Division

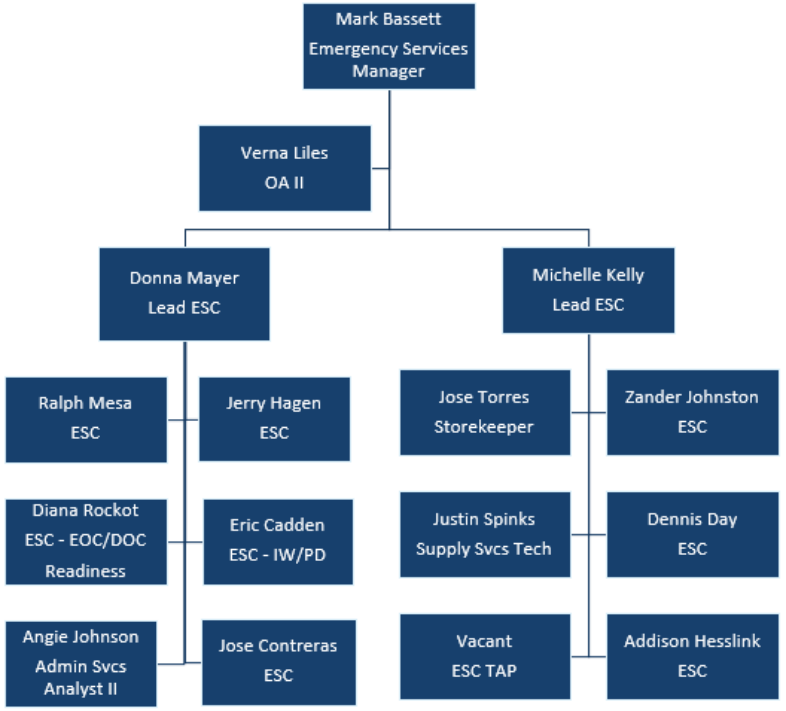


Figure 15: EMD Riverside Emergency Medical Services Agency Division

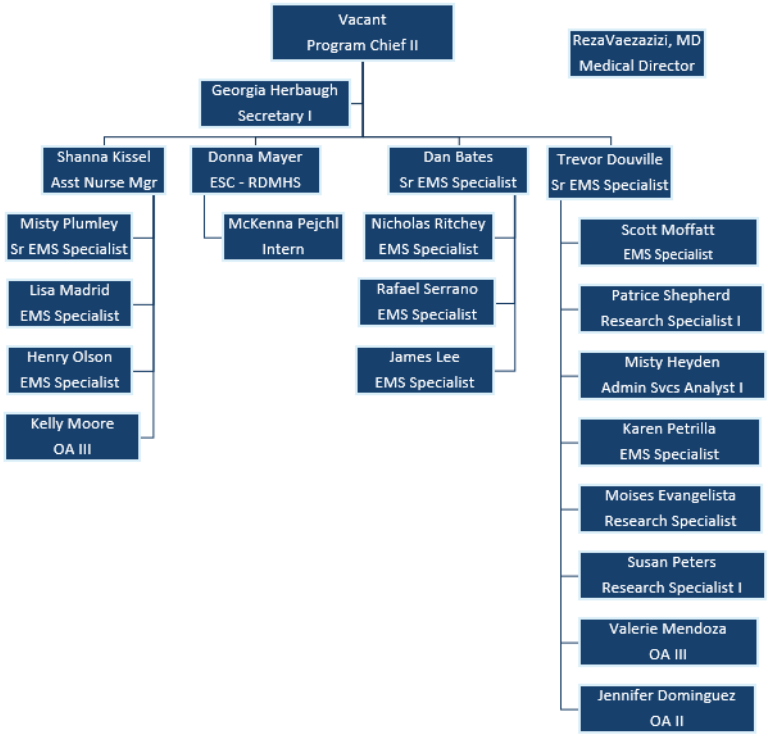
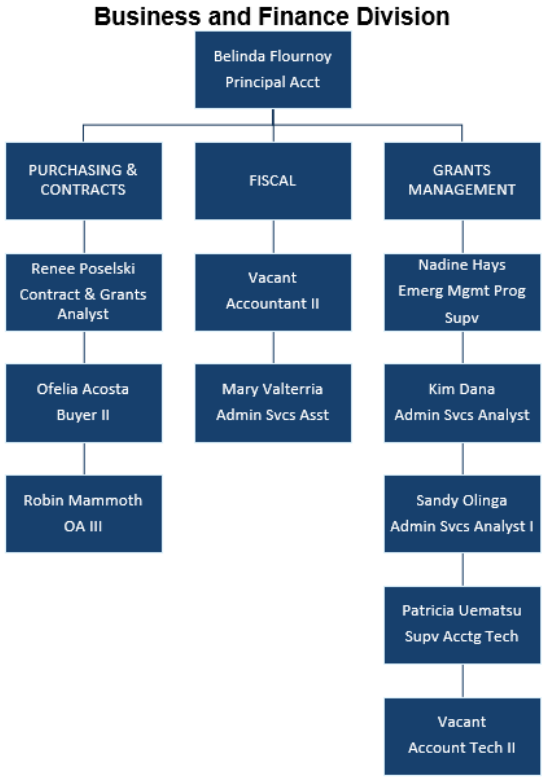


Figure 16: EMD Business and Finance Division



3.7 LHMP Steering Committee Partners

Riverside County recognizes that any successful planning activity, such as the development of a comprehensive plan, involves bringing together a cross-section of the public to reach consensus on how to achieve a desired outcome or resolve a community problem. Using this inclusive process, the public gains a better understanding of the problem or issue and strives to develop a vision along with goals, priorities, and actions.

The result is a common set of community values and widespread support for directing financial, technical, and human resources to an agreed upon course of action, usually identified in a plan. The same is true for mitigation planning. An effective and open public involvement process ensures that all citizens understand risks and vulnerability so that they will work with the jurisdiction and support policies, actions and tools that over the long-term will lead to reduction and/or eliminate long-term risk to human life and property in the event of a disaster or hazard.

An introductory meeting was held with County Department leaders and a presentation given to develop a planning and review process. The following table identifies the agencies that were represented.

Table 5: Internal Steering Committee Partnering Agencies

DEPARTMENTS	POSITION	TOPIC
Agricultural Commissioner's Office	Deputy Ag Commissioner	Insect Infestation, Drought
Animal Services	Commissioner of Field Services, Lieutenant of Field Services	Animals affected
Assessor's Office	Secretary	Population and Building Data
Cal OES	Emergency Services Coordinator	Drought, Earthquake, Insect Infestation, State Representative
Economic Development Agency	Aviation Facilities Specialist/Grants, Aviation Secretary, Assistant Director, Facilities Management Division	Population and Demographics

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Emergency Management Department	Program Director, Program Coordinator II, Emergency Services Coordinator, Health Education Assistant, Office Assistant	Goals and Objectives, Nuclear, Power Outage, Pipeline, Communication Failure, Cyber Attack, Extreme Weather, Landslides, Aqueduct
Environmental Health	Deputy Director	Hazardous Materials, Earthquake
Flood Control	Principle Engineer	Dam failure, Flood Hazard
Imperial Irrigation Water District	Emergency Services Coordinator	Aqueduct, Power Outage
NOAA	Acting Meteorologist In Charge	Extreme Weather, Drought
Public Health	Branch Chief	Pandemic and Disease/Contamination,
RC-HR / County Hospitals	Safety Coordinator	Health Care Facilities, Health Impact, Behavior Health
Riverside County Fire	Chief, Division Chief	Wildfire, Pipeline, Transportation and Hazardous Materials
Riverside County IT	Deputy Chief Information Security Officer, Chief Information Security Officer, Information Technology Officer II, Supervising Communications Analyst	Communication Failure and Cyber Attack
Riverside County Office of Education	Safety, Emergency Preparedness Coordinator	Schools, Shelters, Critical Facilities
Sheriff's Office	Sergeant	Civil unrest, Jails, Terrorism
SoCal Edison	Local Public Affairs Officer	Power Outages
SoCal Gas	Public Affairs Manager	Pipeline
Transportation and Land Management Agency	Chief Engineering Geologist, Admin Services Manager	Earthquake, Landslide, GIS, General plan references

Various portions of the 2012 plan included information that was provided by internal county departments. These sections were highlighted and given to the originating departments for review, comments, and updates by utilizing the following methodology:

- Review information provided and identify necessary corrections for updates
- Review definition for hazards to ensure accuracy
- Provide any additional incidents that occurred between 2012 to present
- For revisions or updates, provide supporting documentation with credible sources including but not limited to, studies (planning, safety, mitigation, etc.) maps, charts, tables, photos, surveys, cost-benefit analysis or technical guidance
- Facilitate discussions for each hazard prioritization and mitigation measure
- Develop a group or team from your department to review the document and changes prior to sending the information back to EMD
- Contact EMD to answer any questions or to provide additional comments
- Provide updated maps
- Return all revisions to EMD

The Transportation and Land Management Agency (TLMA) provided updated county-wide maps that had been included in the 2012 Multi-Jurisdictional Plan and the County's 2015 General Plan.

As part of the planning process, a review of the unincorporated area was conducted to assess existing and new hazards through utilization of MyPlan though Cal OES.

Emergency Management Agencies in the neighboring and surrounding counties were contacted to discuss their mitigation efforts and plans, inclusive of:

- Orange County
- San Bernardino County
- San Diego County
- La Paz County (Arizona)

Outreach was conducted with tribal communities in Riverside County. Most of the tribes have completed Tribal Hazard Mitigation Plans. The participating tribe that joined the County in the 2017 update expressed their intent to build a stronger partnership with the County.

(See Section 2.7 for all tribes located in Riverside County)

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3.8 Public Outreach

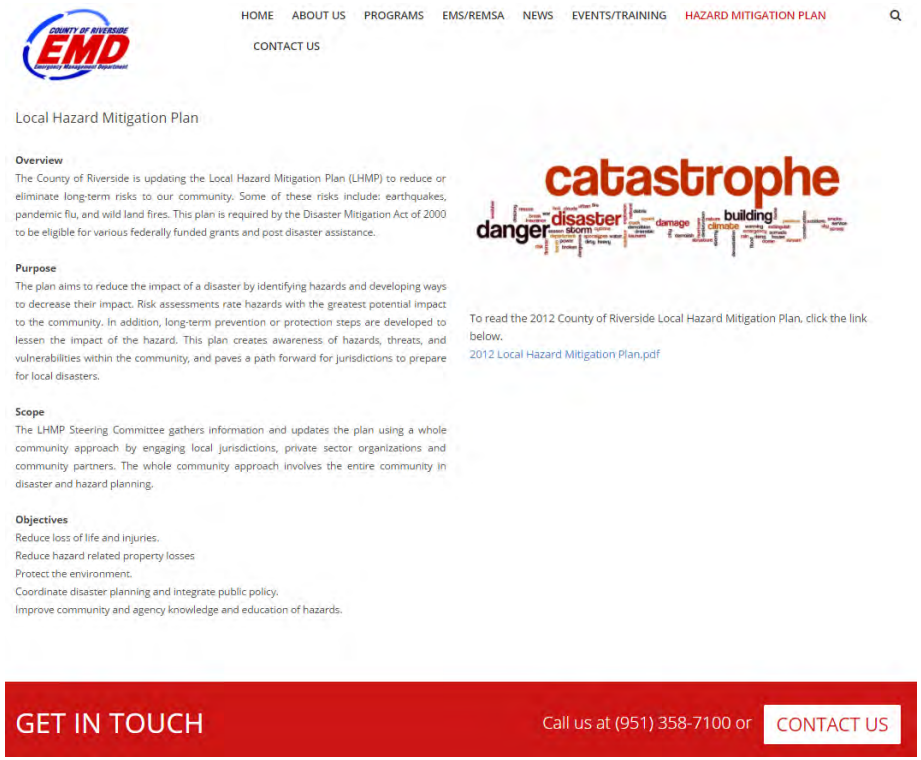
Public notice of the LHMP update was posted on the Emergency Management Department Website (RivCoEMD.org), Twitter and announced at various community meetings throughout the County. All meetings were open to the public and allowed public comment. The audience represented various vested individuals who provided input, insight, and concerns regarding the hazards affecting their specific communities. Comments made were regarding the incorporation of particular hazards that the plan already addresses.

(Please see Appendix D for all outreach and meeting information)

In an attempt to seek public comment postcards with LHMP and National Flood Insurance Program (NFIP) information was distributed thought the County. The post cards will be presented at County owned Fire stations as well as community events. Every year during National Preparedness Month the postcards will be distributed again to continue to seek comments throughout the plan cycle. English and Spanish versions were available. For 2017 National Preparedness Month locations where postcards were distributed, please see Appendix D.

Figure 17: EMD LHMP Website

LHMP URL: http://www.rivcoemd.org/LHMP



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Figure 18: Twitter Post

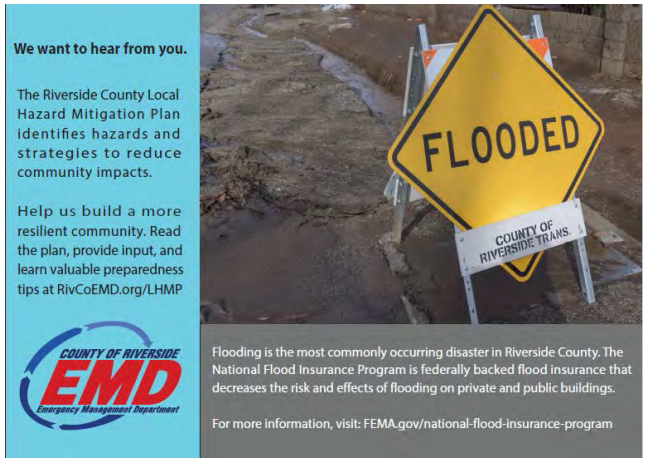
Twitter URL:
https://twitter.com/RivCoReady?ref_src=twsrc%5Etfw&ref_url=http%3A%2F%2Frivcoemd.org%2Frivcoready%2F



Figure 19 LHMP Postcard Side 1



Figure 20 LHMP Postcard Side 2



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Figure 21: LHMP Spanish Postcard Side 1



Figure 22: LHMP Spanish Postcard Side 2



3.8.1 Hazard Mitigation Meetings

Internal EMD Planning meetings were held to discuss review findings and the process was planned as explained in Section 3.1. The EMD Planning Team met regularly to discuss plan progress, participant status and any other matters as necessary.

Organizational efforts were initiated with the County and participating jurisdictions to inform and educate the plan participants of the purpose and need for updating the countywide hazard mitigation plan. An initial meeting was held with key community representatives to discuss the plan update process. The initial jurisdiction kick-off meetings were held on December 6th, 8th, 13th and 15th in 2016. In 2017 workshops were then held the first two weeks of February and June. FEMA's two day course G-318 (Mitigation Planning for Local and Tribal Communities) was hosted by EMD on April 3rd and 4th.

Table 6: Table of Presentations and Meetings

The following table documents public outreach efforts and community meetings:

Public Outreach Presentations and Updates

Date	Name of Meeting, Location	Type of Presentation	Number Attending	Hours
6/22/2016	Western Riverside Emergency Council (WREC) Meeting, Riverside	Informed Council of upcoming Plan update and encouraged participation	19	20 mins.
7/14/2016	Operational Area Planning Committee (OAPC) Meeting, Beaumont	Informed OA on upcoming Plan to update	163	15 mins
9/19/2016	Palo Verde COMM. Meeting, Blythe, CA.	LHMP discussion, Local Hazard Mitigation Plan update process, encouraged East County participation and Public Outreach	16	1
9/29/2016	Email Distribution #1	Email blast, Distributed contact verification emails for partnering jurisdictions and agencies. Provided LHMP informational guides and resources.	_	_

10/6/2016	Local Hazard Mitigation Plan Steering Committee Kick-Off for County Departments	Overview of Hazard Mitigation FEMA 2011 LHMP Review Guide Update Process County Inventory Checklist County Risk Assessment Participants, New, Returning, and Not Participating	19	2
10/11/2016	Emergency Management Project Committee	Project Overview, LHMP introduction, planning process	34	10 mins.
10/13/2016	Operational Area Planning Committee (OAPC) Meeting, Beaumont	Updated OA on progress of update, offered participants opportunity to reach out to county for technical support, offered public opportunity to ask questions and provide comment (no comments made)	64	2
10/19/2016	Steering Committee Email Distribution #1	Informed the members of the google drive that contains LHMP documentation for additional support Informed about the next steps and what about the next meeting date Provided contact information for EMD LHMP staff	_	_
12/1/2016	Email Distribution #2	Invitation to LHMP Template workshop, update on county hazard identification/ranking, and general information on where they should be in the update process	_	_
12/6/2016	Tribal Workshop, Riverside	Overview of Hazard Mitigation FEMA 2011 LHMP Review Guide County Update Process and Progress Mitigation Websites and Resources Technical Support	7	1
12/8/2016	City Workshop, Riverside	Overview of Hazard Mitigation FEMA 2011 LHMP Review Guide County Update Process and Progress Mitigation Websites and	15	2

		Resources Technical Support		
12/8/2016	Mountain Emergency Communications COMM. Meeting, Idyllwild, CA	LHMP discussion, Local Hazard Mitigation Plan update process	7	2
12/13/2016	Special District Workshop, Riverside	Overview of Hazard Mitigation FEMA 2011 LHMP Review Guide County Update Process and Progress Mitigation Websites and Resources Technical Support	8	1
12/15/2016	School District Workshop, Riverside	Overview of Hazard Mitigation FEMA 2011 LHMP Review Guide County Update Process and Progress Mitigation Websites and Resources Technical Support	7	2.5
12/15/2016	Northwest COMM. Meeting, Jurupa Valley, CA	LHMP discussion, Local Hazard Mitigation Plan update process	12	2
12/20/2016	Southwest COMM. Meeting, Murrieta, CA	LHMP discussion, Local Hazard Mitigation Plan update process	6	2
12/29/2016	Steering Committee Email Distribution #2	Sent each member questions about specific hazards that pertained to the department they work for	_	_
1/4/2017	Email Distribution #3	Informed LHMP participants of additional LHMP workshops that will be hosted to provide further assistance	_	_
1/11/2017	Local Hazard Mitigation Plan Steering Committee, Riverside	Group Discussion, Hazard Identification/Ranking Final Review, Mitigation Actions and Strategies Brainstorm	16	2

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1/12/2017	Operational Area Planning Committee (OAPC) Meeting, Beaumont	Updated OA on progress of update, offered participants opportunity to reach out to county for technical support, offered public opportunity to ask questions and provide comment (no comments made)	74	2
1/19/2016	Steering Committee Email Distribution #3	Thanked all members for participating in the previous meeting. Provided the risk scores of the hazards that were discussed at the previous meeting. Provided the most current updates for the mitigation actions from 2012 & asked for each of them to provide new actions for current county hazards. Informed about the next meeting date	_	_
2/7/2017	City Workshop, Riverside	Answered LHMP questions & concerns. Provided additional assistance if needed Reviewed LHMP drafts if needed	10	1
2/8/2017	School District Workshop, Riverside	Answered LHMP questions & concerns. Provided additional assistance if needed. Reviewed LHMP drafts if needed	2	1
2/9/2017	Special District Workshop, Riverside	Answered LHMP questions & concerns Provided additional assistance if needed Reviewed LHMP drafts if needed	4	1
2/14/2017	Email Distribution #4	Informed LHMP participants about the final 2017 LHMP County Hazard Ranking. Talked about a possible LHMP Training that EMD is deciding on hosting Informed about the Senate Bills 1000 & 379. Provided a link to help participants obtain maps for their jurisdiction if they are having trouble with Hazus	_	_

2/23/2017	Email Distribution #5	Informed LHMP participants about the cancellation of the April workshops due to the substation of having the LHMP FEMA Training. Informed about the confirmation of the FEMA G-318 Training that will be hosted April 3-4 and provided the sign-up link. Informed that the June workshops are still going to be held to provide any additional assistance on the plan	_	_
2/27/2017	Riverside County Emergency Managers Committee	Provided Cities and various County Departments information on the status of the update. Offered information on how committee participants could become involved in the planning process		2
3/1/2017	Steering Committee Reminder Email	Reminded members that the date for submitting new mitigation actions for the current top 10 county hazards was approaching	_	_
3/15/2017	Palo Verde COMM. Meeting, Blythe, CA	LHMP discussion, Local Hazard Mitigation Plan update process	18	1.5
4/5/17	Operational Area Planning Committee and Annual Disaster Council Meeting	Updated OA on progress of update, offered participants opportunity to reach out to county for technical support, offered public opportunity to ask questions and provide comment		2
4/21/2017	Steering Committee Email Distribution #4	Provided minutes from previous meeting, informed about reviewing LHMP mitigation actions and goals/objectives, sent calendar invite for next meeting	_	_
4/24/2017	Steering Committee Email	Sent selected committee members to provide input on LHMP hazard profiles depending on the hazard that corresponds to the department they represent	_	_

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6/5/2017	Tribal Workshop, Riverside	Answered LHMP questions & concerns. Provided additional assistance if needed Reviewed LHMP drafts if needed	4	1
6/6/2017	City Workshop, Riverside	Answered LHMP questions & concerns. Provided additional assistance if needed Reviewed LHMP drafts if needed	8	1
6/7/2017	School District Workshop, Riverside	Answered LHMP questions & concerns. Provided additional assistance if needed Reviewed LHMP drafts if needed	6	1
6/8/2017	Special District Workshop, Riverside	Answered LHMP questions & concerns, Provided additional assistance if needed Reviewed LHMP drafts if needed	6	1
7/13/2017	Operational Area Planning Committee (OAPC) Meeting, Beaumont	Updated OA on progress of update, offered participants opportunity to reach out to county for technical support, offered public opportunity to ask questions and provide comment (no comments made)		2
8/17/2017	Local Hazard Mitigation Plan Steering Committee, Riverside	Review completed sections for finalization	10	1
9/2/2017	Indio Preparedness Month Booth, Home Depot, at 42100 Jackson Street from 9 a.m. - 12 p.m.	Personal preparedness and mitigation information		3
9/5/2017	Twitter Post	LHMP and NFIP information		
9/9/2017	Riverside Preparedness Month Booth, Galleria at Tyler, 1299 Galleria at Tyler from 11 a.m. - 3 p.m.	Personal preparedness and mitigation information		4
9/9/2017	Farm Barn, Wildomar Preparedness and Mitigation Presentation	Personal preparedness and mitigation information		1
9/12/2017	County Preparedness Month Booth, County of Riverside Administration Center, 4080 Lemon Street, from 10:30 a.m. - 1:30 p.m.	Personal preparedness and mitigation information		5

9/16/2017	Lake Elsinore Preparedness Month Booth, 710 W. Graham Ave., Lake Elsinore, CA	Personal preparedness and mitigation information		4
9/16/2017	Perris Preparedness Month Booth, Walmart, 1800 N. Perris Blvd from 8 a.m. - 12 p.m.	Personal preparedness and mitigation information		4
9/23/2017	Jurupa Valley Preparedness Month Booth, K-Mart, 7840 Limonite Avenue from 8 a.m. - 12 p.m.	Personal preparedness and mitigation information		4
9/30/2017	Hemet Preparedness Month Booth, Hemet Valley Mall, 2200 W. Florida Ave. from 8 a.m. - 12 p.m.	Personal preparedness and mitigation information		4

Table 7: Participant Meetings

The following table documents participant facilitated meetings:

LHMP Meetings Attended

Date	Location	Type of Meeting	Number Attending	Hours
8/24/2016	City Emergency Operations Center, Riverside	One to One Assistance LHMP Process Familiarity and HAZUS/GIS information	3	1
11/10/2016	Hemet Fire Administration Building, Hemet	Plan review, update process and clarification assistance	3	2.5
11/15/2016	Riverside EMD	Plan review, update process and clarification assistance	2	1
12/13/2016	Conference call to Mather	CA SHMPT Quarterly Meeting	N/A	4.5
12/14/2016	Hemet	Plan review, update process and clarification assistance	3	2
12/15/2016	Moreno Valley	Plan review, update process and clarification assistance	6	1
2/7/2017	Riverside EMD	Plan review, update process and clarification assistance	2	1
3/14/2017	Perris	Participation with Eastern Municipal Water Districts Planning Committee	10	2.5
3/15/2017	Riverside EMD	Plan review, update process and clarification assistance	3	5

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3/28/2017	Riverside EMD	Plan review, update process and clarification assistance	3	2
3/29/2017	Beaumont Police Department	Plan review, update process and clarification assistance	4	2
4/11/2017	Mather	CA SHMPT Quarterly Meeting	N/A	4.5
4/11/2017	Murrieta Fire Administration	Plan review, update process and clarification assistance	4	1.15
4/13/2017	Cathedral City Fire Station	Plan review, update process and clarification assistance	2	2
4/20/2017	Banning City Hall	Plan review, update process and clarification assistance	3	1.5
4/20/2017	Desert Sands USD	Plan review, update process and clarification assistance	4	2
4/25/2017	Calimesa City Hall	Plan review, update process and clarification assistance		
4/25/2017	Temecula City Hall	Plan review, update process and clarification assistance	4	1.15
4/26/2017	Perris	Participation with Eastern Municipal Water Districts Planning Committee	6	2
4/27/2017	San Jacinto City Hall	Meeting with City Manager and staff to discuss joining the County LHMP	5	
5/1/2017	Moreno Valley USD	Plan review, update process and clarification assistance	3	1.5
5/1/2017	Lake Elsinore USD	Plan review, update process and clarification assistance	2	1.15
5/2/2017	Banning - High Valley Water District	Plan review, update process and clarification assistance	3	2
5/3/2017	Indian Wells & Palm Desert	Plan review, update process and clarification assistance	2	7
5/9/2017	La Quinta City Hall	Plan review, update process and clarification assistance	2	1.5
5/17/2017	Beaumont Police Department	Plan review, update process and clarification assistance	5	1.5
5/18/2017	Desert Hot Springs	Plan review, update process and clarification assistance	3	3
5/24/2017	Riverside EOC	Participation in Riversides LHMP planning meeting	6	1
5/25/2017	Wildomar City Hall	Plan review, update process and clarification assistance	3	2
5/25/2017	San Jacinto City Hall	Plan review, update process and clarification assistance	2	2.5
5/31/2017	Murrieta Fire Administration	Plan review, update process and clarification assistance	3	3
6/19/2017	Riverside EMD	LHMP and HMGP assistance for La Quinta	2	1

For complete meeting lists, sign-in sheets, and agendas please see Appendix D.

The public outreach meetings for the LHMP process were conducted in multiple venues. The meetings outlined a brief history of previous hazards, mitigation actions, and the benefits of a multi-jurisdictional hazard mitigation plan in Riverside County.

As part of the public outreach and the regional outreach and planning, the audience was asked at different times during the presentations if there are any hazards they were concerned about, not addressed or problem that has occurred in their living or working areas in the county.

The documented concerns are the following:

- High Winds
- Wildfire
- Earthquake
- Flooding
- Communication Failures
- Lack of trained volunteers
- Information on Jurisdictional Hazards

All of these concerns are being addressed in the hazard profiles located in Section 5, as well as current and future mitigation actions.

For a complete list of actions please see Appendix C

3.9 Existing Plans and Studies

Coordination with other community planning efforts is also paramount to the success of this plan. Hazard mitigation planning involves identifying existing policies, tools and actions that will reduce a community's risk and vulnerability to hazards. Riverside County uses a variety of comprehensive planning mechanisms, such as general plans and ordinances, to guide growth and development. Integrating existing planning efforts and mitigation policies and action strategies into this plan establishes a credible and comprehensive plan that ties into and supports other community programs. The development of this plan incorporated information from the following existing plans,

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ordinances, studies, reports and initiatives as well as other relevant data from neighboring communities and other jurisdictions.

- General Plan
- Zoning Ordinances
- Subdivision Ordinances
- Water Conservation
- Wildfire Ordinance
- California Building Codes
- Riverside County Flood Control Master Drainage Plan
- Safety Element General Plan
- Community Wildfire Protection Plan(s)
- Riverside County Flood Insurance Studies
- Riverside County General Plan and Background Report
- Riverside County Multi-Hazard Mitigation Plan, 2012
- Riverside Operational Area Emergency Operations Plan
- State of California Multi-Hazard Mitigation Plan

Section 4.0 – Updates and Mitigation Actions

4.1 Updates to 2012 Plan

In the 2012 plan cycle, Riverside County identified Pandemic Influenza as a hazard because populations worldwide are at risk for infection and illness. In the past influenza has spread worldwide within months and is expected to spread even more quickly today with air travel. In the 2012 plan Pandemic was ranked fairly low in the list of County hazards. In the 2017 plan Pandemic ranked in our top 3 hazards with earthquakes and wildfires.

The LHMP Steering Committee felt Communication Failure should be added to the 2017 plan because it has the potential to affect response capabilities in both small and large events. In 2016 a 911 failure impacted the EMS system. This had the potential to lead to loss of life in the Coachella Valley. During disasters, communication failures can have a detrimental effect on the operation of the County Emergency Operation Center (EOC) ultimately hindering the OA's agencies ability to return to normal operations.

Dependence on computer systems has opened up vulnerabilities. Sensitive security information stored along with personal information is now stored on networks. For those reasons, computer networks have become a target for hackers and organizations with the intent to do harm. In 2016 the County of Riverside was a target for Ransom Ware.

The maps that are in the 2017 plan are current maps from County Transportation GIS Division and Cal OES's MyPlan Program.

Some revisions to the 2012 plan mitigation actions included:

- Revised Risk Assessment, concerning updated hazard information
- Changed jurisdictional and Special Districts participants.
- Incorporation of existing plans, ordinances and studies.

New Goals and Mitigation Strategies were added that reflect our top ten (10) hazards and risks for Riverside County.

1. Earthquake
2. Pandemic Flu
3. Wildland Fire
4. Electrical Failure
5. Emergent Disease/Contamination
6. Cyber Attack
7. Terrorist Event
8. Communications Failure

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9. Flood
10. Civil Disorder

4.2 Hazard Updates

The hazards identified in the 2012 LHMP remain fairly similar in 2017, however the 2017 LHMP Steering Committee added Communication Failure and Cyber Attack as additional hazards. The overall ranking of the hazards has changed as well.

Table 8: Hazard Identification Table

Hazard	Reason Hazard Identified
Earthquake	• History of events • Presence of fault lines and geologic activity
Pandemic Flu	• Due to air travel and urban expansion there is increasing probability of health related emergencies
Wildland Fire	• History of events • Presence of a large amount of timber and brush
Electrical Failure	• History of events
Emergent Disease/Contamination	• History of events
Cyber Attack	• History of events and danger to sensitive security information for Health Care Facilities
Terrorist Event	• Heightened sense of awareness since September 2001 • History of event in December 2015
Communications Failure	• History of events • Impact level of events
Flood	• History of events and the presence of a large number of rivers and channels
Civil Disorder	• Vulnerability due to number of public venues
Drought	• History of events • Potential to drastically increase wildfire hazard

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Nuclear/Radiological Incident	• Vulnerability due to transportation routes and relative proximity of San Onofre Nuclear Generating Station (SONGS)
Extreme Weather	• History of events
Transportation Failure	• History of events and the presence of a large number of transportation corridors and airport flight paths
Dam Failure	• Vulnerability of dams
Aqueduct	• Presence of aqueducts serving multiple counties
Tornado	• History of events
Insect Infestation	• History of events
Jail/Prison Event	• Vulnerability of State and County correctional facilities
Pipeline Disruption	• History of events • Multiple pipelines within the OA
Landslide	• History of events
HazMat Incident	• History of events • Many transportation corridors and Hazardous Materials Facilities
Water Supply Disruption/Contamination	• History of events • Potential disruption to the OA

4.3 Mitigation Actions and Updates

4.3.1 2012 Plan Updated Mitigation Actions

2012 mitigation strategies and projects are summarized in the following table to show progress made:

Table 9: Mitigation Actions and Updates

Mitigation Actions Table

Type of Hazard	Mitigation Actions	Departments/ Jurisdictions	Status Update
ALL	Incorporate Updated Local Hazard Mitigation Plan into Riverside County General Plan	Transportation, Land Management Agency and Riverside Office of Emergency Services	Recently updated and approved on December 2015 by Board of Supervisors. Adopted 2015, which includes a new reference to implement the Local Hazard Mitigation Plan within the Safety Element.
DROUGHT	Construct reservoirs and water tanks to increase water storage	Water Conservation, Agriculture and County Fire	On-going, no update has been made
EARTHQUAKE	CREWS Earthquake Mitigation Project	County-wide	Ongoing process of recruiting non-participating cities in the Coachella Valley area into the early earthquake warning program.
FIRE	Purchase Masticator to remove vegetation and brush in heavily populated areas prone to fires.	Riverside County Fire	No change. Project still on hold due to lack of funding. Potential future purchase

FIRE	Shake Shingle Roof Replacement Project	Idyllwild	In 2013 Mountain Communities Fire Safe Council was awarded a FEMA grant to replace hazardous shake/wood shingle roofs in the San Jacinto WUI (Wildland Urban Interface) One hundred homes were reroofed with Class A roofing material. The grant was completed in October 2016.
FIRE	Single Tree Removal – removed dying and dead trees.	Idyllwild	Ongoing: dead and dying trees are continuously monitored and removed as needed.
FIRE	Hazard Abatement- Fuel treatment program to remove 1120 acres of natural fuel	Mountain Communities Fire Safe Council Program - Idyllwild	Reducing fuels on private property in the San Jacinto WUI is an on-going activity of Mountain Fire Safe Council. To date, more than 1,600 acres have been treated with the financial help of grant funds awarded to MCFSC
FLOOD	Norco Storm Drain This project is an underground storm drain which will address flooding along Pedley Avenue/Sixth Street.	Riverside County Flood Control	Project completed on 04/05/2011.
FLOOD	Santa Ana River, Norco Bluffs [Corps Project] –Stabilization Project is a Corps of Engineers project that consists of a soil cement structure constructed to the 100-year flood level at the base of the bluff.	Riverside County Flood, Transportation Land Management Agency and Riverside County Fire	The bluff stabilization work was completed in 2004. The District is continuing to work with the Corps on wrapping up the project, including completion of a Project Operation and Maintenance Manual. Once the Corps approves the O&M Manual, the project can be transferred to the District for ownership, operation and maintenance.
FLOOD	Temescal Creek-Foster Road Storm Drain (2-8-00493-01) - This project is an underground storm drain in Foster Road extending from Interstate 15 to Temescal Creek.	Riverside-Corona Resource Conservation District Riverside County Flood Control	Project completed on 09/01/2015
FLOOD	Dillon Road – State Hwy 62 Road Project to clear debris. Road has 25 dips that cause flooding during storms.	Transportation, Land, Management Agency Riverside County Fire	Ongoing; The current action plan is to barricade the low dip sections when they are flooded and remove the storm debris when the water recedes.

FLOOD	Underground storm drain which will extend approximately 1,300 feet south on Pedley Avenue from Norco MDP Line NA on Sixth Street. This project will address localized flooding along Pedley Avenue.	Flood Control and City of Norco	Finished Spring 2011
FLOOD	Restore 100 yr level flood protection to the three million residents within the floodplain downstream from Prado Dam. The Corps proposes to increase both the storage capacity of Prado Dam and its outlet discharge capacity. The embankment will be raised 30 feet, while the spillway sill will be raised 20 feet and the gated discharge capacity will be tripled.	Flood Control	**Part 1** of this project involving Riverside County Flood Control and TLMA was completed **Part 2** of this project involving only Riverside County Flood Control is still pending approval
FLOOD	Ultimate channel improvements for the existing interim channel from 6th Street to the terminus near Rose Court.	City of Norco	Project has not started with no estimation on start date. The District is currently working on 60% design plans and anticipates 90% design plans will be completed in 2017. FEMA processing will be necessary to revise the currently mapped floodplain once the construction is completed.
FLOOD	Improvements to the existing channel between Parkridge Avenue and River Road. The channel is planned as a concrete lined open channel	City of Norco and Riverside County Transportation Land Management Agency	Project began Circa 7/2013 and was finished Circa 2/2014. Lead Agency was RCFC & WCD
FLOOD	Underground storm drain extending from the existing Stage 1 near Pedley Avenue, east on 7th Street to California Avenue then south on California approximately 800 feet to a sump.	Transportation, Land, & Management Agency and Flood Control	Project completed on 04/05/2011
FLOOD	Collection of "mitigation" charges from builders in Mockingbird Canyon with the intention of providing relief to flood prone properties in the lower canyon	Mockingbird Canyon	In process of collecting funds. Charging investors $500 per lot. Talks about whether to keep this project or abandon it. Considered a “mini” ADP (Area Drainage Project)
FLOOD	Storm Drain Last portion will be constructed as part of the same	City of Corona	Project completed on 04/24/2012, Project revised on 04/25/2012.

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	contract as the Ontario Avenue Storm Drain project		
FLOOD	A 1,050-foot drain to de-water a sump in Frank Avenue in the south Mira Loma area	Riverside County Flood Control and City of Eastvale	Project completed on 01/31/2012
FLOOD	The original project consisted of a 54 acre-foot debris basin at the southerly end of Smith Road and a concrete rectangular channel extending northerly to Cajalco Road. Mitigation required for the basin project includes removal of non-native vegetation, debris and remnants of abandoned structures as well as re-grading and establishment of native vegetation.	Riverside County Flood Control	Project completed on 01/10/2006
FLOOD	Underground storm drain in the City of Corona extending from East Grand Boulevard north in Joy Street to Temescal Creek Channel. Design began on this project in 2003 at which time it was discovered during a field check of the preliminary drawings that a recently installed Edison conduit in Joy Street overlapped the only viable alignment for the storm drain. The street is so heavily laden with utilities here is no longer room to install a drain.	City of Corona	Design Phase Schedule for advertisement in March 2017
FLOOD	Underground storm drain in Ontario Avenue extending upstream from the District's existing El Cerrito Channel at El Cerrito Road about 3,000 feet to State Street just west of Interstate 15.	Riverside County Flood Control and Transportation Land & Management Agency	Project revised on 04/25/2012
FLOOD	Underground storm drain in Foster Road extending from Interstate 15 to Temescal Creek	Temescal Creek-Foster Road Storm Drain	Construction began in January 2015 and was completed in September 2015.

FLOOD	Multi-year plan to construct a levee system (approximately 1,200 feet river bottom width) between the existing Corps of Engineers' levee 9,500 feet upstream of State Street, and a point about 8,200 feet downstream of Sanderson Avenue, a distance of about 5 miles. Floodwalls are required to be constructed over the Metropolitan Water District facilities just east of State Street.	San Jacinto and Transportation and Land Management	Funding was received in November 2015 - the levee was included in a suite of projects that received Proposition 84 grant funding from the California Department of Water Resources. The Prop 84 contribution is anticipated to be about $3.5 million.
FLOOD	Project to build MDP extending from South W. Esplanade to east Midway Street to South San Jacinto Street to collect flows from the larger Park Hill basin watershed	City of San Jacinto	Construction for the project began on April 25, 2014 and was completed on July 2, 2015.
FLOOD	Construction of an underground storm drain that extends from a proposed detention basin at the intersection of Potter Road and De Anza Drive then southwest in De Anza to Young Street. The City of San Jacinto is administering the project.	City of San Jacinto and Transportation and Land Management	Project still pending
FLOOD	Underground storm drain from an outlet north of Holland Road southerly in Hawthorne Avenue to a collection system south of Craig Avenue	City of Menifee and Transportation and Land Management	Project Completed 3/01/2011
FLOOD	Project is an underground storm drain that extends from near Yale Street east on Stetson Avenue approximately 1 mile to Dartmouth Street	City of Hemet	Project completed on 09/04/2007
FLOOD	Project is an underground storm drain on Whittier Boulevard extending from the existing storm drain at Palm Avenue east to San Jacinto Street	Riverside County Flood Control and City of Hemet	Project completed on 08/23/2016
FLOOD	Underground storm drain extending from an existing storm drain in Meridian Street near Berkeley venue south in Meridian Street to Whittier Avenue.	Riverside County Flood Control and City of Hemet	Stage 1 completed on 06/21/2016. Stage 2 still pending approval.

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FLOOD	Project is for major flood control project to extend from the San Jacinto River near Goetz Road east approximately 6 miles to Juniper Flats Road and incorporates both lined and unlined open channel, underground storm drains and two major detention basins.	City of Menifee and Transportation, Land and Management Agency	Project built in 4 stages. Some stages have been completed, but others still not finished.
FLOOD	Open channel along Nuevo Road from Dunlap Drive to Perris Valley Channel	City of Perris, Riverside County Transportation and Flood Control	Under new contract: Starting Jan. 2017 and will range about 2.5 yrs. for this entire project to be completed; first part will take about 180 days to complete, but time frame will be extended.
FLOOD	East Ironwood Avenue to Petit Street. Part of the work the City of Moreno Valley is doing in association with improvements to the Moreno Beach Drive & 60 freeway interchange.	City of Moreno Valley and Transportation and Land Management	Storm Drain Line K-1 – City completed design in 2014. Currently seeing construction funding of approximately $2.5m.
FLOOD	Project is an open channel extending from Nason Basin northeasterly approximately 2,500 feet to Ironwood Avenue	City of Moreno Valley and Transportation and Land Management Agency	Storm Drain Line K from Ironwood to the Nason Basin – RCFC&WCD secured an easement in 2014 to receive flows from Line K-1 noted above. Action completed in 2014.
FLOOD **EARTHQUAKE**	Norco Streambank Stabilization. Project consists of a soil cement toe protection structure constructed to the 100-year flood level at the base of the bluff, and a stable earthen buttress fill constructed to the top of the bluff from I-15 Bridge to Center Avenue	Riverside County Flood Control and Transportation Land & Management Agency	Project Completed
FLOOD **EARTHQUAKE**	Stabilization of Interstate 15 near Alhambra Street, as a part of the Prado Dam enlargement feature of the Santa Ana River Mainstream Project at no cost to the District. The project involves the construction of a toe-protection-only structure from Hamner Avenue downstream to approximately 5th Street	Transportation Land Management Agency	Project still pending

LANDSLIDE EARTHQUAKE FLOOD	Proposed improvements include installation of slope protection along the Green River Mobile Home Park, as well as the exposed slopes adjacent to the Green River Homeowners Association and Highway 91 just downstream of Highway 71.	Transportation and Land Management Agency	**Phase 2A**-The District has completed its acquisition of the necessary easements and fee interests from Riverside County, private lands, and Caltrans. Construction of Phase 2A was completed in Fiscal Year 2015/2016. **Phase 2B-Construction** of this segment was completed in Fiscal Year 2014/2015.

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4.3.2 2017 New Mitigation Actions

The 2017 LHMP Steering Committee identified the following Mitigation Actions since the completion of the 2012 plan update. These mitigation actions were prioritized based on the top ten high priority county hazards. This was determined using the county risk assessment that is shown on section 5.2 page 195 "**Figure 23:** 2017 County Hazard Ranking and Risk Scores." The actions below list ways that "all hazards" can be mitigated following the county's top ten hazards starting from the highest. The financial impact of each action does not affect the ranking.

Table 10: 2017 New Mitigation Actions Table

2017 Mitigation Actions Table

Type of Hazard	Mitigation Actions	Departments/ Jurisdictions	Status Update/Timeframe	Potential Funding Source
All Hazards	CERT Training and retention	Riverside County Emergency Management Department	July 2018 – Ongoing On-going for the life of the current plan (yrs. 2018-2023). There will be one training in each of the county districts per year to ensure community members throughout the county get the opportunity to refresh and reinforce their CERT skills. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Homeland Security Program (SHSP)
All Hazards	Continue to utilize the Safety Element of the Riverside County General Plan and the Riverside County FD Master Plan as base documents to implement goals, objectives, and mitigation actions	All Riverside County Departments	On-going for the life of the current plan (yrs. 2018-2023). The Safety Element in the General Plan is continuously updated as new information and changes arise. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Earthquake	Working with CalOES & FEMA to revise the Southern California Catastrophic	All Cities in Riverside County	On-going for the life of the current plan (yrs. 2018-2023). Riverside County will continue to collaborate with Cal OES/ FEMA to improve and update	County General Fund

	Earthquake Response Plan		this plan as needed. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	
Earthquake	Reviewed Office of Statewide Health Planning and Development (OSHPD), Structural Performance Categories and Nonstructural Performance Categories (SPC/NPC) Ratings of Acute Care Hospital Buildings and reported the findings at EM Healthcare Coalition	Riverside County Emergency Management Department & Riverside County Hospitals	On-going for the life of the current plan (yrs. 2018-2023).These reports will continuously be reviewed to make sure they are up to date and consistent with any changes. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	Hospital Preparedness Program (HPP) Grant
Earthquake	Worked with local City Emergency Manager (EM) to address '08 Golden Guardian Riverside County Shake Out Scenario/Assumptions	Riverside County Emergency Management Department	On-going for the life of the current plan (yrs. 2018-2023). County will continuously work with City EM to update and inform of changes or thoughts to improve the annual Shake Out Scenario and help the community increase their preparedness skills. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Earthquake	Mitigate potential seismic hazards through adoption and strict enforcement of current building codes	Riverside County Transportation, Land, Management Agency	On-going for the life of the current plan (yrs. 2018-2023). The codes will be revised and updated to be consistent with emergency measures that can help prevent earthquake impacts in county buildings. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund

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Pandemic Flu	Provide training on immunization techniques	Riverside University Health System-Public Health	On-going for the life of the current plan (yrs. 2018-2023). Continue training to teach any new techniques, strategies, and to ensure all staff are proficient. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	Public Health Emergency Preparedness Grant (PHEP)
Pandemic Flu	Participated and conducted a Non-Medical Intervention Tabletop Exercise	Riverside County Emergency Management Department & Riverside University Health System-Public Health	Completed on 09/28/2015	Pan Flu Grant PHEP Grant
Pandemic Flu	Participated and conducted a Flu vaccination exercise	Riverside County Emergency Management Department & Riverside University Health System-Public Health	Completed on 11/10/2016	Pan Flu Grant PHEP Grant
Pandemic Flu	Generate a draft Crisis Care Plan	Riverside County Emergency Management Department & Riverside University Health System-Public Health	Completed 08/30/2016	Pan Flu Grant PHEP Grant HPP Grant
Pandemic Flu	Training Medical Reserve Corp (MRC) in hospital surge exercises	Riverside County Emergency Management Department	Started in 2011 and is on-going for the life of the current plan (yrs. 2018-2023). Continue training to keep updating and informing volunteers to increase their skills. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	HPP Grant State Homeland Security Program (SHSP)
Pandemic Flu	Training Medical Reserve Corp. (MRC) volunteers in Alternate Care Site	Riverside County Emergency Management Department	Completed in 2014	HPP Grant State Homeland Security Program (SHSP)Pan Flu Grant

Wildland Fire	Create wildfire protection zones that reduce the risks to citizens and firefighters from fire dangers	Riverside County Fire Department & CAL Fire	On-going for the life of the current plan (yrs. 2018-2023). Continuously update and develop protection zones that can help decrease wildfire risks in the community. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Wildland Fire	Strengthen defensible space inspections in fire prone areas	Riverside County Fire Department & CAL Fire	On-going for the life of the current plan (yrs. 2018-2023). Continue inspections in locations that are susceptible to fires. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State and County General Funds & Structural Fire Taxes
Wildland Fire	Continue maintenance of existing fire roads throughout the county to provide fire department access	Riverside County Fire Department & CAL Fire	On-going for the life of the current plan (yrs. 2018-2023). Continue keeping the roads well paved and easy to have fire trucks be able to drive on. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Wildland Fire	Fuel reduction projects throughout the county to reduce fire potential	Riverside County Fire Department & CAL Fire	On-going for the life of the current plan (yrs. 2018-2023). Continuously improve and develop projects to lower the impact of fires in the county. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Wildland Fire	Develop and enforce construction and design standards that ensure the development incorporates fire prevention features	Riverside County Fire Department & CAL Fire	On-going for the life of the current plan (yrs. 2018-2023). Continuously enforce and update measures to prevent fire hazards. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	Developer Fees
Wildland Fire	Conduct and implement long range fire safe planning through code adoption/policies	Riverside County Fire Department & CAL Fire & Riverside County Transportation,	On-going for the life of the current plan (yrs. 2018-2023). Continuously implement code policies to integrate them into the Safety Element as they are developed/updated and	County General Fund and Fire Marshal Fees

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	consistent with the Safety Element of the General Plan	Land, Management Agency (Planning Division)	approved. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	
Wildland Fire	Ben Clark Training Center to provide wildland fire protection related classes to fire personnel	Riverside County Fire Department & CAL Fire	On-going for the life of the current plan (yrs. 2018-2023). Continuously make sure that this center is available to provide wildland fire protection classes to fire staff to improve their skills on fire mitigation and preparedness. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund, private colleges fees, and State Mission Grant funding
Wildland Fire	Continue wildland fire suppression/prepare dness to maintain a state of readiness throughout the year	Riverside County Fire Department & CAL Fire	On-going for the life of the current plan (yrs. 2018-2023). Continuously provide skills training to the community to be prepared for disasters. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Wildland Fire	Rapid intervention, identification and mitigation of Goldspot Oak Bore Beetle (GSOB) trees at various infestation levels on State Responsibility Area (SRA) lands throughout the county. Herbicide or tree removal if necessary	CAL Fire Unit Forester	On-going for the life of the current plan (yrs. 2018-2023).Continuously monitor infestation levels of GSOB trees to continue removing infested trees if necessary. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Wildland Fire	Rapid intervention, identification and mitigation of Pine Bark Beetle infestation, epidemic during times of drought. Removal of trees that are symptomatic or the	CAL Fire Unit Forester	On-Going for the life of the current plan (yrs. 2018-2023).Continuously monitor infestation levels of Pine Bark Beetle to continue removing infested trees or to continue using pesticides if necessary. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding

	use of pesticide when applicable			
Wildland Fire	Continue Truck Trail and road maintenance to provide access for fire suppression vehicles and personnel.	CAL Fire Unit Forester	On-Going for the life of the current plan (yrs. 2018-2023). Continuously preserve and improve Truck Trail and roads, if needed, for rapid available access to fire suppression vehicles. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Wildland Fire	Continue Fire Road maintenance of culverts and road prisms in open space areas on SRA land to allow for adequate drainage.	CAL Fire Unit Forester	On-Going for the life of the current plan (yrs. 2018-2023). Continuously preserve and improve culverts and road prisms, if needed, for sufficient drainage. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Electrical Failure	Coordinated with Southern California Edison to be included in their power outage notifications	Riverside County Emergency Management Department	On-going for the life of the current plan (yrs. 2018-2023). EMD joined SoCal Edison's recipient list as of Dec. 2016 to continuously be informed of any emergency notifications to help prevent electrical failure impacts. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Emergent Disease/ Contamination	Drafted a Region VI Highly Contagious Disease Transportation Plan	Riverside County Emergency Management Department	Completed on 12/08/2016	HPP Grant Ebola Grant
Emergent Disease/ Contamination	Facilitated a Region VI Highly Contagious Disease Transportation Tabletop Exercise	Riverside County Emergency Management Department	Completed on 09/29/2016 The situation manual for this was completed on 11/14/2016	HPP Grant Ebola Grant

Emergent Disease/ Contamination	Drafted a Riverside County Viral Hemorrhagic Fever Preparedness and Response Plan (VHF Plan)	Riverside County Emergency Management Department & Riverside University Health System-Public Health	Completed on 11/2016	HPP Grant Ebola Grant
Cyber Attack	**Enterprise Intrusion Prevention System (IPS)** Protects the county network from Internet-based threats and attacks (~140,000 attacks/day on average)	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continue to update and maintain the IPS network to protect the county from any form of cyber-attacks or threats. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Cyber Attack	**Enterprise Breach Detection System** Inspects all internal/lateral county network traffic for indicators of compromise (IOCs) enabling the ISO to rapidly detect, respond to, contain, and prevent cyber-attacks, malware outbreaks, network reconnaissance, data exfiltration, and C2 (command & control) and botnet activities	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continuously inspect the county network to detect forms of threats or attacks. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Cyber Attack	**Albert Sensor** Monitors and reports to the Center for Internet Security (CIS) Multi-State Information Sharing and Analysis Center (MS-ISAC) all Domain Name	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continuously maintain the Albert Sensor in order keep having the association with the Department of Homeland Security's database on alerting network threats for the county. This action will be reassessed during the monitoring and	County General Fund

	System (DNS) and NetFlow traffic for correlation with the Department of Homeland Security's threat intelligence database for real-time alerting of malicious network connections to blacklisted IP address on the Internet		update phase of the County's 2017 LHMP.	
Cyber Attack	**Countywide Security Awareness Training** SANS Securing The Human information security and privacy training modules deployed on county learning management system (LMS) Educates our workforce on how to be extra vigilant and things to look out for to avoid falling victim to a targeted attack	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continuously provide training to the county's workforce on signs of cyber-attacks and prevent them from being a victim of these attacks. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Cyber Attack	**Enterprise Security Information Event Management (SIEM)** Serves as the county's centralized security event log management repository and correlation engine	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continue to maintain the SIEM to monitor and prevent security threats. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund

Cyber Attack	**Enterprise Internet Proxy (Web Filter)** Prevents county employees and malware from accessing compromised/malicious websites and C2 (command & control) servers, in addition to non-county authorized websites based on category/content filtration policies/rules	Riverside County Technology Information	May 2017 – December 2018 Product (Blue Coat Proxy Advance Secure Gateway (ASG)) has been procured and is in the process of being deployed.	County General Fund
Cyber Attack	**Governance, Risk, & Compliance (GRC) Software Suite** Platform on which our security operations (active network monitoring, breach detection, incident response, business impact analysis, threat containment/eradication, alerting/reporting, process workflow automation, security audits, risk assessments/register, regulatory compliance checks) will be carried out	Riverside County Technology Information	Implementation estimated to begin in June 2017 – July 2018. Product (RSA Archer GRC) has been procured and is in the process of being deployed.	County General Fund
Cyber Attack	**Security Operations Center (SOC)** Planning phase completed, construction estimated to begin in September 2017	Riverside County Information Technology	September 2017 – September 2018. The County's Cyber Security Operations Center (SOC) is under construction.	County General Fund

Cyber Attack	**Information Security Forum (ISF)** Convene on a quarterly basis with department information security officers/liaisons to discuss key security topics, risk trends, and other related matters, including: Formation of a Critical Security Incident Response Team (CSIRT) Conducting security incident/breach simulations and tabletop exercises	Riverside County Information Technology	October 2018 – ongoing This forum will be on-going for the life of the current plan (yrs. 2018-2023). Will continue to conduct constant security incident/breach simulations and tabletop exercises that can help prevent cyber-attacks in the future. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP. The ISO is in the process of identifying members to serve on the Critical Security Incident Response Team (CSIRT). Estimated timeline for formation and initial kickoff meeting is October 2018.	County General Fund
Terrorist Event	SWAT team trained to respond to terrorism events	Riverside County Sheriff	On-going for the life of the current plan (yrs. 2018-2023). Continuously provide training to reflect personnel attrition and train on new tactics. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Terrorist Event	Hazard Device Team trained to respond to terrorism events	Riverside County Sheriff	On-going for the life of the current plan (yrs. 2018-2023). Continuously provide training to reflect personnel attrition and train on new tactics and trends. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Terrorist Event	Sheriff Emergency Response Team trained to respond to terrorism events	Riverside County Sheriff	On-going for the life of the current plan (yrs. 2018-2023). Continuously provide training to reflect personnel attrition and train on new trends. This action will be reassessed during the	County General Fund

			monitoring and update phase of the County's 2017 LHMP.	
Terrorist Event	Sheriff personnel are assigned to the Joint Terrorism Task Force	Riverside County Sheriff	On-going for the life of the current plan (yrs. 2018-2023). Continuously integrate new sheriff personnel to improve this group's structure and capabilities. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Terrorist Event	Ben Clark Training Center provides terrorism related classes for Law Enforcement and First Responders.	Riverside County Sheriff	On-going for the life of the current plan (yrs. 2018-2023). Classes are funded each year through the State Homeland Security Program (SHSP) to continuously educate and train personnel on new skills and improve their abilities. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Terrorist Event	Tactical response training	Riverside County Sheriff & Riverside County Fire Department	On-going for the life of the current plan (yrs. 2018-2023). Continuously train and improve on tactical response. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Communications Failure	**County of Riverside Network (CORNET)** Redundant Internet connections Backbone links are configured with a mesh topology to provide full redundancy	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continuously configure links to prevent the termination of internet connections. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Communications Failure	**Enterprise Voice Network (VoIP)** Centralized SIP trunking for	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continuously provide accessibility to phone carrier	County General Fund

	ingress/egress PSTN access via 8 geographically separated locations Carrier failover protection for inbound voice traffic Enterprise call processing for VoIP Endpoints are logically and physically separated into 3 datacenters ensuring a High-Availability solution Remote site routers configured for SRST; in times of WAN outages, local IP Phones will re-register to local equipment, providing inter-site calling and access to the PSAP via carrier provided analog circuits		connection and call processing. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	
Communications Failure	**Enterprise Best Practices** Internal escalation contact list for all essential personal readily available 24x7 On-Call staffing availability for both Voice and Data Networks Vendor support available at 24x7x4 for all critical	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continue to update contact list when staff support is needed in case of emergencies. Continue to train staff on technologies that arise and equip facilities with power backup supplies. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund

	Network and Voice equipment Regular professional staff training on emerging technologies Frequent equipment configuration backups to SAN Critical Enterprise level equipment is located at facilities with full battery and generator backup power			
Communications Failure	**Enterprise Emergency Notification System** InformaCast Advanced on-premise notification solution for immediate reach to the County's 20,000+ VoIP endpoints InformaCast Mobile cloud-based notification solution to extend the County's reach off-network to mobile devices such as cellular phones and tablets	Riverside County Technology Information	On-Premise solution has been rolled out to all County VoIP endpoints. Mobile Solution has been rolled out to EMD. Mobile solution is ready to be rolled out to other departments as requested. On-going for the life of the current plan (yrs. 2018-2023). Continue to have a notification system to be able to have the ability to connect with off-network devices in case of a communications failure, including Wi-Fi. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund Department Funds; departments who wish to take advantage of this service will be billed back to the departments based on how many users

Communications Failure	**Network Connectivity** Use of Cellular based redundant WAN links for critical county locations. Introduction of MPLS technologies to provide alternate network paths for County locations	Riverside County Technology Information	Several locations have purchased a Cellular based redundant WAN link . Solution can be purchased by other departments. Installation can take up to 6 weeks to install, based on equipment availability. On-going for the life of the current plan (yrs. 2018-2023). Continue to provide alternate network paths for County locations in the case of a communication failure. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund Department Funds; billable by the cellular carrier to requesting departments
Flood	**University Wash Channel, Stage 3 Project No. 221-1-8-00120-03-12** This project will increase public safety and improve local economics by retrofitting an older, built-out commercial/industrial area with drainage infrastructure to alleviate repeated flood damage to existing businesses. The project will also address street and intersection flooding	Riverside County Flood Control and Water Conservation District	Notice To Proceed 2/21/17 Completed 11/14/17	Riverside County Flood Control funds Cost: $3,044,500
Flood	**Monroe MDP – Monroe Channel Project No. 1-8-00071 Stage 4** At request of the City of Riverside, replacement of	Riverside County Flood Control and Water Conservation District	Expected to be advertise in 4th Quarter 2016 Notice to Proceed 8/30/17 Completed 5/01/18	Riverside County Flood Control funds Cost:$2,489,067

	City's existing open channel with underground reinforced concrete box with 10-year storm capacity. Project limits are from California Avenue upstream to Magnolia Avenue			
Flood	**Jurupa – Pyrite MDP Line A-2 Project No. 1-8-00234 Stage 1** Master planned lateral stormdrain to Jurupa Channel. Project is east-west drain crossing Agate Street about 1,000 feet south of Jurupa Road. Outlet point at Jurupa Channel is unimproved and likely to remain so	Riverside County Flood Control and Water Conservation District	30% Plans & R/W Acquisition as of 1/10/17 Projected Start: 9/2018 Projected End: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $338,332
Flood	**University MDP Line 3 Project No. 1-8-09020 Stage 1** The MDP proposes Line 3 as approximately 2,900 feet of 30" RCP east in Blaine Street then northeast to Blaine Street Retention Basin. The Blaine Street Retention Basin is located 600 feet north of Blaine Street between Valencia Hill Drive and Mt. Vernon Avenue.	Riverside County Flood Control and Water Conservation District	Pending approval Projected Start: 12/2020 Projected End: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $2,926,028

	Budgeted for scoping study and evaluation of FEMA map floodplain limits only			
Flood	**Santa Ana River Stabilization Project No. 1-8-00010 Stg. 90** The USACE is expected to initiate restoration of the federally constructed reach of the Santa Ana River Levee system downstream of San Bernardino County line to Tequesquite. Exact form of project not set. Work will likely include repair of groins and toe protection	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $10,685,000
Flood	**Box Springs Dam – Outlet Modification Project No. 1-8-00041** Reconstruct outlet structure to prevent blockage from sediment accumulation	Riverside County Flood Control and Water Conservation District	Pending until Woodcrest Dam is complete 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $981,842
Flood	**Sycamore Dam – Outlet Structure Modifications Project No. 1-8-00042** This project will upgrade the level of safety and serviceability. Initial project components	Riverside County Flood Control and Water Conservation District	Pending until Woodcrest Dam is complete 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $1,854,991

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	include the repair/reinforcement of the existing outlet channel; construction of a new debris rack structure; erosion controls on the embankment of the dam; construction of a safer access road into the facility; design for a safer routing of flood waters from the emergency spillway to Central Avenue; and the installation of a control section to measure outflow from the outlet pipe of the dam. Completion of this project is planned to follow the Woodcrest Dam Outlet Modification project.			
Flood	**Alessandro Dam Outlet Modification Project No. 1-8-00043** Reconstruct outlet structure to prevent blockage from sediment accumulation	Riverside County Flood Control and Water Conservation District	Pending until Woodcrest Dam is complete 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $907,682
Flood	**Prenda Dam Outlet Modification Project No. 1-8-00044**	Riverside County Flood Control and Water Conservation District	Pending until Woodcrest Dam is complete 5 year CIP (Capital Improvement Plan)	Riverside County Flood Control funds Cost: $1,238,312

	Reconstruct outlet structure to prevent blockage from sediment accumulation		Projected start and end: during the life of the plan (2018-2023)	
Flood	**Woodcrest Dam Outlet Modification Project No. 1-8-00045** This project will upgrade the level of safety and serviceability. The approved Project Charter identifies the primary scope of work for the project as follows: design and construction of a new inlet structure to reduce potential for clogging of the outlet works; rehabilitation of the existing outlet gate assembly and control stem; implementation of an automated gate control system; rehabilitation of the outlet pipe; restoration of the outlet channel; and installation of surficial erosion controls on the surface of the dam embankment. Once completed, this project will serve as an example for performing similar upgrades to the remaining	Riverside County Flood Control and Water Conservation District	Development of design plans and specifications on hold until latest Geotechnical investigation is complete Projected Start: March 2019 Projected End: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $2,216,529

	Riverside Reservoirs			
Flood	**North Norco Channel Stage 10 Project No. 222-2-8-00140-10-12** The project is located just upstream of River Road within the city of Norco in Riverside County, California. This project consists of approximately 550 lineal feet of triple cell reinforced concrete box and 125 lineal feet of open concrete channel transition, will replace the existing interim dirt channel. The project remedies ongoing flooding problems in the area thus resulting in positive impacts to residents and businesses	Riverside County Flood Control and Water Conservation District	Completed 9/9/14	Riverside County Flood Control funds
Flood	**Corona MDP Line 5 Stage 1 Project No. 2-8-00280** This project includes the construction of an underground storm drain beginning in Sherman Avenue south of Railroad Street and	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $1,397,201

	extending down Railroad Street westerly to Smith Street. The City is willing to undertake the design and construction of this project using District funding.			
Flood	**Corona MDP Line 52 Stage 1 Project No. 2-8-00350** An underground storm drain extending north from Third Street along E. Grand Boulevard then under the 91 Freeway to Temescal Creek Channel	City Of Corona	Notice to Proceed 7/29/17 Expected Completion: Summer 2018	Riverside County Flood Control funds City of Corona Funds Cost: $4,522,000
Flood	**Coldwater Canyon Structural Improvements Project 2-8-00505** Proposed conceptual improvements include 1) reducing flood risk and nuisance to traveling public on Temescal Canyon Road at the intersection of Glen Ivy Road; and 2) an armored berm along the east bank of Coldwater Wash downstream of the intersection of Temescal Canyon Road and Glen Ivy Road. The armored berm would	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $6,005,806

	prevent the migration of the active Coldwater Wash Channel, thereby protecting the west side of the Mountain Cove Development. Conceptual improvements are pending friendly acquisition of the underlying parcels needed for the project			
Flood	**Coldwater Canyon Floodplain Acquisition Project No. 2-8-00505** Funded portion of project includes a hydrologic and geomorphologic assessment of Coldwater Canyon Wash from Glen Ivy Road to Temescal Wash. Study will evaluate the stability of Coldwater Canyon Wash and recommend potential minimalist interventions, if necessary, to protect Squaw Mountain Bridge and prevent erosion of Painted Hills development canyon slopes along Coldwater Canyon Wash. Balance of funds	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: included in the $6,005,806 amount for Coldwater Canyon Structural Improvement project listed above

	would support potential interventions recommended by the report including floodplain buyout			
Flood	**Southeast Compton Wash At Corona Sanitary landfill Project No. 2-8-09054** Riverside County Waste Management District has requested assistance solving ongoing flooding and erosion problems along the southeast side of the landfill	Riverside County Waste Management District**	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $500,000
Flood	**Lake Mathews Estates Water Quality Pond Project No. 2-8-09058** Proposed in the "Drainage Water Quality Management Plan for the Lake Matthews Watershed", this roughly 10-acre project is to be located on the south side of Cajalco Road about ¾-mile west of Wood Road. The project will capture first flush runoff from Cajalco Creek and carry it to an off-channel pond to	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $2,794,983

	be treated and/or infiltrated			
Flood	**Temescal Wash Floodplain Project No. 2-8-00052** Acquisition of floodplain area for flood protection, water conservation and habitat mitigation banking	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $23,534,000
Flood	**Arroyo Del Toro Channel Stage 1 Project No. 223-3-8-00170-01-12** This project collects flows that pass under Interstate 15, flow through the cemetery and flood the intersection of Riverside Drive and Collier Avenue. The flows will now be collected in a channel and conveyed via an underground storm drain system to the Collier Marsh area	Riverside County Flood Control and Water Conservation District	Completed 6/16/15	Riverside County Flood Control funds

Flood	**Ortega Channel Retrofit Project No. 3-8-00070** Project will replace a portion of the clog-prone storm drain with a more easily accessible and maintainable open channel	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $1,628,761
Flood	**LITTLE LAKE MDP LINE B, STG 1 STETSON AVENUE CHANNEL, STG 7 aka HEMET MDP LINE D Project Nos. 224-4-8-00265-01-12 224-4-8-00211-07-12** The District constructed a segment of the District's Little Lake MOP Line B. This infrastructure will diminish neighborhood flooding and damage to private property and businesses and improve the safety of the traveling public during storm events. This new drain will also permanently reduce flood-related street maintenance and repair costs for the City of Hemet. Little Lake MDP Line B Stage 1 is located primarily within the City of	Riverside County Flood Control and Water Conservation District	Stage 1 Completed 06/21/16 Stage 2 Pending approval Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $6,398,777

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	Hemet, with small portions extending into the City of San Jacinto and unincorporated Riverside County beginning approximate 300 feet north of Berkley Ave and terminating approximately 200 feet south of Florida			
Flood	**Homeland MDP Line 2, Stage 2 Project No. 224-4-8-00337-02-12** The District constructed a segment of drainage infrastructure described in the District's Romoland Master Drainage Plan as Romoland MOP Line A, Stages 4, 5 and 6, Romoland MOP Lines A-2 and A-3, Stage 1, and Briggs Basin. In conjunction with the District's Homeland MDP Line 1, Stage 1, completion of this drainage infrastructure will reduce the floodplain by approximately 1, 762 acres and enable revisions to the FEMA Flood Insurance Rate Maps that result in	Riverside County Flood Control and Water Conservation District	Completed 6/5/12	Riverside County Flood Control funds

	a significant reduction in flood insurance premiums. The District's Homeland MDP Line 1, Stage 1 project is currently ongoing with an anticipated completion in February 2017			
Flood	**Sunnymead MDP Line P-6 Stage 2 Project No. 224-4-8-00716-02-12** The District constructed a segment of drainage infrastructure described in the District's Sunnymead Master Drainage Plan which remedies ongoing flooding problems in the area thus resulting in positive impacts toresidents and businesses.	Riverside County Flood Control and Water Conservation District	Completed 3/25/2014	Riverside County Flood Control funds
Flood	**San Jacinto MDP Line C, Stage 2, Lines C-4, C-5 & B Project No. 224-4-8-00124-02-12** The District constructed a segment of drainage infrastructure described in the District's San Jacinto Master Drainage Plan, which remedies the	Riverside County Flood Control and Water Conservation District	Completed 6/30/15	Riverside County Flood Control funds

	ongoing flooding problems at the intersections of San Jacinto Avenue and Menlo Avenue, San Jacinto Avenue and Midway Street, and Santa Fe Street and Midway Street. Consequently, the removal of ponding water at these intersections during storm events improves traffic and pedestrian safety and public access to the businesses along San Jacinto and Menlo Avenues. The District partnered with the City of San Jacinto to further improve normal residential traffic safety by replacing and reconstructing Midway Street between San Jacinto Avenue and Santa Fe Street			
Flood	**West End Moreno MDP Line LL Project No. 224-4-8-00783-01-12** The District constructed a segment of drainage infrastructure described in the District's West End Moreno MDP which remedies ongoing flooding problems in the	Riverside County Flood Control and Water Conservation District	Completed 5/12/15	Riverside County Flood Control funds

	area, thus resulting in positive impacts to residents and businesses			
Flood	**Romoland MDP Line A, STGS 4,5,6, Homeland MDP Line 1 Briggs Basin, Romoland MDP Lines A-2 and A-3 Project No. 224-4-8-00310-04-12** The District constructed a segment of drainage infrastructure described in the District's Romoland Master Drainage Plan as Romoland MOP Line A, Stages 4, 5 and 6, Romoland MOP Lines A-2 and A-3, Stage 1, and Briggs Basin. In conjunction with the District's Homeland MDP Line 1, Stage 1, completion of this drainage infrastructure will reduce the floodplain by approximately 1, 762 acres and enable revisions to the FEMA Flood Insurance Rate Maps that result in a significant reduction in flood insurance premiums. The District's	Riverside County Flood Control and Water Conservation District	Completed 8/23/16	Riverside County Flood Control funds

	Homeland MDP Line 1, Stage 1 project is currently ongoing with an anticipated completion in February 2017			
Flood	**Little Lake MDP Line B Stage 2 Project No. 4-8-00265** An underground storm drain from just south of Florida Avenue, southerly in Meridian Street to Whittier Avenue.	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $6,804,257
Flood	**San Jacinto River Stage 3 Project No. 4-8-00020** "Stage 3" covers the nearly 10-mile river reach beginning at the entrance to Railroad Canyon and ending upstream at the Ramona Expressway crossing near the Bernasconi Hills. This environmentally and fiscally challenged project has been through several evolutions and has been essentially dormant for nearly a decade. Funding shown is for intensive planning/engineering study of options for managing future development. Goal	Riverside County Flood Control and Water Conservation District	Pending approval Projected Start: 11/2019 Projected End: during the life of the plan (2018-2023)	Riverside County Flood Control funds ADP (Area Drainage Plan) Funds Cost: $70,000,000

	is to develop a viable project for the San Jacinto River from Ramona Expressway to Railroad Canyon considering flood management, transportation, environmental and other opportunities and constraints			
Flood	**Gilman Home Channel Lateral A Stage 3 Gilman Home Channel Stage 90 Project No. 225-5-8-00171-03-12** The District constructed a segment of drainage infrastructure described in the District's Banning Master Drainage Plan which remedies ongoing flooding problems in the area, thus resulting in positive impacts to residents and businesses. Moreover, this project will enable revision of the FEMA Flood Insurance Rate Maps in the impacted area resulting in a significant reduction in flood insurance premiums. Many owners with federally insured	Riverside County Flood Control and Water Conservation District	Completed 9/22/15	Riverside County Flood Control funds

	home loans will realize savings of several thousands of dollars per year			
Flood	**Beaumont MDP Line 16 Stage 1 Project No. 5-8-00201** Project would build MDP Line 16 in Grand Avenue from Beaumont Cherry Valley Water District (BCVWD) infiltration ponds easterly to Bellflower Avenue as an element of a cooperative project with the BCVWD to provide both flood control and storm water capture to recharge groundwater	Riverside County Flood Control and Water Conservation District	Pending approval Projected Start: 12/2020 Projected End: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $5,353,074
Flood	**Eagle Canyon Dam Stage 1 Project No. 6-8-00190** The District constructed a segment of drainage infrastructure described in the District's Palm Springs Master Drainage Plan. Construction of this project also includes remediation of potentially hazardous and nonhazardous illegally dumped materials and	Riverside County Flood Control and Water Conservation District	Completed 11/17/15	Riverside County Flood Control funds

	remedies ongoing flooding problems in the area, thus resulting in positive impacts to residents and businesses. Additionally, Palm Springs MDP Line 43 and Lateral 43A, the underground dam outlet, is currently under construction and completion is anticipated for February 2016. Completion of the underground infrastructure will enable revisions to the FEMA Flood Insurance Rate Maps in the impacted area immediately downstream of Eagle Canyon and will result in a significant reduction in flood insurance premiums			
Flood	**Palm Springs MDP Line 43 and Lateral 43A Project No. 226-6-8-00163-01-12** The District constructed a segment of drainage infrastructure described in the District's Palm Springs Master Drainage Plan as Palm Springs MOP Line 43 and Lateral	Riverside County Flood Control and Water Conservation District	Completed 3/15/16	Riverside County Flood Control funds

	43A. Construction of this project serves as the underground outlet to the District's Eagle Canyon Dam facility that was completed on September 21, 2015 with the Notice of Completion accepted by the Board as Agenda Item Number 11-1 on November 17, 2015. Completion of both District facilities will enable revisions to the FEMA Flood Insurance Rate Maps in the impacted area immediately downstream of Eagle Canyon Dam and will result in a significant reduction in flood insurance premiums			
Flood	**Murrieta Creek Channel (Phase II & III) Project No. 7-8-00021** Murrieta Creek Flood Control Project from Old Town Temecula to Elm Street in Murrieta	Riverside County Flood Control and Water Conservation District/United States Army Corps of Engineers*	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $82,000,000

Flood	**Whitewater River Levee Restoration Project No. 6-8-00250** Restoration work to increase freeboard and bring levee adjacent to Cimarron Golf Resort into compliance with FEMA certification guidelines	Riverside County Flood Control and Water Conservation District	Pending – Full scope of restoration work not yet established but funding figure shown is based on preliminary engineer's estimate 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost:1,260,000
Flood	**Palm Canyon Wash – Cherley Creek Levee Restoration Stage 90 Project No. 6-8-00040** Major construction to bring levee serving small tributary upstream of South Palm Canyon Wash into compliance with FEMA certification guidelines. Project will be combination of RSP and soil-cement lined channel and levee	Riverside County Flood Control and Water Conservation District	Expected Advertise Date: 2nd Quarter 2018 Projected Start: 08/2019 Projected End: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $6,187,021
Flood	**Banning MDP Line D-2 Stage 1 Project No. 5-8-00169** This project is over one mile of underground storm drain that connects to the existing Ramsey Street Storm Drain at the intersection of Hargrave Street and Ramsey Street. It includes Line D-2, Stage 1 which will continue northerly along Hargrave Street for approximately 5,250 feet before terminating at Indian School Lane. Line D-2A, Stage 1 will tie into Line D-2 at the intersection of Hargrave Street and Theodore Street. Line D-2A will continue westerly along Theodore Street for approximately 600 feet before terminating at Florida Street.	RCFC/City of Banning	Notice to Proceed: 5/15/17 Completed: 2/27/18	Riverside County Flood Control funds

Civil Disorder	Trained and equipped Mobile Field Force Teams throughout the county	Riverside County Sheriff	On-going for the life of the current plan (yrs. 2018-2023). Continuously provide training to reflect personnel attrition; Less-lethal equipment acquired. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund

Note: Please refer to individual annexes for a full listing of jurisdictional Mitigation Actions

Figure 24: Riverside County FY Capital Assets

Capital asset activity for the year ended June 30, 2016 was as follows (in thousands):

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Notes to the Basic Financial Statements (Continued)
June 30, 2016

NOTE 8 – CAPITAL ASSETS

Capital asset activity for the year ended June 30, 2016 was as follows (In thousands):

	Balance July 1, 2015	Additions	Retirements	Transfers	Balance June 30, 2016
Governmental activities:					
Capital assets, not being depreciated:					
Land & easements	$ 529,885	$ 7,889	$ (188)	$ -	$ 537,586
Construction in progress	757,220	295,880	(221)	(343,280)	709,599
Total capital assets, not being depreciated	1,287,105	303,769	(409)	(343,280)	1,247,185
Capital assets, being depreciated:					
Infrastructure					
Flood channels	266,840	-	-	1,656	268,496
Flood storm drains	423,741	1,094	-	27,064	451,899
Flood dams and basins	33,968	-	-	10,559	44,527
Roads	1,886,995	29,398	-	217,937	2,134,330
Traffic signals	38,113	197	-	4,496	42,806
Bridges	202,814	2,285	-	5,191	210,290
Runways	24,179	-	-	-	24,179
Sewer systems	-	-	-	2,924	2,924
Communication towers	16,146	-	-	-	16,146
Parks trails and improvements	15,562	-	-	1,578	17,140
Land improvements	110	-	-	-	110
Structures and improvements	1,592,498	22,642	(1,089)	67,735	1,681,786
Equipment	524,781	54,434	(26,963)	4,116	556,368
Total capital assets, being depreciated	5,025,747	110,050	(28,052)	343,256	5,451,001
Less accumulated depreciation for:					
Infrastructure	(1,221,481)	(121,966)	-	-	(1,343,447)
Land improvements	(25)	(1)	-	-	(26)
Structures and improvements	(424,466)	(39,587)	882	300	(462,871)
Equipment	(311,223)	(37,550)	25,725	(276)	(323,324)
Total accumulated depreciation	(1,957,195)	(199,104)	26,607	24	(2,129,668)
Total capital assets, being depreciated, net	3,068,552	(89,054)	(1,445)	343,280	3,321,333
Governmental activities capital assets, net	$ 4,355,657	$ 214,715	$ (1,854)	$ -	$ 4,568,518

Source: (Riverside County Comprehensive Annual Financial Report 2016)

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4.4 Critical Facilities and Infrastructures

Critical facilities are facilities that pose unacceptable risks to public safety if severely damaged or non-operational. In Riverside County, critical facilities include schools, hospitals, fire stations, police stations, emergency operation centers, communication centers, dams, and industrial sites that use or store explosives, toxic materials. It is essential that critical facilities have no structural weaknesses that can lead to collapse.

Critical facilities may provide only limited services if lifelines are disrupted. Seismic hazard mitigation for lifeline structures is complex given the diversity of lifeline facilities. Earthquake ground motion could affect a variety of lifeline structures such as the control tower in an airport or the buildings that house computers and telephone circuits that are central to communications networks. Strong ground motion can also result in damage to freeway interchanges and bridges that are essential for successful transportation of goods and services. Buried pipelines are generally not damaged by strong ground motions, but can be severely disrupted in areas of surface rupture, liquefaction, or landslides.

Figure 25: Riverside County Capital Assets

COUNTY OF RIVERSIDE
Capital Asset Statistics by Function
Last Ten Fiscal Years
June 30, 2016

	Fiscal Year Ending June 30				
Function/Program	**2016**	**2015**	**2014**	**2013**	**2012**
County Libraries					
Branch libraries	35	35	35	35	33
Book mobiles	2	2	2	2	2
Books in collection	1,168,364	1,382,932	1,393,689	1,657,925	1,570,834
Museum	1	-	-	-	-
Riverside University Health Systems - Medical Center					
Major clinics	4	4	4	4	4
Routine and specialty clinics	44	44	44	37	
Beds licensed	439	439	439	439	439
Fire					
Stations	37	37	37	38	42
Trucks	158	158	145	142	145
Parks and Recreation					
Regional parks	11	14	11	11	11
Historic sites	5	5	5	5	5
Nature centers	4	4	4	4	4
Archaeological sites	6	5	6	6	6
Wildlife reserves	9	7	9	9	9
RV and mobile home parks	2	2	3	3	3
Managed areas	5	5	5	5	5
Recreational facilities	3	1	3	2	2
Community centers	1	1	-	-	-
Sheriff					
Patrol stations	10	10	10	10	10
Patrol vehicles	930	932	928	916	915
Waste Resources					
Landfills	6	6	6	6	6
Capacity in tons	62,191,202	54,232,021	54,230,474	54,230,474	54,189,339

Source: (Riverside County Comprehensive Annual Financial Report, 2016)

*Note: this data reflects the asset statistics for the unincorporated portions of Riverside County. Please refer to individual annexes for participating jurisdiction data.

4.4.1 Mitigation Goals and Strategies Relating to Critical Facilities

From approximately 2011 to 2013 the Riverside County General Plan is/was undergoing an update. It was approved and adopted in 2015. The Riverside County Multi-Jurisdictional Local Hazard Mitigation Plan was included in the Safety Element of the 2015 General Plan. Upon completion of the LHMP plan update and FEMA approval, EMD will coordinate an update with the Riverside County Transportation and Land Management Agency to the Safety Element of the General Plan in accordance with Senate Bill 1000.

The General Plan identified the following policies relating to critical facilities.

S 7.7 Strengthen the project permit and review process to ensure that proper actions are taken to reduce hazard impacts and to encourage structural and nonstructural design and construction. Damage must be minimized for critical facilities, and susceptibility to structural collapse must be minimized, if not eliminated

A. Ensure that special development standards, designs, and construction practices reduce risk to tolerable levels for projects involving critical facilities, large-scale residential development, and major commercial or industrial development through conditional use permits and the subdivision review process. If appropriate, impact fees should be assessed to finance required actions.

B. Require mitigation measures to reduce potential damage caused by ground failure for sites determined to have potential for liquefaction. Such measures shall apply to critical facilities, utilities, and large commercial and industrial projects as a condition of project approval.

C. Require that planned lifeline utilities, as a condition of project approval, be designed, located, structurally upgraded, fit with safety shutoff valves, be designed for easy maintenance, and have redundant back up lines where unstable slopes, earth cracks, active faults, or areas of liquefaction cannot be avoided.

D. Review proposed uses of fault setback areas closely to ensure that county infrastructure (roads, utilities, and drains) are not unduly placed at risk by the developer. Insurance, bonding, or compensation plans should be used to compensate the County of Riverside for the potential costs of repair.

S 7.8 Promote strengthening of planned and existing utilities and lifelines, the retrofit and rehabilitation of existing weak structures, and the relocation of certain critical facilities. S 7.9 Find alternatives that improve site safety for the protection of critical facilities. Property acquisition for open space, change in building use or occupancy, or other appropriate measures can be employed to reduce risks posed by hazards. (AI 101)

S 7.10 Discourage development of critical facilities that are proposed in dam failure inundation areas, and apply hazardous materials safety guidelines within such zones

S 7.11 Coordinate with the Public Utilities Commission (PUC) and/or utilize the Capital Improvement Program, to strengthen, relocate, or take other appropriate measures to safeguard high-voltage lines, water, sewer, natural gas and petroleum pipelines, and trunk electrical and telephone conduits that (AI 4):

- Extend through areas of high liquefaction potential.
- Cross active faults.
- Traverse earth cracks or landslides.

S 7.12 Require extra design considerations for lifelines across subsidence areas

Source: (All from Safety Element S-7: Critical Facilities and Lifelines)

Note: The Mitigation Goals and Strategies related to each hazard are found in Section 5 of the 2017 LHMP.

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4.4.2 Loss Factors

The loss estimates provided in this LHMP are based on data currently available and result in an approximation of risk used to understand relative risk from various hazards and potential losses. There are uncertainties inherent in any loss estimation methodology, in part from incomplete knowledge concerning the different hazards, as well as approximations and simplifications used in the analysis. You can see from the map below that the region of Riverside County has the highest number of declared disasters since 1950.

Figure 26: 2013 California State Hazard Mitigation Plan, Primary Sources of Disaster Losses



Table 4.F from the 2013 SHMP Chapter 4, identifies disaster incidents, casualties, and Cal OES costs by type. Cal OES has revised the database during the preparation of the 2013 State Hazard Mitigation Plan (SHMP).

Table 11: Disaster Incidents, Casualties, and Cost by Type

Table 4.F: Disaster Incidents, Casualties, and Cost by Type, 1950 - 2012

Disaster Type	Emergencies Through 2012	State Emergency Proclamations Though 2012	Federal Disaster Declarations Though 2012	Deaths Through 2012*	Injuries Through 2012*	Cal OES-Administered Costs Though 2012*
Fire	178	75	122	129	2,139	$2,735,466,734
Flood	129	116	47	294	759	$4,548,964,020
Earthquake	23	21	13	193	18,962	$8,110,772,990
Agricultural	18	17	0	0	0	$389,895,974
Freeze	9	8	4	0	0	$1,017,890,620
Landslide	9	8	1	24	0	$126,172,037
Economic	6	6	1	0	0	$32,823,425
Civil Unrest	6	6	1	85	3,331	$167,722,732
Drought	8	8	0	0	0	$2,686,858,480
Hazardous Material	5	3	0	0	0	0
Wind	3	3	0	0	0	$82,100
Air Disaster	2	2	0	232	2	0
Facility	2	2	0	0	0	$654,897
Road Damage	3	3	0	0	0	$462,986
Tsunami	3	3	2	13	1	$49,617,379
Invasive Species	1	1	0	0	0	0
Storms	6	6	1	0	0	$69,392,668
Tornado	1	1	0	0	0	0
Other	5	5	0	0	0	$10,660,320
Total	***417***	***294***	***192***	***970***	***25,194***	***$19,947,437,362***

Source: Cal OES database

Table 4.F from the SHMP, which shows the pattern of statewide emergencies, disasters and associated losses by hazard types since 1950, when coupled with seismic knowledge, suggests the following findings:

- Earthquakes occur less frequently than the other primary hazards causing disasters but account for the greatest combined losses (deaths, injuries, and damage costs).

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- Wildfires are the most frequent source of declared disasters and account for the third highest combined losses.
- Floods are the second most frequent disaster source and account for the second highest combined losses.
- Earthquake costs exceeded wildfire costs by four times, using limited measures identified in these tables.
- Although floods have resulted in a greater number of total deaths during this period, earthquakes have accounted for the highest number of combined deaths and injuries.
- Earthquakes represent by far the greatest long term catastrophic disaster threat.

From this analysis it is clear that these three hazards – earthquakes, fires, and floods – are the predominant disasters in California since 1950. For this reason these hazards are being addressed in the 2017 Mitigation Strategies and are among the top ten hazards for the County.

For Riverside County, fires occur more often, but there have been more declarations for Flooding. The Earthquake hazard for Riverside County is compounded by the three major faults that traverse the county: San Andreas, Elsinore and San Jacinto Faults.

Earthquake hazard mitigation is particularly relevant to SHMP Goal 1 (Significantly reduce life loss and injuries) and SHMP Goal 2 (Minimize damage to structures and property), set forth in Chapter 2 of the SHMP. In light of both the social and economic disruption caused by moderate-sized earthquakes, together with the significant potential for catastrophic earthquakes greater in magnitude than those experienced since 1950, heightened attention is needed for mitigation strategies relating to this particular hazard. Earthquake mitigation actions often involve expensive projects that will be considered as funding becomes available.

The 2013 State Hazard Mitigation Plan (SHMP) is the data source contained in Figure 26 “2013 California State Hazard Mitigation Plan, Primary Sources of Disaster Losses” and Table 14 “Disaster Incidents, Casualties, and Cost by Type.” Once the 2018 SHMP is completed and approved, Figure 26 and Table 14 will be updated to include the most recent maps and new information.

4.4.3 2015 General Plan Policies on High Risk Facilities

Many essential public facilities and hazardous materials sites are located within the 100-year flood zones of Riverside County making them a high risk facility. These facilities include: 14 of Riverside County's 39 airports; 4 of 18 hospitals; 47 of 109 police stations, fire stations and emergency operation centers; 92 of 380 schools; 446 of 1,306 highway bridges; and 695 of 1,978 hazardous materials sites.

In attempts to mitigate future damages from hazards Riverside County has adopted the following policies related to high risk facilities:

S 4.12 Require certain existing essential, dependent care, and high-risk facilities that are not in conformance with provisions of the County zoning to upgrade or modify building use to a level of safety consistent with the inundation risk.

S 4.13 Require that facilities storing substantial quantities of hazardous materials within inundation zones shall be adequately flood-proofed and hazardous materials containers shall be anchored and secured to prevent flotation and contamination.

S 4.14 Require that dependent care facilities have all flood-vulnerable electrical circuitry flood-proofed.

S 4.15 Require that high-risk facilities maintain and rehearse inundation response plans.

S 4.16 Utilize power of public land acquisition and other land use measures to create open space zoning of inundation zones in areas that are destined for redevelopment; when this is not feasible, low density land uses should be employed.

S 4.17 Continue to assess and upgrade inundation risk and protection in the County.

S 4.18 Require that the design and upgrade of street storm drains be based on the depth of inundation, relative risk to public health and safety, the potential for hindrance of emergency access and regress from excessive flood depth, and the threat of contamination of the storm drain system with sewage effluent. In general, the 10-year flood flows shall be contained within the top of curbs and the 100-year flood flows within the street right-of-way.

S 4.19 Encourage periodic reevaluation of the 500-year, 100-year and 10-year flood hazard in the county by state, federal, county, and other sources, and use such

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studies to improve existing protection, to review protection standards proposed for new development and redevelopment, and to update emergency response plans.

S 4.20 Balance flood control mitigation with open space and environmental protection.

S 4.21 Encourage the use of specific plans to allow increased densities in certain areas of a proposed development; or apply Transfer of Development Credits to encourage the placement of appropriate land uses in natural hazard areas, including open space, passive recreational uses, or other development capable of tolerating these hazards.

S 4.22 Take an active role in acquiring property in high-risk flood zones and designating the land as open space for public use or wildlife habitat.

Source: (All from Safety Element S-4: High Risk Facilities)

4.5 Estimated Property Loss

Table 12: Riverside County Property Values by City

RIVERSIDE COUNTY ASSESSOR
ASSESSED VALUE FOR CITIES
2016/2017

CITY	TOTAL 2016/2017 LOCAL ROLL	LESS NON-REIMBURSED EXEMPTIONS	NET TANGIBLE VALUE	LESS HOMEOWNER'S EXEMPTIONS	2016/2017 NET TAXABLE VALUE	2015/2016 NET TAXABLE VALUE	ASSESSED VALUE CHANGE	PERCENTAGE CHANGE
BANNING	2,045,247,539	45,871,853	1,999,375,686	37,881,836	1,961,493,850	1,882,818,554	78,675,296	4.18%
BEAUMONT	4,033,833,512	72,476,220	3,961,357,292	45,964,609	3,915,392,683	3,643,317,362	272,075,321	7.47%
BLYTHE	761,613,603	63,004,403	698,609,200	10,157,238	688,451,962	650,422,651	38,029,311	5.85%
CALIMESA	777,715,662	23,367,990	754,347,672	11,668,290	742,679,382	688,503,238	54,176,144	7.87%
CANYON LAKE	1,652,995,284	7,904,074	1,645,091,210	15,499,400	1,629,591,810	1,576,999,192	52,592,618	3.33%
CATHEDRAL CITY	4,283,435,909	138,609,909	4,144,826,000	45,685,725	4,099,140,275	3,895,539,688	203,600,587	5.23%
COACHELLA	1,830,946,311	145,800,821	1,685,145,490	20,232,061	1,664,913,429	1,568,941,117	95,972,312	6.12%
CORONA	19,089,817,282	295,245,447	18,794,571,835	137,765,442	18,656,806,393	17,908,062,535	748,743,858	4.18%
DESERT HOT SPRINGS	1,551,338,227	50,664,372	1,500,673,855	18,806,180	1,481,867,675	1,387,764,103	94,103,572	6.78%
EASTVALE	8,480,220,118	24,367,500	8,455,852,618	52,006,677	8,403,845,941	7,985,398,302	418,447,639	5.24%
HEMET	5,462,283,087	160,726,514	5,301,556,573	83,700,458	5,217,856,115	4,910,865,826	306,990,289	6.25%
INDIAN WELLS	5,405,900,297	44,360,931	5,361,539,366	8,750,000	5,352,789,366	5,199,720,372	153,068,994	2.94%
INDIO	7,833,242,426	166,041,389	7,667,201,037	67,986,440	7,599,214,597	7,227,358,677	371,855,920	5.15%
JURUPA VALLEY	8,549,381,868	73,158,280	8,476,223,588	71,144,081	8,405,079,507	7,759,097,935	645,981,572	8.33%
LA QUINTA	12,656,728,074	153,105,942	12,503,622,132	49,049,000	12,454,573,132	11,928,886,312	525,686,820	4.41%
LAKE ELSINORE	5,307,465,580	51,072,923	5,256,392,657	44,361,317	5,212,031,340	4,804,948,961	407,082,379	8.47%
MENIFEE	8,298,729,553	144,682,408	8,154,047,145	104,886,464	8,049,160,681	7,546,039,225	503,121,456	6.67%
MORENO VALLEY	14,312,770,759	265,286,262	14,047,484,497	137,670,247	13,909,814,250	13,082,108,737	827,705,513	6.33%
MURRIETA	12,399,753,873	427,027,712	11,972,726,161	106,791,901	11,865,934,260	11,517,794,187	348,140,073	3.02%
NORCO	3,070,099,530	56,750,389	3,013,349,141	28,081,200	2,985,267,941	2,869,322,737	115,945,204	4.04%
PALM DESERT	14,272,341,711	177,182,717	14,095,158,994	67,417,332	14,027,741,662	13,676,360,170	351,381,492	2.57%
PALM SPRINGS	11,645,678,225	248,294,657	11,397,383,568	60,181,033	11,337,202,535	10,611,925,311	725,277,224	6.83%
PERRIS	5,260,169,698	62,427,955	5,197,741,743	42,537,361	5,155,204,382	4,701,427,764	453,776,618	9.65%
RANCHO MIRAGE	8,800,691,414	547,774,373	8,252,917,041	29,367,800	8,223,549,241	7,902,324,250	321,224,991	4.06%
RIVERSIDE	28,238,701,299	1,258,881,996	26,979,819,303	240,204,427	26,739,614,876	25,457,203,551	1,282,411,325	5.04%
SAN JACINTO	2,686,709,160	53,470,350	2,633,238,810	37,396,030	2,595,842,780	2,450,518,477	145,324,303	5.93%
TEMECULA	14,978,634,970	211,399,196	14,767,235,774	107,238,640	14,659,997,134	13,956,583,981	703,413,153	5.04%
WILDOMAR	3,076,506,781	78,932,764	2,997,574,017	34,419,940	2,963,154,077	2,792,309,928	170,844,149	6.12%
CITY TOTALS	216,762,951,752	5,047,889,347	211,715,062,405	1,716,851,129	209,998,211,276	199,582,563,143	10,415,648,133	5.22%

Table 13: Unincorporated Riverside County Property Values

RIVERSIDE COUNTY ASSESSOR
ASSESSED VALUE FOR UNINCORPORATED AREAS
2016/2017

AREA	TOTAL 2016/2017 LOCAL ROLL	LESS NON-REIMBURSED EXEMPTIONS	NET TANGIBLE VALUE	LESS HOMEOWNER'S EXEMPTIONS	2016/2017 NET TAXABLE VALUE	2015/2016 NET TAXABLE VALUE	ASSESSED VALUE CHANGE	PERCENTAGE CHANGE
Alvord	1,230,054,315	4,293,168	1,225,761,147	13,185,200	1,212,575,947	1,168,289,865	44,286,082	3.79%
Banning	857,212,468	6,125,583	851,086,885	4,479,983	846,606,902	852,236,383	(5,629,481)	-0.66%
Beaumont	648,297,773	15,075,109	633,222,664	10,993,484	622,229,180	586,683,054	35,546,126	6.06%
Coachella	1,671,093,056	80,010,632	1,591,082,424	8,069,138	1,583,013,286	1,510,147,344	72,865,942	4.83%
Colton	116,664,357	2,395,678	114,268,679	1,022,000	113,246,679	109,632,339	3,614,340	3.30%
Corona-Norco	3,875,856,489	25,066,596	3,850,789,893	37,439,128	3,813,350,765	3,662,399,145	150,951,620	4.12%
Desert Center	225,135,919	268,078	224,867,841	286,731	224,581,110	230,368,870	(5,787,760)	-2.51%
Desert Sands	3,278,845,921	24,635,707	3,254,210,214	29,894,896	3,224,315,318	3,160,090,327	64,224,991	2.03%
Elsinore	1,751,940,102	26,941,744	1,724,998,358	20,938,252	1,704,060,106	1,619,779,503	84,280,603	5.20%
Hemet	4,630,913,679	178,713,683	4,452,199,996	60,345,499	4,391,854,497	4,219,200,805	172,653,692	4.09%
Menifee	723,454,268	4,564,864	718,889,404	5,084,800	713,804,604	633,826,810	79,977,794	12.62%
Moreno	675,058,135	6,544,761	668,513,374	1,183,000	667,330,374	667,642,315	(311,941)	-0.05%
Murrieta	2,324,077,841	6,592,272	2,317,485,569	11,002,600	2,306,482,969	2,232,361,878	74,121,091	3.32%
Nuview	748,064,054	5,474,709	742,589,345	9,152,982	733,436,363	684,809,351	48,627,012	7.10%
Palm Springs	2,056,242,569	80,765,934	1,975,476,635	25,297,200	1,950,179,435	1,901,356,909	48,822,526	2.57%
Palo Verde	632,543,996	2,784,631	629,759,365	2,604,106	627,155,259	595,860,635	31,294,624	5.25%
Perris	690,091,152	2,975,783	687,115,369	7,771,056	679,344,313	639,320,863	40,023,450	6.26%
Riverside	3,199,609,739	36,371,239	3,163,238,500	33,399,108	3,129,839,392	2,912,917,501	216,921,891	7.45%
Romoland	477,974,775	4,577,213	473,397,562	9,274,571	464,122,991	429,229,956	34,893,035	8.13%
San Jacinto	253,872,969	124,842,772	129,030,197	1,572,281	127,457,916	122,212,421	5,245,495	4.29%
Temecula	6,526,157,456	97,664,677	6,428,492,779	48,139,000	6,380,353,779	5,988,694,048	391,659,731	6.54%
Val Verde	1,597,610,712	148,031,619	1,449,579,093	14,465,706	1,435,113,387	1,369,550,576	65,562,811	4.79%
Yucaipa	99,434,526	135,778	99,298,748	917,000	98,381,748	94,389,584	3,992,164	4.23%
TOTALS	38,290,206,271	884,852,230	37,405,354,041	356,517,721	37,048,836,320	35,391,000,482	1,657,835,838	4.68%

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Section 5.0 – Risk Assessment

5.1 Overview and Risk Assessment Process

The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The Risk is measured by hazard, vulnerability and exposure probability.

The Riverside County Multi-Jurisdiction Hazard Mitigation Plan's risk assessment follows the methodology described in the FEMA publication *Understanding Your Risks—Identifying Hazards and Estimating Losses* (FEMA 386-2, 2002), which breaks the assessment down to a four-step process:

- Identify Hazards
- Profile Hazard Events
- Inventory Assets
- Estimate Losses

This risk assessment covers the entire geographical extent of Riverside County, including the incorporated communities and other participating jurisdictions. Since this plan is a multi-jurisdictional plan, participating jurisdictions completed their own hazard analysis and risk assessment and many have ranked their hazards differently than the County to match the needs of their jurisdiction. The County Local Hazard Mitigation Steering Committee has evaluated how these identified hazards and risks vary from jurisdiction to jurisdiction. These individual hazards and assessments are briefly outlined in this chapter with more details found in the jurisdiction's annex. If no additional data is provided in an annex, it should be assumed that the risk and potential impacts to the affected jurisdiction are similar to those described here for the entire Riverside County Operational Area LHMP.

The Riverside County Operational Area LHMP update involved a comprehensive review and update of each section of the risk assessment with new data, where available, and new analyses.

5.1.1 Results and Methodology

The County Local Hazard Mitigation Steering Committee utilized the existing 2012 Local Hazard Mitigation Plan identified hazards. Using existing hazard data and input gained through planning meetings, the Hazard Mitigation Steering Committee agreed upon a list of natural, man-made and technological hazards that could affect Riverside County.

Hazard data from the California Office of Emergency Services (Cal OES), FEMA, and many other sources were examined to assess the significance of these hazards to the planning area. Significance was measured in general terms and focused on key criteria such as frequency and resulting damage, which includes deaths and injuries, as well as property and economic damage. The natural hazards evaluated as part of this plan include those that have occurred historically or have the potential to cause significant human and/or monetary losses in the future. Man-made and technological hazards were evaluated in the same manner. During the assessment of the identified County hazards the Steering Committee realized the need to add Cyber Attack and Communication Failure to the Local Hazard Mitigation Plan. The Committee based this decision off of the history of events and probability of future occurrences.

Please see table 4.1 Hazard Identification Table for justification of each hazards ranking.

Table 14: 2017 LHMP Top 5 Identified Hazards

Riverside County Multi-Jurisdictional Local Hazard Mitigation Plan Risk Assessment Chart						
Jurisdiction	Priority Risk/ Hazards					Differs from County Priorities?
County	**#1**	**#2**	**#3**	**#4**	**#5**	
Riverside OA	Earthquake	Pan Flu	Wildfire	Electrical Failure	Emergent. Disease	See Section 5.3
Cities						
Banning	Earthquake	Fire	Transportation	HazMat	Flood	Yes
Beaumont	Earthquake	Fire	Flood	HazMat	Transportation	Yes
Blythe	Extreme Weather	Wind	Power Failure	Transportation	HazMat	Yes
Calimesa	Fire	Earthquake	Flood	Extreme Weather	Drought	Yes
Canyon Lake	Flood	Earthquake	Fire	Transportation	Nuclear Incident	Yes
Cathedral City	Earthquake	Flood	Wind	Landslide	Extreme Weather	Yes

Coachella	Earthquake	Extreme Weather	HazMat	Power Failure	Wind	Yes
Corona	Earthquake	Fire	Power Failure	Terrorism	Flood	Yes
Desert Hot Springs	Earthquake	Flood	Fire	Extreme Weather	Wind	Yes
Eastvale	Earth	Flood	Fire	Pipeline	Insect Infestation	Yes
Hemet	Earthquake	Pan Flu	Fire	Electrical Failure	Emergent Disease	No
Indian Wells	Earthquake	Flood	Extreme Weather	Power Failure	Wind	Yes
Indio	Earthquake	Extreme Weather	Emergent Disease	Pan Flu	Drought	Yes
Jurupa Valley	Earthquake	Pan Flu	Fire	Power Failure	Emergency Disease	No
La Quinta	Earthquake	Flood	Power Failure	Extreme Weather	Drought	Yes
Lake Elsinore	Fire	Flood	Power Failure	Extreme Weather	Drought	Yes
Murrieta	Earthquake	Pan Flu	Fire	Power Failure	Emergent Disease	No
Norco	Flood	Fire	Earthquake	Extreme Weather	Agricultural Hazard	Yes
Palm Desert	Earthquake	Flood	Extreme Weather	Power Failure	Drought	Yes
Palm Springs	Earthquake	Power Failure	Transportation	Extreme Weather	Wind	Yes

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Perris	Fire	Flood	Earthquake	HazMat	Power Failure	Yes
Rancho Mirage	Earthquake	Flood	Fire	Drought	Civil Unrest	Yes
Riverside	Earthquake	Flood	Drought	Terrorism	Fire	Yes
San Jacinto	Earthquake	Extreme Weather	Flood	Landslide	Drought	Yes
Temecula	Transportation	Earthquake	Flood	Terrorism	Fire	Yes
Wildomar	Earthquake	Fire	Drought	Flood	Extreme Weather	Yes
Tribes						
Morongo	Wildfire	Severe Wind Event	Earthquake	Electrical Failure	Transportation	Yes
Special Districts						
Eastern Municipal Water	N/A	N/A	N/A	N/A	N/A	See Annex
High Valleys Water	Extreme Weather	Drought	Fire	Wind	Power Failure	Yes
Idyllwild Fire Protection	Fire	Drought	Insect Infestation	Earthquake	Pan Flu	Yes
Imperial Irrigation District	Earthquake	Extreme Weather	Terrorism	N/A	N/A	Yes
Kaiser	Earthquake	Fire	Extreme Weather	Drought	Wind	Yes

Rancho California Water	Earthquake	Drought	Flood	Fire	N/A	Yes
Santa Ana Watershed	Earthquake	Wind	N/A	N/A	N/A	Yes
Western Municipal Water	Pipeline	Power	Extreme Weather	Drought	Wind	Yes
School Districts						
Beaumont Unified	Earthquake	Wind	Drought	Fire	Flood	Yes
Desert Sands Unified	Earthquake	Flood	Extreme Weather	HazMat	Drought	Yes
Hemet Unified	Civil Disorder	Extreme Weather	Wind	Flood	Fire	Yes
Lake Elsinore Unified	Earthquake	Pan Flu	Extreme Weather	Flood	Nuclear	Yes
Moreno Valley Unified	Earthquake	Fire	Extreme Weather	Power Failure	Wind	Yes
Perris Union High School	Earthquake	Fire	Wind	Pan Flu	Flood	Yes
Riverside Community College	Insect Infestation	Jail/Prison Event	Civil Disorder	Nuclear	Terrorism	Yes
Riverside County Office of Education	Earthquake	Wildland Fire	Pandemic	Flood	Severe Wind	Yes
Riverside Unified	Earthquake	Power Failure	Pipeline	HazMat	Extreme Weather	Yes
San Jacinto Unified	Earthquake	Fire	Flood	Wind	Extreme Weather	Yes

Please refer to individual annexes for additional hazard priorities for participating jurisdictions.

5.2 Agency Inventory Description

All participants were asked to evaluate the potential for an event to occur in their jurisdiction by hazard and the potential impact based on:

1. Economic loss and recovery
2. Physical loss of structures (residential, commercial, and critical facilities)
3. Infrastructure loss or damage
4. Continuity of operations for a normal daily governmental activities
5. Ability to quickly recover from the event and return to normal daily activities
6. Loss of life and potential injuries from the event.

The participants were then asked to rate the potential and severity using a scale of between 0 and 4 (4 being the most severe). The jurisdictions were also asked to rank the listed hazards as they relate to their jurisdiction from 1 to 20 (1 being the highest overall threat to their jurisdiction).

The following table was given to participants during the 2012 plan update and again for the 2017 update. Participants were informed that the county hazards were likely to be re-ranked and Communication Failure and Cyber-attack would be added.

Figure 27: 2012 and 2017 Participant Ranking Chart

NAME:	AGENCY:		DATE :		
	COUNTY		LOCAL JURISDICTION		
HAZARD	SEVERITY 0 - 4	PROBABILITY 0 - 4	SEVERITY 0 - 4	PROBABILITY 0 - 4	RANKING 1 - 20
1. EARTHQUAKE					
2. WILDLAND FIRE					
3. FLOOD					
OTHER NATURAL HAZARDS					
4. DROUGHT					
5. LANDSLIDES					
6. INSECT INFESTATION					
7. EXTREME SUMMER/WINTER WEATHER					
8. SEVERE WIND EVENT					
AGRICULTURAL					
9. DISEASE/CONTAMINATION					
10. TERRORISM					
OTHER MAN-MADE					
11. PIPELINE					
12. AQUEDUCT					
13. TRANSPORTATION					
14. POWER OUTAGE					
15. HAZMAT ACCIDENTS					
16. NUCLEAR ACCIDENT					
17. TERRORISM					
18. CIVIL UNREST					
19. JAIL/PRISON EVENT					
MEDICAL					
20. PANDEMIC					

Note: Please refer to the individual Local Hazard Mitigation Plans for participating jurisdiction

Please See Appendix E for the Inventory Worksheet template provided to participants.

The County Ranking used a similar format when looking at the probability and severity of a potential hazard but also included information on Healthcare Impact and Mitigation Capabilities. The following chart was used by the Local Hazard Mitigation Steering Committee while ranking the 2017 Hazards.

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Figure 28: 2017 County Hazard Ranking and Risk Scores

HAZARD	PROBABILITY	SEVERITY	HEALTHCARE	EMS	BEHAVIORAL / MENTAL HEALTH	RESPONDER AGENCIES	COMMUNITY AGENCIES	*RISK SCORE*
	Improbable: 0 Remote: 1 Occasional: 2 Probable: 3 Frequent: 4	NA: 0 Negligible: 1 Marginal: 2 Critical: 3 Catastrophic: 4	NA: 0 Negligible: 1 Marginal: 2 Critical: 3 Catastrophic: 4	NA: 0 Negligible: 1 Marginal: 2 Critical: 3 Catastrophic: 4	NA: 0 Negligible: 1 Marginal: 2 Critical: 3 Catastrophic: 4	NA: 0 Low: 1 Moderate: 2 High: 3 Extreme: 4	NA: 0 Low: 1 Moderate: 2 High: 3 Extreme: 4	
Aqueduct	2	3	2	2	2	2	3	0.38
Drought	3	3	2	2	2	2	2	1.13
Earthquake	2	4	4	4	3	2	2	3.50
Extreme Weather	2	3	2	2	2	2	2	0.75
Flood	3	3	2	3	2	2	3	1.13
Insect Infestation	3	2	2	1	1	2	2	0.00
Landslide	3	3	1	1	1	2	2	-0.56
Tornado	1	2	2	2	2	2	2	0.25
Wildland Fire	4	3	3	3	3	3	3	2.25
Civil Disorder	2	3	3	3	1	4	0	1.13
Communications Failure	2	3	3	3	3	3	3	1.13
Cyber Attack	4	2	3	2	2	3	1	1.50
Dam Failure	1	3	2	3	2	2	3	0.38
Electrical Failure	4	4	2	2	2	2	2	2.00
HazMat Incident	4	3	2	2	1	3	3	-0.75
Jail/Prison Event	1	2	1	1	1	4	0	-0.13
Nuclear/Radiological Incident	1	4	2	3	3	2	2	1.00
Pipeline Disruption	2	3	2	2	1	3	3	-0.38
Terrorist Event - MCI	1	3	3	3	4	3	1	1.13
Transportation Failure	2	3	2	2	1	2	2	0.38
Water Supply Disruption/Contamination	3	2	0	0	0	2	2	-1.50
Emergent Disease/Contamination	3	3	3	3	2	3	2	1.69
Pandemic Flu	2	4	4	4	4	3	2	3.50

5.3 Hazard Profiles and Descriptions

Hazard Assessment and Identification

The County utilized the tools described in Section 3.3 for the hazard identification process and provided them to the individual cities and special districts. Cal OES MyPlan was used for information about floods, earthquake, fire and some critical facilities locations. Additionally, Riverside County Transportation and Land Management Agency provided maps detailing where hazards and critical facilities are located.

All participating jurisdictions and special districts conducted a risk assessment and identified hazards specific to their jurisdiction, document the impact of those hazards, and develop specific goals and strategies to address the risks and hazards.

The probability of each hazard in Riverside County was determined by rating their occurrence level from 0 - 4, in which each level or number represented a specific descriptor. For example, improbable = (0), remote = (1), occasional = (2), probable = (3), and frequent = (4). Each descriptor was defined according to how often each hazard occurs in Riverside County.

- *Improbable* means it is not likely to happen in more than ten years
- *Remote* means it happens once in ten years
- *Occasional* means it happens once in five years
- *Probable* means it happens once every two years (biannual)
- *Frequent* means it happens at least once a year (annually)

Identification of Hazards

With its varying topography; a mix of urban and rural areas and rapidly growing permanent, transient, and recreational populations, the Riverside County Operational Area is subject to potential negative impacts from a broad range of hazards and threats. There are three broad categories of hazards that threaten the OA:

- Natural hazards
- Technological hazards
- Man-Made hazards

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5.3.1 Earthquake

Severity: 4

Probability: 2

Risk Score: 3.50

OA Jurisdictions Affected by Earthquakes

- All incorporated cities of Riverside County
- Unincorporated areas of Riverside County

Hazard Definition

An earthquake is a sudden, rapid shaking of the ground caused by the breaking and shifting of rock beneath the Earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth as the huge plates that form the Earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free causing the ground to shake. Most earthquakes occur at the boundaries where the plates meet; however, some earthquakes occur in the middle of plates.

Where earthquakes have struck before, they can strike again, often without warning. The major form of direct damage from most earthquakes is damage to construction. Bridges are particularly vulnerable to collapse and dam failure may generate major downstream flooding. Buildings vary in susceptibility depending on their construction and the types of soils on which they are built. Earthquakes destroy utility infrastructure which, in turn, may set off fires, hinder rescue efforts, and impact normal functions for an extended period of time. The hazard of earthquakes varies from place to place depending on the regional and local geology. Ground shaking may occur 65 miles or more from the epicenter (the point on the ground surface above the focus). Ground shaking can change the mechanical properties of some fine grained, saturated soils, where upon the soils liquefy and act as a fluid (liquefaction).

Most earthquake-related injuries result from collapsing walls, flying glass, and falling objects as a result of the ground shaking.

Figure 29: Historical Earthquakes in the Riverside County Area - 5.0 and Above

Year	Richter Scale Magnitude	Description
1812	7.0	Occurred on the southern section of the San Andreas fault near Wrightwood.
1857	7.9	Occurred 60 miles northwest of Fort Tejon and ruptured 225 miles of the San Andreas fault.
1890	6.5	Occurred in the "San Jacinto or Elsinore Fault region" on the Rockhorse Truck Trail, north of the Borrego Valley Airport.
1890	6.5	Occurred in the same region as the 1890 earthquake.
1899	6.4	San Jacinto earthquake destroys San Jacinto and Hemet
1910	5.0	Occurred on the Elsinore fault northwest of the City of Lake Elsinore.
1918	6.9	San Jacinto earthquake strikes the same area that was damaged by an earthquake 19 years earlier.
1923	6.3	North San Jacinto Fault earthquake damaged the San Bernardino and Redlands area. This the last known time that this fault, which runs under the I-215/I-10 interchange, ruptured in this area.
1937	6.0	Terwilliger Valley earthquake was in the same general area as the 1890 earthquake.
1942	6.3	Fish Creek Mountains earthquake was south of the Ocotillo airport.
1954	6.2	Arroyo Salada earthquake was west of the Salton Sea.
1968	6.5	Borrego Mountain Earthquake was northeast of Ocotillo Wells
1987	6.6	Superstition Hills earthquake near the Salton Sea
1992	7.2	Occurred near Landers, California and caused the rupture of five different faults. Those faults were: Johnson Valley, Landers, Homestead Valley, Emerson, and Camp Rock.
1992	7.3	Occurred 3 hours after the Landers Earthquake with an epicenter near Big Bear, CA
1994	6.8	Northridge Earthquake
1999	7.4	Hector Mine Earthquake
2010	5.4	Borrego Springs earthquake believed by seismologists to have been possibly triggered by the strong earthquake which occurred near Calexico in 2010.

Located within Riverside County are several known active and potentially active earthquake faults, including the San Andreas Fault, San Jacinto Fault, and Elsinore Fault In the event of an earthquake, the location of the epicenter, as well as the time of day and season of the year, would have a profound effect on the number of deaths and casualties, as well as property damage.

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Research centers devoted to the detection and logging of earthquake events record the ongoing weekly activity of small magnitude in Riverside County faults. The most recent earthquake in Riverside County was located in Banning on July 7, 2017, and had a magnitude of 1.1. There are a number of small scale earthquakes that happen weekly but larger scale or catastrophe shaking is less likely.

A **moderate** earthquake occurring in or near Riverside County could result in deaths, casualties, property damage, environmental damage, and disruption of normal government and community services. The effects could be aggravated by collateral emergencies such as fires, flooding, hazardous material spills, utility disruptions, landslides, transportation emergencies, and the possible failure of several dams in Riverside County. The community needs would most likely exceed the response capability of the County's emergency management organizations, requiring mutual assistance from volunteer and private agencies, the California Office of Emergency Services (Cal OES), and the Federal Emergency Support Functions.

A **catastrophic** earthquake in Riverside County could cause thousands of casualties, extensive major property damage, disruption in communications and utility systems, disruption in supply and distribution systems, and general panic. An earthquake of this magnitude could directly affect all of Riverside County and most of southern California, causing a critical demand on mutual aid resources and competition for national relief.

Key effects and response considerations:

- **Effects on people and housing.** In any earthquake, the primary consideration is saving lives. Time and effort must also be dedicated to providing for mental health for reuniting families, providing shelter to displaced persons, and restoring basic needs and services. Major efforts will be required to remove debris and clear roadways, demolish unsafe structures, assist in re-establishing public services and utilities, and provide continuing care and temporary housing for affected citizens.

  A survey of local, State, and Federal government emergency plans indicate that although there is a general capacity to respond to small and intermediate-sized earthquakes, it is unlikely that any of these governmental units will be able to cope with the immediate impact of a great quake, such as a Magnitude (M) 8.3 event on the south-central San Andreas fault. The general public must realize that the assistance that they have been used to expecting simply will not be immediately available. In fact, in the event of an earthquake of such magnitude, citizens must be prepared to wait for up to 72 hours or more for any type of organized response.

- **Effects on commercial and industrial structures.** After any earthquake, individuals are likely to lose wages due to the inability of businesses to function because of damaged goods and/or facilities. With business losses, the County of Riverside and the cities in the Riverside County Operational Area will lose revenue. Economic recovery from even a minor earthquake will be critical to the communities involved.

- **Effects on infrastructure.** The damage caused by an earthquake can lead to the paralysis of the local infrastructure: police, fire, medical and governmental services.

- **Effects on Critical Facilities.** A large number of critical facilities have been identified as being adjacent to the various faults in the County and surrounding counties. The list of facilities includes hospitals, fire stations, law enforcement facilities, and schools.

  Effects on agriculture. Earthquakes can cause loss of human life, loss of animal life, and property damage to structures and land dedicated to agricultural uses. The most significant long-term impacts on agriculture from earthquakes are those that arise from the cascading effects of fire and flood.

Historically, the San Andreas Fault is the most active among the fault network that cuts through rocks of the California coastal region. The entire San Andreas Fault system is more than 800 miles long and extends to depths of at least 10 miles within the earth. The San Andreas Fault in California forms a continuous, narrow break in the earth's crust that extends from northern California southward to Cajon Pass near San Bernardino; southeastward from Cajon Pass. Several branching faults, including the San Jacinto and Banning faults, share the movement of the crustal plates as the fault continues to the south east, on to the Salton Sea and on to Baja California Sea of Cortez.

Recent studies of the eastern section of the San Andreas near San Gorgonio Pass reveal that this area is more advanced in the cycle of strain accumulation than the western area at the Cajon Pass. Earthquake activity around the Southern San Andreas, including the June 1992 Landers-Big Bear earthquakes, has prompted scientists to increase their studies of this area.

The San Jacinto fault has had a higher level of moderate-to- large earthquakes during the past 50 to 100 years, although the rate of slip is not as high. Geodetic data indicates there is an "appreciable" strain accumulation across both faults, implying that either one or both may be primed for release. One of the larger and more active fault segments of

the San Jacinto fault, the Casa Loma Faults, runs from near Perris Reservoir to just north of Anza. Also, another large and active named segment is the Clark Fault, which runs from near Hemet to just 9 miles southwest of the shore of the Salton Sea. Historically, this section of the San Jacinto Fault produced a series of large earthquakes starting in 1899 on average every 14 years with the longest interval being 19 years. The last slip occurred on the Superstition Hills and Elmore Ranch sequence in1987. In 2015, the Working Group on California Earthquake Probabilities (WGCEP) estimated 30-year probabilities of 19 percent for an M 6.7 and larger event on the Southern San Jacinto Fault.

A third major fault zone that traverses Riverside County is the Elsinore Fault. The Elsinore Fault Zone is one of the largest in southern California. The main trace of the Elsinore fault zone has only seen one historical event greater than magnitude 5.2 – the earthquake of 1910, a magnitude 6 shock near Temescal Valley.

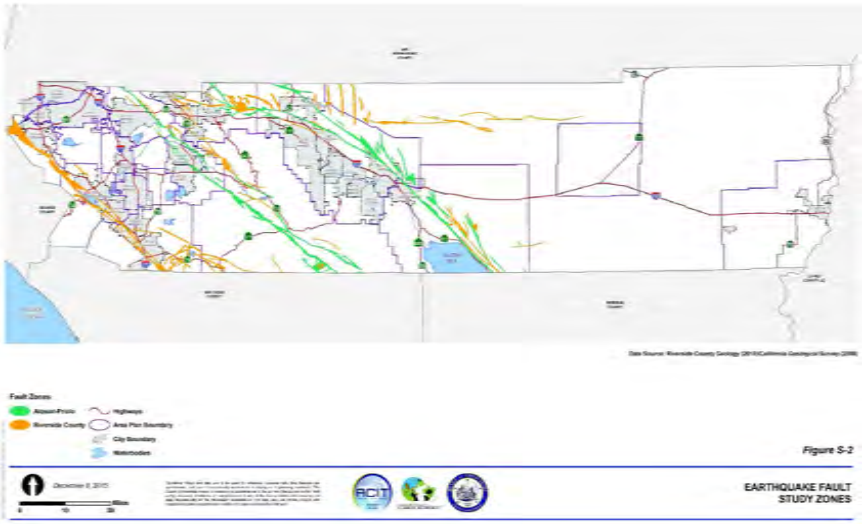
Risk Assessment Conclusion.

Riverside County is at risk for a significant earthquake causing catastrophic damage and strains on response and mitigation resources. Both property and human life are at high risk. The County experiences hundreds of minor quakes and tremblers each month from the myriad of faults in the area. Studies indicate that stress is building up in major faults like the San Andreas. A major quake could happen at any time.

Earthquake risk is very high in the most heavily populated western portion of the County and the Coachella Valley, due to the presence of two of California's most active faults, the San Andreas and San Jacinto. The risk is moderate in the eastern portion of the County beyond the Coachella Valley.

The following maps have been provided by the Riverside County Transportation and Land Management Agency and developed using Cal OES MyPlan.

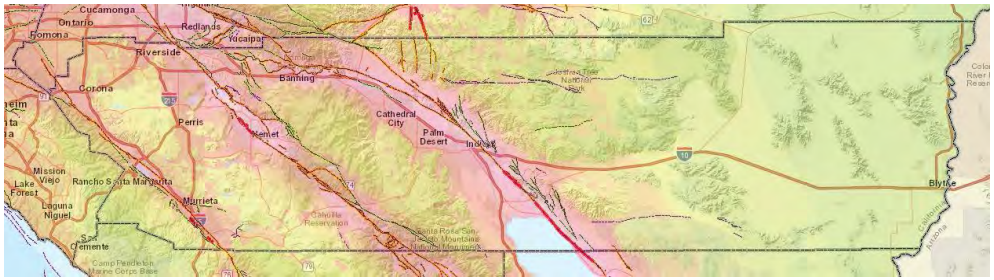
Map 2: Riverside County Faults and Zones



Map 3: Fault Activity



Map 4: Ground Shaking Potential



Relationship to Other Hazards – Cascading Effects

Earthquakes can cause many cascading effects such as fires, flooding, hazardous material spills, utility disruptions, landslides, transportation emergencies, electrical failure and the possible failure of several dams in Riverside County.

Hazus Assessment

HAZUS®MH was used to generate general building stock and essential facility loss estimates for five different natural hazard scenarios. Two of the scenarios were large scenario earthquakes. The earthquakes chosen for analysis were an M6.8 Elsinore Fault Scenario Earthquake, and the M7.8 "ShakeOut" Scenario Earthquake on the Southern San Andreas Fault.

Risk assessment results were generated using the following HAZUS®MH analysis options:

- **General Buildings**
  - Ground Motion
  - Damage State Probabilities
  - Damage
  - Direct Economic Loss
- **Essential Facilities**
  - Medical Care
  - Police Stations
  - Fire Stations
  - Emergency Response
  - Schools
- **Transportation Systems**
  - Highways
  - Railways
  - Light Rail
  - Bus System
  - Port and Harbor
  - Ferry System
  - Airport Transportation
- **Utility Systems**
  - Potable Water
  - Waste Water
  - Oil
  - Natural Gas

- Electric Power
- Communication

- **Induced Physical Damage**
  - Fire following
  - Debris
- **Direct Social Losses**
  - Casualties
  - Shelter

Table 18 (ES-2) provides a summary of HAZUS®MH-estimated regional impacts for Riverside County for the two earthquake scenarios. As shown in the tables, the total estimated direct economic loss related to building damage ranges from $1.8B to $9.8B in the two scenario events. It should be noted that these totals are for Riverside County only. Both earthquake scenarios have the potential to cause additional damage in adjacent counties (for example, the Elsinore scenario would also significantly impact San Diego and Orange counties), whose losses are not tabulated here.

Table 15: Summary of HAZUS estimated Impacts on Riverside County for Two Earthquake Scenarios

Table ES-2. Summary of HAZUS®MH-estimated Impacts on Riverside County for Two Earthquake Scenarios

Impact Category	M6.8Elsinore	M7.8"ShakeOut" San Andreas*
Economic Loss due to Building Damage	$1.2B	$6.9 B
Total Building-related Direct Economic Loss	$1.8B	$9.8 B
# Buildings in Complete Damage State	100	25,000* (many MH)
Debris Generated (million tons)	0.3	3.5
Displaced Households	110 Households	19,000 Households*
People Needing Short-term Shelter	90 People	8,600 People*
Fatalities (2 am, 2 pm, 5 pm)	<10,<10,<10	60 bldg (70 all causes)*
Total Injuries (2 am, 2 pm, 5 pm)	200, 200, 220	11,600 bldg (11,900 all)*
% of Households without Water	<1%	99%
# Highway Bridges w/ at least Moderate Damage (potentially closed)	None expected	100

*Note: selected custom estimates for the "ShakeOut" scenario have been taken from the full USGS technical report, "*The ShakeOut Scenario*". http://pubs.usgs.gov/of/2008/1150

Table 19 summarizes expected essential facility performance in the two earthquake events. Estimated building damages to essential facilities in Riverside County ranges from about $64M - $351M. These loss totals should not be considered all-inclusive, as replacement cost data was not available for many hospitals, and a small number of schools and police facilities.

Table 16: Summary of HAZUS – estimated Impacts for Riverside County Essential Facilities in Two Earthquake Scenarios

Essential Facility	Category	M6.8 Elsinore		M7.8 "ShakeOut" San Andreas	
		Mean Damage	Economic Loss ($1,000)	Mean Damage	Economic Loss ($1,000)
Hospitals*	Medium	2%	$4,858	14%	$3,842
	Large	0%	$899	26%	$5,180
Schools	K-12 (default data)	1%	$2,375	2%	$3,708
	K-12 (providing data)	1%	$54,774	6%	$314,182
	CCD (providing data)	0%	$706	5%	$24,465
EOCs		1%	$3	6%	$20
Police Stations		0%	$3	7%	$35
Fire Stations		1%	$3	4%	$14
TOTALS			**$63,620**		**$351,446**

*Note: In Riverside County, there are no hospitals which would be categorized by HAZUS as "Small" (<50 licensed acute care beds)

Elsinore Earthquake Scenario – Regional Impacts

The M6.8 Elsinore scenario earthquake will impact the western-most communities and infrastructure of Riverside County. A summary of regional impacts is provided in Figure 29. These impacts are described below.

Of the approximately 647,000 buildings modeled within the improved general building stock data for Riverside County, less than 1% (approximately 100) are expected to suffer "complete" damage in the Elsinore scenario earthquake. These buildings would be considered "red-tagged" or unsafe for continued occupancy. A small percentage of these buildings (15% or less) have the potential for collapse, suggesting the need for Urban

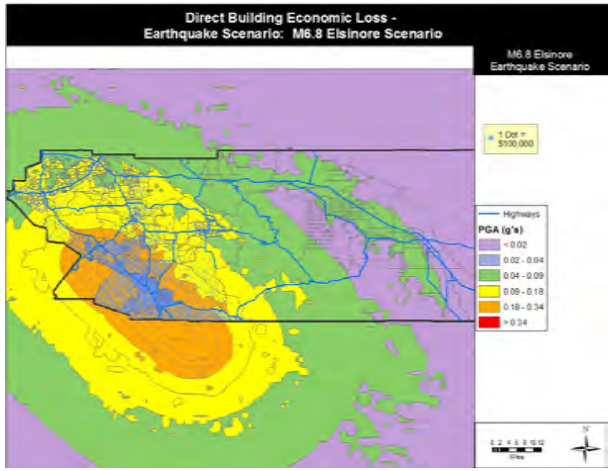
Search & Rescue (USAR). Approximately 2,200 buildings (0.3%) are expected to suffer "extensive" damage, and would be considered "yellow-tagged", with restrictions on continued use. While the remainder of buildings would be considered "green-tagged" (safe for occupancy, although some damage may have occurred), as many as 3% (20,500) would be expected to suffer "moderate" damage, and an additional 13% (82,700) would suffer "slight" damage.

As much as 0.3 million tons of debris may result from these damaged buildings – 47% is expected to be heavy debris (concrete and steel), requiring heavy equipment to break down and remove, while 53% is expected to be light debris (wood, brick and other debris).

The number of people killed as a result of shaking-induced and transportation system damage is expected to be less than 10, regardless of the time of day that the earthquake occurs.

Total injuries, including the range of injuries from minor injuries treated with basic medical care to mortal injuries (deaths), are expected to be on the order of 200-220. Transportation of the injured for treatment is not expected to be impacted by transportation system damage, as no bridge in the County is expected to suffer "moderate" damage or greater.

Figure 30: Direct Building Economic Loss



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"ShakeOut" San Andreas Earthquake Scenario Regional Impacts

The M7.8 "ShakeOut" San Andreas scenario earthquake will impact most of the populated portions of Riverside County. A summary of impacts is provided in Table 19. It should be noted, however, that some impact estimates have been taken from the improved estimates developed by the extensive community modeling effort (Jones, et al., 2008) conducted for the "ShakeOut" exercise. The use of these estimates is noted where appropriate.

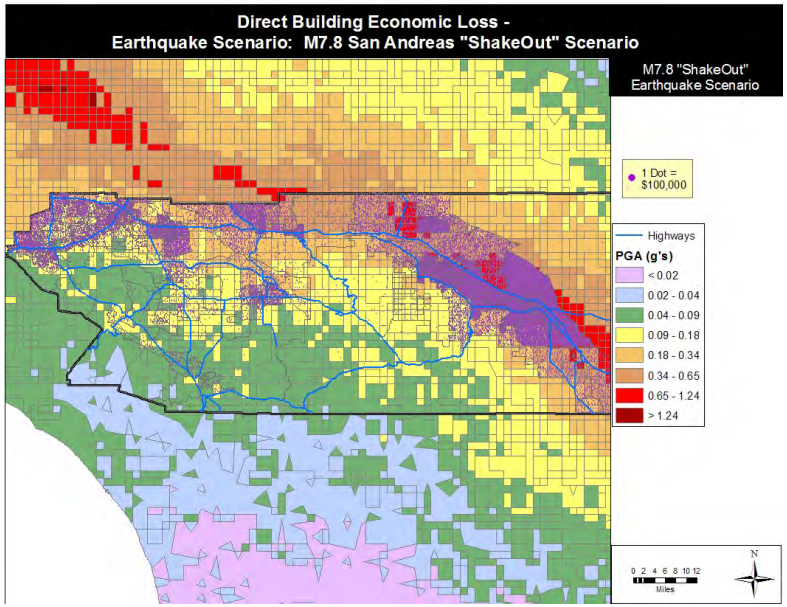
Table 17: Summary of HAZUS – Estimated Impacts for Riverside County Due to an M7.8 Scenario Earthquake on the "ShakeOut" San Andreas Fault

Economic Loss due to Building Damage	$6.9 B
Total Building-related Direct Economic Loss	$9.8 B
# Buildings in Complete Damage State	25,000* (many MH)
Debris Generated (million tons)	3.5
Displaced Households	19,000 Households*
People Needing Short-term Shelter	8,600 People*
Fatalities (2 am, 2 pm, 5 pm)	60 in buildings (70 all causes)*
Total Injuries (2 am, 2 pm, 5 pm)	11,600 in buildings (11,900 all)*
% of Households without Water	99%
# Highway Bridges w/ at least Moderate Damage (potentially closed)	100

*Note: selected custom estimates for the "ShakeOut" scenario have been taken from: http://pubs.usgs.gov/of/2008/1150

In the M7.8 "ShakeOut" Scenario earthquake on the San Andreas Fault, dollar losses related to shaking-induced building damage are estimated to reach $6.9 billion, while total direct economic losses are expected to be approximately $9.8 billion. The geographic distribution of total direct economic loss is mapped in Figure 4-9.

Figure 31: Direct Economic Loss in Riverside County Resulting from an M7.8 Scenario Earthquake on the "ShakeOut" San Andreas Fault



According to the published "ShakeOut" scenario (Jones, et al., 2008), approximately 25,000 buildings would be expected to suffer "Complete" damage in the scenario earthquake. These building, predominantly residential mobile homes, would be considered "red-tagged" or unsafe for continued occupancy. A small percentage of these buildings (15% or less) have the potential for collapse, suggesting the need for Urban Search & Rescue. More than 18,000 buildings are expected to suffer "Extensive" damage in this scenario earthquake and would be considered "yellow-tagged", with restrictions on continued use. While the remainder of buildings would be considered "green-tagged" (safe for occupancy, although some damage may have occurred), approximately 63,000 would be expected to suffer "Moderate" damage, and an additional 137,000 would suffer "Slight" damage.

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Almost 3.5 million tons of debris may result from these damaged buildings – 58% is expected to be heavy debris (concrete and steel), requiring heavy equipment to break down and remove, while 42% is expected to be light debris (wood, brick and other debris).

In the "ShakeOut" scenario (Jones, et al., 2008), damage to single family and multi-family dwellings is expected to result in the displacement of approximately 19,000 households. Immediately after the earthquake, significant disruption to the water supply and distribution system is expected, essentially impacting the entire county. While many of the displaced may find shelter with friends and family, or in available hotels, approximately 8,600 people are expected to seek public shelter.

The number of people killed as a result of shaking-induced building, transportation system damage, and post-earthquake fire may be on the order of 60 to 70 people. Total injuries, including the range of injuries from minor injuries treated with basic medical care to mortal injuries (deaths) from all causes, are estimated to reach 11,900 within the County.

Transportation of the injured for treatment could be impacted by transportation system damage with as many as 100 bridges in the County suffering at least "Moderate" damage.

Essential Facility Impacts

Table 19 provides an overview of essential facility performance in the "ShakeOut" San Andreas Scenario earthquake. The table lists the number of essential facility sites and buildings (these numbers will differ for multi-building campuses, such as schools and hospitals). The table also provides the total building replacement value and the number of buildings for which value data was available. As can be seen in the table, replacement cost data for hospitals was generally not available, unlike most other essential facility types. Expected building performance in this earthquake event is on the order of 7% damage or less for EOCs, fire stations, police stations, and schools, but as much as 26% damage for large hospitals. The total economic loss for essential facilities has been estimated to exceed $351 million, with 97% of the total loss occurring in schools. It should be noted that although cost data is only available for 31 hospital buildings (out of 77), these 31 buildings suffer more than $9 million in loss, indicating that the actual total economic loss for hospitals would be significant, but can't be estimated at this time because of the lack of replacement value data.

Table 18: Riverside County Essential Facility Loss Estimates – M7.8 "ShakeOut" San Andreas Fault Scenario Earthquake

Essential Facility	Category	No. of Facilities/ Sites	No. of Buildings	No. of Beds	Replacement Cost ($1,000)	# Buildings w/ replacement cost data	Functionality Day 1 (%)	Mean Damage	Economic Loss ($1,000)
Hospitals*	Medium	8	28	793	$162,827	21	64	14%	$3,842
	Large	8	49	2,467	$200,792	10	26	26%	$5,180
Schools	K-12 (default data)	152	152		$219,600	152	74	2%	$3,708
	K-12 (providing data)	689	9,981		$6,049,534	9,213	64	6%	$314,182
	CCD (providing data)	12	258		$356,708	257	54	5%	$24,465
EOCs		43	43		$310,273	43	60	6%	$20
Police Stations		51	51		$675,299	48	57	7%	$35
Fire Stations		156	156		$366,493	156	72	4%	$14
TOTALS		**1,119**	**10,718**	**3,260**	**$8,341,525**	**9,900**			**$351,446**

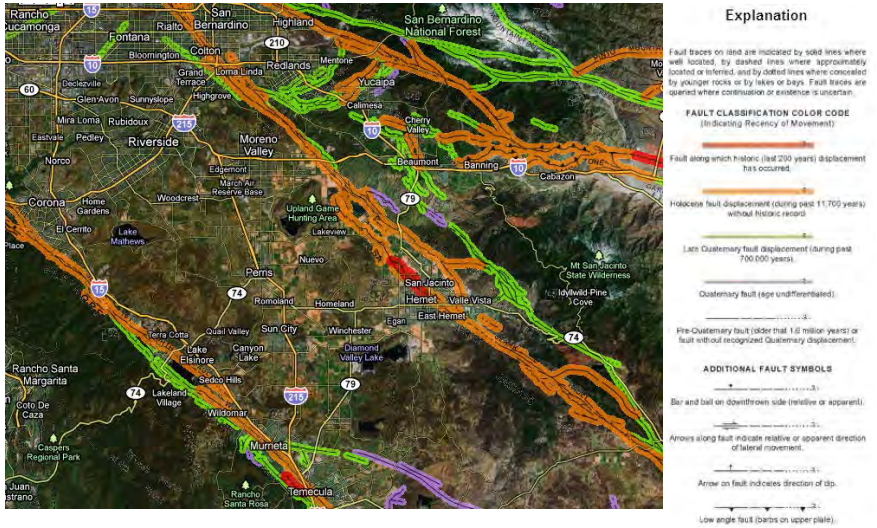
*Note: In Riverside County, there are no hospitals which would be categorized by HAZUS as "Small" (<50 licensed acute care beds)

The following three maps are from the Fault Activity Map of California, California Geologic Survey, Data Map

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Map 5: Fault Activity Map of California, Western Riverside County



Map 6: Fault Activity Map of California, Central Riverside County





Map 7: Fault Activity Map of California, Eastern Riverside County





5.3.2 Pandemic Flu

Severity: 4

Probability: 2

Risk Score: 3.50

OA Jurisdictions Affected by Pandemic and Epidemic

- All incorporated cities of Riverside County
- Unincorporated areas of Riverside County

Hazard Definition

A disease outbreak can cause illness and result in significant casualties. Since 1900, there have been four influenza pandemics that killed approximately 600,000 people in the United States. In 2009 the H1N1 flu was first identified in Imperial and San Diego counties, killing more than 550 Californians, sent thousands more to hospitals, caused widespread fear and anxiety and the declaration of a public health emergency. H1N1 in 2009 tested the State's medical infrastructure as never before. H1N1 quickly spread nationwide and then around the globe, taking a heavy toll on people not usually susceptible to serious influenza.

History

2009 - Rise of H1N1, popularly referred to as the Swine Flu. According to the California Center for Infectious Diseases, the H1N1 flu (2009 H1N1 influenza virus) is a type of influenza virus that causes respiratory disease that can spread between people. While most people who have been sick have recovered without needing medical treatment, hospitalizations and deaths from infection with this virus has occurred. The spread of H1N1 flu occurs in the same way that seasonal flu spreads. Flu viruses are spread mainly from person to person through coughing or sneezing by people with influenza. As a result of preparation and mitigation strategies such as vaccinations and public education, the threat of a full-blown H1N1 pandemic in the U.S. is receding. However, the possibility of another pandemic still exists.

2003 - A previous pandemic flu threat that still looms is the avian flu. Birds can contract avian flu and pass it along to humans. Some strains of the avian flu are more virulent than others. Public health experts continue to be alert to the risk of a possible re-emergence of a 2003 epidemic of avian flu among people primarily in Asia. People who had been very close contact with infected birds (for example, people who lived with chickens in their houses) contracted a virulent form of avian

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flu and there was a significant death rate from this disease. Thus far, the avian flu virus has not mutated and has not demonstrated easy transmission from person to person. However, were the virus to mutate in a highly virulent form and become easily transmissible from person to person, the public health community would be very concerned about the potential for a pandemic influenza outbreak. Such a pandemic could disrupt all aspects of society and severely affect the economy.

Risk Assessment

Influenza, also known as the flu, is a disease that attacks the respiratory system (nose, throat, and lungs) in humans. Although mild cases may be similar to a viral "cold," influenza is typically much more severe. It usually comes on suddenly; may include fever, headache, tiredness, dry cough, sore throat, nasal congestion, and body aches; and more often results in complications such as pneumonia. Seasonal influenza is a yearly occurrence that causes serious flu-related complications primarily for persons aged 65 and older and those with chronic health conditions (such as asthma, diabetes, or heart disease), pregnant women, and young children. Those who are exposed but do not succumb develop immunity to the strain circulating that year. Worldwide pandemics of influenza occur when a novel virus emerges to which the population has little immunity. The 20th century saw three such pandemics, the most notable of which was the 1918 Spanish influenza pandemic that was responsible for 20 million deaths throughout the world. Secondary impacts include significant economic disruption that can occur due to loss of employee work time and costs of treating or preventing spread of the flu.

Source: https://archive.cdph.ca.gov/HealthInfo/discond/Pages/Influenza(Flu).aspx

California Department of Public Health

The 2009 H1N1 influenza (flu) pandemic occurred against a backdrop of pandemic response planning at all levels of government including years of developing, refining and regularly exercising response plans at the international, federal, state, local, and community levels. At the time, experts believed that avian influenza A (H5N1) viruses posed the greatest pandemic threat. H5N1 viruses were endemic in poultry in parts of the world and were infecting people sporadically, often with deadly results. Given that reality, pandemic preparedness efforts were largely based on a scenario of severe human illness caused by an H5N1 virus. Despite differences in planning scenarios and the actual 2009 H1N1 pandemic, many of the systems established through pandemic planning were used and useful for the 2009 H1N1 pandemic response.

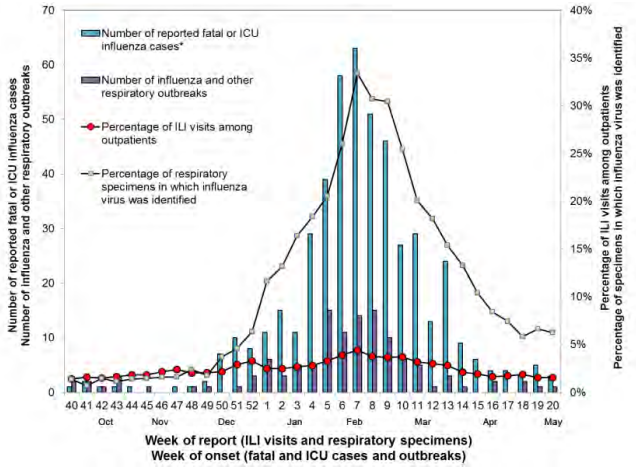
http://www.cdc.gov/h1n1flu/cdcresponse.htm (see attachment for complete document report)

The California Department of Public Health (CDPH) monitors flu conditions on an annual bases, including all virologic, case based and syndromic surveillance. CDPH works with Riverside County to help the community prepare and mitigate the effects of Pandemic Flu.

- **Effects on people and housing.** The risk to people can be severe, leading to hospitalization and possibly loss of life. Damage to housing as a result of Pandemic Flu is not likely.
- **Effects on commercial and industrial structures**. The risks are minimal to structures.
- **Effects on infrastructure.** The risks are minimal, but if there is a pandemic the risk will decrease the numbers of workers that go to work, which can have economic and functional effects to the organizations in a community. Continuity of Business and Continuity of Government planning goes into action in these cases.
- **Effects on agriculture.** The risk of animals borne disease can be great in a pandemic, depending on the disease. The impact to agriculture can be great, again depending on the disease.

The following charts are from the CDPH Influenza and Other Respiratory Diseases

Figure 32: Surveillance Report for the 2015–2016 Flu Season.



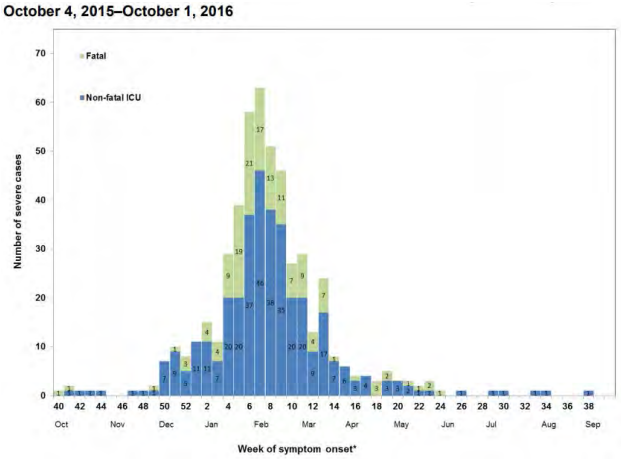


Table 19: Statewide 2011-2016 Influenza Cases0

Appendix I. Number of fatal and non-fatal ICU cases of laboratory-confirmed influenza in persons <65 years of age reported to the California Department of Public Health, by local health jurisdiction, 2011–2012 influenza season through 2015–2016 influenza season

	2011-2012*		2012-2013*		2013-2014*		2014-2015*		2015-2016*	
Jurisdiction	Fatal	Non-fatal ICU	Fatal	Non-fatal ICU	Fatal	Non-fatal ICU	Fatal	Non-fatal ICU	Fatal	Non-fatal ICU
CALIFORNIA	51	166	116	241	416	837	79	290	144	355
Alameda†	6	9	3	3	12	26	2	12	5	19
Berkeley City	0	0	0	0	0	1	0	0	0	1
Alpine	0	0	0	0	0	0	0	0	0	0
Amador	0	0	0	0	0	3	0	1	0	1
Butte	0	2	0	1	3	3	0	0	0	1
Calaveras	0	0	0	0	2	2	0	0	0	0
Colusa	0	0	0	0	0	1	0	0	0	0
Contra Costa	0	9	1	12	9	40	1	8	1	11
Del Norte	0	0	1	0	0	0	0	0	0	0
El Dorado	0	0	0	0	3	8	0	1	0	3
Fresno	3	10	7	14	22	18	4	14	5	8
Glenn	0	0	0	0	1	1	0	0	0	0
Humboldt	0	0	0	3	1	6	1	1	1	1
Imperial	0	0	0	0	2	6	0	0	0	1
Inyo	0	0	0	0	0	0	0	0	0	1
Kern	1	2	2	0	11	23	0	5	1	1
Kings	0	0	0	0	7	5	0	2	1	2
Lake	0	2	0	0	1	5	0	3	0	1
Lassen	0	0	0	0	1	1	0	0	0	0
Los Angeles†	12	0	32	0	75	22	16	7	36	0
Long Beach City	1	2	1	0	8	4	1	5	1	10
Pasadena City	0	0	0	0	0	0	0	0	0	0
Madera	0	0	2	1	3	6	1	1	1	1
Marin	0	0	0	1	2	1	0	2	0	0
Mariposa	0	0	0	0	0	0	0	1	0	0
Mendocino	0	1	0	1	4	12	0	0	0	1
Merced	0	1	0	0	5	6	0	0	0	1
Modoc	0	0	0	0	0	0	0	0	0	0
Mono	0	0	0	0	0	0	0	0	0	0
Monterey	0	1	0	4	7	12	2	6	1	2
Napa	0	0	0	0	0	7	1	1	0	3
Nevada	1	0	0	0	1	4	0	2	0	0
Orange	2	18	6	31	22	35	11	23	14	40
Placer	0	0	0	2	1	9	1	3	1	3
Plumas	0	0	0	0	0	0	0	1	0	0
Riverside	0	16	6	14	23	43	2	14	9	22
Sacramento	3	25	10	40	29	96	4	27	8	42
San Benito	0	0	0	1	0	0	0	0	0	1
San Bernardino	5	15	7	13	31	52	4	15	6	32
San Diego	5	10	17	43	44	112	8	59	28	64
San Francisco	0	1	2	1	4	28	1	0	0	0
San Joaquin	2	5	0	8	8	23	3	8	2	9
San Luis Obispo	0	0	2	2	1	7	0	3	0	3
San Mateo	2	10	1	3	6	18	5	12	2	6
Santa Barbara	0	2	1	4	3	9	2	6	4	10
Santa Clara	1	8	9	10	20	45	2	14	6	17
Santa Cruz	0	1	0	4	5	6	0	6	0	4
Shasta	0	0	0	0	3	10	0	1	0	5
Sierra	0	0	0	0	0	0	0	0	0	0
Siskiyou	0	0	0	0	2	5	0	0	0	0
Solano	0	1	0	7	3	14	2	10	2	6
Sonoma	0	0	0	1	7	19	1	2	5	4
Stanislaus	2	6	1	3	13	31	2	2	1	2
Sutter	0	0	0	1	1	3	0	0	0	0
Tehama	0	0	1	2	0	2	0	0	0	1
Trinity	0	0	0	0	0	0	1	0	0	0
Tulare	1	1	1	2	5	25	0	2	0	3
Tuolumne	0	0	0	0	1	1	0	0	0	0
Ventura	4	7	3	6	3	11	1	9	3	7
Yolo	0	1	0	3	1	10	0	1	0	4
Yuba	0	0	0	0	0	0	0	0	0	1

* 2011–2012: October 2, 2011–September 29, 2012; 2012–2013: September 30, 2012–September 28, 2013; 2013–2014: September 29, 2013–September 27, 2014; 2014-2015: September 28, 2014-October 3, 2015; 2015-2016: October 4, 2015-October 2, 2016

† Does not include city counts

Source:Https://archive.cdph.ca.gov/HealthInfo/discond/Documents/CA%20Year%20End%20Flu%20Summary_2015-2016_final.pdf

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5.3.3 Wildland Fire

Severity: 3

Probability: 4

Risk Score: 2.25

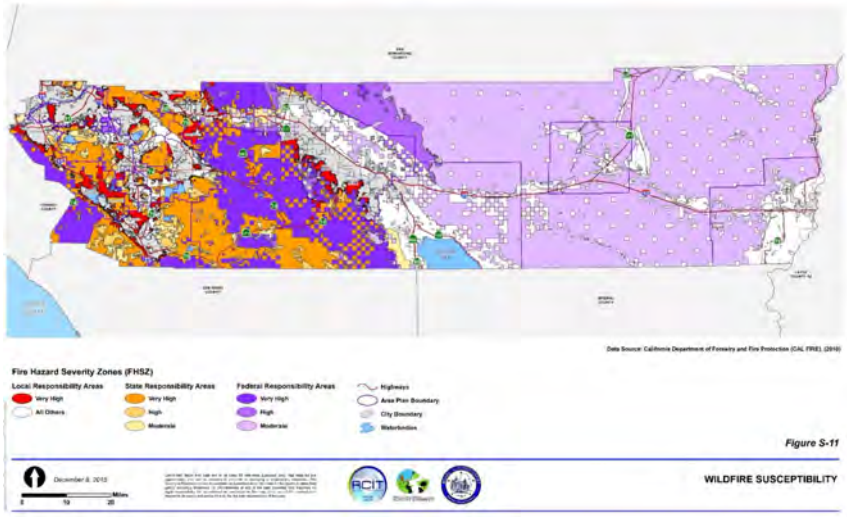
OA Jurisdictions Affected by Wildfire

- Fern Valley Water District
- Idyllwild Fire Protection District
- Idyllwild Water District
- Menifee Union School District
- Temecula Valley Unified School District
- Riverside County Office of Education
- Riverside Unified School District
- San Jacinto Unified School District

Cities in which CAL FIRE has made recommendations on Very High Fire Hazard Severity Zones (VHFHSZ) in Riverside County (22 cities)

- Banning
- Beaumont
- Calimesa
- Canyon Lake
- Cathedral City
- Corona
- Desert Hot Springs
- Hemet
- Jurupa Valley
- Lake Elsinore
- Menifee
- Moreno Valley
- Murrieta
- Norco
- Palm Desert
- Palm Springs
- Perris
- Rancho Mirage
- Riverside
- San Jacinto
- Temecula
- Wildomar

Map 8: Riverside County Wildland Fire Threat



Hazard Definition

A wildfire is an uncontrolled fire spreading through vegetative fuels, posing danger and destruction to property. Wildfires can occur in undeveloped areas and spread to urban areas.

Public Resources Code §4114 and §4130 authorize the State Board of Forestry and Fire Protection (Board) to establish a fire plan which, among other things, establishes the levels of statewide fire protection services for State Responsibility Area (SRA) lands. These levels of service recognize other fire protection resources at the federal and local level that collectively provide a regional and statewide emergency response capability. In addition, California's integrated mutual aid fire protection system provides fire protection services through automatic and mutual aid agreements for fire incidents across all ownerships where structures and other human development are more concentrated.

The California Fire Plan is the state's road map for reducing the risk of wildfire. The Fire Plan is a cooperative effort between the State Board of Forestry and Fire Protection and the California Department of Forestry and Fire Protection. By placing the emphasis on what needs to be done long before a fire starts, the Fire Plan looks to reduce firefighting costs and property losses, increase firefighter safety, and to contribute to ecosystem health.

State Responsibility Areas (SRAs)

State Responsibility Areas (SRAs) are those lands within California that meet specific geographic and environmental criteria. These are areas where CAL FIRE has legal and financial responsibility for wildland fire protection and where CAL FIRE administers fire hazard classifications and building standard regulations. SRAs are defined as lands that 1) are county unincorporated areas, 2) are not federally owned, 3) have wildland vegetation cover rather than agricultural or ornamental plants, 4) have watershed and/or range/forage value, and 5) have housing densities not exceeding three units per acre.60 Similar to the Federal Responsibility Areas (FRAs), where SRAs contain built environment or development, the responsibility for fire protection of those improvements (non-wildland) is that of a local government agency.

Local Responsibility Areas (LRAs)

Local Responsibility Areas (LRAs) include land within incorporated cities, cultivated agriculture lands and non-flammable areas in unincorporated areas and those lands that do not meet the criteria for SRA or FRA. LRA fire protection is typically provided by city fire departments, fire protection districts, and counties, and by CAL FIRE under contract

to local governments. LRAs may include flammable vegetation and Wildland-Urban Interface (WUI) areas where the financial and jurisdictional responsibility for improvement and wildland fire protection is that of a local government agency.

Homes in Wildland-Urban Interface (WUI) Areas

Wildfire poses a significant risk to the people of California and their homes, as evidenced by an increasing trend in structural losses from wildland fires. The risk is predominantly associated with wildland-urban interface (WUI) areas. WUI is a general term that applies to development interspersed within or adjacent to landscapes that support wildland fire.

Housing Unit Density Classes:

Class Description

- Rural/Outlying: From one housing unit per five acres to one housing unit per twenty acres.
- Urban: Dwelling unit density of 2 to 8 units per acre.
- Wildland Urban Interface: The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.
- Wildland Intermix Interface is a condition where homes and other structures are scattered throughout a wildland area.

Managing the human/wildfire conflict requires a commitment of resources and a focused mitigation plan over the long term. The approach must be system-wide and include the following:

- An informed, educated public that takes responsibility for its own decisions relating to wildfire protection
- An effective wildfire suppression program
- An aggressive hazardous fuels management program

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- Land use policies and standards that protect life, property, and natural resources
- Building and fire codes that reduce structural ignitions from windblown embers and flame contact from WUI fires and impede or halt fire spread within the structure once ignited
- Construction and property standards that provide defensible space

While some wildfires start by natural causes, humans cause four out of every five wildfires. Wildfires started by humans are usually the result of debris burns, arson, or carelessness. As a natural hazard, a wildfire is often the direct result of a lightning strike that may destroy personal property and public land areas, especially on state and national forest lands. The predominate dangers from wildfires are:

1. Injury or loss of life to people living in the affected area or using the area for recreational facilities.
2. Injury or loss of life to first responders.
3. The destruction of timber, property, wildlife

History

There is a long history of wildfires in Riverside County. The table below represents Wildland Fires of 100 acres or greater from 2001 to 2017. The source of the information is the California Department of Forestry and Fire Protection.

Table 20: Riverside County Large Fires 300 Acres and Greater (2001-2017)

Wildland Incidents within Riverside to include Local and State Incidents.

YEAR	NUMBER OF LARGE FIRES
2017	6 (as of July 2017)
2016	3
2015	5
2014	1
2013	5
2012	7
2011	1
2010	4
2009	3
2008	3
2007	6
2006	12
2005	7
2004	6
2003	9
2002	5
2001	5

Source: http://cdfdata.fire.ca.gov/incidents/incidents_search_results?search=riverside

Interestingly, the preceding Riverside County Wildland Fire Threat map points out the distinct bi-lateral character of Riverside County. The western end of the County is more

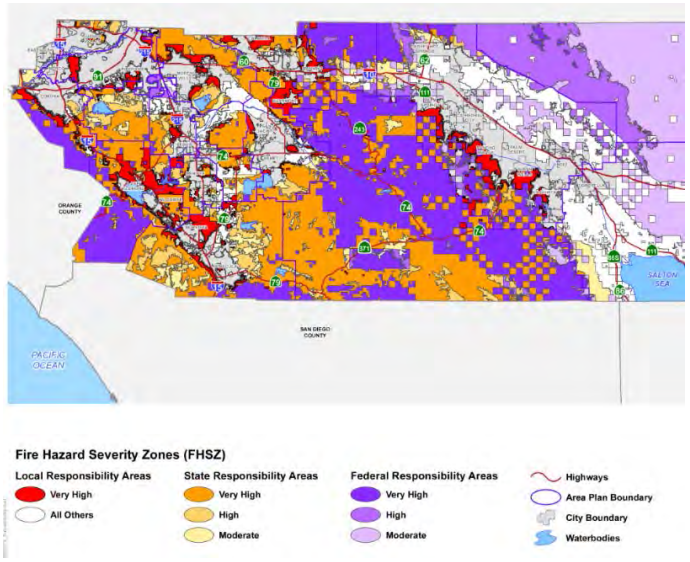
urban, densely populated, and covered with vegetation that is susceptible to wildfires. The eastern end of the County is primarily desert, with far less population and far less vegetation than the western end of the County.

The categories are:

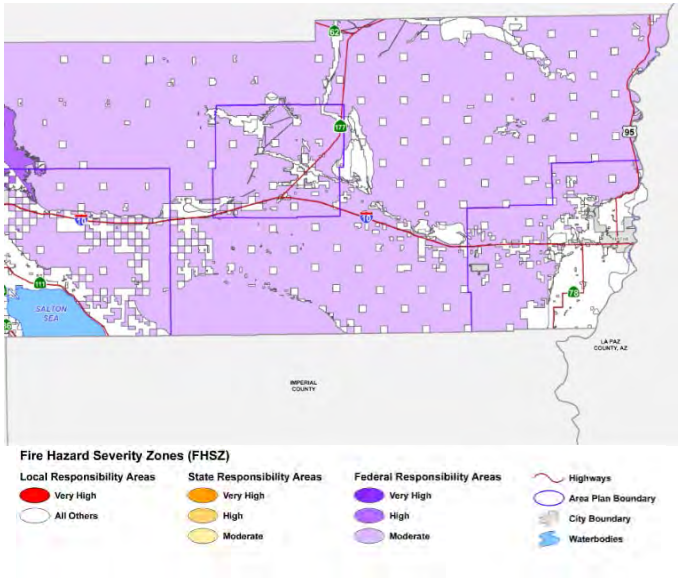
- Little or No Threat
- Moderate
- High
- Very High
- Extreme

The following two maps are maps of Fire Hazard Severity Zones. They show the wildfire susceptibility Risks and the local responsibility area, and the state or federal responsibility areas.

Map 9: Western Riverside County Wildfire Susceptibility Risks Map



Map 10: Eastern Riverside County Wildfire Susceptibility Risks Map



Risk Assessment

Fire is a continuous threat in Southern California, particularly in Riverside County. The major areas of concern are the wildland and urban interfaces. Hundreds of homes now border major forests and brush areas. With thousands of people living near and visiting wildland areas, the probability of human-caused fires is growing. Although occurring with less frequency, the threat of fire from lightning strikes also exists. The Idyllwild area, San Jacinto Mountains is heavily forested and high hazard area.

Generally, the dry seasons are a major time for an increase in the number of forest fires and structure fires. The standard "shake roof" is a particular hazard, as is the poor control of flammable growth around structures. During times of the strong "Santa Ana" winds, fire danger is particularly high.

The increase of industrial complexes, transportation networks, and utility networks pose a threat that is not seasonal, but rather year-round. Associated with industry and transportation networks is the ever present problem of hazardous materials. Although not necessarily a wildland threat, a fire occurring in an urban area involving hazardous materials could have serious consequences.

Due to the undeveloped and rugged terrain in parts of Riverside County, highly flammable brush- covered land, and long, dry summers, many portions of the County have experienced numerous wildland fires in the recent past.

- **Effects on people and structures.** The effects on people and housing can be significant. Many fires shown in the table above resulted in the evacuation of homes. Wildfires have the potential to destroy residential and commercial buildings, as well as critical infrastructure.

- **Effects on infrastructure.** Due to destroyed powerlines, wildfires often result in power outages. These outages can be extensive in geographic area and numbers of persons affected.

- **Effects on Critical Facilities.** There are approximately 15 fire stations that are in potential direct risk from wildland fires. There are additional critical locations within the Idyllwild area that are at a high danger risk from wildland fires. In many cases (i.e. fire stations and schools) these facilities cannot be relocated into a safer area.

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- **Effects on agriculture.** Effects on agriculture can be devastating. In addition to the obvious impacts on animals and crops, wildfire can have deleterious effects on soil and water that will affect agriculture for an extended period of time.

Relationship to Other Hazards – Cascading Effects

Major wildfires can completely destroy ground cover causing flooding and erosion. If heavy rains follow a major fire, flash floods, heavy erosion, landslides and mudflows can occur. These cascading effects can have ruinous impacts on people, structures, infrastructure, and agriculture.

Risk Assessment Conclusion.

The western end of Riverside County is far more susceptible to wildfire than the eastern end of the County. The effects can be far-reaching in terms of the number of acres involved, the toll on human life, and the economic consequences. Wildfire will continue to be a high-risk hazard for Riverside County.

5.3.4 Electrical Failure – Power Outage

Severity: 4

Probability: 4

Risk Score: 2.00

OA Jurisdictions Affected by Power Outage Incidents

- Cathedral City
- City of La Quinta
- City of Palm Springs
- Desert Water Agency
- Imperial Irrigation District
- Western Municipal Water District

Hazard Definition

Identifying Energy Shortage Hazards

California continues to experience both population growth and weather cycles that contribute to a heavy demand for power. Climate change may also increase California's vulnerability to energy shortage hazards. Predicted increases in heat waves, as well as increasingly severe winter storms, will put ever greater strain on California's electricity system.

Hydro-generation provides approximately 20 percent of California's electric power, with the balance coming from fossil fuels, nuclear, and renewable sources. Rotating outages and/or blackouts such as those experienced in 2000 and 2001 can occur due to losses in transmission or generation and/or extremely severe temperatures that lead to heavy electric power consumption.

The electric power industry does not have a universal agreement for classifying disruptions.

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Nevertheless, it is important to recognize that different types of outages are possible so that plans may be made to handle them effectively. Electric power disruptions can be generally grouped into two categories: intentional and unintentional.

There are four types of intentional disruptions:

1. Planned (Maintenance): Some disruptions are intentional and can be scheduled. For example, a disruption may be necessary when components of the power system are taken out of service for maintenance or upgrading. Scheduled intentional disruptions can last from several minutes to several hours, and customers are usually notified in advance.

2. Unscheduled (Repair): Some intentional disruptions must be done "on the spot." As a result, advance notice cannot be provided. For example, a fire department or a police department may request a disruption in service during a fire or an accident.

3. Demand-Side Management: Some customers (i.e., on the demand side) have entered into an agreement with their utility provider to curtail their demand for electricity during periods of peak system loads. In return for agreeing to these disruptions, these customers receive a lower electric rate and/or a rebate.

4. Load Shedding (Rotating): When the power system is under extreme stress due to heavy demand and/or failure of critical components, it is sometimes necessary to intentionally interrupt the service to selected customers to prevent the entire system from collapsing. In such cases, customer service (or load) is cut, sometimes with little or no warning. One form of load shedding called a "rotating blackout" involves cutting service to selected customers for a predetermined period (usually not more than two hours). As power is restored to one block of customers, the power to another block of customers is interrupted to reduce the overall load on the system.

Unintentional or unplanned disruptions are outages that come with essentially no advance notice. This type of disruption is the most problematic. The following are categories of unplanned disruptions:

- Accident by the utility, utility contractor, or others.
- Malfunction or equipment failure due, for example, to age, improper operation, excessive operation, or manufacturing defect; special subcategories cover broken fuse links and underground cable, joint, or termination failures.
- Equipment overload (utility company or customer).

- Reduced capability (equipment that cannot operate within its design criteria).
- Tree contact other than from storms.
- Vandalism or intentional damage.
- Weather, including ice/snow, lightning, wind, earthquake, flood, and broken tree limbs taking down power lines.
- A wildfire that damages transmission lines.

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Table 21: Riverside County Power Outages (1993-2017)

Location	Date	Incident Description
Riverside County	10/28/1993	Variety of fires. 129 structures destroyed. Power outages. 6 injuries.
Greater Jurupa Area	1/6/1996	Property damage, power disruption, road damage.
Beaumont	2/17/1999	60mph winds damaged roofs, downed trees and power lines, and created a dense dust storm. A plume of dust penetrated homes and covered all surfaces and filled closets and cupboards. Yards had 3" to 6" of silt. 1128 homes damaged. 27 vehicles.
Hector Mine Earthquake	10/16/1999	Minor damage to buildings, power interruption, communication interruption, gas line break causing a leak.
Blythe	8/23/2000	Power outage from storms. Provided shelter for 24 people.
Desert Cities	8/27/2000	Thunderstorm and wildfires caused power interruption. 2,800 customers without power.
Eastern Coachella Valley	7/3/2001	Power failure. Several thousand people affected.
Riverside County	2/9/2002	High wind. Damage throughout the County. Roof damage, structure fires, wildfires started but were contained before 15 acre point. Power outages from the wind.
Moreno Valley	7/22/2002	51 home blackout. Transformer fire. Illegal dumping of used motor oil into the transformer vault.
Mira Loma, Jurupa, Rubidoux, Pedley, Sky Country	1/6/2003	High wind caused road closures, downed trees and power lines. Semi-truck overturns. Power outages affecting 10,000. Fire.
Riverside County	1/14/2003	Power lines down with 936,569 people affected, trees felled, homes damaged, fire triggered from downed lines,

Elsinore, Hemet, Moreno Valley, Perris, San Jacinto and Temecula in the southeastern area of Riverside County	4/23/2009	Substation load interruption led to loss of power to 280.000 residents
Riverside County, Orange County, parts of Arizona and Mexico	9/8/2011	Cascading outages led to approximately 2.7 million customers without power due to an 11-minute system disturbance. Power loss lasted as long as 12 hours for some affected. Riverside County's Imperial Irrigation District was directly affected.
Thousand Palms, Indio and Desert Hot Springs	4/30/2014	A cut fiber ring led to communication failure for 261 residents. Power outages for 10,500 residents due to windy conditions.
Riverside	3/11/2016	Micro-burst caused down powerlines and power outages, 3,000 people affected.
Riverside	4/29/2016	Power outage led to 20,020 SoCal Edison customers affected.
Moreno Valley	2/10/2017	8,137 residents lost power due to substation malfunction
Riverside University Health System	5/11/2017	Scheduled maintenance required the hospital to switch to partial generator power for 16 hours.
Desert Reginal Hospital	5/17/2017	Experience power outage and ran off generators for
Riverside	10/26/2017	Load shedding caused loss of power to 104,000 residents

Risk Assessment

The possibility of catastrophic damage to property or loss of life due directly to power failure is slight. An individual could lose their life if they come into contact with a downed power line. Although the risk of a power outage is high, the direct damage potential is low.

Power outages or interrupted service often occur during electrical storms and high winds. Wildfires also cause power outages in Riverside County. There is a very real possibility of a widespread blackout due to the earthquake.

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- **Effects on people and housing**. Impacts due directly to power failure are slight. If the persons require electric powered medical equipment, they will be at greater risk. In the areas of the county that can be impacted by high temperatures, or very cold temperatures, a power outage can have an on the heating or cooling abilities.

- **Effects on commercial and industrial structures**. Impacts due directly to power failure are slight. If the outage lasts many days, the impact would be of a greater severity.

- **Effects on infrastructure.** Impacts to the ability of infrastructure in the area of failure to support emergency response may be significant, although not permanent.

- **Effect on Critical Facilities.** Most critical facilities are required to have a back- up generator, but there is no official list of "all" critical having and maintain working back- up generators. Depending on the facility, the power outage can have strong effects on parts of the population that need medical devices, also for cooling and heating purposes.

- **Effects on agriculture.** Impacts due directly to power failure are slight.

Relationship to Other Hazards – Cascading Effects

As noted, other hazards such as an earthquake, wildfire, electrical storms, and high winds may be causes of blackouts.

Risk Assessment Conclusion

The County needs to be prepared to restore power should there be a failure due to downed lines caused by another hazardous condition or any other reason.

5.3.5 Emergent Disease/Contamination

Severity: 3

Probability: 3

Risk Score: 1.69

OA Jurisdictions Affected by Emergent Disease/Contamination

- All incorporated cities of Riverside County
- Unincorporated areas of Riverside County

Hazard Definition

According to the Center for Disease Control, the term "emerging infectious diseases" refers to diseases of infectious origin whose incidence in humans has either increased within the past two decades or threatens to increase in the near future. Emergent diseases are new, new to the area, reappearing in the area after being fairly dormant, or a strain has become resistant to antibiotics. These illnesses are caused by bacteria, viruses or fungi that have entered into the body and began to multiply. Infectious diseases can be spread throughout the County population in a number of different ways:

- Vector (Bug bites)
- Person to person
- Contaminated food water or soil

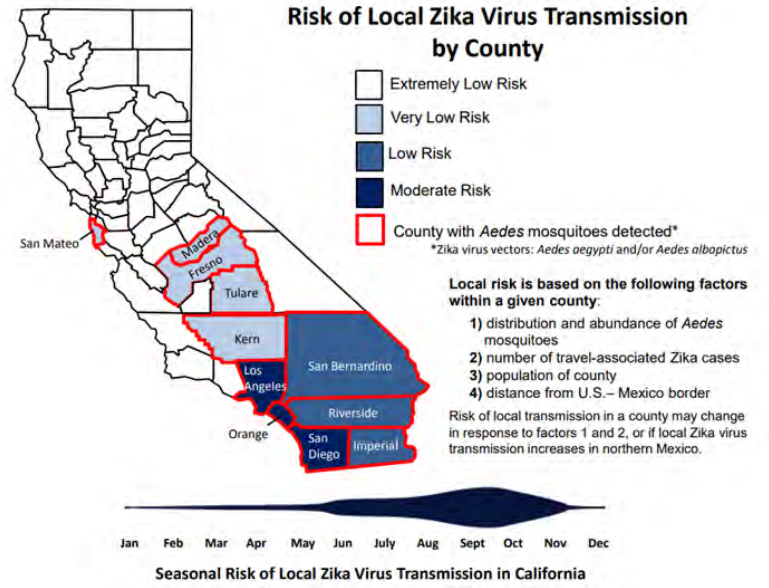
Zika

Zika is a virus that is predominantly transmitted through the vector. Female Aedes ageypti are more dangerous than males. This is due to the fact that females have blood meals and males do not. They also spread the infection through laying eggs in standing water. Riverside County has detected Aedes ageypti, however, the ones that have been tested do not carry the virus. The reported cases in Riverside County have all been travel related illnesses. The threat of transmission is still present due to the potential sexual transmission of the virus.

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Figure 33: Zika Risk Map by County



Source:https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/LocalZikaRiskMap.pdf

Ebola

Ebola is dominant in African countries, though with the ease of travel it has the potential to make its way to California. It is transmitted through blood, bodily fluids, direct contact with broken skin, contaminated needles and infected primates. When infected it can be fatal. Ebola can spread rapidly within Health Care Facilities when staff are not properly trained of not wearing adequate personal protective gear.

Risk Assessment

- **Effects on people and housing.** The risk to people can be severe, leading to hospitalization and possibly loss of life. Damages to housing as a result of Pandemic Flu are not likely.

- **Effects on commercial and industrial structures.** The risks are minimal to structures.

- **Effects on infrastructure.** The risks are minimal, but if there is an emergent outbreak the risk to people will lessen the numbers of workers that can go to their regular employment, which can strain the maintaining the infrastructure. Continuity of Business and of Government may become an issue. Outbreaks also but a strain on schools, hospitals, doctor offices and businesses.

- **Effects on agriculture:** Agriculture can be devastatingly affected by emergency diseases. There are a number of vector borne illnesses that can affect livestock such as Lyme disease, Salmonella and rabies. Plant pests or viruses can cause huge losses in crops that can threaten food safety and farmer livelihood stability.

History of Events

2015/17 – Zika was confirmed in Riverside County in 2015 with 14 infections. In 2017, there were 2 confirmed cases. All cases were travel related. Report accuracy reflects confirmed cases. Due to the symptoms mirroring a cold, the number could be higher but the mortality rate for this disease is very low. Its greatest impact is on a pregnant woman. 153 cases were reported within the state of California as of August 2016. Sexual transmission is a possibility with this virus. Transmitting mosquitos, Aedes ageypti, are present within the County.

2014/16 – Riverside County was alerted of the 2014 West Africa Ebola Outbreak in West African countries. Worldwide, a total of 1,975 cases where confirmed and 1,069 deaths were reported in August 2014. In 2016 the numbers had grown to 15,261 confirmed cases and 11,325 fatalities, It was the largest outbreak in history. Infection Control Measures were released from the Riverside Department of Public Health to first responders and EMS professionals. Though Riverside did not experience an outbreak or confirm a case, they were on high alert of the potential spread of the disease.

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2015 – West Nile was contracted by 737 people within the county and there were 45 reported deaths.

2013 – Large scale Tuberculosis testing. 2 cases were confirmed and 72 were treated for latent TB infections.

2004 – Botulism Type A was detected in four inmates with in Riverside County.

2003 – West Nile Virus was detected in birds in the City of Riverside and the Coachella Valley. There was one reported human case within the County. Imperial and Los Angeles Counties also reported human cases.

Relationship to Other Hazards – Cascading Effects

This hazard has the potential to impact EMS first responders and Health Care Facilities. In the event that the timing of an outbreak coincided with another hazard, the healthcare impact could be extensive.

Risk Assessment Conclusion

Public Health Departments for the County, State, nation and the world constantly monitor all emerging diseases. This gives medical personnel the necessary time to prepare or mitigate possible effects of an emerging disease.

As a result of the Ebola and Zika outbreaks, Riverside County EMS Agency released Policy 3307, Emerging Viruses. Its purpose is to specify procedures to be followed when highly pathogenic emerging viruses are suspected during emergency call taking and response, or confirmed prior to interfaculty transport.

5.3.6 Cyber Attack

Severity: 2

Probability: 4

Risk Score: 1.50

OA Jurisdictions Affected by Cyber Attack

- All incorporated cities of Riverside County

Hazard Definition

Cyber-terrorism is the use of computer network tools to shut down critical government infrastructures such as energy, transportation, and government operations, or to coerce or intimidate a government or civilian population. The premise of cyber terrorism is that as nations and critical infrastructure became more dependent on computer networks for their operation, new vulnerabilities are created. A hostile nation or group could exploit these vulnerabilities to penetrate a poorly secured computer network and disrupt or even shut down critical public or business operations.

The goal of cyber terrorism is believed to be aimed at hurting the economy of a region or country, and to amplify the effects of a traditional physical terrorist attack by causing additional confusion and panic.

Cyber-terrorism. Recent incidents illustrate the County's vulnerability to cyber- terrorism.

- **Effects on people and housing**. If a Cyber-attack were to happen at a Healthcare Facility the effects could be detrimental to patients. Sensitive Security Information could be obtained and the hackers could release patient files, payment information and other personal data that could harm individuals and employees.
- **Effects on commercial and industrial structures**. Depending on levels of contamination and exposure, effects could range from minimal to devastating.
- **Effects on infrastructure**. Cyber-terrorism can have profound effects on infrastructure. If an attack were to happen in a critical facility it could potentially make it inoperable.
- **Effects on agriculture.** Depending on levels of contamination and exposure, effects could range from minimal to devastating.

History of Events

In 2016 the County of Riverside Emergency Management Department was targeted for a ransomware attack that resulted in a disruption of work. It also affected the DOC shared drive, which could have hindered response to a disaster.

Relationship to Other Hazards – Cascading Effects

Cyber-attacks have the ability to shut down entire facilities. If an attack were to happen during a disaster it could greatly affect the response of first responders and EOC personnel.

Risk Assessment Conclusion

Cyber-attacks happen within the County on a daily basis. The Riverside County Information Technology Department (RCIT) has multiple prevention systems in place that protect County servers and network systems. RCIT monitors County systems 24 hours a day and has the Albert Sensor that will report to the Center for Internet Security (CIS), Multi-State Information Sharing and Analysis Center (MS-ISAC) all Domain Name System (DNS) and NetFlow traffic for correlation with the Department of Homeland Security's threat intelligence database for real-time alerting of malicious network connections to blacklisted IP address on the Internet. Another implemented system is the Enterprise Breach Detection System that inspects all internal/lateral county network traffic for indicators of compromise (IOCs) enabling the ISO to rapidly detect, respond to, contain, and prevent cyber-attacks, malware outbreaks, network reconnaissance, data exfiltration, and C2 (command & control) and botnet activities.

RCIT is also in the process of implementing more programs for the safety of the County's networks. Due to the level of security, the threat of a Cyber-attack is fairly low, but the potential damages could be very damaging.

5.3.7 Terrorist Event

Severity: 3

Probability: 1

Risk Score: 1.13

OA Jurisdictions Affected by Terrorism

- All incorporated cities of Riverside County
- Unincorporated areas of Riverside County

Hazard Definition

Terrorism is the use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives. Terrorist acts or and acts of war may cause casualties, extensive property damage, fires, flooding, and other ensuing hazards.

Terrorism takes many forms, including:

- Chemical
- Biological
- Radiological
- Nuclear
- Explosive
- Cyber-terrorism
- Active shooters
- Vehicle Ramming

Chemical: Chemical weapons have been used primarily to terrorize an unprotected civilian population and not as a weapon of war. This is because of fear of retaliation and the likelihood that the agent would contaminate the battlefield for a long period of time.

Some analysts suggest that the possibility of a chemical attack would appear far more likely than either the use of nuclear or biological materials, largely due to the easy availability of many of the necessary precursor substances needed to construct chemical weapons. Additionally, the rudimentary technical knowledge needed to build a working chemical device is taught in every college level chemistry course in the world.

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Some chemical agents are odorless and tasteless and are difficult to detect. They can have an immediate effect (a few seconds to a few minutes) or a delayed effect (several hours to several days).

Biological: Biological weapons are defined as any infectious agent such as a bacteria or virus used to produce illness or death in people, animals, or plants. This definition is often expanded to include biologically-derived toxins and poisons. Biological agents can be dispersed as aerosols or airborne particles. Terrorists may use biological agents to contaminate food or water because the agents are extremely difficult to detect.

Radiological: A radioactive material is a material made up of unstable atoms which give off excess energy in the form of radiation through the process of radioactive decay.

Radiation cannot be detected by human senses. Wherever radioactive materials are used, transported, or stored there is a potential for a radiological accident to occur. Some of their most common uses include:

- By doctors to detect and treat serious diseases.
- By educational institutions and companies for research.
- By the military to power large ships and submarines.
- By companies in the manufacture of products.
- As a critical base material to help produce the commercial electrical power that is generated by a nuclear power plant.
- As one of the critical components in nuclear weapons, which are relied upon to help deter the threat of war.

Nuclear: The possibility exists that a terrorist organization might acquire the capability of creating a small nuclear detonation. A single nuclear detonation in the United States would likely produce fallout affecting an area many times greater than that of the blast itself. There is also the possibility that a terrorist will construct a “dirty bomb”, a bomb that is used to distribute nuclear-contaminated materials. It would have less of an effect than a “traditional” nuclear bomb, but the terror effect on the population would be great.

Explosive: The possibility exists that a terrorist may attack with conventional explosives, particular in a public setting. Innumerable incidents have occurred around the world involving car bombs, truck bombs, and bombs attached directly to terrorist individuals.

Cyber Terrorism: Please see Section 5.3.6

Active shooters: Active shooter events in the nation have increased dramatically over the last 17 years. According to the report "a Study of Active Shooter Incidents in the United States Between 2000 and 2013" produced by the Department of Justice, it states that there have been 160 Active Shooter incidents from 2000-2013. Furthermore, in the updated version of that report for 2014-2015, it states that there has been an additional 40 Active Shooter incidents spanning 26 states. These attacks have led to 92 casualties and 139 wounded.

Vehicle Ramming: The use of vehicle ramming has steadily increased and it is likely that this tactic will continue to rise. This attack style required little specialized training or skill and poses little risk to the assailant. It is seen as an effective style due to its minimal detection when acquiring the weapon and overall flexibility when planning target location and targets. Known terrorist organizations encourage ramming and have even released tips on maximizing casualties.

History

Fortunately, Riverside County has little history of incidents of terrorism. However, threats and incidents have been on the rise over the last 17 years.

Riverside County has also been impacted by terrorist acts in surrounding counties. On December 2nd, 2015 a disgruntled employee shot and killed many former coworkers in San Bernardino County. The "Waterman Incident" affected Riverside County in the following ways:

- Activation of the Riverside County Medical Health Operational Area Coordinator (MHOAC) for outreach to Riverside Environmental Health and Riverside Behavioral Health representatives.
- The MHOAC completed a comprehensive list of available Riverside resources (to include name, contact info, and wrap around service requirements).
- The MHOAC provided the resource list to the Regional Disaster Medical Health Specialist (RDMHS).
- Riverside Environmental Health sent 63 employees and Behavioral Health sent 89 employees to San Bernardino County to support the initial response and re-establishment of the San Bernardino County Environmental Health Division from December 2015 through June 2016.

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Risk Assessment

Chemical. A terrorist would not have to build a complicated chemical release device. During favorable weather conditions, an already existing chemical plant could be sabotaged or bombed releasing a toxic cloud to drift into a populated area. The result could be just as dangerous as having placed a smaller chemical device in a more confined space. This type of incident would cause the maximum amount of fear, trepidation, and potential panic among the civilian population, and thus achieve a major terrorist objective.

Biological. The agents are cheap, easy to make, and simple to conceal. Even small amounts, if effectively deployed, could cause massive injuries and overwhelm emergency rooms. The production of biological weapons can be carried out virtually anywhere — in simple laboratories, on a farm, or even in a home.

However, experts say it remains very difficult to transform a deadly virus or bacterium into a weapon that can be effectively dispersed. A bomb carrying a biological agent would likely destroy the germ as it explodes. Dispersing the agents with aerosols is challenging because biomaterials are often wet and can clog sprayers. Most agree that, while a biological attack could be devastating in theory, in reality, the logistical challenges of developing effective agents and then dispersing them makes it less likely a terrorist could carry out a successful widespread assault.

Radiological/Nuclear. Under extreme circumstances an accident or intentional explosion involving radiological materials can cause very serious problems. Consequences may include death, severe health risks to the public, damage to the environment, and an extraordinary loss of, or damage to, property.

Explosive. While generally more limited in the extent of the damage inflicted, explosive terrorist attacks may have consequences including death and damage to property. Targets would include county fairs, music festivals, critical facilities and sporting events.

Active shooters: The increase of violent crimes throughout the nation has increased awareness within Riverside County. The possibility of an attack has increased. Though the threat to infrastructure is fairly limited this hazard could result in loss of life, injury and economic disruption. Targets could include public events, government facilities, schools and shopping centers.

Vehicle Ramming: This terrorist tactic has been increasing over the last five years. Riverside County has a very low history of this event but moderate probabilities of it happening again. This tactic is very hard to detect and mitigation is extremely difficult to

carry out. Riverside County Sheriff's Department has increased their awareness of this terrorist style in an attempt to foil any attempted ramming incident.

Extremists, especially in European countries have moved towards filling the vehicles with explosives to increase the number of fatalities in an attack. Though this approach has not yet made it to Riverside County, the potential threat has increased.

Relationship to Other Hazards – Cascading Effects

Terrorism has the potential to cause a cascading event. After a terrorist incident people may display signs of civil disorder driven by fear.

Risk Assessment Conclusion.

The western end of Riverside County is far more susceptible to terrorism than the eastern end of the County. The effects can be far-reaching in terms of the number of buildings involved, the toll on human life, and the economic consequences.

5.3.8 Communications Failure

Severity: 3

Probability: 2

Risk Score: 1.13

OA Jurisdictions Affected by Network Communications Failure

- All incorporated cities of Riverside County
- Unincorporated areas of Riverside County

Hazard Definition

CoRNet

The County of Riverside Network (CoRNet) provides Voice and Data communication for most County departments and facilities. CoRNet is a distributed design consisting of Regional Hub locations to which sites in each region have their point to point circuits connected. Each of these Hub locations is then connected to its adjacent Hub locations via high bandwidth circuits.

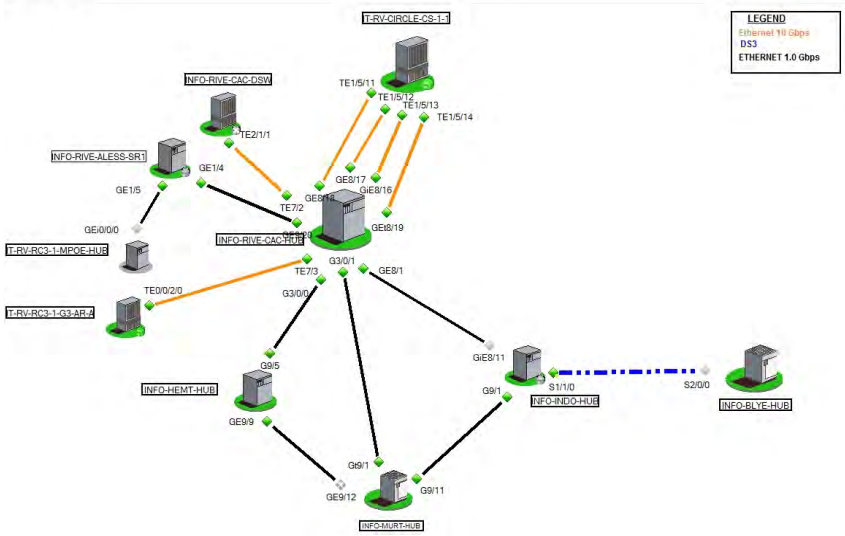
Voice Services are controlled from the County Administration Center Hub with redundancy provided by the Indio Hub location. Application Services and Internet Services for the County are delivered via the County Administration Center Hub location and soon from the RC3 Data Center.

With the completion of the Converged Network Project in 2016, CoRNet now provides both Voice and Data over the same network infrastructure. The same network connection that provided a data connection for the customers hardwired PC's now provides the connectivity for all phone communications and wireless devices.

A loss of Network connectivity now impacts both Voice and Data and wireless (Wi-Fi) communications. In the event of a Communication Failure, the entire County would be affected.

There are multiple hazards that could result in a "Network" failure such as Earthquake, Power Outage and other Natural Disasters.

Network Map



Indio Hub Failure

- Sites impacted
  - All CoRNet connected Desert locations
- Services impacted
  - All Voice, Data and Wifi services for this region.

Murrieta (SWJC) Hub Failure

- Sites impacted
  - All CoRNet connected South County locations
- Services impacted
  - All Voice, Data and Wifi services for this region.

Hemet Hub Failure

- Sites impacted
  - All CoRNet connected Hemet area County locations
- Services impacted

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  - All Voice, Data and Wifi services for this region.

Riverside Hub Failure

- Sites impacted
  - All Central Riverside locations (Voice, Data and Wifi)
  - All County Hubs will lose all application and Internet based services
  - All State and Vendor provided application services.
- Services impacted
  - All Voice communications for Central Riverside locations.
  - All other Hubs would fail over to the Indio Hub for Voice.
  - All County Hubs will lose all application, Internet and Wifi based services.

PSEC

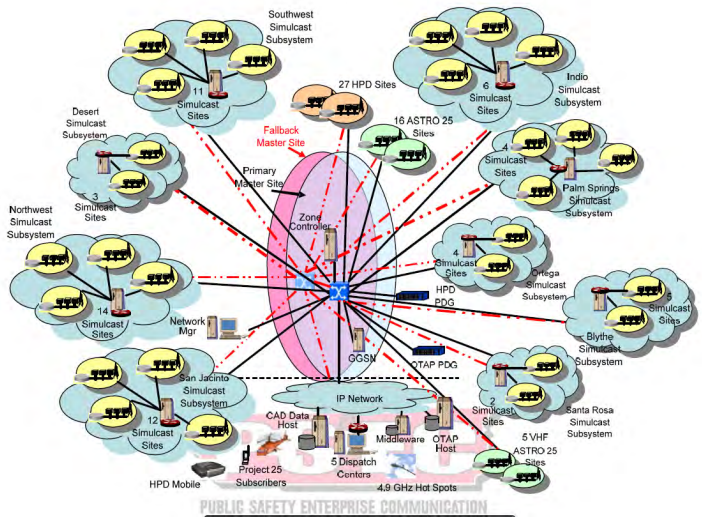
The Riverside County Information Technology/Public Safety Enterprise Communications (RCIT/PSEC) Division provides public safety communications for all participating City and County law enforcement, fire service, public works, and allied agencies in Riverside County. In January of 2014, RCIT/PSEC replaced an aging countywide Enhanced Digital Access Communications System (EDACS) system with a Motorola 7.x APCO P25 Phase 2 high availability and Dynamic System Resilience voice radio system and a High-Performance Data system with a mobile VPN client for multiple network access. PSEC provides and manages all aspects of Public Safety Radio Services and mobile data for participating agencies which include almost all County agencies and the city police departments of Banning, Murrieta, Riverside, and Corona.

Thirty plus full-time staff provide 24/7/365 Public Safety Communications for over 6,800 voice and data mobile users who operate over a 7,303 square mile area. The PSEC radio system provides all levels of government communications for the 2,189,641* residents of Riverside County including first responder dispatch for Law Enforcement 9-1-1 Dispatch Centers. The staff maintains:

- 76 radio and microwave remote sites
- 75 PSEC radio Voice and Data transmitter Sites
- 1 – Primary Motorola (M)- Core Site
- 1 Motorola (M) Core Dynamic System Resilience (DSR) Site
- 86 licensed Microwave Hops
- Approximately 5500 Voice Users
- Approximately 1300 Mobile and Tablet Data Users
- 8 Dispatch Centers

The PSEC Division of RCIT processed 24,421,574.0 Public Safety Transmissions for FY16/17

Figure 34: PSEC System Architecture



System Redundancy

A significant and material attribute of the System is how it performs during various failure conditions. The PSEC ASTRO 25 Radio System is designed with multiple levels of redundancy and the ability to provide continued communications should failures occur. Because the System can be a lifeline to County users and citizens, there is no tolerance for System failure. The System can withstand multiple failures and still provide full-featured trunked communications.

At each remote site, dispatch location and Master site, components that have the potential to interrupt communications have been backed up with redundant components. The system is designed such that multiple component failures must occur before users will notice a degradation in performance (other than a brief period during the switch over to a redundant component).

Master Sites

There are two Master sites. In the event of a catastrophic failure of the one Master site, the second Master site will take over operation of the entire system. In the event of a loss of microwave communications links between the east side and the west side of the county, one Master site can take over system operations in the east county, while the second will continue to control the west county. In this scenario, dispatchers at either location of the Master sites would not be able to reach units operating on the east side of the county, nor the west.

History of Events

CoRNet

Riverside County has not experienced a large scale Communication Failure with CoRNet.

PSEC

In early 2017 the PSEC radio system had a technical issue that led to the temporary disruption of 911 services in the Indio/Palm Springs area.

Risk Assessment Conclusion

CoRNet

As RCIT continues working toward redundancy in many areas (Data Center, MPLS, Redundant Internet Connections etc.), it is important to understand the scope of an outage depending on where it occurs on CoRNet under the current design.

While a single Hub failure would only impact the locations serviced through that Hub. Other hub locations would not be affected. A failure of the Riverside Hub would have a widespread impact. A failure at the Riverside Hub would result in the loss of all Application, Internet and Wi-Fi services for the entire county.

PSEC

The RCIT/PSEC Division has developed hardened sites to maintain Public Safety two-way communications to support first responders during natural disasters and civil disturbance. All of the microwave and core sites are hardened with towers that are rated

to either 85 or 120 mph wind, Seismic Zone 4, and are maintained by professionals dedicated to Public Safety Communications.

The PSEC system is highly redundant with several layers of fault tolerance. There are multiple routing paths for routers, switches, trunked repeaters, overlapping coverage and core roaming services. Although individual sites may be affected by a major earthquake or another disaster, the PSEC system has been designed to offer a high level of operability overall.

Restoration of downed infrastructure could take hours to a month(s) depending on the severity of the damage with the worst case being a loss of physical infrastructure.

The PSEC system has already performed well in minor earthquakes and major fires. The system has also been highly available on a day to day basis. The probability of the system working to support first responders is high if the PSEC Division properly maintains the system and is funded to do so.

The Core and Radio Network Interface (RNI) has intrusion detection and is isolated from the outside with multiple layers of firewalls to protected from Cyber Attacks. A comprehensive assessment by RCIT ISO and the manufacturer Motorola was performed when the PSEC radio system was deployed. RCIT ISO can be contacted to provide more details on how the RCIT network is protected

Relationship to Other Hazards – Cascading Effects

Any loss of The RCIT/PSEC Public Safety Voice and Data system would affect first responder performance during emergencies of all types in Riverside County for Law, Fire, EMS and local government entities like Public Works.

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5.3.9 Flood

Severity: 3

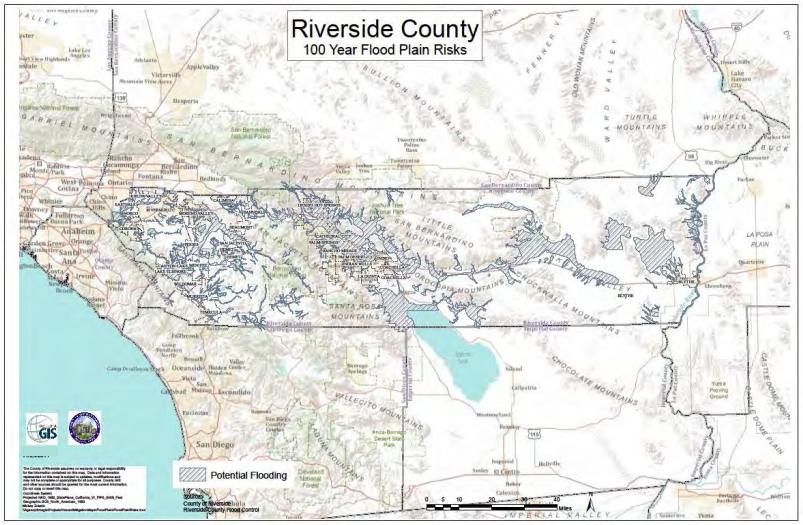
Probability: 3

Risk Score: 1.13

OA Jurisdictions Affected by Flooding

- City of Blythe
- City of Calimesa
- City of Canyon Lake
- City of Cathedral City
- City of Desert Hot Springs
- City of Eastvale
- City of Indian Wells
- City of Jurupa Valley
- City of La Quinta
- City of Lake Elsinore
- City of Norco
- City of Palm Desert
- City of Perris
- City of San Jacinto
- City of Temecula
- City of Wildomar
- Rancho California Water District
- Riverside County Office of Education
- Riverside Unified School District

Map 11: Riverside County 100 Year Flood Plain Risks



Hazard Definition

A flood is defined as an overflowing of water onto an area of land that is normally dry. Floods generally occur from natural causes, usually weather-related, often in conjunction with a prolonged period of seasonal precipitation or with sudden and very heavy rain falls. Floods can, however, result from human causes as a dam impoundment bursting. Dam break floods are usually associated with intense rainfall or prolonged flood conditions. In the Riverside County area, a major earthquake could cause a dam failure. In a dam failure scenario, the greatest threat to life and property typically occurs in those areas located immediately below the dam since flood depths and discharges generally decrease as the flood wave moves downstream.

Floods are generally classed as either slow-rise or flash floods. Slow-rise floods may be preceded by a warning time lasting from hours to days, or possibly weeks. Evacuation and sandbagging for a slow rise flood may lessen the flood-related damage. Conversely, flash floods are characterized by extremely short warning times.

Hydrologic Regions

Although Riverside County occasionally experiences periods of significant drought, the County can also experience periods of substantial rainfall. When Riverside County does experience heavy rain, or rain over a period of days or weeks, many areas of the County are subject to flooding. Runoff from rain drains either naturally into rivers, washes, and creeks or into flood control facilities. Flash flooding is also a common problem, especially in the Coachella Valley and the easterly portions of the county. Flash flooding is typically associated with short duration, high-intensity precipitation events often associated with summer thunderstorms. Such events can occur even during a drought.

The topography of the County varies from mountainous areas several thousand feet above sea level to low desert areas that are actually below sea level. Riverside County falls within two distinct Natural Hydrologic Regions as described in the State of California Multi-Hazard Mitigation Plan (SHMP):

South Coast Region

The South Coast hydrologic region extends up from the U.S. - Mexico border to the Tehachapi, San Bernardino, San Gabriel, and San Jacinto mountains. Nearly one-third of the area is coastal plain. This region contains major urban centers, including the counties of Los Angeles, Orange, and San Diego. Much of the flooding is sudden and severe, resulting in massive slides, debris flows, and mudflows. The western portion of

Riverside County falls within the South Coast Region and contains portions of the Santa Ana River, San Jacinto River and Santa Margarita River watersheds.

Colorado River – Desert Region

The dominant hydrologic features of this region are the Colorado River, which forms its eastern boundary, and the Salton Sea, which lies just shy of its western boundary. The region is marked by the San Bernardino and San Jacinto mountains. The region is also bounded by the U.S.- Mexico border to the south and the South Lahontan region to the north. This is generally a sparsely populated agricultural region that experiences sporadic flooding; however, the upper Coachella Valley has a much higher population density. Both common winter storm events and summertime monsoonal flows from Mexico's Pacific Coast can spawn massive rainstorms, general flooding and flash floods. The Eastern portion of Riverside County falls within the Desert Region and contains portions of the Whitewater River and Colorado River watersheds.

Characteristic Weather Patterns

In Riverside County, various weather patterns are associated with flood events such as El Niño conditions, La Niña conditions, Summer Monsoons, and "Pineapple Express".

Floods that affect Riverside County can be attributed to three different types of storm events:

1. A general winter storm that combines high-intensity rainfall and a rapid melting of the mountain snow pack.
2. A tropical storm out of the southern Pacific Ocean.
3. A summer thunderstorm, particularly in the desert areas.

There are three principal types of flood hazards:

1. Stream flooding (including bridge scour and stream erosion)
2. Flash flooding (including debris and mud flows)
3. Sheet flow flooding (including alluvial fan flooding)

The major rivers in the South Coast hydrologic region of Riverside County are dry most of the year and pose flood threats to developments within the floodplain during general storms of long duration. When a major storm moves into the area, the excess precipitation becomes surface runoff. Resultant flood flows have predominantly short durations and

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sharp peaks. Increased urbanization increases flood potential by increasing the percentage of impervious surfaces.

In the Desert hydrologic region, high-intensity rainfall from the period of July to August can produce severe flash flooding. Winter rains are generally more widespread in the desert and flash flood potential is less due to the lower intensity of rainfall. Winter rains are nonetheless capable of producing flooding but are somewhat more predictable. There is a severe danger to motorists who may attempt to drive through flooded washes which are typically dry.

Storms with high volumes of precipitation in a short period of time have occurred in the County causing flash floods, contaminated drinking water, disrupted electrical service, and damaged homes and contents. In addition, land that has been denuded of foliage and trees due to fire or human activity has experienced serious erosion from the rainfall.

Excessive precipitation can inundate soil in slopes causing mudslides and landslides. These events can destroy homes, block highways, and destroy power lines. The County is vulnerable to this type of flood damage. Heavy storms also can strand individuals playing near or crossing streams, rivers, flood control channels and intersections.

Riverside County has several major river systems, dams, and reservoirs. Excessive rainfall can stress these systems causing serious damage to property and potential loss of life. Rivers can overflow their banks, destroying bridges and washing out roads and highways during major flood events. Dam failure is discussed in a separate section of this LHMP on that specific hazard.

History

Table 22: Riverside County Flood History

Location	Date of Incident	Reported Damage	Number Injured	Incident Description
Riverside County	1/17/1993	$12,629,191	0	Flooding
Idyllwild	3/5/1995	$1,000,000	Not Avail.	Flooding caused by rains. 3,000 acres of farmland flooded. Portions of Highway 74 washed away
Mecca	3/6/1995	$1,000,000	2	Flooding caused by rains.
Riverside County	2/6/1998	12,629,191	0	El Nino storms flooding, debris, road damage water damage to homes

Cherry Valley, Calimesa, Yucaipa-Oak Glen Conservation Camp, Banning	7/11-12/1999	$750,000	3	Flash flood. Camp and property damaged.
Desert Hot Springs	3/5/2000	$300,000	1	Flooding caused by rain and snow
Moreno Valley	3/7/2000	$1,500,000	Not Avail.	Flooding caused by rain. Mudslides. Homes and property destroyed.
Eastern Riverside County	8/29/2000	Not Avail.	0	Flash flood due to severe thunderstorm, hail, heavy rain.
Eastern Riverside County	7/6/2001	$3,383,000	0	Flash flood. Road damage, farmland damage, crop damage.
County Areas & Riverside City	11/24/2001	Not Avail.	Not Avail.	Flood channel blocked. Homes flooded.
Moreno Valley, Cathedral City	8/18/2003	$500,000	Not Avail.	Flash flood Government buildings flooded
Anza, Banning	9/4/2003	$150,000	Not Avail.	Flash flood.
Corona, Palm Springs	11/12/2003	$10,000	0	Flash flood.
Mira Loma, Moreno Valley	2/2/2004	$10,000	Not Avail.	Flash flood.
Temecula, Riverside, Mira	2/18/2004	$55,000	Not Avail.	Flash flood.
Mira Loma, Moreno Valley, Perris, Sun City, Lake Elsinore	10/20/2004	$500,000	0	Flash flood.
Riverside County FEMA DR -1577	12/27/2004	Not Avail	Not Avail	Severe Storms, Flooding, Debris Flows and mud slides
Riverside County FEMA DR -1585	2/16/2005	Not Avail	Not Avail	Severe Storms, Flooding, Debris Flows and mud slides
Riverside County FEMA DR -1884	3/8/2010	Not Avail	Not Avail	Severe Storms, Flooding, Debris Flows and mud slides
Riverside County FEMA DR -1952	12/17/2010	Not Avail	Not Avail	Severe Storms, Flooding, Debris Flows and mud slides

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Hemet, Coachella Valley and Thousand Palms	9/7-8/2014	Not Avail	Not Avail	Flash flooding in Coachella Valley. Mud and water closed roads and stranded vehicles in La Quinta, Palm Desert, and Thousand Palms. Homes in La Quinta were surrounded by water. Moving water was 3 feet deep on roads and 4 to 5 feet of standing water submerged vehicles.
Throughout County	12/3-4/2014	Not Avail	1	Flooding resulted, with mud, debris and water closing several roadways and stranding vehicles. Mud with debris 10 feet high piled up on Soboba Rd. north of San Jacinto. A swift water rescue was needed.
Throughout County	7/19/2015	Not Avail	1	Flooding in the county lead to the need for a swift water rescue, the washout of Interstate-10 near Desert Center, and neighborhood in and near Moreno Valley flooded causing damage to resident's homes and property.
Menifee	9/8/2015	Not Avail	Not Avail	Flooding
Temecula	1/5-7/2016	Not Avail	Not Avail	Flooding
Throughout County	2/27/2017	Not Avail	1	Flooding resulted from the storm. A swift water rescue was needed in Temecula. Heavy road damage disrupted traffic.

Source: https://www.weather.gov/media/sgx/documents/weatherhistory.pdf
http://www.cnrfc.noaa.gov/storm_summaries/dec2010storms.php
http://ks.water.usgs.gov/pubs/reports/wsp.2499.sumca0193.html
http://www.floodcontrol.co.riverside.ca.us/Downloads/AnnualReports/DistrictAnnualReport15-16.pdf

Flood Hazard Mapping

For floodplain management purposes, the following discussion describes the Federal Emergency Management Agency (FEMA) definition of "100-year flood." The term "100-

year flood" is misleading. It is not a flood that will occur once every 100 years. Rather, the flood elevation has a 1 percent chance of being equaled or exceeded each year. Thus, a 100-year flood could occur more than once in a relatively short period of time. The one percent chance flood is used by the National Flood Insurance Program (NFIP) as the minimum standard for floodplain management regulation and, in most cases, triggers the need for mandatory flood insurance coverage. A structure located within a FEMA Special Flood Hazard Area has a 26 percent chance of suffering flood damage during the term of a 30-year mortgage.

Riverside County utilizes several sources to determine local flood hazards: FEMA Flood Insurance Rate Maps, DWR Awareness Maps, and local flood zone delineation maps as identified in Riverside County Ordinance 458 (updated 6/9/2017). For floodplain management purposes, the County regulates unincorporated development within each of the above maps. Each of the incorporated Cities administers its own floodplain management program and may or may not utilize floodplain information beyond that provided by FEMA's Flood Insurance Rate Maps.

FEMA Flood Insurance Rate Mapping

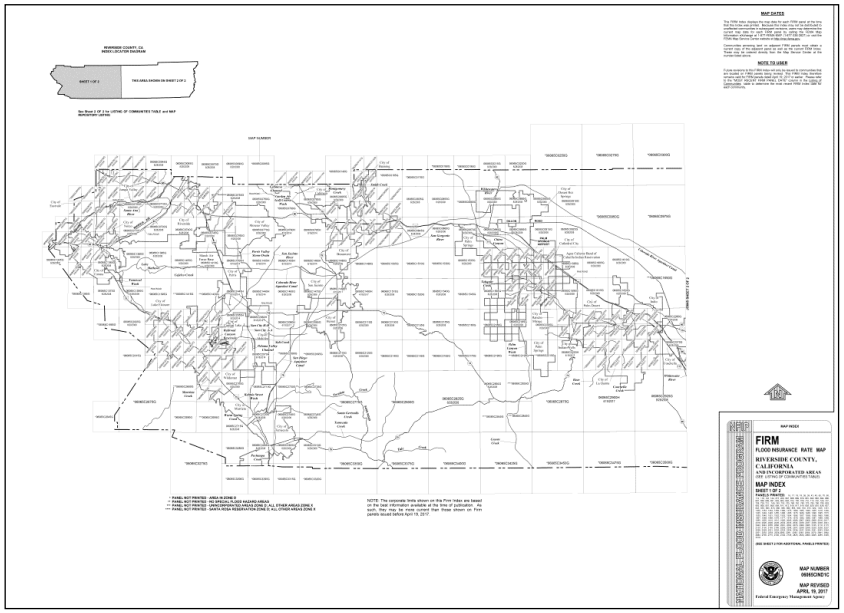
FEMA updated the Digital Flood Insurance Rate Maps (DFIRMS) effective range from August 28, 2008, to April 19, 2017, depending on when jurisdictions requested maps to be updated. The DFIRMS are available for public viewing from FEMA's website:

Source: http://msc.fema.gov/portal/advanceSearch#searchresultsanchor

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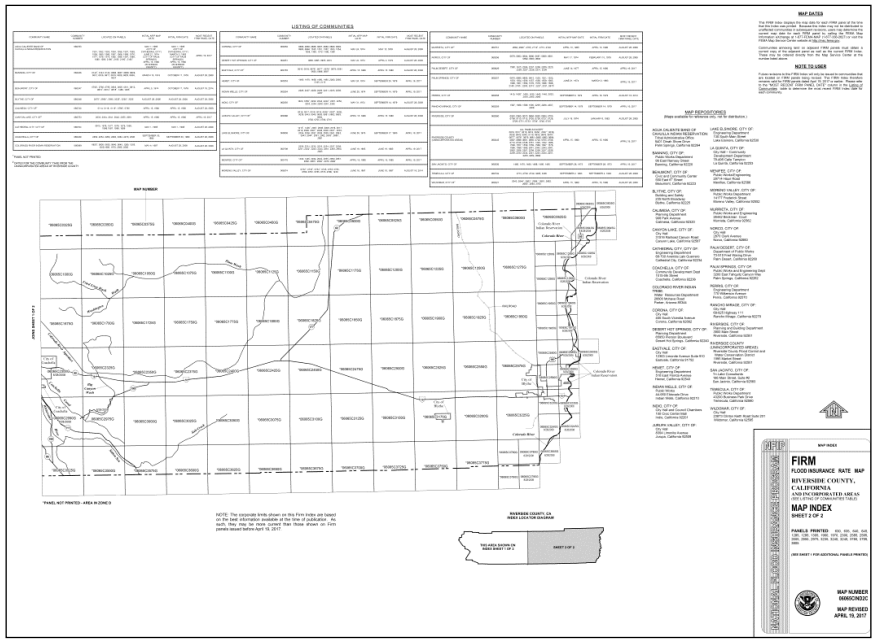
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Map 12: FEMA FIRM Map 2017 – West County



Source: http://msc.fema.gov/portal/advanceSearch#searchresultsanchor

Map 13: FEMA FIRM Map 2017 – East County



Source: http://msc.fema.gov/portal/advanceSearch#searchresultsanchor

Table 23: FIRM Flood Zones

Zone	Description
A	Area with a 1% annual chance of flooding. No depths or Base Flood Elevations (BFEs) are shown.
AE	Base floodplain where BFEs are provided. AE Zones are now used on digital FIRMs instead of A1 - A30 Zones.
A1 through 30	Known as numbered A Zones, these are the base floodplains in the old FIRM format where a BFE is shown.
AH	Area with a 1% annual chance of shallow flooding with an average depth ranging from 1 to 3 feet. BFEs are shown at selected intervals.
AO	River or stream flood hazard area, or area with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow with an average depth ranging from 1 to 3 feet. Average flood depths derived from detailed analyses are shown.
AR	Area with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam).
A99	Area with a 1% annual chance of flooding protected by a federal flood control system where construction has reached specified legal requirements. No depths or BFEs are shown.
V	Coastal area with a 1% or greater chance of flooding and an additional hazard associated with storm waves. No BFEs are shown within these zones.
VE or V1 through 30	Coastal area with a 1% or greater chance of flooding and an additional hazard associated with storm waves. BFEs are shown at selected intervals.
B, C, X	Zones considered having moderate to low risk of flooding, although flood insurance is available to property owners and renters in communities that participate in the NFIP.
D	Area with possible but undetermined flood hazards, where no flood hazard analysis has been conducted.

FEMA also conducted a Flood Insurance Study and determined that the following areas have the potential to flood.

Figure 24: Flood Insurance Study Areas

Water Source Studied	Water Source Studied	Water Source Studied
Acacia Creek Drain	Lincoln Avenue Drain	San Sevaine Channel
Alessandro Wash	Little Morongo Wash	Santa Ana River
All American Canal	Long Canyon Wash	Sheet Flow along Ocotillo Road
Arlington Canal	Macomber Palms Channel	Smith Creek
Arroyo Del Toro	Magnesia Falls Road	Smith Creek West Tributary
Bear Creek	Magnesia Springs Channel	South Norco Channel and Trib.s A and B
Beaumont Chanel	Main Street Drain	Spring Brook
Bedford Canyon Wash	Mangular Channel	Spring Brook Wash
Big Morongo Wash	Marshall Creek	Stetson Avenue Channel
Biskra Palms Channel	McVicker Canyon Wash	Stovepipe Canyon Creek
Blind Canyon Channel	Metz Road Basin	Stream A (Vicinity of Des. Hot Springs)
Bly Channel	Mirage Indian Trail Wash	Sun City Channels A-A, C-C, H-H and X-X
Box Springs Wash	Mission Creek	Sun City Southeast Tributary
Calimesa Channel	Mockingbird Canyon Wash	Sunny Slope Channel
Carrizo Alluvial Fan	Montgomery Creek	Sunnymead Storm Channel
Channel H	Mountain Avenue Wash	Taylor Avenue Drain
Cherry Avenue Channel	Murrieta Creek	Temecula Creek
Coachella Valley Stormwater Channel	North Cathedral Channel	Temescal Wash
Country Club Creek and North Tributary	North Norco Channel and Trib.s A, B and C	Tequesquite Arroyo
Day Creek Santa Ana River	North Palm Springs Wash	The Veldt
Dead Indian Alluvial Fan	North Side Wolf Valley Creek	Third Street Basin
Deep Canyon Alluvial Fan	Oak Street Channel	Thousand Palms Canyon Wash
Deep Canyon Storm Water Channel	Ocotillo Drive Wash	Thousand Palms Main Channel
Desert Hot Springs Channel	Orange Lateral	Thousand Palms Tributaries A, B and C
Dunes View Road Channel	Ortega Wash	Thunderbird Wash
Dry Morongo Wash	Ortega Channel	Tramview Wash
East Cathedral Channel	Palm Canyon Wash	Tramview Wash Tributary
East Gilman Home Channel	Palm Valley Drain	University Wash
East Rancho Mirage Storm Channel	Park Hill Drain	Wash G
El Cerrito Channel	Pechanga Creek	Wash I
Elsinore Spillway Channel	Perris Valley Storm Drain	Wasson Canyon Creek
Garden Air Gold Course Wash	Pigeon Pass Channel	West Cathedral Channel
Gilman Home Channel	Prenda Wash	West Norco Channel
Harrison Wash	Pushawalla Canyon Wash	West Pershing Channel
Hemet Storm Channel	Pyrite Channel	Whitewater River
Highland Springs Channel	Rache Channel	Whitewater River (C.V.S.C.)
Interstate-10 Wash	Ramsey Street Drain	Whittier Avenue Channel
Kalmia Street Wash	Rice Canyon Wash	Woodcrest Wash
Lake Elsinore	Salt Creek and Tributary	Unnamed Stream A
Lakeland Village Channel	Salt Creek Overflow	Unnamed Stream B
Lakeview Wash	San Gorgonio River	Unnamed Stream C
Leach Canyon Channel	San Jacinto River	1001 Ranch Drain
Lime Street Channel	San Jacinto Lateral	1001 Ranch Drain West Tributary

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DWR Awareness Floodplain Mapping

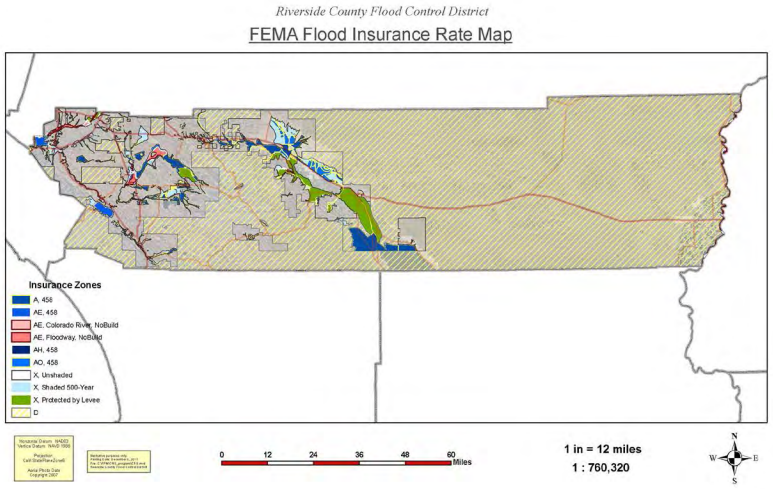
The intent of the California Department of Water Resources (DWR) Awareness Floodplain Mapping project was to identify all pertinent flood hazard areas by 2015 for areas that are not mapped under the FEMA National Flood Insurance Program (NFIP) and to provide the community and residents an additional tool in understanding potential flood hazards currently not mapped as a regulated floodplain. The awareness maps identify the 100-year flood hazard areas using approximate assessment procedures. These floodplains are shown as flood-prone areas without specific depths and other flood hazard data. Awareness Floodplain Maps were incorporated into County Ordinance 458.

The maps that were originally adopted are available on the DWR website. DWR will not be modifying these maps since it was a one-time project. As development occurs and the floodplains change due to channelization, the floodplain limits of the Awareness floodplains are being updated by Riverside County Flood Control (RCFC) and will be reflected on the RCFC interactive maps found at:

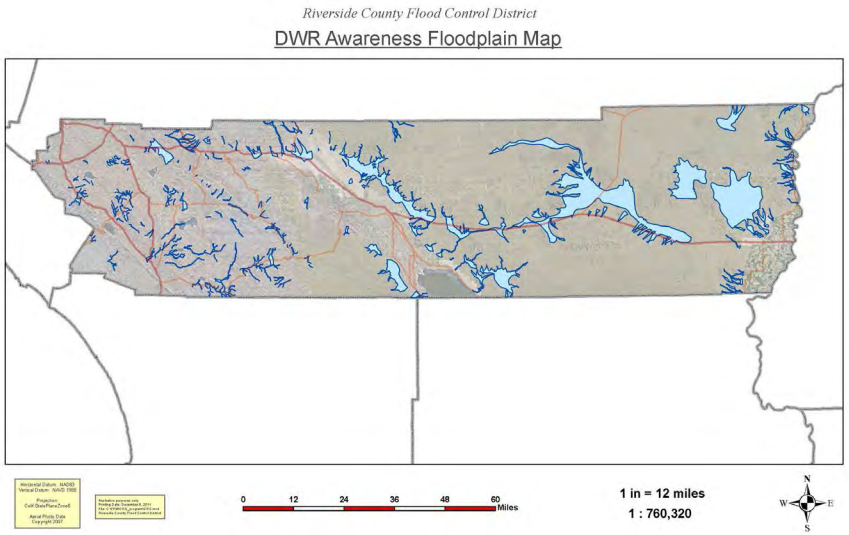
http://rcflood.org/FloodDetermination/FloodDetermination_V09.aspx

California Department of Water Resources Awareness Floodplain Maps can be found at http://www.water.ca.gov/floodmgmt/lrafmo/fmb/fes/awareness_floodplain_maps/

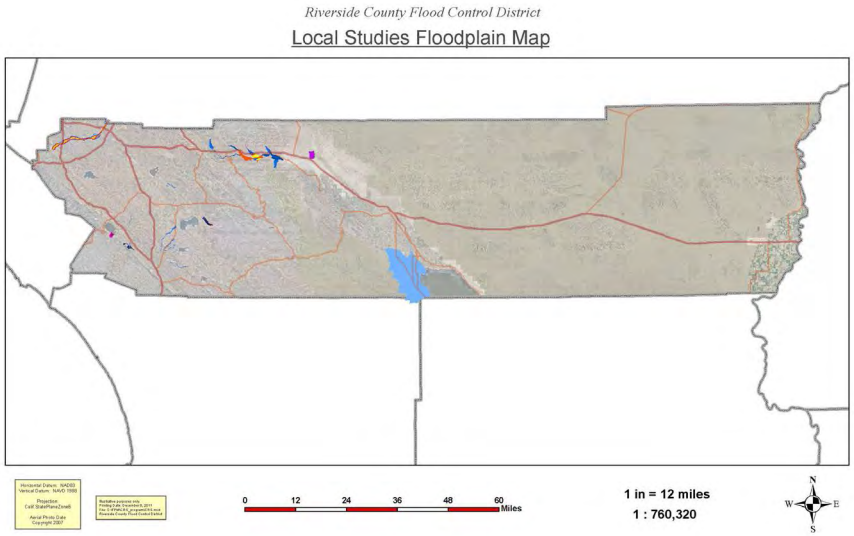
Map 14: FEMA Flood Insurance Rate Map



Map 15: DWR Awareness Floodplain Map



Map 16: Local Studies Floodplain Map



Risk Assessment

As stated in the State of California Multi-Hazard Mitigation Plan, Riverside County has 27 declared flood disasters from the period of 1950 – December 2012. The total can be updated to 29 when adding the two flood disaster declarations in 2015 and 2017. The State's plan also shows Riverside County has a population of 295,081 living within FIRM-Designated Floodplains (based on 2000 Census Data). According to the 2017 Southern California Association of Governments (SCAG) Unincorporated Area of Riverside County Report, the number of residents living in the unincorporated area has increased to 364,413.

HAZUS was used to generate general building stock and essential facility loss estimates for three different floods in the County – a 1% annual chance flood event (100-year flood) with the existing certified levee system in the County intact, a 1% annual chance flood event without consideration of these levees, and a 500-year (0.2% chance per year) flood. Flood hazard data from DFIRM maps available at FEMA's Map Service Center were used to develop the flood scenarios.

Table 24: Summary of HAZUS – Estimated Impacts on Riverside County for Three Flood Scenarios

Impact Category	100-Year	100-Year w/o Levee	500-Year
Economic Loss due to Building Damage, Total Building-related Direct	$0.81 B $1.7 B	$2.3 B $4.9 B	$3.6 B $7.8 B
# Buildings in Complete Damage State	1,356	3,655	6,262
Debris Generated (million tons)	0.20	0.50	0.78
Displaced Households, People Needing Short- term Shelter	16,896 41,846	79,078 223,787	125,887 357,092
# Highway Bridges w/ at least Moderate Damage (potentially closed)	0 (of 4 damaged)	0 (of 4 damaged)	0 (of 4 damaged)

Table 25: Summary of HAZUS – Estimated Impacts for Riverside County Essential Facilities in Three Flood Scenarios

Essential Facility	Category	100-Year		100-Year w/o Levee		500-Year	
		Time to Restore (Days)	Economic Loss ($1,000)	Time to Restore (Days)	Economic Loss ($1,000)	Time to Restore (Days)	Economic Loss ($1,000)
Hospitals*	Medium	0	$0	540	$0	540	$0
	Large	0	$0	540	$0	360-540	$0
Schools	K-12 (default data)	480	$115	480	$865	480	$2,232
	K-12 (providing data)	360-720	$12,482	360-720	$38,838	360-720	$66,911
	CCD (providing data)	0	$0	360-480	$6,285	360-480	$6,285
EOCs		0	$0	480	$560	360-480	$5,113
Police Stations		480	$0	360-480	$0	360-480	$796
Fire Stations		480	$692	360-480	$692	360-630	$1,994
TOTALS		**360-720**	**$13,289**	**360-720**	**$47,240**	**360-720**	**$83,331**

*Note: In Riverside County, there are no hospitals which would be categorized by HAZUS as "Small" (<50 licensed acute care beds)

- **Effects on People and Housing:** Of the approximately 647,000 buildings modeled within the general building stock for Riverside County, about 1% (6,262) are expected to suffer "complete" damage in the 0.2% annual chance flood event (500-year flood) scenario. These building would be considered "red-tagged" or unsafe for continued occupancy. About 94% of the 6,262 buildings are manufactured housing (i.e., mobile homes). Approximately 43,000 buildings (6.6%) are expected to suffer more than 20% damage or more while about 18,000 buildings are estimated to suffer flood damage of less than 20%. As much as 0.78 million tons of debris may result from these damaged buildings – 21% is expected to be heavy debris (concrete and steel), requiring heavy equipment to break down and remove, while 79% is expected to be light debris (wood, brick, drywall and other debris).

Damage to single family and multi-family dwellings is expected to result in the displacement of almost 126,000 households. While many of the displaced may find shelter with friends and family, or in available hotels, as many as 357,000 people are expected to seek short-term public shelter. This large number of people would likely overwhelm the emergency sheltering capacity of the county. The displaced populace should be able to move to safe locations without too much difficulty. While four (4) bridges in the county's transportation system are expected to suffer minor flood damage, the bridges are expected to remain functional.

- **Essential Facility Impacts:** Table 29 provides an overview of essential facility performance in the 0.2% annual chance flood event (500-year flood) with levees scenario. The table lists the number of essential facility sites and buildings (these numbers will differ for multi-building campuses, such as schools and hospitals). The table also provides the total building replacement value, and the number of buildings for which value data was available. As can be seen in the table, replacement cost data for hospitals was generally not available, unlike most other essential facility types. Expected building damage in this flooding event ranges from 0% damage for numerous essential facility types with some, but minimal, flooding, to as much as 7.1% mean damage for one school district. The total economic loss for essential facilities has been estimated to reach about $83 million, almost 91% of which ($75 million) will occur in schools and about 6% of which will occur in EOCs ($5.1 million). It should be noted that no hospital losses were estimated since all hospitals impacted by this flooding scenario did not provide replacement value data. (The full economic impact on hospitals can't be estimated at this time because of the lack of comprehensive replacement value data).

Table 26: Riverside County Essential Facility Loss Estimates – 0.2% Annual Chance Flood Scenario

Essential Facility	Category	No. of Facilities/Sites	No. of Buildings	No. of Beds	Replacement Cost ($1,000)	# Buildings w/ replacement	# Non-Functional Buildings	Time to Restore (Days)	Economic Loss ($1,000)
Hospitals*	Medium	8	28	793	$162,827	21	0	540	$0
	Large	8	49	2,467	$200,792	10	0	360-540	$0
Schools	K-12 (default data)	152	152		$219,600	152	31	480	$2,232
	K-12 (providing data)	689	9,981		$6,049,534	9,213	1,111	360-720	$66,911
	CCD (providing data)	12	258		$356,708	257	92	360-480	$6,285
EOCs		43	43		$310,273	43	4	360-480	$5,113
Police Stations		51	51		$675,299	48	2	360-480	$796
Fire Stations		156	156		$366,493	156	8	360-630	$1,994
TOTALS		**1,119**	**10,718**	**3,260**	**$8,341,525**	**9,900**	**1,248**	**360-720**	**$83,331**

Note: In Riverside County, there are no hospitals which would be categorized by HAZUS as "Small" (<50 licensed acute care beds)

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Table 27: Estimated Impacts on Riverside County Fire Stations in a 1% Annual Chance Flood Scenario

Agency	Number of Buildings	Replacement Cost ($1,000)	# Buildings w/ replacement cost data	No. Non-Functional Buildings	Restoration Time (Days)	Mean Building Damage	Economic Loss ($1,000)
Cathedral City FD	3	$10,500	3	0	360-480	0.0%	$0
Corona FD	7	$23,170	7	2	480	7.0%	$385
Hemet FD	5	$15,360	5	1	480-630	6.2%	$604
Murrieta FD	4	$9,530	4	0	0	0.0%	$0
Norco FD	2	$4,750	2	0	480	0.0%	$0
Palm Springs FD	5	$6,115	5	0	360-480	0.0%	$0
Pechanga FD	2	$5,430	2	0	0	0.0%	$0
Riverside County FD	95	$249,411	95	3	360-480	1.0%	$740
Riverside FD	17	$11,875	17	1	480	4.5%	$60
Other Agencies	4	$10,600	4	0	0	0.0%	$0
USFS	12	$19,752	12	1	480	4.4%	$205
TOTALS	**156**	**$366,493**	**156**	**8**	**360-630**	**2.9%**	**$1,994**

Table 28: Estimated Impacts on Riverside County EOCs in a 0.2% Annual Chance Flood (Levees Intact) Scenario

County	No. of Buildings	Replacement Cost ($1,000)	No. Non-Functional Buildings	Restoration Time (Days)	Mean Damage	Economic Loss ($1,000)
Riverside	43	$310,273	4	360-480	1.7%	$5,113

Table 29: Estimated Impacts on Riverside County Police Facilities in a 0.2% Annual Chance Flood (Levees Intact) Scenario

Agency	Number of Buildings	Replacement Cost ($1,000)	# Non-Functional Buildings	Time to Restore (Days)	Mean Damage	Economic Loss ($1,000)
Riverside County Sheriff	30	$491,973	2	360-480	1.2%	$796
Other Agencies	21	$183,326	0	360-480	0.0%	$0
TOTALS	**51**	**$675,299**	**2**	**360-480**	**0.2%**	**$796**

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Table 30: Estimated Impacts on Riverside School Districts in a 0.2% Annual Chance Flood Scenario

Category	District Name	Number of Facilities/ Sites*	No. of Buildings	Replacement Cost ($1,000)	# Buildings w/ replacement cost data	# Non-Functional Buildings	Restoration Time (Days)	Mean Damage	Economic Loss ($1,000)
K-12 (default data)		151	**152**	$219,600	152	31	480	5.2%	$2,232
K-12 (providing data)	Alvord USD	26	**525**	$274,026	525	8	360-480	1.4%	$583
	Banning USD	11	186	$92,169	180	30	360-480	2.7%	$892
	Beaumont USD	20	209	$179,231	208	36	360-480	4.7%	$6,424
	Coachella Valley USD	30	707	$271,777	691	128	360-480	2.3%	$4,392
	Corona-Norco USD	49	855	$718,384	855	128	360-480	2.0%	$6,792
	Desert Center USD	2	25	$13,438	25	0	0	0.0%	$0
	Desert Sands USD	33	681	$519,732	655	212	360-480	2.0%	$16,475
	Hemet USD	29	621	$294,809	620	81	360-480	2.0%	$5,681
	Jurupa USD	29	547	$285,015	547	8	360-480	1.3%	$330
	Lake Elsinore USD	29	539	$0	0	116	360-720	7.1%	$0
	Menifee Union SD	13	213	$116,628	211	0	0	0.0%	$0
	Moreno Valley USD	36	639	$361,250	639	31	480	6.0%	$1,451
	Murrieta Valley USD	18	470	$299,250	470	0	0	0.0%	$0
	Nuview Union SD	5	79	$38,186	79	7	360-480	1.2%	$901
	Palm Springs USD	31	493	$414,806	492	150	360-360	3.3%	$7,922
	Palo Verde USD	9	121	$83,907	121	0	0	0.0%	$0
	Perris SD	12	175	$98,885	174	13	360-480	3.1%	$1,315
	Perris Union High SD	13	226	$202,431	221	12	360-480	2.6%	$5,405
	Riverside Co Office of	167	326	$149,923	159	66	360-480	4.4%	$2,013
	Riverside USD	47	1,015	$497,272	1,015	22	360-480	1.8%	$941
	Romoland SD	5	63	$46,793	63	0	0	0.0%	$0
	San Jacinto USD	16	213	$130,375	213	62	360-480	1.6%	$5,380
	San Jacinto Valley	1	13	$1,105	13	1	360-480	0.4%	$14
	Temecula Valley USD	32	643	$548,085	642	0	0	0.0%	$0
	Val Verde USD	25	386	$388,179	384	0	0	0.0%	$0
	Yucaipa-Calimesa	1	11	$23,878	11	0	0	0.0%	$0
CCD (providing data)	Desert CCD	1	75	$84,687	74	62	360-480	4.1%	$4,130
	Mt. San Jacinto CCD	2	73	$96,439	73	30	360-480	4.5%	$2,155
	Palo Verde CCD	5	12	$37,440	12	0	0	0.0%	$0
	Riverside CCD	4	98	$138,142	98	0	0	0.0%	$0
TOTALS		**852**	**10,39**	**$6,625,842**	**9,622**	**1,234**	**360-720**	**3.3%**	**$75,428**

Table 31: Estimated Impacts on Riverside County Hospitals in a 0.2% Annual Chance Flood Scenario

Hospital Size[20]	Supervisorial District	No. of Hospital Sites	Number of Buildings	Number of Licensed Beds	Replacement Cost ($1,000)	No. Buildings w/ replacement cost data	# Non-Functional Buildings	Restoration Time (Days)	Mean Damage	Economic Loss ($1,000)
Medium	1st	1	7	122	$36,575	7	0	0	0.0%	$0
Large		2	5	406	$0	0	0	360-540	0.0%	$0
Medium	2nd	0								
Large		2	8	533	$0	0	0	0	0.0%	$0
Medium	3rd	3	5	297	$98,000	5	0	540	0.0%	$0
Large		1	10	433	$200,792	10	0	0	0.0%	$0
Medium	4th	2	11	196	$7,474	5	0	540	0.0%	$0
Large		2	25	656	$0	0	0	540	0.0%	$0
Medium	5th	2	5	178	$20,778	4	0	0	0.0%	$0
Large		1	1	439	$0	0	0	0	0.0%	$0
TOTALS		**16**	**77**	**3,260**	**$363,619**	**31**	**0**	**360-540**	**0.0%**	**$0**

Note: In Riverside County, there are no hospitals which would be categorized by HAZUS as "Small" (<50 Licensed acute care beds)

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- **Effects on Infrastructure:** A slow-rising flood situation will progress through a series of stages, beginning with minor rainfall and evolving to a major event such as substantial flooding. Once flooding begins, personnel will be needed to assist in rescuing persons trapped by floodwaters, securing utilities, cordoning off flood areas, and controlling traffic. These actions may overtax local agencies, and additional personnel and resources may be required. It is anticipated that existing mutual aid resources would be used as necessary to augment local resources.

  Many essential public and quasi-public facilities and hazardous materials sites are located within the 100- or 500-year flood zones of Riverside County. As of the writing of the Safety Element of the County's General Plan, these included 14 of the County's 39 airports; 4 of 18 hospitals; 47 of 109 police stations, fire stations, and emergency operation centers; 92 of 380 schools; 446 of 1,306 highway bridges; and 695 of 1,978 hazardous materials sites.

- **Effects on Agriculture:** As the historical events in Riverside County show, effects on agriculture can be devastating. Flooding can damage crops, livestock, and dairy stock. In addition to the obvious impacts on animals and crops, flooding can have deleterious effects on soil and the ability to reinvigorate the agricultural activities affected once the flood waters recede.

Risk Assessment Conclusion

Flooding due to heavy precipitation or dam failure is a potential hazard in Riverside County, with the resultant possibilities for damage to property and loss of life. Severe flooding can be particularly costly. In a relative sense, flooding due to precipitation does not present the degree of danger posed by other hazards such as major earthquakes. If there is flooding due to dam failure, the danger could be cataclysmic.

Relationship to Other Hazards – Cascading Effects

Fire can breakout because of dysfunctional electrical goods. Hazardous materials can also get into floodways, causing health concerns and polluted water supplies.

5.3.10 Civil Disorder

Severity: 3

Probability: 2

Risk Score: 1.13

OA Jurisdictions Affected by Civil Disorder

- All incorporated cities of Riverside County

Hazard Definition

Civil disorder or unrest is usually triggered by dramatic political or social events. Every major metropolitan area in California has experienced and is at risk for, civil disorder. The most significant civil unrest incident in the State was the 1992 Los Angeles Civil Disturbance that resulted in 53 deaths, over 2,300 injuries and over $800 million in damages. This event also precipitated simultaneous, but smaller, incidents throughout California and the country.

Civil disorder is an incident intended to disrupt community affairs and threaten the public safety. Civil disorder includes riots, mob violence, and any unlawful demonstration resulting in police intervention and arrests. Civil Unrest is generally associated with controversial political, judicial, and/or economic issues and events.

History

Riverside County is not a place where there has been a lot of historic civil disturbance events of noticeable magnitude. There are locations within Riverside County where large public gatherings take place. These locations have the potential for unstable conditions, possibly affecting the ability of a jurisdiction in the County to provide sufficient law enforcement and fire protective services.

May 1, 2017 – "May Day" protest in Riverside to oppose President Trump's actions against undocumented workers, LGBT rights, fair wages, Black Lives Matter, refugees and immigrants.

January 31, 2017 – Protests held in Riverside to protest President Trumps Travel restrictions from seven primarily Muslim countries.

January 21, 2017 – Thousands marched in Downtown Riverside for Woman's rights.

November 10, 2016 – UC Riverside students marched in an anti-Trump rally.

May 7, 2016 – Trump supporters rally in Temecula approximately 350 people attended.

July 13, 2012 – Rally against violent crimes at the Riverside Public Library.

January 31, 2012 – Union Strike at various locations in Riverside County.

December 2, 2011 - Protests at all of the main entrances to the Mission Inn where Buster was holding a re-election fundraiser.

November 6, 2011 - There was an "Occupy" protest near City Hall, and 8 protesters were arrested.

November 22, 2011 - 200 to 300 students gathered at UCR's bell tower at the center of campus to protest. (Occupy UC Riverside).

April 15, 2010 - Riverside County Tax Day Tea Parties' Protest Rally (Tea Party).

January 13, 2009 - The Riverside County Board of Supervisors today temporarily suspended an ordinance it passed last week to limit protests outside a large Church of Scientology compound near Hemet. Protesters show up about once a month outside Golden Era Productions, home to 500 Scientologists, on Gilman Springs Road.

December 2004 - A demonstration at county administrative buildings that was part of a nationwide protest sponsored by the American Family Rights Association.

Risk Assessment

During a Civil Unrest incident that affects Riverside County, there are certain critical facilities within the County that may be more at risk than others. These critical facilities include venues for musical concerts and sporting events, facilities where legal and illegal demonstrations are held, and any other facilities with events that attract large numbers of people. All of these situations create significant traffic congestion and the potential for disruptive behavior.

- **Effects on people and housing.** The effects of a Civil Unrest are varied and usually based on the type, severity, scope, and duration of the disturbance. Effects may include illegal assemblies, injuries, and even loss of life.

- **Effects on commercial and industrial structures**. Effects may include traffic congestion or gridlock, illegal assemblies, disruption of utility service, and property damage.

- **Effects on infrastructure.** Effects may include traffic congestion or gridlock, disruption of utility service, and property damage.
- **Effects on agriculture.** Effects may include traffic congestion or gridlock, disruption of goods transportation services, and property damage.

Risk Assessment Conclusion

The overall risk of civil unrest in Riverside County is low.

Relationship to Other Hazards – Cascading Effects

Civil Unrest may lead to a fire, destruction of property, disruption of power, injury to persons, and even loss of life. It also has the potential to affect first responder response times by traffic blocking protesting techniques.

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5.3.11 Drought

Severity: 3

Probability: 3

Risk Score: 1.13

OA Jurisdictions Affected by Drought

- All incorporated cities of Riverside County
- Unincorporated areas of Riverside County

Hazard Definition

A drought is a long period of extremely dry weather when there is not enough rain for the successful growing of crops or the replenishment of water supplies.

Drought is a gradual phenomenon. Normally, one dry year does not constitute a drought in California but rather serves as a reminder of the need to plan for droughts. California's extensive system of water supply infrastructure (reservoirs, groundwater basins, and interregional conveyance facilities) generally mitigates the effects of short-term dry periods for most water users.

Drought can have secondary impacts. For example, drought is a major determinant of wildfire hazard, in that it creates greater propensity for fire starts and larger, more prolonged conflagrations fueled by excessively dry vegetation, along with reduced water supply for firefighting purposes. Drought is also an economic hazard. Significant economic impacts on California's agriculture industry can occur as a result of short and long term drought conditions; these include hardships to farmers, farm workers, packers, and shippers of agricultural products. In some cases, droughts can also cause significant increases in food prices to the consumer due to shortages.

Past experience with California droughts tells us that drought impacts are felt first by those most dependent on or affected by annual rainfall – agencies fighting forest fires, ranchers engaged in dryland grazing, rural residents relying on wells in low yield rock formations, or small water systems lacking a reliable water source.

The driest single year in California's measured hydrologic history is 1977.

California's last major statewide drought was 2014-2017. On April 17, 2017, Governor Jerry Brown issues EO B-40, officially ending the drought state of emergency.

Climate scientists studying California weather patterns find that drought conditions are likely to become more frequent and persistent over the 21st century due to climate change. The experiences of California during recent years underscore the need to examine more closely the state's water storage, distribution, management, conservation, and use policies.

California Progress as of 2017:

In January 2014, with California facing one of the most severe droughts on record, Governor Brown proclaimed a State of Emergency due to drought conditions beginning in 2012 through 2016. An interagency Drought Task Force was convened to monitor drought impacts and advise on actions to be taken if drought conditions worsened. The Drought Task Force also developed a plan for the provision of emergency food supplies, financial assistance and unemployment services in communities that suffer high levels of unemployment due to drought conditions.

In September 2014, Governor Brown issued an Executive Order authorizing Cal OES to provide California Disaster Assistance Act (CDAA) funding for local government assistance to provide emergency water supplies to households without water for drinking and/or sanitation purposes.

In April 2017, Governor Brown lifted the Executive Order Proclaiming a drought, however, he retained prohibition on wasteful practices.

The Drought Contingency Plan (DCP) contains strategies and actions that state agencies have taken or may take to prepare for, respond to, and recover from droughts. Its purpose is to minimize drought impacts by improving agency coordination and enhancing monitoring and early warning capabilities, water shortage impact assessments, and preparedness, response, and recovery programs. The DCP identifies an integrated, regional approach to addressing drought, drought action levels, and appropriate agency responses as drought conditions change. It calls for coordination and clearly defined roles and responsibilities of federal, state, and local agencies, and timely dissemination of information to decision-makers.

Five levels of drought response are identified. These range from Level 1, representing an: Abnormally Dry period (calling for raising awareness), to Level 3, a Severe Drought (requiring mandatory conservation in some communities and emergency actions), to Level 5, an Exceptional Drought (water supplies may be cut off and maximum response). A Governor's emergency drought proclamation may be initiated at Level 3.

Drought can be defined according to meteorological, hydrological, or agricultural criteria.

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Meteorological drought is usually based on long-term precipitation departures from normal, but there is no consensus regarding the threshold of the deficit or the minimum duration of the lack of precipitation that makes a dry spell an official drought.

Hydrological drought refers to deficiencies in surface and subsurface water supplies. It is measured as stream flow, as well as lake, reservoir, and ground water levels.

Agricultural drought occurs when there is insufficient soil moisture to meet the needs of a particular crop at a particular time. A deficit of rainfall over cropped areas during critical periods of the growth cycle can result in destroyed or underdeveloped crops with greatly depleted yields. Agricultural drought is typically evident after meteorological drought but before a hydrological drought.

Socioeconomic drought associates the supply and demand of economic goods or services with elements of meteorological, hydrologic, and agricultural drought. Socioeconomic drought occurs when the demand for water exceeds the supply as a result of weather- related supply shortfall. This may also be called a water management drought.

History

Riverside County chronically experiences drought cycles. Drought causes stress on the County's ability to provide water to the community. In addition, drought conditions can cause extensive weakening of trees in forested areas causing them to become highly vulnerable to disease and insect infestation. Many trees have weakened and died, creating a severe fire hazard. Furthermore, wildland brush areas were dry, presenting wildfire risk.

Figure 35: California's drought level first week of March 2011-2015

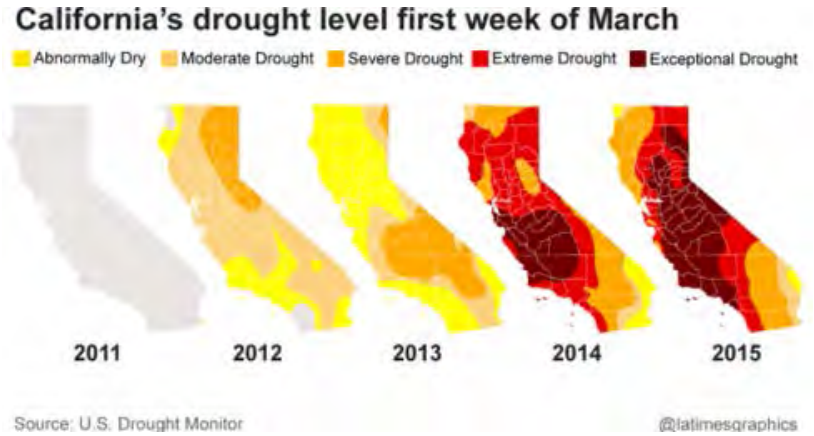
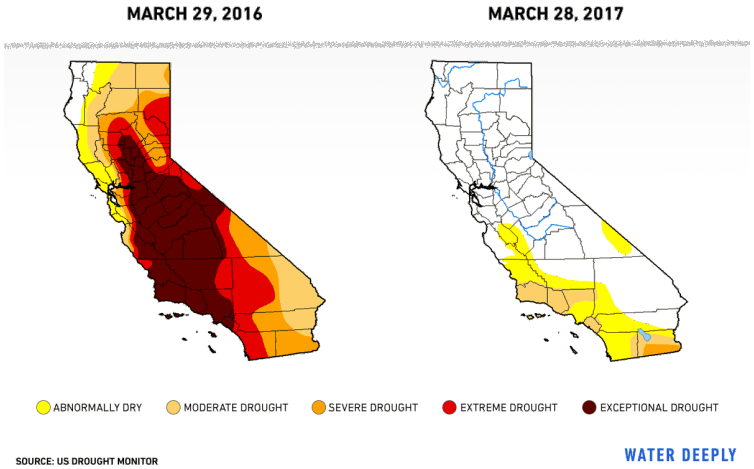


Figure 36: California's drought level March 2016-2017



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Drought Risk Assessment

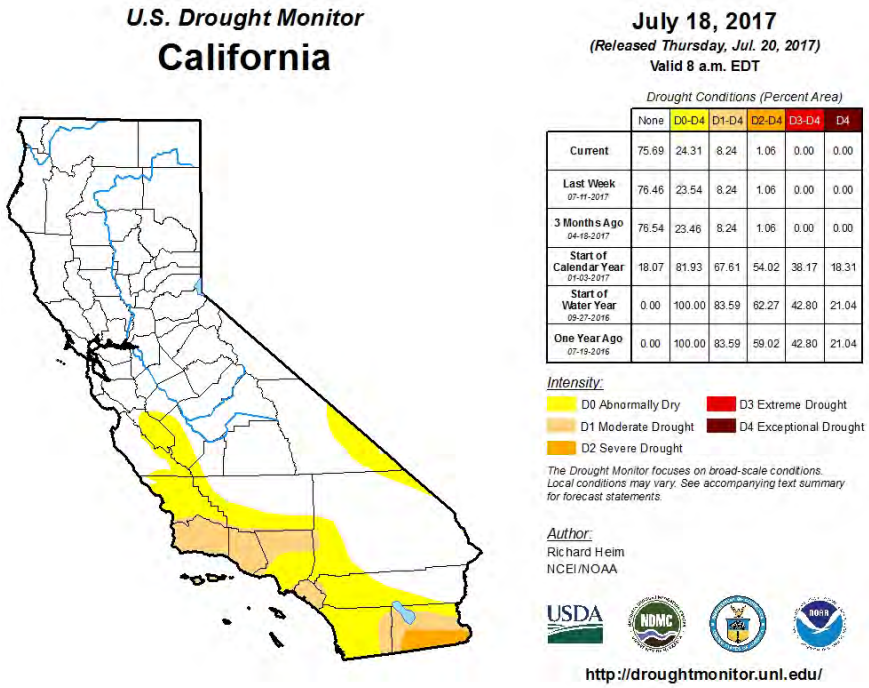
The Department of Water Resources produces a California Water Plan every five years that not only includes a statewide water budget but also regional watershed water budgets. These water budgets are based on California Department of Finance population projections and indicate clearly that demand for water will exceed supply in 2020 whether or not a drought condition exists at that time. The largest average-year shortages are forecasted for the South Coast Region, which heavily relies on imported water. Future average-year shortages in the South Coast Region reflect forecasted population growth plus lower Colorado River supplies as California reduces its use of Colorado River water to the State's basic apportionment.

Although a drought in and of itself is not a direct threat to property and life, the impact on the County's agricultural industry and home development can be monumental. The costs to the County for the current drought in terms of fire damage and forest management have been in the millions. This is a chronic problem for Riverside County and accounts for significant indirect costs, loss of property and threat to human life.

Relationship to Other Hazards – Cascading Effects

Drought can increase the severity of other hazards. For example, drought can lead to an increase in dead vegetation when can increase fire hazards. It can also lead to increased insect infestations.

Figure 37: U.S Drought Monitor – California



5.3.12 Nuclear/Radiological Incident

Severity: 4

Probability: 1

Risk Score: 1.00

OA Jurisdictions Affected by Nuclear Incidents

- All incorporated cities of Riverside County
- Unincorporated areas of Riverside County

Hazard Definition

Radiological Accidents

Radioactive materials are routinely transported in California. These materials include the medical and industrial sources described below, as well as wastes that have radioactive components. Many of the radioactive waste shipments come from research and cleanup efforts at national laboratories.

Radiological accidents that result in the release of radioactive materials may result in long-term health risks and contamination of the state resources, including air, water supply, groundwater, and agricultural lands.

Profiling Radiological Accident Hazards

Due to strict regulation of nuclear power plants in the United States, significant nuclear power incidents that can cause harm to the public have a low probability of occurrence, and none have occurred in California. Even though the probability of a catastrophic event involving a nuclear power plant is extremely low and these plants are extremely well protected, the consequences of a severe accident or a successful terrorist attack on a nuclear power plant that results in a release of radioactive materials could be very significant.

State and local governments having jurisdiction within ten miles of an operating nuclear power plant must plan, train, and conduct emergency exercises annually in accordance with federal regulations. Detailed emergency plans are maintained by each affected agency. Four Emergency Classification Levels (ECLs) have been established in federal regulations to characterize the severity of the emergency and the response actions

required. The ECLs must be used as the foundation for emergency response planning, training and exercises.

Planning Zones

A series of zones have been established around each nuclear power plant to clearly identify the required activities in the event of an accident. Although three specific zones are identified, efforts to protect public health and safety and the environment are made without regard to whether particular areas are inside or outside of these zones:

- The Emergency Planning Zone is an approximate 10-mile radius around the plants. Plans for this zone are in place to protect people, property, and the environment from the effects of exposure to a radioactively contaminated plume.
- The Ingestion Pathway Zone covers an approximate 50-mile radius around the plant. In this zone, plans are in place to mitigate the effects of radioactive contamination to agriculture, and food processing and distribution.

There are three general situations that could affect Riverside County, namely:

1. A situation involving nuclear weapons, which is discussed in the Terrorism section of this LHMP (Section 5.3.7);
2. A situation involving the transportation of nuclear materials; and
3. An incident involving the San Onofre Nuclear Generating Station (SONGS).

As will be discussed in the Terrorism section of this LHMP, the possibility exists that a terrorist organization might acquire the capability of creating a small nuclear detonation. A single nuclear detonation in the United States would likely produce fallout affecting an area many times greater than that of the blast itself. There is also the possibility that a terrorist will construct a “dirty bomb”, a bomb that is used to distribute nuclear-contaminated materials. It would have less of an effect than a “traditional” nuclear bomb, but the terror effect on the population would be great.

A nuclear incident could be initiated by a transportation emergency, either accidental or intentional. See the Transportation Emergencies section of this LHMP (Section 5.3.14).

SONGS is located on the Pacific Coast in northwestern San Diego County, approximately 4 miles southeast of the City of San Clemente. Surrounding San Onofre is a Basic Emergency Planning Zone, approximately 10 miles in radius within which certain precautionary actions must be taken and specific precautionary plans must be prepared.

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This zone does not include any portion of Riverside County. Beyond this zone is an area that could be affected by radioactive fallout being deposited in such a manner as to detrimentally affect the human food chain, which includes all of Riverside County. This area is identified as the Ingestion Pathway Zone. Specifically, the primary threat is that of radioactive iodine 131 being deposited upon fodder consumed by dairy cows and subsequently appearing in milk in the public marketplace.

History of Events

Fortunately, Riverside County has not experienced a nuclear accident.

Risk Assessment

Transportation of nuclear and/or irradiated materials is of growing concern. A severe transportation incident could require the evacuation of a large number of people, major rerouting of traffic systems, and an expensive decontamination process for the area involved. Ancillary problems associated with such an incident are discussed in the sections of this LHMP dealing with Hazardous Materials and with Transportation Incidents.

Radiological Waste Transportation

Since 1989, the staff of the Energy Commission has represented California on two western state groups: the Western Governors' Association WIPP Transportation Advisory Group and the Western Interstate Energy Board's High-Level Radioactive Waste Committee. Both groups work with the U.S. Department of Energy and other state regional groups to develop accident prevention and emergency response plans for major federal non-classified shipments of radioactive waste. Staff also coordinates the California Nuclear Transport Working Group that develops and updates accident prevention and emergency response plans for federal shipments of transuranic waste to the Waste Isolation Pilot Plant (WIPP) in New Mexico.

To mitigate disaster, federal regulations require that:

- radiological materials transported by train use special packaging based on the hazard of the shipment
- there are extensive worker training and documentation
- vehicle and packages of radioactive materials are inspected
- The waste travels via specific, controlled routes.

More information about radiological waste transportation can be found on Cal OES's radiological *transportation website.*

A detailed discussion of radiation hazards and their effects on humans along with a description of the operation of a nuclear power generating facility and the hazards posed thereby are contained in the State of California Nuclear Power Plant Emergency Response Plan and in other documents.

The State Nuclear Power Plant Emergency Response Plan assigns to the County of Riverside responsibility for certain actions to protect the public and the environment within Riverside County from the effects of an accident. The plan also lists the support and assistance available from various State and Federal organizations.

- **Effects on people and housing.** Depending on levels of radiation exposure, the effects could range from minimal to devastating.
- **Effects on commercial and industrial structures.** Depending on levels of radiation exposure, the effects could range from minimal to devastating.
- **Effects on infrastructure.** Depending on levels of radiation exposure, the effects could range from minimal to devastating.
- **Effects on agriculture.** Depending on levels of radiation exposure, the effects could range from minimal to devastating.

Risk Assessment Conclusion

The nearest plant to Riverside County is San Onofre, which is a three tower facility in San Diego County. In 1992 the site retired Tower 1. Towers 2 and 3 remained operational until 2012. In March of 2015 SoCal Edison was granted permission to decommission towers 2 and 3 and permanently close the site. The estimated date for full closure of the power plan is December 31, 2031.

The County is far enough away from nuclear power plants that cataclysmic exposure is not likely. There is the possibility of Riverside County being used as a major evacuation route from a nuclear plant accident. This would tax the County's response resources. The radiation from an accident would, of course, negatively affect the area.

Relationship to Other Hazards – Cascading Effects

Cascading effects of a nuclear incident could include contaminated water, air, and soil. It could also impact first responders and the 911 system.

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5.3.13 Extreme Weather

Severity: 3

Probability: 2

Risk Score: 0.75

OA Jurisdictions Affected by Extreme Weather

- All incorporated cities of Riverside County
- Unincorporated areas of Riverside County

Hazard Definition

Extreme weather hazards in Riverside County include:

- Extreme Heat
- Severe Cold
- Wind Event
- Fog Event
- Agricultural Event

Climate Change can impact weather patterns within the County. Climate changes can increase or change effects of weather. Some changes may include reduced water supply, increased temperatures, decreased precipitation and increased wildfire risks.

The National Climate Data Center (NCDC) receives Storm Data from the National Weather Service. The National Weather service receives their information from a variety of sources, which include but are not limited to: county, state and federal emergency management officials, local law enforcement officials, SKYWARN spotters, NWS damage surveys, newspaper clipping services, the insurance industry and the general public.

Storm Data Disclaimer:

Storm Data is an official publication of the National Oceanic and Atmospheric Administration (NOAA) which documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce. In addition, it is a partial record of other significant meteorological events, such as record maximum or minimum temperatures or precipitation that occurs in connection with another event. Some information appearing in

Storm Data may be provided by or gathered from sources outside the National Weather Service (NWS), such as the media, law enforcement and/or other government agencies, private companies, individuals, etc. An effort is made to use the best available information but because of time and resource constraints, information from these sources may be unverified by the NWS. Therefore, when using information from Storm Data, customers should be cautious as the NWS does not guarantee the accuracy or validity of the information.

Table 32: Storm Data Table (4/30/1950 to 8/7/2017)

Type	# of Events	Property Loss	Crop Loss	Deaths	Injuries
Drought	26	N/A	N/A	N/A	N/A
Dust Storm	26	405 K	100 K	0	77
Flood	246	88.405 M	5.200 M	7	26
Fog	18	25K	0	0	21
Funnel Cloud	26	0	0	0	0
Hail	30	131.5 K	10 K	0	2
High Winds	227	65.579 M	36.705 M	8	71
Lightning	30	254.5 K	10.1K	1	6
Precipitation	25	40.400 M	0	0	26
Snow and Ice	57	1.386 M	0	4	102
Strong Winds	19	999 K	0	1	2
Temp Extremes	25	1.330 M	1.175 M	31	39
Thunderstorm Winds	119	4.980 M	10 K	0	0
Tornado	24	21.537 M	0	0	4

Type	# of Events	Property Loss	Crop Loss	Deaths	Injuries
Wild and Forest Fire	161	190.892 M	1.247 M	1	131
Totals	**1,329**	**2.229 B**	**174.429 M**	**53**	**507**

Note: Figures in the chart above were gathered from NOAA's Storm Event Database and may not be a complete listing of previous hazard occurrences.

Riverside County's weather has a history of extremes. There are basically three weather regions in the County, each with its own type of weather and each with a different impact on the County. In some cases, the high temperatures in the desert are harmful to the public, but beneficial to agriculture. In other cases, a steady rainfall that raises the water table can be good for the County, yet too much rain will cause flooding and a disruption in the production of agricultural goods.

Average Climates across the County

The Weather Tables portray the averages for several areas across the County of Riverside. The cities included are Riverside, Idyllwild and Blythe. These cover the Desert, Mountain and Valley Regions, and are clear examples of the weather extremes within the county.

Riverside Climate

Climate Riverside - California °C | °F

	Jan	Feb	Mar	Apr	May	Jun
Average high in °F:	68	68	71	76	80	87
Average low in °F:	43	44	46	49	54	57
Av. precipitation in inch:	2.32	2.4	1.69	0.67	0.2	0.08
Days with precipitation:	-	-	-	-	-	-
Hours of sunshine:	-	-	-	-	-	-

	Jul	Aug	Sep	Oct	Nov	Dec
Average high in °F:	94	95	91	83	74	67
Average low in °F:	62	62	59	53	46	42
Av. precipitation in inch:	0.04	0.08	0.16	0.47	0.83	1.38
Days with precipitation:	-	-	-	-	-	-
Hours of sunshine:	-	-	-	-	-	-

Source: http://www.usclimatedata.com/climate/riverside/california/united-states/usca1695

Idyllwild Climate

Climate Idyllwild - California °C | °F

	Jan	Feb	Mar	Apr	May	Jun
Average high in °F:	56	56	59	64	72	80
Average low in °F:	30	30	31	35	41	47
Av. precipitation in inch:	4.88	5.35	3.78	1.81	0.43	0.16
Days with precipitation:	-	-	-	-	-	-
Hours of sunshine:	-	-	-	-	-	-
Average snowfall in inch:	8	8	6	3	1	0

	Jul	Aug	Sep	Oct	Nov	Dec
Average high in °F:	86	86	81	71	62	55
Average low in °F:	54	54	49	41	34	29
Av. precipitation in inch:	0.67	0.79	0.83	1.22	2.52	3.7
Days with precipitation:	-	-	-	-	-	-
Hours of sunshine:	-	-	-	-	-	-
Average snowfall in inch:	0	0	0	0	2	4

Source: http://www.usclimatedata.com/climate/idyllwild/california/united-states/usca0506

Blythe Climate

Climate Blythe - California °C | °F

	Jan	Feb	Mar	Apr	May	Jun
Average high in °F:	68	73	80	88	97	105
Average low in °F:	40	44	49	55	63	69
Av. precipitation in inch:	0.55	0.59	0.39	0.08	0.04	0.04
Days with precipitation:	-	-	-	-	-	-
Hours of sunshine:	-	-	-	-	-	-

	Jul	Aug	Sep	Oct	Nov	Dec
Average high in °F:	109	108	102	90	76	66
Average low in °F:	78	77	69	57	46	39
Av. precipitation in inch:	0.24	0.43	0.43	0.2	0.24	0.59
Days with precipitation:	-	-	-	-	-	-
Hours of sunshine:	-	-	-	-	-	-

Source: http://www.usclimatedata.com/climate/idyllwild/california/united-states/usca0506

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5.3.13.1 Extreme Heat

Overview

Extreme heat can be described as overly hot temperatures that are sustained to the extent that human and animal overexposure can cause heat illness and death. Heat illness is a major cause of preventable morbidity in regions characterized by high ambient temperatures.

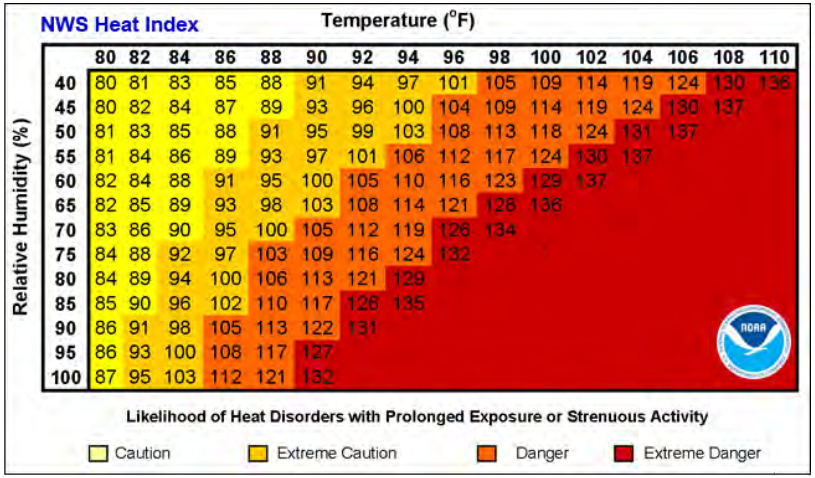
Riverside County has a wide range of temperatures, from freezing in some areas during the winter months to extremely hot temperatures for long periods of time during the summer in the deserts and other areas. In 2011 Riverside County and several other counties were impacted by a power outage during a period of high temperatures. The State Hazard Mitigation Plan addresses the issue of Extreme Heat Hazards, and this information has been included in this LHMP.

The figure on the next page illustrates the Heat Index (HI) as a function of heat and relative humidity. The Heat Index describes how hot the heat-humidity combination makes the air feel. As relative humidity increases, the air seems warmer than it actually is because the body is less able to cool itself via evaporation of perspiration. As the Heat Index rises, so do health risks.

Specifically:

- When the Heat Index is 90°F, heat exhaustion is possible with prolonged exposure and/or physical activity.
- When it is 90° to 105°F, heat exhaustion is probable with the possibility of sunstroke or heat cramps with prolonged exposure and/or physical activity.
- When it is 105° to 129°F, sunstroke, heat cramps or heat exhaustion is likely, and heatstroke is possible with prolonged exposure and/or physical activity.
- When it is 130°F and higher, heatstroke and sunstroke are extremely likely with continued exposure. Physical activity and prolonged exposure to the heat increase the risks.

Figure 38: The National Weather Service (NWS) Heat Index



Source: http://www.nws.noaa.gov/os/heat/heat_index.shtml

The National Weather Service (NWS) will initiate its Heat Index Program Alert procedures when the high temperature is expected to exceed 105° to 110° (depending on local climate) for at least two consecutive days.

Extreme Heat and infrastructure

Extreme heat can not only result in loss of life and injury but it can also cause damages to infrastructures. According to the 2017 update Draft of the Safeguarding California Plan, highway systems can be affected by extreme heat by roads buckling and rutting.

Profiling Extreme Heat Hazards (from the 2013 SHMP)

"Heat waves do not cause damage or elicit the immediate response that floods, fires, earthquakes, and other disasters do. They have, however, claimed many lives in comparison with other disasters. For example, the 1989 Loma Prieta Earthquake resulted in 63 deaths while the 1992 Northridge Earthquake was responsible for the loss of 55 lives. The catastrophic 2003 Southern California Firestorms resulted in 24

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deaths. However, according to the 2013 SHMP, the worst single heat wave event in California occurred in Southern California in 1955, when an eight-day heat wave is said to have resulted in 946 deaths. The 2013 SHMP also states that the July 2006 heat wave in California caused the deaths of at least 136 people over a 13-day period (6 deaths were still under investigation in 2007). Another source, the Spatial Hazard Events and Loss Data for the United States (SHELDUS), estimates that approximately 47 heat events occurred in California between the years 1960 and 2008. Adjusted to 2008 dollars, SHELDUS reports that severe heat events in California caused roughly $1.8 million in property damage and $531.7 million in crop damage. From 2012 to 2014 there were 159 fatalities related to extreme Heat events within California.

The California Climate Adaptation Strategy (CAS), citing a California Energy Commission study, states that "over the past 15 years, heat waves have claimed more lives in California than all other declared disaster events combined." Despite this history, however, not a single heat emergency was formally proclaimed at the state level or declared as a federal disaster between 1960 and 2008. Though no formal explanation exists for this seeming contradiction, scholars have written about the exclusion of heat events as declared disasters. For example, Eric Klinenberg, author of an account of a heat wave which killed 739 people in the City of Chicago in July 1995, suggests that the hidden nature of social vulnerability combined with the inconspicuous nature of heat events (unlike earthquakes, floods, wildfires, tornados, etc.) prevent them from being declared as legitimate disasters.61 Further, although heat events can have a devastating effect on agriculture, heat-caused property damage over the last 48 years has been relatively small.

Treating Heat as a "Legitimate Disaster" (from the 2013 SHMP)

These facts raise several issues. First, since the primary goal of the SHMP is to significantly reduce the loss of life and injuries in the state of California, heat is considered a legitimate disaster type. Though heat does not cause much economic damage or damage to the built environment, the number of people it has killed underscores the importance of mitigating its impacts. Second, heat events highlight the importance of thoughtful social vulnerability analyses. While changes to the built environment can greatly alter vulnerability to different hazards, social vulnerability and resiliency are especially important during heat events. For example, socially isolated elderly persons are especially vulnerable. Any mitigation efforts aimed at reducing heat losses will focus on ways to reduce social isolation as well as changes to the built environment. Third, heat events illustrate how seemingly unrelated phenomena combine to create a disaster. For example, the increased use of air conditioners during heat waves can lead to power outages, which makes the events even more deadly. Upgrading water and power infrastructure, then, is a form of heat disaster mitigation.

Situational and physical characteristics help to identify vulnerable populations that may not comfortably or safely access and use disaster resources. Specifically, when discussing heat related emergency preparedness, the following groups could be considered vulnerable or at greater risk in a heat emergency:

- Infants and small children under age three
- Women who are pregnant
- Elderly people (age 65 and older)
- Homeless
- The obese
- The bedridden
- Mentally ill
- Those with cognitive disorders
- Those with medical conditions (e.g., heart disease, diabetes, high blood pressure)
- Those requiring life-saving medications (e.g., for high blood pressure, depression, insomnia)
- Individuals with drug or alcohol addictions
- Those with mobility constraints
- People who are non-ambulatory
- Those under extreme working conditions
- The poor
- People who are socially isolated
- Non-English speakers who may not have access to information

Animals, including domestic pets, livestock, and poultry are also susceptible to extreme heat. For example, dogs and cats are in danger of heat stroke in temperatures of 110°F. The heat wave of 2006 resulted in 15 reported pet deaths and more than 25,000 cattle, and 700,000 fowl heat-related deaths.

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Table 33: 1991 -2013 Heat Deaths in California

	< 1	1-4	5-9	10-14	15-19	20-24	25-44	45-64	65-84	85+	*Total*
1991	0	0	0	0	0	1	6	5	5	0	***17***
1992	0	0	0	1	2	0	8	3	2	1	***17***
1993	0	1	0	0	0	1	1	3	6	0	***12***
1994	0	0	0	0	0	0	7	7	9	0	***23***
1995	0	0	0	0	0	1	6	5	3	2	***17***
1996	0	1	0	0	0	0	5	8	7	0	***21***
1997	0	0	0	0	0	0	3	0	3	1	***7***
1998	0	0	0	0	0	2	3	2	2	0	***9***
1999	0	2	0	0	0	0	5	3	8	1	***19***
2000	2	0	1	0	0	2	10	9	8	3	***35***
2001	0	3	0	0	0	0	3	8	4	1	***19***
2002	2	1	0	0	0	1	12	4	3	1	***24***
2003	1	0	0	0	1	3	12	6	6	0	***29***
2004	1	2	0	0	0	1	9	8	6	1	***28***
2005	0	1	1	2	0	2	13	7	5	5	***36***
2006	1	0	0	0	0	3	22	48	38	10	***122***
2007	2	1	0	0	2	2	14	13	4	4	***42***
2008	0	0	0	0	1	1	5	15	3	4	***29***
2009	1	0	0	0	1	2	8	15	7	5	***39***
2010	1	0	0	0	1	1	5	9	4	1	***22***
2011	0	0	0	0	0	1	3	8	4	1	***17***
2012	0	0	0	0	1	2	17	13	7	4	***44***
2013	1	0	0	1	2	2	10	14	11	2	***43***
Total	***12***	***12***	***2***	***4***	***11***	***28***	***187***	***213***	***155***	***47***	***671***

*Current as of June 2017
Source: CDPH Vital Statistics Death Statistical Master Files
Prepared by: California Department of Public Health, Safe and Active Communities Branch
Report generated from http://epicenter.cdph.ca.gov on: August 07, 2017

5.3.13.2 Severe Cold

Overview

Riverside County generally experiences a Mediterranean or Desert climate. When temperatures suddenly drop it can potentially lead to loss of life in humans and livestock, as well as severely damage crops.

When temperatures drop below freezing that is the most dangerous time for crops. When water freezes it expands, this effect causes damage to a plants structure and may cause it to die.

Identifying Freeze Hazards (2013 SHMP)

Sustained temperatures below freezing in California's generally mild weather regions can cause life loss and health risks to vulnerable populations. Although infrequent, freezes can severely affect California agriculture. Freezing temperatures occurring during winter and spring growing seasons can cause extensive crop damage.

Secondary impacts of freeze disasters can include major economic impacts on farmers, farm workers, packers, and shippers of agricultural products. Freezes can also cause significant increases in food prices to the consumer due to shortages.

Freezing spells are likely to become less frequent in California as climate temperatures increase. If emissions follow higher pathways, freezing events could occur only once per decade in a sizable portion of the state by the second half of the 21st century. While fewer freezing spells would decrease cold-related health effects, too few freezes could lead to increased incidence of disease as vectors and pathogens do not die off (CNRA 2009).

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5.3.13.3 Wind Event

Overview

Windstorms are a hazard for many of the participating.

Santa Ana Winds have caused large amounts of damage and increased the fire damage level dramatically. Santa Ana Winds are generally defined as warm, dry winds that blow from the east or northeast (offshore). These winds occur below the passes and canyons of the coastal ranges of Southern California and in the Los Angeles basin. Santa Ana winds often blow with exceptional speed in the Santa Ana Canyon (the canyon from which it derives its name). Forecasters at the NWS in Oxnard and San Diego usually place speed minimums on these winds and reserve the use of "Santa Ana" for winds greater than 25 knots.

The complex topography of Southern California combined with various atmospheric conditions creates numerous scenarios that may cause widespread or isolated Santa Ana events. Commonly, Santa Ana winds develop when a region of high pressure builds over the Great Basin (the high plateau east of the Sierra Mountains and west of the Rocky Mountains including most of Nevada and Utah). The clockwise circulation around the center of this high pressure area forces air downslope from the high plateau. The air warms as it descends toward the California coast at the rate of 5 degrees F per 1000 feet due to compressional heating. Thus, compressional heating provides the primary source of warming. The air is dry since it originated in the desert, and it dries out even more as it is heated.

Santa Ana winds commonly occur between October and February with December having the highest frequency of events. Summer events are rare. Wind speeds are typically north to east at 35 knots through and below passes and canyons with gusts to 50 knots. Stronger Santa Ana winds can have gusts greater than 60 knots over widespread areas and gusts greater than 100 knots in favored areas. Frequently, the strongest winds in the basin occur during the night and morning hours due to the absence of a sea breeze. The sea breeze which typically blows onshore daily can moderate the Santa Ana winds during the late morning and afternoon hours.

The following maps and photos show the direction of the Santa Ana winds as they travel from the stable, high-pressure weather system called the Great Basin High through the canyons and towards the low-pressure system off the Pacific. Riverside County is in the direct path of the ocean-bound Santa Ana winds.

Figure 39: Direction of Santa Ana Wind Patterns



Source: http://www.theweatherprediction.com/weatherpapers/049/

Risk Assessment

The Santa Ana Winds pose several different types of threats.

1. By themselves, the winds pose a threat to the health of the people and to structures in the County.

a. Health risks relate primarily to breathing problems caused by the blowing dust and plant pollen.

b. Structural issues relating to the winds range from roofs being blown off to trees falling onto buildings.

2. The winds increase the threat and/or severity of fires in the urban areas

a. Wind-blown flames will spread more rapidly when pushed by high Santa Ana Winds.

3. Santa Ana Winds dry out brush and forest areas and increase the speed of a fire.

4. Santa Ana Winds cause power lines to arc, resulting in fires
5. Santa Ana Winds can either cause trees to fall on power lines or power lines to break, causing power outages.

Wind Erosion

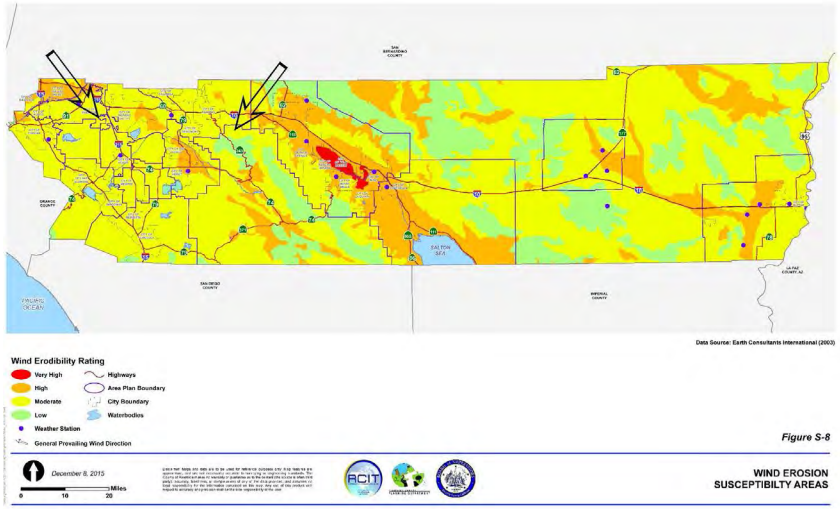
Soil erosion is also a natural on-going process that transports, erodes and displaces soil particles through a transport mechanism, such as flowing water or the wind. Loose texture and steep slopes primarily result in high wind erosion potential in soils. Wind erosion is most severe in arid regions, where sandy or loamy sediments are un-vegetated and exposed to severe wind conditions.

In addition to the problems caused by the Santa Ana Winds, wind erosion is a serious environmental problem attracting global attention. Soil movement is initiated as a result of wind forces exerted against the surface of the ground. Dust particles in the air create major health problems. Atmospheric dust causes respiratory discomfort, may carry pathogens that cause eye infections and skin disorders and reduces highway and air traffic visibility. Dust storms can cause additional problems. Buildings, fences, roads, crops, trees and shrubs can all be damaged by abrasive blowing soil.

The wind and wind-blown sand are an environmentally-limiting factor throughout much of Riverside County. Approximately 20 percent of the land area of Riverside County is vulnerable to "high" and "very high" wind erosion susceptibility. The Coachella Valley, the Santa Ana River Channel in northwestern Riverside County, and areas in and around the Cities of Hemet and San Jacinto are zones of high wind erosion susceptibility. Human intervention can accelerate the natural erosion process. For instance, typical consequences of development increase erosion potential from the removal of vegetative cover and reduction of overall permeable area. These activities can lead to increased water runoff rates and concentrated flows that have greater potential to erode exposed soils. The effects of excessive erosion range from nuisance problems that require additional maintenance, such as increased siltation in storm drains, to instances of more severe damage, where water courses are down-cut and gullies develop. These processes can eventually undermine adjacent structures or topography. Human activities that disturb soils in arid regions increase wind erosion potential. Many of the desert areas are also susceptible to blowing sand, a severe

form of wind erosion that damages property and accumulates soil on roadways. The majority of the soils within the district exhibit moderate to high erosion potential, which can be compounded by development.

Map 17: Riverside County Wind Erosion Map



5.3.13.4 Fog Event

Overview

Fog forms from air being cooled to the point where it can no longer hold all of the water vapor it contains. For example, rain can cool and moisten the air near the surface until fog forms. A cloud-free, humid air mass at night can lead to fog formation, where land and water surfaces that have warmed up during the summer are still evaporating water into the atmosphere. This is called radiation fog. A warm moist air mass blowing over a cold surface also can cause fog to form, called advection fog.

Fog can have a devastating effect on transportation. Nighttime driving in the fog is dangerous and multi-car pileups have resulted from drivers using excessive speed for the conditions and visibility. Fog contributes to transportation accidents and is a life safety hazard. These accidents can cause multiple injuries and deaths and could have serious implications for human health and the environment if a hazardous or nuclear waste shipment were involved. Dense fog may also delay emergency response vehicles.

This hazard does not occur regularly but has had an impact on the highways.

5.3.13.5 Agricultural Event

Overview

Agriculture in Riverside County must be considered from two standpoints, namely, both as a product producer/exporter and a major economic provider to the County of Riverside. In 2014, Riverside County ranked in the top fourteen leading agricultural counties in California, with an agricultural production value of $1.36 billion. Major agricultural industries include milk, nursery products, citrus and avocado, grapes, vegetables and hay.

Riverside County is divided into two general agriculture regions (Desert and Western Riverside County), with the San Bernardino National Forest acting as a natural dividing line.

Desert - Coachella Valley & Palo Verde Valley

Agriculture is the second largest industry in the Desert Valleys and is primarily crop- related. Over 61% of Riverside County's crop production is grown in the Coachella and Palo Verde Valleys. In addition to crop production, many supporting industries, such as packing and distribution, are located in the desert

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area. The Coachella Valley produces 95% of all dates grown in the United States and the annual fruit crop exceeds 40 million pounds. The Desert's list of agriculture-related products includes:

- Vegetable & Melon Crops (Bell Peppers, Lettuce, Corn, Watermelon, etc.)
- Nursery Stock
- Turf/Sod Producers
- Field Crops (Hay, Cotton, Wheat, etc.)
- Citrus
- Tree & Vine Crops (Table Grapes, Dates)

Western Riverside County (WR)

Agriculture in the Western Riverside County region is an ever-changing industry. With the large increase in housing in this area of the County over the past few years, there has been a reduction of several agriculture-related industries. This reduction is primarily in the poultry and dairy industries. The Western Riverside County list of agriculture-related products includes:

- Dairy Cattle
- Nursery Stock
- Beef Cattle
- Poultry and Eggs
- Citrus Crops
- Tree and Vine Crops (Avocado, Wine Grapes)
- Field Crops (Wheat, Hay, Green Chop)
- Vegetable Crops (Potatoes, etc.)
- Fish Hatcheries (for domestic and international distribution)

Statistics for Riverside County Agriculture

Table 11: USDA statistics for Riverside County Agriculture for 2012 show the following:

Payroll	$16 million
Farms	3,440
Farm Acreage	344,044
Crop Value Production	$1.03 billion +
Livestock, poultry value including production	$146 million +
Dairy cows	42,954
Sheep and Lambs	36,846
20 week old and older layers	4,127,452
Wheat for Grain Acreage	6,400

United States Department of Agriculture, National Agricultural Statistics Service reports listed the following as the Top 5 commodities in 2015.

Table 12: Top 5 Commodities

Milk Products	$165,124 million
Table Grapes	$143,988 million
Nursery Stock	$137,707 million
Lemons	$120,557 million
Hay	$81,760 million

History

Table 13: Agriculture-related disasters in Riverside County:

Riverside County Agriculture Disasters

Year	Disaster	Commodity	Damages	Region
1979-80	Wind	Avocado and Citrus	$40,000.00	
1979-80	Rain/Floods (El Nino)	Olive Trees (4,200)	$319,494.00	WR.
1979-80	Rain/Floods	Sugar beets, Barley &	$182,711.00	WR.
1979-	Rain/Floods	Potato Crop	$2,000,000.00	WR.
1979-80	Rain/Floods	Dairy and Livestock	$211,900.00	WR.
1982-1983	Rain/Floods (El Nino)	All agriculture		Countywide
1990 *	Insect Infestation-Med- fly	Fruit		Countywide
1990-91	Freezing temperatures	Citrus, avocados,	$15,450,000.00	Countywide
1990-	Drought			WR
1991	Insect Infestation-white fly	Melons, squash, cucumbers,		WR, Desert
1992-	Rain/Flood			
1993-94	Insect Infestation-Med- Fly	Fruit		WR
1996	Plant disease-Karnel Blunt	Wheat		WR/Blythe
1997-98	Rain/Flood (El Nino)	Wheat	$167,000.00	WR
1997-98	Rain/Flood (El Nino)	Livestock & Dairy	$4,100,000.00	WR

1999	Freezing temperatures	Citrus	$1,630,000.00	Countywide
*1999-2002 **	*Insect spread disease - (Pierce's Disease)*	*Wine Grapes*	*$16,000,000.00*	*WR*
*2001-July **	*Rain/Floods-Desert Storm*	*Misc. land & irrigation damage*	*~ $1,000,000.00*	*CV*
2002-2003	Drought	Dairy farms, dry land crops, etc.		Countywide
2002	High Winds/Freeze	Avocado & Citrus Crops	$8,586,000.00	WR
2002-03	Animal Disease-END	Poultry - 300,000 birds in So. Calif.		WR
2003-04	Wildfire	Nursery, various		WR
2004-05	Severe Storms – Excessive Moisture	All Agricultural Commodities		Countywide
2005	Severe Storms – Excessive Moisture	All Agricultural Commodities		Countywide
2006	Excessive	Livestock		WR
2007	Winter Storms	All Agricultural		Countywide
2007	Wildfires	Avocados		WR
2007	Below Normal Temperatures, Winter Storms	All Agricultural Commodities		Countywide

2007	Hail	All Agricultural		Countywide
2007	Drought	Grain Crops, Livestock	$3.8 Million +	WR
2008	Wildfires	All Agricultural		WR
2009	Drought	Grain Crops, Livestock	$5.0 Million +	WR
2010	Earthquake	Agricultural Buildings		Coachella Valley
2010	Winter Storms – Flooding, Debris Flow,	All Agricultural Commodities		Countywide
2013-2016	Drought	Crops damaged due to		County Wide

*Denotes a locally declared disaster

Risk *Assessment*

When considering Agriculture the County factored in both crops and animals/livestock. Both groups have a three day window before serious damages occur (aside from physical damages that may happen due to earthquake or floods).

Animals

Most beef and dairy ranches, chicken ranches, swine farms, and other agricultural animal facilities usually only have a 2-to-3 day supply of feed on-site. Most of the large feed providers in the County do not have more than a 3-to-5 day supply. Restocking of feed supplies is done primarily by rail to the feed providers and then by truck to the local ranches.

In addition to providing feed for the animals, the impact on the dairy farms would be immense. The time factor for the dairy farms would be almost immediate. Not being able to move milk to the milk house was a major concern. Dairy cows have to be milked and without the ability to transport the milk off property, that milk has to be disposed of in some way so as not to contaminate the soil or create a positive host for insects.

Crops

Although many crops are time sensitive and there is a limited amount of storage space in local packing houses, transportation issues vary based on the time of year and crop season.

Water Related Hazards

Many crops are not as water-dependent as animals are, though some ground and vine crops have a very short lifespan without an adequate supply. Short-term water supplies can be provided to animals through the use of water trucks; however, water trucks cannot support large crop areas with an adequate level of water.

Water-related issues included:

1. Local water supply (wells, holding ponds, etc.) contamination occurring either naturally or from man-made causes
2. Loss of water supply due to pipeline or aqueduct damage from an earthquake.

Hazmat Incidents – On-Property and Off-Property

The definition for an On-Property Hazmat incident relates to the improper use of chemicals, crop-dusting accidents or errors, accidental chemical spills into the ground, and other similar incidents. Off-Property Hazmat events relate to the typical transportation Hazmat incident. Both groups (animal-related and crop-related) were very concerned about the impact of an On-Property event. There was a higher level of concern about the impact of an Off-Property event for animals than for crops. Both groups rated the probability of either type of event occurring as low.

Transportation Events

Transportation events were listed as either short-term (less than 3 days) or long-term (over 3 days) and included:

1. Railroad accidents interrupting the delivery of products into the County;
2. Railroad accidents interrupting the movement of products out of the County;
3. A railroad or trucking strike; and

4. A disruption in transportation lines due to an earthquake, flood, fire, or another event.

Both animals and crops viewed the 3-day point as critical from both an economic and operational standpoint, with the crop group indicating that the 3-day window could be reduced based on whether or not it was picking season.

Insect infestation and Disease to Crops and Vines

There is an ever-changing potential for damage to local crops and vines from disease and insect infestation. The County has been attacked by a wide variety of pests, insects, and diseases, and because of the diversity of the types of crops in the County, maintaining a pro-active approach has been difficult. Studies and history show that should there be a disease outbreak or contamination of crops/vines, the economic impact would be enormous. Recent events in other states have shown the potential for bans on importation of cattle/dairy products from affected states.

One of the primary concerns of the producers in the County is the illegal or uninspected importation of plants into this region. The majority of insect, pest, and disease issues in the County can be attributed to this problem.

Table 37: Primary Crop-related Insect Infestations for Riverside County

The table below shows the primary crop-related insect infestations in the County over the past twenty years:

NAME
AFRICANIZED HONEY BEE
BARK BEETLE
CITRUS LEAFMINER
GLASSY-WINGED SHARPSHOOTER
GYPSY MOTH
HONEY BEE TRACHEAL MITE
JAPANESE BEETLE
LESSER SNOW SCALE
MAGNOLIA WHITE SCALE
MEDITERRANEAN FRUIT FLY
ORIENTAL FRUIT FLY
PIERCE'S DISEASE
RED IMPORTED FIRE ANT
STING NEMATODE
TROPICAL PALM SCALE
VARROA MITE/HONEY BEE
ASIAN CITRUS PSYLLID
SILVERLEAF WHITEFLY
POLYPHAGOUS SHOT-HOLE BORER

Figure 40: 2015 Pest Interceptions Chart

PEST INTERCEPTIONS - 2015

Scientific Name	Common Name	Pest Rating	Interceptions
Solenopsis invicta	Red Imported Fire Ant	A	30
Maconellicoccus hirsutus	Pink Hibiscus Mealybug	A	8
Lopholeacaspsis cockerelli	Cockerell Scale	A	3
Pseudaulacaspis cockerelli	Magnolia White Scale	A	1
Ceroplastes floridensis	Florida Wax Scale	A	1
Paropeas achatinaceum	Land Snail	A	1
Aspidiotus destructor	Coconut Scale	A	1
Homalodisca vitripennis	Glassy-Winged Sharpshooter	B	2
Aonideilla aurantii	California Red Scale	B	1
Pulvinaria urbicola	Urban Soft Scale	B	1
Bradybaena similaris	Asian Tramp Snail	B	1
Fatoua villosa	Crabweed	B	1
Nipaecoccus sp.	Mealybug	Q	2
Paracoccus sp.	Mealybug	Q	2
Aspindiella sacchari	Armored Scale	Q	1
Phenacoccus peruvianus	Mealybug	Q	1
Ferriasia sp.	Mealybug	Q	1
Milviscutulus sp.	Scale	Q	1
Ophelimus mastielli	Gall Wasp	Q	1
Bambusaspis miliaris	Bamboo Pit Scale	Q	1

Animal Diseases

There have not been recent incidents of catastrophic outbreaks of disease in the cattle/dairy industry. This is due in part to excellent precluding efforts on behalf of the cattle/dairy industry. Studies and history show that if there is an outbreak of cattle/dairy- related disease, the economic impact would be enormous. Recent events in other states have shown the potential for bans on importation of cattle/dairy products from affected states. In a short period of time, the inability to export products from the County would have wide-ranging economic effects.

The poultry industry is particularly vulnerable to the spread of disease because many fowl are kept in residential back yards and are therefore hard to monitor. Diseases can be spread by mosquitoes and/or ranch service operations that often serve more than one farm, increasing the odds of infection being spread. Outbreaks of the Exotic Newcastle Disease in the poultry industry in 2003 have resulted in the necessary depopulation of 3.16 million chickens in the County. This disease required the quarantine of a large area of Southern California, including all of Riverside County. The economic loss to the ranchers and County as a whole was estimated to be 161 million.

Diseases of primary concern to the area are:

- Avian Influenza
- Exotic Newcastle Disease
- Fowl Pox
- Hoof-and-Mouth Disease
- Transmissible Spongiform Encephalopathies

Loss of Electrical Power

The loss of electrical power is becoming more of a concern to all areas of agriculture. Depending on the season, the loss of electrical supply to a poultry ranch can be devastating within 2-to-4 hours because of the inability to keep the chickens cool. The loss of electrical power for over a 12 hour period can be devastating to a dairy farmer who cannot milk dairy cows.

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5.3.14 Transportation Failure

Severity: 3

Probability: 2

Risk Score: 0.38

OA Jurisdictions Affected by Transportation Hazard Incidents

- Riverside Community College District
- San Gorgonio Memorial Hospital
- Banning
- Beaumont
- Blythe
- Calimesa
- Canyon Lake
- Cathedral City
- Coachella
- Corona
- Desert Hot Springs
- Eastvale
- Hemet Indian Wells
- Indio
- Jurupa Valley
- La Quinta
- Lake Elsinore
- Menifee
- Moreno Valley
- Murrieta
- Norco
- Palm Desert
- Palm Springs
- Perris
- Rancho Mirage
- Riverside
- San Jacinto
- Temecula
- Wildomar

Hazard Definition

Transportation hazards are incidents involving air, rail, or highway transport of goods or passenger travel resulting in property damage, death, or serious injury. The incidents can be caused by transportation of hazardous materials, earthquake, hazardous weather, or other hazardous conditions affecting the uninterrupted flow of transportation and/or public safety.

Five major transportation systems operate within Riverside County.

1. Highways
2. Railroads
3. Air traffic
4. High-pressure petroleum and gas lines
5. Aqueducts.

Pipelines and aqueducts are treated separately in following sections of this LHMP.

History

Highways. The traffic density on the freeway and highway systems in the western part of the County is of particular concern. The population and economic growth in this area have caused increased demand on these networks.

Although the seasons do not have a large impact on Riverside County, there is the threat of poor visibility due to winter fog. Adding to this problem is the fact that one out of every ten trucks on the freeway carries some sort of hazardous materials. (In addition, California Highway Patrol statistics show that 20 – 25 percent of them are usually driven in an unsafe mechanical condition.)

Rail Lines. Major rail transport lines through Riverside County include Union Pacific and the Burlington Northern Santa Fe (BNSF) Railway Companies. Rails, cars, supporting bridges, overpasses, and electrically-operated switching mechanisms are susceptible to damage.

Union Pacific and the BNSF Railway Companies lines enter the Coachella Valley from Imperial County along the eastern shore of the Salton Sea.

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Major population centers affected by railroad transportation are vulnerable to the impact of a wide variety of hazardous materials transported by these carriers. Additionally, there are lines running east and west that carry significant tonnage daily. Some of these lines are in remote areas, but that does not lessen the overall seriousness of their impact.

Airlines / Airports.

The western part of Riverside County has some of the busiest air traffic areas in the United States. Commercial, as well as military traffic, is very heavy. The number of near misses reported by pilots underscores the increasing possibility of a mid-air collision over the County.

There are two major airports in Riverside County: March Air Reserve Base and Palm Springs International. There are also numerous smaller municipal and commercial airports and private air strips:

- Banning Airport
- Bermuda Dunes Airport
- Blythe Airport
- Chiriaco Summit Airport
- Corona Municipal Airport
- Desert Center Airport
- Flabob Airport
- French Valley Airport
- Hemet- Ryan Airport
- Lake Elsinore/Skylark Airport
- Perris Valley Airport
- Rancho California Airport
- Riverside Municipal Airport
- Jacqueline Cochran Regional Airport

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In addition, there are five major out-of-county airports operating in the vicinity of Riverside County with significant flight-paths over the County:

1. John Wayne Airport (Orange County)
2. Long Beach Airport (Los Angeles County)
3. Los Angeles International (LAX) Airport
4. Ontario Airport (San Bernardino County)
5. Chino Airport (Airport Influence Area extends into Riverside County)
6. San Diego International Airport (SAN) San Diego County

Risk Assessment

The possibility for a transportation hazard to occur is ongoing. There have been railway incidents in the recent past, although they have not been numerous and have not caused extensive damage. Semi-trucking incidents are not uncommon and could result in a hazardous spill at any time, although notable events have not occurred in recent history. There has not been a serious airline accident in the area in the recent past.

- **Effects on people and housing.** As the historical events in Riverside County show, people may be evacuated when a transportation emergency occurs. Relative to some of the other natural hazards assessed earlier in this LHMP, the numbers of people affected by transportation emergencies are usually less. However, a transportation accident on Interstate 10 during a period of high heat can result in hundreds (or more) of commuters being stranded on the highway with little resources for an extended period of time.

- **Effects on commercial and industrial structures**. There may be economic consequences due to transportation emergencies, but the damage is generally limited to clean-up of facilities and grounds or simply interruption of business due to evacuation.

- **Effects on infrastructure.** Transportation emergencies may result in downed power lines. Also, Hazmat materials released in a transportation emergency may impact waterways and drainage systems, and incidents can lead to the evacuation of schools, business districts, and residential areas.

- **Effects on agriculture**. Transportation is essential to the agricultural industry.

For all elements of agriculture other than those that are dairy-related, any incident that affects transportation for more than three days is "major." For the dairy segment of the agricultural industry, any incident that affects the ability to transport product by more than 12 hours is considered "major."

Risk Assessment Conclusion.

In general, transportation hazards are not cataclysmic in terms of widespread property damage and loss of life. Existing emergency operations should be equipped to handle almost of any transportation hazard that may occur.

However, because Riverside County has an agricultural production value of over $1 billion, any transportation emergency that affects the ability of agriculture to conduct its routine business (importing supplies and exporting production) can have severe economic consequences for the County.

Relationship to Other Hazards – Cascading Effects

Depending on the location of the incident, the cascading effects of transportation emergencies are generally limited to those of Hazmat incidents, Fires or Extreme Weather (if the incident occurs in the desert when the temperatures are very high, citizens in vehicles stopped for several hours can suffer from the heat and lack of conveniences). In all cases, health and life may be threatened.

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5.3.15 Dam Failure

Severity: 3

Probability: 1

Risk Score: 0.38

OA Jurisdictions Affected by Dam Failure

- Norco
- Eastvale
- Corona
- Lake Elsinore
- Wildomar
- Murrieta
- Temecula
- Perris
- Menifee
- Riverside
- Jurupa Valley
- Hemet
- Moreno Valley
- San Jacinto
- Various Portions of unincorporated areas in the West County

Hazard Definition

The term "dam failure" encompasses a wide variety of circumstances. Potential causes of a dam failure are numerous and can be attributed to deficiencies in the original design of the dam, the quality of construction, the maintenance of the dam and operation of the appurtenances while the dam is in operation, and acts of nature including precipitation in excess of the design, flood, and damage from earthquakes. Water over topping the dam crest is a common cause of failure in earth dams.

Overtopping will cause erosion of the dam crest and eventual dam breach. Piping of earth dams is another common form of failure. Piping is a form of erosion that occurs underground caused by rodent burrowing and the presence of extensive root systems from vegetation growing on and around the dam.

Flooding of the area below the dam may occur as the result of structural failure of the dam, overtopping, or a seiche. The primary danger associated with a dam failure is the swift, unpredictable flooding of those areas immediately downstream of the dam.

There are three general types of dams: earth and rock fill, concrete arch or hydraulic fill, and concrete gravity. Each of these types of dams has different failure characteristics. The earth/rock fill dam will fail gradually due to the erosion of the breach; a flood wave will build gradually to a peak and then decline until the reservoir is empty. A concrete arch or hydraulic fill dam will fail almost instantaneously; with a very rapid build-up to a peak and then a gradual decline. A concrete gravity dam will fail somewhere in between instantaneous and gradual, with the corresponding build-up of flood wave.

History

Historically, Riverside County has not experienced any significant dam failure incidents, although there are several major dams in the County of both the earthen and steel reinforced concrete type

Risk Assessment

The County of Riverside is subject to potential flooding from several local dams, reservoirs, streams, rivers, and washes. These include but are not limited to, Lake Elsinore, the Colorado River, and the San Jacinto River. Seasonal flooding with the failure of run-off storage reservoirs, canals, and levees could seriously compound the situation, particularly in or near urban population centers. From the time of complete failure to inundation could be as little as 5-to-10 minutes.

Portions of Riverside County along the Colorado River corridor could suffer from a catastrophic failure of dams that are located far outside the borders of Riverside County. These dams include Palo Verde Diversion Dam, Headgate Rock Dam, Parker Dam, Davis Dam, and Hoover Dam. If there were a catastrophic dam failure, it is estimated that it would take a minimum of 23 hours before the flood waters reach the City of Blythe.

With major disruptions in power and communications systems, a warning may not be received from dam or reservoir sites in time to initiate an organized evacuation or broadcast warnings via emergency radio stations. If a credible prediction is initiated, then preparation for a damaging earthquake could begin and residents and business owners within dam inundation areas could be directed to assembly areas to wait for official word regarding safe re-entry. This method of direction and control could substantially reduce potential loss of life, if enough warning were available.

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- **Effects on Agriculture** can be catastrophic, both for crops and for animals. Loss of property is a real risk, as well.

Risk Assessment Conclusion.

Although dam failure incidents have not historically been a problem in Riverside County, the County's location with respect to earthquake fault lines presents the very real danger of dam failure due to quakes. If this were to occur, the effects could be catastrophic. Also, as noted above, seasonal flooding with the failure of run-off storage reservoirs, canals, and levees could seriously compound the risks of dam failure and additional flooding.

Relationship to Other Hazards – Cascading Effects

Dam failure obviously causes downstream flooding. It may also lead to power failures and downed power lines. The secondary effects of dam failure can include the disruption of the local and state economies by damage to buildings and roads, the severance of communications, the disruption of supply and delivery mechanisms, additional welfare, and emergency aid to the recovering economy.

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Table 38: Dams within the County of Riverside

Listed Alphabetically By County

Dam No.	National ID No.	Name	Owner	County	Stream	Year Built	Capacity (Ac-ft)	Res. Area (Acres)	Drainage Area (mi^2)	Crest Elev. (ft)
1003-003	CA00798	Alessandro	Riverside County Flood Control And Water Conservation	Riverside	Alessandro Cr	1956	370	17	4.63	1146
1003-007	CA00802	Boxsprings	Riverside County Flood Control And Water Conservation	Riverside	Box Springs Cr	1960	405	29	4	1139
35-021	CA01441	Cajalco Creek	Metropolitan Water Dist	Riverside	Cajalco Creek	2001	889	74.4	22.7	1512
87-008	CA01204	Declez Retention	San Bernardino County Flood Control District	Riverside	San Sevaine Cr	1984	331	21	10.7	849
35-018	CA01410	Diamond Valley Lake	Metropolitan Water District	Riverside	Domenigoni Valley Cr	2000	800000	4860	13	1769
35-019	CA01413	Diamond Valley Lake Forebay	Metropolitan Water District	Riverside	Domenigoni Val Can	1999	500	31	0.13	1497.5
1812-000	CA01302	Dunn Ranch	Agri-Empire,A Calif Corp	Riverside	Hamilton Cr	1987	90	7	0.2	142.5
1003.02	CA10503	Eagle Canyon Debris Basin	Riverside County Flood Control And Water Conservation	Riverside	Eagle Canyon	2015	222	7.1	-	405
822-000	CA00767	El Casco	Riverside Land Conservancy	Riverside	San Timoteo Creek	1879	143	15	0.09	116
81-000	CA00304	Fairmount Park	City Of Riverside	Riverside	Santa Ana River	1923	200	40	22	793
827-000	CA00769	Foster	Idyllwild Water District	Riverside	Lily Creek	1945	56	6	0.85	5812
35-020	CA01424	Goodhart Canyon Detention Basin	Metropolitan Water Dist	Riverside	Goodhart Canyon	1999	1026	98	3.8	1627.2

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1003	CA00787	Harrison Street	Riverside County Flood Control And Water Conservation	Riverside	Harrison Creek	1954	208	14	2.03	1123.5
35-016	CA01349	Henry J Mills No 2	Metropolitan Water Dist	Riverside	Offstream	1996	92	5	0.1	1651.2
35-014	CA01085	Henry J Mills Reservoir	Metropolitan Water Dist	Riverside	Offstream	1979	83	6	0	1651
35-017	CA01374	Hj Mills Reclamation	Metropolitan Water District	Riverside	Offstream	1996	98	16	0.03	1593
1003-014	CA01212	Jurupa Basin	Riverside County Flood Control And Water Conservation	Riverside	Jurupa Wash	1983	167	17	1.69	855
817-000	CA00763	Lake Hemet	Lake Hemet Municipal Water District	Riverside	San Jacinto Riv	1895	14000	470	67	4341.5
1003-016	CA01392	Lakeview	Riverside County Flood Control And Water Conservation	Riverside	San Jacinto Riv	1994	530	39	7.6	1621
818-002	CA00766	Lee Lake	Elsinore Valley Mun Wd	Riverside	Temescal Creek	1919	1100	70	53	1153
1003-009	CA01103	Mabey Canyon	Riverside County Flood Control And Water Conservation	Riverside	Mabey Creek	1974	68	5	1.5	1146
1003-011	CA01211	Mary Street	Riverside County Flood Control And Water Conservation	Riverside	Alessandro Wash	1981	320	19	6.7	1009
35-000	CA00212	Mathews	Metropolitan Water District of Southern California	Riverside	Cajalco Creek	1938	182000	2750	40	1404
1003-015	CA01197	Metz Road Debris Basin	Riverside County Flood Control And Water Conservation	Riverside	San Jacinto Riv	1981	88	20	1	1470.5
81-003	CA00305	Mockingbird Canyon	City Of Riverside	Riverside	Mockingbird Can	1914	1250	64	13.13	1015

1003-010	CA01179	Oak Street	Riverside County Flood Control And Water Conservation	Riverside	Oak Street Cr	1979	138	36	6.02	1034
1-068	CA00054	Perris	California Department Of Water Resources	Riverside	Bernasconi Pass	1973	131452	2340	10	1600
1003-006	CA00801	Pigeon Pass	Riverside County Flood Control And Water Conservation	Riverside	Pigeon Pass	1958	900	86	8.71	1702.5
1003-004	CA00799	Prenda	Riverside County Flood Control And Water Conservation	Riverside	Prenda Creek	1954	192	15	1.93	1242
829-000	CA00771	Quail Valley	Forecast Homes	Riverside	San Jacinto Riv	1959	103	10	1.6	1490
818-000	CA00765	Railroad Canyon	Elsinore Valley Mun Wd	Riverside	San Jacinto River	1928	11586	525	664	1410
35-012	CA00223	Robert A Skinner	Metropolitan Water Dist	Riverside	Tucalota Creek	1973	43800	860	51.5	1493
35-015	CA01271	Skinner Clearwell	Metropolitan Water District	Riverside	Offstream	1991	356	14	0	1433
1811-000	CA01237	Sunnymead Ranch	Sunnymead Ranch Comm Assoc	Riverside	Reche Canyon	1985	400	35	2	1770
1003-005	CA00800	Sycamore	Riverside County Flood Control And Water Conservation	Riverside	Sycamore Canyon	1956	860	57	10.7	1013
1003-013	CA01170	Tahchevah	Riverside County Flood Control And Water Conservation	Riverside	Tachevah Creek	1964	650	60	3.2	582
1003-012	CA01242	Tahquitz Creek Debris	Riverside County Flood Control And Water Conservation	Riverside	Tahquitz Creek	1991	75	5	18	562
2028-000	CA00770	Vail	Rancho Calif Water District	Riverside	Temecula Creek	1949	51000	1078	306	1482.6
1003-008	CA00803	Wide Canyon	Riverside County Flood Control And Water Conservation	Riverside	West Wide Canyon	1968	1490	57	33.5	1560

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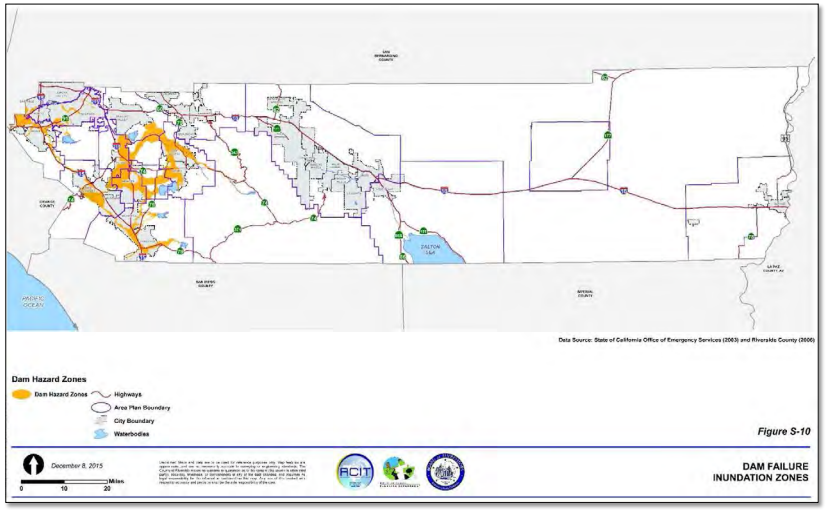
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1003-000	CA00796	Woodcrest	Riverside County Flood Control And Water Conservation	Riverside	Woodcrest Creek	1954	420	24	5.32	1122.5

The most recent damn built was Eagle Canyon Debris Basin in 2015

Descriptions of the dams, their inundation impact on the County, and a delineation of response efforts are outlined in the 2015 Draft version of the Flood and Dam Inundation Plan, maintained by Riverside County Transportation and Land Management Agency.

Map 18: Riverside County Dam Inundation Risks



5.3.16 Aqueduct

Severity: 3

Probability: 2

Risk Score: 0.38

OA Jurisdictions Affected by Aqueduct Failure

- All incorporated cities of Riverside County
- Unincorporated areas of Riverside County

Hazard Definition

An Aqueducts is an artificial channel to transport water. There are two major Aqueducts that traverse Riverside County:

- California Aqueduct
- Colorado River Aqueduct.

The California Aqueduct is a 444-mile long, artificially river shaped facility that is a crucial component of the State Water Project. The California Department of Water Resources states that the Project includes 34 storage facilities, reservoirs and lakes; 20 pumping plants; 4 pumping-generating plants; 5 hydroelectric power plants; and about 701 miles of open canals and pipelines. It travels from Sacramento into San Bernardino County and finally ends in western Riverside County. The East Branch is the portion of the Aqueduct that transports water for storage into Lake Perris.

The Colorado River Aqueduct stretches 242 miles across Arizona and California. According to the American Society of Civil Engineers, it consists of more than 90 miles of tunnels, nearly 55 miles of cut-and-cover conduit, almost 30 miles of siphons, and five pumping stations. More than a billion gallons of water travel through it a day. It travels from Arizona into San Bernardino County, enters the eastern portion of Riverside County and travels the length of the County until it ends near the City of Riverside. It was built and is currently maintained by the Metropolitan Water District of Southern California.

Figure 41: California Aqueducts



Source: 2013 (SHMP)

History of Events

Riverside County has not experienced a large scale Aqueduct incident.

Risk Assessment

An earthquake or landslide could severely damage the two main aqueducts that travel through the county, possibly render them out of service. In this event the water supply to the County would be greatly affected.

Long periods of droughts have been known to damage aqueduct infrastructure. Wells have needed to work harder to pump low levels of water. This has resulted in many irrigation districts to raise the sides of canals to encourage gravitational water flow. However, this tactic can negatively affect bridges.

- **Effects on people and housing.** There is a low impact on housing unless the aqueduct was to flood a residential area. The impact to people can range from minor to disastrous. A failure could greatly impact the County's water supply leaving the County to source water elsewhere until the damages to the aqueduct can be remedied. It can also impact the economy in the event that crops are damaged and farmers lose valuable product.

- **Effects on commercial and industrial structures**. There is a low impact on commercial and industrial structures.

- **Effects on infrastructure.** There is a low impact on infrastructure.

- **Effects on agriculture.** In the event of an aqueduct failure crops could be devastatingly impacted.

Risk Assessment Conclusion

This hazard has a low probability but has the potential to have catastrophic impacts to the county.

Relationship to Other Hazards – Cascading Effects

An Aqueduct failure could lead to water supply contamination or disruption and flooding. It could also increase the effects of a drought.

5.3.17 Tornado

Severity: 2

Probability: 1

Risk Score: 0.25

OA Jurisdictions Affected by Tornados

- Hemet
- Perris
- Desert Center
- Coachella Valley
- Mecca
- Homeland

Hazard Definition

Tornados

Tornadoes are spawned when there is warm, moist air near the ground, cool air aloft, and winds that speed up and change direction. An obstruction, such as a house, in the path of the wind, causes it to change direction. This change increases pressure on parts of the house, and the combination of increased pressures and fluctuating wind speeds creates stresses that frequently cause structural failures.

In order to measure the intensity and wind strength of a tornado, Dr. T. Theodore Fujita developed the Fujita Tornado Damage Scale. This scale compares the estimated wind velocity with the corresponding amount of suspected damage. The scale measures six classifications of tornadoes with increasing magnitude from an "F0" tornado to an "F6+" tornado.

Tornados, like those that occur every year in the Midwest and Southeast parts of the United States, are a rare phenomenon in most of California, with most tornado-like activity coming from micro-bursts.

The chart below depicts the Fujita Tornado Damage Scale:

Table 39: Fujita Tornado Damage Scale

Scale	Wind Estimate (mph)	Typical Damage
F0	< 73	**Light damage.** Some damage to chimneys and TV antennas; breaks twigs off trees; pushes over shallow-rooted trees.
F1	73-112	**Moderate damage.** Peels surface off roofs; windows broken; light trailer houses pushed or overturned; some trees uprooted or snapped; moving automobiles pushed off the road. 74 mph is the beginning of hurricane wind speed.
F2	113-157	**Considerable damage.** Roofs torn off frame houses leaving strong upright walls; weak buildings in rural areas demolished; trailer houses destroyed; large trees snapped or uprooted; railroad boxcars pushed over; light object missiles generated; cars blown off highway.
F3	158-206	**Severe damage.** Roofs and some walls torn off frame houses; some rural buildings completely demolished; trains overturned; steel-framed hangar-warehouse-type structures torn; cars lifted off the ground; most trees in a forest uprooted snapped, or leveled.
F4	207-260	**Devastating damage.** Whole frame houses leveled, leaving piles of debris; steel structures badly damaged; trees debarked by small flying debris; cars and trains thrown some distances or rolled considerable distances; large missiles generated.
F5	261-318	**Incredible damage.** Whole frame houses tossed off foundations; steel-reinforced concrete structures badly damaged; automobile-sized missiles generated; trees debarked; incredible phenomena can occur.
F6-F12	319 to sonic	**Inconceivable damage.** Should a tornado with the maximum wind speed in excess of F5 occur, the extent and types of damage may not be conceived. A number of missiles such as iceboxes, water heaters, storage tanks, automobiles, etc. will create serious secondary damage on structures.
Source: http://weather.latimes.com/tornadoFAQ.asp		

Microbursts

Unlike tornados, microbursts are strong, damaging winds that strike the ground and often give the impression a tornado has struck. They frequently occur during intense thunderstorms. The origin of a microburst is downward moving air from a thunderstorm's core. But unlike a tornado, they affect only a rather small area.

University of Chicago storm researcher Dr. Ted Fujita first coined the term “downburst” to describe strong, downdraft winds flowing out of a thunderstorm cell that he believed were responsible for the crash of Eastern Airlines Flight 66 in June of 1975.

A downburst is a straight-direction surface wind in excess of 39 mph caused by a small-scale, strong downdraft from the base of convective thundershowers and thunderstorms. In later investigations into the phenomena, he defined two sub-categories of downbursts: the larger macro bursts and small microbursts.

Macro bursts are downbursts with winds up to 117 mph that spread across a path greater than 2.5 miles wide at the surface and which last from 5 to 30 minutes. The microburst, on the other hand, is confined to an even smaller area, less than 2.5 miles in diameter from the initial point of downdraft impact. An intense microburst can result in damaging winds near 270 km/hr (170 mph) and often last for less than five minutes.

“Downbursts of all sizes descend from the upper regions of severe thunderstorms when the air accelerates downward through either exceptionally strong evaporative cooling or by very heavy rain which drags dry air down with it. When the rapidly descending air strikes the ground, it spreads outward in all directions, like a fast-running faucet stream hitting the sink bottom.

When the microburst wind hits an object on the ground such as a house, garage or tree, it can flatten the buildings and strip limbs and branches from the tree. After striking the ground, the powerful outward running gust can wreak further havoc along its path. Damage associated with a microburst is often mistaken for the work of a tornado, particularly directly under the microburst. However, damage patterns away from the impact area are characteristic of straight-line winds rather than the twisted pattern of tornado damage.”

History

The history table demonstrates the high number of tornados and microbursts that have occurred in the County.

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Figure 42: Historical Tornados Statistics for Riverside

DATE	FORCE	DEATH(S)	INJURED	DISTANCE
10/17/2015	0	0	0	22
09/09/2012	0	0	0	14
08/12/2012	0	0	0	16
05/22/2008	0	0	0	11
05/22/2008	2	0	1	8
05/22/2008	0	0	0	8
05/22/2008	0	0	0	10
07/23/2006	0	0	0	20
07/23/2005	0	0	0	27
03/04/2005	0	0	0	11
02/26/2005	0	0	0	17
01/09/2005	0	0	0	29
12/21/2001	0	0	0	28
02/24/2001	0	0	0	27
02/16/2000	0	0	0	30
05/13/1998	0	0	0	21
02/07/1994	0	0	0	28
02/08/1993	0	0	0	28
01/17/1993	0	0	1	28
03/20/1991	0	0	0	1
03/20/1991	0	0	0	16
02/28/1991	0	0	0	27
01/18/1988	0	0	0	27

Source:http://www.homefacts.com/tornadoes/California/Riverside-County/Riverside.html

Map 19: Past Riverside Count Tornadoes



Source: http://www.tornadohistoryproject.com/tornado/California/Riverside/map

Risk Assessment

- **Effects on people and housing.** Tornadoes are very dangerous and can destroy homes and injure or kill Riverside County residents. The county has been fortunate in the past because we have not experienced loss of life and very few injuries caused by tornadoes or airborne debris.

- **Effects on commercial and industrial structures.** Industrial structures could house Hazardous Materials that have to potential to be released if the facility is damaged. Workers could be trapped under debris if the tornado hits during business hours.

- **Effects on infrastructure.** Infrastructures could be damaged by high winds at building failure points such as rook joist or wall stud- bottom plate intersections. Flying debris can also cause damages.

- **Effects on agriculture.** Tornadoes have the power to destroy crops or tools/structures needed by the farmer to tend his crops. It can also lead to the death of livestock.

Risk Assessment Conclusion

Riverside County's "Tornado Alley" spans from the 15 Corridor to desert center and is highly susceptible to microburst and tornados that result is high dollar recovery costs.

Relationship to Other Hazards – Cascading Effects

Tornados can destroy powerlines causing disruption in power to residents and commercial properties. They can damage critical facilities and devastate homes.

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5.3.18 Insect Infestation

Severity: 2

Probability: 3

Risk Score: 0.00

OA Jurisdictions Affected by Insect Infestation

- All incorporated cities of Riverside County
- Unincorporated areas of Riverside County

(Bark Beetle)

- Idyllwild Fire Protection District

(Red Imported Fire Ant Quarantine)

- Alvord Unified School District
- Cathedral City
- City of Banning
- City of Blythe
- City of Calimesa
- City of Canyon Lake
- City of Coachella
- City of Corona
- City of Desert Hot Springs
- City of Hemet
- City of Indian Wells
- City of Indio -- only portions of the city are within the boundaries of the Red Imported Fire Ant Quarantine area
- City of La Quinta
- City of Lake Elsinore
- City of Moreno Valley – only portions of the city are within the boundaries of the Red Imported Fire Ant Quarantine area
- City of Murrieta
- City of Norco
- City of Palm Desert -- only portions of the city are within the boundaries of the Red Imported Fire Ant Quarantine area
- City of Palm Springs -- only portions of the city are within the boundaries of the Red Imported Fire Ant Quarantine area
- City of Perris
- City of Rancho Mirage -- only portions of the city are within the boundaries of the Red Imported Fire Ant Quarantine area
- City of Riverside
- City of Temecula
- Home Gardens County Water District
- Idyllwild Water District
- Lake Elsinore Unified School District
- Menifee Unified School District
- Moreno Valley Unified School District
- Rancho California Water District
- Riverside Community Hospital
- Riverside County Office of Education, Children, and Family Services
- Riverside County Transportation

and Land Management Agency
- Riverside Unified School District
- San Gorgonio Pass Water Agency
- Valley Sanitation District
- Western Municipal Water District

Hazard Definition

Insect infestation occurs when an undesirable type of insect inhabits an area in a manner that causes serious harm to: cash crops, livestock, or poultry; wild land trees, plants, or animals; or humans. Countless insects live on, in, and around plants, animals, and humans in all environments. Many are harmless, while others can cause fatal damage. Under some conditions, insects that have been present and relatively harmless can become hazardous. For example, severe drought conditions can weaken trees and make them more susceptible to destruction from insect attacks.

The major forms of insects are:

- **Chewing insects** are defoliating insects. They generally strip plants of green matter such as leaves. Caterpillars and beetles make up the largest proportion of chewing insects. Under normal conditions, trees can usually bounce back from an attack of these defoliators, though repeat infestation will weaken a tree and can eventually kill it by starving it of energy.

- **Boring, or tunneling, insects** cause damage by boring into the stem, roots, or twigs of a tree. Some lay eggs that then hatch and the larvae burrow more deeply into the wood, blocking off the water-conducting tissues of the tree. Boring insects generally feed on the vascular tissues of the tree. If the infestation is serious, the upper leaves are starved of nutrients and moisture, and the tree can die. Signs of borer infestation include entry/exit holes in the bark, small mounds of sawdust at the base, and sections of the crown wilting and dying.

- **Sucking insects** do their damage by sucking out the liquid from leaves and twigs. Many sucking insects are relatively immobile, living on the outside of a plant and forming a hard protective outer coating while they feed on the plant's juices. Quite often they will excrete a sweet, sticky substance known as honeydew which contains unprocessed plant material. Honeydew can cause sooty mold to form on leaves and can become a nuisance. Signs of infestation include scaly formations on branches, dieback of leaves, and honeydew production.

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Table 40: Example Insect Species

NAME
AFRICANIZED HONEY BEE
BARK BEETLE
CITRUS LEAFMINER
GLASSY-WINGED SHARPSHOOTER
GYPSY MOTH
HONEY BEE TRACHEAL MITE
JAPANESE BEETLE
LESSER SNOW SCALE
MAGNOLIA WHITE SCALE
MEDITERRANEAN FRUIT FLY
ORIENTAL FRUIT FLY
RED IMPORTED FIRE ANT
STING NEMATODE
TROPICAL PALM SCALE
VARROA MITE/HONEY BEE
ASIAN CITRUS PSYLLID
SILVERLEAF WHITEFLY
POLYPHAGOUS SHOT-HOLE BORER
ASIAN CITRUS PSYLLID
GOLDSPOT OAK BORE BEETLE, (GSOB)
PINE BARK BEETLE
SHOT HOLE BORER BEETLE
KUROSHIO SHOT HOLE BORERS

In conjunction with the above outlined problems, insects can carry and spread or vector disease to plants, animals, and people.

Definition of Vector Control

Vector Control Programs are responsible for providing services that reduce the risk of illness caused by any organism transporting a pathogen. Some examples of these organisms and some of the pathogens they can carry are:

- Mosquito - West Nile Virus, St. Louis Encephalitis, Western Equine Encephalitis
- Rodent Fleas - Plague

- Western Black Legged Tick - Lyme Disease
- Rodents - Hantavirus

Riverside County actually has three vector control agencies. There are two Vector Control Districts and the County Vector Control Program operating through the Department of Environmental Health. The Coachella Valley Mosquito and Vector Control District manages these services for a portion of the desert community around the Coachella Valley. The Northwest Mosquito and Vector Control District provides services in the northwest portion of the county. The County Vector Control program covers the unincorporated areas of the County and other areas such as contracted cities that may fall outside of the two other vector district boundaries.

History

Presently - Parts of Riverside County (Moreno Valley, Indio, Rancho Mirage, Palm Desert, Bermuda Dunes, and Palm Springs) are under quarantine by state and federal officials to stop the spread of Red Imported Fire Ants. The quarantine limits the movement of plants and soil and requires commercial nursery growers to take steps to ensure their products are free of Red Imported Fire Ants. It is believed that the infestations in Southern California may stem from the shipment of infested nursery stock from the southeastern states.

2012 - Polyphagous Shot-Hole Borer, an insect pest that attacks over 200 types of agricultural and landscape trees, became widespread in Southern California. By 2015, this insect pest was established in Western Riverside County. This insect pest is detrimental to the avocado industry and landscape ornamental trees in California.

2009 - A portion of Riverside County (Coachella Valley) was placed under quarantine for Asian Citrus Psyllid (ACP). In 2011, the quarantine area was expanded to include Western Riverside County. The quarantine limits the movement of nursery stock and citrus from the quarantine area. Growers must take steps to ensure their products are free from ACP prior to movement.

2003 -Governor Gray Davis proclaimed a State of Emergency in Riverside, San Bernardino, and San Diego Counties where hundreds of thousands of trees were dead and dying after being weakened by drought and attacked by an infestation of bark beetles. Trees on more than 150,000 acres died and an estimated 75,000 residents were threatened by catastrophic wildfire, injury, and property damage from falling trees.

1999-2000, an insect-spread disease (Pierce's Disease spread by Glassy-winged Sharpshooter) caused over $16 million damage to wine grapes in the west County area. Riverside County is under quarantine by state officials to stop the spread of

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Glassy-winged Sharpshooter and Pierce's Disease. The quarantine limits the movement of nursery stock, bulk grapes, bulk citrus and requires inspection and certification of these commodities by the local Agricultural Commissioner prior to movement from the infested area.

1991-1994 - Africanized Honey Bees entered California near Blythe. Since 1994, they have spread to all counties in Southern California (Imperial, San Diego, Orange, Los Angeles, Riverside, San Bernardino, Ventura and Kern). In 1993-94 and 1990, Med-fly infestations damaged fruit Countywide. In 1991, a whitefly infestation damaged melons, squash, and cucumbers Countywide.

Risk Assessment

Riverside County has a demonstrated vulnerability to insect infestation. The climate makes it possible for insects to reproduce with little natural hindrance to their proliferation.

Programs for monitoring Encephalitis in Riverside County have been in effect for more than two decades in a cooperative effort with the California Department of Public Health (CDPH), the University of California, the Mosquito and Vector Control Association of California, and the Riverside County Public Health Department. Since its introduction to Southern California in 2003, West Nile Virus surveillance has been a primary focus. This type of surveillance is driven by live mosquito trapping and processing for virus detection. The dead bird surveillance program is also headed up by CDPH where the public can report dead birds via their website (www.westnile.ca.gov) or a telephone hotline (1-877-WNV-BIRD). If CDPH staff determines that a dead bird is deemed acceptable for testing, Vector Control offices are notified for collection and testing. Another aspect of this program consists of sentinel chicken flocks being placed in areas where high populations of Culex tarsalis, the western encephalitis mosquito, are known to exist and where such areas infringe on local communities. Blood samples are sent to the CDPH Viral & Rickettsial Disease Laboratory where they are analyzed for the antibodies to the viruses. All of these disease indicators allow programs to focus their vector control efforts. Since 2006, at least seventy three cases of West Nile virus human infections have been reported within Riverside County with ten fatalities. Horses have also been infected and succumbed to this disease.

In Riverside County, Plague is associated with animal disease outbreaks in populations of California Ground Squirrels. The vector is the Squirrel Flea. In 1979 during a disease outbreak among California ground squirrels in Silent Valley, located south of the City of Banning, a boy contracted Plague. It was properly diagnosed and he recovered. This incident provided impetus to start the Plague Surveillance Program and eventually establish the County's Vector Control Program. Over the course of the past several

decades surveillance activities have isolated Plague endemic areas in the San Jacinto Mountain range.

- **Effects on people and housing.** In the case of the Bark Beetle, the fire hazard it creates can cause the loss of homes and life as demonstrated in the fall fires of 2003. In the case of certain mosquitoes, West Nile Virus has infected humans and horses.

- **Effects on agriculture, and commercial and industrial structures.** If a given insect is particularly hazardous to forests, crops, or property, it can cost the County millions of dollars in lost revenue and eradication and replacement.

Risk Assessment Conclusion.

Insect infestation is an ongoing threat to agriculture and public health in Riverside County. The effects on people and property can be disastrous and costly.

The County and independent vector control special districts have aggressive programs utilizing:

- Disease surveillance such as certified personnel, insect/rodent traps, lab testing capacities, and Sentinel chicken flocks.
- Vector control equipment and approved pesticides.
- Public outreach.

Relationship to Other Hazards – Cascading Effects

The Bark Beetle infestation is a classic example of cascading effects. The insect killed hundreds of thousands of trees, increasing the wildfire hazard, which resulted in the unfortunate devastation of the fall fires of 2003.

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5.3.19 Jail/Prison Event

Severity: 2

Probability: 1

Risk Score: -0.13
OA Jurisdictions Affected by Jail or Prison Events

- Blythe
- Riverside
- Norco
- Banning
- Indio
- Murrieta

Hazard Definition

There are numerous State of California Correctional Institutions and County correctional facilities in Riverside County. Law enforcement is tasked with maintaining order in the facilities and preventing inmates from escaping into the community.

Chuckawalla Valley State Prison in Blythe provides long-term housing and services for male felons classified as medium and low-medium custody inmates.

Ironwood State Prison in Blythe provides services for minimum and medium custody inmates through academic education, vocational instruction, and support services. The prison also has the Institutional Hearing Program (IHP) which prepares inmates who are illegal immigrants for release to United States Immigration and Naturalization Service custody and the return to their native country.

The California Rehabilitation Center (CRC) in Norco is a medium Level II correctional facility and that only accommodates male inmates since April 2007. The CRC inmate population consists of felon commitments as well as Civil Addicts.

The California Institution for Woman (CIW) in Chino accommodates all custody levels of female inmates and functions as a reception/processing center for incoming female inmates. In addition to its large general population, CIW houses inmates with special

needs such as pregnancy, psychiatric care, methadone, and medical problems such as HIV infection.

The California Institution for Men in Chino consists of four separate facilities under the administration of one warden. Located three miles south of the city of Chino, the facilities provide housing for minimum through medium custody inmates. The reception centers receive and process newly committed male felons from several southern California counties. The California Youth Authority operates a facility in Chino. While all of these facilities are in the County of San Bernardino, their close proximity to Riverside County and the City of Corona necessitate their inclusion here as facilities of concern to Riverside County.

In addition, there are five correctional facilities within the County, namely:

1. Robert Pressley Detention Center
2. Blythe Jail
3. Indio Jail
4. Southwest County Jail (Murrieta)
5. Larry D. Smith Correctional Facility

History

Historically, the threat to society has been low. Law enforcement has demonstrated an overall capability to maintain the incarcerated population in a manner that does not pose an immediate threat to the general population.

Risk Assessment

It is important that law enforcement remains in a state of readiness for any incidents that could precipitate a threatening situation.

The passing of Assembly Bill 109 (2011) has shifted state prison populations back into the county jail populations as a way to stop state prison overcrowding. The effects of this change are just now being seen. Time will tell what the overall impact to Riverside County and its citizens will actually be.

Riots within the facilities generally do not pose a direct threat to the public on the outside. Occasionally an inmate has escaped correctional facilities. The danger involved in their escape is predicated on the escapee's criminal characteristics.

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Riverside County Regional Medical Center provides medical care to both state and local inmates in an area designated as a prison ward, which could have a severe impact on health care delivery at the facility during and immediately after a prison ward incident. The degree of disruption would, of course, depend on the extent of the incident.

- **Effects on people and housing.** Relatively speaking, the risks are minimal. However, violent offenders escaping custody in a disaster could lead to residents in the surrounding areas being at risk of harm.
- **Effects on commercial and industrial structures**. The risks are minimal.
- **Effects on infrastructure.** The risks are minimal.
- **Effects on agriculture.** The risks are minimal.

Risk Assessment Conclusion.

Relatively speaking, the risks of jail and prison incidents will remain a minimal threat to the County. It is important that law enforcement remains in a state of readiness for any incidents that could precipitate a threatening situation.

Relationship to Other Hazards – Cascading Effects

In the event that Interstate 10 becomes damaged, it could affect evaluation routes and essential supplies from getting into the prison or jail.

Risks are minimal but have the potential to decrease responder availability during disasters if a facility is damaged. Another possible drain on resources would be in the event of inmate relocation due to damaged facilities or the potential damage to a facility.

5.3.20 Pipeline Disruption

Severity: 3

Probability: 2

Risk Score: -0.38

OA Jurisdictions Affected by Pipeline Incidents

- Desert Water Agency
- Western Municipal Water District
- City of Banning
- City of Beaumont
- City of Corona
- City of Palm Springs
- City of Temecula
- Riverside Community College District
- San Gorgonio Memorial Hospital

Hazard Definition

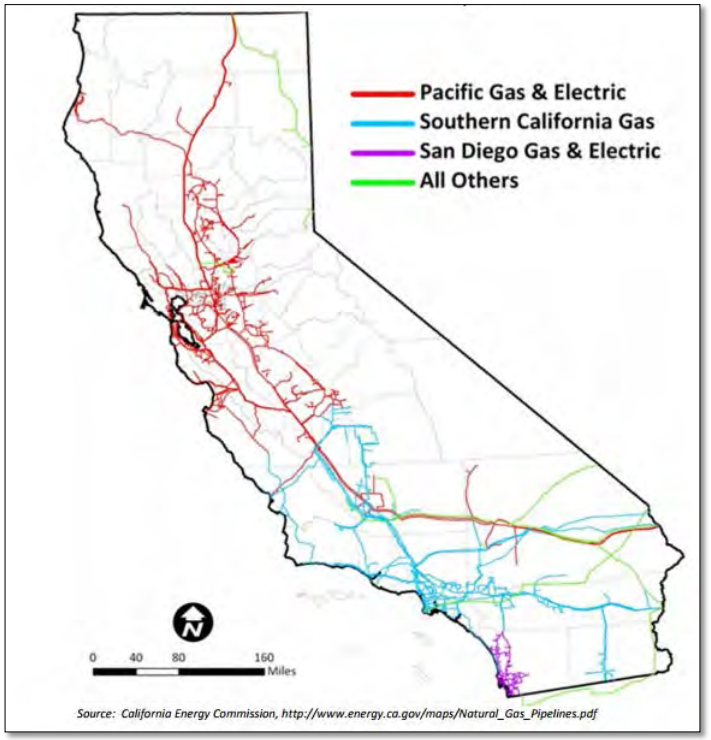
There are many pipeline distribution systems that transit Riverside County, including systems for water, natural gas, and petroleum products.

Identifying Natural Gas Pipeline Hazards (SHMP)

The United States is heavily dependent on transmission pipelines to distribute energy and fuel sources. Virtually all natural gas, which accounts for about 28 percent of the energy consumed annually, is transported by transmission pipelines. Energy demand in the United States continues to increase. Although California is a leader in exploring and implementing alternative energy sources such as the wind and solar, the expansion of traditional energy sources, such as natural gas, continues. Increased urbanization is resulting in more people living and working close to existing gas transmission pipelines that were placed prior to government agencies adopting and implementing land use and other pipeline safety regulations.

Compounding the potential risk is the age and gradual deteriorating of the gas transmission system due to natural causes. Significant failure, including pipe breaks and explosions, can result in loss of life, injury, property damage, and environmental impacts. Causes of and contributors to pipeline failures include construction errors, material defects, internal and external corrosion, operational errors, control system malfunctions, outside force damage, subsidence, and seismicity. Growth in population, urbanization, and land development near transmission pipelines, together with the addition of new facilities to meet new demands, may increase the likelihood of pipeline damage due to human activity and the exposure of people and property to pipeline failures.

Figure 43: California Gas Lines



Major water conveyance systems consist of the Colorado River Aqueduct operated by Metropolitan Water District (MWD) of Southern California, the California Aqueduct operated by the State Department of Water Resources (DWR), and water distribution lines operated by MWD.

A major pipeline carrying natural gas parallels Interstate 10 and Highway 60 throughout the County. This pipeline brings gas from the southwestern states into Southern California.

Petroleum products are stored and distributed at many major areas throughout the County. Of particular interest are the aviation fuel tanks and pipelines located at March Air Reserve Base. Although under the control of the U.S. Government, their potential for impact on the surrounding area is of interest to the County.

History

Fortunately, Riverside County has not experienced a large scale pipeline disruption. However, there are multiple small incidents on a yearly basis that are handled by the respective resource provider.

Risk Assessment

A rupture of the main line with a major release could have serious effects in terms of flooding and property damage. A gas line rupture could explode causing serious property damage and loss of life.

- **Effects on people and housing.** The consequences to people and housing from pipeline disruption can range from flooding to explosion, both could be quite severe.
- **Effects on commercial and industrial structures.** Similarly, the effects on commercial and industrial structures from flooding or explosion could be severe.
- **Effects on agriculture.** In the same way, the effects on agriculture from flooding or explosion could be severe.

Risk Assessment Conclusion.

Pipelines are vulnerable to especially with the possibility of an earthquake, causing significant breakage. The degree of damage county-wide for a given rupture would be minimal, even though there might be significant injuries, loss of life and property in the

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immediate area of the incident, depending on what kind of pipe ruptures and where the rupture occurs.

Relationship to Other Hazards – Cascading Effects

Pipeline incidents may lead to flooding, fires and air, water and land contamination. Incidents with natural gas or petroleum product pipelines may lead to explosion and fire.

5.3.21 Landslide

Severity: 3

Probability: 3

Risk Score: -0.58

OA Jurisdictions Affected by Landslide Incidents

- Most mountain areas within the County

Hazard Definition

Like its earthquake-generating faults, California's mountainous terrain is also a consequence of dynamic geologic processes in operation as the North American Plate grinds past the Pacific Plate. More than one-third of California is mountainous terrain that generally trends parallel to the coast, forming a barrier that captures moisture from offshore storms originating in the Gulf of Alaska and Mexico. Steep topography, weak rocks, heavy winter rains, and occasional earthquakes all lead to slope failures more frequently than would otherwise occur under gravity alone.

A landslide is the breaking away and gravity-driven downward movement of hill slope materials, which can travel at speeds ranging from fractions of an inch per year to tens of miles per hour depending on the slope steepness and water content of the rock/soil mass.

Landslides range from the size of an automobile to a mile or more in length and width and, due to their sheer weight and speed, can cause serious damage and loss of life. Their secondary effects can be far reaching; for example, catastrophic flooding can result from the sudden release of river water impounded by landslide debris or slope failure of an earthen dam.

Although the area affected by a single landslide is less than that of earthquakes, landslides are pervasive in California's mountainous terrain and occur far more often, resulting in cumulative losses approaching $200 million in a given year. Average annual landslide losses in California are estimated at about $100 million. Because landslides occur as isolated events in both time and location, and there is presently no systematic means in place for documenting their losses, landslide hazard is often underestimated or goes unrecognized in the policy arena, even though landslides continue to cause millions of dollars in cumulative damage to California's homes, businesses, and infrastructure.

A landslide is a geologic hazard where the force of gravity combines with other factors to cause earth material to move or slide down an incline. Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly. Slopes with the greatest potential for sliding

are between 34 degrees and 37 degrees. Although steep slopes are commonly present where landslides occur, it is not necessary for the slopes to be long.

Landslides, rock falls, and debris flows occur continuously on all slopes; some processes act very slowly, while others occur very suddenly, often with disastrous results. As human populations expand over more of the land surface, these processes become an increasing concern.

The most common types of landslides are (U.S. Department of the Interior, U.S. Geological Survey, Fact Sheet 2004-3072, July 2004):

Slides - Although many types of mass movements are included in the general term "landslide," the more restrictive use of the term refers only to mass movements, where there is a distinct zone of weakness that separates the slide material from the more stable underlying material.

Falls - Abrupt movements of masses of geologic materials, such as rocks and boulders that become detached from steep slopes or cliffs.

Topples - Toppling failures are distinguished by the forward rotation of a unit or units about some pivotal point, below or low in the unit, under the actions of gravity and forces exerted by adjacent units or by fluids in cracks.

Flows – There are five basic categories of flows that differ from one another in fundamental ways.

a. Debris flows: A debris flow is a form of rapid mass movement in which a combination of loose soil, rock, organic matter, air, and water mobilize as a slurry that flows downslope.
b. Debris avalanche: This is a variety of very rapid to extremely rapid debris flow.
c. Earthflow: The slope material liquefies and runs out, forming a bowl or depression at the head. The flow itself is elongate and usually occurs in fine-grained materials or clay-bearing rocks on moderate slopes and under saturated conditions. However, dry flows of granular material are also possible.
d. Mudflow: A mudflow is an earthflow consisting of material that is wet enough to flow rapidly and that contains at least 50 percent sand-, silt-, and clay-sized particles. In some instances, for example in many newspaper reports, mudflows and debris flows are commonly referred to as "mudslides."
e. Creep: Creep is the imperceptibly slow, steady, downward movement of slope-forming soil or rock.

Lateral Spreads - Lateral spreads are distinctive because they usually occur on very gentle slopes or flat terrain. The dominant mode of movement is lateral extension accompanied by shear or tensile fractures. The failure is caused by liquefaction, the process whereby saturated, loose, cohesionless sediments (usually sands and silts) are transformed from a solid into a liquefied state.

The geologic setting of southern California locally is conducive to slope failures and slope-failure deposits (landslides) that can be a hazard to human life and property. These hazards are created when geologic materials are displaced down a topographic slope under the influence of gravity. Factors that determine slope-failure occurrence include:

1. Slope angle
2. Geologic materials (substrate)
3. Climatic conditions
4. Earthquake shaking
5. Debris Flows

Sudden "mudslides" gushing down rain-sodden slopes and gullies are widely recognized by geologists as a hazard to human life and property. Most "mudslides" are localized in small gullies, threatening only those buildings and roadways in their direct path. They can burst out of the soil on almost any rain-saturated hill when rainfall is heavy enough. Often they occur without warning in localities where they have never been seen before.

There are predictable relationships between local geology and landslides, rockfalls and debris flows. Knowledge of these relationships can improve planning and reduce vulnerability. Slope stability is dependent on many factors and their interrelationships, including rock type, pore water pressure, slope steepness, and natural or man-made undercutting.

Riverside County has a history of landslides during seasons of high precipitation.

History

January, 2016 – Landslides near Banning resulted from a low 4.3 magnitude earthquake.

December, 2014 – Mud Flow in Gilman Springs, San Jacinto.

2002 – Landslide on Highway 60 in San Timoteo Badlands

Risk Assessment

There is a continuing risk of landslides during seasons of high precipitation. In addition, earthquakes could also cause significant landslides. The County has a great deal of hilly and mountainous terrain increasing the likelihood of a landslide incident.

- **Effects on people and structures**. Landslides constitute a threat to property, road safety, and life. Small landslides would not pose a serious risk. However, there is a possibility that a severe landslide in a populated area could cause significant damage and risk to life.
- **Effects on infrastructure**. Landslides can cause disruptions in power supply pipelines, power and telephone poles, and County roads and highways.
- **Effect on Critical Facilities**. An initial review of known landslide locations and the location of critical facilities indicates that there does not appear to be any of these facilities in close proximity to a Landslide Management Zone.
- **Effects on agriculture**. Similar to the threats to people and structures, small landslides would not pose a serious risk. However, there is the possibility that a severe landslide could cause significant damage and risk of life to elements of the agricultural industry.

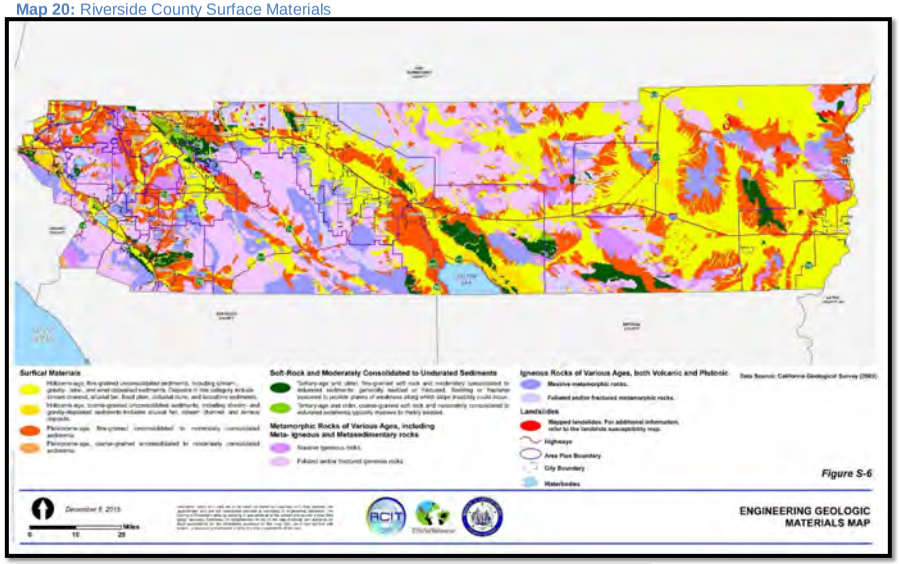
Risk Assessment Conclusion

Landslides are a continuing risk in Riverside County, especially during seasons of high precipitation. History has shown also that many landslides occur in areas where landslides have not been predicted.

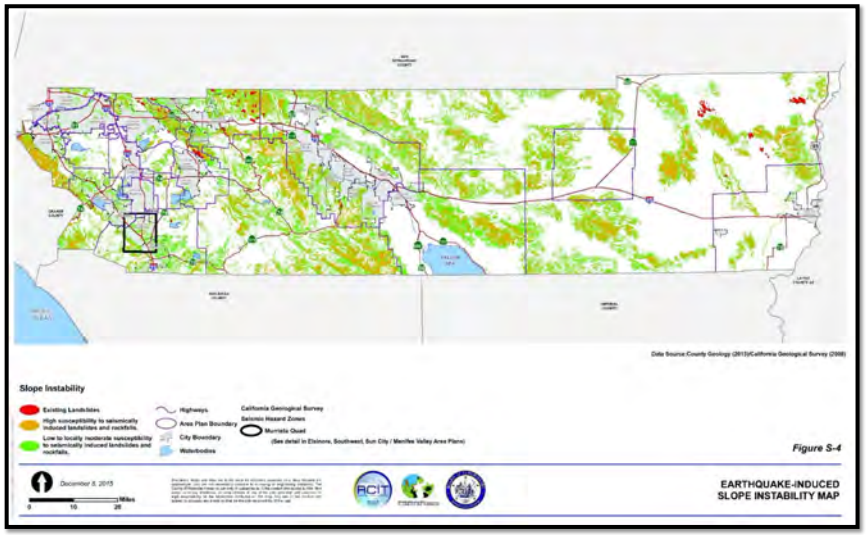
Relationship to Other Hazards – Cascading Effects

As noted, landslides can be the result of an earthquake or severe weather. The starting mechanism for a landslide will determine some of the cascading events. The end result is if a landslide occurs in a populated area, or area used by people, earth materials can cover or impede the area as described above. If a landslide were to impact power lines or other utility systems a cascading effect could be power, utility or sewer loss.

Map 20: Riverside County Surface Materials



Map 21: Riverside County Slope Instability Map



5.3.22 Hazardous Materials Incident

Severity: 3

Probability: 4

Risk Score: -0.75

OA Jurisdictions Affected by Hazardous Materials Incidents

- All incorporated cities of Riverside County
- Unincorporated areas of Riverside County

Hazard Definition

Hazardous materials (Hazmat), consist of substances that by their nature, lack of containment, and reactivity, have the capability for inflicting harm. Hazmat poses a threat to health and the environment when improperly managed. Hazmat can be toxic, corrosive, flammable, explosive, reactive, an irritant, or a strong sensitizer. Hazmat substances also include certain infectious agents, radiological materials, oxidizers, oil, used oil, petroleum products, and industrial solid waste substances.

Hazardous materials can pose a threat where they are manufactured, stored, transported or used. They are used in almost every manufacturing operation and by retailers, service industries, and homeowners.

Hazardous material incidents are one of the most common threats to public health and the environment. Incidents may occur as the result of natural disasters, human error, terrorism, and/or accident.

Hazmat incidents typically take five forms:

1. Fixed facility incidents
    - Laws require those facilities to notify state and local authorities about what is being used or produced there and incidents with the materials can be planned for.
2. Transportation incidents
    - Transportation incidents are more difficult to prepare for because it is impossible to know what material(s) could be involved until an accident actually happens.

3. Pipeline incidents
    - Pipelines carry natural gas and petroleum. Breakages in pipelines carry differing amounts of danger, depending on where and how the break occurs, and what is in the pipe.
4. Terrorism incidents (or suspected Terrorism)
    - Intentional acts involving violence and/ or the threat of violence. Similar to transportation incidents, these occurrences are more difficult to prepare for due to unknown locations and substances.
5. Illegal Disposal / Abandonment
    - Similar to transportation incidents, these occurrences are more difficult to prepare for due to unknown locations and substances.

History

Many forms of hazardous materials are present in both the rural and urban areas of Riverside County. They are present in permanent storage locations, roadway and railway transport mediums, long-distance pipelines, and at various industrial and agricultural application sites. The County's location, with its rail and highway transportation routes, and various industries, has a growing potential for serious hazardous materials incidents. Interstates 10, 15 and 215, and State Highways 60 and 91 are all heavily traveled by trucks. Those trucks carry a wide variety of hazardous materials including gasoline, corrosives, oxidizers, pesticides, and radioactive materials.

The railroad lines traveling throughout the County also carry some extremely hazardous cargoes. Fortunately, the railroads have a good safety record with regard to the transportation of hazardous materials.

Traffic on railroads is not as prevalent as on truck routes in Riverside County, but poses a much greater problem when an accident is involved due to the volumes of hazardous materials on board.

There is a great deal of air traffic along the airways above Riverside County with the March Air Reserve Base Palm Springs International Airport, French Valley Airport, Hemet-Ryan Airport, Riverside Municipal Airport, Jacqueline Cochran Regional Airport and Bermuda Dunes Airport all operating within the County. The potential for a hazardous materials incident exists, especially with respect to military operations.

There are many pipeline distribution systems that traverse the County. These are discussed in Section 5.3.20.

Table 41: History of Hazmat Incidents in 2016

Riverside County Department of Environmental Health Hazmat Incidents July 1, 2015 to June 30, 2016	
HAZARDOUS MATERIALS INCIDENT TYPE	TOTAL NUMBER
General Emergency Response (do not fit other categories)	28
Drug Labs	23
Drug Dumps	3
Facility Incidents	122
Roadway Incidents	119
Aircraft Incidents	3
Railroad Incidents	7
Mercury Incidents	5
Dielectric Fluid Incidents	40
Radiological Incidents	0
Pesticide Incidents	2
Medical Waste Incidents	9
Noxious Odor Incidents	39
Illegal Disposal of Substances	207
Transportation/Manifesting Violations	0
Suspected Terrorism	4
TOTAL Hazardous Materials Incidents:	**611**

The Riverside County Department of Environmental Health Hazardous Materials Emergency Response Program handled over 611 incidents in fiscal year (FY15/16) often in conjunction with Cal Fire countywide except for a few cities that handled Haz Mat incidents within their jurisdiction. The incidents cover all areas described in the definition section.

In 2016 The Riverside County Fire department responded to 613 Hazardous Materials Incidents.

The administering agencies within Riverside County are responsible for the control of fixed hazardous materials facilities, including the Participating Agencies of Riverside Fire Department and Corona Fire Department.

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Risk Assessment

The amount of hazardous materials transported over rail and roadways on a daily basis is unknown, but estimated to be steadily increasing as our economy grows. There is the potential for a hazardous materials incident almost anywhere on the numerous highways and roads that crisscross Riverside County. The greatest concern focuses on the 10, 15, 60, 91, and 215 freeways. The most vulnerable areas along these routes are considered to be the on/off ramps and interchanges.

A major concern with the trucking industry is the safe operation of their trucks. With the deregulation of the trucking industry, spot checks of trucks in many states, including California, have shown that a large percentage of trucks currently in service are not in safe enough condition to be operated on public highways.

Many industries are moving into the County. Many facilities exist today, with more construction forecast. To support these industries, the County is likely to realize a large increase in the transportation of toxic, flammable, and corrosive materials into and out of the County. With the increased use of hazardous materials, there is an increased need for safe hazardous waste management and disposal. There will be the increased transportation of hazardous materials waste to proper disposal sites located outside of Riverside County.

Illegal dumping and clandestine drug labs are also a hazardous materials problem. Although not exclusive to Riverside County, the County is a target for these activities due to its accessibility in the outlying areas and the open living conditions in the mountain and desert areas.

No Class I landfills are operated in Riverside County. Seven Class III landfills are active in Riverside County. All accept only non-hazardous solid wastes and are located in unincorporated areas. Six of these landfills are operated by the Riverside County Waste Resources Department, while one (El Sobrante) is privately owned and operated. The El Sobrante, Badlands, Lamb Canyon, and Blythe landfills currently accept waste from outside of Riverside County. Blythe however, only takes small loads or may refuse to accept waste because it is a relatively small facility.

Hazardous waste generators include food and beverage processors as well as battery, semi- conductor, and metal container manufacturers, as well as automobile repair facilities, munition manufacturers, utility districts, and other industries. Although hazardous waste generators are scattered throughout Riverside County, most of the large generators of hazardous waste are located in the western portion of the County, including in the cities of Corona, Jurupa Valley, Riverside, and Temecula.

Nearly all of Riverside County residents have some type of hazardous materials in their homes. Examples include motor oil, paints, cleaners, aerosols, and pesticides. Household hazardous materials pose serious health issues for people who improperly use or dispose of these materials. Adverse environmental impacts can occur when household hazardous materials are disposed of in unlined sanitary landfills, where these materials may leach through the soil and contaminate groundwater.

Medical facilities, including clinics, hospitals, professional offices, blood and plasma centers, and medical research facilities generate a wide variety of hazardous substances. These substances may include contaminated medical equipment or supplies, infectious biological matter, prescription medicines, and radioactive materials used in medical procedures. The disposal of medical waste is achieved by on-site autoclaving of red-bagged waste (any medical waste that could possibly transmit a pathogen) and subsequently transported to a Class III landfill, or to a permitted incinerator. The Riverside County Department of Environmental Health has regulatory control over the disposal of medical and biological waste.

- **Effects on people and housing.** Historical events in Riverside County have necessitated evacuations when a Hazmat incident occurs. Relative to some of the other natural hazards assessed earlier in this LHMP, the numbers of people affected by Hazmat incidents are usually less.

- **Effects on commercial and industrial structures.** There may be economic consequences due to Hazmat incidents, but the damage is generally limited to clean-up of facilities and grounds, or simply an interruption of business due to evacuation.

- **Effects on infrastructure.** Hazmat incidents involving transportation may result in downed power lines. Also, Hazmat materials may impact waterways and drainage systems, and incidents can lead to the evacuation of schools, business districts, and residential areas.

- **Effects on agriculture.** As noted previously, there is a long history of agricultural production in Riverside County. Agricultural activities typically include the storage and periodic application of pesticides, herbicides, and fertilizers, as well as the storage and use of toxic fuels and solvents. The infiltration of these substances may leach into local groundwater supplies, presenting an elevated risk of groundwater contamination.

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Risk Assessment Conclusion

Although Hazmat incidents can have serious property damage and even loss of life, Hazmat accidents do not generally affect extremely large areas. Hazmat incidents present a real danger and are highly unpredictable in terms of determining when or where they will occur, but generally do not pose a serious threat to the ability of Riverside County to respond. Reasonable preparation by law enforcement, fire department, and medical community enables the County to deal with the majority of likely events. Many emergency workers prepare for Hazmat events as part of their ongoing training. Agencies and facilities are also routinely equipped to deal with most events that might occur.

Relationship to Other Hazards – Cascading Effects

Besides the immediate effect of a hazardous materials incident at the scene of the emergency, there are ancillary effects as well. For instance, there may be impacts on waterways and drainage systems, and the evacuation of schools, business districts, and residential areas.

5.3.23 Water Supply Disruption/Contamination

Severity: 2

Probability: 3

Risk Score: -1.50

OA Jurisdictions Affected by Hazardous Materials Incidents

- All incorporated cities of Riverside County
- Unincorporated areas of Riverside County

Hazard Definition

People exposed to water supply disruption or toxic pollutants caused by contaminations may be threatened by a number of health risks:

- Dehydration, hepatitis, and cancer
- Eating contaminated food products, such as fish from contaminated waters; meat, milk, or eggs from animals that fed on contaminated plants; and fruits and vegetables grown in contaminated soil
- Drinking water contaminated by toxic pollutants
- Ingesting contaminated soil. Young children are especially vulnerable because they often ingest soil from their hands or from objects they place in their mouths
- Touching (making skin contact with) contaminated soil, dust, or water (for example, during recreational use of contaminated water bodies)

Risk Assessment

According to the Environmental Protection Agency, there are four major types of drinking water contamination; physical, chemical, biological, and radiological.

Physical contaminants primarily impact the physical appearance or other physical properties of water. Examples of physical contaminants are sediment or organic material suspended in the water of lakes, rivers and streams from soil erosion.

Chemical contaminants are elements or compounds. These contaminants may be naturally occurring or man-made. Examples of chemical contaminants include nitrogen,

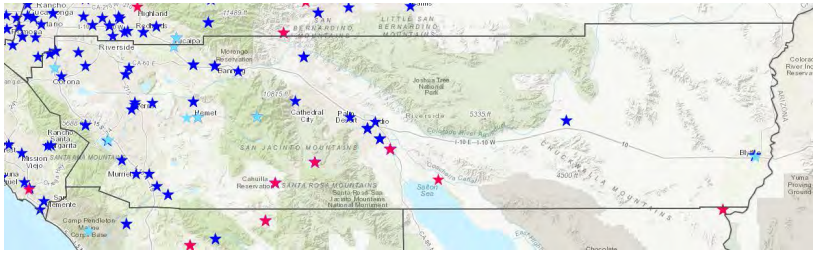
bleach, salts, pesticides, metals, toxins produced by bacteria, and human or animal drugs.

Biological contaminants are organisms in water. They are also referred to as microbes or microbiological contaminants. Examples of biological or microbial contaminants include bacteria, viruses, protozoan, and parasites.

Radiological contaminants are chemical elements with an unbalanced number of protons and neutrons resulting in unstable atoms that can emit ionizing radiation. Examples of radiological contaminants include cesium, plutonium and uranium.

Source: https://www.epa.gov/ccl/types-drinking-water-contaminants

Ground water contamination is also a major threat because of its use for drinking water and irrigation. Potential groundwater contaminants include; storage tanks, septic systems, hazardous waste, landfills, chemicals and road salts, and littering.



Source: waterboards.maps.arcgis.com

Map illustrated water systems in Riverside County. Blue stars represent in compliance water systems, red stars are systems out of compliance as of July 2017.

- **Effects on people and housing.** The effect on housing is relatively low, but the effect on people may be devastating. Though the County encourages residents to store at least 72 hours of water for their household, the reality is only a small percentage actual partake in that practice. This means that in the event of disruption or contamination that renders usable water sources limited, people may become dehydrated and suffer from other serious health issues such as cancer. In the event that contamination happens during the summer months when temperatures reach 90-105, the population is at an even higher risk.

- **Effects on commercial and industrial structures.** The effect to structures is relatively low.
- **Effects on infrastructure.** The effect to structures is relatively low.
- **Effects on agriculture.** Water contamination could devastate agriculture in Riverside County. The contaminant could be poisonous to crops and livestock. Depending on the level of exposure, entire field could be damaged to the point of total loss.

History

March 2, 2017 – 198 residents were exposed to water contaminated with uranium in the unincorporated area of Pinyon Pines.

Risk Assessment Conclusion

Due to high levels of monitoring and preparedness within water agencies, the threat of water contamination is fairly low. However, it could greatly impact the county if it is caused by a cascading event such as an earthquake.

Relationship to Other Hazards – Cascading Effects

The loss of water could drastically affect other man-made and natural hazards. In the event of an earthquake and pipelines are damaged, it could greatly reduce the amount of water available to fight fires. The amount of water available to residents would also be drastically reduced.

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Section 6.0 – Community Rating System

The County of Riverside and all cities within the County participate in the National Flood Insurance Program (NFIP). Riverside County Ordinance NO. 458 Regulating Special Flood Hazard Areas and Implementing the National Flood Insurance Program was last updated on August 14, 2014.

Riverside County also participates in the Community Rating System (CRS). The rating system is a voluntary NFIP program that aims to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management. In addition to the county, four cities participate in CRS: Lake Elsinore, Moreno Valley, Murrieta, and Palm Springs.

The most active in the Community Rating System within the County is Palm Springs. Their high scores in the system allow the city to offer the highest discount off of flood insurance (20% for SFHA and 10% for Non-SFHA).

Community Number	Community Name	CRS Entry Date	Current Effective Date	Current Class	% Discount for SFHA	% Discount for Non-SFHA	Status
060245	Riverside County*	10/01/10	05/01/16	7	15	5	C
060636	Lake Elsinore	10/01/09	05/01/14	8	10	5	C
065074	Moreno Valley	10/01/91	10/01/96	8	10	5	C
060751	Murrieta	10/01/97	10/01/97	9	5	5	C
060257	Palm Springs	10/01/92	05/01/11	6	20	10	C

Note: SFHA, Special Flood Hazard Areas

6.1 Repetitive Loss Properties

Areas which have flooded in the past are highly likely to experience recurring flooding. The repetitive nature of flood damage is cause for concern. FEMA, in coordination with the state, identifies California's top Repetitive Loss (RL) Communities. Riverside County is not a top Repetitive Loss community. Riverside County unincorporated areas only have eleven identified repetitive loss properties. That is an increase of four properties since the 2012 plan. Two of the eleven repetitive loss properties have been mitigated and the Riverside County Flood Control District is investigating ways to mitigate the remaining five properties so as to avoid future flooding incidents. Options being considered are both structural and non-structural mitigation measures.

Table 42: Riverside County Repetitive Loss Properties

City	Mitigated?	Insured?	Date of Loss	Date of Loss	Total Paid
LAKE ELSINORE	YES	NO	02/14/1980	01/05/1979	$91,618.83
LAKE ELSINORE	NO	NO	12/04/1982	03/15/1980	$21,052.64
LAKE ELSINORE	NO	NO	04/15/1983	08/11/1980	$ 6,436.09
HEMET	YES	NO	03/02/1983	09/06/1981	$ 2,684.06
RIPLEY	NO	NO	09/23/1983	07/23/1983	$ 6,602.15
CORONA	NO	NO	01/04/1995	12/04/1987	$ 70,282.69
THOUSAND PALMS	NO	NO	12/22/2010	10/17/2005	$ 26,331.18
THOUSAND PALMS	NO	YES	09/08/2014	02/25/2005	$ 44,272.25
THOUSAND PALMS	NO	YES	09/08/2014	12/22/2010	$ 29,896.05

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THOUSAND PALMS	NO	YES	09/08/2014	12/22/2010	$ 33,345.35
THOUSAND PALMS	NO	YES	09/08/2014	01/22/2010	$ 119,638.09

6.2 National Flood Insurance Program

Public Law 90-448 of 1968, known as the National Flood Insurance Act, established the National Flood Insurance Program (NFIP) which provides for federal government underwriting of flood insurance policies sold by private companies. Supported by a national mapping system showing boundaries for 100- and 500-year floodplains, the NFIP encourages local governments to direct development away from floodplain areas or mitigate flood risks through local floodplain management regulations. Through the Community Rating Service (CRS), the NFIP provides for financial incentives in the form of lower insurance rates for local communities encouraging mitigation of flood hazards in a manner parallel to rate incentives related to private fire insurance and enforced by the mortgage industry. The National Flood Insurance Act was modified in 1994 to provide for flood hazard mitigation planning and project grants.

The unincorporated community of Riverside County joined the NFIP on April 15, 1980. Currently, unincorporated Riverside County is one of 30 local communities that participate in the NFIP. Please refer to the table on the following page for participating jurisdictions.

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Table 43: Jurisdictions and authorities participating with National Flood Insurance Program

CID	COMMUNITY NAME	INIT FHBM	INIT FIRM IDENTIFIED	CURR EFF MAP DATE	REG-EMER DATE	IDENTIFIED TRIBAL
060763C	AGUA CALIENTE BAND OF CAHUILLA INDIANS TRIBE	06/21/74	03/02/83	04/19/17	06/21/96	Yes
060246#	BANNING	03/15/74	10/17/78	08/28/08	10/17/78	No
060247#	BEAUMONT	04/05/74	10/17/78	08/18/14	10/17/78	No
060248#	BLYTHE	05/10/74	06/30/76	(NSFHA)	06/30/76	No
060740#	CALIMESA	-	08/28/08	08/28/08	05/01/91	No
060753C	CANYON LAKE	-	11/20/96	04/19/17	09/15/98	No
060704#	CATHEDRAL CITY	-	05/01/85	08/28/08	11/12/82	No
060249#	COACHELLA	05/17/74	09/30/80	(NSFHA)	09/30/80	No
060250#	CORONA	05/24/74	05/15/78	08/28/08	05/15/78	No
060251#	DESERT HOT SPRINGS	05/24/74	04/02/79	08/28/08	04/02/79	No
060155#	EASTVALE	-	08/28/08	08/28/08	06/05/13	No
060253C	HEMET	05/24/74	09/29/78	04/19/17	09/29/78	No
060254C	INDIAN WELLS	06/28/74	09/14/79	04/19/17	09/14/79	No
060255#	INDIO	05/31/74	09/14/79	08/28/08	09/14/79	No
060286#	JURUPA VALLEY	-	08/18/14	08/18/14	09/23/13	No

060709C	LA QUINTA	-	06/19/85	04/19/17	07/01/85	No
060636C	LAKE ELSINORE	06/28/74	09/17/80	04/19/17	09/17/80	No
060176C	MENIFEE	-	08/28/08	04/19/17	05/03/12	No
065074#	MORENO VALLEY	-	06/18/87	08/18/14	06/18/87	No
060751#	MURRIETA	-	04/15/80	08/28/08	06/09/93	No
060256#	NORCO	05/17/74	02/15/79	08/28/08	02/15/79	No
060629C	PALM DESERT	06/14/77	04/15/80	04/19/17	04/15/80	No
060257C	PALM SPRINGS	06/21/74	03/02/83	04/19/17	03/02/83	No
060258#	PERRIS	09/06/74	04/16/79	08/18/14	04/16/79	No
060259C	RANCHO MIRAGE	-	09/14/79	04/19/17	09/14/79	No
060245C	RIVERSIDE COUNTY *	-	04/15/80	04/19/17	04/15/80	No
060260#	RIVERSIDE	07/19/74	01/06/83	08/28/08	01/06/83	No
065056C	SAN JACINTO	-	09/28/73	04/19/17	09/28/73	No
060742#	TEMECULA	-	09/02/93	08/28/08	08/28/91	No
060221#	WILDOMAR	-	08/28/08	08/28/08	01/20/11	No

Section 7.0 – Capabilities Assessment

7.1 Regulatory Mitigation Table

Table 44: Regulatory Tools

Regulatory Tool	Yes/No	Comments
General Plan	Yes	General Plan December 15, 2015
Zoning Ordinance	Yes	Adopted updates to General Plan on December 15, 2015, Ordinance No. 348: Providing For Land Use Planning And Zoning Regulations and Related Functions of the County of Riverside effective 1/05/17
Subdivision Ordinance	Yes	Adopted updates to General Plan on December 15, 2015, Riverside County Ordinance No. 460: Subdivision Regulations, Riverside County Code of Ordinances, Title 16
Site Plan Review Requirements	Yes	Adopted updates to General Plan on December 15, 2015, Building and Safety Department submission requirements
Growth Management Ordinance	Yes	Adopted updates to General Plan on December 15, 2015,
Floodplain Ordinance	Yes	Adopted updates to General Plan on December 15, 2015, Riverside County Ordinance No. 458: Regulating Flood Hazards and Implementing the National Flood Insurance Program, last amended 8/28/08
Other special purpose ordinance (storm water, water conservation, wildfire)	Yes	Adopted updates to General Plan on December 15, 2015, Riverside County Ordinance No. 754: Establishing Stormwater/Urban Runoff Management and Discharge Controls, Ordinance No. 859: The Water Efficient Landscaping Requirements, Ordinance No, 787: Adopting the 2016 California Fire Code as Amended 1/1/17.
Building Code	Yes	Riverside County Ordinance 457: Building Codes and Fees, California Building Code, 2016

Fire Department ISO rating	Yes	Rating: 4 (Under reevaluation, expected update in October 2017)
Erosion or sediment control program		Adopted updates to General Plan on December 15, 2015
Storm Water Management Program	Yes	Riverside County Ordinance No. 754: Establishing Stormwater/Urban Runoff Management and Discharge Controls, Riverside County Flood Control Storm Water Protection Program
Capital Improvements Plan	Yes	CIP Budget and proposals updated in November 2015
Economic Development Plan	Yes	Riverside County Economic Development Strategic Action Plan – 2013-2016, Riverside County Economic Development Strategy (CEDS) 2015/2016 Annual Update
Local Emergency Operations Plan	Yes	Riverside County Emergency Operations Plan updated in February 2006
Flood Insurance Study or other engineering study for streams	Yes	County of Riverside Environmental Impact Report No. 521, Section 4.11 March 2014, Riverside County Unincorporated Areas Flood Insurance Study, 2008
Master Drainage Plan	Yes	Last Report, Lakeland Village in March 2015

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7.2 Administrative/Technical Mitigation Table

Table 45: Administrative/Technical Mitigation Tools

Department/Position	Yes/No	Personnel/Resources
Agricultural Commissioner's Office	Yes	Agricultural Biologist, EOC Responders
Assessor's Office	Yes	Parcels information, Loss Estimates, Planners
Environmental Health	Yes	Program Chief, Hazmat and Environmental Specialist, EOC Responder's
Public Health	Yes	Nurses, Program Managers, EOC Responder's, Behavioral Health programs that provide resources and information for community members and mentally ill individuals.
Emergency Management Department	Yes	Division Chiefs, Program Coordinators, Emergency Services Coordinators, Administrative Services Personnel
Emergency Medical	Yes	EMS Specialist, Agency Chief, EOC Responder's
Animal Services	Yes	Chief Operations, Executive Management, Animal Control Officers, Administrative Personnel, EOC Responder's, Riverside Emergency Animal Rescue System (R.E.A.R.S.)
Riverside County Fire	Yes	Firefighters I/II, Engineers, Captains, Battalion Chiefs, Division Chiefs, Deputy Chiefs, County Fire Chief, Prevention Specialists, Forester's , Emergency Services Coordinators, Emergency Services program Supervisor, Deputy Director, Incident Management Teams, Administrative Services Personnel

Flood Control	Yes	Flood Control Specialist and Managers, Engineers, GIS Specialists, EOC Responder's
Sheriff's Office	Yes	Sherriff's Emergency Response Team (SERT) members, EOC Responder's
Roads	Yes	Engineers, EOC Responder's, Highway Operations Superintendent
Building and Safety Planning Dept.	Yes	Planners, Principle Building Inspectors, Engineers, EOC Responder's
Geographic Information System	Yes	GIS Specialist, CIS Supervisors, GIS Analysts, EOC Responder's
Information Technology	Yes	Chief Information Officer, IT Officers, EOC Responder's, Communication, Field assets, IT Support
Air Quality Management District	Yes	Air Monitoring
Waste Management	Yes	Operations Supervisor, Hazardous Waste Supervisor, Specialist, Engineers
Disaster Corps	Yes	Trained Volunteers, Deployment Capabilities both in the Operational Area and Statewide.
Radio Amateur Civil Emergency Services (R.A.C.E.S.)	Yes	Radio Operators, EOC Responders

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7.3 Fiscal Mitigation Capabilities

Table 46: Fiscal Mitigation Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)	Comments
Community Development Block Grants	Yes	Must meet eligibility requirements
Capital improvements project funding	Yes	Funds set aside for fiscal year 11/12 per Board of Supervisor's district
Authority to levy taxes for specific purposes	Yes	With voter approval
Impact fees for new development	Yes	Planning, Fire, Building & Safety
Incur debt through general obligation bonds	Yes	With voter approval
Incur debt through special tax bonds	Yes	With voter approval
Pre-Hazard Mitigation Grants	Yes	
Post-Mitigation Grants	Yes	

7.4 Funding Opportunities

The Hazard Mitigation Grant Program (HMGP) is authorized by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (the Stafford Act), Title 42, United States Code (U.S.C.) 5170c. The key purpose of HMGP is to take critical mitigation measures to reduce the risk of loss of life and property from future disasters during the reconstruction process following a disaster. HMGP is available, when authorized under a Presidential major disaster declaration, in the areas requested by the California Governor. The amount of HMGP funding available to the Applicant is based upon the total Federal assistance to be provided by FEMA for disaster recovery under the Presidential major disaster declaration.

The Flood Mitigation Assistance (FMA) program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended (NFIA), 42 U.S.C. 4104c, with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP).

The Pre-Disaster Mitigation (PDM) program is authorized by Section 203 of the Stafford Act, 42 U.S.C. 5133. The PDM program is designed to assist States, Territories, Tribal governments, and local communities in implementing a sustained pre-disaster hazard mitigation program to reduce the overall risk to the population and structures from future hazard events, while also reducing Federal disaster response expense.

Table 47: Grant Funding Opportunities for Mitigation

Grant Name	Agency	Purpose	Contact
Pre-Disaster Mitigation Program **(PDM)**	U.S. Department of Homeland Security, Federal Emergency Management Agency	To provide funding for States, and communities for cost-effective hazard mitigation activities which complement a comprehensive hazard mitigation program to reduce injuries, loss of life, property damage, and reconstruction of property.	FEMA 500 C. Street, SW Washington, DC 20472 Phone: (202) 646-4621 www.fema.gov
Hazard Mitigation Grant Program	U.S. Department of Homeland Security, Federal Emergency Management Agency	To prevent future losses of lives property due to disasters; to implement State of local hazard mitigation plans; to enable mitigation measures to be implemented during immediate recovery from a disaster; and to provide funding for previously identified mitigation measures to benefit the disaster area.	FEMA 500 C Street S.W. Washington, DC 20472 Phone (202) 646-4621 www.fema.gov
Flood Mitigation Assistance (FMA)	U.S. Department of Homeland Security, Federal Emergency Management Agency	To help States and communities plan and carry out activities designed to reduce the risk of flood damage to structures insurable under the NFIP.	FEMA 500 C Street S.W. Washington, DC 20472 Phone (202) 646-4621 www.fema.gov

Emergency Management Performance Grants (EMPG)	U. S. Department of Homeland Security; Federal Emergency Management Agency	To encourage the development of comprehensive emergency management at the State and local level and to improve emergency management planning, preparedness, mitigation, response and recovery capabilities.	FEMA 500 C Street S.W. Washington, DC 20472 Phone (202) 646-4621 www.fema.gov
Community Development Grant Program (CDBG)	U.S. Department of Housing and Urban Development	To develop viable urban communities by providing decent housing and a suitable living environment. Principally for low-to-moderate income individuals.	HUD 451 7th Street, S. W. Washington, DC 20410-7000 Phone: (202) 708-3587 www.hud.gov
Public Assistance Program (PA)	U.S. Department of Homeland Security, Federal Emergency Management Agency	To provide supplemental assistance to States, local governments, and certain private nonprofit organizations to alleviate suffering and hardship resulting from major disasters or emergencies declared by the President. Under Section 406, Public Assistance funds may be used to mitigate the impact of future disasters.	FEMA 500 C Street S.W. Washington, DC 20472 Phone (202) 646-4621 www.fema.gov

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Emergency Watershed Protection	U.S. Department of Agriculture, Natural Resource Conservation Service	To provide emergency technical and financial assistance to install or repair structures that reduce runoff and prevent soil erosion to safeguard life and property.	NRCS PO BOX 2890 Washington, DC 20013 Phone: (202) 720-3527 www.nrcs.usda.gov
Land and Water Conservation Fund Grants	U. S. Department of the Interior, National Park Service	To acquire and develop outdoor recreation areas and facilities for the general public, to meet current and future needs.	NPS PO Box 37217 Washington, DC 20013-7127 Phone: (202) 565-1200 www.nps.gov
Disaster Mitigation and Technical Assistance Grants	U.S. Department of Commerce, Economic Development Administration	To help States and localities to develop and /or implement a variety of disaster mitigation strategies.	EDA Herbert C. Hoover Building Washington, DC 20230 Phone: (800) 345-1222 www.eda.gov
Watershed Surveys and Planning	U.S. Department of Agriculture, Natural Resource Conservation Service	To provide planning assistance to Federal, State, and local agencies for the development of coordination water and related land resources programs in watersheds and river basins	NRCS PO Box 2890 Washington, DC 20013 Phone: (202) 720-3527 www.nrcs.usda.gov

National Earthquake Hazards Reduction Program (NEHRP)	U.S. Department of Homeland Security, Federal Emergency Management Agency	To mitigate earthquake losses that can occur in many parts of the nation providing earth science data and assessments essential for warning of imminent damaging earthquakes, land-use planning, engineering design, and emergency preparedness decisions.	FEMA 500 C Street S.W. Washington, DC 20472 Phone (202) 646-4621 www.fema.gov
Assistance to Firefighters Grant	U. S. Department of Homeland Security, Federal Emergency Management Agency	Competitively awarded project grants to provide direct assistance, on a competitive basis, to fire departments for the purpose of protecting the health and safety of the public and firefighting personnel against fire and fire-related hazards	FEMA 500 C Street S.W. Washington, DC 20472 Phone (202) 646-4621 www.fema.gov
Fire Management Assistance Grants	U. S. Department of Homeland Security, Federal Emergency Management Agency	To provide project grants and the provision of specialized services for the mitigation, management, and control of fires that would constitute a major disaster.	FEMA 500 C Street S.W. Washington, DC 20472 Phone (202) 646-4621 www.fema.gov

Engineering for Natural Hazards	National Science Foundation	Supports fundamental research that advances knowledge for understanding and mitigating the impact of natural hazards on constructed civil infrastructure	National Science Foundation Phone: (703) 292-7024 https://www.nsf.gov

7.5 Mitigation Outreach and Partnerships

In addition to the capabilities and funding sources listed in sections 7.1 – 7.4, Riverside County provides training, exercises, workshops and volunteer management to non-profit organizations, faith-based organizations, businesses, and other local municipalities and programs to better accomplish mitigation.

Various communities as well as County of Riverside Emergency Management Department provides Community Emergency Response Team (CERT) training to the public and county employees. Following a major disaster, first responders who provide fire and medical assistance will not be able to immediately meet all of the demands for their services. The Community Emergency Response Team (CERT) Program provides for community and employee self-sufficiency in order to meet the general public's urgent life-saving and sustenance needs until emergency personnel arrive. The Community Emergency Response Team (CERT) Program educates people about disaster preparedness and trains them in basic response skills, such as fire safety, light search and rescue, and disaster medial operations. CERT members assist their fellow citizens/coworkers in their community or workplace following a disaster. CERT members take an active role in their community by preparing for a disaster, thus reducing their own impact risk.

There are currently Twenty (22) jurisdictions supporting CERT Programs within the County: Riverside County EMD, Beaumont, Corona, Indio, La Quinta, Lake Elsinore, Cathedral City, Moreno Valley, Murrieta, Palm Springs, Perris, Riverside, Temecula, San Jacinto, Menifee, Wildomar, Canyon Lake, Rancho Mirage, Desert Hot Springs, Palm Desert, Blythe and the town of Idyllwild.

In addition to the volunteer program, EMD coordinates the Radio Amateur Civil Emergency Service (RACES), a group of licensed radio amateurs who operate during declared emergencies. Once activated by local, county or State jurisdictions, RACES may assist any agency to provide emergency communications support as requested by the County of Riverside. RACES members trains volunteers how to operate amateur radios to mitigate communication failures. RACES members conduct radio tests to ensure critical facilities, including hospitals, maintain redundant communications in case of a failure. The County manages the Medical Reserve Corps (MRC) which coordinates the skills of practicing and retired physicians, nurses and other health professionals as well as other citizens interested in health issues. MRC focuses on these specific personnel who are eager to volunteer in order to address their community's ongoing public health needs and to help their community during large-scale emergency situations. MRC volunteers may also serve a vital role by assisting their communities with ongoing public

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health needs through public awareness of disease outbreaks, immunizations, screenings, health and nutrition education and volunteering in community health centers and local hospitals.

EMD joins forces with the Riverside University Health System – Public Health (RUHS-PH) by providing a flu clinic for community members to receive their flu shot free of charge. This clinic provides a means for the County to mitigate pandemic flu as a hazard by vaccinating more people, reducing the impact or risk of a pandemic flu outbreak.

EMD coordinates with RUHS-PH, the Riverside Emergency Medical Services Agency (REMSA), hospitals, local health care facilities, and other disciplines to develop the annual Statewide Medical Health Exercise (SWMHE). Each year the state selects a scenario focusing on testing objectives designed to improve understanding of response procedures, building collaborative relationships, and identify areas of improvement. The SWMHE plays a critical role in the on-going support to Public Health and Medical preparedness and mitigation efforts by local, regional, and State agencies. Participation in the exercise allows hospitals, ambulance providers, law enforcement, and fire to test and validate policies, plans, procedures, training, equipment, and agreements. In addition, it helps clarify and train personnel in roles and responsibilities, improve interagency coordination, identify gaps in resources and response plans, strengthen relationships among all participating agencies, meet various requirements from regulatory and accreditation agencies.

EMD provides a Healthcare Operations Decontamination (HCO-D) course to train hospital staff and county first responders to improve their abilities, mitigating hazmat incidents. This course allows healthcare workers to improve their response capabilities, reducing the impact of the hazmat incident on patients, community members and their facilities.

Workshops and trainings on plan developing are offered by EMD staff to assist jurisdictions create plans that can address mitigation actions for affecting hazards. For example, Point of Dispensing (POD) trainings and workshops are provided to cities and other disciplines in Riverside County to allow them to be prepared and diminish the effect of a disease outbreak. With the help of EMD, the jurisdictions can create an approved plan that will list some of the actions they have or would like to have in place to prevent their community members from being affected by emergent diseases.

EMD administers the Hospital Preparedness Program (HPP) grant. The grant provides funds to purchase emergency equipment, ensuring hospitals, clinics, and long-term facilities throughout the county are equipped with the proper supplies to help prevent and

mitigate the effects of disasters. The grant also funds training for healthcare workers to increase their skills and abilities in mitigating hazards.

Citizen Corps Councils have additionally been established in the Temecula, Lake Elsinore, Wildomar and Jurupa Valley. These provide a cadre of credentialed volunteers for the jurisdiction to utilize during a disaster response.

Riverside County has an established General Plan that was updated and adopted in December 2015. According to the County's Transportation & Land Management Agency (TLMA), the plan is designed to ensure that the County retains its core identity by guiding future growth. This growth should respect the diversity of the region and configure development in relation to the land it occupies and ensures that its various parts relate. It is the County's over-arching policy to document for land use matters. It also determines housing needs, need for roads, and locations for commercial and industrial use will be better suited throughout the County for the next 20 years and beyond. The overall implementation process of the LHMP can be supported by the General Plan through the incorporation of mitigation actions, goals, or polices.

The Zoning Ordinance for Riverside County administers the County's General Plan. TLMA states that while the General Plan identifies land use designations in the long-term, the Zoning Ordinance identifies specific and immediate uses for land. The General Plan's successful implementation can only occur if the County of Riverside Zoning Ordinance is updated and consistent with the plan as state law mandates General Plan-Zoning consistency and is able to implement the long-term intent of the Plan. Implementation of mitigation actions that include improving structures can be accomplished by adopting them into this Ordinance.

The Subdivision Ordinance for Riverside County is mandated by State law to conduct a local approval of land subdivision via the Subdivision Map Act. TLMA implies that local review of proposed subdivisions and parcel maps includes assessment of consistency with, and implementation of, the County's General Plan. This ordinance can have the ability to support the implementation of mitigation objectives and policies stated in the LHMP.

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Section 8.0 – Goals and Strategies

8.1 Goals and Objectives

Goal 1: Reduce Loss of Life and Injuries

Objective 1.1: Provide timely notification and direction to the public in preparation for imminent and potential hazards.

Objective 1.2: Protect public health and safety through mitigation, preparing for, responding to, and recovering from the effects of natural, technological or man-made disasters.

Objective 1.3: Reduce hazard impacts and protect life, property and the environment from damages.

Objective 1.4: Improve understanding of the type, location and effects of hazards and vulnerabilities, as well as measures needed to protect life.

Goal 2: Reduce Hazard Related Property Losses

Objective 2.1: Encourage new development to occur in locations that avoid or minimize exposure to hazards. Continue to utilize County Ordinance 458, in concerns to NFIP and flood hazard areas and County Ordinance 460, in concerns to land use.

Objective 2.2: Reduce hazard related property losses by enforcing strong building codes.

Objective 2.3: Reduce repetitive losses for fire, flood, and earthquakes by encouraging protective measures and by anticipating future events.

Objective 2.4: Reduce hazard impacts to critical facilities, utilities and services through the implementation of low cost mitigation strategies.

Objective 2.5: Continue to strengthen land use regulations in high hazard areas.

Goal 3: Protect the Environment

Objective 3.1: Mitigate the impact of recurring drought conditions that impact both ground water supply and the agricultural industry.

Objective 3.2: Reduce hazards that adversely impact habitats, especially in regions with endangered species.

Goal 4: Maintain Coordination of Disaster Planning and Integrated Public Policy

Objective 4.1: Incorporate changes within Cal OES and FEMA that may affect public policy and planning.

Objective 4.2: Incorporate mitigation related activities into other disaster planning mechanisms, such as the Riverside County General Plan and Capital Improvement Plan.

Goal 5: Improve Community and Agency Awareness

Objective 5.1: Increase public threat awareness in concerns to the nature and extent of hazards they may be exposed to and where they can occur.

Objective 5.2: Improve mitigation and hazard related outreach to businesses, county departments, and stakeholders to increase their understanding of the threats within the county and actions they can take to reduce those hazard impacts.

8.2 Prioritizing Strategies

For the 2017 LHMP, the County assessed each strategy based on the goals and objectives in the LHMP and the General Plan. The process used by the County to prioritize goals and their respective objectives consisted of an evaluation of the hazards and their threat from the 2012 LHMP reviewing any events that occurred 2012 to 2017, and evaluating these against potential impacts. The participating Cities and Special Districts have identified their mitigation strategies in their stand-alone Annexes that are specific to their area of authority or jurisdiction.

8.3 Future and Current Mitigation Strategies

The Riverside County General Plan, adopted in December 2015, includes the following policies and recommendations for new construction and proposals in Safety Element 4:

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Earthquake Hazards:

S 1.1 Mitigate hazard impacts through adoption and strict enforcement of current building codes, which will be amended as necessary when local deficiencies are identified.

S 1.2 Enforce state laws aimed at identification, inventory, and retrofit of existing vulnerable structures.

S 2.1 Minimize fault rupture hazards through enforcement of Alquist-Priolo Earthquake Fault Zoning Act provisions and the following policies: (AI 80, 91)

a. Require geologic studies or analyses for critical structures, lifeline, high-occupancy, schools, and high-risk structures within 0.5 miles of all Quaternary historic faults shown on the Earthquake Fault Studies Zones map.
b. Require geologic trenching studies within all designated Earthquake Fault Studies Zones, unless adequate evidence, as determined and accepted by the Riverside County Engineering Geologist, is presented. The County of Riverside may require geologic trenching of non-zoned faults for especially critical or vulnerable structures or lifelines.
c. Require that lifelines be designed to resist, without failure, their crossing of a fault, should fault rupture occur.
d. Support efforts by the California Department of Conservation, California Geological Survey to develop geologic and engineering solutions in areas of ground deformation due to faulting and seismic activity, in those areas where a through-going fault cannot be reliably located.

S 2.2 Require geological and geotechnical investigations in areas with potential for earthquake-induced liquefaction, landsliding or settlement, for any building proposed for human occupancy and any structure whose damage would cause harm, except for accessory buildings.

S 2.5 Require that engineered slopes be designed to resist seismically- induced failure. For lower-risk projects, slope design could be based on pseudo-static stability analyses using soil engineering parameters that are established on a site-specific basis. For higher-risk projects, the stability analyses should factor in the intensity of expected ground shaking, using a Newmark-type deformation analysis.

S 2.6 Require that cut and fill transition lots be over-excavated to mitigate the potential of seismically-induced differential settlement.

S 2.7 Require a 100% maximum variation of fill depths beneath structures to mitigate the potential of seismically-induced differential settlement.

Flood Hazards:

S 4.1 For new construction and proposals for substantial improvements to residential and nonresidential development within 100-year floodplains as mapped by FEMA or as determined by site specific hydrologic studies for areas not mapped by FEMA, Riverside County shall apply a minimum level of acceptable risk; and disapprove projects that cannot mitigate the hazard to the satisfaction of the Building Official or other responsible agency.

S 4.2 The County shall enforce provisions of the Building Code in conjunction with the following guidelines: (AI 25)

a. All residential, commercial and industrial structures shall be flood-proofed from the mapped 100-year storm flow. This may require that the finished floor elevation be constructed at such a height as to meet this requirement. Non-residential (commercial or industrial) structures may be allowed with a "flood-proofed" finished floor below the Base Flood Elevation (i.e., 100-year flood surface) to the extent permitted by state, federal and local regulations. New critical facilities shall be constructed above grade to the satisfaction of the Building Official, based on federal, state, or other reliable hydrologic studies. To the extent that residential, commercial, or industrial structures cannot meet these standards, they shall not be approved.
b. Critical facilities shall not be permitted in floodplains unless the project design ensures that there are two routes for emergency egress and regress, and minimizes the potential for debris or flooding to block emergency routes, either through the construction of dikes, bridges, or large-diameter storm drains under roads used for primary access.
c. Development using, storing, or otherwise involved with substantial quantities of onsite hazardous materials shall not be permitted within a 100-year floodplain or dam inundation zone, unless all standards for evaluation, anchoring, and flood-proofing have been satisfied; and hazardous materials are stored in watertight containers, not capable of floating, to the extent required by state and federal laws and regulations.
d. Specific flood-proofing measures may require: use of paints, membranes, or mortar to reduce water seepage through walls; installation of water tight doors, bulkheads, and shutters; installation of flood water pumps in structures; and proper modification and protection of all electrical equipment, circuits, and

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appliances so that the risk of electrocution or fire is eliminated. However, fully enclosed areas that are below finished floors shall require openings to equalize the forces on both sides of the walls.

S 4.3 Prohibit construction of permanent structures for human housing or employment to the extent necessary to convey floodwaters without property damage or risk to public safety. Agricultural, recreational, or other low intensity uses are allowable if flood control and groundwater recharge functions are maintained.

S 4.4 Prohibit alteration of floodways and channelization unless alternative methods of flood control are not technically feasible or unless alternative methods are utilized to the maximum extent practicable. The intent is to balance the need for protection with prudent land use solutions, recreation needs, and habitat requirements, and as applicable to provide incentives for natural watercourse preservation, including density transfer programs as may be adopted. (AI 25, 60) a. Prohibit the construction, location, or substantial improvement of structures in areas designated as floodways, except upon approval of a plan which provides that the proposed development will not result in any significant increase in flood levels during the occurrence of a 100-year flood discharge. b. Prohibit the filling or grading of land for nonagricultural purposes and for non-authorized flood control purposes in areas designated as floodways, except upon approval of a plan which provides that the proposed development will not result in any significant increase in flood levels during the occurrence of a 100-year flood discharge.

S 4.5 Prohibit substantial modification to watercourses, unless modification does not increase erosion or adjacent sedimentation, or increase water velocities, so as to be detrimental to adjacent property, nor adversely affect adjacent wetlands or riparian habitat.

S 4.6 Direct flood control improvement measures toward the protection of existing and planned development.

S 4.7 Any substantial modification to a watercourse shall be done in the least environmentally damaging manner practicable in order to maintain adequate wildlife corridors and linkages and maximize groundwater recharge.

S 4.8 Allow development within the floodway fringe, if the proposed structures can be adequately flood-proofed and will not contribute to property damage or risks to public safety.

S 4.9 Within the floodway fringe of a floodplain as mapped by FEMA or as determined by site specific hydrologic studies for areas not mapped by FEMA, require development to be capable of withstanding flooding and to minimize use of fill. However, some development may be compatible within flood plains and floodways, as may some other land uses. In such cases, flood proofing would not be required. Compatible uses shall not, however, obstruct flows or adversely affect upstream or downstream properties with increased velocities, erosion backwater effects, or concentrations of flows.

S 4.10 Require all proposed projects anywhere in the county to address and mitigate any adverse impacts that it may have on the carrying capacity of local and regional storm drain systems.

S 4.11 Encourage neighboring jurisdictions to require development occurring adjacent to the County to consider the impact of flooding and flood control measures on properties within unincorporated Riverside County.

Fire Hazards:

S 5.1 Develop and enforce construction and design standards that ensure that proposed development incorporates fire prevention features through the following:

a. All proposed development and construction within Fire Hazard Severity Zones shall be reviewed by the Riverside County Fire and Building and Safety departments.
b. All proposed development and construction shall meet minimum standards for fire safety as defined in the Riverside County Building or County Fire Codes, or by County zoning, or as dictated by the Building Official or the Transportation Land Management Agency based on building type, design, occupancy, and use.
c. In addition to the standards and guidelines of the California Building Code and California Fire Code fire safety provisions, continue to implement additional standards for high-risk, high occupancy, dependent, and essential facilities where appropriate under the Riverside County Fire Code (Ordinance No. 787) Protection Ordinance. These shall include assurance that structural and nonstructural architectural elements of the building will not impede emergency egress for fire safety staffing/personnel, equipment, and apparatus; nor hinder evacuation from fire, including potential blockage of stairways or fire doors
d. Proposed development and construction in Fire Hazard Severity Zones shall provide secondary public access, in accordance with Riverside County Ordinances.

e. Proposed development and construction in Fire Hazard Severity Zones shall use single loaded roads to enhance fuel modification areas, unless otherwise determined by the Riverside County Fire Chief.
f. Proposed development and construction in Fire Hazard Severity Zones shall provide a defensible space or fuel modification zones to be located, designed, and constructed that provide adequate defensibility from wildfires.

S 5.2 Encourage continued operation of programs for fuel breaks, brush management, controlled burning, revegetation and fire roads.

S 5.3 Monitor fire-prevention measures (such as fuel reduction) through a site specific fire-prevention plan to reduce long-term fire risks in the Fire Hazard Severity Zones.

S 5.4 Limit or prohibit development or activities in areas lacking water and access roads.

S 5.5 Encourage proposed development in Fire Hazard Severity Zones to develop where fire and emergency services are available or planned.

S 5.6 Demonstrate that the proposed development can provide fire services that meet the minimum travel times identified in Riverside County Fire Department Fire Protection and EMS Strategic Master Plan.

S 5.7 Minimize pockets of flammable vegetation that increase likelihood of fire spread through conceptual landscaping plans to be reviewed by Planning and Fire Departments in the Fire Hazard Severity Zones. The conceptual landscaping plan of the proposed development shall at a minimum include:

a. Plant palette suitable for high fire hazard areas to reduce the risk of fire hazards.
b. Retention of existing natural vegetation to the maximum extent feasible.
c. Removal of onsite combustible plants.

S 5.8 Design to account for topography of a site and reduce the increased risk from fires in the Fire Hazard Severity Zones located near ridgelines, plateau escarpments, saddles, hillsides, peaks, or other areas where the terrain or topography affect its susceptibility to wildfires by:

a. Providing fuel modification zones with removal of combustible vegetation, but minimizing visual impacts and limiting soil erosion.
b. Replacing combustible vegetation with fire resistant vegetation to stabilize slopes.
c. Submitting topographic map with site specific slope analysis.

d. Submitting erosion and sedimentation control plans.
e. Providing a minimum 30 foot of setback from the edge of the fuel modification zones.
f. Minimizing disturbance of 25% or greater natural slopes.

S 5.9 Reduce fire threat and strengthen fire-fighting capability so that the County could successfully respond to multiple fires. (AI 88)

S 5.10 Require automatic natural gas shutoff earthquake sensors in high-occupancy industrial and commercial facilities, and encourage them for all residences.

S 5.11 Utilize ongoing brush clearance fire inspections to educate homeowners on fire prevention tips by implementing annual countywide weed abatement program

S 5.12 Conduct and implement long-range fire safety planning, including stringent building, fire, subdivision, and municipal code standards, improved infrastructure, and improved mutual aid agreements with the private and public sector.

S 5.13 Develop a program to utilize existing reservoirs, tanks, and water wells in the county for emergency fire suppression water sources.

S 5.14 Periodically review inter-jurisdictional fire response agreements, and improve firefighting resources as recommended in the Riverside County Fire Department Fire Protection Plan and EMS Strategic Master Plan to keep pace with development, including construction of additional high-rises, mid-rise business parks, increasing numbers of facilities housing immobile populations, and the risk posed by multiple ignitions, to ensure that (AI 4, AI 88):

- Fire reporting and response times do not exceed the goals listed in the Riverside County Fire Department Fire Protection Plan and EMS Strategic Master Plan identified for each of the development densities described.
- Fire flow requirements (water for fire protection) are consistent with Riverside County Ordinance 787.
- The planned deployment and height of aerial ladders and other specialized equipment and apparatus are sufficient for the intensity of development desired.

S 5.15 Continue to utilize the Riverside County Fire Department Fire Protection Plan and EMS Strategic Master Plan as the base document to implement the goals and objectives of the Safety Element.

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S 5.16 Encourage property owners to utilize clustering and Transfer of Development Rights (TDR) program when developing lands within Fire Hazard Severity Zones by:

- Restricting the development of a property through placement of conservation easement.
- Acquiring the conservation easements similar to that of MSHCP Program.

S 5.17 Identify, map, and update on an as-needed continual basis, the Fire Hazard Severity Zone maps.

S 5.18 Ensure that the Fire Department has appropriate municipal staffing and fire protection planning staff that meet the needs of development pressure and adequately respond to long range fire safety planning.

S 5.19 Implement a coordination program with fire protection and emergency service providers to reassess fire hazards after wildfire events and to adjust fire prevention and suppression needs, as necessary.

S 5.20 Implement a regional coordination program to increase support for coordination among fire protection and emergency service providers.

S 5.21 Implement a long-term training and education program among government agencies and communities about fire protection.

Wind Hazards:

S 3.11 Require studies that address the potential of this hazard on proposed development within “High” and “Very High” wind erosion hazard zones as shown on Figure S-8, Wind Erosion Susceptibility Map.

S 3.12 Include a disclosure about wind erosion susceptibility on property title for those properties located within “High” and “Very High” wind erosion hazard zones as shown on Figure S-8, Wind Erosion Susceptibility Map.

S 3.13 Require buildings to be designed to resist wind loads.

S 3.14 Educate builders about the wind environment and encourage them to design projects accordingly

8.4 Ongoing Mitigation Strategies

8.4.1 Earthquake Strategies

Retrofitting Against Earthquake:

Earthquake retrofitting measures include removing masonry overhangs that will fall onto the street during shaking. Bracing the building provides structural stability, but can be very expensive. Less expensive approaches may be more cost effective for an area like that faces a relatively low earthquake threat. These include tying down appliances, water heaters, bookcases and fragile furniture so they won't fall over during a quake and installing flexible utility connections that will not break when shaken.

8.4.2 Flood Strategies

Generally, natural, man-made, and technological hazards impact people and improved property the most. Vacant space may incur damages as well, but the threat to life and property is greatly decreased. In some cases, properties can be modified so the hazard does not reach the damage-prone improvements. Flooding is the one of those hazards that can be kept away from a structure. There are five common methods to do this:

- Retrofit the building
- Create a barrier between the building and the source of flooding
- Move the building out of the flood-prone area
- Elevate the building above the flood level
- Demolish the building.

Retrofitting Against Flooding:

Flood retrofitting measures include dry flood proofing where all areas below the flood protection level are made watertight. Walls are coated with waterproofing compounds or plastic sheeting. Openings (doors, windows, and vents) are closed, either permanently, with removable shields, or with sandbags. Dry flood proofing of new and existing nonresidential buildings in the regulatory floodplain is permitted under State, FEMA and local regulations. Dry flood proofing of existing residential buildings in the floodplain is also permitted as long as the building is not substantially damaged or being substantially improved. Owners of buildings located outside the regulatory floodplain can always use dry flood proofing techniques.

The alternative to dry flood proofing is wet flood proofing: water is let in and everything that could be damaged by a flood is removed or elevated above the flood level. Structural components below the flood level are replaced with materials that are not subject to water

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damage. This is the approach used for the first floor of the elevated homes. For example, concrete block walls are used instead of wooden studs and gypsum wallboard. The furnace, water heater, and laundry facilities are permanently relocated to a higher floor. Where the flooding is not deep, these appliances can be raised on blocks or platforms.

Barriers:

An effective way of keeping flood water away from a structure is to construct a barrier. This barrier can be built of dirt or soil, berms, concrete, steel, a floodwall or through a simple sand-bagging operation. In areas subject to flash flooding, deep waters, or other high hazard, relocation and evacuation is often the only safe and responsible approach.

Careful design is needed so as not to create flooding or drainage problems on neighboring properties. Depending on how porous the ground is, if floodwaters will stay up for more than an hour or two, the design needs to account for leaks, seepage of water underneath, and rainwater that falls inside the perimeter. This is usually done with a sump and/or drain to collect the internal groundwater and surface water and a pump and pipe to pump the internal drainage over the barrier.

Barriers can only be built so high. They can be overtopped by higher than expected flood waters. Barriers made of earth are susceptible to erosion from rain and floodwaters if not properly sloped, covered with grass, and maintained. A berm can settle over time, lowering its protection level. A floodwall can crack, weaken, and lose its watertight seal. Therefore, barriers need careful design and maintenance (and insurance on the building, in case of failure).

Relocation:

Moving a structure to higher ground is the surest and safest way to protect it from flooding. While almost any building can be moved, the cost goes up for heavier structures, such as those with exterior brick and stone walls, and for large or irregularly shaped buildings. However, experienced building movers can handle most job.

In areas subject to flash flooding, deep waters, or other high hazard, relocation is often the only safe approach. Relocation is also preferred for large lots that include buildable areas outside the floodplain or where the owner has a new flood-free lot (or portion of the existing lot) available.

Elevation:

Raising a building above the flood level can be almost as effective as moving it out of the floodplain. Water flows under the building, causing little or no damage to the structure or its contents.

Raising a building above the flood level is cheaper than moving it and can be less disruptive to a neighborhood. Elevation has proven to be an acceptable and reasonable means of complying with floodplain regulations that require new, substantially improved, and substantially damaged buildings to be elevated above the base flood elevation.

One concern with elevation is that it may expose the structure to greater impacts from other hazards. If not braced and anchored properly, an elevated building may have less resistance to the shaking of an earthquake and the pressures of high winds.

Demolition:

Some buildings, especially heavily damaged or repetitively flooded ones, are not worth the expense to protect them from future damage. It is cheaper to demolish them and either replace them with new, flood protected structures ("pilot reconstruction"), or relocate the occupants to a safer site. Demolition is also appropriate for buildings that are difficult to move—such as larger, slab foundation, or masonry structures—and for dilapidated structures that are not worth protecting. Generally, demolition projects are undertaken by a government agency, so the cost is not borne by the property owner, and the land is converted to public open space use, such as a park.

One potential problem is sometimes an acquisition and demolition project is a "checkerboard" pattern in which nonadjacent properties are acquired. This can occur when some owners, especially those who have and prefer a waterfront location, prove reluctant to leave. Creating such an acquisition pattern in a community simply adds to the maintenance costs that taxpayers must support.

8.4.3 Fire Strategies

Wildfire:

One way to lessen the threat of a fire is by keeping fuel away from buildings. This is called the concept of "defensible space." Defensible space involves providing sufficient space between the structure and flammable vegetation.

Within this space, the fire service has room to battle the wildfire before it reaches the structure or to stop a structural fire before it ignites the wildland vegetation. With sufficient

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defensible space, the structure even has a chance to survive on its own when fire service personnel and equipment are not available, as often happens during a significant wildfire.

The 2003 Fire Siege was perhaps the worst fire disaster in Southern California history. The firestorm that raged through the region consisted of 14 major fires that quickly exhausted resources and lasted for multiple weeks. The lessons from that fire season served as a warning for everyone living in areas prone to fire danger and resulted in stronger fire prevention and mitigation efforts.

In January 2005 a new state law became effective that extended the defensible space clearance around homes and structures from 30 feet to 100 feet. Proper clearance to 100 feet dramatically increases the chance of your house surviving a wildfire. This defensible space also provides for firefighter safety when protecting homes during a wildland fire. Riverside County Ordinance No. 859 Water Efficient Landscape Requirements mentions the use of defensible space and avoiding the use of fire-prone plant materials. Ordinance No. 695 Abatement of Hazardous Vegetation effective July 16, 2009 states "a one hundred (100) foot wide strip of land around structure(s) located on an adjacent improved parcel"

Riverside County has a Fire Protection contract with Cal Fire and utilizes many of their materials to educate individuals on why they should maintain a proper defensible space.

Public Fire Education:

Family Escape Plan:

In a County as fire prone as Riverside, you can never be too fire safe. Throughout Southern California, wildfire danger is a year-around threat. Our goal is to make each and every home more fire safe. We ask residents to make sure they have a fire escape plan, and that they practice what to do in an emergency.

Smoke Alarms:

Over ninety-three percent of all homes in the United States have at least one smoke alarm. The bad news is that one third of them are not working. The County encourages residents to make sure their smoke alarms are operating correctly by testing them regularly.

8.4.4 All Hazard Strategies

Facility Audits:

One of the first things we can do to reduce loss of structures within the County of Riverside is to evaluate all critical facilities' that are exposed to potential damage from the hazards. We should include a review of insurance coverage and identify where more information can be found on the property protection measure(s) recommended by the audit. Typically property protection measures are used to modify buildings or property that has a greater potential to damage. Property protection measures fall under three approaches:

- Modify the site to keep the hazard from reaching the building
- Modify the building so it can withstand the impacts of the hazard
- Insure the property owner receives the opportunity for financial relief after the damage has occurred, This is usually received under the owners insurance policies or technical and financial assistance can be provided by a government agency

Other measures:

- Burying utility lines is a retrofitting measure that addresses earthquakes, winds from tornadoes, thunderstorms, and the ice that accompanies winter storms.
- Installing or incorporating backup power supplies minimizes the effects of power losses caused by downed lines.
- Roofs can be replaced with materials less susceptible to damage by hazards, such as modified asphalt or formed steel shingles and other fireproof materials
- Wildfire mitigation in residential properties can include installing spark arrestors on chimneys.
- Winter storm retrofitting measures include improving insulation on older buildings, relocating water lines from outside walls to interior spaces, and insulating water lines in crawlspaces and under elevated buildings.
- Windows can be sealed or covered with an extra layer of glass (storm windows) or plastic sheeting.

8.5 Mitigation Actions

County Hazard Mitigation Goals and Actions:

The Agency Inventory Document and Mitigation Strategies and Goals, were used by the county and each participating city and special district to review the possible mitigation

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actions that would be appropriate for that agency to work on. This is based on how the Riverside County planning area can reduce the vulnerability of people, property, infrastructure, and natural and cultural resources to future disaster losses. Only those actions where the County is the lead jurisdiction are detailed further in Section 4.3. Actions specific to other participating jurisdictions are detailed in the jurisdictional annexes.

It is important to note that Riverside County and the participating jurisdictions have numerous existing, detailed action descriptions, which include benefit-cost estimates, in other planning documents, such as the General Plan, community wildfire protection plans and capital improvement budgets and reports. These actions are considered to be part of this plan, and the details, to avoid duplication, should be referenced in their original source document. The Riverside County planning area also realizes that new needs and priorities may arise as a result of a disaster or other circumstances and reserves the right to support new actions, as necessary, as long as they conform to the overall goals of this plan.

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Section 9.0 Plan Implementation and Maintenance Process

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. This section provides an overview of the overall strategy for plan implementation and maintenance. It also outlines the method and proposed schedule for monitoring, updating, and evaluating the plan. The chapter will discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

9.1 Implementation

The Riverside County Operational Area Multi-Jurisdiction Local Hazard Mitigation Plan is a partnership between the jurisdictions involved. Implementation prioritization is determined during the planning process and after taking funding into consideration. Economic constraints make low or no-cost actions most easily accomplished in plan implementation.

A highly effective and low cost implementation mechanism is the incorporation of our hazard mitigation plan recommendations into Operational Area and other planning efforts discussed in more detail below. Another strategy is for participating jurisdictions to assimilate mitigation strategies into their day-to-day functions and priorities. This effort will be achieved by monitoring agenda, attending stakeholder meetings, and review of programs and policies for coordination and opportunities to implement mitigation strategies. Riverside County Operational Area will also monitor funding opportunities to facilitate the implementation of more costly recommended actions. The County will assist in the identification of specialized pre- and post- disaster funds, state and federal earmarked funds, and other grant programs for opportunities to implement mitigation actions and identified projects.

The primary duty of the participating jurisdictions is to participate in reporting to their community governing boards and the public on the status of their plan implantation and mitigation opportunities and keep the County of Riverside EMD updated of changes to the status of their recommended actions or priorities. The primary duty of the County will be to promote mitigation action funding opportunities, organize Steering Committee meetings for plan evaluation and potential updates on a yearly basis and post any relevant information on the County website and others as appropriate.

9.2 Role of Hazard Mitigation Steering Committee

With the adoption of this plan, the participating jurisdictions will be responsible for the plan implementation and maintenance. The participating jurisdictions, led by County of Riverside Emergency Management Department will work to maintain a Hazard Mitigation Steering Committee to:

- Disseminate hazard mitigation activities and opportunities to all participants;
- Pursue the implementation of high-priority, low-cost mitigation actions;
- Monitor and identify cost-share and funding opportunities to support the community and recommended actions;
- Monitor and assist in implementation and evaluate updates of this plan;
- Support and assist ALL jurisdictions not included in the Multi-Jurisdictional Plan to develop their own stand-alone local hazard mitigation plans;
- Report on plan progress and changes to participating jurisdictions

9.3 Incorporation into Existing Planning Mechanisms

Incorporation of the hazard mitigation plan recommendations into other County and jurisdictional plans and policies is part of our implementation plan.

Plans include:

- County and City General Plans
- County and City Emergency Operations Plans
- County and City Ordinances
- Flood and Storm-water Management Master Plans
- Wildfire Protection Plans
- Capital Improvement Plans and Budgets

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- Other plans and policies outlined in the capability assessments in the jurisdictional annexes
- Other plans, regulation, and practices with a mitigation focus.

9.4 Maintenance

Plan maintenance will be an annual process by both the County and participating jurisdictions to monitor and evaluate the plans' implementation and to update the plan as progress, changes in actions or priorities, or changing circumstances are recognized. The County will notify Cal OES and FEMA with plan updates to ensure they have the most current version of a participating jurisdiction's plan.

County of Riverside Emergency Management Department, Preparedness Division, is responsible for initiating plan reviews, consulting and organizing a Hazard Mitigation Steering Committee Meeting and facilitating coordination with participating jurisdictions. In order to evaluate progress and update mitigation strategies identified in the plan, the County of Riverside EMD and the participating jurisdictions will review the plan annually and following a large scale event. County of Riverside EMD and participating jurisdictions will submit a five-year written update to Cal OES and FEMA Region IX, unless disaster or other circumstance (e.g., changing regulations) require a change to this schedule.

Maintenance Evaluation Process

The yearly review of the plan will be presented and discussed at our annual Operational Area Planning Committee, Disaster Council Meeting held in January. The assessment will address whether:

- The goals and objectives address current and expected conditions.
- The nature, magnitude, and/or type of risks have changed.
- The current resources are appropriate for implementing the plan.
- There are implementation problems, such as technical, political, legal, or coordination issues with other agencies.
- The outcomes have occurred as expected (a demonstration of progress).
- The agencies and other partners participated as originally proposed.

Updates to this plan will:

- Consider changes in vulnerability due to action implementation;
- Document and highlight instances where mitigation efforts have proven effective;
- Document new hazards and identify any hazards that were previously overlooked;
- Incorporate any new data or studies on identified hazards and risks;
- Incorporate growth and development-related changes to infrastructure inventories; and
- Incorporate any new action recommendations or changes in action or risk prioritization.

County of Riverside Emergency Management Department, Preparedness Division, will conduct a plan update 18 months prior to plan expiration. In addition, Riverside County EMD will seek grant funding to support the coordination and development of the plan update. Upon notice of the HMPG funding opportunity, Riverside will apply for any available HMGP funding. After plan adoption, the LHMP Steering Committee in coordination with the EMD Planning team will conduct an annual review of the plan, flagging any sections in the plan that will require further updates. The sections flagged for revision will be included in the next LHMP update. Additional meetings will occur annually throughout the five-year cycle. Changes will be made to the plan to accommodate for actions that are no longer relevant due to shifting agendas, funding or no longer considered feasible.

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10.0 Continued Public Involvement

The Riverside County Operational Area Multi-Jurisdiction Hazard Mitigation Plan update process has provided an opportunity to solicit participation from new and existing stakeholders, publicize successful mitigation strategies and actions, and seek public comments.

The County will continue its efforts to involve the public during the annual maintenance process and after any major events that lead to revisions in the plan.

The Riverside County Emergency Management Department and participating jurisdictions will be responsible for facilitating continued public and stakeholder involvement for their plan updates. They will do this through: input from the Hazard Mitigation Steering Committee, public outreach meetings, web and social media postings, press releases and public hearings for the plan's maintenance.

There are also opportunities for participating jurisdictions to obtain and share information with their stakeholders by participating in the Operational Area Planning Committee and the Disaster Council meetings.



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APPENDIX A – Resolution

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APPENDIX B – Participating Jurisdictions and Letters of Commitment

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LHMP Participant Database

Agency Title	In, Out, or New	Agency Type	Agency Discipline
Agua Caliente Band of Cahuilla Indians	DROPPED	Tribe	Tribe
Beaumont Unified	IN	School District	Education
City of Banning	IN	City	N/A
City of Beaumont	IN	City	N/A
City of Blythe	IN	City	N/A
City of Calimesa	IN	City	N/A
City of Canyon Lake	IN	City	N/A
City of Cathedral	IN	City	N/A
City of Coachella	IN	City	N/A
City of Corona	IN	City	N/A
City of Desert Hot Springs	IN	City	N/A
City of Eastvale	IN	City	N/A
City of Hemet	IN	City	N/A
City of Indian Wells	IN	City	N/A
City of Indio	IN	City	N/A
City of Jurupa Valley	IN	City	N/A
City of La Quinta	IN	City	N/A
City of Lake Elsinore	IN	City	N/A

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City of Murrieta	IN	City	N/A
City of Norco	IN	City	N/A
City of Palm Desert	IN	City	N/A
City of Palm Spring	IN	City	N/A
City of Perris	IN	City	N/A
City of Rancho Mirage	IN	City	N/A
City of Riverside	IN	City	N/A
City of San Jacinto	IN	City	N/A
City of Temecula	IN	City	N/A
City of Wildomar	IN	City	N/A
Desert Sands USD	NEW	School District	Education
Eastern Municipal Water	IN	Utilities	Water
Fern Valley Water	OUT	Utilities	Water
Hemet Unified School District	IN	School District	Education
High Valley Water	IN	Utilities	Water
Home Gardens County Water	OUT	Utilities	Water
Idyllwild Fire Protection	IN	Special District	Fire Protection
Idyllwild Water	OUT	Utilities	Water
Imperial Irrigation District	IN	Utilities	Water
Kaiser Hospital - Riverside	NEW	Hospital	Health Care

Lake Elsinore USD	IN	School District	Education
March Air Force Base	DROPPED	Military	Airforce
Menifee Union	OUT	School District	Education
Moreno Valley USD	NEW	School District	Education
Morongo Band of Mission Indians	NEW	Tribe	Tribe
Nuview Union	OUT	School District	Education
Palm Springs Unified	OUT	School District	Education
Perris Elementary	OUT	School District	Education
Perris Union HSD	IN	School District	Education
Pine Cove Water	OUT	Utilities	Water
Ramona Band of Indians	DROPPED	Tribe	Tribe
Rancho California Water	IN	Utilities	Water
Riverside Community Colleges	IN	School District	Education
Riverside County Office of Education	IN	County	Education
Riverside Unified School District	IN	School District	Education
San Gorgonio Memorial Healthcare	OUT	Special District	Healthcare
San Jacinto USD	IN	School District	Education
Santa Ana Watershed	IN	Utilities	Water
Val Verde Unified	OUT	School District	Education
Western Municipal Water	IN	Utilities	Water

Participant Contact Information

Local Hazard Mitigation Plan Contacts

Company	Last Name	First Name	Email Address	Job Title	Business Phone	Mobile Phone	Fax Number	Address	City	ZIP
Agua Caliente Band of Cahuilla Indians	Canales	Victoria	vcanales@aguacaliente.net	Emergency Services Coordinator	760.285.9271	760.699.6852		5401 Dinal Shore Dr.	Palm Springs	92264
Beaumont Unified	Evens	Mareesa	mevans@beaumontusd.k12.ca.us	Director of Risk Management	951.797.5366		951.797.6521			
City of Banning	Diaz	Alex	adiaz@ci.banning.ca.us	Chief of Police	951-849-1194	951-840-8563		125 E. Ramsey Street, P.O. Box 998	Banning	92220
City of Beaumont	Keyser	Mark	mkeyser@beaumontpd.org	Lieutenant	951-769-8500	951-529-7878	951.769.8506	660 Orange Avenue	Beaumont	92223
City of Blythe	Thomas	Kelly	KThomas@cityofblythe.ca.gov	Community Service Officer	760-922-6111.2241		760-922-3652	240 N Spring Street	Blythe	92225
City of Calimesa	Monson	Margaret	pworks@cityofcalimesa.net	Interim Public Works Director	(909) 795-9801 ext.235	(951) 538-4748		908 Park Avenue	Calimesa	92320
	Johnson	Bonnie	BJohnson@cityofcalimesa.net	City Manager	909.795.9801 ext.239		909.795.4399	908 Park Avenue	Calimesa	92320

City of Canyon Lake	A. Borja	Mark	mborja@cityofcanyonlake.com	Administrative Services Manager	(951)246-2024			31516 Railroad Canyon Road	Canyon Lake	92587
City of Cathedral	Hauser	Eric	ehauser@cathedralcity.gov	Chief	(760) 770-8200			32100 Desert Vista Rd.	Cathedral City	92234
	Wilson	Paul	pwilson@cathedralcity.gov	Fire Chief	760-770-8200			32100 Desert Vista Rd.	Cathedral	92234
City of Coachella	R. Torres	George	gtorres@coachella.org	Emergency Services Coordinator		(760) 501-8122	(760) 398-1630	53462 Enterprise Way	Coachella	92236
City of Corona	Moran-McGough	Gina	Gina.Moran-McGough@ci.corona.ca.us	Emergency Services Coordinator	(951) 736-2458	951-415-8071	(951) 270-2737	400 South Vicentia Avenue	Corona	92882
City of Desert Hot Springs	Brooks	Mark	mark.brooks@fire.ca.gov	Battalion Chief	760-343-3510	951-366-9295				
	Wilms	Doria	dwilms@cityofdhs.org	Deputy City Clerk	(760) 329-6411 ext. 260					
City of Eastvale	A. Rodriguez	Alia	Arodriguez@eastvaleca.gov	Senior Admin Analyst	951.703.4412		9517034760	12363 Limonite Ave., Suite 910	Eastvale	91752
City of Hemet	Mills	Jennifer	Jmills@cityofhemet.org	Emergency Services Coordinator	9517652451		9517652328	510 East Florida Avenue	Hemet	92543
City of Indian Wells and	Cadden	Eric	Eric.Cadden@rivco.org	Emergency Services Coordinator		760.578.2088	760.863.8882	4210 Riverwalk	Riverside	92505

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Palm Desert								Pkwy, Suite 300		
City of Indio	Kelly	Michelle	mkelly@indio.org	Emergency Services Coordinator						
			Michelle.Caldwell@rivco.org			760.766.5802				
City of Jurupa Valley	Rollings	Terri	trollings@jurupavalley.org	Assistant to the City Manager	951.332.6464	951.332.6995		8930 Limonite Ave.	Jurupa Valley	92509
City of La Quinta	Johnston	Zander	zjohnston@la-quinta.org	ESC	760.777.7044	7605016221		78495 Calle Tampico	La Quinta	92253
City of Lake Elsinore	DeSantiago	Rick	rdsantiago@lake-elsinore.org	Emergency Services Coordinator	951.674.3124		951.471.1251	130 S. Main Street	lake Elsinore	92530
	George Eakins	Catherine	ceakins@lake-elsinore.org	Administrative Assistant	951.674.5170 ext.241		951.471.1251	521 North Langstaff St.	Lake Elsinore	92530
City of Menifee	Glynn	Steven	sglynn@cityofmenifee.us	PW Manager	(951) 723-3719	(951) 775-6691	951.679.3843	29714 Haun Road	Menifee	92586
City of Moreno Valley	Wilkinson	Steve	stevew@moval.org	Management Analyst	951.486.6788			22870 Calle San Juan De Los Lagos - PO Box 88005	Moreno Valley	92552
	Bricker	Zuzzette	zuzzetteb@moval.org	City OEM	951.413.3809	951.337.0485		22870 Calle San Juan De Los Lagos - PO Box 88005	Moreno Valley	92552

City of Murrieta	Shuck	Ken	kshuck@MurrietaCA.gov.	Fire Marshal	951.461.6158		951.677.6799	41825 Juniper Street	Murrieta	92562
	Aylward	Terri	Taylward@MurrietaCA.gov	Fire Prevention Coordinator	951.461.6158		951.677.6799	41825 Juniper Street	Murrieta	92562
City of Norco	Lane	Scott	scott.lane@fire.ca.gov	Battalion Chief	(951) 737-8097				Norco	
	Schuchard	Gina	gschuchard@ci.norco.ca.us	Finance Officer	951.270.5650				Norco	
	Okoro	Andy	aokoro@ci.norco.ca.us	City Manager	951.570.5611	951.545.2017		3902 Hillside Avenue	Norco	92860
City of Palm Spring	Lebsock	Anjila	Anjila.lebsock@palmspringsca.gov	Emergency Service Coordinator	760-323-8185		760-778-8430	300 N. El Cielo Road	Palm Springs	92262
City of Perris	Martinez	David	dmartinez@cityofperris.org	Interim Building Official/Fire Marshal	951.443.1029 ext.228		951.943.3293	135 N. D Street	Perris	92570
City of Rancho Mirage	Kopp	Bud	budk@ranchomirageca.gov	Planning Manager	760.328.2266					
	Wilson	Britt	brittw@RanchoMirageCA.gov	Management Analyst	760.324.4511-230		(760) 324-9851	69825 Highway 111	Rancho Mirage	92270
City of Riverside	Annas	Mark	mannas@riversideca.gov	Emergency Operations Coordinator	951-320-8103	951-320-5321	951-320-8102	3085 St. Lawrence Street	Riverside	92504

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

City of Temecula	Cardenas	Roberto	roberto.cardenas@cityoftemecula.org	Fiscal Services Manager	951-693-3944		951-302-4159	41000 Main Street	Temecula	92590
City of Wildomar	Morales	Janet	jmorales@cityofwildomar.org	Senior Admin Analyst	951-677-7751.210		951.698.1463	23873 Clinton Keith Rd Ste. 201	Wildomar	92595
	Chapman	Les	lchapman@cityofwildomar.org	Public Works Superintendent	9 51-677-7751.205		951.698.1463	23873 Clinton Keith Rd Ste. 201	Wildomar	92595
Desert Sands USD	Nacua	Edward	edward.nacua@desertsands.us	Director of Security & Safety Services	760.771.8646	760.644.2269	760.771-8713	47950 Dune Palms Dr.	La Quinta	92253
Eastern Munic. Water	Hefley	Doug	hefleyd@emwd.org	Director of Safety, Risk and Emergency Management	951.928.377.4218	951.287.8627		P.O. Box 8300 2270 Trumble Road	Perris	92572
	Bray	Ryan	ryan.bray@rmpcorp.com	Technical Insulant, Risk and Emergency Management	949.282.0123 ext. 238			P.O. Box 8300 2270 Trumble Road	Perris	92572
Hemet Unified School District	Radford	Lyle	lradford@hemetusd.org	Safety and Security Technician	(951)765-5100 -2301			1791 West Acacia Ave	Hemet	92545
High Valley Water	Thornton	Nera	nthornton@highvalleywater.com	Office Administrator	951.849.2612		951.922.9667	47781 Twin Pines Rd.	Banning	92220

Idyllwild Fire Protection	Reitz	Patrick	chief@idyllwildfire.com	Chief	951-659-2153					
Imperial Irrigation District	Contreras	Jose	jscontreras@iid.com	Emergency Services Coordinator		760.604.5242		333 E Barioni Blvd	Imperial	92251
Kaiser Hospital - Riverside	Sankey	Corrie	Corrie.L.Sankey@KP.Org	Dir. Of EH&S	951.353.5513	951.595.3825	951.353.5159	10800 Magnolia Ave.	Riverside	92505
Lake Elsinore USD	Scranton	Julie	julie.scranton@leusd.k12.ca.us	Safety & Risk Services Supervisor	951.253.7181		951.245.6609	545 Chaney St.	Riverside	92530
March Air Force Base	Tucker	Marvin	marvin.tucker@us.af.mil	Chief, Emergency Management	951.655.4766			2991 Graeber St Bldg 1214	Riverside	92518
Moreno Valley USD	Evangelista	Tracy	tevangelista@mvusd.net		951.571.7500.17565					
Morongo Band of Mission Indians	Ellsworth	David	dellsworth@morongo-nsn.gov	EOC Deputy	951.755.5277	951.768.3311	951.572.6017	11581 Portrero Road	Banning	92220
	Velasquez Sr.	Floyd W.	fvelasquez@morongo-nsn.gov	Emergency Services Manager	951.572.6141	951.392.9828		12700 Pumarra Road	Banning	92220
	Johnson	Jesse	jjohnson@morongo-nsn.gov	Emergency Service Analyst	951-572-6071	951-392-4129				
Perris Union HSD	Miller	Judy	judy.miller@puhsd.org	Director of Risk Management	951.529.4691		951.943.5356	155 E. 4th St.	Perris	92570

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

	Smiderly	Christine	christine.smiderly@puhsd.org	Risk Management Secretary	(951) 943-6369 ext. 80282			155 E. 4th St.	Perris	92570
Ramona	Gomez	John	jgomez@ramona-nsn.gov	Project Manager	951.763.4105	951.941.4943		5610 Hwy 371, Ste. B P.O. Box 391670	Anza	92539
Rancho California Water	Morrison	Dave	morrisond@ranchowater.com	Safety Officer	951.296.6949	951.538.4398				
Riverside Community Colleges	W. Simmons	Michael	michael.simmons@rccd.edu	Director, Risk Management, Safety & Police	(951) 222-8128	(951) 206-8605	(951) 328-3502	3801 Market Street, 3rd Floor	Riverside	92501
Riverside County Office of Education	D'Amico	Michael	MDAMICO@rcoe.us	Safety, Emergency Preparedness Coordinator	951-826-6530	951-609-5537		3939 Thirteenth Street	Riverside	92501
Riverside Unified School District	Mueller	Ken	kmueller@rusd.k12.ca.us	Director of Maintenance and Operations	(951)788-7496 ext. 84001			3070 Washington Street	Riverside	92504
San Jacinto USD	Lawrence	Dawn	dlawrence@SanJacinto.k12.ca.us	Prep Coordinator	951.929.7700.4411	253.249.6282		2045 S. San Jacinto Ave.	San Jacinto	92583
Santa Ana Watershed	Quintero	Carlos	cquintero@sawpa.org	Senior Project Manager	951.354.4234	951.941.7611		11615 Sterling Avenue	Riverside	92503
Western Municipal	McMillien	Tom	tmcmillen@wmwd.com	Safety Officer	951.571.7252			14205 Meridian Parkway	Riverside	92518

Water District										

LETTERS OF COMMITMENT

Cities

City of Banning
City of Beaumont
City of Blythe
City of Calimesa
City of Canyon Lake
City of Cathedral
City of Coachella
City of Corona
City of Desert Hot Springs
City of Eastvale
City of Hemet
City of Indian Wells
City of Indio
City of Jurupa Valley
City of La Quinta
City of Lake Elsinore
City of Murrieta
City of Norco
City of Palm Desert
City of Palm Spring
City of Perris
City of Rancho Mirage
City of Riverside
City of San Jacinto
City of Temecula
City of Wildomar

Tribes

Agua Caliente Band of Cahuilla Indians – DROPPED
Morongo Band of Mission Indians
Ramona Band of Indians

Special Districts

Beaumont Unified
Desert Sands USD
Eastern Municipal Water
Hemet Unified School District
High Valley Water
Idyllwild Fire Protection
Imperial Irrigation District
Kaiser Hospital - Riverside
Lake Elsinore USD
March Air Force Base – DROPPED OUT
Moreno Valley USD
Perris Union HSD
Rancho California Water
Riverside Community Colleges
Riverside County Office of Education
Riverside Unified School District
San Jacinto USD
Santa Ana Watershed
Western Municipal Water

City of Banning
Office of the City Manager

September 27, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Banning is submitting this letter of commitment to confirm that the City of Banning has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the City of Banning agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The City of Banning understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and

99 E. Ramsey St. • P.O. Box 998 • Banning, CA 92220-0998 • (951) 922-3101 • Fax (951) 922-3128

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

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- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Michael Rock, City Manager, commit the City of Banning to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 27th day of September, 2016

Michael Rock, City Manager

CITY OF BEAUMONT

August 2, 2016

PARTICIPATING JURISDICTION

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Beaumont is submitting this letter of commitment to confirm that the City of Beaumont has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the City of Beaumont agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The City of Beaumont understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

550 E. 6th Street • Beaumont • CA • 92223 • Phone: (951) 769-8520 • Fax: (951) 769-8526
www.ci.beaumont.ca.us

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

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Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Richard Warne, commit the City of Beaumont to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 2nd day of August

Interim City Manager

CITY OF BLYTHE

235 North Broadway • Blythe, California 92225
Phone (760) 922-6161 • Fax (760) 922-4938

October 19, 2016

PARTICIPATING JURISDICTION

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Blythe is submitting this letter of commitment to confirm that The City of Blythe has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; The City of Blythe agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The City of Blythe understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

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- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Peter Cosentini, City Manager, commit the City of Blythe to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 19th Day of October, 2016

Peter Cosentini, City Manager

CITY OF CALIMESA

908 Park Avenue, Calimesa, California 92320
Telephone 909.795.9801 Facsimile 909.795.4399
www.cityofcalimesa.net

May 1, 2017

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Calimesa is submitting this letter of commitment to confirm that the City of Calimesa has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the City of Calimesa agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The City of Calimesa understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement

Riverside Operational Area
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in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I ***Bonnie Johnson, City Manager*** commit the City of Calimesa to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 1st day of May, 2017

Bonnie Johnson, City Manager
City of Calimesa

908 Park Avenue • Calimesa, California 92320 • (909) 795-9801

CITY OF CANYON LAKE

June 24, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Canyon Lake is submitting this letter of commitment to confirm that the City of Canyon Lake has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the City of Canyon Lake agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The City of Canyon Lake understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process,

31516 Railroad Canyon Road, Canyon Lake, CA 92587 · 951/244-2955 · FAX 951/246-2022
admin@cityofcanyonlake.com · www.cityofcanyonlake.com

Riverside Operational Area
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CITY OF CANYON LAKE

attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Aaron Palmer, City Manager, commit the City of Canyon Lake to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 24 day of June, 2016

Aaron D Palmer

31516 Railroad Canyon Road, Canyon Lake, CA 92587 · 951/244-2955 · FAX 951/246-2022
admin@cityofcanyonlake.com · www.cityofcanyonlake.com

Cathedral City
Office of the City Manager

June 1, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Cathedral City is submitting this letter of commitment to confirm that the City of Cathedral City has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the City of Cathedral City agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The City of Cathedral City understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction;
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.);
- Documentation of an effective process to maintain and implement the plan; and

68-700 Avenida Lalo Guerrero • Cathedral City • California • 92234
www.cathedralcity.gov

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

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- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process and as a participant in a multi-jurisdictional plan; I, Charles P. McClendon, City Manager commit the City of Cathedral City to the County of Riverside's Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 1st day of June, 2016

Charles P. McClendon, City Manager

68-700 Avenida Lalo Guerrero • Cathedral City • California • 92234
www.cathedralcity.gov

CITY OF COACHELLA
1515 SIXTH STREET, COACHELLA, CALIFORNIA 92236
PHONE (760) 398-3502 • FAX (760) 398-8117 • WWW.COACHELLA.ORG

June 13, 2016

PARTICIPATING JURISDICTION

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, City of Coachella is submitting this letter of commitment to confirm that City of Coachella has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; City of Coachella agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

City of Coachella understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,

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CITY OF COACHELLA
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PHONE (760) 398-3502 • FAX (760) 398-8117 • WWW.COACHELLA.ORG

- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I George R. Torres Emergency Services Coordinator, commit City of Coachella to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 13th day of June 2016

An Affirmative Action/Equal Opportunity Employer

CITY OF CORONA FIRE DEPARTMENT
735 PUBLIC SAFETY WAY • CORONA, CA 92880 • (951) 736-2220 • FAX (951) 736-2497
WWW.DISCOVERCORONA.COM

June 13, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Corona is submitting this letter of commitment to confirm that the City of Corona has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the City of Corona agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The City of Corona understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;

"SERVING OUR CITY WITH PRIDE"

- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I David Duffy, Fire Chief commit the City of Corona to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 13th day of June 2016.

David P. Duffy

David Duffy, Fire Chief

"SERVING OUR CITY WITH PRIDE"

City of Desert Hot Springs
65-950 Pierson Blvd.• Desert Hot Springs • CA • 92240
(760) 329-6411
www.cityofdhs.org

June 8, 2016

PARTICIPATING JURISDICTION

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Desert Hot Springs is submitting this letter of commitment to confirm that Desert Hot Springs has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; Desert Hot Springs agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

Desert Hot Springs understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Martín Magaña, City Manager, commit the City of Desert Hot Springs to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 8th day of June, 2016.

City of Eastvale
12363 Limonite Avenue, Suite #910 • Eastvale, CA 91752
(951) 361-0900 • Fax: (951) 361-0888 • www.EastvaleCA.gov

May 31, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department:

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Eastvale is submitting this letter of commitment to confirm that the City of Eastvale has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning, the City of Eastvale agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The City of Eastvale understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.);
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

City of Eastvale
12363 Limonite Avenue, Suite #910 • Eastvale, CA 91752
(951) 361-0900 • Fax: (951) 361-0888 • www.EastvaleCA.gov

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, *Michele Nissen*, commit the *City of Eastvale* to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 31st day of May, 2016

Michele Nissen
City Manager

City of Hemet

445 E. FLORIDA AVE • HEMET, CALIFORNIA 92543 • (951) 765-2301

CITY MANAGER
Alexander P. Meyerhoff

June 13, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department:

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Hemet is submitting this letter of commitment to confirm that City of Hemet has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the City of Hemet agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The City of Hemet understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process; attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and

Riverside County Emergency Management Department
Kim Saruwatari, Director
Page 2
June 13, 2016

- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Alexander P. Meyerhoff, commit the City of Hemet to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 13th day of June, 2016

Alexander P. Meyerhoff
City Manager

INDIAN WELLS
CALIFORNIA

April 1, 2016

PARTICIPATING JURISDICTION

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, Indian Wells submitting this letter of commitment to confirm that Indian Wells has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; Indian Wells agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

Indian Wells understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Eric W. Cadden commit Indian Wells the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this June day of 3rd, 2016.

Eric W. Cadden

44-950 Eldorado Drive – Indian Wells, California 92210-7497- (V) 760.2489 (F) 346.0407
www.IndianWells.com

June 1, 2016

Attn: Kim Saruwatari, Director
Riverside County Emergency Management Department
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment of Participating Jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Director Saruwatari:

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Indio is submitting this letter of commitment to confirm that the City of Indio has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the City of Indio agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department to complete the plan in conformance with FEMA requirements.

The City of Indio understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.

p: 760.391.4000 f: 760.391.4008 100 Civic Center Mall Indio, CA 92201 www.INDIO.org

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I *Dan Martinez*, commit the City of Indio to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Sincerely,

DAN MARTINEZ
City Manager, City of Indio

Executed this 1st day of June, 2016

p: 760.391.4000 f: 760.391.4008 100 Civic Center Mall Indio, CA 92201 www.INDIO.org

City of Jurupa Valley

Laura Roughton, Mayor . Verne Lauritzen, Mayor Pro Tem .
Brian Berkson, Council Member . Frank Johnston, Council Member . Brad Hancock, Council Member

June 8, 2016

City of Jurupa Valley

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Jurupa Valley is submitting this letter of commitment to confirm that Jurupa Valley has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning, the City of Jurupa Valley agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The City of Jurupa Valley understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

8930 Limonite Ave., Jurupa Valley, CA 92509-5183, (951) 332-6464
www.jurupavalley.org

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Gary Thompson, City Manager, commit the City of Jurupa Valley to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 8th day of June, 2016

Gary S. Thompson, City Manager

8304 Limonite Avenue, Suite M, Jurupa Valley, CA 92509-5183, (951) 332-6464
www.jurupavalley.org

City of La Quinta

June 9, 2016

Ms. Kim Saruwatari, Director
Riverside County Emergency Management Department
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Ms. Saruwatari:

Per the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements for multi-jurisdictional mitigation plans, the City of La Quinta is submitting this letter of commitment to confirm that the City has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning, the City agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County to complete the plan in conformance with FEMA requirements.

The City understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identify hazards unique to the jurisdiction and not addressed in the master planning document;
- Conduct a vulnerability analysis and identify of risks, where they differ from the general planning area;
- Formulate mitigation goals responsive to public input and develop mitigation actions complementary to those goals. A range of actions will be identified specific for each jurisdiction;
- Demonstrate that there has been proactive participation in the planning process by all community stakeholders.
- Document an effective process to maintain and implement the plan;
- Adopt the Multi-Jurisdictional Hazard Mitigation Plan.

Please do not hesitate to contact me with questions or concerns.

Sincerely,

Frank J. Spevacek
City Manager

78-495 Calle Tampico | La Quinta | California 92253 | 760.777.7000 | www.La-Quinta.org

CITY OF LAKE ELSINORE
DREAM EXTREME

June 8, 2016

PARTICIPATING JURISDICTION

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Lake Elsinore is submitting this letter of commitment to confirm that City of Lake Elsinore has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; City of Lake Elsinore agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

City of Lake Elsinore understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.

951.674.3124
[illegible]
[illegible]
www.lake[illegible]

- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Grant Yates, City Manager, commit City of Lake Elsinore to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 8th day of June, 2016

Grant Yates, City Manager

CITY OF MURRIETA

June 16, 2016

PARTICIPATING JURISDICTION

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the Murrieta Fire Department is submitting this letter of commitment to confirm that Murrieta Fire Department has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; Murrieta Fire Department agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

Murrieta Fire Department understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and

FIRE DEPARTMENT • 41825 Juniper Street • Murrieta, California 92562
phone: 951.304.FIRE (3473) • fax: 951.677.6799 • web: murrieta.org

- Documentation of an effective process to maintain and implement the plan; and.
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Jason Briley commit the Murrieta Fire Department to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed June 16, 2016

Jason Briley, Fire Marshal
City of Murrieta Fire Department

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

CITY of NORCO

CITY HALL • 2870 CLARK AVENUE • NORCO CA 92860 • (951) 735-3900 • www.norco.ca.us •

June 13, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Director Saruwatari,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Norco is submitting this letter of commitment to confirm that the city has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the City agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The City of Norco understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document.
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area.
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.).
- Documentation of an effective process to maintain and implement the plan.
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

CITY COUNCIL

KEVIN BASH	GREG NEWTON	ROBIN GRUNDMEYER	BERWIN HANNA	TED HOFFMAN
Mayor	Mayor Pro Tem	Council Member	Council Member	Council Member

Riverside County Operational Area Multi-Jurisdictional
Hazard Mitigation Planning
Page 2
June 13, 2016

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Andy Okoro commit the City of Norco to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 13th day of June 2016

Andy Okoro, City Manager
City of Norco

Attest:

Cheryl L. Link, City Clerk
City of Norco

City of Palm Springs
David H. Ready, Esq., Ph.D.
City Manager
3200 E. Tahquitz Canyon Way, Palm Springs, CA 92262
Tel 760.322.8350 • Fax 760.323.8207 • TDD 760.864.9527
David.Ready@palmspringsca.gov • www.palmspringsca.gov

June 1, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department:

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Palm Springs is submitting this letter of commitment to confirm that the City of Palm Springs has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning, the City of Palm Springs agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department to complete the plan in conformance with FEMA requirements.

The City of Palm Springs understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction;
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.);
- Documentation of an effective process to maintain and implement the plan; and,

PO Box 2743, Palm Springs, California 92263

Page Two
June 1, 2016
Riverside County Emergency Management

- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan, I, David H. Ready, Esq., Ph.D., commit the City of Palm Springs to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 13 day of JUNE 2016

David H. Ready, Esq., Ph.D.

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

CITY OF PERRIS

DEPARTMENT OF DEVELOPMENT SERVICES
Building and Safety Division
135 N. 'D' STREET, PERRIS, CA 92570-2200
TEL.: (951) 943-1029 FAX: (951) 657-9685

June 13, 2016

RE: City of Perris letter of commitment

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Perris is submitting this letter of commitment to confirm that the City of Perris has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the City of Perris agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The City of Perris understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any

planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Clara Miramontes, commit the City of Perris to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 13th day of June 2016

Sincerely

Clara Miramontes
Development Services Director
City of Perris

CITY OF RANCHO MIRAGE

July 14, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Rancho Mirage is submitting this letter of commitment to confirm that the City of Rancho Mirage has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the City of Rancho Mirage agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The City of Rancho Mirage understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Britt W. Wilson commit the City of Rancho Mirage to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 14th day of July 2016

Britt W. Wilson
Emergency Services Coordinator, City of Rancho Mirage
Brittw@ranchomirageca.gov
760-324-4511

c. Bud Kopp, City of Rancho Mirage Planning Manager

Fire Department

City of Arts & Innovation

June 15, 2016

PARTICIPATING JURISDICTION

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the Riverside Fire Department – Office of Emergency Management is submitting this letter of commitment to confirm that the Riverside Fire Department – Office of Emergency Management has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the Riverside Fire Department – Office of Emergency Management agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

City of Riverside understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,

Office of Emergency Management
3085 St Lawrence Street, Riverside, CA 92504 | **Phone:** (951) 320-8100 | **RiversideCA.gov/Fire**

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Mark Annas, Emergency Operations Coordinator, commit Riverside Fire Department – Office of Emergency Management to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 15 day of June, 2016

Mark D. Annas
Emergency Operations Coordinator
Riverside Fire Department
Office of Emergency Management

SAN JACINTO

Scott Miller
Mayor

Alonso Ledezma
Mayor Pro Tem

Crystal Ruiz
Councilmember

Andrew Kotyuk
Councilmember

Russ Utz
Councilmember

May 16, 2017

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of San Jacinto is submitting this letter of commitment to confirm that the City of San Jacinto has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; The City of San Jacinto agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The City of San Jacinto understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Robert Johnson, commit the City of San Jacinto to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 5/16 day of 2017

Robert A. Johnson
City Manager

595 S. San Jacinto Ave. | San Jacinto, CA 92583 | Ph 951-487-7330 | Fax 951-654-3728 | www.ci.san-jacinto.ca.us

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

City of Temecula

City Manager's Office
41000 Main Street • Temecula, CA 92590
Phone (951) 506-5100 • Fax (951) 694-6499 • www.cityoftemecula.org

June 9, 2016

PARTICIPATING JURISDICTION

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Temecula is submitting this letter of commitment to confirm that the City of Temecula has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the City of Temecula agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The City of Temecula understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and

- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I *Aaron Adams*, commit the City of Temecula to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 9 day of June 2016.

X _____
Aaron Adams, City Manager

Bridgette Moore, Mayor
Timothy Walker, Mayor Pro Tem
Ben Benoit, Council Member
Bob Cashman, Council Member
Marsha Swanson, Council Member

23873 Clinton Keith Rd, Ste 201
Wildomar, CA 92595
951/677-7751 Phone
951/698-1463 Fax
www.CityofWildomar.org

June 13, 2016

CITY OF WILDOMAR

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level. The City of Wildomar is submitting this letter of commitment to confirm that City of Wildomar has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; City of Wildomar agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

City of Wildomar understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Dan York, Assist City Manager, commits City of Wildomar to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 13th day of June 2016

Dan York
Assistant City Manager
City of Wildomar

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

DROPPED OUT

AGUA CALIENTE BAND OF CAHUILLA INDIANS

EMERGENCY SERVICES & RISK MANAGEMENT

June 13, 2016

PARTICIPATING JURISDICTION

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the Agua Caliente Band of Cahuilla Indians is submitting this letter of commitment to confirm that the Agua Caliente Band of Cahuilla Indians has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning, the Agua Caliente Band of Cahuilla Indians agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The Agua Caliente Band of Cahuilla Indians understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

5401 DINAH SHORE DRIVE, PALM SPRINGS, CA 92264
WWW.AGUACALIENTE-NSN.GOV

AGUA CALIENTE BAND OF CAHUILLA INDIANS

EMERGENCY SERVICES & RISK MANAGEMENT

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I *John Lavallee* commit *Agua Caliente Band of Cahuilla Indians* to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 13 day of June

5401 DINAH SHORE DRIVE, PALM SPRINGS, CA 92264
WWW.AGUACALIENTE-NSN.GOV

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

MORONGO BAND OF MISSION INDIANS
A SOVEREIGN NATION

Morongo Band of Mission Indians

June 2, 2016
Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the Morongo Band of Mission Indians is submitting this letter of commitment to confirm that Morongo Band Of Mission Indians has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; [Morongo Band Of Mission Indians agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

[Morongo Band of Mission Indians] understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (Examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and

- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I G. Michael Milhiser, commit Morongo Band of Mission Indians to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 3 day of 2016.

DROPPED OUT

RAMONA BAND OF CAHUILLA

56310 Highway 371, Suite B
Post Office Box 391670
Anza, California 92539

Tel: (951) 763-4105
Fax: (951) 763-4325
Website: www.ramona-nsn.gov
Email: admin@ramona-nsn.gov

"A SOVEREIGN NATION"

August 23, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

The Ramona Band of Cahuilla ("Band"), a federally recognized tribe, is submitting this letter of commitment to confirm that the Band has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

The Federal Emergency Management Agency's ("FEMA") Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans, and the Band's participation will allow for a more comprehensive evaluation of hazards and proposed mitigation measures through the coordination at the county, regional, or watershed level.

The Band agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The Band understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and

- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Band's Multi-Jurisdictional Hazard Mitigation Plan by the Band's governing body.

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Joseph D. Hamilton, Chairman, commit the Ramona Band of Cahuilla to participation in the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Please feel free to contact the Band's administrative offices at (951)763-4105 if you have any questions or wish to discuss this matter further.

Respectfully,

Joseph D. Hamilton
Chairman, Ramona Band of Cahuilla

QUALITY EDUCATION
A Shared Commitment

BEAUMONT UNIFIED SCHOOL DISTRICT

BOARD OF TRUSTEES

ADMINISTRATION

June 15, 2016

PARTICIPATING JURISDICTION

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, Beaumont Unified School District is submitting this letter of commitment to confirm that Beaumont Unified School District has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; Beaumont Unified School District agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

Beaumont Unified School District understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

350 W. Brookside Avenue • PO Box 187 • Beaumont • California • 92223-0187 • Tele: (951) 845-1631

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan, I *Terrence Davis*, commit *Beaumont Unified School District* to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 13th day of July, 2016

(Jurisdiction official's signature)

350 W. Brookside Avenue • P.O Box 187 • Beaumont • California • 92223-0187 • Tele: (951) 845-1631

Desert Sands Unified School District
47-950 Dune Palms Road • La Quinta, California 92253 • (760) 777-8567 • FAX: (760) 771-8574
BOARD OF EDUCATION: Michael Duran, Donald B. Griffith, Wendy Jonathan, Matteo Monica III, Gary Tomak
SUPERINTENDENT: Dr. Gary Rutherford
Security Services • (760) 771-8646 • FAX: (760) 771-8713
Jeff Kaye, Director of Security & Safety Services

June 14, 2016

Desert Sands Unified School District

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the Desert Sands Unified School District is submitting this letter of commitment to confirm that The Desert Sands Unified School District has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; The Desert Sands Unified School District agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The Desert Sands Unified School District understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.

- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Jeff Kaye, Director of Security and Safety, commit the Desert Sands Unified School District to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 14 day of June 2016

Jeff Kaye

Director of Security and Safety Services
Desert Sands Unified School District

June 13, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Subject: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department:

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the Eastern Municipal Water District is submitting this letter of commitment to confirm that Eastern Municipal Water District has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; Eastern Municipal Water District agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

Eastern Municipal Water District understands that it must engage in the following planning process, as described in FEMA's Local Multi-Hazard Mitigation Planning Guidance dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;

2270 Trumble Road • P.O. Box 8300 • Perris, CA 92572-8300
T 951.928.3777 • F 951.928.6177 emwd.org

Kim Saruwatari
June 13, 2016
Page 2

- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Douglas Hefley, commit Eastern Municipal Water District to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 13th day of June, 2016.

Sincerely,

Douglas Hefley
Director of Safety, Risk and Emergency Management

DH:sr

EASTERN MUNICIPAL WATER DISTRICT

HEMET UNIFIED SCHOOL DISTRICT

Dr. Barry L. Kayrell
Superintendent

Dr. LaFaye Platter
Deputy Superintendent
Dr. David Horton
Assistant Superintendent
Vince Christakos
Assistant Superintendent

Professional Development Service Center
1791 W. Acacia Avenue
Hemet, CA 92545
(951) 765-5100
Fax: (951) 765-5115

Professional Development Academy
2085 W. Acacia Avenue
Hemet, CA 92545
(951) 765-5100
Fax: (951) 765-6421

www.hemetusd.org

Governing Board
Marilyn Forst
Megan Haley
Vic Scavarda
Patrick Scarl
James Smith
Ross Valenzuela
Joe Wojcik

Hemet Unified School District
Lucy M. Dressel, Director of Safety/Risk Management/Benefits
1791 West Acacia Avenue
Hemet, CA 92545

May 26th, 2016

Hemet Unified School District

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, Hemet Unified School District is submitting this letter of commitment to confirm that Hemet Unified School District has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; Hemet Unified School District agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

Hemet Unified School District understands that it must engage in the following planning process, as described in FEMA's Local Multi-Hazard Mitigation Planning Guidance dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant

involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and

- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Lucy M. Dressel, commit Hemet Unified School District to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 26th day of May 2016

Lucy M. Dressel, Director of Safety/Risk Management/Benefits

HEMET UNIFIED SCHOOL DISTRICT

Dr. Barry L. Kayrell
Superintendent

Dr. LaFaye Platter
Deputy Superintendent
Dr. David Horton
Assistant Superintendent
Vince Christakos
Assistant Superintendent

Professional Development Service Center
1791 W. Acacia Avenue
Hemet, CA 92545
(951) 765-5100
Fax (951) 765-5115

Professional Development Academy
2085 W. Acacia Avenue
Hemet, CA 92545
(951) 765-5100
Fax (951) 765-6421

www.hemetusd.org

Governing Board
Marilyn Forst
Megan Haley
Vic Scavarda
Patrick Scarl
James Smith
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Joe Wojcik

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

High Valleys Water District

June 8, 2016

PARTICIPATING JURISDICTION

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the High Valleys Water District is submitting this letter of commitment to confirm that the High Valleys Water District has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the High Valleys Water District agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The High Valleys Water District understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Ernest B. Wright, commit the High Valleys Water District to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 8th day of June, 2016

Ernest B Wright

Ernest B. Wright

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

Idyllwild Fire Protection District
PO Box 656
Idyllwild, CA 92549
(951) 659-2153

Thursday, June 09, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the Idyllwild Fire Protection District (IFPD) is submitting this letter of commitment to confirm that the IFPD has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the IFPD agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The IFPD understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings,

Page **1** of **2**

contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Patrick Reitz, Fire Chief, commit the Idyllwild Fire Protection District to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 9th day of June, 2016.

Patrick Reitz
Fire Chief

Page 2 of 2

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

IID
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A century of service.

June 8, 2016

PARTICIPATING JURISDICTION

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the Imperial Irrigation District is submitting this letter of commitment to confirm that Imperial Irrigation District has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; Imperial Irrigation District agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

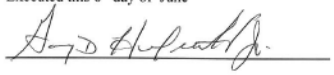
Imperial Irrigation District understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,

- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Gary D. Hatfield, Jr , commit Imperial Irrigation District to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 8th day of June



Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

KAISER PERMANENTE
Riverside Service Area
10800 Magnolia Ave.
Riverside, CA. 92505

August 3, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, Kaiser Permanente Riverside Service Area is submitting this letter of commitment to confirm that Kaiser Permanente Riverside Service Area has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; Kaiser Permanente Riverside Service Area agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

Kaiser Permanente Riverside Service Area understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

KAISER PERMANENTE
Riverside Service Area
10800 Magnolia Ave.
Riverside, CA. 92505

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Corrie Sankey, commit Kaiser Permanente Riverside Service Area to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 2 day of August 2016

Corrie Sankey
Director, Environmental Health and Safety
Emergency Management

Lake Elsinore Unified School District

Governing Board

Stan Crippen
Trustee Area 1

Susan E. Scott
Trustee Area 2

Heidi Matthies Dodd
Trustee Area 3

Juan Saucedo
Trustee Area 4

Harold E. Stryker
Trustee Area 5

Administration

Dr. Doug Kimberly
Superintendent

Dr. George Landon
Deputy Superintendent Administrative & Fiscal Support Services

Dr. Gregory J. Bowers
Assistant Superintendent Facilities & Operations Support Services

Dr. Albin Guevara
Assistant Superintendent Administrative & Educational Support Services

Dr. Kip Meyer
Assistant Superintendent Personnel Support Services

Sam Wensel
Executive Director Personnel Support Services

(951) 253-7000

545 Chaney Street
Lake Elsinore, CA 92530

www.leusd.k12.ca.us

June 8, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the Lake Elsinore Unified School District (LEUSD) is submitting this letter of commitment to confirm that LEUSD has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; LEUSD agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

LEUSD understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and

- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Dr. Gregory J. Bowers, commit Lake Elsinore Unified School District to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 8th day of June 2016

Dr, Gregory J. Bowers, Assistant Superintendent
Facilities & Operations Division

DROPPED OUT

DEPARTMENT OF THE AIR FORCE

AIR FORCE RESERVE COMMAND

13 June 2016

Riverside County Emergency Management Department

Kim Saruwatari, Director

4210 Riverwalk Pkwy, Ste. 300

Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, March ARB is submitting this letter of commitment to confirm that March ARB has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; March ARB agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

March ARB understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;

- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Marvin J. Tucker, commit March ARB to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

MARVIN J. TUCKER, GS-11, DAF

Chief, Emergency Management

Board of Education
Jesse M. Holguin, President
Desire Fleming, Ed.D., Vice President
Cleveland Johnson, Clerk
Gary S. Baugh, Ed.D.
Patrick N. Kelleher

Superintendent of Schools
Judy D. White, Ed.D.

Moreno Valley Unified School District
25634 Alessandro Boulevard
Moreno Valley, California 92553
951-571-7500
www.mvusd.net

The mission of Moreno Valley Unified School District is to ensure all students graduate high school prepared to successfully enter into higher education and/or pursue a viable career path.

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the Moreno Valley Unified School District is submitting this letter of commitment to confirm that Moreno Valley Unified School District has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; Moreno Valley Unified School District agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

Moreno Valley Unified School District understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I *Darryl Scott*, commit *Moreno Valley Unified School District* to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 14 day of June

Signature of Director of Safety and Security, Darryl Scott

PERRIS UNION
HIGH SCHOOL DISTRICT
155 E. Fourth Street, Perris, CA 92570
951-943-6369
puhsd.org @puhsd PerrisUnionHSD

Superintendent: Jonathan L. Greenberg, Ed.D.

Grant Bennett
Assistant Superintendent
Educational Services

Candace Reines
Assistant Superintendent
Business Services

Tonya Davis
Chief Human
Resources Officer

Joseph Williams
Executive Director
Technology

April 1, 2016

PARTICIPATING JURISDICTION

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, Perris Union High School District is submitting this letter of commitment to confirm that Perris Union High School District has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; Perris Union High School District agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

Perris Union High School District understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.

Board of Trustees: Edward Agundez · Dr. Jose Luis Araux · Joan D. Cooley · David C. Nelissen · Carolyn A. Twyman

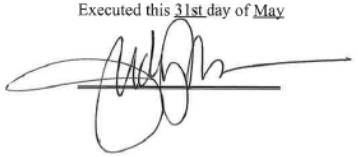
Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I *Judy Miller, Director of Risk Management and Environmental Safety* , commit Perris Union High School District to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 31st day of May



Board of Trustees: Edward Agundez · Dr. Jose Luis Araux · Joan D. Cooley · David C. Nelissen · Carolyn A. Twyman

Rancho Water

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& Maintenance
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Chief Engineer
Kelli E. Garcia
District Secretary
James B. Gilpin
Best Best & Krieger LLP
General Counsel

June 30, 2016

RIVERSIDE COUNTY EMERGENCY MANAGEMENT DEPARTMENT
Ms. Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

SUBJECT: LETTER OF COMMITMENT AS PARTICIPATING JURISDICTION IN RIVERSIDE COUNTY OPERATIONAL AREA MULTI-JURISDICTIONAL HAZARD MITIGATION PLANNING

Dear Ms. Saruwatari:

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the Rancho California Water District (RCWD/District) is submitting this letter of commitment to confirm that RCWD has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; RCWD agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The District understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and

Rancho California Water District
42135 Winchester Road • Post Office Box 9017 • Temecula, California 92589-9017 • (951) 296-6900 • FAX (951) 296-6860 • www.ranchowater.com

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I *Dave Morrison Safety Officer*, commit *Rancho California Water District* to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 30th day of June

Should you have any questions regarding this matter, please contact me at the District office at (951) 296-6900.

Sincerely,

RANCHO CALIFORNIA WATER DISTRICT

Dave Morrison
Safety Officer

090\DT

Rancho California Water District
42135 Winchester Road • Post Office Box 9017 • Temecula, California 92589-9017 • (951) 296-6900 • FAX (951) 296-6860 • www.ranchowater.com

RCCD RIVERSIDE COMMUNITY COLLEGE DISTRICT
OFFICE OF THE CHANCELLOR
MORENO VALLEY COLLEGE | NORCO COLLEGE | RIVERSIDE CITY COLLEGE

June 1, 2016

PARTICIPATING JURISDICTION

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the Riverside Community College District is submitting this letter of commitment to confirm that Riverside Community College District has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; The Riverside Community College District agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The Riverside Community College District understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.

3801 Market Street
Riverside, CA 92501
(951) 222-8800
Fax (951) 682-5339
www.rccd.edu

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I *Michael L Burke, Ph.D.*, commit *Riverside Community College District* to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 1st day of June

Michael L. Burke

Michael L. Burke, Ph.D.

RIVERSIDE COUNTY OFFICE OF EDUCATION
KENNETH M. YOUNG
Riverside County Superintendent of Schools

3939 Thirteenth Street
P.O. Box 868
Riverside, California
92502-0868
(951) 826-6530

47-110 Calhoun Street
Indio, California
92201-4779
(760) 863-3000

24980 Las Brisas Road
Murrieta, California
92562-4008
(951) 600-5651

Riverside County Board of Education

Jeanie B. Corral
Bruce N. Dennis
Jay N. Hoffman, Ed.D.
Susan J. Rainey, Ed.D.
Elizabeth F. Romero
Wendel W. Tucker, Ph.D.
Ralph R. Villani, Ed.D.

May 26, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy., Ste. 300
Riverside, CA 92505

Re: **Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning**

Dear Riverside County Emergency Management Department:

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level. The Riverside County Office of Education is submitting this letter of commitment to confirm that Riverside County Office of Education has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; Riverside County Office of Education agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

Riverside County Office of Education understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;

- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and,
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Teresa Hyden, Chief Business Official, commit Riverside County Office of Education to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 1st day of June, 2016

Teresa Hyden
Chief Business Official
Division of Administration and Business Services
(951) 826-6790 / FAX [951] 826-6974

MD:amn
c: Michael D'Amico, Coordinator, Safety and Emergency Preparedness

BOARD OF EDUCATION
Mr. Tom Hung
President
Mr. Brent Lee
Vice President
Pamela Lock-Dawson
Clerk
Mrs. Kathy Allavie
Dr. I. Angelov Farooq

Riverside Unified School District

ADMINISTRATION BUILDING
3380 14TH STREET - P. O. BOX 2800
RIVERSIDE, CALIFORNIA 92516

OFFICE OF THE ASSISTANT SUPERINTENDENT
Operations Division
951-788-7135, Extension 80413
FAX: 951-778-5668

David C. Hansen
District Superintendent

RUSD
Innovation in Education

Riverside County Emergency Management Department
Kim Saruwatari
Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Ms. Saruwatari,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the Riverside Unified School District is submitting this letter of commitment to confirm that the Riverside Unified School District has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; the Riverside Unified School District agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

The Riverside Unified School District understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction;

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and,
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Kirk R. Lewis, commit the Riverside Unified School District to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 8th day of June, 2016.

Kirk R. Lewis
Assistant Superintendent, Operations

August 10, 2016

Riverside County Emergency Management Department

Kim Saruwatari, Director

4210 Riverwalk Pkwy, Ste. 300

Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department:

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the San Jacinto Unified School District (SJUSD) is submitting this letter of commitment to confirm that SJUSD has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; SJUSD agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department to complete the plan in conformance with FEMA requirements.

SJUSD understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.)
- Documentation of an effective process to maintain and implement the plan
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan and by adoption of resolution from the Board of Trustees (attached), I commit San Jacinto Unified School District to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Sincerely,

Diane Perez

Superintendent

Santa Ana Watershed Project Authority

Over 45 Years of Innovation, Vision, and Watershed Leadership

One Water One Watershed
AWRA Integrated Water Resources Management Award
Harvard Kennedy School's Top 25 Innovations in American Government

June 14, 2016

Thomas P. Evans
Commission
Chair

Celeste Cantú
General
Manager

Orange
County
Water
District

Western
Municipal
Water District

Eastern
Municipal
Water
District

San
Bernardino
Valley
Municipal
Water
District

Inland
Empire
Utilities
Agency

Kim Saruwatari, Director
Riverside County Emergency Management Department
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as Participating Jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Ms. Saruwatari:

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the Santa Ana Watershed Project Authority (SAWPA) is submitting this letter of commitment to confirm that SAWPA has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; SAWPA agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

SAWPA understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction;
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.);
- Documentation of an effective process to maintain and implement the plan; and
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

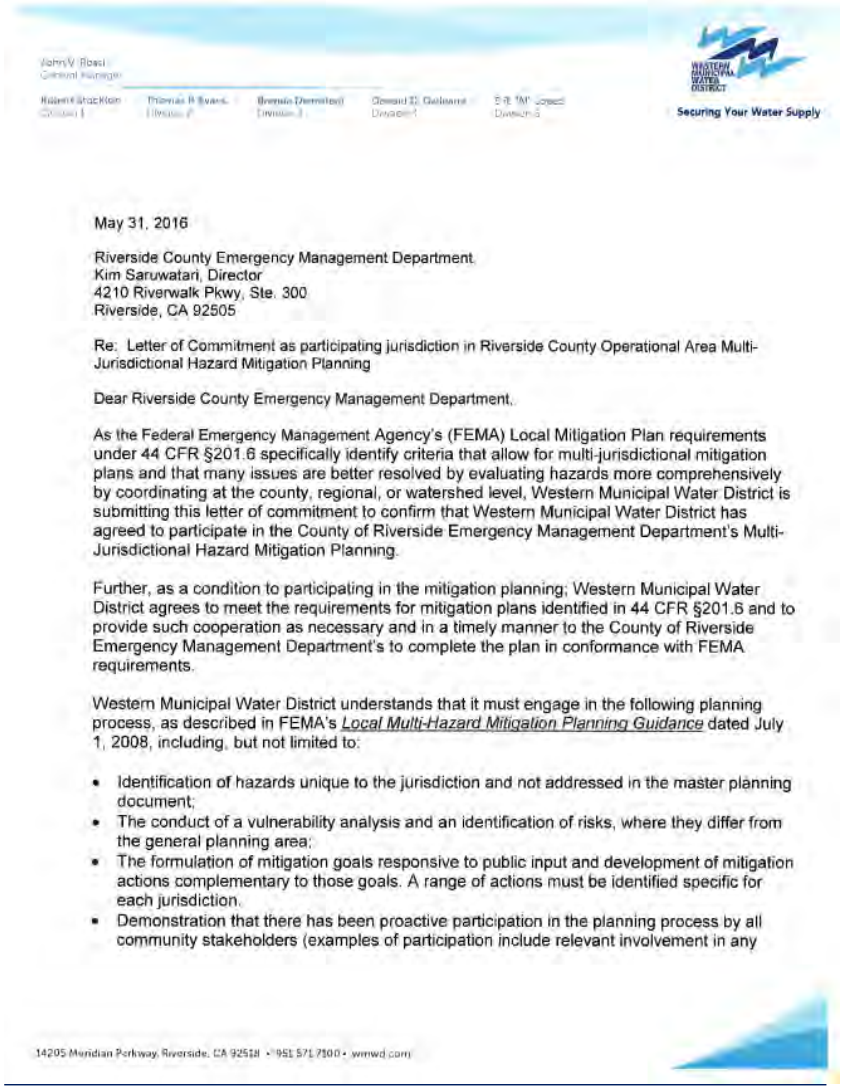
11615 Sterling Avenue, Riverside, CA 92503 • 951.354.4220
www.sawpa.org • www.sawpa.org/OWOW

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Celeste Cantú, General Manager, commit SAWPA to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

You may contact Richard Haller at 951.354.4240 or rhaller@sawpa.org with any questions.

Sincerely,

Celeste Cantú
General Manager



John V. Rossi
General Manager

Robert Stockton, Division 1 | Thomas R. Evans, Division 2 | Brenda Dennstedt, Division 3 | Gerard D. Delahaut, Division 4 | [illegible], Division 5

Western Municipal Water District

Securing Your Water Supply

May 31, 2016

Riverside County Emergency Management Department
Kim Saruwatari, Director
4210 Riverwalk Pkwy, Ste. 300
Riverside, CA 92505

Re: Letter of Commitment as participating jurisdiction in Riverside County Operational Area Multi-Jurisdictional Hazard Mitigation Planning

Dear Riverside County Emergency Management Department,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, Western Municipal Water District is submitting this letter of commitment to confirm that Western Municipal Water District has agreed to participate in the County of Riverside Emergency Management Department's Multi-Jurisdictional Hazard Mitigation Planning.

Further, as a condition to participating in the mitigation planning; Western Municipal Water District agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as necessary and in a timely manner to the County of Riverside Emergency Management Department's to complete the plan in conformance with FEMA requirements.

Western Municipal Water District understands that it must engage in the following planning process, as described in FEMA's *Local Multi-Hazard Mitigation Planning Guidance* dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.
- Demonstration that there has been proactive participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any

14205 Meridian Parkway, Riverside, CA 92518 • (951) 571-7100 • wmwd.com

planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I John V. Rossi, commit Western Municipal Water District to the County of Riverside Emergency Management Department Multi-Jurisdictional Hazard Mitigation Planning effort.

Executed this 4th day of June 2016,

John V. Rossi, General Manager

JVR:tm

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APPENDIX C – Mitigation Action Table

2012 Plan Strategies Updated Status

Mitigation Actions Table

Type of Hazard	Mitigation Actions	Departments/ Jurisdictions	Status Update
ALL	Incorporate Updated Local Hazard Mitigation Plan into Riverside County General Plan	Transportation, Land Management Agency and Riverside Office of Emergency Services	Recently updated and approved on December 2015 by Board of Supervisors. Adopted 2015, which includes a new reference to implement the Local Hazard Mitigation Plan within the Safety Element.
DROUGHT	Construct reservoirs and water tanks to increase water storage	Water Conservation, Agriculture and County Fire	On-going, no update has been made
EARTHQUAKE	CREWS Earthquake Mitigation Project	County-wide	Ongoing process of recruiting non-participating cities in the Coachella Valley area into the early earthquake warning program.
FIRE	Purchase Masticator to remove vegetation and brush in heavily populated areas prone to fires.	Riverside County Fire	No change. Project still on hold due to lack of funding during budget cuts. Potential future purchase
FIRE	Shake Shingle Roof Replacement Project	Idyllwild	In 2013 Mountain Communities Fire Safe Council was awarded a FEMA grant to replace hazardous shake/wood shingle roofs in the San Jacinto WUI (Wildland Urban Interface) One hundred homes were reroofed with Class A roofing material. The grant was completed in October 2016.

FIRE	Single Tree Removal – removed dying and dead trees.	Idyllwild	Ongoing - Nearing Closeout: dead and dying trees are continuously monitored and removed as needed.
FIRE	Hazard Abatement- Fuel treatment program to remove 1120 acres of natural fuel	Mountain Communities Fire Safe Council Program - Idyllwild	Reducing fuels on private property in the San Jacinto WUI is an on-going activity of Mountain Fire Safe Council. To date, more than 1,600 acres have been treated with the financial help of grant funds awarded to MCFSC
FLOOD	Norco Storm Drain This project is an underground storm drain which will address flooding along Pedley Avenue/Sixth Street.	Riverside County Flood Control	Project completed on 04/05/2011.
FLOOD	Santa Ana River, Norco Bluffs [Corps Project] – Stabilization Project is a Corps of Engineers project that consists of a soil cement to protection structure constructed to the 100-year flood level at the base of the bluff.	Riverside County Flood, Transportation Land Management Agency and Riverside County Fire	The bluff stabilization work was completed in 2004. The District is continuing to work with the Corps on wrapping up the project, including completion of a Project Operation and Maintenance Manual. Once the Corps approves the O&M Manual, the project can be transferred to the District for ownership, operation and maintenance.
FLOOD	Temescal Creek-Foster Road Storm Drain (2-8-00493-01) - This project is an underground storm drain in Foster Road extending from Interstate 15 to Temescal Creek.	Riverside-Corona Resource Conservation District Riverside County Flood Control	Project completed on 09/01/2015
FLOOD	Dillon Road – State Hwy 62 Road Project to clear debris. Road has 25 dips that cause flooding during storms.	Transportation, Land, Management Agency Riverside County Fire	Ongoing; The current action plan is to barricade the low dip sections when they are flooded and remove the storm debris when the water recedes.
FLOOD	Underground storm drain which will extend	Flood Control and City of Norco	Finished approximately in Spring 2011

	approximately 1,300 feet south in Pedley Avenue from Norco MDP Line NA in Sixth Street. This project will address localized flooding along Pedley Avenue.		
FLOOD	Restore 100 yr level flood protection to the three million residents within the floodplain downstream, the Corps proposes to increase both the storage capacity of Prado Dam, and its outlet discharge capacity. The embankment will be raised 30 feet, while the spillway sill will be raised 20 feet and the gated discharge capacity will be tripled.	Flood Control	**Part 1** of this project involving Riverside County Flood Control and TLMA was completed **Part 2** of this project involving only Riverside County Flood Control is still pending approval
FLOOD	Ultimate channel improvements for the existing interim channel from 6th Street to the terminus near Rose Court.	City of Norco	Project has not started. No estimation on start date. The District is currently working on 60% design plans and anticipates 90% design plans will be completed by next year (2017). FEMA processing will be necessary to revise the currently mapped floodplain once the construction is completed.
FLOOD	Ultimate improvements to the existing channel between Parkridge Avenue and River Road. The channel is planned as a concrete lined open channel	City of Norco and Riverside County Transportation Land Management Agency	Project began Circa 7/2013 and was finished Circa 2/2014. Lead Agency was RCFC & WCD
FLOOD	Underground storm drain extending from the existing Stage 1 near Pedley Avenue, east in 7th Street to California Avenue then south in California approximately 800 feet to a sump.	Transportation, Land, & Management Agency and Flood Control	Project completed on 04/05/2011

FLOOD	Collection of "mitigation" charges from builders in Mockingbird Canyon with the intention of providing relief to flood prone properties in the lower canyon	Mockingbird Canyon	In process of collecting funds. Charging investors $500 per lot. Talks about whether to keep this project or abandon it. Considered a “mini” ADP (Area Drainage Project)
FLOOD	Storm Drain Last portion will be constructed as part of the same contract as the Ontario Avenue Storm Drain project	City of Corona	Project completed on 04/24/2012, Project revised on 04/25/2012.
FLOOD	A 1,050-foot drain to de-water a sump in Frank Avenue in the south Mira Loma area	Riverside County Flood Control and City of Eastvale	Project completed on 01/31/2012
FLOOD	The original project consisted of a 54 acre-foot debris basin at the southerly end of Smith Road and a concrete rectangular channel extending northerly to Cajalco Road. Mitigation required for the basin project includes removal of non-native vegetation, debris and remnants of abandoned structures as well as re-grading and establishment of native vegetation.	Riverside County Flood Control	Project completed on 01/10/2006
FLOOD	Underground storm drain in the City of Corona extending from East Grand Boulevard north in Joy Street to Temescal Creek Channel. Design began on this project in 2003 at which time it was discovered during a field check of the preliminary drawings that a recently installed Edison conduit in Joy Street overlapped the only viable alignment for the storm drain. The street is so heavily laden with utilities here is no longer room to install a drain.	City of Corona	Designed Phase Schedule for advertisement in March 2017

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

FLOOD	Underground storm drain in Ontario Avenue extending upstream from the District's existing El Cerrito Channel at El Cerrito Road about 3,000 feet to State Street just west of Interstate 15.	Riverside County Flood Control and Transportation Land & Management Agency	Project revised on 04/25/2012
FLOOD	Underground storm drain in Foster Road extending from Interstate 15 to Temescal Creek	Temescal Creek-Foster Road Storm Drain	Construction began in January 2015 and was completed in September 2015.
FLOOD	Multi-year plan to construct the ultimate levee system (approximately 1,200 feet river bottom width) between the existing Corps of Engineers' levee 9,500 feet upstream of State Street, and a point about 8,200 feet downstream of Sanderson Avenue, a distance of about 5 miles. Floodwalls on piles are required to be constructed over the Metropolitan Water District facilities just east of State Street.	San Jacinto and Transportation and Land Management	Funding was received in November 2015 - the levee was included in a suite of projects that received Proposition 84 grant funding from the California Department of Water Resources. The Prop 84 contribution is anticipated to be about $3.5 million.
FLOOD	Project to build MDP extending from South W. Esplanade to east Midway Street to South San Jacinto Street to collect flows from the larger Park Hill basin watershed	City of San Jacinto	Construction for the project began on April 25, 2014 and was completed on July 2, 2015.
FLOOD	Construction of an underground storm drain that extends from a proposed detention basin at the intersection of Potter Road and De Anza Drive then southwest in De Anza to Young Street. The City of San Jacinto is administering the project.	City of San Jacinto and Transportation and Land Management	Project still pending

FLOOD	Underground storm drain from an outlet north of Holland Road southerly in Hawthorne Avenue to a collection system south of Craig Avenue	City of Menifee and Transportation and Land Management	Project Completed 3/01/2011
FLOOD	Project is an underground storm drain that extends from near Yale Street east on Stetson Avenue approximately 1 mile to Dartmouth Street	City of Hemet	Project completed on 09/04/2007
FLOOD	Project is an underground storm drain on Whittier Boulevard extending from the existing storm drain at Palm Avenue east to San Jacinto Street	Riverside County Flood Control and City of Hemet	Project completed on 08/23/2016
FLOOD	Underground storm drain extending from an existing storm drain in Meridian Street near Berkeley venue south in Meridian Street to Whittier Avenue.	Riverside County Flood Control and City of Hemet	Stage 1 completed on 06/21/2016. Stage 2 still pending approval.
FLOOD	Project is for major flood control project to extend from the San Jacinto River near Goetz Road east approximately 6 miles to Juniper Flats Road and incorporates both lined and unlined open channel, underground storm drains and two major detention basins.	City of Menifee and Transportation, Land and Management Agency	Project built in 4 stages. Some stages have been completed, but others still not finished.
FLOOD	Open channel along Nuevo Road from Dunlap Drive to Perris Valley Channel	City of Perris, Riverside County Transportation and Flood Control	Under new contract: Starting Jan. 2017 and will range about 2.5 yrs. for this entire project to be completed; first part will take about 180 days to complete, but time frame will be extended.

FLOOD	East Ironwood Avenue to Petit Street. Part of the work the City of Moreno Valley is doing in association with improvements to the Moreno Beach Drive & 60 freeway interchange.	City of Moreno Valley and Transportation and Land Management	Storm Drain Line K-1 – City completed design in 2014. Currently seeing construction funding of approximately $2.5m.
FLOOD	Project is an open channel extending from Nason Basin northeasterly approximately 2,500 feet to Ironwood Avenue	City of Moreno Valley and Transportation and Land Management Agency	Storm Drain Line K from Ironwood to the Nason Basin – RCFC&WCD secured an easement in 2014 to receive flows from Line K-1 noted above. Action completed in 2014.
FLOOD **EARTHQUAKE**	Norco Streambank Stabilization. Project consists of a soil cement toe protection structure constructed to the 100-year flood level at the base of the bluff, and a stable earthen buttress fill constructed to the top of the bluff from I-15 Bridge to Center Avenue	Riverside County Flood Control and Transportation Land & Management Agency	Project Completed
FLOOD **EARTHQUAKE**	Stabilization of Interstate 15 near Alhambra Street, as a part of the Prado Dam enlargement feature of the Santa Ana River Mainstream Project at no cost to the District. The project involves the construction of a toe-protection-only structure from Hamner Avenue downstream to approximately 5th Street	Transportation Land Management Agency	Project still pending
LANDSLIDE **EARTHQUAKE** **FLOOD**	Proposed improvements include installation of slope protection along the Green River Mobile Home Park, as well as the exposed slopes adjacent to the Green River Homeowners Association and Highway 91 just downstream of Highway 71.	Transportation and Land Management Agency	**Phase 2A-The** District has completed its acquisition of the necessary easements and fee interests from Riverside County and private lands. Acquisition of the necessary easements and fee interests from Caltrans is ongoing. Construction of Phase 2A was completed in Fiscal Year

			2015/2016.**Phase 2B-Construction** of this segment was completed in Fiscal Year 2014/2015.

2017 New Mitigation Strategies

2017 Mitigation Actions Table

Type of Hazard	Mitigation Actions	Departments/ Jurisdictions	Status Update/Timeframe	Potential Funding Source
All Hazards	CERT Training and retention	Riverside County Emergency Management Department	July 2018 – Ongoing On-going for the life of the current plan (yrs. 2018-2023). There will be one training in each of the county districts per year to ensure community members throughout the county get the opportunity to refresh and reinforce their CERT skills. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Homeland Security Program (SHSP)
All Hazards	Continue to utilize the Safety Element of the Riverside County General Plan and the Riverside County FD Master Plan as base documents to implement goals, objectives, and mitigation actions	All Riverside County Departments	On-going for the life of the current plan (yrs. 2018-2023). The Safety Element in the General Plan is continuously updated as new information and changes arise. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Earthquake	Working with CalOES & FEMA to revise the Southern California Catastrophic Earthquake Response Plan	All Cities in Riverside County	On-going for the life of the current plan (yrs. 2018-2023). Riverside County will continue to collaborate with Cal OES/ FEMA to improve and update this plan as needed. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund

Earthquake	Reviewed Office of Statewide Health Planning and Development (OSHPD), Structural Performance Categories and Nonstructural Performance Categories (SPC/NPC) Ratings of Acute Care Hospital Buildings and reported the findings at EM Healthcare Coalition	Riverside County Emergency Management Department & Riverside County Hospitals	On-going for the life of the current plan (yrs. 2018-2023).These reports will continuously be reviewed to make sure they are up to date and consistent with any changes. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	Hospital Preparedness Program (HPP) Grant
Earthquake	Worked with local City Emergency Manager (EM) to address '08 Golden Guardian Riverside County Shake Out Scenario/Assumptions	Riverside County Emergency Management Department	On-going for the life of the current plan (yrs. 2018-2023). County will continuously work with City EM to update and inform of changes or thoughts to improve the annual Shake Out Scenario and help the community increase their preparedness skills. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Earthquake	Mitigate potential seismic hazards through adoption and strict enforcement of current building codes	Riverside County Transportation, Land, Management Agency	On-going for the life of the current plan (yrs. 2018-2023). The codes will be revised and updated to be consistent with emergency measures that can help prevent earthquake impacts in county buildings. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Pandemic Flu	Provide training on immunization techniques	Riverside University Health System-Public Health	On-going for the life of the current plan (yrs. 2018-2023). Continue training to teach any new techniques, strategies, and to ensure all staff are proficient. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	Public Health Emergency Preparedness Grant (PHEP)

Pandemic Flu	Participated and conducted a Non-Medical Intervention Tabletop Exercise	Riverside County Emergency Management Department & Riverside University Health System-Public Health	Completed on 09/28/2015	Pan Flu Grant PHEP Grant
Pandemic Flu	Participated and conducted a Flu vaccination exercise	Riverside County Emergency Management Department & Riverside University Health System-Public Health	Completed on 11/10/2016	Pan Flu Grant PHEP Grant
Pandemic Flu	Generate a draft Crisis Care Plan	Riverside County Emergency Management Department & Riverside University Health System-Public Health	Completed 08/30/2016	Pan Flu Grant PHEP Grant HPP Grant
Pandemic Flu	Training Medical Reserve Corp (MRC) in hospital surge exercises	Riverside County Emergency Management Department	Started in 2011 and is on-going for the life of the current plan (yrs. 2018-2023). Continue training to keep updating and informing volunteers to increase their skills. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	HPP Grant State Homeland Security Program (SHSP)
Pandemic Flu	Training Medical Reserve Corp. (MRC) volunteers in Alternate Care Site	Riverside County Emergency Management Department	Completed in 2014	HPP Grant State Homeland Security Program (SHSP)Pan Flu Grant
Wildland Fire	Create wildfire protection zones that reduce the risks to citizens and firefighters from fire dangers	Riverside County Fire Department & CAL Fire	On-going for the life of the current plan (yrs. 2018-2023). Continuously update and develop protection zones that can help decrease wildfire risks in the community. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Wildland Fire	Strengthen defensible space inspections in fire prone areas	Riverside County Fire Department & CAL Fire	On-going for the life of the current plan (yrs. 2018-2023). Continue inspections in locations that are susceptible to fires. This action will be reassessed during	State Mission and/or Grant funding

			the monitoring and update phase of the County's 2017 LHMP.	
Wildland Fire	Continue maintenance of existing fire roads throughout the county to provide fire department access	Riverside County Fire Department & CAL Fire	On-going for the life of the current plan (yrs. 2018-2023). Continue keeping the roads well paved and easy to have fire trucks be able to drive on. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Wildland Fire	Fuel reduction projects throughout the county to reduce fire potential	Riverside County Fire Department & CAL Fire	On-going for the life of the current plan (yrs. 2018-2023). Continuously improve and develop projects to lower the impact of fires in the county. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Wildland Fire	Develop and enforce construction and design standards that ensure the development incorporates fire prevention features	Riverside County Fire Department & CAL Fire	On-going for the life of the current plan (yrs. 2018-2023). Continuously enforce and update measures to prevent fire hazards. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Wildland Fire	Conduct and implement long range fire safe planning through code adoption/policies consistent with the Safety Element of the General Plan	Riverside County Fire Department & CAL Fire & Riverside County Transportation, Land, Management Agency (Planning Division)	On-going for the life of the current plan (yrs. 2018-2023). Continuously implement code policies to integrate them into the Safety Element as they are developed/updated and approved. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Wildland Fire	Ben Clark Training Center to provide wildland fire protection related classes to fire personnel	Riverside County Fire Department & CAL Fire	On-going for the life of the current plan (yrs. 2018-2023). Continuously make sure that this center is available to provide wildland fire protection classes to fire staff to improve their skills on fire mitigation and preparedness. This action will be reassessed during the monitoring	State Mission and/or Grant funding

			and update phase of the County's 2017 LHMP.	
Wildland Fire	Continue wildland fire suppression/preparedness to maintain a state of readiness throughout the year	Riverside County Fire Department & CAL Fire	On-going for the life of the current plan (yrs. 2018-2023). Continuously provide skills training to the community to be prepared for disasters. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Wildland Fire	Rapid intervention, identification and mitigation of Goldspot Oak Bore Beetle (GSOB) trees at various infestation levels on State Responsibility Area (SRA) lands throughout the county. Herbicide or tree removal if necessary	CAL Fire Unit Forester	On-going for the life of the current plan (yrs. 2018-2023).Continuously monitor infestation levels of GSOB trees to continue removing infested trees if necessary. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Wildland Fire	Rapid intervention, identification and mitigation of Pine Bark Beetle infestation, epidemic during times of drought. Removal of trees that are symptomatic or the use of pesticide when applicable	CAL Fire Unit Forester	On-Going for the life of the current plan (yrs. 2018-2023).Continuously monitor infestation levels of Pine Bark Beetle to continue removing infested trees or to continue using pesticides if necessary. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Wildland Fire	Continue Truck Trail and road maintenance to provide access for fire suppression vehicles and personnel.	CAL Fire Unit Forester	On-Going for the life of the current plan (yrs. 2018-2023). Continuously preserve and improve Truck Trail and roads, if needed, for rapid available access to fire suppression vehicles. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding

Wildland Fire	Continue Fire Road maintenance of culverts and road prisms in open space areas on SRA land to allow for adequate drainage.	CAL Fire Unit Forester	On-Going for the life of the current plan (yrs. 2018-2023). Continuously preserve and improve culverts and road prisms, if needed, for sufficient drainage. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	State Mission and/or Grant funding
Electrical Failure	Coordinated with Southern California Edison to be included in their power outage notifications	Riverside County Emergency Management Department	On-going for the life of the current plan (yrs. 2018-2023). EMD joined SoCal Edison's recipient list as of Dec. 2016 to continuously be informed of any emergency notifications to help prevent electrical failure impacts. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Emergent Disease/ Contamination	Drafted a Region VI Highly Contagious Disease Transportation Plan	Riverside County Emergency Management Department	Completed on 12/08/2016	HPP Grant Ebola Grant
Emergent Disease/ Contamination	Facilitated a Region VI Highly Contagious Disease Transportation Tabletop Exercise	Riverside County Emergency Management Department	Completed on 09/29/2016 The situation manual for this was completed on 11/14/2016	HPP Grant Ebola Grant
Emergent Disease/ Contamination	Drafted a Riverside County Viral Hemorrhagic Fever Preparedness and Response Plan (VHF Plan)	Riverside County Emergency Management Department & Riverside University Health System-Public Health	Completed on 11/2016	HPP Grant Ebola Grant
Cyber Attack	**Enterprise Intrusion Prevention System (IPS)** Protects the county network from Internet-based threats and attacks (~140,000 attacks/day on average)	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continue to update and maintain the IPS network to protect the county from any form of cyber-attacks or threats. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund

Riverside Operational Area
Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)

July 2018

Cyber Attack	**Enterprise Breach Detection System** Inspects all internal/lateral county network traffic for indicators of compromise (IOCs) enabling the ISO to rapidly detect, respond to, contain, and prevent cyber-attacks, malware outbreaks, network reconnaissance, data exfiltration, and C2 (command & control) and botnet activities	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continuously inspect the county network to detect forms of threats or attacks. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Cyber Attack	**Albert Sensor** Monitors and reports to the Center for Internet Security (CIS) Multi-State Information Sharing and Analysis Center (MS-ISAC) all Domain Name System (DNS) and NetFlow traffic for correlation with the Department of Homeland Security's threat intelligence database for real-time alerting of malicious network connections to blacklisted IP address on the Internet	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continuously maintain the Albert Sensor in order keep having the association with the Department of Homeland Security's database on alerting network threats for the county. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund

Cyber Attack	**Countywide Security Awareness Training** SANS Securing The Human information security and privacy training modules deployed on county learning management system (LMS) Educates our workforce on how to be extra vigilant and things to look out for to avoid falling victim to a targeted attack	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continuously provide training to the county's workforce on signs of cyber-attacks and prevent them from being a victim of these attacks. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Cyber Attack	**Enterprise Security Information Event Management (SIEM)** Serves as the county's centralized security event log management repository and correlation engine	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continue to maintain the SIEM to monitor and prevent security threats. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Cyber Attack	**Enterprise Internet Proxy (Web Filter)** Prevents county employees and malware from accessing compromised/malicious websites and C2 (command & control) servers, in addition to non-county authorized websites based on category/content filtration policies/rules	Riverside County Technology Information	May 2017 – December 2018 Product (Blue Coat Proxy Advance Secure Gateway (ASG)) has been procured and is in the process of being deployed.	County General Fund

Cyber Attack	**Governance, Risk, & Compliance (GRC) Software Suite** Platform on which our security operations (active network monitoring, breach detection, incident response, business impact analysis, threat containment/eradication, alerting/reporting, process workflow automation, security audits, risk assessments/register, regulatory compliance checks) will be carried out	Riverside County Technology Information	Implementation estimated to begin in June 2017 – July 2018. Product (RSA Archer GRC) has been procured and is in the process of being deployed.	County General Fund
Cyber Attack	**Security Operations Center (SOC)** Planning phase completed, construction estimated to begin in September 2017	Riverside County Information Technology	September 2017 – September 2018. The County's Cyber Security Operations Center (SOC) is under construction.	County General Fund
Cyber Attack	**Information Security Forum (ISF)** Convene on a quarterly basis with department information security officers/liaisons to discuss key security topics, risk trends, and other related matters, including: Formation of a Critical Security Incident Response Team (CSIRT)	Riverside County Information Technology	October 2018 – ongoing This forum will be on-going for the life of the current plan (yrs. 2018-2023). Will continue to conduct constant security incident/breach simulations and tabletop exercises that can help prevent cyber-attacks in the future. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP. The ISO is in the process of identifying members to serve on the Critical Security Incident	County General Fund

	Conducting security incident/breach simulations and tabletop exercises		Response Team (CSIRT). Estimated timeline for formation and initial kickoff meeting is October 2018.	
Terrorist Event	SWAT team trained to respond to terrorism events	Riverside County Sheriff	On-going for the life of the current plan (yrs. 2018-2023). Continuously provide training to reflect personnel attrition and train on new tactics. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Terrorist Event	Hazard Device Team trained to respond to terrorism events	Riverside County Sheriff	On-going for the life of the current plan (yrs. 2018-2023). Continuously provide training to reflect personnel attrition and train on new tactics and trends. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Terrorist Event	Sheriff Emergency Response Team trained to respond to terrorism events	Riverside County Sheriff	On-going for the life of the current plan (yrs. 2018-2023). Continuously provide training to reflect personnel attrition and train on new trends. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Terrorist Event	Sheriff personnel are assigned to the Joint Terrorism Task Force	Riverside County Sheriff	On-going for the life of the current plan (yrs. 2018-2023). Continuously integrate new sheriff personnel to improve this group's structure and capabilities. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Terrorist Event	Ben Clark Training Center provides terrorism related classes for Law	Riverside County Sheriff	On-going for the life of the current plan (yrs. 2018-2023). Classes are funded each year through the State Homeland Security Program (SHSP) to	County General Fund

	Enforcement and First Responders.		continuously educate and train personnel on new skills and improve their abilities. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	
Terrorist Event	Tactical response training	Riverside County Sheriff & Riverside County Fire Department	On-going for the life of the current plan (yrs. 2018-2023). Continuously train and improve on tactical response. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Communications Failure	**County of Riverside Network (CORNET)** Redundant Internet connections Backbone links are configured with a mesh topology to provide full redundancy	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continuously configure links to prevent the termination of internet connections. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund
Communications Failure	**Enterprise Voice Network (VoIP)** Centralized SIP trunking for ingress/egress PSTN access via 8 geographically separated locations Carrier failover protection for inbound voice traffic Enterprise call processing for VoIP Endpoints are logically and physically separated into 3 datacenters ensuring a High-	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continuously provide accessibility to phone carrier connection and call processing. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund

	Availability solution Remote site routers configured for SRST; in times of WAN outages, local IP Phones will re-register to local equipment, providing inter-site calling and access to the PSAP via carrier provided analog circuits			
Communications Failure	**Enterprise Best Practices** Internal escalation contact list for all essential personal readily available 24x7 On-Call staffing availability for both Voice and Data Networks Vendor support available at 24x7x4 for all critical Network and Voice equipment Regular professional staff training on emerging technologies Frequent equipment configuration backups to SAN Critical Enterprise level equipment is located at facilities with full battery and generator backup power	Riverside County Technology Information	On-going for the life of the current plan (yrs. 2018-2023). Continue to update contact list when staff support is needed in case of emergencies. Continue to train staff on technologies that arise and equip facilities with power backup supplies. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund

Communications Failure	**Enterprise Emergency Notification System** InformaCast Advanced on-premise notification solution for immediate reach to the County's 20,000+ VoIP endpoints InformaCast Mobile cloud-based notification solution to extend the County's reach off-network to mobile devices such as cellular phones and tablets	Riverside County Technology Information	On-Premise solution has been rolled out to all County VoIP endpoints. Mobile Solution has been rolled out to EMD. Mobile solution is ready to be rolled out to other departments as requested. On-going for the life of the current plan (yrs. 2018-2023). Continue to have a notification system to be able to have the ability to connect with off-network devices in case of a communications failure, including Wi-Fi. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund Department Funds; departments who wish to take advantage of this service will be billed back to the departments based on how many users
Communications Failure	**Network Connectivity** Use of Cellular based redundant WAN links for critical county locations. Introduction of MPLS technologies to provide alternate network paths for County locations	Riverside County Technology Information	Several locations have purchased a Cellular based redundant WAN link . Solution can be purchased by other departments. Installation can take up to 6 weeks to install, based on equipment availability. On-going for the life of the current plan (yrs. 2018-2023). Continue to provide alternate network paths for County locations in the case of a communication failure. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund Department Funds; billable by the cellular carrier to requesting departments

Flood	**University Wash Channel, Stage 3 Project No. 221-1-8-00120-03-12** This project will increase public safety and improve local economics by retrofitting an older, built-out commercial/industrial area with drainage infrastructure to alleviate repeated flood damage to existing businesses. The project will also address street and intersection flooding	Riverside County Flood Control and Water Conservation District	Notice To Proceed 2/21/17 Completed 11/14/17	Riverside County Flood Control funds Cost: $3,044,500
Flood	**Monroe MDP – Monroe Channel Project No. 1-8-00071 Stage 4** At request of the City of Riverside, replacement of City's existing open channel with underground reinforced concrete box with 10-year storm capacity. Project limits are from California Avenue upstream to Magnolia Avenue	Riverside County Flood Control and Water Conservation District	Expected to be advertise in 4th Quarter 2016 Notice to Proceed 8/30/17 Completed 5/01/18	Riverside County Flood Control funds Cost:$2,489,067
Flood	**Jurupa – Pyrite MDP Line A-2 Project No. 1-8-00234 Stage 1** Master planned lateral stormdrain to Jurupa Channel. Project is east-west drain crossing	Riverside County Flood Control and Water Conservation District	30% Plans & R/W Acquisition as of 1/10/17 Projected Start: 9/2018 Projected End: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $338,332

	Agate Street about 1,000 feet south of Jurupa Road. Outlet point at Jurupa Channel is unimproved and likely to remain so			
Flood	**University MDP Line 3 Project No. 1-8-09020 Stage 1** The MDP proposes Line 3 as approximately 2,900 feet of 30" RCP east in Blaine Street then northeast to Blaine Street Retention Basin. The Blaine Street Retention Basin is located 600 feet north of Blaine Street between Valencia Hill Drive and Mt. Vernon Avenue. Budgeted for scoping study and evaluation of FEMA map floodplain limits only	Riverside County Flood Control and Water Conservation District	Pending approval Projected Start: 12/2020 Projected End: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $2,926,028
Flood	**Santa Ana River Stabilization Project No. 1-8-00010 Stg. 90** The USACE is expected to initiate restoration of the federally constructed reach of the Santa Ana River Levee system downstream of San Bernardino County line to Tequesquite. Exact form of	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $10,685,000

	project not set. Work will likely include repair of groins and toe protection			
Flood	**Box Springs Dam – Outlet Modification Project No. 1-8-00041** Reconstruct outlet structure to prevent blockage from sediment accumulation	Riverside County Flood Control and Water Conservation District	Pending until Woodcrest Dam is complete 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $981,842
Flood	**Sycamore Dam – Outlet Structure Modifications Project No. 1-8-00042** This project will upgrade the level of safety and serviceability. Initial project components include the repair/reinforcement of the existing outlet channel; construction of a new debris rack structure; erosion controls on the embankment of the dam; construction of a safer access road into the facility; design for a safer routing of flood waters from the emergency spillway to Central Avenue; and the installation of a control section to measure outflow from the outlet pipe	Riverside County Flood Control and Water Conservation District	Pending until Woodcrest Dam is complete 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $1,854,991

	of the dam. Completion of this project is planned to follow the Woodcrest Dam Outlet Modification project.			
Flood	**Alessandro Dam Outlet Modification Project No. 1-8-00043** Reconstruct outlet structure to prevent blockage from sediment accumulation	Riverside County Flood Control and Water Conservation District	Pending until Woodcrest Dam is complete 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $907,682
Flood	**Prenda Dam Outlet Modification Project No. 1-8-00044** Reconstruct outlet structure to prevent blockage from sediment accumulation	Riverside County Flood Control and Water Conservation District	Pending until Woodcrest Dam is complete 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $1,238,312
Flood	**Woodcrest Dam Outlet Modification Project No. 1-8-00045** This project will upgrade the level of safety and serviceability. The approved Project Charter identifies the primary scope of work for the project as follows: design and construction of a new inlet structure to reduce potential for clogging of the outlet works;	Riverside County Flood Control and Water Conservation District	Development of design plans and specifications on hold until latest Geotechnical investigation is complete Projected Start: March 2019 Projected End: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $2,216,529

	rehabilitation of the existing outlet gate assembly and control stem; implementation of an automated gate control system; rehabilitation of the outlet pipe; restoration of the outlet channel; and installation of surficial erosion controls on the surface of the dam embankment. Once completed, this project will serve as an example for performing similar upgrades to the remaining Riverside Reservoirs			
Flood	**North Norco Channel Stage 10 Project No. 222-2-8-00140-10-12** The project is located just upstream of River Road within the city of Norco in Riverside County, California. This project consists of approximately 550 lineal feet of triple cell reinforced concrete box and 125 lineal feet of open concrete channel transition, will replace the existing interim dirt channel. The project remedies ongoing flooding	Riverside County Flood Control and Water Conservation District	Completed 9/9/14	Riverside County Flood Control funds

	problems in the area thus resulting in positive impacts to residents and businesses			
Flood	**Corona MDP Line 5 Stage 1 Project No. 2-8-00280** This project includes the construction of an underground storm drain beginning in Sherman Avenue south of Railroad Street and extending down Railroad Street westerly to Smith Street. The City is willing to undertake the design and construction of this project using District funding.	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $1,397,201
Flood	**Corona MDP Line 52 Stage 1 Project No. 2-8-00350** An underground storm drain extending north from Third Street along E. Grand Boulevard then under the 91 Freeway to Temescal Creek Channel	City Of Corona	Notice to Proceed 7/29/17 Expected Completion: Summer 2018	Riverside County Flood Control funds City of Corona Funds Cost: $4,522,000
Flood	**Coldwater Canyon Structural Improvements Project 2-8-00505** Proposed conceptual improvements include 1) reducing	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $6,005,806

	flood risk and nuisance to traveling public on Temescal Canyon Road at the intersection of Glen Ivy Road; and 2) an armored berm along the east bank of Coldwater Wash downstream of the intersection of Temescal Canyon Road and Glen Ivy Road. The armored berm would prevent the migration of the active Coldwater Wash Channel, thereby protecting the west side of the Mountain Cove Development. Conceptual improvements are pending friendly acquisition of the underlying parcels needed for the project			
Flood	**Coldwater Canyon Floodplain Acquisition Project No. 2-8-00505** Funded portion of project includes a hydrologic and geomorphologic assessment of Coldwater Canyon Wash from Glen Ivy Road to Temescal Wash. Study will evaluate the stability of Coldwater Canyon	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: included in the $6,005,806 amount for Coldwater Canyon Structural Improvement project listed above

	Wash and recommend potential minimalist interventions, if necessary, to protect Squaw Mountain Bridge and prevent erosion of Painted Hills development canyon slopes along Coldwater Canyon Wash. Balance of funds would support potential interventions recommended by the report including floodplain buyout			
Flood	**Southeast Compton Wash At Corona Sanitary landfill Project No. 2-8-09054** Riverside County Waste Management District has requested assistance solving ongoing flooding and erosion problems along the southeast side of the landfill	Riverside County Waste Management District**	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $500,000

Flood	**Lake Mathews Estates Water Quality Pond Project No. 2-8-09058** Proposed in the "Drainage Water Quality Management Plan for the Lake Matthews Watershed", this roughly 10-acre project is to be located on the south side of Cajalco Road about ¾-mile west of Wood Road. The project will capture first flush runoff from Cajalco Creek and carry it to an off-channel pond to be treated and/or infiltrated	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $2,794,983
Flood	**Temescal Wash Floodplain Project No. 2-8-00052** Acquisition of floodplain area for flood protection, water conservation and habitat mitigation banking	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $23,534,000
Flood	**Arroyo Del Toro Channel Stage 1 Project No. 223-3-8-00170-01-12** This project collects flows that pass under Interstate 15, flow through the cemetery and flood the intersection of Riverside Drive	Riverside County Flood Control and Water Conservation District	Completed 6/16/15	Riverside County Flood Control funds

	and Collier Avenue. The flows will now be collected in a channel and conveyed via an underground storm drain system to the Collier Marsh area			
Flood	**Ortega Channel Retrofit Project No. 3-8-00070** Project will replace a portion of the clog-prone storm drain with a more easily accessible and maintainable open channel	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $1,628,761
Flood	**LITTLE LAKE MDP LINE B, STG 1 STETSON AVENUE CHANNEL, STG 7 aka HEMET MDP LINE D Project Nos. 224-4-8-00265-01-12 224-4-8-00211-07-12** The District constructed a segment of the District's Little Lake MOP Line B. This infrastructure will diminish neighborhood flooding and damage to private property and businesses and improve the safety of the traveling public during storm events. This new drain will also permanently reduce	Riverside County Flood Control and Water Conservation District	Stage 1 Completed 06/21/16 Stage 2 Pending approval Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $6,398,777

	flood-related street maintenance and repair costs for the City of Hemet. Little Lake MDP Line B Stage 1 is located primarily within the City of Hemet, with small portions extending into the City of San Jacinto and unincorporated Riverside County beginning approximate 300 feet north of Berkley Ave and terminating approximately 200 feet south of Florida			
Flood	**Homeland MDP Line 2, Stage 2 Project No. 224-4-8-00337-02-12** The District constructed a segment of drainage infrastructure described in the District's Romoland Master Drainage Plan as Romoland MOP Line A, Stages 4, 5 and 6, Romoland MOP Lines A-2 and A-3, Stage 1, and Briggs Basin. In conjunction with the District's Homeland MDP Line 1, Stage 1, completion of this drainage infrastructure will reduce the	Riverside County Flood Control and Water Conservation District	Completed 6/5/12	Riverside County Flood Control funds

	floodplain by approximately 1, 762 acres and enable revisions to the FEMA Flood Insurance Rate Maps that result in a significant reduction in flood insurance premiums. The District's Homeland MDP Line 1, Stage 1 project is currently ongoing with an anticipated completion in February 2017			
Flood	**Sunnymead MDP Line P-6 Stage 2 Project No. 224-4-8-00716-02-12** The District constructed a segment of drainage infrastructure described in the District's Sunnymead Master Drainage Plan which remedies ongoing flooding problems in the area thus resulting in positive impacts toresidents and businesses.	Riverside County Flood Control and Water Conservation District	Completed 3/25/2014	Riverside County Flood Control funds
Flood	**San Jacinto MDP Line C, Stage 2, Lines C-4, C-5 & B Project No. 224-4-8-00124-02-12** The District constructed a segment of drainage	Riverside County Flood Control and Water Conservation District	Completed 6/30/15	Riverside County Flood Control funds

	infrastructure described in the District's San Jacinto Master Drainage Plan, which remedies the ongoing flooding problems at the intersections of San Jacinto Avenue and Menlo Avenue, San Jacinto Avenue and Midway Street, and Santa Fe Street and Midway Street. Consequently, the removal of ponding water at these intersections during storm events improves traffic and pedestrian safety and public access to the businesses along San Jacinto and Menlo Avenues. The District partnered with the City of San Jacinto to further improve normal residential traffic safety by replacing and reconstructing Midway Street between San Jacinto Avenue and Santa Fe Street			
Flood	**West End Moreno MDP Line LL Project No. 224-4-8-00783-01-12** The District constructed a segment of drainage infrastructure described in the	Riverside County Flood Control and Water Conservation District	Completed 5/12/15	Riverside County Flood Control funds

	District's West End Moreno MDP which remedies ongoing flooding problems in the area, thus resulting in positive impacts to residents and businesses			
Flood	**Romoland MDP Line A, STGS 4,5,6, Homeland MDP Line 1 Briggs Basin, Romoland MDP Lines A-2 and A-3 Project No. 224-4-8-00310-04-12** The District constructed a segment of drainage infrastructure described in the District's Romoland Master Drainage Plan as Romoland MOP Line A, Stages 4, 5 and 6, Romoland MOP Lines A-2 and A-3, Stage 1, and Briggs Basin. In conjunction with the District's Homeland MDP Line 1, Stage 1, completion of this drainage infrastructure will reduce the floodplain by approximately 1, 762 acres and enable revisions to the FEMA Flood Insurance Rate Maps that result in a significant	Riverside County Flood Control and Water Conservation District	Completed 8/23/16	Riverside County Flood Control funds

	reduction in flood insurance premiums. The District's Homeland MDP Line 1, Stage 1 project is currently ongoing with an anticipated completion in February 2017			
Flood	**Little Lake MDP Line B Stage 2 Project No. 4-8-00265** An underground storm drain from just south of Florida Avenue, southerly in Meridian Street to Whittier Avenue.	Riverside County Flood Control and Water Conservation District	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $6,804,257
Flood	**San Jacinto River Stage 3 Project No. 4-8-00020** "Stage 3" covers the nearly 10-mile river reach beginning at the entrance to Railroad Canyon and ending upstream at the Ramona Expressway crossing near the Bernasconi Hills. This environmentally and fiscally challenged project has been through several evolutions and has been essentially dormant for nearly a decade. Funding shown is for intensive planning/engineering study of options for managing future development. Goal is to develop a viable project for the San Jacinto River from Ramona Expressway to Railroad Canyon considering flood management, transportation, environmental and other opportunities and constraints	Riverside County Flood Control and Water Conservation District	Pending approval Projected Start: 11/2019 Projected End: during the life of the plan (2018-2023)	Riverside County Flood Control funds ADP (Area Drainage Plan) Funds Cost: $70,000,000

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Flood	**Gilman Home Channel Lateral A Stage 3 Gilman Home Channel Stage 90 Project No. 225-5-8-00171-03-12** The District constructed a segment of drainage infrastructure described in the District's Banning Master Drainage Plan which remedies ongoing flooding problems in the area, thus resulting in positive impacts to residents and businesses. Moreover, this project will enable revision of the FEMA Flood Insurance Rate Maps in the impacted area resulting in a significant reduction in flood insurance premiums. Many	Riverside County Flood Control and Water Conservation District	Completed 9/22/15	Riverside County Flood Control funds

	owners with federally insured home loans will realize savings of several thousands of dollars per year			
Flood	**Beaumont MDP Line 16 Stage 1 Project No. 5-8-00201** Project would build MDP Line 16 in Grand Avenue from Beaumont Cherry Valley Water District (BCVWD) infiltration ponds easterly to Bellflower Avenue as an element of a cooperative project with the BCVWD to provide both flood control and storm water capture to recharge groundwater	Riverside County Flood Control and Water Conservation District	Pending approval Projected Start: 12/2020 Projected End: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $5,353,074
Flood	**Eagle Canyon Dam Stage 1 Project No. 6-8-00190** The District constructed a segment of drainage infrastructure described in the District's Palm Springs Master Drainage Plan. Construction of this project also includes remediation of potentially hazardous and nonhazardous illegally dumped	Riverside County Flood Control and Water Conservation District	Completed 11/17/15	Riverside County Flood Control funds

	materials and remedies ongoing flooding problems in the area, thus resulting in positive impacts to residents and businesses. Additionally, Palm Springs MDP Line 43 and Lateral 43A, the underground dam outlet, is currently under construction and completion is anticipated for February 2016. Completion of the underground infrastructure will enable revisions to the FEMA Flood Insurance Rate Maps in the impacted area immediately downstream of Eagle Canyon and will result in a significant reduction in flood insurance premiums			
Flood	**Palm Springs MDP Line 43 and Lateral 43A Project No. 226-6-8-00163-01-12** The District constructed a segment of drainage infrastructure described in the District's Palm Springs Master Drainage Plan as Palm Springs MOP Line 43 and Lateral	Riverside County Flood Control and Water Conservation District	Completed 3/15/16	Riverside County Flood Control funds

	43A. Construction of this project serves as the underground outlet to the District's Eagle Canyon Dam facility that was completed on September 21, 2015 with the Notice of Completion accepted by the Board as Agenda Item Number 11-1 on November 17, 2015. Completion of both District facilities will enable revisions to the FEMA Flood Insurance Rate Maps in the impacted area immediately downstream of Eagle Canyon Dam and will result in a significant reduction in flood insurance premiums			
Flood	**Murrieta Creek Channel (Phase II & III) Project No. 7-8-00021** Murrieta Creek Flood Control Project from Old Town Temecula to Elm Street in Murrieta	Riverside County Flood Control and Water Conservation District/United States Army Corps of Engineers*	Pending approval 5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $82,000,000
Flood	**Whitewater River Levee Restoration Project No. 6-8-00250** Restoration work to increase freeboard and bring levee	Riverside County Flood Control and Water Conservation District	Pending – Full scope of restoration work not yet established but funding figure shown is based on preliminary engineer's estimate	Riverside County Flood Control funds Cost:1,260,000

	adjacent to Cimarron Golf Resort into compliance with FEMA certification guidelines		5 year CIP (Capital Improvement Plan) Projected start and end: during the life of the plan (2018-2023)	
Flood	**Palm Canyon Wash – Cherley Creek Levee Restoration Stage 90 Project No. 6-8-00040** Major construction to bring levee serving small tributary upstream of South Palm Canyon Wash into compliance with FEMA certification guidelines. Project will be combination of RSP and soil-cement lined channel and levee	Riverside County Flood Control and Water Conservation District	Expected Advertise Date: 2nd Quarter 2018 Projected Start: 08/2019 Projected End: during the life of the plan (2018-2023)	Riverside County Flood Control funds Cost: $6,187,021
Flood	**Banning MDP Line D-2 Stage 1 Project No. 5-8-00169** This project is over one mile of underground storm drain that connects to the existing Ramsey Street Storm Drain at the intersection of Hargrave Street and Ramsey Street. It includes Line D-2, Stage 1 which will continue northerly along Hargrave Street for approximately 5,250 feet before terminating at Indian School	RCFC/City of Banning	Notice to Proceed: 5/15/17 Completed: 2/27/18	Riverside County Flood Control funds

	Lane. Line D-2A, Stage 1 will tie into Line D-2 at the intersection of Hargrave Street and Theodore Street. Line D-2A will continue westerly along Theodore Street for approximately 600 feet before terminating at Florida Street.			
Civil Disorder	Trained and equipped Mobile Field Force Teams throughout the county	Riverside County Sheriff	On-going for the life of the current plan (yrs. 2018-2023). Continuously provide training to reflect personnel attrition; Less-lethal equipment acquired. This action will be reassessed during the monitoring and update phase of the County's 2017 LHMP.	County General Fund

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APPENDIX D – Public Outreach Presentations and Meetings

Please see Attachment D: Agendas and Sign-ins for supporting documentation.

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Public Outreach Presentations and Updates

Date	Name of Meeting, Location	Type of Presentation	Number Attending	Hours
6/22/2016	Western Riverside Emergency Council (WREC) Meeting, Riverside	Informed Council of upcoming Plan update and encouraged participation	19	20 mins.
7/14/2016	Operational Area Planning Committee (OAPC) Meeting, Beaumont	Informed OA on upcoming Plan to update	163	15 mins
9/19/2016	Palo Verde COMM. Meeting, Blythe, CA.	LHMP discussion, Local Hazard Mitigation Plan update process, encouraged East County participation and Public Outreach	16	1
9/29/2016	Email Distribution #1	Email blast, Distributed contact verification emails for partnering jurisdictions and agencies. Provided LHMP informational guides and resources.	–	–
10/6/2016	Local Hazard Mitigation Plan Steering Committee Kick-Off for County Departments	Overview of Hazard Mitigation FEMA 2011 LHMP Review Guide Update Process County Inventory Checklist County Risk Assessment Participants, New, Returning, and Not Participating	19	2
10/11/2016	Emergency Management Project Committee	Project Overview, LHMP introduction, planning process	34	10 mins.
10/13/2016	Operational Area Planning Committee (OAPC) Meeting, Beaumont	Updated OA on progress of update, offered participants opportunity to reach out to county for technical support, offered public opportunity to ask questions and provide comment (no comments made)	64	2

10/19/2016	Steering Committee Email Distribution #1	Informed the members of the google drive that contains LHMP documentation for additional support Informed about the next steps and what about the next meeting date Provided contact information for EMD LHMP staff	–	–
12/1/2016	Email Distribution #2	Invitation to LHMP Template workshop, update on county hazard identification/ranking, and general information on where they should be in the update process	–	–
12/6/2016	Tribal Workshop, Riverside	Overview of Hazard Mitigation FEMA 2011 LHMP Review Guide County Update Process and Progress Mitigation Websites and Resources Technical Support	7	1
12/8/2016	City Workshop, Riverside	Overview of Hazard Mitigation FEMA 2011 LHMP Review Guide County Update Process and Progress Mitigation Websites and Resources Technical Support	15	2
12/8/2016	Mountain Emergency Communications COMM. Meeting, Idyllwild, CA	LHMP discussion, Local Hazard Mitigation Plan update process	7	2
12/13/2016	Special District Workshop, Riverside	Overview of Hazard Mitigation FEMA 2011 LHMP Review Guide County Update Process and Progress Mitigation Websites and Resources Technical Support	8	1
12/15/2016	School District Workshop, Riverside	Overview of Hazard Mitigation FEMA 2011 LHMP Review Guide County Update Process and Progress Mitigation Websites and Resources Technical Support	7	2.5
12/15/2016	Northwest COMM. Meeting, Jurupa Valley, CA	LHMP discussion, Local Hazard Mitigation Plan update process	12	2

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12/20/2016	Southwest COMM. Meeting, Murrieta, CA	LHMP discussion, Local Hazard Mitigation Plan update process	6	2
12/29/2016	Steering Committee Email Distribution #2	Sent each member questions about specific hazards that pertained to the department they work for	–	–
1/4/2017	Email Distribution #3	Informed LHMP participants of additional LHMP workshops that will be hosted to provide further assistance	–	–
1/11/2017	Local Hazard Mitigation Plan Steering Committee, Riverside	Group Discussion, Hazard Identification/Ranking Final Review, Mitigation Actions and Strategies Brainstorm	16	2
1/12/2017	Operational Area Planning Committee (OAPC) Meeting, Beaumont	Updated OA on progress of update, offered participants opportunity to reach out to county for technical support, offered public opportunity to ask questions and provide comment (no comments made)	74	2
1/19/2016	Steering Committee Email Distribution #3	Thanked all members for participating in the previous meeting Provided the risk scores of the hazards that were discussed at the previous meeting Provided the most current updates for the mitigation actions from 2012 & asked for each of them to provide new actions for current county hazards Informed about the next meeting date	–	–
2/7/2017	City Workshop, Riverside	Answered LHMP questions & concerns Provided additional assistance if needed Reviewed LHMP drafts if needed	10	1
2/8/2017	School District Workshop, Riverside	Answered LHMP questions & concerns Provided additional assistance if needed Reviewed LHMP drafts if needed	2	1
2/9/2017	Special District Workshop, Riverside	Answered LHMP questions & concerns Provided additional assistance if needed Reviewed LHMP drafts if needed	4	1

2/14/2017	Email Distribution #4	Informed LHMP participants about the final 2017 LHMP County Hazard Ranking. Talked about a possible LHMP Training that EMD is deciding on hosting. Informed about the Senate Bills 1000 & 379. Provided a link to help participants obtain maps for their jurisdiction if they are having trouble with Hazus	–	–
2/23/2017	Email Distribution #5	Informed LHMP participants about the cancellation of the April workshops due to the substation of having the LHMP FEMA Training Informed about the confirmation of the FEMA G-318 Training that will be hosted April 3-4 and provided the sign-up link Informed that the June workshops are still going to be held to provide any additional assistance on the plan	–	–
3/1/2017	Steering Committee Reminder Email	Reminded members that the date for submitting new mitigation actions for the current top 10 county hazards was approaching	–	–
3/15/2017	Palo Verde COMM. Meeting, Blythe, CA	LHMP discussion, Local Hazard Mitigation Plan update process	18	1.5
4/21/2017	Steering Committee Email Blast #4	Provided minutes from previous meeting, informed about reviewing LHMP mitigation actions and goals/objectives, sent calendar invite for next meeting	–	–
4/24/2017	Steering Committee Email	Sent selected committee members to provide input on LHMP hazard profiles depending on the hazard that corresponds to the department they represent	–	–
6/5/2017	Tribal Workshop, Riverside	Answered LHMP questions & concerns Provided additional assistance if needed Reviewed LHMP drafts if needed	4	1

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6/6/2017	City Workshop, Riverside	Answered LHMP questions & concerns Provided additional assistance if needed Reviewed LHMP drafts if needed	8	1
6/7/2017	School District Workshop, Riverside	Answered LHMP questions & concerns Provided additional assistance if needed Reviewed LHMP drafts if needed	6	1
6/8/2017	Special District Workshop, Riverside	Answered LHMP questions & concerns Provided additional assistance if needed Reviewed LHMP drafts if needed	6	1
7/13/2017	Operational Area Planning Committee (OAPC) Meeting, Beaumont	Updated OA on progress of update, offered participants opportunity to reach out to county for technical support, offered public opportunity to ask questions and provide comment (no comments made)		2
8/17/2017	Local Hazard Mitigation Plan Steering Committee, Riverside	Review completed sections for finalization	10	1
9/2/2017	Indio Preparedness Month Booth, Home Depot, at 42100 Jackson Street from 9 a.m. - 12 p.m.	Personal preparedness and mitigation information		3
9/5/2017	Twitter Post	LHMP and NFIP information		
9/9/2017	Riverside Preparedness Month Booth, Galleria at Tyler, 1299 Galleria at Tyler from 11 a.m. - 3 p.m.	Personal preparedness and mitigation information		4
9/9/2017	Farm Barn, Wildomar Preparedness and Mitigation Presentation	Personal preparedness and mitigation information		1
9/12/2017	County Preparedness Month Booth, County of Riverside Administration Center, 4080 Lemon	Personal preparedness and mitigation information		5

	Street, from 10:30 a.m. - 1:30 p.m.			
9/16/2017	Lake Elsinore Preparedness Month Booth, 710 W. Graham Ave., Lake Elsinore, CA	Personal preparedness and mitigation information		4
9/16/2017	Perris Preparedness Month Booth, Walmart, 1800 N. Perris Blvd from 8 a.m. - 12 p.m.	Personal preparedness and mitigation information		4
9/23/2017	Jurupa Valley Preparedness Month Booth, K-Mart, 7840 Limonite Avenue from 8 a.m. - 12 p.m.	Personal preparedness and mitigation information		4
9/30/2017	Hemet Preparedness Month Booth, Hemet Valley Mall, 2200 W. Florida Ave. from 8 a.m. - 12 p.m.	Personal preparedness and mitigation information		4

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LHMP Private Meetings Attended

Date	Location	Type of Meeting	Number Attending	Hours
8/24/2016	City Emergency Operations Center, Riverside	One to One Assistance LHMP Process Familiarity and HAZUS/GIS information	3	1
11/10/2016	Hemet Fire Administration Building, Hemet	Plan review, update process and clarification assistance	3	2.5
11/15/2016	Riverside EMD	Plan review, update process and clarification assistance	2	1
12/13/2016	Conference call to Mather	CA SHMPT Quarterly Meeting	N/A	4.5
12/14/2016	Hemet	Plan review, update process and clarification assistance	3	2
12/15/2016	Moreno Valley	Plan review, update process and clarification assistance	6	1
2/7/2017	Riverside EMD	Plan review, update process and clarification assistance	2	1
3/14/2017	Perris	Participation with Eastern Municipal Water Districts Planning Committee	10	2.5
3/15/2017	Riverside EMD	Plan review, update process and clarification assistance	3	5
3/28/2017	Riverside EMD	Plan review, update process and clarification assistance	3	2
3/29/2017	Beaumont Police Department	Plan review, update process and clarification assistance	4	2
4/11/2017	Mather	CA SHMPT Quarterly Meeting	N/A	4.5
4/11/2017	Murrieta Fire Administration	Plan review, update process and clarification assistance	4	1.15
4/13/2017	Cathedral City Fire Station	Plan review, update process and clarification assistance	2	2
4/20/2017	Banning City Hall	Plan review, update process and clarification assistance	3	1.5
4/20/2017	Desert Sands USD	Plan review, update process and clarification assistance	4	2
4/25/2017	Calimesa City Hall	Plan review, update process and clarification assistance		

4/25/2017	Temecula City Hall	Plan review, update process and clarification assistance	4	1.15
4/26/2017	Perris	Participation with Eastern Municipal Water Districts Planning Committee	6	2
4/27/2017	San Jacinto City Hall	Meeting with City Manager and staff to discuss joining the County LHMP	5	
5/1/2017	Moreno Valley USD	Plan review, update process and clarification assistance	3	1.5
5/1/2017	Lake Elsinore USD	Plan review, update process and clarification assistance	2	1.15
5/2/2017	Banning - High Valley Water District	Plan review, update process and clarification assistance	3	2
5/3/2017	Indian Wells & Palm Desert	Plan review, update process and clarification assistance	2	7
5/9/2017	La Quinta City Hall	Plan review, update process and clarification assistance	2	1.5
5/17/2017	Beaumont Police Department	Plan review, update process and clarification assistance	5	1.5
5/18/2017	Desert Hot Springs	Plan review, update process and clarification assistance	3	3
5/24/2017	Riverside EOC	Participation in Riversides LHMP planning meeting	6	1
5/25/2017	Wildomar City Hall	Plan review, update process and clarification assistance	3	2
5/25/2017	San Jacinto City Hall	Plan review, update process and clarification assistance	2	2.5
5/31/2017	Murrieta Fire Administration	Plan review, update process and clarification assistance	3	3
6/19/2017	Riverside EMD	LHMP and HMGP assistance for La Quinta	2	1
9/18/2017	Riverside Flood Control	LHMP and HMGP information presentation/meeting with Riverside County Flood Control Staff for potential Mitigation Action Project	5	2

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APPENDIX E – Inventory Template

RIVERSIDE COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION AGENCY 2016 INVENTORY WORKSHEETS

Insert Jurisdiction/Agency Name
Insert Date

TABLE OF CONTENTS

Introduction: These documents are meant to be discussed, used and reviewed by a multi-disciplinary team. The Participation by a wide range of stakeholders who play a role in identifying and implementing mitigation actions is required.

SPECIAL CONCERNS:

1. *Has the completed Letter of Commitment been returned to EMD? EMD must forward this completed Letter of Commitment to CAL OES.*
2. *Has the completed Letter of Participation been returned to EMD?*

1. Local Jurisdiction Contact Information	Page 3
2. Hazard Identification Questionnaire	Pages 4-6
3. Specific Hazards Summary	Page 7
4. Jurisdiction Vulnerability Worksheet	Pages 8-9
5. Jurisdiction Mitigation Strategies and Goals	Pages 10-14
6. Local Jurisdiction Proposed Mitigation Action and Strategy Proposal	Pages 14-16
7. Local Jurisdiction Development Trends	Pages 17-18
8. Appendix A-Plan Review Tool	Pages A1-10

Appendix A the Plan Review Tool for your reference. This is the document Cal OES and FEMA will utilize to verify that all of the required information is in the submitted documents. Please refer to the document for information.

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1. LOCAL JURISDICTION CONTACT INFORMATION

The information on this page identifies:

- Jurisdiction and the contact person
- Jurisdiction's service area size and population
- EOP Plan and a Safety Element of their General Plan

PLEASE PROVIDE THE FOLLOWING INFORMATION:

Agency/Jurisdiction:				
Type Agency/Jurisdiction:				
Contact Person:	Title:			
First Name:		Last Name:		
Agency Address:	Street:			
	City:			
	State:			
	Zip:			
Contact Phone			FAX	
E-mail				
Population Served		Square Miles Served		
Does your organization have a general plan?				
Does your organization have a safety component to the general plan?				
What year was your plan last updated?				
Does your organization have a disaster/emergency operations plan?				
What year was your plan last updated?				
Do you have a recovery annex or section in your plan?				
Do you have a terrorism/WMD annex or section in your plan?				

2. Hazard Identification Questionnaire

The purpose of the questionnaire is to help identify the hazards within your service area. The list was developed from the first round of meetings with the various working groups in the 2012 plan creation, and from the hazards listed in the County's General Plan. Each hazard is discussed in detail in the 2012 LHMP. The information will be used as the basis for each jurisdiction to evaluate its capabilities, determine its needs, and to assist in developing goals and strategies. The information identifies:

a) What hazards can be identified within or adjacent to the service area of the jurisdiction.
b) Which of those hazards have had reoccurring events
c) What specific hazards and risks are considered by the jurisdiction to be a threat specifically to the jurisdiction? (These locations should be identified by name and location for inclusion in the Specific Hazard Summary Table).
    a. Specific types of facilities owned and operated by the jurisdiction.
    b. Locations damaged from prior disasters or hazard causing events.
d) Information about the jurisdiction's EOC

With your Multi-Disciplinary Planning Team:

a. Instructions for Updating Jurisdictions, with your planning team: Review your old Questionnaire for accuracy and relevance, mark changes.

b. Instructions for New Jurisdictions and Special Districts, with your planning team, meet and go over the questionnaire. Fill in YES, NO or NA on the Questionnaire.

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HAZARD IDENTIFICATION QUESTIONNAIRE

DOES YOUR ORGANIZATION HAVE:	
AIRPORT IN JURISDICTION	
AIRPORT NEXT TO JURISDICTION	
DAIRY INDUSTRY	
POULTRY INDUSTRY	
CROPS/ORCHARDS	
DAMS IN JURISDICTION	
DAMS NEXT TO JURISDICTION	
LAKE/RESERVOIR IN JURISDICTION	
LAKE/RESERVOIR NEAR JURISDICTION	
JURISDICTION IN FLOOD PLAIN	
CONTROLLED FLOOD CONTROL CHANNEL	
UNCONTROLLED FLOOD CONTROL CHANNEL	
EARTHQUAKE FAULTS IN JURISDICTION	
EARTHQUAKE FAULTS NEXT TO JURISDICTION	
MOBILE HOME PARKS	
NON-REINFORCED FREEWAY BRIDGES	
NON-REINFORCED BRIDGES	
BRIDGES IN FLOOD PLAIN	
BRIDGES OVER OR ACROSS RIVER/STREAM	
ROADWAY CROSSING RIVER/STREAM	
NON REINFORCED BUILDINGS	
FREEWAY/MAJOR HIGHWAY IN JURISDICTION	
FREEWAY/MAJOR HIGHWAY NEXT TO JURISDICTION	
FOREST AREA IN JURISDICTION	
FOREST AREA NEXT TO JURISDICTION	
WITHIN THE 50 MILES SAN ONOFRE EVACUATION ZONE	
MAJOR GAS/OIL PIPELINES IN JURISDICTION	
MAJOR GAS/OIL PIPELINES NEXT TO JURISDICTION	
RAILROAD TRACKS IN JURISDICTION	
RAILROAD TRACKS NEXT TO JURISDICTION	
HAZARDOUS WASTE FACILITIES IN JURISDICTION	
HAZARDOUS WASTE FACILITIES NEXT TO JURISDICTION	
HAZARDOUS STORAGE FACILITIES IN JURISDICTION	
HAZARDOUS STORAGE FACILITIES NEXT TO JURISDICTION	
DOES YOUR ORGANIZATION OWN OR OPERATE A FACILITY	
IN A FLOOD PLAIN	
NEAR FLOOD PLAIN	
NEAR RAILROAD TRACKS	
NEAR A DAM	
UPSTREAM FROM A DAM	
DOWNSTREAM FROM A DAM	
DOWNSTREAM OF A LAKE	
DOWNSTREAM FROM A RESERVOIR	
NEAR A CONTROLLED FLOOD CONTROL CHANNEL	
NEAR UNCONTROLLED FLOOD CONTROL CHANNEL	
ON AN EARTHQUAKE FAULT	
NEAR AN EARTHQUAKE FAULT	
WITHIN THE 50 MILE SAN ONOFRE EVACUATION ZONE	
IN A FOREST AREA	
NEAR A FOREST AREA	
NEAR A MAJOR HIGHWAY	

A HAZARDOUS WASTE FACILITY	
NEAR A HAZARDOUS WASTE FACILITY	
A HAZARDOUS STORAGE FACILITY	
NEAR A HAZARDOUS STORAGE FACILITY	
NON REINFORCED BUILDINGS	
A MAJOR GAS/OIL PIPELINE	
NEAR A MAJOR GAS/OIL PIPELINE	
DOES YOUR ORGANIZATION HAVE ANY LOCATIONS THAT:	
HAVE BEEN DAMAGED BY EARTHQUAKE AND NOT REPAIRED	
HAVE BEEN DAMAGED BY FLOOD	
HAVE BEEN DAMAGED BY FLOOD MORE THAN ONCE	
HAVE BEEN DAMAGED BY FOREST FIRE	
HAVE BEEN DAMAGED BY FOREST FIRE MORE THAN ONCE	
HAVE BEEN IMPACTED BY A TRANSPORTATION ACCIDENT	
HAVE BEEN IMPACTED BY A PIPELINE EVENT	
EMERGENCY OPERATIONS INFORMATION	
DOES YOUR ORGANIZATION HAVE AN EOC	
IS YOUR EOC LOCATED IN A FLOOD PLAIN	
NEAR FLOOD PLAIN	
NEAR RAILROAD TRACKS	
NEAR A DAM	
UPSTREAM FROM A DAM	
DOWNSTREAM FROM A DAM	
DOWNSTREAM OF A LAKE	
DOWNSTREAM FROM A RESERVOIR	
NEAR A CONTROLLED FLOOD CONTROL CHANNEL	
NEAR UNCONTROLLED FLOOD CONTROL CHANNEL	
ON AN EARTHQUAKE FAULT	
NEAR AN EARTHQUAKE FAULT	
WITHIN THE 50 MILE SAN ONOFRE EVACUATION ZONE	
IN A FOREST AREA	
NEAR A FOREST AREA	
NEAR A MAJOR HIGHWAY	
A HAZARDOUS WASTE FACILITY	
NEAR A HAZARDOUS WASTE FACILITY	
A HAZARDOUS STORAGE FACILITY	
NEAR A HAZARDOUS STORAGE FACILITY	
NON REINFORCED BUILDINGS	
A MAJOR GAS/OIL PIPELINE	
NEAR A MAJOR GAS/OIL PIPELINE	
OTHER FACILITY INFORMATION ARE THERE LOCATIONS WITHIN YOUR JURISDICTION THAT:	
COULD BE CONSIDERED A TERRORIST TARGET	
COULD BE CONSIDERED A BIO-HAZARD RISK	

With your planning team, list the “Yes” answers and discuss. Use the information as a group to summarize your jurisdiction's hazards and vulnerabilities.

3. SPECIFIC HAZARDS SUMMARY

This table helps to identify the information (name, owner, location, etc.) about the specific hazards identified in the Hazard Questionnaire.

In the Summary Table, list the basic information of the hazards identified by the jurisdiction in the Hazard Identification Questionnaire as a potential threat. These specific hazards were used in the development of response plans, maps, and other analysis data.

a. Instructions for Updating Jurisdictions and Special Districts: With your planning team, review the "Yes" answers and see if there were any changes, if so summarize why there is a difference from the 2012.

b. Instructions for New Jurisdictions and Special Districts: With your planning team, review the "Yes" answers and discuss. Use the information as a group to summarize your jurisdiction's hazards and vulnerabilities.

SPECIFIC HAZARDS SUMMARY

Jurisdiction	Hazard Type	Hazard Name	In Jurisdiction?	Adjacent to Jurisdiction?

4. JURISDICTION VULNERABILITY WORKSHEET

This table is a listing of the primary hazards identified by the 2012 LHMP working groups. Each jurisdiction was asked to evaluate the potential for an event to occur in their jurisdiction by hazard. They were also asked to evaluate the potential impact of that event by hazard on their jurisdiction. The impact potential was determined based on:

1. Economic loss and recovery
2. Physical loss to structures (residential, commercial, and critical facilities)
3. The loss or damage to the jurisdictions infrastructure
4. Their ability to continue with normal daily governmental activities
5. Their ability to quickly recover from the event and return to normal daily activities
6. The loss of life and potential injuries from the event.

The jurisdictions were asked to rate the potential and severity using a scale of between 0 and 4 (4 being the most severe). The jurisdictions were also asked to rank the listed hazards as they relate to their jurisdiction from 1 to 20 (1 being the highest overall threat to their jurisdiction).

With the assistance of the RCIP Plan and County Departments, Riverside County OES conducted an extensive evaluation of the severity and probability potential for the county as a whole. The hazards were also ranked for the County. These numbers and rankings were provided to the jurisdictions as a comparison guide.

A separate table was created to address the hazards relating to agriculture and was assessed by the agriculture working group.

a. Instructions for Updating Jurisdictions and Special Districts: Please review the table, determine if your ranking from the 2012 LHMP remains the same.
b. Instructions for New Jurisdictions and Special Districts: Please evaluate the potential for an event to occur in your jurisdiction by hazard. Then, evaluate the potential impact of that event by hazard on your jurisdiction according to #1-6 from the potential impact list above.

NOTE: Under Medical, Pandemic was added. This was a result of the H1N1 and other incidents.

NAME:	AGENCY:	DATE :

	COUNTY		LOCAL JURISDICTION		
HAZARD	**SEVERITY 0 - 4**	**PROBABILITY 0 - 4**	**SEVERITY 0 - 4**	**PROBABILITY 0 - 4**	**RANKING 1 - 20**
1. EARTHQUAKE					
2. WILDLAND FIRE					
3. FLOOD					
OTHER NATURAL HAZARDS					
4. DROUGHT					
5. LANDSLIDES					
6. INSECT INFESTATION					
7. EXTREME SUMMER/WINTER WEATHER					
8. SEVERE WIND EVENT					
AGRICULTURAL					
9. DISEASE/CONTAMINATION					
10. TERRORISM					
OTHER MAN-MADE					
11. PIPELINE					
12. AQUEDUCT					
13. TRANSPORTATION					
14. POWER OUTAGE					
15. HAZMAT ACCIDENTS					
16. NUCLEAR ACCIDENT					
17. TERRORISM					
18. CIVIL UNREST					
19. JAIL/PRISON EVENT					
MEDICAL					
20. PANDEMIC					

5. JURISDICTION MITIGATION STRATEGIES AND GOALS

This comprehensive table is a listing of the various mitigation strategies, goals, and objectives developed by the 2012 LHMP working groups. The jurisdictions were also given the opportunity to list additional strategies, goals, and objectives specific to either their jurisdiction or their workgroup (i.e. the hospitals, agriculture, etc.).

LOCAL JURISDICTION MITIGATION STRATEGIES AND GOALS

With your Planning Team

a. Instructions for Updating Jurisdictions and Special Districts: please review the table; determine if your ranking from the 2012 LHMP remains the same.

b. Instructions for New Jurisdictions and Special Districts: please follow below:

Please evaluate the priority level for each listed mitigation goal identified below as it relates to your jurisdiction or facility. If you have any additional mitigation goals or recommendations, please list them at the end of this document.

Place an H (High), M (Medium), L (Low), or N/A (Not Applicable) for your priority level for each mitigation goal in the box next to the activity.

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	EARTHQUAKE
	Aggressive public education campaign in light of predictions
	Generate new literature for dissemination to:
	◊ Government employees
	◊ Businesses
	◊ Hotel/motel literature
	◊ Local radio stations for education
	◊ Public education via utilities
	◊ Identify/create television documentary content
	Improve the Emergency Alert System (EAS)
	◊ Consider integration with radio notification systems
	◊ Upgrade alerting and warning systems for hearing impaired
	◊ Training and maintenance
	Procure earthquake-warning devices for critical facilities
	Reinforce emergency response facilities
	Provide training to hospital staffs
	Require earthquake gas shutoffs on remodels/new construction
	Evaluate re-enforcing reservoir concrete bases
	Evaluate EOCs for seismic stability
	Install earthquake cutoffs at reservoirs
	Install earthquake-warning devices at critical facilities
	Develop a dam inundation plan for new Diamond Valley Reservoir
	Earthquake retrofitting
	◊ Bridges/dams/pipelines
	◊ Government buildings/schools
	◊ Mobile home parks
	Develop educational materials on structural reinforcement and home inspections **(ALREADY DEVELOPED)**
	Ensure Uniform Building Code compliance
	◊ Update to current compliance when retrofitting
	Insurance coverage on public facilities
	Funding for non-structural abatement (Earthquake kits, etc.)
	Pre - identify empty commercial space for seismic re-location
	Electrical co-generation facilities need retrofitting/reinforcement (Palm Springs, others?)
	Mapping of liquefaction zones
	Incorporate County geologist data into planning
	Backup water supplies for hospitals
	Evaluate pipeline seismic resiliency
	Pre-positioning of temporary response structures
	Fire sprinkler ordinance for all structures

	Evaluate adequacy of reservoir capacity for sprinkler systems
	Training/standardization for contractors performing retrofitting
	Website with mitigation/contractor/retrofitting information
	◊ Links to jurisdictions
	◊ Alerting information
	◊ Volunteer information
	Evaluate depths of aquifers/wells for adequacy during quakes
	Evaluate hazmat storage regulations near faults
	COMMUNICATIONS IN DISASTER ISSUES
	Communications Interoperability
	Harden repeater sites
	Continue existing interoperability project
	Strengthen/harden
	Relocate
	Redundancy
	Mobile repeaters
	FLOODS
	Update development policies for flood plains
	Public education on locations of flood plains
	Develop multi-jurisdictional working group on floodplain management
	Develop greenbelt requirements in new developments
	Update weather pattern/flood plain maps
	Conduct countywide study of flood barriers/channels/gates/water dispersal systems
	Required water flow/runoff plans for new development
	Perform GIS mapping of flood channels, etc.
	Install vehicular crossing gates/physical barriers for road closure
	Maintenance of storm sewers/flood channels
	Create map of flood channels/diversions/water systems etc.
	Require digital floor plans on new non-residential construction
	Upgrade dirt embankments to concrete
	Conduct countywide needs study on drainage capabilities
	Increase number of pumping stations
	Increase sandbag distribution capacities
	Develop pre-planned response plan for floods
	◊ Evacuation documentation
	◊ Re-examine historical flooding data for potential street re-design
	Training for city/county PIOs about flood issues
	Warning systems - ensure accurate information provided
	◊ Publicize flood plain information (website?)
	◊ Install warning/water level signage

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	◊ Enhanced public information
	◊ Road closure compliance
	◊ Shelter locations
	◊ Pre-event communications
	Look at County requirements for neighborhood access
	◊ Secondary means of ingress/egress
	Vegetation restoration programs
	Ensure critical facilities are hardened/backed up
	Hardening water towers
	Terrorism Surveillance - cameras at reservoirs/dams
	Riverbed maintenance
	Evaluate existing lift stations for adequacy
	Acquisition of property for on-site retention
	Evaluate regulations on roof drainage mechanism
	Erosion-resistant plants
	Traffic light protection
	Upkeep of diversionary devices
	Install more turn-off valves on pipelines
	Backup generation facilities
	Identify swift water rescue capabilities across County
	WILDFIRES
	Aggressive weed abatement program
	◊ Networking of agencies for weed abatement
	Develop strategic plan for forest management
	Public education on wildfire defense
	Encourage citizen surveillance and reporting
	Identify hydrants with equipment ownership information
	Enhanced firefighting equipment
	Fire spotter program/red flag program
	◊ Expand to other utilities
	Research on insect/pest mitigation technologies
	Volunteer home inspection program
	Public education program
	◊ Weather reporting/alerting
	◊ Building protection
	◊ Respiration
	Pre-identify shelters/recovery centers/other resources
	Roofing materials/defensive spacing regulations
	Community task forces for planning and education
	Fuel/dead tree removal

	Strategic pre-placement of firefighting equipment
	Establish FEMA coordination processes based on ICS
	Brush clearings around repeaters
	Research new technologies for identifying/tracking fires
	Procure/deploy backup communications equipment
	"Red Tag" homes in advance of event
	Provide fire-resistant gel to homeowners
	Involve insurance agencies in mitigation programs
	Clear out abandoned vehicles from oases
	Code enforcement
	Codes prohibiting fireworks
	Fuel modification/removal
	Evaluate building codes
	Maintaining catch basins
OTHER HAZARDS	
	Improve pipeline maintenance
	Wetlands mosquito mitigation (West Nile Virus)
	Insect control study
	Increase County Vector Control capacities
	General public drought awareness
	◊ Lawn watering rotation
	Develop County drought plan
	Mitigation of landslide-prone areas
	Develop winter storm sheltering plan
	Ease permitting process for building transmission lines
	Evaluate restrictions on dust/dirt/generating activities during wind seasons
	Rotational crop planning/soil stabilization
	Enhance agricultural checkpoint enforcement
	Agriculture - funding of detection programs
	Communications of pipeline maps (based on need to know)
	Improved notification plan on runaway trains
	Improve/maintain blackout notification plan.
	Support business continuity planning for utility outages
	Terrorism training/equipment for first responders
	◊ Terrorism planning/coordination
	◊ Staffing for terrorism mitigation
	Create a SONGS regional planning group
	◊ Include dirty bomb planning
	Cooling stations - MOUs in place
	Fire Ant eradication program

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	White Fly infestation abatement/eradication program
	Develop plan for supplemental water sources
	Public education on low water landscaping
	Salton Sea desalinization
	Establish agriculture security standards (focus on water supply)
	ID mutual aid agreements
	Vulnerability assessment on fiber-optic cable
	Upgrade valves on California aqueduct
	Public education
	◊ Bi-lingual signs
	◊ Power Outage information
	Notification system for rail traffic - container contents
	Control and release of terrorism intelligence
	Develop prison evacuation plan (shelter in place?)

Use the list and rankings to narrow down or identify "your" strategies. The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy includes the development of goals, objectives, and prioritized mitigation actions.

Goals are general guidelines that explain what you want to achieve. They are broad policy statements and are usually long-term and represent global visions, such as "Protect Existing Property."

Objectives define strategies or implementation steps to attain the identified goals. Unlike goals, objectives are specific, measurable, and may have a defined completion date. Objectives are more specific, such as "Increase the number of buildings protected from flooding."
The development of effective goals and objectives enables the planning team to evaluate the merits of alternative mitigation actions and the local conditions in which these activities would be pursued. A potential mitigation action that would support the goal and objective goal example above is "Acquire repetitive flood loss properties in the Acadia Woods Subdivision."

In the 2012 LHMP, each jurisdiction was required to develop a Mitigation Strategy Proposal based on one of the following:

1. The strategy, goal, or objective rating "High Priority" on the Local Jurisdiction Mitigation Strategies and Goals (WORKSHEET ABOVE)
2. A specifically identified strategy, goal, or objective that was developed as part of one of the working groups planning sessions such as the hospitals or agriculture
3. A specifically identified strategy, goal, or objective that was developed as part of one of the jurisdiction's internal working group planning sessions

6. LOCAL JURISDICTION PROPOSED MITIGATION ACTION AND STRATEGY PROPOSAL

a. Instructions for Updating Jurisdictions and Special Districts: With your planning team, please review the table from # 5, and determine if your ranking from the 2012 LHMP remains the same.

Review the chosen Mitigation Strategy that your jurisdiction submitted. The updated plan **must** identify the completed, deleted, or deferred actions or activities from the previously approved plan as a benchmark for progress.

If the mitigation actions or activities remain unchanged from the previously approved plan, the updated plan **must** indicate why changes are not necessary. Further, the updated plan **shall** include in its prioritization any new mitigation actions identified since the previous plan was approved or through the plan update process.

b. Instructions for New Jurisdictions and Special Districts: With your planning team, Use the "High Priority" rated strategy, goal or objective as a starting point to determine your Mitigation Strategy Proposal.

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LOCAL JURISDICTION PROPOSED MITIGATION ACTION AND STRATEGY PROPOSAL

Jurisdiction:
Contact:
Phone:

MITIGATION STRATEGY INFORMATION

Proposal Name:

Proposal Location:

Proposal Type

Place an "X" by the type of mitigation strategy (one or more may apply)

- [ ] Flood and mud flow mitigation
- [ ] Fire mitigation
- [ ] Elevation or acquisition of repetitively damaged structures or structures in high hazard areas
- [ ] Mitigation Planning (i.e. update building codes, planning develop guidelines, etc.)
- [ ] Development and implementation of mitigation education programs
- [ ] Development or improvement of warning systems
- [ ] Additional Hazard identification and analysis in support of the local hazard mitigation plan
- [ ] Drinking and/or irrigation water mitigation
- [ ] Earthquake mitigation
- [ ] Agriculture - crop related mitigation
- [ ] Agriculture - animal related mitigation
- [ ] Flood inundation/Dam failure
- [ ] Weather/Temperature event mitigation

DESCRIPTION OF THE PROPOSED MITIGATION STRATEGY

Proposal/Event History	List any previous disaster related events (dates, costs, etc.)
Description of Mitigation Goal Narrative:	Give a detailed description of the need for the proposal, any history related to the proposal. List the activities necessary for its completion in the narrative section below, including estimated timeline. (how long will it take)

Does your jurisdiction have primary responsibility for the proposal? If not, what agency does?

Yes	X	No		Responsible Agency:

FUNDING INFORMATION

Place an "X" by the proposed source of funding for this proposal

- [ ] Unfunded proposal - funds are not available for the proposal at this time
- [ ] Local jurisdiction General Fund
- [ ] Local jurisdiction Special Fund (road tax, assessment fees, etc.)
- [ ] Non-FEMA Hazard Mitigation Funds
- [ ] Local Hazard Mitigation Grant Funds - Future Request
- [ ] Hazard Mitigation Funds

- [ ] Has your jurisdiction evaluated this mitigation strategy to determine its cost benefits?
(i.e. has the cost of the mitigation proposal been determined to be beneficial in relationship to the potential damage or loss using the attached Cost/Benefit Analysis Sheet or another internal method)

As part of this process, each Submitting Jurisdiction is required to perform a cost-benefit analysis. They were required to answer the question at the bottom of the Proposal page that asks if they had conducted a Cost-Benefit Analysis of some type. This analysis was conducted either by completing a Cost Benefit form or by some other approved method. Many of the jurisdictions used the cost-effective analysis approach outlined in the FEMA publication, *Cost and Benefits of Natural Hazards Mitigation.* This cost-benefit analysis was not restricted to natural hazards.

In some cases, the jurisdiction or working group identified a proposal that highlighted a life- safety issue over a standard hazard proposal. This was done when there was either historical data or other sources of information indicating that the life-safety issue needed to be emphasized or brought to the public's attention.

7. LOCAL JURISDICTION DEVELOPMENT TRENDS QUESTIONNAIRE

LAND USE ISSUES - COMPLETE THE INFORMATION BELOW

This questionnaire identifies a comparison of specific land use issues between 2012, 2017 and 2022. The questionnaire also identifies the specific threat potential to the jurisdiction in relationship to residential and commercial structures along with critical facilities. This threat potential is focused on structural loss rather than dollar-value loss as it relates to the three main natural hazards – earthquakes, floods, and wildland fires. The determination of dollar-value loss relating to commercial and critical facilities was found to be very limited and a difficult task to establish. This issue will be addressed in future updates of the Plan.

The questionnaire also requires the jurisdiction to identify the process it will use to maintain their portion of the Plan.

LOCAL JURISDICTION DEVELOPMENT TRENDS QUESTIONNAIRE 2011

LAND USE ISSUES - COMPLETE THE INFORMATION BELOW

JURISDICTION:	DOES YOUR AGENCY HAVE RESPONSIBILITY FOR LAND USE AND/OR DEVELOPMENT ISSUES WITHIN YOUR JURISDICTIONAL BOUNDARIES? YES NO			
	2012 DATA	2017 DATA		2022
Current Population in Jurisdiction or Served			Projected Population in Jurisdiction or Served - in 2022	
Current Sq Miles in Jurisdiction or Served			Projected Sq Miles in Jurisdiction or Served - in 2022	
Does Your Jurisdiction have any ordinances or regulations dealing with disaster mitigation, disaster preparation, or disaster response?			If yes, please list ordinance or regulation number.	
What is the number one land issue your agency will face in the next five years				
Approximate Number of Homes/Apts/etc.			Projected Number of Homes/Apts/etc. - in 2022	
Approximate Total Residential Value			Projected Residential Total Value - in 2022	
Approximate Number of Commercial Businesses			Projected Number of Commercial Businesses - in 2022	
Approximate Percentage of Homes/Apts/etc in flood hazard zones			Approximate Percentage of Homes/Apts/etc in flood hazard zones - in 2022	
Approximate Percentage of Homes/Apts/etc in earthquake hazard zones			Approximate Percentage of Homes/Apts/etc in earthquake hazard zones - in 2022	
Approximate Percentage of Homes/Apts/etc in wildland fire hazard zones			Approximate Percentage of Homes/Apts/etc in wildland fire hazard zones - in 2022	
Approximate Percentage of Commercial Businesses in flood hazard zones			Approximate Percentage of Commercial Businesses in flood hazard zones - in 2022	
Approximate Percentage of Commercial Businesses in earthquake hazard zones			Approximate Percentage of Commercial Businesses in earthquake hazard zones - in 2022	
Approximate Percentage of Commercial Businesses in wildland fire hazard zones			Approximate Percentage of Commercial Businesses in wildland fire hazard zones - in 2022	
Number of Critical Facilities in your Jurisdiction that are in flood hazard zones			Projected Number of Critical Facilities in your Jurisdiction that are in flood hazard zones - in 2022	
Number of Critical Facilities in your Jurisdiction that are in earthquake hazard zones			Number of Critical Facilities in your Jurisdiction that are in earthquake hazard zones - in 2022	
Number of Critical Facilities in your Jurisdiction that are in wildland fire hazard zones.			Number of Critical Facilities in your Jurisdiction that are in wildland fire hazard zones - in 2022	
Does your jurisdiction plan on participating in the County's on-going plan maintenance program every two years as described in Part I of the plan?			If not, how will your jurisdiction do plan maintenance?	
Will a copy of this plan be available for the various planning groups within your jurisdiction for use in future planning and budgeting purposes?				Yes or No

APPENDIX A:
LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction:	**Title of Plan:** **Local Hazard Mitigation Plan**	**Date of Plan:**
Local Point of Contact:		**Address:**
Title:		
Agency:		
Phone Number:		**E-Mail:**

State Reviewer:	**Title:**	**Date:**

FEMA Reviewer:	**Title:**	**Date:**
Date Received in FEMA Region ***(insert #)***		
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved		

SECTION 1: REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan** (section and/or	**Met**	**Not Met**
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))			
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))			
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))			
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))			
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))			

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1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan** (section and/or	**Met**	**Not Met**
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))			
ELEMENT A: REQUIRED REVISIONS			
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))			
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))			
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))			
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))			
ELEMENT B: REQUIRED REVISIONS			
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))			
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))			
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or	Met	Not Met
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))			
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))			
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))			
ELEMENT C: REQUIRED REVISIONS			
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))			
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))			
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))			
ELEMENT D: REQUIRED REVISIONS			
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Plan Adoption/ Resolution Page 4 all plans		
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Plan Adoption/ Resolution Page 4 all plans		
ELEMENT E: REQUIRED REVISIONS			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			
F1.			

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1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or	Met	Not Met
F2.			
ELEMENT F: REQUIRED REVISIONS			

SECTION 2:
PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item, and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature, and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the overall plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

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A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

How does the Plan go above and beyond minimum requirements to document the planning process with respect to:

- *Involvement of stakeholders (elected officials/decision makers, plan implementers, business owners, academic institutions, utility companies, water/sanitation districts, etc.);*
- *Involvement of Planning, Emergency Management, Public Works Departments or other planning agencies (i.e., regional planning councils);*
- *Diverse methods of participation (meetings, surveys, online, etc.); and*
- *Reflective of an open and inclusive public involvement process.*

Element B: Hazard Identification and Risk Assessment

In addition to the requirements listed in the Regulation Checklist, 44 CFR 201.6 Local Mitigation Plans identifies additional elements that should be included as part of a plan's risk assessment. The plan should describe vulnerability in terms of:

1) *A general description of land uses and future development trends within the community so that mitigation options can be considered in future land use decisions;*
2) *The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; and*
3) *A description of potential dollar losses to vulnerable structures, and a description of the methodology used to prepare the estimate.*

How does the Plan go above and beyond minimum requirements to document the Hazard Identification and Risk Assessment with respect to:

- *Use of best available data (flood maps, HAZUS, flood studies) to describe significant hazards;*
- *Communication of risk on people, property, and infrastructure to the public (through tables, charts, maps, photos, etc.);*
- *Incorporation of techniques and methodologies to estimate dollar losses to vulnerable structures;*
- *Incorporation of Risk MAP products (i.e., depth grids, Flood Risk Report, Changes Since Last FIRM, Areas of Mitigation Interest, etc.); and*
- *Identification of any data gaps that can be filled as new data became available.*

Element C: Mitigation Strategy

How does the Plan go above and beyond minimum requirements to document the Mitigation Strategy with respect to:

- *Key problems identified in, and linkages to, the vulnerability assessment;*
- *Serving as a blueprint for reducing potential losses identified in the Hazard Identification and Risk Assessment;*
- *Plan content flow from the risk assessment (problem identification) to goal setting to mitigation action development;*
- *An understanding of mitigation principles (diversity of actions that include structural projects, preventative measures, outreach activities, property protection measures, post-disaster actions, etc);*
- *Specific mitigation actions for each participating jurisdictions that reflects their unique risks and capabilities;*
- *Integration of mitigation actions with existing local authorities, policies, programs, and resources; and*
- *Discussion of existing programs (including the NFIP), plans, and policies that could be used to implement mitigation, as well as document past projects.*

Element D: Plan Update, Evaluation, and Implementation (*Plan Updates Only*)

How does the Plan go above and beyond minimum requirements to document the 5-year Evaluation and Implementation measures with respect to:

- *Status of previously recommended mitigation actions;*
- *Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk;*
- *Documentation of annual reviews and committee involvement;*
- *Identification of a lead person to take ownership of, and champion the Plan;*
- *Reducing risks from natural hazards and serving as a guide for decisions makers as they commit resources to reducing the effects of natural hazards;*
- *An approach to evaluating future conditions (i.e. socio-economic, environmental, demographic, change in built environment etc.);*
- *Discussion of how changing conditions and opportunities could impact community resilience in the long term; and*
- *Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience.*

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B. Resources for Implementing Your Approved Plan

Ideas may be offered on moving the mitigation plan forward and continuing the relationship with key mitigation stakeholders such as the following:

- *What FEMA assistance (funding) programs are available (for example, Hazard Mitigation Assistance (HMA)) to the jurisdiction(s) to assist with implementing the mitigation actions?*
- *What other Federal programs (National Flood Insurance Program (NFIP), Community Rating System (CRS), Risk MAP, etc.) may provide assistance for mitigation activities?*
- *What publications, technical guidance or other resources are available to the jurisdiction(s) relevant to the identified mitigation actions?*
- *Are there upcoming trainings/workshops (Benefit-Cost Analysis (BCA), HMA, etc.) to assist the jurisdictions(s)?*
- *What mitigation actions can be funded by other Federal agencies (for example, U.S. Forest Service, National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA) Smart Growth, Housing and Urban Development (HUD) Sustainable Communities, etc.) and/or state and local agencies?*

SECTION 3:
MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)

INSTRUCTIONS: For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were 'Met' or 'Not Met,' and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it should be used as an optional worksheet to

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ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
1												
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MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
20												

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APPENDIX F – Historical Landmarks

Continue to next page.

Name (Landmark Plaque Number)	National Register	California State Historical Landmar	California Register of	Point of Interest	Date Listed	City (County)
ADMINISTRATION BUILDING, SHERMAN INSTITUTE (N851)	Yes				1/9/1980	Riverside (Riverside)
AGENTS HOME (P231)				Yes	10/5/1971	Thermal (Riverside)
ALL SOULS UNIVERSALIST CHURCH (N666)	Yes				9/18/1978	Riverside (Riverside)
ANDREAS CANYON (N201)	Yes				1/8/1973	Palm Springs (Riverside)
ARCHEOLOGICAL SITES CA-RIV-504 AND CA-RIV 773 (N2195)	Yes				3/12/2003	Blythe (Riverside)
ARLINGTON BRANCH LIBRARY AND FIRE HALL (N1839)	Yes				7/22/1993	Riverside (Riverside)
ARMORY HALL (N1748)	Yes				1/29/1992	Lake Elsinore (Riverside)
ARMORY HALL, GRAND ARMY OF THE REPUBLIC BUILDING (P822)				Yes	5/15/1996	Lake Elsinore (Riverside)
ATCHISON, TOPEKA, AND SANTA FE RAILWAY DEPOT AT BLYTHE (P735)				Yes	2/11/1991	Blythe (Riverside)
BANDINI ADOBE SITE (P120)				Yes	6/6/1969	Norco (Riverside)
BANDINI-COTA ADOBE SITE (P122)				Yes	6/6/1969	Corona (Riverside)
BANNING WOMEN'S CLUB (P725)				Yes	11/20/1989	Banning (Riverside)
BARKER DAM (N394)	Yes				10/29/1975	Twentynine Palms (Riverside)
BEAUMONT CARNEGIE LIBRARY (P807)				Yes	12/4/1994	Beaumont (Riverside)
BLYTHE FERRY CROSSING (P195)				Yes	5/19/1971	Blythe (Riverside)
BLYTHE INTAGLIOS (N384)	Yes				8/22/1975	Blythe (Riverside)
BOGART HOUSE (P808)				Yes	12/4/1994	Beaumont (Riverside)
BUTTERCUP FARMS PICTOGRAPH (N411)	Yes				5/3/1976	Perris (Riverside)
BUTTERFIELD STAGE STATION (188)		Yes			6/20/1935	Corona (Riverside)
CAMP EMERSON (P147)				Yes	11/3/1969	Idyllwild (Riverside)
CAMP YOUNG--DESERT TRAINING CENTER, CAMA (P87)				Yes	6/2/1968	Desert Center (Riverside)
CANTU RANCH/GALLEANO WINERY (P773)				Yes	8/21/1992	Mira Loma (Riverside)
CARNEGIE, ANDREW, LIBRARY (N502)	Yes				6/29/1977	Corona (Riverside)
CARVED ROCK (187)		Yes			6/20/1935	Corona (Riverside)
CHILDS, WILLIAM, HOUSE (N2063)	Yes				7/28/1999	Riverside (Riverside)

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CHINATOWN (P74)	Yes			Yes	1/24/1968	Riverside (Riverside)
CITRUS EXPERIMENT STATION (P121)				Yes	6/6/1969	Riverside (Riverside)
CITRUS MACHINERY PIONEERING (P123)				Yes	6/6/1969	Riverside (Riverside)
COACHELLA VALLEY COUNTY WATER DISTRICT (P141)				Yes	8/29/1969	Coachella (Riverside)
COACHELLA VALLEY FISH TRAPS (N175)	Yes				6/13/1972	Valerie (Riverside)
COPLIN HOUSE SPOKANE HOTEL PLUEGER REALTY (P759)				Yes	11/8/1991	Banning (Riverside)
CORN SPRINGS (N2038)	Yes				10/30/1998	Desert Center (Riverside)
CORN SPRINGS (P80)				Yes	1/24/1968	Desert Center (Riverside)
CORNELIUS AND MERCEDES JENSON RANCH (943)		Yes			6/12/1981	Rubidoux (Riverside)
CORONA FOUNDERS MONUMENT (738)		Yes			6/6/1960	Corona (Riverside)
CORONA HIGH SCHOOL (N2297)	Yes				8/3/2005	Corona (Riverside)
COTTONWOOD SCHOOL (P520)				Yes	2/1/1978	Sage (Riverside)
CRESCENT BATHHOUSE (N380)	Yes				7/30/1975	Lake Elsinore (Riverside)
DE ANZA CROSSING OF THE SANTA ANA RIVER, 1775 AND 1776 (787)		Yes			9/18/1963	Riverside (Riverside)
DESERT INN (P307)				Yes	7/13/1973	Palm Springs (Riverside)
DESERT QUEEN MINE (N402)	Yes				1/17/1976	Twentynine Palms (Riverside)
DOS PALMAS (P78)				Yes	1/24/1968	Mecca (Riverside)
EAGLE MOUNTAIN IRON (P229)				Yes	10/5/1971	Desert Center (Riverside)
EL MIRADOR HOTEL AND TOWER (P570)				Yes	6/12/1981	Palm Springs (Riverside)
ELSINORE WOMEN'S CLUB (P832)				Yes	2/5/1998	Lake Elsinore (Riverside)
ELSINORE'S HOTTEST SULPHUR SPRINGS (P97)				Yes	6/7/1968	Lake Elsinore (Riverside)
ESTUDILLO MANSION (N2146)	Yes				10/25/2001	San Jacinto (Riverside)
FEDERAL POST OFFICE (N705)	Yes				11/20/1978	Riverside (Riverside)
FIRST CHURCH OF CHRIST, SCIENTIST (N1794)	Yes				9/22/1992	Riverside (Riverside)
FIRST CONGREGATIONAL CHURCH OF RIVERSIDE (N1975)	Yes				4/3/1997	Riverside (Riverside)
FIRST POST OFFICE (P174)				Yes	3/19/1970	Temecula (Riverside)
FRINK RANCH (P94)				Yes	6/7/1968	Beaumont (Riverside)
GALLEANO WINERY (N2207)	Yes				6/22/2003	Mira Loma (Riverside)
GARBANI, ROCCO, HOMESTEAD (N2079)	Yes				12/22/1999	Winchester (Riverside)

GIANT DESERT FIGURES (101)		Yes			3/29/1933	Blythe (Riverside)
GILMAN RANCH (P41)	Yes			Yes	6/2/1967	Banning (Riverside)
HALL CITY AND HALL'S GRADE (P124)				Yes	6/6/1969	Cabazon (Riverside)
HAMILTON SCHOOL (#1), LITTLE RED SCHOOL HOUSE (P746)				Yes	8/2/1991	Anza (Riverside)
HARADA HOUSE (N517)	Yes				9/15/1977	Riverside (Riverside)
HEMET DAM AND LAKE HEMET (P95)				Yes	6/7/1968	Hemet (Riverside)
HEMET MAZE STONE (557)		Yes			8/24/1956	Hemet (Riverside)
HENDERSON/REID BUILDING (P774)				Yes	8/21/1992	Banning (Riverside)
HERITAGE HOUSE (N205)	Yes				2/28/1973	Riverside (Riverside)
HIGHGROVE HYDROELECTRIC PLANT (P108)				Yes	12/11/1968	Riverside (Riverside)
HIGHLAND SPRINGS (P38)				Yes	6/2/1967	Banning (Riverside)
IDYLLWILD (P335)				Yes	7/12/1974	Idyllwild (Riverside)
INDIAN SCHOOL AGENCY OFFICE, INDIAN SCHOOL AGENCY (P233)				Yes	10/5/1971	Thermal (Riverside)
INDIAN WELLS (P83)				Yes	1/24/1968	Palm Desert (Riverside)
JENSEN, CORNELIUS, RANCH (N815)	Yes				9/6/1979	Rubidoux (Riverside)
JOHN W. NORTH PARK / SEVENTH STREET HISTORIC DISTRICT (P308)				Yes	7/13/1973	Riverside (Riverside)
LAKE NORCONIAN CLUB (N2083)	Yes				2/4/2000	Norco (Riverside)
LEDERER, GUS, SITE (N2196)	Yes				3/12/2003	Desert Center (Riverside)
LORING OPERA HOUSE, GOLDEN STATE THEATER (P64)				Yes	9/22/1967	Riverside (Riverside)
MARCH FIELD HISTORIC DISTRICT (P93)				Yes	6/7/1968	Moreno Valley (Riverside)
MARCH FIELD HISTORIC DISTRICT (N1893)	Yes				12/6/1994	Riverside (Riverside)
MARTINEZ CANYON ROCKHOUSE (N2074)	Yes				12/14/1999	North Palm Springs (Riverside)
MARTINEZ HISTORICAL DISTRICT (N236)	Yes				5/17/1973	Torres-Martinez Indian Reservation (Riverside)
MARTINEZ HISTORICAL DISTRICT/MARTINEZ INDIAN AGENCY (P232)				Yes	10/5/1971	Thermal (Riverside)
MASONIC TEMPLE (N872)	Yes				6/6/1980	Riverside (Riverside)
MCCOY SPRING ARCHEOLOGICAL SITE (N1103)	Yes				5/10/1982	Blythe (Riverside)
MISSION COURT BUNGALOWS (N1835)	Yes				7/8/1993	Riverside (Riverside)

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MISSION INN (761)	Yes	Yes			4/28/1961	Riverside (Riverside)
MOROVIAN CHURCH AND INDIAN SCHOOL, INDIAN SCHOOL (P230)				Yes	10/5/1971	Thermal (Riverside)
MOUNT RUBIDOUX (P65)				Yes	9/22/1967	Riverside (Riverside)
MURRIETA CREEK ARCHEOLOGICAL AREA (N229)	Yes				4/24/1973	Temecula (Riverside)
NOBLE'S RANCH (P82)				Yes	1/24/1968	Beaumont (Riverside)
NORTH CHUCKWALLA MOUNTAIN QUARRY DISTRICT (N966)	Yes				8/24/1981	Desert Center (Riverside)
NORTH CHUCKWALLA MOUNTAINS PETROGLYPH DISTRICT CA-RIV 1383 (N969)	Yes				9/3/1981	Desert Center (Riverside)
OLD MORENO SCHOOL (P702)				Yes	8/23/1988	Moreno Valley (Riverside)
OLD TEMESCAL ROAD (638)		Yes			3/31/1958	Corona (Riverside)
OLD YWCA BUILDING (N1009)	Yes				1/28/1982	Riverside (Riverside)
ORIGINAL PALM SPRINGS, THE (P118)				Yes	6/6/1969	Palm Springs (Riverside)
PAINTED ROCK (190)		Yes			6/20/1935	Corona (Riverside)
PALM CANYON THEATER / STEVENS, FRANCES S., SCHOOL (C21)			Yes		11/7/2003	Palm Springs (Riverside)
PALMDALE RAILROAD SITE / RAILROAD THAT FAILED (P146)				Yes	11/3/1969	Palm Springs (Riverside)
PARENT WASHINGTON NAVEL ORANGE TREE (20)		Yes			6/1/1932	Riverside (Riverside)
PEDLEY-TYPE DAM (P337)				Yes	7/12/1974	Banning (Riverside)
PERRIS DEPOT (N1871)	Yes				8/5/1994	Perris (Riverside)
PINACATE MINING DISTRICT (P553)				Yes	6/6/1980	Good Hope (Riverside)
PINACATE, PINACATE MINING DISTRICT (P554)				Yes	6/6/1980	Perris (Riverside)
RAMONA BOWL, SITE OF THE RAMONA PAGEANT (1009)		Yes			2/16/1993	Hemet (Riverside)
RANCHO SANTA ROSA (P719)				Yes	11/3/1989	Murrieta (Riverside)
RIVERSIDE CEMENT COMPANY (P336)				Yes	7/12/1974	Riverside (Riverside)
RIVERSIDE COUNTY COURTHOUSE (P96)				Yes	6/7/1968	Riverside (Riverside)
RIVERSIDE FIRST CONGREGATIONAL CHURCH (P76)				Yes	1/24/1968	Riverside (Riverside)

RIVERSIDE MUNICIPAL AUDITORIUM AND SOLDIER'S MEMORIAL BUILDING (N576)	Yes				3/31/1978	Riverside (Riverside)
RIVERSIDE-ARLINGTON HEIGHTS FRUIT EXCHANGE (N877)	Yes				6/9/1980	Riverside (Riverside)
RUINS OF THIRD SERRANO ADOBE (224)		Yes			6/20/1935	Corona (Riverside)
RYAN HOUSE AND LOST HORSE WELL (N368)	Yes				6/5/1975	Twentynine Palms (Riverside)
SAAHATPA (749)		Yes			8/17/1960	(Riverside)
SAN PEDRO, LOS ANGELES, & SALT LAKE RR DEPOT (N491)	Yes				4/18/1977	Riverside (Riverside)
SAN TIMOTEO CANYON SCHOOLHOUSE (P125)	Yes			Yes	6/6/1969	Calimesa (Riverside)
SANTA FE RAILWAY DEPOT (P711)				Yes	11/22/1988	Hemet (Riverside)
SANTA ROSA RANCHO (1005)		Yes			2/18/1992	Murrieta (Riverside)
SERRANO BOULDER (185)		Yes			6/20/1935	Corona (Riverside)
SERRANO TANNING VATS (186)		Yes			6/20/1935	Corona (Riverside)
SHAVER'S WELL (P148)				Yes	11/3/1969	Mecca (Riverside)
SIMON'S, M. H., UNDERTAKING CHAPEL (N878)	Yes				6/9/1980	Riverside (Riverside)
SITE OF BLYTHE INTAKE (948)		Yes			3/1/1982	Blythe (Riverside)
SITE OF BLYTHE INTAKE (P63)				Yes	9/22/1967	Blythe (Riverside)
SITE OF CONTRACTOR'S GENERAL HOSPITAL (992)		Yes			8/17/1990	(Riverside)
SITE OF DE ANZA CAMP, MARCH 1774 (103)		Yes			3/29/1933	Anza (Riverside)
SITE OF INDIAN VILLAGE OF POCHEA (104)		Yes			3/29/1933	Hemet, (Riverside)
SITE OF LOUIS RUBIDOUX HOUSE (102)		Yes			3/29/1933	Rubidoux (Riverside)
SITE OF OLD RUBIDOUX GRIST MILL (303)		Yes			7/12/1939	Rubidoux (Riverside)
SMILEY PLACE (P760)				Yes	11/8/1991	Indio (Riverside)
SOUTHERN HOTEL (N1803)	Yes				10/15/1992	Perris (Riverside)
SPEED OF LIGHT EXPERIMENT SITE (P119)				Yes	6/6/1969	Idyllwild (Riverside)
ST. BONIFACE SCHOOL (P415)				Yes	8/7/1975	Beaumont (Riverside)
SUTHERLAND FRUIT COMPANY (N1439)	Yes				4/11/1986	Riverside (Riverside)
TAHQUITZ CANYON (N189)	Yes				10/31/1972	Palm Springs (Riverside)
TEMECULA QUARRIES (P175)				Yes	3/19/1970	Temecula (Riverside)
TEMESCAL TIN MINES (P79)				Yes	1/24/1968	Corona (Riverside)
THOMAS-GARNER RANCH (P176)				Yes	3/19/1970	Idyllwild (Riverside)
TORO VILLAGE (P81)				Yes	1/24/1968	Indio (Riverside)

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TRUJILLO ADOBE (P75)				Yes	1/24/1968	Riverside (Riverside)
U.S. EXPERIMENTAL DATE STATION, DATE INDUSTRY BIRTHPLACE (P306)				Yes	7/13/1973	Mecca (Riverside)
UNIVERSITY HEIGHTS JUNIOR HIGH SCHOOL (N1832)	Yes				6/24/1993	Riverside (Riverside)
VALERIE JEAN'S DATE SHOP,RUSSELL NICOLL HOME/OL KING SOLO (P736)				Yes	2/11/1991	Thermal (Riverside)
VICTORIA AVENUE (N2108)	Yes				10/26/2000	Riverside (Riverside)
WEAVER ADOBE (P39)				Yes	6/2/1967	Banning (Riverside)
WHITEWATER (P40)				Yes	6/2/1967	Banning (Riverside)
WILEY'S WELL (P77)				Yes	1/24/1968	Blythe (Riverside)
WOMAN'S IMPROVEMENT CLUB CLUBHOUSE (N1579)	Yes				11/3/1988	Corona (Riverside)
YERXA'S DISCOVERY (P560)				Yes	12/19/1980	Desert Hot Springs (Riverside)

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APPENDIX G – Trends Questionnaire

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JURISDICTION:	DOES YOUR AGENCY HAVE RESPONSIBILITY FOR LAND USE AND/OR DEVELOPMENT ISSUES WITHIN YOUR JURISDICTIONAL BOUNDARIES? YES			
	2012 DATA	2017 DATA		2022
Current Population in Jurisdiction or Served	2,196,137	2,329,256	Projected Population in Jurisdiction or Served - in 2022	2,506,739
Current Sq Miles in Jurisdiction or Served	6,375	7,295.6	Projected Sq Miles in Jurisdiction or Served - in 2022	7,295.6
Does Your Jurisdiction have any ordinances or regulations dealing with disaster mitigation, disaster preparation, or disaster response?	Yes	Yes	If yes, please list ordinance or regulation number.	
What is the number one land issue your agency will face in the next five years	N/A			
Approximate Number of Homes/Apts/etc.	696,290	700,413	Projected Number of Homes/Apts/etc.- in 2022	955,853
Approximate Total Residential Value	N/A	362,066	Projected Residential Total Value - in 2022	
Approximate Number of Commercial Businesses	N/A	N/A	Projected Number of Commercial Businesses - in 2022	N/A
Approximate Percentage of Homes/Apts/etc. in flood hazard zones	12%		Approximate Percentage of Homes/Apts/etc. in flood hazard zones - in 2022	N/A
Approximate Percentage of Homes/Apts/etc. in earthquake hazard zones	5%		Approximate Percentage of Homes/Apts/etc. in earthquake hazard zones - in 2022	N/A
Approximate Percentage of Homes/Apts/etc. in wildland fire hazard zones	34%		Approximate Percentage of Homes/Apts/etc. in wildland fire hazard zones - in 2022	N/A
Approximate Percentage of Commercial Businesses in flood hazard zones	N/A	N/A	Approximate Percentage of Commercial Businesses in flood hazard zones - in 2022	N/A
Approximate Percentage of Commercial Businesses in earthquake hazard zones	N/A	N/A	Approximate Percentage of Commercial Businesses in earthquake hazard zones - in 2022	N/A
Approximate Percentage of Commercial Businesses in wildland fire hazard zones	N/A	N/A	Approximate Percentage of Commercial Businesses in wildland fire hazard zones - in 2022	N/A
Number of Critical Facilities in your Jurisdiction that are in flood hazard zones	41	1,298	Projected Number of Critical Facilities in your Jurisdiction that are in flood hazard zones - in 2022	N/A
Number of Critical Facilities in your Jurisdiction that are in earthquake hazard zones	21		Number of Critical Facilities in your Jurisdiction that are in earthquake hazard zones - in 2022	N/A
Number of Critical Facilities in your Jurisdiction that are in wildland fire hazard zones.	69		Number of Critical Facilities in your Jurisdiction that are in wildland fire hazard zones - in 2022	N/A
Does your jurisdiction plan on participating in the County's on-going plan maintenance program every year as described in Part I of the plan?	N/A	N/A	If not, how will your jurisdiction do plan maintenance.	
Will a copy of this plan be available for the various planning groups within your jurisdiction for use in future planning and budgeting purposes?				Yes

APPENDIX H – Mitigation Cost Analysis Guidelines

Continue to next page.

COUNTY OF RIVERSIDE
OFFICE OF THE
AUDITOR-CONTROLLER

County Administrative Center
4080 Lemon Street, 11th Floor
P.O. Box 1326
Riverside, CA 92502-1326
(951) 955-3800
Fax (951) 955-3802

Paul Angulo, CPA
Auditor-Controller

Auditor-Controller Review of Rates/Fees

Pursuant to Board of Supervisors Policy B-4 and B-28, County departments wishing to establish a rate/fee, or revise an existing rate/fee for service provided to other County departments, other public agencies, organizations, or individuals, are required to obtain approval by the County Executive Office and be reviewed by the (ACO) Auditor-Controller's Office prior to submitting their rate/fee request to the Board of Supervisors.

Federal (OMB) Office of Management and Budget Circular A-87 provides guidance for determining costs that may be recovered in rates/fees.

Rate/Fee packages submitted for review to the ACO must include the following:

1. A narrative fully explaining the methodology used (i.e., the purpose of the rate/fee, how it was developed, how each rate/fee was calculated, and who will be charged the rate/fee).

2. Electronic copies of spreadsheets created to calculate the rate/fee. Please provide notes to explain where the information was derived and clearly identify if changes have been made to the original data. Ensure multiple tabs are correctly linked and pertinent data is highlighted.

3. Supporting documentation validating all expenditure and revenue amounts used, full disclosure of all calculations, and clear identification of overhead calculations and application of the overhead to all the department's divisions/functions.

ACO Documentation Requirements

1. Direct salary/benefits costs by classification; including hourly rate of pay & benefits rate;
2. Direct costs by line item included in the rate/fee (non-salary/benefit);
3. Departmental administrative overhead costs included in rate/fee, as well as the total administrative cost applied to all divisions/functions;
4. Departmental indirect costs by line item included in rate;
5. Countywide overhead costs;
6. Schedule of fixed asset amortization;
7. Copy of (ICRP) Indirect Cost Rate Proposal, if applicable;
8. Copy of last year's budget for the function;

9. Time studies, if applicable;
10. Methodology for Productive hourly rate computations, if applicable;
11. Government Code reference for statutorily set rates/fees;
12. Related off-setting revenues;
13. County Ordinance reference, if applicable;
14. ISF retained earnings information;
15. Summary showing current rates/fees and revised rates/fees;
16. Completed Form 11; and
17. Copy of the annual productivity and efficiency report.

The above list is not all inclusive and additional documentation may be required in support of submitted rates/fees.

If you have any questions in regards to the rate/fee review process or the required documentation, please contact Principal Accountant, Russell Dominski at 955-8136.

Thank you in advance for your cooperation.

Cc: Jay Orr, County Executive Officer
Ivan Chand, Deputy County Executive Officer
Karen Johnson, Senior Management Analyst

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APPENDIX I – Acronyms

This list contains acronyms commonly used in Emergency Management and those specific to Riverside County.

AC	Area Command
ADA	Americans with Disabilities Act
ALS	Advanced Life Support
ARC	American Red Cross
ARES	Amateur Radio Emergency Services
CALDAP	California Disaster Assistance Program
CAL FIRE	California Department of Forestry and Fire Protection
CAL-TRANS	California Department of Transportation
CALWAS	California Warning System
CAR	Corrective Action Report
CBO	Community Based Organization
CBRNE	Chemical, Biological, Radiological, Nuclear or High-Yield Explosive
CCC	California Conservation Corps
CDC	Centers for Disease Control, U.S. Public Health Service
CDF	California Department of Forestry
CEPEC	California Earthquake Prediction Evaluation Council
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CERT	Community Emergency Response Team
CESFRS	California Emergency Service Fire Radio System
CESRS	California Emergency Services Radio System
CFR	Code of Federal Regulations
CHP	California Highway Patrol
CLEMARS	California Law Enforcement Mutual Aid Radio System
CLERS	California Law Enforcement Radio System

CLETS	California Law Enforcement Telecommunications System
COG	Continuity of Government
DA	Damage Assessment
DAP	Disaster Assistance Programs
DCS	Disaster Communications Service
DFCO	Deputy Federal Coordinating Officer
DFO	Disaster Field Office
DHA	Disaster Housing Assistance
DHS	Department of Homeland Security
DMAT	Disaster Medical Assistance Team
DMORT	Disaster Mortuary Operational Response Team
DOC	Department Operations Center
DOD	Department of Defense
DOI	Department of Interior
DOJ	Department of Justice
DOL	Department of Labor
DOS	Department of State
DOT	Department of Transportation
DRC	Disaster Recovery Center
DRC	Disaster Resource Center
DSA	Division of the State Architect (California)
DWR	California Department of Water Resources
EAS	Emergency Alert System
EDD	Employment Development Department
EDIS	Emergency Digital Information System
EMAC	Emergency Management Assistance Compact
EMD	Emergency Management Department
EMI	Emergency Management Institute
EMIS	Emergency Management Information System (Los Angeles County)

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EMMA	Emergency Managers Mutual Aid
EMP	Electromagnetic Pulse
EMPG	Emergency Management Performance Grant
EMS	Emergency Medical Services
EMSA	Emergency Medical Services Authority
EMT	Emergency Medical Technician
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
EPA	Environmental Protection Agency
EPI	Emergency Public Information
EPIC	Emergency Public Information Center
ERT	Emergency Response Team
ESA	California Emergency Services Act
ESC	Emergency Services Coordinator
ESF	Emergency Support Functions
EST	Emergency Support Team
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FCC	Federal Communications Commission
FCO	Federal Coordinating Officer
FEMA	Federal Emergency Management Agency
FFY	Federal Fiscal Year
FHWA	Federal Highway Administration
FIA	Federal Insurance Administration
FIRESCOPE	Firefighting Resources of Calif. Organized for Potential Emergencies
FOG	Field Operations Guide
FTS	Field Treatment Sites
GAR	Governor's Authorized Representative
GSA	General Services Administration

HAZMAT	Hazardous Materials
HEW	U.S. Department of Health, Education and Welfare
HHS	Department of Health and Human Services
HMC	Hazard Mitigation Coordinator
HMDA	Hazard Mitigation and Disaster Assistance
HMGP	Hazard Mitigation Grant Program
HMO	Hazard Mitigation Officer
HMT	Hazard Mitigation Team
HSAS	Homeland Security Advisory System
HSC	Homeland Security Council
HSEEP	Homeland Security Exercise Evaluation Program
HSOC	Homeland Security Operations Center
HSPD	Homeland Security Presidential Directive
HSPD-5	Homeland Security Presidential Directive-5
HUD	Housing and Urban Development Program
IA	Individual Assistance
IAC	Incident Advisory Council
IAP	Incident Action Plan
IC	Incident Commander
IC	Incident Command
ICP	Incident Command Post
ICS	Incident Command System
IDE	Initial Damage Estimate
IID	Imperial Irrigation District
IMT	Incident Management Team
IRS	U.S. Internal Revenue Service
JDIC	Justice Data Interface Controller
JFO	Joint Field Office
JIC	Joint Information Center

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JIS	Joint Information System
JOC	Joint Operations Center
JPA	Joint Powers Agreement
JTTF	Joint Terrorism Task Force
LNO	Liaison Officer
MACS	Multi-Agency Coordination System
MARAC	Mutual Aid Regional Advisory Committee
MMRS	Metropolitan Medical Response Team
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MTA	Metropolitan Transit Authority
NAWAS	National Warning System
NDAA	California Natural Disaster Assistance Act
NDMS	National Disaster Medical System
NEP	National Exercise Program
NFA	National Fire Academy
NFIP	National Flood Insurance Program
NGO	Nongovernmental Organization (See PNP, NVOAD, VOAD)
NHC	National Hurricane Center
NHPA	National Historic Preservation Act
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NOC	National Operations Center
NOI	Notice of Interest
NRC	Nuclear Regulatory Commission
NRF	National Response Framework
NSC	National Security Council
NVOAD	National Voluntary Organizations Active in Disaster (See NGO, PNP, VOAD)
NWS	National Weather Service

OA	Operational Area
OASIS	Operational Area Satellite Information System
OEM	Office of Emergency Management
OES	Office of Emergency Services
OSA	California Office of the State Architect
OSHA	Occupational Safety and Health Administration
PA	Public Assistance
PA/O	Public Assistance Officer
PDD	Presidential Decision Directive
PFO	Principal Federal Officer
PFO	Principal Federal Official
PIO	Public Information Officer
PIS	Public Information System
PNP	Private Nonprofit Organization (see NGO, NVOAD, VOAD)
POC	Point of Contact
POLREP	Pollution Report
PUC	California Public Utilities Commission
PVO	Private Voluntary Organizations
PW	Project Worksheet
R&D	Research and Development
RACES	Radio Amateur Civil Emergency Services
RCOE	Riverside County Office of Education
RCSD	Riverside County Sheriff's Department
REOC	Regional Emergency Operations Center (State OES Region)
RESTAT	Resources Status
RIMS	Response Information Management System (State OES)
RIMS	Resources Inventory Management System (federal)
ROSS	Resource Ordering and Status System
RRCC	Regional Response Coordination Center

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RRCC	Regional Response Coordinating Center
SAP	State Assistance Program
SAR	Search and Rescue
SARA	Superfund Amendment Reauthorization Act (Title III)
SBA	Small Business Administration
SCAQMD	South Coast Air Quality Management District
SCC	Sheriff's Communications Center (Los Angeles County)
SCO	State Coordinating Officer
SDO	Standards Development Organizations
SEMS	Standardized Emergency Management System
SFLEO	Senior Federal Law Enforcement Official
SFO	Senior Federal Official
SHMO	State Hazard Mitigation Officer
SIOC	Strategic Information and Operations Center
SITREP	Situation Report
SO	Safety Officer
SOC	State Operations Center
SOP	Standard Operating Procedure
STO	State Training Officer
TEW	Terrorism Early Warning group
TLMA	Transportation and Land Management Agency
UC	Unified Command
USACE	United States Army Corps of Engineers
USAR	Urban Search and Rescue
USDA	U.S. Department of Agriculture
USFA	United States Fire Administration
USGS	United States Geological Survey
VOAD	Volunteer Organizations Active in Disaster (See NGO, PNP, NVOAD)
WMD	Weapons of Mass Destruction

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APPENDIX J – References

References for the Updated LHMP included information from many websites, FEMA and Cal EMA guidance documents and resources from the County of Riverside Departments.

Guidance and other Documents:
2012 Riverside County Operational Area Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP)
FEMA Local Mitigation Plan Review Guide
2010 State of California Hazard Mitigation Plan (SHMP)
Disaster Mitigation Act of 2000
County of Riverside General Plan, multiple Elements
Riverside County Operational Area Emergency Operations Plan
FEMA Hazard Mitigation Planning
FEMA How To Guide #1, Getting Started: Building Support for Mitigation Planning
FEMA How To Guide #2, Understanding Your Risks: Identifying Hazards and Estimating Losses
FEMA How To Guide #3, Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies
FEMA How To Guide #4, Bringing the Plan to Life: Implementing the Hazard Mitigation Plan
FEMA How To Guide #5, Using Benefit-Cost Review in Mitigation Planning
FEMA How To Guide #6, Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning
FEMA How To Guide #7, Integrating Manmade Hazards into Mitigation Planning
FEMA How To Guide #8, Multi-Jurisdictional Mitigation Planning
FEMA How To Guide #9, Using the Hazard Mitigation Plan to Prepare Successful Mitigation Projects
Freeway Closure Plan
Joint Information System (JIS) Plan
Mass Care & Shelter Guidance and Standard Operating Procedures
Natural Hazard Mapping, Analysis, and Mitigation: a Technical Background Report in Support of the Safety Element of the New Riverside County 2000 General Plan
Riverside County Essential Facilities Risk Assessment (RCEFRA) Project Report June 2009
2015 Riverside County SCAG Repot – Profile of Riverside County
Southern California Catastrophic Earthquake Response Plan

Website Links:	
Cal OES Hazard Mitigation Portal	http://hazardmitigation.calema.ca.gov/
Cal OES Local Mitigation Planning	http://www.caloes.ca.gov/for-individuals-families/hazard-mitigation-planning/local-hazard-mitigation-program
My Hazards Mapping Website	http://myhazards.calema.ca.gov/
My Plan Mapping Site	http://myplan.calema.ca.gov/
Distressed and Abandoned Properties	http://www.foreclosureregistration.org/
Query for fires, used to find details on 63 large fires for Riverside County	http://cdfdata.fire.ca.gov/incidents/incidents_search_results?search=riverside
Data query to find heat data, health related stats	http://epicenter.cdph.ca.gov/ReportMenus/InjuryDataByTopic.aspx
Seismic landslide zones	http://gmw.consrv.ca.gov/shmp/html/pdf_maps_so.html
Landslide Alerts	http://www.usgs.gov/hazard_alert/alerts/landslides.rss
Kinder Morgan Public Information	http://www.kindermorgan.com/public_awareness/
	http://www.kindermorgan.com/public_awareness/AdditionalInformation/KMSafetyBrochures.cfm
Riverside County Ordinances Link	http://www.rctlma.org/admin/content/ordinance_
Riverside County Building and Safety Link	http://www.rctlma.org/building/default.aspx
Riverside County Auditor Controller	http://www.auditorcontroller.org/ReportsPublications.aspx
Riverside Flood Control	http://www.floodcontrol.co.riverside.ca.us/AnnualReports.aspx
Riverside County Transportation & Land Management Agency	http://planning.rctlma.org/Portals/0/genplan/general_Plan_2017/elements/OCT17/Ch01_Intro_120815.pdf?ver=2017-10-11-102103-380
	http://planning.rctlma.org/ZoningInformation/GeneralPlan/RiversideCountyGeneralPlan2015.aspx
	http://planning.rctlma.org/
Ready.Gov Website	http://www.ready.gov/pandemic
	http://www.ready.gov/terrorism
Disability Planning Data for Planners From Pooled 2005-2007 ACS PUMS Data.	www.DisabilityPlanningData.com
The Spatial Hazard Events and Losses Database for the United States. Version 7.0 Database.	http://www.sheldus.org.

Columbia, SC: University of South Carolina. 2009.	
Water Plan information	http://www.water.ca.gov/publications/forms/
Flood Risk Maps	http://www.water.ca.gov/myfloodrisk/
Dam Safety Website	www.water.ca.gov/damsafety/index.cfm
Source: California Energy Commission, Natural Gas Pipelines	http://www.energy.ca.gov/maps/Natural_Gas_Pipelines.pdf
75 Gas Transmission Pipeline Long Range Planning	http://www.pge.com/myhome/customerservice/response/pipelineplanning/
Source: U.S. Department of Transportation's Office of Pipeline Safety	http://osfm.fire.ca.gov/pipelineregulation.html
Recent Earthquakes in California and Nevada	http://scedc.caltech.edu/recent/Quakes/quakes0.html
Data: Explore 15 Years of Power Outages	http://insideenergy.org/2014/08/18/data-explore-15-years-of-power-outages/
Thousands without power in unincorporated Riverside County	http://abc7.com/news/thousands-without-power-in-unincorporated-riverside-county/1315149/
Power and phone outages reported across Riverside/San Bernardino counties	http://www.kesq.com/news/power-and-phone-outages-reported-across-riverside_san-bernardino-counties/62501575
Arizona-Southern California Outages on September 8, 2011	cascading outages and leaving approximately 2.7 million customers without power
A Study of Active Shooter Incidents in the United States Between 2000 and 2013	file:///C:/Users/sbruns/Downloads/(U)_ActiveShooter021317_17B_WEB%20(1).PDF
Active Shooter Incidents in the United States in 2014 and 2015	file:///C:/Users/sbruns/Downloads/ActiveShooterIncidentsUS_2014-2015.pdf
U.S. Drought Monitor – California	http://droughtmonitor.unl.edu/data/jpg/20170718/20170718_CA_trd.jpg
Riverside County Flood Control and Water Conservation District ANNUAL REPORT FY 2015/2016	http://www.floodcontrol.co.riverside.ca.us/Downloads/AnnualReports/DistrictAnnualReport15-16.pdf
San Onofre - Units 2 and 3	https://www.nrc.gov/info-finder/decommissioning/power-reactor/san-onofre-units-2-3.html
Cal OES - San Onofre Nuclear Generating Station	http://www.caloes.ca.gov/cal-oes-divisions/planning-preparedness/nuclear-power-plant-program
Colorado River Aqueduct	http://www.asce.org/project/colorado-river-aqueduct/
California State Water Project Overview	http://www.water.ca.gov/swp/

Addressing Emerging Infectious Disease Threats: A Prevention Strategy for the United States Executive Summary	https://www.cdc.gov/mmwr/preview/mmwrhtml/00031393.htm
National Center for Emerging and Zoonotic Infectious Diseases (NCEZID)	https://www.cdc.gov/ncezid/who-we-are/index.html
Botulism from Drinking Pruno	https://wwwnc.cdc.gov/eid/article/15/1/08-1024_article
West Nile Virus in California	https://wwwnc.cdc.gov/eid/article/10/8/04-0077_article
Risk of Local Zika Virus Transmission by County	https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/LocalZikaRiskMap.pdf
Ebola (Ebola Virus Disease)	https://www.cdc.gov/vhf/ebola/transmission/index.html
Mapping Site Links:	
Cal OES Hazard Mapping	http://www.caloes.ca.gov/cal-oes-divisions/geographic-information-systems
Cal OES My Plan	http://myplan.calema.ca.gov/
Faults Mapping	http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html
California Department of Water Resources	http://gis.bam.water.ca.gov/bam/
Handouts and Documents Distributed to Participants:	
FEMA Local Mitigation Planning Handbook	
FEMA How To Guide #1, Getting Started: Building Support for Mitigation Planning	
FEMA How To Guide #2, Understanding Your Risks: Identifying Hazards and Estimating Losses	
FEMA How To Guide #3, Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies	
FEMA How To Guide #4, Bringing the Plan to Life: Implementing the Hazard Mitigation Plan	
FEMA How To Guide #5, Using Benefit-Cost Review in Mitigation Planning	
FEMA How To Guide #6, Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning	
FEMA How To Guide #7, Integrating Manmade Hazards into Mitigation Planning	
FEMA How To Guide #8, Multi-Jurisdictional Mitigation Planning	

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FEMA How To Guide #9, Using the Hazard Mitigation Plan to Prepare Successful Mitigation Projects
FEMA Mitigation Ideas
2016 Riverside County SCAG Repot – Profile of Riverside County
Community Rating System
FEMA Local Mitigation Plan Review Guide
2016 Inventory Worksheet
2017 LHMP Template
Senate Bill 1000
Senate Bill 379
FEMA Mitigation Grant Information

APPENDIX G

RESOLUTION ADOPTING 2020 UWMP AND WSCP

RESOLUTION NO. 2021-04

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE CHINO BASIN DESALTER AUTHORITY ADOPTING THE CHINO BASIN DESALTER AUTHORITY URBAN WATER MANAGEMENT PLAN 2020

WHEREAS, the Chino Basin Desalter Authority ("CDA") prepared that certain draft Chino Basin Desalter Authority Urban Water Management Plan 2020, dated June 2021 ("2020 UWMP"), in accordance with the requirements of the Urban Water Management Planning Act, California Water Code Section 10610, *et seq.*; and

WHEREAS, in accordance with California Water Code Section 10642, CDA encouraged public participation with respect to the preparation of the 2020 UWMP by making the 2020 UWMP available for review by the public online, at *www.chinodesalter.org*, on May 20, 2021; and

WHEREAS, on June 3, 2021, the CDA Board of Directors held a public hearing to receive public testimony and comments regarding the 2020 UWMP; and

WHEREAS, notice of the time and place of the June 3, 2021 public hearing was published on May 11, 2021 and May 18, 2021 in the Inland Valley Daily Bulletin and May 12, 2021 and May 19, 2021 in the Riverside Press Enterprise, in accordance with California Government Code Section 6066; and

WHEREAS, the CDA Board of Directors considered all public comments and testimony presented at the public hearing relating to the 2020 UWMP; and

WHEREAS, the CDA Board of Directors now desires to adopt the 2020 UWMP.

NOW, THEREFORE, BE IT RESOLVED, the Board of Directors of the Chino Basin Desalter Authority hereby declares, finds, and determines as follows:

1. The recitals set forth above are true and correct.

2. The 2020 UWMP is hereby approved and adopted.

3. The Chairperson or the Chairperson's designee, the General Manager or the General Manager's designee, and any other proper officer of CDA, are each hereby authorized and directed to execute and deliver any and all documents and instruments and to do and cause to be done any and all acts and things necessary or proper to implement the 2020 UWMP.

4. The 2020 UWMP shall be placed on file with the General Manager or another officer of CDA, as directed from time to time by the General Manager. The General Manager is hereby directed to transmit copies of the 2020 UWMP to the California Department of Water Resources, the California State Library, and each city and county within which CDA provides water supplies, all within thirty (30) days following the date of adoption of this Resolution.

5. The CDA Board of Directors hereby finds and determines that, pursuant to California Water Code Section 10652, the adoption of the 2020 UWMP does not constitute a "project" within the meaning of the California Environmental Quality Act, Public Resources Code Section 21000, *et seq.*

6. This Resolution shall take effect immediately upon adoption.

PASSED AND ADOPTED this 3rd day of June, 2021.

Kenneth McLaughlin
Chairperson

ATTEST:

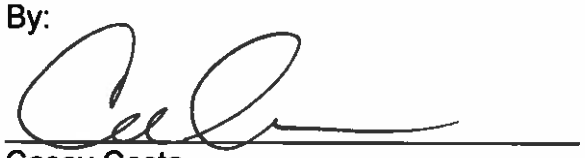
Casey Costa
Secretary

STATE OF CALIFORNIA)
) ss
COUNTY OF SAN BERNARDINO)

I, Casey Costa, Secretary of the Chino Basin Desalter Authority, do hereby certify that the foregoing Resolution, being No. 2021-04, was duly adopted by the Board of Directors of the Chino Basin Desalter Authority on the 3rd day of June, 2021, by the following vote:

AYES:	Ken McLaughlin, Jurupa Community Services District Jim Bowman, City of Ontario Eunice Ulloa, City of Chino Peter Rogers, City of Chino Hills Greg Newton, City of Norco Vicki Rupe, Santa Ana River Water Company Gracie Torres, Western Municipal Water District
NOES:	None
ABSENT:	None
ABSTAIN:	None

By:



Casey Costa
Secretary

RESOLUTION NO. 2021-05

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE CHINO BASIN DESALTER AUTHORITY ADOPTING THE CHINO BASIN DESALTER AUTHORITY WATER SHORTAGE CONTINGENCY PLAN 2020

WHEREAS, the Chino Basin Desalter Authority ("CDA") is an urban water supplier that is required to adopt an Urban Water Management Plan pursuant to Water Code Sections 10620 et seq.; and

WHEREAS, CDA adopted the Chino Basin Desalter Authority Urban Water Management Plan 2020 ("2020 UWMP") on June 3, 2021 in accordance with the requirements of the Urban Water Management Planning Act, California Water Code Section 10610, *et seq.*; and

WHEREAS, CDA is also required to prepare and adopt a Water Shortage Contingency Plan (2020 WSCP) that consists of certain elements prescribed by Water Code Section 10632, and to make the Plan available to the California State Library, the California Department of Water Resources, and to any city or county within which CDA supplies water no later than 30 days after adoption of the Plan and no later than July 1, 2021, as a required component of the Urban Water Management Plan; and

NOW, THEREFORE, BE IT RESOLVED, the Board of Directors of the Chino Basin Desalter Authority hereby declares, finds, and determines as follows:

1. The recitals set forth above are true and correct.

2. The 2020 Water Shortage Contingency Plan for the Chino Basin Desalter Authority is hereby approved and adopted.

3. This Resolution shall take effect immediately upon adoption.

PASSED AND ADOPTED this 1st day of July 2021.

Kenneth McLaughlin
Chairperson

ATTEST:

Casey Costa
Secretary

STATE OF CALIFORNIA)
) ss
COUNTY OF SAN BERNARDINO)

I, Casey Costa, Secretary of the Chino Basin Desalter Authority, do hereby certify that the foregoing Resolution, being No. 2021-05, was duly adopted by the Board of Directors of the Chino Basin Desalter Authority on the 1st day of July 2021, by the following vote:

AYES: Ken McLaughlin, Jurupa Community Services District
Jim Bowman, City of Ontario
Eunice Ulloa, City of Chino
Peter Rogers, City of Chino Hills
Greg Newton, City of Norco,
Vicki Rupe, Santa Ana River Water Company
Gracie Torres, Western Municpal Water District

NOES: None

ABSENT: None

ABSTAIN: None

By:



Casey Costa
Secretary

URBAN WATER MANAGEMENT PLAN

Prepared for

RUBIDOUX DISTRICT
CALIFORNIA'S FIRST COMMUNITY SERVICES 1952

Adopted June 17, 2021

Amendment Date: April 21, 2022



ALBERT A. WEBB ASSOCIATES

3590 Rubidoux Boulevard
Jurupa Valley, CA 92509
(951) 684-7580
General Manager: Jeff Sims, P.E.

2020 Urban Water Management Plan

Adopted June 17, 2021
Amended April 21, 2022[1]

Prepared by:

3788 McCray Street
Riverside, CA 92506
(951) 686-1070
Program Manager: Brad Sackett, P.E.
Project Manager: Autumn DeWoody

[1] (Changes made throughout this report as part of the 2022 amendment are shown in red text)

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G Validated Water Loss Audits
H Climate Change Technical Memorandum
I SB X7-7 Compliance and Verification Forms
J Orange County Judgment
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L Consumer Confidence Report
M Ordinance No. 111 and Resolution No. 2019-858
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ACRONYMS

AMR	Automatic Meter Reading
AWWA	American Water Works Association
BMP	Best Management Practice
CASGEM	California Statewide Groundwater Elevation Monitoring
CDA	Chino Desalter Authority
CCR	California Code of Regulations
CDP	Census Designated Place
CFD	Community Facilities District
CII	Commercial, Industrial, and Institutional
CIMIS	California Irrigation Management Information System

CUWCC	California Urban Water Conservation Council
CWC	California Water Code
CWSRF	California Water State Revolving Fund
DAC	Disadvantaged Community
DMM	Demand Management Measure
DWR	Department of Water Resources
DYY	Dry Year Yield
EPA	Environmental Protection Agency
ERP	Emergency Response Plan
GIS	Geographic Information System
GRCC	Groundwater Recharge Coordinating Committee
GWMP	Groundwater Management Plan
ICS	Incident Command System
IEBL	Inland Empire Brine Line
IERCD	Inland Empire Resource Conservation District
IEUA	Inland Empire Utilities Agency
ILI	Infrastructure Leaking Index
ITP	Independent Technical Panel
JCSD	Jurupa Community Services District
JPA	Joint Powers Authority
MCL	Maximum Contaminant Level
MHI	Median Household Income
MOU	Memorandum of Understanding
MWD	The Metropolitan Water District of Southern California
MZ	Management Zone
N/A	Not Applicable
OBMP	Optimum Basin Management Plan
PWS	Public Water System
PWSS	Public Water System Statistics
RCSD	Rubidoux Community Services District
RHNA	Regional Housing Needs Assessment
RIX	Rapid Infiltration Extraction
RPU	Riverside Public Utilities
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RWQCP	Regional Water Quality Control Plant
SARI	Santa Ana River Interceptor
SARWC	Santa Ana River Water Company
SAWPA	Santa Ana Watershed Project Authority
SB	(California) Senate Bill
SBCFCD	San Bernardino County Flood Control District
SCAG	Southern California Association of Governments
SWP	State Water Project
SWRCB	State Water Resources Control Board

TVMWD	Three Valleys Metropolitan Water District
UCR	University of California, Riverside
UWMP	Urban Water Management Plan
WEBB	Albert A. Webb Associates
WET	Water Education for Teachers
WMWD	Western Municipal Water District
WRCRWA	Western Riverside County Regional Wastewater Authority
WSCP	Water Shortage Contingency Plan
WUE	Water Use Efficiency

Units of Measurement and Chemical Symbols

AF	Acre Feet
AFY	Acre Feet per Year
CY	Calendar Year
EDU	Equivalent Dwelling Unit
°F	Fahrenheit
FY	Fiscal Year
GPCD	Gallons per Capita per Day
GPM	Gallons per Minute
HCF	Hundred Cubic Feet
MEU	Meter Equivalent Unit
MGD	Million Gallons per Day
mg/L	Milligrams per Liter
TDS	Total Dissolved Solids

DOCUMENT PREPARATION TEAM

ALBERT A. WEBB ASSOCIATES

Brad Sackett, PE, Senior Engineer
Autumn DeWoody, Senior Environmental Analyst
Kris Danielson, PE, Senior Engineer
Eliza Laws, Senior Environmental Analyst
Monica Tobias, Associate Environmental Analyst
Chandler Draschlin, EIT, Associate Engineer
Noemi Avila, Assistant Environmental Analyst

RUBIDOUX COMMUNITY SERVICES DISTRICT

Jeff Sims, PE, General Manager
Ted Beckwith, PE, Director of Engineering
Yvonne Reyes, Assistant Engineer
Lee Bugbee, System Operator III
Miguel Valdez, Operations Manager

CHAPTER 1 INTRODUCTION AND LAY DESCRIPTION

1.1 REGULATORY BACKGROUND

In 1983, the California Legislature enacted the Urban Water Management Planning Act (Act). The Act is codified in California Water Code (CWC or Water Code) Sections 10610 - 10657. The Act requires an urban water supplier (Supplier) that is providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet (AF) of water annually to adopt an Urban Water Management Plan (UWMP) and update it every five years for the purpose of demonstrating water supply reliability in normal, single dry, and multiple dry years. The Act requires each Supplier to submit their UWMP to the California Department of Water Resources (DWR). DWR staff then reviews the submitted plans to make sure they have satisfied the requirements identified in the Act, including subsequent revisions. DWR will then submit a report to the State Legislature summarizing the status of the UWMPs.

In order for an urban water supplier to be eligible for any water grant or loan administered by DWR, the supplier must have a current UWMP on file that DWR has determined met the current Act requirements. A current UWMP must also be maintained by the supplier throughout the term of any grant or loan administered by DWR. Depending on the conditions that are specified in the funding guidelines, a current UWMP may also be required in order to be eligible for other State funding sources.

With the adoption of the Water Conservation Act of 2009, also known as SB X7-7 (Senate Bill 7 of the Senate's 7th Extraordinary Session), the State is required to reduce urban per-person water use by 20 percent by the year 2020. SB X7-7 is codified in CWC sections 10608 – 10608.64. To achieve this goal, each Supplier that prepares an UWMP is required to also develop an urban water use target to help the state collectively achieve a 20-percent reduction in water use by 2020.

Since 2015, the Act has been expanded and revised significantly in response to prolonged drought, groundwater overdraft, regulatory revisions, and changing climatic conditions. Although the exact changes in the Water Code are too numerous to list here, the significant new requirements for the 2020 UWMPs are:

- Water reliability assessment for a drought lasting five consecutive years;
- Drought Risk Assessment for a five-year period from 2021 to 2025;
- Seismic risk assessment of water system facilities and a mitigation plan;
- Water Shortage Contingency Plan (WSCP) with action items for a drought or catastrophic supply interruption;
- Consistency with Groundwater Sustainability Plans that are currently being prepared in certain groundwater basins; and
- A lay description of the fundamental conclusions of the UWMP, especially regarding water service reliability, challenges ahead, and strategies for managing reliability risks.

OUR MISSION

To provide high quality water service, sewer disposal, trash, and fire mitigation services at the best value for our customers.

The Rubidoux Community Services District (RCSD or "District") is a public retail urban water supplier. It is the stated goal of RCSD to deliver high-quality water supply service at the best value for its customers. The purpose of the 2020 UWMP is to outline progress toward conservation and supply reliability goals since the District's 2015 UWMP was prepared, as well to outline future long-term opportunities to meet projected water demands while also assessing the impact of long-term drought and climate change. The identification of future opportunities for water supplies in the UWMP neither commits RCSD to any stated endeavor, nor precludes them from exploring a different project that is not identified in the UWMP.

Another purpose of this document is to inform the local wholesale water provider of RCSD's projected population and projected need for water supplies. This includes Western Municipal Water District (WMWD or "Western"). The District currently does not obtain water from a wholesale water supplier, and recycled water is not currently available to the District.

This document also intends to communicate forecasted growth to the wastewater treatment agency that provides sewer service to the District. This includes the City of Riverside Public Utilities Department and the Regional Water Quality Control Plant (RWQCP).

Albert A. Webb Associates (WEBB) was contracted to prepare this document on behalf of RCSD under their staff advisement and approval. The RCSD Board of Directors held a public hearing on June 17, 2021 and adopted the 2020 UWMP, which includes the 2020 Water Shortage Contingency Plan in chapter 8 on June 17, 2021 as recorded in RCSD Resolution Nos. 2021-878 and 2021-879 which are provided in **Appendix A**. This document was amended on April 21, 2022, to reflect the findings of the District's Water Master Plan dated 2022. Please refer to **Appendix Q** for copies of amendment resolutions and noticing**.**

1.2 SIMPLE LAY DESCRIPTION OF THE 2020 UWMP FINDINGS

RCSD's 2020 Urban Water Management Plan (UWMP) has been prepared in compliance with the California Water Code (CWC or Water Code). This description satisfies the requirement in the Water Code Section 10630.5 to include a simple lay description of water service reliability and the reasonably foreseeable challenges and corresponding solutions anticipated for the next 20 years.

Rubidoux Community Services District (RCSD or District) was organized in 1952 as the first Community Services District in the State of California. Currently, the entire District service area covers approximately 5,167 acres; however, 329 acres receive water service from West Valley Water District and is therefore not a part of this UWMP. The District provides water service to approximately 4,907 acres (7.7 square miles). The District's water supply comes entirely from local groundwater and is delivered to 6,335 service connections via 70 miles of water pipelines. RCSD has always been able to provide its customers with the water they need and fully expects that it will continue to do so for the foreseeable future based on the analysis herein.

Since the adoption of the 2015 Urban Water Management Plan, RCSD has been successful in meeting the goals and intent of the Urban Water Management Planning Act of 1983 and the Water Conservation Act of 2009. The District has accomplished the following items, which are discussed further in this document:

- Supplied in calendar year (CY) 2020, 4,770 acre-feet (AF) of drinking water to 6,335 metered connections, including residential, commercial, industrial, governmental, losses, and hydrant meters.[1]

- Supplied in CY 2020, 417 AF of non-potable water to 10 meters used for irrigation and construction water.

- Met the 2020 water use target pursuant to the Water Conservation Act of 2009 (SB X7-7) of 166 gallons per capita per day (GPCD) with an actual CY 2020 water use rate of 126 GPCD.

- Obtained a grant award of $300,000 from California Office of Emergency Services' Community Power Resiliency Program to install fixed generators at Well 1A, Well 2, and Mission Booster Station to improve system reliability during power outages.

- Rehabilitated Well 18 and added additional treatment systems to remove PFAS at Wells 1A, 2, 4, 6, 8, and 18 and the Thompson Water Treatment Facility.

- Prepared and submitted validated water loss audits to the State Department of Water Resources each year.

- Began conversion of customer meters to Automatic Meter Reading (AMR) system, which provides real-time information on water use that can help identify leaks or meter tampering. Require all new housing developments in the future to have AMR meters.

- Replaced approximately 2,000 water meters that were damaged or failed and conducted about 30 field tests of meters between 2016 and 2020.

- Adopted a gradual water rate increase beginning in 2020 through fiscal year 2023/2024 in accordance with Proposition 218 and compliant with AB 3030.

- Reduced potable water losses each year since 2017.

[1] One acre-foot of water is the same as 325,851.43 gallons.

- Remained a member of the California Water Efficiency Partnership (CalWEP) and the Emergency Response Network of the Inland Empire (ERNIE).

- Obtained corrosion and seismic/structural/safety engineering evaluations for the District's four active water storage tanks.

- Annexed the Agua Mansa Commerce Park Specific Plan area into the District. Began the process to annex and detach other areas along the District boundary so that the service area only includes areas served by RCSD.

- Annexed into the District a portion of the future Shadow Rock development.

- Consumed approximately 3.1 million kWh of electricity in CY 2020 to operate the production, treatment, distribution, conveyance, and other elements of the water distribution system that are within RCSD's operational control. Generated approximately 1,570 kWh with solar panels on the reservoir tanks.

- Made a commitment in 2021-2022 to update the RCSD Water Master Plan, Sewer Master Plan, and the RCSD Emergency Response Plan and Operations Plan, and prepare a Risk and Resilience Plan pursuant to the American Water Infrastructure Act.

Water Supplies

RCSD obtains all of its water supply from the local groundwater basin. This basin is identified as the "Riverside South Basin" and has been historically stable and sufficient to meet the needs of the District. Recorded groundwater levels show the basin is resilient to short-term and long-term drought conditions. The water quality in the basin however is impacted and requires treatment prior to distribution unless it is used for irrigation from a non-potable well. RCSD is currently adding additional treatment systems to meet current state notification limits for a new group of emerging contaminants called PFAS. With these additional treatment systems, the District will continue meeting state and federal limits to provide safe drinking water to all residents. In the event of a catastrophic event that would cut off water supplies to at least some but not likely all of the District, RCSD is prepared to bring in water from neighboring agencies, utilize water in storage reservoirs, use backup generators, and reroute water to bring the system back online as quickly as possible.

For the future, the District is planning to add several well fields and treatment facilities over the next 20 years to replace aging wells and meet the needs of future customers. Within the next five years, the District is planning to make a connection with a neighboring agency in order to bring imported water supplies into the drinking water distribution system, of which one purpose is to reduce the concentration of total dissolved solids (TDS, or salts) in the District's wastewater (sewage). Bringing recycled water to RCSD customers is currently cost-prohibitive.

Models predict that over the next 20 years the potential effects of climate change to this region of the state will result in a general increase in temperature and decrease in rainfall, with rainfall occurring in more intense but shorter events. This may affect how much groundwater is available and change how much water customers use outdoors to keep lawns and landscaping thriving in the hotter temperatures.

Water Use

The majority of RCSD customers are residential with a small commercial / industrial / governmental sector. It is estimated that there are 36,827 people living within the District's water service boundary as of CY 2020. The District population is projected to increase to 66,100 people in a mid-range density scenario and up to 83,400 people in a maximum-density scenario as properties develop according to the City's current land use plan. Buildout of the District, or rather when all the properties are developed as planned by the City of Jurupa Valley, is estimated to be reached by about 2049 and at that time, ultimate potable water use is expected to be 11,049 AF per year (not including any water sold to JCSD or others, which is currently estimated at an additional 2,000 AF per year).

Fundamental Determinations of the Plan

The water supplies that are currently available to the District are projected to remain a reliable source of water to meet the demands of customers regardless of foreseeable potential constraints including drought and water quality. Additional water supplies will be brought online to meet the projected demands of future residents through buildout of the service area. The projections of reliability considered the potential effects of climate change, impacted water quality, water shortage, the effectiveness of water conservation and emergency water supplies,

and the effects of five-consecutive-year drought periods. The District is improving its metering system to more closely monitor water use and address infrastructure and water quality constraints by replacing and upgrading aging facilities. The District will continue to evaluate preparedness to respond to the effects of long-term drought and lessen the impacts of catastrophic events to the distribution system and supply sources.

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CHAPTER 2 PLAN PREPARATION

2.1 PLAN PREPARATION

Pursuant to Water Code Section 10620(b), every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier. RCSD prepared and adopted an UWMP beginning in 1985 and every five years thereafter.

This Plan follows the report organization outlined in the State UWMP Guidebook (Final March 2021). DWR has provided tables that are required to be completed by the District as part of the UWMP. Because RCSD is a retail water supplier and not a "wholesale" water supplier, the tables and information provided in the UWMP follow the requirements for "retail" water suppliers. The required UWMP tables provided by DWR are in shades of blue and titled "Submittal Table 2-1," for example. The additional tables created during the writing of this report that are not required for DWR are numbered using the chapter number in alphabetical order such as "Table 2A," for example. The required DWR tables pertaining to Baselines and Targets (Chapter 5) begin with "SB X7-7 Table…" and are shaded brown and green. A checklist to ensure compliance of this Plan with the UWMP Act requirements is provided in **Appendix B**.

The Water Code requires that the water use and planning data for the entire year of 2020 is used, and because RCSD reports on a calendar year (CY) basis, data included in this UWMP is through December 31, 2020. During CY 2020, RCSD supplied 4,770 acre-feet (AF) of potable water to 6,335 potable meters and 417 AF of non-potable water to 10 non-potable meters, as shown in **Submittal Table 2-1**. The District has just one Public Water System (PWS). Each PWS is assigned a number and they are regulated by the State Water Resources Control Board (SWRCB or State Water Board), Division of Drinking Water.

Submittal Table 2-1 Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020 *
Add additional rows as needed			
CA3310044	Rubidoux Community Services District	6335	4,770
	TOTAL	6,335	4,770
**** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: From RCSD Annual Production Summary 2020. CY 2020, units in AF, potable water only. Non-potable water supplied in CY2020 was 417 AF through 10 connections.			

DWR suggests that water suppliers engage in *regional* planning to reduce inefficiencies when many agencies are sharing the same water supply source. Although the Water Code provides mechanisms for participating in regional urban water management planning, RCSD has chosen "Individual Reporting" for its UWMP, as identified in **Submittal Table 2-2**.

Submittal Table 2-2: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable* (select from drop down list)
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

Suppliers must report their water data in the same units consistently throughout the UWMP. **Submittal Table 2-3** confirms that RCSD is a retailer with the data provided herein on a calendar year (CY) basis and all units of measure in this UWMP are in acre-feet (AF).

Submittal Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
☐	Supplier is a wholesaler
☑	Supplier is a retailer
Fiscal or Calendar Year (select one)	
☑	UWMP Tables are in calendar years
☐	UWMP Tables are in fiscal years
Units of measure used in UWMP * (select from drop down)	
Unit	AF
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES:	

2.2 PLAN COORDINATION

RCSD does not currently receive water supplies from a wholesale supplier. However, RCSD is within the service area of Western Municipal Water District (WMWD or "Western") and could receive wholesale water supplies from Western in the future. Another reason RCSD has coordinated with Western is that Western is a court-appointed member of the Western-San Bernardino Watermaster, which is responsible for implementing the court's adjudication of the groundwater basin that RCSD utilizes. This includes reporting to the court all groundwater production and recharge activities by all pumpers in the basin, including RCSD.

RCSD received a request from Western on March 23, 2021 for the District's projected imported water needs, local supplies, and total District water demand. RCSD provided said information to Western on April 12, 2021 for use in its respective UWMP as documented in **Submittal Table 2-4**. Copies of all coordination with the wholesaler, other agencies, and land use authorities are provided in **Appendix C**.

Submittal Table 2-4 Retail: Water Supplier Information Exchange
The retail Supplier has informed the following wholesale supplier(s) of projected water use in accordance with Water Code Section 10631.
Wholesale Water Supplier Name
Add additional rows as needed
Western Municipal Water District
NOTES:

The Water Code also requires Suppliers to coordinate the preparation of the UWMP with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable (CWC section 10620(d)(3)). Further, the Water Code requires notices to be sent at least 60 days prior to the public hearing to any city or county within the District's service area (CWC section 10621(b)). The District's water service area is contained entirely within the City of Jurupa Valley. A small area of unincorporated San Bernardino County is technically within the District boundary, but water service is not provided there. RCSD notified and solicited input from the following pertinent agencies for preparation of this Plan:

- City of Jurupa Valley
- City of Riverside Public Utilities
- City of Riverside Regional Water Quality Control Plant
- County of Riverside
- County of San Bernardino
- Cucamonga Valley Water District
- Inland Empire Utilities Agency
- Jurupa Community Services District
- Jurupa Unified School District
- Santa Ana River Water Company
- Western Municipal Water District
- Western-San Bernardino Watermaster
- West Valley Water District
- City of Colton Water Department
- Riverside Highland Water Company
- Santa Ana Watershed Project Authority

RCSD sent a letter to the entities listed above on March 10, 2021 notifying of the District's intent to update the 2015 UWMP including the Water Shortage Contingency Plan. The District sent a second notice to the same entities dated April 28, 2021 with details on the public hearing for the UWMP and Water Shortage Contingency Plan. Copies of all notices are included in **Appendix D**. No responses to the letters were received by the District. Chapter 10 includes detailed information on notifications and plan adoption proceedings.

2.2.1 Land Use Agency Coordination

As described in further detail in Chapter 3, RCSD and WEBB met with Planning Department staff from the City of Jurupa Valley on March 11, 2021 pursuant to CWC Section 10631(a). A copy of the meeting request letter is located in Appendix C. This meeting was held for the specific purpose of coordinating on the most appropriate land use data to use for the 2020 UWMP. The City staff provided current information on demographics, land use plan updates, and accessory dwelling unit (ADU) applications.

Although a portion of the District is within unincorporated San Bernardino County currently, the District does not provide water service to that area and therefore did not consult with San Bernardino County on land use data as part of this UWMP update.

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CHAPTER 3 SYSTEM DESCRIPTION

3.1 GENERAL DESCRIPTION

RCSD was organized on November 24, 1952 in accordance with the State of California Community Services District Law (Government Code Section 60000 et seq) for the purpose of providing certain public services including domestic water service. RCSD is California's first community services district (CSD). The District is empowered to manage water resources and to construct, operate, maintain, repair, and replace water system facilities as needed to provide water service in compliance with applicable standards and regulations. The District routinely constructs, maintains, and replaces facilities as necessary to maintain adequate, reliable, and safe water service to its customers.

The District is a public entity and governed by a five-member Board of Directors elected at-large. Each member resides within the District and is elected to a four-year term. The role of the Board of Directors is to provide oversight and establish the governing policies of the District. The District's General Manager oversees the day-to-day operations. The Board of Directors conduct regular Board meetings on the first and third Thursday of every month at 4:00 pm at the District Office.

3.2 SERVICE AREA BOUNDARY

The RCSD boundary encompasses an area of approximately 5,369 acres that are mostly within the City of Jurupa Valley in northwest Riverside County. The District is bounded by San Bernardino County to the north, the Jurupa Mountains and Pedley Hills to the southwest, the City of Jurupa Valley to the west, the Santa Ana River to the south and the City of Riverside to the east. Refer to **Figure 3-1 – Vicinity Map** (all figures are located at the end of each chapter).

RCSD provides water service to approximately 5,048 acres. Approximately 329 acres of the District is not served water by RCSD, as shown in **Figure 3-2 – Water Service Area**. West Valley Water District (WVWD or West Valley) serves water to approximately 206 acres within the City of Jurupa Valley and approximately 123 acres of unincorporated San Bernardino County that are technically within the RCSD boundary. Because this area in the upper northeast corner of the District is served by another supplier, which has been serving the area

for some time, and the area is slated for detachment from the District in the very near future, this 329-acre area is not considered as part of the District for purposes of the UWMP.

3.2.1 Annexations

In 2020, RCSD annexed the area of the future Agua Mansa Commerce Park Specific Plan for the purpose of providing water service in the future. This added approximately 291 acres of the former Riverside Cement Plant, which received water from a private, onsite well. The specific plan will include a 4.4 million square foot logistics center with 70 acres of open space. Otherwise, there have been no other changes to the District's service area boundary since the 2015 UWMP.

The District is actively working on several annexations to add land and remove land from its service area in the future for the purposes of (1) incorporating properties that have been served water by the District for some time, but are technically outside the service area; (2) detaching properties from the District service area that are served by other water suppliers; (3) incorporating property that is owned by the District but is outside the service area; (4) incorporating property that is within a District pressure zone but outside of the current service area; and (5) incorporating properties to be served by the District in the future as a result of new development applications. These efforts will make the service area more contiguous and remedy some longstanding inconsistencies. The neighboring water suppliers are shown in **Figure 3-3 – Surrounding Water Suppliers.**

3.2.2 Potable Water System and Pressure Zones

All water delivered by the District is produced from groundwater wells and all groundwater is treated prior to distribution. The District currently has six active potable wells (i.e., Wells 1A, 2, 4, 6, 8, and 18) and Well 5 for emergency use only with a combined maximum pumping capacity of approximately 9,950 gallons per minute (gpm). In CY 2020, only wells 1A, 2, 6, and 8 were used, with Well 8 providing the majority of total potable production (53%), followed by Well 1A (27%), Well 2 (19%), and Well 6 (1%). Well 18 is currently being repaired and Well 4 was put back into service in 2021 following improvements to the treatment system. All wells are located within the RCSD boundary and draw from the Riverside South Groundwater Basin. Water from Wells 4 and 6 is treated at the District's Anita B. Smith (Smith) Nitrate Removal

Facility to reduce the concentration of nitrate before it enters the distribution system. The Smith Plant has a treatment capacity of approximately 4.9 million gallons per day (MGD) (3,400 gpm) based on current year 2020 water quality and well production. Water from the other wells is treated at the District's Leland J. Thompson (Thompson) Water Treatment Plant. The Thompson Plant has a treatment capacity of approximately 7.2 MGD (5,000 gpm). Water from the Thompson Plant is then blended with water from Well 2 before it enters the distribution system. Prior to blending, water from Well 2 is currently being treated for removal of 1,2,3-trichloropropane (1,2,3-TCP). A third water treatment facility, the LaVerne J. Mahnke (Mahnke) Manganese Removal Facility, is currently not used. The District also operates three booster pumping plants (i.e., Goldenwest, Mission, and Skyloft) with a combined online capacity of approximately 2,210 gpm, four active water storage reservoirs and a fifth not in service (i.e., Atkinson, Hunter No. 1, Hunter No. 2, Watson, and Perrone) with a combined capacity of 6.4 million gallons (MG), and approximately 74 miles of potable water pipelines.

RCSD is currently completing projects to add treatment systems to the active wells to remove perfluorooctanic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) that are in the PFAS family of chemicals using a combination of ion-exchange (IX) at Wells 1A, 8, and 18 and granulated activated carbon (GAC) at Wells 2, 4 and 6 (DM 2021-10).

RCSD received a grant in March 2021 from the California Governor's Office of Emergency Services (CalOES) "Community Power Resiliency Program" to offset most of the costs for fixed generators at Well 1A, Well 2, and Mission Booster Station. The generators will help mitigate the effect of power disruptions and have been placed where they would be most beneficial for increased system reliability (DM 2021-17).

The District's potable water system contains two large and one small water pressure zones (PZ); Atkinson PZ, Hunter PZ, and Ridgeline PZ, respectively. The Ridgeline PZ is served by the Skyloft Booster Pumping Plant, which includes a hydropneumatic system to serve elevations above the upper limit of the Hunter PZ. Most of the water delivered by the District is used within the Atkinson PZ. The District is currently updating its *2015 Water Master Plan*, which is expected to be completed by 2022 and will provide detailed information on the District's water distribution facilities.

3.2.3 Non-Potable Water System

The District has six non-potable wells (i.e., Well Nos. 3, 7, 11, 14, and 19/20). In CY 2020, the District operated four non-potable wells (i.e., Wells 3, 11, and 19/20) with a combined pumping capacity of 1,200 gpm. Well 3 supplies hydrants with non-potable construction water, Well 11 supplies the Jurupa Hills Golf Course, and Well 19/20 supplies non-potable water for irrigating street median landscaping along Mission Boulevard as well as hydrants and landscaping at an animal hospital. The District also maintains nominal lengths of non-potable pipelines that are associated with each non-potable well. In CY 2020, Well 11 provided 89% of non-potable water supplies, with the remainder provided by Well 19 and Well 3. Wells 7 and 14 can be available for non-potable use with a combined pumping capacity of 700 gpm.

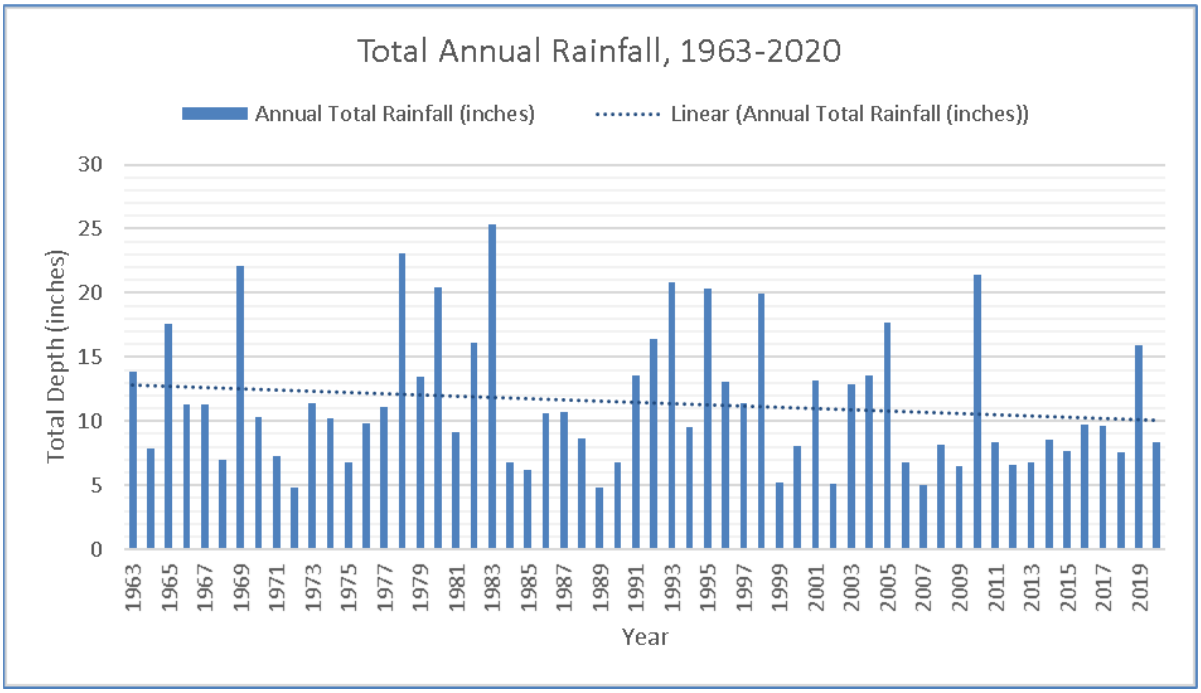
3.3 SERVICE AREA CLIMATE

Like much of inland Southern California, climate in the District's service area is characteristically Mediterranean with short, mild winters and hot, dry summers.

3.3.1 Rainfall

Precipitation in the District occurs between fall and spring, with the majority occurring in winter months. Based on 57 years of data, the District receives an annual average of 11.4 inches (RCFC(a)). Yearly rainfall data for the District from 1963 through 2020 is shown in **Chart 3-1**, which was obtained from the Riverside County Flood Control and Water Conservation District (RCFC) Station No. 178 ("Riverside North"). This station is located at their district headquarters approximately 2 miles east of RCSD offices.

Chart 3-1: Total Annual Rainfall 1963-2020 (inches) at Riverside Stn. 178 (Source: RCFC(a))

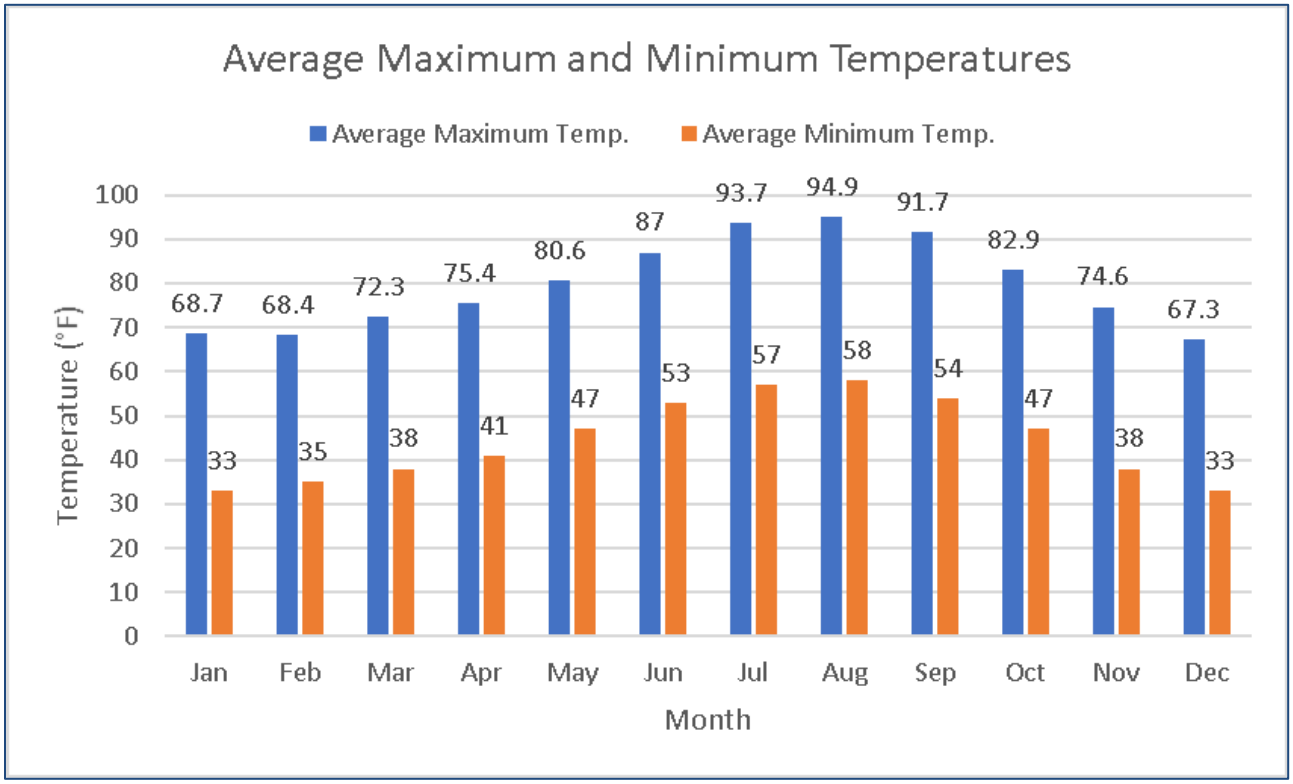


As shown in Chart 3-1, the maximum recorded rainfall was 25.3 inches in 1983 and the least was 4.8 inches in 1972. The linear trendline shows a slight decrease in total annual rainfall over the time period.

3.3.2 Temperature

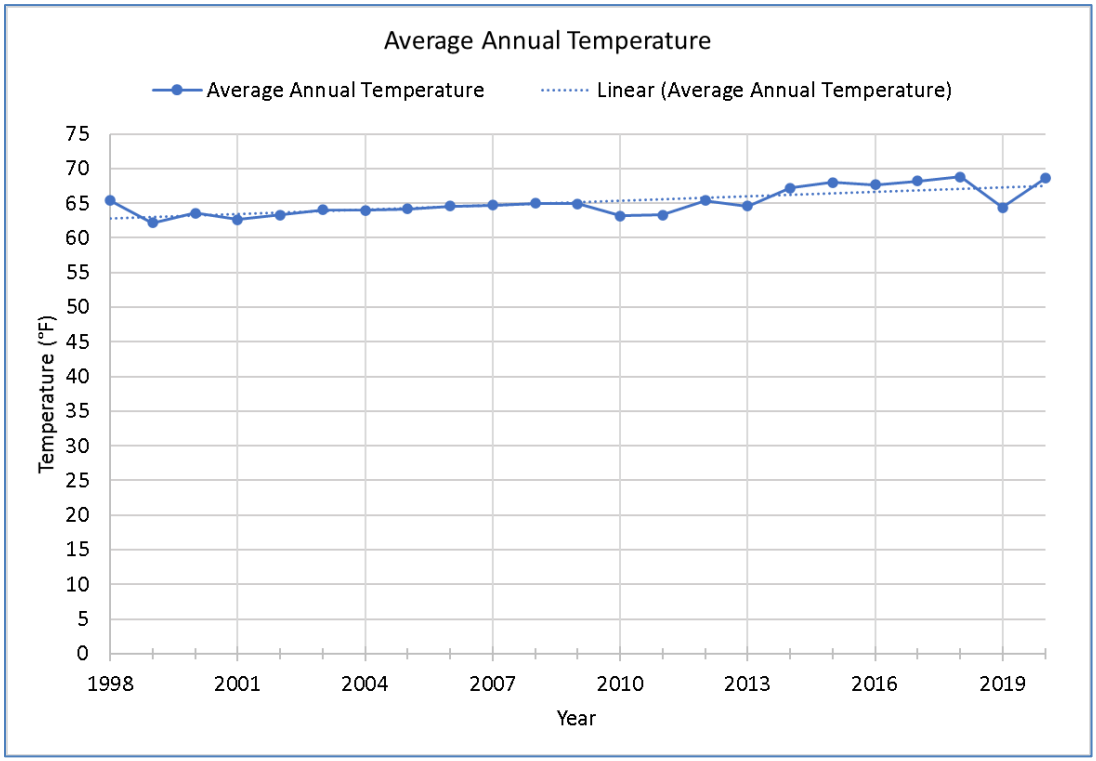
Like most of inland Southern California, temperatures in the RCSD service area are typically mild, with cool winters and hot summers. Maximum temperatures occur in summer months, with a maximum average of approximately 95ºF in August based on the last 22 years of data, as shown in **Chart 3-2.** Minimum temperatures occur in winter months with average minimums at 33°F in December and January. The temperature data shown here was recorded at the Riverside Airport located approximately five miles south of RCSD offices.

Chart 3-2: Monthly Average Maximum and Minimum Temperatures at Riverside Airport, 1998-2020 (Source: AgACIS)



Average annual temperatures for the service area over the last 22 years are shown in **Chart 3-3**. The trendline suggests a gradual increase in the average annual temperature.

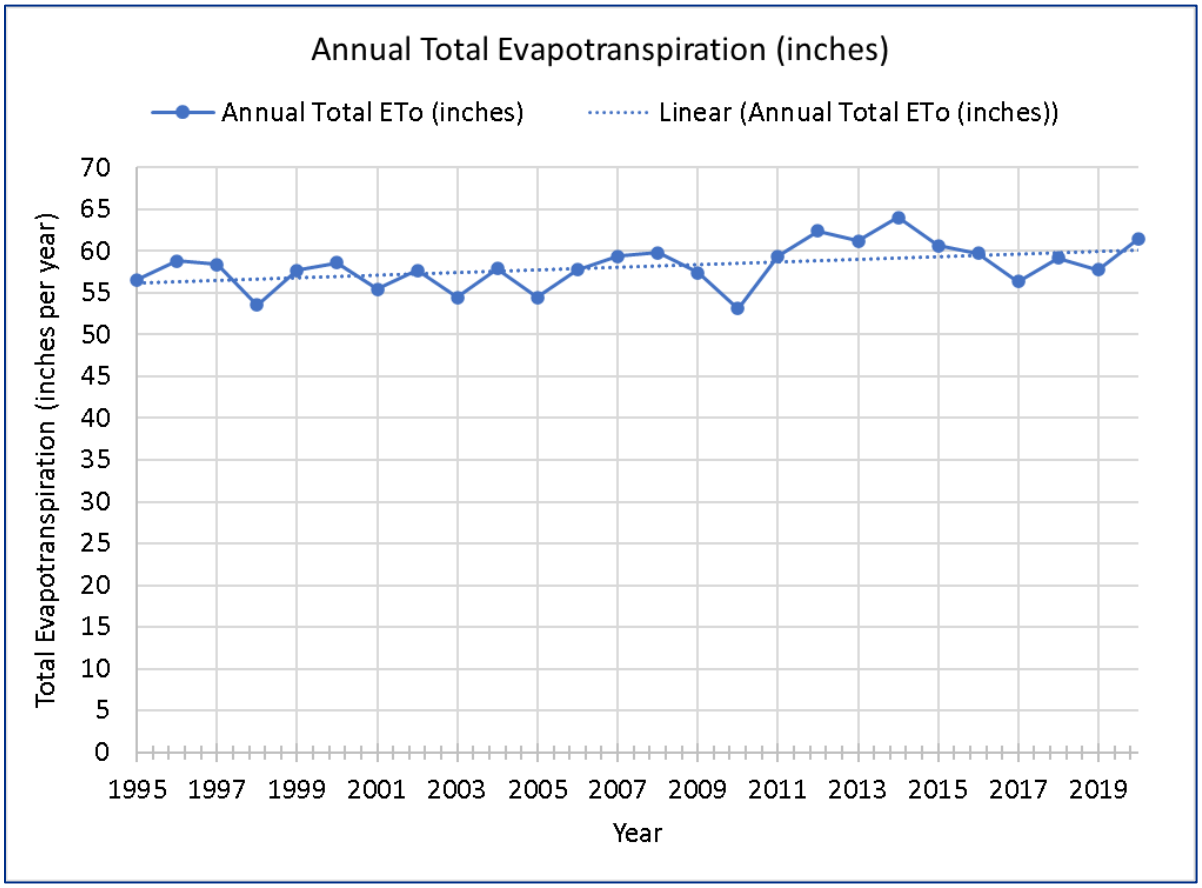
Chart 3-3: Annual Average Temperature at Riverside Airport, 1998-2020 (Source: AgACIS)



3.3.3 Evapotranspiration

Evapotranspiration (ET) is the combination of processes when water is lost from the soil surface by evaporation and lost from plants by transpiration. The evaporation power of the atmosphere is expressed by the reference crop evapotranspiration (ET_o) in units of depth of water over time (e.g., inches/day). The greater the ET rate, the more water needed to satisfy plant demands. Total annual ET_o values from 1995 to 2020 measured in proximity to the District service area are shown in **Chart 3-4**.

Chart 3-4: Total Annual Evapotranspiration (inches), 1995-2020 (Source: Valley Soil)



The annual average ET_o rate for this time period is 58.2 inches/year. The highest total annual ET_o was measured in 2014 at 64.0 inches and the lowest total ET_o was in 2010 at 53.1 inches. The linear trendline suggests an increase in ET_o over the time period.

3.3.4 Summary of Potential Climate Changes

Several sections of the Water Code have been revised since the 2015 UWMP cycle to require that water suppliers account for the impacts of climate change on water supplies and supply reliability in their 2020 UWMPs. Although the Water Code does not specify the technical nor general methods for how to consider climate change in UWMPs, DWR provides guidance on common approaches that can be used. Detailed discussions of the potential effects of climate change on District water demands, water supplies, and water reliability are provided in Chapter 4 – Water Use Characterization, Chapter 6 – Water Supply Characterization, and Chapter 7 –

Water Service Reliability Assessment. The following is a summary of the anticipated climate changes or scenarios within the District.

This discussion is guided by the "Urban Water Management Plan Guidebook 2020" and relies, in part, on the tools and resources available on the Cal-Adapt Website (https://cal-adapt.org/), which synthesizes volumes of downscaled climate change projections and climate impact research from California's scientific community. The default visualizations in the Cal-Adapt projections shown herein are based on the average values from a variety of models and are projections of future climate. They are not weather predictions and should not be treated as such.[1]

Climate projections cannot tell us what will happen on a given date in the future. But they can tell us what to expect from our future climate in general and how much more often (or less often) extreme events such as heat waves and heavy rainfall are likely to occur in the future. However, they cannot predict when those events will actually occur.

The Cal-Adapt climate models presented here make predictions for the period of 2006 to 2100 and recreate the historical climate for the period 1950 to 2005. Two future climate projections using medium and high greenhouse gas and aerosol emissions scenarios are presented here. These scenarios are known as Representative Concentration Pathways (RCP). Each RCP represents a standardized set of assumptions of humanity's trajectory in the coming years. Cal-Adapt does not provide data for a "low" greenhouse gas emissions scenario.

The Medium Emissions Scenario (RCP 4.5) represents a mitigation scenario where global carbon dioxide (CO_2) emissions peak by 2040 and then decline. Statewide, temperature is projected to increase 2-4 Celsius (°C) for this scenario by the end of this century.

The High Emissions Scenario (RCP 8.5) represents a scenario where CO_2 emissions continue to rise throughout the 21st century. Statewide, temperature is projected to increase 4-7 °C for this scenario by the end of this century.

[1] Weather is the behavior of the atmosphere over short periods, such as days and weeks. Climate is the long-term behavior of the atmosphere, and it is almost always expressed in averages—for example, average annual temperature, average monthly rainfall, or average water equivalent of mountain snowpack at a given time of year. In other words, climate is the statistics of weather.

Cal-Adapt's "Local Climate Change Snapshot" tool provides the following climate projections for temperature, precipitation, and wildfire for the District's service area. The City of Jurupa Valley was selected as the representative location of the District's service area.

As discussed further in Chapter 4, Western Municipal Water District (WMWD or Western) conducted an analysis of climate change data as part of Western's 2020 UWMP and provided the results to its member agencies, including RCSD, on April 22, 2021 (WMWD(a)). The source data were climate models gathered by DWR for water resources planning. Because Western's analysis does not provide a summary of anticipated climate changes for the service area, the following projections of temperature and precipitation trends from Cal-Adapt for the City of Jurupa Valley are included herein for reference. Said trends from Cal-Adapt of increasing temperatures and decreasing rainfall do not conflict with Western's analysis.

Cal-Adapt Temperature Projections

Overall temperatures are projected to rise in California during the 21st century. While the entire state will experience temperature increases, the local impacts will vary greatly. Four separate climate indicators are reported by Cal-Adapt for temperature changes: 1) Annual Average Maximum Temperature, 2) Annual Average Minimum Temperature, 3) Extreme Heat Days, and 4) Warm Nights.

Annual Average Maximum Temperature reports the average of all the hottest daily temperatures in a year. The most likely outcome and range of future projections of Annual Average Maximum Temperature in the Jurupa Valley area are shown in **Chart 3-5**.

Chart 3-5– Cal-Adapt Projections for Annual Average Maximum Temperature (°F)
(Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley)

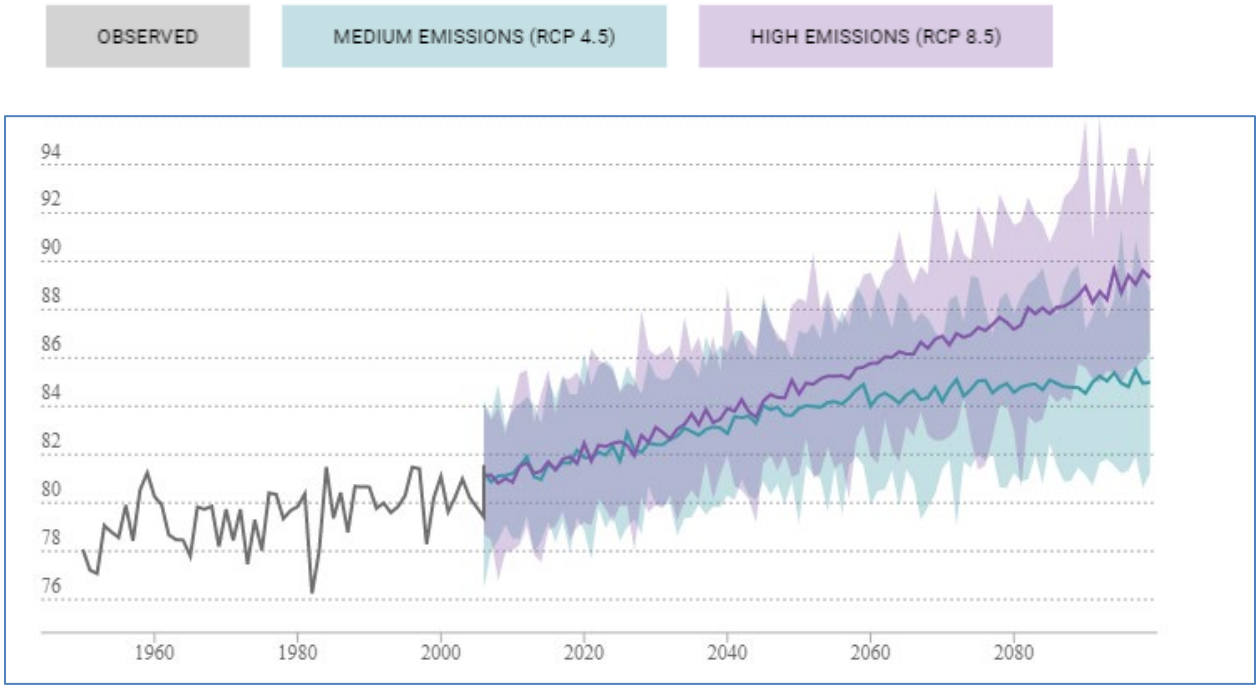


Table 3A below provides a summary of Cal-Adapt projections for Annual Average Maximum Temperature for baseline (1961-1990) and mid-century (2035-2064) time periods in the Jurupa Valley area.

Table 3A - Cal-Adapt Projections for Annual Average Maximum Temperature

Time Period	Change from Baseline	30-year Average	30-year Range
Baseline (1961-1990)	--	79.3 °F	78.9 - 79.7 °F
Mid-century (2035-2064)			
RCP 4.5	+4.5 °F	83.8 °F	81.6 - 86.3 °F
RCP 8.5	+5.4 °F	84.7 °F	82.1 - 87.0 °F

Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley.
RCP: representative concentration pathway; 4.5: medium emissions scenario; 8.5: high emissions scenario.

Annual Average Minimum Temperature reports the average of all the coldest daily temperatures in a year. Shown on **Chart 3-6** is the most likely outcome and range of future projections of Annual Average Minimum Temperature in the Jurupa Valley area.

Chart 3-6 – Cal-Adapt Projections for Annual Average Minimum Temperature (°F)
(Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley)

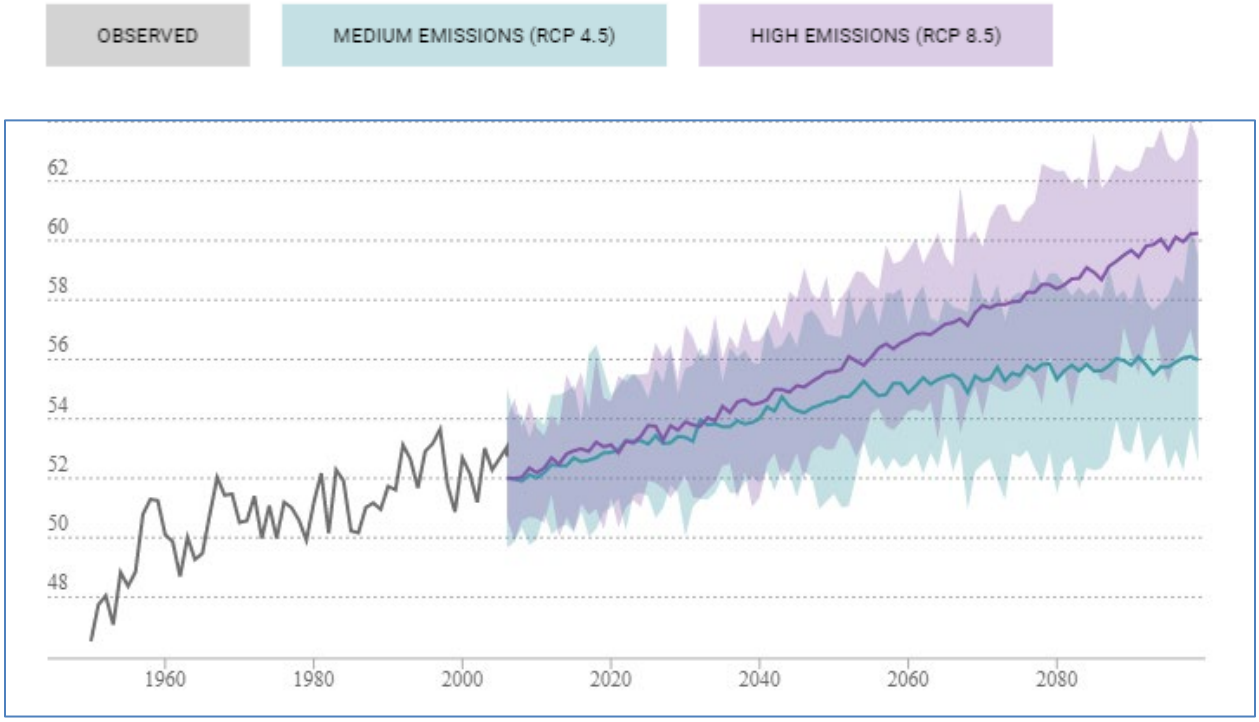


Table 3B below provides a summary of Cal-Adapt projections for Annual Average Minimum Temperature for baseline and mid-century time periods in the Jurupa Valley area.

Table 3B - Cal-Adapt Projections for Annual Average Minimum Temperature

Time Period	Change from Baseline	30-year Average	30-year Range
Baseline (1961-1990)	--	50.7 °F	50.4 – 50.9 °F
Mid-century (2035-2064)			
RCP 4.5	+3.9 °F	54.6 °F	52.9 – 56.0 °F
RCP 8.5	+4.9 °F	55.6 °F	53.9 – 57.2 °F

Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley. RCP: representative concentration pathway; 4.5: medium emissions scenario; 8.5: high emissions scenario.

Extreme Heat Days reports the number of days in a year when daily maximum temperature is above a threshold temperature of 104.1 °F. Shown in **Chart 3-7** is the most likely outcome and range of future projections of Extreme Heat Days in the Jurupa Valley area.[2]

Chart 3-7 – Cal-Adapt Projections for Number of Extreme Heat Days
(Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley)

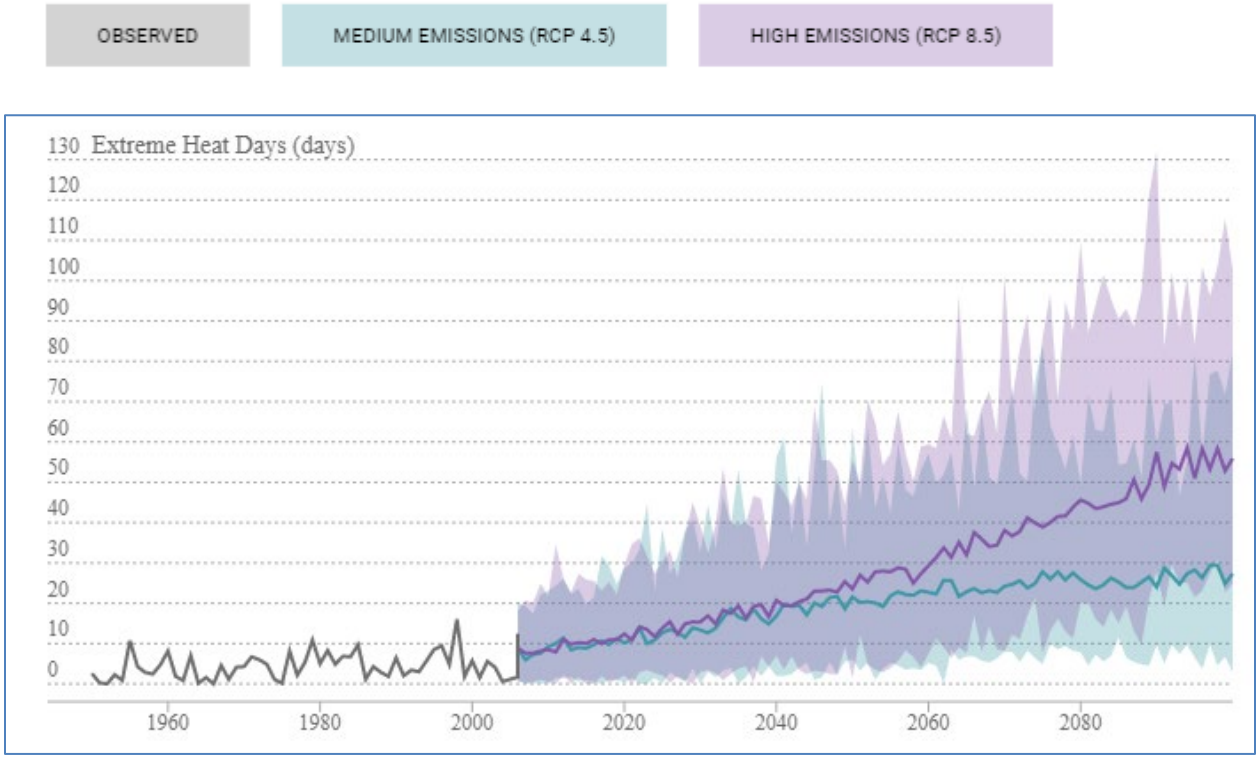


Table 3C below provides a summary of Cal-Adapt projections for Extreme Heat Days for baseline and mid-century time periods in the Jurupa Valley area.

[2] Note the threshold temperature used in Cal-Adapt is location specific. It is defined as the 98th percentile value of historical daily maximum/minimum temperatures (from 1961–1990, between April and October) observed at a location.

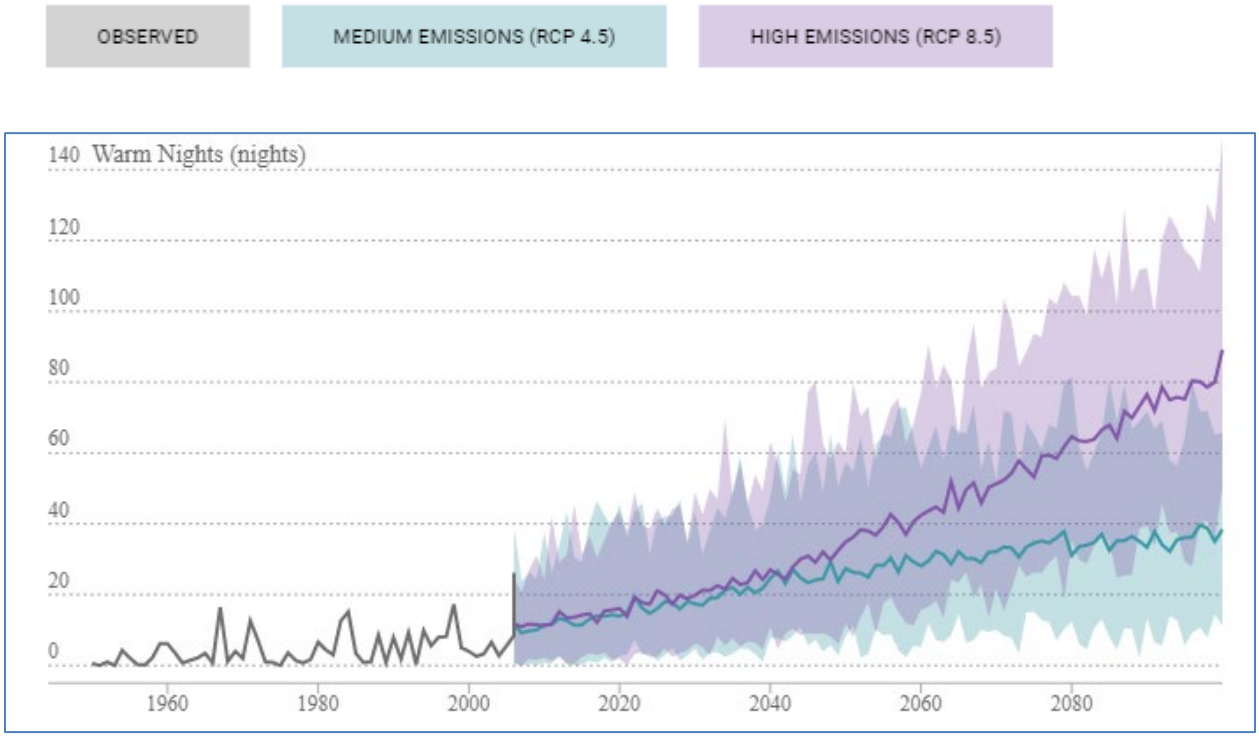
Table 3C – Cal-Adapt Projections for Number of Extreme Heat Days

Time Period	Change from Baseline	30-year Average	30-year Range
Baseline (1961-1990)	--	4 days	2 – 5 days
Mid-century (2035-2064)			
RCP 4.5	+16 days	20 days	13 – 45 days
RCP 8.5	+21 days	25 days	14 – 60 days

Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley
RCP: representative concentration pathway; 4.5: medium emissions scenario; 8.5: high emissions scenario.

Warm Nights reports the number of days in a year when daily minimum temperature is above a threshold temperature of 68.7 °F. Shown on **Chart 3-8** is the most likely outcome and range of future projections of Warm Nights in the Jurupa Valley area.[3]

Chart 3-8– Cal-Adapt Projections for Number of Warm Nights
(Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley)



[3] Note the threshold temperature used in Cal-Adapt is location specific. It is defined as the 98th percentile value of recorded daily maximum/minimum temperatures (from 1961–1990, between April and October) observed at a location.

Table 3D below provides a summary of Cal-Adapt projections for Warm Nights for baseline (1961-1990) and mid-century (2035-2064) time periods in the Jurupa Valley area.

Table 3D – Cal-Adapt Projections for Number of Warm Nights

Time Period	Change from Baseline	30-year Average	30-year Range
Baseline (1961-1990)	--	5 days	1 – 11 days
Mid-century (2035-2064)			
RCP 4.5	+21 days	26 days	14 – 46 days
RCP 8.5	+29 days	34 days	20 – 55 days

Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley
RCP: representative concentration pathway; 4.5: medium emissions scenario; 8.5: high emissions scenario.

Cal-Adapt Precipitation Projections

California's climate varies between wet and dry years. Research suggests that for much of the state, wet years will become wetter, and the dry years will become drier. Dry years are also likely to be followed by dry years, thus increasing the risk of drought. While California does not see the average annual precipitation changing significantly in the next 50-75 years, precipitation will likely be delivered in more intense storms and within a shorter wet season.

Three separate climate indicators are reported for precipitation changes: 1) Maximum 1-day Precipitation, 2) Maximum Length of Dry Spell, and 3) Annual Precipitation.

The Maximum 1-Day Precipitation amount for each year is the greatest amount of daily rain or snow (over a 24-hour period) for each year. **Chart 3-9** shows the most likely outcome and range of future projections of Maximum 1-day Precipitation in the Jurupa Valley area.

Chart 3-9 – Cal-Adapt Projections for Maximum 1-day Precipitation
(Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley)

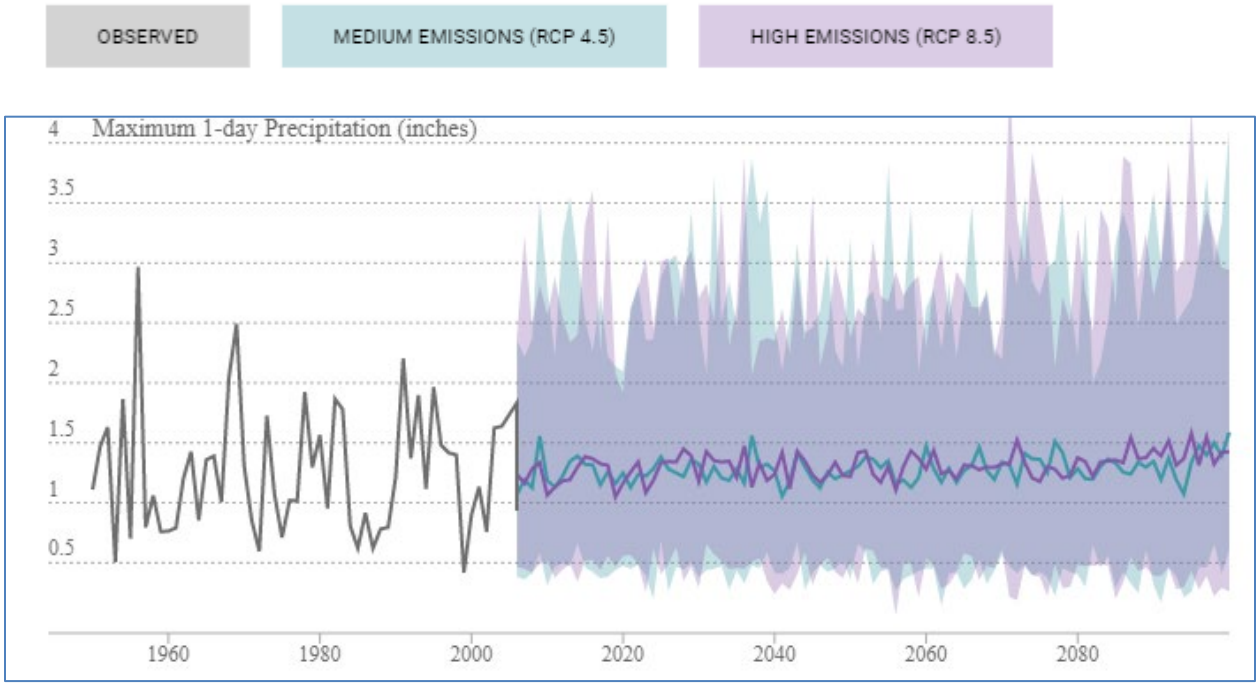


Table 3E, below provides a summary of Cal-Adapt's projections for Maximum 1-day Precipitation for baseline (1961-1990) and mid-century (2035-2064) time periods for the Jurupa Valley Area.

Table 3E– Cal-Adapt Projections for Maximum 1-Day Precipitation

Time Period	Change from Baseline	30-year Average	30-year Range
Baseline (1961-1990)	--	1.205 inches	1.014 – 1.359 inches
Mid-century (2035-2064)			
RCP 4.5	+0.058 inches	1.263 inches	1.038 – 1.426 inches
RCP 8.5	+0.079 inches	1.284 inches	1.063 – 1.516 inches

Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley
RCP: representative concentration pathway; 4.5: medium emissions scenario; 8.5: high emissions scenario.

Maximum Length of Dry Spell is the maximum length of dry spell for each year. In other words, the maximum number of consecutive days with precipitation less than one millimeter for each

year. **Chart 3-10** shows the most likely outcome and range of future projections of Maximum Length of Dry Spell in the Jurupa Valley area.

Chart 3-10 – Cal-Adapt Projections for Maximum Length of Dry Spell
(Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley)

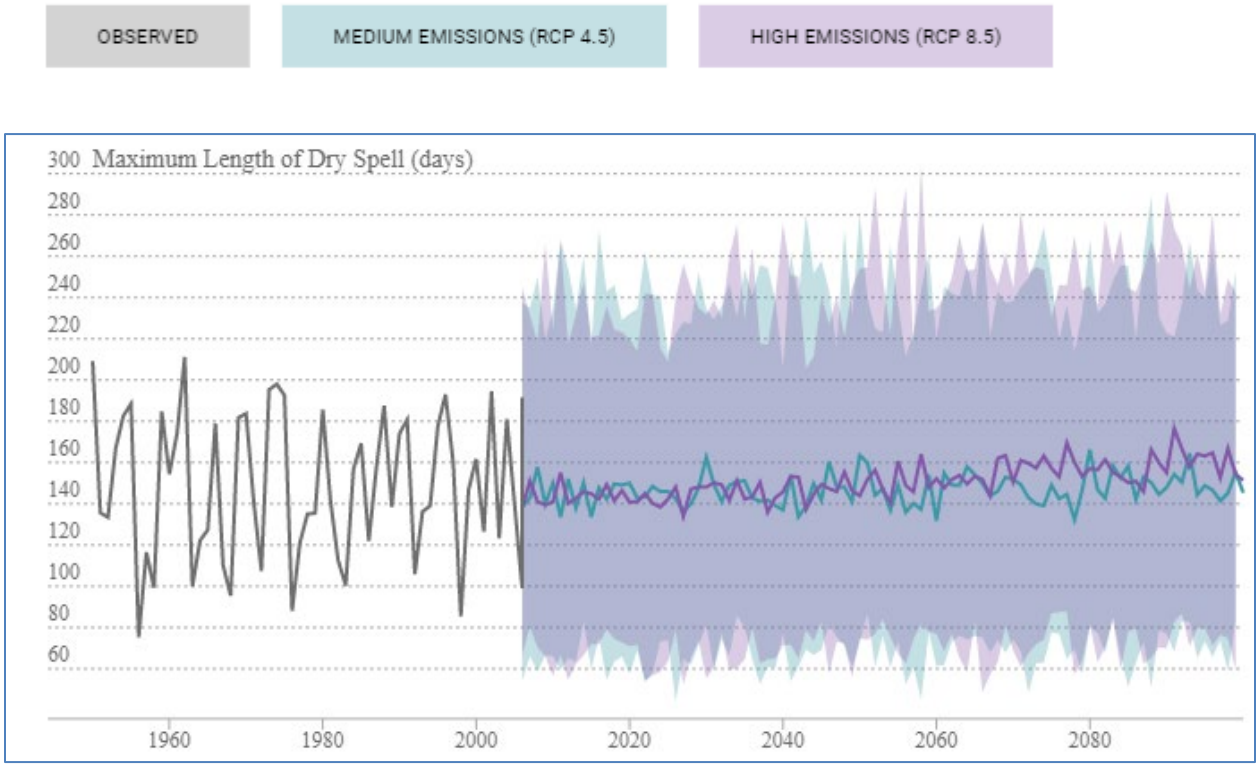


Table 3F, below provides a summary of Cal-Adapt projections for Maximum Length of Dry Spell for baseline and mid-century time periods in the Jurupa Valley area.

Table 3F – Cal-Adapt Projections for Maximum Length of Dry Spell

Time Period	Change from Baseline	30-year Average	30-year Range
Baseline (1961-1990)	--	138 days	123 – 156 days
Mid-century (2035-2064)			
RCP 4.5	+8 days	146 days	125 – 171 days
RCP 8.5	+10 days	148 days	117 – 181 days

Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley
RCP: representative concentration pathway; 4.5: medium emissions scenario; 8.5: high emissions scenario.

Annual Precipitation is the total precipitation projected for a year. **Chart 3-11** shows the most likely outcome and range of future projections of Annual Precipitation in the Jurupa Valley area.

Chart 3-11- Cal-Adapt Projections for Annual Precipitation
(Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley)

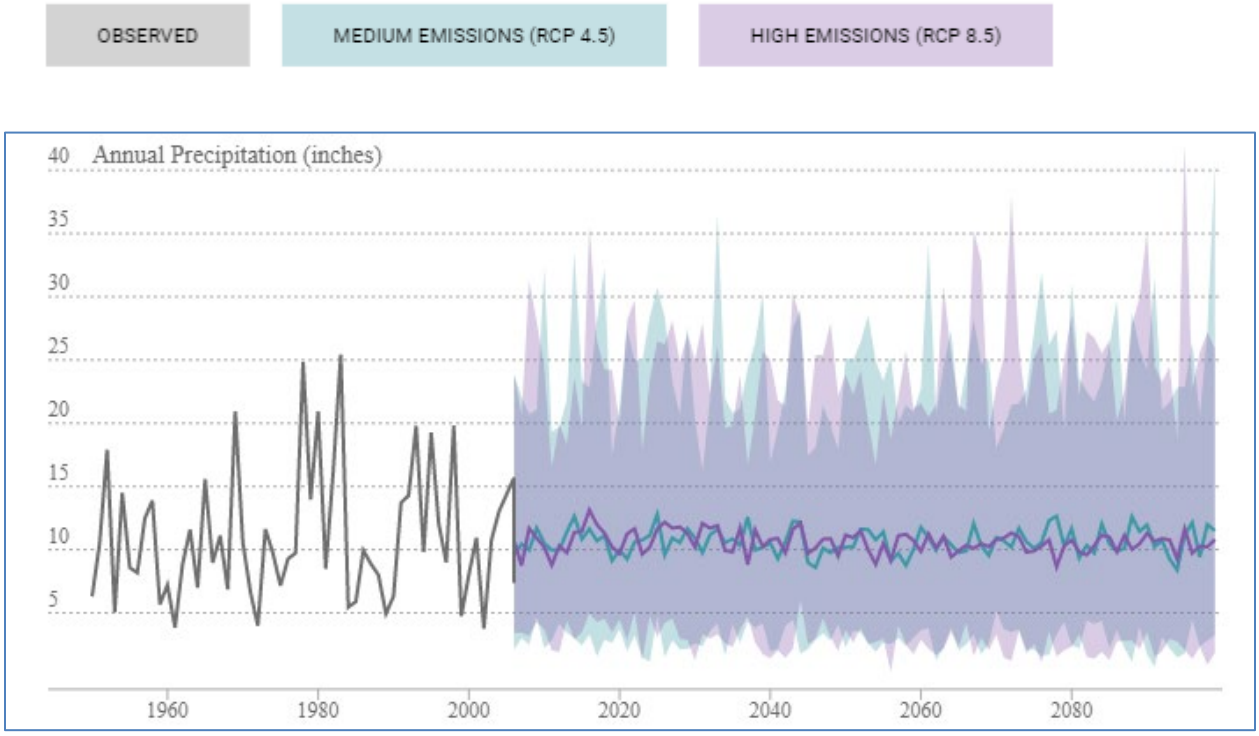


Table 3G, below provides a summary of Cal-Adapt's projections for Annual Precipitation for baseline (1961-1990) and mid-century (2035-2064) time periods in the Jurupa Valley area.

Table 3G - Cal-Adapt Projections for Annual Precipitation

Time Period	Change from Baseline	30-year Average	30-year Range
Baseline (1961-1990)	--	10.9 inches	9.4 – 12.0 inches
Mid-century (2035-2064)			
RCP 4.5	-0.4 inches	10.5 inches	8.1 – 13.8 inches
RCP 8.5	-0.4 inches	10.5 inches	7.9 – 14.2 inches

Source: Cal-Adapt, Local Climate Snapshot for Jurupa Valley
RCP: representative concentration pathway; 4.5: medium emissions scenario; 8.5: high emissions scenario.

Cal-Adapt Wildfire Projections

The frequency, severity, and impacts of wildfire are sensitive to climate change as well as many other factors, including development patterns, temperature increases, wind patterns, precipitation change, and pest infestations. Therefore, it is more difficult to predict exactly where and how fires will burn. Instead, climate models estimate increased risk of wildfires.

The Cal-Adapt information presented here (Annual Average Area Burned) can help inform at a high level if wildfire activity is likely to increase. However, this information is not complete—many regions across the state have no projections (such as regions outside combined fire state and federal protection responsibility areas), and more detailed analyses and projections are needed for local decision-making. These projections are most robust for the Sierra Nevada given model inputs. However, as we have seen in recent years, much of California can expect an increased risk of wildfire, with a wildfire season that starts earlier, runs longer, and features more extreme fire events.

The Cal-Adapt average of the area projected to be at risk to burning in a year for the modeled baseline (1961-1990) time period for the City of Jurupa Valley is approximately 42 acres. By the mid-century (2035-2064) time period, the annual average risk of wildfire is projected to decrease to 8.5 acres in the City of Jurupa Valley. The areas within and near the District service area that are most at risk of wildfire are the Jurupa Mountains and Pedley Hills. Also, brush fires have taken place along the Santa Ana Riverbed which borders the District to the southeast (JVGP, p. 8-16).

Uncertainty of Cal-Adapt Projections

Climate projections provided by Cal-Adapt are approximations of future climate, but as with any statement about the future, there is no way to be certain they are accurate. One source of uncertainty in future climate projections is human greenhouse gas emissions. Projected climate data may not prove to be accurate if the actual emissions pathway differs from the scenarios used to make the projections.

Another source of uncertainty in climate projections is the fact that different climate models—the tools used to simulate the climate system and produce future climate data—may produce different outcomes. There are more than 30 global climate models developed by climate

modeling centers around the world, and they have different ways of representing aspects of the climate system. In addition, some aspects of the climate system are less well understood than others. Climate scientists are constantly working to improve the theories of the climate system and its representation in climate models. In the meantime, one way to account for model differences is to look at projections from as many different models as possible to get a range of possible outcomes. An average of the values can be taken across the different models, and this average value is a more likely outcome than the value from any single model.

It is important to note that here the term "uncertainty" is being used in the scientific sense, to acknowledge that there is a range in possible future outcomes. That climate change is occurring and is caused by human activity is the consensus of the overwhelming majority of scientists engaged with the issue. What is less certain is the extent to which the climate will change in the future, and precisely how the changes will affect natural and human systems.

3.4 SERVICE AREA POPULATION AND DEMOGRAPHICS

3.4.1 Service Area Population

The District currently serves a population of approximately 36,827 people, which does not include the portion served by West Valley Water District. The current District population was generated using DWR's online Population Tool, which was developed specifically for UWMPs and updated for the 2020 cycle. The Population Tool calculates current and past populations using U.S. Census year data (1990, 2000, 2010) with the total number of meters from the RCSD Annual Reports to the SWRCB to calculate a person-per-connection ratio.[4] To calculate the 2020 population, the total number of connections is entered (6,335 meters) and the Population Tool multiplies that by a calculated person-per-connection ratio of 5.18. Results of the Population Tool are provided in **Appendix E**.

The current and future projected population of the District are shown in **Submittal Table 3-1**.

[4] U.S. Census data from the 2020 Census was not available in time for use in the DWR Population Tool.

Submittal Table 3-1 Retail: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	36,827	40,542	51,303	54,996	58,955	63,199
NOTES: 2020 population from DWR Population Tool. Average annual growth rate of 1.4% (from U.S. Census Bureau) with addition of 7,842 persons in 2030 from estimated completion of the Rio Vista Specific Plan (1,307 DU and 6 people/DU). Mid-range density buildout estimated by 2049 at 66,100 persons, which includes 20% increase in people/unit for certain residential land uses to account for potential future ADUs.						

The population projections from 2025-2045 that are shown in Submittal Table 3-1 were calculated using the City's current land use plan, the average annual growth rate for the City from 2009-2019 from U.S. Census Bureau data, and two persons per dwelling unit factors including a higher factor to account for additional potential accessory dwelling units (ADUs). ADUs are discussed below in Section 3.4.2.

U.S. Census Bureau data from 2009 to 2019 suggests the annual population growth rate for the City of Jurupa Valley is 1.4% over that time period (USCB). U.S. Census Bureau "Quickfacts" 2015-2019 data estimates 4.21 persons per dwelling unit and the DWR Population Tool estimates 5.81 persons per dwelling unit for 2020. The average of the two sources is 5 persons per dwelling unit, which is used for the population projection of residential land uses that do not typically accommodate ADUs.

The Rio Vista Specific Plan is a significant housing project that may be developed and incorporated into the District's service area by 2030 (see Section 3.5 below for more details). The project proposes 1,307 dwelling units. Conservatively assuming 6 persons per dwelling unit, which is a 20% increase to account for potential ADUs that may be built, the population projection in Submittal Table 3-1 assumes 7,842 persons are added to the District population by 2030.

The buildout population for the District is calculated assuming full buildout of the City of Jurupa Valley's current General Plan Land Use Map (updated March 2021) and the District's current water service area boundary. See buildout calculations in **Appendix F**. The City's residential land use types have a minimum and maximum allowable density and typically, development

occurs at the mid-point between the minimum and the maximum. Therefore, this plan estimates mid-range density and maximum density buildout scenarios. The mid-range density population is estimated at 66,100 persons and the maximum density buildout population is estimated at 83,400 persons taking into account 20% more people for the residential land use types that allow ADUs (see Section 3.4.2) (Appendix F).

Using the calculated growth rate of 1.4%, 5 or 6 persons per dwelling unit (depending on the land use type), the additional estimated population from the Rio Vista project, a mid-range buildout population of 66,100 persons, and a starting 2020 population of 36,827 persons, the portion of Jurupa Valley that is within RCSD's service area may achieve mid-range density buildout of 66,100 persons by year 2049.

3.4.2 Accessory Dwelling Units

Accessory dwelling units (ADUs) are also known as "granny flats," second units, or in-law units. They can be for one or more people and can be detached, attached, existing space converted into an independent living unit, or a Junior ADU contained entirely within an existing or proposed single-family residence. ADUs are being encouraged by the State to increase residential infill and help meet the increasing statewide demand for affordable housing. Because the ADU laws (Gov. Code 65852.2) change each year, readers should refer to the California Department of Housing and Community Development (www.hcd.ca.gov) for the latest changes to the law.

An increase in ADUs in existing residential areas may densify them more than what had been planned for previously by the District. Particularly in areas that are considered currently "built-out" with infrastructure that is already sized at "ultimate" design capacity, an increase in ADUs may trigger capital projects to upsize existing pipes or replace degrading infrastructure earlier than expected.

RCSD and WEBB met with the City of Jurupa Valley Planning Department staff for the purposes of this UWMP. As a result, the City of Jurupa Valley shared that between 2016 and 2020, they have received two building permit applications for attached ADUs within the District's boundary: one in 2019 and one in 2020. Both were applications to convert existing garage space (Personal Communication, A. Tam, 4/13/21).

The Jurupa Valley City Council adopted Ordinance No. 2020-18 on November 5, 2020 to amend the Zoning Ordinance pertaining to ADUs and junior ADUs. It is hard to gauge how the ADU laws will play out in the RCSD service area. Residential properties in Jurupa Valley tend to have the space needed for attached and detached ADUs. However, several census block groups within Jurupa Valley have median household incomes that meet the threshold for "disadvantaged" and "severely disadvantaged" communities (see Section 3.4.4, below).

For the planning purposes of this UWMP, an estimate has been made assuming each dwelling unit has 5 persons and half of the residential properties where ADUs are allowed may develop an ADU and each ADU would have 2 persons, which results in a 20% population increase. Therefore, the potential future impact of ADU's in residential areas is accounted for in two ways: (1) the number of people per dwelling unit was increased by 20%, from 5.0 to 6.0, but only for those residential land uses with densities up to and including medium high density residential (Appendix F); (2) the water demand projections in Chapter 4 are increased 20% for the same residential land uses. It is assumed ADUs are not feasible for high density residential to highest density residential land uses. The 20% increase in population for certain land use types that allow ADUs is embedded in the population projections in Submittal Table 3-1.

The District plans to address ADUs in the future to ensure consistency with the State regulations, including when a separate connection is required and to correctly assess and collect appropriate fees.

3.4.3 Other Social, Economic, and Demographic Factors

The City of Jurupa Valley (City) encompasses approximately 45 square miles in western Riverside County. According to U.S. Census Bureau "QuickFacts" data, the City has a 2019 population estimate of 109,527 people and a 2019 median household income of $70,642 (USCB). According to the City's 2017 General Plan, Jurupa Valley has a large blue-collar population with most employees working in the transportation, warehousing, and retail trade and manufacturing industries (p. 11-3). The City is comprised of nine distinct communities; three of which are in the District (i.e., Rubidoux, Belltown, and Crestmore Heights). Rubidoux is the largest and most densely developed of the nine communities with a variety of land uses (*ibid,* p. 9-3); however, unemployment rates are higher in this area compared to county and state averages (*ibid,* p. 11-3). The Belltown area is largely suburban or small town with

equestrian trails, while Crestmore Heights is mostly semi-rural and low density in character (*ibid,* p. 2-1).

Land use in the City is predominantly single-family residential consisting of a mix of medium- and low-density units, with concentrations in the older neighborhoods of low-cost rental housing (ibid, p. 5-40). The City strives to maintain a small-town feel and the equestrian lifestyle, while also incorporating a mix of retail commercial, office, and industrial uses. The City in general is currently experiencing growth in residential and industrial uses. The City has potential for significant growth and redevelopment in all urban land use types, especially historic town centers.

RCSD's service area consists mainly of single-family residential customers, but also includes some commercial, industrial, institutional, and landscape connections. The number of potable water meters from 2016 to 2020 are shown in **Table 3H.** Over this time period, the number of service connections for single-family residential have consistently accounted for 94% of all customer meters. Service connections for multi-family residential customers make up 6% of all meters, commercial/institutional meters are 0.3%, and industrial has been 0.03% of the total.

Table 3H - RCSD Metered Connections, 2016-2020

Customer Meter	2016	2017	2018	2019	2020
Single-Family Residential	6,115	6,165	6,265	5,548	5,558
Multi-Family Residential	385	385	385	385	385
Commercial /Institutional	20	20	20	384	389
Industrial	2	2	2		
Potable Hydrants	-	-	-	4	3
Non-Potable	3	3	3	13	10
Total Active Connections	**6,525**	**6,575**	**6,675**	**6,334**	**6,345**

Source: RCSD *Large Water System Annual Report to the Drinking Water Program [Section 116530 Health & Safety Code]* for years ending December 31, 2016-2020.

3.4.4 Disadvantaged Communities

U.S. Census data is gathered at three levels of precision: Census Designated Place (CDP), Census Tracts, and Census Block Groups. CDPs are at the broadest level for unincorporated

areas. Census Tracts are made up of Block Groups. According to U.S. Census data collected from 2014 to 2018 by DWR's Disadvantaged Communities (DAC) Mapping Tool, some Community Tracts and Block Groups within the RCSD service area qualify as "disadvantaged" and "severely disadvantaged" as shown in **Figure 3-4 – Disadvantaged Community by Census Block**.

California Code of Regulations Section 596.1(b)(2) defines a "disadvantaged community (DAC)" as: "A community with an annual median household income (MHI) that is less than 80 percent of the statewide annual MHI." The statewide MHI according to the Census American Community Survey (ACS) 2014-2018 dataset is $71,228; thus, 80 percent and 60 percent of that value represents the DAC and Severely DAC (SDAC) thresholds, respectively. Therefore, a community where the MHI is less than $56,982 meets the DAC threshold and a MHI less than $42,737 meets the SDAC threshold (ACS).

The DWR DAC Mapping Tool is an online reference to assist local agencies to evaluate DAC status, using the definition provided by Proposition 84 Guidelines. Having areas in its service area that qualify as a DAC opens the District to the possibility of applying for State grant funding to assist with the implementation, planning, and DAC involvement efforts through Proposition 1 (Water Quality, Supply, and Infrastructure Improvement Act of 2014), and potentially grant funding through Proposition 84, Chapter 2 (Integrated Regional Water Management). In the event RCSD proceeds with either grant application process, additional research beyond what is provided herein per the grant requirements may be necessary.

3.5 LAND USES WITHIN SERVICE AREA

The District does not have land use authority within its service area; rather, that authority rests with the City of Jurupa Valley. The City incorporated on July 1, 2011 and adopted its first locally prepared General Plan on September 7, 2017. The best guide for future land use within any city or county is that jurisdiction's General Plan Land Use Element; thus, as mentioned previously, the basis for land use and population projections herein is the current General Plan Land Use Map (updated March 2021).

Pursuant to Water Code Section 10631(a), RCSD sent a letter to the City of Jurupa Valley on February 4, 2021 requesting a meeting to coordinate with the City on the most appropriate

land use information to use for water resources planning (a copy of said letter is located in Appendix C). RCSD and WEBB met with the City on March 11, 2021 to coordinate on land use information specifically for the UWMP. The District did not meet with San Bernardino County because it does not serve water to that area and is in the process of detaching the area from its service area. A summary of said coordination meeting with Jurupa Valley is below:

- RCSD and WEBB met via teleconference with the City of Jurupa Valley on March 11, 2021. Attendees included: Annette Tam, Principal Planner for the City of Jurupa Valley; Ted Beckwith, Director of Engineering from RCSD; and Autumn DeWoody, Senior Environmental Analyst and Brad Sackett, Senior Engineer from WEBB. As a result of the meeting, the City provided the current land use plan (current as of March 2021), data on recent ADU applications, and information on large projects planned within and adjacent to the District.

The City is currently implementing its 5th-Cycle Housing Element Housing Program, which addresses the City's regional housing needs from 2013 to 2021. On June 4, 2019, the City's 5th-Cycle Housing Element was certified by the State. The certification was contingent upon the City's inclusion of a Housing Program that established a zoning implementation plan to rezone at least 16 acres with minimum densities of 25 dwelling units per acre anywhere suitable within the City. This involved several General Plan Amendments and Zone Changes. The land use map used for this UWMP which includes these General Plan Amendments to address the City's regional housing needs allocation is shown in **Figure 3-5 – Land Use Designations.**

There are three areas within the District that are undeveloped/underdeveloped that are anticipated to develop in the next 5-20 years; this includes the Agua Mansa Commerce Park Specific Plan, Rio Vista Specific Plan, Emerald Meadows Ranch Specific Plan, and Shadow Rock (**Figure 3-6 – Future Large Developments)**.

Agua Mansa Commerce Park Specific Plan

The Agua Mansa Commerce Park is a fully entitled 4.4 million square foot logistics center on 291 acres formerly used by the Riverside Cement Plant. Construction of Phase I has commenced consisting of five buildings and 3.6 million square feet of warehouse buildings, and 70 acres of open space. The District prepared a Water Supply Assessment (WSA) for the project dated December 2016 pursuant to Senate Bill (SB) 610. This WSA estimated the water

demand of the project to be 50 AF per year (RCSD(a), p. II-1), which is included in the water demand projections in Chapter 4 beginning in 2025. The Specific Plan area was annexed into the District in 2020. Because this is not a residential project, this project does not contribute to the population projections in Submittal Table 3-1.

Rio Vista Specific Plan

The Rio Vista Specific Plan currently proposes 1,307 dwelling units on 917 acres, with a 14-acre school site and 600 acres of parks and open space. If entitled, this plan would supersede and replace the existing Rio Vista Specific Plan previously adopted by the County prior to City incorporation. The District prepared a WSA for the project dated July 2018 pursuant to SB 610. This WSA determined that the water use for the project is 2,000 AF per year (RCSD(b), p. II-1), which is included in the water demand projections in Chapter 4 beginning in 2030. The Specific Plan area is currently vacant and within the District's sphere of influence; annexation into the District would be required. Because this has a residential component, this project's proposed additional population was added to the population projections in Submittal Table 3-1 beginning in 2030.

Emerald Meadows Ranch Specific Plan

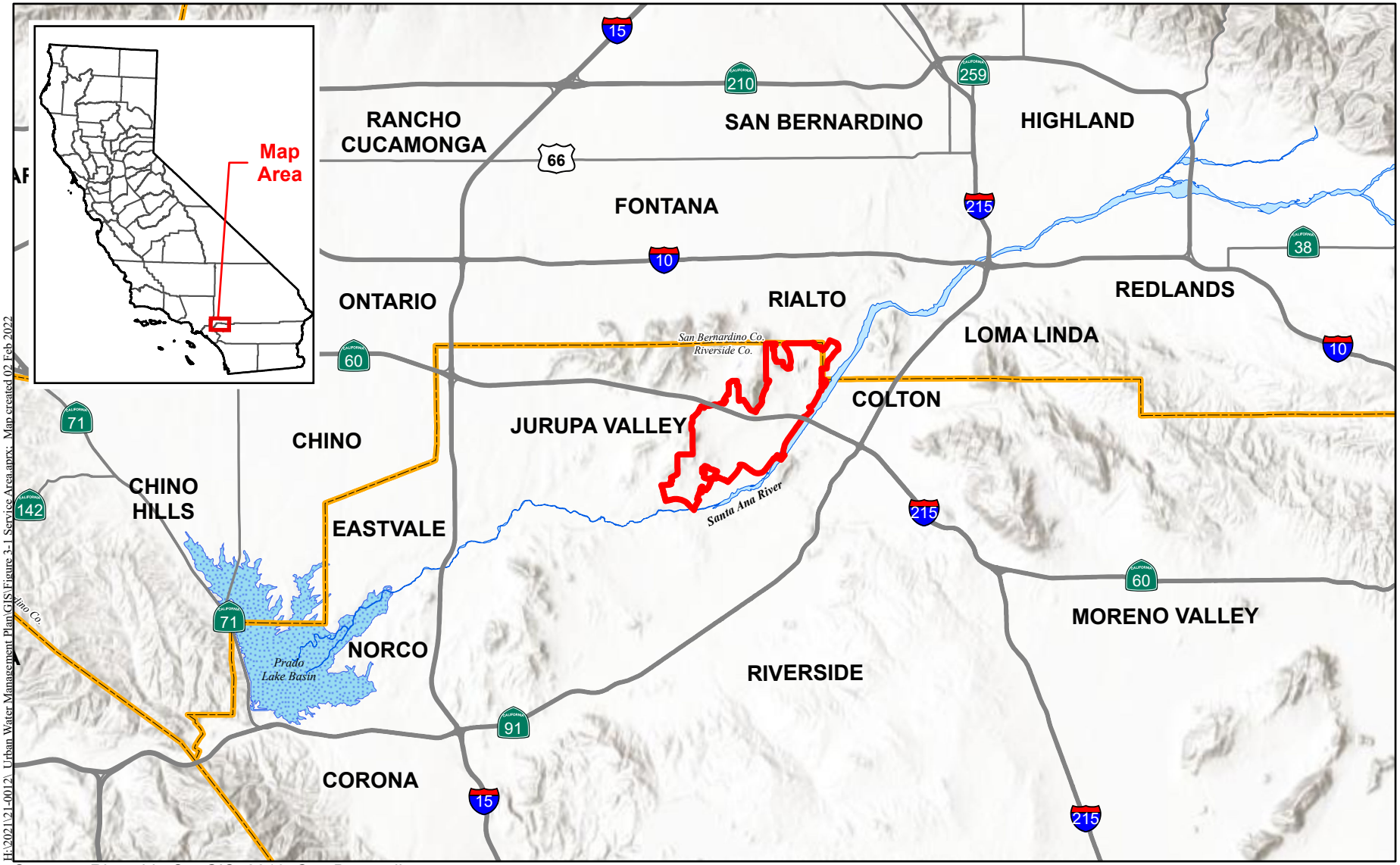
The Emerald Meadows Ranch Specific Plan was adopted in 2006 by the County Board of Supervisors and provides for various densities of residential neighborhoods, school, park, and church sites, and a commercial site at Rubidoux Blvd. and the State Route 60 Freeway. To date, the City Council has not approved changes to the 2006 land use plan. The Specific Plan property is currently vacant and within the District's service area. Because the land uses of this Specific Plan are already shown in the City's land use plan, the population projections in Submittal Table 3-1 include the potential population of this Specific Plan beginning in 2025.

Shadow Rock

The Shadow Rock project (formerly, the Highland Park project) is a residential development currently under construction partly within RCSD's service area and partly within JCSD's service area. The portion of the project within RCSD is approximately 127 acres of previously vacant land with no prior water demand that is slated for approximately 275 homes and a projected population of 1,064 residents. A Plan of Services dated May 4, 2018 estimates this water

demand at 216 AFY (POS, 2018). The water demand and population projections herein include this project beginning in 2025.

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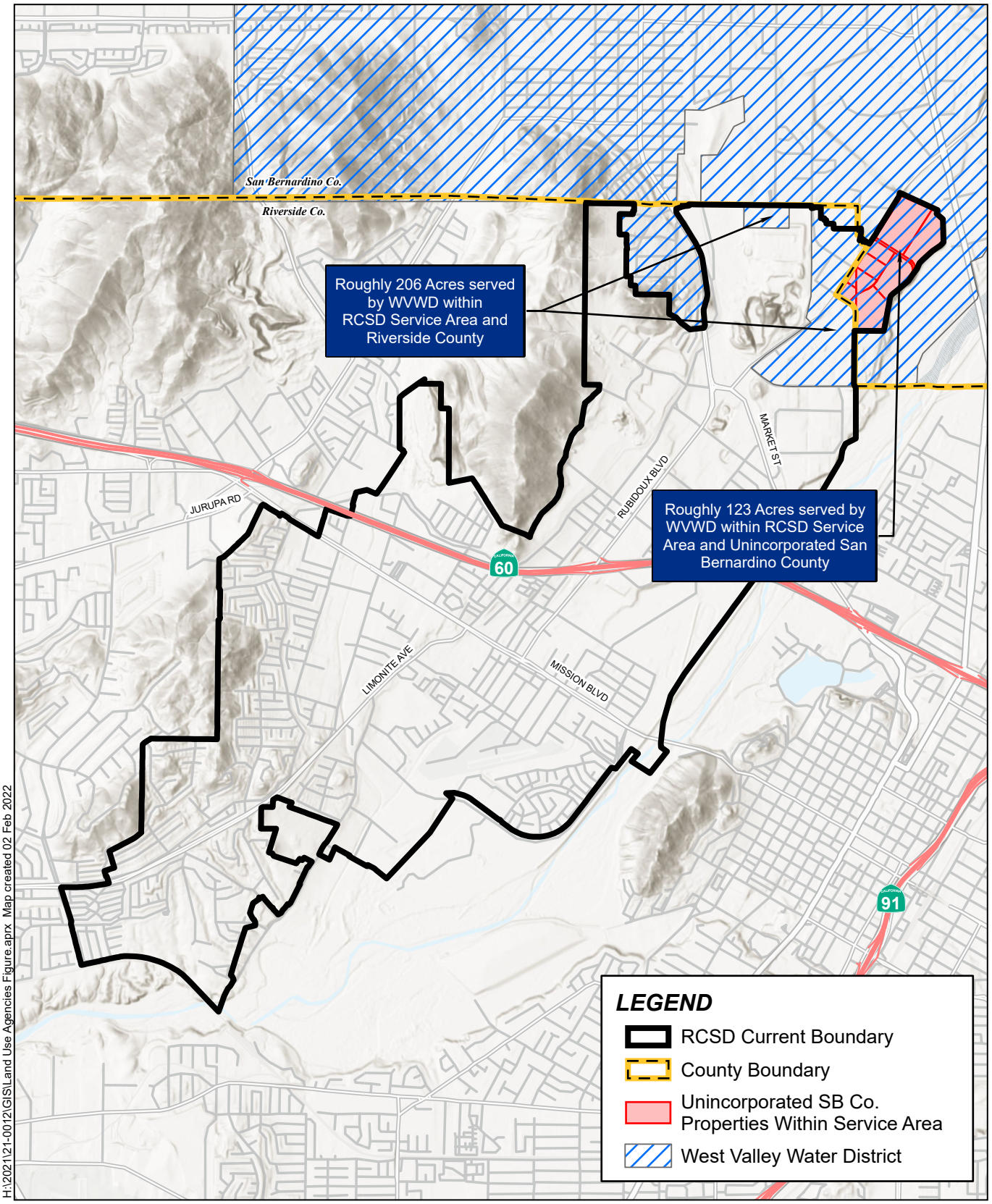
H:\2021\21-0012_Urban Water Management Plan\GIS\Figure 3-1 Service Area.aprx; Map created 02 Feb 2022

Sources: Riverside Co. GIS, 2019; San Bernardino
USDA NAIP, 2020

0 5 10 Miles

Figure 3-1 Vicinity Map

RCSD Urban Water Management Plan 2020



Sources: RCSD 2015; San Bernardino Co. GIS, 2021; USDA NAIP, 2016.

0 1,500 3,000 4,500 Feet

Figure 3-2 Water Service Area

RCSD Urban Water Management Plan 2020

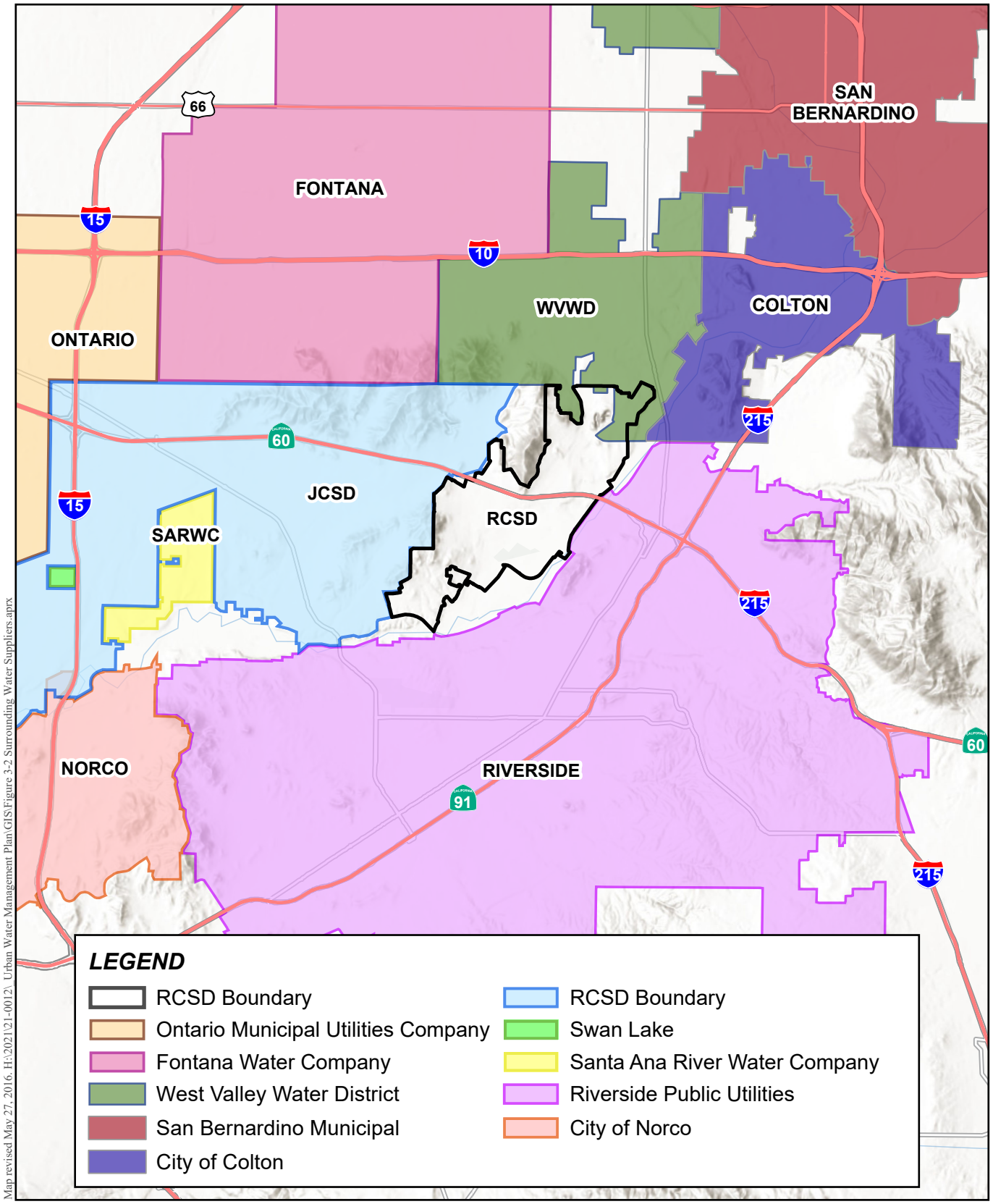
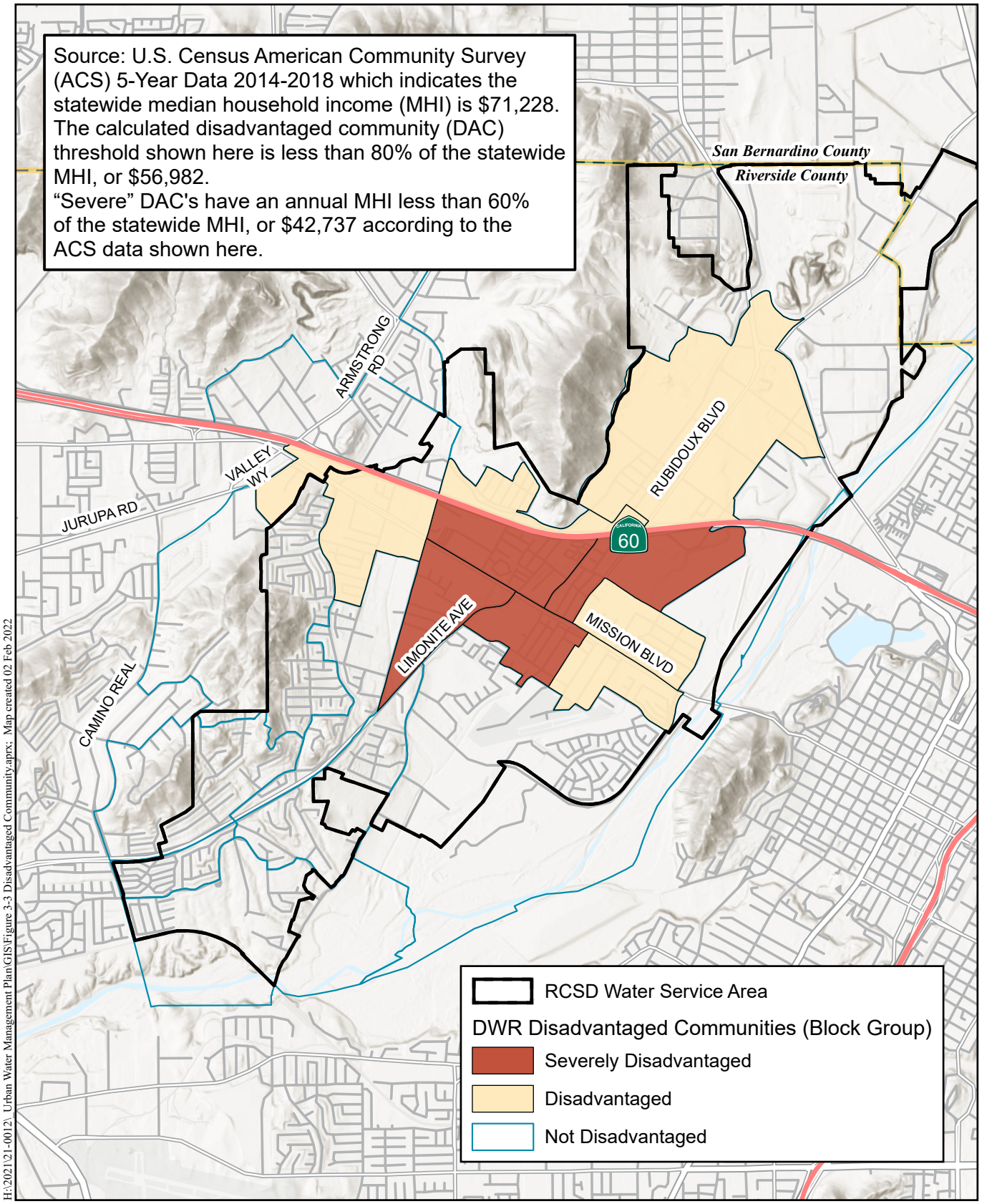


Figure 3-3 Surrounding Water Providers

RCSD Urban Water Management Plan 2020

0 2 4 Miles

ALBERT A. WEBB ASSOCIATES

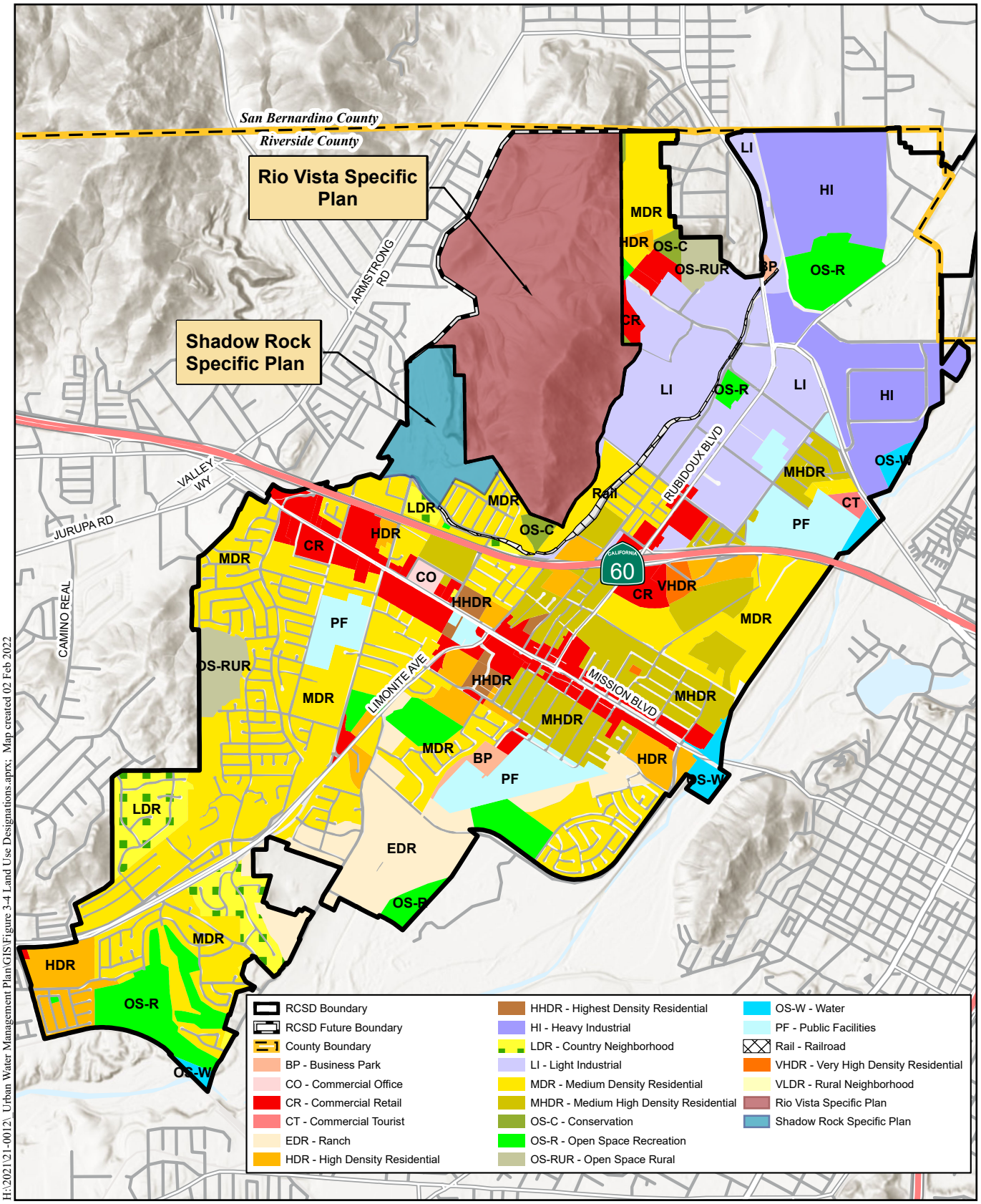


H:\2021\21-0012_Urban Water Management Plan\GIS\Figure 3-3 Disadvantaged Community.aprx: Map created 02 Feb 2022

Sources: Calif. Dept. Water Res., 2021; US Census Bureau, 2018; Riverside Co. GIS, 2021.

0 4,000 8,000 Feet

Figure 3-4 Disadvantaged Communities
RCSD Urban Water Management Plan 2020



H:\2021\21-0012_Urban Water Management Plan\GIS\Figure 3-4 Land Use Designations aprx; Map created 02 Feb 2022

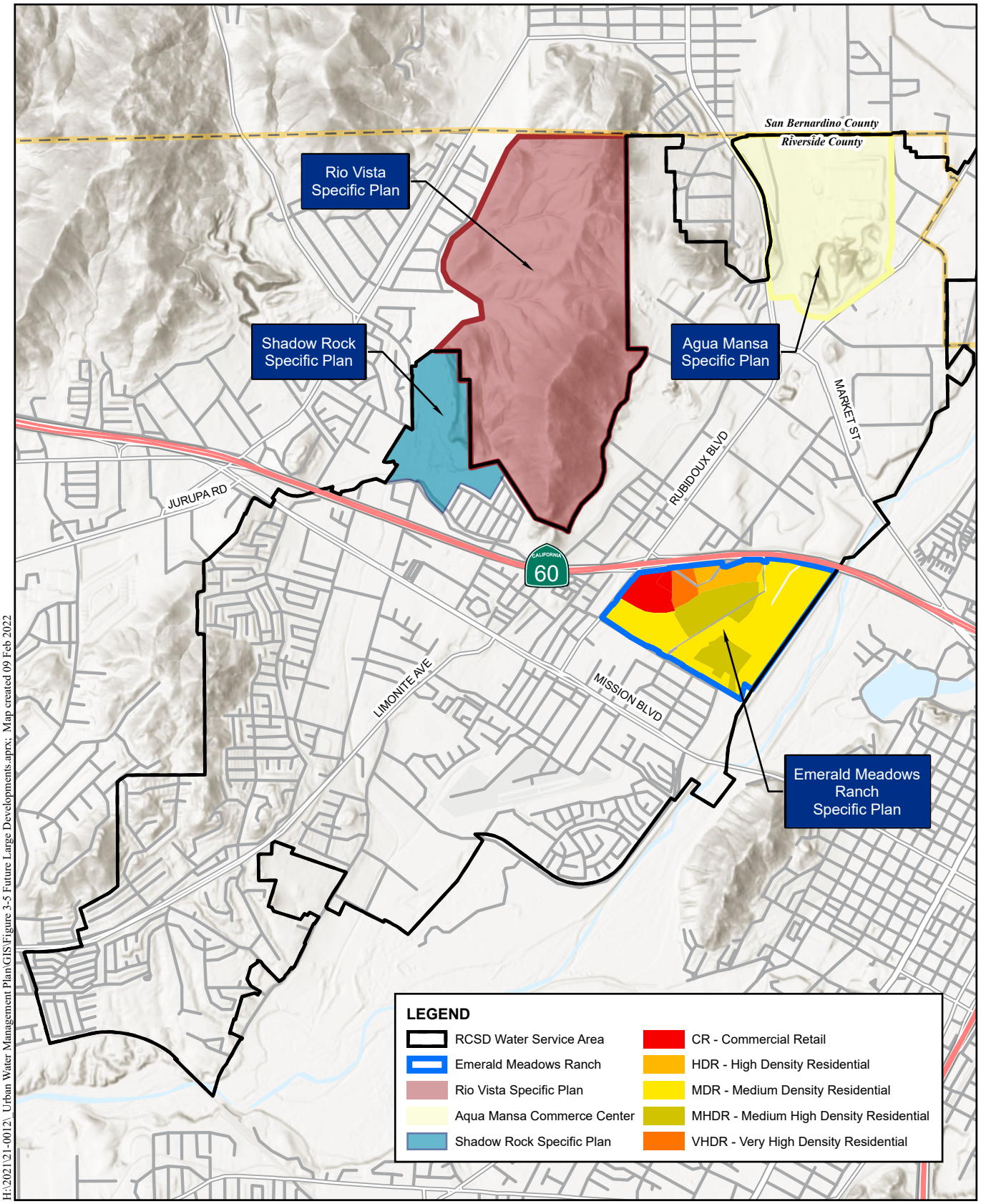
Sources: City of Jurupa Valley, 2021;
Riverside Co. GIS 2021

0 3,000 6,000 Feet

Figure 3-5 Land Use Designations

RCSD Urban Water Management Plan 2020

ALBERT A. WEBB ASSOCIATES



H:\2021\21-0012_Urban Water Management Plan\GIS\Figure 3-5 Future Large Developments.aprx; Map created 09 Feb 2022

Sources: City of Jurupa Valley, 2021; Riverside Co. GIS 2021; NAIP, 2016.

0 2,000 4,000 Feet

Figure 3-6 Future Large Developments

RCSD Urban Water Management Plan 2020

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CHAPTER 4 WATER USE CHARACTERIZATION

This chapter describes how the water that is produced, purchased, and sold within the District is then used, and how water is projected to be used through the year 2045. Demands for potable water and non-potable water are accounted for separately.

4.1 PAST WATER USE

The District provides potable water to its urban retail customers and non-potable irrigation water for parks, school fields, and construction. Up until 2017, RCSD supplied potable water to a neighboring agency, JCSD. The District's metered water deliveries from 2015 to 2020 are shown in **Table 4A**. The District reports single-family residential and multi-family residential combined, and commercial, institutional (governmental), and industrial are combined as well. Water lost during the process of distribution due to leaks, metering inaccuracies, and theft are reported as water losses. Water use values are reported each year by RCSD to the State Water Board.

Table 4A RCSD Metered Water Deliveries (AF), 2016-2020

Water Use Sectors	2015[1]	2016	2017	2018	2019	2020[4]
Single-Family Residential & Multi-Family Residential	3,151	2,942	3,213	3,313.2	3,321.1	3,623
Commercial, Institutional, and Industrial	995	929	947	981.5	962.3	969
Hydrant Meters	-	-	-	-	-	83
Other (District facilities)	0	0	0	3.9	0	4
Potable Distribution System Losses[2]	1,187	439.8	553.7	502.4	319.5	91
Potable Water Sold to Other Agencies[3]	1,837	2,029	2,323	0	0	0
Total Potable Demand (AF)	**7,170**	**6,340**	**7,037**	**4,801**	**4,603**	**4,770**
Non-Potable Irrigation	631	0	0	410.5	0	382
Non-Potable Hydrants	-	-	-	-	-	4
Non-Potable Losses	-	-	-	-	-	31

Source: RCSD *Large Water System Annual Report to the Drinking Water Program [Section 116530 Health & Safety Code]* for years ending December 31, 2016-2019.
[1] From RCSD 2015 UWMP, p. 4-2.
[2] Source: RCSD *Validated Water Audit Report* for CY 2016-2019.
[3] Sales to Jurupa Community Services District stopped in 2017.
[4] Source: RCSD meter data from CY 2020.
AF = acre-feet

Table 4A suggests that residential customers continue to use the majority of water in the District—from 40% of total water used in 2015 to 72% of total demand in 2019—and that the number of acre-feet used by residential customers has been relatively consistent over this time. Commercial/Institutional/Industrial has consumed on average 16% of total water use, and water losses constituted 9% of total use on average between the years of 2016 and 2019. Before sales of water to JCSD stopped at the end of 2017 due to water quality concerns, that demand was approximately 30% of the District's water demand between 2015 and 2017.

4.2 CURRENT WATER USE

As of December 31, 2020, RCSD consumed 4,770 AF of potable water and 417 AF of non-potable water for a total of 5,187 AF. For reference, the District's 2015 UWMP estimated a total demand volume of 6,552 AF for CY 2020. As shown in **Submittal Table 4-1** (next page), the actual metered water use is reported in groups, with single-family residential combined with multi-family residential, and commercial, industrial, and institutional (governmental) combined into one sector.

Submittal Table 4-1 Retail: Demands for Potable and Non-Potable Water - Actual			
Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume*
Add additional rows as needed			
Other Potable	Single-family and multi-family residential combined	Drinking Water	3,622
Other Potable	Commercial, industrial, and institutional/governmental combined	Drinking Water	969
Other Potable	Hydrant Meters	Drinking Water	83
Other Potable	District facilities (unbilled)	Drinking Water	4
Losses	Potable	Drinking Water	91
Other Non-Potable	Hydrants	Raw Water	4
Landscape	Non-potable irrigation	Raw Water	382
Losses	Non-Potable	Raw Water	31
		TOTAL	5,187
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Units in acre-feet (AF). From CY 2020 RCSD meter data.			

The non-potable irrigation demand is satisfied with non-potable well water, which is separate from the potable system. The potable and non-potable water losses shown in Submittal Table 4-1 are estimates for CY 2020 and calculated by subtracting total demand from total supply.

4.3 PROJECTED WATER USE

Estimating future demand for water is essential for the District to manage its water supply and appropriately plan its infrastructure investments. In general, the District expects residential customers to continue being the majority of water use. The water use projections made herein are based on buildout of the City's current land use plan (updated March 2021) being reached by 2049 using updated (2020) water duty factors (aka, unit water demand factors) that were calculated for this UWMP and the forthcoming RCSD Water Master Plan. The water duty factors are based on actual metered water usage from 2018 through 2020.

As described in Chapter 3, the City's current land use plan already includes the approved land uses of the Emerald Meadows Ranch Specific Plan, therefore it was not added manually herein. The additional demand from the future Shadow Rock residential development of 216 AFY and Agua Mansa Commerce Park Specific Plan of 50 AFY were manually added into the District's future demands beginning in 2025. Likewise, the additional water demand expected from the future Rio Vista Specific Plan of 2,000 AFY was manually added into the District's future demands beginning in 2030.

Projected usage by type is based on the proportion of total potable use in CY 2020, which was 76% residential, 20% non-residential, 2% potable hydrant meters, 0.1% District meters, and 2% losses. Future sales of potable water to JCSD are considered separate from the urban retail demands and have been held steady at 2,000 AF per year.

To project the non-potable demands from 2025-2045, an average annual growth rate of 1.7% was calculated based on the difference in non-potable production volumes between 2020 and 2010. Non-potable water use has varied significantly over the past 10 years from as little as 301 AF in 2013 to 700 AF in 2016. Non-potable use is dominated by one golf course customer and there is a very limited distribution system; therefore, it is possible that peak usage of non-potable water could be reached before 2045. Projected usage by type is based on the proportion of total non-potable use in CY 2020, which was 92% irrigation, 7% losses, and 1% hydrant meters. RCSD potable and non-potable water demand projections are shown in **Submittal Table 4-2**.

Submittal Table 4-2 Retail: Use for Potable and Non-Potable Water - Projected

Use Type Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool	Additional Description (as needed)	Projected Water Use* *Report To the Extent that Records are Available*				
		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Other Potable	Single Family Residential and Multi-Family Residential Combined	4,350	6,394	6,919	7,444	7,970
Other Potable	Commercial, Industrial, and Institutional (Governmental) Combined	1,164	1,711	1,851	1,992	2,132
Other Potable	Potable Hydrant Meters	100	147	159	171	184
Other Potable	District facilities (unbilled)	5	8	8	9	10
Losses	Potable Losses	109	161	174	187	200
Sales/Transfers/Exchanges to other Suppliers	Sales to JCSD (potable)	2,000	2,000	2,000	2,000	2,000
Other Non-Potable	Non-Potable Hydrant Meters	4	5	5	6	6
Landscape	Non-potable Irrigation	416	452	492	535	582
Losses	Non-Potable Losses	34	37	40	43	47
	TOTAL	8,182	10,914	11,649	12,388	13,130

**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Units in acre-feet (AF). Potable demands increase by 138 AFY to reach population buildout in 2049, with Shadow Rock (216 AFY), Agua Mansa (50 AFY) added to potable demand in 2025 and Rio Vista (2000 AFY) added to potable demand in 2030. Potable usage by type based on proportion of total use in CY 2020 (i.e., 76% residential, 20% non-residential, 2% hydrants, 0.1% District use, 2% losses). Sales are held constant and separate from projection methodology. Total non-potable demand based on 1.7% average annual growth rate (from non-potable production from 2010-2020). Non-potable usage by type based on proportion of total non-potable use in CY 2020 (i.e., 1% hydrants, 92% irrigation, and 7%

Future water savings (or "Passive Savings") from codes, standards, ordinances, or transportation and land use plans are not included in the District's demand projections. Total water demand for RCSD beginning with current demand and projected through 2045 is summarized in **Submittal Table 4-3**. There is currently no recycled water demand and no recycled water was put into long-term storage (see Chapter 6).

Submittal Table 4-3 Retail: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045 (opt)
Potable Water, Raw, Other Non-potable *From Tables 4-1R and 4-2 R*	5,187	8,182	10,914	11,649	12,388	13,130
Recycled Water Demand[1] *From Table 6-4*	0	0	0	0	0	0
Optional Deduction of Recycled Water Put Into Long-Term Storage[2]						
TOTAL WATER USE	5,187	8,182	10,914	11,649	12,388	13,130
[1] Recycled water demand fields will be blank until Table 6-4 is complete *[2] Long term storage means water placed into groundwater or surface storage that is not removed from storage in the same year. Supplier **may** deduct recycled water placed in long-term storage from their reported demand. This value is manually entered into Table 4-3.*						
NOTES: Units in acre-feet (AF).						

4.4 DISTRIBUTION SYSTEM WATER LOSSES

Distribution system water loss is the water lost to the system between the point of production and the point of delivery to customers. It includes “real” losses or those attributed to leaks, breaks, and overflows, and “apparent” losses, which include metering inaccuracies, data handling errors, and water theft. Water loss is considered a demand and is shown in Table 4A and Submittal Tables 4-1 and 4-2 as part of the District’s past, current, and future water demands. **Submittal Table 4-4** summarizes the District’s total losses from CY 2016 to CY 2020.

Submittal Table 4-4 Retail: Last Five Years of Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
01/2016	439.8
01/2017	553.7
01/2018	502.4
01/2019	319.5
01/2020	91
[1] Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet. *[2] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES: Units in acre-feet (AF). Potable water only. 2016-2019 data comes from validated water loss audits. 2020 data is estimated from meter data as total potable production minus total potable consumption.	

California Senate Bill No. 1420 (SB 1420) requires water utilities that submit UWMPs to calculate annual system water losses in a water loss audit. Copies of the District's validated water loss audits from 2016-2019 are included in **Appendix G**. A validated audit for CY 2020 data was not required to be prepared prior to adoption of this UWMP. The efforts to decrease water loss are described in Chapter 9 – Demand Management Measures.

4.4.1 Future Water Loss Performance Standard

Water Code Section 10608.34, subdivision (i) (Senate Bill 555, 2015) requires the State Water Resources Control Board to adopt volumetric performance standards for water loss for urban retail water suppliers. Pursuant to this law, urban retail water suppliers have been annually submitting water loss audits to DWR since October 2017. Copies of RCSD validated water audits are located in Appendix G.

Additionally, urban retail water suppliers are required to calculate an urban water use objective that includes indoor, outdoor, commercial, industrial, and institutional irrigation uses and allowed water loss by 2024 (AB 1668 and SB 606, 2018). These standards are still in the pre-rulemaking process and have not been adopted to-date. However, the Water Code requires

data to be included in this 2020 UWMP that demonstrates whether the District will meet its water loss performance standard, even though it has yet to be determined. Therefore, to demonstrate that RCSD is expected to meet its forthcoming water loss performance standard, the reader should refer to Submittal Table 4-4 and the 2017-2019 audits located in Appendix G that show losses on the decline from 2017-2020. This is a result of a larger effort by RCSD to replace old pipelines and dedicate more staff effort towards repairing leaks and improving data management. In addition, the District will start calibrating and testing meters and installing an automatic meter reading (AMR) system within the next few years such that all meters could be part of an AMR system by 2028 when the State expects to start assessing compliance for the forthcoming water loss standard. Chapter 9 discusses these efforts in more detail. Because RCSD's CY 2019 validated water loss audit shows "real" loss at 37.96 gallons per connection per day, the District may be required to submit responses to the forthcoming state questionnaires on water loss-specific information and may have to further reduce water loss (SWRCB Fact Sheet, pp. 1-2). However, considering the preliminary potable losses for CY 2020 are just 91 AF as shown in Submittal Table 4-4, the District may not be required to further reduce water loss. Regardless of the forthcoming standards, the District is leading a concerted effort to improve the efficiency of the distribution system, which will help reduce water loss.

4.5 WATER USE FOR LOWER INCOME HOUSEHOLDS

California Senate Bill No. 1087 (SB 1087) requires the water use projections of an UWMP to include the water demands for affordable housing as identified in the housing element of any city, county, or city and county in the service area of the supplier. SB 1087 builds on an existing statutory priority for providing water and sewer services to affordable housing developments.

The City of Jurupa Valley General Plan Housing Element was approved in 2017 and addresses the City's housing needs from 2013 to 2021. The next update will address the period from 2021 to 2029. On June 4, 2019, the City's Fifth-Cycle Housing Element (2013-2021) was certified by the State; however, it was contingent upon the City developing a Housing Program that rezoned at least 16 acres with minimum densities of 25 units per acre anywhere suitable within the City. (JV(a), pp. 1-4)

The City Council initiated the amendments to the General Plan Land Use Map and the Zoning Map to implement said Housing Program in March of 2019. In March 2021, the City Council approved the rezoning of approximately 35 acres on 13 individual parcels of land distributed throughout the community, which will allow an estimated 595 units and meet the State's requirement (JV(a), pp. 1-4). The land use plan used for this UWMP and includes said General Plan Amendments is shown in Chapter 3, Figure 3-5.

RCSD has a civic and legal responsibility to provide water for the health and safety of the service area. RCSD serves all residential customers equally regardless of income level and RCSD does not deny service to non-delinquent accounts. Because the residential water use projections provided herein are based on the aforementioned changes to the City General Plan land use plan, which includes residential designations of all types including designations that allow for low-income housing and included to help the City meet its regional housing needs allocation, the water use projections in Submittal Table 4-3 include water use for housing needed for lower-income households as verified by **Submittal Table 4-5**.

Submittal Table 4-5 Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) *Drop down list (y/n)*	No
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, or otherwise are utilized in demand projections are found.	
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes

4.6 CLIMATE CHANGE CONSIDERATIONS FOR WATER USE

Beginning in the 2020 UWMP, the Water Code requires the District to consider the impacts of climate change in its water use projections, which are shown in Submittal Table 4-2. The District's considerations for climate change impacts began with using the *Climate Change Vulnerability Screening Form for Urban Water Management Planning* included with the DWR Guidebook for 2020 UWMPs. Pursuant to Water Code, the District's planning for climate change impacts was commensurate with the number of customers served and the volume of

water supplied. The type and degree to which climate change impacts were considered in the District's water use projections, and the basis for those assumptions are described below.

Western prepared a Technical Memorandum dated April 22, 2021 describing an analysis performed as part of its Drought Contingency Plan and Climate Change Vulnerability Assessment and made the results available for use by RCSD and other retail agencies within Western's service area to use in their UWMPs (WMWD(a)). A copy of said memo is located in **Appendix H**. The results of the analysis generated factors that its retail agencies can apply to water demand and supply projections to represent the projected effects of climate change within Western's service area. RCSD has used these factors herein where noted (see **Table 4B**, next page). The results of the analysis that pertain to water demands are provided below:

> *The impacts of climate change on outdoor water demand are projected to be similar during normal and drought years over the next two decades. This is because climate change datasets show that temperatures are projected to increase over time, regardless of hydrologic conditions. These projected increases in temperature are estimated to increase ET rates for landscaping, irrigated agriculture, and native vegetation. For all year types, outdoor water use is projected to increase by about 3 percent during the next two decades. The water demand change factors are applied to outdoor water uses, which have been adjusted for future population growth and conservation measures. Indoor water uses are assumed to respond to future population growth and conservation as well but are not sensitive to climate change.* (WMWD(a), p. 13)

Table 4B - Water Demand Climate Change Factors for Outdoor Water Uses[1]

Beginning Year	Normal Year	Single-Dry Year	Five-Year Dry Period
2020	100.0%	100.0%	100.0%
2025	100.6%	100.6%	99.8%
2030	101.2%	101.3%	101.2%
2035	101.8%	101.9%	101.8%
2040	102.4%	102.5%	102.4%
2045	103.1%	103.2%	103.0%

Source: Western Municipal Water District, *Technical Memorandum: Western Drought Contingency Plan – Climate Change Vulnerability Assessment*, April 22, 2021 (WMWD(a), p. 13), located in Appendix H.

(1) 2020 is baseline year. Because the District is unable to tease out indoor from outdoor water use for most of its customers at this time, the factors have been applied to all demands. Factors that are greater than 100% will increase the demand and factors that are less than 100% will decrease the demand.

To account for the potential effects of climate change to projected water demands, RCSD has conservatively applied the normal year factors from Western's analysis in Table 4B to the demand projections of Submittal Table 4-2 beginning in 2025 through 2045, even though some of that demand is indoor use that is not sensitive to climate change. The results are shown below in **Table 4C**.

Table 4C Potential Effect of Climate Change to Projected Normal Year Demands

	2025	2030	2035	2040	2045
TOTAL DEMANDS From Table 4-2[1]	8,182	10914	11,649	12,388	13,130
Normal Year Water Demand Climate Change Factor[2]	100.6%	101.2%	101.8%	102.4%	103.1%
TOTAL DEMANDS with Climate Change Factor (AF)	8,231	11,045	11,858	12,685	13,538
Potential Increase in Water Demand from Climate Change (AF) [3]	49	131	210	297	407

Notes: Units in acre-feet (AF).

(1) From Table 4-2.

(2) Factors from Table 4B (WMWD(a)).

(3) Difference between total demands and total demands with climate change factor.

According to the Cal-Adapt projections provided in Chapter 3 and Western's technical memorandum and climate change analysis, higher temperatures and less rainfall are anticipated to occur as a result of climate change, and these are the factors that may affect water demand the most. Customer demands increase in summer; therefore, an increase in average annual temperatures and the frequency and duration of heat waves as the result of climate change is expected to increase existing customer demands for water, particularly outdoor use. Based on past events, the District anticipates additional restrictions on outdoor water use will occur through Water Code changes and County, City, or District ordinance changes. Because RCSD primarily serves urban water demand and does not have an agricultural customer base, such restrictions are expected to result in changes to the urban environment, such as improvements to indoor water use (i.e., replacing inefficient appliances/fixtures), or changes in public and private landscaping that incorporates more drought-tolerant plant species and/or zero irrigation.

The District's demand projections herein have conservatively assumed no reductions in future water use from codes, ordinances, or other water conservation policies. Water demands across all customer sectors are projected to increase over the 20-year period. This is a conservative approach given that future development and redevelopment projects will have the latest water conservation mandates such as more efficient fixtures and drought-tolerant plant species. For example, the aforementioned large development projects (i.e., Agua Mansa, Rio Vista, Emerald Meadows, Shadow Rock) will include water-efficient features that may reduce the currently estimated water demands for these projects.

The District plans to continue managing demand by using tiered water rates (see Chapter 9). Currently the lowest tier of 1 to 5 hundred cubic feet (HCF) is $1.18/unit.[1] The highest tier, 30 HCF and greater is $3.03/unit. This tiered rate structure has created demand hardening where the annual demand per connection is averaging approximately 0.63 AFY (205,286 gallons or approximately 3 HCF) (per electronic Annual Reports Years 2017 and 2018 filed with the Division of Drinking Water).

[1] 1 HCF = 748.8 gallons

CHAPTER 5 SB X7-7 BASELINES AND TARGETS

With the adoption of the Water Conservation Act of 2009, also known as Senate Bill (SB) X7-7, the State is required to reduce urban per capita water use by 20 percent by the year 2020. To help the State reach this legislative requirement, each retail urban water supplier (Supplier), including RCSD, is required to also reduce their respective urban per capita (per person) water use by 20 percent. SB X7-7 required each Supplier to determine their baseline water use (Water Use Baseline) during the baseline period and their target water use for the years 2015 (Interim Water Use Target) and 2020 (2020 Water Use Target). The cumulative efforts of each Supplier to meet their respective target water use would result in the State achieving the legislative water reduction requirement by 2020.

In the 2010 UWMP, RCSD calculated the Water Use Baseline, the Interim Water Use Target, and the 2020 Water Use Target using the best available census data at the time, which was the 2000 U.S. Census. In the District's 2015 UWMP, the baselines and targets were updated and recalculated using DWR's Population Tool which included the 2010 U.S. Census. The 2015 Interim Water Use Target was 187 gallons per capita per day (GPCD) and the 2020 Water Use Target was 166 GPCD.[1] Because the District's actual water use was 181 GPCD in 2015, the 2015 UWMP determined that RCSD met the Interim Water Use Target and was on track to meet the 2020 Water Use Target by year end 2020. Compliance with the Interim Water Use Target was verified by DWR reviewing the SB X7-7 Verification Forms submitted with the District's 2015 UWMP. The complete set of SB X7-7 Verification Forms is provided in **Appendix I.**

In this UWMP, RCSD must demonstrate that they met its 2020 Water Use Target by completing the SB X7-7 2020 Compliance Form which are also provided in Appendix I. Please note the tables from the SB X7-7 Verification Forms and the SB X7-7 2020 Compliance Form that are shown in this Chapter differ from the UWMP tables in the rest of this Plan as they are colored green and brown and begin with the title "SB X7-7 Table …"

[1] Two terms are often used interchangeably; "Daily per Capita Water Use" and "Gallons per Capita per Day" (GPCD). Daily per Capita Water Use is the amount of water used per person per day. In the UWMP, this is total water use within a service area, divided by population and is measured in gallons. GPCD is Daily per Capita Water Use measured in gallons. These are different from R-GPCD, which is solely the residential water use divided by population and is used in drought reporting to the SWRCB.

5.1 RECALCULATION OF BASELINES AND TARGETS

There are some situations where the per-person daily water use baselines and targets must, or may be, recalculated including availability of better data, certain service area expansions, contractions, or annexations of already developed areas.

The District's 2015 service area boundary increased by approximately 127 acres in 2018 with annexation of the Shadow Rock residential project and another 291 acres in 2020 with annexation of the Agua Mansa Commerce Park Specific Plan area (see Figure 3-6). The site of the future Shadow Rock development is undeveloped and did not receive water service from the District until after the end of 2020. The future Agua Mansa project is on the site of a former cement plant surrounded by open space that relied on a private onsite well for water service and the District did not provide water service to the site until after the end of 2020. Because the annexed land was not receiving water service from a supplier prior to the annexation and did not receive supplies from RCSD before the end of 2020, and these annexations are due solely to new construction, no revisions to the District's Water Use Baseline, Interim Water Use Target, and 2020 Water Use Target from the 2015 UWMP were made herein consistent with *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (Feb. 2016) (*Methodologies*).

5.2 BASELINE AND TARGETS

The District's Water Use Baseline, Interim Water Use Target, and the 2020 Water Use Target calculated in the 2015 UWMP are summarized here, and the complete set of tables are provided in Appendix I.

Since RCSD does not deliver recycled water, the 10-year baseline or the "Baseline GPCD" period began in 1999 and ended in 2008. The 5-year baseline or the "Target Confirmation" period began in 2003 and ended in 2007, as shown in **SB X7-7 Table -1**.

SB X7-7 Table-1: Baseline Period Ranges

Baseline	Parameter	Value	Units
10- to 15-year baseline period	2008 total water deliveries	6,511	Acre Feet
	2008 total volume of delivered recycled water	-	Acre Feet
	2008 recycled water as a percent of total deliveries	0.00%	Percent
	Number of years in baseline period[1, 2]	10	Years
	Year beginning baseline period range	1999	
	Year ending baseline period range[3]	2008	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2003	
	Year ending baseline period range[4]	2007	

[1] *If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period.* [2] *The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.*

[3] *The ending year must be between December 31, 2004 and December 31, 2010.*

[4] *The ending year must be between December 31, 2007 and December 31, 2010.*

NOTES:

Once the baseline periods are set, the baseline GPCD is calculated by dividing the volume of water into the system for each baseline year by the service area population in that year (population as calculated by the DWR Population Tool). The 10-year and 5-year baseline GPCD calculations are shown below in **SB X7-7 Table 5,** which has not changed from the 2015 UWMP.

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1999	24,856	5,466	196
Year 2	2000	25,367	5,631	198
Year 3	2001	25,850	5,922	205
Year 4	2002	26,340	6,733	228
Year 5	2003	26,824	6,113	203
Year 6	2004	27,305	6,595	216
Year 7	2005	27,780	6,304	203
Year 8	2006	28,251	6,841	216
Year 9	2007	28,717	6,894	214
Year 10	2008	29,179	6,511	199
Year 11	0	-	-	
Year 12	0	-	-	
Year 13	0	-	-	
Year 14	0	-	-	
Year 15	0	-	-	
10-15 Year Average Baseline GPCD				**208**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use
Year 1	2003	26,824	6,113	203
Year 2	2004	27,305	6,595	216
Year 3	2005	27,780	6,304	203
Year 4	2006	28,251	6,841	216
Year 5	2007	28,717	6,894	214
5 Year Average Baseline GPCD				**210**
2015 Compliance Year GPCD				
2015		33,441	6,774	**181**
NOTES:				

To calculate the 2020 Water Use Target, the *Target Method 1 – 80 percent of Baseline* methodology was selected in the 2015 UWMP pursuant to Water Code Section 10608.20(b)(1), as shown in **SB X7-7 Table 7-A.**

SB X7-7 Table 7-A: Target Method 1
20% Reduction

10-15 Year Baseline GPCD	2020 Target GPCD
208	166

NOTES:

5.3 2020 SERVICE AREA POPULATION

To correctly calculate the compliance year (2020) GPCD, the population served in 2020 was determined by using DWR's online Population Tool (Appendix E). The Population Tool was also used for the 2015 UWMP.

The DWR Population Tool utilizes U.S. Census year (i.e., 1990, 2000, and 2010)[2] population data, electronic boundary maps of the District service area for each census year, and the number of meter connections from the District's *Annual Report to the Drinking Water Program*. The Population Tool then calculates the population for the non-census years as shown in **SB X7-7 Table 3**.

[2] The U.S. Census 2020 decennial data was not available at the time of the 2020 UWMPs.

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	36,827
NOTES: Source DWR Population Tool	

The 2020 Water Use Target year population of 36,827 is considered a reasonable estimate because it is commensurate with the estimated population of 36,400 persons in the District's 2015 *Water Master Plan* (K&S(b), p.II-2).

5.4 2020 GROSS WATER USE

Gross water use is a measure of water that enters the distribution system of the Supplier over a 12-month period (calendar year) with certain allowable exclusions. These exclusions are:

- Recycled water delivered within the service area;
- Indirect recycled water;
- Water placed into long term storage (surface or groundwater);
- Water conveyed to another Supplier;
- Water delivered for agricultural use; or
- Process water.

The above exclusions do not apply to RCSD. Therefore, no exclusions to gross water use will be made for 2020 GPCD calculations.

Gross water use reported for the year 2020 was calculated using *Methodology 1: Gross Water* of the *Methodologies* document, consistent with the way the water use was calculated in the 2015 UWMP for the baseline periods. A 12-month calendar calculation period was used, the water distribution area was delineated and includes District-produced and purchased water. **SB X7-7 Table 4-A** below shows the water entering RCSD's distribution system (both potable and non-potable water) in the year 2020. Approximately 5,187 AFY of groundwater was

produced from RCSD's own wells (i.e., "The Supplier's own water source"). No potable water was purchased from other sources (i.e., "A purchased or imported source").

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Wells
This water source is *(check one)* **:**	
☑	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	5,187	-	5,187

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES: Source 2020 Annual Report to the Drinking Water Program for Year Ending December 31, 2020.

RCSD does not have any other water sources, therefore the total annual gross water use shown in SB X7-7 Tables 4-A and in **SB X7-7 Table 4** below are the same. The District's gross water use for CY 2020 is 5,187 AFY. No deductions were made for exported water, change in the distribution system storage, indirect recycled water, water delivered for agricultural use, or process water.

SB X7-7 Table 4: 2020 Gross Water Use							
Compliance Year 2020	2020 Volume Into Distribution System *This column will remain blank until SB X7-7 Table 4-A is completed.*	2020 Deductions					2020 Gross Water Use
		Exported Water *	Change in Dist. System Storage* (+/-)	Indirect Recycled Water *This column will remain blank until SB X7-7 Table 4-B is completed.*	Water Delivered for Agricultural Use*	Process Water *This column will remain blank until SB X7-7 Table 4-D is completed.*	
	5,187			-		-	**5,187**
* **Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.							
NOTES:							

5.5 2020 COMPLIANCE DAILY PER CAPITA WATER USE (GPCD)

Based on the 2020 population estimate and 2020 gross water use, RCSD's 2020 daily per capita water use is estimated as 126 GPCD as shown in **SB X7-7 Table 5A, below.**

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water *Fm SB X7-7 Table 4*	2020 Population *Fm SB X7-7 Table 3*	2020 GPCD
5,187	36,827	**126**
NOTES:		

Because the calculated 2020 Water Use Target was 166 GPCD (SB X7-7 Table 7-A, above), and the actual 2020 GPCD is 126 GPCD, the District achieved its target and is compliant with SB X7-7, as shown in **SB X7-7 Table 9**. Pursuant to Water Code Section 10608.24, the District may adjust the actual 2020 GPCD if factors outside the Supplier's control or if special situations occurred. RCSD has determined that no adjustments due to extraordinary events, weather normalization, or economics were warranted.

SB X7-7 Table 9: 2020 Compliance

Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD (Enter "0" if Adjustment Not Used)			TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
	Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]				
126	-	-	-	-	126	166	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

The complete calculations are located in Appendix I. In summary, RCSD has met the water use reduction goal of SB X7-7 and successfully met its 2020 Water Use Target.

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CHAPTER 6 WATER SUPPLY CHARACTERIZATION

RCSD currently obtains its water supply from groundwater pumped from the Riverside County portion of the Riverside-Arlington Subbasin, which is referred to as "Riverside South Basin" within the larger Upper Santa Ana Valley Groundwater Basin (**Figure 6-1 – Groundwater Basins** located at the end of the chapter). The District service area overlies a portion of the Riverside South Basin. The District currently does not purchase water from another agency.

In the future, the District could rely on the Riverside South Basin for all of its water supply, and it plans to construct new wells and water treatment facilities to fully utilize this source; however, to increase potable supply redundancy and lower native total dissolved solids (TDS) concentrations in wastewater, the District is currently planning a connection to a neighboring agency that can supply imported water from a State Water Project Contractor.

6.1 PURCHASED OR IMPORTED WATER

RCSD currently does not purchase water from other local water entities or imported water supplies from the State Water Project.[1] RCSD is within the service area of Western Municipal Water District (Western), which is a member agency of The Metropolitan Water District of Southern California (Metropolitan) who is a State Water Project Contractor. Western can sell wholesale supplies of imported water that it purchases from Metropolitan to agencies within its service area. Because RCSD is within the service area of Western, the District could purchase water supplies from Western in the future contingent on several factors including whether a physical pipeline connection can be made.

RCSD's neighbor to the north, West Valley Water District, can also sell imported State Water Project water that it receives from San Bernardino Valley Municipal Water District, a State Water Project Contractor. With development of an interconnection, and execution of various agreements to transfer water from one Contractor's service area to another, the District could utilize imported water from this source.

State Water Project water comes from Northern California in the Sacramento/San Joaquin Delta. State Water Project Contractors receive an annual allocation from DWR that can change

[1] In this plan, the term "imported water" refers only to State Water Project water; it does not refer to any other sources.

[2] Measured as the average extractions from 1959 – 1963 (WSBW(c), p. 86).

several times each year depending on several factors, including rainfall/snowpack, biological constraints, and various ongoing regulations. In dry years, Contractors can use water held in storage facilities and a variety of flexible programs to store and transfer water so that when DWR's SWP water allocation is low, supply can continue to be available.

Imported water supplies tend to have a low concentration of TDS, which can be used to blend with other water sources to decrease the overall TDS concentration in drinking water. TDS affects the taste and appearance of water so it is typically not a health hazard for consumption, but higher concentrations of TDS in the wastewater impairs the ability of the wastewater treatment operator to meet its discharge permit requirements.

6.2 GROUNDWATER

The District's water supply currently consists entirely of groundwater from the Riverside South Basin (see Figure 6-1). The District operates wells and treatment facilities for potable water and wells for non-potable (raw) water for irrigation, as described below.

6.2.1 Basin Description

The District's water supply comes from the Riverside-Arlington Subbasin (DWR Bulletin 118 Basin No. 8-2.03, aka "Riverside Basin"), which is part of the Upper Santa Ana Valley Groundwater Basin (DWR Bulletin 118 Basin No. 8.2). The Riverside Basin encompasses a surface area of 58,600 acres (92 square miles) within portions of Riverside and San Bernardino Counties. The Riverside Basin underlies part of the Santa Ana River Watershed and is bounded by impermeable rocks of Box Springs Mountains to the southeast, Arlington Mountain to the south, La Sierra Heights and Mount Rubidoux to the northwest, and the Jurupa Mountains to the north (K&S(a), p. 5-2). The Riverside County portion of the Riverside Basin is referred to as "Riverside South Basin" for purposes of its adjudication and is the focus of the discussion herein. See Figure 6-1 for basin locations.

6.2.2 Groundwater Management

The Riverside Basin is adjudicated by two Judgments; first, the Judgment in Case No. 117628, Orange County Water District vs. City of Chino, et al., entered April 17, 1969 ("Orange County Judgment"), which is provided in **Appendix J**. Second, the pumping rights to the San

Bernardino, Colton and Riverside Groundwater Basins are set forth in the Judgment in Case No. 78426-County of Riverside, Western Municipal Water District of Riverside County et al., v. East San Bernardino County Water District et al., entered April 17, 1969 ("Western-San Bernardino Judgment"). A copy of the Western-San Bernardino Judgment is provided in **Appendix K** and will be the focus of the remainder of this section.

The Western-San Bernardino Judgment provides a physical solution that establishes the entitlements and obligations of the two major water districts overlying said basins, namely San Bernardino Valley Municipal Water District (Valley District) and Western. The court appointed a Watermaster, composed of one person nominated from Valley District and one person nominated from Western to administer and enforce all instruction and orders of the court. (WSBW(c), pp. 1, 5)

Compliance with the Judgment requires an annual accounting of groundwater and surface water flows and diversions within the various basins in order that the Watermaster may properly report to the court the comparisons of the year-by-year operations with the verified entitlements and an accounting as to the replenishment obligations or credits indicated by such comparison (WSBW(c), p. 5).

Section IX(b) of the Judgment, below, describes the aggregate pumping limit:

> *Over any five year period, there may be extracted from such Basin Area, without replenishment obligation, an amount equal to five times such annual average for the Basin Area; provided, however, that if extractions in any year exceed such average by more than 30 percent, Western* [Municipal Water District] *shall provide replenishment in the following year equal to the excess extractions over such 20 percent peaking allowance.*

The Judgment does not specify the volume of water in the Riverside Basin that the District can extract or is limited to. The base period average production from 1959-1963 in the Riverside South Basin was 29,633 acre-feet and this is the base right for use in the basin.[2] If annual production exceeds 20% of this average, or if a five-year period production exceeds five times the amount of 29,633 acre-feet, then Western shall provide replenishment. Pumping in the

[2] Measured as the average extractions from 1959 – 1963 (WSBW(c), p. 86).

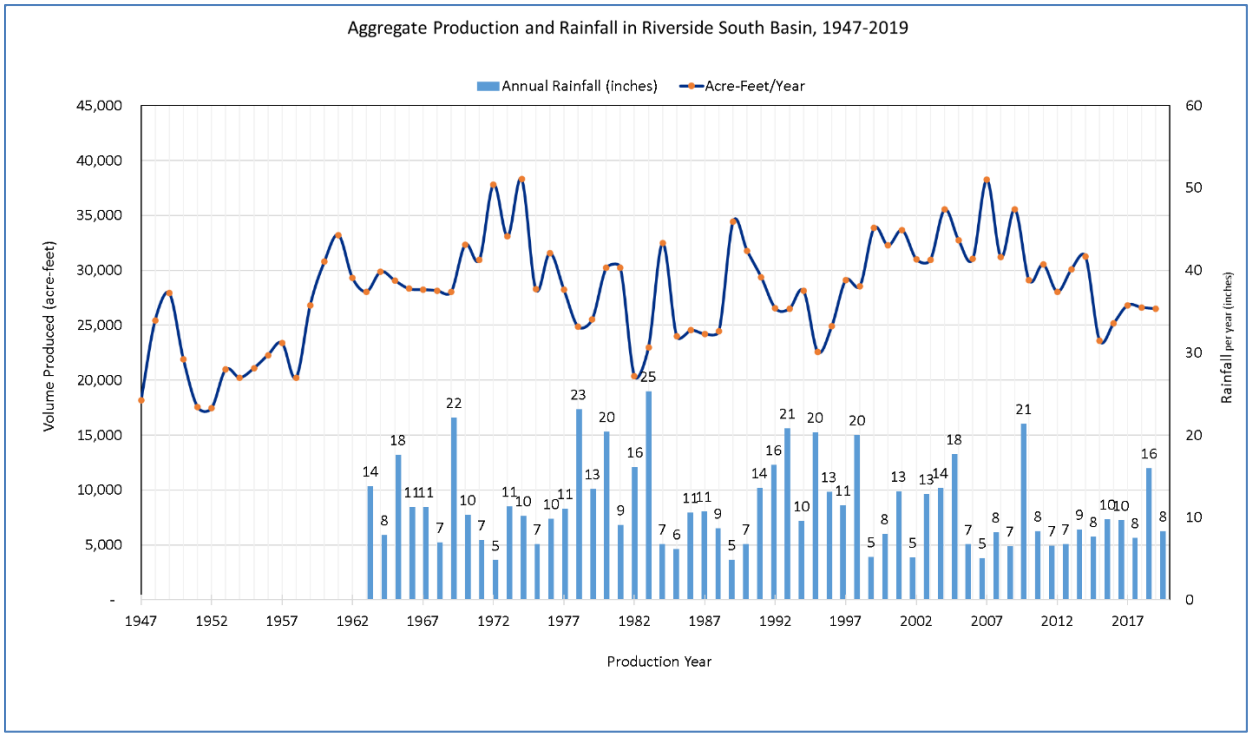
Riverside Basin has not exceeded the base right since the Judgment was entered into. Because the Judgment allows under-extractions to count as credits (and potential increase in storage or base flow) and over-extractions to count as obligations (and potential decline in storage or base flow), Western has a credit of 544,221 AF as of 2019 that can be used to offset future obligations (WSBW(c), p. 119). In the event Western is required to provide replenishment water to the Riverside Basin and no credits were available to offset the obligation, then the District may be responsible for some of the cost of that replenishment, along with other users.

As of 2019, total extractions from the Riverside South Basin area were 26,500 AF, which is compared to total extractions in the base period of 1959-1963 at 29,633 AF. Accumulated credits as of 2019 totaled 719,796 AF and accumulated obligations totaled 175,575 AF for a net credit of 544,221 AF (to Western) as of 2019 (WSBW(c), p. 167). Because aggregate production in the adjudicated area remains below the base right, and credits available to offset obligations are roughly ten times the base right, ample supply in the basin is expected.

6.2.3 Recorded Groundwater Pumping and Sufficiency of Supply

Total recorded groundwater production from 1947 to 2019 for all producers in the Riverside South Basin as recorded by the Watermaster is provided in **Chart 6-1**, which includes annual rainfall from the Riverside area beginning in 1963 (see Chart 3-1).

Chart 6-1 - Aggregate Groundwater Production in Riverside South Basin from 1947-2019 and Total Annual Rainfall in Riverside Area 1963-2019
(Source: WSBW(a); RCFC(b))



(1) "Filing" production amounts were used for years 1947-1958 and 1964-1969. "Verified" production amount was used for all other years.
(2) Total amount produced based on these records is 2,046,427 acre-feet (AF).

The data in Chart 6-1 suggests total production in the basin has hovered around 30,000 AF per year since the adjudication was developed. For example, aggregate production in 2019 was about the same as aggregate production in 1959. During the low rainfall years, an increase in pumping is observed and in wetter years pumping tends to decline. However, the opposite is observed during the statewide drought from 2013-2017; pumping decreased significantly in 2015 with low rainfall, which is assumably a result of demand-reduction efforts and conservation. The total volume produced by all the various entities and wells over this 72-year period is approximately 2.05 million acre-feet.

The District's recorded groundwater production data from just District wells beginning in 1970 through 2020 are provided in **Table 6A**. The average annual growth rate for production from 1970 to 2015 is approximately 3%; however, between 2016 and 2020 the average annual rate is -7%.

Table 6A - RCSD Groundwater Production Records

Year	Total Annual Groundwater Production (AF)
1970	1,900
1980	3,000
1990	5,100
1995	5,000
1997	4,800
1998	4,400
1999	5,076
2000	5,630
2001	6,335
2002	5,939
2003	5,912
2004	6,352
2005	6,078
2006	6,606
2007	6,836
2008	6,248
2009	6,227
2010	5,929
2011	6,600
2012	6,786
2013	6,757
2014	7,063
2015	7,801
2016	7,329
2017	7,636
2018	5,256
2019	4,717
2020	5,187
Average	5,804

Source:
1970-2010 from K&S(a) 2015, pp. II-1, II-4.
2011-2015 from K&S(b) 2016, p. 5-4.
2016-2019 from WSBW(a)
2020 from District records.
AF = acre-feet.

The total annual groundwater produced by RCSD from 2016-2020 is provided in **Submittal Table 6-1.** Sufficient water supplies have been available from the Riverside South Basin to meet the District's needs over the past five years.

Submittal Table 6-1 Retail: Groundwater Volume Pumped						
☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
☐	All or part of the groundwater described below is desalinated.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
Add additional rows as needed						
Alluvial Basin	Riverside South Basin (No. 8-02.03) for potable use.	6629	7182	4844	4284	4770
Alluvial Basin	Riverside South Basin (No. 8-02.03) for non-potable use.	700	454	412	433	417
	TOTAL	7,329	7,636	5,256	4,717	5,187
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Volumes in AF. Source: 2016-2019 from Western-San Bernardino Watermaster Production Data by Basin. 2020 data from RCSD.						

From 2016-2020, the average annual production volume of potable and non-potable water produced was 5,542 AF and 483 AF, respectively. The average annual rate of change for potable and non-potable production was -6% and -11%, respectively (Submittal Table 6-1).

The District's groundwater supply has been sufficient in drought years to meet its needs. The District has not been impacted by seasonal or year-to-year climatic changes, nor subject to short-term water shortages resulting from drought conditions.

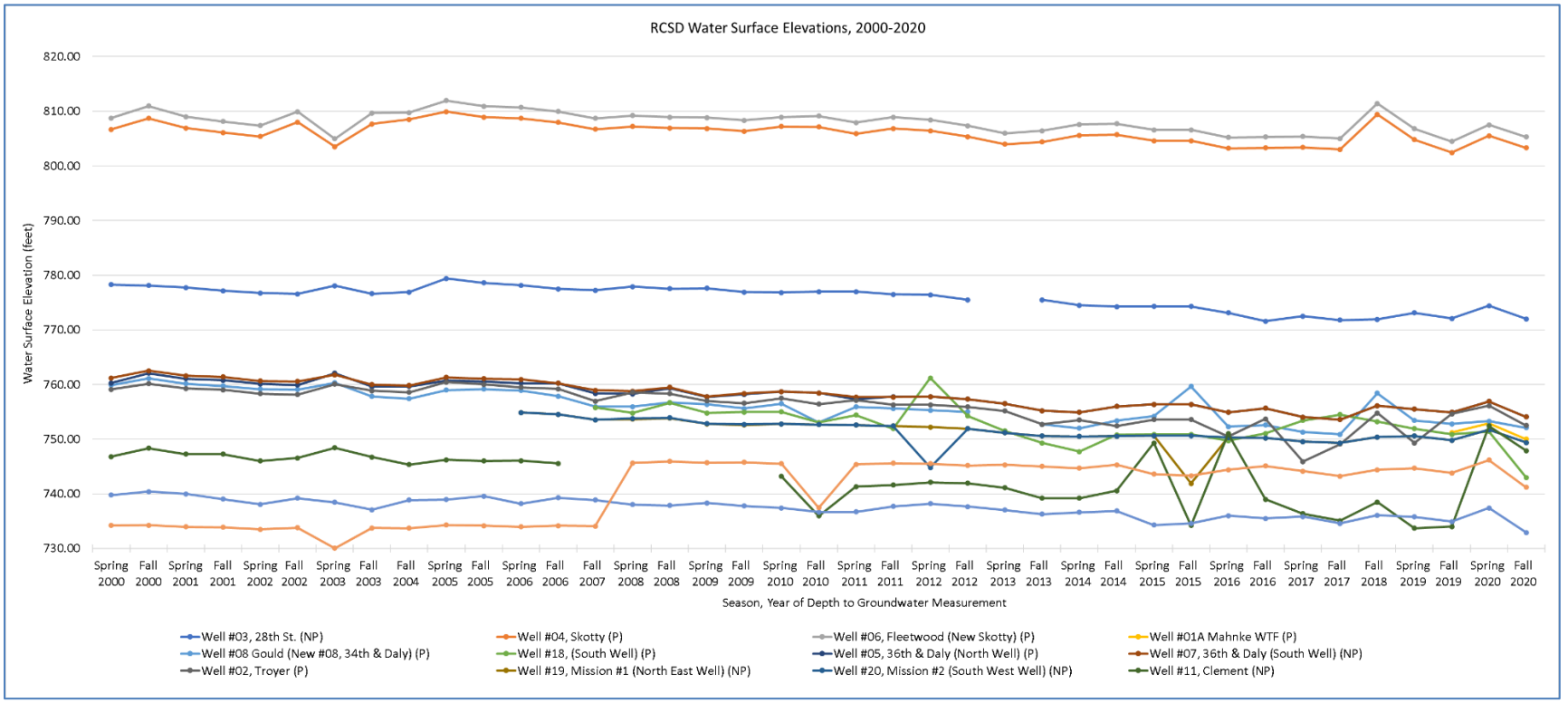
The Riverside Basin is adjudicated as described previously. An adjudicated water right has perhaps the most substantial indicia of reliability of any water right that currently exists in California. An adjudicated right is based upon long-term studies whose purpose it is to protect the long-term functionality of the water source. These rights are coordinated in an established

and binding manner with all the other users of the basin and are overseen by a Watermaster which has the authority to mandate and proscribe activities whose purpose is to protect the water source and maximize its long-term beneficial use.

RCSD's ability to pump water in an amount necessary to meet customer demands is sanctioned and protected by the aforementioned Judgment. Groundwater replenishment by Western is required if the annual extractions exceed the amount allowed by the Judgment. The Western-San Bernardino Watermaster has documented in its *Annual Report for Calendar Year 2020*, "during the five-year period 2015 through 2019, Plaintiffs did not exceed the allowable extractions and that Western [Municipal Water District] credits exceed obligations and therefore is not required to provide replenishment (WSBW, p. iii)." To date, replenishment has not been required. Because of certain constraints on supply, such as water quality discussed further in Chapter 7, the sufficiency of groundwater pumped by RCSD has been a matter more of cost than of physical supply.

As part of the annual *Cooperative Well Measuring Program,* the District provides the Watermaster its data from well measurements taken in the fall and spring that include depth to water so that the water surface elevation can be measured. The first Cooperative Well Measuring Report was for Spring of 1964 as part of the adjudication court filings. The Fall 2020 report shown in **Chart 6-2** (next page) shows groundwater surface elevations in District wells beginning in June of 2000 through Fall 2020 (WSBW(b), Jan. 18, 2021). Two readings are taken each year, one in the spring when groundwater tends to rise from winter rains and one in the fall when groundwater tends to be lower after a dry summer and greater groundwater extraction during the summer months. A higher water surface elevation indicates the water is closer to the ground surface. As shown in Chart 6-2, the water surface elevations in District wells stay generally constant over the past 20 years and have not changed by more than 20 feet between measurements. During the drought of 2013-2017, and specifically in the fall of 2015, water levels decreased in two non-potable wells by several feet (Wells 11 and 19) while the water surface elevation in Wells 2 and 8 actually rose after the summer of 2015. This data suggests the water surface elevations in District wells do not respond to changes in weather in the same way consistently and there are likely other factors to consider such as inflow from upgradient parts of the basin.

Chart 6-2 - RCSD Groundwater Surface Elevations in Active Wells, 2000-2020
(Source: Cooperative Well Measuring Program, Fall 2020 Report (WSBW(b))



(P) and (NP) indicate potable and non-potable.

Gaps indicate either missing data, the time before the well started, or the time after well stopped.

All readings from Spring 2018 were removed because water surface elevation equaled the ground surface elevations and therefore erroneous.

6.3 SURFACE WATER

RCSD does not use surface water as part of its supply, nor does it have plans to expand supply sources by using surface water.

The Santa Ana River (Reach 4) is the one major surface water body nearest the District service area. The river is managed in various ways by other entities and is not a part of the District's activities.

6.4 STORMWATER

Riverside County Flood Control and Water Conservation District has the authority to manage stormwater and divert flow for beneficial use, such as groundwater recharge. RCSD does not have this authority.

Communities are increasingly implementing opportunities to beneficially use stormwater for things like habitat, recharge, and irrigation. New developments and significant redevelopment projects are often required to capture all of the runoff on their site to provide treatment, slow the speed of runoff, and sometimes facilitate infiltration and recharge. RCSD welcomes the use of stormwater capture systems developed by other parties.

6.5 WASTEWATER AND RECYCLED WATER

RCSD is the responsible agency for collecting and conveying the municipal wastewater generated within its service area. RCSD does not use recycled water nor has plans to do so in the future. All wastewater in the District is sent to the following wastewater treatment plant:

- City of Riverside Regional Water Quality Control Plant (RWQCP) located at 5950 Acorn Street, Riverside, CA 92504.

The RWQCP's National Pollutant Discharge Elimination System (NPDES) Permit limits the concentration of TDS in treated effluent that is discharged to the Santa Ana River to be at or less than 650 mg/L (milligrams per liter). Currently, the District's TDS exceeds this limit and is delivering wastewater to the City with a TDS concentration averaging 720 mg/L. The City has

taken certain actions to require the District to reduce the level of TDS in the wastewater sent to RWQCP (DM 2021-18).

6.5.1 Recycled Water Coordination

Recycled water is currently produced and distributed from the RWQCP for beneficial use in the City of Riverside, which is outside of the District boundary (see **Figure 6-2 – Wastewater Treatment and Discharge**). RCSD is entitled to the recycled water produced from its share of wastewater flows delivered to the RWQCP, less any plant losses and the District's proportionate share of any discharge obligation to the Santa Ana River pursuant to the 1969 Judgment. RCSD currently does not use or distribute recycled water. The District has investigated the potential for providing recycled water generated by the RWQCP within its service area (K&S(a)). Because the RWQCP is located downgradient and across the Santa Ana River from the District, the infrastructure that would be required to move and deliver recycled water to the District where it can be best put to use has been determined to be cost-prohibitive. Therefore, the availability of recycled water to RCSD without substantial outside funding and logistical support is not anticipated over the next 25 years.

6.5.2 Wastewater Collection, Treatment, and Disposal

RCSD's wastewater system consists of collection and trunk sewer pipelines, lift stations and force mains. All wastewater from the District is sent to the City of Riverside RWQCP, which is operated by the City of Riverside Public Utilities and located outside of the District boundary. The District through a series of agreements with the City of Riverside has 3.055 MGD of capacity rights in the treatment facilities. The District is responsible for approximately 68 miles of gravity sewer pipelines and six wastewater lift stations each with associated force mains. The District is currently preparing an update to its *2015 Wastewater Facilities Master Plan* by early 2022.

The RWQCP provides preliminary, primary, secondary, and tertiary treatment and meets all Title 22 requirements for recycled water. It has a rated capacity of 46 MGD. Treated effluent from RWQCP is discharged to the Santa Ana River or distributed for reuse as described above. In CY2020, the District sent approximately 1,900 AF (1.7 MGD) to the RWQCP as shown in **Submittal Table 6-2.**

Submittal Table 6-2 Retail: Wastewater Collected Within Service Area in 2020						
☐	There is no wastewater collection system. The supplier will not complete the table below.					
	Percentage of 2020 service area covered by wastewater collection system *(optional)*					
	Percentage of 2020 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? *Drop Down List*	Volume of Wastewater Collected from UWMP Service Area 2020 *	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? *Drop Down List*	Is WWTP Operation Contracted to a Third Party? *(optional)* *Drop Down List*
Rubidoux Community Services District	Metered	1,900	City of Riverside	Regional Water Quality Control Plant	No	No
Total Wastewater Collected from Service Area in 2020:		1,900				
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3* **.**						
NOTES: Volume in AF. From RCSD records.						

No wastewater is treated or disposed of within the District's service area, therefore the District will not complete DWR Submittal Table 6-3 – Wastewater Treatment and Discharge Within Service Area in 2020.

6.5.3 Recycled Water System

RCSD does not provide a recycled water system at this time. Recycled water is not used and is not planned for use within the District's service area, therefore the District will not complete DWR Submittal Table 6-4 – Recycled Water Direct Beneficial Uses Within Service Area.

6.5.4 Potential, Current, and Projected Recycled Water Uses

As described previously, the potential for recycled water being distributed by RCSD without substantial outside funding and logistical support is very low and not anticipated to occur over the 20-year planning horizon. Recycled water was not used in 2015 nor projected for use in

2020; therefore the District will not complete DWR Submittal Table 6-5 – 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual.

6.5.5 Actions to Encourage and Optimize Future Recycled Water Use

Recycled water could offset potable water currently being used for irrigation, or potable water supplies planned for irrigation, thus freeing up potable supplies for the District. RCSD is entitled to its share of flows to the RWQCP, less any plant losses and the District's proportionate share of any discharge obligation to the Santa Ana River. However, RCSD has investigated the feasibility of providing recycled water to its customers and determined that implementation of such actions, at this time, is cost-prohibitive, given the high estimated project costs and high unit cost of recycled water when compared to the District's current unit cost of potable and non-potable groundwater (K&S(a)). Federal, state, and local funding, if available, could offset the cost incurred during project construction which typically makes the project cost-prohibitive. Obtaining funding can also help build community support for a project because it results in reduced taxpayer contribution. The District does not plan to expand recycled water use in the future, therefore the District will not complete DWR Submittal Table 6-6 – Methods to Expand Future Recycled Water Use.

6.6 DESALINATED WATER OPPORTUNITIES

RCSD does not currently desalinate its water supplies as part of its treatment processes (i.e., remove salts), nor does the District have plans currently to provide or partner on desalination facilities. The proposed Water Master Plan update will explore this issue and may propose desalination facilities on its local well supply to reduce the TDS loading in its wastewater. This master plan update is anticipated by 2022.

6.7 WATER EXCHANGES OR TRANSFERS

RCSD has an agreement to transfer water to JCSD and, in turn, purchase water from JCSD if needed. The District has no other exchange or transfer programs. The District does plan to purchase imported water supplies in the future as described in Section 6.1, but this is not considered an exchange or transfer. The District does maintain emergency interties, which are addressed in Chapter 7.

6.8 FUTURE WATER SUPPLY PROJECTS

Expected future water supply projects or programs that will have a quantifiable increase in water supply to RCSD and can reasonably be expected to be implemented within the 20-year timeframe of the UWMP are summarized in **Submittal Table 6-7**. The District's current project to add treatment systems is not shown in Submittal Table 6-7 because it will not result in additional supply. Narrative descriptions of each project (or group of projects) follow in timeline order after the table.

Submittal Table 6-7 Retail: Expected Future Water Supply Projects or Programs

☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.
☐	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.
	Provide page location of narrative in the UWMP

Name of Future Projects or Programs	Joint Project with other suppliers?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Supplier* *This may be a range*
	Drop Down List (y/n)	*If Yes, Supplier Name*				
Add additional rows as needed						
New Wells 21 and 22 & Expansion of Thompson WTP.	No		New wells 21, 22; expansion of Thompson WTP to 7500 gpm.	2025	All Year Types	2,400
New Wells 23 and 24	No		New wells 23 and 24	2030	All Year Types	2,400
New Well 25	No		Replace Well 2 (currently at 900 gpm) with 1,500 gpm	2030	All Year Types	480
New Well 27	No		Replace Well 4 (currently at 1,250 gpm) with 1,500 gpm	2040	All Year Types	200
Agency Connection	Yes	Western Municipal Water District and City of Riverside Public Utilities (RPU); or West Valley Water District (WVWD)	Interconnect	2025	All Year Types	1,200 - 2,000

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Units in acre-feet (AF). Supply volume assumes pump run time of 50%. Water treatment facilities will expand as necessary along with increased number of wells.

- Agency Connection Project.

  By 2025, the District plans to finalize agreements with Western or West Valley Water District to purchase imported potable water supplies (i.e., State Water Project water) pending final agreements. A connection to Western's system would be via the forthcoming Mission Avenue Bridge Project. The County of Riverside Transportation Department is undertaking the Mission Avenue Bridge Project in cooperation with the Cities of Riverside and Jurupa Valley to replace the existing Mission Boulevard Bridge over the Santa Ana River by 2025 and expand it to approximately 88 feet wide and 1,100 feet long and include space for additional pipelines. One use of imported water would be to blend its lower TDS concentrations with the District's water that has higher TDS concentrations so that the District's wastewater delivered to RWQCP meets the TDS threshold concentration of 650 mg/L. A connection to West Valley's system would be via a new interconnect at the shared boundary between the districts. Anticipated demand for imported water is approximately 1,200 AFY to 2,000 AFY at buildout. Because Metropolitan has determined imported water to be reliable in normal, single-dry, and multiple-dry years (WMWD(a)), this supply is assumed to be available to RCSD in normal, single-dry, and multiple-dry years.

- Wells 21 and 22.

  Future Wells 21 and 22 may be located between 34th Street and the 60 Freeway near the Santa Ana River coming online in the near-term of approximately 2025. Wells 21 and 22 would convey to the District's Mahnke Manganese Treatment Facility and Thompson Water Treatment Facility, respectively prior to distribution. Each well would have a pumping capacity of 1,500 gpm each, which translates to 2,400 AFY assuming 50% well run time. This supply would be available in normal, single-dry, and multiple-dry years. The Thompson Water Treatment Plant would be expanded from 5,000 gpm to 7,500 gpm to treat water produced from not only Wells 17 and 18 but also from new wells 21, 22, 23 and 24 (see next bullet).

- Wells 23 and 24.

  Future wells 23 and 24 may be located between 34th Street and the 60 Freeway near the Santa Ana River coming online in the near-term of approximately 2030. These wells would convey to the District's Thompson Water Treatment Facility prior to distribution. Each well would have a pumping capacity of 1,500 gpm each, which translates to 2,400 AFY assuming 50% well run time. This supply would be available in normal, single-dry, and multiple-dry years.

- Well 25.

  Future Well 25 would replace existing Well 2, which currently has a maximum production rate of 900 gpm. Because future Well 25 would have a pumping rate of 1,500 gpm, this results in a net gain in water supply of approximately 600 gpm (480 AFY). This supply is expected to come online by 2030 and would be available in normal, single-dry, and multiple-dry years.

- Well 27.

  Future Well 27 would replace existing Well 4, which currently has a maximum production rate of 1,250 gpm. Because future Well 27 would have a pumping rate of 1,500 gpm, this results in a net gain in water supply of approximately 250 gpm (200 AFY). This supply is expected to come online by 2040 and would be available in normal, single-dry, and multiple-dry years.

6.9 SUMMARY OF EXISTING AND PLANNED SOURCES OF WATER

The water supplies utilized by the District in CY 2020 are provided in **Submittal Table 6-8.** Potable and non-potable supplies are shown, and each come from the same groundwater basin.

Submittal Table 6-8 Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2020		
Drop down list May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool		Actual Volume*	Water Quality Drop Down List	Total Right or Safe Yield* (optional)
Add additional rows as needed				
Groundwater (not desalinated)	Riverside South Basin (No. 8-02.03) for potable use.	4,770	Drinking Water	
Groundwater (not desalinated)	Riverside South Basin (No. 8-02.03) for non-potable use.	417	Other Non-Potable Water	
	Total	5,187		0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES: Volume in AF. From RCSD Annual Summary CY2020.				

The District's planned sources of water supplies are provided in **Submittal Table 6-9**, which are based on information reasonably available to RCSD during preparation of this UWMP.

Submittal Table 6-9 Retail: Water Supplies — Projected						
Water Supply	Additional Detail on Water Supply	Projected Water Supply * Report To the Extent Practicable				
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool		**2025** Reasonably Available Volume	**2030** Reasonably Available Volume	**2035** Reasonably Available Volume	**2040** Reasonably Available Volume	**2045** (opt) Reasonably Available Volume
Add additional rows as needed						
Groundwater (not desalinated)	Riverside South Basin (No. 8-02.03) for potable use.	6,528	6,528	6,528	6,528	6,528
Groundwater (not desalinated)	Riverside South Basin (No. 8-02.03) New Wells 21 and 22	2,400	2,400	2,400	2,400	2,400
Groundwater (not desalinated)	Riverside South Basin (No. 8-02.03) New Wells 23 and 24	0	2,400	2,400	2,400	2,400
Groundwater (not desalinated)	Riverside South Basin (No. 8-02.03) New Well 25	0	480	480	480	480
Groundwater (not desalinated)	Riverside South Basin (No. 8-02.03) New Well 27	0	0	0	200	200
Purchased or Imported Water	Agency connection for potable use.	1,200	2,000	2,000	2,000	2,000
Groundwater (not desalinated)	Riverside South Basin (No. 8-02.03) for **non-potable use.**	454	494	537	584	635
	Total	10,582	14,302	14,345	14,592	14,643
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Volumes in acre-feet (AF). Build-out year assumed to be 2049. Groundwater supply volume assumes pump run time of 50%.						

The projected potable water supplies in Submittal Table 6-9 include the annual sale of potable water to JCSD, potable supply projects in Submittal Table 6-7, and utilization of the District's existing active wells. Imported water supplied from the "Agency Connection" project is assumed to be reliable in average and drought years (see Section 6.10.1, below). The non-potable water supply is expected to grow steadily over the next 20 years. The supply amounts shown in Submittal Table 6-9 are within the existing pumping capacity of the District's non-potable wells.

6.10 SPECIAL CONDITIONS

6.10.1 Climate Change Effects

Beginning in the 2020 UWMP, the Water Code requires the District to consider the impacts of climate change in its water supply projections, which are shown in Submittal Table 6-9. Considerations for climate change impacts began with using the *Climate Change Vulnerability Screening Form for Urban Water Management Planning* located in the appendices to the DWR Guidebook for 2020 UWMPs (March 2021). Pursuant to Water Code, the District's planning for climate change impacts anticipated supply availability under a normal water year, single-dry year, and droughts lasting at least five years, as described below.

The water supply change factors from Western's Technical Memorandum dated April 22, 2021 were applied to RCSD's projected supplies (WMWD(a), p. 11; Appendix H). The water supply factors developed by Western and used herein are provided in **Table 6B**, below. The factors demonstrate Western's findings:

> *For normal years, precipitation and natural recharge are initially projected to decrease during the first decade before stabilizing during the second decade. The maximum projected range of decrease for normal year values is 1.7 percent. However, the projections show that droughts will initially be less severe from the perspective of local rainfall and recharge for the single dry year with increases of up to 1 percent. Recharge during 5-year droughts is projected to decrease by up to 2.3 percent by 2045*. (WMWD(a), p. 11)

Table 6B – Water Supply Climate Change Factors for Precipitation and Natural Recharge

Beginning Year	Normal Year	Single-Dry Year	Five-Year Dry Period
2020[1]	100.0%	100.0%	100.0%
2025	99.1%	100.5%	99.5%
2030	98.3%	101.0%	98.9%
2035	98.5%	100.8%	98.5%
2040	98.7%	100.7%	98.1%
2045	98.9%	100.5%	97.7%

Source: Western Municipal Water District, *Technical Memorandum: Western Drought Contingency Plan – Climate Change Vulnerability Assessment*, April 22, 2021 (WMWD(a), p. 11; Appendix H).

(1) 2020 is baseline year.

To account for the potential effects of climate change to water supplies, and the uncertainty therein, RCSD has conservatively applied the normal year factors from Western's factors for precipitation and natural recharge in Table 6B to the groundwater supply projections of Submittal Table 6-9 beginning in 2025 through 2045, even though the District's groundwater supply has not been responsive to drought in the past. The results are shown below in **Table 6C**.

Table 6C – Potential Effect of Climate Change to Normal Year Projected Supplies

	2025	2030	2035	2040	2045
TOTAL SUPPLY From Table 6-9 (AF)[1]	10,582	14,302	14,345	14,592	14,643
Water Supply Climate Change Factor[2]	99.1%	98.3%	98.5%	98.7%	98.9%
TOTAL SUPPLY with Climate Change Factors (AF)	10,487	14,059	14,130	14,402	14,482
Potential Decrease in Total Supply from Climate Change (AF)	95	243	215	190	161

Notes: Units in acre-feet (AF).
(1) From Table 6-9.
(2) Climate change factors from WMWD(a).

6.10.2 Regulatory Conditions and Project Development

Constraints to the District's water supplies are discussed in Chapter 7.1.2. In summary, additional regulations for yet-to-be determined emerging contaminants in water are expected to continue influencing existing and future water supplies to some degree. Said effects could include how future well sites are located and what wellhead treatment(s) and/or blending are needed and subsequent costs to do so. The District expects to be able to provide the necessary treatment(s) for the next 20 years so that the water continues to meet federal and state standards.

6.10.3 Other Locally Applicable Criteria

As discussed previously in Chapter 6.2, groundwater production in adjudicated basins is not unlimited. Although production from the basin is currently well below the base right and well below the trigger for requiring replenishment water from Western, changes to the terms of the adjudication could affect how the District characterizes this supply source. This would be an example of other locally applicable criteria that is entirely outside of the District's control but could dictate to some degree how much can be produced from the Riverside South Basin. This constraint is discussed further in Chapter 7.1.2.

As discussed previously in Chapter 6.8, the imported water supply that is expected to become available to the District in the future is assumed to be reliable in normal, single-dry, and multiple-dry years. However, the District remains prepared to fully utilize its local supplies and treatment systems to meet demand if imported supplies are decreased or temporarily suspended.

6.11 ENERGY USE

Energy is required to operate a water supply system, including the energy needed to pump, treat, store, and deliver water to the end consumer. Beginning in 2020, UWMPs must report estimates of the energy used for its water distribution system that is within its operational control (Water Code Section 10631.2(a)). RCSD obtained electricity usage data from its electricity supplier, Southern California Edison for calendar year 2020 for each electrical meter located at each of the District's facilities. This includes RCSD water wells, booster stations, reservoirs, treatment systems, and pressure reducing stations. Total electricity used for the water distribution system in CY 2020 is provide in **Table O-1B**. This includes 2,357,910 kWh for potable wells and booster stations, 169,091 kWh for non-potable wells, 576,902 kWh for water treatment plants and 1,570 kWh generated by solar power at reservoirs.[3]

Each of the District's four active reservoirs are solar powered with a total of five solar panels. Each solar panel has a peak power of 160 watts (W) and a battery backup. If the battery voltage drops too low before the sun rises, then electricity is provided by Edison. Assuming

[3] A kilowatt-hour (kWh) equals the amount of energy used by keeping a 1,000-watt appliance running for one hour.

average peak sun of 5.38 hours per day for 365 days, approximately 1,570 kWh can be generated and used by the solar tanks each year (www.turbinegenerator.org).

Table O-1B: Recommended Energy Reporting - Total Utility Approach

Enter Start Date for Reporting Period	1/1/2020	**Urban Water Supplier Operational Control**		
End Date	12/30/2020			
☐ Is upstream embedded in the values reported?		**Sum of All Water Management Processes**	**Non-Consequential Hydropower**	
Water Volume Units Used	*AF*	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process (volume unit)		*5,187*	*0*	*5,187*
Energy Consumed (kWh)		*3,105,473*	*0*	*3,105,473*
Energy Intensity (kWh/volume)		*598.7*	*0.0*	*598.7*

Quantity of Self-Generated Renewable Energy

1,570 kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

Combination of Estimates and Metered Data

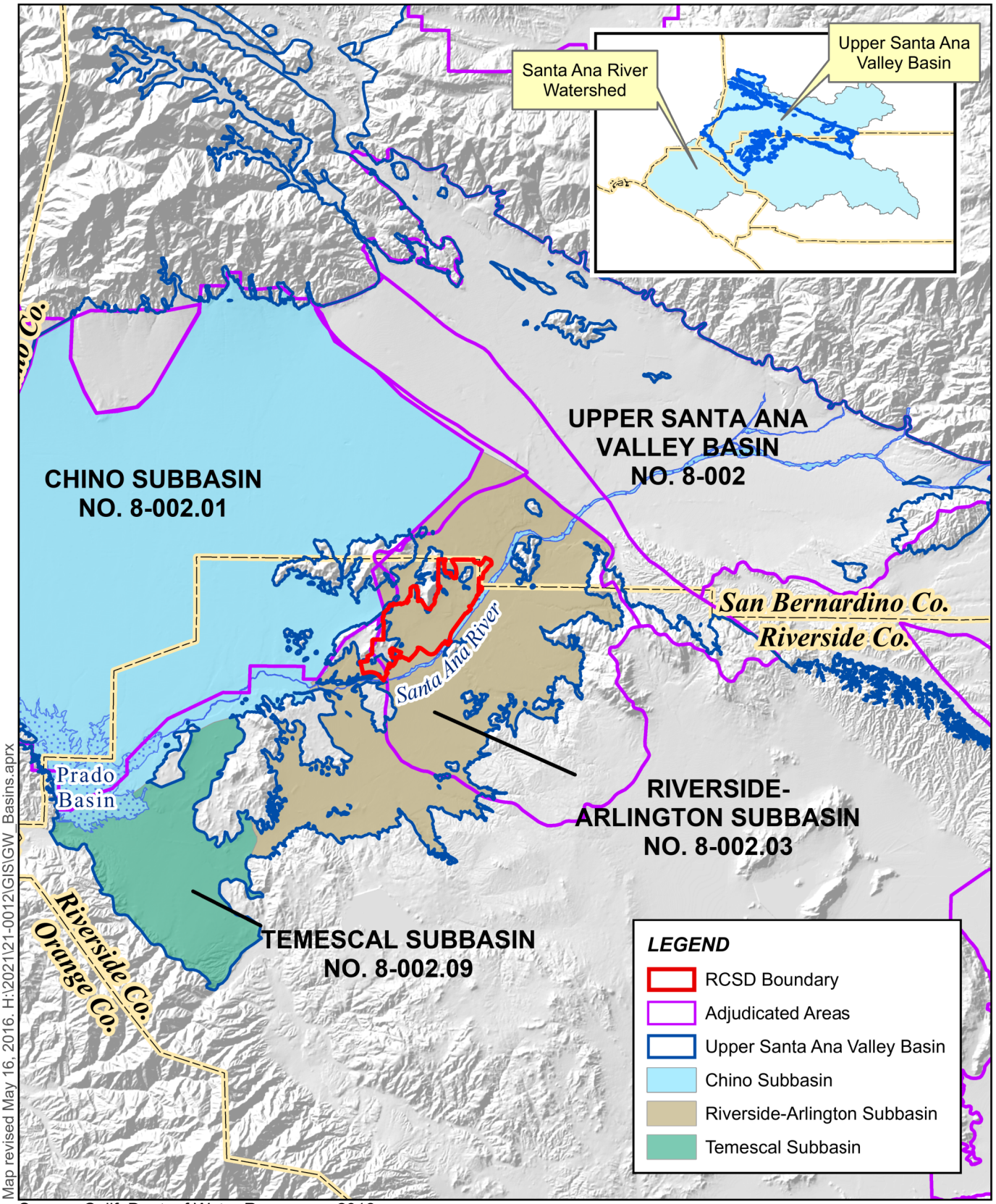
Data Quality Narrative:

CY2020 metered electricity use obtained from Southern California Edison in spring 2021. Renewable energy is estimated from solar panel specifications and average peak sun of 5.38 hours/day.

Narrative:

Edison meter data includes active potable wells, non-potable wells, water treatment facilities, and booster stations. District also has 1 natural gas generator and 3 potable wells have diesel generators. All 4 active reservoirs are solar powered with a total of 5 solar panels; each with battery backup and then Edison service when voltage drops too low before sun rises.

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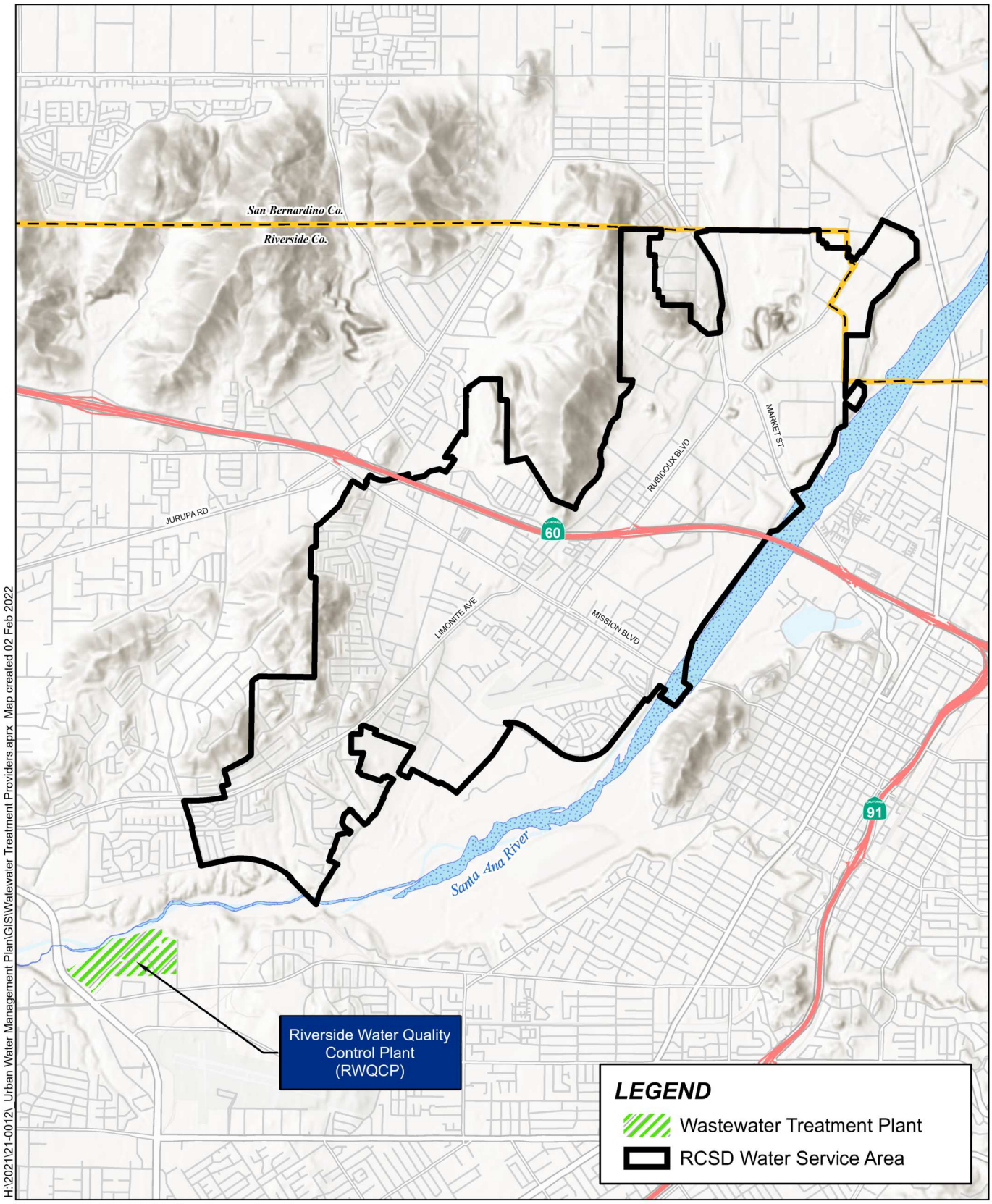


Map revised May 16, 2016. H:\2021\21-0012\GIS\GW_Basins.aprx

Source: Calif. Dept. of Water Resources, 2018.

Figure 6-1 – Groundwater Basins

RCSD Urban Water Management Plan 2020



Sources: RCSD 2015; San Bernardino Co. GIS, 2021; ESRI, 2021.

0 2,000 4,000 6,000 Feet

Fig. 6-2 Wastewater Treatment Provider

RCSD Urban Water Management Plan 2020

ALBERT A. WEBB ASSOCIATES

CHAPTER 7 WATER SERVICE RELIABILITY AND DROUGHT RISK ASSESSMENT

This chapter describes RCSD's ability to meet the water needs of its customers with its water supplies under varying conditions. Assessing water service reliability takes into consideration a number of factors, including plausible changes in supplies, regulatory and legal constraints, climate change, and expected growth, among others. This chapter also includes a near-term assessment of a severe drought period lasting for the next five consecutive years from 2021 to 2025.

7.1 WATER SERVICE RELIABILITY ASSESSMENT

Pursuant to Water Code, this reliability assessment will compare the total water supply sources available to the District with the long-term projected water use over the next 20 years, in five-year increments during normal, single-dry, and multiple-dry (five consecutive) water years. This assessment marries the findings in Chapter 4 – Water Use Characterization and Chapter 6 – Water Supply Characterization to help direct management actions for the future.

7.1.1 Summary of Water Use and Water Supply

As described in Chapter 4, past water use from 2015 to 2020 indicates residential customers are the dominate consumer of water at approximately 70% of annual water use on average, followed by commercial, institutional, and industrial customers consuming approximately 20% of total water use, with the remainder being attributable to dedicated irrigation and construction uses, and system losses. When RCSD was able to sell water to its neighboring agency JCSD up until the end of 2017, those sales could make up roughly 30% of the District's total annual water demands. Potable water loss has fluctuated but is on the decline as improvements are made to the system (see Table 4A). Current water use shows metered water deliveries in CY 2020 consisted of 4,770 AF of potable water and 417 AF of non-potable water for a total of 5,187 AF (Table 4-1). This is an increase from the total water use in 2019 but still lower than 2018 consumption. Residential customers were the majority consumer. The amount of water lost each year due to leaks, theft, or metering inaccuracies has been decreasing since 2017 with CY 2020 losses at just 91 AF. Future water use is projected to increase gradually for each use type from 2025 to 2049 to reach ultimate demand of 10,800 AFY for potable water, 2,000 AFY for sales of potable water to JCSD, and approximately 680

AFY for non-potable water (assuming a linear 1.7% per year increase). Buildout of the District is projected to be reached by 2049. Refer to Submittal Tables 4-1, 4-2, 4-3, and 4-4 for current (2020) and future (2025-2045) water use, as well as water losses.

As described in Chapter 6, RCSD relies on groundwater for its water supply, which has been historically reliable and sufficient to meet demands; however, use of the water for potable purposes requires all wells to have treatment systems. The District relies on the Riverside South Basin located in the Riverside-Arlington Subbasin of the Upper Santa Ana River Basin. The Riverside South Basin is adjudicated by two court Judgments, one of which appointed the Western-San Bernardino Watermaster to administer and enforce all instruction and orders of the court (Appendix K). The Judgment establishes an aggregate pumping limit criteria for the Riverside South Basin; for example, if the total pumping in any one year from all producers exceeds the limit, then Western must provide replenishment water the following year on behalf of all producers in the basin, the costs of which may be shared by all producers. To date, replenishment water has not been needed. Historic aggregate annual production volumes are shown in Chart 6-1. The District operates potable and non-potable wells, treatment facilities, booster stations, four storage reservoirs, and approximately 74 miles of water pipelines.

Past groundwater production by the District has increased over the past 40 years from 1,900 AFY in 1970 to a high of 7,801 AFY in 2015 to meet customer demands (Table 6A). Current groundwater production in CY 2020 is 4,770 AF of potable water and 417 AF of non-potable water (Submittal Table 6-1). Future groundwater production by the District will have the capability to increase with the addition of several new well fields and treatment systems; in addition, the District plans to purchase imported water supplies within the next five years to dilute the concentration of TDS in wastewater (Submittal Table 6-7). The District does not currently use desalinated water nor has intentions to use surface water, stormwater, or recycled water for water supplies. The Riverside South Basin has proven to be a stable and reliable water source, even when environmental conditions are exceptionally dry (see Chart 6-2 for recorded RCSD groundwater surface elevations). Refer to Submittal Table 6-7 for planned supply projects, Submittal Table 6-8 for current (2020) supplies, and Submittal Table 6-9 for projected supplies through 2045.

7.1.2 Constraints to Water Supply

Four factors can affect the availability of groundwater for the District: sufficient production capacity (e.g., wells, pumps, pipes, etc.); sustainability of the groundwater to meet pumping demand on a renewable basis; quality of the water; and outages resulting from catastrophic events including earthquake, fire, and power loss.

Production Capacity Constraints

The District has a total of six potable wells (and one backup emergency well) with a total potential pumping capacity of 9,950 gpm. As of 2020, four wells are used to meet demands with a total potential pumping capacity 6,250 gpm; a fifth well is available if needed with 1,100 gpm pumping capacity. Within a year, the sixth potable well which is currently offline due to clogging will be usable again with 1,500 gpm pumping capacity.

The District has a total of seven non-potable wells with a total pumping capacity of 2,300 gpm; however, one well with 400 gpm capacity will be staying inactive. As of 2020, three non-potable wells are used to meet demands with a total pumping capacity of 1,000 gpm. The other three wells with a total of 900 gpm capacity are currently not connected to the system but could be reconnected in the future for non-potable supply.

The current production capacities do not constrain the potable or non-potable water supply. Current average day demand is approximately 13 AF per day, which would require approximately 3,100 gpm to produce. Because the District has a potable pumping capacity of more than twice that (i.e., 6,250 gpm), there is currently no constraint on water supply from insufficient pumping capacity. It has been recommended for the future, however, to increase production capacity to establish more reserve capacity (K&S, p. II-9). The District is undertaking an update to its 2015 Water Facilities Master Plan which is expected by 2022 to identify improvements to the system to ensure the District meets recommended design criteria.

Water Quality Constraints

The District's water supply could be constrained in the event wells are shut down because of contaminants appearing at concentrations exceeding the drinking water standards. The District maintains treatment systems to specifically lower the concentrations of nitrate, manganese,

1,2,3-TCP, and perchlorate. The Anita B. Smith Water Treatment Plant was constructed in 1995 to reduce the concentration of nitrate in water produced by Wells 4 and 6. Constructed in 1996, the Mahnke Water Treatment Plant reduces the concentration of manganese in water produced by Well 8; however, this plant is not currently in use to meet potable demands. The third treatment plant operated by the District, the Thompson Water Treatment Plant came online in 2013 to reduce manganese from water supplied by Wells 17 (now decommissioned) and 18. The District also blends water from different wells in order to deliver water that meets the drinking water standards.

The District is currently adding treatment systems to reduce PFOA and PFOS (part of the PFAS family of chemicals) to below the notification levels. Notification levels are nonregulatory, precautionary health-based measures for concentrations in drinking water that warrant notification and further monitoring and assessment. Public water systems are encouraged to test their water for contaminants with notification levels, and in some circumstances may be ordered by the state to test. If the systems do test, they are required to report exceedances to their governing boards and the SWRCB and are urged to report this information to customers via the Consumer Confidence Report. The RCSD 2019 Consumer Confidence Report (CCR) reported average concentrations of PFOA and PFOS at 10.98 parts-per-trillion (ppt) and 10.13 (ppt), respectively, which exceed the current notification levels for PFOA and PFOS which are 5.1 ppt and 6.5 ppt, respectively. The District's most recent CCR describing the results of water quality testing performed in 2019 is provided in **Appendix L.**

The Riverside South Basin has higher concentrations of TDS than typical of water imported from Northern California. As reported in the District's CCRs published from 2016 to 2019, TDS concentrations in the water supply delivered to customers have averaged 505 milligrams per liter (mg/L) with a range of detection from 460 mg/L to 550 mg/L. TDS is regulated by a secondary drinking water standard, meaning it affects the taste, odor, or appearance of drinking water but consuming it does not affect human health at the standards level. The secondary drinking water standard for TDS is 1,000 mg/L.

Although all of the District's potable well supplies require some level of treatment prior to distribution, and all future potable wells are expected to require treatment as well, the water quality of the District's well water has not constrained the quantity of water available to RCSD

in the past. With the additional treatment systems being installed currently and ongoing testing, the District does not expect water quality to constrain supplies in the future.

Water Supply Constraints

The District's groundwater supply could be constrained in the event of declining groundwater levels. In that case, the cost of production would increase to pump at deeper depths or at new locations or purchase supplies from other sources. However, this is unlikely according to the groundwater data submitted from the District and verified by the Watermaster. As of 2019, total extractions from the Riverside South Basin area were 26,500 AF, which is compared to total extractions in the base period of 1959-1963 at 29,633 AF. Accumulated credits as of 2019 totaled 719,796 AF and accumulated obligations totaled 175,575 AF for a net credit of 544,221 AF (to Western) as of 2019 (WSBW(c), p. 167). Because aggregate production in the adjudicated area remains below the base right, and credits available to offset obligations are roughly ten times the base right, ample supply in the basin is expected. Further, records show relatively stable groundwater elevations for RCSD wells over the past 20 years. Refer to Chart 6-1 in Chapter 6 for recorded annual aggregate production volumes and refer to Chart 6-2 for recorded RCSD groundwater surface elevations.

As described in Section 6.8, the District is pursuing an imported water supply via a future Agency Connection. Imported water supplies may be constrained due to regulatory, legal, biological, and structural constraints on the State Water Project supplies from the Sacramento/San Joaquin Delta in Northern California. To address reliability of imported water supplies for its retail agencies, which includes RCSD, Western prepared a Technical Memorandum describing the results of its Climate Change Vulnerability Assessment (dated April 22, 2021) (Appendix H). It states, "The current (November 2020) draft of Metropolitan's 2020 UWMP Drought Risk Assessment indicates that no service reliability concerns are projected for imported water during normal and drought periods before 2045. For purposes of the UWMP, imported water supplies to Western can be assumed to be unchanged during normal years, single dry years, and five-year droughts" (p. 3). Therefore, RCSD will also assume that projected imported water supplies from the future Agency Connection will be available in normal and drought years.

Catastrophic Events and Interties

Catastrophic events including electrical outages, earthquakes, fire, or any other natural disaster could constrain water supplies. In the event of such an emergency, the District is prepared to purchase emergency water supplies from neighboring agencies over the time required to get the District's system functioning again.

The District and JCSD share two interties and a mutual aid agreement that can be activated in an emergency to flow in either direction (i.e., RCSD Intertie South and Jewel Street Intertie). Currently, West Valley and RCSD are actively working together to develop a connection. The District is actively working with the City of Riverside to make a connection to the City's distribution system in order to receive imported water supplies from Western. In an emergency, this may be another option to satisfy demands until the repairs can be made.

The District has one natural gas portable generator, diesel backup generators at three potable wells, and backup generators at the Mahnke, Thompson, and Smith Water Treatment Plants to provide emergency water in the event of a widespread power failure. The non-potable irrigation wells do not have backup power onsite. As of March 2021, the District secured grant funding to purchase fixed generators at two potable wells and a booster station for the purpose of increased system reliability and mitigate power disruptions to service (DM 2021-17).

In 2020, the District retained Harper & Associates Engineering, Inc. to conduct corrosion investigations and seismic, structural, and safety engineering evaluations of the District's four active water storage tanks (HAE(a), HAE(b), HAE(c), HAE(d)). The results of the seismic analyses portion of the reports are provided in Chapter 8 under the seismic assessment and mitigation discussion. These reports provide the District action items they can undertake to improve system reliability in an earthquake emergency.

7.1.3 Reliability by Type of Year

RCSD has had a reliable water supply to meet demands during normal, single-dry, and multiple-dry years and to-date has not experienced a water shortage. Further, the District had sufficient water supplies during the statewide drought from 2012 to 2017. The Water Code requires each water supplier to determine three types of years and how much supply was

available for each: normal (or average),[1] single-dry,[2] and multiple-dry years for five years.[3] As shown in **Submittal Table 7-1**, the District expects all of its average supply to be available regardless of the year type, including future imported water supplies.

Submittal Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment)			
Year Type	**Base Year** If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2019-2020, use 2020	**Available Supplies if Year Type Repeats**	
		☐	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____
		☑	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available *	**% of Average Supply**
Average Year	2010		100%
Single-Dry Year	2018		100%
Consecutive Dry Years 1st Year	2012		100%
Consecutive Dry Years 2nd Year	2013		100%
Consecutive Dry Years 3rd Year	2014		100%
Consecutive Dry Years 4th Year	2015		100%
Consecutive Dry Years 5th Year	2016		100%
Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.			
***Units of measure (AF, CCF, MG**) must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: % average supply is 100% for both potable and non-potable supplies during the years shown.			

The selected base years were selected on rainfall data collected by Riverside County Flood Control and Water Conservation District from five stations scattered around western Riverside

[1] A year, or an averaged range of years, that most closely represents the average water supply available to the agency. The UWMP Act uses the term “normal”.
[2] The single-dry year is the year that represents the lowest water supply available to the agency.
[3] The multiple-dry year period that represents the lowest average water supply availability to the agency for a consecutive multiple year period (three years or more).

County (i.e., Riverside, Corona, Elsinore, Hemet/San Jacinto, and Perris/Moreno Valley). Each year, the Flood Control District determines whether that year was, on average, a very dry, dry, normal, wet, very wet, or record wet year by converting annual total rainfall as a percentage of normal, where normal is calculated as the average per station. Records from these stations range from 64 to 128 years of rainfall data; therefore, it is considered robust. Flood Control's data as of fiscal year 2019/2020 suggests 2010 was considered a "normal" rainfall year for western Riverside County; 2018 was "very dry" year between two "wet" years (2017 and 2019); and 2012 to 2016 were five consecutive "dry" years (RCFC(a)).

A second version of Submittal Table 7-1 showing the hydrological conditions for imported water supplies was not prepared because, according to Western and Metropolitan, imported water supplies will be reliable in all year types (WMWD(a), p. 3).

7.1.4 Normal Year Reliability

Normal Year. This condition represents the water supplies a supplier considers available during normal conditions.

Water use is described in Chapter 4 and projections of future water use during a normal year are provided in Submittal Table 4-3. RCSD water supplies are presented in Chapter 6 and water supply projections during a Normal Year are provided in Submittal Table 6-9. The Normal Year supply and demand projections are compared in **Submittal Table 7-2**, below**.**

Submittal Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	10,582	14,302	14,345	14,592	14,643
Demand totals *(autofill from Table 4-3)*	8,182	10,914	11,649	12,388	13,130
Difference	2,400	3,388	2,696	2,204	1,512
NOTES: Volume in acre-feet (AF). Includes potable and non-potable water in a normal year scenario with future supply projects from Table 6-7. Assumes pump run time of 50%.					

As shown in Submittal Table 7-2, during an average rainfall year occurring between 2025 and 2045, sufficient water supplies will be available to meet demands to the year 2045.

The following assumptions have been made to estimate supply and demand during a normal year:

- Supply includes the future supply projects from Submittal Table 6-7, which are: (1) future Agency Connection project beginning 2025 at 1,200 AFY growing to 2,000 AFY by 2030; (2) Wells 21 and 22 beginning 2025 at 2,400 AFY; (3) Wells 23 and 24 beginning 2030 at 2,400 AFY; (4) Well 25 beginning 2030 at an additional 480 AFY; and (5) Well 27 beginning 2040 at an additional 200 AFY.

- Demands include annual growth with additional demands from the Shadow Rock, Agua Mansa Specific Plan (50 AFY) and Rio Vista Specific Plan (2,000 AFY) projects beginning in 2025 and 2030. Demand also includes sales of potable water to JCSD at 2,000 AFY beginning 2025 (this amount is held constant through 2045).

- Submittal Table 7-2 does not include potential effects of climate change.

Table 7A shows a comparison of climate-adjusted normal year water supplies and demands for the 20-year planning horizon to compare with the non-climate adjusted values in Submittal Table 7-2.

Table 7A: Comparison of Climate Change-Adjusted Normal Year Supply and Demand

	2025	2030	2035	2040	2045
TOTAL SUPPLY with Climate Change Factors for Groundwater Supplies (AF)[1]	10,487	14,059	14,130	14,402	14,482
TOTAL DEMANDS with Climate Change Factor for Outdoor Demands (AF)[2]	8,008	10,814	11,621	12,441	13,285
Difference (AF)	2,479	3,245	2,508	1,962	1,196

Notes: Units in acre-feet (AF).
(1) From Table 6C.

(2) From Table 4C.

The normal year climate change factors reflect modeling projections of increasing outdoor water demand and decreasing precipitation and recharge. As shown in Table 7A, comparing the climate change-adjusted supply and demand projections in a normal year suggests sufficient supply will be available for the District with the addition of at least one of the new well fields listed in Submittal Table 6-7 (i.e., Wells 21 and 22 or Wells 23 and 24) slated for completion by 2025 and 2030, and/or operating existing wells at an average pump run time greater than 50%. However, it should be noted that the demand factor was applied to all demands (indoor and outdoor), when only outdoor demands are expected to increase in response to climate change effects. If the new wells are not included in total supplies beginning in 2030, then a small shortfall in supply is observed and in order to make supply equal demand in this scenario, future supplies from the existing well field would need to be approximately 20% higher starting from around 2030, which can be met with the existing operating capacity of the wells.

7.1.5 Single-Dry Year Reliability

Single Dry Year. The year that represents the lowest water supply available to the Supplier.

The District's Single Dry Year supply and demand comparisons are provided in **Submittal Table 7-3**, which show the expectation that water supply will meet expected demand through 2045. Although 2018 was a single-dry year, the District observed no decrease in its available supply, and customer demand actually rose approximately 10 percent from 2017 urban retail demand (which does not include demand from sales to JCSD).

Submittal Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 (Opt)
Supply totals*	10,582	14,302	14,345	14,592	14,643
Demand totals*	8,182	10,914	11,649	12,388	13,130
Difference	2,400	3,388	2,696	2,204	1,512
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: Units in acre-feet (AF). Single dry year conditions of base year 2018 are assumed (approximately half the normal rainfall).					

The following assumptions have been made to estimate supply and demand during a single-dry year:

- There will be no decline in the non-potable and potable groundwater supplies from District wells as compared to a normal year supply.
- Imported water supplies from future Agency Connection will be unchanged.
- There will be no decline in customer water use compared to a normal year.
- The District will prohibit water waste and encourage efficient use of water supplies.
- Customers will continue to voluntarily conserve water unless a water shortage condition occurs that would trigger the response actions listed in the Water Shortage Contingency Plan (located in Chapter 8, herein).
- Water losses are included in future potable water demands at 2% of annual demand.
- The potential effects of climate change during a single-dry year are shown in **Table 7B.**

Table 7B: Comparison of Climate Change-Adjusted Single-Dry Year Supply and Demand

	2025	2030	2035	2040	2045
Single-Dry Year Supply from Table 7-3 (AF))	10,582	14,302	14,345	14,592	14,643
Water Supply Climate Change Factors for Single Dry Year(1)	100.5%	101.0%	100.8%	100.7%	100.5%
Single-Dry Year Supply with Climate Change Factors (AF)	10,635	14,445	14,460	14,694	14,716
Single-Dry Year Demand from Table 7-3 (AF)	8,182	10,914	11,649	12,388	13,130
Water Demand Climate Change Factors for Single Dry Year(2)	100.6%	101.3%	101.9%	102.5%	103.2%
Single-Dry Year Demand with Climate Change Factors (AF)	8,231	11,056	11,870	12,697	13,551
Difference (AF)	**2,404**	**3,389**	**2,590**	**1,997**	**1,165**

Notes: Units in acre-feet (AF). (1) From Table 6B (WMWD(a)).
(2) From Table 4B (WMWD(a)).

Table 7B suggests that although climate models predict precipitation and natural recharge may increase during a single-dry year in 2025, the increase in outdoor water use due to higher temperatures may outpace that prediction. However, because the District cannot separate indoor from outdoor use, the assumption made in Tables 7A and 7B is that all water demand is being treated as outdoor demand and that indoor and outdoor demands will respond equally. Therefore, climate-change adjusted demand in these tables is likely overstated. With the addition of future supply, no shortfall is observed in Table 7B. To make up the shortfall without the future supply projects so that supply equals demand in this scenario, future supplies may need to be increased from 0.1% to 4% higher to account for potential increases in outdoor water demand and decreases in precipitation and natural recharge starting from around 2025 to 2045. The increases are within the normal operating capacities of the wells.

7.1.6 Multiple-Dry Year Reliability

Five-Consecutive-Year Drought. The driest five-year historical sequence for the Supplier.

The District selected the five-year base period from 2012-2016 to represent conditions during a multiple-dry year scenario. The District's Multiple-Dry Year supply and demand comparisons are provided in **Submittal Table 7-4**. Because the District observed little to no decrease in its water supplies during the drought period of 2012-2016, supply and demand are consistent with normal year Submittal Table 7-2.

Submittal Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	10,582	14,302	14,345	14,592	14,643
	Demand totals	8,182	10,914	11,649	12,388	13,130
	Difference	2,400	3,388	2,696	2,204	1,512
Second year	Supply totals	10,582	14,302	14,345	14,592	14,643
	Demand totals	8,182	10,914	11,649	12,388	13,130
	Difference	2,400	3,388	2,696	2,204	1,512
Third year	Supply totals	10,582	14,302	14,345	14,592	14,643
	Demand totals	8,182	10,914	11,649	12,388	13,130
	Difference	2,400	3,388	2,696	2,204	1,512
Fourth year	Supply totals	10,582	14,302	14,345	14,592	14,643
	Demand totals	8,182	10,914	11,649	12,388	13,130
	Difference	2,400	3,388	2,696	2,204	1,512
Fifth year	Supply totals	10,582	14,302	14,345	14,592	14,643
	Demand totals	8,182	10,914	11,649	12,388	13,130
	Difference	2,400	3,388	2,696	2,204	1,512
Sixth year *(optional)*	Supply totals	10,582	14,302	14,345	14,592	14,643
	Demand totals	8,182	10,914	11,649	12,388	13,130
	Difference	2,400	3,388	2,696	2,204	1,512
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Units in acre-feet (AF).						

The following assumptions are made to estimate supply and demand during a consecutive five-year multiple-dry year period (drought stages are described in detail in Chapter 8):

- There will be no decline of the non-potable and potable groundwater supplies from District wells as compared to a normal year supply.
- Imported water supplies from future Agency Connection will be unchanged.
- There will be no decline in customer water use compared to a normal year.
- The District will prohibit water waste and encourage efficient use of water resources.
- Customers will continue to voluntarily conserve water unless a water shortage condition occurs that triggers shortage response actions from the Water Shortage Contingency Plan (located in Chapter 8, herein).
- Water losses are included in future potable water demands at 2% of annual demand.
- The potential effects of climate change to the multiple-dry year supply and demand comparison are not embedded in Submittal Table 7-4. The potential climate change effects of decreasing precipitation and natural recharge and the effect of increasing outdoor water demand are reflected in Years 1-5 as shown below.

	2025*	2030*	2035*	2040*	2045* (Opt)
Supply totals	10,529	14,145	14,130	14,315	14,306
Demand totals	8,166	11,045	11,858	12,685	13,524
Difference	2,363	3,100	2,271	1,630	782

7.1.7 Management Tools and Options for Reliability

As shown in the tables above, RCSD anticipates having adequate water supplies to meet future demands during normal, single-dry, and multiple-dry years through the 20-year planning period. This is mainly because of the reliability of the District's primary water source in the Riverside South Basin and the ability of customers to conserve when needed. Periodic drought

has not affected the groundwater levels to the point where the District's water supply is reduced and requires demand management or supply augmentation. In the event of a significant water shortage, the District will utilize its existing tiered water rate structure to encourage water conservation by reducing the quantity use range of each tier.

RCSD will continue efforts to maximize the use of local water resources and minimize the need to import water. District actions such as increased groundwater treatment systems, implementation of demand management measures to reduce losses and increase system efficiency are anticipated. Imported water supplies are necessary at this time to reduce TDS concentrations in sewage and meet wastewater discharge requirements.

Demand management measures implemented by RCSD over the past five years and planned for the next five years are outlined in Chapter 9 and are designed to help RCSD meet its future water use reduction targets. Although the District has achieved the 2020 water use target for water conservation pursuant to SB X7-7, it is understood that drought conditions are likely ongoing in the foreseeable future. Therefore, water conservation efforts are planned to continue and expand to optimize potable water use to the maximum extent practicable. To encourage water use reductions during water shortages, RCSD has developed a multi-level Water Shortage Contingency Plan, as discussed in detail in Chapter 8 of this UWMP.

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7.2 DROUGHT RISK ASSESSMENT

The Drought Risk Assessment (DRA) is a new requirement beginning with the 2020 UWMP. The DRA can be updated before the next UWMP cycle (i.e., 2025); however, the notification and approval procedures in Chapter 10 of the UWMP would be required for any interim changes to the DRA. An update to the DRA may be needed as result from new information becoming available, water supply or water use changes, or in the event of unforeseen circumstances.

The DRA is based on the five driest consecutive years on record taking into account any extra effects to water supplies from plausible changes in climate, regulations, and other locally applicable criteria. If there is a shortage, the DRA identifies what the effects to the shortage would be from increasing supply and/or reducing demand. The DRA differs from the supply and demand comparisons in Tables 7-3 and 7-4 in that climate change effects have been taken into account. Water Code requires that the DRA include a description of the data and methods used, the basis for the supply shortage conditions, determination of the reliability of each source, and comparison of total water supplies and uses during the drought, which are described below.

7.2.1 Data, Methods, and Basis for Water Shortage Conditions

Supply conditions for the District wells during the five driest years (2012-2016) were consistent with non-drought years. Although typical seasonal fluctuations occur in individual wells, overall groundwater level contours from 2000 through 2020 have remained stable as shown in Chart 6-2 (Chapter 6). Therefore, a water shortage from a prolonged drought, including one occurring in the next five years (2021-2025) is not anticipated. However, a water shortage as a result of a catastrophic event such as an earthquake is foreseeable. Although the tank ages range from 60 years to 30 years old and have endured many major earthquakes, at least three of them are due for a seismic upgrade or replacement, according to the District's seismic analysis (HAE(a), HAE(b), HAE(c), HAE(d)). Therefore, the water shortage conditions are based the hypothetical failure of at least one tank reservoir resulting from a significant earthquake.

Imported State Water Project water may become available to the District in the near future as described in Chapter 6 (Submittal Table 6-7). Although there is inherent uncertainty in the

consistent availability of this water supply source, this DRA has assumed that imported water supplies will be reliable following the determination of Metropolitan in its draft 2020 UWMP.

7.2.2 Individual Water Source Reliability

The following are characterizations of the expected quantity of supply and reliability of the supply during the first year of a drought beginning in 2021.

- Drought Year 1: 2021
    - Total water consumption increases from 2020 by approximately 3% due to urban growth (3.0% increase in potable water and 1.7% increase for non-potable demand).
    - No decline to customer water use as compared to 2020. Water waste prohibition remains in effect.
    - No decline in water supply from District non-potable or potable well water as compared to 2020.
    - Repairs to Well 18 (potable) will be completed and back online at 1,500 gpm. Well 4 (potable) at 1,100 gpm was not used in 2020 but it can be used in 2021.
- Drought Year 2: 2022
    - Total water consumption increases from 2021 by approximately 3% due to urban growth (3% increase in potable use and 1.7% increase in non-potable use).
    - No decline to customer water usage as compared to 2020, unless there is a statewide conservation mandate to reduce water use, or a decline in groundwater supplies, or an emergency water shortage not caused by drought.
    - No decline in water supply from non-potable or potable well water as compared to 2020.

- Repairs to Well 18 (potable) will be completed and it will be back online at 1,500 gpm. Well 4 (potable) at 1,100 gpm was not used in 2020 but it can be used in 2021.

- Drought Year 3: 2023
  - Total water consumption increases from 2022 by approximately 3% due to urban growth (3% increase in potable water use and 1.7% increase in non-potable use).
  - No decline to customer water usage as compared to 2020, unless there is a statewide conservation mandate to reduce water use, or a decline in groundwater supplies, or an emergency water shortage not caused by drought.
  - No decline in water supply from non-potable or potable well water as compared to 2020.

- Drought Year 4: 2024
  - Total water consumption increases from 2023 by approximately 3% due to urban growth (3% increase in potable water use and 1.7% increase in non-potable water use).
  - No decline in customer water usage as compared to 2020, unless there is a statewide conservation mandate to reduce water use, or a decline in groundwater supplies, or an emergency water shortage not caused by drought.
  - No decline in water supply from non-potable or potable well water as compared to 2020.

- Drought Year 5: 2025
  - Agency Connection Project will come online to deliver approximately 1,200 AFY of imported potable water supplies to help dilute the TDS concentration in the District's wastewater.

- Sales of potable water to JCSD using the existing interties will begin again at approximately 2,000 AFY.
- Shadow Rock and Agua Mansa Commerce Center Specific Plan expected completion year with additional 216 AFY and 50 AFY water demand, respectively.
- Total water consumption increases from 2024 by approximately 38% due to urban growth (2.6%), Shadow Rock project (216 AFY), Agua Mansa project (50 AFY), sales to JCSD (2,000 AFY) and 1.7% increase in non-potable use).
- No decline in customer water usage as compared to 2020, unless there is a statewide conservation mandate to reduce water use, or an inexplicable decline in groundwater supplies, or an emergency water shortage not caused by drought.
- No decline in water supply from non-potable or potable well water as compared to 2020.

One source of uncertainty in the aforementioned assumptions is timing of when the future imported water supply will be completed and when deliveries will start, and whether the drought affects the amount delivered. Likewise, timing for completion of the Agua Mansa project is uncertain. Another source of uncertainty is whether non-potable water demand will increase and whether the District will be forced to mandate water conservation as a result of a statewide drought declaration or as a result of an unforeseen interruption of service from an earthquake or other hazard.

7.2.3 Total Water Supply and Use Comparison

When a water supplier cannot meet the demand of its customers for whatever reason, this DRA assumes two things can happen: the supplier can mandate customers to conserve water, thus reducing demand; and/or the supplier can augment or supplement its normal supplies with an emergency and temporary source of water.

RCSD customers were responsive to the water conservation mandate in 2015. The District is in the process of developing an updated and thorough water conservation ordinance which will

help clarify expectations and authorities. Water demands are expected to gradually increase as the service area builds out by about 2049 and a couple of large development projects are annexed into the District (see Chapter 4).

Supply augmentation for RCSD comes from the District's ability to fully utilize production capabilities and produce additional water from the Riverside South Basin consistent with the Judgment (Appendix K). Emergency supplies can be obtained from the intertie and mutual aid agreement with JCSD, and the District is actively working with West Valley Water District to develop a connection.

Assuming the next five years, 2021 through 2025, are a five-consecutive-year drought, and taking into account the assumptions in Section 7.2.2, the District's potential water supply surplus (or shortage) is provided in **Submittal Table 7-5** (next page)**.** If there is a shortage, then the benefit of a supply augmentation or use reduction action is shown to address the shortage. Because Western's climate change factors show 100% of supply and demand beginning in 2020, no climate change effects have been added to the calculations in Submittal Table 7-5.

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Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)	
2021	**Total**
Total Water Use	5,332
Total Supplies	5,332
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use	5,478
Total Supplies	5,478
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use	5,624
Total Supplies	5,624
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2024	Total
Total Water Use	5,770
Total Supplies	5,770
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2025	Total
Total Water Use	8,182
Total Supplies	8,182
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

As shown in Submittal Table 7-5, supply is expected to equal demand in each year from 2021 to 2025 assuming each year is a drought year primarily because the supplies from District wells have not decreased in previous long-term drought periods to such a degree that demand management actions or supply augmentation is required to respond to a supply shortage.

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CHAPTER 8 WATER SHORTAGE CONTINGENCY PLAN

This Water Shortage Contingency Plan (WSCP) details RCSD's actions in the event of an actual water shortage scenario. A water shortage means that the water supply that is available is insufficient to meet the normally expected customer water use at a given point in time. In 2018, the Legislature modified the UWMP laws to require a WSCP with the specific elements contained herein. The District may modify this WSCP at any time independent of updates to the UWMP; however, the same steps to notify and hold a public hearing are required with each modification as described herein. This chapter is written as a stand-alone document and therefore repeats many elements from the other chapters in the UWMP.

Original WSCP Adoption Resolution No. 2021-879 on June 17, 2021. The WSCP was amended April 21, 2022 (Adoption Resolution No. 2022-887) to modify water shortage response actions and update emergency response actions in conjunction with the adoption of Ordinance No. 2022-130 (Establishing the Program for Implementing the Water Shortage Contingency Plan) (a copy of which is provided in **Appendix Q** and completion of the District's 2021 Emergency Response Plan. With adoption of Ordinance No. 2022-130, Ordinance No. 111 (Landscape Water Use Efficiency Program) was rescinded to remove any conflict with the City of Jurupa Valley's Water Efficient Landscape Design Requirements.

8.1 WATER SUPPLY RELIABILITY ANALYSIS

Pursuant to Water Code Section 10632(a)(1), the following is a summary of the Water Service Reliability Assessment and Drought Risk Assessment located in Chapter 7 of this UWMP.

The District has assessed the reliability of its water service during normal, single-dry, and multiple-dry years by comparing total projected water supplies with total projected water demand over the next 20 years, in five-year increments. Future water supplies for RCSD include all reasonably foreseeable and quantifiable future water supply projects that the District is either currently undertaking or is in the process of implementing. Future water demands for RCSD reflect a land-use based approach assuming mid-range density buildout of the District's service area and updated water duty factors from 2018-2020 customer meter data prepared separately for each land use type in the District. In summary, the groundwater supply available to the District has been and is projected to continue to be sufficient to meet projected pumping demands with water treatment systems and given the relatively stable groundwater elevations

and resiliency of the basin. Therefore, the District is projected to have sufficient water supplies to meet expected customer demands in normal years, single-dry years, and multiple-dry years occurring anytime between 2025 and 2045.

The District has prepared a five-consecutive-year Drought Risk Assessment (DRA) for a drought beginning in 2021 and continuing through 2025. The DRA assumes a nominal reduction in customer water use with each passing year to reflect voluntary conservation. These projected reductions in water use are deemed realistic given the observed reductions RCSD customers made during the five-year drought from 2013 to 2017. Further, the DRA assumes imported water supplies would be available to the District beginning in drought year one (2021) through drought year five (2025) (WMWD(a), p. 3). Local groundwater supplies from District wells are assumed to be reliable in all years of the DRA, which is consistent with what was observed during the five-year drought from 2013 to 2017.

Groundwater reliability is based on the well reporting and monitoring programs performed by the Western-San Bernardino Watermaster. Records of aggregate production rates show that pumping has decreased in recent years and was well below the limit where replenishment by others may be required (UWMP, Chart 6-1). Further, records of the District's groundwater surface elevations shows relatively stable elevations that are not consistently responsive to drought conditions; for example, during the drought of 2013-2017, some well elevations actually rose (UWMP, Chart 6-2). With treatment systems, the District has always had a reliable groundwater supply. A water shortage resulting from drought conditions is not foreseeable. Further, the District's ability to produce water pursuant to the Western-San Bernardino Judgment of 1969 is projected to be sufficient to meet demands through the next five years if it were five consecutive drought years.

The ability to produce water from the Riverside South Basin has been constrained in the last couple of years by the sudden and unexpected appearance of a newly regulated family of contaminants (i.e., PFAS). Several of the District's wells are undergoing new wellhead treatments as a result. The difference in groundwater production has been made up by the District's other wells. It is plausible that there will be more contaminants being regulated in the future that the District currently is not aware of and unable to fully prepare for. However, the District is currently addressing the known impairments with a plan of targeted projects to keep

wells online. Because of the District's efforts to expand treatment capabilities, add several new well fields and treatment plants over the next 20 years coupled with efforts to make the system more efficient with closer monitoring capabilities including Advanced Metering Infrastructure coming online over the next few years, the DRA has assumed that availability of groundwater supplies will not be reduced due to water quality constraints.

8.2 ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES

Beginning in 2022, the District will prepare an annual water supply and demand assessment (or, Annual Assessment) and submit an Annual Water Shortage Assessment Report to the California Department of Water Resources (DWR). The Annual Assessment is a determination of the near-term outlook for supplies and demands and how a perceived shortage may relate to WSCP shortage stage response actions in the next 12-month period; this determination is based on known circumstances and information available to RCSD at the time of analysis.

The Annual Water Shortage Assessment will be due by July 1 of each year pursuant to Water Code Section 10632.1. DWR is currently developing a stand-alone guidance document to help suppliers develop their own procedures but it will not be available before the deadline for this document, which is July 1, 2021. Therefore, the decision-making process and key data inputs for the Annual Assessment shown below are interim and subject to change when the DWR guidance document becomes available.

8.2.1 Decision-Making Process for Annual Assessment

The Annual Assessment and related reporting are to be conducted based on the District's procedures described in the WSCP. At this time, the Annual Assessment is anticipated to be primarily based on the District's ongoing water supply and water demand monitoring process, the results and analysis of which is presented monthly to the Board of Directors. The Annual Assessment will involve examination of developing demand and supply conditions for the next 12 months, as well as considerations for potential actions consistent with the WSCP. In June when an Annual Assessment is presented to the Board of Directors, it may include a request to trigger specific shortage response actions. Upon approval, RCSD staff will then submit the Annual Assessment to DWR by July 1.

8.2.2 Data and Methodologies for Annual Assessment

The primary data sources that could be used by the District to evaluate the water reliability for the current year and one dry year are detailed below pursuant to Water Code Section 10632(a)(2). The Annual Assessment determination will be based on considerations of available water supplies, unconstrained demand, and infrastructure considerations.[1] Because the WSCP shortage stages are defined in terms of shortage percentages, shortage percentages for current year and one dry year conditions would be calculated for the Annual Assessment. The characteristics of "one dry year" according to the District will be at the discretion of the District, which may be refined and changed over time based on ongoing data collection. The 2020 UWMP suggests the conditions of a single-dry year would be consistent with average rainfall in 2018, which was approximately half of average (47%) with average being 11 inches per year (UWMP Table 7-1). The District will focus the Annual Assessment based on actual forecasted near-term water supply conditions to ensure appropriate shortage response actions are triggered in a timely manner with expected outcomes.

1. **Evaluation Criteria.**

   For each Annual Assessment, the District will characterize current year and one dry year scenarios based on best-available data. RCSD will consult with the Western-San Bernardino Watermaster with regard to any limitations on groundwater extractions. The District will consult with Jurupa Community Services District (JCSD) to confirm their anticipated purchases of water. Said consultations will focus on estimates for the next 12 months and estimates if a single-dry year condition occurs where rainfall is half of average. The District will make an estimation of available core supplies and unconstrained demands for the next 12-month period and a dry-year scenario to calculate shortage percentages. These findings will be given additional context and

[1] For the Annual Assessment and WSCP, Water Code Section 10632(a)(2)(B)(i) directs the District to use current year "unconstrained demand" when assessing water supply reliability. Unconstrained demand is defined as expected water use in the upcoming year, based on recent water use, and before any projected shortage response actions that may be taken under the WSCP. Unconstrained demand may be differentiated from observed demand, which may be constrained by preceding, ongoing, or future actions, such as emergency actions taken as part of a multi-year drought. Routine activities such as ongoing conservation programs and regular operational adjustments are not considered as constraints on demands.

influenced by infrastructure considerations (discussed below) which will differ from year to year.

2. Water Supply.

For each Annual Assessment, the District will quantify each source of water supply for the next 12 months and in a single-dry year condition based at least in part on the consultations described in step 1 (Evaluation Criteria). Quantification of supplies will differentiate the District's water supplies in Table 8-3 that are expected to be used in a supply augmentation situation.

3. Current Year Unconstrained Customer Demand.

For each Annual Assessment, the District will gather data to forecast near-term demands, and may take into consideration historical usage trends, weather trends, and water-use efficiency trends. This data may include the number of service availability letters issued recently to gauge future demand. Because these would be "constrained" observed demands rather than unconstrained demands, the District would adjust its near-term demand forecast for the Annual Assessment to account for extraordinary demand management measures that the District may intend to or have already put into effect for the current year.

4. Current Year Available Supply.

For each Annual Assessment, the District will make two estimates of the available annual water supply using (1) current year conditions for the next 12 months and (2) one dry year conditions. Because the definition of one dry year is at the discretion of the District, RCSD will be able to refine and update its assumptions for a dry-year scenario in each Annual Assessment as information becomes available.

5. Infrastructure Considerations.

For each Annual Assessment, the District will describe infrastructure constraints that would influence the ability to obtain the water supply as expected and/or the ability to distribute normally to customers. Projects in the next 12 months that would influence

capabilities would be quantified with the volume of water becoming available or unavailable and the duration of projects/constraints.

Each year, RCSD regularly carries out preventive and corrective maintenance of its facilities to inspect and repair pipelines and facilities and support capital improvement projects. These shutdowns involve a high level of planning and coordination; they are scheduled to ensure that major portions of the distribution system are not out of service at the same time. Operational flexibility within RCSD's system allows shutdowns to be successfully completed while continuing to meet customer demands.

6. Other Factors.

For each Annual Assessment, the District can describe locally applicable factors that can influence or disrupt supplies, along with other unique local considerations that are considered to be part of the Annual Assessment.

8.3 SIX STANDARD WATER SHORTAGE STAGES

The Water Code requires six standard water shortage stages in the WSCP that correspond to progressive ranges of up to 10%, 20%, 30%, 40%, and 50% shortages and greater than 50% shortage. Each stage represents an increasing gap between RCSD's supplies and demands as determined in the Annual Assessment. As described above, shortage percentages will be calculated as percent shortfall of supplies against demands for anticipated current year conditions and assumed dry-year conditions. Shortage levels also apply to catastrophic interruption of water supplies, including but not limited to a regional power outage or earthquake. The District's shortage response actions for each shortage level are shown in **Submittal Table 8-1** and described below.

Submittal Table 8-1
Water Shortage Contingency Plan Levels

Shortage Level	Percent Shortage Range	Shortage Response Actions (*Narrative description*)
1	Up to 10%	RCSD has adequate supplies to cover 10% shortage. Effort at this stage is to encourage voluntary conservation.
2	Up to 20%	RCSD has adequate supplies to cover up to a 20% shortage. Effort at this stage is to encourage voluntary conservation.
3	Up to 30%	RCSD produces from a historically stable groundwater basin and has not in the past or currently received imported water to meet potable demand. The goal in this stage is to encourage voluntary conservation through onsite surveys to reduce obvious water waste for the highest users.
4	Up to 40%	In addition to actions taken in Stages 1, 2, and 3, RCSD will make the following restrictions mandatory: outdoor irrigation is limited to two days per week between the hours of 8:00 PM and 8:00 AM, and all public water uses that are not required for health and safety are prohibited. District may augment rebate amounts to entice greater utilization.
5	Up to 50%	In addition to the actions taken in Stages 1, 2, 3, and 4, RCSD may engage conservation drought fees according to the current rate schedule.
6	>50%	In addition to Stages 1, 2, 3, 4, and 5, RCSD may engage in conservation drought fees according to the current rate schedule.
NOTES: Depending on the nature of the shortage, RCSD may be able to augment supply through the intertie with JCSD at any stage. Water waste prohibitions are in-effect at all times as stated in the District's ordinance for implementing the WSCP.		

On October 15, 2009 the RCSD Board of Directors adopted Ordinance No. 111 to establish the Landscape Water Use Efficiency Program which provided compliance measures in support of the State Water Conservation in Landscaping Act (State Landscape Model Ordinance [AB 1881, 2006]).

On June 8, 2015, RCSD adopted Resolution No. 2015-820 declaring a modified stage 2 drought contingency pursuant to the District's 2015 Water Shortage Contingency Plan for compliance with State Water Resources Control Board (SWRCB) requirements.

On November 7, 2019, the RCSD Board of Directors adopted Resolution No. 2019-858 to rescind Resolution No. 2015-820; however, the water conservation practices mandated by Resolution 2015-820 continue to be encouraged as stated in section F of Resolution No. 2019-858. These rescissions were based on improvements to the District's water supplies and repeal by the SWRCB of various water conservation regulations and requirements that were put into effect in 2015 due to statewide drought conditions. Copies of Resolution No. 2019-858 and Ordinance No. 111 are located in **Appendix M.**

8.4 WATER SHORTAGE RESPONSE ACTIONS

The water shortage response actions the District can take that align with the defined shortage levels in Table 8-1 include demand reduction actions, supply augmentation actions, operational changes, and additional mandatory prohibitions. The authority to determine shortage conditions and to select appropriate shortage response actions remains with the District.

8.4.1 Demand Reduction

There are generally two ways to respond to a water shortage—through either demand reduction actions (i.e., conservation) or supply augmentation. RCSD Resolution No. 2019-858 states, "To promote ongoing water conservation practices by customers, the District Board of Directors encourages customers avoid use of water in the following manner except where necessary to address an immediate health and safety need or comply with a term or condition of a permit issued by a state or federal agency."

1. Outdoor watering of ornamental landscapes or turf between the hours of 10:00 AM and 6:00PM
2. Outdoor watering of ornamental landscapes or turf of more than two (2) days per week
3. Outdoor watering of ornamental landscapes or turf of more than thirty (30) minutes per station for drip irrigation systems, and twenty (20) minutes per station for stream irrigation systems
4. Outdoor watering of ornamental landscapes or turf during or within forty-eight (48) hours after measurable rainfall
5. Watering of outdoor landscapes that cause runoff such that water flows onto adjacent property, non-irrigated areas, private or public walkways, roadways, parking lots, or structures
6. Using hoses that dispense potable water, except where the hose is fitted with a shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use
7. Using potable water in a fountain or decorative water feature, unless the water is recirculated
8. Draining or refilling swimming pools (maintaining water level is acceptable) without the written approval of the District's General Manager
9. Not covering a swimming pool when not in use
10. Swimming pool construction without the written approval of the District's General Manager
11. Serving of drinking water other than upon request in eating or drinking establishments, including but not limited to restaurants, hotels, cafes, cafeterias, bars, or other public places where food or drinks are served and/or purchased
12. Washing of driveways & sidewalks.

Excerpt from RCSD Resolution No. 2019-858, Section F – District Water Conservation Measures.

The District's demand reduction actions for this WSCP are provided in **Submittal Table 8-2,** including the estimated proportion of the shortage gap that the demand reduction action is expected to meet at each level. If the demand reduction action does not meet the entire shortage gap, then the difference is made up by supply augmentation shown below.

Submittal Table 8-2: Demand Reduction Actions				
Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUE data online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
Add additional rows as needed				
1	Expand Public Information Campaign	1 to 3%; District has adequate supplies to cover 10% shortage. Effort at this stage is to encourage voluntary conservation.		No
2	Expand Public Information Campaign	1 to 3%; District has adequate supplies to cover 20% shortage. Effort at this stage is to encourage voluntary conservation.		No
3	Offer Water Use Surveys	4 to 7%; District produces from a historically stable groundwater basin and has not in the past or currently received imported water to meet potable demand. Goal in this stage is to encourage voluntary conservation through onsite surveys of the highest water users to reduce obvious water waste.		No
4	Provide Rebates on Plumbing Fixtures and Devices	10%; In addition to actions taken in Stages 1, 2,& 3, the District may augment rebate amount to entice greater utilization.		No
4	Landscape - Other landscape restriction or prohibition	20%; outdoor watering is limited to two days per week between the hours of 8:00 PM and 8:00 AM, and all public water uses that are not required for health and safety are prohibited.		Yes
5	Implement or Modify Drought Rate Structure or Surcharge	40%; In addition to Stages 1, 2, 3 & 4, engage conservation drought fees according to the current rate structure.		Yes
6	Implement or Modify Drought Rate Structure or Surcharge	50%; In addition to actions taken in Stages 1 through 5, engage conservation drought fees according to the current rate structure.		Yes
NOTES: During a water shortage, a combination of supply augmentation actions (Table 8-3) and these demand reduction actions will be used in concert to continue water service. Water waste prohibitions are in-effect at all times as stated in the District's ordinance for implementing the WSCP.				

RCSD customers are always encouraged to utilize the rebates available for purchases of water conservation devices (e.g., smart irrigation controllers, premium high-efficiency toilets, turf replacement, rain barrels, high-efficiency clothes washers, etc.). Links to available rebate programs are located on the RCSD website.

8.4.2 Supply Augmentation

The District can augment or supplement its water supplies by utilizing its full pumping capabilities in the Riverside South Basin and depending on the nature of the shortage, utilize the intertie shared with JCSD for potable water. These augmentation actions would not be redundant to the supplies discussed in UWMP Chapter 6 because these actions are above and

beyond a normal water supply scenario. Pursuant to the Judgment, the District can pump what is needed to meet customer needs (Appendix K).

The District's supply augmentation actions are listed in **Submittal Table 8-3**.

Submittal Table 8-3: Supply Augmentation and Other Actions

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier *Drop down list* *These are the only categories that will be accepted by the WUEdata online submittal tool*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*
Add additional rows as needed			
All Levels	Expand Public Information Campaign	1-5%	
All Levels	Transfers	Will vary depending on need and availability	Intertie with JCSD or emergency interties with WVWD or Western.
All Levels	Other Purchases	Will vary depending on need and availability	Purchase additional imported water from Western when connection to RPU is completed (see UWMP Table 6-7).
1	Other Actions (describe)	5%	Utilize full pumping ability in the Basin
2	Other Actions (describe)	10%	Utilize full pumping ability in the Basin
3	Other Actions (describe)	20%	Utilize full pumping ability in the Basin
4	Other Actions (describe)	20%	Utilize full pumping ability in the Basin
5	Other Actions (describe)	10%	Utilize full pumping ability in the Basin
6	Other Actions (describe)	10%	Utilize full pumping ability in the Basin

NOTES: JCSD = Jurupa Community Services District; WVWD = West Valley Water District; Western = Western Municipal Water District; RPU = City of Riverside Public Utilities

8.4.3 Operational Changes

The operational actions that would be undertaken during a water shortage are shown in Submittal Table 8-2 and Submittal Table 8-3. The District already has a program to monitor, analyze, and track customer usage rates and has budgeted a pipeline replacement program.

8.4.4 Additional Mandatory Restrictions

All mandatory restrictions developed by the District in addition to any state-mandated prohibitions are listed in Submittal Table 8-2. No additional mandatory restrictions are in effect other than a prohibition against water waste; however, the Board of Directors has the discretion to develop in the future locally appropriate restrictions as conditions dictate.

8.4.5 Emergency Response Plan

RCSD prepared and submitted to the State an updated Emergency Response Plan (ERP) dated December 2021 (revised 2022). The prior ERP was dated March 26, 2008. Applicable

excerpts from the document are included herein where noted; the document in its entirety is kept by the District

RCSD developed the ERP to facilitate resumption of normal operation of its facilities after an emergency including catastrophic supply interruptions. As stated in the ERP, "The core business processes to keep functioning during a recovery process include: treatment processes, water production wells and water transmission pipelines, booster pump stations, reservoirs, and sewage lift stations" (p. 6). The District's priorities for use of available water during a water shortage are, in order of priority, as follows: (1) fire protection, health, and welfare emergency uses; (2) indoor water for residential customers; (3) indoor water for public buildings and schools; (4) indoor water for commercial and industrial; (5) non-landscaping outdoor water for commercial and industrial; (6) other uses including exterior residential use.

The ERP conducted a threat evaluation for the following natural hazards: earthquakes, floods, waterborne diseases, pandemic and drought (p. 2). Human-caused threats evaluated by the ERP include: vandalism, terrorism, system neglect, cross-connections, backflow conditions, construction accidents, chemical spills, sewage spills, power outages, fires, water supply interruption, and cyberattack (pp. 2-4). The ERP determined that the disaster threat with the highest risk is an earthquake and "the most probable risks to RCSD's facilities are earthquake, fire, hazardous chemical release, vandalism, and terrorism" (p.6).

The ERP contains disaster response procedures and flow charts for the various types of disaster. The District follows the Standard Emergency Management System (SEMS) Incident Command System approach to manage an incident that is outside of normal day to day operations. The ERP describes three levels of incidents: Level 1 (small chemical spill), Level 2 (major line break requiring additional pumps, contractors, or rental equipment; hazardous materials release that does not threaten public health) and Level 3 (the most severe incidents when off-site emergency services are needed, including but not limited to structural earthquake damage) (p.17). Once the incident level is determined, the Emergency Operation Center (EOC) is established (p. 19). The ERP also provides guidelines for Disaster Response, Search and Rescue, Fire Response, Earthquake Response, Hazardous Materials Release/Response, Aircraft Crash Response, and Terrorism Response, as well as evacuation and medical emergency procedures.

During a water shortage scenario resulting from natural or man-made causes, the District can receive emergency water supplies through the existing interties with JCSD, and the District is actively working with West Valley Water District to develop a connection. These interconnections would provide water service in the event of a catastrophic outage while the District is making repairs or taking other steps needed to bring service back online. The District has adequate backup power at each of its water treatment plants and at several sites to provide emergency water service (indoor domestic use only) to its customers in the event of a widespread power failure (K&S(a), p. 6-8). Portable standby generators are available for use where needed in an emergency.

RCSD is a member of the Emergency Response Network of the Inland Empire (ERNIE), which facilitates public agency preparedness for, response to, and recovery from local and regional disasters. Agencies volunteer to enter into an agreement to provide mutual aid and assistance to other member agencies. ERNIE assists agencies with trainings, communication, documentations for reimbursement, concept of emergency operations, and writing after-action reports and corrective action plans. RCSD is not a member of the California Water/Wastewater Agency Response Network (CalWARN).

8.4.6 Seismic Risk Assessment and Mitigation Plan[2]

Pursuant to Water Code Section 10632.5, beginning January 1, 2020, the UWMP shall include a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities. The District may comply with this requirement by submitting a copy of the most recent local hazard mitigation plan (LHMP) prepared under the federal Disaster Mitigation Act of 2000 if the LHMP addresses seismic risk (a copy of the LHMP is located in **Appendix N**).

Local Hazard Mitigation Plan

The City of Jurupa Valley maintains an active LHMP. The City of Jurupa Valley *2018 Local Hazard Mitigation Plan* was prepared pursuant to the Disaster Mitigation Act of 2000.[3] RCSD

[2] Pursuant to Water Code section 10632.5, the assessment herein is based on other sources, as described herein. Albert A. Webb Associates is not qualified to make its own independent seismic risk assessments or recommend mitigation actions and assumes no responsibility for those recommended herein.
[3] City of Jurupa Valley 2018 Local Hazard Mitigation Plan: https://www.jurupavalley.org/181/Local-Hazard-Mitigation-Plan

participated in the preparation process of the LHMP as a special district. The LHMP does address seismic risk.

According to the City's LHMP, "The most prominent hazard…are a major earthquake, flooding potential from 100-year storm events in winter months along the Santa Ana River bank, and windstorms causing power outages" (p. 13). Further, "Earthquake risk is very high in western Riverside County (which includes Jurupa Valley), due to the presence of two of California's most active faults: the San Andreas and San Jacinto" (p. 13). The LHMP lists among the "critical facilities" one regional treatment plant, 11 water well/tank sites, three water distribution plants, and one sewer lift station (p. 16). An assessment and ranking of risks are included in the LHMP including flood, earthquake, wildfire, severe weather (heat/wind/cold), technical hazards, drought severity, and agricultural hazards (pp. 20-21).

The LHMP lists the following mitigation action that has been implemented by the District to address earthquake risk (p. 26):

- *The separate water service agencies have installed auxiliary power sources on various municipal water wells and sewer lift stations.*

  Priority: High
  Responsible Dept: JCSD / RCSD
  Timeframe: completed
  Funding/Cost: Unknown – funded by other agencies
  Hazard: structural (earthquake)

The LHMP lists the following mitigation action addressing seismic risk and designated it as the responsibility of RCSD (p. 29):

7.3 ON-GOING MITIGATION STRATEGY PROGRAMS

Rubidoux Community Services District is currently designing a new $2.8 million dollar 6MG water storage tank, a $10 million dollar sewage conveyance facilities damaged during the 2005 flood, and a $150,000 water service replacement project.

Priority: High

Responsible Dept: **Rubdioux Community Services District (separate agency)**

Timeframe: ongoing

Funding/cost: RCSD water restricted capital fund (outside agency)

Hazard: Structural (earthquake), fire

Project #1-Reduce the level of risk to loss of life, personal injury, public and private property damage, economic and social dislocation, and disruption of vital community services that would result from earthquake.

Goal 1: Adopt all of Riverside County Ordinances and Resolution including Land Ordinances. The City has completed this part of the process by adopting and implementing Ordinance No. 2011-01. Additional ordinances are adopted as needed on an ongoing basis to address issues that arise.

Objective: Amend the Building and Zoning Codes to incorporate specific standards for siting, seismic design, and review of Critical Facilities.

Action: Require all new developments, existing critical facilities and structures to comply with the most recent California Building Code seismic design standards.

Priority: High

Responsible Dept: Planning and Building Departments

Timeframe: Ongoing for the life of the plan 2018-2022. This action will be reevaluated during the updating stage of the plan

Funding/cost: Current funding; cost unknown

Hazard: Earthquake

Excerpt from City of Jurupa Valley Local Hazard Mitigation Plan, p. 29.

Tank Seismic Analysis

For the purpose of assessing and developing a plan to mitigate seismic risks specific to the needs of the District, RCSD contracted with Harper & Associates Engineering, Inc. (HAE) in

2020 to prepare reservoir tank seismic analyses for the District's four active tanks: Atkinson, Hunter 1, Perrone, and Watson.

HAE's analyses on the tank structures "was analyzed to assess adequacy for seismic overturning, sloshing, and uplift. Hoop stresses caused by seismic loads were also analyzed as part of this study" (HAE(a), p. 2). Further, "the seismic analysis was performed using the procedures outlined in AWWA-D 100" (p. 2). The key results of said assessment reports prepared for each tank represent future mitigation actions for RCSD to address seismic risks. In summary, for the Atkinson, Hunter No. 1, and Perrone Tanks, HAE recommends due to the ages of the reservoirs, that each tank undergo either a seismic upgrade (including various elements) or the tank be replaced ((HAE(a), p. 5), (HAE(b), p. 4), (HAE(c), p. 3). For the Watson Tank, HAE recommends a change in the locations of all pipe penetrations through the bottom of the tank (HAE(d), p. 3).

8.4.7 Shortage Response Action Effectiveness

The District's response actions are shown in Table 8-2 and Table 8-3. Each response action listed has a corresponding percentage of the shortage gap that the action is expected to meet. The percentages in Table 8-2 are based on the observed effectiveness of demand reduction actions undertaken during the last five years, including the drought from 2013-2017. The higher the percentage, the more effective the action is expected to be in reducing demand.

In normal water supply conditions, production figures are recorded daily in the District's computerized database. Total production and consumption by all categories of customers are reported monthly to District management and Board of Directors. (K&S(a), p. 7-12)

During drought periods, the RCSD Operations Department reports weekly production figures to the General Manager (or, daily or hourly reports depending on severity of shortage), who then prepares a monthly report to the Board of Directors on progress toward the water conservation target. In doing so, the District does analyze the efficacy of response actions on at least a monthly basis.

The effectiveness of the supply augmentation actions shown in Table 8-3 have not been needed to-date because the District has not experienced a supply shortage. Therefore, the

effectiveness is estimated based on a thorough understanding of pumping capacity, well locations, and expected production rates based on long-term records. Because the District's system has been designed to fully utilize the groundwater basin, the supply augmentation actions in Table 8-3 are estimated to close the water shortage gap by any proportion that is not met by customer conservation efforts.

8.5 COMMUNICATION PROTOCOLS

The District will regularly, and not less than once per year, communicate to all customers that water waste is prohibited. Within ten (10) days following the declaration of a shortage level (or declaration of the end of a shortage level), the District will publish a copy of the resolution, or an easy-to-read summary of the resolution with a link to the complete resolution in the newspaper used for publication of official notices. In addition, the District will provide the information on the District's website, at the District office, and to each customer by mail. The notices will include details as to how much reduction in water use is requested and provide suggested means to achieve that. During a disaster when prior notice of water shortage response actions may not be possible, noticing procedures will be dictated by the District's ERP.

The District's 2021 ERP describes the process of communication that is expected by staff during an emergency. In general, the District's Public Information Officer will "have the responsibility of developing and releasing information about the incident to the news media, to incident personnel, and to other appropriate organizations and agencies" (p. 13). Public notification channels can include the RCSD Web site, local radio and television stations, and Social Media (Facebook, Twitter, LinkedIn, Instagram, etc.).

8.6 COMPLIANCE AND ENFORCEMENT

Pursuant to Water Code Section 10632(a)(6), the WSCP should explain the customer compliance, enforcement, appeal, and exemption procedures for triggered shortage response actions as determined by the WSCP.

The District's tiered water rate structure has proven to be an effective way to motivate customers to reduce their water consumption. Refer to Ordinance No. 2022-130 that describes compliance, enforcement, appeal, and exemption procedures consistent with the WSCP. As

shown in Submittal Table 8-2, the demand reduction actions in Shortage Levels 1-3 are voluntary and not associated with an enforceable penalty. The actions taken in Shortage Levels 4-6 would be enforceable according to the water conservation ordinance.

8.7 LEGAL AUTHORITIES

As discussed in Section 8.3, the RCSD Board of Directors has adopted ordinances and resolutions in response to declared drought conditions, which establish legal authority for implementing demand reduction actions and enforcement. RCSD maintains legal authority to implement the shortage response actions in Section 8.4, and to enforce them relative to Section 8.6 by way of declarations made by the Board of Directors and the District's water conservation ordinance.

The following statements have been included herein to demonstrate consistency with Water Code Section 10632(a)(7):

1. Water Code Section Division 1, Section 350 - Declaration of a water shortage emergency condition.

The governing body of the Rubidoux Community Services District shall declare a water shortage emergency condition to prevail within the area served by the Rubidoux Community Services District whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the Rubidoux Community Services District to the extent that there would be insufficient water for human consumption, sanitation, and fire protection.

2. California Government Code, California Emergency Services Act (Article 2, Section 8558).

The Rubidoux Community Services District shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency.

The following is a list of contacts for all cities and counties for which the District provides service that can be used in the event of a local emergency as defined in subpart (c) of Gov. Code Section 8558:

a. County of Riverside Emergency Management Dept. (951) 358-7100

b. City of Jurupa Valley City Manager's Office (951) 332-6161

8.8 FINANCIAL CONSEQUENCES OF THE WSCP

The District's primary revenue source is water sales. Surplus revenues are placed in the District's reserve, which is used to fund emergency repairs and water system capital improvements. The District maintains a financial reserve that is adequate to address the costs of multiple plant repairs. (K&S(a), p. 7-13)

With implementation of the WSCP, RCSD's response actions would include demand management, supply augmentation, and operational flexibility, all of which could impact RCSD financially. Financial consequences would include a decrease in revenue due to a decrease in water use, an increase in costs to augment supply, as well as an increase in administrative costs for recording, monitoring, reporting, and enforcing the District's response actions to implement the WSCP.

Upon implementation of the WSCP, RCSD would use its financial resources to mitigate the impacts of water shortages. Mitigation actions that would be initiated to address revenue reductions and expense increases associated with shortage response actions include use of a tiered rate structure that becomes more restrictive and enforceable in Shortage Levels 4-6 (Section 8.6, above). Penalties collected under this policy will be used to implement and enforce water conservation measures. In addition, RCSD would consider a reduction of operation and maintenance expenses, deferral of capital improvement projects and use of the District's operations reserve fund as needed to mitigate any short-term revenue shortfalls.

8.8.1 Additional Costs from Discouraging Excessive Water Use During a Drought Emergency

During a drought emergency, the District is required to prohibit excessive water use pursuant to Water Code Section 365 et al. Reporting the actions undertaken by the District to do so

does not need to be reported in this UWMP; however, reporting the cost of compliance with Section 365 et al. is a required component of this UWMP, pursuant to Water Code Section 10632(a)(8)(C).

For reference, Water Code Section 367 states there are three types of drought emergencies: (1) declared statewide drought emergency; (2) suppliers move to a local stage of requiring mandatory reductions (as part of the WSCP); and (3) declared local drought emergency. During any one of these three types of drought emergencies, Water Code Section 366 states that excessive water use must be prohibited by using either a rate structure or an excessive water use ordinance.

RCSD prohibits excessive water use and water waste by all customers at all times, which includes declared statewide and local drought emergencies, with violations of said prohibition subject to the penalties described therein. Further, each drought response level declared by the District includes the prohibition of excessive water use, also subject to the penalties described therein.

The costs of discouraging excessive water use during a drought emergency would include increased staffing costs for recording and monitoring water use, issuing customer notifications, providing increased customer education, issuing enforcement warnings, and conducting enforcement actions associated with excessive water use.

8.9 MONITORING AND REPORTING

The District will monitor and report on implementation of this WSCP based on key water use metrics to meet state reporting requirements. The District monitors all activities in the water distribution system through a dynamic system control and data acquisition (SCADA) system. The District will monitor and contact high water users to offer water audits and investigate potential water waste during a drought declaration. The Operations Department will continue to monitor the system daily and weekly with regular reporting to the General Manager. Reports are provided monthly to the Board of Directors as to the status of water supplies and water demands. At such time the State Water Board provides the regulations for monthly reporting along with associated enforcement metrics, these will be reviewed and incorporated herein as appropriate.

8.10 REFINEMENT PROCEDURES

Water Code Section 10632(a)(10) requires a description of how this WSCP will be reevaluated and improved upon to ensure water shortage risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented as needed.

The WSCP will be periodically reevaluated to ensure that its shortage response actions are effective and up-to-date based on lessons learned from implementing the WSCP. The plan will be revised and updated during the UWMP five-year cycle to incorporate new information. For example, new demand reduction and/or supply augmentation actions may be added. If significant revisions are warranted, then the WSCP will be updated outside of the UWMP five-year update cycle. In the course of preparing the forthcoming Annual Assessments each year, RCSD staff can routinely analyze the functionality of the WSCP and prepare recommendations to modify the WSCP to the Board of Directors for the purpose of improving effectiveness in meeting the intent and goals of the WSCP.

8.11 SPECIAL WATER FEATURE DISTINCTION

Pursuant to Water Code Section 10632(b), water features that are not for human recreation are analyzed and defined separately from swimming pools and spas.

Non-Swimming Pool and Non-Spa Water Features

Water features that are not used for the purpose of human recreation are referred to as “decorative water features” in RCSD Ordinance No.2022-130. During a drought declaration, these features must use recirculated water. Water waste that is found to be related to such features may be enforced pursuant to the District’s water waste prohibition. Said water waste can be reported to the District by email and telephone, as well as by staff. The District will also be able to spot a malfunctioning meter or water waste through its forthcoming AMR system. Additional demand reduction actions that are triggered during declared droughts can be developed to address decorative water features and incorporated herein during the next update to the WSCP.

Swimming Pools and Spas

Swimming pools and spas that are intended for human recreation must use potable water for health and safety considerations. RCSD ordinances do not address swimming pools and spas specifically. Water waste that is found to be related to pools and spas may be enforced pursuant to the District's water waste prohibition. Said water waste can be reported to the District via email and telephone, as well as by staff. The District will also be able to spot a malfunctioning meter or water waste through its forthcoming AMR system. Additional demand reduction actions that are triggered during declared droughts can be developed to address swimming pools and spas and incorporated herein during the next update to the WSCP.

8.12 PLAN ADOPTION, SUBMITTAL, AND AVAILABILITY

The following are the steps to adopt, submit, implement, and amend the WSCP. The WSCP may be amended independently of the UWMP, as needed.

8.12.1 WSCP Adoption or Amendment

To adopt a WSCP or amend an adopted WSCP, the District will provide two required notices to customers and each city and county within which it provides service: (1) notice of a public hearing at least 60 days prior to the public hearing stating that the WSCP is being reviewed and adoption (or amendment) of the WSCP is being considered; (2) notice of the time and place of the public hearing including where the draft document is available for public viewing. Per Government Code Chapter 17.5 (commencing with Section 7290) of Division 7 of Title 1, the District must hold the public hearing consistent with the Dymally-Alatorre Bilingual Services Act. Determination of whether language assistance is needed is at the discretion of the District (per Gov. Code Section 7293). The District shall also place the notice containing the date and location of the public hearing and location of where the plan is available for public viewing in a newspaper once a week for two successive weeks (per Gov. Code Section 6066).

The public hearing for the WSCP may take place at the same meeting as the adoption hearing of the Board of Directors; however, the meeting agenda must include the public hearing as an agenda item. Before the District can submit the WSCP to DWR, the Board of Directors must formally adopt the WSCP. The adoption resolution should be included with the WSCP, either as an attachment or Web address where it can be found online.

8.12.2 WSCP Submittal and Availability

The WSCP (or amended WSCP) must be submitted to DWR within 30 days of adoption. Submittal must be done electronically using the Water Use Efficiency (WUE) data online submittal tool located at: https://wuedata.water.ca.gov/. Within 30 days of submitting the adopted WSCP to DWR, the District must make the plan available for public review during normal business hours. This can be accomplished by placing a hardcopy at the front desk or by posting copies on the District Web site.

The WSCP (or amended WSCP) must also be submitted to the California State Library within 30 days of adoption. Submittal must be done via compact disc (CD) or hardcopy and mailed to:

California State Library
Government Publications Section
Attn: Coordinator, Urban Water Management Plans
P.O. Box 942837
Sacramento, CA 94237-0001

(If delivered by courier or overnight carrier, the street address should be used instead: 900 N Street, Sacramento, CA 95814.)

The WSCP (or amended WSCP) must also be submitted to each city or county to which the District provides water within 30 days of adoption. It may be submitted in an electronic format.

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CHAPTER 9 DEMAND MANAGEMENT MEASURES

Demand management is an integral part of water resources management. Because the demand for water tends to increase as communities grow and available water supplies can change over time, having water-use demand management measures (DMMs) that help lower demands for water can improve water service reliability. This chapter provides a comprehensive description of the water conservation programs that RCSD has implemented, is currently implementing, and plans to implement to meet future urban water-use reduction targets.

9.1 DEMAND MANAGEMENT MEASURES FOR RETAIL AGENCIES

The section of the Water Code that addresses DMMs was significantly modified in 2014 to simplify, clarify, and update DMM reporting requirements. The state legislature enacted streamlining of the retail agency requirements from 14 measures to six general requirements plus an "other" category, as follows (CWC §10631(1)(B)):

1. Water waste prevention ordinances;
2. Metering;
3. Conservation pricing;
4. Public education and outreach;
5. Programs to assess and manage distribution system real loss;
6. Water conservation program coordination and staffing support; and
7. Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovating measures, if implemented.

Pursuant to the Water Code, each DMM description below includes how the measure has been implemented over the past five years, and how future projects will help the District to meet future water use targets.

9.1.1 Water Waste Prevention Ordinances

On May 16, 1996, the RCSD Board of Directors adopted Resolution No. 657 establishing a policy for the utilization of District wells producing non-potable water for construction water purposes.

On October 15, 2009, the RCSD Board of Directors adopted Ordinance No. 111 to establish the Landscape Water Use Efficiency Program which provided compliance measures in support of the State Water Conservation in Landscaping Act (State Landscape Model Ordinance [AB 1881, 2006]). Ordinance No. 111 includes efficient water management measures and water waste prevention practices which include, but are not limited to, limiting watering hours, prohibiting excessive water flow or runoff, prohibiting washing down hard or paved surfaces, and customers' obligation to fix leaks, breaks, or malfunctions. Ordinance No. 111 applies to customers with landscape areas one acre or greater in size and customers with properties with dedicated landscape irrigation meters. A copy of Ordinance No. 111 is located in **Appendix M**.

On June 8, 2015, RCSD adopted Resolution No. 2015-820 declaring a modified stage 2 drought contingency pursuant to the District's 2015 Water Shortage Contingency Plan for compliance with State Water Board requirements.

On November 7, 2019, the RCSD Board of Directors adopted Resolution No. 2019-858 to rescind Resolution No. 657 and rescind Resolution No. 2015-820; however, the water conservation practices mandated by Resolution 2015-820 continue to be encouraged as stated in section F of Resolution No. 2019-858. These rescissions were based on improvements to the District's water supplies and repeal by the SWRCB of various water conservation regulations and requirements that were put into effect in 2015 due to statewide drought conditions. By rescinding Resolution No. 657, construction water can be obtained from either potable water hydrant meters or non-potable wells. By rescinding Resolution No. 2019-858, the aforementioned Resolution No. 111 remains the District's enforceable water waste prevention ordinance. A copy of Resolution No. 2019-858 is located in Appendix M.

- **Implementation Over the Past Five Years**

  RCSD operated under the requirements of District Resolution Nos. 657, 2015-820, 2019-858, and Ordinance No. 111. The District has provided and will continue to

provide water conservation advice via the District's website at www.rcsd.org/water-conservation. Additionally, the District's main lobby refers customers to www.iefficient.com which is a website developed by water agencies and cities throughout the Inland Empire to share rebates, tips, and tools to conserve water.

- **Planned Implementation to Achieve Future Water Use Targets**

  RCSD will continue to operate under the requirements of District Resolution No. 2019-858 and Ordinance No. 111. However, as a result of preparing this UWMP the District is looking into updating its water conservation ordinance. Although the District will continue to provide water conservation advice via the District's website, bill inserts, and referring customers to www.iefficient.com, they plan to partner with Western and Metropolitan so that customers may take advantage of water conservation rebate programs offered by those agencies.

9.1.2 Metering

RCSD service connections are fully metered, and all future connections will also be metered. RCSD does not currently calibrate its supply or customer meters. RCSD is in the process of converting to Automatic Meter Reading (AMR) meters and AMR technology for all of its service connections. The conversion does not include calibration. AMR technology automatically collects consumption data from water meters and transfers that data to a central database for billing, troubleshooting, and analysis. AMR technology can reduce the cost of meter reading, provide real-time information, reduce billing errors, monitor tampering, and promote conservation with time-of-use consumption.

As of 2020, RCSD has approximately four dedicated landscape meters. A dedicated landscape meter, also known as an outdoor irrigation meter, is a water meter that exclusively meters water used for outdoor watering and irrigation. These dedicated landscape meters are usually used at parks, road medians, and playing fields. More recently it has become common practice to install a separate meter in homeowner's associations to measure irrigation use in common landscaping. RCSD continues its efforts to increase the number of dedicated landscape meters to monitor irrigation demand.

- **Implementation Over the Past Five Years**

  Since 2015, RCSD has replaced approximately 2,000 residential and non-residential (potable and non-potable) water meters. Meters are replaced when they stop registering or become damaged. In rare instances, if a customer believes the meter is malfunctioning, RCSD conducts a field test and installs a replacement if the meter is under- or over-registering. Approximately 30 field tests have been performed since 2015, which averages to approximately five to six field tests a year.

- **Planned Implementation to Achieve Future Water Use Targets**

  Over the next five years, the District will install AMR meters, starting with 85 units in the immediate future. The District's annual budget will include funds to replace a portion of existing meters with AMR meters. Moreover, new housing developments in the District will be required in the future to install AMR meters. For example, the Shadow Rock project will include AMR meters.

  As indicated in its water loss audits, RCSD will work with vendors to begin regular calibrations of its well and booster pump meters annually and regularly calibrate a percentage of customer meters.

  The District will continue its efforts to ensure that all service connections are fully metered and become a part of its AMR system. Further, dedicated landscape meters will be installed where feasible. All meters will continue to be updated, replaced, and repaired as needed.

9.1.3 Conservation Pricing

Conservation pricing incentivizes customers regarding their water use. For example, the rates might be tiered at progressively higher prices to encourage efficient water use. Like a water waste ordinance, a conservation pricing structure is always in place and is not dependent upon a water shortage for implementation, although a conservation rate structure could include a drought rate structure that has surcharges implemented during drought declarations.

The District currently implements a tiered rate structure for water services, which is a form of conservation pricing. Each tier is defined by a range of water usage (Tier 1: 0- 5 units, Tier 2: 6-

12 units, Tier 3: 13-20 units, Tier 4: 21-29 units, and Tier 5: 30 units and greater). One unit is equal to 100 cubic feet or 748 gallons of water. The District does not implement a drought rate structure.

- **Implementation Over the Past Five Years**

  Since 2015, the District maintained a tiered rate structure and, in accordance with Proposition 218 and compliant with AB 3030, has increased rates each year except for 2019. The District adopted Ordinance No. 2020-126 on June 18, 2020, approving an annual 6 percent "Pass Through" charge to water rates in accordance with Proposition 218 and compliant with AB 3030. A copy of Ordinance No. 2020-126 is located in **Appendix O.**

- **Planned Implementation to Achieve Future Water Use Targets**

  With the adoption of Ordinance 2020-126, the District will continue to increase water rates, in accordance with Proposition 218 and compliant with AB 3030, not to exceed 6 percent annually through fiscal year (FY) 2023-2024. The new water rates were effective January 1, 2021. The District may prepare a Cost of Services Study depending on the results of the forthcoming water and wastewater master plan updates that are expected by 2022.

9.1.4 Public Education and Outreach

The District promotes water conservation education to its customers by providing water conservation tips via the District's website at www.rcsd.org/water-conservation. The water conservation tips were prepared by Metropolitan. Additionally, the District's main lobby refers customers to www.iefficient.com, which is a website developed by water agencies and cities throughout the Inland Empire to share rebates, tips, and tools to conserve water.

- **Implementation Over the Past Five Years**

  RCSD offered water conservation education to customers through its website at www.rcsd.org/water-conservation and by referring customers to www.iefficient.com. RCSD was provided two towable electronic signs that were driven around the District when the statewide water conservation mandates were in effect. Messages were

displayed that encouraged and explained to customers how to conserve because of the statewide drought.

- **Planned Implementation to Achieve Future Water Use Targets**

  The District is planning to develop a partnership with Western to gain access to Metropolitan's rebate programs and make those rebates available to its customers. The District will also seek a qualified consultant to assist with development and execution of a water conservation program for the District.

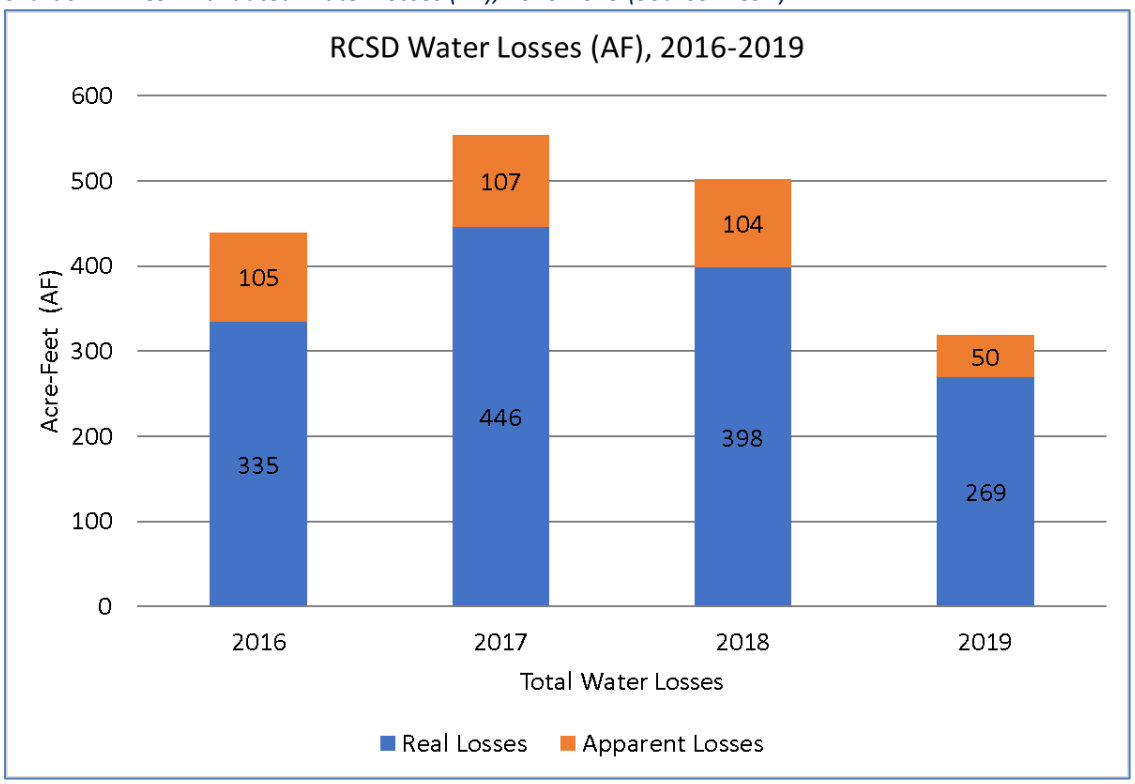
9.1.5 Programs to Assess and Manage Distribution System Real Loss

The average production losses from the years 2016 to 2019 are estimated at 9 percent based on the RCSD Water Loss Audits described in Chapter 4 (copies of the District's validated water loss audits from 2016 to 2019 are located in Appendix G). Meter data for CY 2020 suggests potable losses were reduced to 1.9%; however, this is pending confirmation with a validated water loss audit to be submitted to DWR by October 1, 2021. Most leaks occur on water service laterals (i.e., the line between the meter and the main line), which are a type of real loss and replaced completely instead of repaired. System leaks are detected visually and reported by employees and customers. The District periodically replaces water mains as part of its capital improvement program.

- **Implementation Over the Past Five Years**

  Water Code section 10608.34(i) (Senate Bill 555, 2015) directs the State Water Board to "adopt rules requiring urban retail water suppliers to meet performance standards for the volume of water losses." Pursuant to this law, urban retail water suppliers including RCSD have been annually submitting water loss audits to DWR since October 2017 (refer to Chapter 4). Results of the water loss audits from 2016 to 2019 are shown in **Chart 9-1**, with real losses being the dominant type.

Chart 9-1 – RCSD Validated Water Losses (AF), 2016-2019 (Source: RCSD)



Losses for 2020 are preliminarily estimated at 91 AF and will be confirmed with a validated water loss audit to be submitted to DWR by October 1, 2021.

The meter and main repairs performed by the District for the past five years are detailed in **Table 9A** as evidence of RCSD's ongoing efforts to detect leaks quickly and minimize water loss.

Table 9A - RCSD Meter and Main Repairs, 2016-2020

Calendar Year	Service Connection (Meter) Breaks or Leaks	Main Breaks or Leaks
2016	144	9
2017	94	8
2018	109	10
2019	69	8
2020[(1)]	117	5

Source: RCSD *Large Water System Annual Report to the Drinking Water Program [Section 116530 Health & Safety Code for the years ending December 31, 2016- 2019*.

[(1)] RCSD *Complaints Total for 2020.*

- **Planned Implementation to Achieve Future Water Use Targets**

  As suggested during the annual water loss audit validation process, RCSD will work with vendors to begin regular calibrations of its well and booster pump meters and regularly calibrate a percentage of customer meters. The District is currently reviewing all systems for reliability in preventing water loss and will conduct a system-wide condition assessment to identify issues before they become problems.

9.1.6 Water Conservation Program Coordination and Staffing Support

Currently the District does not have a water conservation coordinator, nor does it have a water conservation program in place. However, the District plans on assigning a customer service representative to manage a water conservation program once one is established by the District.

- **Implementation Over the Past Five Years**

  The District does not have a conservation coordinator, nor does it have a water conservation program in place. The District's water conservation efforts were namely to educate customers by providing water conservation tips via its website at www.rcsd.org/water-conservation and via a third-party website at www.iefficient.com.

- **Planned Implementation to Achieve Future Water Use Targets**

  The District plans on developing a water conservation program and possibly assigning a customer service representative to manage a water conservation program once one is established by the District. The District is planning to develop a partnership with Western to gain access to Western's rebate programs and make those available to RCSD customers. The customer service representative would answer questions and coordinate rebate submittals with customers.

9.1.7 Other Demand Management Measures

RCSD does not have other DMMs that have a significant impact on water use.

9.2 ALLIANCE FOR WATER EFFICIENCY AND CALIFORNIA WATER EFFICIENCY PARTNERSHIP

Prior to 2018, RCSD was a member of the California Urban Water Conservation Council (CUWCC), the goal of which was to increase efficient water use statewide through partnerships among urban water agencies, public interest organizations and private entities. CUWCC helped to integrate urban water conservation Best Management Practices into the planning and management of California's water resources.

In March 2018, the CUWCC was reorganized to reflect a new era in water use efficiency. The new organization is comprised of two separate sections: the California Water Efficiency Partnership (CalWEP) and its national partner, the Alliance for Water Efficiency (AWE). RCSD is a member of CalWEP. CalWEP's mission is to maximize urban water efficiency and conservation throughout California by supporting and integrating innovative technologies and practices; encouraging effective public policies; advancing research, training, and public education; and building collaborative approaches and partnerships.

9.3 FUTURE WATER USE OBJECTIVES

In 2018, Assembly Bill 1668 (AB1668) and Senate Bill 606 (SB606) were signed into law to develop a new framework for statewide long-term water conservation. Together, the programs of these laws are organized around four goals: to use water more wisely; eliminate water waste; strengthen local drought resilience; and improve agricultural water use efficiency and drought planning. Notably, the 2018 legislation applies to the actions of DWR, SWRCB, and water suppliers; it does not set any standards or rules for individual customer use.

DWR and SWRCB developed a handbook for the 2018 legislation entitled, *Making Water Conservation a California Way of Life – Primer of 2018 Legislation on Water Conservation and Drought Planning, Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman)* (November 2018). To fully plan, develop and implement the new framework, DWR and the SWRCB will work closely together over the next few years to develop new standards for indoor residential water use, outdoor residential water use, CII water use for landscape irrigation with dedicated meters, and water loss.

Pursuant to the 2018 legislation, this UWMP includes a Water Shortage Contingency Plan and a Drought Risk Assessment that is due July 1, 2021 and every five years thereafter. The District will submit to DWR an annual water shortage assessment report beginning June 1, 2022. Beginning November 1, 2023 and annually thereafter, RCSD will submit a report to DWR on urban water use objectives, actual urban water use, implementation of CII water use performance measures, and progress toward an urban water use objective (yet to be determined). Lastly, by January 1, 2024 the District will submit to DWR a supplement to the 2020 UWMP that describes how demand management measures are implemented to achieve its yet-to-be-determined urban water use objective.

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CHAPTER 10 PLAN ADOPTION, SUBMITTAL & IMPLEMENTATION

This chapter provides guidance to address the Water Code (CWC) requirements for a public hearing, the Plan adoption process, submitting an adopted Plan to DWR, Plan implementation, and the process for amending an adopted Plan.

Beginning in 2020, the Water Code requires that the Water Shortage Contingency Plan (WSCP) must have the same process for public hearing, adoption, submittal, and amendments as the UWMP.

10.1 INCLUSION OF ALL 2020 DATA

The Water Code requires current year water use and planning data to be included in the UWMP. Since RCSD is reporting on a calendar year basis, this UWMP and WSCP includes data through calendar year 2020 (January 1 through December 31). As such, this UWMP and WSCP could not be completed until after the end of calendar year 2020.

10.2 NOTICE OF PUBLIC HEARING

Water Code requires that a public hearing must be held by the District prior to adopting the UWMP and/or WSCP. All public input shall be considered by the Board of Directors. There are two audiences within the service area that are required to be noticed for the public hearing: cities and counties, and the general public.

10.2.1 Notice to Cities and Counties

60-Day Notification

All cities and counties within which the District provides water supplies must be notified that the District will be reviewing the UWMP and considering amendments or changes to the Plan. This notice must be sent at least 60 days prior to the public hearing. In order to provide ample opportunity to participate in the UWMP process.

RCSD sent the first notice on March 10, 2021 notifying interested entities of the District's intention to review and update the UWMP including the WSCP, well in advance of the required 60 days prior to the public hearing. Copies of all notifications are located in **Appendix D**. (CWC § 10621(b) and §10642)

Notice of Public Hearing

The District delivered a second notice to cities, the county, and interested entities on April 28, 2021, to confirm the time and place of the public hearing. The notice also reaffirmed that the Draft UWMP and Draft WSCP would be publicly available for viewing at the District website (www.rcsd.org) and a printed hardcopy at the District Headquarters no less than two weeks prior to the public hearing. The draft documents were posted on the District website and the District Headquarters beginning on June 3, 2021. Copies of all notifications are located in Appendix D. Required notifications to the cities and the county within the District service area are listed in **Submittal Table 10-1** to confirm receipt of a 60-day notice and notice of public hearing.

Submittal Table 10-1 Retail: Notification to Cities and Counties

City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Jurupa Valley	Yes	Yes
County Name *Drop Down List*	**60 Day Notice**	**Notice of Public Hearing**
Add additional rows as needed		
Riverside County	Yes	Yes
San Bernardino County	Yes	Yes

In addition to the city and the county, RCSD also notified the following list of interested entities.

- City of Jurupa Valley
- City of Riverside Public Utilities
- City of Riverside Water Quality Control Plant
- County of Riverside
- County of San Bernardino
- Cucamonga Valley Water District
- Inland Empire Utilities Agency
- Jurupa Community Services District
- Jurupa Unified School District
- Santa Ana River Water Company
- Western-San Bernardino Watermaster
- Western Municipal Water District
- West Valley Water District

- City of Colton Water Dept.
- Riverside Highland Water Company
- Santa Ana Watershed Project Authority

10.2.2 Notice to the Public

The public was notified of the public hearing and availability to review the draft UWMP and draft WSCP in the local newspaper (*The Press Enterprise)* once a week for two successive weeks pursuant to Government Code section 6066, on June 3 and June 10, 2021. RCSD also placed an announcement on its website. The draft UWMP and draft WSCP were posted on the District website and at the District Headquarters beginning on Thursday, June 3, 2021. Copies of all notifications are located in Appendix D. (CWC §10642)

10.3 PUBLIC HEARING AND ADOPTION

Pursuant to the Water Code, the RCSD Board of Directors held a public hearing on Thursday, June 17, 2021 to receive public comment on the draft UWMP and the draft WSCP (CWC §10608.26(a)). The public hearing was included as an agenda item, which is included in Appendix A.

The Water Code requires the public hearing to accomplish all of the following in order to comply with the Water Conservation Act of 2009 (SB X7-7):

- Allow community input on the District's implementation plan;[1]
- Consider the economic impacts of the District's implementation plan; and
- Adopt a method for determining the District's urban water use target.[2]

Therefore, the public hearing provided information on the District's baseline values, water use targets and compliance, and implementation plan required in the Water Conservation Act of 2009 (SB X7-7).

[1] The term "implementation plan" as mentioned in the Water Conservation Act of 2009 (SB X7-7) is not defined. But according to DWR staff, it is meant to suggest the District's plans, as described in the UWMP, to continue meeting its water conservation target.
[2] The method chosen by RCSD to calculate the 2020 water use target has been, *Method 1: Eighty percent of the water supplier's baseline per capita water use,* as defined in CWC Section 10608.20(a)(1).

10.3.1 Document Adoption

The 2020 UWMP and WSCP were formally adopted by the RCSD Board of Directors on June 17, 2021 following a public hearing on June 17, 2021 (CWC § 10642). Copies of the adoption resolutions are included in **Appendix A**.

10.4 PLAN SUBMITTAL

10.4.1 Document Submittal to DWR

The 2020 UWMP, including the WSCP must be submitted to DWR within 30 days of adoption and by July 1, 2021 (CWC §10621(e)). Document submittal to DWR is done electronically through WUEdata. After the UWMP and WSCP are submitted, DWR will review the plan utilizing the checklist provided in Appendix B and decide as to whether or not the documents address the requirements of the Water Code. The DWR reviewer will contact RCSD as needed during the review process. Upon completion of the Plan review, DWR will issue a letter to the District with results of the review.

Proof of submittal to DWR is located in **Appendix P.**

10.4.2 Electronic Data Submittal

DWR developed an online submittal tool, WUEdata, which was used for the 2015 UWMPs. This tool has been updated for submitting the 2020 UWMPs. The tool accepts complete UWMPs, as well as tabular data from all the data tables. The WUE data online submittal tool is online at https://wuedata.water.ca.gov/. (CWC § 10644(a)(2))

10.4.3 Submittal to the California State Library

No later than 30 days after adoption, RCSD shall submit a CD or hardcopy of the adopted 2020 UWMP, including the adopted WSCP, to the California State Library (CWC § 10644(a)(1)) located at:

California State Library
Government Publications Section
Attention: Coordinator, Urban Water Management Plans
P.O. Box 942837

Sacramento, CA 94237-0001

Or by courier or overnight carrier to the State Library at:

California State Library
Government Publications Section
Attention: Coordinator, Urban Water Management Plans
900 N Street
Sacramento, CA 95814

Proof of submittal to the State Library is located in **Appendix P.**

10.4.4 Submittal to Cities and Counties

No later than 30 days after adoption of the 2020 UWMP, including the WSCP, the District shall submit a hard or electronic copy of the documents to the County of Riverside (CWC §10635(c)).

Proof of submittal to the City of Jurupa Valley and County of Riverside is located in **Appendix P.**

10.5 PUBLIC AVAILABILITY

The adopted 2020 UWMP, including the adopted WSCP, are available for public review at RCSD Headquarters, located at 3590 Rubidoux Boulevard, Jurupa Valley, California, 92509 during normal business hours Monday through Friday 7:00 AM to 5:00 PM. In addition, a copy of the adopted UWMP and WSCP can be found on RCSD's website (www.rcsd.org) for public viewing anytime. (CWC § 10645(a) and 10645(b))

Proof of public availability is located in **Appendix P.**

10.6 NOTIFICATION TO PUBLIC UTILITIES COMMISSION

Pursuant to Water Code, those water suppliers that are regulated by the California Public Utilities Commission (CPUC) must submit their UWMP and WSCP to the CPUC as part of its general rate case filings. Because RCSD is not regulated by the CPUC, the District will not be submitting their documents to the CPUC. (CWC §10621(c))

10.7 AMENDING AN ADOPTED PLAN

If RCSD decides to amend the adopted 2020 UWMP, then each of the steps for notification, public hearing, adoption, and submittal must also be followed for the amended plan. This includes providing copies of amendments or changes to the plan to DWR, California State Library, and any city or county within which the supplier provides water within 30 days of adoption. (CWC §10644(a)(1))

10.7.1 Amending a Water Shortage Contingency Plan

If RCSD decides to revise the adopted 2020 WSCP after DWR approves the 2020 UWMP, then RCSD must submit to DWR an electronic copy through the WUE Data Portal of its revised WSCP within 30 days of its adoption. (CWC § 10644(b))

10.7.2 Amendment List

- The first amendment to this UWMP and the first amendment to the WSCP were adopted by the District Board of Directors on April 21, 2022 after a public hearing was held on April 7, 2022. Notices to the City of Jurupa Valley, County of Riverside, and San Bernardino County were provided via email on February 3, 2022 (more than 60 days in advance). Draft documents were made publicly available beginning February 10, 2022. Notices of the public hearing were posted in English and Spanish language newspapers once a week for two weeks in early March 2022. Within 30 days of adoption, the adopted plans were made available on the District's website, www.rcsd.org and notices sent to the City and Counties containing an electronic link to download the adopted reports. In addition, a CD was mailed to the California State Library with the amended plans. Copies of all resolutions, notices, and documents related to this amendment are located in **Appendix Q**.

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WESTERN MUNICIPAL WATER DISTRICT

2020 Urban Water Management Plan

Revised March 30, 2022

JUNE 2021 | WESTERN MUNICIPAL WATER DISTRICT



WESTERN MUNICIPAL WATER DISTRICT

2020 Urban Water Management Plan

JUNE 16, 2021

REVISED MARCH 30, 2022

Prepared by Water Systems Consulting, Inc.

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ACRONYMS & ABBREVIATIONS

°F	Degrees Fahrenheit
AF	Acre Foot
AFY	Acre Feet per Year
AMR	Automatic Meter Reader
APA	Administrative Procedures Act
AWWA	American Water Works Association
BMP	Best Management Practice
CALWARN	California Water/Wastewater Agency Response Network
CCF	Hundred Cubic Feet
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFS	Cubic Feet per Second
CII	Commercial, Industrial, and Institutional
CIMIS	California Irrigation Management Irrigation System
CUWCC	California Urban Water Conservation Council
DCR	DWR SWP Delivery Capacity Report
DDW	SWRCB Division of Drinking Water
DMM	Demand Management Measure
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EPA	United States Environmental Protection Agency
ERNIE	Emergency Response Network of the Inland Empire
ET	Evapotranspiration
ETo	Reference Evapotranspiration
GIS	Geographic Information System
GPCD	Gallons per Capita per Day
GPM	Gallons per Minute
HECW	High Efficiency Clothes Washer
HET	High Efficiency Toilet
LAFCO	Local Agency Formation Commission
MAF	Million Acre-Feet

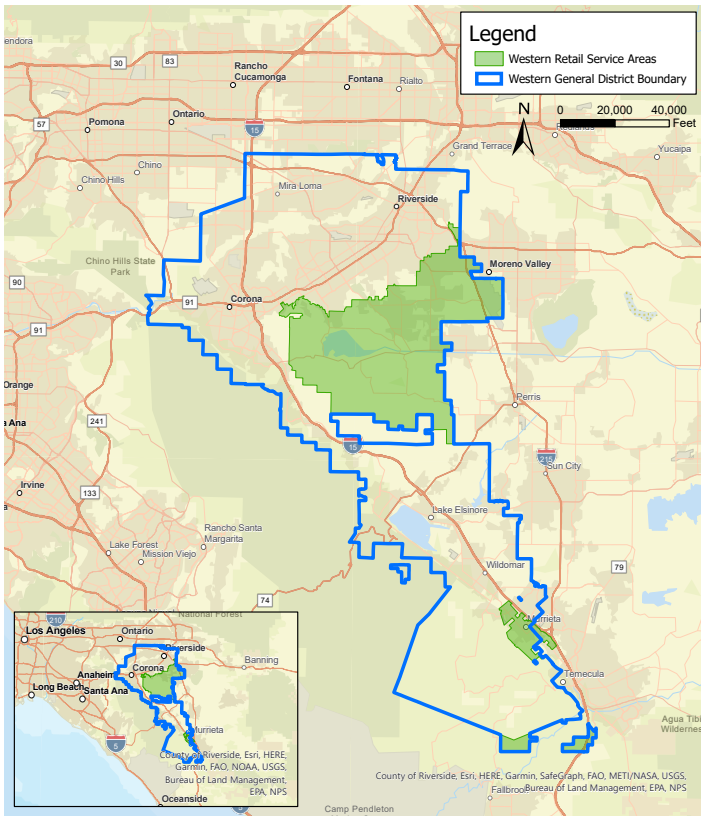
MCL	Maximum Contaminant Level
MF	Multi-family
MG	Million Gallons
MGD	Million Gallons per Day
MOU	Memorandum of Understanding
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
QWEZ	Qualified Water Efficient Landscaper
RIX	Rapid Infiltration and Extraction
RPA	Reasonable and Prudent Alternative
RUWMP	Regional Urban Water Management Plan
RWQCB	Regional Water Quality Control Board
SBX7-7	Senate Bill 7 of Special Extended Session 7
SF	Single Family
SOC	Synthetic Organic Chemicals
SOI	Sphere of Influence
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TCE	Trichloroethylene
ULFT	Ultra-Low Flush Toilet
UV	Ultraviolet
UWMP	Urban Water Management Plan
UWMP Act	Urban Water Management Planning Act
WBIC	Weather Based Irrigation Controller
WSCP	Water Shortage Contingency Plan
WFF	Water Filtration Facility
WSS	Water Sense Specification
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

Providing Water Security to Western Riverside County for over 60 years

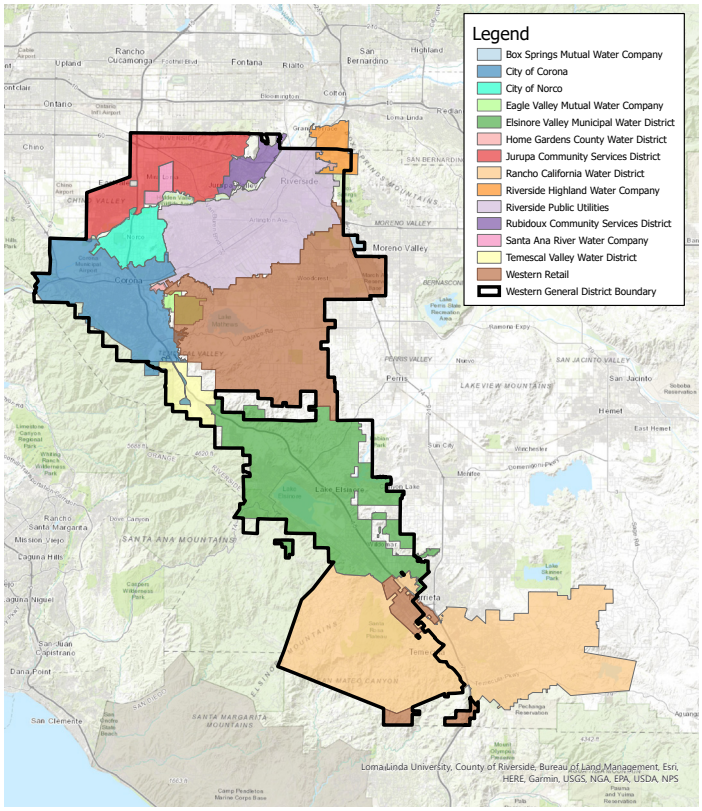
Western is a regional leader for safe, reliable, and affordable water supply.

The Western Municipal Water District (Western) was formed in 1954 to bring supplemental water to the growing western Riverside county. Today, Western provides water supply, wastewater treatment and disposal, and water resource management to nearly one million people in a service area covering roughly 527-square miles in western Riverside County.

Western serves approximately 25,000 retail and fourteen (14) wholesale customers with water from the Colorado River, State Water Project, recycled water and local groundwater.



Western Retail serves retail customers directly in Orangecrest, Mission Grove, El Sobrante, Eagle Valley, Temescal Canyon, Woodcrest, Lake Mathews, portions of Mead Valley and Perris, and March Air Reserve Base.



As a member agency of the Metropolitan Water District of Southern California (Metropolitan), Western Wholesale provides supplemental water to the cities of Corona, Norco, and Riverside and the water agencies serving Box Springs, Eagle Valley, Elsinore Valley, Temescal Valley, and Temecula.

Western's 2020 Urban Water Management Plan

Contents of Western's
2020 URBAN WATER MANAGEMENT PLAN

PART 1: INTRODUCTION

Chapter 1 – Introduction

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Chapter 9 – Retail Water Supply

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PART 4: SUPPORTING INFORMATION

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Appendices

One document that describes Western's water vision.

Water agencies in California that serve more than 3,000 customers or 3,000 acre-feet (AF) annually are required by California law to prepare an Urban Water Management Plan (UWMP or Plan) every five years. The Plan supports Western's long-term resource planning to ensure that adequate water supplies are available to meet existing and future water needs. The Plan integrates local and regional land use planning, regional water supply, infrastructure, and demand management projects, as well as statewide issues of concern like climate change and regulatory requirements.

The Plan includes sections for Western Wholesale and Western Retail, and focuses on the following topics:

Supply and Demand – A detailed analysis of current and future water use and sources of supply over a 25-year planning horizon

Water Supply Reliability – A detailed assessment of water supply reliability

Drought Risk Assessment – An analysis of drought risk assuming a five consecutive year drought

Water Use Efficiency and Conservation – A summary of water use efficiency and conservation programs

Water Shortage Contingency Plan – A summary of planned responses in the event of a water shortage

Outreach and Engagement – A summary of the outreach, communication and engagement that was conducted in support of the Plan

Western is both a water wholesaler (Western Wholesale) and retailer (Western Retail), and the 2020 UWMP covers both roles separately.

The 2020 UWMP is an Important Part of Water Planning in the Region

The UWMP integrates with many other regional and local planning efforts for planning consistency.

This UWMP is just one of many interrelated local and regional planning efforts Western is either leading or coordinating with to secure water supplies for customers within its service area. For more information on the specific scope and content of each of the plans shown below, refer to Figure 1-2 in the UWMP. The 2020 UWMP was prepared in parallel with a Drought Contingency Plan (DCP) that is being developed for the entire Western Wholesale service area.

REGIONAL PLANS	WESTERN'S PLANS	LOCAL PLANS
Metropolitan Integrated Resources Plan and 2020 UWMP	Western Retail Facilities Master Plans	Retail Agency UWMPs
One Water One Watershed (OWOW) Plan	**Western's 2020 UWMP**	Local Hazard Mitigation Plan
2020 Upper Santa Ana Watershed Integrated Regional UWMP	Risk and Resilience Assessment & Emergency Response Plan	
Arlington Basin Groundwater Sustainability Plan	2019 Water Use Efficiency Master Plan	
Western 2020 Drought Contingency Plan		



Connecting with Stakeholders and the Public

Western is committed to informing and engaging stakeholders and the general public.

Western is committed to engaging its customers and stakeholders in a proactive and collaborative way to assist in its water planning efforts. The various groups involved with the UWMP and their role are summarized in the graphics below. Western implemented a tiered engagement plan that included local, regional, state and national participation, including the general public and Western's own Board of Directors.

DROUGHT TASK FORCE MEMBER ORGANIZATIONS

ENVIRONMENTAL AND CONSERVATION GROUPS

- Inland Empire Resource Conservation District
- Inland Empire Waterkeeper
- Riverside-Corona Resource Conservation District
- Santa Ana Watershed Project Authority

ENVIRONMENT AND SOCIAL JUSTICE

- Center for Community Action and Environmental Justice

REGIONAL GOVERNMENT (6%)

- Riverside County Flood Control and Water Conservation District
- Western Riverside Council of Governments

RESEARCH

- University of California, Riverside
- Water Resources Institute

LOCAL GOVERNMENT

- City of Murrieta

TRIBAL REPRESENTATIVES

- Pechanga Tribal Government

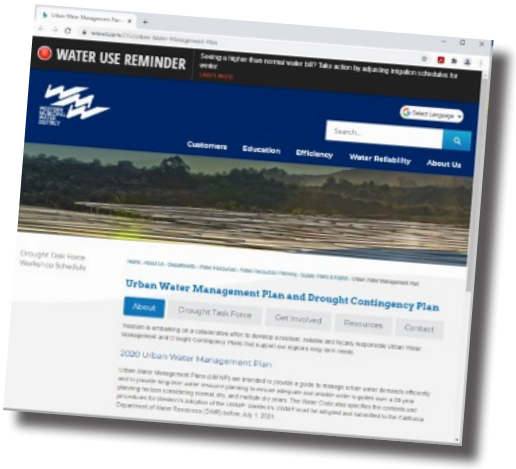
RETAIL: CUSTOMER STAKEHOLDER

- Altman Plants
- March Air Reserve Base
- Vons/Kroger
- Woodcrest MAC
- Woodcrest MAC/Riverside County

WATER AGENCY: REGIONAL

- Eastern Municipal Water District
- Metropolitan Water District of Southern California
- San Bernardino Valley Municipal Water District
- Box Springs Mutual Water Company
- City of Corona
- City of Norco
- Elsinore Valley Municipal Water District
- Jurupa Community Services District
- Rancho California Water District
- Riverside Highland Water Company
- Riverside Public Utilities
- Rubidoux Community Services District
- Temescal Valley Water District

Western formed a Drought Task Force that includes diverse perspectives to inform development of the UWMP and the DCP that will be completed in 2022.



Western created a webpage to provide another opportunity for interested individuals or organizations to learn more about the UWMP, view the Drought Task Force participants and workshop schedules, subscribe to project updates, review and comment on the Plan and access related resources.

Where Western's Water Comes From

The region relies on a diverse water supply portfolio.

Retail water agencies in Western's service area rely on a variety of sources to meet demands, including imported water, local groundwater and recycled water. Many of the supply sources within the region are shared by multiple retail water agencies, including Western Retail.

SUPPLIES AND INFRASTRUCTURE

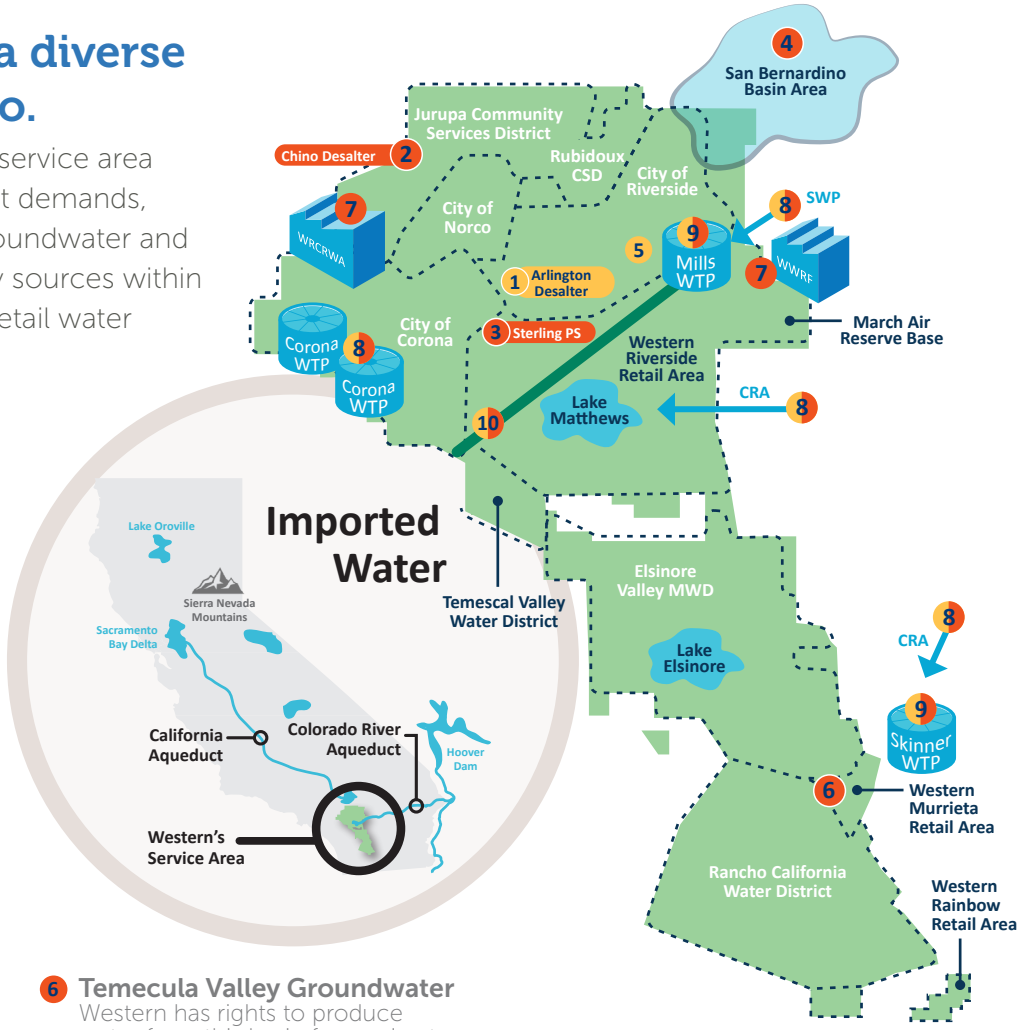
1 Arlington Desalter and Victoria Recharge Basin
Produces drinking water by treating local non-potable groundwater using reverse osmosis to remove salt and other matter. This process also helps clean up the groundwater basin and improve the quality over time. The new Victoria Recharge Basin captures stormwater from precipitation and runoff and percolates into the groundwater basin where it is later used by the Arlington Desalter, increasing local supply reliability.

2 Chino Desalter
Western partners with several other water agencies to treat local non-potable groundwater using reverse osmosis to create a new high quality drinking water supply.

3 Sterling Pump Station and La Sierra Pipeline
The recently completed Sterling pump Station and La Sierra Pipeline connect the Chino and Arlington Desalters to and allow Western to deliver both water sources to many different locations, increasing regional reliability.

4 San Bernardino Basin (SBBA)
Western owns rights to pump local potable groundwater from the SBBA and has a long term lease with Meeks & Daley Water Company to use additional water from the SBBA.

5 City of Riverside
Western has an agreement with Riverside to purchase their surplus local groundwater. Riverside also pumps and delivers Western's water from the SBBA to Western Retail at interconnections using their existing facilities.



6 Temecula Valley Groundwater
Western has rights to produce water from this basin for service to Western's Murrieta Retail system.

7 Recycled Water a Local Drought Proof Supply
Western provides recycled water and non-potable groundwater to meet non-potable irrigation water needs, preserving the potable supplies for domestic use.

8 Imported Water
Western Wholesale obtains potable and nonpotable imported water supply from the SWP and CRA through Metropolitan at various locations and delivers it to Western Retail and other wholesale customers in their service area. Some Western Wholesale customers receive raw imported water directly from Metropolitan pipelines and use the water for groundwater recharge or treat it at their own treatment plants for potable use.

9 Mills and Skinner Water Treatment Plants (WTP)
Metropolitan treats imported water at their Mills and Skinner WTPs and provides potable imported water to Western to distribute to Western Retail and other wholesale customers.

10 Mills Gravity Line
Deliver treated imported water from the Mills WTP to Western Retail and several Western Wholesale customers.

Wholesale
Retail
Wholesale & Retail

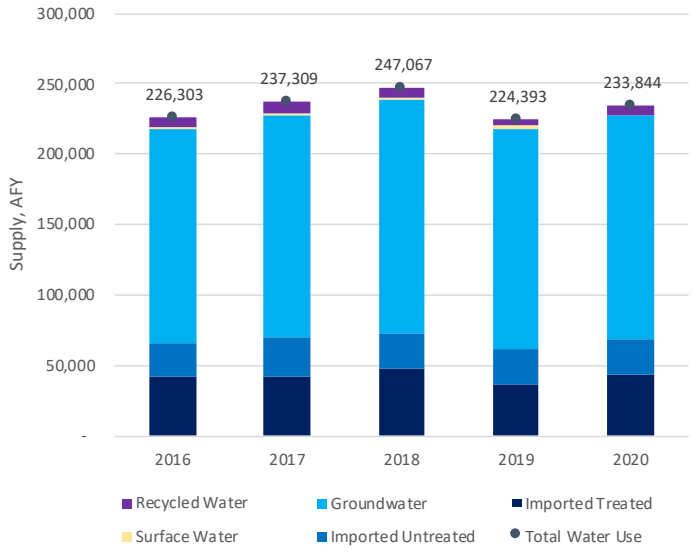
CRA - Colorado River Aqueduct
SWP - State Water Project

Total Water Use within Western's Service Area

Western's retail agencies rely on a mix of supplies, and not all supply comes from Western.

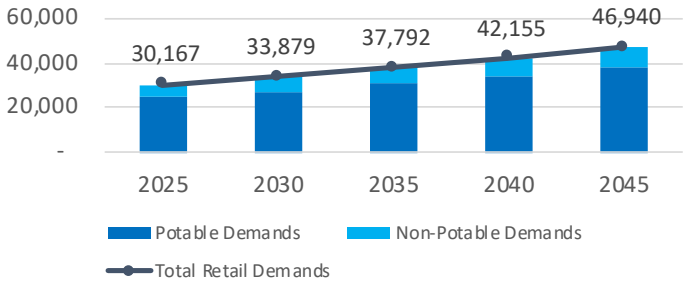
Total water use within Western's service area has ranged from approximately 220,000 AF to more than 245,000 AF in the last five years, including Western Retail. In 2020, approximately 31% of the total water used within Western's service area was provided by Western Wholesale. In addition to wholesale water purchased from Western, most of the water purveyors within Western's service area also deliver local surface and groundwater and/or recycled water within their respective service areas and some rely solely on local water supplies.

TOTAL WATER USE IN WESTERN'S SERVICE AREA FROM 2016 THROUGH 2020.

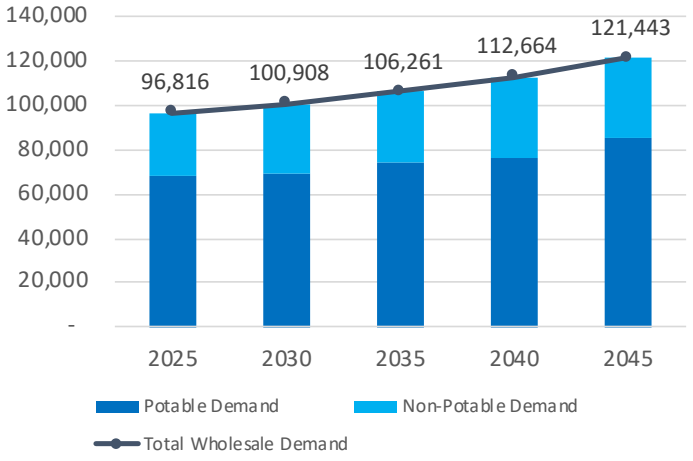


Western Wholesale delivers potable and non-potable supplies to its wholesale customers. Western Wholesale's total demand is expected to increase from 74,927 AF in 2020 to over 121,000 AF in 2045.

PROJECTED RETAIL DEMAND, AFY.



PROJECTED WHOLESALE DEMAND, AFY, INCLUDING WESTERN RETAIL DEMANDS.



Using Water Wisely

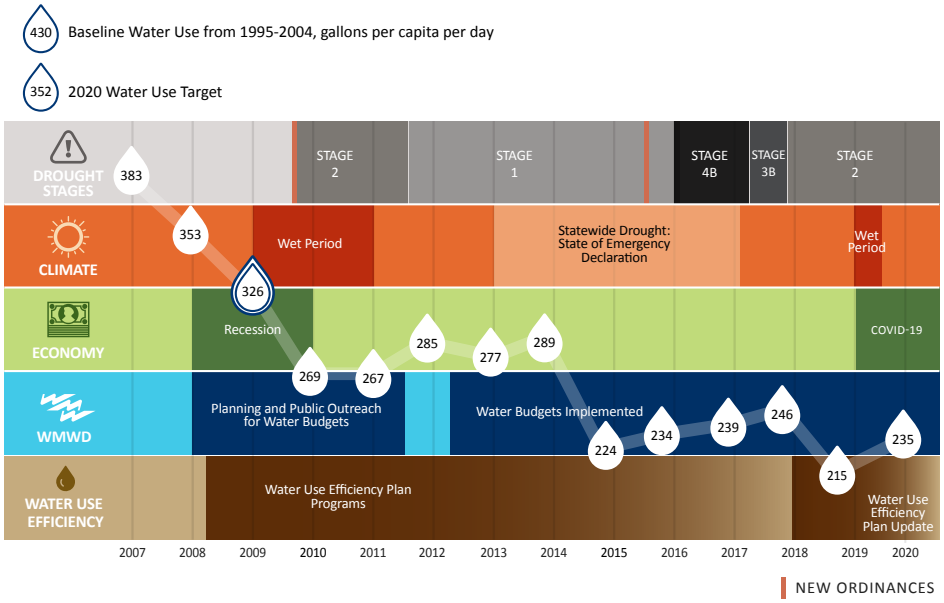
Western is an active and visible advocate and resource for wise water use in the region.

Western has been a leader in water use efficiency for many years and actively collaborates with local and regional agencies and the communities it serves to implement innovative programs and drive reductions in water usage. Western staff also serves in a leadership role for the California Water Efficiency Partnership (CalWEP) whose mission is to maximize urban water efficiency and conservation throughout California by supporting and integrating innovative technologies and practices; encouraging effective public policies; advancing research, training, and public education; and building collaborative approaches and partnerships.

20% BY 2020

By 2009, Western Retail had met their target to reduce per capita water consumption by 20% by 2020 and went on to achieve a reduction of more than 45% by 2020.

Activities that have affected retail water usage in Western Municipal Water District.



Water use efficiency is a core business component in Western's customer partnership with both wholesale and retail customers.

Revised 3/30/2022



Western's Supplies are Reliable, Even in Drought

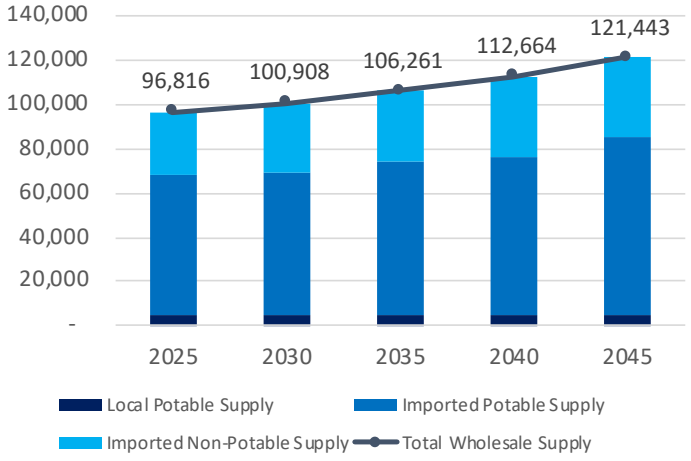
Western's diverse supplies and continued investments provide reliable water for the region.

Western evaluates the reliability of its supplies considering short and long-term variations in weather and climate patterns, including the impacts of climate change. Additionally, Western's supply sources may be impacted by water quality and legal restrictions, environmental and/or ecological constraints, as well as potential for interruption of supply driven by catastrophic events.

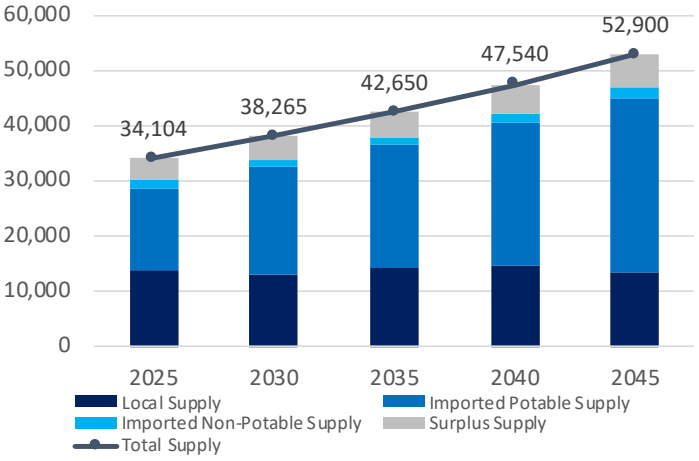
To address these risks, Western and Metropolitan invest in a variety of projects and programs to enhance water supply reliability. These include investing in water conservation and development of local supplies, as well as storage, transfer and exchange programs, and improvements in regional infrastructure. Metropolitan is also pursuing solutions in enhance reliability of SWP supplies through long-term investments in the Sacramento-San Joaquin Delta (Bay-Delta). The net effect is a very robust and reliable supply, even under extended drought conditions.

Western evaluated supply reliability during a single dry year, multiple dry years, and a multiple year drought that could potentially occur within the next five years (2021-2025). In all cases, Western's supplies were sufficient to meet demand without any supply shortages.

PROJECTED WESTERN WHOLESALE SUPPLIES IN A SINGLE DRY YEAR, AFY



PROJECTED WESTERN RETAIL SUPPLIES IN A SINGLE DRY YEAR, AFY



What Happens if Supplies are Interrupted?

Western's Water Shortage Contingency Plan (WSCP) describes how Western is preparing for and may respond to potential water shortage.

A water shortage occurs when water supply available is insufficient to meet the normally expected customer water use at a given point in time. A shortage may occur due to several reasons, such as water supply quality changes, climate change, drought, regional power outage, and catastrophic events (e.g., earthquake). Additionally, the State may declare a statewide drought emergency and mandate that water suppliers reduce demands, as occurred in 2014. The WSCP serves as the operating manual that Western will use to prevent catastrophic service disruptions through proactive, rather than reactive, mitigation of water shortages. The Western WSCP provides a process for an annual water supply and demand assessment and structured steps designed to respond to actual conditions. Although Western does not foresee implementing water shortage levels for Western Wholesale or Western Retail unless determined by Metropolitan, this level of detailed planning and preparation provide accountability and predictability and help Western maintain reliable supplies and reduce the impacts of any supply shortages and/or interruptions.

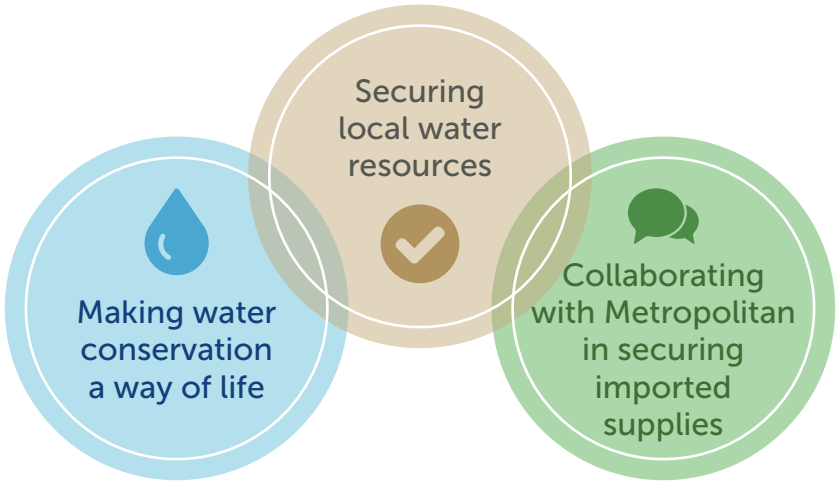


Looking to the Future – Delivering Long-term Water Security



Western is poised for continued leadership to support the region's long-term water security.

Western has ongoing programs to continue its mission of providing safe, reliable, environmentally sensitive, and financially responsible water resources for its customers.



Additionally, Western is currently partnering with the Drought Task Force to prepare a Drought Contingency Plan (DCP) that takes a deeper dive into drought planning and preparedness across Western's entire service area, including an in-depth evaluation of the potential range of impacts of climate change on Western's long-term supplies.

STAY INFORMED AND INVOLVED

Tap into education, advocacy and awareness by staying involved with Western.

@WesternMWD @WesternMWD

@WesternMWD ww.WMWD.com

To stay informed and involved in Western's ongoing programs and efforts, check out our website at www.wmwd.com, or follow us on Facebook, Twitter and Instagram.

Part 1

Introduction

WESTERN MUNICIPAL WATER DISTRICT

1 Introduction

This chapter provides a brief overview of Western Municipal Water District (Western) and the purpose of this Urban Water Management Plan (UWMP). It also describes how the UWMP is organized and how it relates to other local and regional planning efforts that Western is involved in.

This document presents the 2020 UWMP for Western. Western supplies water on both a wholesale (Western Wholesale) and a retail (Western Retail) basis and this document addresses the UWMP requirements for each in separate sections. The Western Wholesale system also includes Western Retail as a customer.

Western is a public agency headquartered in Riverside, California. Western was formed in 1954 to provide water to the growing western Riverside County through local and imported sources.

IN THIS SECTION

- About Western
- Purpose of the Plan
- Plan Organization
- Relation to Other Documents

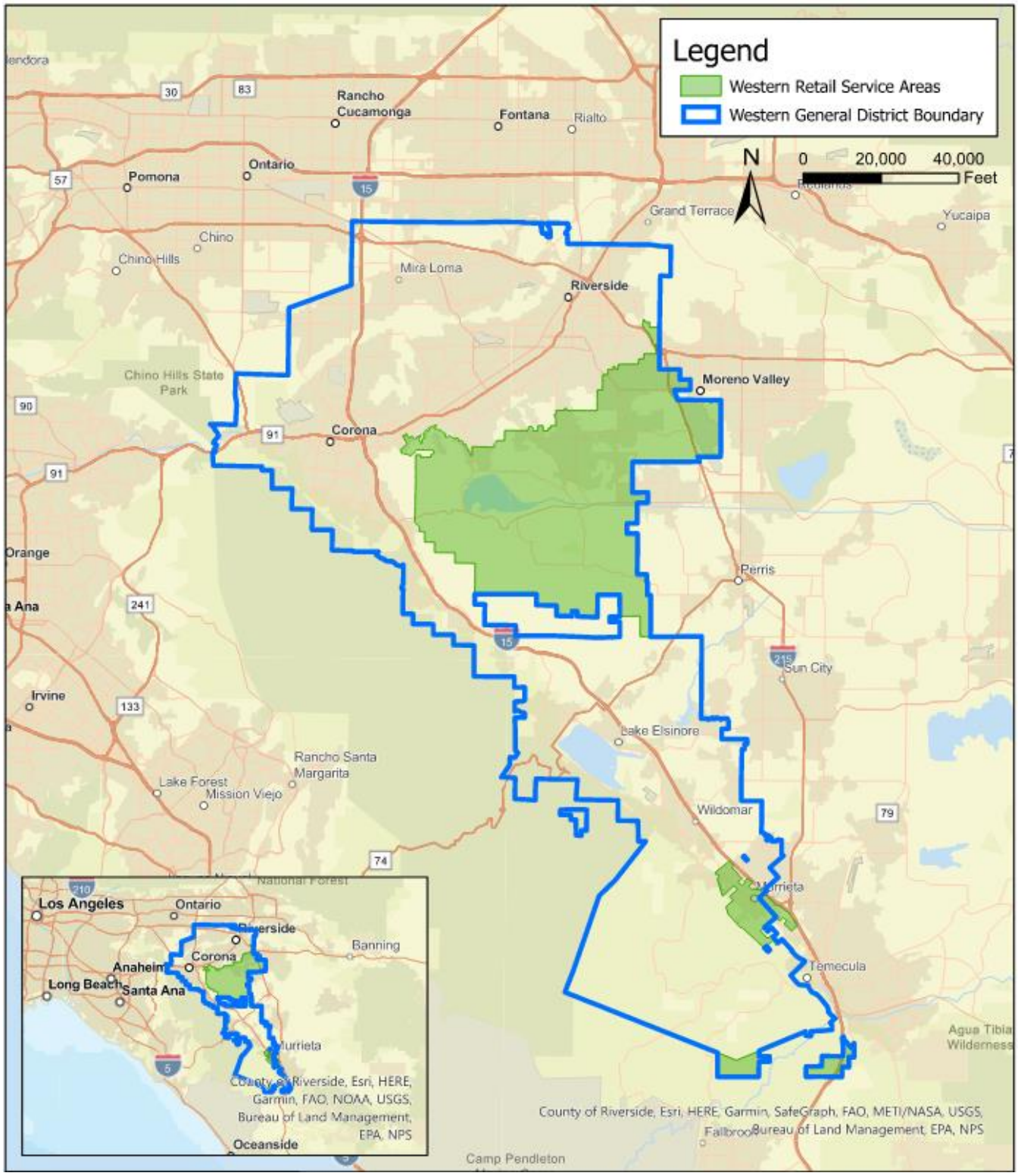
Today, Western provides water supply, wastewater treatment and disposal, and water resource management to nearly one million people in a service area covering roughly 527-square miles, shown in **Figure 1-1**. In total, Western sells approximately 80,000 acre-feet (AF) of water each year and operates two wastewater treatment plants and a groundwater desalination plant.

As a member agency of the Metropolitan Water District of Southern California (Metropolitan), Western Wholesale provides wholesale water to the region within its service area, which includes the cities of Corona, Norco and Riverside and the water agencies serving Box Springs, Eagle Valley, Elsinore Valley, Temescal Valley, and Temecula.

Western Retail also directly serves water to approximately 25,000 retail customers in the unincorporated areas of El Sobrante, Eagle Valley Temescal Creek, Woodcrest, Lake Mathews, March Air Reserve Base and Rainbow, as well as portions of the cities of Riverside and Murrieta.

Western is one of the five member agencies of the Santa Ana Watershed Project Authority (SAWPA), a joint powers authority that conducts regional water resources planning and project implementation within the Santa Ana River Watershed.

Figure 1-1. Western Wholesale and Western Retail Service Area Boundaries



1.1 Urban Water Management Plan Purpose

In 1983, the State of California Legislature (Legislature) enacted the Urban Water Management Planning Act (UWMP Act). The law required an urban water supplier, providing water for municipal purposes to more than 3,000 customers or serving more than 3,000 AF annually, to adopt an Urban Water Management Plan every five years demonstrating water supply reliability under normal as well as drought conditions. The UWMP Act applies to wholesale and retail suppliers. In 2020, Western Wholesale provided nearly 75,000 AF of water to its wholesale customers (including Western Retail). In 2020, Western Retail delivered over 25,000 AF of water to nearly 25,000 service connections throughout its retail service areas. Therefore, Western Wholesale and Western Retail are required to prepare an UWMP so Western's UWMP must meet the requirements for both.

Since the original UWMP Act was passed, it has undergone significant expansion to address a broad range of issues that impact the water supply reliability of each water supplier, including prolonged droughts, groundwater overdraft and changing climatic conditions. The current UWMP Act requirements are found in Sections 10610-10657 and 10608 of the California Water Code.

DWR provides guidance on preparing an UWMP to meet and understand the requirements in the California Water Code by developing an UWMP Guidebook, conducting workshops, developing tools, and providing program staff to help water suppliers prepare comprehensive and useful water management plans, and implement water conservation programs. Suppliers prepare their own UWMPs in accordance with the requirements and submit them to DWR. DWR then reviews the plans to make sure they have addressed the requirements identified in the California Water Code for completeness and submits a report to the Legislature summarizing the status of the plans for each five-year cycle.

The purpose of this UWMP is for water suppliers to evaluate their long-term resource planning and establish management measures to ensure adequate water supplies are available to meet existing and future demands. The UWMP provides a framework to help water suppliers maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during drought conditions or other water supply interruptions.

The UWMP is a valuable planning tool used for multiple purposes including:

- Provides a standardized methodology for water utilities to assess their water resource needs and availability.
- Serves as a resource to the community and other interested parties regarding water supply and demand, conservation and other water related information.
- Provides a key source of information for cities and counties when considering approval of proposed new developments and preparing regional long-range planning documents such as city and county General Plans.
- Informs other regional water planning efforts.

California Water Code Section 10632 also includes updated requirements for suppliers to prepare a Water Shortage Contingency Plan (WSCP). The WSCP documents a supplier's plans to manage and mitigate an actual water shortage condition, should one occur because of drought or other impacts on water supplies. In the 2015 UWMP cycle, the WSCP was part of the UWMP. For the 2020 update, the WSCP is required to be a standalone document so that it can be updated independently of the UWMP but must be referenced in and attached to the 2020 UWMP. An overview of the WSCP requirements are described in the body of this UWMP and the standalone WSCP is attached as **Appendix A**.

1.2 Plan Organization

This document was prepared in compliance with the California Water Code and the 2020 guidelines established by DWR and constitutes Western's 2020 UWMP for both Western Wholesale and Western Retail.

The 2020 UWMP is organized in four parts:

PART 1: INTRODUCTION

Chapter 1 – Introduction

Chapter 2 – Outreach and Engagement

Chapter 3 – Service Area Description

PART 2: WESTERN WHOLESALE

Chapter 4 – Wholesale Water Supply

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PART 3: WESTERN RETAIL

Chapter 9 – Retail Water Supply

Chapter 10 – Retail Water Use

Chapter 11 – Retail Water Service Reliability and Drought Risk Assessment

Chapter 12 – Retail Demand Management Measures

Chapter 13 – Retail Water Shortage Contingency Plan

PART 4: SUPPORTING INFORMATION

References

Appendices

Throughout this report, water volume is represented in units of acre-feet (AF). Data is presented on a calendar year basis.

1.3 Relation to Other Efforts

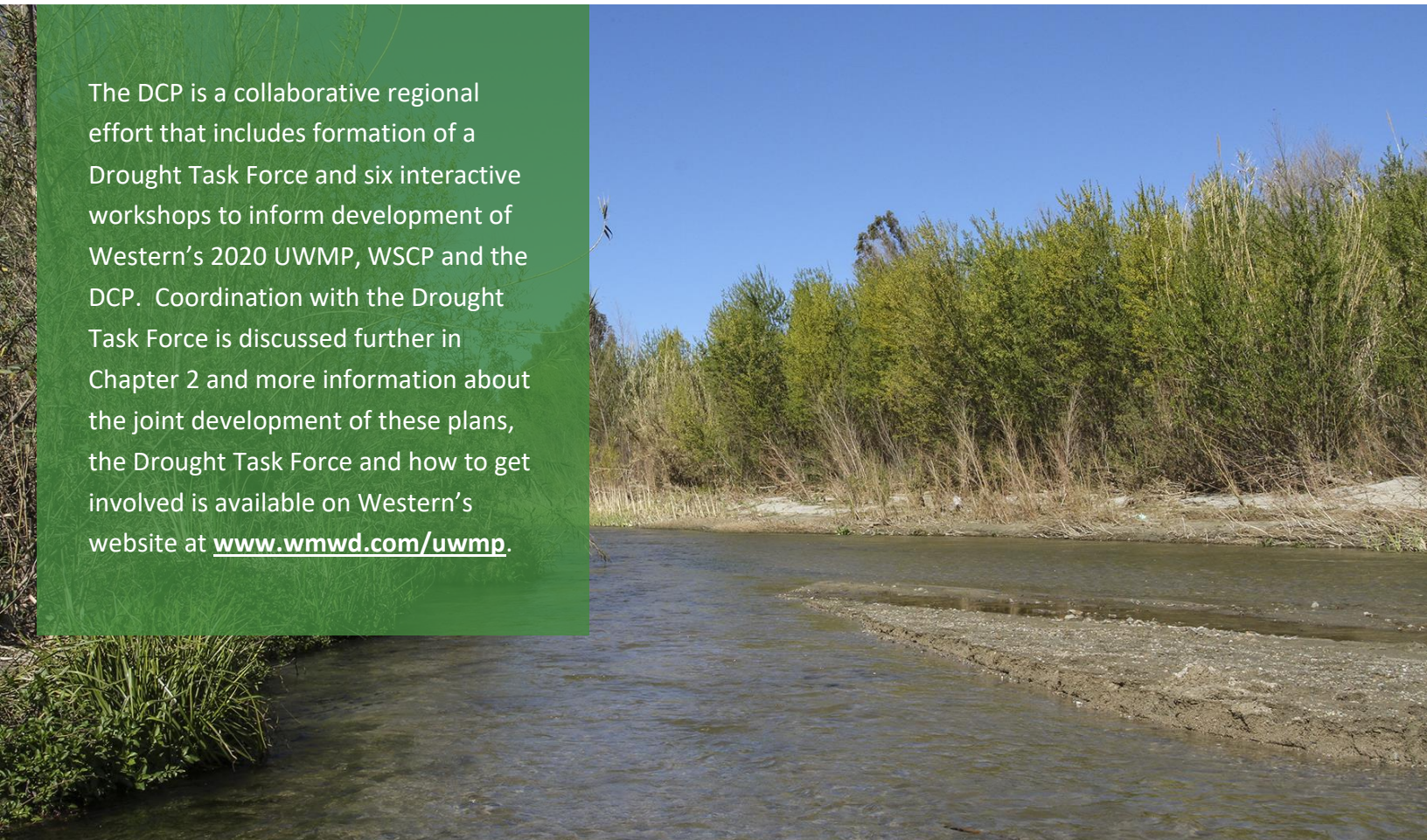
In addition to the 2020 UWMP, Western is involved in several other internal and external planning efforts and collaborates with a variety of stakeholders to achieve coordination and consistency between the various planning documents, especially those prepared by Western.

Figure 1-2 provides an overview of the many related planning efforts and how they integrate with the various elements of Western's 2020 UWMP. Elements of other plans that directly inform the development of this UWMP are shaded in gray.

1.3.1 Western Drought Contingency Plan

Western received a grant from the United States Bureau of Reclamation (Reclamation) to prepare a Drought Contingency Plan (DCP) consistent with Reclamation's Drought Response Program Framework. The Drought Response Framework provides assistance to water users and managers to conduct drought contingency planning, including consideration of risks and uncertainties related to changing hydrologic conditions, and to take actions that will build long-term resiliency to drought.

The DCP has many elements in common with elements of the UWMP and WSCP, such as supply and demand analysis, climate change vulnerability and water shortage response actions. Therefore, the two plans are being prepared in parallel as a joint project with a coordinated schedule and approach. This allows Western to capture efficiencies in simultaneous development of the documents and to fully align the analysis and recommendations of both plans. The DCP will be prepared over a two-year timeframe and will be completed by the end of 2022, but some elements that inform the 2020 UWMP were escalated in the DCP schedule to meet the earlier UWMP submittal deadline of July 1, 2021.



The DCP is a collaborative regional effort that includes formation of a Drought Task Force and six interactive workshops to inform development of Western's 2020 UWMP, WSCP and the DCP. Coordination with the Drought Task Force is discussed further in Chapter 2 and more information about the joint development of these plans, the Drought Task Force and how to get involved is available on Western's website at **www.wmwd.com/uwmp**.

Figure 1-2. UWMP Relation to Other Planning Efforts

Plan elements with a direct link to this UWMP

PLANNING DOCUMENT	PREPARED BY	DOCUMENT PROGRESS STATUS	PLAN AREA FOCUS: WESTERN WHOLESALE	PLAN AREA FOCUS: WESTERN RETAIL	PLAN AREA FOCUS: REGIONAL OR STATE	PLAN TOPICS: SUPPLIES / RELIABILITY	PLAN TOPICS: DEMANDS / WATER USE EFFICIENCY	PLAN TOPICS: INFRASTRUCTURE	PLAN TOPICS: CLIMATE CHANGE	PLAN TOPICS: RISK AND MITIGATION	PLAN TOPICS: WATER SHORTAGE & EMERGENCY RESPONSE
WESTERN 2020 UWMP	Western	■■■■■ This UWMP	✓	✓		✓	✓		✓	✓	✓
WATER SHORTAGE CONTINGENCY PLAN	Western	■■■■■ Developed as part of 2020 UWMP	✓	✓		✓	✓		✓	✓	✓
WESTERN DROUGHT CONTINGENCY PLAN	Western in collaboration with Drought Task Force	■■■□□ Under Development as part of 2020 UWMP	✓	✓	✓	✓	✓	✓	✓	✓	✓
WESTERN RETAIL FACILITIES MASTER PLANS	Western	■■■□□ Under development		✓			✓	✓			
RIVERSIDE RETAIL SERVICE AREA BUILD-OUT DEMAND ANALYSIS	Western	■■■■■ Completed in 2019		✓			✓				
MURRIETA SERVICE AREA BUILD-OUT DEMAND ANALYSIS	Western	■■■■■ Completed in 2018		✓			✓				
ARLINGTON BASIN GROUNDWATER SUSTAINABILITY PLAN (GSP)	Western in collaboration with the Arlington Groundwater Sustainability Agency (GSA)	■■■□□ Under development	✓	✓	✓	✓			✓	✓	
AWIA RISK AND RESILIENCE ASSESSMENT AND EMERGENCY RESPONSE PLAN	Western	■■■■■ Completed	✓	✓		✓		✓		✓	
LOCAL HAZARD MITIGATION PLAN	Western	■■■■■ Completed in 2017	✓	✓		✓		✓		✓	
METROPOLITAN INTEGRATED RESOURCES PLAN (IRP) AND 2020 UWMP	MWD in collaboration with Western and other member agencies	■■■□□ Under development	✓	✓	✓	✓	✓		✓	✓	✓
2019 WATER USE EFFICIENCY (WUE) MASTER PLAN	Western	■■■■■ Completed in 2019		✓			✓				
LOCAL RETAIL AGENCY 2020 UWMPS	Local retail water suppliers	■■■□□ Under development			✓	✓	✓		✓	✓	✓
2020 UPPER SANTA ANA WATERSHED INTEGRATED REGIONAL URBAN WATER MANAGEMENT PLAN	San Bernardino Valley Municipal Water District in collaboration with Western and other agencies	■■■□□ Under development			✓	✓	✓		✓	✓	✓
ONE WATER ONE WATERSHED PLAN	SAWPA in collaboration with Western and others	■■■■■ Completed in 2019			✓	✓	✓		✓	✓	✓

2 WESTERN MUNICIPAL WATER DISTRICT
Outreach and Engagement

This chapter describes the outreach and engagement activities conducted by Western during preparation of the 2020 UWMP, the various stakeholders involved in preparation of this UWMP along with the public review and adoption process.

Throughout preparation of this UWMP, Western actively engaged with stakeholders, including cities, counties, water agencies, and the public to inform them of Western's efforts and activities, gather the best available data for use in developing this UWMP, and coordinate planning activities with other related regional plans and initiatives.

Western employed a combination of outreach efforts, which were designed to educate decision-makers and customers about key plan decisions and engagement activities, which are designed to influence the development of the UWMP by curating the perspective of select stakeholders at key plan milestones.

Details regarding the key outreach and engagement efforts conducted by Western as part of the UWMP development are presented in this chapter.

IN THIS SECTION

- Outreach and Engagement Overview
- Stakeholders
- Plan Review, Adoption, and Submittal

2.1 Stakeholders

Western actively engaged with diverse stakeholder groups throughout the development of the UMWP. The various stakeholder groups involved with the UWMP and their role is summarized below in **Table 2-1**. Each stakeholder group and the methods of outreach and engagement are described in the following sections.

Table 2-1. Key Stakeholders and Roles

	ROLE FOR UWMP			
STAKEHOLDER GROUP	**INFORM / EDUCATE**	**GATHER PERCEPTIONS / OPINIONS**	**ADVISE**	**DECIDE**
Drought Task Force	X	X	X	
Engineering, Operations, Water Resources (EOWR) Committee	X	X	X	
Western Board of Directors				X
General Public	X	X		

OUTREACH
One-way communication to educate, inform

ENGAGEMENT
Multi-directional communication to inform plan decisions

2.1.1 Drought Task Force

As described in **Chapter 1**, the UWMP was developed in parallel with a Drought Contingency Plan. As part of this combined effort, Western recruited, convened and engaged a Drought Task Force comprised of 29 organizations represented by knowledgeable community leaders who can offer diverse, informed perspectives to support effective drought contingency planning as well as inform Western's UWMP and WSCP. The members of the Drought Task Force organized by stakeholder segment group are presented in **Table 2-2**. All of the retail water agencies in Western's service area are represented on the Drought Task Force.

During the UWMP preparation, the Task Force members participated in two interactive workshops to share their perspectives to inform development of elements of the UWMP, WSCP and DCP, and will continue to participate in approximately four more workshops to complete the development of the DCP by the end of 2022.

Table 2-2. Drought Task Force Members

SEGMENT	PERCENT REPRESENTATION	ORGANIZATION
Environmental and Conservation Groups	14%	Inland Empire Resource Conservation District
		Inland Empire Waterkeeper
		Riverside-Corona Resource Conservation District
		Santa Ana Watershed Project Authority
Environment and Social Justice	3%	Center for Community Action and Environmental Justice
Regional Government	7%	Riverside County Flood Control and Water Conservation District
		Western Riverside Council of Governments
Research	7%	University of California, Riverside
		Water Resources Institute
Local Government	3%	City of Murrieta
Retail: Customer Stakeholder	17%	Altman Plants
		March Air Reserve Base
		Vons/Kroger
		Woodcrest MAC
		Woodcrest MAC/Riverside County
Tribal representatives	4%	Pechanga Tribal Government
Water Agency: Regional	10%	Eastern Municipal Water District
		Metropolitan Water District of Southern California
		San Bernardino Valley Municipal Water District
Water Agency: Retail Agencies in Western service area	34%	Box Springs Mutual Water Company
		City of Corona
		City of Norco
		Elsinore Valley Municipal Water District
		Jurupa Community Services District
		Rancho California Water District
		Riverside Highland Water Company
		Riverside Public Utilities
		Rubidoux Community Services District
		Temescal Valley Water District

2.1.2 Western Engineering, Operations and Water Resources (EOWR) Committee

Western's EOWR Committee serves as an advisor to UWMP development. To keep the Committee informed and provide opportunity for input on key plan milestones, Western staff provided project updates at EOWR public meetings spanning the UWMP development. The EOWR Committee was provided the opportunity to review and provide comment on the draft UWMP.

2.1.3 Western Board of Directors

Western's Board of Directors (Board) is the formal decision-making body that adopts the UWMP and recommends it for submittal to DWR. To keep the Board informed, Western staff provided periodic updates at public Board meetings, spanning the UWMP development.

2.1.4 General Public

To reach all customers within Western's service area, Western created a specific web page for the UWMP and DCP, available at **https://wmwd.com/UWMP**. This webpage provides another opportunity for interested individuals to learn about the UWMP and DCP planning efforts, view the Drought Task Force participants and workshop schedules, subscribe to project updates, review and comment on both plans, and links to past resources or plans.

In addition to the project website, Western staff distributed timely informational notices to the public to raise awareness about the project and encourage participation in public comment periods through email bulletins, social media posts and newspaper publications.

The Draft UWMP was made available for public review in mid-May, 2021.

The Western Board conducted a public hearing on June 16, 2021 to receive public comments and consider adoption of the Draft UWMP and Draft WSCP. The public comment period and public hearing was noticed twice in local English and Spanish newspapers:

English language: Press Enterprise notices published on April 15 and April 22, 2021

Spanish language: La Prenza notices published on April 16 and April 23, 2021

The hearing notices are attached as **Appendix B**.

2.1.5 Other Stakeholder Outreach

60-Day Notices

To fulfill the requirements of Water Code Section 10621(c), Western sent letters of notification of preparation of the 2020 UWMP to all cities and counties within Western's service area 60 days prior to the public hearing. All organizations that were provided the 60-day notification letter were notified a second time about the availability of the draft 2020 UWMP and public hearing scheduled for June 16, 2021. Copies of the 60-day notification letters are attached as **Appendix C**.

The following agencies were notified:

- Box Springs Mutual Water Company
- City of Corona
- City of Corona, Department of Water and Power
- City of Eastvale
- City of Jurupa Valley
- City of Lake Elsinore
- City of Murrieta
- City of Norco
- City of Riverside
- City of Temecula
- County of Riverside
- Eagle Valley Mutual Water Company
- Elsinore Valley Municipal Water District
- Home Gardens County Water District
- Home Gardens Sanitary District
- Jurupa Community Services District
- Metropolitan Water District of Southern California
- Rancho California Water District
- Riverside Highland Water Company
- Riverside Public Utilities
- Rubidoux Community Services District
- Temescal Valley Water District

Metropolitan and Retail Agency Coordination

Western coordinated with Metropolitan to provide information on projected supplies and demands within Western's wholesale service area. Metropolitan prepared estimates of Western Wholesale's demand for imported water and provided its estimates to Western.

Western also coordinated with each of the retail water agencies in its service area to obtain updated supply and demand projections for inclusion in the Western Wholesale supply reliability analysis.

2.2 Plan Adoption, and Submittal

Western made the draft 2020 UWMP available on-line at **https://wmwd.com/UWMP** and at Western's headquarters for public review on in mid-May 2021.

The final 2020 UWMP was formally adopted by Western on June 16, 2021. A copy of the Adoption Resolution is included in **Appendix D**. The WSCP was also adopted on June 16, 2021, as described in the WSCP, attached in **Appendix A**.

Copies of the final 2020 UWMP and 2020 WSCP were sent to the California State Library, DWR (electronically using the WUEdata reporting tool), and all cities and counties within Western's service area within 30 days of adoption.

Western made copies of the final UWMP and WSCP available on its website and at its office within 30 days after the adoption.



WESTERN MUNICIPAL WATER DISTRICT

3 Service Area Description

This chapter describes Western's wholesale and retail service areas, customers, and land uses, as well as population, demographics, and climate features.

IN THIS SECTION

- Western Service Areas
- Population and Demographics
- Climate

3.1 Western Wholesale Service Area

The Western Wholesale service area encompasses 527 square miles that spans from the northern Riverside County boundary to the southern Riverside County boundary. Western's wholesale service area is also bounded by the Riverside County line to the west and by Eastern Municipal Water District to the east. As a member agency of Metropolitan, Western provides wholesale supplemental water to the region within its service area. In total, there are fourteen (14) retail water agencies, shown on the following page, within Western Wholesale's service area, including Western Retail, that currently receive or can receive water from Western. **Figure 3-1** illustrates its respective service areas within the Western Wholesale boundary.

Retail Water Agencies in Western Wholesale Service Area

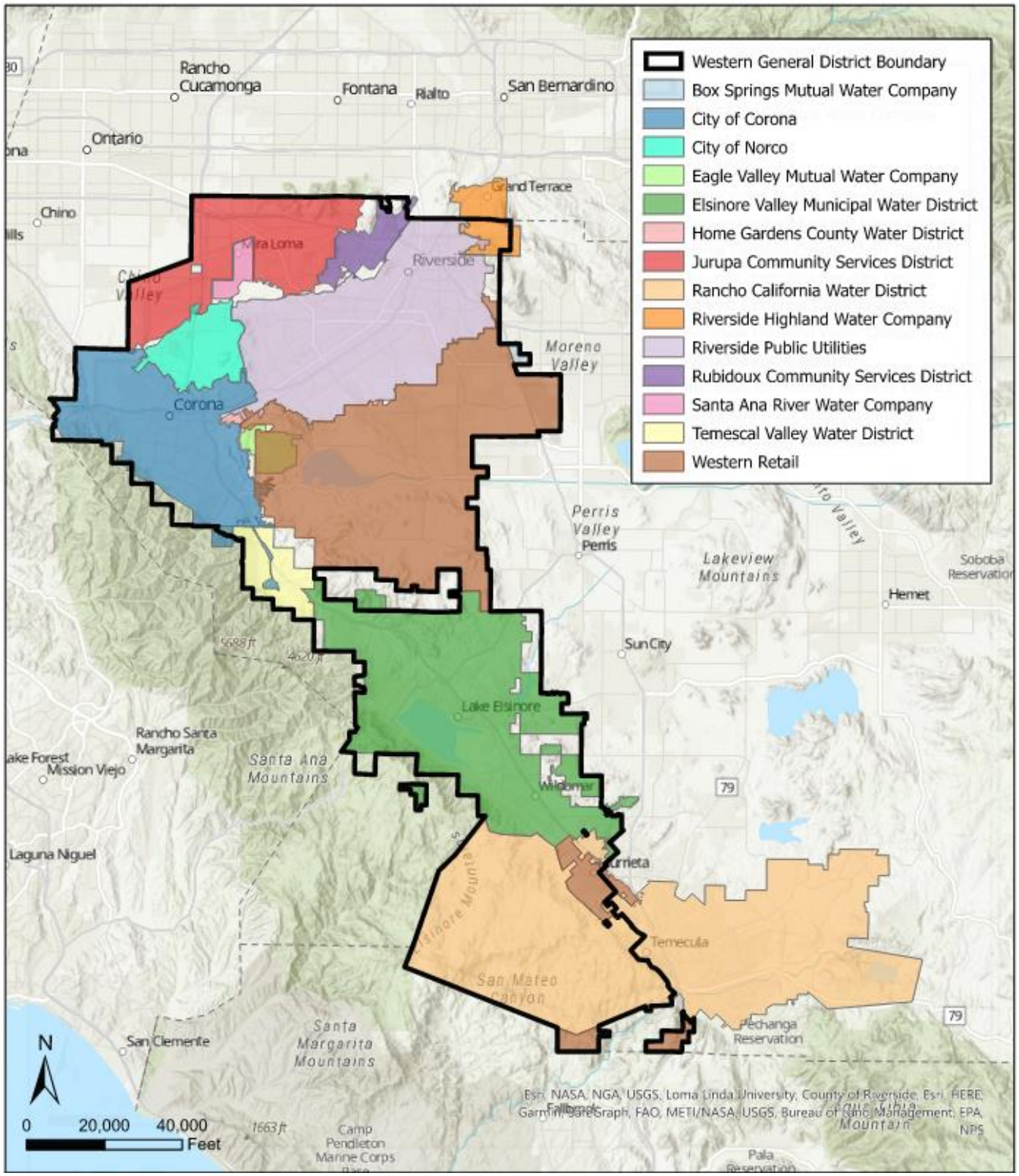
Box Springs Mutual Water District
City of Corona
City of Norco
Eagle Valley Mutual Water Company
Elsinore Valley Municipal Water District
Home Gardens County Water District
Jurupa Community Services District
Rancho California Water District
Riverside Highlands Water Company
Riverside Public Utilities
Rubidoux Community Services District
Santa Ana River Water Company
Temescal Valley Water District
Western Retail

Of the retail water agencies in the Western Wholesale service area, eight received wholesale water from Western Wholesale in 2020. These agencies are referred to as wholesale customers in this Plan. Western considers Western Retail a wholesale customer and is therefore included in wholesale system descriptions throughout this Plan. In addition to purchasing both wholesale treated and untreated water from Western Wholesale, most of these retail agencies also deliver local surface and groundwater and/or recycled water within their respective service areas.

The remaining six retail agencies currently utilize solely local supplies. It is anticipated that some of these six may utilize Western wholesale supplies in the future as the region grows (refer to **Chapter 4,** Wholesale Water Supply).



Figure 3-1. Western Wholesale Service Area and Customers



3.2 Western Retail Service Area

Western provides water to nearly 25,000 customer connections, such as single-family residences or commercial businesses, within its retail service area, including the Riverside Retail System, Murrieta Retail System, and Rainbow Retail System, as shown in **Table 3-1**. These three service areas are collectively referred to as Western Retail and cover a total of 104 square miles and serve water to an estimated population of nearly 100,000.

Table 3-1. Western Retail System Connections

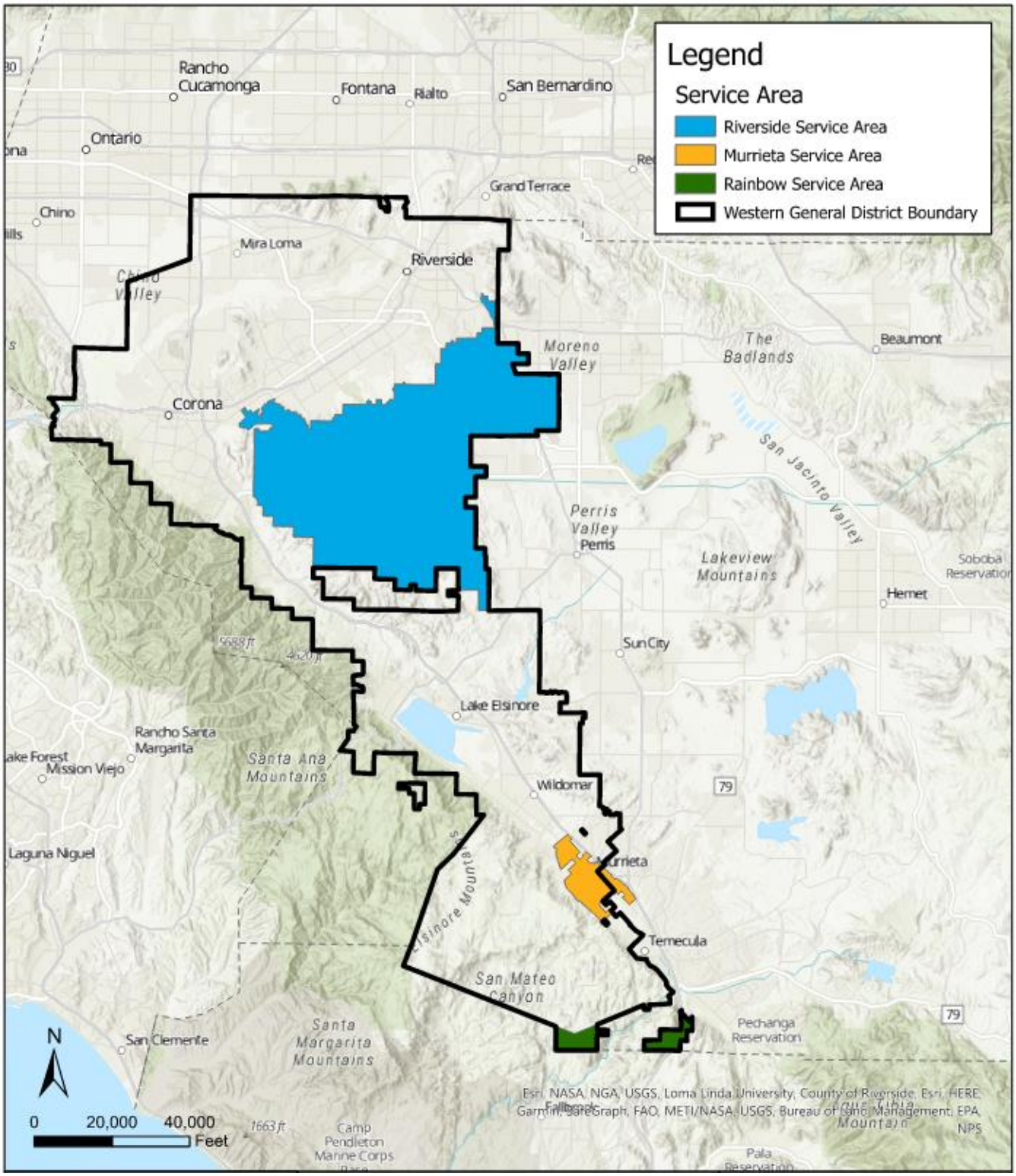
WESTERN RETAIL SYSTEM	NUMBER OF RETAIL CONNECTIONS IN 2020
Riverside Retail System	21,657
Murrieta Retail System	2,946
Rainbow Retail System	42
TOTAL	**24,645**

The Riverside Service Area includes a portion of the City of Riverside and unincorporated areas of Riverside County, including the communities of El Sobrante, Eagle Valley, Temescal Creek, Woodcrest, Lake Matthews, and March Air Reserve Base.

In 2005, Western took ownership of the Murrieta County Water District as a separate retail service area, now called the Murrieta Service Area. The entire area lies within the city of Murrieta.

Western Retail also serves a very small area, called the Rainbow Service Area, in an area just south of the City of Temecula in the unincorporated portion of Riverside County.

Figure 3-2. Western Retail Service Areas



3.3 Service Area Population and Demographics

Western provides service to nearly one million people in both a wholesale and retail capacity. A summary of population by service area is provided in the following section.

3.3.1 Service Area Population

Population estimates for Western's wholesale service area was developed using demographic projections from the Southern California Association of Governments (SCAG) Connect SoCal: The 2020-2045 Regional Transportation Plan/Sustainable Community Strategy (September 2020). SCAG routinely forecasts population, housing, and employment estimates as well as develops transportation plans to support growing population and housing needs throughout the region.

SCAG provided updated population, housing, and employment estimates for 2020, 2035, and 2045. This data is organized by Transportation Analysis Zones (TAZ). Because TAZ do not align with Western's service area, a geographical analysis in ArcGIS was used to determine the growth that is projected to occur within Western's service area. For intermediate years, the average annual rate of growth was determined and applied to find the population for 2025, 2030, and 2040. Estimates for 2020 and future year population are provided in **Table 3-2**. The population estimates for Western Wholesale include Western Retail.

Population within Western retail was estimated using a 2.2% increased and is based on growth rates established in recent master planning efforts. Modifications to Western retail population were made to better represent recent trends in growth that are anticipated to continue. SCAG growth estimates for Western's retail service areas did not appear to accurately represent near term future growth when compared to project development and permitting records.

Western's retail service area does not experience substantial seasonal changes in population. Some slight changes are observable in the area adjacent to the University of California Riverside campus in the northern portion of the Riverside Service Area.

Table 3-2. Population Projections for Western Wholesale

	2020	2025	2030	2035	2040	2045
WESTERN WHOLESALE[1]	**979,634**	**1,025,334**	**1,077,603**	**1,131,288**	**1,177,721**	**1,225,915**
WESTERN RETAIL	**94,898**	**105,865**	**118,100**	**131,749**	**146,976**	**163,958**
Riverside	79,044	87,652	97,260	107,981	120,293	134,013
Murrieta	15,676	18,011	20,610	23,506	26,389	29,621
Rainbow	178	202	231	262	294	324

[1] Western Wholesale includes Western Retail population and represents the total population within Western's general district boundary.

3.3.2 Other Social, Economic, and Demographic Factors

Based on 2015-2019 data, the United States Census Bureau (Census) estimates that households within Riverside County are composed of 3.28 people per household and approximately 74% of households are single-family residences. Approximately 54% of households are composed of married-couples with families. The median age of a resident within Riverside County is approximately 35 years old. Based on 2015-2019 Census data, approximately 82% of people 25 years or older had at least graduated from high school and 22% obtained a bachelor's degree or higher. It was estimated that 18% of people did not complete high school.

Throughout Riverside County, approximately 55% of the working population (people ages 16 and over) were employed. Approximately 78% held a private wage or salary position, and 15% were employed by the federal, state, or local government. Educational services, health care and social assistance (21%) is the most common industry that Riverside County Residents work in, followed by a retail trade (13%). The median household income was approximately $67,005, while the median earnings for a full-time, year-round worker was $46,825 (United States Census Bureau, n.d.).

It was estimated that 14% of people within Riverside County were in poverty. Nearly 9.3% of households participated in government programs, such as the Supplemental Nutrition Assistance Program (SNAP). Of the households that received SNAP, 67% had children under the age of 18 and 31% had one or more people over the age of 60 within the household. (United States Census Bureau, n.d.).

Riverside County is a relatively diverse area. Census data reported that of the people identifying as one race alone, 60% were White. Approximately 4.4% identified as two or more races. Of the total population, an estimated 35.3% identified as White non-Hispanic and 48.9% as Hispanic. It was estimated that 41% of people at least 5 years or older spoke a language other than English at home. In addition to English, Spanish was the most common language and was spoken by 34% of people 5 years or older. 15% of people stated that they did not speak English "very well" (United States Census Bureau, n.d.).

According to research from UC Riverside School of Business Center for Economic Forecasting and Development, before the COVID-19 pandemic, employment in the Inland Empire was expanding at a steady pace, based on data from California's Employment Development Department. From October 2018 to October 2019, the region added 30,900 nonfarm jobs, a 2.0% increase. This surpassed the 1.8% gains in the state and the 1.4% gains in the nation. Although pre-pandemic the employment growth for the Inland Empire remained steady, growth has slowed compared with recent years; total nonfarm employment grew 3.0% from October 2017 to October 2018 and 3.8% from October 2016 to October 2017 (University of California, Riverside School of Business, 2020).

The Inland Empire's labor market has continued to recover from the COVID-19 pandemic, adding 93,100 jobs since lows in April 2020. Despite ongoing employment recovery, year-over-year employment fell 7.1%. However, it is estimated that employment growth throughout the Inland Empire is outpacing that of the entire state (University of California, Riverside School of Business, 2020).

3.4 Land Uses within Service Area

SCAG prepares demographic forecasts based on land use data through an extensive process that emphasizes input from local planners in coordination with local or regional land use authorities, incorporating essential information to reflect anticipated future populations and land uses. SCAG's projections undergo extensive local review, incorporate zoning information from city and county general plans, and are supported by Environmental Impact Reports. Using SCAG's regional land use dataset, the existing land use within Western's wholesale service area is shown in Table 3-3 and the projected land use (based general plan land use designations) is shown in Table 3-4.

Table 3-3. Existing Land Uses within Western's General Service Area

LAND USE	ACREAGE	PERCENTAGE OF TOTAL SERVICE AREA
Single Family Residential	61,055	18%
Multi-Family Residential	3,330	1%
Mixed Residential	180	0%
Rural Residential	11,575	3%
Commercial and Services	4,993	2%
General Office	1,553	0%
Facilities	2,447	1%
Education	4,631	1%
Industrial	13,039	4%
Transportation, Communications, and Utilities	7,401	2%
Mixed Commercial and Industrial	121	0%
Mixed Residential and Commercial	9	0%
Open Space and Recreation	28,140	8%
Agriculture	25,564	8%
Water	7,235	2%
Specific Plan	226	0%
Mobile Homes and Trailer Parks	3,403	1%
Military Installations	6,797	2%
Under Construction	3,244	1%
Vacant	116,618	35%
Undevelopable or Protected Land	930	0%
Unknown	41	0%
Other	29,425	9%
TOTAL	**331,955**	**100%**

Table 3-4. Projected Land Uses within Western's General Service Area

LAND USE	ACREAGE	PERCENTAGE OF TOTAL SERVICE AREA
Single Family Residential	156,332	47%
Multi-Family Residential	4,039	1%
Mixed Residential	2,298	1%
Rural Residential	11,305	3%
Commercial and Services	6,773	2%
General Office	483	0%
Facilities	11,132	3%
Education	569	0%
Industrial	14,985	5%
Transportation, Communications, and Utilities	470	0%
Mixed Commercial and Industrial	7,202	2%
Mixed Residential and Commercial	1,985	1%
Open Space and Recreation	56,535	17%
Agriculture	900	0%
Water	6,920	2%
Specific Plan	14,004	4%
Other	36,020	11%
TOTAL	**331,955**	**100%**

3.5 Service Area Climate

Western's climate is characterized by typical hot, dry summers, and mild winters. **Table 3-5** presents average climate data for the service area, including temperature, rainfall, and reference evapotranspiration (ETo). As shown in **Table 3-5**, the warmest month of the year is August with an average temperature of 85.0 degrees Fahrenheit (°F), while the coldest month of the year is December with an average temperature of 59.8°F.

The annual average precipitation within Western's boundary is about 8.8 inches. As shown in **Table 3-5**, the majority of rainfall occurs in the months of December through March. December is typically the wettest month with an average rainfall of approximately 2.3 inches.

Table 3-5. Historical Climate Data

	AVERAGE TEMPERATURE (°F) [1]	AVERAGE PRECIPITATION (IN.) [1]	AVERAGE STANDARD ETO (IN.) [1]
January	61.2	1.84	2.84
February	61.5	1.48	3.39
March	65.2	1.19	5.08
April	68.8	0.67	6.36
May	71.3	0.27	6.98
June	78.0	0.01	7.80
July	83.7	0.20	8.30
August	85.0	0.21	8.09
September	82.4	0.26	6.37
October	75.0	0.39	4.62
November	66.3	0.83	3.21
December	59.8	2.34	2.53

[1]CIMIS weather station 44 at UC Riverside; https://cimis.water.ca.gov/. Data from 2010 through 2020.

3.5.1 Climate Change

As part of this UWMP, Western considered the impacts of climate change on future water supplies and demands and water supply reliability. There are several studies that evaluate the potential impacts of climate change within the Western Wholesale and Retail areas.

Santa Ana Watershed Basin Study

SAWPA and the United States Bureau of Reclamation (USBR) completed the Santa Ana Watershed Basin Study (Basin Study) in 2013 as a complementary study to SAWPA's Integrated Regional Water Management planning process for the Santa Ana Watershed. As part of the Basin Study, USBR prepared a Climate Change Analysis for the Santa Ana River Watershed, included as **Appendix E**. The analysis evaluated frequently asked questions reading impacts to climate change on the Santa Ana River Watershed. The key findings most relevant to Western's water supply reliability are (U.S Department of the Interior Bureau of Reclmanation, August 2013):

- Annual surface water is likely to decrease over future periods;
- Precipitation shows somewhat long-term decreasing trends;
- Temperature will increase, which is likely to cause increased water demand and reservoir evaporation;
- More precipitation will fall as rain instead of snow;
- Projected decreases in precipitation and increases in temperature will decrease natural recharge throughout the basin;
- Management actions such as reducing municipal and industrial water demands or increasing recharge will be required to maintain current groundwater levels.

Metropolitan 2020 UWMP

In its Draft 2020 UWMP, Metropolitan addresses the uncertainties of climate change on water supply planning, identifying several areas of concern:

- Reduction in Sierra Nevada snowpack;
- Increased intensity and frequency of extreme weather events;
- Prolonged drought periods;
- Water quality issues associated with increase in wildfires;
- Changes in runoff pattern and amount; and
- Rising sea levels resulting in:
    - Impacts to coastal groundwater basins due to seawater intrusion;
    - Increased risk of damage from storms, high-tide events, and the erosion of levees; and
    - Potential pumping cutbacks on the SWP

Hydrologic variability, potential climate change, and regulatory risk are embedded in Metropolitan's modeling efforts. Metropolitan's modeling utilizes historical hydrologic conditions from 1992 to 2017 to simulate expected demands on Metropolitan supplies, as well as capacities and constraints of its storage facilities and supply program. The Water Reliability Assessment and the Drought Risk Assessment in Metropolitan's Draft 2020 UWMP demonstrates that Metropolitan is able to mitigate the challenges posed by hydrologic variability, potential climate change, and regulatory risk on its imported supply sources through the significant storage capabilities it has developed over the last two decades, both dry-year and emergency storage (Metropolitan Water District of Southern California, 2021).

Metropolitan's 2020 IRP, which is currently under development, is further addressing ways to account for and mitigate the uncertainties associated with climate change.

Western Drought Contingency Plan – Climate Change Vulnerability Assessment

As part of the DCP that is currently being developed, a Climate Change Vulnerability Assessment (CCVA) for the Western service area was prepared to improve the understanding of climate change impacts on future water demand and local water supplies within Western's wholesale service area during normal and drought periods (GEI Consultants, April 2021). The CCVA technical memorandum provides details on the climate model data sources, climate analysis approach, calculation of the various supply and demand change factors. The complete CCVA is provided in **Appendix F**.

DWR has developed statewide climate change datasets to for use in the water resource planning that depict climate conditions in California under historical and future climate conditions. The DWR climate data used in the CCVA was assembled from 20 global climate models, to best represent anticipated climate conditions in California. The CCVA analysis was based on the median projected change from the majority of the selected climate models. DWR's California specific data is broken down into grid cells that are approximately 1/16th degree (approximately 3.75 miles) for the entire state. Each grid cell contains monthly time series based on 1915 to 2011 used to forecast future precipitation and evapotranspiration (ET) under 2030 and 2070 climate conditions.

Based on the timeseries data, climate change factors pertaining to supply and demand for normal, single dry, and 5-year dry periods were determined. The change factors represent the ratio of a simulated future value to the corresponding simulated historical value. The time series for precipitation and corresponding change factor can be used to estimate changes in supply while the time series for evapotranspiration and corresponding change factor can be used to estimate changes in demand. The results of the CCVA show:

- Decreases in water supplies from the Santa Ana and Santa Margarita River basins under normal and drought conditions
- Decreases in precipitation and increases in surface water evaporation resulting from increased temperatures
- Smaller decreases in precipitation and natural groundwater recharge under normal and multi-year drought conditions. Results for a single-dry year anticipate slightly wetter future conditions compared to the 2020 baseline
- Precipitation will occur during shorter rainy seasons at a higher intensity
- Increases in outdoor water use under normal and drought conditions resulting from increased temperatures and higher ET rates

Western is proactively planning to adapt to and mitigate the effects of climate change. Western is involved in various efforts to recharge local groundwater basins, which will help mitigate the effects of expected declines in natural groundwater recharge. Western also has an industry leading conservation program to promote water use efficiency across its wholesale and retail service areas. Western will continue to prioritize actions to adapt to and mitigate climate change to minimize impacts to supply reliability therefore, the climate change factors developed in the CCVA were not applied directly to the supply and demand projections in this UWMP.

As part of the ongoing DCP development, Western plans to analyze the extreme climate scenarios developed by DWR to characterize the range of potential impacts of climate change for the purposes of developing drought response and mitigation measures for the DCP, which will be completed in 2022.

Climate change can also impact water resources indirectly. For example, wildfire hazards are projected to increase in southern California with climate change. Wildfires can impact water resources by increasing water requirements for firefighting, changing surface vegetation and runoff patterns in burn areas, causing debris flows, and increasing siltation of reservoirs and hydraulic structures.

Part 2

Western Wholesale

4 WESTERN MUNICIPAL WATER DISTRICT
Wholesale Water Supply

This chapter describes the water supplies Western Wholesale uses to meet wholesale demands, which include desalinated local groundwater and imported water from Metropolitan. In addition, a summary of the total water use and various water sources within the region is provided.

The retail water agencies within Western's general service area boundary use a variety of local groundwater, surface water, and recycled water sources to meet customer demands. In addition, Western Wholesale provides desalinated groundwater and imported water as supplemental supplies to its wholesale customers.

IN THIS SECTION

- Regional Water Sources
- Water Supply Characterization
- Energy Intensity



In 2020, Western provided approximately 31% of the total water supply to the region.

4.1 Regional Supplies

This section summarizes all of the water supplies available to the region within the Western Wholesale boundary, including local and imported water supplies.

4.1.1 Imported Water

Western purchases imported water from Metropolitan and sells to wholesale customers within Western's service area, including Western Retail. Metropolitan imports water from the State Water Project (SWP), which conveys water from the Bay-Delta to Southern California via the California Aqueduct, and from the Colorado River through the Colorado River Aqueduct (CRA). The supply mix varies depending on the availability of SWP supplies, which varies every year, much more significantly than the Colorado River supply. During the recent drought, water allocations from SWP were significantly reduced, leading to a greater proportion of Colorado River supplies in Metropolitan's supply mix.

Additional wholesalers within the region include Eastern Municipal Water District (Eastern), who also provides imported water to the portion of Rancho California Water District (RCWD) that falls within Eastern' s wholesale service area and to Western's Murrieta Retail System.

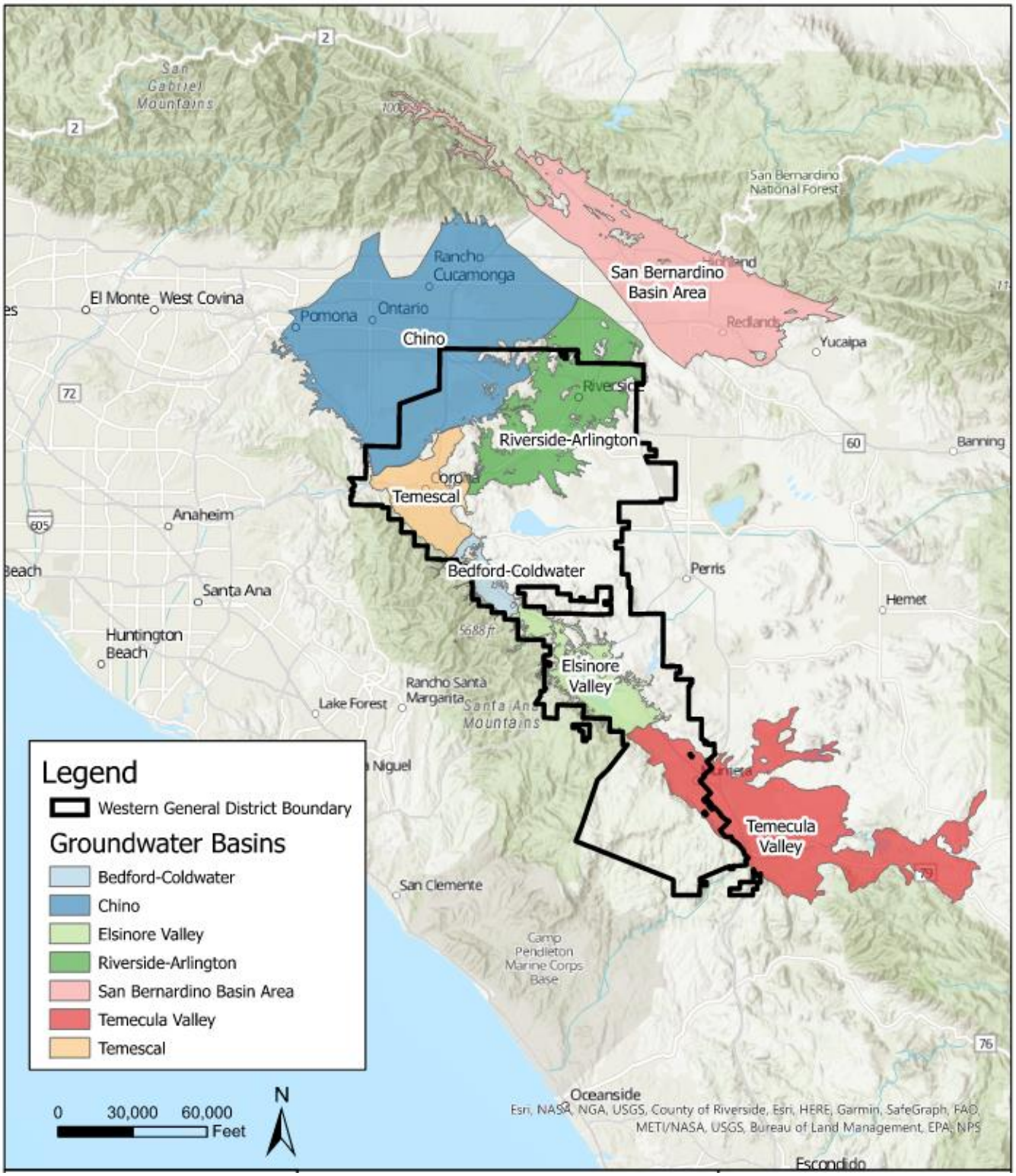
4.1.2 Groundwater

The region also uses local groundwater from seven different groundwater basins, San Bernardino Basin Area (SBBA), Chino Basin, Riverside-Arlington Basin, Temescal Basin, Bedford-Coldwater Basin, Elsinore Valley Basin, and Temecula Valley Basin. The locations of these basins are shown in **Figure 4-1**. Each of these basins is either adjudicated and managed by a Watermaster or managed by a Groundwater Sustainability Agency to ensure long term reliably supply, even in dry years.

Western Wholesale uses supply from the Riverside-Arlington Basin, which is described in detail in Section 4.2.2.

Western Retail uses supply from the SBBA, Chino Basin and Temecula Valley Basin, which are described in more detail in Section 9.2.2.

Figure 4-1. Local Groundwater Basins



4.1.3 Recycled Water

Several retail water agencies in the region, including Western Retail, also use recycled water to meet non-potable demands. Recycled water sources in the region include:

- Western Water Recycling Facility (WWRF)
- Western Riverside County Regional Wastewater Treatment Plant (WRCRWTP), operated by Western and owned by Western Riverside County Regional Wastewater Authority (WRCRWA), a joint powers authority (JPA) composed of the cities of Norco and Corona, Jurupa Community Services District, Home Gardens Sanitary District, and Western
- City of Corona water reclamation facilities WRF1, WRF2 and WRF3
- EVMWD Regional Water Recycling Facility
- EVMWD Railroad Canyon Water Recycling Facility
- EVMWD Horsethief Canyon Water Recycling Facility
- Santa Rosa Water Recycling Facility, overseen by Western, EVMWD, and RCWD through a JPA
- City of Riverside Water Quality Control Plant
- Temecula Valley Water Reclamation facility, owned and operated by Temescal Valley Water District

Western Retail has access to recycled water supply from the WWRF and WRCRWA plants, which are described in detail in Section 9.2.4.

4.1.4 Surface Water

EVMWD uses surface water from Canyon Lake, also referred to as Railroad Canyon Reservoir. Recently, Canyon Lake has experienced water quality issues and is currently not an active supply source for EVMWD. EVMWD is working to install a treatment system to recover the supply and anticipates resuming use by 2025.

4.1.5 Stormwater

Capturing stormwater for supplemental groundwater recharge is a key strategy in the region to increase local supplies, enhance long term sustainability of local groundwater basins and help mitigate the effects of climate change on local supplies.

There are various stormwater capture facilities throughout the region and additional projects are currently under development, including the Riverside North Aquifer Storage and Recovery (ASR) Project. The Riverside North ASR project is a partnership between Western, San Bernardino Valley Municipal Water District (Valley District) and RPU. The project consists of proposed in-channel and off-channel recharge along the Santa Ana River. The proposed off-channel recharge facility location is along the west side of the Santa Ana River and proposes the construction of up to eight individual recharge basins encompassing approximately 25 acres. The in-channel recharge basin proposes construction of an inflatable dam across the Santa Ana River channel, which can be raised and lowered depending on the amount of water flowing in the river. This project is estimated to recharge an average of approximately 6,000 acre-feet of water per year. The in-channel and off-channel water captured will be recharged into the Riverside North sub basin of the Riverside-Arlington Basin and a portion of the retained water will be diverted to the Riverside Canal pipeline for direct use. The project is currently in the environmental and permitting phase and is anticipated to be constructed by 2025.

4.1.6 Regional Water Sources Summary

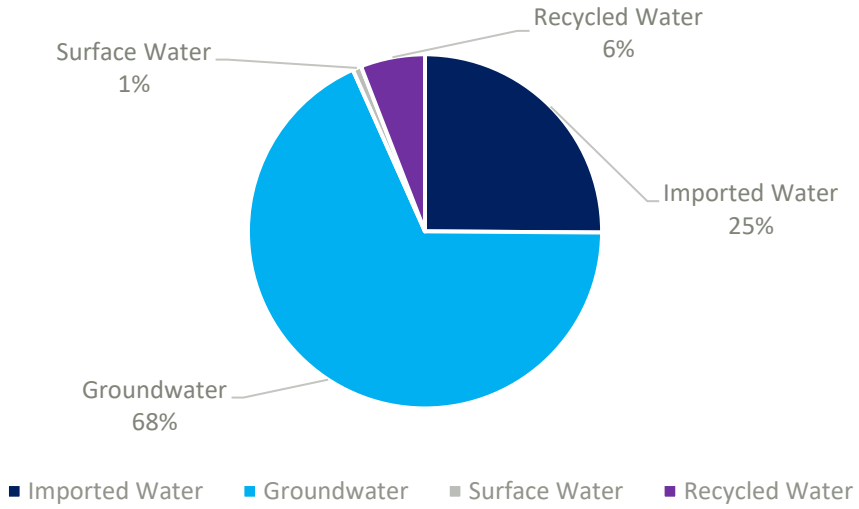
Each water agency in the region uses a unique mix of supplies and not all supply comes from Western Wholesale. An overview of the water sources used by each agency within Western's service area is shown in Table 4-1. Based on the historical water use for each of Western's retail agencies from 2017-2019, almost half of Western's retail agencies rely on imported water as a major supply source, but local groundwater is the largest source of supply for the region, as shown in Figure 4-2.

Table 4-1. Current Water Sources by Agency

Agency	Imported Water	Groundwater	Surface Water	Recycled Water[1]
Western Wholesale	X	X		
Western Retail	X	X		X
Box Springs Mutual Water District	X	X		
City of Corona	X	X		X
City of Norco	X	X		X
Eagle Valley Mutual Water Company	X	X		
Elsinore Valley Municipal Water District	X	X	X	X
Home Gardens County Water District		X		X
Jurupa Community Services District		X		X
Rancho California Water District	X	X		X
Riverside Highlands Water Company		X		
Riverside Public Utilities	X	X		X
Rubidoux Community Services District	X	X		
Santa Ana River Water Company		X		
Temescal Valley Water District	X	X		X

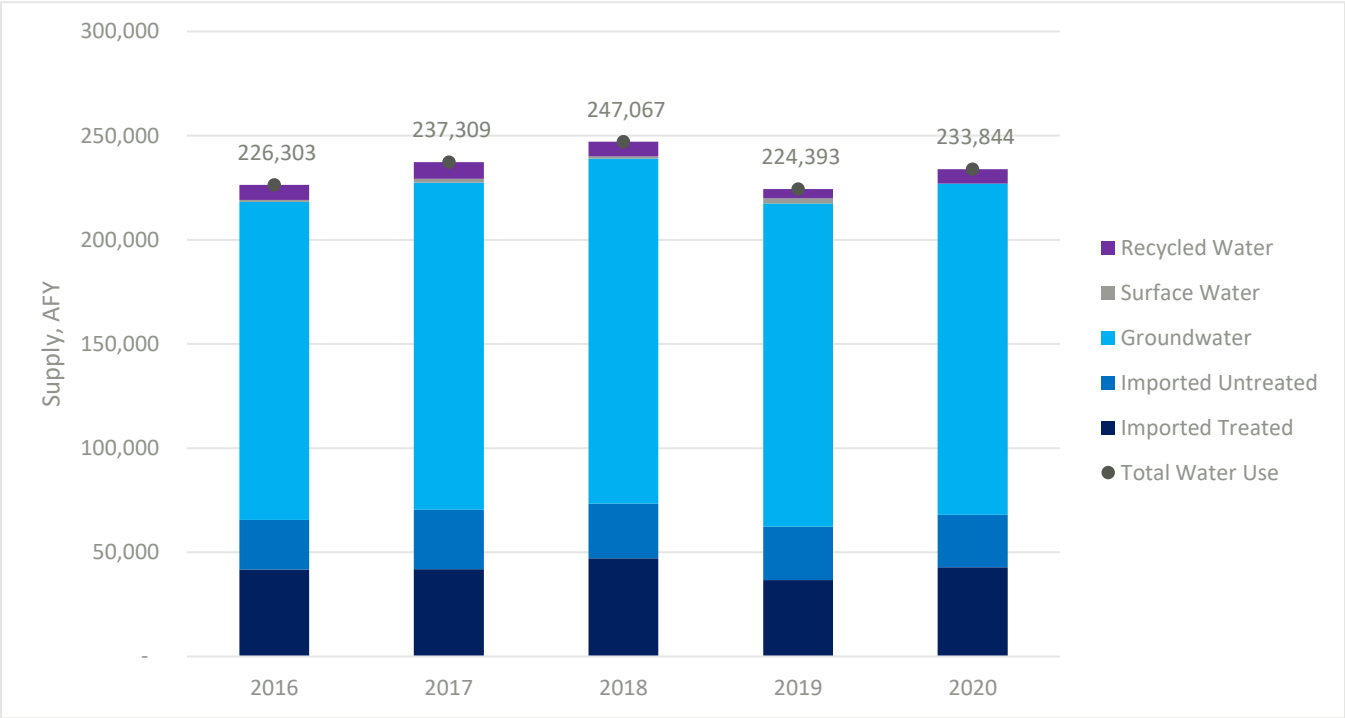
[1] Includes recycled water sources that are not currently used but may be in the future.

Figure 4-2. Percent Regional Water Use by Source



Total water use within Western's service area has ranged from approximately 220,000 AF to nearly 250,000 AF in the last five years, including Western Retail. In 2020, approximately 31% of the total water used within Western's service area was provided by Western Wholesale.

Figure 4-3. 2016-2020 Regional Water Use by Source, AFY



4.2 Western Wholesale Supply

To meet the supplemental supply needs of its wholesale customers, Western Wholesale uses desalinated local groundwater and imported water from Metropolitan.

On overview of the sources of supply and key infrastructure for both Western Wholesale and Western Retail is shown on the following page.

Where Western's Water Comes From

Western has a diverse supply portfolio used to meet wholesale and retail demands, including imported water, local groundwater and recycled water. Western has made significant investments in local water supplies to reduce reliance on imported water, increase reliability and reduce costs. A robust network of infrastructure provides flexibility to route supplies to various locations, providing additional reliability to Western's wholesale and retail customers.

Supplies and Infrastructure

1 Arlington Desalter and Victoria Recharge Basin
Produces drinking water by treating local non-potable groundwater using reverse osmosis to remove salt and other matter. This process also helps clean up the groundwater basin and improve the quality over time. The new Victoria Recharge Basin captures stormwater from precipitation and runoff and percolates into the groundwater basin where it is later used by the Arlington Desalter, increasing local supply reliability.

2 Chino Desalter
Western partners with several other water agencies to treat local non-potable groundwater using reverse osmosis to create a new high quality drinking water supply.

3 Sterling Pump Station and La Sierra Pipeline
The recently completed Sterling pump Station and La Sierra Pipeline connect the Chino and Arlington Desalters to and allow Western to deliver both water sources to many different locations, increasing regional reliability.

4 San Bernardino Basin (SBBA)
Western owns rights to pump local potable groundwater from the SBBA and has a long term lease with Meeks & Daley Water Company to use additional water from the SBBA.

5 City of Riverside
Western has an agreement with Riverside to purchase their surplus local groundwater. Riverside also pumps and delivers Western's water from the SBBA to Western Retail at interconnections using their existing facilities.

6 Temecula Valley Groundwater
Western has rights to produce water from this basin for service to Western's Murrieta Retail system.

7 Recycled Water a Local Drought Proof Supply
Western provides recycled water and non-potable groundwater to meet non-potable irrigation water needs, preserving the potable supplies for domestic use.

8 Imported Water
Western Wholesale obtains potable and nonpotable imported water supply from the SWP and CRA through Metropolitan at various locations and delivers it to Western Retail and other wholesale customers in their service area. Some Western Wholesale customers receive raw imported water directly from Metropolitan pipelines and use the water for groundwater recharge or treat it at their own treatment plants for potable use.

9 Mills and Skinner Water Treatment Plants (WTP)
Metropolitan treats imported water at their Mills and Skinner WTPs and provides potable imported water to Western to distribute to Western Retail and other wholesale customers.

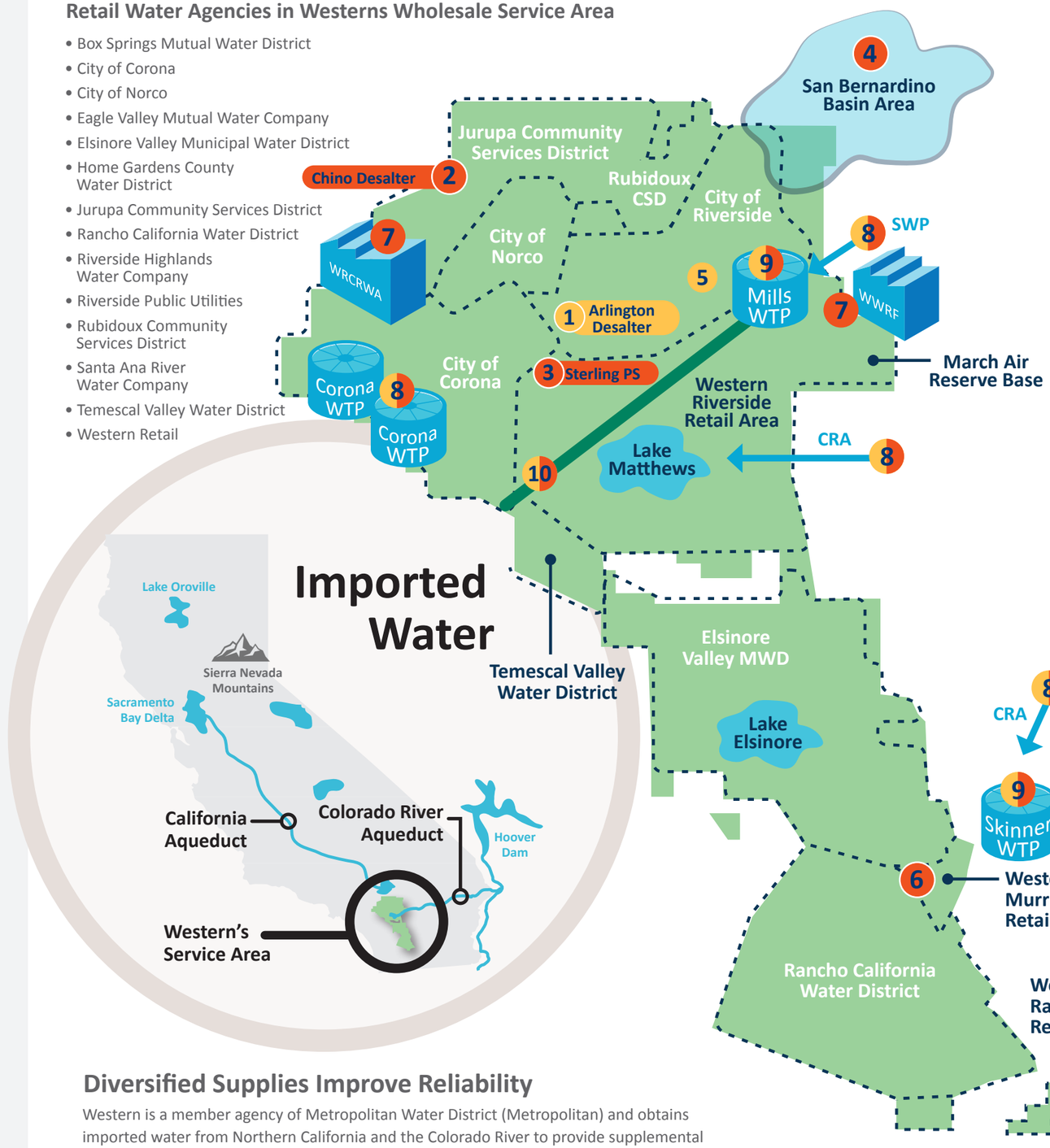
10 Mills Gravity Line
Deliver treated imported water from the Mills WTP to Western Retail and several Western Wholesale customers.

Wholesale · Retail · Wholesale & Retail

CRA - Colorado River Aqueduct · SWP - State Water Project

Retail Water Agencies in Westerns Wholesale Service Area

- Box Springs Mutual Water District
- City of Corona
- City of Norco
- Eagle Valley Mutual Water Company
- Elsinore Valley Municipal Water District
- Home Gardens County Water District
- Jurupa Community Services District
- Rancho California Water District
- Riverside Highlands Water Company
- Riverside Public Utilities
- Rubidoux Community Services District
- Santa Ana River Water Company
- Temescal Valley Water District
- Western Retail



Diversified Supplies Improve Reliability

Western is a member agency of Metropolitan Water District (Metropolitan) and obtains imported water from Northern California and the Colorado River to provide supplemental supplies within its service area. Imported water is an important part of Western's supply portfolio but is more costly and more prone to interruptions than local supplies due to the long distance it must travel to reach the region and other factors. Western has focused on diversifying its water supply to reduce reliance on imported water by developing local supplies.

4.2.1 Purchased and Imported Water

Western Wholesale's primary supply is imported water from Metropolitan. Approximately 75 percent of the wholesale supply was obtained from Metropolitan in 2020.

Metropolitan was formed in 1928 to develop, store, and distribute water for domestic and municipal purposes to the residents of Southern California. Today, the Metropolitan service area stretches across the Southern California coastal plain, serves 26 member agencies, and includes portions of Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties.

Metropolitan is a wholesale water provider and has no retail customers. It provides treated and untreated water directly to its member agencies. Over the last ten years, Metropolitan has provided between 50 % and 60 % of the municipal, industrial, and agricultural water used in its nearly 5,200-square mile service area. The remaining water is provided through local resources and other sources of imported water.

Western is one of the 26 member agencies that make up Metropolitan, which include 14 cities, 10 other municipal water districts and one county water authority. Western, like other member agencies, receives deliveries at different points in the system and pays for the service through a rate structure made up of multiple components. Each year, member agencies advise Metropolitan of how much water they anticipate they will need during the next five years. Metropolitan then works with member agencies to develop forecasts of long-term future water supply.

Metropolitan delivers supply to member agencies from two sources, the Colorado River Aqueduct (CRA), which it owns and operates, and the State Water Project (SWP), owned and operated by DWR. The supply mix varies depending on the availability of SWP supplies, which varies every year, much more significantly than the Colorado River supply. During the recent drought, water allocations from SWP were significantly reduced, leading to a greater proportion of Colorado River supplies in Metropolitan's supply mix. Additional information about Metropolitan is provided in Metropolitan' 2020 UWMP.

Western Wholesale receives treated imported water from Metropolitan's Mills Water Treatment Plant (WTP) and Skinner WTP, in addition to raw water which is delivered directly to wholesale customers from various connections to Metropolitan's system. Western Wholesale also owns and operates the Mills Gravity Line, which distributes treated water from the Mills WTP to the Western Retail Riverside system and several other wholesale customers.

Western has a ten-year purchase agreement with Metropolitan for a Tier 1 annual maximum of 105,783 AFY with a minimum Purchase Order Commitment for 70,522 AFY, effective January 1, 2015 to December 31, 2024. Western can purchase additional water beyond the purchase agreement maximum at Metropolitan's higher Tier 2 rate. A copy of the Purchase Order Commitment is provided in **Appendix G**. Western plans to renew the purchase order agreement in the future and the annual maximum and minimum will be revised as needed to meet anticipated use at that time.

Metropolitan does not provide supply projections for each member agency. Instead, Metropolitan uses a regional approach to developing projections. Metropolitan calculates the demand for the entire region, as discussed in its UWMP. Using information about existing and proposed local projects, Metropolitan then determines the amount of imported water supply and demand. Throughout the preparation of the 2020 UWMP, Western has provided information about local supply and projects and population projections to Metropolitan. Based on this information and information provided by other member agencies, Metropolitan has determined it is able to meet the demands of all member agencies through 2045, with significant surplus supplies.

4.2.2 Groundwater

Western extracts groundwater from the Riverside-Arlington basin and operates the Arlington Desalter, a reverse-osmosis groundwater treatment facility. The estimated supply available from the Arlington Desalter is approximately 5,000 AFY. The Arlington Desalter provides a local source of potable water for Western wholesale customers.

4.2.2.1 Riverside-Arlington Basin

The Riverside-Arlington Basin (classified as subbasin in DWR's Bulletin 118: DWR 8-02.03) underlies part of the Santa Ana River Valley in northwest Riverside County and southwest San Bernardino County, and stores water in alluvial deposits. The subbasin is part of the Upper Santa Ana Valley Groundwater Basin (DWR 8-02). It is bordered by the Box Springs Mountains on the southeast, Arlington Mountain on the south, La Sierra Heights and Mount Rubidoux on the northwest, and the Jurupa Mountains on the north. It is also bordered by the Rialto-Colton fault to the northeast, and a groundwater divide beneath the community of Bloomington along a portion of its northern boundary. The Riverside-Arlington Basin is replenished by infiltration from Santa Ana River flow (in the northern portion of the subbasin), underflow past the Rialto-Colton fault, intermittent underflow from the Chino subbasin, return irrigation flow, and deep percolation of precipitation.

Within the Riverside-Arlington Basin lies a subbasin called the Arlington Groundwater Basin, which is a shallow, alluvial-filled valley. Groundwater quality in the Arlington Subbasin has historically been degraded by elevated concentrations of TDS, nitrate, and other contaminants from industrial sources. To utilize Arlington Basin groundwater, Western operates the Arlington Desalter, a reverse-osmosis groundwater treatment facility that began operation in 1990. The Arlington Desalter is located at the western (down-gradient) end of the Arlington Basin, along with five nearby production wells. The Arlington Desalter serves two purposes, providing a local source of potable water and decreasing subsurface outflow of low-quality groundwater to the Temescal Basin. The capacity was recently expanded to provide additional potable supply.

The Arlington Basin is not adjudicated. Western has adopted the Arlington Basin Groundwater Management Plan (Western, 2012), which includes actions to mitigate overdraft and replenish groundwater levels, as well as protect and improve groundwater quality. The Riverside-Arlington Subbasin is classified as a low priority basin, but proactive management will continue to ensure its reliability into the future. The Riverside-Arlington Subbasin Groundwater Sustainability Agency (GSA) is currently developing a Groundwater Sustainability Plan (GSP) to achieve this goal. The GSP will develop water budgets, assess groundwater storage, develop sustainable management criteria, undesirable results, and minimum thresholds to protect the basin for future supply. The GSP also considers how the Riverside-Arlington subbasin interacts with adjacent basins in the area. The ongoing GSP will result in a plan and identify projects needed to ensure future sustainability of supplies from this basin.

The historic production from Arlington Desalter from 2016 to 2020 is shown in **Table 4-2**.

Table 4-2. DWR 6-1W Groundwater Volume Pumped, AFY

All or part of the groundwater described below is desalinated.

GROUNDWATER TYPE	LOCATION OR BASIN NAME	2016	2017	2018	2019	2020
Alluvial Basin	Riverside-Arlington	4,880	4,754	5,433	4,449	4,814
	TOTAL:	**4,880**	**4,754**	**5,433**	**4,449**	**4,814**

The City of Norco is the primary user of Arlington Desalter as a supply source, but water can also be delivered to the City of Corona or Jurupa Community Services District. The City of Corona has purchased water from the Arlington Desalter in the past and may do so again in the future.

Victoria Recharge Basin

In 2019, Western completed construction of the Victoria Recharge Basin near the intersection of Victoria Avenue and Jackson Street in Riverside (Victoria site). This site will be used to replenish the Riverside-Arlington groundwater basin with up to 1,800 acre-feet of water per year. The project benefits include:

- The Victoria Recharge Basin increases groundwater storage through the capture and recharge of stormwater that would otherwise be lost.
- The project improves groundwater quality and water management of the Arlington Basin, increasing the groundwater supply enabling the Arlington Desalter to operate at capacity.
- The project will provide a local water source to help decrease the region's reliance on imported water from Northern California.
- Locally-sourced water provides system reliability in the event of imported water disruption.

At this time, there are no other recharge sites planned; however, Western continues to explore additional recharge sites to continue to increase local supply reliability.

Victoria Recharge Basin



4.2.3 Surface Water

Western does not utilize any local surface water sources for its wholesale system. However, Western is a partner in developing stormwater recharge projects to supplement local supplies as described in **Section 4.1.5**.

4.2.4 Wastewater and Recycled Water

Western's recycled water sources are discussed in **Section 4.1.3**. Western Retail uses the recycled water produced at the Western WRF and is entitled to its portion of the recycled water produced at WRCWRA but does not have infrastructure in place to use the recycled water. Recycled water supplies for Western Retail are discussed in **Chapter 9**.

Recycled Water Coordination

Western Wholesale does not currently use recycled water to meet wholesale customer demands but is coordinating with other regional agencies to evaluate opportunities for future use of recycled water from WRCWRA.

4.2.5 Water Exchanges and Transfers

Western Wholesale does not currently have any exchanges or transfers with other water agencies.

Emergency Interties

Western has interties with Eastern Municipal Water District (Eastern) and EVMWD for mutual aid and as an emergency supply source. Western also has interconnections with the cities of Riverside and Corona.

4.2.6 Future Water Projects

4.2.6.1 Santa Ana River Conservation and Conjunctive Use Program (SARCCUP)

The five regional water agencies in the Santa Ana River Watershed have identified a watershed scale project, the Santa Ana River Conservation and Conjunctive Use Program (SARCCUP), a cooperative program between Metropolitan, Western and other agencies in the Santa Ana Watershed to store imported water during wet years for use during dry years.

The group includes representatives from the following regional water agencies:

- Western Municipal Water District
- Eastern Municipal Water District
- Inland Empire Utilities Agency (IEUA)
- Orange County Water District
- San Bernardino Valley Municipal Water District

The program goals of SARCCUP include:

- Providing watershed-wide benefits based upon regional collaboration
- Creating significant new dry-year yield

- Increasing the resiliency and reliability of the water supply

The SARCCUP includes multiple separate groundwater banks located in different groundwater basins within the Santa Ana Watershed, including the Chino, Elsinore, Orange County, Riverside-Arlington, San Bernardino and San Jacinto groundwater basins. The total storage proposed for SARCCUP is about 137,000 acre-feet (AF). The combined extraction capacity is 45,667 AFY. Because the participants are sharing the benefits equally, each agency receives 25% (1/4) of the total capacity (IEUA does not currently have any storage capacity), resulting in each of the SARCCUP agencies receiving 11,417 AFY of new dry-year yield. This may require transfers, in lieu, or exchanges between the agencies in both wet and dry years.

Western's SARCCUP facilities include the Sterling Pump Station and La Sierra Pipeline, Cannon Campbell Pump Station, Riverside-Arlington Well and Transmission Main and Elsinore Wells.

In early 2016, SAWPA was formally notified that it had been awarded $64,268,000 by DWR for its Proposition 84 2015 IRWM grant proposal, which included the SARCCUP. From the grant, SAWPA governance designated $55 million for SARCCUP implementation. The SARCCUP Proposition 84 grant award includes the development of a Decision Support Model which was used to help refine the proposed facilities and that identified additional facilities that could be included in future phases of the program. The total cost of Phase 1 of the SARCCUP program is approximately $150 million.

Construction of the SARCCUP facilities is ongoing and is estimated to be complete by 2023. The SARCCUP agencies will continue work to finalize all of the individual agreements needed for operations of the facilities and water purchases. This includes an agreement between the SARCCUP agencies and Metropolitan to allow the purchase of water made available under the program and special conditions associated with use of the water during droughts and emergencies.

4.2.7 Summary of Existing and Planned Sources of Water

Western plans to continue to provide water from the Arlington Desalter and imported water from Metropolitan to meet the demands of its wholesale customers. Western continues to evaluate additional local projects to decrease dependence on imported water and increase regional reliability. The total volume of water supplied from various sources in 2020 is summarized in **Table 4-3**.

Table 4-3. Actual Water Supplies

SUPPLY SOURCE	2020 VOLUME, AFY
POTABLE	**47,631**
Metropolitan Imported Treated Water	42,817
Arlington Desalter	4,814
NON-POTABLE	**25,151**
Metropolitan Untreated Water	25,151
TOTAL	**72,782**

Western plans to continue prioritizing use of the local groundwater supply from the Arlington Desalter.

According to the information provided in Metropolitan's 2020 UWMP, Metropolitan has determined that they can meet all demands in normal, dry, and multiple dry years with existing supplies and storage. Metropolitan's UWMP also shows significant excess supply available under all conditions so additional water is available if needed. More detail can be found in Metropolitan's 2020 UWMP.

Western will only purchase imported supplies as needed to meet demands. Therefore, projected imported water supplies are equal to projected imported water demands, less the supply from the Arlington Desalter. Additional imported water is available from Metropolitan if needed. Western Wholesale projected supplies are shown in **Table 4-4**.

Table 4-4. Projected Water Supplies, AFY

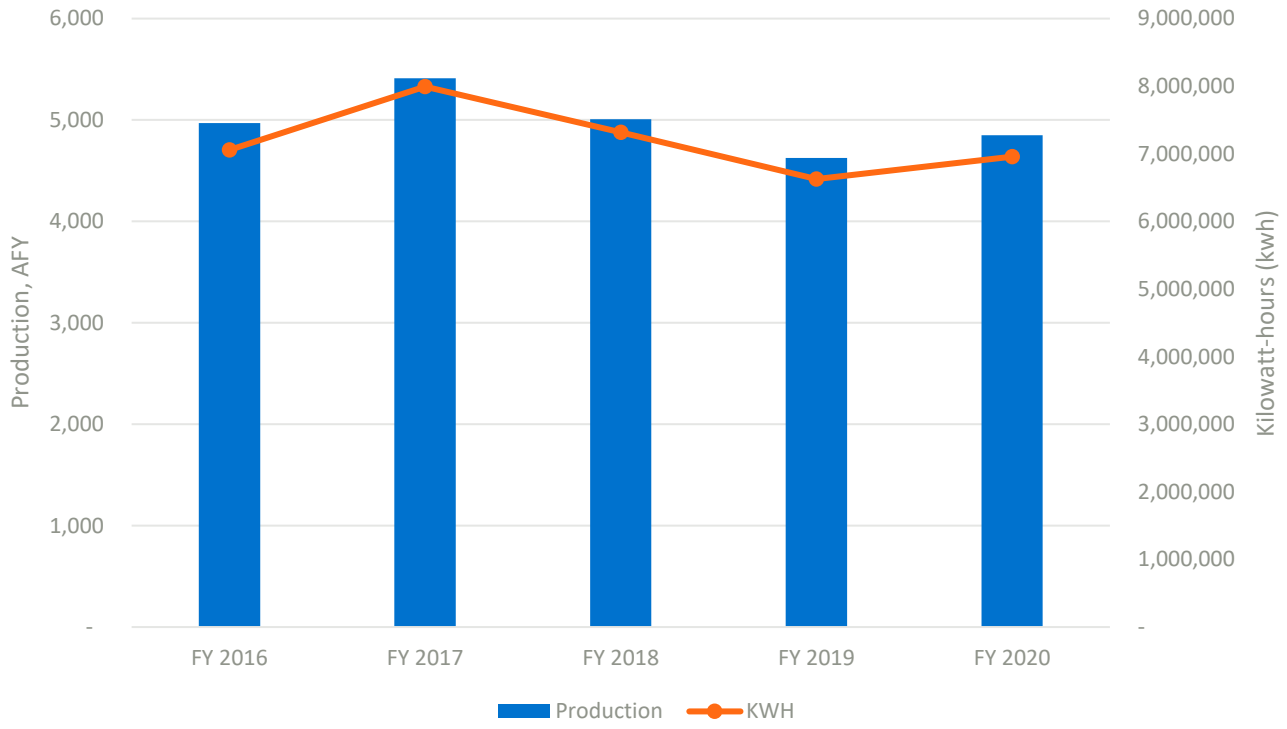
SUPPLY SOURCE	2025	2030	2035	2040	2045
Metropolitan Imported Water[1]	91,816	95,908	101,261	107,664	116,443
Arlington Desalter	5,000	5,000	5,000	5,000	5,000
TOTAL	**96,816**	**100,908**	**106,261**	**112,664**	**121,443**

[1]Metropolitan imported water may serve both potable and non-potable demands.

4.2.8 Energy Intensity

Western monitors energy usage at the Arlington Desalter. On average, Western uses 1,445 kilowatt-hours (kwh) for every AF of water produced (1,445 kwh/AF) from the Arlington Desalter. Energy usage includes pumping from the various Arlington Desalter wells and desalter treatment. A summary of energy used for production in 2016 through 2020 is provided in **Figure 4-4**.

Figure 4-4. Past Energy Used at the Arlington Desalter



WESTERN MUNICIPAL WATER DISTRICT

5 Wholesale Water Use Characterization

This chapter describes Western's historical, current, and projected wholesale water uses. Wholesale water use projections were developed by Western's wholesale customers and provided to Western for inclusion in the 2020 UWMP.

Western provides both potable and non-potable wholesale water to the region within its service area. Western's wholesale supplies are described in **Chapter 4**.

IN THIS SECTION

- Wholesale Customers
- Past, Current, and Projected Water Use



Colorado River Aqueduct

5.1 Western Wholesale Customers

In total, there are fourteen (14) retail water agencies within Western's wholesale service area, including Western Retail, that currently receive or can receive water from Western. Eight of the agencies received either local or imported wholesale water from Western in 2020 and an additional three are planning for future wholesale water supplies from Western, if needed. In addition to wholesale water purchased from Western, most of the water purveyors also deliver local surface and groundwater and/or recycled water within their respective service areas and some rely solely on local water supplies. Regional supplies are briefly discussed in **Chapter 4**.

Table 5-1 shows which retail agencies are current Western Wholesale customers and which are planning to obtain wholesale water from Western in the future.

Table 5-1. Current and Future Wholesale Customers

RETAIL AGENCY	CURRENT WESTERN WHOLESALE CUSTOMER	POTENTIAL FUTURE WESTERN WHOLESALE CUSTOMER
Box Springs Mutual Water Company (BSMWC)	✓	
City of Corona	✓	
City of Norco	✓	
Eagle Valley Mutual Water Company (Eagle Valley MWC)	✓	
Elsinore Valley Municipal Water District (EVMWD)	✓	
Home Gardens County Water District (HGCWD)		
Jurupa Community Services District (JCSD)		✓
Rancho California Water District (RCWD)	✓	
Riverside Highland Water Company (RHWC)		✓
Riverside Public Utilities		✓
Rubidoux Community Services District (RCSD)		✓
Santa Ana River Water Company (SARWC)		
Temescal Valley Water District (TVWD)	✓	
Western Retail	✓	

5.2 Past and Current Wholesale Water Use

A summary of past deliveries to Western Wholesale customers is provided in **Table 5-2**. Total deliveries varied from 2016 to 2019, which was likely driven primarily by local weather conditions. In 2019, the region received above average rainfall, which reduced outdoor water use.

Table 5-2. Western's Wholesale Historical and Current Water Use by Customer, AFY

WHOLESALE CUSTOMER	2016	2017	2018	2019	2020
Box Springs Mutual Water Company	80	84	120	121	149
City of Corona	15,616	18,693	17,606	15,280	17,866
City of Norco	4,578	4,096	4,933	4,449	4,814
Eagle Valley Mutual Water Company	75	71	90	108	132
Elsinore Valley Municipal Water District	15,945	16,337	19,671	14,531	15,115
Rancho California Water District	18,550	21,603	18,431	16,923	17,449
Temescal Valley Water District	3,019	3,205	3,205	3,083	3,435
Western Retail	12,392	12,956	14,669	12,554	13,823
TOTAL	**70,255**	**77,045**	**78,724**	**67,049**	**72,782**

For 2020, the potable and non-potable uses by customer are summarized in **Table 5-3**.

Table 5-3. 2020 Wholesale Water Use, AFY

WHOLESALE CUSTOMER	2020 USE
POTABLE	
Box Springs Mutual Water Company	149
City of Corona	1,229
City of Norco	4,814
Elsinore Valley Municipal Water District	15,115
Rancho California Water District	10,886
Temescal Valley Water District	3,435
Western Retail	12,004
TOTAL POTABLE	**47,631**
NON-POTABLE	
City of Corona	16,637
Eagle Valley Mutual Water Company	132
Rancho California Water District	6,563
Western Retail	1,819
TOTAL NON-POTABLE	**25,151**
TOTAL DEMAND	**72,782**

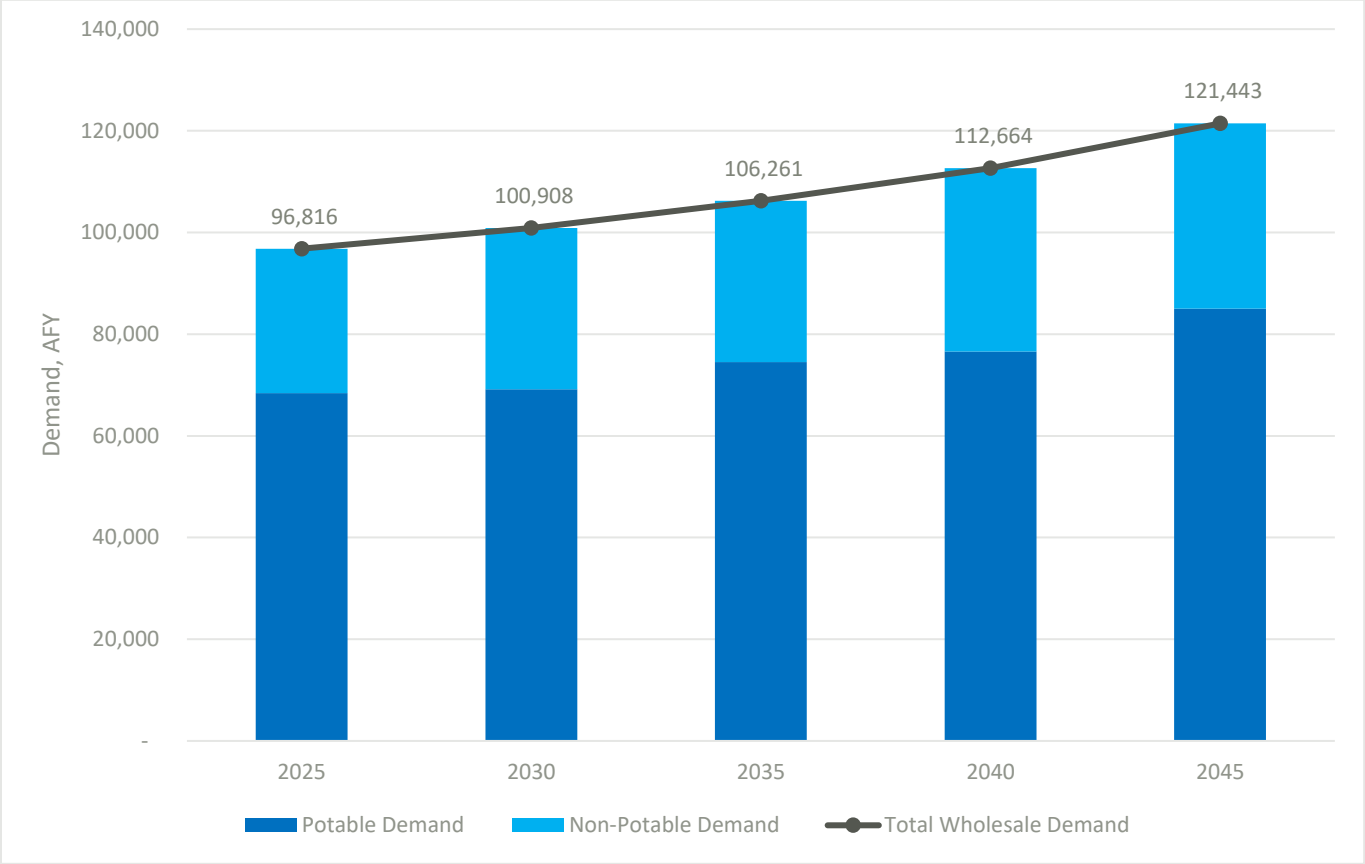
5.3 Projected Water Use

In preparation of this UWMP, Western coordinated with its wholesale customers to obtain the most recent planning projections and maintain consistency with the projections that will be shown in retail agency 2020 UWMPs. Based on input from the retail agencies, the expected water use for Western Wholesale for the next 25 years is summarized below in **Table 5-4** and **Figure 5-1**.

Table 5-4. Projected Wholesale System Demand, AFY

WHOLESALE CUSTOMER	2025	2030	2035	2040	2045
POTABLE					
Box Springs Mutual Water Company	145	150	175	175	175
City of Corona	1,838	1,838	1,838	1,838	1,838
City of Norco	250	250	250	250	250
Elsinore Valley Municipal Water District	18,000	16,605	18,338	20,073	21,925
Jurupa Community Services District	10,000	10,000	10,000	10,000	10,000
Rancho California Water District	16,593	12,240	12,848	9,289	10,088
Riverside Public Utilities	2,000	3,000	3,000	3,000	3,000
Rubidoux Community Services District	1,200	2,000	2,000	2,000	2,000
Temescal Valley Water District	3,720	3,800	3,800	3,800	3,800
Western Retail	14,680	19,306	22,293	26,181	31,928
TOTAL POTABLE	**68,426**	**69,189**	**74,542**	**76,606**	**85,004**
NON-POTABLE					
City of Corona	13,323	13,323	13,323	13,323	13,323
Eagle Valley Mutual Water Company	110	110	110	110	110
Elsinore Valley Municipal Water District	0	3,700	3,700	3,700	3,700
Rancho California Water District	13,286	13,286	13,286	17,625	17,625
Western Retail	1,671	1,300	1,300	1,300	1,681
TOTAL NON-POTABLE	**28,390**	**31,719**	**31,719**	**36,058**	**36,439**
TOTAL DEMAND	**96,816**	**100,908**	**106,261**	**112,664**	**121,443**

Figure 5-1. Projected Wholesale Demand, AFY



5.3.1 Characteristic Five-Year Water Use

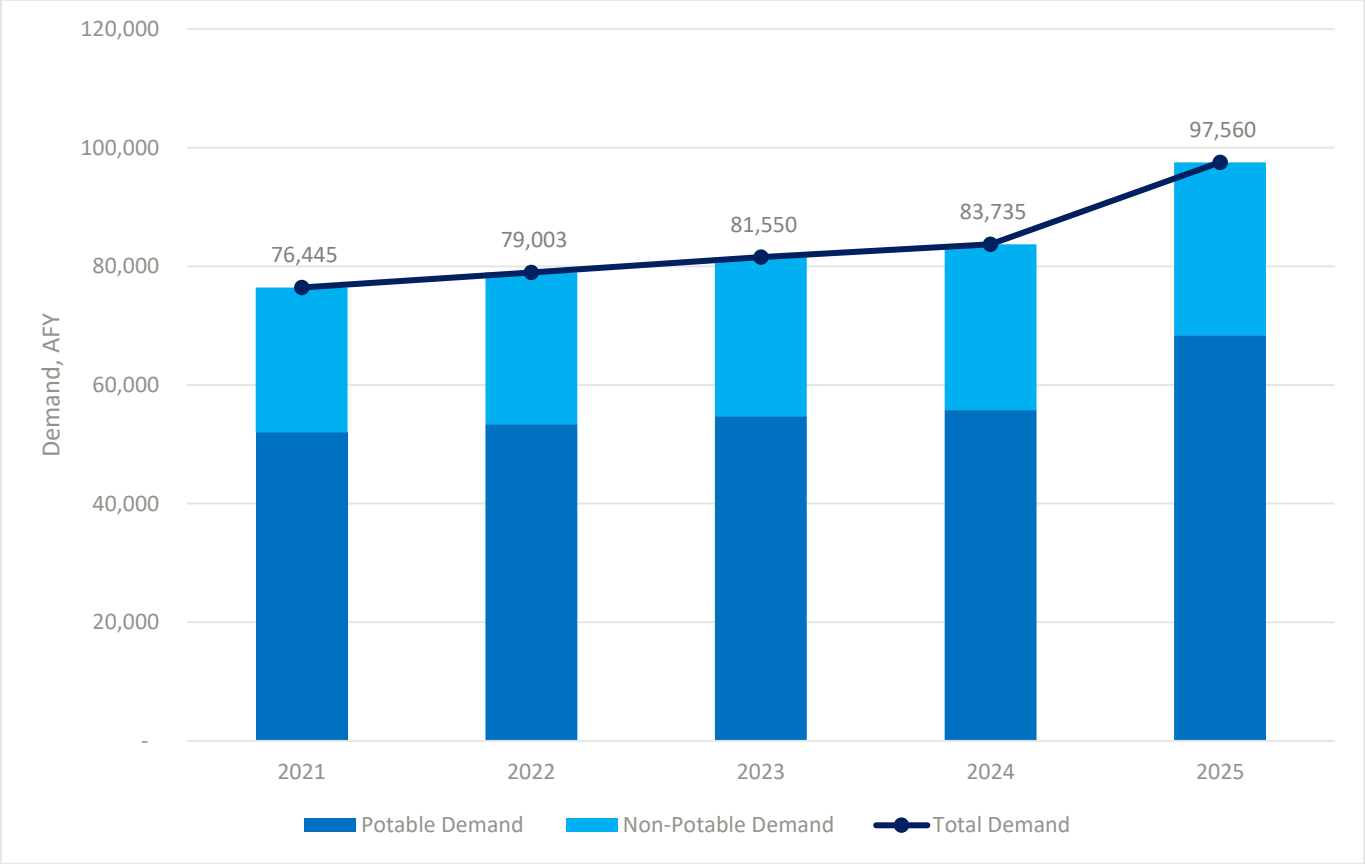
In addition to past and projected uses, the UWMP more closely analyzes anticipated conditions for the next five years (2021 – 2025). Demands for the next five years are provided in **Table 5-5** and **Figure 5-2**. The demand projections established in this chapter assume typical, unconstrained demand, free from other influential factors like conservation mandates.

Details on analysis for the next five years are discussed in **Chapter 6**.

Table 5-5. Projected Wholesale System Demand for the Next Five Years (2021-2025), AFY

WHOLESALE CUSTOMER	2021	2022	2023	2024	2025
POTABLE					
Box Springs Mutual Water Company	125	130	135	140	145
City of Corona	1,838	1,838	1,838	1,838	1,838
City of Norco	250	250	250	250	250
Elsinore Valley Municipal Water District	16,776	17,952	18,733	19,149	18,000
Jurupa Community Services District	0	0	0	0	10,000
Rancho California Water District	15,453	15,453	15,833	16,213	16,593
Riverside Public Utilities	0	0	0	0	2,000
Rubidoux Community Services District	0	0	0	0	1,200
Temescal Valley Water District	3,320	3,420	3,520	3,620	3,720
Western Retail	14,253	14,359	14,465	14,472	14,680
TOTAL POTABLE	**52,015**	**53,401**	**54,774**	**55,782**	**68,426**
NON-POTABLE					
City of Corona	13,323	13,323	13,323	13,323	13,323
Eagle Valley Mutual Water Company	110	110	110	110	110
Rancho California Water District	9,105	10,150	11,195	12,241	13,286
Western Retail	1,893	2,018	2,147	2,280	2,415
TOTAL NON-POTABLE	**24,431**	**25,601**	**26,775**	**27,954**	**29,134**
TOTAL DEMAND	**76,445**	**79,003**	**81,550**	**83,735**	**97,560**

Figure 5-2. Projected Wholesale Demand for the Next Five Years (2021-2025), AFY



WESTERN MUNICIPAL WATER DISTRICT

6 Wholesale Water Service Reliability and Drought Risk Assessment

This section describes the reliability of Western's wholesale water supplies, which reflects Western's ability to meet the water needs of its customers with water supplies under varying conditions. The essential findings are that Western can reliably meet its wholesale demands with existing and future supply sources based on demand and supply projections.

Every urban water supplier is required to assess the reliability of its water service to its retail agencies under normal, dry, and multiple-dry years for at least the next 20 years, and specifically assesses the drought risk over the next five years. There are various factors that may impact reliability of supplies such as legal, environmental, water quality, and climatic, which are discussed below. These factors can result in immediate (facility failures), near-term (SWP limitations), or long-term (climate change) impacts to reliability and must therefore be considered in future planning.

The impacts of these factors on reliability increase under single-dry and multiple-dry year hydrologic patterns. Western's work to expand and further diversify its supply portfolio is an important step toward improving the reliability of supplies. Western has also prepared a comprehensive Water Shortage Contingency Plan to provide reliability in the event of a water shortage, presented in **Appendix A**. Expected water supply reliability for normal, single dry year, and multiple-dry years through 2045 is discussed in this chapter followed a drought risk assessment for 2021 to 2025.

IN THIS SECTION

- Supply Constraints
- Water Service Reliability Assessment
- Drought Risk Assessment

6.1 Constraints on Water Sources

Western's sources of wholesale supply are imported water purchased from Metropolitan and local groundwater treated at the Arlington Desalter. These two supply sources may be impacted by climatic and hydrologic conditions, water quality, and legal restrictions, as well as potential for interruption of supply driven by catastrophic events.

6.1.1 Imported Water Supply Reliability

The majority of Western's supplies are imported water purchased from Metropolitan, and as described below, Western's supply reliability analysis follows the analysis and data developed by Metropolitan as presented in Metropolitan's 2020 UWMP. Metropolitan described several challenges in providing adequate, reliable, and high-quality supplemental water supplies along with potential management measures in the Metropolitan 2020 UWMP.

Potential constraints to Metropolitan supplies and associated supply reliability include:

Drought

The water conditions that the region faced leading up to 2020 were characterized by alternating scarcity and abundance. While investments in storage and flexible operations have prepared Metropolitan to capitalize on available supplies in wet years and manage through drought years, drought challenges remain. The Colorado River Basin has historically experienced large swings in annual hydrologic conditions and has exhibited a drying trend over the last 21 years. Changes in this period have been mitigated by actions taken by Metropolitan in cooperation with the Bureau of Reclamation and the other Basin States to maintain system storage, avoiding a shortage declaration. At the close of 2020, however, system storage was at or near its lowest since 2000, so there is less water available to buffer future dry conditions. The Sacramento-San Joaquin Delta (Bay-Delta) has suffered reduced flows and rising temperatures and SWP supplies have been significantly reduced at times, with a record low allocation of 5 percent in 2014.

Environmental/Ecological Needs (Operational Constraints)

Sensitive species in the Bay-Delta system require base flows for survival; these flows are threatened by drought and other factors, reducing the volume of water available for pumping to the SWP. As species become further stressed, environmental demands on Bay-Delta water may increase. Operational constraints will likely continue until a long-term solution to the problems in the Bay-Delta is identified and implemented.

Climate Change

Climate change is anticipated to increase the frequency and intensity of droughts and flooding, reduce Sierra Nevada snowpack, change runoff pattern and amount, raise average temperatures, and raise sea levels. These effects may reduce the availability of supplies in the Bay-Delta and Colorado River systems. Sea level rise poses a significant challenge to the salt balance in the Bay-Delta and could result in pumping restrictions. Sea level rise also increases the vulnerability of the Bay-Delta supply to seismic events.

Threats to Infrastructure

Metropolitan's imported supplies must travel across large distances to reach turnouts where local agencies are able to access the water. California is a seismically active state and prone to wildfires, which could damage imported water infrastructure anywhere along the SWP or Colorado River Aqueduct in such a manner as to disrupt supply availability. California is also a large state with a large economy, housing some major industries and defense installations. This makes it a potential target for acts of terrorism, including potential threats to its water supplies and infrastructure.

Water Quality

Water quality challenges, such as salinity, algae toxins, disinfection byproduct precursors, nutrients, and the identification of constituents of emerging concern, have the potential to impact imported water supplies. To date, Metropolitan has not identified any water quality risks that cannot be mitigated. Salinity, particularly Colorado River supplies, is a significant issue, but Metropolitan anticipates the only constraint will be the need to blend Colorado River water with SWP supplies to meet salinity needs.

Metropolitan's 2020 UWMP describes a variety of past and ongoing actions to address these water supply challenges to maintain water reliability within its service area.

Metropolitan's proactive measures include:

Continuing Water Conservation

Metropolitan supports financial incentives, education, outreach programs and appliance/plumbing standards at both the regional and local level. Metropolitan also works with member and local agencies, including Western, to help identify opportunities and procure grant funding for conservation programs.

Increasing Local Resources

Since 1982, Metropolitan has assisted local agencies in the development of water recycling and groundwater recovery under the Local Resources Program (LRP). The LRP program has been expanded to provide incentives for on-site recycled water retrofit costs and development of other water resources including seawater desalination and stormwater.

Augmenting Water Supplies

Augmenting water supplies through water transfers and exchanges is an element of Metropolitan's Integrated Resources Plan (IRP) to mitigate water shortages during dry periods.

Increasing Storage Programs

Metropolitan has a number of storage programs with water agencies along the California Aqueduct that would allow it to store SWP supplies during surplus conditions and to have stored water returned when needed. Metropolitan has invested in infrastructure to allow more effective use of stored water when needed and has also developed additional storage programs.

Modifying Metropolitan's Distribution System

Driven by the historic low SWP allocation in 2014, Metropolitan and several member agencies have made operational and system modifications to enhance operational flexibility and efficient delivery of Colorado River, SWP, and in-region supplies within Metropolitan's service area. Within Western's service area, the Inland Feeder-Lakeview Pipeline Intertie, which was completed in 2016 and allows for delivery of water from Diamond Valley Lake to Mills WTP, increases Western's imported water supply reliability. This intertie enables the Mills WTP to withstand an extended interruption of supplies from the California Aqueduct East Branch. The intertie also provides delivery flexibility to handle any required repairs by DWR to the Santa Ana Valley Pipeline north segment.

Implementing Shortage Response Actions (when needed)

Metropolitan developed a Water Shortage Contingency Plan (WSCP) to be consistent with elements of the existing Metropolitan Water Surplus and Drought Management Plan (WSDM) and Water Supply Allocation Plan (WSAP). If needed, Metropolitan will implement shortage response actions to distribute limited imported supplies and preserve storage reserves.

Pursuing Long-term Solutions in the Bay-Delta

Metropolitan adopted a Delta action plan in June 2007 that includes a long-term Delta Plan. The long-term action plan recognizes three basic elements that must be addressed: Delta ecosystem restoration, water supply conveyance, and flood control protection and storage development.

Maintaining Water Quality

Metropolitan responds to water quality concerns by protecting the quality of the source water, developing water management programs that maintain and enhance water quality, and changing water treatment protocols or blending.

Planning for Climate Change

In addition to many other activities related to climate change, Metropolitan is currently developing an updated 2020 Integrated Resources Plan (IRP), which recognizes risks and uncertainties from climate change and other sources. Metropolitan has established an intensive, comprehensive technical process to identify key vulnerabilities to regional reliability, including climate change. This Robust Decision Making (RDM) approach was used with both the 2015 and 2010 IRP Updates. This methodology can show how vulnerable the region's reliability is to longer-term risks such as climate change and can also establish "signposts" that can be monitored to see when critical changes may be happening.

To maintain a reliable source of imported water supply for its member agencies, Metropolitan has and will continue to contend with these considerable challenges. After learning from the droughts of 1977-78 and 1989-92, Metropolitan, in conjunction with its member agencies, instituted a resource planning process that is based on diversification of the region's water supply portfolio and continued efficient water use. This integrated resource planning process has recognized that only through a mix of imported and member agency local supplies, along with aggressive implementation of water conservation, can the Metropolitan service area attain overall reliability of water supply.

This integrated planning effort has resulted in the following documents:

1996, 2004, 2010, 2015, and 2020 Integrated Resources Plans (IRP)

Metropolitan's IRP process assessed potential future regional demand projections based upon anticipated population and economic growth as well as conservation potential. The IRP also includes regional supply strategies and implementation plans to better manage resources, meet anticipated demand, increase overall system reliability, and adapt to the effects of climate change. Metropolitan is currently preparing the 2020 IRP.

1999 Water Surplus and Drought Management Plan

The Water Surplus and Drought Management Plan provides the policy guidance to manage the region's water supplies by integrating the operating activities of supply surplus and shortage to achieve the reliability goals of the IRP.

Water Supply Allocation Plan

The Water Supply Allocation Plan, last updated in 2014, includes the specific formula for calculating member agency supply allocations and the key implementation elements needed for administering the allocation. The need for the Water Supply Allocation Plan arose after the 2008 Bay- Delta biological opinions and rulings that limited SWP supplies to its contractors including Metropolitan. The Water Supply Allocation Plan formula seeks to balance the impacts of a shortage at the retail level while maintaining equity on the wholesale level for shortages of Metropolitan supplies up to 50 percent.

All these planning documents recognize that the reliability of the Metropolitan service area is dependent on improving the reliability of imported supplies from the Colorado River and State Water Project as well as the successful implementation of future local supplies and conservation. This dependence on an integrated approach to water reliability and diversification of supplies has been the foundation of DWR's State Water Plan, through its last several updates and is the cornerstone of Governor Newsom's California Water Resilience Portfolio. Some of the most significant factors affecting reliability for imported water supplies include legal, environmental, water quality and climatic changes. Successful implementation of Metropolitan's UWMP is dependent on the continued successful implementation of local supply projects by local agencies, including Western and its wholesale customers.

6.1.2 Groundwater Supply Reliability

The reliability of Western's groundwater supply will be proactively managed by Western and its local partners through the Riverside-Arlington Subbasin Groundwater Sustainability Agency. Development of the GSP is ongoing and expected to be completed in 2021. The GSP will determine the sustainable water budget for the basin, accounting for the effects of climate change, develop sustainable management criteria, undesirable results, and minimum thresholds to evaluate groundwater conditions, and implement a monitoring network and identify supplemental projects to ensure the basin is reliable and can support demands throughout the future.

6.2 Water Service Reliability Assessment

This section presents Western's expected water supply reliability for a normal year, single dry year, and five consecutive dry years, including projections for 2025, 2030, 2035, 2040, and 2045.

The primary constraint on the available of water supplies has been in extreme drought conditions. As described above, Metropolitan has made substantial investments to increase imported water supply reliability during periods of extended drought. As a result, Metropolitan's 2020 UWMP projects the ability to meet all imported water demands under normal, single dry year, and multiple dry year conditions, with excess supplies.

Through implementation of the Arlington GSP, Western expects the Riverside-Arlington water supply to be stable and does not anticipate any reduction to supplies in dry years.

The basis of the reliability assessment is presented in this section.

6.2.1 Year Type Characterization

The water service reliability and Drought Risk Assessment analyze supply over several water years: normal, single dry, and multiple dry years. DWR defines these years as:

Normal Year

The normal year represents the water supplies a supplier considers available during normal conditions. Metropolitan uses an average from 1922 to 2017 to establish normal year supply availability. To remain consistent, Western utilizes the same period for analyzing imported water availability since majority of the wholesale system is supplied by imported Metropolitan water.

Single Dry Year

The single dry year is recommended to be the year that represents the lowest water supply available. Metropolitan has identified 1977 as the single driest year.

Five-consecutive Dry Year

The driest five-year historical sequence for the Supplier, which may be the lowest average water supply available for five years in a row. Metropolitan has identified 1988 through 1992 as the greatest 5-year drought period.

Table 6-1. DWR 7-1W Basis of Water Year Data (Reliability Assessment)

		AVAILABLE SUPPLY IF YEAR TYPE REPEATS
YEAR TYPE	BASE YEAR	PERCENT OF AVERAGE SUPPLY
Average Year	1922-2017	
Single-Dry Year	1977	99%
Consecutive Dry Years 1st Year	1988	100%
Consecutive Dry Years 2nd Year	1989	100%
Consecutive Dry Years 3rd Year	1990	100%
Consecutive Dry Years 4th Year	1991	100%
Consecutive Dry Years 5th Year	1992	100%

6.2.2 Water Service Reliability

Normal year supply and demand projections for the wholesale system were developed in **Chapter 4** and **Chapter 5** and form the basis of this reliability analysis. Western wholesale customers provided their own assumptions for demand changes during single and multiple dry years, which are incorporated into this analysis.

Western obtains both Potable and Non-Potable imported water from Metropolitan. For this analysis, it was assumed that non-potable supplies were equal to non-potable demands and potable supplies were equal to potable demands. However, it is important to note that Western is not limited to a particular volume of imported water and that Metropolitan's 2020 UWMP shows a substantial surplus of supplies under all conditions. Metropolitan has made substantial investments in storage projects to ensure reliability in dry years. Therefore, Western expects to have access to additional imported water supplies, if needed.

Results of the reliability analysis for normal, single dry, and 5-consecutive dry years are shown in the following sections. This analysis applies only to Western Wholesale supplies. Other regional supplies that are used by Western's wholesale customers agencies are discussed in **Chapter 4**.

Water Service Reliability – Normal Year

Table 6-2. Normal Year Supply and Demand Comparison, AFY

	2025	2030	2035	2040	2045
POTABLE					
Supply	68,426	69,189	74,542	76,606	85,004
Demand	68,426	69,189	74,542	76,606	85,004
DIFFERENCE	**0**	**0**	**0**	**0**	**0**
NON-POTABLE					
Supply	28,390	31,719	31,719	36,058	36,439
Demand	28,390	31,719	31,719	36,058	36,439
DIFFERENCE	**0**	**0**	**0**	**0**	**0**

Water Service Reliability – Single Dry Year

Table 6-3. Single Dry Year Supply and Demand Comparison, AFY

	2025	2030	2035	2040	2045
POTABLE					
Supply	68,426	69,189	74,542	76,606	85,004
Demand	68,426	69,189	74,542	76,606	85,004
DIFFERENCE	**0**	**0**	**0**	**0**	**0**
NON-POTABLE					
Supply	28,390	31,719	31,719	36,058	36,439
Demand	28,390	31,719	31,719	36,058	36,439
DIFFERENCE	**0**	**0**	**0**	**0**	**0**

Water Service Reliability – Five Consecutive Dry Year

Table 6-4. Multiple Dry Year Supply and Demand Comparison, AFY

		2025	2030	2035	2040	2045
FIRST YEAR	POTABLE					
	Supply	68,426	69,189	74,542	76,606	85,004
	Demand	68,426	69,189	74,542	76,606	85,004
	DIFFERENCE	0	0	0	0	0
	NON-POTABLE					
	Supply	28,390	31,719	31,719	36,058	36,439
	Demand	28,390	31,719	31,719	36,058	36,439
	DIFFERENCE	0	0	0	0	0
SECOND YEAR	POTABLE					
	Supply	68,426	69,189	74,542	76,606	85,004
	Demand	68,426	69,189	74,542	76,606	85,004
	DIFFERENCE	0	0	0	0	0
	NON-POTABLE					
	Supply	28,390	31,719	31,719	36,058	36,439
	Demand	28,390	31,719	31,719	36,058	36,439
	DIFFERENCE	0	0	0	0	0
THIRD YEAR	POTABLE					
	Supply	68,426	69,189	74,542	76,606	85,004
	Demand	68,426	69,189	74,542	76,606	85,004
	DIFFERENCE	0	0	0	0	0
	NON-POTABLE					
	Supply	28,390	31,719	31,719	36,058	36,439
	Demand	28,390	31,719	31,719	36,058	36,439
	DIFFERENCE	0	0	0	0	0

*Continued on next page.

FOURTH YEAR	**POTABLE**					
	Supply	68,426	69,189	74,542	76,606	85,004
	Demand	68,426	69,189	74,542	76,606	85,004
	DIFFERENCE	**0**	**0**	**0**	**0**	**0**
	NON-POTABLE					
	Supply	28,390	31,719	31,719	36,058	36,439
	Demand	28,390	31,719	31,719	36,058	36,439
	DIFFERENCE	**0**	**0**	**0**	**0**	**0**
FIFTH YEAR	**POTABLE**					
	Supply	68,426	69,189	74,542	76,606	85,004
	Demand	68,426	69,189	74,542	76,606	85,004
	DIFFERENCE	**0**	**0**	**0**	**0**	**0**
	NON-POTABLE					
	Supply	28,390	31,719	31,719	36,058	36,439
	Demand	28,390	31,719	31,719	36,058	36,439
	DIFFERENCE	**0**	**0**	**0**	**0**	**0**

6.2.3 Description of Management Tools and Options

Most of the water supplied by Western's wholesale system is imported water from Metropolitan. As a member agency of Metropolitan, Western coordinates with Metropolitan through planning processes such as the 2020 IRP to ensure a consistent and reliable supply is available. In addition, Western continues to explore local projects to increase supply to the wholesale system and continues to promote conservation and educational programs to increase drought awareness and conservation actions throughout the region.

6.3 Drought Risk Assessment

The Drought Risk Assessment (DRA) is a new requirement to the UWMP that focuses analysis on the next five years (2021 - 2025). To estimate demands for 2021 through 2025, a straight-line interpolation was applied from the 2020 actual demand to the 2025 projected demand.

6.3.1 Data, Methods, and Basis for Water Shortage Condition

The data, methods, and basis for a water shortage condition were identified using typical normal year supply and demand, as developed in **Chapter 4** and **Chapter 5**.

The DRA provides a snapshot of the anticipated surplus or deficit if a drought were to occur in the next five years. If Western estimates a greater demand than supply available, estimated shortage response actions savings from the WSCP may be entered into the DRA. WSCP savings can fall under supply augmentation or demand reduction estimates that Western would expect to achieve during a water shortage.

The demands for the DRA's five-consecutive dry years were based on the normal demand. Normal year demands represent "unconstrained demand". Unconstrained demand is water demand absent any water supply restrictions. This exercise allows an agency to get an indication of the potential amount of conservation that may be required to reduce demands.

6.3.2 DRA Water Source Reliability

As described in Metropolitan's 2020 UWMP and DRA, Metropolitan's near-term assessment reveals that its supply capabilities are expected to exceed its projected water use for years 2022, 2024, and 2025. However, estimates of projected water supply and use reveals that there could be a possible shortfall of core supplies in 2021 and 2023. This shortfall is largely triggered by the assumed repeat of the historical 1988 and 1990 low supply conditions from the SWP to predict supply availability for 2021 and 2023. Actual supply conditions for 2021 and 2023 may prove different from historic supply conditions (Metropolitan Water District of Southern California, 2021).

Metropolitan's DRA illustrates its potential shortage response actions if such shortfall were to happen. As detailed in Metropolitan's 2020 UWMP (**Section 2.5** and **Appendix 4**), Metropolitan has in place a robust WSCP and comprehensive shortage response plan that includes demand reduction measures and supply augmentation actions. In Metropolitan's DRA, years 2021 and 2023 are estimated to have shortage levels within 10% of water use, corresponding to its WSCP Level 1 Shortage. Metropolitan has a range of response actions that it can take in a Level 1 Shortage, including take from Storage, execute Flexible Supplies, implement Voluntary Demand Reduction, and implement its Water Supply Allocation Plan. Metropolitan's DRA anticipates taking from its storage during these shortfall years to augment its supply and meet its demand. As of January 1, 2021, Metropolitan has 3.2 million AF in storage that may be used for dry-year needs within multiple reservoirs to mitigate any potential shortage in 2021 and 2023. In addition, Metropolitan may also take from its water banking programs in the Central Valley, draw from in-region conjunctive use programs, pursue additional supplies through SWP transfers, or exercise any combination of supply augmentation actions.

With a potential surplus estimated for years 2022, 2024, and 2025, no water service reliability concern is anticipated, and no shortfall mitigation measures are expected to be exercised. Metropolitan will periodically revisit its representation of both individual supply sources and of the gross water use estimated for each year and will revise its DRA if needed.

This DRA assumes that Western will be able to purchase sufficient supplies to meet demands based on the results of Metropolitan's DRA. As shown in **Table 6-5**, Western's supplies are anticipated to be reliable, and no supply shortfalls are expected from 2021 to 2025 when assuming the next five years are similar to the driest five years. Western does not anticipate the need to implement shortage response actions in its wholesale WSCP in the next five years, unless Metropolitan implements a WSAP, which is not expected based on Metropolitan's DRA analysis.

Table 6-5. Wholesale DRA Results, AFY

	2021	2022	2023	2024	2025
POTABLE					
Gross Water Use	52,015	53,401	54,774	55,782	68,426
Total Supply	52,015	53,401	54,774	55,782	68,426
DIFFERENCE	**0**	**0**	**0**	**0**	**0**
NON-POTABLE					
Gross Water Use	24,431	25,601	26,775	27,954	29,134
Total Supply	24,431	25,601	26,775	27,954	29,134
DIFFERENCE	**0**	**0**	**0**	**0**	**0**

7 WESTERN MUNICIPAL WATER DISTRICT
Wholesale Demand Management Measures

This chapter describes Western's implementation of wholesale demand management measures (DMMs) intended to promote water use efficiency in partnership with retail agencies to support sustainable management of regional water supplies.

Western has been a leader in water use efficiency for many years and actively collaborates with local and regional agencies and the communities it serves to implement innovative programs and drive reductions in water usage. Western staff also serves in a leadership role for the California Water Efficiency Partnership (CalWEP) whose mission is to maximize urban water efficiency and conservation throughout California by supporting and integrating innovative technologies and practices; encouraging effective public policies; advancing research, training, and public education; and building collaborative approaches and partnerships. Western leverages these partnerships, tools, and resources within its service area.

Details on Western's wholesale DMMs are provided in the following sections. DMMs implemented for Western Retail are described in **Chapter 12**.

IN THIS SECTION

- Metering
- Outreach and Public Education
- Water Conservation Program Coordination and Staffing
- Asset Management

7.1 Metering

All of Western's wholesale customers are fully metered and billed volumetrically each month.

Western has 14 wholesale agencies in its service area (see **Chapter 3**, System Description), eight of which received raw and treated water supplies from Western in 2020, served through 20 meters. Metropolitan owns and maintains all but three of these meters. Western's operations staff performs annual meter calibrations on all wholesale meters.

7.2 Outreach and Public Education

As a wholesaler, Western implements Public Education and Outreach programs within its general service area, described in more detail below.



7.2.1 Public Outreach

Western's Strategic Communications department provides extensive public outreach to the communities it serves, with at least quarterly contact. Water-use efficiency is promoted through press releases and events, paid advertising, bill inserts, customer newsletter, landscape water conservation media campaigns, website program brochures, speaker's bureau, and cooperative partnerships with other retail agencies and other area partners.

Western's outreach programs deliver the following key messages:

- Imported water supplies are unreliable at times;
- Demand for quality water has increased over time;
- Conservation efforts and efficient use are highly effective means to stretch and extend water resources; and
- Western has incentive programs and support mechanisms that will increase water efficiency and benefit customers.

In addition, Western has converted its office landscaping to drought-tolerant plants to encourage public acceptance, desire for, and use of water-efficient landscapes. The local chapter of the Master Gardeners of Riverside County also helps facilitate regular workshops to promote environmentally responsible and sustainable horticultural practices. Details on the Master Gardeners of Riverside County are provided in **Chapter 12**, Retail Demand Management Measures.

7.2.2 School Education Programs

Western sponsors a regional school education program in its general service area. Western has been a leader in the field of water education since 1982. Western partners with its retail water agencies to implement programs for schools throughout Western's general service area. Western's School Program is designed to encourage and assist educators as they teach students about water supply, distribution, reclamation, conservation, and the future of water supplies. The material and services offered meet the requirements of the California Science Framework Addendum and are provided at no charge to participating teachers, schools, and students, public and private. Western conducts class presentations and teacher workshops, and offers materials including student workbooks, water cycle bracelets, earth balls, water story rocks, assembly-related material, teachers' guides, videos, speakers, and field trips. Complete class water education units are also distributed. A total of



157 public schools are eligible to participate in Western's education program; 143 of these schools are located within Western's wholesale service area (exclusive of those schools in Western's retail service area).

Western has also established free, virtual tools to support teachers and engage students in response to the COVID-19 pandemic. The "Lighten Your Load" program provides water education support for teachers. Teachers can sign up for a one-on-one planning session with Western's water education experts and will receive individualized advice and access to resources for use within a virtual classroom environment while meeting the California State and Next Generation Standards. Western has also developed a new video game to help students learn about California's water system and Western's distribution system. The game's beta version debuted at the 2020 Science and Technology Education Partnership (STEP) Conference. This interactive game will help students learn about where their water comes from (Western Municipal Water District, 2020).

Since 1995, Western has offered programs to fund creative classroom projects that further a better understanding of water and the vital role it plays in the community. Western also offers grants for educators under the Lois B. Krieger Water Project Grants for Educators fund. Teachers within Western's general service area can apply to receive up to $1,000 in classroom funding for water education projects (both virtual and in-classroom). In 2020, 21 teachers received grant awards totaling more than $14,000 for projects pertaining to water quality testing, hydroponic gardening, and sensory water exploration. All teachers in Western's District, in both private and public schools in grades K–12, are eligible to apply for these grants.

Western also offers limited scholarships for students residing in its service area who are studying fields related to water (water policy, public administration and management, environmental geology, water management, water conservation) at local universities, including California State University San Bernardino, University of California Riverside, Riverside City College, and Norco College.

7.3 Water Conservation Program Coordination and Staffing

Western has maintained a full-time water conservation coordinator position since 1990. The water conservation coordinator implements wholesale and retail area programs.

7.4 Asset Management

Western maintains and implements upgrades to its distribution system, including facilities, equipment, and infrastructure, through regular operation and maintenance activities. Western's Operations Department implements maintenance and repairs of Western's system.

7.5 Wholesale Supplier Assistance Program

Western provides financial and technical assistance and helps build partnerships with its retail agencies to promote conservation. Western participates in Metropolitan's Member Agency Administered (MAA) funding for projects that are not included in Metropolitan's regular rebate program. Western receives $748,000 in every two-year Metropolitan budget cycle for conservation projects.

In the past, Western and its wholesale customers have used the MAA funding for the following projects:

- High-efficiency toilet installations
- High-efficiency sprinkler nozzle distributions
- Weather-based irrigation controller distributions
- Hot Water Recirculating Pump distributions
- Swimming pool cover rebates
- Utility-side Leak Detection equipment purchases
- Customer-side leak detection and flow monitoring rebates
- Analysis of customer-side leak detection devices
- Drinking water education programs
- Water-use-efficiency customer workshops
- Educational video game development
- Smart Irrigation equipment installation
- Multi-family toilet sensor installations
- Study of color-retention in warm season turf grasses with University of California Riverside
- Partnership with SoCalGas to install water saving devices

Western continues to promote conservation throughout its entire service area and supports its wholesale customers' conservation programs.

8

WESTERN MUNICIPAL WATER DISTRICT

Wholesale Water Shortage Contingency Plan

The WSCP is a strategic plan that Western uses to prepare for and respond to foreseeable and unforeseeable water shortages. This chapter provides an overview of the portions of Western's Water Shortage Contingency Plan that are applicable to Western Wholesale. The standalone Water Shortage Contingency Plan is included in Appendix A.

The California Water Code Section 10632 requires that every urban water supplier that serves more than 3,000 acre-feet per year or has more than 3,000 connections to prepare and adopt a standalone Water Shortage Contingency Plan (WSCP) as part of its UWMP. Western Wholesale and Western Retail are subject to the WSCP requirements and a single WSCP has been developed to meet the requirements for both systems. This chapter provides an overview of the portions of the WSCP that are applicable to Western Wholesale. **Chapter 13** provides an overview of the portions of the WSCP that are applicable to Western Retail. Western's WSCP is included as **Appendix A** and will be separately submitted to DWR by July 1, 2021. The WSCP is developed separately from Western's 2020 UWMP and can be amended, as needed, without amending the UWMP.

IN THIS SECTION

- WSCP Outline
- Wholesale WSCP Requirements Overview

The WSCP is a strategic plan that Western uses to prepare for and respond to foreseeable and unforeseeable water shortages. A water shortage occurs when water supply available is insufficient to meet the normally expected customer water use at a given point in time. A shortage may occur due to a number of reasons, such as water supply quality changes, climate change, drought, regional power outage, and catastrophic events (e.g., earthquake). Additionally, the State may declare a statewide drought emergency and mandate that water suppliers reduce demands, as occurred in 2014. The WSCP serves as the operating manual that Western will use to prevent catastrophic service disruptions through proactive, rather than reactive, mitigation of water shortages. The Western WSCP provides a process for an annual water supply and demand assessment for the wholesale system and structured steps designed to respond to actual conditions. This level of detailed planning and preparation provide accountability and predictability and will help Western maintain reliable supplies and reduce the impacts of any supply shortages and/or interruptions.

The WSCP must be updated based on new requirements every five years and will be adopted as a current update for submission to the California Department of Water Resources by July 1, 2021.

8.1 Water Shortage Contingency Plan Outline

Western's WSCP is organized into six sections:

- **Section 1** - Overview of the WCSP
- **Section 2** - Western Wholesale Water Shortage Contingency Plan
- **Section 3** - Western Retail Water Shortage Contingency Plan
- **Section 4** - Emergency Response, Seismic Risk Assessment and Mitigation
- **Section 5** - WSCP Refinement Procedures
- **Section 6** - Plan Adoption, Submittal and Availability

All sections are applicable to Western Wholesale except Section 3, which is applicable to Western Retail only.

8.2 Overview of the Wholesale Requirements of the WSCP

The Water Code establishes several prescriptive elements which must be included in a wholesale water supplier's WSCP. Each element and its location within the WSCP is described below.

Water Supply Reliability Analysis: Summarizes Western Wholesale's water supply reliability and identifies any key issues that may trigger a shortage condition. This requirement is addressed in Section 2 of the WSCP.

Annual Water Supply and Demand Assessment Procedures: Describes the key data inputs, evaluation criteria, and methodology for assessing the Western Wholesale system's reliability for the coming year and the steps to formally declare any water shortage levels and response actions. This requirement is addressed in Section 2 of the WSCP.

Shortage Stages: Establishes water shortage levels to clearly identify and prepare for shortages. This requirement is addressed in Section 2 of the WSCP.

Shortage Response Actions: Describes the response actions that may be implemented or considered for each stage to reduce gaps between supply and demand. This requirement is addressed in Section 2 of the WSCP.

Communication Protocols: Describes communication protocols under each stage to ensure customers, the public, and government agencies are informed of shortage conditions and requirements. This requirement is addressed in Section 2 of the WSCP.

Legal Authority: Lists the legal documents that grant Western the authority to declare a water shortage and implement and enforce response actions. This requirement is addressed in Section 2 of the WSCP.

Financial Consequences of WSCP Implementation: Describes the anticipated financial impact of implementing water shortage stages and identifies mitigation strategies to offset financial burdens. This requirement is addressed in Section 2 of the WSCP.

WSCP Refinement Procedures: Describes the factors that may trigger updates to the WSCP and outlines how to complete an update. This requirement is addressed in Section 5 of the WSCP.

Plan Adoption, Submittal, and Availability: Describes the process for the WSCP adoption, submittal, and availability after each revision. This requirement is addressed in Section 6 of the WSCP.

Part 3

Western Retail

9

WESTERN MUNICIPAL WATER DISTRICT

Retail Water Supply

Western retail utilizes a variety of supply sources, including imported water and local groundwater from various basins. Potential future water supply sources focus on local projects to increase regional reliability and reduce dependence on imported water.

IN THIS SECTION

- Water Supply Overview
- Water Supply Characterization
- Energy Intensity

9.1 Water Supply Overview

Western has invested in local supply sources to reduce dependence on imported water and maintain reasonable costs for its customers. Western's supply sources are expected to meet projected demands and are sustainably managed to be drought resilient. However, to protect local sources and offset financial impacts from imported water, Western will continue to promote conservation and enhance local reliability.

The Riverside service area uses local groundwater from potable and non-potable sources, potable and non-potable imported water and recycled water.

The Murrieta service area uses local groundwater. In recent years, imported water from Eastern has also been used.

The Rainbow service area uses only imported water.

9.2 Retail Water Supply Characterization

As mentioned, Western's retail system uses a variety of supply sources and are detailed below.

9.2.1 Purchased or Imported Water

Imported Water from Metropolitan

In 2020, Western retail obtained approximately 60 percent of its total supply as imported water from Metropolitan. The Riverside service area receives treated imported water from the Mills WTP, delivered through the Mills Gravity Line. Western may also purchase untreated water from Metropolitan to serve non-potable uses.

The Murrieta system uses imported water, delivered by Eastern through the Los Alamos interconnection, to supplement local groundwater supplies.

The Rainbow system relies solely on treated imported water from Metropolitan.

Western uses imported water to meet the balance of demands not met by local sources. Western strives to utilize local sources prior to Metropolitan water to minimize costs.

City of Riverside

In 2017, the City of Riverside and Western executed a Cooperative Agreement for Long-Term Wheeling and Surplus Water Sales (2017 Agreement), attached in **Appendix H**. The 2017 Agreement provides Western up to 2,000 AFY of City of Riverside surplus water until 2027 (which may continue after 2027 with both party's approval). The 2017 Agreement also provides the wheeling of up to 4,600 AFY of Meeks and Daley Water Company water to Western (described below). Currently, Western takes delivery of this water at two locations; the Mockingbird and Whitegates interconnections. Western is currently in design for two additional connections with the City of Riverside to add redundancy, flexibility, and potentially additional deliveries in the future.

Western also purchases non-potable water from the Riverside-Arlington basin from the City of Riverside, which is delivered through the Riverside Canal. Through coordination with Riverside, non-potable supplies from the RPU are expected to continue to be available to Western in the future.

Meeks and Daley Water Company

Western and EVMWD have a contractual agreement for Western to use EVMWD's Meeks and Daley Water Company (Meeks and Daley) rights within the SBBA. These rights are owned by EVMWD and leased to Western in exchange for capacity in the Mills Gravity Line that EVMWD uses for imported Metropolitan water. The purchase agreement between Western and EVMWD is provided in **Appendix I**. Western obtains 4,680 AFY for its retail system through this agreement. Western also owns shares in Meeks and Daley that entitle them to 226.52 AFY from the SBBA, which is shown in **Section 13.2.2**.

Since Western does not own or operate infrastructure that can directly extract water from the SBBA basin, the City of Riverside pumps and delivers this water to Western through system interconnections under the 2017 Agreement as the "long-term wheeling" portion of the agreement. Each year, Western and Riverside develop an operating plan to establish the expected delivery schedule for that year for the Riverside surplus water and Western's total Meeks & Daley water supply. A copy of the 2021 Operating Plan is provided in **Appendix J**. Western has the ability to move up to 7,208 AFY to its Retail system under this agreement.

EVMWD

Western also purchases non-potable water from the Riverside-Arlington basin from EVMWD's Palm Well, which is delivered through the Riverside Canal. Through coordination with EVMWD, non-potable supplies from the Palm Well area expected to continue to be available to Western in the future.

Riverside Highland Water Company

In the past, Western has also entered into 1-year lease agreements with RHWC to acquire up to 1,500 AFY from RHWC's adjusted groundwater rights from the SBBA. Western may enter into such agreements again in the future; however, since no current agreement is in place, leased RHWC shares are not included in Western's supply estimates for this UWMP.

Chino Desalter

The Chino Sub basin is an adjudicated basin managed by the Chino Basin Watermaster. The Chino Sub basin lies in the southwest corner of San Bernardino County and is bordered to the east by the Rialto-Colton fault. In the other three directions, the Chino Sub basin is ringed by impermeable mountain rock, the San Gabriel Mountains to the north, the Jurupa Mountains and Puente Hills to the south and southwest.

On January 2, 1975, several Chino Basin producers filed suit in California State Superior Court for San Bernardino County (the "Court") to settle the problem of allocating water rights in the Chino Basin. On January 27, 1978, the Court entered a judgment in Chino Basin Municipal Water District v. City of Chino et al. adjudicating water rights in the Chino Basin and establishing the Chino Basin Watermaster. The Judgment adjudicated all groundwater rights in Chino Basin and contains a physical solution to meet the requirements of water users having rights in or dependent upon the Chino Basin. The Judgment also appointed the Watermaster to account for and implement the management of the Chino Basin. The Judgment declared that the initial operating safe yield of the Chino Basin is 145,000 AFY. The Basin is managed through implementation of the Chino Optimum Basin Management Plan.

Portions of the Chino Basin have been degraded by elevated concentrations of TDS and nitrate. Similar to the Arlington Desalter, Chino Desalter facilities have been constructed to provide a local source of potable water and decreasing subsurface outflow of low-quality groundwater to the Santa Ana River.

The Chino Basin Desalter Authority (CDA) oversees operation of the Chino Desalter facilities. The Chino Desalter is comprised of two facilities: Chino I and Chino II. These facilities remove salts from brackish groundwater extracted from the Chino Basin. Chino I is located in Chino and began operation in 2000, with an initial capacity of 9,000 AFY. It is operated and maintained by Inland Empire Utilities Agency (IEUA) and treats brackish groundwater through reverse osmosis (RO) and ion exchange technologies (IX).

JCSD operates and maintains the Chino II facility in Jurupa Valley. Chino II began operation in 2006 and initially treated up to 11,820 AFY. In 2016, the Chino II facility was expanded to treat up to 21,000 AFY (2). The Chino II Desalter also utilizes RO and IX to treat the brackish groundwater.

Western Retail owns 3,534 AFY of capacity in the Chino II Desalter. However, Western Retail does not currently use this source and as a result leases it to Jurupa Community Services District.

9.2.2 Groundwater

As discussed previously, Western owns shares in Meeks and Daley that entitle them to produce 226.52 AFY from the SBBA, which is conveyed by the City of Riverside and used in the Riverside retail system.

Western directly extracts groundwater for its retail customers in the Murrieta service area from the Temecula Valley Basin.

Total groundwater extractions from 2016 through 2020 are provided in **Table 9-1**. Descriptions of these basins are provided in **Chapter 4**.

Table 9-1. Groundwater Extractions, AFY

BASIN	2016	2017	2018	2019	2020
Temecula Valley	398	423	398	370	399
San Bernardino Basin Area[1]	226.52	226.52	226.52	226.52	226.52
TOTAL	**624**	**650**	**624**	**596**	**626**

[1]The City of Riverside pumps this groundwater on Western's behalf. Western owns 226.52 AFY of Meeks and Daley water rights within the San Bernardino Basin Area.

Temecula Valley Basin

The Temecula Valley Basin (DWR designated Basin 9.005) lies under several valleys within the southwest portion of Riverside County and parts of northern San Diego County. The Temecula Valley Basin is bound by nonwater-bearing crystalline rocks of the Peninsular Ranges. The overlying valleys are drained by Wilson, Temecula, Murrieta, Warm Springs, and Pechanga Creeks to the Santa Margarita River, which flows west out of the Temecula Valley. The Pechanga Indian Reservation also overlies portions of the southwestern part of the basin. The Temecula Valley Basin typically receives 7 to 15 inches of rainfall each year (California Department of Water Resources).

The Temecula-Murrieta subbasin is an alluvial basin within the Temecula Valley Basin. Within the Temecula-Murrieta Basin lie two aquifers: the Pauba aquifer and the Temecula aquifer, the latter of which underlies the former. The Pauba aquifer covers approximately 18 square miles and the Temecula aquifer extends over an area of approximately 100 square miles.

As part of the Santa Margarita River system, surface water and groundwater supporting surface water (defined as being in the older and younger alluvium) within the Temecula-Murrieta Basin have been under some form of court jurisdiction since 1928. Rights to utilize surface water and groundwater determined to be contributing to the Santa Margarita River are governed by the Modified Final Judgment and Decree entered on April 6, 1966 by the U.S. District Court in United States v. Fallbrook Public Utility District, et al. (Civil No. 1247-SD-T) (provided in **Appendix K**). A Watermaster was appointed in March 1989 to administer and enforce the provisions of the judgment and subsequent orders of the Court. A Steering Committee, currently comprising representatives from the United States, Eastern Municipal Water District (Eastern), Western, Fallbrook Public Utility District (Fallbrook PUD), Metropolitan, the Pechanga Tribe, and RCWD, was also appointed. The purpose of the Steering Committee is to assist the Court and the Watermaster in administering the water rights (Santa Margarita River Watershed Watermaster Report, 2013). The following presents a summary of the groundwater management agencies in the Temecula-Murrieta Basin:

- **Santa Margarita River Watershed Watermaster** – Court approved Watermaster for oversight and administration of water rights
- **Santa Margarita River Watershed Steering Committee** – Assist the Court and the Watermaster in administering the water rights
- **Rancho California Water District** – Prepares Groundwater Audit and Recommended Groundwater Production Report for operation of District groundwater wells and recharge facilities

The Groundwater Audit and Recommended Groundwater Production Report (RGPR) sets limits for producers in the Temecula-Murrieta Basin. The amount of groundwater that can be produced varies due to such factors as rainfall, recharge area, and amount and location of well pumping capacity.

San Bernardino Basin Area

The San Bernardino Basin Area (SBBA) was defined and adjudicated in gross by the Western-San Bernardino Judgment (Western Judgment) in 1969. The SBBA has a surface area of approximately 141 square miles and lies between the San Andreas and San Jacinto faults. The basin is bordered on the northwest by the San Gabriel Mountains and Cucamonga fault zone; on the northeast by the San Bernardino Mountains and San Andreas fault zone; on the east by the Banning fault and Crafton Hills; and on the south by a low, east-facing escarpment of the San Jacinto fault and the San Timoteo Badlands. Alluvial fans extend from the base of the mountains and hills that surround the valley and coalesce to form a broad, sloping alluvial plain in the central part of the valley. The SBBA encompasses the Bunker Hill sub basin (DWR designated Basin 8.02-06) also includes a small portion of the Yucaipa Basin (DWR designated Basin 8-02.07) and Rialto-Colton Basin (DWR designated Basin 8-02.04).

It was determined in the Western Judgment that the Plaintiffs (Riverside County agencies) have a 64,862 AFY share of the safe yield, which equates to 27.95% of the safe yield. The Plaintiffs include the City of Riverside (the successor to the Riverside Water Company and the Gage Canal Company), Riverside Highland Water Company, Meeks & Daley Water Company, and Regents of the University of California. Non-plaintiffs are agencies in San Bernardino County represented by San Bernardino Valley Municipal Water District and are entitled to 72.05% of the safe yield, or 167,238 AF. The Riverside County agencies may not exceed their allocation unless they participate in "New Conservation" (explained below).

The Western Judgment contemplates that the parties will undertake "new conservation" which is defined as any increase in replenishment from natural precipitation which results from operation of works and facilities not in existence as of 1969, other than works installed to offset losses from flood control channelization. The Western Judgment specifies that the parties to the Judgment have the right to participate in any new conservation projects, provided they pay the appropriate share of the cost. The net effect of new conservation is an increase in pumping rights by the Plaintiffs and "credits" for the non-Plaintiffs.

In 2013, both the Plaintiffs and Non-Plaintiffs agreed to participate in the cost to capture water that historically flowed to the ocean. This New Conservation was due to the construction and operation of the Seven Oaks Dam. The 2015 Annual Report for the Western-San Bernardino Annual Report increases the rights for both Parties, as shown in Table 9-2.

Table 9-2. Adjusted SBBA Rights Due to New Conservation Allocation

PARTIES	PERCENTAGE	SAFE YIELD ALLOCATION (AF)	NEW CONSERVATION ALLOCATION (AF)	ADJUSTED RIGHT (AF)
NON-PLAINTIFFS (SAN BERNARDINO COUNTY AGENCIES)	**72.05%**	**167,238**	**5,507**	**172,745**
PLAINTIFFS (RIVERSIDE COUNTY AGENCIES)	**27.95%**	**64,862**	**2,136**	**66,998**
City of Riverside		52,199	1,719	53,918
Riverside Highland Water Company		4,294	141	4,435
Agua Mansa and Meeks and Daley Water Company		7,833	258	8,091
Regents of the University of California		536	18	554
TOTAL SUM OF EXTRACTIONS	**100%**	**232,100**	**7,643**	**239,743**

Riverside-Arlington Basin

Western is planning to construct a new non-potable well in the Riverside Arlington Basin to supplement non-potable supplies available from the Riverside Canal from RPU and the EVMWD Palm Well.

The Riverside-Arlington Basin is described in Section 4.2.2.1.

9.2.3 Surface Water and Stormwater

Western does not directly utilize any surface water or stormwater sources for its retail system. However, Western represents the Riverside County agencies as the Watermaster for the SBBA and participates in regional projects to capture stormwater to enhance the long-term sustainability of the SBBA and help mitigate the effects of climate change on local supplies. As a shareholder of Meeks and Daley Water Company, Western Retail benefits.

9.2.4 Wastewater and Recycled Water

As described in **Section 4.1.3**, There are two wastewater treatment plants that provide recycled water to Western Retail: the Western WRF and the WRCRWA Treatment Plant. Recycled water is used in the Riverside Service Area only. Western leverages the recycled water program to increase supply reliability and reduce the amount of imported water.

Recycled Water Coordination

Western adopted its "Western Strategic Plan" in 2012 to respond to on-going water resource issues in Southern California. Of the five goals developed in the plan, the first, Source Water Reliability, is to develop a water supply reliability portfolio while determining the financial feasibility of projects. In December 2009, Western prepared a Recycled Water Master Plan (RWMP), which was updated in June 2014 (Albert A. Webb Associates for Western Municipal Water District, June 2014). Western coordinated with multiple agencies to provide input during development of the original, including Riverside Public Utilities, Gage Canal Company, and Riverside Unified School District to determine potential recycled water demands.

Wastewater Collection, Treatment, and Disposal

The Western WRF and WRCRWA provide wastewater collection and treatment services for Western's Riverside Retail Service Area. Western operates the WRCRWA Treatment Plant, which is a regional wastewater treatment facility owned by WRCRWA, a joint powers authority composed of the cities of Norco and Corona, Jurupa Community Services District, Home Gardens Sanitary District, and Western.

Western also owns and operates the Western WRF, formerly the March Wastewater Treatment Plant. The WWRF was expanded in 2011 to a capacity of 3 MGD tertiary treatment. Recycled water is then distributed to customers including the Riverside National Cemetery, General Archie Old Golf Course, schools, parks, groves, and nurseries.

Wastewater treatment in Western's other retail areas is provided by EMWD at the Temecula Valley Regional Water Reclamation Facility and Rancho California Water District at the Santa Rosa Water Reclamation Facility. Both EMWD and Rancho California Water District already utilize flows from their wastewater plants to create recycled water. Because these facilities already produce recycled water, flows to these two plants do not have the potential to provide additional recycled water to Western.

WRCRWA Treatment Plant

The WRCRWA Treatment Plant is a 14 MGD tertiary facility that currently discharges all flows to the Santa Ana River. A recent Change of Use Petition has been granted to enable future re-use of recycled water from the WRCWRA Treatment Plan. There are no existing recycled water facilities to deliver the WRCWRA water to Western's service area so Western is exploring other opportunities to make beneficial use of its share of the recycled water.

From 2017 to 2019, the average WRCWRA flow generated by Western retail customers was 0.73 MGD (about 820 AFY) and is expected to increase to 1.6 MGD (about 1,800 AFY) at buildout.

Western Water Recycling Facility

Western operates the WWRF, which treats domestic wastewater from March Air Reserve Base and the north-central portion of the Riverside Service Area. The plant was upgraded in 2014 to produce 2,200 AFY of tertiary treated wastewater, which is discharged to an impoundment and then pumped to supply the recycled water system. The recycled water is provided to the Riverside National Cemetery, General Old Golf Course, and various landscaping, agricultural and commercial use sites. When supply exceeds demand, such as during wet winter months, excess recycled water is stored in the on-site impoundment until needed. If recycled water demands exceed supply, March Air Force Base's Expanded Groundwater Extractions and Treatment System (EGETS) may operate and send groundwater flows to blend with recycled water in Western's on-site storage ponds at the WWRF. If there is a large discrepancy between recycled water demand and recycled water supply, excess recycled water from the WWRF can be placed in Western's existing sewer collection system for conveyance and treatment to WRCRWA, where it is eventually discharged to the Santa Ana River.

The volume of influent to the WWRF, and new demand for recycled water is dependent on new development in the Riverside Service Area. Increasing the available supply of recycled water will allow customers who currently use non-potable water from the CRA to switch to a more drought- proof local supply for their non-potable water needs.



Recycled Water System Description

As mentioned, Western utilizes recycled water in the Riverside Service Area only. The recycled water system consists of nearly 56 miles of pipeline ranging from 4 to 42 inches in diameter; eight pump stations with 25 pumps and a combined rating of 5,175 horsepower; and a storage capacity of 1.3 MG in five tanks and one open reservoir. Western has an additional two open reservoirs, but they are not currently used in normal operation and not included in the storage totals outlined in the RWMP (Albert A. Webb Associates for Western Municipal Water District, June 2014).

Recycled water from the WWRF is provided to the Riverside National Cemetery and General Archie Old Golf Course as well as various parks, schools, groves, and nurseries. Recycled water is a drought-proof supply as it stems from wastewater by customers within Western's service area.

Potential, Current, and Projected Recycled Water Uses

Recycled water provided by Western is used by a limited number of customers, primarily those with large outdoor irrigation needs. Western anticipates future recycled water use to expand to additional customers, who will be able to reduce their outdoor use of potable water. Western is currently updating its Riverside Facilities Master Plan for the non-potable system and is investigating opportunities to expand recycled water service to existing and future customers.

Current Use

In 2020, Western delivered 1,758 AFY tertiary treated recycled water to its retail customers. This exceeds the volume anticipated in the 2015 UWMP.

Potential Users

Western has been working with commercial, residential, and institutional developments in the retail area to ensure that recycled water can be used to the fullest extent possible. Potential users within Western's service area include all industrial, commercial, and agricultural users that currently utilize potable and non-potable supply from the Riverside Canal and the CRA. Specific areas identified in the RWMP for potential expansion include the Orangecrest and Mission Grove areas and the Meridian Business Park. Western is flexible and open to additional developments and interest in recycled water use. Three Riverside Unified School District (RUSD) and one Val Verde Unified School District schools have been plumbed or retrofitted for recycled water. All new residential projects will be conditioned to install recycled water systems for parks and common areas. Additional recycled water users are identified in the RWMP. Total existing and future demand is anticipated to be approximately 8,000 AFY (Albert A. Webb Associates for Western Municipal Water District, June 2014).

Actions to Encourage and Optimize Future Recycled Water Use

The primary means by which Western encourages recycled water use is through its water rate structure. Non-potable and recycled water customer rates are substantially lower than potable water. In addition, recycled water use is mandated by Ordinance 377 in those areas where recycled water is available and can be used properly. Industrial and commercial developers near non-potable distribution pipelines are required to plan for future use of recycled water, including installing proper piping and facilities to minimize economic impacts when recycled water becomes available at the use site. This is implemented through the plan check process, where plans are not approved until the required recycled water facilities are designed.

As mentioned, Western is in the process of updating its Riverside Facilities Master Plan. This effort will continue to analyze future recycled water use and assess infrastructure needs to promote additional recycled water use and offset potable demand.

9.2.5 Desalinated Water Opportunities

As described above, Western is already pursuing the use of desalinated groundwater as part of its long-term water supply. Western is a member agency of the Chino Basin Desalter Authority and owns 3,534 AFY of capacity. The Chino Basin Desalter treats brackish groundwater to potable quality and may be expanded in the future. Currently, Western's shares are sold to the City of Norco.

Western's service area is located on the other side of the Santa Ana Mountains from the Pacific Ocean. Seawater desalination, as a source of supply for Western, would require development of a coastal desalination facility and either construction of a conveyance pipeline and associated appurtenances from the coast inland and over the mountains to Western's service area, or development of an exchange agreement with another agency to trade desalted water for Metropolitan supplies.

The development of (or participation in) a new water supply using a seawater desalination technique, while costly, is being investigated by other wholesale and retail water agencies in Southern California. Because Western is an inland area, desalination would only work if Western joined with other water purveyors in the development of a coastal desalination facility, and then received water from the SWP supplies of other participants via an exchange. It is not cost effective nor environmentally sound for Western to receive direct delivery of desalted ocean water due to the distance and the topography between Western and the Pacific Ocean.

9.2.6 Water Exchanges and Transfers

Western does not currently have any exchange or transfer agreements aside from agreements already discussed that pertain to local groundwater and purchases.

Emergency Interties

Western has interties with Eastern and EVMWD for use as an emergency supply source. Western also has interconnections with the cities of Riverside and Corona.

9.2.7 Future Water Projects

Eastern, a neighboring agency of Western, has developed the North Perris Groundwater Basin Program to remediate contamination within the North Perris Groundwater Basins, protect non-contaminated areas of the basin, develop a local source of supply, including a secondary, secure potable supply for MARB, as well as provide long-term remediation of rising groundwater levels within MARB. Because of potential issues with serving MARB, Western and Eastern have entered into an interagency agreement for the Perris North Project, headed by Eastern. The interagency agreement, attached in **Appendix M** allows Western to purchase Perris North Project water in accordance with the Maximum Allocation Schedule if and when MARB demands increase in the future. The project is expected to produce approximately 6,750 AFY of total supply, with Western initially purchasing 500 AFY following completion of the project then increasing up to 1,500 AFY by 2040.

Table 9-3. Future Water Supply Projects

FUTURE SUPPLY PROJECT	DESCRIPTION	PLANNED IMPLEMENTATION YEAR	PLANNED FOR USE IN YEAR TYPE	EXPECTED INCREASE IN SUPPLY
Perris North Project	Joint Project with Eastern Municipal Water District	2025	All Year Types	500 – 1,500 AFY

9.2.8 Summary of Existing and Planned Sources of Water

As described throughout this chapter, Western has worked to develop a variety of local and imported water supplies to meet its customer demands. Western will continue to work to secure local supplies and increase reliability, while promoting conservation and/or recycled water use. **Table 9-4** summaries the various supplies used in 2020 and **Table 9-5** and **Figure 9-1** summarize projected supply through 2045.

Table 9-4. 2020 Water Supply, AFY

SUPPLY SOURCE	SUPPLY, AFY
POTABLE	**21,834**
Metropolitan	12,004
Groundwater (San Bernardino Basin, Western Meeks and Daley)	226.52
Groundwater (San Bernardino Basin, Leased Meeks and Daley)	4,208
Groundwater (RPU Surplus)	3,163
Groundwater (Temecula Valley Basin)	399
Eastern (Murrieta)	1,834
NON-POTABLE	**4,909**
Metropolitan	1,819
EVMWD (Riverside-Arlington Groundwater)	944
RPU (Riverside-Arlington Groundwater)	388
WWRF	1,758
TOTAL SUPPLY	**26,743**

Table 9-5. Projected Supply, AFY

SUPPLY SOURCE	2025	2030	2035	2040	2045
POTABLE	**27,073**	**30,199**	**33,686**	**37,574**	**41,821**
Metropolitan[1]	14,680	19,306	22,293	26,181	31,928
Chino Desalter[2]	3,534	3,534	3,534	3,534	3,534
Temecula Valley Basin Groundwater [3]	1,452	1,452	1,452	1,452	1,452
Leased Meeks and Daley[4]	4,680	4,680	4,680	4,680	4,680
Western Owned Meeks and Daley[5]	226.52	226.52	226.52	226.52	226.52
City of Riverside Surplus[6]	2,000				
Eastern North Perris Agreement[7]	500	1,000	1,500	1,500	
NON-POTABLE	**7,031**	**8,066**	**8,964**	**9,966**	**11,079**
Metropolitan[8]	1,671	1,300	1,300	1,300	1,681
Riverside-Arlington Basin Groundwater[9]	2,500	3,131	3,104	3,465	4,100
WWRF[10]	1,940	2,598	3,481	4,032	4,032
WRCWRA[11]	920	997	1,079	1,169	1,266
TOTAL SUPPLY	**34,104**	**38,265**	**42,650**	**47,540**	**52,900**

[1]Available supply from Metropolitan determined as the remaining demand not met by local supply sources with a 10% buffer.

[2]Western's shares of the Chino Desalter, currently leased to Jurupa Community Services District.

[3]Planned groundwater extractions to serve the Murrieta service area.

[4]Agreement with EVMWD to lease Meeks and Daley groundwater rights.

[5]Western-owned Meeks and Daley groundwater rights.

[6]Based on the 2017 Agreement, surplus water sales. Additional surplus supply may be available in the future but is not guaranteed.

[7]Eastern Perris North Project.

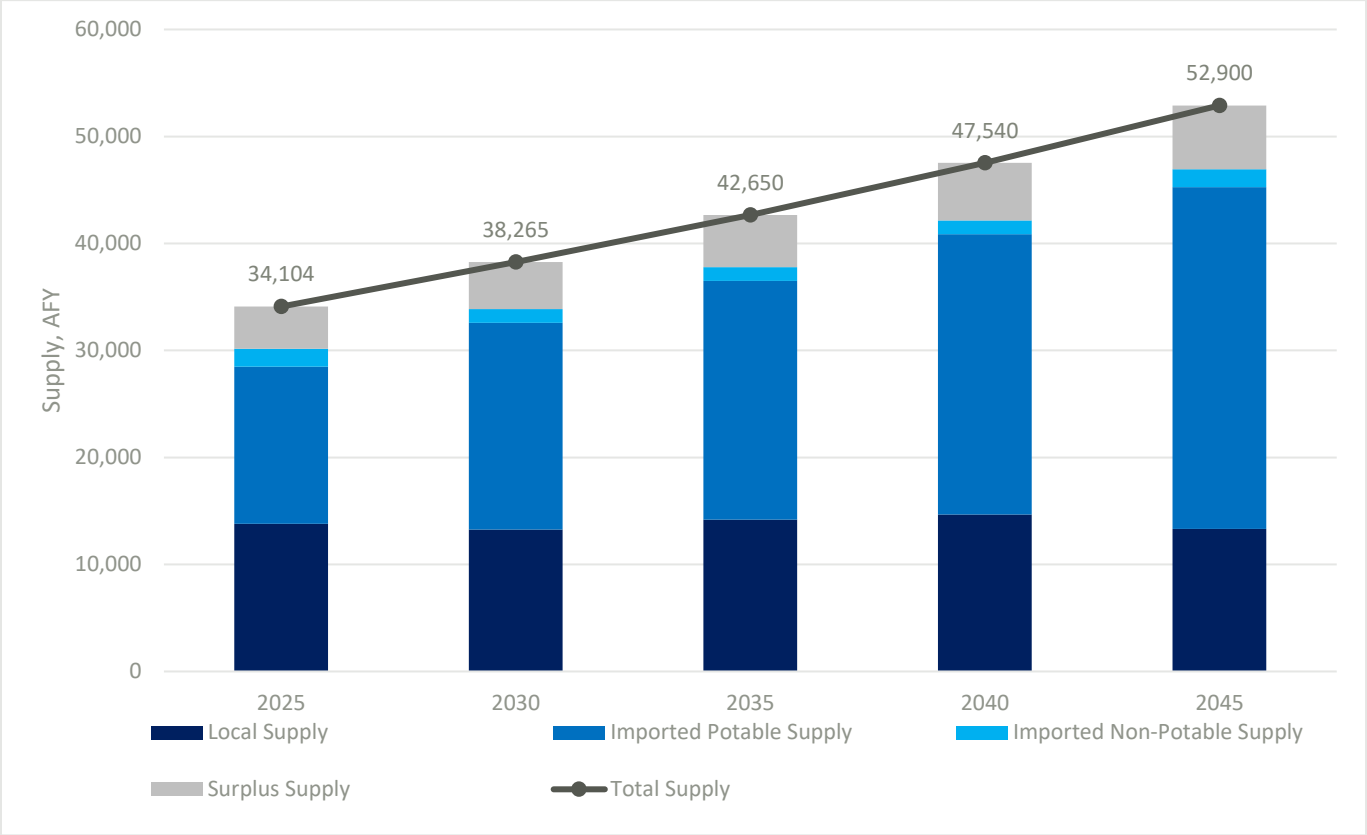
[8] Non-potable supply from Metropolitan is assumed to meet the remaining demand not met by local supply sources.

[9]Expected supply used from local non-potable groundwater and delivered through the Riverside Canal, including Western's planned non-potable well and purchases from RPU and EVMWD's Palm Well.

[10]Projected 2030 WWRF effluent determined in the Riverside Non-Potable Facilities Master Plan. The rate of growth was calculated between 2030 and average 2017-2019 data (2018 used to determine rate of growth) and applied for years 2025 and 2030-2045. Based on this growth rate, the WWRF is expected to reach buildout between 2035 and 2040.

[11]WRCWRA supply is not currently available to Western Retail customers as no infrastructure currently exists to convey recycled water from the plant to Western Retail. This supply is currently considered surplus supply but Western is evaluating opportunities to make use of it.

Figure 9-1. Projected Retail Supply, AFY



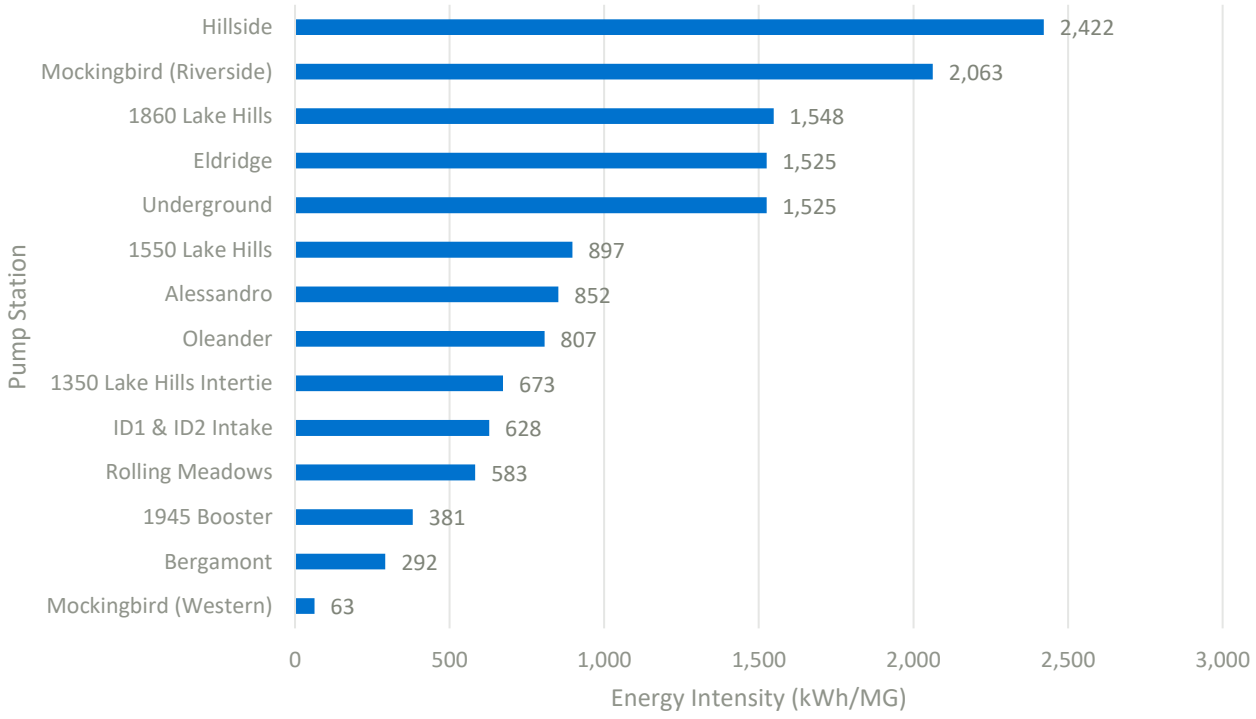
9.3 Energy Intensity

Western contracted with Hansen Allen & Luce, Inc. (HAL) to complete a Water System Optimization Study (Optimization Study) in 2018 and identify how Western could best align hydraulic performance, water quality, and energy efficiency for its Riverside service area. The Optimization Study more specifically analyzed overall hydraulic performance, storage utilization, pump station operation, energy efficiency, and water quality. Western's existing hydraulic model and energy usage for 2014 through 2017 was used as the basis for the optimization analysis.

In addition to electricity, Western uses natural gas to operate its system. The Holcomb Pump Station is powered by natural gas from the Shell Energy Company. Other areas of the Riverside service area are powered from natural gas provided by the Southern California Gas Company (SoCal Gas). Both electricity and natural gas exhibit similar usage patterns, with peaks during the summer months that mimic water demand trends.

The Optimization Study estimated the expected energy intensity for each pump station, as shown in **Figure 9-2** (Hansen Allen & Luce, Inc. for Western Municipal Water District, October 2018). Overall, the study estimated that the average energy intensity for the Riverside service area is approximately 3,700 kWh/MG (kilo-watt-hours per million gallons). This value does not include the energy intensity from imported water or water purchased from other agencies.

Figure 9-2. Estimated Energy Consumed by Pump Station (Hansen Allen & Luce, Inc. for Western Municipal Water District, October 2018)



10 WESTERN MUNICIPAL WATER DISTRICT Retail Water Use

This chapter describes historical, current, and projected water uses for Western's retail service areas.

Western provides potable water to customers within the Riverside, Murrieta, and Rainbow service areas. In addition, Western provides non-potable water to customers in the Riverside service area.

Between 2016 – 2020, Western retail customers used an average of 23,000 AFY of water.

IN THIS SECTION

- Non-Potable and Potable Water Use
- Past, Current, and Projected Water Use
- SBX7-7 Baselines, Targets, and Compliance

10.1 Non-Potable and Potable Water Use

Western's Riverside retail service area uses water for both potable and non-potable uses. Potable uses include agriculture, commercial, single-family residential, multi-family residential, landscape, industrial, military, temporary, and Fireline uses. Temporary connections include meters issued for construction water use.

Non-potable water is also used for agriculture and landscape and is tracked separately. The non-potable system uses a blend of recycled water, non-potable groundwater, and non-potable imported water.

The Murrieta and Rainbow retail service areas use potable water for a variety of uses, including single-family, multi-family, commercial, landscape, and others. These systems do not currently use non-potable water.

10.2 Past, Current, and Projected Water Use by Sector

Past, current, and projected water uses for Western's retail system is discussed in the following sections. In 2020, the largest customer category was single-family customers that used approximately 60% of the total water consumed.



10.2.1 Past Water Use

Water use in Western's retail systems has varied from 2013 to 2020. There was a notable decline in 2015 following the State's 2014 declaration of a drought emergency and implementation of statewide mandatory demand reductions. After the statewide restrictions ended in 2016, demands rebounded slightly but have not returned to 2013 levels, despite adding nearly 1,600 new customer connections from 2013 to 2020. Western also implemented water budget rates for indoor and outdoor uses which has helped to limit total consumption and conserve water. This is an indication that Western's aggressive conservation program has been effective at achieving some permanent demand reductions. Note that for non-potable customers, Western's billing data does not differentiate recycled water use from other non-potable use so recycled water use is included. A summary of the water use for each retail service area is provided in **Figure 10-1**, **Figure 10-2**, and **Figure 10-3**. Total Western retail use is summarized in **Figure 10-4** and **Table 10-1**.

Figure 10-1. Riverside Service Area Historical Water Use, AFY

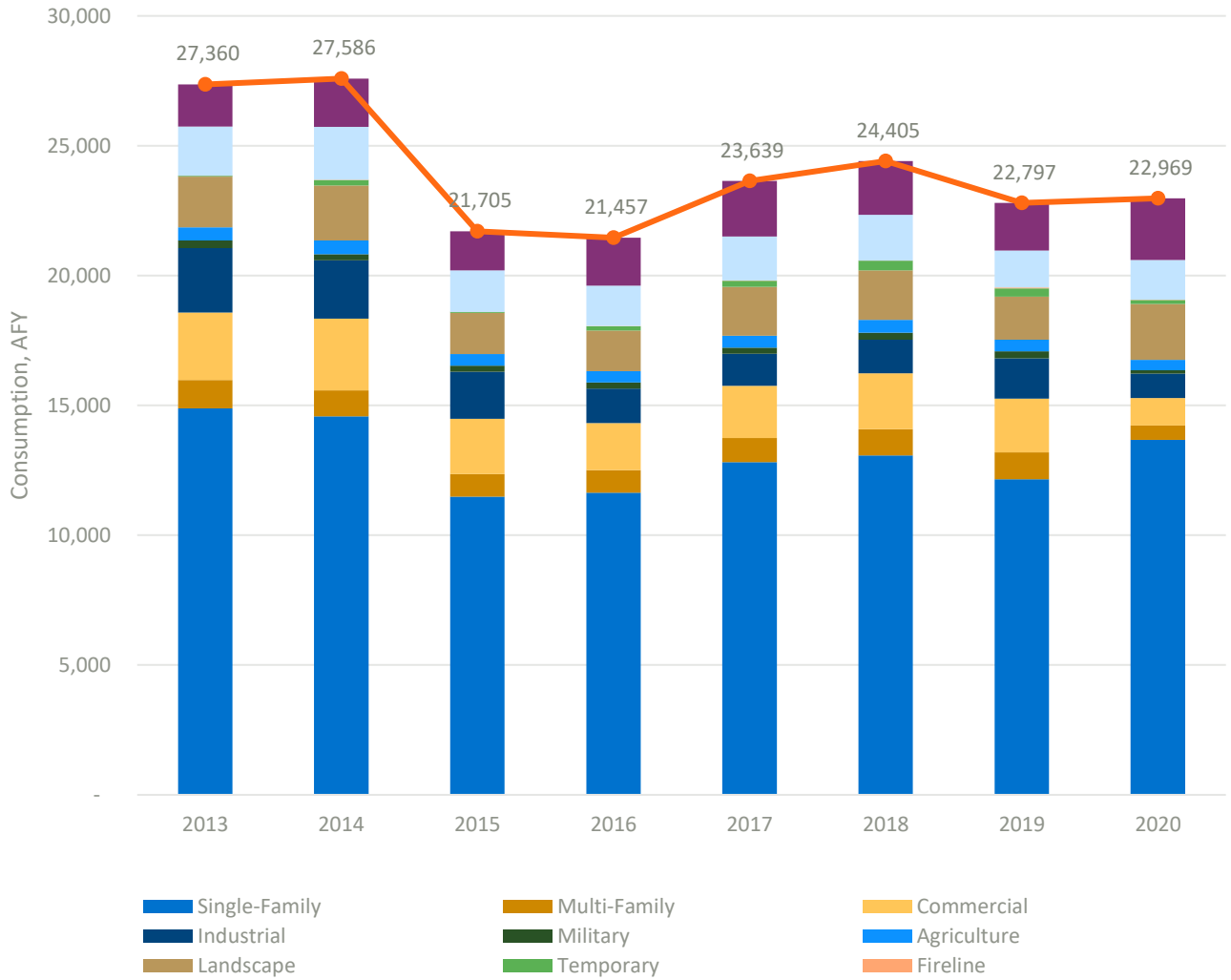


Figure 10-2. Murrieta Service Area Historical Water Use, AFY

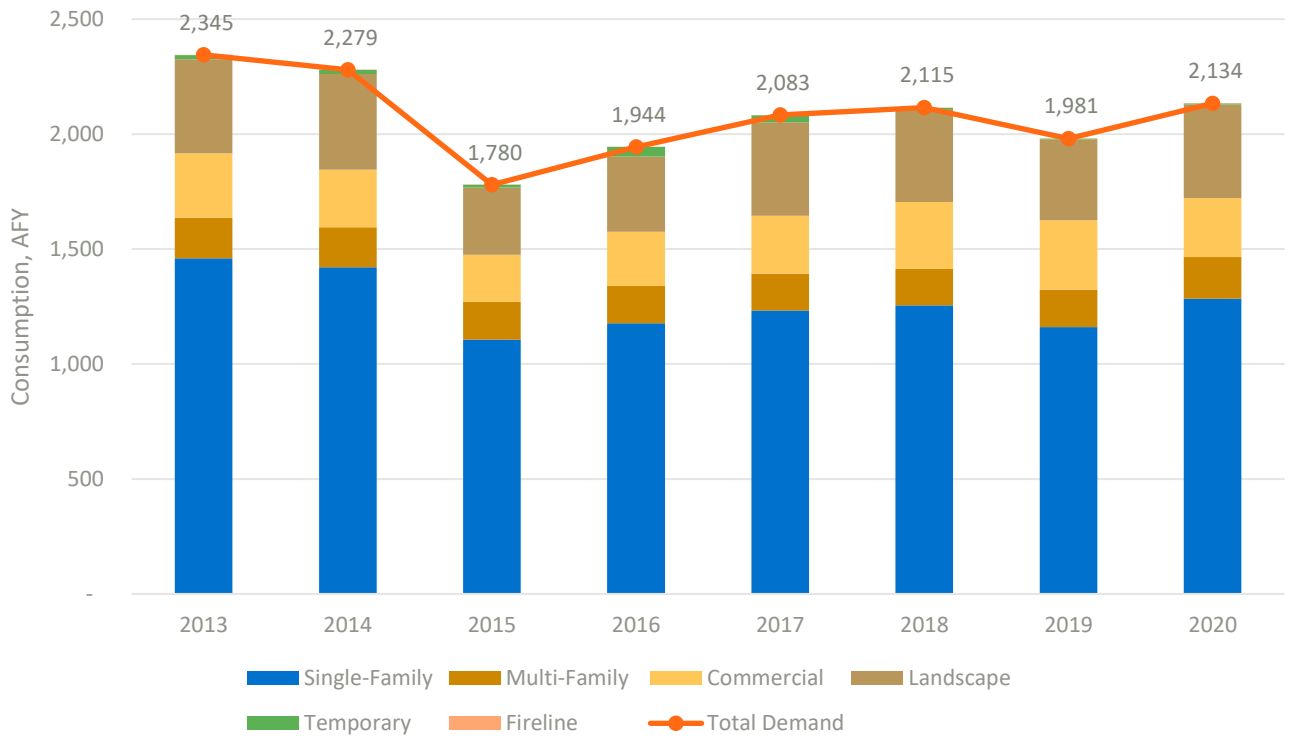


Figure 10-3. Rainbow Service Area Historical Water Use, AFY

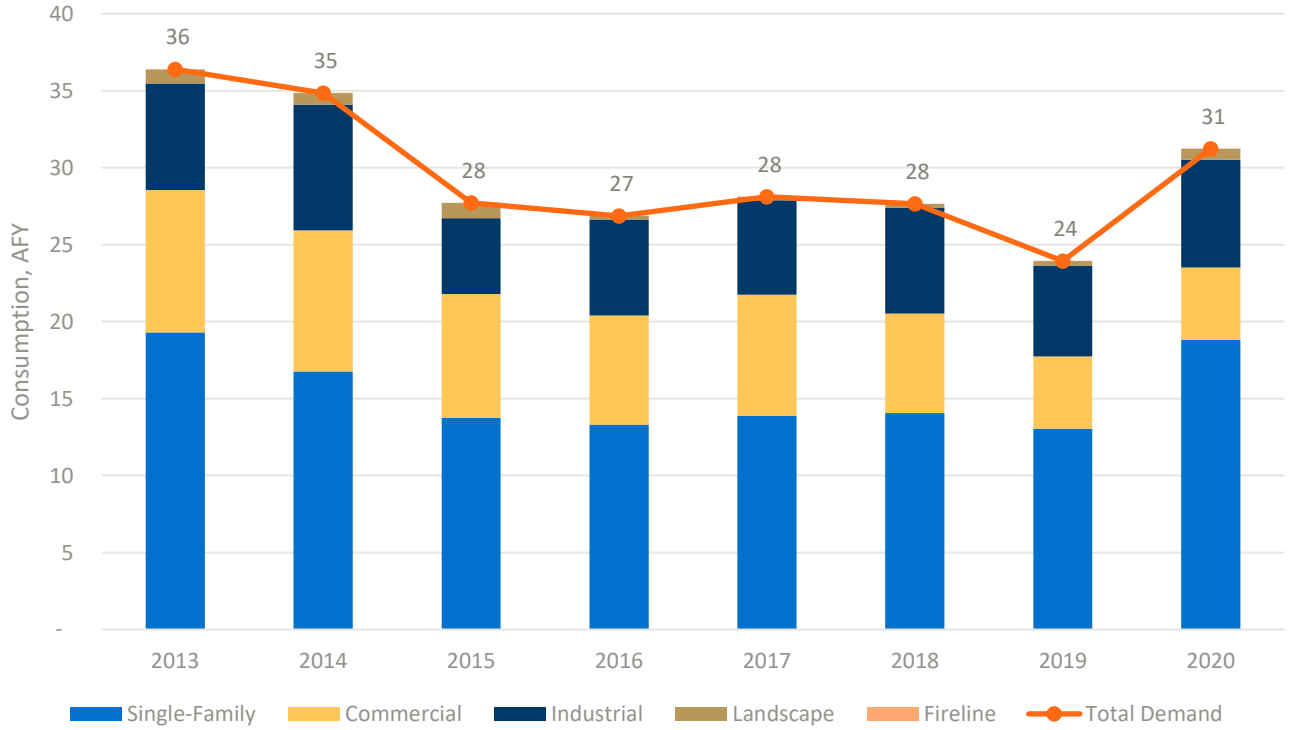
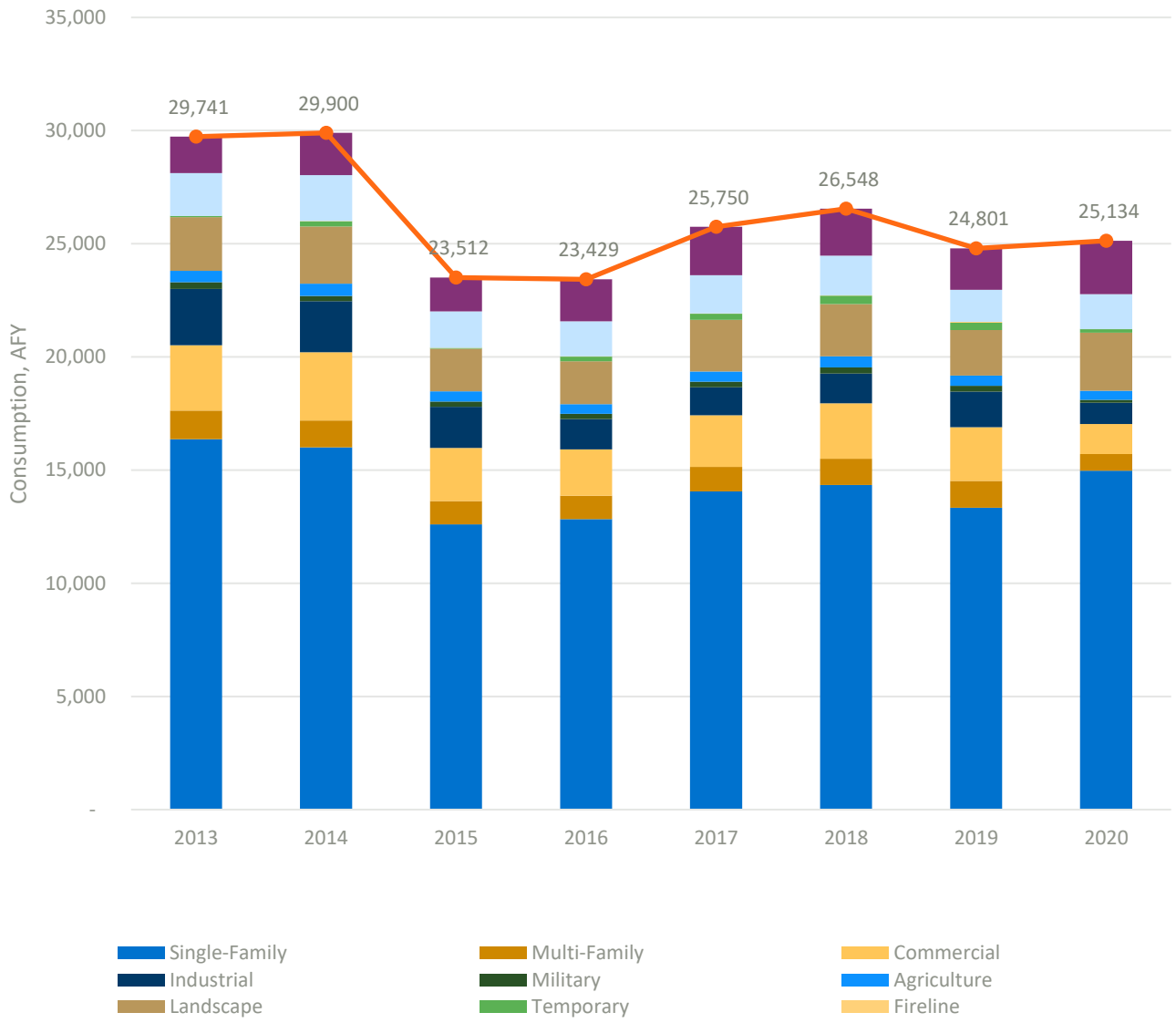


Table 10-1. Western Retail Historic and Current Water Use, AFY

WESTERN RETAIL TOTAL	2013	2014	2015	2016	2017	2018	2019	2020
POTABLE								
Agriculture	510	532	449	432	453	487	454	397
Commercial	2,897	3,019	2,345	2,050	2,273	2,450	2,371	1,328
Single-Family	16,362	16,010	12,600	12,830	14,058	14,344	13,332	14,973
Landscape	2,360	2,538	1,883	1,898	2,285	2,313	2,011	2,563
Industrial	2,487	2,258	1,814	1,338	1,245	1,305	1,565	940
Military	290	234	237	234	237	274	266	132
Multi-Family	1,265	1,179	1,036	1,033	1,089	1,162	1,193	731
Temporary	53	223	41	204	274	378	315	159
Fireline	2	11	2	7	6	7	37	6
TOTAL POTABLE	**26,226**	**26,003**	**20,406**	**20,025**	**21,919**	**22,720**	**21,545**	**21,230**
NON-POTABLE								
Agriculture – Non-Potable	1,896	2,036	1,603	1,553	1,696	1,758	1,421	1,538
Landscape – Non-Potable	1,619	1,862	1,502	1,850	2,135	2,070	1,835	2,366
TOTAL NON-POTABLE	**3,515**	**3,898**	**3,106**	**3,403**	**3,831**	**3,828**	**3,256**	**3,904**
TOTAL DEMAND	**29,741**	**29,900**	**23,512**	**23,429**	**25,750**	**26,548**	**24,801**	**25,134**

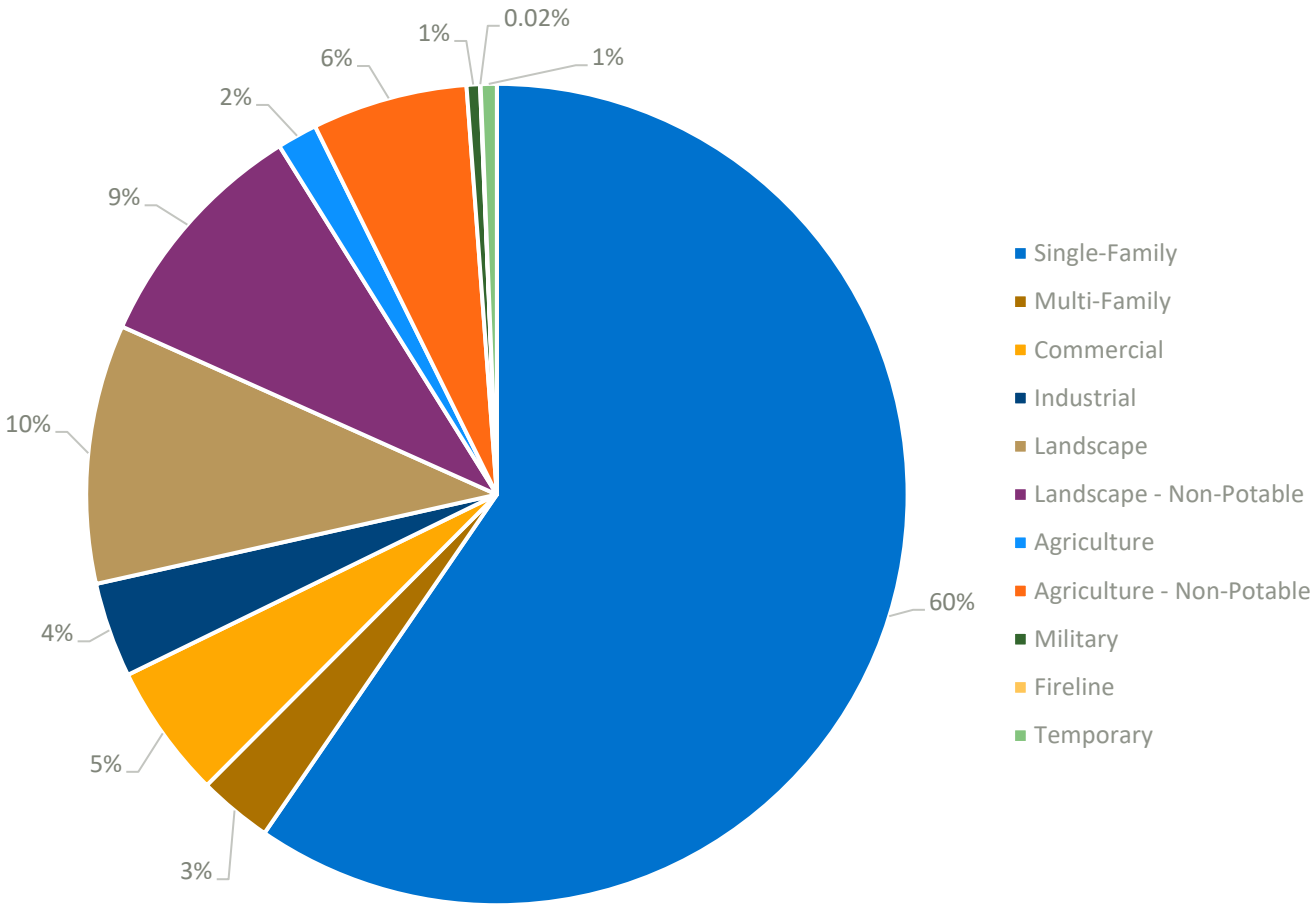
Figure 10-4. Western Retail Historical and Current Water Use, AFY



10.2.2 Current Water Use

In 2020, Western Retail (Riverside, Murrieta, and Rainbow service areas combined) used 25,134 AF of water. Single family residences consumed 60% of the total water used. The second largest customer category was landscape, using 10% of the total water demand. The breakdown of water use by customer category is illustrated in **Figure 10-5**.

Figure 10-5. Western Retail 2020 Water Use by Customer Category



10.2.3 Distribution System Water Losses

There are two types of water losses considered in the water loss audit, apparent losses, and real losses. Apparent losses are losses attributed to meter inaccuracies or data management (e.g., losses due to how water is accounted for or measured), while real losses are physical losses of water. Sources of distribution system water loss include:

- Leaks from water lines - Leakage from water pipes is a common occurrence in water systems. A significant number of leaks remain undetected over long periods of time as they are very small; however, these small leaks contribute to the overall water loss. Aging pipes typically have more leaks.
- Water used for flushing and fire hydrant operations
- Unauthorized uses or theft of water
- Meter Inaccuracies - meters can under-represent actual consumption in the water system.
- Unrecorded water uses when reservoirs overflow

Western has completed annual water loss audits for the Riverside retail system since 2015 following the procedures outlined by AWWA to identify and quantify system losses. These reports are submitted to the State each year by October 1. Western also prepares a water loss calculation for the Murrieta and Rainbow systems on an annual basis for internal use in managing water losses.

Historical water loss for each system is summarized in **Table 10-2**. The 2020 AWWA Water loss audit for Riverside system will not be available until October 1 per State requirements so an estimated water loss is shown based on the difference between total water supplied to the system and total water billed to the customers.

Table 10-2. Historical Water Losses for Retail Service Areas, AFY and Percent of Consumption

	2016	2017	2018	2019	2020
Riverside	3,236 (20%)	1,378 (8%)	1,262 (7%)	1,226 (7%)	1,495 (6%)
Murrieta	3 (<1%)	245 (11%)	27 (1%)	21 (1%)	99 (4.4%)
Rainbow	12 (33%)	9 (26%)	11 (30%)	7 (25%)	16 (34%)

Water losses for the Riverside service area have been trending down, likely due to recent replacement of water meters throughout the system; however, meters along the Mills Gravity Line may exhibit meter inaccuracies during low flow periods. The Murrieta system maintains consistently low water loss. The Rainbow service area exhibits high water losses due to all water being delivered through a single Metropolitan turnout (meter WR-13) and a handful of customers with relatively low use. Meter inaccuracies, especially during low flow periods, are expected to be the primary driver for the relatively high water loss in the Rainbow system.

The State Water Board is currently preparing performance standards for distribution system water loss. These standards are still being reviewed and finalized with stakeholder input. Western is committed to managing system water losses to reduce water waste and will endeavor to meet the future water loss performance standard once adopted by the State Water Board. A discussion of current and planned programs to manage water loss are included in **Chapter 15**, Retail Demand Management Measures.

For the purposes of projecting future demands, the Riverside system is assumed to maintain a 4% loss, the Murrieta system is assumed to maintain a 3% loss and the Rainbow system is assumed to maintain a 25% loss.

10.2.4 Projected Water Use

To estimate future potable water use, Western explored several demand projection methodologies based on SCAG and Department of Finance (DOF) projections, recent buildout studies, and ongoing master planning efforts. The growth rates projected by SCAG and DOF for the Riverside and Murrieta retail service areas indicated relatively low annual growth rates, which is not representative of the growth Western expects based on knowledge of planned developments. While these projections were not used as the sole basis for Western's population and demand projections, they were used as baseline comparisons.

Western also analyzed previous buildout studies for the Murrieta and Riverside service areas that were prepared in 2018 and 2019, respectively. These buildout studies included a parcel land-use based approach to determine the future buildout demand. The buildout studies informed demands for the ongoing Murrieta Water Facilities Master Plan and the ongoing Riverside Water Facilities Master Plan. Both master plans have more closely analyzed development that is expected to occur within the next 10 years, between 2020 and 2030. A comparison of 2020 actual demands and the 2030 projected demands in the Water Facilities Master plans yields an annual average growth rate of approximately 2.2%. Western anticipates that a similar trend may continue through 2045. To be consistent with the land use and development-based analysis prepared for the Water Facilities Master plans, Western elected to utilize a uniform 2.2% growth rate for the Riverside and Murrieta service areas.

Western's Rainbow service area has remained relatively constant in terms of growth and water use and minimal future growth is expected, which is consistent with the SCAG projections for this service area. To forecast demands for the Rainbow service area, the SCAG growth rate was applied to existing demand. Based on this analysis, demands within the Rainbow service area are estimated to increase by 6 AFY in 2045, compared to 2020 actual demand.

To project potable demands for each system, a linear interpolation for each service area was applied using the various growth rates described above. To estimate future water, use for each customer category, the percentage of total 2020 use was applied to total future demand. The estimated water loss percent was then applied for each system to determine the total projected water use.

To project Riverside retail non-potable demands, a similar approach was used. A comparison of 2020 actual non-potable demands and the 2030 projected non-potable demands in the Water Facilities Master plan yields an annual average growth rate of approximately 3%. After 2030, Western anticipates that non-potable use will continue to grow but at a slower rate. Non-potable demands after 2030 are anticipated to grow at 2.2%, the same rate as the potable system. Estimated water losses within the non-potable system were assumed to be 23%, the average non-potable water loss from 2016 through 2020. Over the last five years, water losses within the non-potable system have ranged from 20 to 26%. Within the non-potable system, water is typically loss at the Jefferson Pump station. The Jefferson Pump station diverts water from the Riverside Canal, but due to operational constraints, some non-potable water flows to the River.

Table 10-3 summarizes the demand by service area while **Figure 10-6** and **Table 10-4** summarize the total projected Western Retail demand by customer class, in AFY.

Table 10-3. Projected Retail Water Demand by Service Area, AFY

SERVICE AREA	2025	2030	2035	2040	2045
Riverside	27,674	31,101	34,695	38,705	43,178
Riverside Potable	22,119	24,675	27,527	30,709	34,258
Riverside Non-Potable*	5,555	6,426	7,168	7,997	8,921
Murrieta	2,452	2,735	3,051	3,404	3,715
Rainbow	41	44	46	46	47
WESTERN RETAIL TOTAL	**30,167**	**33,879**	**37,792**	**42,155**	**46,940**

*Non-potable demands include demand met by recycled water. Western cannot distinguish between recycled water and non-potable deliveries as its system is combined.

Figure 10-6. Projected Retail Water Use by Customer Type, AFY

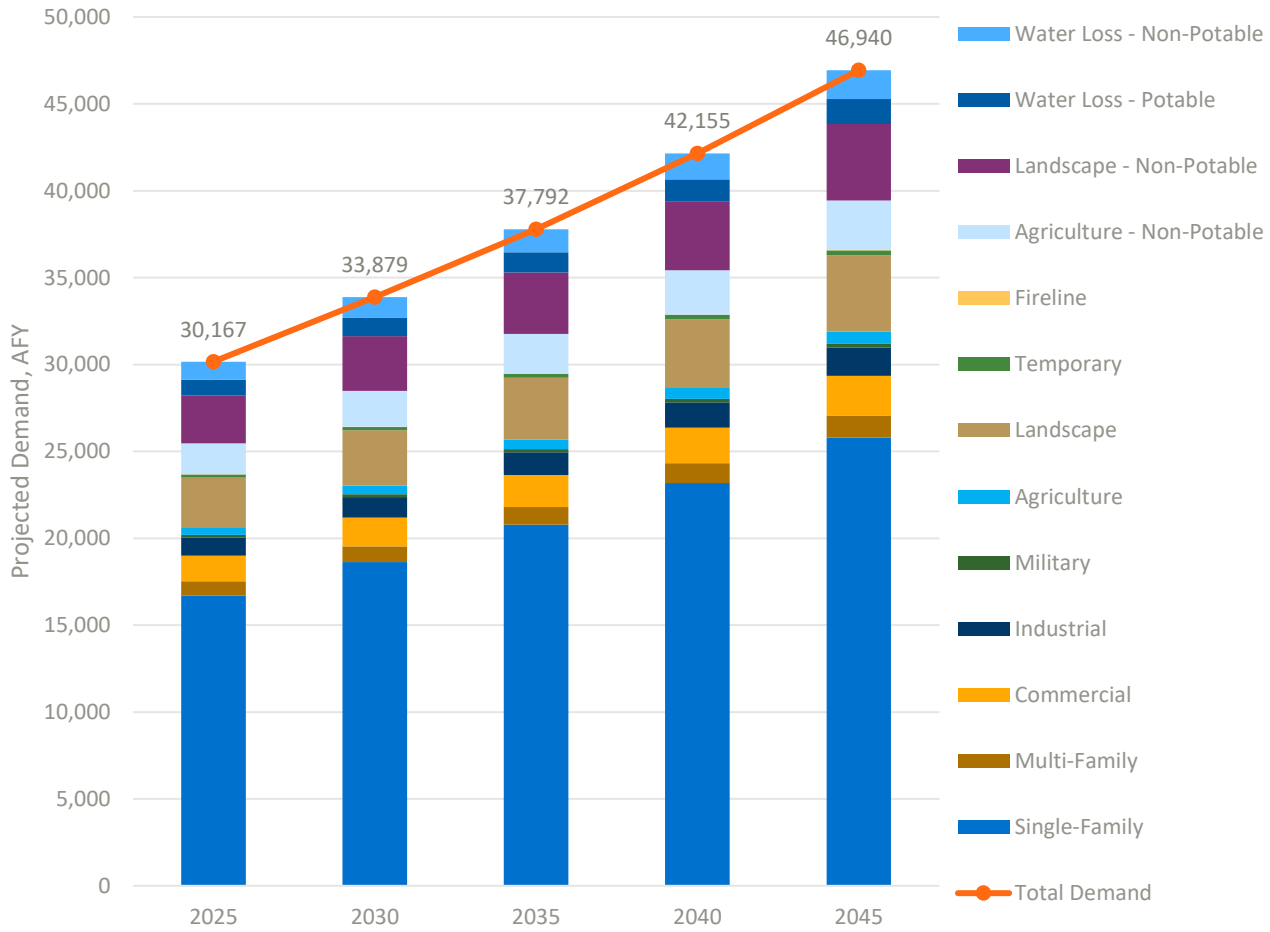


Table 10-4. Total Projected Demands for Water, AFY

PROJECTED WATER USE	2025	2030	2035	2040	2045
POTABLE					
Agriculture	443	494	551	615	685
Commercial	1,481	1,652	1,843	2,056	2,288
Single-Family	16,703	18,632	20,783	23,182	25,803
Landscape	2,859	3,189	3,557	3,968	4,417
Industrial	1,049	1,170	1,305	1,456	1,620
Military	148	165	184	205	228
Multi-Family	815	909	1,015	1,132	1,260
Temporary	177	198	220	246	274
Fireline	6	7	8	9	10
Losses - Potable	930	1,037	1,157	1,289	1,435
TOTAL POTABLE	**24,612**	**27,454**	**30,624**	**34,158**	**38,019**
NON-POTABLE*					
Agriculture – Non-potable	1,779	2,058	2,296	2,561	2,857
Landscape – Non-potable	2,737	3,166	3,532	3,940	4,396
Losses – Non-potable	1,039	1,202	1,340	1,495	1,668
TOTAL NON-POTABLE	**5,555**	**6,426**	**7,168**	**7,997**	**8,921**
TOTAL DEMAND	**30,167**	**33,879**	**37,792**	**42,155**	**46,940**

*Non-potable demands include demand met by recycled water. Western cannot distinguish between recycled water and non-potable deliveries as its system is combined.

Although Western's non-potable system includes recycled water, for the purposes of demand projection and future recycled water reporting, the estimated percentage of total non-potable demands met by recycled water was determined based on the 2020 supply ratio between recycled water and non-potable sources. In 2020, WWRF produced approximately 36% of the total non-potable supply that was used. As a result, it was assumed that 36% of non-potable demands were met by recycled water. To forecast future demands, it was assumed that recycled water supply from the WWRF would be used prior to local or imported non-potable water. Future non-potable demands are summarized in **Table 10-5** below.

Table 10-5. Non-Potable Demand, AFY

	2025	2030	2035	2040	2045
NON-POTABLE					
Agriculture	809	759	555	545	841
Landscape	1,767	1,867	1,792	1,924	2,380
NON-POTABLE DEMAND	**2,576**	**2,626**	**2,347**	**2,469**	**3,221**
RECYCLED WATER					
Agriculture	970	1,299	1,740	2,016	2,016
Landscape	970	1,299	1,740	2,016	2,016
RECYCLED WATER DEMAND	**1,940**	**2,598**	**3,481**	**4,032**	**4,032**
Losses - Non-Potable	1,039	1,202	1,340	1,495	1,668
TOTAL NON-POTABLE SYSTEM DEMAND	**5,555**	**6,426**	**7,168**	**7,997**	**8,921**

Estimating Future Water Savings

In 2018, the legislature enacted SB 606 and AB 1668, which provide for implementation of a water budget-based approach to establishing new urban water use objectives for water suppliers. The series of water use efficiency standards that will inform calculation of Western's new water use objective are still under development and will take effect in 2023. Once the new standards have been established, Western will reevaluate customer demands and identify approaches to comply with the new standard, which will be incorporated into the next UWMP prepared in 2025. Western is committed to promoting water use efficiency and will continue to implement a comprehensive set of programs intended to reduce customer demands and support sustainable use of regional water supplies.

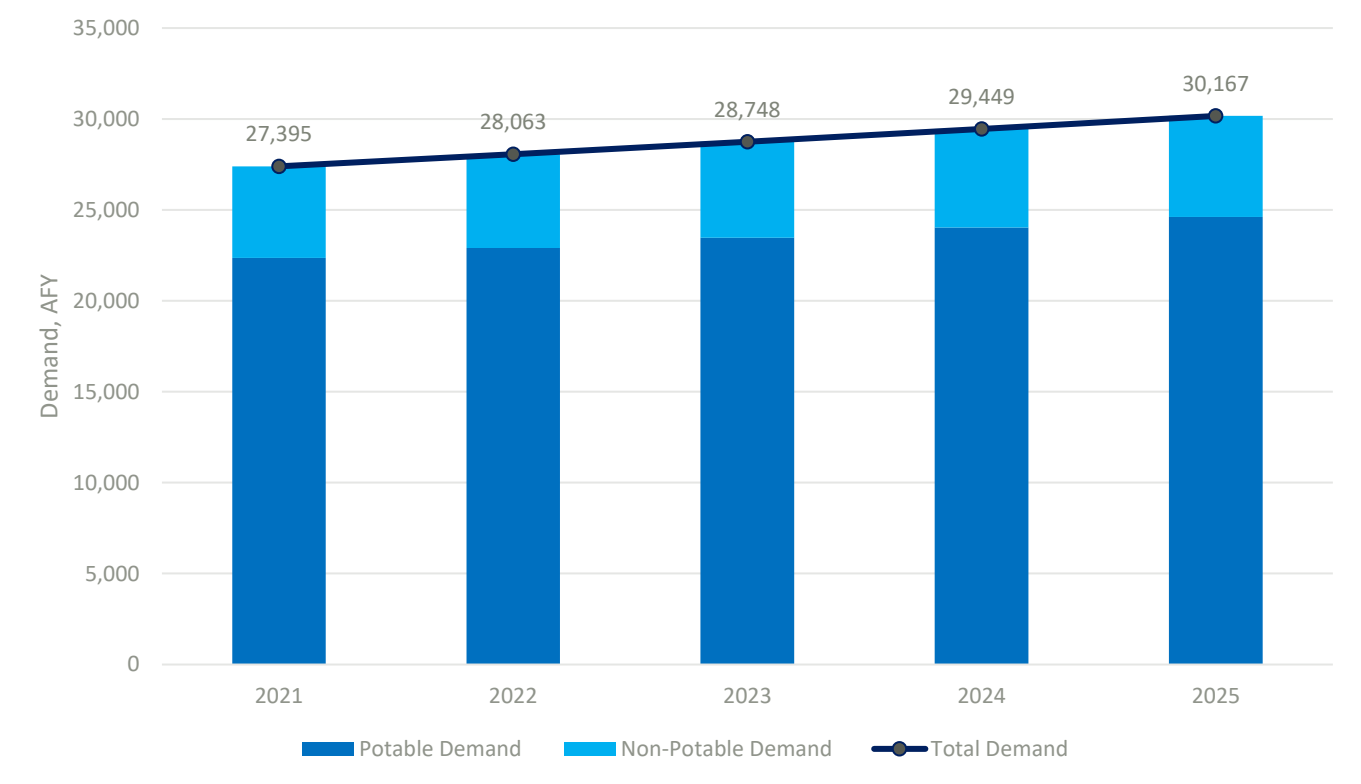
10.2.5 Characteristic Five-Year Water Use

In addition to past and projected uses, the UWMP more closely analyzes anticipated conditions for the next five years (2021 – 2025). Demands for the next five years are provided in **Table 10-6** and **Figure 10-7**. The demand projections established in this chapter assume typical, unconstrained demand, free from other influential factors like conservation savings. Based on the projections established above, Western anticipates that retail demands may increase by approximately 12% from actual 2020 use to projected use in 2025. Projected use in 2025 was determined using growth rates developed as part of master planning efforts. Details on an analysis for the next five years is discussed in **Chapter 13**.

Table 10-6. Projected Retail System Demand for the Next Five Years (2021-2025), AFY

	2021	2022	2023	2024	2025
Potable	22,364	22,906	23,461	24,030	24,612
Non-Potable	5,032	5,158	5,287	5,419	5,555
TOTAL DEMAND	**27,395**	**28,063**	**28,748**	**29,449**	**30,167**

Figure 10-7. Projected Retail Demand for the Next Five Years (2021-2025), AFY



10.3 Water Use for Lower Income Households

California Water Code 10631.1 requires that water use projections of an UWMP include the projected water use for low-income households as identified in the housing element of any city, county, or city and county in the service area of the supplier. Western retail areas fall within the city of Riverside, unincorporated Riverside County, and the city of Murrieta. Mapping showed that none of the low-income areas of the city of Riverside falls within Western's retail service areas.

The County of Riverside's 2014 Housing Element of its General Plan estimates that approximately 37.9 percent of all households in the western portion of Riverside County are "very low" or "low" income. The city of Murrieta's 2013 Housing Element of its General Plan estimates that 25 percent of all households in the city are "extremely low", "very low", or "low-income".

The GIS analysis completed as preparation for Western's 2015 UWMP showed that the portion of low-income households within Western's retail service areas are lower than county- or city-wide (RMC for Western Municipal Water District, June 2016). There are no low-income communities identified in the Rainbow Service Area, and small populations in both the Murrieta and Riverside Service Areas. The GIS analysis found that only 18 percent of the Riverside Service Area, and only 12 percent of the Murrieta Service Area qualifies as DAC using 2010-2014 American Community Survey (ACS) data.

The low-income household demands were calculated using Western's projections for single-family and multi-family water use and the percentage of the total retail service area that met the criteria for DACs based on the 2010-2015 ACS data, as shown in **Table 10-7**.

Table 10-7. Low Income Demands, AFY

	2025	2030	2035	2040	2045
Low Income Demand, AFY	3,068	3,091	3,117	3,145	3,170

10.4 SBX7-7 Baseline and Targets

Senate Bill x 7-7 (SB7) was incorporated into the Urban Water Management Planning Act (UWMP Act) in 2009 and requires that all water suppliers increase water use efficiency with the overall goal to decrease per-capita water consumption within the state by 20 percent by the year 2020. SB7 required the California Department of Water Resources (DWR) to develop certain criteria, methods, and standard reporting forms through a public process that could be used by water suppliers to establish their baseline water use and determine their water conservation targets. SB7 and the Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use (SB7 Guidebook) (California Department of Water Resources, February 2016) specify methodologies for determining the baseline water demand, 2015 interim urban water use target and the 2020 urban water use target for Western. Western utilized a 10-year baseline period from 1995 to 2004 and a five-year baseline period from 2003 to 2007 to determine the 2020 water use target. Western's baseline and 2020 target was calculated in the 2015 UWMP and has not changed for this plan. More details on the development of the baselines and target can be found in the 2015 UWMP and **Appendix N**. Western's final 2020 target water use was calculated as 352 GPCD.

Table 10-8. SBX7-7 Baseline and Targets Summary

BASELINE PERIOD	START YEAR	END YEAR	AVERAGE BASELINE GPCD*	CONFIRMED 2020 TARGET *
10-15 Year	1995	2004	430	352
5 Year	2003	2007	370	352

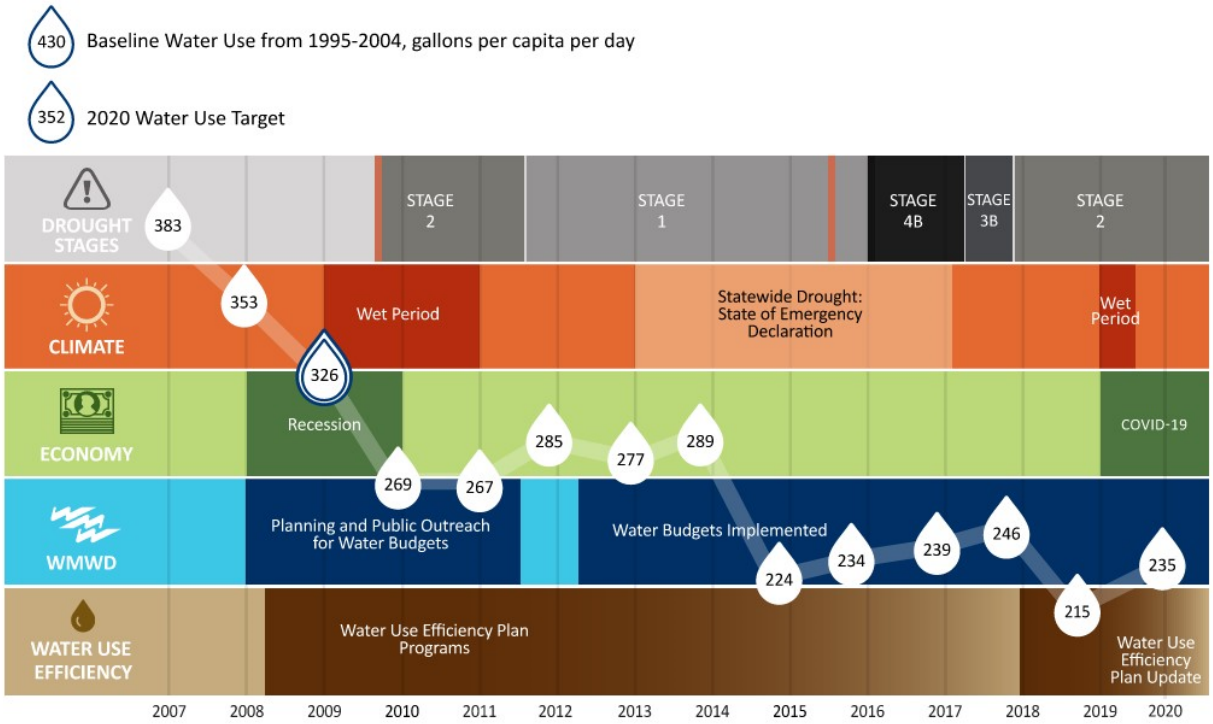
*All values are in Gallons per Capita per Day (GPCD)

10.4.1 2020 Compliance Daily Per-Capita Water Use (GPCD)

The calculated gpcd for 2020 is 235 gpcd, which meets Western's target of 352 gpcd by 2020. This is based on 2020 total potable and non-potable retail water use of 24,986 AFY and a 2020 population estimate of 94,898 based on DWR's Population Tool.

By 2009, Western Retail had met its target to reduce per capita water consumption by 20% by 2020 and went on to achieve a reduction of more than 45% by 2020.

Activities that have affected retail water usage in Western Municipal Water District.



11 Retail Water Service Reliability and Drought Risk Assessment

WESTERN MUNICIPAL WATER DISTRICT

This chapter describes the reliability of Western's retail water supplies, which reflects Western's ability to meet the water needs of its retail customers with water supplies under varying conditions. The essential findings are that Western can reliably meet its retail demands with existing and future supply sources based on demand and supply projections.

Similar to **Chapter 6**, which focused on Western wholesale, this chapter describes the expected Western retail water supply reliability for normal, single dry year, and multiple-dry years through 2045 followed by a drought risk assessment for 2021 to 2025.

Western's work to expand and further diversify its retail supply portfolio is an important step toward improving the reliability of retail supplies. Western has also prepared a comprehensive Water Shortage Contingency Plan to provide reliability in the event of a water shortage, presented in **Appendix A**.

IN THIS SECTION

- Supply Constraints
- Water Service Reliability Assessment
- Drought Risk Assessment

11.1 Constraints on Water Sources

As described in **Chapter 10**, Western has various water supply sources available (groundwater, imported water, and recycled water) to meet retail demands during normal, single-dry, and multiple-dry years. These supply sources may be impacted by climatic and hydrologic conditions, water quality, and legal restrictions, as well as potential for interruption of supply driven by catastrophic events.

11.1.1 Imported Water Supply Reliability

Western retail obtains imported water supplies from Western wholesale. Imported water supply constraints are discussed in **Chapter 6,** Wholesale Water Service Reliability and Drought Risk Assessment.

11.1.2 Groundwater Supply Reliability

Western retail obtains groundwater supplies from several local groundwater basins. Each of the groundwater sources are adjudicated and closely managed by Watermasters and/or Groundwater Sustainability Agencies. Western plays a key role in the management of the groundwater basins it relies on to meet retail demands and participates in ongoing water conservation measures and regional recharge projects to enhance and protect the reliability of local groundwater.

Potential constraints to groundwater supply reliability include:

Drought

The effects of a local drought are not immediately recognized since the local groundwater basins have substantial storage capacity to support continued use during dry periods. However, groundwater supply availability does become threatened when long term recharge and inflow decreases.

Overdraft

Under extended supply pressures, groundwater basins can enter overdraft conditions, which can have a series of consequences including subsidence. Overdraft can also exacerbate or create water quality issues by reducing the assimilative capacity of the basin or requiring wells to tap into lower quality water that may be present in other parts of the basin.

Climate Change

Climate change could increase the potential for overdraft by increasing demand, reducing other sources of supply, and reducing natural recharge and inflows from surface water and precipitation.

Regional Growth

Population growth could increase demands on groundwater supplies, potentially creating risk of overdraft. Regional growth could also increase the amount of contaminants entering groundwater basins, either as a result of increased urban runoff or industrial or other activities. Growth can also impact recharge areas by expanding impervious surfaces into areas that would otherwise represent entry points for surface water recharging local aquifers.

Water Quality

Some water quality issues are naturally occurring, while others are a result of human actions. Decreased quality of groundwater poses threats to supplies that can be mitigated but require additional costs to treat. Based on current conditions, water quality is not expected to affect Western retail's supply reliability.

Due to the availability of groundwater storage and the sustainable management of local groundwater sources, Western's groundwater supplies are generally considered reliable, even in the face of the constraints identified here.

11.1.3 Recycled Water Supply Reliability

Western's recycled water supply is not expected to be affected by climatic factors because source wastewater flows coming from indoor use are generally not impacted by temperature and precipitation. Recycled water supplies will increase with growth; however, reduced urban water use standards currently under development could result in reduced recycled water supplies.

11.2 Water Service Reliability Assessment

This section presents Western's expected retail water supply reliability for a normal year, single dry year, and five consecutive dry years, including projections for 2025, 2030, 2035, 2040, and 2045.

11.2.1 Year Type Characterization

The water service reliability and Drought Risk Assessment analyze supply over several water years: normal, single dry, and multiple dry years. Local groundwater and recycled water supplies are not expected to change under the various year types, so Western has elected to use the same years identified by Metropolitan for normal, single-dry, and multiple-dry years for both imported and local supplies in this retail supply reliability analysis. DWR defines these years as:

Normal Year

This represents the water supplies a supplier considers available during normal conditions. This could be a single year or averaged range of years that most closely represents the average water supply available. Metropolitan uses an average from 1922 to 2017 to establish normal year supply availability.

Single Dry Year

The single dry year is recommended to be the year that represents the lowest water supply available. Metropolitan has identified 1977 as the single driest year.

Five-consecutive Dry Year

This represents the driest five-year historical sequence for the Supplier, which may be the lowest average water supply available for five years in a row. Metropolitan has identified 1988 through 1992 as the greatest 5-year drought period.

Due to Western's aggressive and highly successful conservation program, demands are assumed to be nominal in single and multiple dry years. As discussed in **Chapter 10**, Western retail can purchase additional imported water from Western wholesale if needed.

Table 11-1. DWR 7-1R Basis of Water Year Data (Reliability Assessment)

		AVAILABLE SUPPLY IF YEAR TYPE REPEATS
YEAR TYPE	BASE[1] YEAR	PERCENT OF AVERAGE SUPPLY
Average Year	1922-2017	
Single-Dry Year	1977	100%
Consecutive Dry Years 1st Year	1988	100%
Consecutive Dry Years 2nd Year	1989	100%
Consecutive Dry Years 3rd Year	1990	100%
Consecutive Dry Years 4th Year	1991	100%
Consecutive Dry Years 5th Year	1992	100%

[1]Applies to both imported and local supplies

11.2.2 Water Service Reliability

Normal supply and demand projections were developed in **Chapter 9** and **Chapter 10** and form the basis of this reliability analysis.

As described in this UWMP, Western prioritizes the use of local supply sources and uses imported water to meet the remaining retail water demands that are not met by local supplies. Retail potable demands exceed local supplies so imported water is used to meet the balance of retail demands. Western retail also does not currently use water from the Chino Desalter, as that water is currently leased to Jurupa Community Services District and is therefore shown as retail surplus within this chapter. It is anticipated that Western retail's shares of the Chino Desalter will continue to be leased to Jurupa Community Services District over the planning period.

For the retail non-potable system, Western's local non-potable supplies are projected to exceed the projected non-potable demand in 2030 through 2040. In 2025 and 2045, non-potable demands are projected to exceed local non-potable supplies so imported water will be used the meet the difference. Western retail may theoretically obtain water from WRCWRA; however, no existing infrastructure exists to convey recycled water from WRCWRA to retail service areas and WRCWRA supply is included in the surplus non-potable supply amounts. In the future, Western anticipates leasing WRCWRA recycled water to other interested agencies.

Local groundwater and recycled water supplies are not expected to be reduced in dry years. As discussed in **Chapter 4**, Metropolitan's 2020 UWMP projects the ability to meet projected imported water demands under normal, single dry year, and multiple dry year conditions and Western wholesale projects a surplus of imported water supplies that are available to Western retail if needed. **Table 11-2**, **Table 11-3** and **Table 11-4** demonstrate that Western anticipates adequate supplies for years 2025 to 2045 to meet retail demand under normal, single dry and multiple-dry year conditions.

Water Service Reliability – Normal Year

Table 11-2. Retail Normal Year Supply and Demand Comparison, AFY

	2025	2030	2035	2040	2045
POTABLE					
Supply	27,073	30,199	33,686	37,574	41,821
Demand	24,612	27,454	30,624	34,158	38,019
DIFFERENCE	**2,461**	**2,745**	**3,062**	**3,416**	**3,802**
NON-POTABLE					
Supply	7,031	8,066	8,964	9,966	11,079
Demand	5,555	6,426	7,168	7,997	8,921
DIFFERENCE	**1,476**	**1,640**	**1,796**	**1,969**	**2,158**

Water Service Reliability – Single Dry Year

Table 11-3. Retail Single Dry Year Supply and Demand Comparison, AFY

	2025	2030	2035	2040	2045
POTABLE					
Supply	27,073	30,199	33,686	37,574	41,821
Demand	24,612	27,454	30,624	34,158	38,019
DIFFERENCE	**2,461**	**2,745**	**3,062**	**3,416**	**3,802**
NON-POTABLE					
Supply	7,031	8,066	8,964	9,966	11,079
Demand	5,555	6,426	7,168	7,997	8,921
DIFFERENCE	**1,476**	**1,640**	**1,796**	**1,969**	**2,158**

Water Service Reliability – Five Consecutive Dry Year

Table 11-4. Retail Multiple Dry Year Supply and Demand Comparison, AFY

		2025	2030	2035	2040	2045
FIRST YEAR	**POTABLE**					
	Supply	27,073	30,199	33,686	37,574	41,821
	Demand	24,612	27,454	30,624	34,158	38,019
	DIFFERENCE	**2,461**	**2,745**	**3,062**	**3,416**	**3,802**
	NON-POTABLE					
	Supply	7,031	8,066	8,964	9,966	11,079
	Demand	5,555	6,426	7,168	7,997	8,921
	DIFFERENCE	**1,476**	**1,640**	**1,796**	**1,969**	**2,158**
SECOND YEAR	**POTABLE**					
	Supply	27,073	30,199	33,686	37,574	41,821
	Demand	24,612	27,454	30,624	34,158	38,019
	DIFFERENCE	**2,461**	**2,745**	**3,062**	**3,416**	**3,802**
	NON-POTABLE					
	Supply	7,031	8,066	8,964	9,966	11,079
	Demand	5,555	6,426	7,168	7,997	8,921
	DIFFERENCE	**1,476**	**1,640**	**1,796**	**1,969**	**2,158**
THIRD YEAR	**POTABLE**					
	Supply	27,073	30,199	33,686	37,574	41,821
	Demand	24,612	27,454	30,624	34,158	38,019
	DIFFERENCE	**2,461**	**2,745**	**3,062**	**3,416**	**3,802**
	NON-POTABLE					
	Supply	7,031	8,066	8,964	9,966	11,079
	Demand	5,555	6,426	7,168	7,997	8,921
	DIFFERENCE	**1,476**	**1,640**	**1,796**	**1,969**	**2,158**

*Table continues on the next page.

		2025	2030	2035	2040	2045
FOURTH YEAR	**POTABLE**					
	Supply	27,073	30,199	33,686	37,574	41,821
	Demand	24,612	27,454	30,624	34,158	38,019
	DIFFERENCE	**2,461**	**2,745**	**3,062**	**3,416**	**3,802**
	NON-POTABLE					
	Supply	7,031	8,066	8,964	9,966	11,079
	Demand	5,555	6,426	7,168	7,997	8,921
	DIFFERENCE	**1,476**	**1,640**	**1,796**	**1,969**	**2,158**
FIFTH YEAR	**POTABLE**					
	Supply	27,073	30,199	33,686	37,574	41,821
	Demand	24,612	27,454	30,624	34,158	38,019
	DIFFERENCE	**2,461**	**2,745**	**3,062**	**3,416**	**3,802**
	NON-POTABLE					
	Supply	7,031	8,066	8,964	9,966	11,079
	Demand	5,555	6,426	7,168	7,997	8,921
	DIFFERENCE	**1,476**	**1,640**	**1,796**	**1,969**	**2,158**

11.2.3 Description of Management Tools and Options

Western has made significant investments in local supply sources to reduce reliance on imported water, improve reliability and reduce costs associated with imported water. Western will remain committed to increasing retail water reliability through investments in local supplies and implementation of a comprehensive conservation program.

11.3 Drought Risk Assessment

The retail Drought Risk Assessment (DRA) focuses on a drought scenario that could potentially occur within the next five years (2021-2025).

11.3.1 Data, Methods, and Basis for Water Shortage Condition

The data, methods, and basis for a water shortage condition were identified using typical normal year supply and demand, as developed in **Chapter 9** and **Chapter 10**. To estimate demands for 2021 through 2025, a straight-line interpolation was applied from the 2020 demand to the 2025 projected demand. The demands for the DRA's five-consecutive dry years were based on the normal demand and assume that demands will not increase in dry years due to Western's aggressive and highly successful conservation program.

The DRA provides a snapshot of the anticipated surplus or deficit if a drought were to occur in the next five years.

11.3.2 DRA Water Source Reliability

As mentioned in this chapter, local resources are not expected to reduce in dry years and will continue to meet the majority of Western's retail demand. Imported water will be used to meet the balance of demands. As described in **Chapter 6**, Metropolitan anticipates a potential shortage in 2021 and 2023 and will implement response actions, including drawing water from storage, to meet anticipated demands. With a potential surplus estimated for years 2022, 2024, and 2025, no water service reliability concern is anticipated, and no shortfall mitigation measures are expected to be exercised by Metropolitan. Based on the results of Metropolitan's DRA, this DRA assumes that Western retail will be able to purchase sufficient supplies to meet retail demands in excess of local supplies. Western does not anticipate the need to implement shortage response actions in its retail WSCP in the next five years, unless Metropolitan implements a WSAP, which is not expected based on Metropolitan's DRA analysis.

Table 11-5. Retail DRA Results, AFY

	2021	2022	2023	2024	2025
POTABLE					
Gross Water Use	22,361	22,904	23,460	24,029	24,612
Total Supply	26,193	26,299	26,406	26,513	27,121
DIFFERENCE	**3,832**	**3,395**	**2,946**	**2,484**	**2,509**
NON-POTABLE					
Gross Water Use	5,033	5,158	5,287	5,420	5,555
Total Supply	7,253	7,378	7,507	7,640	7,775
DIFFERENCE	**2,220**	**2,220**	**2,220**	**2,220**	**2,220**

12 WESTERN MUNICIPAL WATER DISTRICT Retail Demand Management Measures

This chapter describes Western's implementation of retail demand management measures (DMMs) intended to promote water-use efficiency and partner with local communities to support sustainable use of regional water supplies.

Western has actively implemented a conservation program since 2009 and is a regional leader for advancing water efficiency. Western actively collaborates with local and regional agencies and the communities it serves to implement innovative programs and drive change. Western staff also serves in a leadership role for the California Water Efficiency Partnership (CalWEP) whose mission is to maximize urban water efficiency and conservation throughout California by supporting and integrating innovative technologies and practices; encouraging effective public policies; advancing research, training, and public education; and building collaborative approaches and partnerships. Western leverages these partnerships, tools, and resources within its service area.

In order to meet the future demand for water in Western's service area, implementation of new supply projects must be coupled with an expectation of greater water use efficiency by all retail customers. Water use efficiency has become a core business component in Western's customer partnership, with the understanding that water efficiency enables continued economic development and maintenance of the local living environment.

IN THIS SECTION

- Water Waste Prevention Ordinance
- Public Education and Outreach
- Rebates
- Implementation over the Last Five Years

In response to growing concerns regarding the reliability of imported water supplies and the need for increased water-use efficiency, Western first developed and implemented a Water Use Efficiency Master Plan (WUEMP) in 2008 and revised it in 2018. The 2018 WUEMP is included in **Appendix O**. The plan outlines potential programs, partnerships, and messaging research to raise customer awareness about water-use efficiency. It assists customers within Western's retail service area in becoming water efficient and embeds water-use efficiency into Western's policies and customer behavior.

The majority of Western's urban water use is for landscape and outdoor irrigation; therefore, Western has focused its water conservation activities on this sector for the largest and most cost-effective savings.

Western implements a comprehensive set of retail DMMs intended to reduce customer demands and help Western maintain supply reliability. The DMMs also help Western achieve its water use efficiency targets. Details on Western's retail DMMs are provided in the following sections. DMMs implemented for Western's wholesale system is described in **Chapter 7**.

2020 Landscape Contest Winner



12.1 Water Waste Prevention Ordinances

In February 2015, Western's Board of Director's adopted Ordinance No. 384, which updated the Water Supply Shortage Contingency Program. The update established permanent water use prohibitions to be in effect at all times under Stage 1 – Water Supply Watch, unless otherwise declared by the Board. Under a Stage 1 condition, customers are encouraged to use water efficiently and all uses of water must be reasonable and beneficial. It also prohibits waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water. These prohibitions remain in effect under all levels of water shortage contingency declaration in addition to the specific requirements of each level. Each level of the Water Supply Shortage Contingency Program increases in stringency, providing for increasing water conservation during time of water supply shortage. Western's Water Shortage Contingency Plan includes a detailed description of all water waste prohibitions established in Ordinance No. 384. The WSCP is attached as **Appendix A** and summarized in **Chapter 13**.

12.1.1 Metering

All of Western's connections are metered and billed monthly with a water budget rate structure. Western adopted a water budget rate structure in 2011. Water budgets are designed for each customer and include an indoor daily gallons per capita component, as well as an outdoor volume based on landscaped area and parameters established in the State Landscape Model Ordinance.

Western also has a meter testing and replacement policy consisting of the following three parts:

Western uses the customer billing system to track all installed meters by size, type, date installed, customer account type, and warranty information.

Western has a yearly testing program of all meters for the wholesale division and all large meters over 3-inch. These meters are tested annually, and all necessary repairs are performed to maintain AWWA accuracy, based on meter calibration results.

Western periodically samples its residential meter stock to ensure accuracy. As a result of the most recent sampling, it was determined that meters over 15 years old should be replaced. Starting in 2020, Western replaced over half of its residential meters with AMI enabled meters and will have replaced nearly all residential meters by the end of 2021. Western has also implemented a project to install a Meter Data Management System to aid in meter data analysis and a customer portal to help customers track their use.

12.1.2 Conservation Pricing

Western charges water budget rates for all its connections. When customers regularly remain under their water budget, they are billed at the lowest rates available. Customers who use water in excess of their water budgets are billed at higher rate tiers. Western works closely with customers who exceed their water budgets to reduce their water use and associated costs.

12.2 Public Education and Outreach

Western implements a comprehensive Public Education and Outreach program within its retail service area.

12.2.1 Public Outreach

Western's Strategic Communications department provides informational materials to customers through its website, media events, landscape conservation campaigns, and other educational programs. Western also communicates with its customers through newspaper articles, paid advertising, bill inserts, its website (**http://www.wmwd.com/**) and public service announcements. Conservation messages are also included on customer water bills.

As part of the Water-Use Efficiency Master Plan, Western has developed several high-quality outreach pieces to help customers. The first is the SoCal Yard Transformation book, a comprehensive guide to everything you need to know to replace your lawn with drought-tolerant plants. As a companion piece, Western developed the Landscape Style Guide, a coffee table book of designs to help customers choose the style of their yard. Western also developed a Customer Welcome Packet that goes out to all new or move-in customers. The packet welcomes customers to Western and provides everything they need to know about their rates, bills, and water sources.

12.2.2 School Education Programs

Western implements school education programs for its retail area in conjunction with its wholesale area programs, as described in **Chapter 7**. Programs include presentations, field trips and assemblies for grades K-12. Any materials distributed comply with state standards. The materials distributed to students in grades K-6 include a water cycle bracelet, an earth ball, water story rock, and assembly-related material. Students in grades 7-12 receive scout badges, sponsorships, and assembly program-related material. Within Western's retail service are 14 public schools which are eligible to participate in the education programs offered. Western partners with the Discovery Science Center (**http://www.discoverycube.org/**) for its Water Education Assembly Programs for fourth and fifth graders. Western also funds water-related class field trips (virtual and in person) to the Chino Wetlands and the Santa Ana River.

12.3 Programs to Assess and Manage Distribution System Real Losses

Western repairs all reported leaks and breaks to the extent cost effective. In FY 2010, Western started calibrating all large commercial customers with meters 3" and above. In FY 2014, Western started a formal system audit, leak detection and repair program within its retail service area.

Western has completed annual water loss audits since 2015, in accordance with the AWWA guidelines. A copy of past water audits is provided in **Appendix P**.

Western's Finance department carefully tracks water losses each year. This data is used in the annual water loss audits and is also used to determine whether additional water loss interventions are warranted and whether a component analysis is needed.

12.4 Water Conservation Program Coordinating and Staffing

Western has maintained a full-time water conservation coordinator position since 1990. The water conservation coordinator implements retail area programs.

12.5 Other Demand Management Measures – Rebate Programs

Western offers various programs to its residential customers to help them reduce and manage their water use. Western offers rebates to its residential customers through Metropolitan's SoCal WaterSmart program. Additional information on the residential rebates provided by the SoCal WaterSmart Program can be found at **https://socalwatersmart.com/en/residential/** or through Western's website at **https://www.wmwd.com/411/Rebates**. Western also publishes an Annual Rebate Report for each fiscal year that summarizes the number of rebates and cost to implement as well as the expected annual and lifetime savings resulting from each rebate.

Landscape Evaluations (Norris Evaluations)

Shortly following the adoption of the District's WUEMP in 2008, Western began offering retail water customers a free landscape evaluation through a contract with Tim Norris Consulting. Mr. Norris, who holds a degree in irrigation science from Cal Poly Pomona, is highly knowledgeable in the science of proper irrigation system design and very adept at the art of communicating with customers at a level that is easily understood.

The evaluation program has become the foundation of Western's programmatic offering and serves to funnel water users to the other opportunities for increased water use efficiency, such as turf replacement or the regional rebate programs administered by Metropolitan.

The evaluation program has become an extension of both the customer service and the efficiency teams. Customers concerned with a high-water bill or simply seeking to ensure they remain within their water budget can request a free evaluation by contacting Customer Service. Staff provide customer contact information and historic water use data to Norris Consulting. The contractor then schedules an appointment at a time when the customer can be present at their home. During the scheduled appointment, the contractor reviews the irrigation system looking for errors in irrigation scheduling and watering issues. The most common issues observed and reported to customers have been incorrect irrigation scheduling and irrigation problems such as a damaged sprinkler heads and broken irrigation lines. Recommendations provided in the written report for these issues include adjusting the irrigation schedule according to season or current weather conditions and performing

monthly system checks to minimize the time an issue remains uncorrected. The public relations value of this program is immeasurable.

Norris evaluations comprise of two components: Irrigated landscape area measurement and an irrigation and landscape audit. Under the irrigated landscape area measurement, the consultant, Norris, confirms meter number on meter lid and GPS meter location, uses a measure wheel to measure irrigated landscape, photographs the site and visually estimates percent of turf, trees, shrubs, and hardscape, obtains customer related information like persons per household (PPH) and slopes, and provides the customer a Water Budget adjustment form, if applicable.

The irrigation and landscape audit is a more detailed evaluation based on procedures published using the Irrigation Training and Research Center and the Irrigation Association. Norris confirms meter number on meter lid and GPS meter location, documents controller type, station, and schedule, and turns on valves from controllers, identify and document system issues: leaks, broken, misaligned, mismatched heads, pressure problems, spray deflection, sunken heads, plugged equipment, dry spots, wrong sized heads or emitters. In addition, Norris takes photos, identify microclimate, plant material, soil type, and slopes. Norris logs the irrigated areas, measures the square footage by vegetation type, estimates distribution uniformity, and measures pressure at head using a pitot tube. The end result is a generated seasonal irrigation schedule and a list of system issues.

For July 1, 2019 – December 31, 2019, 12 customers participated in a landscape evaluation, with an estimated cost to WMWD of $1,575 and estimated average acre-feet (AF) of water saved over a 5-year lifetime of 4 AF. Due to COVID-19, January 1, 2020 – June 30, 2020 had less participation in physical evaluations. Virtual audits were offered, but the water savings attributed to a virtual audit is unknown and has been excluded from this analysis. Participation numbers for January 1, 2020 – June 30, 2020 were not available at the time of this report.



Toilets (HET)

A premium high-efficiency toilet is a toilet that uses less water than what used to be considered a water-saving toilet. These toilets flush at a rate of 1.1 gallons per flush (gpf) or less. Eligible toilets must replace existing toilets using 1.6 gallons per flush or more. Premium high-efficiency toilets use almost 20% less water than the WaterSense standard and flush the same amount of waste just as, if not more effectively.

Water savings from high-efficiency toilets can save over $800 on a customer's water bill over the lifetime of the product. When combined with SoCal Water$mart rebates, premium high-efficiency toilet upgrades can pay for themselves. The qualifying premium high-efficiency models available for a rebate have been performance tested and certified through MaP testing, an independent testing program.

For FY 2019 – 2020, 4 high efficiency toilet rebates were paid, with an estimated cost of $360 and estimated average acre-feet (AF) of water saved over a 10-year lifetime of 5 AF. Two of the high efficiency toilet rebates were obtained by customers in the Murrieta Service Area.

High Efficiency Clothes Washer (HECW)

As a Metropolitan Water District of Southern California's Member Agency, customers in Western Municipal Water District (WMWD) service area can receive high-efficiency clothes washer rebate for their residential homes. Rebates are limited to a single rebate per installation address.

SoCal Water$mart manages the rebate program, and they state that a high-efficiency clothes washer uses 55% less water than standard clothes washers, reducing water use by over 11,000 gallons a year. Other benefits are that these washers last longer and are energy efficient.

For FY 2019 – 2020, 88 high efficiency clothes washer rebates were paid, with an estimated cost to Metropolitan of $7,480 and estimated average acre-feet (AF) of water saved over a 10-year lifetime of 73 AF. 18 of the high efficiency clothes washer rebates were obtained by customers in the Murrieta Service Area.

Weather Based Irrigation Controllers (WBIC)

Weather-based irrigation controllers (WBICs), also known as "smart sprinkler controllers," allow for more accurate, customized irrigation by automatically adjusting a customer's landscape irrigation schedule and water use in response to changing conditions. State-of-the-art WBIC technology allows customers to tailor their irrigation schedule to meet a landscape's specific design, soil conditions and plant types, while also responding to local changing weather conditions.

For FY 2019 – 2020, 117 weather-based controller rebates were paid, with an estimated cost to MWD of $11,062 and estimated average acre-feet (AF) of water saved over a 10-year lifetime of 77 AF. Twenty-six of the weather-based controller rebates were obtained by customers in the Murrieta Service Area.

Turf Replacement

Starting in 2009, Western Municipal Water District offered its retail customers an opportunity to participate in a Turf Replacement Program. The Turf Replacement Program was designed to help customers offset the costs associated with converting turfgrass to a climate appropriate landscape.

The program took part in three phases, where from 2009 to 2014, the rebate offered ranged from $0.40-$1.00/square foot (sqft), and from 2014 to 2015, the rebate offered was $2.00/sqft. The rebate amount available in 2019 was $3.00/sqft.

To have qualified for the program, customers needed to be the property owner and in good standing with Western for at least twelve (12) months. Landscape that qualified for the conversion needed to have living turfgrass lawn before the removal.

To receive their incentive payment, all sites needed to be inspected and approved prior to the landscape conversion and after the conversion was complete. The program also did not apply retroactively.

The program provided guidelines for what would count as a climate appropriate landscape. At a minimum, thirty-five percent (35%-50%) of the site must be landscaped and/or mulched with at least a two (2) inch layer of organic or inorganic mulch. The remaining portion must be covered with permeable materials.

Participants were also provided with a list of pre-approved climate appropriate plants. Participants were required to convert irrigation systems to drip, microspray, and/or bubblers.

In addition, the rebate could only be used for documented material costs, such as those expenses for the purchase of plant materials, mulch, and irrigation components which are documented with detailed store receipts. All other expenses such as design services, labor, transportation, etc. were ineligible.

The Turf Replacement Program currently is offered at $2/sqft from MET and an additional $1/sqft from Western for FY 2019 – 2020. 30 turf rebates were paid out, $46,559 from Western and $93,946 from MET for a total of $140,505. Approximately 46,973 square feet of turf was removed.

12.5.1 Past Rebate Programs

Large Landscape Program

The Large Landscape Program, a direct installation program, was designed to utilize a Western contractor for direct installation of smart controllers and high efficiency nozzles at residential sites with irrigated landscapes greater than 1 acre.

This component was designed to target Western's highest residential water use customers through use of GIS mapping to identify parcels. Program staff was to compare parcel size with usage information to pinpoint the sites with the highest potential for savings.

The contractor was responsible for marketing the program to targeted customers, auditing the irrigated landscape, and installing the product. A follow-up site visit by the contractor or Western was to be conducted. The purpose of the site visit was to verify the installation, therefore ensuring that water savings are maximized, and customer issues reduced.

Smart Yard

In 2010, Western began implementing Smart Yard™, a community water conservation program designed to achieve more sustainable water use throughout Western's retail customer base.

Western's overall goals of the program was to reduce the water consumption of the Smart Yard™ participants and overall save more than one billion gallons of water over a 10-year period. To accomplish this, Western partnered with HydroPoint Data Systems, Inc., provider of the WeatherTRAK® Smart Water Management solution, to manage the innovative water conservation program.

The program provided homeowners with a landscape water audit and installation of a customized WeatherTRAK smart controller. Research in 23 agency studies found that this controller was proven to conserve water. Western rebated 50 percent of product and installation costs, ranging from $599 to $1,139 per home, depending on the smart controller model required for the landscape. Participating homeowners had to pay the balance with zero-interest financing from Western, which placed a fixed fee starting at $9.99 on their monthly water bills for 5 years. Western's Smart Yard program was designed to save customers significantly more money in water costs than they pay in the monthly fee.

The primary targets were residential homeowners with between 0.25 and 0.99 acre lots, high water use accounts, both commercial and residential, within the direct retail service area.

12.5.2 Commercial, Industrial, and Institutional Programs

Western offers a variety of programs to its Commercial, Industrial, and Institutional customers to help manage and reduce their demands. Many of these programs overlap with residential programs or provide the same or similar services.

Commercial, industrial, and institutional rebate programs include:

- Premium high-efficiency toilets
- Ultra-low and zero water urinals
- Plumbing flow control valves
- Weather-based irrigation controllers (WBICs)
- Rotating nozzles for pop-up spray heads
- Large rotary nozzles
- In-stem flow regulators
- Soil moisture sensor systems
- Turf replacement



12.5.3 Regional Programs

In addition to the programs offered specifically to individual customers, Western supports several regional programs.

Master Gardeners of Riverside County

Master Gardener volunteers are trained by the University of California Cooperative Extension to provide the gardeners of Riverside County with research-based information to promote environmentally responsible and sustainable horticultural practices. The Master Gardeners hold free monthly workshops fall through spring at Western.

Green Plumbers

Green Plumbers is an innovative, national training and accreditation program that assists plumbers in understanding their role in the environment and public health. The organization's goal is to train and deploy a green army of thousands of plumbers to promote the benefits of water conservation and the reduction of GHG emissions. The focus is on changing consumer and plumbing behavior through the use of energy efficient and water saving technologies.

Qualified Water Efficient Landscaper Program - QWEL

The Qualified Water Efficient Landscaper Program (QWEL) trains landscapers in water-wise landscape practices. QWEL provides approximately 20 hours of education focused on water efficient principles including irrigation system and landscape design with proper plat selection for the region's climate. Details are available at **https://www.qwel.net/**.

12.5.4 Large Landscape Conservation Programs and Incentives

In the fall of 2011, Western adopted a budget-based water rate structure which includes a component for outdoor water use based on landscaped area and parameters established in the State Landscape Model Ordinance.

In 2009, Western, in partnership with the Riverside County Water Task Force, developed the Riverside County Landscape Water Use Efficiency Ordinance. As of January 2010, this ordinance had been adopted by the County of Riverside and the Cities of Corona, Canyon Lake, Lake Elsinore, Menifee, Moreno Valley, Murrieta, Perris, Riverside, and Temecula. This ordinance was updated in 2015 and Western will continue to encourage its adoption. The ordinance:

- Establishes a structure for planning, designing, installing, maintaining, and managing water-efficient landscapes in new construction and rehabilitated projects;
- Requires that landscapes not exceed a maximum water demand of fifty percent of its reference evapotranspiration (ETo) or any lower percentage as may be required by water purveyor policy or state legislation;
- Requires setting a Maximum Applied Water Allowance for new construction and existing landscapes, based on reference evapotranspiration.
- The water-efficient landscape requirements contained in this Ordinance shall be applicable to all rehabilitated landscapes associated with residential uses (including single family and multi-family units/projects) with a total landscape area equal to or greater than 2,500 square feet which require a discretionary permit and/or approval; all new landscapes associated with residential uses (including single family and multi-family projects) which require a discretionary permit and/or approval; and all new and rehabilitated landscapes associated with commercial or industrial uses which require a discretionary permit and/or approval.

Dedicated irrigation meters have had water budgets since October 2011 and have been charged using an allocation-based water pricing structure since implementation. Western continues to:

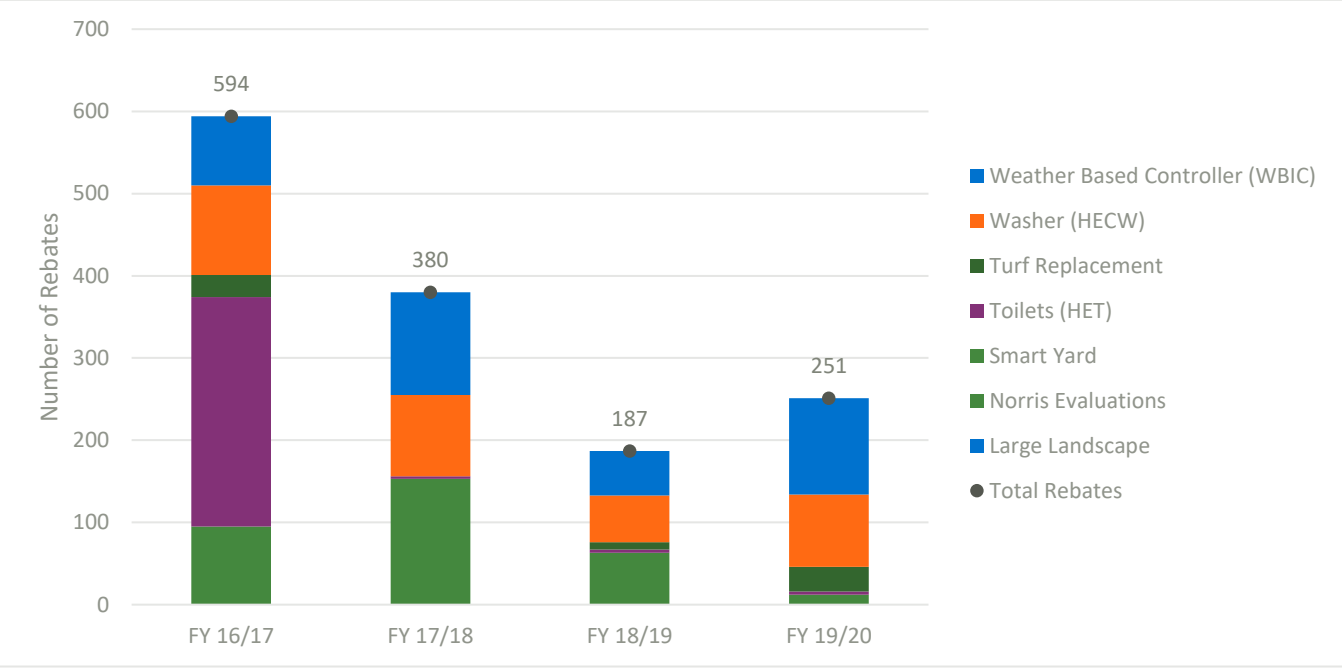
- Target non-dedicated irrigation meter accounts;
- Establish water budgets for those accounts with dedicated irrigation meters;
- Establish an allocation-based conservation water pricing structure.

12.6 Implementation over the Past Five Years

To date, there have been over 7,363 rebates paid to Western's retail customers and over $3.4 million invested in rebates.

In FY 2019/2020, Western achieved water savings of approximately 33 AFY from rebate programs. Western estimates that this equates to a lifetime savings of 249 AF, bringing the cumulative lifetime water savings total to 9,091 AF for all water efficiency rebate activities Western has implemented since 2009 (Western Municipal Water District, 2020). The number of rebate programs utilized in the past five years is summarized in **Figure 12-1**.

Figure 12-1. Past Rebate Information



12.7 Implementation to Achieve Water Use Targets

For decades, Western has valued and promoted conservation and will continue to do so. As a result, Western's customers continue to decrease their water use. Western will continue to pave the way for regional conservation and continue to implement existing conservation programs and explore additional programs to avoid substantial increases in demands.

12.8 Water Use Objectives (Future Requirements)

Western will continue to help its customers become water efficient and reduce their gallons per capita per day (gpcd) consumption. Western will evaluate additional measures if needed once future water use efficiency standards are established.

13 WESTERN MUNICIPAL WATER DISTRICT Retail Water Shortage Contingency Plan

The WSCP is a strategic plan that Western uses to prepare for and respond to foreseeable and unforeseeable water shortages. This chapter provides an overview of the portions of Western's Water Shortage Contingency Plan that are applicable to Western Retail. The standalone Water Shortage Contingency Plan is included in Appendix A.

The California Water Code Section 10632 requires that every urban water supplier that serves more than 3,000 acre-feet per year or has more than 3,000 connections to prepare and adopt a standalone Water Shortage Contingency Plan (WSCP) as part of its UWMP. Western Wholesale and Western Retail are subject to the WSCP requirements and a single WSCP has been developed to meet the requirements for both systems.

IN THIS SECTION

- WSCP Outline
- Retail WSCP Requirements Overview

This chapter provides an overview of the portions of the WSCP that are applicable to Western Retail. Chapter 10 provides an overview of the portions of the WSCP that are applicable to Western Wholesale. Western's WSCP is included as **Appendix A** and will be separately submitted to DWR by July 1, 2021. The WSCP is developed separately from Western's 2020 UWMP and can be amended, as needed, without amending the UWMP.

The WSCP is a strategic plan that Western uses to prepare for and respond to foreseeable and unforeseeable water shortages. A water shortage occurs when water supply available is insufficient to meet the normally expected customer water use at a given point in time. A shortage may occur due to a number of reasons, such as water supply quality changes, climate change, drought, regional power outage, and catastrophic events (e.g., earthquake). Additionally, the State may declare a statewide drought emergency and mandate that water suppliers reduce demands, as occurred in 2014. The WSCP serves as the operating manual that Western will use to prevent catastrophic service disruptions through proactive, rather than reactive, mitigation of water shortages.

The Western WSCP provides a process for an annual water supply and demand assessment for the retail system and structured steps designed to respond to actual conditions. This level of detailed planning and preparation provide accountability and predictability and will help Western maintain reliable supplies and reduce the impacts of any supply shortages and/or interruptions.

The WSCP must be updated based on new requirements every five years and will be adopted as a current update for submission to the California Department of Water Resources by July 1, 2021.

13.1 Water Shortage Contingency Plan Outline

Western's WSCP is organized into six sections:

Section 1 - Overview of the WCSP

Section 2 - Western Wholesale Water Shortage Contingency Plan

Section 3 - Western Retail Water Shortage Contingency Plan

Section 4 - Emergency Response, Seismic Risk Assessment and Mitigation

Section 5 - WSCP Refinement Procedures

Section 6 - Plan Adoption, Submittal and Availability

All sections are applicable to Western Retail except Section 2, which is applicable to Western Wholesale only.

13.2 Overview of the Retail Requirements of the WSCP

The Water Code establishes several prescriptive elements which must be included in a retail water supplier's WSCP. Each element and its location within the WSCP is described below.

Water Supply Reliability Analysis: Summarizes Western Retail's water supply reliability and identifies any key issues that may trigger a shortage condition. This requirement is addressed in Section 3 of the WSCP.

Annual Water Supply and Demand Assessment Procedures: Describes the key data inputs, evaluation criteria, and methodology for assessing the Western Retail system's reliability for the coming year and the steps to formally declare any water shortage levels and response actions. This requirement is addressed in Section 3 of the WSCP.

Shortage Stages: Establishes water shortage levels to clearly identify and prepare for shortages. This requirement is addressed in Section 3 of the WSCP.

Shortage Response Actions: Describes the response actions that may be implemented or considered for each stage to reduce gaps between supply and demand. This requirement is addressed in Section 3 of the WSCP.

Communication Protocols: Describes communication protocols under each stage to ensure customers, the public, and government agencies are informed of shortage conditions and requirements. This requirement is addressed in Section 3 of the WSCP.

Compliance and Enforcement: Defines compliance and enforcement actions available to administer demand reductions. This requirement is addressed in Section 3 of the WSCP.

Legal Authority: Lists the legal documents that grant Western the authority to declare a water shortage and implement and enforce response actions. This requirement is addressed in Section 3 of the WSCP.

Financial Consequences of WSCP Implementation: Describes the anticipated financial impact of implementing water shortage stages and identifies mitigation strategies to offset financial burdens. This requirement is addressed in Section 3 of the WSCP.

Monitoring and Reporting: Summarizes the monitoring and reporting techniques to evaluate the effectiveness of shortage response actions and overall WSCP implementation. Results are used to determine if additional shortage response actions should be activated or if efforts are successful and response actions should be reduced. This requirement is addressed in Section 3 of the WSCP.

WSCP Refinement Procedures: Describes the factors that may trigger updates to the WSCP and outlines how to complete an update. This requirement is addressed in Section 5 of the WSCP.

Plan Adoption, Submittal, and Availability: Describes the process for the WSCP adoption, submittal, and availability after each revision. This requirement is addressed in Section 6 of the WSCP.

Part 4

Supporting Information

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Appendix A Water Shortage Contingency Plan

WESTERN MUNICIPAL WATER DISTRICT

Water Shortage Contingency Plan

JUNE 2021

WESTERN MUNICIPAL WATER DISTRICT



WSC

WESTERN MUNICIPAL WATER DISTRICT

Water Shortage Contingency Plan

JUNE 16, 2021

Prepared by Water Systems Consulting, Inc.

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ACRONYMS & ABBREVIATIONS

°F	Degrees Fahrenheit
AF	Acre Foot
AFY	Acre Feet per Year
AWWA	American Water Works Association
BMP	Best Management Practice
CALWARN	California Water/Wastewater Agency Response Network
CAT	Climate Action Team
CCF	Hundred Cubic Feet
CCR	California Code of Regulations
CFS	Cubic Feet per Second
CII	Commercial, Industrial, and Institutional
CIMIS	California Irrigation Management Irrigation System
CUWCC	California Urban Water Conservation Council
DCR	DWR SWP Delivery Capacity Report
DDW	SWRCB Division of Drinking Water
DFW	California Department of Fish and Wildlife
DMM	Demand Management Measure
DWR	California Department of Water Resources
EPA	United States Environmental Protection Agency
ET	Evapotranspiration
ETo	Reference Evapotranspiration
GIS	Geographic Information System
GPCD	Gallons per Capita per Day
GPM	Gallons per Minute
LAFCO	Local Agency Formation Commission
MCL	Maximum Contaminant Level
MG	Million Gallons
MGD	Million Gallons per Day
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System

RWQCB	Regional Water Quality Control Board
SBX7-7	Senate Bill 7 of Special Extended Session 7
SWRCB	State Water Resources Control Board
UWMP	Urban Water Management Plan
UWMP Act	Urban Water Management Planning Act
WSCP	Water Shortage Contingency Plan
WFF	Water Filtration Facility
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

WESTERN MUNICIPAL WATER DISTRICT

Water Shortage Contingency Plan

The Water Shortage Contingency Plan (WSCP) is a strategic plan that Western Municipal Water District (Western) uses to prepare for and respond to foreseeable and unforeseeable water shortages. A water shortage occurs when water supply available is insufficient to meet the normally expected customer water use at a given point in time. A shortage may occur due to a number of reasons, such as water supply quality changes, climate change, drought, regional power outage, and catastrophic events (e.g., earthquake).

Additionally, the State may declare a statewide drought emergency and mandate that water suppliers reduce demands, as occurred in 2014. The WSCP serves as the operating manual that Western will use to prevent catastrophic service disruptions through proactive, rather than reactive, mitigation of water shortages. The Western WSCP provides a process for an annual water supply and demand assessment and structured steps designed to respond to actual conditions. This level of detailed planning and preparation provide accountability and predictability and will help Western maintain reliable supplies and reduce the impacts of any supply shortages and/or interruptions.

This WSCP was prepared in conjunction with Western's 2020 Urban Water Management Plan (UWMP) and is a standalone document that can be modified as needed. This document is compliant with the California Water Code (CWC) Section 10632 and incorporates guidance from the State of California Department of Water Resources (DWR) UWMP Guidebook 2020 (California Department of Water Resources, 2021). This WSCP is required to be updated based on new requirements every five years and will be adopted as a current update for submission to the California Department of Water Resources by July 1, 2021.

IN THIS SECTION

- Overview of the WSCP
- Western Wholesale WSCP
- Western Retail WSCP

1.1 Overview of the WSCP

Western serves water to both wholesale and retail customers and this WSCP addresses Western's response to shortages in both its wholesale and retail systems, in separate sections. Some elements of the WSCP do not apply to the wholesale system and are noted below.

The WSCP describes the following:

Water Supply Reliability Analysis

Summarizes Western's water supply analysis and reliability and identifies any key issues that may trigger a shortage condition.

Annual Water Supply and Demand Assessment Procedures

Describes the key data inputs, evaluation criteria, and methodology for assessing the system's reliability for the coming year and the steps to formally declare any water shortage levels and response actions.

Shortage Stages

Establishes water shortage levels to clearly identify and prepare for shortages.

Shortage Response Actions

Describes the response actions that may be implemented or considered for each stage to reduce gaps between supply and demand.

Communication Protocols

Describes communication protocols under each stage to ensure customers, the public, and government agencies are informed of shortage conditions and requirements.

Compliance and Enforcement

Defines compliance and enforcement actions available to administer demand reductions.

Legal Authority

Lists the legal documents that grant Western the authority to declare a water shortage and implement and enforce response actions.

Financial Consequences of WSCP Implementation

Describes the anticipated financial impact of implementing water shortage stages and identifies mitigation strategies to offset financial burdens.

Monitoring and Reporting

Summarizes the monitoring and reporting techniques to evaluate the effectiveness of shortage response actions and overall WSCP implementation. Results are used to determine if additional shortage response actions should be activated or if efforts are successful and response actions should be reduced.

WSCP Refinement Procedures

Describes the factors that may trigger updates to the WSCP and outlines how to complete an update.

Special Water Features Distinctions

Identifies exemptions for decorative features aside from pools and spas.

Plan Adoption, Submittal, and Availability

Describes the process for the WSCP adoption, submittal, and availability after each revision.

1.2 Western Wholesale Water Shortage Contingency Plan

This section of the WSCP describes how Western will respond to a wholesale water shortage.

As a member agency of Metropolitan Water District (Metropolitan), Western provides wholesale imported water to various retail agencies in the region. Western has also secured local groundwater supplies to supplement imported supplies, which provides additional reliability and flexibility in the event of a water shortage.

Not all retail agencies within Western's service area purchase wholesale water from Western; as such, the Wholesale WSCP only applies to Western's wholesale customers, which currently include:

- Box Springs Mutual Water Company
- City of Corona
- City of Norco
- Eagle Valley Mutual Water Company
- Elsinore Valley Municipal Water District
- Temescal Valley Water District
- Rancho California Water District
- Western Retail

Additional information on Western's wholesale customers can be found in Western's 2020 UWMP.

1.2.1 Background

Metropolitan Reliability Planning and Water Supply Allocation Plan

The majority of Western's wholesale supplies are imported via Metropolitan and are subject to availability of Metropolitan supplies. Metropolitan, in coordination with its member agencies, has conducted extensive reliability planning, including the 1996 Integrated Water Resources Plan (IRP) and its three updates in 2004, 2010, and 2015; the 2020 IRP currently in development; the Water Surplus and Drought Management (WSDM) Plan; and the Water Supply Allocation Plan (WSAP).

- The IRP is Metropolitan's evolving long-term plan to secure adequate water supplies for Southern California.
- The WSDM Plan provides policy guidance for managing regional water supplies during surplus and shortage conditions. Similar in concept to the WSCP, the WSDM Plan provides an overall vision for operational supply management and characterizes a flexible sequence of actions to minimize the probability of severe shortages and reduce the likelihood of extreme shortages.
- The WSAP is Metropolitan's policy and formula for equitably allocating available water supplies to member agencies during extreme water shortages when Metropolitan determines it is unable to meet all its demands. Metropolitan's WSAP identifies 10 levels of shortage designed to reduce demands by up to 50%. The WSAP does not prescribe demand reduction or limit the available supply but incentivizes reductions through higher fees for use over the allocation amount.

Additional reliability planning efforts by Metropolitan include its Emergency Storage Objective and its Seismic Risk Assessment and Mitigation Plan. More information on all planning efforts listed above can be found in Metropolitan's' 2020 UWMP and WSCP.

Metropolitan's WSCP acknowledges that WSAP allocation is a costly shortage response action that places acute burdens upon member agencies and the public. Other shortage response actions are generally preferred to the extent practicable. Metropolitan's overall strategy considers WSAP allocations to be a fallback option to address any remaining shortages when supply augmentation actions and other demand management measures are insufficient to meet demand reduction objectives. Metropolitan's WSAP in included as Attachment 1.

Western has aligned its water shortage policies with Metropolitan's with respect to imported water supplies.

Western Drought Allocation Plan

Western has adopted a Drought Allocation Plan (DAP) that passes through Metropolitan's WSAP actions for imported water shortages to Western wholesale customers. The DAP was prepared by Western in conjunction with its retail agencies and mirrors the 10 stages of Metropolitan's WSAP. The DAP establishes a means to allocate limited imported water supplies among Western's imported water agencies if Metropolitan implements various stages of its WSAP. Initially developed in 2008, the DAP was updated in 2015 to reflect changes from Metropolitan and the potential impacts of future droughts. The allocation methodology in the DAP was updated for consistency with Metropolitan's WSAP and agreed upon by Western's wholesale customers. A copy of Western's DAP is included as Attachment 1.

The DAP establishes water allocations based on several variables including base period demand, conservation, growth, regional shortage, availability of local supplies, retail water agency dependence on imported supplies, and conservation demand hardening. The allocation method was designed to be equitable on the wholesale level, while helping to minimize hardships experienced by retail agencies and the customers they serve throughout the region.

As with Metropolitan's WSAP, the DAP does not prescribe how Western's wholesale customers reduce demands during shortage, rather the DAP incentivizes conservation through fees for excessive use. Metropolitan charges penalties for use above an allocation established by implementing one of the 10 stages of its WSAP. At the end of the 12-month allocation year, any allocation surcharges or penalties incurred through excessive use of Metropolitan supplies will be passed along to Western's wholesale customers, prorated to reflect each agency's contribution towards penalty and fee accrual.

Metropolitan's WSAP was incorporated into its WSCP but was not modified as part of Metropolitan's WSCP development. Similarly, Western's DAP is incorporated into this Wholesale WSCP, but has not been changed since it was last updated and adopted in 2015. A copy of Metropolitan's WSAP is included as Attachment 2.

1.2.2 Wholesale Water Supply Reliability Analysis

Understanding water supply reliability, factors that could contribute to water supply constraints, availability of alternative supplies, and what effect these have on meeting customer demands provides Western with a solid basis on which to develop appropriate and feasible response actions in the event of a water shortage. In the 2020 UWMP, Western conducted a Water Reliability Assessment to compare the total water supply sources available to long-term projected water use over the next 25 years, in five-year increments, for a normal water year, a single dry water year, and a drought lasting five consecutive water years. Western also conducted a Drought Risk Assessment to evaluate a drought period that lasts five consecutive water years starting from the year following when the assessment is conducted.

The primary constraint on the available of water supplies has been in extreme drought conditions. As described in Metropolitan's 2020 UWMP, Metropolitan has made substantial investments to increase imported water supply reliability during periods of extended drought. As a result, Metropolitan's 2020 UWMP projects the ability to meet all imported water demands under normal, single dry year, and multiple dry year conditions, with excess supplies.

Through implementation of the Arlington GSP, Western expects its local wholesales supply from the Riverside-Arlington groundwater basin water to be stable and does not anticipate any reduction to supplies in dry years.

An analysis of both assessments determined that Western is reliable and anticipates that sufficient local and imported supplies will be available to meet demands, even in dry years, based on Metropolitan's 2020 UWMP.

1.2.3 Wholesale Annual Water Supply and Demand Assessment

As an urban water supplier, Western must prepare and submit an Annual Water Supply and Demand Assessment for its wholesale system (Wholesale Annual Assessment). The Wholesale Annual Assessment is an evaluation of the near-term outlook for supplies and demands to determine whether the potential for a supply shortage exists and whether there is a need to trigger a WSCP shortage stage and response actions in the current calendar year to maintain supply reliability. This process will take place at the same time each year based on known circumstances and information available to Western at the time of analysis and can be updated or revised at any time if circumstances change. Starting in 2022, the Wholesale Annual Assessment will be due by July 1 of every year, as indicated by CWC Section 10632.1.

As a member agency of Metropolitan, Western's protocols for evaluating water supply and demands and implementing shortage restrictions are integrated with Metropolitan's.

Western will establish and convene a WSCP Team to conduct the Wholesale Annual Assessment each year. The WSCP Team may include the following Western staff:

- Director of Water Resources
- Deputy Director of Water Resources
- Director of Finance
- Director of Strategic Communications
- Water Resources Specialist
- Operations Manager

Western's Wholesale Annual Assessment procedure, including key data inputs, evaluation criteria and responsible staff is summarized in Table 1.

Table 1. Wholesale Annual Assessment Timeline

TIMING	ASSESSMENT ACTIVITIES	PROCEDURE, KEY DATA INPUTS, EVALUATION CRITERIA AND OTHER CONSIDERATIONS	WESTERN STAFF RESPONSIBLE
MARCH	Estimate unconstrained demands for coming year	Each year in July, Metropolitan requests "Member Agency Demand Estimate Surveys" from each of their member agencies as part of their annual budgeting process. Western wholesale customers submit a 5-year demand estimate, subtotaled by imported water source (potable or non-potable) and by delivery point (for the following 12-months only). Western will use the estimates provided the previous July. For other Western wholesale supplies, Western coordinates with wholesale customers each year at budget time (March) to establish demands for the following year.	Water Resources Specialist Director of Water Resources
MARCH	Estimate available supplies for the year, considering the following year will be dry	Western anticipates that sufficient imported supplies will be available to meet demands, even in dry years, based on Metropolitan's 2020 UWMP. If Metropolitan has declared a WSAP stage (typically done in spring of a given year if needed), water use above the WSAP allocation will be charged a penalty rate. The Arlington Basin Groundwater Sustainability Plan (GSP) framework will be used to estimate available supplies from the Arlington Desalter.	Director of Water Resources
MARCH	Consider potential infrastructure constraints that may impact supply delivery	Identify any known Metropolitan or Western infrastructure issues that may pertain to near-term water supply reliability, including repairs, construction, and environmental mitigation measures that may temporarily constrain capabilities, as well as any new projects that may add to system capacity. Identify any facilities out of service due to water quality problems, equipment failure, etc. that may impact normal water deliveries.	Operations Manager
APRIL	Convene WSCP Team to conduct Wholesale Annual Assessment	Compare supplies and demands and discuss any infrastructure constraints that may impact supply delivery. If the potential for a shortage exists or if Metropolitan has enacted a WSAP stage, determine which Western shortage response stage and actions are recommended to reduce/eliminate the shortage or to pass through the Metropolitan WSAP.	WSCP Team

TIMING	ASSESSMENT ACTIVITIES	PROCEDURE, KEY DATA INPUTS, EVALUATION CRITERIA AND OTHER CONSIDERATIONS	WESTERN STAFF RESPONSIBLE
MAY	Engineering, Operations and Water Resources (EOWR) Committee Update	If a shortage stage and response actions are recommended by the WSCP Team, or if Metropolitan has enacted a WSAP stage, provide an update to the EOWR Committee with the findings of the Wholesale Annual Assessment and planned actions. Western's DAP gives the General Manager the authority to implement the DAP in response to Metropolitan implementing its WSAP without further Board action.	Director of Water Resources
JUNE	Western Board of Directors Update	If a shortage stage and response actions are recommended by the WSCP Team, or if Metropolitan has enacted a WSAP stage, provide an update to the Board of Directors with the findings of the Wholesale Annual Assessment and planned actions. Western's DAP gives the General Manager the authority to implement the DAP in response to Metropolitan implementing its WSAP without further Board action.	Director of Water Resources
ON-GOING	Implement WSCP actions, if needed	Relevant members of Western staff will implement shortage response actions if needed.	WSCP Team
PRIOR TO JULY 1	Submit Wholesale Annual Assessment	Send Final Wholesale Annual Assessment to DWR.	Water Resources Specialist

1.2.4 Wholesale Water Shortage Levels and Response Actions

With the exception of a catastrophic failure of the Mills Gravity Line or other infrastructure failure of similar magnitude, Western does not foresee implementing water shortage levels except under Metropolitan's direction and according to Metropolitan's WSAP. If a potential water supply shortage is identified in the Wholesale Annual Assessment, this section provides information on the wholesale water shortage levels and response actions that Western may implement. It is important to note that Western's system is complex and the ultimate actions taken by Western will depend on the unique issues of each particular condition and the opportunities available during a particular shortage condition.

Western has aligned its Wholesale WSCP shortage levels with the six standard water shortage levels outlined in the Water Code. Shortage levels indicate the gap in supply compared to normal year availability. The six standard water shortage levels correspond to progressively increasing estimated shortage conditions (up to 10-, 20-, 30-, 40-, 50-percent, and greater than 50-percent shortage compared to the normal reliability condition) and align with the response actions that Western would implement to meet the severity of the impending shortages.

Western will evaluate the water shortage conditions on a case-by-case basis and determine which response actions are appropriate to maintain water supply reliability or mitigate potential impacts. In collaboration with its wholesale customers, Western's response to potential shortages may include increased public outreach throughout the region, exploration of additional supply sources, changes to typical operations, and promoting voluntary actions to reduce demands. If Metropolitan implements its WSAP, Western will implement its DAP to align with Metropolitan. Western's six water Shortage Levels and corresponding response actions that could be implemented by Western are summarized in Table 2. The following subsections describe Western's potential response actions in more detail.

Western may also implement additional actions not listed in Table 2. Western may implement a combination of the actions specified below, as appropriate, but not necessarily all six actions for each level. Selected actions will depend on the nature of water shortage conditions at a given time.

Table 2. Wholesale Water Shortage Levels and Potential Response Actions

WHOLESALE WATER SHORTAGE LEVELS[1]	ONGOING WATER USE EFFICIENCY	PUBLIC OUTREACH	SUPPLY AUGMENTATION	OPERATIONAL CHANGES	VOLUNTARY DEMAND REDUCTIONS	IMPLEMENT DROUGHT ALLOCATION PLAN[2]
Normal Conditions	✓	✓				
Level 1 (Up to 10%)	✓	✓	✓	✓	✓	✓
Level 2 (Up to 20%)	✓	✓	✓	✓	✓	✓
Level 3 (Up to 30%)	✓	✓	✓	✓	✓	✓
Level 4 (Up to 40%)	✓	✓	✓	✓	✓	✓
Level 5 (Up to 50%)	✓	✓	✓	✓	✓	✓
Level 6 (Above 50%)	✓	✓	✓	✓	✓	✓

[1]Percentages represent supply shortage compared to normal conditions.

[2]Western DAP is only triggered in response to Metropolitan WSAP allocations

Ongoing Water Use Efficiency

Western has been a leader in water use efficiency for many years and actively collaborates with local and regional agencies and the communities it serves to implement innovative programs and drive change. As described in Western's 2020 UWMP, Western implements a variety of wholesale demand management measures (DMMs) on a routine basis intended to promote water use efficiency and partner with its wholesale customers to support sustainable management of regional water supplies.

Communication Plan

During a water shortage condition, including short term supply constraints caused by infrastructure impacts, Western collaborates with its wholesale customers to provide enhanced and coordinated public outreach to communicate current conditions, potential impacts to water service and actions that are being taken by Western and its wholesale customers, and actions the public is being asked to take to help reduce water use during the shortage.

Supply Augmentation

In the event of a shortage in normally available supplies, Western may be able to augment supplies through other local groundwater sources and storage programs, if available at the time of the shortage. Such augmentation actions would be short-term and do not overlap with the normal supplies.

Operational Changes

During shortage conditions, operations may be affected by supply augmentation or demand reduction responses. Western will consider its operational procedures at the time of a shortage to identify changes that can be implemented to address water shortage on a short-term basis. In addition, Western and its neighboring agencies have mutual aid agreements and assist each other, if possible, in emergency situations.

Voluntary Demand Reductions

If Metropolitan implements a WSAP allocation, Western will implement its DAP to align. The WSAP and DAP does not require Western's wholesale customers reduce demands during shortage, rather they incentivize demand reduction through fees for excessive use. Metropolitan charges penalties for use above an allocation established by implementing one of the 10 stages of its WSAP and Western passes any penalties charged through to the respective wholesale customers that contributed to accruing the penalties. Demand reductions are voluntary and supplies beyond the allocation can still be purchased at higher penalty rates.

Additional Mandatory Restrictions

Western does not impose mandatory restrictions on its wholesale customers.

Shortage Response Action Effectiveness

Western is committed to working with its wholesale customers to mitigate the impacts of potential supply shortages. Western expects to address any supply shortages through a combination of public outreach, supply augmentation, operational changes, voluntary demand reductions, and implementation of the DAP. The range of potential supply shortage reductions that could be achieved from each response action is summarized in Table 3.

Table 3. Potential Supply Shortage Reduction for Response Actions

RESPONSE ACTION	POTENTIAL SUPPLY SHORTAGE REDUCTION	DESCRIPTION
Ongoing Water Use Efficiency	N/A	Western supports the water use efficiency programs of its wholesale customers but does not directly track resulting water savings from wholesale customers.
Public Outreach	Supports effectiveness of other actions	Anticipated shortages will involve an appropriately sized outreach campaign to address the targeted demand reduction, which depends on the combined effectiveness of other shortage response actions.
Supply Augmentation	0-100%	Supply augmentation actions consisting of stored water and as-needed flexible supplies are expected to address between 0 to 100 percent of anticipated shortages for any shortage level, depending on availability of those supplies; in lesser WSCP shortage levels, it is more likely that shortages can be completely addressed through supply augmentation.
Voluntary Demand Reductions	0-100 %	Efficacy of demand reduction efforts is difficult to estimate or predict and water savings are a function of the extent to which public information campaigns reach water users and the degree of consumer response to those messages, as well as the response of Western wholesale customers and their ability to utilize other supplies.
Implement Drought Allocation Plan	0-50%	Metropolitan's WSAP is designed to reduce demands by up to approximately 50 percent of the WSAP's calculated base demand.

1.2.5 Communication Protocols

Western routinely communicates with local water agencies through quarterly general manager meetings. General managers of all the local water agencies meet and discuss regional and agency specific issues, which may include impacts or changes to wholesale supplies and demands.

In the event of water supply shortage, Western will use this forum for ongoing communication about supply shortages and response actions. The region's general managers can also utilize these meetings to help coordinate consistent regional messaging in times of drought.

1.2.6 Legal Authorities

Western obtains legal authority to implement its DAP though Ordinance 385, which was approved and adopted on May 20, 2015, by Western's Board after a public hearing. A copy of Ordinance 385 is included as Attachment 3.

Western shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code.

1.2.7 Financial Consequences of WSCP

As mentioned above, in times of extreme shortage, Metropolitan may elect to implement its WSAP and Western will implement its DAP in response. The WSAP reduces allocations to Metropolitan's member agencies, including Western. If Western's wholesale agencies consume more water than their allocation, Metropolitan charges Western penalties based on the percentage of use over the allocation amount. Western will pass along any penalties or surcharges incurred to Western's wholesale customers, prorated to reflect each agency's contribution towards penalty and fee accrual.

In the event of a wholesale water shortage, Western anticipates that revenues will decrease as wholesale customers shift to using other supplies, whether in response to short term outages or the WSAP/DAP penalty pricing, if implemented.

1.3 Western Retail Water Shortage Contingency Plan

Western Retail refers to customers that directly purchase and use water from Western, such as single-family residences or commercial businesses. Western provides water to nearly 25,000 connections within the retail service area, including the Riverside Retail Service Area, Murrieta Retail Service Area, and Rainbow Retail Service Area. These three service areas are collectively referred to as Western Retail and cover a total of 104 square miles and serve water to an estimated population of nearly 100,000.

The Riverside Service Area includes a portion of the City of Riverside and unincorporated areas of Riverside County, including the communities of El Sobrante, Eagle Valley, Temescal Creek, Woodcrest, Lake Matthews and March Air Reserve Base. In 2005, Western took ownership of the Murrieta County Water District as a separate retail service area, now called the Murrieta Service Area. The entire area lies within the city of Murrieta. Western also serves a very small area, called the Rainbow Service Area, in an area just south of the City of Temecula in the unincorporated portion of Riverside County.

Western Retail currently obtains approximately 60% of its supply from Metropolitan and 40% of its supply from local groundwater sources. Note that Western treats its retail system as a wholesale customer as it relates to imported water supplies and demands.

1.3.1 Retail Water Supply Reliability Analysis

Understanding water supply reliability, factors that could contribute to water supply constraints, availability of alternative supply sources, and the effect these have on Western's ability to meet customer demands provide Western with a solid understanding used to develop appropriate and feasible response actions in the event of a water shortage. In the 2020 UWMP, Western conducted a Water Reliability Assessment to compare the total water supply sources available to long-term projected water use over the next 25 years, in five-year increments, for a normal water year, a single dry water year, and a drought lasting five consecutive water years. Western also conducted a Drought Risk Assessment to evaluate a drought period that lasts five consecutive water years starting in 2021. An analysis of both assessments determined that Western is reliable and anticipates meeting retail demands through local and imported water sources.

As described in Section 1.2.2, Western Wholesale expects to have sufficient supplies available to meet the demands of Western Retail and its other wholesale customers, even in dry years, based on Metropolitan's 2020 UWMP.

Western Retail also obtains groundwater supplies from several local groundwater basins. Each of the groundwater sources are adjudicated and closely managed by Watermasters and/or Groundwater Sustainability Agencies. Western plays a key role in the management of the groundwater basins it relies on to meet retail demands and participates in ongoing water conservation measures and regional recharge projects to enhance and protect the reliability of local groundwater.

Western Retail's recycled water supply is not expected to be affected by climatic factors because source wastewater flows coming from indoor use are generally not impacted by temperature and precipitation

Western Retail is reliable and anticipates that sufficient local and imported supplies will be available to meet demands, even in dry years.

1.3.2 Retail Annual Water Supply and Demand Assessment

As an urban water supplier, Western must prepare and submit an Annual Water Supply and Demand Assessment for its retail system (Retail Annual Assessment). The Retail Annual Assessment is an evaluation of the near-term outlook for supplies and demands to determine whether the potential for a supply shortage exists and whether there is a need to trigger a WSCP shortage level and response actions in the current calendar year to maintain supply reliability. Starting in 2022, the Retail Annual Assessment will be due by July 1 of every year, as indicated by CWC Section 10632.1. Western's Retail Annual Assessment procedure, including key data inputs, evaluation criteria and responsible staff is summarized in Table 4.

Western will establish and convene a WSCP Team to conduct the Retail Annual Assessment each year. The WSCP Team may include the following Western staff:

- Director of Water Resources
- Deputy Director of Water Resources
- Director of Finance
- Director of Strategic Communications
- Water Resources Specialist
- Operations Manager

Table 4. Retail Annual Assessment Procedure

TIMING	ASSESSMENT ACTIVITIES	PROCEDURE, KEY DATA INPUTS, EVALUATION CRITERIA AND OTHER CONSIDERATIONS	WESTERN STAFF RESPONSIBLE
MARCH	Estimate unconstrained demands for coming year	Western has several potential approaches to estimate demand for the coming year, including a demand climate model that uses a time series regression analysis, estimates developed by the Finance Department based on historical use, and a California Data Collaborative (CaDC) tool. Western tracks demand estimates from multiple approaches compared to actual demand to refine its estimates over time.	Water Resources Specialist Finance Manager
MARCH	Estimate available supplies for the year, considering the following year will be dry	Western anticipates that sufficient imported supplies will be available to meet demands, even in dry years, based on Metropolitan's 2020 UWMP. If Metropolitan declares a WSAP stage (typically done in spring of a given year if needed), normal quantities of water will still be available, but will be charged at penalty rate above the allocation. Western's local supplies are from groundwater basins that are sustainably managed to provide long term supply reliability and are not anticipated to be impacted in dry years. In the unlikely event that local supplies are reduced, Western will coordinate with the groundwater management groups in the respective basins to identify any supply reductions. Western plays an active role in these groups to help ensure long term water supply reliability for Western Retail customers.	Director of Water Resources
MARCH	Consider potential infrastructure constraints that may impact supply delivery	Identify any known Metropolitan or Western infrastructure issues that may pertain to near-term water supply reliability, including repairs, construction, and environmental mitigation measures that may temporarily constrain capabilities, as well as any new projects that may add to system capacity. Identify any facilities out of service due to water quality problems, equipment failure, etc. that may impact normal water deliveries.	Operations Manager
APRIL	Convene WSCP Team to conduct Retail Annual Assessment	Compare supplies and demands and discuss any infrastructure constraints that may impact supply delivery. If the potential for a shortage exists or if Metropolitan has enacted a WSAP stage, determine which Western shortage response level and actions are recommended to reduce/eliminate the shortage or to reduce demands on Metropolitan. Additionally, if the State declares a drought state of emergency and requires demand reductions, the WSCP Team will determine which water shortage level and response actions are needed to comply with the State mandate.	WSCP Team
MAY	Engineering, Operations and Water Resources (EOWR) Committee	If the potential for a shortage exists, if Metropolitan has enacted a WSAP stage or if the State has mandated demand reductions, the results of the Retail Annual Assessment will be presented to EOWR Committee, including the recommended shortage level and response actions.	Director of Water Resources

TIMING	ASSESSMENT ACTIVITIES	PROCEDURE, KEY DATA INPUTS, EVALUATION CRITERIA AND OTHER CONSIDERATIONS	WESTERN STAFF RESPONSIBLE
JUNE	Western Board of Directors	If the potential for a shortage exists, if Metropolitan has enacted a WSAP stage or the State has mandated demand reductions, the results of the Retail Annual Assessment will be presented to the Western Board of Directors, including the recommended shortage level and response actions. The Board of Directors may order the implementation of a shortage level and will adopt a resolution declaring the applicable water shortage level.	Director of Water Resources Western Board of Directors
ON-GOING	Implement WSCP actions, if needed	Relevant members of Western staff will implement shortage response actions associated with the declared water shortage level.	WSCP Team
PRIOR TO JULY 1	Submit Retail Annual Assessment	Send Final Retail Annual Assessment to DWR.	Water Resources Specialist

1.3.3 Retail Water Shortage Levels

With the exception of a catastrophic failure of the Mills Gravity Line or other infrastructure failure of similar magnitude, Western does not foresee imposing a retail water shortage level except under the State's direction, as occurred in 2014. If a potential water supply shortage is identified in the Retail Annual Assessment, this section provides information on the retail water shortage levels and response actions that Western may implement.

Western Retail uses five (5) shortage stages to identify and respond to water shortage emergencies. At a minimum, Western encourages baseline conservation efforts year-round, regardless of a shortage emergency.

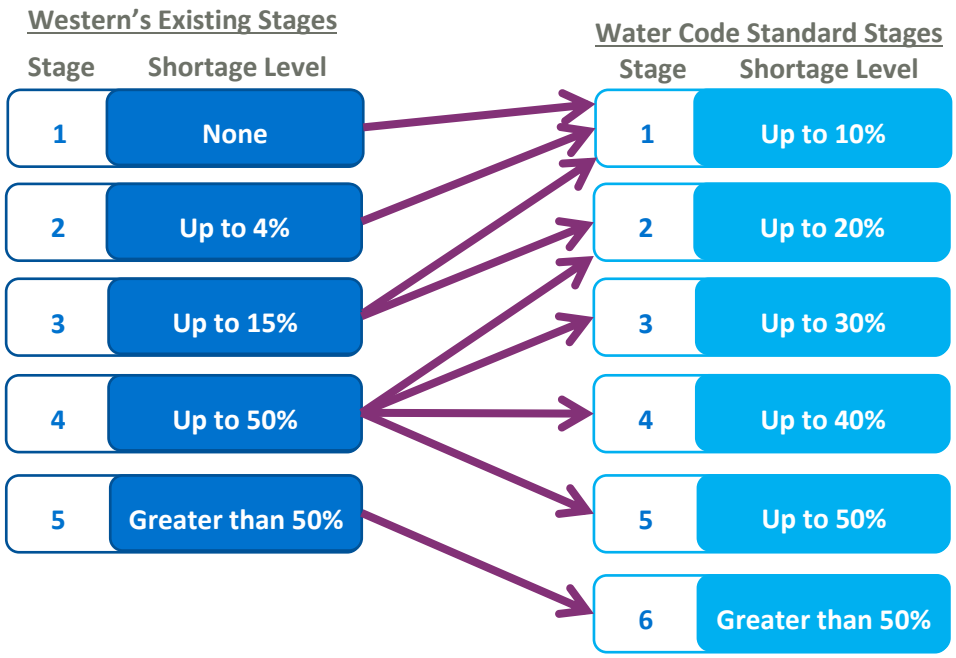
The Water Code outlines six standard water shortage levels that correspond to a gap in supply compared to normal year availability. The six standard water shortage levels correspond to progressively increasing estimated shortage conditions (up to 10-, 20-, 30-, 40-, 50-percent, and greater than 50-percent shortage compared to the normal reliability condition) and align with the response actions that a water supplier would implement to meet the severity of the impending shortages.

The Water Code allows suppliers with an existing Water Shortage Contingency Plan that uses different water shortage levels to comply with the six standard levels by developing and including a cross-reference relating its existing shortage categories to the six standard water shortage levels. Western Retail is maintaining the current five shortage stages for this WSCP, as shown in Table 5. A cross reference to the six standard stages is shown in Figure 1.

Table 5. Western Retail Water Shortage Contingency Plan Levels

SHORTAGE LEVEL	PERCENT SHORTAGE RANGE	WATER SHORTAGE CONDITION
1	At all times	Water Supply Watch
2	Up to 4%	Water Supply Alert
3	Up to 15%	Targeting Waste Reduction
4	Up to 50%	Targeting Outdoor Reductions
5	Greater than 50%	Mandatory Targeted Indoor/Outdoor Reductions – Catastrophic Failure or "Immediate Emergency"

Figure 1. Western's Shortage Stages in Relation to DWR's Six Standard Shortage Stages



1.3.4 Shortage Response Actions

Western expects to mitigate supply shortages through a variety of response actions including various supply sources, demand reduction actions, conservation, operational changes, outreach, and if necessary, mandatory prohibitions.

Supply Augmentation

Western currently maintains interconnections with the cities of Riverside and Corona, Eastern Municipal Water District and Elsinore Valley Municipal Water District. During water shortage emergencies, Western may be able to obtain supplemental water supply though these connections, if available.

Western Retail may also purchase additional imported or local groundwater supply from Western Wholesale.

Supply augmentation actions are summarized in Table 6.

Table 6. Supply Augmentation

SHORTAGE LEVEL	SUPPLY AUGMENTATION METHOD	HOW MUCH IS THIS GOING TO REDUCE THE SHORTAGE GAP?	ADDITIONAL EXPLANATION OR REFERENCE
All	Purchased or Imported Water	Up to 100%	Depends on supply availability from neighboring agencies or Western Wholesale

Demand Reduction

Western has identified a variety of demand reduction actions to offset supply shortages. These actions include, but are not limited to conservation and rebate programs, leak detection and repair, limitations on irrigation and other voluntary actions to reduce customer demand. Demand reduction actions are summarized in Table 7.

The Water Code Section 10623 (b) now requires that suppliers analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code. Non-pool or non-spa water features may use or be able to use recycled water, whereas pools and spas must use potable water for health and safety considerations so limitations to pools and spas may require different considerations compared to non-pool or non-spa water features. Western's Ordinance 384 includes a demand reduction response action that applies to both water features and swimming pools, requiring them to be equipped with recirculating pumps. While this response action is appropriate for both water features and pools and spas, Western will consider these features separately when the WSCP Ordinance is updated.

Table 7. Demand Reduction Actions

SHORTAGE LEVEL	DEMAND REDUCTION ACTIONS	HOW MUCH IS THIS GOING TO REDUCE THE SHORTAGE GAP? (AFY)	ADDITIONAL EXPLANATION OR REFERENCE	PENALTY, CHARGE, OR OTHER ENFORCEMENT
All	Landscape - Other landscape restriction or prohibition	480	Adjust automatic irrigation timers for weather patterns and landscape requirements; Texas Living Waters (Texas Living Waters Project, 2018)	Yes
All	Other - Require automatic shut of hoses			Yes
All	Landscape - Limit landscape irrigation to specific times	4,800	Texas Living Waters (Texas Living Waters Project, 2018)	Yes
All	Other water feature or swimming pool restriction		Features and pools shall be equipped with re-circulating pumps.	Yes
All	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	6,000	EPA Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Costs (United States Environmental Protection Agency, Office of Water, 2002)	Yes
All	Landscape - Restrict or prohibit runoff from landscape irrigation			Yes
3 and Up	Implement or Modify Drought Rate Structure or Surcharge		Eliminate Adjustments to outdoor water budgets; Eliminate Tier in rates	Yes
4 and Up	Other		No new potable service connections, temporary meters, or permanent meters	No
4 and Up	Landscape - Other landscape restriction or prohibition		No new landscapes unless irrigated with recycled water.	No
5 and Up	Landscape - Prohibit all landscape irrigation			Yes

Operational Changes

During shortage conditions, operations may be affected by supply augmentation or demand reduction responses. Western will consider its operational procedures at the time of a shortage to identify changes that can be implemented to address water shortage on a short-term basis.

Additional Mandatory Restrictions

Western has identified additional mandatory restrictions to implement in a water shortage emergency. Such restrictions will first be evaluated on the type of shortage condition and needs to close the gap between supply and demand needs.

Potential restrictions include, but are not limited to:

- Restricting watering to the hours of 8:00 pm to 8:00 am.
- No potable water for washing hard surfaces except to alleviate immediate fire or sanitation hazards, and then only by the use of certain water saving equipment.
- No runoff from irrigation or leaks.
- No installation of new landscapes unless irrigated with recycled water.
- No potable water for construction and dust control, except as necessary for public health, safety, and welfare.

Shortage Response Action Effectiveness

Western has estimated the effectiveness of shortage response actions when data pertaining to such actions is available. Estimates of the effectiveness for actions are included in Table 6 and Table 7. It is expected that response actions effectiveness is also a result of successful communication and outreach efforts, described below.

1.3.5 Communication Protocols

Western prioritizes effective communication, especially in times of a water shortage emergency. Western provides details on droughts, shortage stages and restrictions on its website at https://www.wmwd.com/391/Drought-Restrictions.

Western also has a Community Affairs Office that oversees public affairs, legislative programs, and initiatives. The Community Affairs Office also develops programs and information about Western's efficiency programs, water reliability initiatives, and other educational programs. Western staff members also engage with their customers through presentations to community service organizations and other groups.

The Community Affairs team created a strategic outreach plan that provides the framework for customer outreach as needed for Stage implementation for the Water Supply Shortage Contingency Plan.

It will be imperative to swiftly communicate with Western Retail customers as to what will be required and how to achieve the required water efficiency results. The following methods may be used to communicate information about stages to retail customers:

- **Bill message** – bill messages would be placed directly on customer bills and note key information about the specific Stage.
- **Bill insert** – inserts go out in Western's monthly water bills. Bill inserts would contain key information about the specific Stage.
- **Direct mail postcard** – postcards would feature specific information about the specific Stage and be mailed directly to customers.
- **Auto-call greeting/message** – telephonic, recorded message highlighting key information about the specific Stage would be sent to customers.
- **Website content** – website content containing key information about the specific Stage would be posted on Western's website.
- **Social media posts** – social media posts containing key information about the specific Stage would go on the District's Facebook and Twitter accounts; each Stage would utilize roughly 10 posts.
- **Fact sheet** – a fact sheet for each Stage with key information would be used within District offices, at community events, etc.
- **News release and/or advisory** – news release with key information and messages on each specific Stage would be provided to the media.

1.3.6 Compliance and Enforcement

Western always discourages excessive water consumption. Western may issue various penalties, charges, and other enforcement actions in response to violation of prohibitions in effect at a given time and/or stage. Western's tiered-rate structure promotes conservation and discourages excessive use during all stages and is modified as more severe stages are enacted to act as a penalty for exceeding the water restrictions set by a stage. Enforcement measures in the WSCP are organized as:

- Violations and remedies
- Notices
- Administrative compliance orders and fines and/or penalties
- Over-budget water use penalties
- Recovery of costs

Violations and Remedies

Violations of the WSCP may result in a variety of responses, including declaration of criminal violation, issuance of a cease-and-desist order, civil actions, or a combination of the three. Violations are considered on-going, as described below.

Criminal Violation

It is unlawful for any person to willfully violate the provisions of the WSCP. Any violation of the WSCP is a misdemeanor, unless made an infraction by the prosecutor, subject to imprisonment in the county jail for not more than 30 days or by fine not to exceed $1,000, or by both as provided in California Water Code section 377.

Civil Action

In addition to any other remedies provided in the WSCP, any violation of the WSCP may be enforced by civil action brought by Western and the imposition of administrative fines and/or penalties. In any such action, Western may seek, and the court may grant, as appropriate, any or all of the following remedies:

- a temporary and/or permanent injunction
- assessment of the violator for the costs of enforcement of the violation and for the reasonable costs of preparing and bringing legal action under the WSCP
- assessments under this subsection shall be paid to Western to be used exclusively for costs associated with implementing or enforcing the water supply shortage and regulatory provisions of the WSCP.

Cease-and-Desist Order

Western's General Manager may issue a cease-and-desist order directing the Property Owner, or occupant, or other Person in charge of day-to-day operations of any property, and/or any other Person responsible for a violation of the WSCP to immediately discontinue any prohibited use of water pursuant to Ordinance 384 and immediately cease any activity not in compliance with the terms, conditions, and requirements of this Ordinance 384.

Cumulative

All remedies provided in the WSCP shall be cumulative and not exclusive.

On-going

A Person shall be deemed guilty of a separate offense for every day or portion thereof during which any violation of any provision of the WSCP is committed, continued, or permitted.

Notices

If enforcement of the WSCP is required, Western will issue notices as appropriate. Any notice, notice of violation, cease-and-desist order, and administrative compliance order shall be served pursuant to the requirements of set in Ordinance 384. In addition to or in conjunction with the notice of violation, Western will provide notices as required for administrative compliance orders.

After one written notice of violation, Western may order a special meter reading or readings to ascertain whether wasteful or unreasonable use of water is occurring and may impose a meter reading fee for each meter reading it conducts.

Administrative Compliance Order and Fines and/or Penalties

Separate from, in addition to, or in combination with a notice of violation or cease and desist order, Western may issue an administrative compliance order against the Property Owner and/or occupant of the property where a violation of the WSCP occurred and/or any other Person responsible for a violation of the WSCP. Issuance of a notice of violation or a cease-and-desist order is not a prerequisite to the issuance of an administrative compliance order. The administrative compliance order shall allege the act(s) or failure(s) to act that constitute violations of the WSCP and shall set forth the penalty for the violation(s).

Western may impose administrative monetary fines and/or penalties, in addition to other appropriate action requirements and measures as described in the WSCP and summarized in Table 8.

Table 8. Administrative Compliance Actions

	METERS SMALLER THAN 2"		METERS 2" OR LARGER	
VIOLATION NUMBER	STAGES 1 & 2	STAGES 3, 4, & 5	STAGES 1 & 2	STAGES 3, 4, & 5
First	First written notice identifying violation, potential penalties, and compliance requirements		First written notice identifying violation, potential penalties, and compliance requirements	
Second[1]	Second written notice with copy of WSSCP, potential penalties, and compliance requirements		Second written notice with copy of WSSCP, potential penalties, and compliance requirements	
Third[1]	Fine of $100/day for each day of the violation	Fine of $200/day for each day of the violation	Fine of $100/day for each day of the violation	Fine of $300/day for each day of the violation
Fourth[1]	Fine of $200/day for each day of the violation	Fine of $400/day for each day of the violation	Fine of $300/day for each day of the violation	Fine of $600/day for each day of the violation
Fifth, and subsequent	Installation of flow-restricting device or termination of service; requires compliance and payment of fees prior to restoration of service		Installation of flow-restricting device or termination of service; requires compliance and payment of fees prior to restoration of service	

[1]Within the preceding 12 calendar months.

Over-Budget Water Use Penalties

Any funds collected by Western as penalties for use of water in excess of a property's allocated water budget during a declared water shortage will be deposited in designated special funding accounts, for uses summarized in Table 9.

Table 9. Allowable Uses of Collected Penalties

CONSERVATION PENALTY ACCOUNT	SUPPLY PENALTY ACCOUNT
• Water conservation programs • Outreach and education for water conservation, decreasing water waste, or water awareness. • Enforcement of the WSCP	• Additional water supplies • Operations and maintenance • Revenue shortfalls from operation and maintenance, budgeted and actual for Tiers 1 and 2 • Payments of allocation exceedance penalties to Metropolitan • Payment of other costs associated with water deliveries or service during water curtailment, shortage emergency, or immediate emergency

Recovery of Costs

Western will provide an invoice for costs to the Property Owner and/or occupant, or any other responsible party who is subject to an enforcement action. Additional fines, penalties, or fees, as determined by Western's Board, may also be applied. These charges may include costs for:

- Visits of an Enforcement Officer or other staff for time incurred for meter reading, follow-up visits, or the installation or removal of a flow- restricting device.
- Monitoring, inspection, and surveillance procedures pertaining to enforcement of the WSCP.
- Enforcing compliance with any term or provision of the WSCP.
- Re-initiating service at a property where service has been discontinued pursuant to the WSCP.
- Processing any fees necessary to carry out the provisions of the WSCP

1.3.7 Legal Authorities

Ordinance 384 was adopted and approved on February 18, 2015, by Western's Board of Directors. Ordinance 384 established Western's WSCP and declared that water resources shall be put to beneficial use to the fullest extent possible. Ordinance 384 provides Western with the authority to implement conservation programs and restrict water in emergencies or during droughts. Ordinance 384, included as Attachment 4, continues to serve as the legal foundation for Western's Retail WSCP.

Western shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code.

1.3.8 Financial Consequences of WSCP

Western anticipates that revenues will decrease as customers comply with the WSCP and any potential declared shortage stage. A three-point program (in order of preference) has been developed to meet the fiscal shortfall from reduced revenues:

- Reduce operation, maintenance, and administration expenses.
- Defer selected capital improvement projects that are non-critical.
- Utilize reserves where needed to offset impact of reduced revenues.

Since most of the rate charged for water delivered to customers is used to pay for the cost of supply (e.g., local supplies purchased from neighboring agencies or imported water purchased from Metropolitan), the net impact from reduced water sales is the loss of revenue contributed by the Operations & Maintenance (O&M) component in the water rate. The O&M component in the water rate is used to help pay for a portion of the cost to provide water service to customers (e.g., water quality testing, maintenance and repairs, meter reading, customer billing, etc.). Revenue from the O&M component can be considered the "net revenue" received from water sales.

In addition, the penalties for excess water use beyond a customer's water budget have encouraged conservation, thereby reducing net revenues from water sales. While penalties incurred for violation of the WSCP can be used to cover the O&M funding shortfall created by the reduced sales, penalties generally provide only a small amount of revenue. If the water shortage is deemed temporary, a rate increase may not be required. However, for long-term shortages, rate increases and/or drought surcharges applied to the water rate would be considered to make up for reduced net revenue. A consequence of increasing the commodity cost may be further conservation by customers. Fixed monthly service charges that are not commodity-based are not expected to significantly change due to a water shortage. These charges would continue to provide revenue to pay for O&M expenditures.

Water shortages may also impact construction activities, especially during Stage 4 and 5, when water use for construction is heavily restricted, and a moratorium is in place for new meters and approval of new service. A reduction in construction activities will reduce fees collected by Western from developers, such as capacity charges, as well as engineering related fees, such as plan check fees and annexation fees.

As consumption decreases and additional conservation programs and/or efforts are implemented, purchased water, and purchased power expenses will decrease. However, some expenditures are expected to increase. Staff costs and other costs for community education, enforcement of ordinances, monitoring and evaluation of water use, drought planning, and assisting with customer questions and complaints are expected to rise. If construction is drastically reduced, staff may not be required for certain functions, but it is expected that the increased workload to deal with water shortage issues will more than offset the reduced workload for construction support. Table 10 summarizes general estimates of potential impacts to revenues and expenditures related to water shortage.

Table 10. Revenue and Expenditure Impacts

REVENUE/EXPENDITURE IMPACT	ESTIMATED DEGREE OF IMPACT
Reduced Sales	Decrease in water sales could range from 10 to 30%.
Reduced Development	Reduction in fees collected during planning and construction activities.
Increased Staff Cost	Existing staff will be used where available, but additional temporary staff may be needed.
Increased O&M Cost	Other non-purchased water/power O&M costs could increase by 1 to 5%, including identifying and quickly repairing all system water leaks.
Increased Cost of Supply	Only if assessed penalties from Metropolitan for exceeding drought determined water allocation.

Western has developed reserve funds to sustain the revenue and expenditure impacts of a short- term water shortage. Reserve funds could be used for a 1- to 2-year period to cover the impact of reduced water sales. However, these reserves will need to be restored to minimum levels after the water shortage. If the water shortage is long-term, rate increases, and drought surcharges are expected to be considered to mitigate the financial impact. Long-term water shortages may also require reducing capital expenditures by delaying projects for major facilities construction, upgrade, or replacement, limiting new connections to decrease operational expenditures and to decrease the likelihood of exceeding imported water allocations, and evaluating methods to reduce administrative overhead. Summaries of measures to overcome revenue and expenditure impacts are provided in Table 11.

Table 11. Mitigation to Financial Impacts

BUDGET SOURCE	POTENTIAL MEASURES
Reserves	Use of reserves may provide short-term rate stabilization but will require delays in capital expenditures and require rebuilding reserves after the water shortage.
Decrease Capital Expenditures	Delay major construction projects for facilities as well as upgrades and replacements.
Reduce O&M and Overhead	Defer maintenance where feasible. Defer overhead expenses where possible. If staff reductions are required, service level will be impacted.

1.3.9 Monitoring and Reporting

Water savings from implementation of the WSCP will be determined by consumption and production meter readings. Customer meters will be read every month in Stages 1, 2, and 3, and weekly in Stages 4 and 5. If necessary, Western may read customer meters more often, especially for customers that exceed their water budget. Western will monitor production meters on a weekly basis.

Under normal conditions, Western monitors sales and deliveries on a monthly and daily basis. All of Western's water sales are metered and all connections are read monthly. Water orders are scheduled daily with water deliveries recorded daily. Water deliveries and transfers at booster stations can be monitored through Western's Supervisory Control and Data Acquisition (SCADA) system to determine usage in various portions of the retail area. Western prepares monthly sales and delivery reports that are reviewed and compared to previous reports and statistics for prior months and seasons. Under shortage conditions, Western may prepare these reports daily. In addition, billing reports may be reviewed to identify users who are exhibiting high water use so that Western may work with them to reduce their demand.

1.4 Emergency Response, Seismic Risk Assessment and Mitigation

1.4.1 Emergency Response Plan

In the event of a catastrophic supply interruption, Western would follow its Emergency Response Plan (ERP) in addition to the WSCP.

In 2020, Western completed a Risk and Resilience Assessment (RRA) and Emergency Response Plan (ERP) in accordance with America's Water Infrastructure Act (AWIA) of 2018. The purpose of the RRA and ERP is to meet the AWIA compliance requirements and plan for long-term resilience of Western's infrastructure. The RRA assessed Western's water system in order to identify critical assets and processes that may be vulnerable to human and natural hazards, and to identify measures that can be taken to reduce risk and enhance resilience from service disruption for the benefit of customers. The RRA identifies and characterizes both infrastructure-specific and system-wide vulnerabilities and threats and quantifies the consequences of disruption. The RRA also identifies various options (and constraints) in addressing and mitigating risk. The RRA, is conjunction with the ERP, charts a course for water system resilience. The RRA also provided various recommendations to increase reliability of Western's system. Since critical pieces of infrastructure and specific vulnerabilities are detailed in the RRA and ERP, the contents of the document are confidential and for use by Western staff only.

1.4.2 Seismic Risk Assessment and Mitigation Plan

Per the Water Code Section 10632.5, suppliers are required to assess seismic risk to water supplies as part of their WSCP. Western published a Local Hazard Mitigation Plan (LHMP) in 2017 that identified relevant local hazards, reviewed and assessed past disasters, estimated the probability of future disaster occurrences, and set goals to mitigate potential risks and reduce or eliminate longer-term risks to people and property from both natural and man-made hazards. The LHMP identified risks pertaining to earthquakes, floods, wildfires, landslides, pandemics, high winds, drought, power outages, hazardous materials, terrorism, and several others. On a scale of 0 to 4, the LHMP identified the probability of an earthquake occurring and its severity as a 3. An earthquake was ranked as the 6th most important hazard to plan for, after a pipeline issue, power outage, extreme summer or winter weather, drought, and a severe wind event (Western Municipal Water District, 2017).

Historically, Western has experienced a couple of large earthquakes. The most significant earthquakes in the region both occurred in June 1992 and were the Landers earthquake with a 7.3 magnitude, and the Big Bear earthquake with a 6.4 magnitude (the Big Bear earthquake was an aftershock to the Landers earthquake). Both earthquakes were over 40 miles from Western and did not cause any significant damage to Western's infrastructure (Western Municipal Water District, 2017). It is expected that faults within Western's region could generate an earthquake with an 8.2 magnitude or greater and would severely impact Western's infrastructure.

- The LHMP identified various projects Western has planned to mitigate seismic risks and impacts, including:
- Study to determine if the installation of seismically activated valves for drinking and/or irrigation water would be operationally and fiscally beneficial to maintain water supply and service after an earthquake.
- Acquiring debris removal equipment for use after a disaster. Western can perform typical pipeline repairs and debris removal but may require more robust equipment to remove large amounts of debris after a disaster.
- Develop a staff team trained to evaluate the safety of Emergency Operations Center locations immediately following an earthquake. Project includes training in post-earthquake structural evaluation.

- Purchase a greater variety of materials and sizes for pipeline repair. Items may include PVC pipe, steel pipe, ductile iron fittings, air vacs, and valves. Materials would be stockpiled throughout Western's service area to be readily available after an earthquake.
- Provide additional back-up power for use during large scale power failures at all pump stations.
- Map and possibly relocate pipeline alignments near creeks or areas subject to ground movement such as landslide and rock areas.
- Perform a seismic evaluation of entire water distribution system to determine priority of retrofit projects.
- Perform seismic analysis and retrofits to older tanks that were constructed to past seismic standards.
- Install Compressed Natural Gas (CNG) tanks at natural gas-powered facilities as several transmission mains within Western's service area are powered by natural gas.

1.5 WSCP Refinement Procedures

The WSCP is best prepared and implemented as an adaptive management plan. Western will use results obtained from its monitoring and reporting program to evaluate any needs for revisions. Potential changes to the WSCP that would warrant an update include, but are not limited to, any changes to trigger conditions, changes to the shortage stage structure, changes to rate structures or development of water budgets, and/or changes to customer reduction actions.

Any prospective changes to the WSCP would need to be presented to Western's Board of Directors (Board) for approval. Western will hold a public hearing, obtain any comments, and formally adopt the updated WSCP. Notices for refinement and the public hearing date will be published in the local newspaper in advance of any public meetings.

1.6 Plan Adoption, Submittal, Availability

The WSCP will be presented for adoption to Western's Board at a public meeting. The Board and members of the public may submit any comments prior to approval and adoption. The WSCP will be submitted to DWR at the same time as the 2020 Urban Water Management Plan.

The WSCP will be made available to all staff, customers, and any affected cities, counties, or other members of the public through Western's website, located under the Water Reliability, Drought and Restrictions section.

References

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United States Environmental Protection Agency, Office of Water. (2002). *Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Costs.* United States Environmental Protection Agency.

Western Municipal Water District. (2017). *Local Hazard Mitigation Plan.* Riverside: Western Municipal Water District.

Attachment 1 -
Western Drought Allocation Plan

Drought Allocation Plan
for the
Western Municipal Water District of Riverside County

Updated
May 2015

WESTERN
MUNICIPAL
WATER
DISTRICT

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Appendix A Wholesale Customer Allocation by Shortage Level

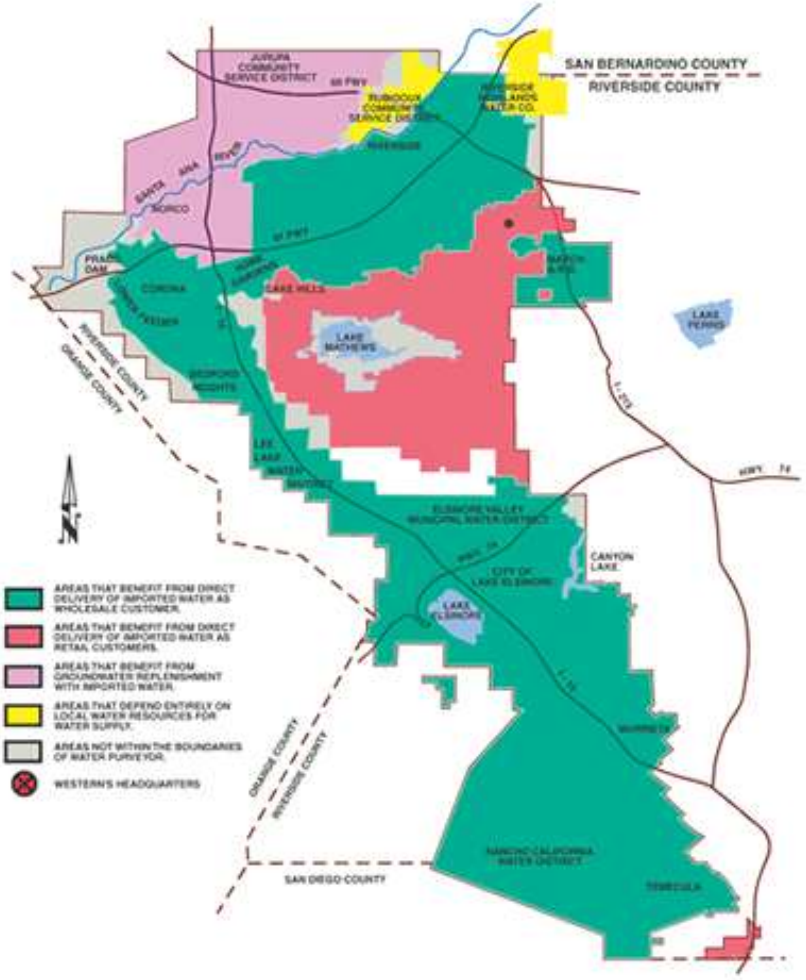
Appendix B Overview of the Metropolitan Water District Shortage Allocation Plan

Section 1 Introduction

The purpose of the Drought Allocation Plan (DAP) is to provide Western Municipal Water District of Riverside County (Western) and its wholesale customers with a means of allocating limited imported water supplies from the Metropolitan Water District of Southern California (Metropolitan) under various shortage conditions. The DAP is intended to help the region minimize the impacts of shortages and ensure an equitable allocation of imported water supplies.

The DAP will be used to allocate water for retail municipal, industrial, and agricultural purposes among the following agencies:

- Box Springs Mutual Water Company
- City of Corona
- City of Norco
- Eagle Valley Mutual Water Company
- Elsinore Valley Municipal Water District
- Lee Lake Water District
- Rancho California Water District
- Western Municipal Water District Retail Customers



Section 2 Drought Allocation Plan Preparation

A fourth year of dry climate conditions throughout the state and uncertainty about water availability from the State Water Project have increased the possibility that Metropolitan may not have access to the supplies necessary to meet total firm demands at some point in the future and may have to allocate shortages in supplies to its member agencies. To prepare for this possibility, Metropolitan staff worked jointly with member agencies to develop an updated Water Shortage Allocation Plan (WSAP) for 2015 and beyond. This plan, which addresses the principles adopted by the Metropolitan Board of Directors in the 1999 *Water Surplus and Drought Management Plan* (WSDM Plan), was adopted by Metropolitan's Board of Directors in December 2014. A summary of the 2007 plan and the 2014 update is included in Appendix B, attached.

To facilitate implementation of Metropolitan's plan at the local level, Western has developed this DAP. The DAP identifies the methods that will be used to allocate limited imported supplies among Western's wholesale customers, if and when Metropolitan implements its WSAP.

Wholesale Customer Coordination

In 2008, the initial preparation and implementation of a DAP for the Western service area required input from Western's wholesale customers. Recognizing the importance of wholesale customer involvement for the first-of-its-kind plan document, Western created a workgroup, made up of staff from Western and the potentially affected wholesale customers. For this update, Western staff simply modified the allocation methodology so that it was consistent with Metropolitan's recently updated WSAP plan. These changes in methodology were presented to wholesale customer representatives at a regular meeting hosted by Western's general manager in January 2015. As these changes, which are explained in Section 3, did not substantially change the plan outcome, the need for formal workshops was unnecessary to gain support for this update.

Section 3 DAP Supply Allocation Methodology

This section includes a description of the updated supply allocation methodology developed following the 2014 modification of Metropolitan's WSAP. The goal of the DAP is to provide an equitable means of apportioning imported supplies during periods where Metropolitan implements the various shortage levels of its WSAP. This allocation methodology is consistent with the approach defined within Metropolitan's plan and has been adjusted for local needs and conditions. Appendix A, attached, includes estimated retail agency allocations based on the following methodology.

Base Period Calculations

The first step in estimating retail demands and wholesale water needs in the allocation year is to establish a base period with established water supply and delivery data that approximates a base operating condition within Western's service area. **The base period for each of the different categories of demands and supplies is calculated using data from the two most recent non-allocation years (Fiscal Years 2012-13 and 2013-14)**; exceptions to this methodology are noted in the following descriptions of base period calculations.

The following are the components of the Base Period calculation:

Base Period Total Demand: Total water demands for the base period are calculated by adding the Base Period Import Supplies (the demands on Western), and the Base Period Local Supplies.

Base Period Local Supplies: Local supplies for the base period are calculated using the two-year average of groundwater production, groundwater recovery, surface-water production, and other imported supplies. Non-potable recycled water production is not included in this calculation. (This is to address the impact of demand hardening due to recycled water use.)

Base Period Wholesale Demands: Firm demands on Western for the base period are calculated using the two-year average of retail Municipal & Industrial (M&I) demands.

Base Period Gallons per Capita Daily (*GPCD):* Conservation Demand Hardening occurs at the retail water use level as consumers install more conservation-saving devices and participate in available programs. In order to estimate conservation savings, Metropolitan requires each member agency to establish an historical baseline GPCD calculated in a manner consistent with California Senate Bill SBx7-7. Western's 10-year GPCD base period for this plan is 1999 through 2008. The calculated regional Base Period GPCD is 362. Reductions from the Base Period GPCD to the Allocation Year are the basis used to calculate the equivalent conservation savings in acre-feet.

Allocation Year Calculations

The next step in estimating water demands in the allocation year is to adjust the base period estimates of retail demand for population or economic growth, and to adjust for changes in local supplies.

Allocation Year Demand Adjustment: Total retail demands for the allocation year are calculated by adjusting the Base Period Retail Demands for growth.

Growth Adjustment: The lesser of 159.4 GPCD (value provided by Metropolitan), or the calculated base period for each agency, is applied to the change in population from the base period to the allocation year.

Allocation Year Local Supplies: Allocation year local supplies are estimated using the base period local supplies and should include any adjustments for gains and losses of local supply, and extraordinary increases in production over the base period. These adjustments are made to give a more accurate estimate of actual supplies in the allocation year, and in turn, more accurately reflect an agency's demand for supplies from Western.

Gain of Local Supply Adjustment: This adjustment accounts for planned or scheduled gains in local supply production above the base period, which are not due to extraordinary actions to increase water supply in the allocation year. These previously-scheduled increases in supply programs or local production should be added to the base period local supplies.

Loss of Local Supply Adjustment: This adjustment accounts for losses of local supply production from the base period. Losses of local supply, due to such things as hydrology or water quality, should be subtracted from the Base Period Local Supplies.

Extraordinary Increased Production Adjustment: This adjustment accounts for extraordinary increases in local supplies above the base period. Extraordinary increases in production include such efforts as purchasing transfers or mining of groundwater basins. In order not to discourage such extraordinary efforts, only a percentage of the yield from these supplies is added back to Allocation Year Local Supplies. This has the effect of "setting aside" the majority of the yield for the agency who procured the supply. The following table shows the percentages of the extraordinary increases in local supply that are counted in each level of supply allocation:

Regional Shortage Level (%)	Percentage Counted in Local Supply
1 (5%)	0%
2 (10%)	0%
3 (15%)	15%
4 (20%)	20%
5 (25%)	25%
6 (30%)	30%
7 (35%)	35%
8 (40%)	40%
9 (45%)	45%
10 (50%)	50%

Allocation Year Wholesale Demands: Demands on Western for the allocation year are calculated by subtracting the Allocation Year Local Supplies from the Allocation Year Retail Demands.

Allocation Formula and Accounting

The following table contains the elements used in the allocation formula. The formula was designed to be equitable on the wholesale level while helping to minimize hardships experienced by individuals and by the regional economy at the retail level.

(1) Regional Shortage Level	(2) Regional Shortage Percentage	(3) Wholesale Minimum Allocation	(4) Retail Impact Adjustment Maximum
1	5%	92.5%	0%
2	10%	85.0%	5.0%
3	15%	77.5%	7.5%
4	20%	70.0%	10.0%
5	25%	62.5%	12.5%
6	30%	55.0%	15.0%
7	35%	47.5%	17.5%
8	40%	40.0%	20.0%
9	45%	32.5%	22.5%
10	50%	25.0%	25.0%

Shortage Levels(1): The formula allocates shortages of Western supplies over ten levels: from 5 to 50 percent, in 5 percent increments.

Shortage Percentage(2): The maximum total regional shortage percentage of Western's available supplies when compared to the sum of the demands in the allocation year.

Wholesale Minimum Allocation(3): The Wholesale Minimum Allocation is established to ensure a minimum level of wholesale water service (Western supplies) at the wholesale customer level, and sets the target for recognizing a wholesale customer's ongoing investment in Western's system. The Wholesale Minimum Allocation ensures that wholesale customers will not experience shortages on the wholesale level that are greater than one-and-a-half times the percentage shortage of Western's regional water supplies. The Wholesale Minimum Allocation is equal to 100 percent minus one-and-a-half times the shortage level.

Retail Impact Adjustment Maximum(4): The Retail Impact Adjustment Maximum is the factor used to address major differences in retail level shortages associated with across-the-board cuts. The purpose of this adjustment is to ensure that agencies with a high level of dependence on Western do not experience highly disparate shortages compared to other agencies when faced with a reduction in wholesale water supplies. The Retail Impact Adjustment Maximum factor is calculated as the difference between the Regional Shortage Percentage and the Wholesale Minimum Allocation. The amount of the adjustment each wholesale customer receives is prorated on a linear scale, based on its dependence on Western at the retail level. The prorated amount of allocation is referred to as the Retail Impact Adjustment Allocation. For agencies that are 100 percent dependent on Western, this method will result in an allocation of Western supplies that, at the retail level, will result in a shortage equal to the Regional Shortage Percentage. In other words, through this allocation, no agency will experience a greater percentage shortage than the regional shortage percentage.

Conservation Demand Hardening Credit: The Conservation Demand Hardening Credit is calculated at the regional level in Metropolitan's WSAP. The value of the regional conservation credit is divided proportionally among the agencies within Western's service area that purchased imported water during the Base Period. The individual agency's volume of imported water is compared to the total of all agency purchases of imported water. The Conservation Demand hardening credit will be based on an initial 10 percent of the GPCD-based Conservation savings plus an additional 5 percent for each level of Regional Shortage set by the Board of Directors during implementation of the WSAP. The credit will also be adjusted for:

- overall percentage reduction in retail water demand, and
- Western's dependence on Metropolitan.

This provides a base demand hardening credit equal to 10 percent of conservation savings and increases the credit as deeper shortages occur, which is when conservation demand hardening has a bigger impact on the retail consumer. The credit also increases based on the percentage of an agency's demand that was reduced through conservation. This accounts for increased hardening that occurs as increasing amounts of conservation are implemented. Lastly, the credit is scaled to the member agency's dependence on Metropolitan to ensure that credits are being applied to the proportion of water demand that is being affected by reductions in Metropolitan supply.

M&I Allocation: The allocation of Western supplies to an agency for its retail demand is the sum of the Wholesale Minimum Allocation, the Retail Impact Adjustment, and the Conservation Demand Hardening Credit.

Allocation Example – Calculating Base Period Information to Determine Allocation Year Needs

The following example gives a step-by-step description of how the recommended formula would be used to calculate an allocation of Western's imported supplies to its wholesale customers and retail service area. This example is based on a Fiscal Year 2015-16 allocation using the average of Fiscal Year 2012-13 and Fiscal Year 2013-14 as the base period. The data used for this example was provided by each agency in late 2014.

Step 1: *Calculate Base Period Retail Demand*

The first step in developing an agency's allocation is to estimate the agency's retail level water needs. Two pieces of information are required to calculate retail level water needs:

(1) The amount of local supplies that were produced in the base period, and
(2) The amount of demands on Western in the base period.

Base Period Local Supplies are calculated using the average of production data from Fiscal Year 2012-13 and Fiscal Year 2013-14 for groundwater, groundwater recovery, surface water, and/or other non-Western imported supplies.

Base Period Wholesale Demands on Western are calculated using the same averaged time period as the Base Period Local Supplies.

Base Period Retail Demand can be calculated once the information described above has been determined. The sum of the Base Period Local Supplies and the Base Period Wholesale Demands equals the Base Period Retail Demand.

Step 2: *Adjust Base Period Retail Demand for Growth*

The second step in developing an agency's allocation is to adjust the Base Period Retail Demand for growth that occurred since the Base Period. Based on Department of Finance statistics, the projected population growth in Riverside County was 1.12 percent for the period 2011 through 2013. The Base Period population is adjusted by 1.12 percent for each year between the Base Period and the allocation year. The change in the demand for water is calculated by multiplying the change in population by the lesser of 159.4 gallons per capita daily or the calculated base period GPCD for each agency.

Agency within Western	Applied GPCD
Box Springs Mutual Water Company	104.0
City of Corona	159.4
City of Norco	159.4
Eagle Valley Mutual Water Company	-
Elsinore Valley Municipal Water District	159.4
Lee Lake Water District	138.0
Metropolitan Water District	-
Rancho California Water District	159.4
Western Municipal Water District Retail	159.4

Allocation Year Retail Demand is the result of applying the growth adjustment to the Base Period Retail Demand. It represents a reasonable estimate of the total amount of firm water that an agency needs at the retail level in the year of allocation.

Step 3: *Adjustment for changes in local supply from the Base Period*

The third step in calculating each agency's allocation is to calculate the agency's local supply production in the year of the allocation. This is done by using Base Period Local Supplies that were calculated in Step 1 as a base estimate, and adding back any gains or losses in Base Period Local Supplies that are occurring in the allocation year. If an agency has undertaken extraordinary efforts to secure alternative supplies, this Extraordinary Increase in Local Supplies would also be added here.

Allocation Year Local Supplies are the result from adjusting the Base Period Local Supply for all of the changes listed above.

Step 4: *Calculate Wholesale Water Needs in the Allocation Year*

Now that both the Allocation Year Retail Demands and the Allocation Year Local Supplies have been estimated, the agency's Allocation Year Wholesale Demand can be calculated.

Allocation Year Wholesale Demands on Western are calculated by subtracting the Allocation Year Local Supplies from the Allocation Year Retail Demands. Any demand that is remaining after the agency's local supplies are accounted for represents demand for wholesale supplies from Western.

Dependence on Western is calculated as the percentage of an agency's retail need that is met by Western wholesale supplies.

Step 5: *Apply Base Period Conservation Demand Hardening Credit*

The Conservation Demand Hardening Credit is calculated at the regional level in Metropolitan's WSAP. The value of the regional conservation credit is divided proportionally between the agencies within Western's service area that purchased imported water in the Base Period. The individual agency's volume of imported water is compared to the total of all agencies purchases of imported water.

Allocation Example – Calculating a Supply Allocation in a Regional Shortage Level 3

This example will follow the allocation formula accounting, through a Regional Shortage Level 3 (15%). The table below shows the essential elements of the allocation formula under a Regional Shortage Level 3.

(1) Regional Shortage Level	(2) Regional Shortage Percentage	(3) Wholesale Minimum Allocation	(4) Retail Impact Adjustment Maximum
3	15%	77.5%	7.5%

Step 1: *Calculate Wholesale Minimum Allocation*

The Wholesale Minimum Allocation is calculated by multiplying the agency's Allocation Year Wholesale Demand by the Wholesale Minimum Allocation percentage from the allocation table.

Step 2: *Calculate Retail Impact Adjustment Allocation*

The next step in determining this agency's allocation is to calculate the Retail Impact Adjustment Allocation. Recall from the allocation table, the Retail Impact Adjustment Maximum factor is the difference between the Wholesale Minimum Allocation and the Regional Shortage Percentage. Under a Regional Shortage Level 3 (15 percent), the Retail Impact Adjustment Maximum factor available to any agency is 7.5 percent. Each agency's Retail Impact Adjustment factor is calculated by multiplying the 7.5 percent Retail Impact Adjustment Maximum factor by the agency's Dependence of Western, which was calculated in a previous step.

Step 3: *Apply the Conservation Hardening Credit*

Step 4: *Add the Wholesale Minimum Allocation, the Retail Impact Adjustment Allocation, and the Conservation Hardening Credit to get the final M&I agency allocation.*

The Wholesale Minimum Allocation, the Retail Impact Adjustment Allocation, and the Conservation Hardening Credit are added together to total to the M&I allocation.

Step 5: *Add Unallocated Supplies*

After each agency's M&I allocation is calculated, each agency's M&I allocation is added together to determine the total M&I allocation for all of Western's wholesale customers. As with the example above, if the total M&I allocation is lower than the allocation that Western is receiving from Metropolitan, the surplus is allocated among the wholesale customers based on the proportion of each agency's Wholesale Minimum Allocation to the Western's total Wholesale Minimum Allocation. If the amount is greater than

the allocation from Metropolitan, then the next regional shortage level will be applied until the total M&I allocation is equal or less than allocation from Metropolitan.

Step 6: *Total Allocation*

The final step in calculating this agency's allocation of Western supplies is to sum up all of the elements of the allocation formula that were calculated above.

Section 4 Estimate of Retail Agency Allocation under Drought Allocation Plan

Western (retail) and the retail water suppliers within Western's general service area are, to varying degrees, dependent upon Metropolitan for imported water supply. The following table summarizes the estimated impact of the Metropolitan Board of Directors-adopted (December 2014) WSAP process for the allocation of water supplies to Western's general service area during ten levels of water supply shortage. The water supply available to Western is further allocated between the retail water suppliers in a fashion similar to the Metropolitan process.

MWD WATER SUPPLY ALLOCATION PLAN - 2014 UPDATE			
Regional Shortage Level	MWD Declared Shortage	Import Water Available[1]	Regional Reduction Level[2]
0	-	-	-
1	-5.0%	72,689	-5.1%
2	-10.0%	72,689	-5.1%
3	-15.0%	71,496	-6.7%
4	-20.0%	69,489	-9.3%
5	-25.0%	67,482	-11.9%
6	-30.0%	65,475	-14.5%
7	-35.0%	63,469	-17.2%
8	-40.0%	61,462	-19.8%
9	-45.0%	59,455	-22.4%
10	-50.0%	57,488	-25.0%

FY 2014 Import Demand = 76,614 acre feet.

1. The total *Imported Water Available* subject to change based on the certification of local production at the end of a fiscal year.
2. *Regional Reduction Level* percentages are based on FY 2014 imported water demands, not the base period demands. The reduction levels also apply to the region as a whole, not to the individual retail agencies.

Appendix B includes an overview of Metropolitan's WSAP methodology for shortage allocations. Western will use a process similar to that of Metropolitan to allocate imported water supplies among the retail water agencies within Western's general service area. Agencies that purchased water in the Metropolitan base period (Fiscal Years 2012-13 and 2013-14) share in the allocation of imported water. These agencies include: Box Springs Mutual Water Company, the City of Corona Department of Water and Power, Eagle Valley Mutual Water Company, Elsinore Valley Municipal Water District, Lee Lake Water District, Metropolitan, the City of Norco, Rancho California Water District, and Western Municipal Water District for its retail water service area. The following agencies within Western's general service area did not purchase imported water during Metropolitan's base period and, therefore, are not included in the allocation of imported water supplies: Home Gardens County Water District, Jurupa Community Services District, the City of Riverside Public Utilities, Riverside Highlands Water Company, and Rubidoux Community Services District.

The following table summarizes the estimated imported water supply available to the retail water suppliers within Western's general service area at each of Metropolitan's shortage levels 1 through 10. These values are estimates as the actual volumes of water available to each agency are dependent on the production of local

supplies throughout Western's imported agency region and is reconciled at the completion of each fiscal year during which a Metropolitan water allocation is in place.

Shortage Level	Box Springs MWC	City of Corona	Eagle Valley MWC	Elsinore Valley MWD	Lee Lake WD	MWD	City of Norco	Rancho California WD	Western MWD (Retail)	Total
1	88	14,643	488	16,734	3,104	11	171	17,797	19,646	72,689
2	88	14,643	488	16,734	3,104	11	171	17,797	19,646	72,689
3	84	14,275	437	16,639	3,098	10	154	17,455	19,339	71,496
4	81	13,799	411	16,230	3,037	9	143	16,946	18,828	69,489
5	77	13,323	385	15,822	2,976	9	133	16,436	18,317	67,482
6	74	12,847	360	15,413	2,915	8	122	15,927	17,806	65,475
7	70	12,371	334	15,005	2,855	7	111	15,417	17,294	63,469
8	66	11,896	308	14,596	2,794	7	101	14,907	16,783	61,462
9	63	11,420	283	14,188	2,733	6	90	14,398	16,272	59,455
10	59	10,944	257	13,780	2,672	6	80	13,888	15,760	57,488

Appendix A includes spreadsheets detailing the calculation of retail agency allocations under Metropolitan shortage allocation levels 1 through 10.

Section 5 Allocation Plan Implementation Elements

The following are the implementation elements that are necessary for administering an allocation during a time of shortage. These elements cover the processes needed to declare a shortage level as well as providing a penalty rate structure for enforcing each agency's allocation.

Implementing an Allocation of Supplies
At this time, it is anticipated that the only time Western would allocate imported supplies from Metropolitan is if Metropolitan is forced to allocate its supplies through its WSAP process.

Setting the Shortage Level
Should Metropolitan implement the WSAP, Western staff will determine the appropriate Shortage Level so that supplies allocated at the Western service area level are equal to or less than the Metropolitan allocation. Simultaneously, Western will determine whether any appeals need to be filed with Metropolitan.

Allocation Period
The allocation period for the DAP will be consistent with the period defined within Metropolitan's WSAP. This allocation period covers twelve consecutive months, typically from July of a given year through the following June. This period was selected by Metropolitan so as to minimize the impacts of varying State Water Project allocations. It was also selected to provide wholesale customers with sufficient time to implement their outreach strategies and rate modifications. Metropolitan has indicated that it is their intention when possible to set allocations through the declaration of a shortage level at the April Board of Directors' meeting preceding the next fiscal year.

Determination of Penalties
At the end of the allocation year, Metropolitan will bill Western for any accrued penalties. Penalties will be based on the water rates in effect the last day of June of the allocation year. Western will bill its agencies for penalties based on its penalty rate structure. Any excess funds collected will be refunded proportionately to those agencies that paid penalties.

Allocation Surcharge
At the end of each allocation year, Metropolitan will bill Western for any accrued Allocation Surcharges ("surcharges") based on Metropolitan's adopted WSAP. Western will pass-through Metropolitan's surcharges to its retail agencies (which includes Western's own retail customers) based on Metropolitan's allocation surcharge rate structure described at the end of this section.

If Western exceeds its total allocation from Metropolitan for the year, the underutilization of any individual retail agency's allocation will be reallocated that year to other retail agencies that exceed their allocation in accordance with the same methodology used when Western exceeds its total Metropolitan Tier 1 Maximum. This methodology is described in Western's Board of Directors-adopted "Determining Water Rates and Charges for Water User Agencies" Resolution (this Resolution changes from time to time and is currently Resolution 2876). Only retail agencies that had Metropolitan water deliveries in the WSAP base year, and thus contributed to the amount of Metropolitan water allocated to Western, will be included in the underutilization reallocation calculation described in this paragraph.

No billing or assessment of surcharges to retail agencies will take place until the end of the twelve-month allocation year unless Western at its sole discretion determines that significant surcharges are probable. In this latter case, Western will use an equitable method of invoicing all or a portion of such anticipated surcharges to

retail agencies exceeding their individual allocation. This invoicing will be done prior to the end of the allocation year. At the end of the allocation year and after being assessed any surcharges by Metropolitan, Western will reconcile any collected surcharge revenue and issue invoices or credit memos to retail agencies accordingly, with invoice payment terms consistent with those described in the current applicable Resolution (referenced in the previous paragraph). The purpose of this latter provision is to reduce Western's risk from collecting significant receivable amounts after the end of the allocation year. If at the end of the allocation year Western does not incur any surcharges from Metropolitan, then individual retail agencies will not be invoiced for surcharges (or will be refunded any surcharges paid in advance of year-end).

Metropolitan's surcharge is based on the costs that Metropolitan and its member agencies are incurring to implement outdoor water use reductions through turf removal programs. The surcharge is designed to provide a price signal based on the marginal conservation costs incurred to reduce water use in dry and shortage years. Any revenues collected by Metropolitan from the surcharge would be used to fund the implementation of the Turf Removal Program, or other similar programs designed to conserve water and reduce future demands.

Metropolitan is currently paying $2 per square foot of turf removed. The estimated water savings is 44 gallons per year for each square foot of turf removed for a period of ten years. Based on this savings rate, the estimated cost of the program is $1,480 per acre-foot. Water use between 100 percent and 115 percent of a member agency's water supply allocations would be charged with a surcharge of $1,480 per acre-foot. Water use greater than 115 percent would be charged two times the surcharge or $2,960 per acre-foot. Two times the surcharge would allow the funding of additional turf removal and conservation programs to conserve additional water and further reduce demand or, if appropriate, allow for a higher per square foot incentive payment. The surcharge rates are assessed in addition to the normal rates for Metropolitan water purchases. The penalty rate structure is summarized in the table below:

Water Use	Allocation Surcharge In Addition to Cost of Water
100% of Allocation	$0
Between 100% & 115%	$1,480
Greater than 115%	$2,960

Below are three potential scenarios related to the assessment of the surcharge:

Scenario 1: Retail agency water deliveries are less than Western's Metropolitan allocation. The result after the allocation year would be that retail agencies would not owe any surcharges even if agencies are over their individual allocation.

Scenario 2: Retail agency water deliveries are over Western's Metropolitan allocation, but less than 115 percent. The $1,480 per acre-foot surcharge would be assessed only to retail agencies that exceed their individual allocation after taking into consideration the proration of underutilized allocation.

Scenario 3: Retail agency water deliveries are over Western's Metropolitan allocation by more than 115 percent with individual agencies' exceedance varying. First, underutilized allocation would be prorated to the water deliveries that are over by 100 and 115 percent, with the balance assessed a surcharge of $1,480 per acre-foot. Any water remaining that exceeds 115 percent would be assessed a surcharge of $2,960 per acre-foot (two times $1,480).

Appendix A Wholesale Customer Allocation by Shortage Level

Shortage Level 1: Calculations Spreadsheet

	BOX SPRINGS	CORONA	EAGLE VALLEY	EVMWD	LLWD	MWD	NORCO	RANCHO	WESTERN	TOTAL
BASE PERIOD DEMAND										
Base Period Import Supplies (AVG FY13 & FY14)	86	15,518	514	19,214	3,074	11	93	18,029	19,060	75,599
Base Period Local Supplies (AVG FY13 & FY14)	295	19,177	0	7,832	0	0	8,651	10,562	6,136	52,653
Base Period Total Demand	**380**	**34,696**	**514**	**27,047**	**3,074**	**11**	**8,743**	**28,591**	**25,196**	**128,252**
ALLOCATION YEAR DEMAND ADJUSTMENT										
Base Period Average Population	3,300	158,611	0	139,599	19,962	0	27,063	24,742	94,807	468,083
% of growth	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%
Allocation Year Population	3,337	160,390	0	141,165	20,185	0	27,367	25,019	95,871	473,334
GPCD Applied to Growth	104	159	0	159	138	0	159	159	159	159
Demand Growth	4.29	317.71	0.00	279.63	34.62	0.00	54.21	49.56	189.91	938.00
LESS Growth in Conservation & Recycling	3.26	297.17	0.00	231.66	26.33	0.00	74.89	244.89	215.81	1094.00
Adjusted Allocation Year Demand	**381**	**34,716**	**514**	**27,094**	**3,082**	**11**	**8,722**	**28,396**	**25,170**	**128,096**
ALLOCATION YEAR IMPORT DEMAND										
Allocation Year Local Supplies (FY2014)	**292**	**20,012**	**0**	**10,466**	**0**	**0**	**8,543**	**10,571**	**5,523**	**55,407**
Allocation Year Imported Demand	**89**	**14,704**	**514**	**16,628**	**3,082**	**11**	**179**	**17,825**	**19,647**	**72,689**
IMPORT MINIMUM ALLOCATION										
Import Minimum Percentage	92.5%	92.5%	92.5%	92.5%	92.5%	92.5%	92.5%	92.5%	92.5%	92.5%
Import Minimum Allocation	**82.7**	**13,601.3**	**475.2**	**15,381.3**	**2,851.0**	**10.6**	**165.9**	**16,487.8**	**18,173.9**	**67,237.2**
RETAIL IMPACT ADJUSTMENT CREDIT[1]										
Dependence on Metropolitan	23%	42%	100%	61%	100%	100%	2%	63%	78%	57%
Retail Impact Adjustment Allocation	0.6%	1.1%	2.5%	1.5%	2.5%	2.5%	0.1%	1.6%	2.0%	1.4%
Retail Impact Adjustment CREDIT	0.5	155.7	12.8	255.1	77.1	0.3	0.1	279.7	383.4	1,031.2
Import Allocation with Retail Credit	**83.3**	**13,757.0**	**488.0**	**15,636.5**	**2,928.0**	**10.9**	**166.0**	**16,767.5**	**18,557.3**	**68,268.4**
DEMAND HARDENING CREDIT[2]										
Demand Hardening Credit	**5**	**886**	**0**	**1,097**	**176**	**0**	**5**	**1,029**	**1,088**	**4,420**
TOTAL DAP IMPORT ALLOCATION										
Total DAP Allocation	**88**	**14,643**	**488**	**16,734**	**3,104**	**11**	**171**	**17,797**	**19,646**	**72,689**

Base GPCD	362
Allocation Year GPCD	242
Change in GPCD	120
Acre-Foot Change	63,837
Regional Shortage Percentage	5%
GPCD Percent Reduction	33.3%

1. The MWD Retail Impact Adjustment Credit, when applied to the individual water agencies within Western's general service area, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such the amount of water over allocated is subtracted from the total Demand Hardening Credit.
2. The MWD Conservation Demand Hardening Credit methodology, when applied to the various GPCD values and GPCD changes at the local level with significantly lower water demands, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such, the wholesale Demand Hardening Credit has been divided among the urban retail water suppliers in proportion to the base period demand for imported water relative to the total imported water demand for all urban retail water suppliers.

The table above illustrates the calculation of the estimated import water supply available to each water supplier within Western's service area during DAP Shortage Level 1. All values are estimates as the actual volumes of water available to each agency are ultimately dependent on the certified production of local supplies throughout Western's import agency region. The final allocation will be reconciled at the completion of each fiscal year during which a water allocation is in place.

Shortage Level 2: Calculations Spreadsheet

	BOX SPRINGS	CORONA	EAGLE VALLEY	EVMWD	LLWD	MWD	NORCO	RANCHO	WESTERN	TOTAL
BASE PERIOD DEMAND										
Base Period Import Supplies (AVG FY13 & FY14)	86	15,518	514	19,214	3,074	11	93	18,029	19,060	75,599
Base Period Local Supplies (AVG FY13 & FY14)	295	19,177	0	7,832	0	0	8,651	10,562	6,136	52,653
Base Period Total Demand	**380**	**34,696**	**514**	**27,047**	**3,074**	**11**	**8,743**	**28,591**	**25,196**	**128,252**
ALLOCATION YEAR DEMAND ADJUSTMENT										
Base Period Average Population	3,300	158,611	0	139,599	19,962	0	27,063	24,742	94,807	468,083
% of growth	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%
Allocation Year Population	3,337	160,390	0	141,165	20,185	0	27,367	25,019	95,871	473,334
GPCD Applied to Growth	104	159	0	159	138	0	159	159	159	159
Demand Growth	4.29	317.71	0.00	279.63	34.62	0.00	54.21	49.56	189.91	938.00
LESS Growth in Conservation & Recycling	3.26	297.17	0.00	231.66	26.33	0.00	74.89	244.89	215.81	1094.00
Adjusted Allocation Year Demand	**381**	**34,716**	**514**	**27,094**	**3,082**	**11**	**8,722**	**28,396**	**25,170**	**128,096**
ALLOCATION YEAR IMPORT DEMAND										
Allocation Year Local Supplies (FY2014)	**292**	**20,012**	**0**	**10,466**	**0**	**0**	**8,543**	**10,571**	**5,523**	**55,407**
Allocation Year Imported Demand	**89**	**14,704**	**514**	**16,628**	**3,082**	**11**	**179**	**17,825**	**19,647**	**72,689**
IMPORT MINIMUM ALLOCATION										
Import Minimum Percentage	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
Import Minimum Allocation	**76.0**	**12,498.5**	**436.6**	**14,134.2**	**2,619.8**	**9.7**	**152.4**	**15,151.0**	**16,700.4**	**61,785.5**
RETAIL IMPACT ADJUSTMENT CREDIT[1]										
Dependence on Metropolitan	23%	42%	100%	61%	100%	100%	2%	63%	78%	57%
Retail Impact Adjustment Allocation	1.2%	2.1%	5.0%	3.1%	5.0%	5.0%	0.1%	3.1%	3.9%	2.8%
Retail Impact Adjustment CREDIT	1.0	311.4	25.7	510.3	154.1	0.6	0.2	559.4	766.8	2,062.4
Import Allocation with Retail Credit	**77.1**	**12,809.9**	**462.3**	**14,644.5**	**2,773.9**	**10.3**	**152.6**	**15,710.4**	**17,467.2**	**63,847.9**
DEMAND HARDENING CREDIT[2]										
Demand Hardening Credit	**10**	**1,772**	**0**	**2,194**	**351**	**0**	**11**	**2,059**	**2,177**	**8,841**
TOTAL DAP IMPORT ALLOCATION										
Total DAP Allocation	**87**	**14,582**	**462**	**16,839**	**3,125**	**10**	**163**	**17,769**	**19,644**	**72,689**

Base GPCD	362
Allocation Year GPCD	242
Change in GPCD	120
Acre-Foot Change	63,837
Regional Shortage Percentage	10%
GPCD Percent Reduction	33.3%

1. The MWD Retail Impact Adjustment Credit, when applied to the individual water agencies within Western's general service area, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such the amount of water over allocated is subtracted from the total Demand Hardening Credit.
2. The MWD Conservation Demand Hardening Credit methodology, when applied to the various GPCD values and GPCD changes at the local level with significantly lower water demands, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such, the wholesale Demand Hardening Credit has been divided among the urban retail water suppliers in proportion to the base period demand for imported water relative to the total imported water demand for all urban retail water suppliers.

The table above illustrates the calculation of the estimated import water supply available to each water supplier within Western's service area during DAP Shortage Level 2. All values are estimates as the actual volumes of water available to each agency are ultimately dependent on the certified production of local supplies throughout Western's import agency region. The final allocation will be reconciled at the completion of each fiscal year during which a water allocation is in place.

Shortage Level 3: Calculations Spreadsheet

	BOX SPRINGS	CORONA	EAGLE VALLEY	EVMWD	LLWD	MWD	NORCO	RANCHO	WESTERN	TOTAL
BASE PERIOD DEMAND										
Base Period Import Supplies (AVG FY13 & FY14)	86	15,518	514	19,214	3,074	11	93	18,029	19,060	75,599
Base Period Local Supplies (AVG FY13 & FY14)	295	19,177	0	7,832	0	0	8,651	10,562	6,136	52,653
Base Period Total Demand	**380**	**34,696**	**514**	**27,047**	**3,074**	**11**	**8,743**	**28,591**	**25,196**	**128,252**
ALLOCATION YEAR DEMAND ADJUSTMENT										
Base Period Average Population	3,300	158,611	0	139,599	19,962	0	27,063	24,742	94,807	468,083
% of growth	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%
Allocation Year Population	3,337	160,390	0	141,165	20,185	0	27,367	25,019	95,871	473,334
GPCD Applied to Growth	104	159	0	159	138	0	159	159	159	159
Demand Growth	4.29	317.71	0.00	279.63	34.62	0.00	54.21	49.56	189.91	938.00
LESS Growth in Conservation & Recycling	3.26	297.17	0.00	231.66	26.33	0.00	74.89	244.89	215.81	1094.00
Adjusted Allocation Year Demand	**381**	**34,716**	**514**	**27,094**	**3,082**	**11**	**8,722**	**28,396**	**25,170**	**128,096**
ALLOCATION YEAR IMPORT DEMAND										
Allocation Year Local Supplies (FY2014)	**292**	**20,012**	**0**	**10,466**	**0**	**0**	**8,543**	**10,571**	**5,523**	**55,407**
Allocation Year Imported Demand	**89**	**14,704**	**514**	**16,628**	**3,082**	**11**	**179**	**17,825**	**19,647**	**72,689**
IMPORT MINIMUM ALLOCATION										
Import Minimum Percentage	77.5%	77.5%	77.5%	77.5%	77.5%	77.5%	77.5%	77.5%	77.5%	77.5%
Import Minimum Allocation	**69.3**	**11,395.7**	**398.1**	**12,887.1**	**2,388.7**	**8.9**	**139.0**	**13,814.1**	**15,226.8**	**56,333.9**
RETAIL IMPACT ADJUSTMENT CREDIT[1]										
Dependence on Metropolitan	23%	42%	100%	61%	100%	100%	2%	63%	78%	57%
Retail Impact Adjustment Allocation	1.8%	3.2%	7.5%	4.6%	7.5%	7.5%	0.2%	4.7%	5.9%	4.3%
Retail Impact Adjustment CREDIT	1.6	467.1	38.5	765.4	231.2	0.9	0.3	839.2	1,150.2	3,093.6
Import Allocation with Retail Credit	**70.9**	**11,862.8**	**436.6**	**13,652.5**	**2,619.8**	**9.7**	**139.3**	**14,653.3**	**16,377.0**	**59,427.4**
DEMAND HARDENING CREDIT[2]										
Demand Hardening Credit	**13**	**2,412**	**0**	**2,986**	**478**	**0**	**14**	**2,802**	**2,962**	**12,068**
TOTAL DAP IMPORT ALLOCATION										
Total DAP Allocation	**84**	**14,275**	**437**	**16,639**	**3,098**	**10**	**154**	**17,455**	**19,339**	**71,496**

Base GPCD	362
Allocation Year GPCD	242
Change in GPCD	120
Acre-Foot Change	63,837
Regional Shortage Percentage	15%
GPCD Percent Reduction	33.3%

1. The MWD Retail Impact Adjustment Credit, when applied to the individual water agencies within Western's general service area, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such the amount of water over allocated is subtracted from the total Demand Hardening Credit.
2. The MWD Conservation Demand Hardening Credit methodology, when applied to the various GPCD values and GPCD changes at the local level with significantly lower water demands, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such, the wholesale Demand Hardening Credit has been divided among the urban retail water suppliers in proportion to the base period demand for imported water relative to the total imported water demand for all urban retail water suppliers.

The table above illustrates the calculation of the estimated import water supply available to each water supplier within Western's service area during DAP Shortage Level 3. All values are estimates as the actual volumes of water available to each agency are ultimately dependent on the certified production of local supplies throughout Western's import agency region. The final allocation will be reconciled at the completion of each fiscal year during which a water allocation is in place.

Shortage Level 4: Calculations Spreadsheet

	BOX SPRINGS	CORONA	EAGLE VALLEY	EVMWD	LLWD	MWD	NORCO	RANCHO	WESTERN	TOTAL
BASE PERIOD DEMAND										
Base Period Import Supplies (AVG FY13 & FY14)	86	15,518	514	19,214	3,074	11	93	18,029	19,060	75,599
Base Period Local Supplies (AVG FY13 & FY14)	295	19,177	0	7,832	0	0	8,651	10,562	6,136	52,653
Base Period Total Demand	**380**	**34,696**	**514**	**27,047**	**3,074**	**11**	**8,743**	**28,591**	**25,196**	**128,252**
ALLOCATION YEAR DEMAND ADJUSTMENT										
Base Period Average Population	3,300	158,611	0	139,599	19,962	0	27,063	24,742	94,807	468,083
% of growth	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%
Allocation Year Population	3,337	160,390	0	141,165	20,185	0	27,367	25,019	95,871	473,334
GPCD Applied to Growth	104	159	0	159	138	0	159	159	159	159
Demand Growth	4.29	317.71	0.00	279.63	34.62	0.00	54.21	49.56	189.91	938.00
LESS Growth in Conservation & Recycling	3.26	297.17	0.00	231.66	26.33	0.00	74.89	244.89	215.81	1094.00
Adjusted Allocation Year Demand	**381**	**34,716**	**514**	**27,094**	**3,082**	**11**	**8,722**	**28,396**	**25,170**	**128,096**
ALLOCATION YEAR IMPORT DEMAND										
Allocation Year Local Supplies (FY2014)	**292**	**20,012**	**0**	**10,466**	**0**	**0**	**8,543**	**10,571**	**5,523**	**55,407**
Allocation Year Imported Demand	**89**	**14,704**	**514**	**16,628**	**3,082**	**11**	**179**	**17,825**	**19,647**	**72,689**
IMPORT MINIMUM ALLOCATION										
Import Minimum Percentage	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
Import Minimum Allocation	**62.6**	**10,292.9**	**359.6**	**11,639.9**	**2,157.5**	**8.0**	**125.5**	**12,477.3**	**13,753.2**	**50,882.2**
RETAIL IMPACT ADJUSTMENT CREDIT[1]										
Dependence on Metropolitan	23%	42%	100%	61%	100%	100%	2%	63%	78%	57%
Retail Impact Adjustment Allocation	2.3%	4.2%	10.0%	6.1%	10.0%	10.0%	0.2%	6.3%	7.8%	5.7%
Retail Impact Adjustment CREDIT	2.1	622.8	51.4	1,020.5	308.2	1.1	0.4	1,118.9	1,533.6	4,124.8
Import Allocation with Retail Credit	**64.7**	**10,915.6**	**411.0**	**12,660.5**	**2,465.7**	**9.2**	**125.9**	**13,596.2**	**15,286.9**	**55,007.0**
DEMAND HARDENING CREDIT[2]										
Demand Hardening Credit	**16**	**2,883**	**0**	**3,570**	**571**	**0**	**17**	**3,350**	**3,541**	**14,482**
TOTAL DAP IMPORT ALLOCATION										
Total DAP Allocation	**81**	**13,799**	**411**	**16,230**	**3,037**	**9**	**143**	**16,946**	**18,828**	**69,489**

Base GPCD	362
Allocation Year GPCD	242
Change in GPCD	120
Acre-Foot Change	63,837
Regional Shortage Percentage	20%
GPCD Percent Reduction	33.3%

1. The MWD Retail Impact Adjustment Credit, when applied to the individual water agencies within Western's general service area, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such the amount of water over allocated is subtracted from the total Demand Hardening Credit.
2. The MWD Conservation Demand Hardening Credit methodology, when applied to the various GPCD values and GPCD changes at the local level with significantly lower water demands, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such, the wholesale Demand Hardening Credit has been divided among the urban retail water suppliers in proportion to the base period demand for imported water relative to the total imported water demand for all urban retail water suppliers.

The table above illustrates the calculation of the estimated import water supply available to each water supplier within Western's service area during DAP Shortage Level 4. All values are estimates as the actual volumes of water available to each agency are ultimately dependent on the certified production of local supplies throughout Western's import agency region. The final allocation will be reconciled at the completion of each fiscal year during which a water allocation is in place.

Shortage Level 5: Calculations Spreadsheet

	BOX SPRINGS	CORONA	EAGLE VALLEY	EVMWD	LLWD	MWD	NORCO	RANCHO	WESTERN	TOTAL
BASE PERIOD DEMAND										
Base Period Import Supplies (AVG FY13 & FY14)	86	15,518	514	19,214	3,074	11	93	18,029	19,060	75,599
Base Period Local Supplies (AVG FY13 & FY14)	295	19,177	0	7,832	0	0	8,651	10,562	6,136	52,653
Base Period Total Demand	**380**	**34,696**	**514**	**27,047**	**3,074**	**11**	**8,743**	**28,591**	**25,196**	**128,252**
ALLOCATION YEAR DEMAND ADJUSTMENT										
Base Period Average Population	3,300	158,611	0	139,599	19,962	0	27,063	24,742	94,807	468,083
% of growth	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%
Allocation Year Population	3,337	160,390	0	141,165	20,185	0	27,367	25,019	95,871	473,334
GPCD Applied to Growth	104	159	0	159	138	0	159	159	159	159
Demand Growth	4.29	317.71	0.00	279.63	34.62	0.00	54.21	49.56	189.91	938.00
LESS Growth in Conservation & Recycling	3.26	297.17	0.00	231.66	26.33	0.00	74.89	244.89	215.81	1094.00
Adjusted Allocation Year Demand	**381**	**34,716**	**514**	**27,094**	**3,082**	**11**	**8,722**	**28,396**	**25,170**	**128,096**
ALLOCATION YEAR IMPORT DEMAND										
Allocation Year Local Supplies (FY2014)	**292**	**20,012**	**0**	**10,466**	**0**	**0**	**8,543**	**10,571**	**5,523**	**55,407**
Allocation Year Imported Demand	**89**	**14,704**	**514**	**16,628**	**3,082**	**11**	**179**	**17,825**	**19,647**	**72,689**
IMPORT MINIMUM ALLOCATION										
Import Minimum Percentage	62.5%	62.5%	62.5%	62.5%	62.5%	62.5%	62.5%	62.5%	62.5%	62.5%
Import Minimum Allocation	**55.9**	**9,190.0**	**321.1**	**10,392.8**	**1,926.3**	**7.2**	**112.1**	**11,140.4**	**12,279.7**	**45,430.5**
RETAIL IMPACT ADJUSTMENT CREDIT[1]										
Dependence on Metropolitan	23%	42%	100%	61%	100%	100%	2%	63%	78%	57%
Retail Impact Adjustment Allocation	2.9%	5.3%	12.5%	7.7%	12.5%	12.5%	0.3%	7.8%	9.8%	7.1%
Retail Impact Adjustment CREDIT	2.6	778.5	64.2	1,275.7	385.3	1.4	0.5	1,398.6	1,917.0	5,156.0
Import Allocation with Retail Credit	**58.5**	**9,968.5**	**385.3**	**11,668.5**	**2,311.6**	**8.6**	**112.5**	**12,539.0**	**14,196.7**	**50,586.5**
DEMAND HARDENING CREDIT[2]										
Demand Hardening Credit	**19**	**3,354**	**0**	**4,153**	**664**	**0**	**20**	**3,897**	**4,120**	**16,896**
TOTAL DAP IMPORT ALLOCATION										
Total DAP Allocation	**77**	**13,323**	**385**	**15,822**	**2,976**	**9**	**133**	**16,436**	**18,317**	**67,482**

Base GPCD	362
Allocation Year GPCD	242
Change in GPCD	120
Acre-Foot Change	63,837
Regional Shortage Percentage	25%
GPCD Percent Reduction	33.3%

1. The MWD Retail Impact Adjustment Credit, when applied to the individual water agencies within Western's general service area, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such the amount of water over allocated is subtracted from the total Demand Hardening Credit.
2. The MWD Conservation Demand Hardening Credit methodology, when applied to the various GPCD values and GPCD changes at the local level with significantly lower water demands, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such, the wholesale Demand Hardening Credit has been divided among the urban retail water suppliers in proportion to the base period demand for imported water relative to the total imported water demand for all urban retail water suppliers.

The table above illustrates the calculation of the estimated import water supply available to each water supplier within Western's service area during DAP Shortage Level 5. All values are estimates as the actual volumes of water available to each agency are ultimately dependent on the certified production of local supplies throughout Western's import agency region. The final allocation will be reconciled at the completion of each fiscal year during which a water allocation is in place.

Shortage Level 6: Calculations Spreadsheet

	BOX SPRINGS	CORONA	EAGLE VALLEY	EVMWD	LLWD	MWD	NORCO	RANCHO	WESTERN	TOTAL
BASE PERIOD DEMAND										
Base Period Import Supplies (AVG FY13 & FY14)	86	15,518	514	19,214	3,074	11	93	18,029	19,060	75,599
Base Period Local Supplies (AVG FY13 & FY14)	295	19,177	0	7,832	0	0	8,651	10,562	6,136	52,653
Base Period Total Demand	**380**	**34,696**	**514**	**27,047**	**3,074**	**11**	**8,743**	**28,591**	**25,196**	**128,252**
ALLOCATION YEAR DEMAND ADJUSTMENT										
Base Period Average Population	3,300	158,611	0	139,599	19,962	0	27,063	24,742	94,807	468,083
% of growth	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%
Allocation Year Population	3,337	160,390	0	141,165	20,185	0	27,367	25,019	95,871	473,334
GPCD Applied to Growth	104	159	0	159	138	0	159	159	159	159
Demand Growth	4.29	317.71	0.00	279.63	34.62	0.00	54.21	49.56	189.91	938.00
LESS Growth in Conservation & Recycling	3.26	297.17	0.00	231.66	26.33	0.00	74.89	244.89	215.81	1094.00
Adjusted Allocation Year Demand	**381**	**34,716**	**514**	**27,094**	**3,082**	**11**	**8,722**	**28,396**	**25,170**	**128,096**
ALLOCATION YEAR IMPORT DEMAND										
Allocation Year Local Supplies (FY2014)	**292**	**20,012**	**0**	**10,466**	**0**	**0**	**8,543**	**10,571**	**5,523**	**55,407**
Allocation Year Imported Demand	**89**	**14,704**	**514**	**16,628**	**3,082**	**11**	**179**	**17,825**	**19,647**	**72,689**
IMPORT MINIMUM ALLOCATION										
Import Minimum Percentage	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%
Import Minimum Allocation	**49.2**	**8,087.2**	**282.5**	**9,145.7**	**1,695.2**	**6.3**	**98.6**	**9,803.6**	**10,806.1**	**39,978.9**
RETAIL IMPACT ADJUSTMENT CREDIT[1]										
Dependence on Metropolitan	23%	42%	100%	61%	100%	100%	2%	63%	78%	57%
Retail Impact Adjustment Allocation	3.5%	6.4%	15.0%	9.2%	15.0%	15.0%	0.3%	9.4%	11.7%	8.5%
Retail Impact Adjustment CREDIT	3.1	934.2	77.1	1,530.8	462.3	1.7	0.6	1,678.3	2,300.5	6,187.2
Import Allocation with Retail Credit	**52.3**	**9,021.4**	**359.6**	**10,676.4**	**2,157.5**	**8.0**	**99.2**	**11,481.9**	**13,106.6**	**46,166.0**
DEMAND HARDENING CREDIT[2]										
Demand Hardening Credit	**21**	**3,826**	**0**	**4,737**	**758**	**0**	**23**	**4,445**	**4,699**	**19,309**
TOTAL DAP IMPORT ALLOCATION										
Total DAP Allocation	**74**	**12,847**	**360**	**15,413**	**2,915**	**8**	**122**	**15,927**	**17,806**	**65,475**

Base GPCD	362
Allocation Year GPCD	242
Change in GPCD	120
Acre-Foot Change	63,837
Regional Shortage Percentage	30%
GPCD Percent Reduction	33.3%

1. The MWD Retail Impact Adjustment Credit, when applied to the individual water agencies within Western's general service area, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such the amount of water over allocated is subtracted from the total Demand Hardening Credit.
2. The MWD Conservation Demand Hardening Credit methodology, when applied to the various GPCD values and GPCD changes at the local level with significantly lower water demands, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such, the wholesale Demand Hardening Credit has been divided among the urban retail water suppliers in proportion to the base period demand for imported water relative to the total imported water demand for all urban retail water suppliers.

The table above illustrates the calculation of the estimated import water supply available to each water supplier within Western's service area during DAP Shortage Level 6. All values are estimates as the actual volumes of water available to each agency are ultimately dependent on the certified production of local supplies throughout Western's import agency region. The final allocation will be reconciled at the completion of each fiscal year during which a water allocation is in place.

Shortage Level 7: Calculations Spreadsheet

	BOX SPRINGS	CORONA	EAGLE VALLEY	EVMWD	LLWD	MWD	NORCO	RANCHO	WESTERN	TOTAL
BASE PERIOD DEMAND										
Base Period Import Supplies (AVG FY13 & FY14)	86	15,518	514	19,214	3,074	11	93	18,029	19,060	75,599
Base Period Local Supplies (AVG FY13 & FY14)	295	19,177	0	7,832	0	0	8,651	10,562	6,136	52,653
Base Period Total Demand	**380**	**34,696**	**514**	**27,047**	**3,074**	**11**	**8,743**	**28,591**	**25,196**	**128,252**
ALLOCATION YEAR DEMAND ADJUSTMENT										
Base Period Average Population	3,300	158,611	0	139,599	19,962	0	27,063	24,742	94,807	468,083
% of growth	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%
Allocation Year Population	3,337	160,390	0	141,165	20,185	0	27,367	25,019	95,871	473,334
GPCD Applied to Growth	104	159	0	159	138	0	159	159	159	159
Demand Growth	4.29	317.71	0.00	279.63	34.62	0.00	54.21	49.56	189.91	938.00
LESS Growth in Conservation & Recycling	3.26	297.17	0.00	231.66	26.33	0.00	74.89	244.89	215.81	1094.00
Adjusted Allocation Year Demand	**381**	**34,716**	**514**	**27,094**	**3,082**	**11**	**8,722**	**28,396**	**25,170**	**128,096**
ALLOCATION YEAR IMPORT DEMAND										
Allocation Year Local Supplies (FY2014)	**292**	**20,012**	**0**	**10,466**	**0**	**0**	**8,543**	**10,571**	**5,523**	**55,407**
Allocation Year Imported Demand	**89**	**14,704**	**514**	**16,628**	**3,082**	**11**	**179**	**17,825**	**19,647**	**72,689**
IMPORT MINIMUM ALLOCATION										
Import Minimum Percentage	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%
Import Minimum Allocation	**42.5**	**6,984.4**	**244.0**	**7,898.5**	**1,464.0**	**5.4**	**85.2**	**8,466.7**	**9,332.6**	**34,527.2**
RETAIL IMPACT ADJUSTMENT CREDIT[1]										
Dependence on Metropolitan	23%	42%	100%	61%	100%	100%	2%	63%	78%	57%
Retail Impact Adjustment Allocation	4.1%	7.4%	17.5%	10.7%	17.5%	17.5%	0.4%	11.0%	13.7%	9.9%
Retail Impact Adjustment CREDIT	3.7	1,089.9	89.9	1,785.9	539.4	2.0	0.6	1,958.1	2,683.9	7,218.4
Import Allocation with Retail Credit	**46.2**	**8,074.3**	**333.9**	**9,684.4**	**2,003.4**	**7.4**	**85.8**	**10,424.8**	**12,016.4**	**41,745.6**
DEMAND HARDENING CREDIT[2]										
Demand Hardening Credit	**24**	**4,297**	**0**	**5,320**	**851**	**0**	**26**	**4,992**	**5,278**	**21,723**
TOTAL DAP IMPORT ALLOCATION										
Total DAP Allocation	**70**	**12,371**	**334**	**15,005**	**2,855**	**7**	**111**	**15,417**	**17,294**	**63,469**

Base GPCD	362
Allocation Year GPCD	242
Change in GPCD	120
Acre-Foot Change	63,837
Regional Shortage Percentage	35%
GPCD Percent Reduction	33.3%

1. The MWD Retail Impact Adjustment Credit, when applied to the individual water agencies within Western's general service area, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such the amount of water over allocated is subtracted from the total Demand Hardening Credit.
2. The MWD Conservation Demand Hardening Credit methodology, when applied to the various GPCD values and GPCD changes at the local level with significantly lower water demands, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such, the wholesale Demand Hardening Credit has been divided among the urban retail water suppliers in proportion to the base period demand for imported water relative to the total imported water demand for all urban retail water suppliers.

The table above illustrates the calculation of the estimated import water supply available to each water supplier within Western's service area during DAP Shortage Level 7. All values are estimates as the actual volumes of water available to each agency are ultimately dependent on the certified production of local supplies throughout Western's import agency region. The final allocation will be reconciled at the completion of each fiscal year during which a water allocation is in place.

Shortage Level 8: Calculations Spreadsheet

	BOX SPRINGS	CORONA	EAGLE VALLEY	EVMWD	LLWD	MWD	NORCO	RANCHO	WESTERN	TOTAL
BASE PERIOD DEMAND										
Base Period Import Supplies (AVG FY13 & FY14)	86	15,518	514	19,214	3,074	11	93	18,029	19,060	75,599
Base Period Local Supplies (AVG FY13 & FY14)	295	19,177	0	7,832	0	0	8,651	10,562	6,136	52,653
Base Period Total Demand	**380**	**34,696**	**514**	**27,047**	**3,074**	**11**	**8,743**	**28,591**	**25,196**	**128,252**
ALLOCATION YEAR DEMAND ADJUSTMENT										
Base Period Average Population	3,300	158,611	0	139,599	19,962	0	27,063	24,742	94,807	468,083
% of growth	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%
Allocation Year Population	3,337	160,390	0	141,165	20,185	0	27,367	25,019	95,871	473,334
GPCD Applied to Growth	104	159	0	159	138	0	159	159	159	159
Demand Growth	4.29	317.71	0.00	279.63	34.62	0.00	54.21	49.56	189.91	938.00
LESS Growth in Conservation & Recycling	3.26	297.17	0.00	231.66	26.33	0.00	74.89	244.89	215.81	1094.00
Adjusted Allocation Year Demand	**381**	**34,716**	**514**	**27,094**	**3,082**	**11**	**8,722**	**28,396**	**25,170**	**128,096**
ALLOCATION YEAR IMPORT DEMAND										
Allocation Year Local Supplies (FY2014)	**292**	**20,012**	**0**	**10,466**	**0**	**0**	**8,543**	**10,571**	**5,523**	**55,407**
Allocation Year Imported Demand	**89**	**14,704**	**514**	**16,628**	**3,082**	**11**	**179**	**17,825**	**19,647**	**72,689**
IMPORT MINIMUM ALLOCATION										
Import Minimum Percentage	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Import Minimum Allocation	**35.8**	**5,881.6**	**205.5**	**6,651.4**	**1,232.9**	**4.6**	**71.7**	**7,129.9**	**7,859.0**	**29,075.5**
RETAIL IMPACT ADJUSTMENT CREDIT[1]										
Dependence on Metropolitan	23%	42%	100%	61%	100%	100%	2%	63%	78%	57%
Retail Impact Adjustment Allocation	4.7%	8.5%	20.0%	12.3%	20.0%	20.0%	0.4%	12.6%	15.6%	11.3%
Retail Impact Adjustment CREDIT	4.2	1,245.6	102.7	2,041.1	616.4	2.3	0.7	2,237.8	3,067.3	8,249.6
Import Allocation with Retail Credit	**40.0**	**7,127.2**	**308.2**	**8,692.4**	**1,849.3**	**6.9**	**72.5**	**9,367.7**	**10,926.3**	**37,325.1**
DEMAND HARDENING CREDIT[2]										
Demand Hardening Credit	**26**	**4,768**	**0**	**5,904**	**945**	**0**	**28**	**5,540**	**5,857**	**24,137**
TOTAL DAP IMPORT ALLOCATION										
Total DAP Allocation	**66**	**11,896**	**308**	**14,596**	**2,794**	**7**	**101**	**14,907**	**16,783**	**61,462**

Base GPCD	362
Allocation Year GPCD	242
Change in GPCD	120
Acre-Foot Change	63,837
Regional Shortage Percentage	40%
GPCD Percent Reduction	33.3%

1. The MWD Retail Impact Adjustment Credit, when applied to the individual water agencies within Western's general service area, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such the amount of water over allocated is subtracted from the total Demand Hardening Credit.
2. The MWD Conservation Demand Hardening Credit methodology, when applied to the various GPCD values and GPCD changes at the local level with significantly lower water demands, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such, the wholesale Demand Hardening Credit has been divided among the urban retail water suppliers in proportion to the base period demand for imported water relative to the total imported water demand for all urban retail water suppliers.

The table above illustrates the calculation of the estimated import water supply available to each water supplier within Western's service area during DAP Shortage Level 8. All values are estimates as the actual volumes of water available to each agency are ultimately dependent on the certified production of local supplies throughout Western's import agency region. The final allocation will be reconciled at the completion of each fiscal year during which a water allocation is in place.

Shortage Level 9: Calculations Spreadsheet

	BOX SPRINGS	CORONA	EAGLE VALLEY	EVMWD	LLWD	MWD	NORCO	RANCHO	WESTERN	TOTAL
BASE PERIOD DEMAND										
Base Period Import Supplies (AVG FY13 & FY14)	86	15,518	514	19,214	3,074	11	93	18,029	19,060	75,599
Base Period Local Supplies (AVG FY13 & FY14)	295	19,177	0	7,832	0	0	8,651	10,562	6,136	52,653
Base Period Total Demand	**380**	**34,696**	**514**	**27,047**	**3,074**	**11**	**8,743**	**28,591**	**25,196**	**128,252**
ALLOCATION YEAR DEMAND ADJUSTMENT										
Base Period Average Population	3,300	158,611	0	139,599	19,962	0	27,063	24,742	94,807	468,083
% of growth	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%
Allocation Year Population	3,337	160,390	0	141,165	20,185	0	27,367	25,019	95,871	473,334
GPCD Applied to Growth	104	159	0	159	138	0	159	159	159	159
Demand Growth	4.29	317.71	0.00	279.63	34.62	0.00	54.21	49.56	189.91	938.00
LESS Growth in Conservation & Recycling	3.26	297.17	0.00	231.66	26.33	0.00	74.89	244.89	215.81	1094.00
Adjusted Allocation Year Demand	**381**	**34,716**	**514**	**27,094**	**3,082**	**11**	**8,722**	**28,396**	**25,170**	**128,096**
ALLOCATION YEAR IMPORT DEMAND										
Allocation Year Local Supplies (FY2014)	**292**	**20,012**	**0**	**10,466**	**0**	**0**	**8,543**	**10,571**	**5,523**	**55,407**
Allocation Year Imported Demand	**89**	**14,704**	**514**	**16,628**	**3,082**	**11**	**179**	**17,825**	**19,647**	**72,689**
IMPORT MINIMUM ALLOCATION										
Import Minimum Percentage	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%
Import Minimum Allocation	**29.1**	**4,778.8**	**167.0**	**5,404.3**	**1,001.7**	**3.7**	**58.3**	**5,793.0**	**6,385.4**	**23,623.9**
RETAIL IMPACT ADJUSTMENT CREDIT[1]										
Dependence on Metropolitan	23%	42%	100%	61%	100%	100%	2%	63%	78%	57%
Retail Impact Adjustment Allocation	5.3%	9.5%	22.5%	13.8%	22.5%	22.5%	0.5%	14.1%	17.6%	12.8%
Retail Impact Adjustment CREDIT	4.7	1,401.3	115.6	2,296.2	693.5	2.6	0.8	2,517.5	3,450.7	9,280.7
Import Allocation with Retail Credit	**33.8**	**6,180.1**	**282.5**	**7,700.4**	**1,695.2**	**6.3**	**59.1**	**8,310.5**	**9,836.1**	**32,904.6**
DEMAND HARDENING CREDIT[2]										
Demand Hardening Credit	**29**	**5,240**	**0**	**6,488**	**1,038**	**0**	**31**	**6,087**	**6,436**	**26,550**
TOTAL DAP IMPORT ALLOCATION										
Total DAP Allocation	**63**	**11,420**	**283**	**14,188**	**2,733**	**6**	**90**	**14,398**	**16,272**	**59,455**

Base GPCD	362
Allocation Year GPCD	242
Change in GPCD	120
Acre-Foot Change	63,837
Regional Shortage Percentage	45%
GPCD Percent Reduction	33.3%

1. The MWD Retail Impact Adjustment Credit, when applied to the individual water agencies within Western's general service area, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such the amount of water over allocated is subtracted from the total Demand Hardening Credit.
2. The MWD Conservation Demand Hardening Credit methodology, when applied to the various GPCD values and GPCD changes at the local level with significantly lower water demands, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such, the wholesale Demand Hardening Credit has been divided among the urban retail water suppliers in proportion to the base period demand for imported water relative to the total imported water demand for all urban retail water suppliers.

The table above illustrates the calculation of the estimated import water supply available to each water supplier within Western's service area during DAP Shortage Level 9. All values are estimates as the actual volumes of water available to each agency are ultimately dependent on the certified production of local supplies throughout Western's import agency region. The final allocation will be reconciled at the completion of each fiscal year during which a water allocation is in place.

Shortage Level 10: Calculations Spreadsheet

	BOX SPRINGS	CORONA	EAGLE VALLEY	EVMWD	LLWD	MWD	NORCO	RANCHO	WESTERN	TOTAL
BASE PERIOD DEMAND										
Base Period Import Supplies (AVG FY13 & FY14)	86	15,518	514	19,214	3,074	11	93	18,029	19,060	75,599
Base Period Local Supplies (AVG FY13 & FY14)	295	19,177	0	7,832	0	0	8,651	10,562	6,136	52,653
Base Period Total Demand	**380**	**34,696**	**514**	**27,047**	**3,074**	**11**	**8,743**	**28,591**	**25,196**	**128,252**
ALLOCATION YEAR DEMAND ADJUSTMENT										
Base Period Average Population	3,300	158,611	0	139,599	19,962	0	27,063	24,742	94,807	468,083
% of growth	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%	1.12%
Allocation Year Population	3,337	160,390	0	141,165	20,185	0	27,367	25,019	95,871	473,334
GPCD Applied to Growth	104	159	0	159	138	0	159	159	159	159
Demand Growth	4.29	317.71	0.00	279.63	34.62	0.00	54.21	49.56	189.91	938.00
LESS Growth in Conservation & Recycling	3.26	297.17	0.00	231.66	26.33	0.00	74.89	244.89	215.81	1094.00
Adjusted Allocation Year Demand	**381**	**34,716**	**514**	**27,094**	**3,082**	**11**	**8,722**	**28,396**	**25,170**	**128,096**
ALLOCATION YEAR IMPORT DEMAND										
Allocation Year Local Supplies (FY2014)	**292**	**20,012**	**0**	**10,466**	**0**	**0**	**8,543**	**10,571**	**5,523**	**55,407**
Allocation Year Imported Demand	**89**	**14,704**	**514**	**16,628**	**3,082**	**11**	**179**	**17,825**	**19,647**	**72,689**
IMPORT MINIMUM ALLOCATION										
Import Minimum Percentage	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Import Minimum Allocation	**22.4**	**3,676.0**	**128.4**	**4,157.1**	**770.5**	**2.9**	**44.8**	**4,456.2**	**4,911.9**	**18,172.2**
RETAIL IMPACT ADJUSTMENT CREDIT[1]										
Dependence on Metropolitan	23%	42%	100%	61%	100%	100%	2%	63%	78%	57%
Retail Impact Adjustment Allocation	5.9%	10.6%	25.0%	15.3%	25.0%	25.0%	0.5%	15.7%	19.5%	14.2%
Retail Impact Adjustment CREDIT	5.2	1,557.0	128.4	2,551.3	770.5	2.9	0.9	2,797.2	3,834.1	10,311.9
Import Allocation with Retail Credit	**27.6**	**5,233.0**	**256.9**	**6,708.4**	**1,541.1**	**5.7**	**45.8**	**7,253.4**	**8,746.0**	**28,484.2**
DEMAND HARDENING CREDIT[2]										
Demand Hardening Credit	**32**	**5,711**	**0**	**7,071**	**1,131**	**0**	**34**	**6,635**	**7,015**	**28,964**
TOTAL DAP IMPORT ALLOCATION										
Total DAP Allocation	**59**	**10,944**	**257**	**13,780**	**2,672**	**6**	**80**	**13,888**	**15,760**	**57,448**

Base GPCD	362
Allocation Year GPCD	242
Change in GPCD	120
Acre-Foot Change	63,837
Regional Shortage Percentage	50%
GPCD Percent Reduction	33.3%

1. The MWD Retail Impact Adjustment Credit, when applied to the individual water agencies within Western's general service area, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such the amount of water over allocated is subtracted from the total Demand Hardening Credit.
2. The MWD Conservation Demand Hardening Credit methodology, when applied to the various GPCD values and GPCD changes at the local level with significantly lower water demands, results in individual agency allocations that exceed the total wholesale allocation from MWD. As such, the wholesale Demand Hardening Credit has been divided among the urban retail water suppliers in proportion to the base period demand for imported water relative to the total imported water demand for all urban retail water suppliers.

The table above illustrates the calculation of the estimated import water supply available to each water supplier within Western's service area during DAP Shortage Level 10. All values are estimates as the actual volumes of water available to each agency are ultimately dependent on the certified production of local supplies throughout Western's import agency region. The final allocation will be reconciled at the completion of each fiscal year during which a water allocation is in place.

Appendix B Overview of the Metropolitan Water District Shortage Allocation Plan

Metropolitan's WSAP is the basis for allocation of shortages in supplies to member agencies should Metropolitan be unable to meet total firm demands. The first WSAP was prepared in 2007 due to dry conditions and uncertainty about future pumping operations from the State Water Project caused by fishery protection measures in the Sacramento-San Joaquin Bay-Delta. Since 2007, Metropolitan staff worked jointly with the member agency managers and staff to revise the plan. In December of 2014, the Metropolitan Board of Directors adopted the revisions as described later in this appendix.

The WSAP is based upon the 1999 Water Surplus and Drought Management Plan (WSDM Plan), which introduced the concept of using a base period to estimate water needs under an allocation.

Water Surplus and Drought Management Plan
The WSDM is the drought management plan that Metropolitan currently operates under which addresses both drought actions and water surplus actions. However, a water allocation methodology in the event "rationing" becomes necessary is not included in the WSDM Plan.

The following are the guiding principle, supporting principles and implementation goals of the WSDM Plan:

Guiding Principle

- Metropolitan will encourage storage of water during periods of surplus and work jointly with its Member Agencies to minimize the impacts of water shortages on the region's retail consumers and economy during periods of shortage.

Supporting Principles

- Maintain an ongoing coordinated effort among Metropolitan and its Member Agencies to encourage efficient water use and cost-effective local resource.
- Encourage local and regional storage during periods of surplus and use of storage during periods of shortage.
- Manage and operate Metropolitan's regional storage and delivery system in coordination with local facilities to capture and store surplus water in local groundwater and surface reservoirs.
- Arrange for secure sources of additional water from outside the region for use during periods of shortage.
- Call upon sources of additional water from outside the region and water stored locally to meet the needs of consumers and protect the economy during periods of shortage.

WSDM Plan Implementation Goals

- Avoid mandatory import water allocations to the extent practicable.
- Equitably allocate imported water on the basis of agencies' needs. Considerations to create an equitable allocation of imported water may include:

  - Impact on retail consumers and economy
  - Reclamation/Recycling
  - Conservation
  - Population and economic growth
  - Investment in local resources
  - Change and/or loss of local supply
  - Participation in Metropolitan's Non-firm (interruptible) Programs
  - Investment in Metropolitan's facilities

- Encourage storage of surplus supplies to mitigate shortages and improve water quality.[9]

Although an allocation method was not adopted, a draft plan was devised and specific concepts of an allocation are laid out in the WSDM Plan. These concepts include an overall policy objective of the allocation method as follows: "…to minimize the impacts to any one agency and the region as a whole. To meet that objective, the method of allocating firm imported supply will account for each agency's:

- demands on Metropolitan,
- local resources, and
- total retail demands."[10]

Water sales to an agency up to the amount allocated will be at the prevailing full service rate. Deliveries for water use from 100 to 102 percent of the allocation would be charged the prevailing full service rate plus $175 per acre-foot (this cost is similar to the cost of Governors Water Bank water offered for sale in the 1987–92 drought). Water deliveries in excess of 102 percent of the target amount would be charged three times the full service rate.

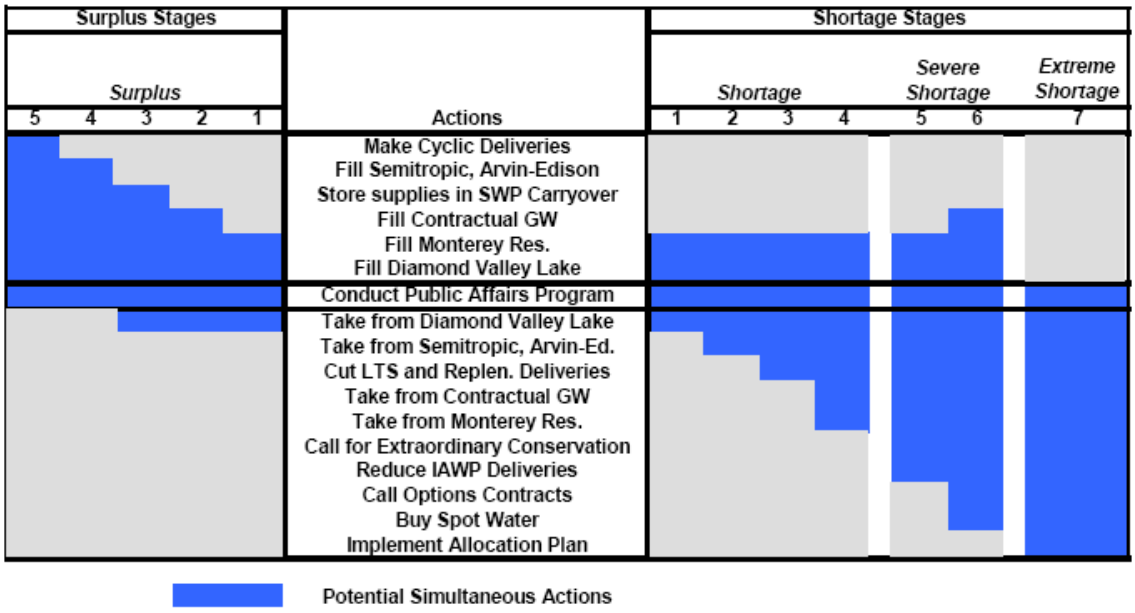
The WSDM Plan has four resource stages in which actions fall. These resource stages are:

- **Surplus:** Supplies are sufficient to allow Metropolitan to meet Full Service demands, make deliveries to all interruptible programs (replenishment, long-term seasonal storage, and agricultural deliveries), and deliver water to regional and local facilities for storage.
- **Shortage:** Supplies are sufficient to allow Metropolitan to meet Full Service demands and make partial or full deliveries to interruptible programs, sometimes using stored water and voluntary water transfers.
- **Severe Shortage:** Supplies are insufficient and Metropolitan is required to make withdrawals from storage, call on its water transfers, and possibly call for extraordinary drought conservation and reduce deliveries under the IAWP.
- **Extreme Shortage:** Supplies are insufficient and Metropolitan is required to allocate available imported supplies.[11]

Based on the resource stage that Metropolitan is in, varying actions may occur. These actions are shown in Figure 1, below, as developed by Metropolitan. The matrix acts as a "framework." Actual response would be based on conditions at the time of need.

Figure 3-1: Sequence of WSDM Plan Water Resource Management Steps

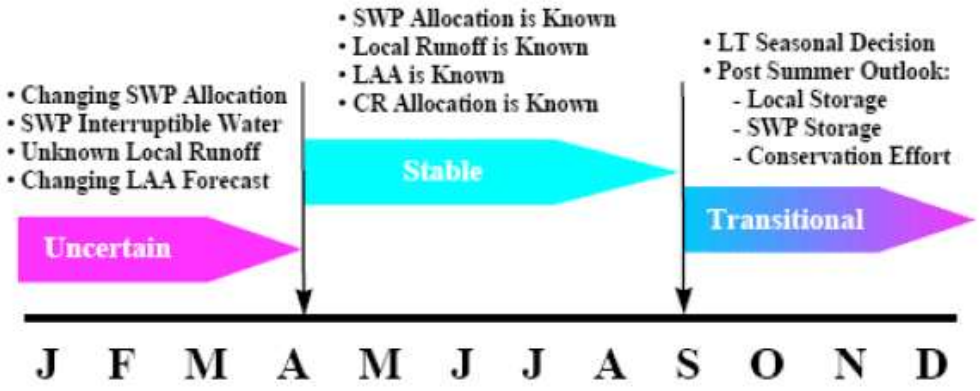
Figure 1: Sequence of WSDM Plan Water Resource Management Steps



The matrix is read from the center of the "Actions" column to the right or left. If Metropolitan is in a surplus stage, it would be read from the center up and to the left. If Metropolitan is in shortage stages, it would be read from the center down and to the right. Metropolitan's General Manager has authority to act on all surplus actions and shortage actions 1 through 4. Metropolitan's Board of Directors must approve actions 5 through 7.

The timeline below, from the WSDM Plan, shows a hypothetical shortage year.[12]

Figure 3-2: Shortage Year Timeline



From January through April, supplies are uncertain. The State Water Project (SWP) allocation is changing based on hydrology as well as the Los Angeles Aqueduct. From May through the end of September, supplies are known and actions have been taken in response to those known supplies. From October through December, a transitional period develops where there is uncertainty on the availability of supplies for the following period, and a decision is made on whether to offer long-term storage deliveries to member agencies as well as assess local storage, SWP storage and conservation efforts that have occurred.

A Drought Program Officer (DPO) will administer the public outreach programs. The DPO will be responsible for coordinating the various activities during a drought.

2007 Metropolitan Shortage Allocation Plan

Metropolitan's November 20, 2007 Board of Directors letter on the Draft Metropolitan Proposed Shortage Allocation Plan identifies the following central objectives of the Plan:

1. Address retail demands and wholesale water needs in the allocation year;
2. Adjust for factors such as population or economic growth, demand hardening, conservation savings, local investment, and the need for wholesale imported water; and
3. Employ an allocation formula that is as equitable as possible on the wholesale level while helping minimize hardships experienced by individuals and by the regional economy at the retail level.

The Plan employs a "two promise method" for supply allocation to ensure that:

1. On a retail level, shortages do not exceed the total Metropolitan percentage shortage (Retail Promise).
2. On a wholesale level, shortages do not exceed one and a half times the total Metropolitan percentage shortage (Wholesale Promise).

Key elements of the plan include:

- **Base Period –** Use of historical data is needed to estimate retail demands, local supplies, and wholesale water needs. The Plan uses a three-year average historical period as its base, with the initial period being 2004 through 2006. It is understood that this base period will be updated or adjusted as time progresses.
- **Growth Adjustment –** Estimates of retail demands need to be adjusted for growth that occurred between an allocation year and the base period. The Proposal uses county-level estimates of average annual growth in population as a proxy for member agency growth. Agencies will also have a choice to use a weighted average of population and job growth instead of just population.
- **Local Supply Adjustment –** Estimates of local supplies need to be adjusted for gains, losses, and extraordinary increases. These adjustments are critical to having reasonable estimates of total retail water needs.

- **Demand Hardening –** The Plan recognizes that significant increases in non-potable recycling and conservation savings devices can harden demands, and make additional reductions in water use more difficult to achieve. To address hardening due to non-potable recycling, non-potable recycling deliveries and the associated demands are not included in the allocation formula, thereby making all elements of the plan applicable to potable water uses only. To address hardening due to conservation, the Plan provides a credit based on the amount of conservation savings within a member agency and the regional shortage level declared by Metropolitan.
- **Depth of Shortage –** The Plan treats shallow shortages, defined as regional shortages up to ten percent, differently than deeper shortages. In shallow shortages, reductions in Metropolitan supplies will be done on an across-the-board basis, with adjustments for conservation demand hardening. This means that severely disparate impacts at a retail level are not addressed until regional shortages are greater than ten percent. At that point, the Plan employs an allocation formula that is equitable on the wholesale level while helping to minimize impacts to the regional economy from disparate shortages at the retail level.

Allocation Procedure

The shortage allocation formula has been developed for ten shortage levels from 5 to 50 percent.

1	5%	92.50%	0.00%	30%
2	10%	85.00%	0.00%	30%
3	15%	77.50%	7.50%	40%
4	20%	70.00%	10.00%	50%
5	25%	62.50%	12.50%	75%
6	30%	55.00%	15.00%	90%
7	35%	47.50%	17.50%	100%
8	40%	40.00%	20.00%	100%
9	45%	32.50%	22.50%	100%
10	50%	25.00%	25.00%	100%

Allocation Period
The allocation period covers twelve consecutive months, from July of a given year through the following June. This period was selected by Metropolitan so as to minimize the impacts of varying SWP allocations. It was also selected to provide member agencies with sufficient time to implement their outreach strategies and rate modifications.

Setting the Regional Shortage Level
Metropolitan staff shall be responsible for recommending a Regional Shortage Level for Board consideration. The final recommendation shall be based on water supply availability and Metropolitan water supply management actions, storage, and transfer operations that are consistent with those outlined in the WSDM Plan adopted by the Board in 1999, and the monthly status reports provided to the Water Planning and Stewardship Committee. Metropolitan's Board of Directors, through the Water Planning and Stewardship Committee, shall be responsible for approving the final Regional Shortage Level at its April meeting. By the April meeting, the majority of the winter snowfall accumulation period will have passed, and will allow staff to make an allocation based on a stable supply picture. Barring

unforeseen large-scale circumstances, the shortage level will be put in place for the entire allocation period without change. This will allow a stable planning platform for the agencies.

Allocation Appeals Process
An appeals process will be necessary for the administration of any changes or corrections to an agency's allocation. Metropolitan shall designate an Appeals Liaison as the official point of contact for all information and inquiries regarding appeals. Basis for appeals claims can include but are not limited to:

- Adjusting erroneous historical data used in base year calculations
- Adjusting for unforeseen loss or gain in local supply
- Adjusting for extraordinary increases in local supply

Small appeals, defined as those that would change an agency allocation by a threshold of less than 10 percent and less than 5,000 acre-feet, shall be evaluated and approved or denied by Metropolitan staff determination. For process transparency, Metropolitan staff shall provide a report to the Board of Directors on all submitted appeals, including the basis for determination of the outcome of the appeal. Member Agencies may request to forward appeals that are denied by Metropolitan staff to the Board of Directors through the Water Planning and Stewardship Committee for final resolution. For large appeals, defined as those that would change an agency allocation by a threshold of 10 percent and at least 5,000 acre-feet, Metropolitan staff shall refer the appeal to the Board of Directors through the Water Planning and Stewardship Committee for approval.

Allocation Penalty Rates
Member agency allocations shall be enforced through a penalty rate structure. The recommended penalty rate structure is an ascending block structure. This structure provides a lower penalty for minor overuse of allocations, and a higher penalty for major overuse of allocations.

Changes since the 2007 Plan

The WSAP has undergone a series of updates since the plan was first developed in 2007 and implemented in 2009. The most recent update approved in December of 2014 includes the following changes:

- Replaced the WSAP Base Period with the Fiscal Years ending 2013 and 2014 and included a credit process for mitigating for reduced local demands as a result of restrictions in place during the new Base Period;
- Replaced the method for calculating Conservation Demand Hardening;
- Added a separate allocation for drought-impacted groundwater basins; and
- Replaced the WSAP Penalty Rates with an Allocation Surcharge based on the marginal costs of water conservation programs.

Updated Base Period
The WSAP "Base Period" is used to determine the retail consumptive water demands for each member agency. The Base Period retail demand is adjusted for growth in population, conservation savings, and non-potable recycling production occurring from the base period to the year in which an allocation is declared (Allocation Year). The recent update replaces the WSAP Base Period of 2004–2006 with Fiscal Years ending 2013 and 2014. The change provides a more up-to-date estimate of current retail consumptive water demand.

Western's complete general water service area Base Period consumptive water demands at the time of Metropolitan Board adoption are summarized in the following table.

Local Supplies		MWD Purchases		Retail Demand		Allocation Year 2015		
FY 2012-2013	FY 2013-2014	FY 2012-2013	FY 2013-2014	FY 2012-2013	FY 2013-2014	Retail Demand	Local Supply	WSAP Baseline
186,497	183,858	68,457	75,910	260,997	259,768	261,793	183,858	77,934

Demand Hardening Methodology
Conservation Demand Hardening occurs at the retail water use level as consumers install more conservation saving devices and participating in available programs. In order to estimate conservation savings, each member agency will establish a historical baseline GPCD calculated in a manner consistent with California Senate Bill SBx7-7. Reductions from the baseline GPCD to the Allocation Year would be the basis used to calculate the equivalent conservation savings in acre-feet. The Conservation Demand Hardening credit will be based on an initial 10 percent of the GPCD-based Conservation savings plus an additional 5 percent for each level of Regional Shortage set by the Board of Directors during implementation of the WSAP. The credit will also be adjusted for:

- overall percentage reduction in retail water demand, and
- Western's dependence on Metropolitan.

This provides a base demand hardening credit equal to 10 percent of conservation savings and increases the credit as deeper shortages occur, which is when conservation demand hardening has a bigger impact on the retail consumer. The credit also increases based on the percentage of an agency's demand that was reduced through conservation. This accounts for increased hardening that occurs as increasing amounts of conservation are implemented. Lastly, the credit is scaled to the member agency's dependence on Metropolitan to ensure that credits are being applied to the proportion of water demand that is being affected by reductions in Metropolitan supply.

Separate Allocation for Drought-Impacted Groundwater Basins
Groundwater basins help provide vital local supplies that can buffer the region from short-term drought impacts. Longer droughts can result in reductions to the many sources of water that replenish groundwater basins, resulting in lower basin levels and potential impacts to the overlying consumptive demands. Limited imported deliveries under these conditions may help avoid impacts to the basins that may be drawn out of their normal operating range or subject to water quality or regulatory impacts. Metropolitan provides a limited allocation for drought impacted groundwater basins based on the following framework:

- Metropolitan staff will meet with a requesting member agency and the appropriate groundwater basin manager to document whether the basin is in one of the following conditions:
  - Groundwater basin overdraft conditions that will result in water levels being outside normal operating ranges during the WSAP allocation period; or
  - Violations of groundwater basin water quality and/or regulatory parameters that would occur without imported deliveries.
- Metropolitan will provide an allocation based on the verified need for groundwater replenishment. The allocation would start with a member agency's ten-year average purchases of imported groundwater replenishment supplies (excluding years in which deliveries were curtailed). The amount would then be reduced by the declared WSAP Regional Shortage Level (5 percent for each Regional Shortage Level).
- Any allocation provided under this provision for drought impacted groundwater basins is intended to help support and maintain groundwater production for consumptive use. As such, a member agency receiving an allocation under this provision will be expected to maintain groundwater production levels equivalent to the average pumping in the Base Period. Any adjustments to a member agency's M&I allocation due to lower groundwater production would be reduced by deliveries made under this provision.
- Agencies for which this allocation does not provide sufficient supplies for the needs of the groundwater basin may use the WSAP Appeals Process to request additional supply (subject to Board approval). The appeal should include a Groundwater Management Plan that documents the need for additional supplies according to the following tenets:
  - Maintenance of groundwater production levels;
  - Maintenance of, or reducing the further decline of, groundwater levels;
  - Maintenance of key water quality factors/indicators;
  - Avoidance of permanent impacts to groundwater infrastructure or geologic features, and;
  - Consideration of severe and/or inequitable financial impacts.

Final amounts and allocations will be determined following consultation with groundwater basin managers and member agencies.

WSAP Penalty Rates

The Allocation Surcharge is based on the costs that Metropolitan and its member agencies are incurring to implement outdoor water use reductions through turf removal programs. The Allocation Surcharge is designed to provide a price signal based on the marginal conservation costs incurred to reduce water use in dry and shortage years. Any revenues collected from the Allocation Surcharge would be used to fund the implementation of the Turf Removal program or other similar programs designed to conserve water and reduce future demands.

- The Allocation Surcharge is based on Metropolitan's current cost of the turf removal program. Metropolitan is currently paying $2 per square foot of turf removed. The estimated water

savings is 44 gallons per year for each square foot of turf removed for a period of ten years. Based on this savings rate, the estimated cost of the program is $1,480 per acre-foot.

- Water use between 100 percent and 115 percent of WSAP supply allocations is charged with the Allocation Surcharge of $1,480 per acre-foot. Water use greater than 115 percent of WSAP supply allocations is charged two times the Allocation Surcharge or $2,960 per acre-foot. Two times the Allocation Surcharge provides funding for additional turf removal and conservation programs to conserve additional water and further reduce demand or, if appropriate, allow for a higher per square foot incentive payment.

Attachment 2 - Metropolitan Water Supply Allocation Plan

Water Supply Allocation Plan



December 2014 Revision

Metropolitan Water District of Southern California

Inside cover: Photo courtesy of Cora Edmonds/ArtXchange for the Healing Planet

Water Supply Allocation Plan

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List of Acronyms

AF – Acre-feet
CUP – Groundwater Conjunctive Use Program
CWD – County Water District
DWP – Drought Management Plan
IAWP – Interim Agricultural Water Program Reductions and Rates
IICP – Incremental Interruption and Conservation Plan
IRP – Integrated Resources Plan
GPCD – Gallons per Capita per Day
M&I – Municipal and Industrial
MWD – Municipal Water District
RUWMP – Regional Urban Water Management Plan
SWP – State Water Project
WSAP – Water Supply Allocation Plan
WSDM – Water Surplus and Drought Management

Definitions

Extraordinary Supplies- Deliberate actions taken by member agencies to augment the total regional water supply only when Metropolitan is allocating supplies through the WSAP.

Groundwater Recovery- The extraction and treatment of groundwater making it usable for a variety of applications by removing high levels of chemicals and/or salts.

In-lieu deliveries- Metropolitan-supplied water bought to replace water that would otherwise be pumped from the groundwater basins.

Seawater Barrier- The injection of fresh water into wells along the coast to protect coastal groundwater basins from seawater intrusion. The injected fresh water acts like a wall, blocking seawater that would otherwise seep into groundwater basins as a result of pumping.

Section 1: Introduction

Calendar Year 2007 introduced a number of water supply challenges for the Metropolitan Water District of Southern California (Metropolitan) and its service area. Critically dry conditions affected all of Metropolitan's main supply sources. In addition, a ruling in the Federal Courts in August 2007 provided protective measures for the Delta Smelt in the Sacramento-San Joaquin River Delta which brought uncertainty about future pumping operations from the State Water Project. This uncertainty, along with the impacts of dry conditions, raised the possibility that Metropolitan would not have access to the supplies necessary to meet total firm demands[1] and would have to allocate shortages in supplies to the member agencies.[2]

In preparing for this possibility, Metropolitan staff worked jointly with the member agency managers and staff to develop a Water Supply Allocation Plan (WSAP). The WSAP includes the specific formulas for calculating member agency supply allocations and the key implementation elements needed for administering an allocation should a shortage be declared. The WSAP became the foundation for the urban water shortage contingency analysis required under Water Code Section 10632 and was incorporated into Metropolitan's 2010 Regional Urban Water Management Plan (RUWMP).

Section 2: Development Process

Member Agency Input

Between July 2007 and February 2008, Metropolitan staff worked cooperatively with the member agencies through a series of member agency manager meetings and workgroups to develop a formula and implementation plan to allocate supplies in case of shortage. These workgroups provided an arena for in-depth discussion of the objectives, mechanics, and policy aspects of the different parts of the WSAP. Metropolitan staff also met individually with fifteen member agencies for detailed discussions of the elements of the recommended proposal. Metropolitan introduced the elements of the proposal to many nonmember retail agencies in its service area by providing presentations and feedback to a number of member agency caucuses, working groups, and governing boards. The discussions, suggestions, and comments expressed by the member agencies during this process contributed significantly to the development of this WSAP.

Board of Directors Input

Throughout the development process Metropolitan's Board of Directors was provided with regular progress reports on the status of this WSAP, with oral reports in September, October, and December 2007, an Information Board of Directors Letter with a draft of the WSAP in November 2007, and a Board of Directors Report with staff recommendations in January 2008. Based on Water Planning and Stewardship Committee discussion of the staff recommendations and further review of the report by

[1] Firm demands are also referred to as uninterruptable demands; likewise non-firm demands are also called interruptible demands.
[2] See Appendix A: Metropolitan Member Agencies.

the member agencies, refinements were incorporated into the WSAP for final consideration and action in February 2008. The WSAP was adopted at the February 12, 2008 Board of Directors meeting.[3]

The 12-Month Review Process

When the Board adopted the WSAP in February 2008, the decision specified a formal revisit of the WSAP commencing in February 2010. The scheduled revisit was meant to ensure the opportunity for Metropolitan staff and the member agencies to re-evaluate the WSAP and recommend appropriate changes to the Board of Directors.

In April 2009, the Board voted to implement the WSAP for the first time. The WSAP was implemented at a Level 2 allocation level, and was in effect for the period of July 1, 2009, through June 30, 2010. Since implementation of the 2009/10 WSAP began in July 2009, a number of practical issues relating to the WSAP were identified by staff and the member agencies for further consideration during the 12-Month Review Process. Metropolitan staff engaged with the member agencies in a formal review of the WSAP from January through May 2010. During the review process the member agency managers participated in a series of six workshops. The focus of these workshops was to facilitate in-depth discussion on WSAP-related issues and lessons learned since the WSAP was implemented in July 2009. The proposed adjustments to the WSAP developed during the review process were adopted at the August 17, 2010 Board of Directors meeting[4].

The Three-Year Review Process

The Board action to adopt of the WSAP in February 2008 also directed staff to review the WSAP formula three years after the February 2008 adoption. February 2011 marked the three-year anniversary since the adoption of the WSAP. Similar to the 12-Month Review Process, the purpose of the Three-Year Review Process was to provide an opportunity for Metropolitan staff and the member agencies to re-evaluate the plan and recommend appropriate changes for board consideration.

Metropolitan staff met with the member agencies in a formal review of the WSAP from February through August 2011. Staff and member agency managers participated in a series of eleven workshops. Proposed adjustments to the WSAP developed during the process were adopted at the September 13, 2011 Board of Directors meeting.[5]

[3] A complete listing of member agency meetings and Board of Directors reporting activities is contained in Appendix B: Water Supply Allocation Plan Process Timeline.

[4] A complete listing of member agency meetings and Board of Directors reporting activities is contained in Appendix C: 12-Month Review Process and Results.

[5] A complete listing of member agency meetings and Board of Directors reporting activities is contained in Appendix D: Three-Year Review Process and Results.

2014 Review Process

In 2014, California was challenged with a third year of severe drought.[6] Metropolitan managed its operations through significant use of regional storage reserves. It was anticipated that end of year total dry storage reserves would approach levels similar to those when the WSAP was last implemented in 2009.

Following discussion at the June 2014 Water Planning and Stewardship Committee, Metropolitan staff convened a member agency working group to revisit the WSAP. The purpose of the working group was to collaborate with member agencies to identify potential revisions to the WSAP in preparation for mandatory supply allocations in 2015. There were eight working group meetings and three discussions at the monthly Member Agency Managers' Meetings.

The process focused on three areas of the WSAP: the Base Period, the Allocation Formula, and the Allocation enforcement mechanism. Proposed adjustments to the WSAP developed during the process were adopted at the December 9, 2014 Board of Directors meeting. [7]

[6] The Governor of California proclaimed a State of Emergency due to drought conditions on January 17, 2014 and, on April 24, 2014 issued an Executive Order proclaiming a continued State of Emergency noting drought conditions have persisted for the last three years and authorizing adoption and implementation of emergency regulations.

[7] A complete listing of member agency meetings and Board of Directors reporting activities is contained in Appendix E: 2014 Review Process and Results.

Section 3: Review of Historical Shortage Plans[8]

The WSAP incorporates key features and principles from the following historical shortage allocation plans but will supersede them as the primary and overarching decision tool for water shortage allocation.

Interruptible Water Service Program

As part of the new rate structure implemented in 1981, Metropolitan's Board of Directors adopted the Interruptible Water Service Program (Interruptible Program) which was designed to address short-term shortages of imported supplies. Under the Interruptible Program, Metropolitan delivered water for particular types of use to its member agencies at a discounted rate. In return for this discounted rate, Metropolitan reserved the right to interrupt delivery of this Interruptible Program water so that available supplies could be used to meet municipal and industrial demands.

Incremental Interruption and Conservation Plan

The ability to interrupt specific deliveries was an important element of Metropolitan's strategy for addressing shortage conditions when it adopted the Incremental Interruption and Conservation Plan (IICP) in December 1990. Reductions in IICP deliveries were used in concert with specific objectives for conservation savings to meet needs during shortages. The IICP reduced Interruptible Service deliveries in stages and provided a pricing incentive program to insure that reasonable conservation measures were implemented.

1995 Drought Management Plan

The 1995 Drought Management Plan (DMP) was a water management and allocation strategy designed to match supply and demand in the event that available imported water supplies were less than projected demands. Adopted by the Metropolitan Board of Directors in November 1994, the 1995 DMP was a short-term plan designed to provide for the 1995 calendar year only. The primary objective of the 1995 DMP was to identify methods to avoid implementation of mandatory reductions. The 1995 DMP included various phases and a step-by-step strategy for evaluating supply and demand conditions and utilizing Metropolitan's available options, with the final phase being implementation of the revised IICP.

1999 Water Surplus and Drought Management Plan

Metropolitan staff began work on the Water Surplus and Drought Management (WSDM) Plan in March 1997 as part of the Integrated Water Resources Plan (IRP), which was adopted by Metropolitan's Board of Directors in January 1996. The IRP established regional water resource targets, identifying the need for developing resource management policy to guide annual operations. The WSDM Plan defined Metropolitan's resource management policy by establishing priorities for the use of regional resources to achieve the region's reliability goal identified in the IRP. In April 1999, Metropolitan's Board of Directors adopted the WSDM Plan.

[8] A summary of the key elements in the following allocation plan is found in Appendix F: Summary of Historical Shortage Plans.

The WSDM Plan also included a set of principles and considerations for staff to address when developing specific allocation methods. The WSDM Plan stated the following guiding principle to be followed in developing any future allocation scheme:

> *"Metropolitan will encourage storage of water during periods of surplus and work jointly with its member agencies to minimize the impacts of water shortages on the region's retail consumers and economy during periods of shortage."*[9]

This principle reflects a central desire for allocation methods that are both equitable and minimize regional hardship to retail water consumers. The specific considerations postulated by the WSDM Plan to accomplish this principle include the following:[10]

- The impact on retail customers and the economy
- Allowance for population and growth
- Change and/or loss of local supply
- Reclamation/Recycling
- Conservation
- Investment in local resources
- Participation in Metropolitan's interruptible programs
- Investment in Metropolitan's facilities.

Section 4: Water Supply Allocation Formula

Based on the guiding principle and considerations described in the WSDM Plan, Metropolitan staff and the member agencies developed a specific formula for allocating water supplies in times of shortage. The formula seeks to balance the impacts of a shortage at the retail level while maintaining equity on the wholesale level, and takes into account growth, local investments, changes in supply conditions and the demand hardening[11] aspects of non-potable recycled water use and the implementation of conservation savings programs. The formula, described below, is calculated in three steps: base period calculations, allocation year calculations, and supply allocation calculations.[12] The first two steps involve standard computations, while the third section contains specific methodology developed for this WSAP.

Base Period Calculations

The first step in calculating a water supply allocation is to estimate water supply and demand using a historical base period with established water supply and delivery data. The base period for each of the different categories of demand and supply is calculated using data from the fiscal years (July through June) ending 2013 and 2014.[13]

[9] WSDM Plan, p. 1. Emphasis added.
[10] WSDM Plan, p. 2.
[11] Demand hardening is the effect that occurs when all low-cost methods of decreasing overall water demand have been applied (e.g., low-flow toilets, water recycling) and the remaining options to further decrease demand become increasingly expensive and difficult to implement.
[12] Detailed operational elements of these objectives and a numerical example are discussed in Appendix G: Water Supply Allocation Formula Example.
[13] Exceptions to this methodology are noted in the descriptions of base period calculations.

Base Period Local Supplies: Local supplies for the base period are calculated using a two-year average of groundwater production, groundwater recovery, Los Angeles Aqueduct supply, surface water production, and other imported supplies. Non-potable recycling production is not included in this calculation due to its demand hardening effect.

Base Period Wholesale Demands: Demands on Metropolitan for the base period are calculated using a two-year average of firm purchases and in-lieu deliveries to long-term groundwater replenishment, conjunctive use, cyclic, and supplemental storage programs.

Base Period Retail Demands: Total retail-level municipal and industrial (M&I) demands for the base period are calculated by adding the Base Period Wholesale Demands and the Base Period Local Supplies. This estimates an average total demand for water from each agency.

Base Period Mandatory Conservation Credit: Metropolitan allows a consultation process that enables member agencies to describe mandatory water use restrictions and/or rationing restrictions that were in place within their service areas during the Base Period. Restrictions may vary among agencies but include restricted water uses, fines, and water budget or penalty based rate structures that are enacted by the governing body of the member agency or retail agency. Following the consultation process, Metropolitan staff will recommend adjustments based on evidence of reduced GPCD. To qualify for an adjustment, GPCD reductions would have to be observed that are beyond those expected from the agency's ongoing conservation efforts and trends.

Allocation Year Calculations

The next step in calculating the water supply allocation is estimating water needs in the allocation year. This is done by adjusting the base period estimates of retail demand for population or economic growth and changes in local supplies.

Allocation Year Retail Demands: Total retail M&I demands for the allocation year are calculated by adjusting the Base Period Retail Demands for baseline inflation and growth.

Baseline Inflation Adjustment: Baseline inflation occurs when non-potable recycling or conservation is developed after the Base Period. The development of these supplies reduces actual demands for water in the Allocation Year. Because non-potable-recycling and conservation are excluded from the WSAP formula, the actual need for water in the Allocation year is overestimated. The Baseline Inflation Adjustment removes increases in non-potable recycling and conservation annually from the Base Period forward to better reflect the true need for water in the Allocation Year.

Growth Adjustment: The growth adjustment is calculated using the estimated actual annual rate of population growth at the county level, as generated by the California Department of Finance, whenever possible. For years without complete data, the growth rate is calculated using an average of the three most recent years available. Growth will be allocated based on historical per capita water use during the Base Period, with a cap equal to Metropolitan's IRP Target for Water Use Efficiency. For

allocation years up to and including 2014, the cap will be 163 GPCD, and for allocation years 2015-2020 the cap will reduce linearly from 163 to 145 GPCD. On an appeals basis, member agencies may request that their adjustment be calculated using member agency level population growth. A weighted combination of actual population and actual employment growth rates may also be requested.

Allocation Year Local Supplies: Allocation Year Local Supplies include groundwater production, groundwater recovery, Los Angeles Aqueduct supply, surface water production, seawater desalination, and other imported supplies. Estimates of Allocation Year Local Supplies are provided by the member agencies upon implementation of a WSAP. If estimates are not provided, Metropolitan will use the sum of the Base Period Local Supplies and Base Period In-Lieu Deliveries as a default. Agencies may provide updated estimates at any time during the Allocation Year to more accurately reflect their demand for Metropolitan supplies.

Extraordinary Supplies: Under the WSAP formula, local supply production in the Allocation Year can either be designated as a "planned" supply, or as an "extraordinary" supply.[14] This is an important designation for a member agency because the two types of supplies are accounted for differently in the WSAP formula. Local supplies classified at Extraordinary Supply are only partially included (scaled depending on the WSAP Level) as local supplies. This has the effect of providing significantly more benefit to the member agency in terms of total water supply that is available to the retail customer.[15]

Allocation Year Wholesale Demands: Demands on Metropolitan for the allocation year are calculated by subtracting the Allocation Year Local Supplies from the Allocation Year Retail Demands.

Water Supply Allocation Calculations

The final step is calculating the water supply allocation for each member agency based on the allocation year water needs identified in Step 2. The following table displays the elements that form the basis for calculating the supply allocation. Each element and its application in the allocation formula are discussed below.

Table 1: Shortage Allocation Index

(a) Regional Shortage Level	(b) Wholesale Minimum Percentage	(c) Maximum Retail Impact Adjustment Percentage
1	92.5%	2.5%
2	85.0%	5.0%
3	77.5%	7.5%
4	70.0%	10.0%

[14] Appendix H: Board Policy Principles on Determining the Status of Extraordinary Supply lists the key Board principles used in determining if a supply qualifies as an Extraordinary Supply.

[15] See Appendix G: Water Supply Allocation Formula Example for specific allocation formulae.

5	62.5%	12.5%
6	55.0%	15.0%
7	47.5%	17.5%
8	40.0%	20.0%
9	32.5%	22.5%
10	25.0%	25.0%

Regional Shortage Level: The WSAP formula allocates shortages of Metropolitan supplies over ten levels.

Wholesale Minimum Allocation: The Wholesale Minimum Allocation ensures a minimum level of Metropolitan supplied wholesale water service to each member agency.

Maximum Retail Impact Adjustment: The purpose of this adjustment is to ensure that agencies with a high level of dependence on Metropolitan do not experience disparate shortages at the retail level compared to other agencies when faced with a reduction in wholesale water supplies. The Maximum Retail Impact Percentage is prorated on a linear scale based on each member agency's dependence on Metropolitan at the retail level. This percentage is then multiplied by the agency's Allocation Year Wholesale Demand to determine an additional allocation.

Conservation Demand Hardening Credit: The Conservation Demand Hardening Credit addresses the increased difficulty in achieving additional water savings at the retail level that comes as a result of successful implementation of water conserving devices and conservation savings programs. To estimate conservation savings, each member agency will establish a historical baseline Gallons Per Person Per Day (GPCD) calculated in a manner consistent with California Senate Bill SBx7-7.[16] Reductions from the baseline GPCD to the Allocation Year are used to calculate the equivalent conservation savings in acre-feet. The Conservation Demand Hardening Credit is based on an initial 10 percent of the GPCD-based Conservation savings plus an additional 5 percent for each level of Regional Shortage set by the Board during implementation of the WSAP. The credit will also be adjusted for:

- The overall percentage reduction in retail water demand
- The member agency's dependence on Metropolitan

The credit is calculated using the following formula:

Conservation Demand Harding Credit = Conservation Savings x (10% + Regional Shortage Level Percentage) x (1 +((Baseline GPCD – Allocation Year GPCD)/Baseline GCPD)) x Dependence on MWD Percentage

[16] California Department of Water Resources, February 2011, "Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use. Available at: http://www.water.ca.gov/wateruseefficiency/sb7/docs/MethodologiesCalculatingBaseline_Final_03_01_2011.pdf

This provides a base demand hardening credit equal to 10 percent of conservation savings and increases the credit as deeper shortages occur, which is when conservation demand hardening has a bigger impact on the retail consumer. The credit also increases based on the percentage of an agency's demand that was reduced through conservation. This accounts for increased hardening that occurs as increasing amounts of conservation are implemented. Lastly, the credit is scaled to the member agency's dependence on Metropolitan to ensure that credits are being applied to the proportion of water demand that is being affected by reductions in Metropolitan supply.

Minimum Per-Capita Water Use Credit: This adjustment creates a minimum per capita water use threshold. Member agencies' retail-level water use is compared to two different thresholds. The proposed minimum thresholds are based upon compliance guidelines established under Senate Bill X7-7.

- 100 GPCD total water use
- 55 GPCD residential water use

Agencies that fall below either threshold under the WSAP will receive additional allocation from Metropolitan to bring them up to the minimum GPCD water use level. If an agency qualifies under both thresholds, the one resulting in the maximum allocation adjustment will be given.[17] To qualify for this credit, member agencies must provide documentation of the total agency level population and the percent of retail level demands that are residential; no appeal is necessary.

Total WSAP Allocation: The allocation to an agency for its M&I retail demand is the sum of the Wholesale Minimum Allocation, the Retail Impact Adjustment, the Conservation Demand Hardening Credit, and the Minimum Per-Capita Water Use Credit.[18]

Total Metropolitan Supply Allocations: In addition to the WSAP Allocation described above, agencies may also receive separate allocations of supplies for and seawater barrier and groundwater replenishment demands. Allocations of supplies to meet seawater barrier demands are to be determined by the Board of Directors independently but in conjunction with the WSAP. Separating the seawater barrier allocation from the WSAP allocation allows the Board to consider actual barrier requirements in the Allocation Year and address the demand hardening issues associated with cutting seawater barrier deliveries. According to the principles outlined for allocating seawater barrier demands, allocations should be no deeper than the WSAP Wholesale Minimum Percentage implemented at that time.

The WSAP also provides a limited allocation for drought-impacted groundwater basins based on the following framework:[19]

[17] See Appendix J: Per Capita Water Use Minimum Example for specific minimum per-capita water use credit formulae and example.
[18] See Appendix G: Water Supply Allocation Formula Example for specific allocation formulae.
[19] See Appendix L: Groundwater Replenishment Allocation for more information.

1. Metropolitan staff will hold a consultation with the requesting member agency and the appropriate groundwater basin manager to document whether the basin is in one of the following conditions:
    a. Groundwater basin overdraft conditions that will result in water levels being outside normal operating ranges during the WSAP allocation period; or
    b. Violations of groundwater basin water quality and/or regulatory parameters that would occur without imported deliveries
2. An allocation is provided based on the verified need for groundwater replenishment. The allocation would start with a member agency's ten-year average purchases of imported groundwater replenishment supplies (excluding years in which deliveries were curtailed). The amount would then be reduced by the declared WSAP Regional Shortage Level.

Section 5: WSAP Implementation

The WSAP will take effect if a regional shortage is declared by the Board of Directors. The following implementation elements are necessary for administering the WSAP during a time of shortage. These elements cover the processes needed to declare a regional shortage level as well as provide information pertaining to the allocation surcharge.

Allocation Period

The allocation period covers twelve consecutive months, from July of a given year through the following June. This period was selected to minimize the impacts of varying State Water Project (SWP) allocations and to provide member agencies with sufficient time to implement their outreach strategies and rate modifications.

Setting the Regional Shortage Level

Metropolitan staff is responsible for recommending a Regional Shortage Level for the Board of Directors' consideration. The recommendation shall be based on water supply availability, and the implementation of Metropolitan's water management actions as outlined in the WSDM Plan. Metropolitan staff will keep the Board of Directors apprised to the status of water supply conditions and management actions through monthly reports to the Water Planning and Stewardship Committee. To further facilitate staff in the development of a recommended regional shortage level, member agency requests for local supply adjustments shall be submitted by April 1st.

Metropolitan's Board of Directors, through the Water Planning and Stewardship Committee, is responsible for approving the final Regional Shortage Level at its April meeting. By the April meeting, the majority of the winter snowfall accumulation period will have passed and will allow staff to make an allocation based on more stable water supply estimates. Barring unforeseen large-scale circumstances, the Regional Shortage Level will be set for the entire allocation period, which will provide the member agencies an established water supply level for their planning.

Exit Strategy

While the Board ultimately has discretion to implement or lift and allocation at any point of time during the year; the WSAP includes a two-part exit strategy that is meant to streamline the WSAP implementation decision making process.

- If the Board decides to implement the WSAP, then any current WSAP allocation would remain in place until the end of the Allocation Year.
- If the Board decides not to implement the WSAP, then any current WSAP allocation would be terminated concurrent with the Board decision.

Allocation Appeals Process

An appeals process is necessary for the administration of any changes or corrections to an agency's allocation. Metropolitan's General Manager will designate, subsequent to a declaration of an allocation by the Board of Directors, an Appeals Liaison as the official point of contact for all information and inquiries regarding appeals. All member agency General Managers will be notified in writing of the name and contact information of the Appeals Liaison. Only appeals that are made through the Appeals Liaison and in accordance with the provisions outlined in Appendix N: Allocation Appeals Process will be evaluated. Basis for appeals claims can include but are not limited to:

- Adjusting erroneous historical data used in base period calculations
- Adjusting for population growth rates
- Determining if a local supply qualifies as Extraordinary Supply

Additional details and a checklist for the appeals process are available in Appendix N: Allocation Appeals Process and Appendix O: Appeals Submittal Checklist.

Allocation Surcharge

Member agency allocations are supported by an Allocation Surcharge. The Allocation Surcharge is charged to water use above the Member Agency allocation and is charged in addition to Metropolitan's standard rates for water service. Allocation Surcharges will only be assessed to the extent that an agency's total annual usage exceeds its total annual allocation. Any revenues collected through the Allocation Surcharge will be applied towards Metropolitan's Water Management Fund, which is used to in part to fund expenditures in dry-year conservation. No billing or assessment of allocation surcharges rates will take place until the end of the twelve-month allocation period.

Allocation Surcharge: The application of the Allocation Surcharge structure is a two tier structure that provides a lower level of Allocation Surcharge for minor overuse of allocations and a higher level of Allocation Surcharge for major overuse of allocations. The structure and applicable Allocation Surcharges are listed in Table 2.

Table 2: Allocation Surcharge			
Water Use	**Base Water Rate[20]**	**Allocation Surcharge[21]**	**Total Rate**
100% of Allocation	Tier 1	0	Tier 1
Between 100% and 115%	Tier 1	$1,480	Tier 1 + ($1,480)
Greater than 115%	Tier 1	$2,960	Tier 1 + ($2,960)

Qualifying Income-Based Rate Allocation Surcharge Adjustment:[22] Any Allocation Surcharges incurred by a member agency under the WSAP will be adjusted to reflect the extent to which retail customers within a member agency's service area are served under a "lifeline" or similar qualified discounted rate program based on income or ability to pay ("Income-Based Rate").

Any member agency who is assessed Allocation Surcharges under the WSAP may submit an acre-foot equivalent of water used by retail customers served under a qualifying Income-Based Rate.[23] This amount of water use would be multiplied by the percentage of retail-level reduction in allocation year demand necessary for that member agency to avoid exceeding its WSAP allocation. The monetary amounts resulting from these acre feet are subtracted from the total monetary amounts incurred by an agency for exceeding its allocation. In the case that the monetary amounts associated with the Income-Based Rate are greater than the total Allocation Surcharges an agency incurs, no Allocation Surcharges will be incurred. The end result of this adjustment is that the member agency will not be subject to Allocation Surcharges for the use of water by their retail customers served under a qualifying Income-Based Rate.

Growth Rate Allocation Surcharge Adjustment": In recognition of member agency differences in geography and climate, a Growth Rate Allocation Surcharge Adjustment will be given to any agency that exceeds its WSAP Allocation. The Allocation Surcharge reduction will be based on the difference in acre-feet between the Growth Adjustment applied at Metropolitan's IRP planning goal rate, and the greater of the following:

- The IRP planning goal rate adjusted for the member agency's ETo, or
- The member agency's certified and documented 20x2020 targeted GPCD

If both of these alternatives result in a lower growth adjustment than the IRP planning goal, no Allocation Surcharge reduction will be made.

[20] The base water rate shall be the applicable water rate for the water being purchased. In most cases, it will be the Tier 1 rate (plus Treatment Surcharge for treated water deliveries). However, it is possible that the water being purchased would be in the amount that would put an agency beyond its Tier 1 limit. In that case, the base water rate will be the Tier 2 rate (plus Treatment Surcharge for treated water deliveries).

[21] Allocation Surcharge is applied to water use in excess of an agency's WSAP allocation.

[22] See Appendix K: Qualifying Income-Based Rate Allocation Surcharge Adjustment Example for specific penalty adjustment formulae and example.

[23] Appropriate documentation and certification will be required.

Tracking and Reporting

Subsequent to a declared regional shortage by the Board of Directors, Metropolitan staff will produce monthly reports of each member agency's water use compared to its allocations based on monthly delivery patterns to be submitted by the member agency. In order to produce these reports, member agencies are requested to submit their local supply use on a monthly basis and certify end of allocation year local supply use. These reports and comparisons are to be used for the purposes of tracking and communicating potential underage/overage of an agency's annual allocations.

Key Dates for Water Supply Allocation Implementation

The timeline for implementation of an allocation is shown in Table 3. A brief description of this timeline follows:

January to March: Water Surplus and Drought Management reporting occurs at Metropolitan's Water Planning and Stewardship Committee meetings. These reports will provide updated information on storage reserve levels and projected supply and demand conditions.

April: Member agencies report their projected local supplies for the coming allocation year. This information is incorporated in staff analysis of storage reserves and projected supply and demand conditions in order to provide an allocation recommendation to the Board. Metropolitan's Board will consider whether an allocation is needed. A declaration of an allocation will include the level of allocation to be in effect for the allocation year. Likewise, member agencies will report their projected demands and local supplies needed to meet seawater barrier and groundwater replenishment requirements for the allocation year. Metropolitan's Board will consider whether allocations for seawater barrier demands and groundwater replenishment demands are needed independently from the WSAP allocation decision.**July 1st**: If the Board declared an allocation in April, then it will be effective starting July 1st. The allocation level will be held through June 30th, barring unforeseen circumstances. Member agencies will now be requested to submit their local supply use on a monthly basis and certify end of allocation year local supply use. Local production data must be reported to Metropolitan by the end of the month following the month of use (use in July must be reported by the end of August). This information will be combined with Metropolitan sales information in order to track retail water use throughout Metropolitan's service area. Each month Metropolitan will report on member agency water sales compared to their allocation amounts.

June 30th: The allocation year is complete.

July: Member agency local supplies must be certified for the month of June, the last month of the previous allocation year.

August: Metropolitan will calculate each member agency's total potable water use based on local supply certifications and actual sales data for the allocation year of July through June. Allocation surcharges will be assessed for usage above a given member agency's final adjusted allocation (reflecting the actual local supply and imported water use that occurred in the allocation year).

Table 3: Board Adopted Allocation Timeline					
Year	**Month**	**Year 1 Board Decision**	**Year 1 Allocation Year**	**Year 2 Board Decision**	**Year 2 Allocation Year**
Year 1	January				
	February				
	March				
	April	Declaration *			
	May				
	June				
	July		**Effective Period** Continuous Tracking of Member Agency Local Supply and Imported Water Use		
	August				
	September				
	October				
	November				
	December				
Year 2	January				
	February				
	March				
	April			Declaration *	
	May				
	June				
	July				
	August		Assess		
	September				
	October				
	November				
	December				
Year 3	January				**Effective Period** Continuous Tracking of Member Agency Local Supply and Imported Water Use
	February				
	March				
	April				
	May				
	June				

*Member agency projections of local supplies are due on April 1st to assist Metropolitan staff in determining the need for an allocation in the coming allocation year.

Appendix A: Metropolitan Member Agencies

Table 4: Member Agencies		
City of Anaheim	City of Glendale	City of San Marino
City of Beverly Hills	Inland Empire Utilities Agency	City of Santa Ana
City of Burbank	Las Virgenes MWD	City of Santa Monica
Calleguas MWD	City of Long Beach	Three Valleys MWD
Central Basin MWD	City of Los Angeles	City of Torrance
City of Compton	MWD of Orange County	Upper San Gabriel MWD
Eastern MWD	City of Pasadena	West Basin MWD
Foothill MWD	San Diego CWA	Western MWD
City of Fullerton	City of San Fernando	

Source: http://mwdh2o.com/WhoWeAre/Member-Agencies/

Appendix B: Water Supply Allocation Plan Process Timeline

July 2007

- City of Long Beach Water Department staff briefing
- Member Agency Managers/Member Agency Workgroup meeting
- Northern Managers Group meeting
    - Foothill MWD, City of Pasadena, City of Long Beach, Calleguas MWD, City of Los Angeles, West Basin MWD, City of Burbank, Three Valleys MWD, City of Glendale, Upper San Gabriel MWD

August 2007

- Central Basin MWD staff briefing
- Eastern MWD staff briefing
- San Diego CWA staff briefing
- Member Agency Managers/Member Agency Workgroup meeting
- Western MWD staff briefing
- City of Beverly Hills staff briefing

September 2007

- Member Agency Subgroup meetings
    - MWD of Orange County, San Diego CWA, West Basin MWD, Central Basin MWD
- MWD of Orange County staff briefing
- Member Agency Workgroup meeting
- Member Agency Workgroup meeting
- MWD Board of Directors Oral Report

October 2007

- Inland Empire Utilities Agency staff briefing
- Central Basin MWD Caucus Meeting (included sub-agencies)
- Three Valleys MWD staff briefing
- MWD of Orange County staff briefing
- West Basin MWD staff briefing
- MWD Board of Directors Oral Report

November 2007

- West Basin MWD Caucus Meeting (included sub-agencies)
- West Basin Water Users Association presentation
- Walnut Valley MWD staff briefing (sub-agency of Three Valleys MWD)
- Foothill MWD Managers Meeting (included sub-agencies)
- Central Basin MWD staff briefing
- City of Claremont City Council (sub-agency of Three Valleys MWD)
- MWD Board of Directors Information Letter with Draft Proposal

December 2007

- Northern Managers Group Meeting
- California Department of Public Health staff briefing
- City of Long Beach Water Department staff briefing
- Santa Ana River Watershed Project Authority presentation
- Foothill MWD Managers Meeting (included sub-agencies)
- MWD Board of Directors Oral Report

January 2008

- Northern Managers Group Meeting
- Water Replenishment District Board of Directors presentation
- Three Valleys MWD staff briefing
- Member Agency Conservation Coordinator's Group presentation
- Member Agency Managers/Member Agency Workgroup meeting
- City of Chino Hills presentation (sub-agency of IEUA)
- Member Agency Workgroup meeting
- Hemet/San Jacinto Exchange Club presentation
- MWD Board of Directors Report with Staff Recommended Water Supply Allocation Plan

February 2008

- MWD of Orange County and Irvine Ranch WD staff briefing
- MWD Board of Directors Action Item
- San Gabriel Valley Water Association Meeting
- Orange County Water Policy Meeting
- SCAG Water Policy Task Force Meeting

Appendix C: 12-Month Review Process and Results

January 2010

- WSAP 12-Month Review Process workshop #1
    - Focused discussion of WSAP issues identified by Metropolitan staff and by member agencies since the July 2009 implementation began.

February 2010

- WSAP 12-Month Review Process workshop #2
    - Continuation of focused discussion
- WSAP 12-Month Review Process workshop #3
    - Continuation of focused discussion

March 2010

- WSAP 12-Month Review Process workshop #4
    - Continuation of focused discussion
- MWD Board of Directors information item
    - Review of potential modifications to the WSAP definition of Extraordinary Supply

April 2010

- WSAP 12-Month Review Process workshop #5
    - Recap of identified issues and discussion of Metropolitan staff proposals for adjustments to the WSAP
- Member Agency Managers Meeting
    - Update on the 12-Month Review Process
- WSAP 12-Month Review Process workshop #6
    - Discussion of WSAP issues related to groundwater replenishment
- Member Agency Managers conference call
    - Clarification of WSAP definition for Extraordinary Supply

May 2010

- Member Agency Managers Meeting
    - Discussion of proposed Extraordinary Supply policy principles and WSAP Local Supply certification process.
- Member Agency Managers conference call
    - Discussion of proposed Extraordinary Supply policy principles

June 2010

- MWD Board of Directors action item

July 2010

- MWD Board of Directors information item
    - Review of proposed adjustments to the WSAP developed in the 12-Month Review Process

August 2010

- MWD Board of Directors action item

Resulting Changes

- Removed references to Gains and Losses of Local Supply
    - Removed references in the WSAP to "gains and losses of local supplies" in order to better facilitate the accounting of historical base year and allocation year local supplies. This change did not affect the WSAP formula or allocations.
- Removed references to the Regional Shortage Percentage
    - Removed references to the "Regional Shortage Percentage" in the WSAP to reduce unintended confusion between calculation factors and shortage amounts. This change did not affect the WSAP formula or allocations.
- Included the Retail Impact Adjustment in all shortage levels
    - Included the Retail Impact Adjustment for Regional Shortage Levels 1 and 2. This change results in additional allocations to Metropolitan-dependent agencies under Level 1 and Level 2 regional shortages.
- Revised the accounting of Extraordinary Supplies
    - Revised the methodology for accounting of Extraordinary Supply in the WSAP formula by:
        - Removing the Base Period Local Supply threshold provision,
        - Removing the sliding-scale sharing mechanism from the formula, and
        - Including the full amount of the Extraordinary Supply in the calculation of the Retail Impact Adjustment.
- Included a Minimum Per Capita Water Use Threshold
    - Developed a minimum water use credit based on two GPCD water use thresholds. Member agencies would receive additional Metropolitan allocation for an acre-foot equivalent of GPCD below the minimum threshold. Member agency water use, on a gallon per capita per day (GPCD) basis, is compared to the following minimum thresholds established under Senate Bill X7-7 (Water Conservation Act of 2009)
        - 100 GPCD total use or
        - 55 GPCD residential indoor use
- Excluded Seawater Barrier from the WSAP Formula
    - Excluded seawater barrier supplies from the WSAP Base Period and Allocation Year local supply calculations. This allows the Board to determine allocations for seawater barrier demands separately from the WSAP.

Appendix D: Three-Year Review Process and Results

February 2011

- WSAP 3-Year Review Process workshop #1
    - Review of the existing WSAP policy formula; review of the process timeline; and focused discussion of WSAP issues identified by Metropolitan staff and by member agencies since the WSAP's adoption in February 2008

March 2011

- WSAP 3-Year Review Process workshop #2
    - Discussion of issues related to local supplies and baseline inflation due to adjustments for recycling in the WSAP formula
- WSAP 3-Year Review Process workshop #3
    - Continuation of prior workshop

April 2011

- WSAP 3-Year Review Process workshop #4
    - Discussion of issues and alternatives related to base period selection and baseline inflation in the WSAP formula
- WSAP 3-Year Review Process workshop #5
    - Discussion of recommendations to address baseline inflation in the WSAP formula

May 2011

- WSAP 3-Year Review Process workshop #6
    - Discussion of issues and alternatives for the growth adjustment methodology in the WSAP formula
- WSAP 3-Year Review Process workshop #7
    - Continuation of prior workshop

June 2011

- WSAP 3-Year Review Process workshop #8
    - Continuation of prior workshop, discussion of WSAP implementation exit strategy
- WSAP 3-Year Review Process workshop #9
    - Continuation of exit strategy discussion, discussion of baseline inflation due to conservation and related conservation demand hardening issues

July 2011

- WSAP 3-Year Review Process workshop #9
    - Continued discussion of baseline inflation and conservation issues, and discussion of sharing allocations between agencies with common local resources

August 2011

- WSAP 3-Year Review Process workshop #10
    - Discussion of WSAP Allocation Year timing vs. Tier 1-Tier 2 rate cycle timing, discussion of approaches for encouraging completion of WSAP local supply certifications
- Review WSAP at Member Agency Managers Meeting
    - Discussion of proposed WSAP adjustments to address baseline inflation issues, revise the growth adjustment methodology, and establish a WSAP exit strategy

September 2011

- MWD Board of Directors action item

Resulting Changes

- Baseline Inflation Adjustment
    - Removed non-potable recycling and conservation from the WSAP baseline
        - Increases in recycling and conservation will be subtracted annually from the Base Period forward
        - The annual population growth rate will be applied after deducting the annual increases in recycling and conservation
        - If an agency ends up in allocation penalty, a penalty reduction will be applied in an amount equal to the Code-Based and rate Structure conservation savings that were removed from the WSAP baseline
- Changed the Growth Adjustment methodology
    - Growth will be allocated at historical per capita rate capped at the 2010 Integrated Water Resource Plan (IRP) Target for Water Use Efficiency
        - For years up to and including 2014, the cap will be 163 GPCD
        - For years 2015-2020, the cap will reduce linearly from 163 to 145 GPCD
    - If an agency exceeds its allocation, a penalty reduction will be applied based on either:
        - The differential Evapotranspiration (ETo) of its service area compared to the MWD average, or
        - Certified and documented 20 x 2020 targeted GPCD
- Exit Strategy
    - Clarified the course of action for an existing WSAP allocation when Metropolitan's Board makes a declaration decision for the following WSAP year
        - If there is an allocation for the next year, then the current allocation stays in place
        - If there is no allocation for the next year, then the current allocation is lifted concurrent with the April decision

Appendix E: 2014 Review Process and Results

July 2014

- WSAP Workgroup Meeting #1
  - First meeting of the 2014 WSAP Review process; review of the existing WSAP policy and formula; review of the process timeline; began discussion of issues related to base period selection
- WSAP Workgroup Meeting #2
  - Discussion of base period selection

August 2014

- WSAP Workgroup Meeting #3
  - Continuation of prior workshop discussion; comparison of base period alternatives

September 2014

- WSAP Workgroup Meeting #4
  - Discussion of a base period proposal; discussion of replenishment issues in the WSAP; discussion of 2015 water supply scenarios
- Review WSAP at Member Agency Managers Meeting
  - Review of WSAP workgroup process; discussion on issues related to base period, demand hardening, and local resources development
- WSAP Workgroup Meeting #5
  - Review of base period recommendation; discussion of issues regarding agencies in mandatory conservation during a base period; discussion on replenishment in the WSAP

October 2014

- WSAP Workgroup Meeting #6
  - Continuation of prior workshop discussion; discussion of alternative methods for conservation demand hardening credit; discussion of new and existing local supplies
- Review WSAP at Member Agency Managers Meeting
  - Review of WSAP workgroup process; discussion of issues related to base period and demand hardening

November 2014

- WSAP Workgroup Meeting #7
  - Review and discussion of issues and potential methods for base period selection and adjustment, replenishment allocation, and conservation demand hardening credit; review of estimated effects of potential WSAP changes at the regional level
- WSAP Workgroup Meeting #8
  - Review of proposed recommendations for the WSAP based on workgroup discussion
- Review WSAP at Member Agency Managers Meeting
  - Review of proposed recommendations for the WSAP based on workgroup discussion

Resulting Changes

- Base Period Update to FY2013 and FY2014
    - Changed the WSAP Base Period from calendar years 2004-2006 to fiscal years ending July 2013 and 2014
    - Mandatory Conservation Adjustment
        - Agencies with mandatory conservation in effect during the base period (FY 2013 and/or FY 2014) may qualify for a demand hardening adjustment, adjustment is subject to a consultation process that includes consideration historical demand and GPCD information

- Modify Conservation Demand Hardening Credit
    - Replaced device calculation-based estimates of conservation savings with a GPCD-based method
        - Conservation savings are calculated by comparing GPCD from a historical baseline to the Allocation Year; the difference is converted to acre-feet using the Allocation Year population.
            - Baseline GCPD is 10-year average ending between 2004 and 2010, with gross water, using gross water use minus non-potable recycled water production and documented historical population
    - Replaced formula for calculating the credit for each Regional Shortage Level
    - Conservation Demand hardening credit will be based on an initial 10 percent of GPCD-based conservation savings plus an additional 5 percent for each level of Regional Shortage; the credit will also be adjusted for the overall percentage reduction in retail water demand and the member agency's dependence on Metropolitan.
- Allocation Surcharge
    - Replaced the WSAP Penalty Rate with an Allocation Surcharge based on the estimated cost of Turf Replacement conservation programs

Appendix F: Summary of Historical Shortage Plans

These five elements incorporated into the WSAP have, in four out of five instances, been used in previous shortage plans. Both the IICP and the 1995 DMP used a historical base period calculation, adjusted for growth, made local supply adjustments, and used conservation hardening credits in their formulations. The retail impact adjustment is the only feature of the WSAP that has not been used historically.

Table 5: Historical Shortage Plan Overview

Plan Element	1991 IICP	1995 DMP	WSAP
Historical Base Period	√	√	√
Growth Adjustment	√	√	√
Local Supply Adjustment	√	√	√
Conservation Hardening Credit	√	√	√
Retail Impact Adjustment			√

Appendix G: Water Supply Allocation Formula Example

The following example gives a step-by-step description of how the formula would be used to calculate an allocation of Metropolitan supplies for a hypothetical member agency. All numbers are hypothetical for the purpose of the example and do not reflect any specific member agency.

Step 1: Calculate Base Period Retail Demand

Base Period Local Supplies: Calculated using a two-year average of groundwater (gw), groundwater recovery (gwr), Los Angeles Aqueduct supply (laa), surface water (sw), seawater desalination (sd), and other non-Metropolitan imported supplies (os). For the purpose of this example, assume that the two year average is 59,000 af.

$$[(gw1+gwr1+laa1+sw1+sd1+os1) + (gw2+gwr2+laa2+sw2+sd2+os2)] \div 2 = 59{,}000 \text{ af}$$

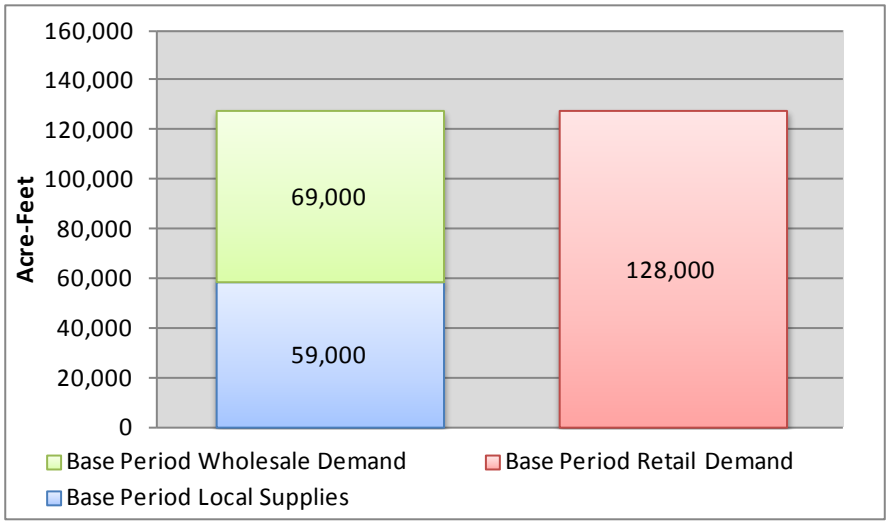
Base Period Wholesale Demands: Calculated using the same two-year time period as the Base Period Local Supplies. The Base Period Wholesale Demands include firm purchases (fp) and in-lieu deliveries to long-term groundwater replenishment (il), conjunctive use (cup), cyclic (cyc), and supplemental storage programs (ss). For the purpose of this example, assume that the two year average is 69,000 af.

$$[(fp^1{+}{+}il^1{+}cup^1{+}cyc^1{+}ss^1) + (fp^2{+}il^2{+}cup^2{+}cyc^2{+}ss^2)] \div 2 = 69{,}000 \text{ af}$$

Base Period Retail Demands: Calculated as the sum of the Base Period Local Supplies and Base Period Wholesale Demand.

$$59{,}000 + 69{,}000 = 128{,}000 \text{ af}$$

Figure 1: Base Period Retail Demand Calculation



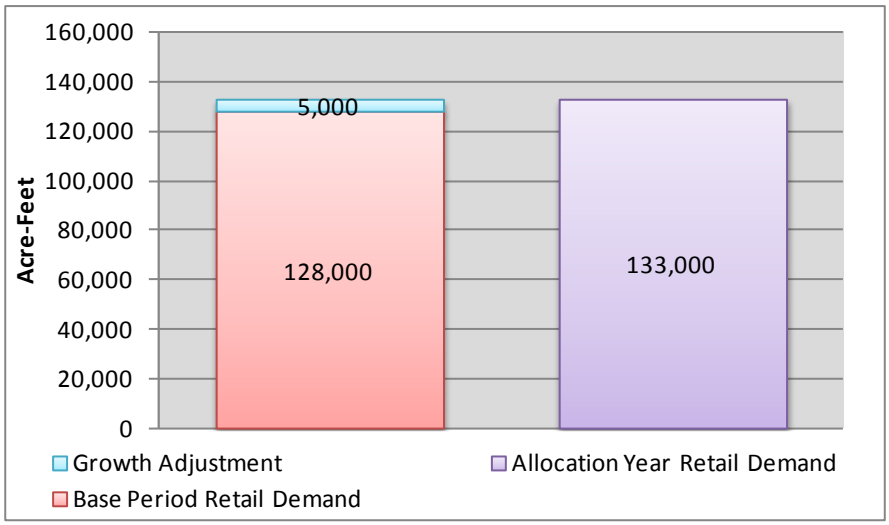
Calculate Adjustment for Base Period Mandatory Rationing (if applicable): The hypothetical agency used in this example is assumed not to qualify for the Base Period Mandatory Rationing Adjustment. A detailed discussion of the adjustment methodology can be found in Appendix I: Base Period Rationing Adjustment Example.

Step 2: Calculate Allocation Year Retail Demand

Allocation Year Retail Demand: Calculated by adjusting the Base Period Retail Demand for any baseline inflation and growth that occurred since the Base Period.

128,000 af + 5,000 af (net adjustment to retail demand) = 133,000 af

Figure 2: Allocation Year Retail Demand Calculation



Step 3: Calculate Allocation Year Wholesale Demand

Allocation Year Local Supplies: Estimates of Allocation Year Local Supplies are provided by the member agencies upon implementation of a WSAP. If estimates are not provided, Metropolitan will use the sum of the Base Period Local Supplies and Base Period In-Lieu Deliveries as a default. Agencies may provide updated estimates at any time during the Allocation Year to more accurately reflect their demand for Metropolitan supplies. For this example assume that the Allocation Year Local Supplies total 65,000 acre-feet.

Allocation Year Local Supplies = 65,000 af

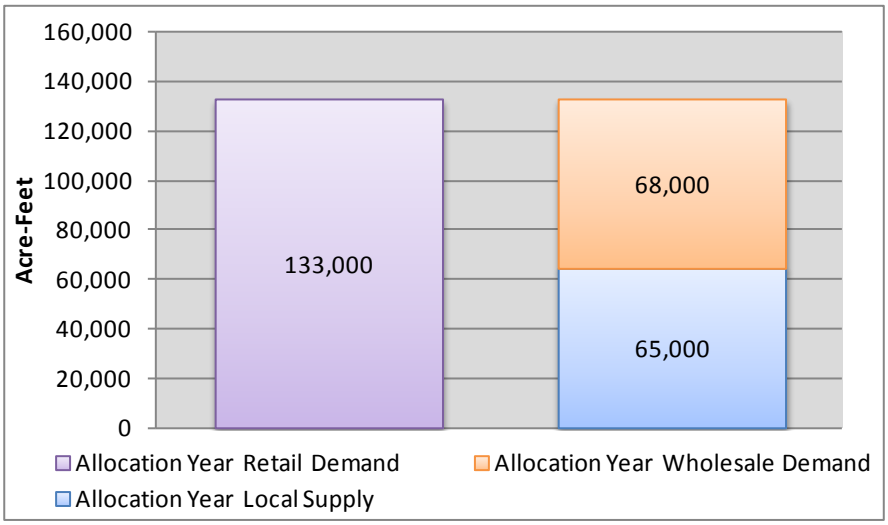
For this example assume also that this agency has an additional 5,000 acre-feet of supplies that meet the determinations for Extraordinary Supply. These supplies are withheld from the allocation formula except for in calculating the Retail Impact Adjustment Allocation.

Extraordinary Local Supplies = 5,000 af

Allocation Year Wholesale Demands: Calculated by subtracting the Allocation Year Local Supplies (65,000 af) from the Allocation Year Retail Demands (133,000 af).

133,000 af - 65,000 af = 68,000 af

Figure 3: Allocation Year Wholesale Demand Calculation



Step 4: Calculate the Wholesale Minimum Allocation

Wholesale Minimum Percentage: Calculate from Table 1 for Regional Shortage Level 4.

Table 1: Shortage Allocation Index		
(a) Regional Shortage Level	(b) Wholesale Minimum Percentage	(c) Maximum Retail Impact Adjustment Percentage
4	70.0%	10.0%

Wholesale Minimum Allocation: Calculated by multiplying the agency's Allocation Year Wholesale Demand (68,000 af) by the Wholesale Minimum Percentage (70%) from the Table 1 for Regional Shortage Level 4.

68,000 af * 70% = 47,600 af

Step 5: Calculate the Retail Impact Adjustment Allocation

Maximum Retail Impact Adjustment Percentage: Calculate from Table 1 for Regional Shortage Level 4.

Retail Impact Adjustment Allocation: Calculated first by determining the agency's dependence on Metropolitan by dividing the Allocation Year Wholesale Demand (68,000 af) minus the Extraordinary Supply (5,000 af) by the Allocation Year Retail Demand (133,000 af) and multiplying by 100.

[(68,000 af - 5,000 af)/ 133,000 af] * 100 = 47%

Next, this percentage dependence on Metropolitan (47%) is multiplied by the Maximum Retail Impact Percentage for Shortage Level 4 (10%).

47% * 10% = 4.7%

This percentage is now multiplied by the Allocation Year Wholesale Demand (68,000 af) for the Retail Impact Adjustment Allocation.

68,000 af * 4.7% = 3,221 af

Step 7: Calculate the Conservation Demand Hardening Adjustment

Calculate Baseline GPCD: To estimate conservation savings, each member agency will establish a historical baseline GPCD calculated in a manner consistent with California Senate Bill SBx7-7, using a 10 or 15-year average ending between 2004 and 2010, using gross water use minus non-potable recycle water production and documented historical population. For this example assume that the Baseline GPCD is 154 GPCD

Baseline GPCD = 154 GPCD

Calculate Allocation Year GPCD: Next, calculate the allocation year GPCD by converting the Allocation Year Retail Demand to GPCD and dividing by the Allocation Year Population from the WSAP. For this example the Allocation Year Retail Demand is 133,000 AF (see Step 2 above) and assume the Allocation Year Population is 905,000 persons. The resulting GPCD is 131 GPCD.

Allocation Year GPCD = 133,000 af/year * 325,851 gallons/af ÷ 365 days/year ÷ 905,000 persons = 131 GPCD

Calculate Reduction in GPCD: Subtract Allocation Year GPCD from Baseline GPCD to determine the GPCD Reduction.

GPCD Reduction = 154 GPCD – 131 GPCD = 23 GPCD

Calculate Conservation Savings: Convert the GPCD Reduction to the equivalent annual conservation savings in acre-feet, using the Allocation Year Population.

$$\text{Conservation Savings} = \frac{(\text{GPCD Reduction}) \times 365 \text{ days/yr} \times \text{Population})}{325{,}851 \text{ gallons/af}}$$

Conservation Savings = 23 x 365 x 905,000 ÷ 325,851 = 23,316 af

Multiply by Regional Shortage Level Percentage: Multiply the Conservation Savings by 10 percent plus an additional 5 percent for each level of Regional Shortage (see Step 4 above). This example assumes a Regional Shortage Level of 4. This scales the hardening credit by the level of regional shortage, thereby increasing the credit as deeper shortages occur when demand hardening has a larger impact on the retail consumer.

23,316 af x (10% + (4 x 5%) = 6,995 af

Multiply by Conservation Savings Percentage: Next, multiply by the percentage of an agency's demand that was reduced through conservation. This scales the hardening by the total percentage reduction to recognize that increased hardening occurs as increasing amounts of conservation are implemented.

Conservation Savings Percentage = 1 + ((Baseline GPCD – Allocation Year GPCD)/Baseline GPCD)

Conservation Savings Percentage = 1+ ((154 GPCD – 131 GPCD)/154 GPCD) = 115%

6,995 af x 115% = 8,044 af

Multiply by Dependence on MWD: Next, multiply by the agency's percentage dependence on MWD as shown in Step 5 above. This scales the credit to the member agency's dependence on MWD to ensure that credits are being applied to the proportion of water demand that is being affected by reductions in MWD's supply. For this example, dependence on MWD is 47%.

8.044 af x 47% = 3,781 af

Summary: The Conservation Demand Hardening Adjustment calculation is summarized by the following formula:

Conservation Demand Hardening Adjustment = Conservation Savings x (10% + Regional Shortage Level %) x (1+Conservation%) x Dependence on MWD %

Conservation Demand Hardening Adjustment = 23,316 af x (10% + (4 x 5%)) x (115%) x (47%) = 3,781 af

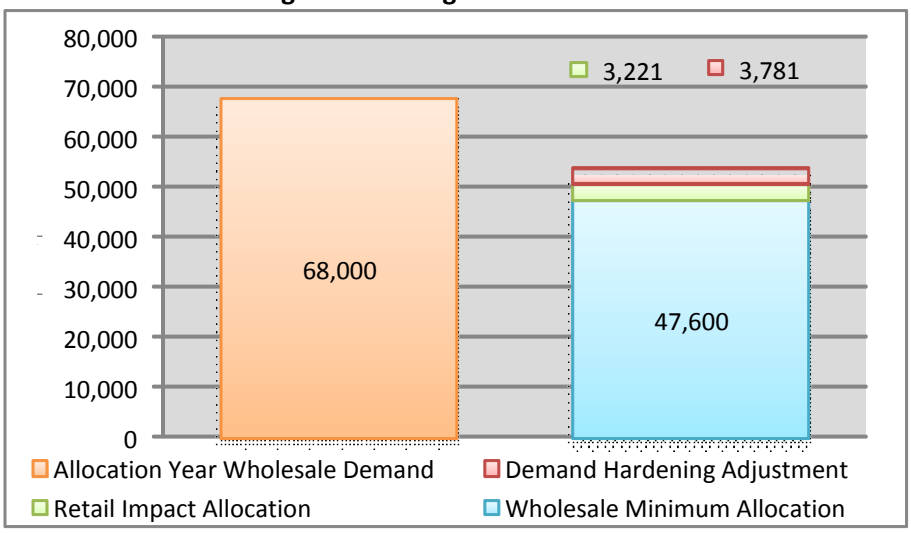
Step 8: Calculate the Low Per-Capita Adjustment Allocation: The hypothetical agency used in this example is assumed not to qualify for the Low Per-Capita Adjustment. A detailed discussion and example of the Low Per-Capita Adjustment calculation can be found in Appendix J: Per Capita Water Use Minimum Example.

Step 9: Calculate the total WSAP Allocation

WSAP Allocation: Calculated by adding the Wholesale Minimum Allocation (47,600 af), the Maximum Retail Impact Adjustment (3,221 af), the Demand Hardening Adjustment (3,781 af), and the Low Per-Capita Adjustment (0 af).

47,600 af + 3,221 af + 3,781 af + 0 af = 54,602 af

Figure 4: WSAP Allocation Regional Shortage Level 4



Step 10: Calculate total retail level reliability

Retail level reliability: Calculated by adding the WSAP Allocation (54,602 af), the Allocation Year Local Supply (65,000 af) and the Extraordinary Local Supply (5,000 af) and dividing by the Allocation Year Retail Demand (133,000 af).

(54,602 af + 65,000 af + 5,000 af) ÷ 133,000 af = 93.7%

Total Metropolitan Supply Allocations: In addition to the WSAP Allocation described above, agencies may also receive separate allocations of supplies for groundwater replenishment and seawater barrier demands. More information on the groundwater replenishment allocation is located in Appendix L: Groundwater Replenishment Allocation.

Appendix H: Board Policy Principles on Determining the Status of Extraordinary Supply

At the June 8, 2010 Water Planning and Stewardship Committee meeting Metropolitan's Board of Directors adopted the following policy principles to guide staff in determining the Extraordinary Supply status of future member agency supply programs.

No Negative Impacts to Other Member Agencies

A potential Extraordinary Supply for a member agency should not decrease the amount of Metropolitan water supply that would be available to the other member agencies in a WSAP. Programs that utilize Metropolitan supplies as a primary or in-lieu source or as a means of payback or future replenishment may have the effect of decreasing supplies, available to other agencies, if designated as Extraordinary Supply.

Provides Supply in Addition to Existing Regional Supplies

A potential Extraordinary Supply should provide a water supply that increases the overall water supplies that are available to the region in a WSAP. A program that is designed to move existing regional supplies from year to year would not qualify.

Specifically Designed Program or Supply Action

A potential Extraordinary Supply must be intentionally created and operated to provide additional supply yield. Normal variations in existing and planned local supply programs would not qualify.

Intended for Consumptive Use in a WSAP

A potential Extraordinary Supply should be designed with the primary intention to deliver water supply to a member agency only at a time when Metropolitan is allocating supplies. Programs designed to deliver water on a regular basis would not qualify. Exceptions for reasonable use of a supply program for emergency or other extenuating local circumstances should be considered.

Fully Documented Resource Management Actions

A potential Extraordinary Supply should have a full description as to the source, transmission, distribution, storage, and delivery of the water supply.

These principles are intended to identify deliberate actions taken by member agencies to augment supplies only when Metropolitan is allocating supplies through the WSAP. Production from existing local supplies, programs that are operated on an ongoing basis, and incidental increases in water supply would not qualify as Extraordinary Supply. The intent of the Extraordinary Supply designation is to recognize programs and actions that are additive to the total regional water supply as the region continues to confront the water supply challenges from drought and regulatory conditions. To that end, any supply actions taken after the initial implementation of the WSAP in July 2009 that utilize Metropolitan supplies either as a primary source, or to refill or replenish an incurred obligation or deficit at a future date would not qualify as Extraordinary Supply.

Appendix I: Base Period Mandatory Rationing Adjustment

Agencies that were under mandatory water use restrictions during the Base Period may have water use that is lower due to the mandatory actions already taken. Without adjusting for this, those agencies could be required to enforce even higher levels of restrictions under an allocation than those agencies that had not started mandatory restrictions.

To qualify for a Base Period Mandatory Rationing Adjustment, the member agency must provide Metropolitan staff with the following information:

- Time period when the mandatory conservation was in effect; it must be in effect during the Base Period
- A statement, with documentation, of how drought restrictions comply with the following Mandatory Conservation qualifications:
    - Governing Body-authorized or enacted
    - Includes mandatory demand reduction actions, restrictions or usage limitations including penalty-backed water budgets
    - Enforced by assessing penalties, fines, or rates based upon violating restrictions or exceeding usage limitations
- If the agency in question is a retail subagency, then the retailer's base period water demands during the Base Period in order to determine proportion to the member agency's total demand
- Historical data to construct GPCD base and trend for the consultation

Calculating the Base Period Rationing Adjustment involves following steps:

- Use the Baseline GPCD 10 or 15-year period selected by member agency for the Conservation Demand Hardening Adjustment calculation.
- Interpolate from the GPCD value of the midpoint of the Baseline GPCD period to the average GPCD of the two years preceding the agency's mandatory conservation
- Extrapolate to the WSAP Base Period (FY2013 and FY2014)
- Calculate the difference between estimated and observed GPCD for FY2013 and FY2014
- Convert to Acre-Feet and add to the member agency's Base Period Retail Demands

Appendix J: Per-Capita Water Use Minimum Example

This adjustment creates a minimum per capita water use threshold. Member agencies' retail-level water use under the WSAP is compared to two different thresholds. The minimum water use levels are based on compliance guidelines for total and residential water use established under Senate Bill X7-7.

Total Retail Level Use: 100 GPCD
Residential Retail Level Use: 55 GPCD

Agencies that fall below either threshold under the WSAP would receive additional allocation from Metropolitan to bring them up to the minimum GPCD water use level. To qualify for this credit, member agencies must provide documentation of the total agency level population and the percent of retail level demands that are residential; no appeal is necessary.

The following example gives a step-by-step description of how the Low Per-Capita Water Use Adjustment would be calculated for a hypothetical member agency. All numbers are hypothetical for the purpose of the example and do not reflect any specific member agency. This example was calculated using the following assumptions:

Allocation Year Retail Demand: 50,000 acre-feet
Allocation Year Local Supplies: 25,000 acre-feet;
Allocation Year Wholesale Demand: 25,000 acre-feet
Base Period Conservation: 5,000 acre-feet
Agency Population: 375,000
Percent of Retail Demands that are Residential: 60%

Step 1: Calculate Total Retail-Level Allocation Year Supplies

Table 6 shows the Allocation Year Local Supply, WSAP Allocation, and the total Allocation Year Supplies for the example agency at each Regional Shortage Level. The WSAP Allocation was calculated using the methodology detailed in Appendix G: Water Supply Allocation Formula Example and the assumptions listed above.

Table 6: Total Retail Level Allocation Year Supplies			
Regional Shortage Level	**Allocation Year Local Supply**	**WSAP Allocation**	**Total Allocation Year Supply**
1	25,000	23,594	48,594
2	25,000	22,188	47,188
3	25,000	20,781	45,781
4	25,000	19,375	44,375
5	25,000	17,969	42,969
6	25,000	16,563	41,563
7	25,000	15,156	40,156
8	25,000	13,750	38,750
9	25,000	12,344	37,344
10	25,000	10,938	35,938

Step 2: Calculate the Equivalent Total and Residential GPCD

The next step is to calculate the equivalent water use in gallons per capita per day (GPCD) for the Total Allocation Year Supply. The following equation shows the GPCD calculation under Regional Shortage Level 10.

35,938 af * 325,851 gallons ÷ 375,000 people ÷ 365 days = 85.6 GPCD

The residential per-capita water use is calculated in the same manner. Based on the assumption that 60% of the agency demands are residential, the following equation shows the residential GPCD calculation under Regional Shortage Level 10.

35,938 af * 60% * 325,851 gallons ÷ 375,000 people ÷ 365 days = 51.3 GPCD

Step 3: Compare the Total and Residential GPCD to the Minimum Water Use Thresholds

The next step is to compare the total GPCD water use to the 100 GPCD total water use threshold. In a Regional Shortage Level 10, the WSAP results in an allocation that is 14.4 GPCD below the minimum threshold.

100 GPCD – 85.6 GPCD = 14.4 GPCD

Likewise the residential GPCD water use is compared to the 55 GPCD residential water use threshold.

55 GPCD – 51.3 GPCD = 3.7 GPCD

Step 4: Determine the Allocation Adjustment in Acre-Feet

The final step is to calculate the acre-foot equivalent of the GPCD that fell below the minimum threshold. In a Regional Shortage Level 10, the adjustment provides 6,068 acre-feet of additional allocation to the agency; the results for Shortage Levels 1-10 are shown in Table 7.

14.4 GPCD ÷ 325,851 gallons * 375,000 people * 365 days = 6,068 acre-feet

Table 7: Total Per-Capita Water Use Adjustment				
Regional Shortage Level	**Allocation Year Supply**	**Equivalent GPCD**	**GPCD Below Threshold**	**Allocation Adjustment**
1	48,594	115.7	0	0
2	47,188	112.3	0	0
3	45,781	109.0	0	0
4	44,375	105.6	0	0
5	42,969	102.3	0	0
6	41,563	98.9	1.1	443
7	40,156	95.6	4.4	1,849
8	38,750	92.3	7.7	3,255
9	37,344	88.9	11.1	4,662
10	35,938	85.6	14.4	6,068

Again, this step is repeated for the residential water use. In a Regional Shortage Level 10, the adjustment provides 1,540 acre-feet of additional allocation to the agency; the residential water use results for Regional Shortage Levels 1-10 are shown in Table 8.

3.7 GPCD ÷ 325,851 gallons * 375,000 people * 365 days = 1,540 acre-feet

Table 8: Residential Per-Capita Water Use Adjustment				
Regional Shortage Level	**Allocation Year Supply**	**Equivalent GPCD**	**GPCD Below Threshold**	**Allocation Adjustment**
1	29,156	69.4	0	0
2	28,313	67.4	0	0
3	27,469	65.4	0	0
4	26,625	63.4	0	0
5	25,781	61.4	0	0
6	24,938	59.4	0	0
7	24,094	57.4	0	0
8	23,250	55.4	0	0
9	22,406	53.3	1.7	697
10	21,563	51.3	3.7	1,540

Agencies that fall below either threshold under the WSAP would receive additional allocation from Metropolitan to bring them up to the minimum GPCD water use level. If an agency qualifies under both thresholds, the one resulting in the maximum allocation adjustment would be given. Under this example the agency would receive 6,068 acre-feet of additional allocation in a Regional Shortage Level 10.

Appendix K: Qualifying Income-Based Rate Allocation Surcharge Adjustment Example

The following example provides a step by step description of how the qualifying income-based rate allocation surcharge adjustment is calculated. To qualify for this adjustment, member agencies must provide documentation showing the amount of retail demands that are covered by a qualifying income-based rate; no appeal is necessary.

The following list summarizes the allocation year demands, local supplies, and allocation as calculated in Appendix G: Water Supply Allocation Formula Example for a hypothetical agency under a Level 4 Regional Shortage. For detailed instructions on how to calculate these figures, reference Appendix G: Water Supply Allocation Formula Example.

Allocation Year Retail Demand: 133,000 acre-feet
Allocation Year Local Supplies: 68,000 acre-feet;
Level 4 WSAP Allocation: 52,735 acre-feet

Step 1: Allocation Surcharge Calculation

(a) **Water Use above Allocation:** The first step in calculating the income-based rate Allocation Surcharge adjustment is to calculate the agency's total Allocation Surcharge under the WSAP. If the agency did not incur any Allocation Surcharge from the allocation year, the income-based rate allocation surcharge adjustment would not apply. For the purpose of this example, the agency used 61,000 acre-feet of MWD supplies in the allocation year. This represents 8,265 acre-feet of use above the water supply allocation.

WSAP Allocation	52,735 af
Actual MWD Water Use	61,000 af
Use Above WSAP Allocation	8,265 af

(b) **Total Allocation Surcharge:** In this example the agency used 115.7% of its water supply allocation. 7,910 of the 8,265 acre-feet of use above the allocation would be assessed the Allocation Surcharge at an amount of $1,480 per acre-foot and 354 of the 8,265 acre-feet of use above the allocation would be assessed the Allocation Surcharge at an amount of $2,960.

Between 100% and 115% of Allocation	7,910 af	$1,480/af	$11,706,800
Greater than 115% of Allocation	354 af	$2,960/af	$1,047,840
Total	8,265 af		$12,754,640

Step 2: Effective Income-Based Rate Cutback

(a) **Calculate Retail Cutback:** The second step in calculating the income-based rate allocation surcharge adjustment is to calculate the amount of supply cutback that would have been expected from qualifying income-based rate customers under the WSAP. Using the water supply allocation that was calculated above, the total retail level impact on the agency can be

determined. In this example the agency receives a retail level cutback of 15,265 acre-feet, or 11.5% of their retail level demand.

WSAP Allocation + Allocation Year Local Supplies	117,735 af
Allocation Year Retail Demand	133,000 af
Effective Cutback	**15,265 af (11.5%)**

(b) Income-based Rate Customer Retail Cutback: To calculate the effective income-based rate cutback, the amount of demand covered by a qualifying income-based rate is multiplied by the effective retail level cutback. For this example assume that the agency has 10,000 acre-feet of qualifying demands.

Qualifying Income-Based Rate Demand	10,000 af
Effective Cutback Percentage	11.5%
Effective Income-Based Rate Cutback	**1,148 af**

(c) Income-based Rate Cutback Allocation Surcharge: Once the effective cutback has been calculated, the amount of Allocation Surcharge that is associated with qualifying income-based rate customers can be determined.

Between 100% and 115% of Allocation	794 af	$1,480/af	$1,175,120
Greater than 115% of Allocation	354 af	$2,960/af	$1,047,840
Total	**1,148 af**		**$2,222,960**

(d) Adjusted Allocation Surcharge Calculation: Finally, the Allocation Surcharge attributable to qualifying income-based rate customers is subtracted from the total Allocation Surcharge that was calculated above to determine the qualifying income-based rate adjusted allocation surcharge. In the case that the monetary amounts associated with the Income-Based Rate are greater than the total amounts an agency incurs, no Allocation Surcharge will be incurred.

Total Allocation Surcharge	$12,754,640
Qualifying Income-Based Rate Allocation Surcharge	$2,222,960
Qualifying Income-Based Rate Adjusted Allocation	**$10,531,680**

Appendix L: Groundwater Replenishment Allocation

Groundwater basins help provide vital local supplies that can buffer the region from short-term drought impacts. Longer droughts can result in reductions to the many sources of water that replenish groundwater basins, resulting in lower basin levels and potential impacts to the overlying consumptive demands. Limited imported deliveries under these conditions may help avoid impacts to the basins that may be drawn out of their normal operating range or subject to water quality or regulatory impacts. To this end, Metropolitan provides a limited allocation for drought impacted groundwater basins based on the following framework:

a) Staff hold a consultation with qualifying member agencies who have taken groundwater replenishment deliveries since 2010 and the appropriate groundwater basin managers to document whether their basins are in one of the following conditions:
    i. Groundwater basin overdraft conditions that will result in water levels being outside normal operating ranges during the WSAP allocation period; or
    ii. Violations of groundwater basin water quality and/or regulatory parameters that would occur without imported deliveries.
b) Provide an allocation based on the verified need for groundwater replenishment. The allocation would start with a member agency's ten-year average purchases of imported groundwater replenishment supplies (excluding years in which deliveries were curtailed). The amount would then be reduced by the declared WSAP Regional Shortage Level (5 percent for each Regional Shortage Level).
c) Any allocation provided under this provision for drought impacted groundwater basins is intended to help support and maintain groundwater production for consumptive use. As such, a member agency receiving an allocation under this provision will be expected to maintain groundwater production levels equivalent to the average pumping in the Base Period. Any adjustments to a member agency's M&I allocation due to lower groundwater production would be reduced by deliveries made under this provision.
d) Agencies for which this allocation does not provide sufficient supplies for the needs of the groundwater basin may use the WSAP Appeals Process to request additional supply (subject to Board approval). The appeal should include a Groundwater Management Plan that documents the need for additional supplies according to the following tenets:
    i. Maintenance of groundwater production levels;
    ii. Maintenance of, or reducing the further decline of, groundwater levels;
    iii. Maintenance of key water quality factors/indicators;
    iv. Avoidance of permanent impacts to groundwater infrastructure or geologic features; and
    v. Consideration of severe and/or inequitable financial impacts.

Final amounts and allocations will be determined following the consultations with groundwater basin managers and member agencies.

Appendix M: Water Rates, Charges, and Definitions

Table 9: Water Rates and Charges Dollars per acre-foot (except where noted)			
Rate	**Effective 1/1/2014**	**Effective 1/1/2015**	**Effective 1/1/2016**
Tier 1 Supply Rate	$148	$158	$156
Tier 2 Supply Rate	$290	$290	$290
System Access Rate	$243	$257	$259
Water Stewardship Rate	$41	$41	$41
System Power Rate	161	$126	$138
Tier 1	$593	$582	$594
Tier 2	$735	$714	$728
Treatment Surcharge	$297	$341	$348
Full Service Treated Volumetric Cost			
Tier 1	$890	$923	$942
Tier 2	$1,032	$1,055	$1,076
Readiness-to-Serve Charge (millions of dollars)	$166	$158	$153
Capacity Charge (dollars per cubic foot second)	$8,600	$11,100	$10,900

Definitions:

(1) **Tier 1 Supply Rate -** recovers the cost of maintaining a reliable amount of supply.

(2) **Tier 2 Supply Rate** - set at Metropolitan's cost of developing additional supply to encourage efficient use of local resources**.**

(3) **System Access Rate** – recovers a portion of the costs associated with the delivery of supplies.

(4) **System Power Rate** – recovers Metropolitan's power costs for pumping supplies to Southern California.

(5) **Water Stewardship Rate** – recovers the cost of Metropolitan's financial commitment to conservation, water recycling, groundwater clean-up and other local resource management programs.

(6) **Treatment Surcharge** – recovers the costs of treating imported water.

(7) **Readiness-to-Serve Charge -** a fixed charge that recovers the cost of the portion of system capacity that is on standby to provide emergency service and operational flexibility.

(8) **Capacity Charge** – the capacity charge recovers the cost of providing peak capacity within the distribution system.

Source: http://www.mwdh2o.com/WhoWeAre/Management/Financial-Information

Appendix N: Allocation Appeals Process

Step 1: Appeals Submittal

All appeals shall be submitted to the Appeals Liaison in the form of a written letter signed by the member agency General Manager. Each appeal must be submitted as a separate request, submittals with more than one appeal will not be considered. The appeal request is to include:

- A designated member agency staff person to serve as point of contact.
- The type of appeal (erroneous baseline data, loss of local supply, etc.).
- The quantity (in acre-feet) of the appeal.
- A justification for the appeal which includes supporting documentation.

A minimum of 60 days are required to coordinate the appeals process with Metropolitan's Board process.

Step 2: Notification of Response and Start of Appeals Process

The Appeals Liaison will phone the designated member agency staff contact within 3 business days of receiving the appeal to provide an initial receipt notification, and schedule an appeals conference. Subsequent to the phone call, the Liaison will send an e-mail to the Agency General Manager and designated staff contact documenting the conversation. An official notification letter confirming both receipt of the appeal submittal, and the date of the appeals conference, will be mailed within 2 business days following the phone contact

Step 3: Appeals Conference

All practical efforts will be made to hold an appeals conference between Metropolitan staff and member agency staff at Metropolitan's Union Station Headquarters within 15 business days of receiving the appeal submittal. The appeals conference will serve as a forum to review the submittal materials and ensure that there is consensus understanding as to the spirit of the appeal. Metropolitan staff will provide an initial determination of the size of the appeal (small or large) and review the corresponding steps and timeline for completing the appeals process.

Steps 4-7 of the appeals process differ depending upon the size of the appeal

Small Appeals

Small appeals are defined as those that would change an agency's allocation by less than 10 percent, or are less than 5,000 acre-feet in quantity. Small appeals are evaluated and approved or denied by Metropolitan staff.

Step 4: Preliminary Decision

Metropolitan staff will provide a preliminary notice of decision to the member agency within 10 business days of the appeals conference. The preliminary decision timeline may be extended to accommodate requests for additional information, data, and documentation. The Appeals Liaison will mail a written letter to the member agency staff contact and General Manager, stating the preliminary decision and the rationale for approving or denying the appeal.

Step 5: Clarification Conference

Following the preliminary decision the Appeals Liaison will schedule a clarification conference. The member agency may choose to decline the clarification conference if they are satisfied with the preliminary decision. Declining the clarification conference serves as acceptance of the preliminary decision, and the decision becomes final upon approval by Metropolitan's executive staff.

Step 6: Final Decision

Metropolitan staff will provide a final notice of decision to the member agency within 10 business days of the clarification conference, pending review by Metropolitan's executive staff. The Appeals Liaison will mail a written letter to the member agency staff contact and General Manager, stating the final decision and the rationale for the decision. A copy of the letter will also be provided to Metropolitan executive staff.

Step 6a: Board Resolution of Small Appeal Claims

Member agencies may request to forward appeals that are denied by Metropolitan staff to the Board of Directors through the Water Planning and Stewardship Committee for final resolution. The request for Board resolution shall be submitted to the Appeals Liaison in the form of a written letter signed by the member agency General Manager. This request will be administered according to Steps 6 and 7 of the large appeals process.

Step 7: Board Notification

Metropolitan staff will provide a report to the Board of Directors, through the Water Planning and Stewardship Committee, on all submitted appeals including the basis for determination of the outcome of the appeal.

Large Appeals

Large appeals are defined as those that would change an agency's allocation by more than 10 percent, and are larger than 5,000 acre-feet. Large appeals are evaluated and approved or denied by the Board of Directors.

Step 4: Preliminary Recommendation

Metropolitan staff will provide a preliminary notice of recommendation to the member agency within 10 business days of the appeals conference. The preliminary decision timeline may be extended to accommodate requests for additional information, data, and documentation. The Appeals Liaison will mail a written letter to the member agency staff contact and General Manager, stating the preliminary recommendation and the rationale for the recommendation. A copy of the draft recommendation will also be provided to Metropolitan executive staff.

Step 5: Clarification Conference

Following the preliminary recommendation the Appeals Liaison will schedule a clarification conference. The member agency may choose to decline the clarification conference if the satisfied with preliminary recommendation. Declining the clarification conference signifies acceptance of the preliminary recommendation, and the recommendation becomes final upon approval by Metropolitan's executive staff.

Step 6: Final recommendation

Metropolitan staff will provide a final notice of recommendation to the member agency within 10 business days of the clarification conference, pending review by Metropolitan executive staff. The Appeals Liaison will mail a written letter to the member agency staff contact and General Manager, stating the final recommendation and the rationale for the recommendation. A copy of the final recommendation will also be provided for Metropolitan executive review.

Step 7: Board Action

Metropolitan staff shall refer the appeal to the Board of Directors through the Water Planning and Stewardship Committee for approval.

Appendix O: Appeals Submittal Checklist

Appeal Submittal

- ☐ Written letter (E-mail or other electronic formats will not be accepted)
- ☐ Signed by the Agency General Manager

Mailed to the appointed Metropolitan Appeals Liaison

Contact Information

- ☐ Designated staff contact
  - o Name
  - o Address
  - o Phone Number
  - o E-mail Address
- ☐ General Manager
  - o Name
  - o Address
  - o Phone Number
  - o E-mail Address

Type of Appeal

- ☐ State the type of appeal
  - o Erroneous historical data used in base period calculations
    - Metropolitan Deliveries
    - Local Production
    - Growth adjustment
    - Conservation savings
  - o Exclusion of physically isolated areas
  - o Extraordinary supply designation
  - o Groundwater Replenishment Allocation
  - o Base Period Mandatory Rationing Adjustment
  - o Other

Quantity of Appeal

- ☐ State the quantity in acre-feet of the appeal

Justification and Supporting Documentation

- ☐ State the rationale for the appeal
- ☐ Provide verifiable documentation to support the stated rationale
  - o Examples of verifiable documentation Include, but are not limited to:
    - Billing Statements
    - Invoices for conservation device installations
    - Basin Groundwater/Watermaster Reports
    - California Department of Finance economic or population data
    - California Department of Public Health reports

Attachment 3 -
Western Ordinance 385

ORDINANCE 385

ORDINANCE OF THE BOARD OF DIRECTORS OF THE WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY ADOPTING A DROUGHT ALLOCATION PLAN

WHEREAS, Western Municipal Water District ("Western") was formed by the voters in 1954 for the purpose of importing water supplies from the Metropolitan Water District of Southern California ("Metropolitan"); and

WHEREAS, Western delivers these imported water supplies, from the State Water Project and the Colorado River Aqueduct and treated at Metropolitan's Henry J. Mills and Robert A. Skinner Filtration Plants, to communities on a wholesale basis to augment their own supplies; and

WHEREAS, Western serves a population of more than 70,000 people directly on a retail basis and over 880,000 people through its member agencies with State Water Project water and various locally-produced supplies; and

WHEREAS, Metropolitan has adopted the 1999 Water Surplus and Drought Management Plan ("WSDM Plan"). The guiding principle of the WSDM Plan is to encourage storage of water during periods of surplus and to work jointly with its member agencies, such as Western, to minimize impacts on the retail consumers and the economy during periods of shortage; and

WHEREAS, recent dry conditions and uncertainty about future pumping operations from the State Water Project have brought about the possibility that Metropolitan may not have access to the supplies necessary to meet total firm demands in the near future and may have to allocate shortages in supplies to its member agencies, such as Western. To prepare for this possibility, Metropolitan adopted an updated Water Supply Shortage Allocation Plan ("WSAP") in December of 2014, which

addresses the principles adopted pursuant to the WSDM Plan; and

WHEREAS, Western desires to adopt this Ordinance in order to adopt a Drought Allocation Plan ("DAP") which is required in order to plan for, and implement, the reduced Metropolitan water deliveries which will result if certain provisions of the WSAP are implemented. The DAP identifies the method that will be used to allocate limited imported supplies among Western's retail agencies if Metropolitan implements said provisions of the WSAP; and

WHEREAS, on April 15, 2015, Western's Board of Directors adopted Resolution 2904, setting a public hearing regarding the proposed adoption of this Ordinance and the DAP; and

WHEREAS, Water Code sections 71640 et seq. authorize Western to restrict the use of Western water during any emergency caused by drought, or other threatened or existing water shortage; and

WHEREAS, Water Code sections 375 et seq. provide that Western may, by a majority vote of the members of the Board of Directors after holding a public hearing upon notice, adopt and enforce a water conservation program, such as the DAP, to reduce the quantity of water used by its customers for the purpose of conserving the water supplies of Western; and

WHEREAS, Western has the power and authority to enact a water conservation program, such as the DAP, pursuant to Water Code sections 375 et seq. and 71640 et seq.

NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF DIRECTORS OF WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY AS FOLLOWS:

Section 1. Notice and Public Hearing. The Board of Directors conducted a public hearing on May 20, 2015 at 14205 Meridian Parkway, Riverside, California in order for customers to have the opportunity to be heard to protest against, and to present their respective needs to the Board of Directors regarding the proposed adoption of this Ordinance 385 and the DAP. Pursuant to Water Code section 376, notice of the public hearing was published on May 12, 2015 in the Riverside Press-Enterprise, a newspaper printed, published, and circulated within the area in which the subject water supply is distributed. Said notice was published at least seven (7) days prior to the date of the hearing;

Section 2. Adoption of Drought Allocation Plan.

(a) Western hereby adopts and authorizes the implementation of the DAP attached hereto as Exhibit "A" and incorporated herein by reference. The General Manager, or his/her designee, are hereby authorized and directed to immediately implement the applicable provisions of this Ordinance and the DAP upon the effective date hereof.

(b) The DAP includes a supply allocation methodology which was patterned after the Metropolitan WSAP methodology and in collaboration with Western's retail agencies. The goal of said methodology is to provide an equitable means of apportioning imported municipal and industrial supplies during periods when Metropolitan implements its WSAP. As further described in the DAP, Western staff and designated wholesale customer representatives have

collectively agreed to the allocation methodology described in the DAP.

(c) The Allocation Plan Implementation Elements shall be implemented at the time, and in the manner, as set forth in the DAP and therefore, shall not require any further action by Western's Board of Directors before being implemented by Western's General Manager, or his/her designee, as set forth in the DAP. For example, and not by way of limitation, it is anticipated that the allocation of imported supplies under the DAP shall be implemented at the time that Metropolitan allocates its supplies through its WSAP process. Should Metropolitan implement its WSAP, Western's General Manager, or his/her designee, will determine the appropriate shortage level, as set forth in the DAP, so that supplies allocated at the Western service area level are equal to or less than the Metropolitan allocation.

Section 3. Application of the DAP. The provisions of the DAP and this Ordinance shall apply to the allocation of water for retail municipal and industrial purposes among the following agencies:

(a) Box Springs Mutual Water Company;
(b) City of Corona;
(c) City of Norco;
(d) Eagle Valley Mutual Water Company;
(e) Elsinore Valley Municipal Water District;
(f) Lee Lake Water District;
(g) Rancho California Water District;
(h) Western Municipal Water District Retail Customers

Section 4. Severability. If any provision, section, subsection, sentence, clause, or phrase of this Ordinance or

the application of same to any person or set of circumstances is held to be unconstitutional, void, or invalid, such decision shall not affect the remaining portions of this Ordinance which shall remain in full force and effect, and all provisions of this Ordinance are declared to be severable for that purpose.

Section 5. Incompatible Provisions. To the extent any provision of this Ordinance is incompatible with or at variance with any other Western policy or rules and regulations, the provisions of this Ordinance shall be controlling, and all other Western policies and rules and regulations shall be interpreted to harmonize with and not change the provisions of this Ordinance.

Section 6. Exemption From California Environmental Quality Act. The Board of Directors determines that the adoption of the DAP and this Ordinance, for the purpose of addressing water shortages and allocation of supplies, are exempt from the requirements of the California Environmental Quality Act ("CEQA") pursuant to Section 15269(c) of the State CEQA Guidelines. Section 15269(c) provides that actions necessary to prevent or mitigate for an emergency are exempt from CEQA. The Board of Directors finds that the adoption of the DAP is necessary to mitigate for the emergency water shortages that may result in the near future if Metropolitan implements its WSAP. The Board of Directors hereby directs staff to prepare and file a Notice of Exemption within five (5) working days of adoption of this Ordinance.

Section 7. Effective Date. This Ordinance shall be effective immediately upon adoption and shall be presumed to continue in effect unless or until a contrary finding is made by applicable action of the Board of Directors. Within fifteen

(15) days from the date of adoption, a summary of this Ordinance shall be published one time in the Riverside Press-Enterprise with the names of those Board members voting for and against. A certified copy of this Ordinance shall be posted in the District offices along with the names of those Board members voting for and against.

Section 8. Prior Ordinances. This Ordinance shall supersede and otherwise control over the provisions of Ordinance 371. As of the effective date of this Ordinance 385, Ordinance 371 shall be of no further force or effect.

Section 9. Incorporation of Recitals. All of the foregoing Recitals are true and correct and the Board of Directors so finds and determines. The Recitals set forth above are incorporated herein and made an operative part of this Ordinance.

ADOPTED AND APPROVED this 20th day of May, 2015 by the Board of Directors of the Western Municipal Water District of Riverside County.

DONALD D. GALLEANO
President

May 20, 2015

I HEREBY CERTIFY that the foregoing is a full, true, and correct copy of Ordinance 385 adopted by the Board of Directors of Western Municipal Water District of Riverside County at a duly-noticed regular meeting held on May 20, 2015.

THOMAS D. EVANS
Secretary-Treasurer

Attachment 4 -
Western Ordinance 384

ORDINANCE 384

AN ORDINANCE OF THE WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY ESTABLISHING AN UPDATED RETAIL CUSTOMER WATER SUPPLY SHORTAGE CONTINGENCY PROGRAM

WHEREAS, California Constitution article X, section 2 and California Water Code section 100 provide that because of conditions prevailing in the State of California, it is the declared policy of the State that the general welfare requires that the water resources of the State shall be put to beneficial use to the fullest extent of which they are capable, the waste or unreasonable use of water shall be prevented, and the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and the public welfare; and

WHEREAS, pursuant to California Water Code section 106, it is the declared policy of the State that the use of water for domestic use is the highest use of water and that the next highest use is for irrigation; and

WHEREAS, pursuant to California Water Code section 71610.5, the District may undertake a water conservation program to reduce water use and may require, as a condition of new service, that reasonable water-saving devices and water reclamation devices be installed to reduce water use; and

WHEREAS, pursuant to California Water Code section 71640, the District may restrict the use of District water during any emergency caused by drought, or other threatened or existing water shortage, and may prohibit the waste of District water or the use of District water during such periods for any purpose other than those that the District determines to be necessary. The District may also prohibit

use of District water during such periods for specific uses which it finds to be nonessential. Pursuant to Water Code section 71641, the District may prescribe and define by ordinance the restrictions, prohibitions, and exclusions referred to in section 71640; and

WHEREAS the Board of Directors recognizes continued long term challenges to the region and the state. The District's Mediterranean climate typically exhibits hot, dry summers and mild, wet winters. Annual precipitation totals vary substantially from year to year, averaging 10.24 to 12.06 inches depending on the region. Climate change impacts are predicted to increase the uncertainty of water supplies. Additionally, regulatory restrictions on pumping from the Bay-Delta region affecting State Water Project ("SWP") deliveries will continue to impact the District's supply reliability. The District relies heavily on SWP supplies, obtaining approximately up to 75 percent of its total supply through imported water sources from MWD; and

WHEREAS, because of the prevailing conditions in the State and the declared policy of the State that the District manage its water resources for the general welfare to ensure their beneficial use to the fullest extent of which they are capable, the District hereby finds and determines that it is necessary and appropriate for the District to adopt, implement, and enforce a Water Supply Shortage Contingency Program (the "Program") to reduce the quantity of water used by consumers within the District to ensure that there is sufficient water for human consumption, sanitation, and fire protection; and

WHEREAS, pursuant to California Water Code section 350, the Board of Directors is authorized to declare a Water Shortage Emergency to prevail within its jurisdiction

when it finds and determines that the District will not be able to or cannot satisfy the ordinary demands and requirements of water consumers without depleting the water supply of the District to the extent that there would be insufficient water for human consumption, sanitation, and fire protection, and as more fully set forth in this Ordinance; and

WHEREAS, the Board of Directors hereby finds and determines that in the event the District determines that it is necessary to declare that a Water Shortage Emergency exists, the District will be authorized pursuant to this Ordinance to implement supply shortage response measures to regulate water consumption activities within the District and ensure that the water delivered in the District is put to beneficial use for the greatest public benefit, with particular regard to domestic use, including human consumption, sanitation, and fire protection, and that the waste or unreasonable use of water is prevented; and

WHEREAS, the Board of Directors is authorized and hereby finds and determines that it is necessary to prescribe and define by ordinance restrictions, prohibitions, and exclusions for the use of water during a threatened or existing water shortage and adopt and enforce a water supply shortage contingency program to: (i) prohibit the waste of District water or the use of District water during such period; (ii) prohibit use of water during such periods for specific uses which the District may from time to time find nonessential; and (iii) reduce and restrict the quantity of water used by Persons within the District; and

WHEREAS, the Board of Directors hereby finds and determines that the District shall: (i) implement water supply shortage response measures; (ii) regulate the water

consumption activities of Persons within the District for the purposes of conserving and protecting the District's water supplies, reducing the quantity of water consumed, and deterring and preventing the waste or unreasonable use or unreasonable method of use of valuable water resources; and (iii) establish and collect regulatory fees and impose fines and/or penalties as set forth herein to accomplish these purposes and recover the costs of the District's water conservation and regulatory program; and

WHEREAS, the Board of Directors hereby finds that the District's five (5) Tier water budget-based rate structure is an effective method of managing demand through price signals and eliminating inefficient usage while maintaining revenue stability and proportionately allocate the costs of service to those who place the greatest demands on the District's water system and limited water supplies; and

WHEREAS, the Board of Directors hereby finds and determines that it is desirable to adopt the Program in order to codify the rules and regulations governing its actions, and the actions of Persons using and consuming water within the District, particularly during declared water shortages and water shortage emergencies, to protect the general welfare and the District's water supplies, and to reduce water consumption all in accordance with the declared policies and laws of the State; and

WHEREAS, the Board of Directors hereby further finds and determines that this Ordinance and the Program set forth herein are in the public interest and serve the public purpose of the District; and

WHEREAS, California Constitution Article XIII D, Section 6 ("Article XIII D")requires that prior to imposing any increase to the District's water service fees, the District shall provide written notice (the "Notice") by

mail of: (1) the proposed increases to such rates and charges to the record owner of each parcel upon which the rates and charges are proposed for imposition and any tenant directly liable for payment of the rates and charges; (2) the amount of the rates and charges proposed to be implemented on each parcel; (3) the basis upon which the rates and charges were calculated; (4) the reason for the rates and charges; and (5) the date, time, and location of a public hearing (the "Hearing") on the proposed rates and charges; and

WHEREAS, pursuant to Article XIII D such Notice is required to be provided to the affected property owners and any tenant directly liable for the payment of the rates and charges not less that forty-five (45) days prior to the Hearing on the proposed rate and charges; and

WHEREAS, the District did provide such Notice to the affected property owners and tenants of the proposed rates for the water service fees in compliance with Article XIII D; and

WHEREAS, at the Hearing held on February 18, 2015, the Board heard and considered all oral testimony, written materials, and written protests concerning the establishment and imposition of the proposed rates and charges for the water service fees, and at the close of the Hearing the District did not receive written protests against the establishment of and imposition of the proposed Water Shortage Contingency Program and associated Drought Pricing for the water service fees from a majority of the affected property owners and tenants directly liable for the payment of water service fees; and

WHEREAS, due to the fiscal impacts referenced above, the Board has determined that it is in the best interests of the District to adopt the proposed Water Supply Shortage

Contingency Program identified herein and as more particularly described and set forth herein; and

NOW, THEREFORE, BE IT ORDAINED by the Board of Directors of the Western Municipal Water District of Riverside County as follows:

Section 1. Recitals

The Board of Directors hereby finds and determines that the above recitals are true and correct and incorporated herein.

Section 2. Findings and intent

(A) The Board of Directors finds and determines that because of the prevailing conditions in the state, and the declared policy of the State, it is necessary and appropriate for the District to adopt, implement, and enforce this Program to reduce the quantity of water used by Persons within the District to ensure that there is sufficient water for human consumption, sanitation, and fire protection. The District further finds and determines that during periods of drought, water shortages, and water shortage emergencies the general welfare requires that the District maximize the beneficial use of its available water resources to the extent that it is capable, and that the waste or unreasonable use, or unreasonable method of use of water shall be prevented and the conservation of water is to be extended with the view to the reasonable and beneficial use thereof in the interests of the people of the District and for the public health, safety, and welfare.

(B) This Ordinance adopts the Program which establishes water waste restrictions, supply shortage response measures, regulations, structural pricing changes, and administrative fines and/or penalties to be implemented during declared water supply shortage stages.

(C) This Ordinance adopts the Program which establishes five (5) water supply shortage stages with sub-stages in Stages 3, 4, and 5 and supply shortage response measures to be implemented by the District, with increasing restrictions on water use and administrative fines and/or penalties for water waste in response to decreasing water supplies and/or worsening drought conditions.

(D) The water supply shortage stages may be caused by, but are not limited to, any or all of the following circumstances or events:

(1) A regional water supply shortage exists;

(2) Delivery infrastructure such as storage reservoirs, pipes, pumps, filtration devices or groundwater wells are inoperable or unusable (such as by power outages, mechanical failure, or contamination);

(3) Alternative water supplies are limited or unavailable;

(4) Groundwater levels or groundwater quality is approaching levels which may require augmentation of the groundwater basin or other actions necessary to protect the groundwater basin as prescribed by the California Department of Water Resources, the Regional Water Quality Control Board, Riverside County, or some other regulatory body; or

(5) MWD's Water Surplus and Drought Management Plan stages and the MWD Water Supply Allocation Plan stages and corresponding actions have been implemented.

Section 3. Purpose and scope

(A) The purposes of the provisions of this Ordinance and Program are to assure the highest beneficial use of District water supplies and to provide sufficient

water supplies to meet the basic needs of human consumption, sanitation, and fire protection within the District's direct retail service area.

(B) This Ordinance is not intended to repeal, abrogate, annul, impair or in any way interfere with the free use of property by covenant, deed, or other private agreement or with restrictive covenants running with the land to which the District provides water services.

(C) The provisions of this Ordinance shall apply to all Persons within the District's direct retail service area and all property served in a retail capacity by the District wherever situated.

(D) Nothing in this Ordinance is intended to affect or limit the ability of the District to respond to an emergency, including an emergency that affects the ability of the District to supply water.

Section 4. Definitions

For the purposes of this Ordinance, the following words, terms, and phrases shall have the following meanings:

"Appellant" means the Person appealing a decision of the Approving Authority, General Manager or other District official.

"Approving Authority" means the General Manager of the District, or his or her designee, charged with approving or denying written applications for Relief.

"Base Period" means a period of time similar to a Customer's Billing Period in both fiscal year 2012-2013 and fiscal year 2013-2014. For the purposes of determining historical water use for a Billing Period, the average is calculated using the similar Billing Period from both fiscal year 2012-2013 and fiscal year 2013-2014.

"Billing Period" means the billing period in which a Customer's water use is measured for purposes of calculating the amount of the water service fees that shall be collected for the water service provided.

"Billing Tier" means the volume of water within a defined and adopted rate.

"Board of Directors" means the Board of Directors of the District.

"Conservation Offset" means the implementation of proven conservation techniques which, when installed, will result in a reduction equal to the demand of a new or proposed use, or the payment of a fee (a "Conservation Offset Fee") in an amount established by the District to cover the cost of implementing such conservation techniques or acquiring alternative water sources to offset the demand of the new or proposed use.

"District" means the Western Municipal Water District.

"Enforcement Officer" means any individual employed or otherwise charged by the District to inspect or enforce codes, ordinances, mandates, regulations, resolutions, rules or other laws adopted by the Board of Directors or other regulatory bodies.

"General Manager" means the General Manager of the District or his or her authorized designee.

"Immediate Emergency" means a breakage or failure of a dam, pump, pipeline or conduit, a disaster or other disruption of the District's water supply.

"Medical Adjustment" means an adjustment to the residential indoor water allocation based on medical needs. Medical adjustments must be approved by the District and are not subject to mandatory residential indoor water allocation reductions in any stage. The District will

consider a request for medical adjustment at any time and at any stage. The adjustment shall be removed with any changes to the account holder.

"MWD" means the Metropolitan Water District of Southern California.

"Non-Potable Water" means water that is not of drinking water quality, but which may still be used for purposes other than for human consumption.

"Person" means any natural person, firm, joint venture, joint stock company, partnership, public or private association, club, company, corporation, business trust, organization, public or private agency, government agency or institution, school district, college, university, any other user of water provided by the District, or the manager, lessee, agent, servant, officer or employee of any of them or any other entity which is recognized by law as the subject of rights or duties.

"Program" means the Water Supply Shortage Contingency Program adopted pursuant to this Ordinance.

"Property Owner" means the owner of a parcel whose name and address appears on the last Riverside County equalized secured property tax assessment roll, or in the case of any public entity, the State of California, or the United States, means the representative of that public entity at the address of that entity known to the District.

"Recycled Water" means municipal wastewater that has been treated to meet all applicable Federal, State and local standards for use in approved applications, including, but not limited to, agricultural and landscape irrigation.

"Relief" means excuse from compliance with the regulations and restrictions on water use contained in this Ordinance.

"State" means the State of California.

"Water Budget" means a Customer's total water billing allocation for indoor and outdoor water use. The specific indoor and outdoor allocation of water depends on the type of Customer (Customer sector) and the specific characteristics of the Customer's site. Use in excess of the allocation is charged at incrementally higher rates.

"Water Customer" or "Customer" means a Person who, according to the District's records, receives water service to a parcel of property.

"Water Shortage Emergency" means a condition existing within the District in which the ordinary water demands and requirements of Persons within the District cannot be satisfied without depleting the water supply of the District to the extent that there would be insufficient water for human consumption, sanitation, and fire protection. A Water Shortage Emergency includes both an Immediate Emergency, in which the District is unable to meet current water needs of Persons within the District, as well as a threatened water shortage, in which the District determines that its supply cannot meet an increased future demand.

"Water Supply Allocation Plan" or "WSAP" means the Plan developed by MWD to calculate member agencies' supply allocations should a shortage be declared.

"Water Surplus and Drought Management" Plan or "WSDM" means the 1999 Plan that MWD uses to direct its resource operations to ensure that shortage allocations of imported water supplies are not required.

Section 5. Stage Implementation

(A) The General Manager shall monitor the projected supply of and demand for water within the retail water service area of the District during periods of a

water shortage or supply shortage and shall recommend to the Board of Directors the extent of the demand reduction required through the implementation and/or termination of particular water supply shortage stages or sub-stages to prudently plan and supply water to water Customers. Thereafter, the Board of Directors may order the implementation or termination of the appropriate stage or sub-stage.

(B) The declaration of any stage or sub-stage beyond Stage 1 shall be made by resolution of the Board of Directors. Within ten (10) calendar days of the adoption of the resolution declaring the applicable stage or sub-stage, the District shall make a public announcement and provide notice of the applicable water supply shortage stage. Such declaration and notice shall provide the extent, terms, and conditions as well as the associated water budget allocations and fines and/or penalties respecting the use and consumption of water in accordance with the applicable water supply shortage stage as provided in this Ordinance. Upon such declaration and publication of such notice, due and proper notice shall be deemed to have been given to each and every Person supplied water within the District.

(C) The water supply shortage stage designated shall become effective immediately upon announcement.

(D) Except in the event of an Immediate Emergency, the declaration of a Water Shortage Emergency during any water supply shortage stage shall be made in accordance with California Water Code sections 350 *et seq.*

(E) Notwithstanding any other provision of this Ordinance, if an Immediate Emergency occurs and the Board of Directors cannot meet in time to act to protect the public interest, the General Manager is hereby authorized and directed to implement any necessary rules and

regulations upon his or her written determination that the District cannot adequately supply water to meet the ordinary demands of water consumers, and that such implementation is necessary to protect the public health and safety.

(1) The General Manager's written determination of an Immediate Emergency shall be:

(a) filed with the District Secretary;

(b) posted on the District's website;

(c) delivered to the Board of Directors; and

(d) subsequently considered by the Board of Directors at a general or special meeting for review, revocation, or ratification.

(2) The implementation of any rules and regulations during an Immediate Emergency shall take effect immediately upon making a posting of the determination of the Immediate Emergency on the District's website.

(3) The Board of Directors' meeting shall be held on the earliest date that a quorum of the Board of Directors is available. At the Board of Directors meeting, the General Manager shall update the Board of Directors on the severity and length of the Immediate Emergency.

Section 6. Stage 1 – Water Supply Watch

(A) Stage 1 is also referred to as a "Water Supply Watch" and applies during periods when the District is able to meet all of the water demands of its Customers. Stage 1 and the permanent prohibitions set forth herein shall be in effect at all times unless the Board of Directors otherwise declares that another stage is in effect pursuant to this Ordinance and such stage establishes more stringent prohibitions on the use of water during the particular stage.

Under Stage 1, Customers are encouraged to use water efficiently and take advantage of the District's water use efficiency programs. Stage 1 also mandates the implementation of several permanent water waste prohibitions, even when there is no foreseeable threat of a water shortage. Water waste is in violation of California Law at any stage. California's water law and policy, Article X, Section 2 of the California Constitution, requires that all uses of the State's water be both reasonable and beneficial and places a significant limitation on water rights by prohibiting the waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water. The permanent prohibitions shall be continually in effect at all levels of water shortage declarations in addition to the requirements specific to each level. All normal water efficiency programs and water conservation regulations of the District will be in full force and effect during Stage 1. The permanent shortage response measures include:

(1) All irrigators shall ensure automatic irrigation timers are adjusted according to changing weather patterns and landscape requirements.

(2) All open hoses shall be equipped with automatic, positive shut-off nozzles.

(3) Watering of lawns and/or groundcovers and irrigating landscaping is permitted only between the hours of 8:00 p.m. and 8:00 a.m.

(4) All swimming pools, spas, ponds, and fountains shall be equipped with re-circulating pumps.

(5) All plumbing leaks, improperly adjusted sprinklers, or other water conduits/fixtures that require repair or adjustment shall be corrected to the satisfaction

of the District within ninety-six (96) hours of notification by the District.

(6) No Person shall use water to wash down sidewalks, driveways, parking areas, tennis courts, patios, or other paved or hard surface areas, except to alleviate immediate fire or sanitation hazards, and then only by use of: a hand-held bucket or similar container, a hand-held hose equipped with an automatic, positive self-closing shut-off device, or a low volume, high-pressure cleaning machine.

(7) No Person shall allow water to leave his or her property by drainage onto adjacent properties or public or private roadways or streets due to excessive irrigation and/or uncorrected leaks.

(8) The washing of automobiles, trucks, trailers, boats, airplanes and other types of mobile equipment, is permitted at any time with a hand-held bucket or a hand-held hose equipped with an automatic, positive shut-off nozzle. Provided, however, such washing may be done at any time on the immediate premises of a commercial car wash, a commercial service station or car dealership with commercial car washing equipment, or by a licensed mobile detailing/car wash professional using low volume, high pressure washing equipment. Further, such washings are exempted from these regulations where the health, safety, and welfare of the public is contingent upon frequent vehicle cleanings, such as garbage trucks and vehicles used to transport food and perishables.

(9) Construction operations receiving water from a construction meter, hydrant meter, or water truck shall not use water for any purpose other than those required by regulatory agencies. Construction projects requiring watering for new landscaping materials shall

adhere to the designated irrigation requirements set forth in Section 6(A) hereof.

(B) The District will attempt to contact Customers by telephone, mail, email and/or printed "door-hanger" to alert of a required repair, adjustment, or violation. All Customers shall ensure that the District has current telephone and email contact information. The District is not responsible for incorrect phone numbers or email addresses.

Section 7. Stage 2 – Water Supply Alert

(A) Stage 2 is also referred to as a "Water Supply Alert" and applies during periods when a reasonable probability exists that the District will not be able to meet all of the water demands of its Customers. This may correlate to MWD's WSDM Plan stage of "Water Supply Watch" or "Water Supply Alert" Conditions.

(B) The objective of Stage 2 is to affect a moderate reduction in water use up to 4% through voluntary actions and may be adjusted depending on supply conditions via a Board approved Resolution.

(C) Voluntary conservation measures will be called upon during this stage. The District shall develop a public information campaign to provide Customers with options for achieving the Stage 2 demand reduction goal. The District shall explore increased Customer incentives for conservation measures.

Section 8. Stage 3 – Targeting Waste Reduction

(A) Stage 3 is also referred to as a "Mandatory Waste Reduction" stage. The intent of Stage 3 is to target and eliminate excessive water waste and water use in the District's three budget-based water rates penalty Tiers 3, 4, and 5. Stage 3 applies during periods when a reasonable probability exists that the District will not be able to

meet all of the water demands of its Customers. This may correlate to MWD's Shortage Allocation Plan Shortage Levels 1 through 3.

(B) The objective of the measures undertaken in Stage 3 is to reduce water system consumption within the District by five to fifteen percent (5 to 15%).

(C) Stage 3 does not apply to the use of non-potable or recycled water. The use of non-potable or recycled water is permitted pursuant to the specific rules and regulations that govern its use.

(D) Potable water Customers in areas directly served by the District that do not have Water Budgets shall reduce their water use by five to fifteen percent (5 to 15%) from the Base Period during declarations of any Stage 3 sub-stage.

(E) Stage 3 has three sub-stages – Stage 3(a), Stage 3(b), and Stage 3(c). The following provisions shall apply during Stage 3:

(1) Stage 3(a). The District shall eliminate all adjustments to existing residential Customers' outdoor Water Budgets including, but not limited to, increases for landscape size, and/or swimming pool, spa, or pond maintenance adjustments. New water using features or expanded landscapes shall not qualify for a Water Budget adjustment. The provisions of this Section 8(E)(1) shall also apply during any other stage or sub-stage other than Stage 1 and Stage 2.

(2) Stage 3(b). Tier 4 water rates shall be eliminated. Customers with Water Budgets, and whose water use exceeds one hundred and twenty-five percent (125%) of their total Water Budget during a Billing Period will be charged the applicable Tier 5 water rates. The provisions of this Section 8(E)(2)shall also apply during Stage 3(c).

(3) Stage 3(c). Tier 3 water rates shall be eliminated. Customers who have Water Budgets, and whose water use exceeds one hundred percent (100%) of their total Water Budget during a Billing Period, shall be charged the applicable Tier 5 water rates.

(F) Voluntary conservation measures will be called upon during this stage. The District shall develop a public information campaign to provide Customers with options for achieving the Stage 3 demand reduction goal and complying with their applicable water allocation. The District shall explore increased Customer incentives for conservation measures.

Section 9. Stage 4 - Targeting Outdoor Reductions

(A) Stage 4 is also referred to as a "Mandatory Outdoor Reductions" stage. The intent of this stage and the related sub-stages is to strategically reduce the demand for water though targeted outdoor reduction actions. Stage 4 applies during periods when the District will not be able to meet all of the water demands of its Customers. This may correlate to any of MWD's WSAP Regional Shortage Levels 4 through 10.

(B) The objective of the measures undertaken in Stage 4 is to reduce water system consumption within the District by sixteen to fifty percent (16 to 50%).

(C) Except as otherwise provided in this Section 9, all supply shortage response measures of Stages 1 through 3 shall be in full force and effect during Stage 4.

(D) Stage 4 does not apply to non-potable or recycled water. The use of non-potable or recycled water is permitted pursuant to the specific rules and regulations that govern their use.

(E) If the District Board of Directors declares a Water Shortage Emergency during a Stage 4, no new potable

water service connections shall be provided, no new temporary meters or permanent meters shall be provided, and no statements of immediate ability to serve or provide potable water service (such as will serve letters, certificates, or letters of availability) shall be issued, except under the following circumstances:

(1) a valid, unexpired building permit has been issued for the project; or

(2) the project is necessary to protect the public's health, safety, and welfare; or

(3) the applicant provides a Conservation Offset or pays a Conservation Offset Fee established by the District in an amount necessary to cover the cost of implementing such conservation techniques or acquiring alternative water sources, to offset the new demand. The fee will be based on the Conservation Offset required to meet the projected demand of the proposed project. Such fee shall apply to residential as well as commercial and industrial buildings, and may be adjusted from time to time as determined by the District. The existence and application of a Conservation Offset, and the amount of the Conservation Offset Fee and other terms and conditions for any Conservation Offset, shall be determined at the District's sole discretion. The existence and application of any such water meter moratorium or other similar restrictions shall be determined by separate and subsequent action of the Board of Directors; or

(4) where an existing service connection exists and an existing water meter is inoperable and cannot be repaired. In such an instance, the size of the new water meter shall be the same or smaller than the water meter being replaced.

(F) Stage 4 has three sub-stages — Stage 4(a), Stage 4(b), and Stage 4(c). The following provisions shall apply during Stage 4:

(1) Stage 4(a).

(i) All landscape Water Budgets shall be reduced by ten percent (10%). Residential Customers who have Water Budgets, and whose water use exceeds one hundred percent (100%) of their Tier 1 and ninety percent (90%) of their Tier 2 Water Budgets during a Billing Period, shall be charged at the applicable Tier 5 water rates. Landscape Customers who have Water Budgets, and whose water use exceeds ninety percent (90%) of their Water Budget during a Billing Period, shall be charged the applicable Tier 5 water rates.

(ii) Commercial or industrial Customers who are served through mixed-use meters, and who have Water Budgets, shall reduce landscape and non-essential outdoor water use by twenty-five percent (25%).

(iii) Potable water Customers in areas directly served by the District and who do not have Water Budgets shall reduce their outdoor water use by ten percent (10%) from the base Period.

(2) Stage 4(b).

(i) All outdoor Water Budgets shall be reduced by forty percent (40%). Residential Customers who have Water Budgets, and whose water use exceeds one hundred percent (100%) of their Tier 1 and forty percent (40%) of their Tier 2 Water Budgets during a Billing Period, shall be charged at the applicable Tier 5 water rates. Landscape Customers who have Water Budgets, and whose water use exceeds forty percent (40%) of their Water Budget during a Billing Period, shall be charged the applicable Tier 5 water rates.

(ii) Commercial or industrial Customers who are served through dedicated or mixed-use meters, and who have Water Budgets, shall reduce their water consumption by ten percent (10%).

(iii) Potable water Customers in areas directly served by Western, and who do not have Water Budgets, shall reduce their outdoor water use by forty percent (40%) from the Base Period.

(3) Stage 4(c).

(i) All outdoor Water Budgets shall be reduced by sixty-five percent (65%). Residential Customers who have Water Budgets, and whose water use exceeds one hundred percent (100%) of their Tier 1 (indoor) Water Budget and thirty-five percent (35%) of their Tier 2 (outdoor) Water Budget during a Billing Period, shall be charged at the applicable Tier 5 water rates. Landscape Customers who have Water Budgets, and whose water use exceeds thirty-five (35%) of their total Water Budget during a Billing Period, shall be charged the applicable Tier 5 rate.

(ii) Installation of new landscapes shall be prohibited unless irrigated with recycled water. Exceptions may be provided for projects with prior approval by the appropriate jurisdiction.

(iii) Commercial and industrial Customers who are served through dedicated or mixed-use meters, and who have Water Budgets, shall reduce their water consumption by twenty percent (20%).

(iv) Potable water Customers in areas directly served by the District who do not have Water Budgets shall reduce their outdoor water use by sixty-five percent (65%).

(v) No new construction or hydrant meters will be issued. Potable water shall not be used for earth work, road construction purposes, dust control, compaction, or trenching jetting. Construction projects necessary to maintain the health, safety, and welfare of the public are exempt from these regulations.

(G) The District shall develop a public information campaign to provide Customers with options for achieving the Stage 4 demand reduction goals and complying with their applicable allocation. The District may explore increased Customer incentives for conservation measures.

Section 10. Stage 5 – Mandatory Targeted Indoor/Outdoor Reductions – Catastrophic Failure or "Immediate Emergency"

(A) Stage 5 is also referred to as a "Mandatory Indoor/Outdoor Reductions" stage. The intent of this stage and the related sub-stages is to substantially reduce the demand for water though indoor actions in addition to the elimination of landscape and non-essential outdoor water use. Stage 5 applies during periods when the District will not be able to meet all of the water demands of its Customers. This shortage level may correlate to MWD's WSAP Regional Shortage Levels 9, 10, or greater. Stage 5 may be declared during an Immediate Emergency. A Stage 5 declaration may also be accompanied by a Board Resolution declaring a Water Shortage Emergency under California Water Code sections 350 *et seq*.

(B) The objective of the measures undertaken in Stage 5 is to significantly reduce water consumption within the District to protect public health, safety, and fire flow.

(C) Except as otherwise provided in this Section 10, all water supply shortage response measures of Stages 1 through 4 shall be in full force and effect during Stage 5.

(D) Stage 5 does not apply to non-potable or recycled water, although there is no guarantee of availability. The use of non-potable or recycled water is permitted pursuant to the specific rules and regulations that govern their use and availability.

(E) All landscape and non-essential outdoor water use for all Customers in all areas of the District's retail water service area shall be prohibited.

(F) Except as to property for which a building permit has been heretofore issued, no new water meter(s) shall be provided, except in the following circumstances:

(1) for projects necessary to protect the public's health, safety, and welfare; or

(2) when using recycled water.

(G) Stage 5 has three sub-stages — Stage 5(a), Stage 5(b), and Stage 5(c). The following provisions shall apply during Stage 5:

(1) Stage 5(a).

(a) All indoor residential Water Budgets shall be reduced by ten percent (10%) to fifty-four (54) gallons per person per day. Residential Customers who have Water Budgets, and whose water use exceeds ninety percent (90%) of their modified Tier 1 Water Budget and zero percent (0%) of Tier 2 Water Budget during a Billing Period, or fifty four gallons per person per day total, shall be charged at the applicable Tier 5 water rates.

(b) Commercial and industrial Customers who are served through dedicated or mixed-use meters, and who have Water Budgets, shall reduce their water consumption by thirty percent (30%).

(c) Potable water Customers in areas directly served by Western that do not have Water Budgets shall reduce their indoor water use by ten percent (10%).

(2) Stage 5(b).

(a)All residential indoor Water Budgets shall be reduced by fifteen percent (15%) to fifty-one (51) gallons per person per day. Residential Customers who have Water Budgets, and whose water use exceeds eighty-five percent (85%) of their Tier 1 modified Water Budget and zero percent (0%) of Tier 2 Water Budget during a Billing Period, or fifty-one (51) gallons per person per day total, shall be charged at the applicable Tier 5 water rates.

(b) Commercial and industrial Customers who are served through dedicated or mixed-use meters, and who have Water Budgets, shall reduce their water consumption by forty percent (40%).

(c) Potable water Customers in areas directly served by the District who do not have Water Budgets shall reduce their indoor water use by fifteen percent (15%) from the Base Period. All non-essential outdoor and landscape water use shall be prohibited.

(3) Stage 5(c).

(a)All residential Customers who have Water Budgets shall have their indoor Water Budgets reduced by twenty percent (20%) to forty-eight (48) gallons per person per day. Residential Customers who have Water Budgets, and whose water use exceeds eighty percent (80%) of their Tier 1 modified Water Budget and zero percent (0%) of Tier 2 Water Budget during a Billing Period, or forty-eight (48) gallons per person per day total, shall be charged at the applicable Tier 5 rates.

(b) Commercial and industrial Customers who are served through dedicated or mixed-use

meters, and who have Water Budgets, shall be reduce their water consumption by fifty percent (50%).

(c) Potable water Customers in areas directly served by the District who do not have Water Budgets shall reduce their indoor water use by twenty percent (20%) from the Base period.

(H) The use of water for commercial, manufacturing, or processing purposes may be further reduced in volume than is indicated in the sub-stages of this section if it is determined to be in the best interest of the health, sanitation, and fire flow protection in the communities served by the District. This determination may be made by the Board of Directors, the General Manager or his or her authorized designee as provided for in Section 5(E).

(I) All dedicated irrigation meters will be locked off by District personnel.

(J) Customers with a District authorized Medical Adjustment to their Tier 1 allocation will be permitted 100 percent (100%) of their Tier 1 Water Budget.

(K) The District shall develop a public information campaign to provide Customers with options for achieving the Stage 5 demand reduction goals and complying with their allocation. The District may explore increased Customer incentives for conservation measures.

Section 11. Violations and remedies

(A) Criminal Violation. It shall be unlawful for any Person to willfully violate the provisions of this Ordinance. Any violation of the provisions of this Ordinance shall be a misdemeanor, unless made an infraction by the prosecutor, subject to imprisonment in the county jail for not more than thirty (30) days or by fine not to

exceed $1,000, or by both as provided in California Water Code section 377.

(B) Cease and Desist Order. The General Manager may issue a cease and desist order directing the Property Owner, or occupant, or other Person in charge of day-to-day operations of any property, and/or any other Person responsible for a violation of this Ordinance to:

(1) immediately discontinue any prohibited use of water pursuant to this Ordinance; and

(2) immediately cease any activity not in compliance with the terms, conditions, and requirements of this Ordinance.

(C) Civil Action. In addition to any other remedies provided in this Ordinance, any violation of this Ordinance may be enforced by civil action brought by the District and the imposition of administrative fines and/or penalties. In any such action, the District may seek, and the court may grant, as appropriate, any or all of the following remedies:

(1) a temporary and/or permanent injunction;

(2) assessment of the violator for the costs of enforcement of the violation and for the reasonable costs of preparing and bringing legal action under this Ordinance; and

(3) assessments under this subsection shall be paid to the District to be used exclusively for costs associated with implementing or enforcing the water supply shortage and regulatory provisions of this Ordinance.

(D) Cumulative. All remedies provided herein shall be cumulative and not exclusive.

(E) On-going. A Person shall be deemed guilty of a separate offense for each and every day or portion

thereof during which any violation of any provision of this Ordinance is committed, continued, or permitted.

Section 12. Notices

(A) Any notice, notice of violation, cease and desist order, and administrative compliance order shall be served pursuant to the requirements of this Ordinance and shall:

(1) identify the provision(s) of this Ordinance and any State law, if applicable, alleged to have been violated; and

(2) state that continued noncompliance may result in civil, criminal, or administrative enforcement actions against the Person who committed the violation, or the Property Owner and/or occupant of the property where the violation occurred; and

(3) state a compliance date that must be met by the Person who committed the violation, or the Property Owner and/or occupant of the property where the violation occurred; and

(4) order remediation work, where applicable, that must be taken by the Property Owner and/or occupant of the property; and

(5) state that the recipient has a right to appeal the matter as set forth in this Ordinance; and

(6) include the address of the affected property and be addressed to the Property Owner as shown on the most recently issued equalized assessment roll or as may otherwise appear in the current records of the District. If the order applies to a responsible party who is not the Property Owner, or if the event is not related to a specific property, the notice may be sent to the last known address of the responsible party; and

(7) be deemed served ten (10) business days after posting on the property, if the Property Owner or occupant of the affected property cannot be located after the reasonable efforts of the General Manager or his or her authorized designee.

(B) Any notice, notice of violation, cease and desist order, and administrative compliance order may be sent by regular mail. Service by regular mail is effective on the date of mailing.

(C) The notice of violation may include, where deemed applicable by the General Manager or his or her authorized designee, the following terms and conditions:

(1) specific steps or actions and time schedules for compliance as reasonably necessary to prevent future violations of this Ordinance; and

(2) any other terms, conditions, or requirements reasonably calculated to prevent continued or threatened future violations of this Ordinance, including, but not limited to, discontinuing or limiting water service with the installation of a flow-restricting device.

(D) In addition to or in conjunction with the notice of violation, for a first violation of any provision of this Ordinance, within two (2) weeks of the violation:

(1) the District may provide notice to the Property Owner or occupant of the property where the violation occurred to advise such Person of:

(a) the water supply shortage stage then in effect and the provisions of this Ordinance relating thereto;

(b) water supply shortage response measures that are required and may be implemented pursuant to this Ordinance;

(c) possible consequences and actions which may be taken by the District for future violations of this Ordinance, including discontinuance of water service; and

(d) fines and/or penalties that may be imposed for the specific violation and any future violations of this Ordinance;

(2) if the General Manager or his or her authorized designee deem it to be appropriate, the District may order the installation of a flow-restricting device on the service line for any Person who violates any term or provision of this Ordinance.

(E) In addition to or in conjunction with the notice of violation, for a second or any subsequent violation of this Ordinance, within two (2) weeks of the violation:

(1) the District may provide notice to the property where the violation occurred to notify the Property Owner or occupant of the property where the violation occurred to advise such Person of:

(a) the water supply shortage stage then in effect and the provisions of this Ordinance relating thereto;

(b) the water supply shortage response measures that are required and may be implemented by such Person; and

(c) possible consequences which may occur in the event of any future violations of this Ordinance;

(2) if the General Manager or his or her authorized designee deem it to be appropriate, the District may order the installation of a flow-restricting device on

the service line for any Person who violates any term or provision of this Ordinance;

(3) if the General Manager or his or her authorized designee deem it to be appropriate, the District may discontinue water service at the location where the violation occurred.

(F) The District may, after one (1) written notice of violation, order that a special meter reading or readings be made in order to ascertain whether wasteful or unreasonable use of water is occurring. The District may impose a meter reading fee for each meter reading it conducts pursuant to this Ordinance.

Section 13. Administrative compliance order and fines and/or penalties

(A) Separate from, in addition to, or in combination with a notice of violation or cease and desist order, the General Manager or his or her authorized designee may issue an administrative compliance order against the Property Owner and/or occupant of the property where a violation of this Ordinance occurred and/or any other Person responsible for a violation of this Ordinance who violates any provision of this Ordinance. Issuance of a notice of violation or a cease and desist order is not a prerequisite to the issuance of an administrative compliance order. The administrative compliance order shall allege the act(s) or failure(s) to act that constitute violations of this Ordinance and shall set forth the penalty for the violation(s).

(B) The General Manager may impose the following administrative monetary fines and/or penalties, in addition to other appropriate action requirements and measures:

(1) For water meters smaller than two inches (2") in size:

(a) For the first violation during any water supply shortage stage by any Person of any provision of this Ordinance, the District may issue a written notice to the Person which sets forth the facts surrounding the violation and additional information such as the required compliance and potential fines and/or penalties for noncompliance;

(b) For a second violation during any water supply shortage stage by any Person of any provision of this Ordinance within the preceding twelve (12) calendar months, the District may issue a written notice to the Person which sets forth a complete copy of this Ordinance or summary document of the District's Water Supply Shortage Contingency Program as well as additional information such as the required compliance and potential fines and/or penalties for noncompliance.

(c) For a third violation during Stages 1 and 2 by any Person of any of the provisions of this Ordinance within the preceding twelve (12) calendar months, the District may impose a monetary penalty in the amount of one hundred dollars ($100.00) per day for each day a Person violates any provision of this Ordinance. During Stages 3, 4, and 5 the District may impose a monetary penalty in the amount of two hundred dollars ($200.00) per day for each day a Person violates any provision of this Ordinance.

(d) For a fourth violation during Stages 1 and 2 by any Person of any of the provisions of this Ordinance within the preceding twelve (12) calendar months, the District may impose a monetary penalty in the amount of two hundred dollars ($200.00) per day for each day a Person violates any provision of this Ordinance. During Stages 3, 4, and 5 the District may impose a

monetary penalty in the amount of four hundred dollars ($400.00) per day for each day a Person violates any provision of this Ordinance.

(e) For a fifth and any subsequent violation, the District may install a flow-restricting device of two and one-half gallons per minute (2.5 GPM) capacity for services up to one and one-half inch (1-1/2") size and comparatively sized restrictors for larger services or terminate a Person's service in accordance with the District's applicable rules and regulations. These measures are in addition to any monetary fines and/or penalties provided for herein.

(f) Any such restricted or terminated service may be restored in accordance with the District's applicable rules and regulations and only upon a showing that the Person is in compliance with this Ordinance. Prior to any restoration of service, the Customer shall pay all District charges for any restriction or termination of service and its restoration as provided for in the District rules governing water service, including, but not limited to payment of all past due bills and fines and/or penalties and any other amounts which may be due and owing under this Ordinance.

(2) For water meters two inches (2") and larger:

(a) For the first violation during any water supply shortage stage by any Person of any provision of this Ordinance, the District may issue a written notice to the Person which sets forth the facts surrounding the violation and additional information such as the required compliance and potential fines and/or penalties for noncompliance.

(b) For a second violation during any water supply shortage stage by any Person of any provision of this Ordinance within the preceding twelve (12) calendar months, the District may issue a written notice to the Person which sets forth a complete copy of this Ordinance or summary document of the District's Water Shortage Contingency Program as well as additional information such as the required compliance and potential fines and/or penalties for noncompliance.

(c) For a third violation during water supply shortage Stages 1 and 2 by any Person of any of the provisions of this Ordinance within the preceding twelve (12) calendar months, the District may impose a monetary fine and/or penalty in the amount of one hundred dollars ($100.00) per day for each day a Person violates any provision of this Ordinance. During Stages 3, 4, and 5 the District may impose a monetary fine and/or penalty in the amount of three hundred dollars ($300.00) per day for each day a Person violates any provision of this Ordinance.

(d) For a fourth violation during water supply shortage Stages 1 and 2 by any Person of any of the provisions of this Ordinance within the preceding twelve (12) calendar months, the District may impose a monetary fine and/or penalty in the amount of three hundred dollars ($300.00) per day for each day a Person violates any provision of this Ordinance. During Stages 3, 4, and 5, the District may impose a monetary fine and/or penalty in the amount of six hundred dollars ($600.00) per day for each day a Person violates any provision of this Ordinance.

(e) For a fifth and any subsequent violation, the District may install a flow restricting device or terminate a Person's service in accordance with the District's applicable rules and regulations, in

addition to the monetary fines and/or penalties provided for herein.

(f) Any such restricted or terminated service may be restored in accordance with the District's applicable rules and regulations and only upon a showing that the Person is in compliance with this Ordinance. Prior to any restoration of service, the Customer shall pay all District charges for any restriction or termination of service and its restoration as provided for in the District rules governing water service, including, but not limited to, payment of all past due bills and fines and/or and any other amounts which may be due and owing under this Ordinance.

(3) An amount that shall not exceed one thousand dollars ($1,000.00) per day for each day on which a Person violates any provision of this Ordinance. Unless timely appealed, an administrative compliance order shall be effective and final as of the date it is issued by the General Manager.

(C) The amount of any fines and/or penalties imposed pursuant to this Section 13 may be collected by including said amount on the Customer's water bill. The amount of any fines and/or penalties imposed pursuant to this Section 13 which have remained delinquent for a period of sixty (60) calendar days shall constitute a lien against the real property of the Person violating this Ordinance. The lien provided herein shall have no force and effect until recorded with the Riverside County Recorder and when recorded shall have the force and effect and priority of a judgment lien and continue for ten (10) years from the time of recording unless sooner released, and shall be renewable in accordance with the provisions of sections 683.110 to

683.220, inclusive, of the California Code of Civil Procedure.

(D) All moneys collected under this Section 13 shall be deposited in a special account of the District and shall be made available for enforcement of this Ordinance and enhanced water conservation incentive programs.

(E) The District may, at its option, elect to petition the Superior Court to confirm any order establishing administrative fines and/or penalties and enter judgment in conformity therewith in accordance with the provisions of sections 1285 to 1287.6, inclusive, of the California Code of Civil Procedure.

Section 14. Over-Budget Water Use Penalties

(A) All penalty moneys collected from over-budget water use during a declared water shortage stage in excess of the applicable Tier 2 rate, shall be deposited in the existing special funding accounts designated for conservation penalty and/or supply penalty as appropriate and may be allocated to or used for any of the following as determined by the District:

1. Conservation Penalty Account:

(a) Enhanced conservation programs designed to reduce water demands;

(b) Outreach and Education Programs designed to reduce water demands, decrease water waste, or generally raise water awareness;

(c) Enforcement of any provision of this Ordinance;

2. Supply Penalty Account:

(a) Purchase, acquisition, delivery, or wheeling of additional water supplies;

(b) General operations and maintenance expenses, including those incurred as a result of reduced water sales;

(c) The difference between budgeted revenue expected from the operations and maintenance component in the water rates of Tier 1 and 2 and actual revenue received from this component;

(d) Payment of penalty expenses incurred as a result of exceeding a MWD water supply allocation;

(e) Payment of any other incremental cost of service associated with providing water deliveries and/or water service during any water curtailment, water shortage emergency, or "Immediate Emergency" pursuant to Water Code sections 350 *et seq.*

Section 15. Recovery of costs

(A) The General Manager shall serve an invoice for costs upon the Property Owner and/or occupant of any property, or any other responsible Person who is subject to a notice of violation, a cease and desist order, or an administrative compliance order. An invoice for costs shall be immediately due and payable to the District. If any Property Owner or Person in charge of day-to-day operations, Customer, or responsible party, or any other Person fails to either pay the invoice for costs or appeal successfully the invoice for costs in accordance with this Ordinance, then the District may institute collection proceedings. The invoice for costs may include reasonable attorneys' fees.

(B) The District shall impose any other fines and/or penalties or regulatory fees, as fixed from time to time by the Board of Directors, for a violation or enforcement of this Ordinance.

(C) In order to recover the costs of the water supply shortage program set forth in this Ordinance, the Board of Directors may, from time to time, fix and impose fees and charges. The District fees and charges may include, but are not limited to fees and charges for:

(1) any visits of a Enforcement Officer or other District staff for time incurred for meter reading, follow-up visits, or the installation or removal of a flow-restricting device;

(2) monitoring, inspection, and surveillance procedures pertaining to enforcement of this Ordinance;

(3) enforcing compliance with any term or provision of this Ordinance;

(4) re-initiating service at a property where service has been discontinued pursuant to this Ordinance;

(5) processing any fees necessary to carry out the provisions of this Ordinance.

Section 16. Appeals

Any Person subject to a notice of violation, cease and desist order, or administrative compliance order may file a written appeal of such order or notice to the General Manager within thirty (30) calendar days of the date of service of the order or notice. An appeal shall be made in accordance with the following procedures:

(1) The Appellant shall complete and submit in writing a form provided by the District for such purpose and shall state in such form the grounds for his or her appeal. All appeals shall be submitted to the District Secretary within thirty (30) calendar days of the date of

the notice of violation, cease and desist order, or administrative compliance order.

(2) The General Manager or his or her authorized designee shall review the appeal and any related information provided, and, if necessary, cause an investigation and report to be made concerning the request for Relief. The General Manager or his or her authorized designee shall have fifteen (15) calendar days from the submission of the appeal to render a decision on whether to grant the appeal and mail notice thereof to the Appellant. If the General Manager or his or her authorized designee grants the appeal, then within fifteen (15) calendar days of such determination the General Manager or his or her authorized designee shall give written notice thereof to the Appellant.

(3) The decision of the General Manager or his or her authorized designee may be appealed by the Appellant to the Board of Directors. Such appeal must be submitted in writing and filed with the District Secretary within fifteen (15) calendar days of the date of decision of the General Manager or his or her authorized designee. The Board of Directors shall conduct a hearing on such appeal at its next regularly scheduled Board of Directors meeting; provided, however, the Board of Directors shall have received the notice of appeal at least fifteen (15) calendar days prior to such meeting. If the appeal is not submitted within at least fifteen (15) calendar days prior to a regularly scheduled Board of Directors meeting, then the Hearing shall be held at the following regularly scheduled meeting of the Board of Directors. A notice of the Hearing shall be mailed to the Appellant at least ten (10) calendar days before the date fixed for the Hearing.

The Board of Directors shall review the appeal de novo. The determination of the Board of Directors shall be conclusive and shall constitute a final order. Notice of the determination by the Board of Directors shall be mailed to the Appellant within ten (10) calendar days of such determination and shall indicate whether the appeal has been granted in whole or in part and set forth the terms and conditions of the appeal, if any, granted to the Appellant. If the appeal is denied, the Appellant shall comply with all terms and conditions of this Ordinance and the applicable stage then in effect.

(4) All adjustments to water budget allocations shall follow the procedure established by the District.

(5) Until the conclusion of the appeal process, all provisions and decisions under appeal shall remain in full force and effect until the conclusion of the appeal process.

Section 17. Relief from compliance

Consideration of written applications for Relief from compliance regarding the regulations and restrictions on water use set forth in this Ordinance may be made by the District.

(A) Written applications for Relief shall be accepted, and may be granted or denied, by the Approving Authority, at his or her sole discretion, or by his or her designee at his or her sole discretion. The application shall be in a form prescribed by the District and shall be accompanied by a non-refundable processing fee in an amount as determined by the Board of Directors for the purpose of defraying the costs incidental to the proceedings.

(B) The grounds for granting or conditionally granting Relief are:

(1) due to unique circumstances, a specific requirement of this Ordinance would result in undue hardship to a Person using District water or to property upon which District water is used, that is disproportionate to the impacts to other District water users generally or to similar property or classes of water users; or

(2) failure to grant Relief would adversely affect the health, sanitation, fire protection, or safety of the applicant or the public.

(C) The application for Relief shall be accompanied, as appropriate, with photographs, maps, drawings, and other information substantiating the applicant's request, including a statement of the applicant.

(D) An application for Relief shall be denied unless the Approving Authority finds, based on the information provided in the application, supporting documentation, or such other additional information as may be requested, and on water use information for the property as shown by the records of the District, all of the following:

(1) That the Relief does not constitute a grant of special privilege inconsistent with the limitations upon other District Customers;

(2) That because of special circumstances applicable to the property or its use, the strict application of this Ordinance would have a disproportionate impact on: (a) the property or use that exceeds Customers generally; or (b) the applicant's health that exceeds Customers generally;

(3) That the authorization of such Relief will not be of substantial detriment to adjacent properties, will not materially affect the ability of the District to effectuate the purposes of this Ordinance, and will not be detrimental to the public interest; and

(4) That the condition or situation of: (a) the subject property or the intended use of the property for which the Relief is sought is not common, recurrent, or general in nature; or (b) the applicant's health or safety is not common, recurrent, or general in nature.

(E) The denial or grant of a Relief shall be acted upon within fifteen (15) business days of the submittal of the complete application, including any photographs, maps, drawings, and other information substantiating the applicant's request and the statement of the applicant. The application may be approved, conditionally approved, or denied. The decision of the Approving Authority shall be prepared in writing, include terms and conditions, if any, and promptly sent to the applicant.

(F) The denial of a request for Relief may be appealed in writing to the General Manager. An appeal shall be made in accordance with the following procedures:

(1) The Appellant shall complete and submit in writing a form provided by the District for such purpose and shall state in such form the grounds for his or her appeal. All appeals shall be submitted to the District Secretary within thirty (30) calendar days of the date of the notice of the denial of the request for Relief.

(2) The General Manager or his or her authorized designee shall review the appeal and any related information provided, and, if necessary, cause an

investigation and report to be made concerning the request for Relief. The General Manager or his or her authorized designee shall have fifteen (15) calendar days from the submission of the appeal to render a decision on whether to grant the appeal and mail notice thereof to the Appellant. If the General Manager or his or her authorized designee grants the appeal and determines that the request for Relief shall be granted, then within fifteen (15) calendar days of such determination the General Manager or his or her authorized designee shall give written notice thereof to the Appellant.

(3) The decision of the General Manager or his or her authorized designee may be appealed by the Appellant to the Board of Directors. Such appeal must be submitted in writing and filed with the District Secretary within fifteen (15) calendar days of the date of decision of the General Manager or his or her authorized designee. The Board of Directors shall conduct a hearing on such appeal at its next regularly scheduled Board of Directors meeting; provided, however, the Board of Directors shall have received the notice of appeal at least fifteen (15) calendar days prior to such meeting. If the appeal is not submitted within at least fifteen (15) calendar days prior to a regularly scheduled Board of Directors meeting, then the Hearing shall be held at the following regularly scheduled meeting of the Board of Directors. A notice of the Hearing shall be mailed to the Appellant at least ten (10) calendar days before the date fixed for the Hearing. The Board of Directors shall review the appeal de novo. The determination of the Board of Directors shall be conclusive and shall constitute a final order. Notice of the determination by the Board of Directors shall be mailed to the Appellant within ten (10) calendar days of such

determination and shall indicate whether the appeal has been granted in whole or in part and set forth the terms and conditions of the Relief, if any, granted to the Appellant. If the appeal is denied, the Appellant shall comply with all terms and conditions of this Ordinance and the applicable stage then in effect.

(4) All adjustments to Tier 1 water budget allocations shall follow the procedure established by the District.

(5) Until the conclusion of the appeal process, all provisions and decisions under appeal shall remain in full force and effect until the conclusion of the appeal process.

Section 18. Conflicting Provisions

If provisions of this Ordinance are in conflict with each other, other rules and regulations of the District, any other resolution or ordinance of the District, or any State law or regulation, the more restrictive provisions shall apply.

Section 19. Severability

If any provision, section, subsection, sentence, clause or phrase or sections of this Ordinance, or the application of same to any Person or set of circumstances, is for any reason held to be unconstitutional, void or invalid, the invalidity of the remaining portions of sections of this Ordinance shall not be affected, it being the intent of the Board of Directors in adopting this Ordinance that no portions, provisions, or regulations contained herein shall become inoperative, or fail by reason of the unconstitutionality of any other provision hereof and all provisions of this Ordinance are declared to be severable for that purpose.

Section 20. Effective Date and Publication

This Ordinance shall be effective upon adoption. Within ten (10) days after its adoption, the District Secretary shall cause this Ordinance to be published once pursuant to California Government Code section 6061 in full in a newspaper of general circulation which is printed, published, and circulated in the District. If there is no such newspaper, the Ordinance shall be posted within the District after its adoption in three public places.

ADOPTED AND APPROVED this 18th day of February 2015 by the Board of Directors of the Western Municipal Water District.

DONALD D. GALLEANO
President

February 18, 2015

I HEREBY CERTIFY that the foregoing is a full, true, and correct copy of Ordinance 384 adopted by the Board of Directors of the Western Municipal Water District of Riverside County at the scheduled Public Hearing held February 18, 2015.

THOMAS P. EVANS
Secretary-Treasurer

Attachment 5 -
Adoption Resolution 3155

RESOLUTION 3155

RESOLUTION OF THE BOARD OF DIRECTORS OF WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY ADOPTING THE WATER SHORTAGE CONTINGENCY PLAN

WHEREAS, The California Urban Water Management Planning Act, Water Code Section 10610 et seq. (the Act), mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, prepare and adopt, in accordance with prescribed requirements, a water shortage contingency plan (WSCP); and

WHEREAS, the Act specifies the requirements and procedures for adopting such Water Shortage Contingency Plans; and

WHEREAS, pursuant to recent amendments to the Act, urban water suppliers are required to adopt and electronically submit their WSCPs to the California Department of Water Resources by July 1, 2021; and

WHEREAS, pursuant to the Water Conservation Act of 2009, also referred to as SB X7-7 (Water Code section 10608 et seq.), an "urban retail water supplier" is defined as a water supplier that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes, and an "urban wholesale water supplier" is defined as a water supplier that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes; and

hearing online, or virtually, as there was no public location for attending in person. The public hearing was live streamed online at wmwd.com in order to provide members of the public and other interested entities with the opportunity to be heard in connection with proposed adoption of the WSCP and issues related thereto; and

WHEREAS, pursuant to said public hearing on Western's WSCP, Western, among other things, encouraged the active involvement of diverse social, cultural, and economic members of the community within Western's service area with regard to the preparation of the Plan, encouraged community input regarding Western's Water Shortage Contingency Plan; and

WHEREAS, the Board of Directors has reviewed and considered the purposes and requirements of the Act and SB X7-7, the contents of the WSCP, and the documentation contained in the administrative record in support of the WSCP, and has determined that the factual analyses and conclusions set forth in the WSCP are legally sufficient; and

WHEREAS, Section 10652 of the California Water Code provides that the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of a water shortage contingency plan as part of an urban water management plan pursuant to California Water Code Section 10632; and

WHEREAS, the Board of Directors desires to adopt the WSCP in order to comply with the Act and SB X7-7.

to provide that portion of the WSCP prepared pursuant to Water Code Section 10635(a) to any city or county within which Western provides water supplies no later than sixty (60) days after submitting a copy of the WSCP with the California Department of Water Resources;

7. Western finds and determines that this resolution is not subject to CEQA pursuant to Water Code Section 10652 because CEQA does not apply to the preparation and adoption of a water shortage contingency plan or to the implementation of the actions taken pursuant to such plans. Because this resolution comprises Western's water shortage contingency plan and involves its implementation, no CEQA review is required;

8. Pursuant to CEQA, Western directs staff to file a Notice of Exemption with the Riverside County Clerk's office within five (5) working days of adoption of this resolution;

9. The document and materials that constitute the record of proceedings on which this resolution and the above findings have been based are located at Clerk of the Board of Directors of Western Municipal Water District. The custodian for these records is the Clerk of the Board of Western;

10. The General Manager is hereby authorized and directed to implement the WSCP in accordance with the Act and SB X7-7 and to provide recommendations to the Board of Directors regarding the necessary budgets, procedures, rules, regulations or further actions to carry out the effective and equitable implementation of the WSCP.

B

Appendix B Public Hearing Notices

Legal Notice

098-044 VAL VERDE USD
ITEM 4048
318081021
MONTOYA, JAMILL TRUSTEE
$3,287.00
ITEM 4049
318081022
$2,829.00
ITEM 4050
318150021
RODRIGUEZ, JOSE F JR
21330 OAKWOOD ST PERRIS CA 92570
$4,418.00
ITEM 4051
318221026
MENDOZA, PALOMA JERALDINE & VALENCIA, CASSANDRA
20480 LEE RD PERRIS CA 92570
$21,437.00
ITEM 4053
318240075
JONES, ELTON JR & THOMPSON MABLE & JONES HENRY & JONES ELTON SR & BAKER MARK & JONES HATTIE
20506 OLD ELSINORE RD PERRIS CA 92570
$12,972.00

098-055 VAL VERDE USD
ITEM 4047
317140036
DELFIS, JINESA M & POWERS, CHRISTOPHER J
23455 CAJALCO RD PERRIS CA 92570
$10,854.00

098-110 VAL VERDE USD
ITEM 4044
314060049
MONTOYA, JAMMIL TRUSTEE
$4,258.00
ITEM 4046
315020024
CORONADO, TERESA R
20086 MARKHAM ST PERRIS CA 92570
$16,941.00
ITEM 4055
319081010
LILLY, CHARLIE & PORTER
20191 HUNTER ST PERRIS CA 92570
$11,996.00

098-112 VAL VERDE USD
ITEM 4045
314200010
CUSTA, LINDA M
22738 REDWOOD DR PERRIS CA 92570
$12,513.00

098-115 VAL VERDE USD
ITEM 4038
295292040
BARNWELL DORRIS M & PAULK ESTON
$3,424.00
I certify under penalty of perjury that the foregoing is true and correct.
Dated this 1st day of April, 2021
Matthew Jennings
Treasurer-Tax Collector of Riverside County, CA
Published in The Press Enterprise on 04/1/21, 04/08/21 & 04/15/21

Legal Notice

FICTITIOUS BUSINESS NAME STATEMENT
F I L E D
County of Riverside
Peter Aldana
Assessor-County Clerk-Recorder
R-202104146 03/31/2021
The following person(s) is (are) doing business as:
MINI ROCKERS MUSIC CLUB
225 E. MONTEREY RD., CORONA, CA 92879 RIVERSIDE
Full name of all registrants and address:
CASTLE FOUR LLC
225 E. MONTEREY RD.
CORONA CA 92879 CA
This business is conducted by: Limited Liability Company
Registrant has not yet begun to transact business under the fictitious business name(s) listed above.
I declare that all the information in this statement is true and correct. (A registrant who declares as true any material matter pursuant to Section 17913 of the Business and Professions Code, that the registrant knows to be false, is guilty of a misdemeanor punishable by a fine not to exceed one thousand dollars ($1,000).)
s/ PETE CASTELLANOS
PRESIDENT
This statement was filed with the County Clerk of Riverside County on date indicated by file stamp above.
NOTICE - In Accordance with Subdivision (a) of Section 17920, A Fictitious Business Name Statement generally expires at the end of five years from the date on which it was filed in the Office of the County Clerk, Except, as provided in Subdivision (b) of Section 17920, where it expires 40 days after any change in the facts set forth in the statement pursuant to Section 17913 other than a change in the residence address of a registered owner. A new Fictitious Business Name Statement must be filed before the expiration. The filing of this statement does not of itself authorize the use in this State of a Fictitious Business Name in violation of the rights of another Federal, State or Common Law (See Section 14411 Et Seq., Business and Professional Code).
I hereby certify that this copy is a correct copy of the original statement on file in my office.
PETER ALDANA
RIVERSIDE COUNTY CLERK
Press-Enterprise: 4/08,4/15,4/22,4/29

Legal Notice

ORDER TO SHOW CAUSE FOR CHANGE OF NAME
CASE NUMBER: CIV SB 2102506
PETITION OF:
Akira Tashie Ynashone Binns
FOR CHANGE OF NAME

TO ALL INTERESTED PERSONS:
1. Petitioner: **Akira Tashie Ynashone Binns** filed a petition with this court for a decree changing names as follows:
Present name: **Akira Tashie Ynashone Binns** to
Proposed name: **Akira Izuko Tashi**
2. THE COURT ORDERS that all persons interested in this matter appear before this court at the hearing indicated below to show cause, if any, why the petition for change of name should not be granted. Any person objecting to the name changes described above must file a written objection that includes the reasons for the objection at least two court days before the matter is scheduled to be heard and must appear at the hearing to show cause why the petition should not be granted. If no written objection is timely filed, the court may grant the petition without a hearing.
NOTICE OF HEARING
Date: 04/23/21
Time: 9:00 AM Dept.: S-17
The address of the court is: **SUPERIOR COURT OF CALIFORNIA, COUNTY OF** SAN BERNARDINO 247 West 3rd St San Bernardino, CA 92415-0210 MAILING ADDRESS: 247 West 3rd St San Bernardino, CA 92415-0210 BRANCH NAME: Civil Division of the San Bernardino District
3. A copy of this **Order to Show Cause** shall be published at least once each week for four successive weeks prior to the date set for hearing on the petition in the following newspaper of general circulation, printed in this county: Inland Valley Daily Bulletin
Date: MAR 11 2021
Lynn M. Poncin JUDGE OF THE SUPERIOR COURT
Publish March 25, 2021 & April 1, 8, 15, 2021
IVDB-SB Ad#11450891

Legal Notice

APN: 285-060-042-5 TS No: CA05000214-16-4 TO No: 191180931-CA-VOI NOTICE OF TRUSTEE'S SALE (The above statement is made pursuant to CA Civil Code Section 2923.3(d)(1). The Summary will be provided to Trustor(s) and/or vested owner(s) only, pursuant to CA Civil Code Section 2923.3(d)(2).) YOU ARE IN DEFAULT UNDER A DEED OF TRUST DATED March 31, 2008. UNLESS YOU TAKE ACTION TO PROTECT YOUR PROPERTY, IT MAY BE SOLD AT A PUBLIC SALE. IF YOU NEED AN EXPLANATION OF THE NATURE OF THE PROCEEDINGS AGAINST YOU, YOU SHOULD CONTACT A LAWYER. On June 1, 2021 at 09:00 AM, at the bottom of the stairway to the building located at 849 W. Sixth Street, Corona, CA 92882, MTC Financial Inc. dba Trustee Corps, as the duly Appointed Trustee, under and pursuant to the power of sale contained in that certain Deed of Trust recorded on April 7, 2008 as Instrument No. 2008-0170997, of official records in the Office of the Recorder of Riverside County, California, executed by LLOYD B. BRYANT AND PATRICIA J. BRYANT, HUSBAND AND WIFE AS JOINT TENANTS, as Trustor(s), in favor of MFS INVESTMENTS, INC. DBA METRO FINANCIAL as Beneficiary, WILL SELL AT PUBLIC AUCTION TO THE HIGHEST BIDDER, in lawful money of the United States, all payable at the time of sale, that certain property situated in said County, California describing the land therein as: AS MORE FULLY DESCRIBED IN SAID DEED OF TRUST The property heretofore described is being sold "as is". The street address and other common designation, if any, of the real property described above is purported to be: 15871 RAWHIDE LANE, RIVERSIDE, CA 92504 The undersigned Trustee disclaims any liability for any incorrectness of the street address and other common designation, if any, shown herein. Said sale will be made without covenant or warranty, express or implied, regarding title, possession, or encumbrances, to pay the remaining principal sum of the Note(s) secured by said Deed of Trust, with interest thereon, as provided in said Note(s), advances if any, under the terms of the Deed of Trust, estimated fees, charges and expenses of the Trustee and of the trusts created by said Deed of Trust. The total amount of the unpaid balance of the obligations secured by the property to be sold and reasonable estimated costs, expenses and advances at the time of the initial publication of this Notice of Trustee's Sale is estimated to be $352,889.01 (Estimated). However, prepayment premiums, accrued interest and advances will increase this figure prior to sale. Beneficiary's bid at said sale may include all or part of said amount. In addition to cash, the Trustee will accept a cashier's check drawn on a state or national bank, a check drawn by a state or federal credit union or a check drawn by a state or federal savings and loan association, savings association or savings bank specified in Section 5102 of the California Financial Code and authorized to do business in California, or other such funds as may be acceptable to the Trustee. In the event tender other than cash is accepted, the Trustee may withhold the issuance of the Trustee's Deed Upon Sale until funds become available to the payee or endorsee as a matter of right. The property offered for sale excludes all funds held on account by the property receiver, if applicable. If the Trustee is unable to convey title for any reason, the successful bidder's sole and exclusive remedy shall be the return of monies paid to the Trustee and the successful bidder shall have no further recourse. Notice to Potential Bidders If you are considering bidding on this property lien, you should understand that there are risks involved in bidding at a Trustee auction. You will be bidding on a lien, not on the property itself. Placing the highest bid at a Trustee auction does not automatically entitle you to free and clear ownership of the property. You should also be aware that the lien being auctioned off may be a junior lien. If you are the highest bidder at the auction, you are or may be responsible for paying off all liens senior to the lien being auctioned off, before you can receive clear title to the property. You are encouraged to investigate the existence, priority, and size of outstanding liens that may exist on this property by contacting the county recorder's office or a title insurance company, either of which may charge you a fee for this information. If you consult either of these resources, you should be aware that the same Lender may hold more than one mortgage or Deed of Trust on the property. Notice to Property Owner The sale date shown on this Notice of Sale may be postponed one or more times by the Mortgagee, Beneficiary, Trustee, or a court, pursuant to Section 2924g of the California Civil Code. The law requires that information about Trustee Sale postponements be made available to you and to the public, as a courtesy to those not present at the sale. If you wish to learn whether your sale date has been postponed, and, if applicable, the rescheduled time and date for the sale of this property, you may call In Source Logic at 702-659-7766 for information regarding the Trustee's Sale or visit the Internet Website www.insourcelogic.com for information regarding the sale of this property, using the file number assigned to this case, CA05000214-16-4. Information about postponements that are very short in duration or that occur close in time to the scheduled sale may not immediately be reflected in the telephone information or on the Internet Website. The best way to verify postponement information is to attend the scheduled sale. Notice to Tenant NOTICE TO TENANT FOR FORECLOSURES AFTER JANUARY 1, 2021 You may have a right to purchase this property after the trustee auction pursuant to Section 2924m of the California Civil Code. If you are an "eligible tenant buyer," you can purchase the property if you match the last and highest bid placed at the trustee auction. If you are an "eligible bidder," you may be able to purchase the property if you exceed the last and highest bid placed at the trustee auction. There are three steps to exercising this right of purchase. First, 48 hours after the date of the trustee sale, you can call 702-659-7766, or visit this internet website www.insourcelogic.com, using the file number assigned to this case CA05000214-16-4 to find the date on which the trustee's sale was held, the amount of the last and highest bid, and the address of the trustee. Second, you must send a written notice of intent to place a bid so that the trustee receives it no more than 15 days after the trustee's sale. Third, you must submit a bid so that the trustee receives it no more than 45 days after the trustee's sale. If you think you may qualify as an "eligible tenant buyer" or "eligible bidder," you should consider contacting an attorney or appropriate real estate professional immediately for advice regarding this potential right to purchase. Date: April 2, 2021 MTC Financial Inc. dba Trustee Corps TS No. CA05000214-16-4 17100 Gillette Ave Irvine, CA 92614 Phone: 949-252-8300 TDD: 866-660-4288 Dalaysia Ramirez, Authorized Signatory SALE INFORMATION CAN BE OBTAINED ON LINE AT www.insourcelogic.com FOR AUTOMATED SALES INFORMATION PLEASE CALL: In Source Logic AT 702-659-7766 Trustee Corps may be acting as a debt collector attempting to collect a debt. Any information obtained may be used for that purpose. Order Number 74399, Pub Dates: 4/8/2021, 4/15/2021, 4/22/2021, PRESS ENTERPRISE MORENO VALLEY EDITION

FICTITIOUS BUSINESS NAME STATEMENT
F I L E D
County of Riverside
Peter Aldana
Assessor-County Clerk-Recorder
R-202104397 04/05/2021
The following person(s) is (are) doing business as:
VEGA ENGINEERING GROUP
29110 LAKEHURST CT MENIFEE, CA 92585 RIVERSIDE
Full name of all registrants and address:
PABLO - VEGA
29110 LAKEHURST CT
MENIFEE CA 92585
This business is conducted by: Individual
Registrant has not yet begun to transact business under the fictitious business name(s) listed above.
I declare that all the information in this statement is true and correct. (A registrant who declares as true any material matter pursuant to Section 17913 of the Business and Professions Code, that the registrant knows to be false, is guilty of a misdemeanor punishable by a fine not to exceed one thousand dollars ($1,000).)
s/ PABLO VEGA
This statement was filed with the County Clerk of Riverside County on date indicated by file stamp above.
NOTICE - In Accordance with Subdivision (a) of Section 17920, A Fictitious Business Name Statement generally expires at the end of five years from the date on which it was filed in the Office of the County Clerk, Except, as provided in Subdivision (b) of Section 17920, where it expires 40 days after any change in the facts set forth in the statement pursuant to Section 17913 other than a change in the residence address of a registered owner. A new Fictitious Business Name Statement must be filed before the expiration. The filing of this statement does not of itself authorize the use in this State of a Fictitious Business Name in violation of the rights of another Federal, State or Common Law (See Section 14411 Et Seq., Business and Professional Code).
I hereby certify that this copy is a correct copy of the original statement on file in my office.
PETER ALDANA
RIVERSIDE COUNTY CLERK
Press-Enterprise: 4/08,4/15,4/22,4/29

FICTITIOUS BUSINESS NAME STATEMENT
F I L E D
County of Riverside
Peter Aldana
Assessor-County Clerk-Recorder
R-202103787 03/26/2021
The following person(s) is (are) doing business as:
PS NAIL SUPPLY
9265 56TH ST , JURUPA VALLEY, CA 92509 RIVERSIDE
Full name of all registrants and address:
SANDRA GUADALUPE SANCHEZ
9265 56TH ST
JURUPA VALLEY CA 92509
This business is conducted by: Individual
Registrant has not yet begun to transact business under the fictitious business name(s) listed above.
I declare that all the information in this statement is true and correct. (A registrant who declares as true any material matter pursuant to Section 17913 of the Business and Professions Code, that the registrant knows to be false, is guilty of a misdemeanor punishable by a fine not to exceed one thousand dollars ($1,000).)
s/ SANDRA GUADALUPE SANCHEZ
This statement was filed with the County Clerk of Riverside County on date indicated by file stamp above.
NOTICE - In Accordance with Subdivision (a) of Section 17920, A Fictitious Business Name Statement generally expires at the end of five years from the date on which it was filed in the Office of the County Clerk, Except, as provided in Subdivision (b) of Section 17920, where it expires 40 days after any change in the facts set forth in the statement pursuant to Section 17913 other than a change in the residence address of a registered owner. A new Fictitious Business Name Statement must be filed before the expiration. The filing of this statement does not of itself authorize the use in this State of a Fictitious Business Name in violation of the rights of another Federal, State or Common Law (See Section 14411 Et Seq., Business and Professional Code).
I hereby certify that this copy is a correct copy of the original statement on file in my office.
PETER ALDANA
RIVERSIDE COUNTY CLERK
Press-Enterprise: 4/01,4/08,4/15,4/22

FICTITIOUS BUSINESS NAME STATEMENT
FILING FBN20210003378

The following person(s) is (are) doing business as:
DEES CUSTOM GLASS
913 Melrose Dr.
San Bernardino, CA 92407

County of Principal Place of Business: **San Bernardino**
Name of **Individual** Registrant:
Derrell R Garcia
913 Melrose Dr.
San Bernardino, CA 92407
This business is/was conducted by: **An Individual**
Registrant commenced to transact business under the fictitious business name or names listed above on: **Not Applicable**
By signing, I declare that all information in this statement is true and correct. A registrant who declares as true any material matter pursuant to Section 17913 of the Business and Professions Code that the registrant knows to be false is guilty of a misdemeanor punishable by a fine not to exceed one thousand dollars ($1,000).
/s/ Derrell R Garcia, Owner
Date: **03/30/2021**
This statement was filed with the County Clerk of San Bernardino on **03/31/2021**
Notice-In accordance with subdivision (a) of Section 17920. A Fictitious Name Statement generally expires at the end of five years from the date on which it was filed in the office of the County Clerk, except, as provided in subdivision (b) of Section 17920, where it expires 40 days after any change in the facts set forth in the statement pursuant to Section 17913 other than a change in the residence address of a registered owner. A new Fictitious Business Name Statement must be filed before the expiration. The filing of this statement does not of itself authorize the use in this state of a fictitious business name in violation of the rights of another under federal, state, or common law (see Section 14411 et seq., Business and Professions Code).
Publish April 8, 15, 22, 29, 2021
IVDB-SB Ad#11453851

Legal Notice

NOTICE TO BIDDERS

The **County of Riverside** ("County") will receive sealed bids for the **Construction Management - Multi-Prime Bid – Riverside County Law Library HVAC Replacement Project– All Bid Categories (see Bid Category List Below).**

Bids must be received no later than **2:00 PM** on **Thursday, May 6th, 2021** (the "Bid Deadline") at **3612 Mission Inn Ave. Riverside, CA 92501** (entrance and parking located on Orange St.)

The Project consists of replacement of wet & dry HVAC system with electrical, switchgear and transformer upgrades within a 35,000 SF building as further described in the bid and contract documents ("County Documents"). The pre-qualified Bidders shall review the County Documents for more complete information regarding the Project and submission of bids. The architect's/engineer's construction cost estimate for this Project is **$3,200,000.**

Bid Documents will be available on **April 8th, 2021** via Smartbid by contacting Tilden-Coil Constructors at 951-684-5901. **Bidders shall submit all documents for bidding as provided for in the Instruction to Bidders. Bids will only be accepted from bidders who have previously pre-qualified with the County of Riverside. Bidders viewing plans online are responsible for contacting Melanie Lopez – mlopez@tilden-coil.com (951) 684-5901 Tilden-Coil Constructors and requesting to be included on the Plan holders List. Bidders are responsible for confirmation that they have viewed all addenda prior to the bid deadline and will be required to acknowledge addenda on their bid form.**

A **mandatory** pre-bid meeting and job walk for prime contractors will be held on **April 14, 2021** at **3535 Tenth St. - Riverside, CA 92501. RSVP is required, please RSVP using this link. https://bit.ly/3ubznL3**

The deadline to submit a request for information is **April 22, 2021.** RFI's may be submitted to rkahrs@tilden-coil.com.

Only Pre-qualified contractors are allowed to bid. Bids must be submitted to the County on the County's bid forms. **All bids must be addressed, sealed in an envelope, and received by the County no later than the Bid Deadline.** All bids will be publicly opened immediately after the Bid Deadline. Bids received after the Bid Deadline shall be rejected. County reserves the right to reject any or all bids and to waive any informality or irregularity in any bid received.

Bids shall be valid for **one hundred twenty (120) days** after the Bid Deadline. Bids must be accompanied by cash, a certified or cashier's check, or a bid bond in favor of the County in an amount not less than ten percent (10%) of the submitted total bid price. The successful bidder will be required to furnish a performance bond and a payment bond, each in the amount of one hundred percent (100%) of the total bid price in the manner described in the Contract Documents. Bidders shall comply with California Public Contract Code Section 4108 with respect to subcontractor bond requirements.

Bidders shall possess one or more of the following California Contractor's license(s) at the time of the bid opening in order to perform the work:

Category #	Description	License
1	HVAC	C20
2	Electrical & Low Voltage	C10
3	General Package	B

Contractors wishing to bid on select trades must have been previously pre-qualified by the County prior to release of this Notice. Subcontractors must possess the appropriate licenses for each specialty subcontracted.

Bid Form . If Alternates are included in the Bidding Documents, then a Bid amount for each and every such Alternate shall be included in the spaces provided in the Bid Form for that purpose. If the Bidder determines that the Alternate does not affect the amount of its Base Bid, then the Bidder shall enter "No Change" in the Bid Form.

Basis for Award . Where the Bidding Documents include Allowances; the Lowest Bid Price is the Total Bid Amount identified on the Bid Form and shall include the Base Bid plus all Allowances. In the event of Alternate Bids, Alternate Bids shall not be included in the Total Bid Amount. If applicable the Alternate Bids shall be listed separately on the spaces provided on the Bid Form for Alternate Bids.

This Project is a public work for purposes of the California Labor Code, which requires payment of prevailing wages. County has obtained the general prevailing rates, which will be on file with the County's Construction Manager and will be available to any interested party.

A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in the Labor Code, unless registered and qualified to perform public work pursuant to Labor Code section 1725.5.

The contractor and all subcontractors shall furnish certified payroll records as required pursuant Labor Code section 1776 directly to the Labor Commissioner in accordance with Labor Code section 1771.4 at least monthly (or more frequently if required by the County or the Labor Commissioner) and in a format prescribed by the Labor Commissioner. Monitoring and enforcement of the prevailing wage laws and related requirements will be performed by the Labor Commissioner/Department of Labor Standards Enforcement (DLSE), and by the County.

Riverside County Board of Law Library Trustees

By: Hon. Jackson Lucky, Law Library Board President

Published: Law Library HVAC Replacement Project: 04/08/21 & 04/15/21
Press-Enterprise

Western Municipal Water District
Public Hearing Notice
2020 Urban Water Management Plan, Water Shortage Contingency Plan, and Addendum to the 2015 Urban Water Management Plan

Notice is hereby given that on **June 16, 2021** at **9:30 a.m.** in the Western Municipal Water District (Western) Boardroom, first floor at 14205 Meridian Parkway, Riverside, CA 92518, the Western Board of Directors will conduct a public hearing to receive public comments and consider adoption of the Draft 2020 Urban Water Management Plan (UWMP), Draft Water Shortage Contingency Plan (WSCP), and Draft Addendum to Western's 2015 UWMP. Following the public hearing, the Western Board of Directors may adopt the Draft 2020 UWMP, Draft WSCP, and Draft Addendum to the 2015 UWMP with recommended modifications as a result of public input.

The Draft 2020 UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages. The Draft WSCP documents Western's plans to manage and mitigate an actual water shortage condition, should one occur because of drought or other impacts on water supplies. The Draft Addendum to the 2015 UWMP is a requirement of the Delta Plan for agencies to demonstrate consistency with the Delta Plan policy to reduce reliance on the Delta through improved regional water self-reliance.

A copy of the Draft 2020 UWMP, Draft WSCP, and Draft Addendum to the 2015 Plan will be available for public review beginning on April 30, 2021 and can be downloaded at [www.wmwd.com/uwmp]. Please contact Western if you require special accommodations.

Please provide written comments on the Draft 2020 UWMP documents to board secretary@wmwd.com prior to June 16, 2021.

In an effort to protect public health and prevent the spread of COVID-19 (coronavirus), and in accordance with the Governor's Executive order N-29-20, the public may view the public hearing online, or virtually, as there will be no public location for attending in person. The public hearing will be live-streamed online at wmwd.com. Members of the public who wish to comment on the 2020 Urban Water Management Plan, Water Shortage Contingency Plan, and Addendum to the 2015 Urban Water Management Plan, may make comments virtually during the public hearing, or may submit comments at the following web Address: https://wmwd.com/publiccomments, or directly to boardsecretary@wmwd.com. Comments received before 4:30 p.m., June 15, 2021, will become part of the June 16 2021 public hearing and Board meeting records.

Members of the public may join the live public hearing via Zoom as follows: Join Zoom Meeting: https://wmwd.zoom.us/j/87320624891. Meeting ID: 873 2062 4891. To join the Zoom meeting by telephone only: Dial (669) 219-2599 or (669) 900-6833, Meeting ID: 873 2062 4891.

If you have any questions regarding Western's 2020 UWMP, WSCP, Addendum to the 2015 Plan, or public hearing meeting, please contact Melissa Matlock at 951.571.7260 or mmatlock@wmwd.com.
Press-Enterprise: 4/15, 4/22

GOVERNMENT ACTIONS & THE NEWSPAPER ROLE

Throughout our nation's history, government agencies have been required to alert citizens of certain government activities that may impact a local community, providing citizens with an opportunity to stay informed and take action when necessary. Newspapers have long partnered with government agencies by publishing public notices, enabling the **government to be fully transparent and accountable to citizen taxpayers.**

Publishing public notices in newspapers informs a wide audience in a local community of a government agency's action; reaching citizens that are passive information seekers. Publishing public notices through the local newspaper also serves an important audit role as the newspaper acts as an independent third party able to legally verify that the government agency has given the public notice.

Take a moment and look through the public notices. You may be surprised by what you will learn.

BEST DELIVERY IN THE GAME!
Turn to the Sports section for outstanding coverage of the Dodgers, Angels and ALL local baseball action.


THE PRESS-ENTERPRISE

1825 Chicago Ave, Suite 100
Riverside, CA 92507
951-684-1200
951-368-9018 FAX

PROOF OF PUBLICATION
(2010, 2015.5 C.C.P)

Publication(s): The Press-Enterprise

PROOF OF PUBLICATION OF

Ad Desc.: WMWD Public Hearing Notice_Newspaper_English /

I am a citizen of the United States. I am over the age of eighteen years and not a party to or interested in the above entitled matter. I am an authorized representative of THE PRESS-ENTERPRISE, a newspaper in general circulation, printed and published daily in the County of Riverside, and which newspaper has been adjudicated a newspaper of general circulation by the Superior Court of the County of Riverside, State of California, under date of April 25, 1952, Case Number 54446, under date of March 29, 1957, Case Number 65673, under date of August 25, 1995, Case Number 267864, and under date of September 16, 2013, Case Number RIC 1309013; that the notice, of which the annexed is a printed copy, has been published in said newspaper in accordance with the instructions of the person(s) requesting publication, and not in any supplement thereof on the following dates, to wit:

04/15, 04/22/2021

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date: April 22, 2021
At: Riverside, California

Legal Advertising Representative, The Press-Enterprise

WESTERN MWD OF RIVERSIDE CO
14205 MERIDIAN PKWY
MARCH AIR RESERVE BASE, CA 92518

Ad Number: 0011448048-01

P.O. Number: 68617-0-SER

Ad Copy:

Western Municipal Water District
Public Hearing Notice
2020 Urban Water Management Plan, Water Shortage Contingency Plan, and Addendum to the 2015 Urban Water Management Plan

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Press-Enterprise: 4/15, 4/22

Employment Empleo

Oportunidades de empleo Employment Opportunities

Accountant, F/T, Bachelor's degree in Accounting, Mail resume to: Premium Meats, Co.,100 Spectrum Center Dr., Ste. 1260, Irvine, CA 92618

Electromechanical Engineer sought by ICU Medical, Inc. in San Clemente, CA, for dvlpg & implmtg new products & pilot assembly lines through adherence to established dsgn control processes. Send resume to: Ricci Chila, 951 Calle Amanecer, San Clemente, CA 92673. REF. JOB CODE: CA0519AR.

NURSING ASSISTANT (5) - Needed by Miravilla Care Center send only resumes to 9246 Avenida Miravilla, Cherry Valley CA 92223

SE BUSCA PERSONAS para la limpieza de las habitaciones y personas para el mantenimiento del HOTEL. Debe trabajar los fines de semana. Debe aplicar en persona. No llamadas. Grand Legacy Hotel. 1650 S. Harbor Blvd, Anaheim CA 92802.

Sr Applications Analyst. Implement, manage, provide technical support & training re: Oracle E-Business Suite & Oracle Business Intelligence & associated applications for employer's financial and business operations. Req: BS computer applications or related field (Foreign equiv degree ok), 60 mos exp in Oracle EBS applications functional & technical analysis & support, extensive exp. in Oracle EBS Finance & HR modules, & Developers tools. Apply online at https://www.governmentjobs.com/careers/irwd or mail resume to: HR, Irvine Ranch Water District, 15600 Sand Canyon Ave., Irvine, CA 92618.

Technology Engineer III sought by Capital Group Companies Global in Irvine, CA: Participates in the strategy research/planning efforts w/in the domain. Must have unrestricted right to work in U.S. Send resume to: Capital Group/Brian Zimmer, 400 S. Hope St., 22nd Fl., Los Angeles, CA 90071. REF. JOB CODE: IR0720DM

Transportation Planner: Lin Consulting, Inc. (Tustin), MS in Civil Engineering req. Email: hr@linconsulting.com

William Grant & Sons has an opening for a Manager, Brand Advocacy position in its Irvine, CA office responsible for serving as an internal specialist resource to the Marketing Team, ensuring that WGS brands and company get a disproportionate share of mind and recommendation within the media, with our trade partners and consumers. Frequent travel in U.S. Req. experience in a bar management or brand ambassador/marketing/sales representative position within spirit industry. Send resume to Shanta Ramkissoon, William Grant & Sons, 130 Fieldcrest Avenue, Edison, NJ 08837.

Rentals Alquiler Casa

Departamentos No amueblados Unfurnished Apts

Aceptando Aplicaciones
APARTAMENTOS GEEL PLACE
3990 Reynolds Rd, Riverside, CA
Apartamentos tipo estudio para personas con necesidades especiales.
Pregunte sobre la disponibilidad del subsidio de alquiler.
Llame al 951.359.3040
Lunes a Jueves. de 8am a 5pm O
TDD # 1-800-735-2929. Somos un igual proveedor de oportunidades y empleador
IGUALDAD DE OPORTUNIDADES DE VIVIENDA
IGUALDAD DE OPORTUNIDADES ACCESO



Announcements Anuncios

VIAJES COMPARTIDOS CARPOOL RIDESHARE

ATT: Nuevos Negocios La ley estatal requiere que dentro de los 30 dias despues de una Declaracion de Nombre Comercial Ficticio se ha presentado el registrante debera public ar una copia de la declaracion en un periodico de circulacion general en el condado en que se encuentra la sede principal del negocio.
Riverside County
SEC. 6000, ET WEQ.,
GOV CODE
The Press-Enterprise
es un periodico de circulacion general en el Condado de Riverside.
Llame al: 951-368-9222
Email: legals@pe.com

Pets Mascotas

Perros Dogs

♥ SHELTIES ♥
Beautiful babies, Sable/Tri's.
209-824-4545

Garage Sale Venta de garaje

Ventas de garaje Garage Sales

Buena Park/Cyp
GARAGE SALE
Sat. April 24th
Huge Neighborhood Garage Sale
7:00 AM - 2:00 PM
Square Block of Valley View & Holder & Ball & Cerritos.
Great Bargains within a friendly community.

Costa Mesa
College Park 21st Annual
Sat. 4/24. 8a-2p
Neigbhorhood of 550 Homes. SOUTH Of Fair Dr. between Harbor & Fairview.
Map of homes & List of items at facebook.com/LindaHartman RealEstate.
Linda 949-644-2144

Merchandise Mercancías

Subastas Auctions

CAPTAIN'S AUCTION WAREHOUSE SPRING FLING AUCTION!
REAL-TIME LIVE ONLINE ONLY AUCTION
from your home in compliance with current CDC COVID-19 guidelines.
Fri. 4/23 @ 3pm PST
VENDING MACHINE PRIZE & TICKET REDEMPTION
Sat 4/24@11am PST
ARCADE GAMES, PINBALLS & REDEMPTIONS
FREE Registration
Bid LIVE ONLINE in REAL-TIME from YOUR HOME!
captainsauction warehouse.com
714-701-9486

Rentals Alquiler Casa

Departamentos No amueblados Unfurnished Apts

RIVERSIDE APTS
$99 MOVE IN SPEC.
oac 1BR from $1050
Chelsy 951-784-1128
oac 2BR from $1350
Shirlen 951.680.9943
Katelynn 686.0186
Se Habla Espanol.
Free Credit Check
★ (951) 264-6296 ★

RIVERSIDE Victoria Heights Apts, 7650 Lincoln Av,Riverside
2, 3 & 4 bedrooms
All Utilities Paid.
1 bd Wait List Clsed
Must Income qualify. (951) 687-2070

Transportation Transporte

Venta de Autos Autos For Sale

#1 $1,500 - $6,500 Cars, Trucks, Vans, SUVs. Text or Call 714-808- 3084
OC Since 1987

$ $
2012 Nissan Altima
$4,999
Pwr win, auto
221246 Fin. Avail *
909.342.4062

2013 CHRYSLER 300
SRT 8 Blk **$27,800**
OEM mint cond. 60k mi #651565
909.238.2436

2013 Prius 3
HOT DEAL
$8,999
Auto, low mi.
78,000 #078725
Financing Avail *
909.342.4062

Venta de Autos Autos For Sale

2014 Mitsubshi Outlander
MUST SEE
$7,999
Auto, pwr win.
Financing Avail *
909.342.4062

Venta de Autos Autos For Sale

LOOK
$8,999
2014 Ford Fusion
SE Auto, pwr win.
338068 Fin. Avail *
909.342.4062


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THE ORANGE COUNTY REGISTER

Public Notice

Call 714-796-2209 • Fax 714-796-7913 • www.ocregister.com

Western Municipal Water District
Notificación de Audiencia Pública
Plan de Gestión de Agua Urbana 2020, Plan de Contingencia Para la Escasez de Agua y Anexo al Plan de Gestión de Agua Urbana 2015

Por la presente se notifica que el **16 de junio de 2021** a las **9:30 am** en la sala de juntas de Western Municipal Water District (Western), en el primer piso en 14205 Meridian Parkway, Riverside, CA 92518, la Junta Directiva de Western llevará a cabo una audiencia para recibir comentarios del público y considerar la adopción del Borrador del Plan de Manejo de Agua Urbana (UWMP) 2020, el Borrador del Plan de Contingencia para la Escasez de Agua (WSCP) y el Borrador del Apéndice al UWMP 2015 de Western. Después de la audiencia pública, la Junta Directiva de Western podría adoptar el Borrador del UWMP 2020, el Borrador del WSCP y el Borrador del Apéndice del UWMP 2015 con las modificaciones recomendadas como resultado de los comentarios del público.

El Borrador 2020 del UWMP documenta los planes de Western para garantizar un suministro de agua adecuado para satisfacer las demandas actuales y futuras considerando variaciones en las condiciones de suministro de agua, incluyendo la escasez de agua. El borrador del WSCP documenta los planes de Western para manejar y mitigar una condición real de escasez de agua, en caso de que ocurra debido a sequías u otros impactos en los suministros de agua. El Borrador del Apéndice al UWMP 2015 es un requisito del Plan Delta para que las agencias demuestren coherencia con la política del Plan Delta para reducir la dependencia del Delta a través de una autosuficiencia regional mejorada del agua.

Una copia del Borrador del UWMP 2020, el Borrador del WSCP y el Borrador del Apéndice del Plan 2015 estarán disponibles para revisión pública a partir del 30 de abril de 2021 y se pueden descargar en [www.wmwd.com/uwmp]. Comuníquese con Western si necesita adaptaciones especiales.

Por favor proporcione comentarios por escrito sobre los borradores de los documentos UWMP 2020 enviándolos a board secretary@wmwd.com antes del 16 de junio de 2021.

En un esfuerzo por proteger la salud pública y prevenir la propagación del COVID-19 (coronavirus), y de acuerdo con la Orden Ejecutiva del Gobernador N-29-20, el público puede ver la audiencia pública en línea, o virtualmente, ya que no habrá lugar público para asistir en persona. La audiencia pública se transmitirá en vivo en línea por wmwd.com. Los miembros del público que deseen comentar sobre el Plan de Gestión de Agua Urbana 2020, el Plan de Contingencia para la Escasez de Agua y el Anexo al Plan de Gestión de Agua Urbana 2015 pueden hacer comentarios virtualmente durante la audiencia pública, o pueden enviar comentarios en la siguiente dirección web: https://wmwd.com/publiccomments, o directamente a boardsecretary@wmwd.com. Los comentarios recibidos antes de las 4:30 p.m. del 15 de junio de 2021 pasarán a formar parte de la audiencia pública del 16 de junio de 2021 y los registros de las reuniones de la Junta.

Los miembros del público pueden asistir a la audiencia pública en vivo a través de Zoom de la siguiente manera: Únase a la reunión de Zoom: https://wmwd.zoom.us/j/87320624891. ID de la reunión: 873 2062 4891. Para unirse a la reunión de Zoom solo por teléfono: Marque (669) 219-2599 o (669) 900-6833, ID de reunión: 873 2062 4891.

Si tiene alguna pregunta sobre el UWMP 2020, el WSCP, el Apéndice del Plan 2015 o la audiencia pública de Western, comuníquese con Melissa Matlock al 951.571.7260 o mmatlock@wmwd.com.

4/16, 4/23

CNS-3460575#
SE DA AVISO POR EL PRESENTE QUE el Distrito De Los Colegios Comunitarios de San Bernardino del Condado de San Bernardino, actuando por y a través de su la Junta de Gobierno, en lo sucesivo denominado SBCCD, está solicitando CALIFICACIONES/PROPUESTAS para Los Servicios de Design-Build del Careers Pathways 2 en el colegio San Bernardino Valley College,por medio de el Programa De Bonos Medida CC RFQP CC01-3608.04. Todos los requisitos deben ser presentados a más tardar a las **2:00 pm PST del 25 de mayo de 2021.** El documentode Solicitud de Calificaciones Y Propuestas (RFQP), incluyendo las instrucciones de presentación, se pueden encontrar en la página de red de SBCCD http://www.sbccd.org/bidsy PlanetBids https://pbsyste.planetbids.com/portal/29414/portal-home. Todas las adendas se publicarán en los mismos sitios web. Los Proponedores son responsables de obtener todos y cada uno de los documentos originales y presentar su PROPUESTA (PROPOSAL) de acuerdo con las especificaciones dentro del documento RFQP, incluyendo todas las adendas. El Distritoreserva el derecho de rechazar cualquiera o todas las PROPOSAL y de ser el único juez de los méritos de cada presentación. Se hará un adjudicación, si acaso, a la empresa cuyo PROPOSAL sea en el mejor interés del Distrito basado en los criterios indicados en eldocumento RFQP. Las Entidades de Diseño-Construcción, como se define en la Sección 81701 (c) del Código de Educación, deben enviar formularios y Cuestionarios de Precalificación completados y ser precalificados por el DISTRITO como parte de este proceso.
4/23/21

LeadHax
Online real estate advertising made simple.
Find out more at
Leadhax.com

"I go to every assignment with eyes wide open to make the best pictures I can."

- **Terry Pierson**, named Photographer of the Year by the NPPA West.



SCNG photojournalist **Terry Pierson** has been named photographer of the year by the National Press Photographer Association's West Region, which represents California, Arizona, Nevada and Hawaii. This is the seventh time in the past 10 years that Terry has received this well-deserved recognition. You can read more about the awards and view a gallery of Terry's extraordinary work by going here: **bit.ly/3sCmrNH**

Great work, Terry. Congratulations!

SOUTHERN CALIFORNIA NEWS GROUP
Los Angeles Daily News ■ The Orange County Register ■ The Press-Enterprise ■ Press-Telegram (Long Beach) ■ Daily Breeze (Torrance) ■ Pasadena Star-News ■ San Gabriel Valley Tribune ■ Whittier Daily News ■ Inland Valley Daily Bulletin ■ The Sun (San Bernardino) ■ The Facts (Redlands)

C

Appendix C Letters of Notification

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Todd Corbin
General Manager
Riverside Public Utilities
3750 University Avenue, 3rd Floor
Riverside, CA 92501

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Todd Corbin,

State law requires each urban water supplier to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. Western Municipal Water District (Western) is currently preparing an update to its 2015 UWMP. The UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

In compliance with California Water Code Section 10621(b), Western is notifying Agencies within the County within which Western provides water supplies that the UWMP is being reviewed and updated. We anticipate having a draft 2020 UWMP available for public review in April 2021 and will post the draft plan to Western's website for review. We will notify your agency once the draft plan is posted. Prior to adoption of the updated 2020 UWMP, the Western Board of Directors will hold a public hearing in May 2021 for the purpose of receiving comments, but we also encourage comments to be submitted prior to the public hearing. The final 2020 UWMP will be submitted to the California Department of Water Resources by July 1, 2021.

Melissa Matlock, Western's Water Resource Specialist, is leading the effort. If you have any questions about the Urban Water Management Plan Update, please feel free to contact me at mmatlock@wmwd.com or by phone at (951-571-7260).

Sincerely,

Lisa Lemoine

Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Todd Moody
General Manager
City of Corona, Department of Water and Power
755 Corporation Yard Way
Corona, CA 92880

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

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State law requires each urban water supplier to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. Western Municipal Water District (Western) is currently preparing an update to its 2015 UWMP. The UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

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Sincerely,

Lisa Lenoire
for

Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Mike Lanni
President
Eagle Valley Mutual Water Company
P.O. Box 7284
Newport Beach, CA 92660

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Mike Lanni,

State law requires each urban water supplier to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. Western Municipal Water District (Western) is currently preparing an update to its 2015 UWMP. The UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

In compliance with California Water Code Section 10621(b), Western is notifying Agencies within the County within which Western provides water supplies that the UWMP is being reviewed and updated. We anticipate having a draft 2020 UWMP available for public review in April 2021 and will post the draft plan to Western's website for review. We will notify your agency once the draft plan is posted. Prior to adoption of the updated 2020 UWMP, the Western Board of Directors will hold a public hearing in May 2021 for the purpose of receiving comments, but we also encourage comments to be submitted prior to the public hearing. The final 2020 UWMP will be submitted to the California Department of Water Resources by July 1, 2021.

Melissa Matlock, Western's Water Resource Specialist, is leading the effort. If you have any questions about the Urban Water Management Plan Update, please feel free to contact me at mmatlock@wmwd.com or by phone at (951-571-7260).

Sincerely,

Lisa Lemaire
for

Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Jeff Sims
General Manager
Rubidoux Community Services District
3590 Rubidoux Boulevard
Riverside, CA 92509

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Jeff Sims,

State law requires each urban water supplier to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. Western Municipal Water District (Western) is currently preparing an update to its 2015 UWMP. The UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

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Sincerely,

Lisa Lemaire

for Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Marcel Lyons
Field Superintendent
Box Springs Mutual Water Company
21740 Dracaea Ave
Moreno Valley, CA 92553

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Marcel Lyons,

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Sincerely,

Lisa Lemoine
for Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Todd Jorgenson
Assistant General Manager - Water
Riverside Public Utilities
3750 University Avenue, 3rd Floor
Riverside, CA 92501

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Todd Jorgenson,

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Sincerely,

Lisa Lemoine

for Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams, Division 1
Gracie Torres, Division 2
Brenda Dennstedt, Division 3
Donald D. Galleano, Division 4
S.R. "Al" Lopez, Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Andy Okoro
City Manager
City of Norco
2870 Clark Avenue
Norco, CA 92860

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Andy Okoro,

State law requires each urban water supplier to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. Western Municipal Water District (Western) is currently preparing an update to its 2015 UWMP. The UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

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Sincerely,

Luc Lemoine

for Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams, Division 1
Gracie Torres, Division 2
Brenda Dennstedt, Division 3
Donald D. Galleano, Division 4
S.R. "Al" Lopez, Division 5

WESTERN MUNICIPAL WATER DISTRICT
Securing Your Water Supply

12/11/2020

Mr. Jeff Pape
General Manager
Temescal Valley Water District
22646 Temescal Canyon Road
Corona, CA 92883

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Jeff Pape,

State law requires each urban water supplier to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. Western Municipal Water District (Western) is currently preparing an update to its 2015 UWMP. The UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

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Sincerely,

Lisa Lemoine
for Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Eva Plajzer
Interm General Manager
Rancho California Water District
42135 Winchester Road
Temecula, CA 92590

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Eva Plajzer,

State law requires each urban water supplier to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. Western Municipal Water District (Western) is currently preparing an update to its 2015 UWMP. The UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

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Sincerely,

for Lisa Lemoine

Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams, Division 1
Gracie Torres, Division 2
Brenda Dennstedt, Division 3
Donald D. Galleano, Division 4
S.R. "Al" Lopez, Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Greg Thomas
General Manager
Elsinore Valley Municipal Water District
P.O. Box 3000
Lake Elsinore, CA 92530

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Greg Thomas,

State law requires each urban water supplier to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. Western Municipal Water District (Western) is currently preparing an update to its 2015 UWMP. The UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

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Sincerely,

Lisa Lemoine

for Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Don Hough
General Manager
Riverside Highland Water Company
12374 Michigan Street
Grand Terrace, CA 92313-5602

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Don Hough,

State law requires each urban water supplier to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. Western Municipal Water District (Western) is currently preparing an update to its 2015 UWMP. The UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

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Sincerely,

Lisa Lemoine

for Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Ms. Janey Gress
General Manager
Home Gardens Sanitary District
13538 Magnolia Avenue
Corona, CA 92879

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Ms. Janey Gress,

State law requires each urban water supplier to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. Western Municipal Water District (Western) is currently preparing an update to its 2015 UWMP. The UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

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Sincerely,

Lyn Lemoine
for

Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Chris Berch
General Manager
Jurupa Community Services District
11201 Harrel Street
Mira Loma, CA 91752

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Chris Berch,

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Sincerely,

Lisa Lemoine

for Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. David Vigil
General Manager
Home Gardens County Water District
3832 Grant Street
Corona, CA 92879

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. David Vigil,

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Sincerely,

Lua Lemoine
for

Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Al Zelinka
City Manager
City of Riverside
3900 Main Street, 3rd Floor
Riverside, CA 92522

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Al Zelinka,

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Sincerely,

Lua Lemoine

for Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Steve Weiss
Planning Director
County of Riverside
4080 Lemon Street
Riverside, CA 92502

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Steve Weiss,

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Sincerely,

Lua Lemoine

for Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Ms. Joanne Coletta
Community Development Director
City of Corona
400 S. Vicentia Avenue
Corona, CA 92882

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Ms. Joanne Coletta,

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Sincerely,

Lisa Lemoine

for Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Grant Taylor
Community Development Director
City of Lake Elsinore
130 S. Main Street
Lake Elsinore, CA 92530

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Grant Taylor,

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Sincerely,

Lisa Lemoine

for Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Jarrett Ramaiya
City Planner
City of Murrieta
1 Town Square
Murrieta, CA 92562

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Jarrett Ramaiya,

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Melissa Matlock, Western's Water Resource Specialist, is leading the effort. If you have any questions about the Urban Water Management Plan Update, please feel free to contact me at mmatlock@wmwd.com or by phone at (951-571-7260).

Sincerely,

Lisa Lemoine

for Melissa Matlock, Ph.D.
Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Luke Watson
Director of Community Development
City of Temecula
41000 Main Street
Temecula, CA 92590

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Luke Watson,

State law requires each urban water supplier to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. Western Municipal Water District (Western) is currently preparing an update to its 2015 UWMP. The UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

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Western Municipal Water District

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General Manager

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Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Steve King
Planning Director
City of Norco
2870 Clark Avenue
Norco, CA 92860

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Steve King,

State law requires each urban water supplier to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. Western Municipal Water District (Western) is currently preparing an update to its 2015 UWMP. The UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

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Western Municipal Water District

Craig D. Miller
General Manager

Steven K. Adams, Division 1
Gracie Torres, Division 2
Brenda Dennstedt, Division 3
Donald D. Galleano, Division 4
S.R. "Al" Lopez, Division 5

WESTERN MUNICIPAL WATER DISTRICT
Securing Your Water Supply

12/11/2020

Mr. Gustavo Gonzalez
Planning Manager
City of Eastvale
12363 Limonite Avenue, Ste. 910
Eastvale, CA 91752

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Gustavo Gonzalez,

State law requires each urban water supplier to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. Western Municipal Water District (Western) is currently preparing an update to its 2015 UWMP. The UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

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Western Municipal Water District

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General Manager

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Division 1

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Division 2

Brenda Dennstedt
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Donald D. Galleano
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S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Thomas Merrell
Planning Director
City of Jurupa Valley
8930 Limonite Avenue
Jurupa Valley, CA 92509

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Thomas Merrell,

State law requires each urban water supplier to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. Western Municipal Water District (Western) is currently preparing an update to its 2015 UWMP. The UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

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Western Municipal Water District

Craig D. Miller
General Manager

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Brenda Dennstedt, Division 3
Donald D. Galleano, Division 4
S.R. "Al" Lopez, Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

12/11/2020

Mr. Brad Coffey
Water Resources Management Group
Metropolitan Water District of Southern California
P.O. Box 54153
Los Angeles, CA 90054-0153

SUBJECT: WESTERN MUNICIPAL WATER DISTRICT'S URBAN WATER MANAGEMENT PLAN UPDATE

Dear Mr. Brad Coffey,

State law requires each urban water supplier to prepare and adopt an Urban Water Management Plan (UWMP) at least once every five years. Western Municipal Water District (Western) is currently preparing an update to its 2015 UWMP. The UWMP documents Western's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

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Western Municipal Water District

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General Manager

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Division 1

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Donald D. Galleano
Division 4

Fauzia Rizvi
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

City of Riverside
Attn: Al Zelinka
City Manager
3900 Main Street, 3rd Floor
Riverside, CA 92522
azelinka@riversideca.gov

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

Western Municipal Water District (Western) is in the process of preparing and updating its 2020 Urban Water Management Plan (UWMP) in compliance with the Urban Water Management Planning Act and the Water Conservation Act of 2009, commonly referred to as SBX7-7. An update of the Western's UWMP is required every five (5) years.

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Melissa Matlock, Ph.D.
Water Resources Specialist
Western Municipal Water District

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Mike Gardner
Division 1

Gracie Torres
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Donald D. Galleano
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Fauzia Rizvi
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

City of Norco
Attn: Andy Okoro
City Manager
2870 Clark Avenue
Norco, CA 92860
aokoro@ci.norco.ca.us

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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Water Resources Specialist
Western Municipal Water District

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General Manager

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Division 1

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Division 3

Donald D. Galleano
Division 4

Fauzia Rizvi
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

Jurupa Community Services District
Attn: Chris Berch
General Manager
11201 Harrel Street
Mira Loma, CA 91752
cberch@JCSD.US

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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Water Resources Specialist
Western Municipal Water District

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Donald D. Galleano
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Fauzia Rizvi
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

Home Gardens County Water District
Attn: David Vigil
General Manager
3832 Grant Street
Corona, CA 92879
hgcwd@yahoo.com

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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Fauzia Rizvi
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

Riverside Highland Water Company
Attn: Don Hough
General Manager
12374 Michigan Street
Grand Terrace, CA 92313-5602
dhough@rhwco.com

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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Water Resources Specialist
Western Municipal Water District

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General Manager

Mike Gardner
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Donald D. Galleano
Division 4

Fauzia Rizvi
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

Metropolitan Water District of Southern California
Attn: Edgar Fandialan
Water Resources Management Group
P.O. Box 54153
Los Angeles, CA 90054-0153
efandialan@mwdh2o.com

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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Water Resources Specialist
Western Municipal Water District

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General Manager

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Fauzia Rizvi
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

Rancho California Water District
Attn: Eva Plajzer
Interm General Manager
42135 Winchester Road
Temecula, CA 92590
plajzere@ranchowater.com

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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Western Municipal Water District

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Division 1

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Fauzia Rizvi
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

City of Lake Elsinore
Attn: Grant Taylor
Community Development Director
130 S. Main Street
Lake Elsinore, CA 92530
gtaylor@lake-elsinore.org

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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Water Resources Specialist
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General Manager

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Donald D. Galleano
Division 4

Fauzia Rizvi
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

Elsinore Valley Municipal Water District
Attn: Greg Thomas
General Manager
P.O. Box 3000
Lake Elsinore, CA 92530
gthomas@evmwd.net

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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Sincerely,

Melissa Matlock

Melissa Matlock, Ph.D.
Water Resources Specialist
Western Municipal Water District

Craig D. Miller
General Manager

Mike Gardner
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

Fauzia Rizvi
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

City of Eastvale
Attn: Gustavo Gonzalez
Planning Manager
12363 Limonite Avenue, Ste. 910
Eastvale, CA 91752
ggonzalez@eastvaleca.gov

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

Western Municipal Water District (Western) is in the process of preparing and updating its 2020 Urban Water Management Plan (UWMP) in compliance with the Urban Water Management Planning Act and the Water Conservation Act of 2009, commonly referred to as SBX7-7. An update of the Western's UWMP is required every five (5) years.

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

Home Gardens Sanitary District
Attn: Janey Gress
General Manager
13538 Magnolia Avenue
Corona, CA 92879
hgsd@sbcglobal.net

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

City of Murrieta
Attn: Jarrett Ramaiya
City Planner
1 Town Square
Murrieta, CA 92562
jramaiya@MurrietaCA.gov

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

Temescal Valley Water District
Attn: Jeff Pape
General Manager
22646 Temescal Canyon Road
Corona, CA 92883
jeffp@temescalvwd.com

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

Rubidoux Community Services District
Attn: Jeff Sims
General Manager
3590 Rubidoux Boulevard
Riverside, CA 92509
jsims@rcsd.org

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

City of Corona
Attn: Joanne Coletta
Community Development Director
400 S. Vicentia Avenue
Corona, CA 92882
Joanne.Coletta@ci.corona.ca.us

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

City of Jurupa Valley
Attn: Joe Perez
Planning Director
8930 Limonite Avenue
Jurupa Valley, CA 92509
jperez@jurupavalley.org

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

City of Temecula
Attn: Luke Watson
Director of Community Development
41000 Main Street
Temecula, CA 92590
Luke.Watson@cityoftemecula.org

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

Box Springs Mutual Water Company
Attn: Marcel Lyons
Field Superintendent
21740 Dracaea Ave
Moreno Valley, CA 92553
info@bsmwc.org

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

City of Corona, Department of Water and Power
Attn: Tom Moody
General Manager
755 Corporation Yard Way
Corona, CA 92880
Tom.Moody@CoronaCA.gov

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

Eagle Valley Mutual Water Company
Attn: Mike Lanni
President
P.O. Box 7284
Newport Beach, CA 92660
jmichaellanni@gmail.com

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

City of Norco
Attn: Steve King
Planning Director
2870 Clark Avenue
Norco, CA 92860
Sking@ci.norco.ca.us

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

County of Riverside
Attn: Steve Weiss
Planning Director
4080 Lemon Street
Riverside, CA 92502
sweiss@rctlma.org

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

Western Municipal Water District (Western) is in the process of preparing and updating its 2020 Urban Water Management Plan (UWMP) in compliance with the Urban Water Management Planning Act and the Water Conservation Act of 2009, commonly referred to as SBX7-7. An update of the Western's UWMP is required every five (5) years.

Water Code section 10621(b) requires an urban water supplier updating its UWMP to notify cities and counties within its service area of the update at least sixty (60) days prior to holding a public hearing. This letter serves as Western's notice that it is preparing and updating its 2020 UWMP, to be adopted and submitted to the California Department of Water Resources by the July 1, 2021 deadline. Western will also be adopting its Water Shortage Contingency Plan (WSCP) as part of the 2020 UWMP.

Western is also considering an Addendum to its 2015 UWMP to demonstrate consistency with the Delta Plan Policy to Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance (California Code Reg., tit. 23, § 5003). A copy of Western's draft 2020 UWMP, WSCP, and 2015 UWMP Addendum will be available for review on Western's website (www.wmwd.com/uwmp) in spring of 2021, and Western will subsequently hold noticed public hearings on the 2020 UWMP, WSCP, and 2015 UWMP Addendum in advance of their proposed adoption.

Western invites you to submit comments and consult with Western regarding its 2020 UWMP update, WSCP, and 2015 UWMP Addendum. Western anticipates holding a public comment period in spring 2021, with a public hearing planned during that time.

If you have any input for the matters contained in this notice letter, require additional information, or would like to set up a meeting to discuss these issues, please contact me at (951) 571-7260 or by email at mmatlock@wmwd.com.

Sincerely,

Melissa Matlock

Melissa Matlock, Ph.D.
Water Resources Specialist
Western Municipal Water District

Craig D. Miller
General Manager

Mike Gardner
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

Fauzia Rizvi
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

Riverside Public Utilities
Attn: Todd Corbin
General Manager
3750 University Avenue, 3rd Floor
Riverside, CA 92501
tcorbin@riversideca.gov

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

February 5, 2021

Riverside Public Utilities
Attn: Todd Jorgenson
Assistant General Manager - Water
3750 University Avenue, 3rd Floor
Riverside, CA 92501
tjorgenson@riversideca.gov

Subject: Western Municipal Water District 2020 Urban Water Management Plan Update

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Fauzia Rizvi
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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Marcel Lyons, Field Superintendent
Box Springs Mutual Water Company
21740 Dracaea Ave
Moreno Valley, CA 92553

Dear Mr. Lyons:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

In February 2021, Western Municipal Water District (Western) informed all counties, cities, and local water agencies that the District is updating its 2020 Urban Water Management Plan (UWMP), Water Shortage Contingency Plan (WSCP), and considering an Addendum to Western's 2015 UWMP.

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Ms. Joanne Coletta, Community Development Director
City of Corona
400 S. Vicentia Avenue
Corona, CA 92882

Dear Ms. Coletta:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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General Manager

Steven K. Adams
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

S.R. "Al" Lopez
Division 5

WESTERN MUNICIPAL WATER DISTRICT
Securing Your Water Supply

April 15, 2021

Mr. Tom Moody, General Manager
City of Corona, Department of Water and Power
755 Corporation Yard Way
Corona, CA 92880

Dear Mr. Moody:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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Fauzia Rizvi
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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Gustavo Gonzalez, Planning Manager
City of Eastvale
12363 Limonite Avenue, Ste. 910
Eastvale, CA 91752

Dear Mr. Gonzalez:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Mike Lanni, President
Eagle Valley Mutual Water Company
P.O. Box 7284
Newport Beach, CA 92660

Dear Mr. Lanni:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Greg Thomas, General Manager
Elsinore Valley Municipal Water District
P.O. Box 3000
Lake Elsinore, CA 92530

Dear Mr. Thomas:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. David Vigil, General Manager
Home Gardens County Water District
3832 Grant Street
Corona, CA 92879

Dear Mr. Vigil:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Ms. Janey Gress, General Manager
Home Gardens Sanitary District
13538 Magnolia Avenue
Corona, CA 92879

Dear Ms. Gress:

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Chris Berch, General Manager
Jurupa Community Services District
11201 Harrel Street
Mira Loma, CA 91752

Dear Mr. Berch:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Joe Perez, Planning Director
City of Jurupa Valley
8930 Limonite Avenue
Jurupa Valley, CA 92509

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Sincerely,
Melissa Matlock
Melissa Matlock, Ph.D.
Water Resources Specialist

Craig D. Miller
General Manager

Mike Gardner
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

Fauzia Rizvi
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Grant Taylor, Community Development Director
City of Lake Elsinore
130 S. Main Street
Lake Elsinore, CA 92530

Dear Mr. Taylor:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Jarrett Ramaiya, City Planner
City of Murrieta
1 Town Square
Murrieta, CA 92562

Dear Mr. Ramaiya:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Edgar Fandialan, Water Resources Management Group
Metropolitan Water District of Southern California
P.O. Box 54153
Los Angeles, CA 90054-0153

Dear Mr. Fandialan:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Steve King, Planning Director
City of Norco
2870 Clark Avenue
Norco, CA 92860

Dear Mr. King:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Andy Okoro, City Manager
City of Norco
2870 Clark Avenue
Norco, CA 92860

Dear Mr. Okoro:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Jeff Sims, General Manager
Rubidoux Community Services District
3590 Rubidoux Boulevard
Riverside, CA 92509

Dear Mr. Sims:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Ms. Eva Plajzer, Interm General Manager
Rancho California Water District
42135 Winchester Road
Temecula, CA 92590

Dear Ms. Plajzer:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Don Hough, General Manager
Riverside Highland Water Company
12374 Michigan Street
Grand Terrace, CA 92313-5602

Dear Mr. Hough:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Steve Weiss, Planning Director
County of Riverside
4080 Lemon Street
Riverside, CA 92502

Dear Mr. Weiss:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Al Zelinka, City Manager
City of Riverside
3900 Main Street, 3rd Floor
Riverside, CA 92522

Dear Mr. Zelinka:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Jeff Pape, General Manager
Temescal Valley Water District
22646 Temescal Canyon Road
Corona, CA 92883

Dear Mr. Pape:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

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WESTERN MUNICIPAL WATER DISTRICT

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April 15, 2021

Mr. Todd Corbin, General Manager
Riverside Public Utilities
3750 University Avenue, 3rd Floor
Riverside, CA 92501

Dear Mr. Corbin:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

In February 2021, Western Municipal Water District (Western) informed all counties, cities, and local water agencies that the District is updating its 2020 Urban Water Management Plan (UWMP), Water Shortage Contingency Plan (WSCP), and considering an Addendum to Western's 2015 UWMP.

Western is pleased to announce that the draft 2020 UWMP, draft Addendum to the 2015 UWMP, and draft WSCP are now posted on Western's website and available for public review. This satisfies California Water Code (CWC) Section 10642 requiring agencies to make their plans available for public inspection prior to adoption. The posted draft documents may be accessed on April 30 using the following link: www.wmwd.com/uwmp.

Public hearings for Western's draft 2020 UWMP, draft Addendum to the 2015 UWMP, and draft WSCP are scheduled for June 16 as part of Western's Board meeting. As required by CWC Section 10621(b), Western sent 60-day notice letters to the cities and counties on February 4, 2021. The letters were sent to the city managers, the county public works and planning directors, and general managers of Western's member agencies within which Western provides water.

In addition, Western scheduled the publication of the Notice of Public Hearing to satisfy the requirement of CWC Section 10642 and Government Code 6066. CWC Section 10642 now requires that notices must be provided pursuant to Chapter 17.5 of the Government Code, which requires that public notification be provided in any non-English language spoken by a substantial number of the public served by the agency. The notification for public hearing will be published under the following schedule:

- For English language – Press Enterprise newspaper – April 15 and April 22, 2021.
- For Spanish language newspaper – La Prenza – April 16 and April 23, 2021.

Western invites you to submit comments and consult with Western regarding its 2020 UWMP update, WSCP, and 2015 UWMP Addendum to boardsecretary@wmwd.com.

If you have any input for the matters contained in this notice letter, require additional information, or would like to set up a meeting to discuss these issues, please contact me at (951) 571-6270 or by email at mmatlock@wmwd.com.

Sincerely,
Melissa Matlock
Melissa Matlock, Ph.D.
Water Resources Specialist

Craig D. Miller
General Manager

Mike Gardner
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

Fauzia Rizvi
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Todd Jorgenson, Assistant General Manager - Water
Riverside Public Utilities
3750 University Avenue, 3rd Floor
Riverside, CA 92501

Dear Mr. Jorgenson:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

In February 2021, Western Municipal Water District (Western) informed all counties, cities, and local water agencies that the District is updating its 2020 Urban Water Management Plan (UWMP), Water Shortage Contingency Plan (WSCP), and considering an Addendum to Western's 2015 UWMP.

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Donald D. Galleano
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Fauzia Rizvi
Division 5

WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

April 15, 2021

Mr. Luke Watson, Director of Community Development
City of Temecula
41000 Main Street
Temecula, CA 92590

Dear Mr. Watson:

Subject: Western Municipal Water District 2020 Urban Water Management Plan Public Hearing Notice

In February 2021, Western Municipal Water District (Western) informed all counties, cities, and local water agencies that the District is updating its 2020 Urban Water Management Plan (UWMP), Water Shortage Contingency Plan (WSCP), and considering an Addendum to Western's 2015 UWMP.

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Sincerely,
Melissa Matlock
Melissa Matlock, Ph.D.
Water Resources Specialist

D

Appendix D Adoption Resolutions

RESOLUTION 3154

RESOLUTION OF THE BOARD OF DIRECTORS OF WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY ADOPTING THE 2020 URBAN WATER MANAGEMENT PLAN

WHEREAS, The California Urban Water Management Planning Act, Water Code Section 10610 et seq. (the Act), mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, prepare an Urban Water Management Plan (Plan); and

WHEREAS, the Act generally requires that said Plan be updated and adopted at least once every five years on or before July 1, in years ending in six and one; and

WHEREAS, pursuant to recent amendments to the Act, urban water suppliers are required to update and electronically submit their 2020 Plans to the California Department of Water Resources by July 1, 2021; and

WHEREAS, pursuant to the Water Conservation Act of 2009, also referred to as SB X7-7 (Water Code section 10608 et seq.), an "urban retail water supplier" is defined as a water supplier that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes, and an "urban wholesale water supplier" is defined as a water supplier that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes; and

WHEREAS, Western Municipal Water District of Riverside County (Western) meets the definition of both an

live streamed online at wmwd.com in order to provide members of the public and other interested entities with the opportunity to be heard in connection with proposed adoption of the 2020 Plan and issues related thereto; and

WHEREAS, pursuant to said public hearing on Western's 2020 Plan, Western, among other things, encouraged the active involvement of diverse social, cultural, and economic members of the community within Western's service area with regard to the preparation of the Plan, encouraged community input regarding Western's 2020 Urban Water Management Plan; and

WHEREAS, the Board of Directors has reviewed and considered the purposes and requirements of the Act and SB X7-7, the contents of the 2020 Plan, and the documentation contained in the administrative record in support of the 2020 Plan, and has determined that the factual analyses and conclusions set forth in the 2020 Plan are legally sufficient; and

WHEREAS, Section 10652 of the California Water Code provides that the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of urban water management plans pursuant to this part; and

WHEREAS, the Board of Directors desires to adopt the 2020 Plan in order to comply with the Act and SB X7-7.

NOW THEREFORE BE IT RESOLVED, the Board of Directors of the Western Municipal Water District of Riverside County hereby resolve as follows:

(60) days after submitting a copy of the Plan with the California Department of Water Resources;

7. Western finds and determines that this resolution is not subject to CEQA pursuant to Water Code Section 10652 because CEQA does not apply to the preparation and adoption of an urban water management plan or to the implementation of the actions taken pursuant to such plans. Because this resolution comprises Western's urban water management plan and involves its implementation, no CEQA review is required;

8. Pursuant to CEQA, Western directs staff to file a Notice of Exemption with the Riverside County Clerk's office within five (5) working days of adoption of this resolution;

9. The document and materials that constitute the record of proceedings on which this resolution and the above findings have been based are located at Clerk of the Board of Directors of Western Municipal Water District. The custodian for these records is the Clerk of the Board of Western;

10. The General Manager is hereby authorized and directed to implement the 2020 Plan in accordance with the Act and SB X7-7 and to provide recommendations to the Board of Directors regarding the necessary budgets, procedures, rules, regulations, or further actions to carry out the effective and equitable implementation of the 2020 Plan.

ADOPTED, this 16th day of June 2021.

Brenda Dennstedt
President

RESOLUTION 3155

RESOLUTION OF THE BOARD OF DIRECTORS OF WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY ADOPTING THE WATER SHORTAGE CONTINGENCY PLAN

WHEREAS, The California Urban Water Management Planning Act, Water Code Section 10610 et seq. (the Act), mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, prepare and adopt, in accordance with prescribed requirements, a water shortage contingency plan (WSCP); and

WHEREAS, the Act specifies the requirements and procedures for adopting such Water Shortage Contingency Plans; and

WHEREAS, pursuant to recent amendments to the Act, urban water suppliers are required to adopt and electronically submit their WSCPs to the California Department of Water Resources by July 1, 2021; and

WHEREAS, pursuant to the Water Conservation Act of 2009, also referred to as SB X7-7 (Water Code section 10608 et seq.), an "urban retail water supplier" is defined as a water supplier that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes, and an "urban wholesale water supplier" is defined as a water supplier that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes; and

hearing online, or virtually, as there was no public location for attending in person. The public hearing was live streamed online at wmwd.com in order to provide members of the public and other interested entities with the opportunity to be heard in connection with proposed adoption of the WSCP and issues related thereto; and

WHEREAS, pursuant to said public hearing on Western's WSCP, Western, among other things, encouraged the active involvement of diverse social, cultural, and economic members of the community within Western's service area with regard to the preparation of the Plan, encouraged community input regarding Western's Water Shortage Contingency Plan; and

WHEREAS, the Board of Directors has reviewed and considered the purposes and requirements of the Act and SB X7-7, the contents of the WSCP, and the documentation contained in the administrative record in support of the WSCP, and has determined that the factual analyses and conclusions set forth in the WSCP are legally sufficient; and

WHEREAS, Section 10652 of the California Water Code provides that the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of a water shortage contingency plan as part of an urban water management plan pursuant to California Water Code Section 10632; and

WHEREAS, the Board of Directors desires to adopt the WSCP in order to comply with the Act and SB X7-7.

to provide that portion of the WSCP prepared pursuant to Water Code Section 10635(a) to any city or county within which Western provides water supplies no later than sixty (60) days after submitting a copy of the WSCP with the California Department of Water Resources;

7. Western finds and determines that this resolution is not subject to CEQA pursuant to Water Code Section 10652 because CEQA does not apply to the preparation and adoption of a water shortage contingency plan or to the implementation of the actions taken pursuant to such plans. Because this resolution comprises Western's water shortage contingency plan and involves its implementation, no CEQA review is required;

8. Pursuant to CEQA, Western directs staff to file a Notice of Exemption with the Riverside County Clerk's office within five (5) working days of adoption of this resolution;

9. The document and materials that constitute the record of proceedings on which this resolution and the above findings have been based are located at Clerk of the Board of Directors of Western Municipal Water District. The custodian for these records is the Clerk of the Board of Western;

10. The General Manager is hereby authorized and directed to implement the WSCP in accordance with the Act and SB X7-7 and to provide recommendations to the Board of Directors regarding the necessary budgets, procedures, rules, regulations or further actions to carry out the effective and equitable implementation of the WSCP.

RESOLUTION 3158

RESOLUTION OF THE BOARD OF DIRECTORS OF WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY ADOPTING AN ADDENDUM TO THE 2015 URBAN WATER MANAGEMENT PLAN

WHEREAS, The California Urban Water Management Planning Act, Water Code Section 10610 et seq. (the Act), mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, prepare an Urban Water Management Plan (Plan); and

WHEREAS, the Act generally requires that said Plan be updated and adopted at least once every five years on or before July 1, in years ending in six and one; and

WHEREAS, pursuant to recent amendments to the Act, urban water suppliers are encouraged by the California Department of Resources (DWR) and the Delta Stewardship Council (DSC) to consider adopting an Addendum to their 2015 Plan to demonstrate consistency with the Delta Plan Policy WR P1 to Reduce Reliance on the Delta through Improved Regional Water Self-Reliance, Cal. Code Regs. tit. 23, § 5003; and

WHEREAS, Western Municipal Water District of Riverside County (Western) meets the definition of an urban retail water supplier for purposes of the Act; and

WHEREAS, Western has prepared an Addendum to Western's 2015 Plan in accordance with Delta Plan Policy WR P1, and in accordance with applicable legal requirements, has undertaken certain coordination, notice, public

WHEREAS, pursuant to said public hearing on Western's Addendum to the 2015 Plan, Western, among other things, encouraged the active involvement of diverse social, cultural, and economic members of the community within Western's service area with regard to the preparation of the Plan, encouraged community input regarding Western's Addendum to the 2015 Urban Water Management Plan; and

WHEREAS, the Board of Directors has reviewed and considered the purposes and requirements of the Act and Delta Plan Policy WR P1, the contents of the Addendum to the 2015 Plan, and the documentation contained in the administrative record in support of the Addendum, and has determined that the factual analyses and conclusions set forth in the Addendum are legally sufficient; and

WHEREAS, the Board of Directors desires to adopt the Addendum to the 2015 Plan prior to July 1, 2021 in order to comply with the Act and Delta Plan Policy WR P1.

NOW THEREFORE BE IT RESOLVED, the Board of Directors of the Western Municipal Water District of Riverside County hereby resolve as follows:

1. The Addendum to Western's 2015 Urban Water Management Plan to demonstrate consistency with the Delta Plan Policy to Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance is hereby adopted as amended by changes incorporated by the Board of Directors as a result of input received (if any) at the public hearing and ordered filed with the Secretary of the Board of Directors;

ADOPTED, this 16th day of June 2021.

BRENDA DENNSTEDT
President

June 16, 2021

I HEREBY CERTIFY that the foregoing is a full, true, and correct copy of Resolution 3158 adopted by the Board of Directors of Western Municipal Water District of Riverside County at its regular meeting held on June 16, 2021.

MIKE GARDNER
Secretary-Treasurer

The Undersigned Certifies That This
Is a True Copy on File as a
Permanent Record of the District.
This Stamp Must be in Pink Ink
To Constitute a Certified Copy.

Western Municipal Water District
By _____ Date 6/16/2021

E

Appendix E USBR Climate Change Analysis for the Santa Ana River Watershed

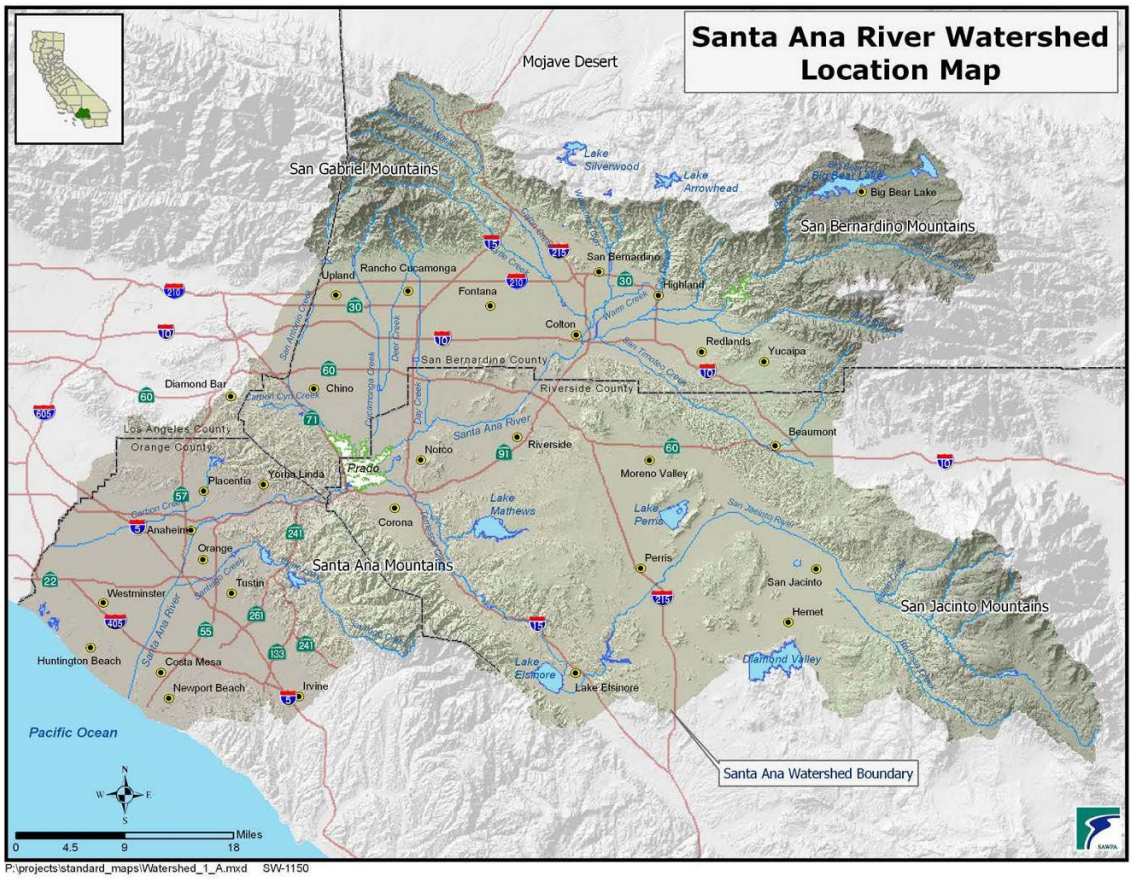
RECLAMATION

Managing Water in the West

Technical Memorandum No. 1

Climate Change Analysis for the Santa Ana River Watershed

Santa Ana Watershed Basin Study, California
Lower Colorado Region



U.S. Department of the Interior
Bureau of Reclamation

August 2013

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

BUREAU OF RECLAMATION
Water and Environmental Resources Division (86-68200)
Water Resources Planning and Operations Support Group (86-68210)
Technical Services Center, Denver, Colorado

Technical Memorandum No. 86-68210-2013-02

Climate Change Analysis for the Santa Ana River Watershed

Santa Ana Watershed Basin Study, California
Lower Colorado Region

Prepared by:

Kristine Blickenstaff, Hydraulic Engineer
Subhrendu Gangopadhyay, Hydrologic Engineer
Ian Ferguson, Hydrologic Engineer
Laura Condon, Hydrologic Engineer
Tom Pruitt, Civil Engineer

Peer reviewed by:

Marketa Elsner, Hydrologic Engineer

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Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
%	percent
~	Approximately
AB 32	Assembly Bill 32
AMJJ	April - July
AR4	Fourth Assessment Report
BCSD	Bias Correction and Spatial Disaggregation or bias-corrected and spatially downscaled
CDF	Cumulative Distribution Function
CO_2e	Carbon Dioxide Equivalent
CMIP	Coupled Model Intercomparison Project (CMIP1, CMIP2, CMIP3, and CMIP5 are CMIP phases 1, 2, 3, and 5 respectively)
DCP	Downscaled Climate Projections
DEM	Digital Elevation Model
DJFM	December - March
DOE	U.S. Department of Energy
DWR	California Department of Water Resources
EMWD	Eastern Municipal Water District
EVMWD	Elsinore Valley Municipal Water District
FAQs	Frequently Asked Questions
GCM	General Circulation Model, or Global Climate Model

GHG	Greenhouse Gas
IEUA	Inland Empire Utilities Agency
IPCC	Intergovernmental Panel on Climate Change
IRWM	Integrated Regional Water Management
km	kilometer
LESJWA	Lake Elsinore and San Jacinto Watersheds Authority
LLNL	Lawrence Livermore National Laboratory
MAF	million acre-feet
MAFY	million acre feet per year
MGD	million gallons per day
MWDSC	The Metropolitan Water District of Southern California
NCAR	National Center for Atmospheric Research
OCWD	Orange County Water District
OWOW	One Water One Watershed
PCMDI	Program for Climate Model Diagnosis and Intercomparison
PET	Potential Evapotranspiration
QSA	Quantification Settlement Agreement
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
SARP	Santa Ana River Mainstem Project
SARW	Santa Ana River Watershed
SAWPA	Santa Ana Watershed Project Authority
SBVMWD	San Bernardino Valley Municipal Water District

SECURE	Science and Engineering to Comprehensively Understand and Responsibly Enhance
SCAG	Southern California Association of Governments
SLR	Sea Level Rise
SWE	Snow Water Equivalent
USGCRP	U.S. Global Change Research Program
USGS	U.S. Geological Survey
VIC	Variable Infiltration Capacity hydrologic model
WaterSMART	WaterSMART (Sustain and Manage America's Resources for Tomorrow)
WCRP	World Climate Research Programme
WMWD	Western Municipal Water District
WRMS	Water Resources Management System

Executive Summary

The Santa Ana Watershed Basin Study (Basin Study) is a collaborative effort by the Santa Ana Watershed Project Authority (SAWPA) and the Bureau of Reclamation (Reclamation), authorized under the Sustain and Manage America's Resources for Tomorrow SECURE Water Act (Title IX, Subtitle F of Public Law 111-11). The study began in 2011 and was completed in the spring of 2013. The Basin Study complements SAWPA's Integrated Regional Water Management (IRWM) planning process, also known as the "One Water One Watershed" (OWOW) Plan, and refines the watershed's water projections, and identifies potential adaptation strategies, in light of projected effects of climate change. This climate change analysis for the Santa Ana River Watershed (SARW) is a contributing section to the Basin Study.

This report explains the methods used to develop an analysis of potential implications of the changing climate, and how those implications might affect issues of importance to the Santa Ana River Watershed. Chapter 1 provides an introduction to the project and the study area, along with a summary of relevant previous studies. The development of climate projections and hydrology models used can be found in Chapter 2. Chapter 3 provides projections for water supply and demand in the SARW. An impact analysis was conducted focusing on key areas of importance to the SARW, the results of which can be found in Chapter 4. A tool to evaluate demand management is presented in Chapter 5, along with a case study of potential adaptation strategies. Chapter 6 addresses uncertainties in climate change analysis.

In light of climate change, prolonged drought conditions, growth, and population projections, a strong concern exists to ensure there will be adequate water supplies to meet future water demand. The findings of this Basin Study will be used to update the OWOW Plan, evaluate the implications of climate change, assess increased energy demand, and ensure that future water quality and supply needs are met. Goals of the study include: incorporating existing regional and local planning studies within the watershed; sustaining the innovative "bottom up" approach to regional water resources management planning; ensuring an integrated, collaborative approach; using science and technology to assess climate change and greenhouse emissions effects; facilitating watershed adaptation planning; and expanding outreach to all major water uses and stakeholders.

Future water supply was analyzed for the Santa Ana River Watershed using the Variable Infiltration Capacity (VIC) hydrologic model (Liang et al., 1994; Liang et al., 1996; Nijssen et al., 1997) to project streamflow using 112 different projections of future climate. Projected climate variables, including daily precipitation, minimum temperature, maximum temperature, and wind speed,

came from the Bias Corrected and Spatially Downscaled Coupled Model Intercomparison Project Phase 3 (BCSD-CMIP3) archive. Historical VIC model simulations over the period 1950-1999 were conducted using historical meteorological forcings (factors affecting the climate of the earth that drive or "force" the climate to change) developed by Maurer et al., (2002), and subsequent extensions. The VIC hydrologic model solves the water balance for each of a series of 1/8° by 1/8° (~12km x 12 km) grid cells, which represent the watershed. Daily climate projections span the time period January 1, 1950 to December 31, 2099 and exist for each grid cell. Grid based outputs of daily runoff and baseflow generated by the VIC hydrologic model are routed to select sites throughout the watershed to produce daily streamflow projections. Through coordination with SAWPA and local water agencies, 36 key locations in the basin were determined, so that sub-basins could be delineated. Change factors were developed by calculating decade mean (reference decade – 1990s; three future decades – 2020s, 2050s, and 2070s) total precipitation and temperature, then calculating percent change, and finally calculating the median change for all the 112 projections. Final products include data sets at key locations for precipitation, temperature, evapotranspiration, April 1st Snow Water Equivalent (SWE), and streamflow.

These data sets were used to answer frequently asked questions regarding impacts of climate change on the Santa Ana River Watershed. The questions and key findings can be found below.

Will surface water supply decrease?

- Annual surface water is likely to decrease over future periods.
- Precipitation shows somewhat long term decreasing trends.
- Temperature will increase, which is likely to cause increased water demand and reservoir evaporation.
- April 1st SWE will decrease.

Will groundwater availability be reduced?

- Groundwater currently provides approximately 54% of total water supply in an average year, and groundwater use is projected to increase over the next 20 years.
- Projected decreases in precipitation and increases in temperature will decrease natural recharge throughout the basin.
- Management actions such as reducing municipal and industrial water demands or increasing trans-basin water imports and recharge will be required in order to maintain current groundwater levels.
- A basin-scale groundwater screening tool was developed to facilitate analysis of basin-scale effects of conservation, increasing imported supply, changing agricultural land use, and other factors on basin-scale groundwater conditions.

Is Lake Elsinore in danger of drying up?

- Lake Elsinore has less than a 10% chance of drying up (2000-2099).
- In the 2000-2049 period, Lake Elsinore has a greater than 75% chance of meeting the minimum elevation goal of 1,240 ft.
- In the future period 2050-2099, Lake Elsinore has less than a 50% chance of meeting the minimum elevation goal of 1,240 ft.
- There is less than a 25% chance that Lake Elsinore will drop below low lake levels (1,234 ft) in either period.
- The Elsinore Valley Municipal Water District (EVMWD) project does aid in stabilizing lake levels; however, for the period 2050-2099 additional measures will likely be required to help meet the minimum elevation goal of 1,240 ft.

Will the region continue to support an alpine climate and how will the Jeffrey Pine ecosystem be impacted?

- Warmer temperatures will likely cause Jeffrey pines to move to higher elevations and may decrease their total habitat.
- Forest health may also be influenced by changes in the magnitude and frequency of wildfires or infestations.
- Alpine ecosystems are vulnerable to climate change because they have little ability to expand to higher elevations.
- Across the State it is projected that alpine forests will decrease in area by 50-70% by 2100.

Will skiing at Big Bear Mountain Resorts be sustained?

- Simulations indicate significant decreases in April 1st snowpack that amplify throughout the 21st century.
- Warmer temperatures will also result in a delayed onset and shortened ski season.
- Lower elevations are most vulnerable to increasing temperatures.
- Both Big Bear Mountain Resorts lie below 3,000 m and are projected to experience declining snowpack that could exceed 70% by 2070.

How many additional days over 95°F are expected in Anaheim, Riverside and Big Bear City?

- All the climate projections demonstrate clear increasing temperature trends.
- Increasing temperatures will result in a greater number of days above 95°F in the future.

- The number of days above 95°F gets progressively larger for all cities advancing into the future.
- By 2070 it is projected that the number of days above 95°F will quadruple in Anaheim (4 to 16 days) and nearly double in Riverside (43 to 82 days). The number of days above 95°F at Big Bear City is projected to increase from 0 days historically to 4 days in 2070.

Will floods become more severe and threaten flood infrastructure?

- Simulations indicate a significant increase in flow for 200-year storm events in the future.
- The likelihood of experiencing what was historically a 200-year event will nearly double (i.e. the 200-year historical event is likely to be closer to a 100-year event in the future).
- Findings indicate an increased risk of severe floods in the future, though there is large variability between climate simulations.

How will climate change and sea level rise affect coastal communities and beaches?

- Climate change will contribute to global sea level rise (SLR) through melting of glaciers and ice caps and thermal expansion of ocean waters, both of which increase the volume of water in the oceans.
- Regional SLR may be higher or lower than global SLR due to effects of regional ocean and atmospheric circulation.
- Average sea levels along the Southern California coast are projected to rise by 5-24 inches by 2050 and 16-66 inches by 2100.
- SLR is likely to inundate beaches and coastal wetlands and may increase coastal erosion. Effects on local beaches depend on changes in coastal ocean currents and storm intensity, which are highly uncertain at this time.
- SLR will increase the area at risk of inundation due to a 100-year flood event.
- Existing barriers are sufficient to deter seawater intrusion at Talbert and Alamitos gaps under a 3-foot rise in sea levels. However, operation of barriers under SLR may be constrained by shallow groundwater concerns.

As climate science continues to evolve, periodic reanalysis and evaluation will be needed to inform the decision-making process.

1.0 Introduction

1.1 Purpose, Scope, and Objective of Study

The Santa Ana Watershed Basin Study (Basin Study) is a collaborative effort by the Santa Ana Watershed Project Authority (SAWPA) and the Bureau of Reclamation (Reclamation), authorized under the Sustain and Manage America's Resources for Tomorrow SECURE Water Act (Title IX, Subtitle F of Public Law 111-11). The study began in 2011 and was completed in the spring of 2013. The Basin Study complements SAWPA's Integrated Regional Water Management (IRWM) planning process, also known as their "One Water One Watershed" (OWOW) Plan, and refines the watershed's water projections, and identifies potential adaptation strategies, in light of projected effects of climate change. This climate change analysis for the Santa Ana River Watershed is a contributing section to the Basin Study.

SAWPA is a joint powers authority that represents five major water resource agencies. SAWPA's area includes over 350 water, wastewater and groundwater management, flood control, environmental, and other nongovernmental organizations. These entities work together collaboratively and focus on the region's OWOW Plan.

In light of climate change, prolonged drought conditions, growth, and population projections, a strong concern exists to ensure there will be adequate water supplies to meet future water demand. The findings of this Basin Study will be used to update the OWOW Plan, evaluate the implications of climate change, and ensure that future water quality and supply needs are met. Goals of the study include: incorporating existing regional and local planning studies within the watershed; sustaining the innovative "bottom up" approach to regional water resources management planning; ensuring an integrated, collaborative approach; using science and technology to assess climate change and greenhouse emissions affects; facilitating watershed adaptation planning; and expanding outreach to all major water uses and stakeholders.

1.1.1 Location and Description of Study Area

The Santa Ana River Watershed (also referred to as SARW, or 'Watershed') is home to over 6 million people, within an area of 2,650 square miles in southern California. The regional population is projected to grow to almost ten million within the next 50 years (U.S. Census Bureau, 2010). The watershed includes much of Orange County, the northwestern corner of Riverside County, the southwestern corner of the San Bernardino County, and small portions of Las Angeles County. The watershed is bounded on the south by the Santa Margarita watershed, on the east by the Salton Sea and Southern Mojave watersheds, and on the northwest by the Mojave and San Gabriel watersheds. SAWPA has five member agencies: Eastern Municipal Water District (EMWD), Inland Empire

Utilities Agency (IEUA), Orange County Water District (OCWD), San Bernardino Valley Municipal Water District (SBVMWD), and Western Municipal Water District (WMWD). shown below in Figure 1.

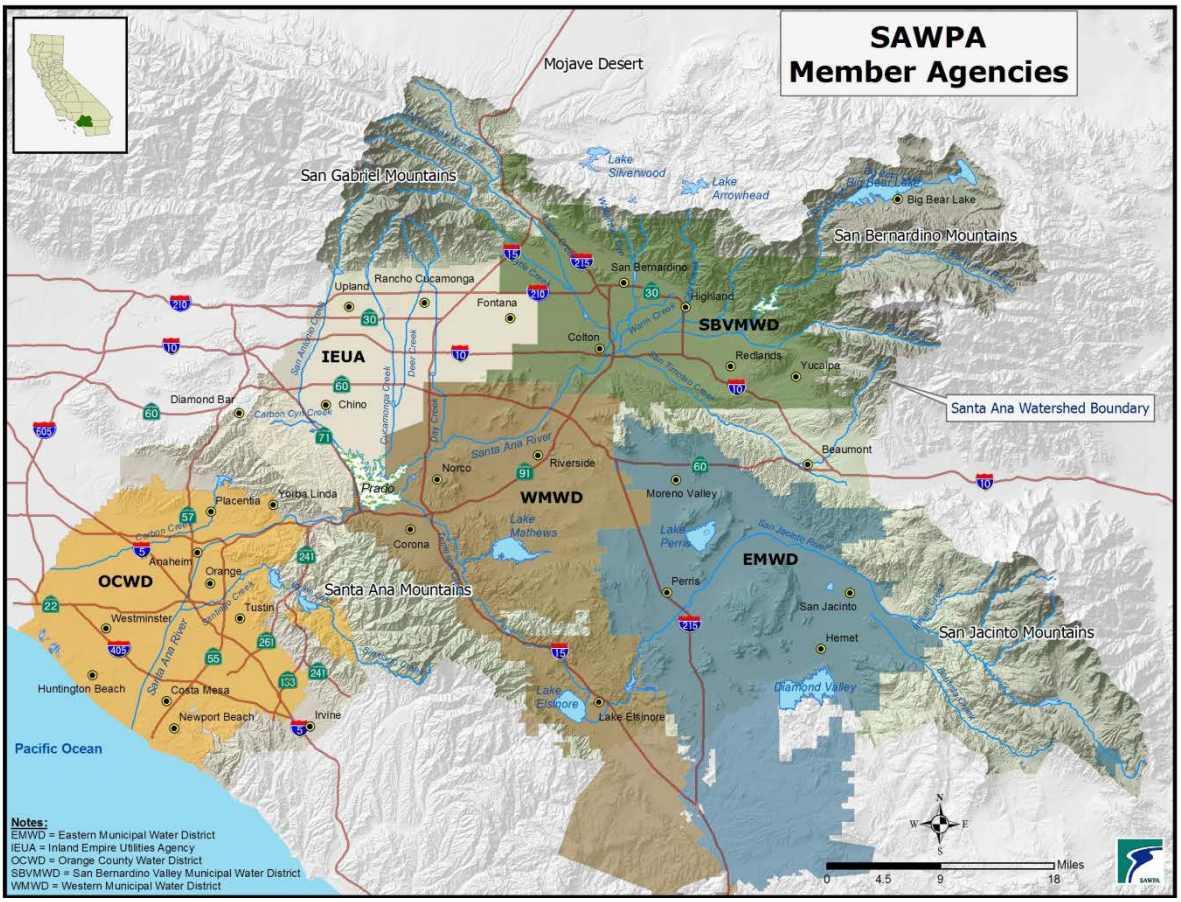


Figure 1: SAWPA member agencies

The climate and geography of the State of California present a unique challenge to the management and delivery of water. While most of the State's precipitation falls on the northern portion of the State, most of California's population resides in the semi-arid, southern portion of the State. Water is diverted, stored, and then transferred from the water-rich north to the more arid central and southern sections of the state through the California State Water Project (SWP), the Central Valley Project, and the Los Angeles Aqueduct. In addition to the projects that transport water from the north to the south, the southern coastal area relies on water imported through The Metropolitan Water District of Southern California's (Metropolitan) Colorado River Aqueduct. The Bureau of Reclamation and seven basin states manage the Colorado River system under the authority of the Secretary of the Interior and for the benefit of the seven basin states. Over-allocation of this resource, along with a U.S Supreme Court Decision (Arizona v. California, 1964) and population and economic growth, led to the recent California "4.4 Plan" and Quantification Settlement Agreement (QSA). The QSA

limits California's share of the Colorado River water supply to 4.4 million acre-feet (MAF). As a result of these actions, Metropolitan's supply from the Colorado River was significantly reduced, especially during extended dry periods. In the past, a buffer supply was developed by constructing new facilities, such as dams and/or aqueducts, to provide water supply for future growth. Today, the gap between supply and demand has closed and increasing emphasis is placed on conservation and development of local supplies. Building new facilities is costly and such projects face strict environmental review before they can be approved. This has caused California to seek more creative and sustainable solutions to water resource management.

1.2 Summary of Previous and Current Studies

A large body of research has been conducted over the past ten or more years on climate change and its potential impacts on the western United States. Most of this research has focused on large scale implications (for example, over the western United States), while providing limited regional scale information. The following section summarizes research that is relevant to the Watershed, and shows that although these results are applicable, additional research was required, through this Basin Study, to evaluate smaller scale, site specific, climate change impacts. For additional information on previous and current climate change studies, not directly related to the Watershed, please see Reclamation's Literature Synthesis on Climate Change Implications for Water and Environmental Resources (http://www.usbr.gov/research/docs/climatechangelitsynthesis.pdf).

1.2.1 Historical Trends

California's historical temperature has increased by about 1.7°F over the past 116 years (Moser et al., 2012), while showing declines in spring snowpack and a shift to earlier spring runoff (Knowles et al., 2007; Regonda et al., 2005; Peterson et al., 2008; Stewart et al., 2009). It is difficult to distinguish long-term climate change from natural climate variability, although many studies have tried to distinguish between the two (Bonfils et al., 2007; Cayan et al., 2001; Gershunov et al., 2009). It is likely that the historical temperature trends are due to a combination of anthropogenic climate change and natural climate variability (Reclamation, 2011k).

A study by Gershunov et al., (2012) shows that generally, there is a positive trend (1950-2010) in heat wave activity over the entire California region that is expressed most strongly and clearly in nighttime rather than daytime temperature extremes. This trend in nighttime heat wave activity has intensified markedly since the 1980s and especially since 2000. The two most recent nighttime heat waves were also strongly expressed in extreme daytime temperatures. Circulations associated with great regional heat waves advect hot air into the region. This air can be dry or moist, depending on whether a moisture source is available, causing heat waves to be expressed preferentially during day or night.

A remote moisture source centered within a marine region west of Baja California has been increasing in prominence because of gradual sea surface warming and a related increase in atmospheric humidity. Adding to the very strong synoptic dynamics during the 2006 heat wave were a prolonged stream of moisture from this southwestern source, and despite the heightened humidity, an environment in which afternoon convection was suppressed, keeping cloudiness low and daytime temperatures high.

Vermeera and Rahmstorf (2009) suggest a simple relationship linking global sea-level variations to temperature. This relationship is tested on synthetic data from a global climate model for the past millennium and the next century. When applied to observed data of sea level and temperature for 1880–2000, and taking into account known anthropogenic hydrologic contributions to sea level, the correlation explains 98% of the variance.

Trends in historical precipitation are more sporadic making it difficult to attribute them to climate change (Hoerling et al., 2010). A series of regression analyses, conducted by Dettinger and Cayan (1995), indicate that runoff timing responds equally to the observed decadal-scale trends in winter temperature and interannual temperature variations of the same magnitude, suggesting that the trend in temperature is sufficient to explain the increasingly early runoff. However, this trend is not immediately distinguishable from natural atmospheric variability.

A well-documented shift towards earlier runoff can be attributed, in part, to more precipitation falling as rain instead of snow (Regonda et al., 2005; Pierce et al., 2008; Das et al., 2009; Hidalgo et al., 2009; Lindquist et al., 2009). Knowles et al., (2007) showed a regional trend during the period 1949–2001 toward smaller ratios of winter-total snowfall water equivalent (SWE) to winter-total precipitation, with the most pronounced reductions occurring in the Sierra Nevada and the Pacific Northwest, with more varied changes (but still predominantly reductions) in the Rockies. The trends in this ratio correspond to shifts toward less SWE rather than to changes in overall precipitation, except in the Southern Rockies, where both snowfall and precipitation have increased. The trends toward reduced SWE are a response to warming across the region, with the most significant reductions occurring where winter-average wet-day minimum temperature changes have been less than +3°C over the course of the study period. The observed trends in hydroclimatology over the western United States will likely have significant impacts on water resources planning and management.

There have been preliminary efforts by agencies managing California's water resources to incorporate climate change research into their planning and management tools, including preliminary modeling studies of potential impacts of climate change to operations of the State Water Project and Central Valley Project, Delta water quality and water levels, flood forecasting and evapotranspiration rates (Anderson et al., 2008).

1.2.2 Climate Projections

The Intergovernmental Panel on Climate Change (IPCC) projections of future climate have been utilized in assessing climate over California. Projections indicate the rate of increase in global mean annual temperature nearly doubles before 2100, and that increases in summer temperatures are greater than winter (IPCC, 2007). There is less confidence in projections of future precipitation than temperature (Reclamation, 2011). However, precipitation projections show less snowfall and more rainfall, less snowpack development and earlier runoff, more intense and heavy rainfall interspersed with longer dry periods (Congressional Budget Office, 2009; Lundquist et al., 2009; Moser et al., 2009; Rauscher et a l2008; Maurer et al.,2007).

1.2.3 Hydrological Projections

The changing climate will likely result in lower stream flow, lower reservoir storage, and decreased water supply deliveries and reliability later in the 21st century throughout California (Vicuna and Dracup, 2007). Drought in the Southwest may no longer be driven by precipitation, but rather by temperature (Hoerling and Eischeid, 2007).

Two hydrologic impacts, in which there is high confidence, are increasing winter streamflow and decreasing late spring and summer flow (Maurer, 2007). There is also high confidence in reduced snowpack at the end of winter, and earlier arrival of the annual peak flow volume, which has important implications for California's water management. The shift to earlier peak streamflow timing, and the decline in end-of-winter snow pack, results in more extreme impacts under higher emissions scenarios in all cases. This indicates that future emissions scenarios play a significant role in the degree of impacts to water resources in California.

The potential effects of climate change on the hydrology and water resources of the Sacramento–San Joaquin River Basin were evaluated by Van Rheenen et al., (2004) using an ensemble of climate projections generated by the U.S. Department of Energy and National Center for Atmospheric Research Parallel Climate Model (DOE/NCAR PCM). From these global simulations, transient monthly temperature and precipitation sequences were statistically downscaled to produce continuous daily hydrologic model forcings, which drove a macro-scale hydrology model (VIC) of the Sacramento–San Joaquin River Basins at a 1/8° spatial resolution, and produced daily streamflow sequences for each climate projection. Each streamflow scenario was used in a water resources system model that simulated current and predicted future performance of the system. Results from the water resources system model indicated that achieving and maintaining status quo system performance in the future would be nearly impossible, given the altered hydrologic projections.

1.2.4 Climate Change Impacts

With respect to management, a number of studies have investigated the implications of climate change on water management in the region, suggesting management of reservoir systems will become more challenging (Vicuna and Dracup, 2007). The impacts are expected to be expensive, but not catastrophic for California (Harou et al., 2010).

Subtle changes in hydrology due to climate change can alter wetlands, resulting in a positive biotic feedback, contributing methane and carbon dioxide to the atmosphere (Burkett and Kusler, 2007). Policy options for minimizing the adverse impacts of climate change on wetland ecosystems include the reduction of current anthropogenic stresses, allowing for inland migration of coastal wetlands as sea-level rises, active management to preserve wetland hydrology, and a wide range of other management and restoration options.

Ficke et al. (2007) summarizes the general effects of climate change on freshwater systems to be increased water temperatures, decreased dissolved oxygen levels, and the increased toxicity of pollutants. Altered hydrologic regimes and increased groundwater temperatures could affect the quality of fish habitat. Eutrophication may be exacerbated and stratification will likely become more pronounced. Model predictions indicate that global climate change will continue even if greenhouse gas emissions decrease or cease. Therefore, proactive management strategies such as removing other stressors from natural systems will be necessary to sustain our freshwater fisheries.

Projected temperature and carbon dioxide increases may extend growing seasons, stimulate weed growth, increase pests, and may impact pollination (Baldocchi and Wong 2006). Stream temperatures in many areas are increasing due to increases in air temperature and reduced summer flows that make streams more sensitive to warmer air temperatures (Haak et al., 2010).

1.3 Identification of Interrelated Activities

1.3.1 Federal – WaterSMART

The WaterSMART Program, established by the Secretary of the Interior under Secretarial Order 3297, addresses an increasing set of water supply challenges, including chronic water supply shortages due to increased population growth, climate variability and change, and heightened competition for finite water supplies. The WaterSMART Program was developed as means of implementing the SECURE Water Act of 2009 (Public Law 111-11). The WaterSMART Program provides the scientific and financial tools and the collaborative environment needed to help balance water supply and demand through the efficient use of current supplies and the development of new supplies. Through WaterSMART, Reclamation is making use of the best available science in the assessments it conducts and the policies it employs. WaterSMART science has

and will continue to inform the real-time decisions of water managers who need reliable estimates of current conditions in the hydrologic cycle and projections of supply and demand in watersheds throughout the nation. Many examples of best available science are being developed through the WaterSMART Program. Much of that science can be accessed through the WaterSMART Clearinghouse, an online collaborative site where best practices and cost-effective technologies for water conservation and sustainable water strategies are shared with the public (http://www.doi.gov/watersmart/html/index.php).

1.3.2 State – Proposition 84 and IRWM

California's Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Prop 84) authorizes $5.388 billion in general obligation bonds to fund safe drinking water, water quality and supply, flood control, waterway and natural resource protection, water pollution and contamination control, state and local park improvements, public access to natural resources, and water conservation efforts.

Integrated Regional Water Management (IRWM) is a collaborative effort to manage all aspects of water resources in a region. IRWM crosses jurisdictional, watershed, and political boundaries; involves multiple agencies, stakeholders, individuals, and groups; and attempts to address the issues and differing perspectives of all the entities involved through mutually beneficial solutions. The California Department of Water Resources is currently working to ensure that IRWM planning is continued and expanded throughout the State; better align state and federal programs, polices, and regulations to support IRWM; identify stable and sufficient funding for IRWM; and further support regional water management groups.

1.3.3 Local – OWOW

The Santa Ana Watershed Project Authority is a planning and implementation agency that was formed in 1972 with the goal of building facilities to protect the water quality of the Watershed. Their planning efforts have expanded and, in 2006, SAWPA's One Water One Watershed (OWOW) plan was adopted. The OWOW plan is a comprehensive view of the watershed and water issues. The plan encompasses all sub-regions, political jurisdictions, water agencies and non-governmental stakeholders (private sector, environmental groups, and the public at large) in the watershed. All types of water (imported, local surface and groundwater, stormwater, and wastewater effluent) are viewed as components of a single water resource, inextricably linked to land use and habitat, and the plan tries to limit impacts of water use and climate change on natural hydrology.

2.0 Climate Projections and Hydrology Models

2.1 Climate Projections

Projected changes in climate (including both anthropogenic changes and natural variability), and their influence on streamflow and basin water supply, have been studied by several researchers in recent years, as described in Chapter 1. Future projections from global climate models (GCMs) indicate that the climate may exhibit trends and increased variability over the 21st century, beyond what has occurred historically. Downscaled GCM projections are one way to consider plausible future conditions.

Downscaled GCM projections are produced by internationally recognized climate modeling centers around the world and make use of greenhouse gas (GHG) emissions scenarios, which include assumptions of projected population growth and economic activity. GCM projections used in this study are spatially downscaled to 12 km grids to make them relevant for regional climate change impacts analysis. This process is illustrated in Figure 2. The downscaled GCM projections used in the Basin Study are based on the Coupled Model Intercomparison Project Phase 3 (CMIP3). These projections were the basis for analysis in the IPCC Fourth Assessment Report (IPCC, 2007).The emission scenarios used in the downscaled GCM projections based on CMIP3 are A2 (high), A1b (medium), and B1 (low), and reflect a range of future GHG emissions. The A2 scenario is representative of high population growth, slow economic development, and slow technological change. It is characterized by a continuously increasing rate of GHG emissions, and features the highest annual emissions rates of any scenario by the end of the 21st Century. The A1B scenario features a global population that peaks mid-century and rapid introduction of new and more efficient technologies balanced across both fossil- and non-fossil intensive energy sources. As a result, GHG emissions in the A1B scenario peak around mid-century. Last, the B1 scenario describes a world with rapid changes in economic structures toward a service and information economy. GHG emission rates in this scenario peak prior to mid-century and are generally the lowest of the scenarios.

Emission scenarios exist that have both higher and lower GHG emissions than those considered in this Basin Study (e.g. A1fi). However, the three scenarios included in the analysis span a wide range of projected GHG, and there are more GCM projections available based on these three emissions scenarios than any others.

This Study used the downscaled CMIP3 climate projections; however, new projections from the CMIP5 were recently published in May 2013. CMIP5 climate projections are based on emission scenarios referred to as representative concentration pathways (RCPs; Taylor, 2011). Even though CMIP5 projections are more current, it has not been determined that they are a more reliable source of climate projections compared to existing CMIP3 climate projections. At this time, CMIP5 projections should be considered an addition to (not a replacement for) the existing CMIP3 projections, unless the climate science community can offer an explanation as to why CMIP5 should be favored over CMIP3.

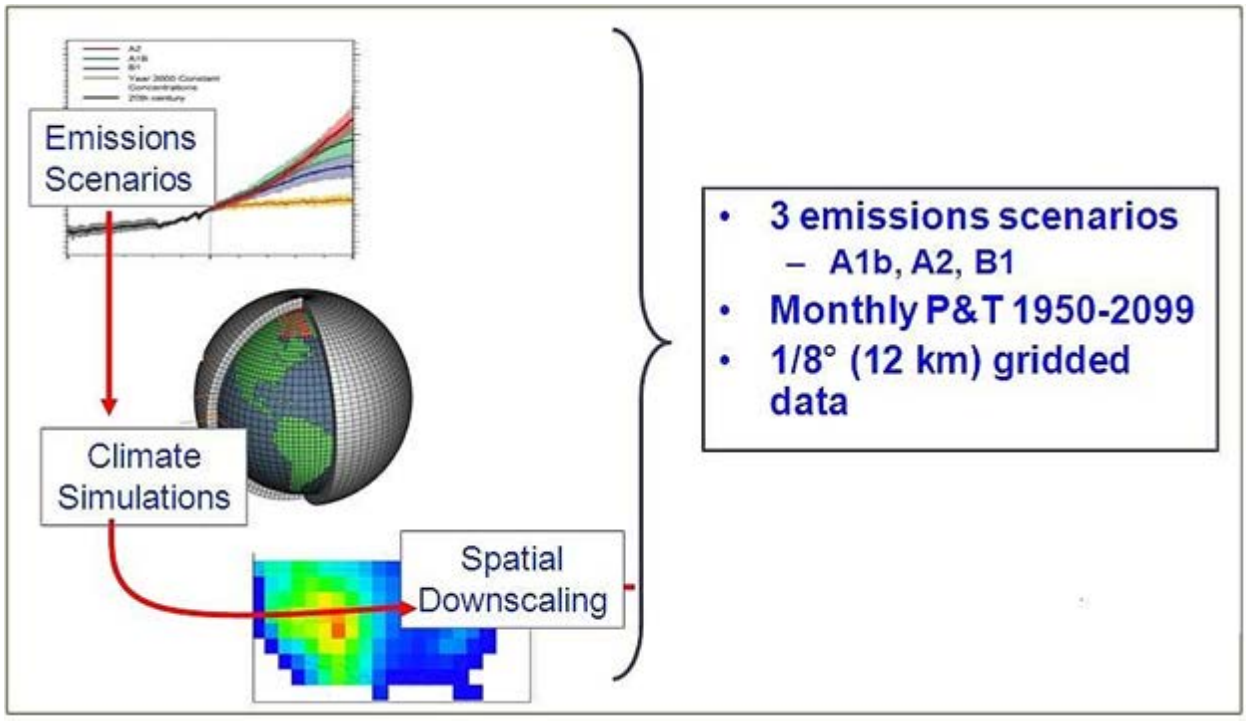


Figure 2: Downscaled GCM key elements figure

2.2 Hydrology Models for the Santa Ana River Watershed

2.2.1 Surface Water

Surface water hydrology projections for the Watershed were developed using the Variable Infiltration Capacity (VIC) model (Liang et al., 1994; Liang et al., 1996; Nijssen et al., 1997) as part of Reclamation's SECURE report on surface water hydrology projections (Reclamation, 2011).

The VIC model is a spatially distributed hydrology model that solves the water balance at each model grid cell. The model initially was designed as a land-surface model to be incorporated in a GCM so that land-surface processes could

be more accurately simulated. However, the model now is run almost exclusively as a stand-alone hydrology model (not integrated with a GCM) and has been widely used in climate change impact and hydrologic variability studies. For climate change impact studies, VIC is run in what is termed the water balance mode that is less computationally demanding than an alternative energy balance mode, in which a surface temperature that closes both the water and energy balances is solved for iteratively. A schematic of the VIC hydrology and energy balance model is given in Figure 3.

The VIC model may be implemented at any spatial resolution, adhering to a latitude-longitude grid. For this Basin Study, and for consistency with Reclamation's West-Wide Climate Risk Assessment, the model was implemented over the study area at 1/8° or ~12 km resolution. Physical characteristics of each cell are predefined within the study area to simulate runoff and other water/land/atmosphere interactions at each grid cell. The VIC hydrology model uses daily weather data (precipitation, maximum temperature, minimum temperature and wind) along with land cover, soils, and elevation information at 1/8° grid scale to simulate hydrologic processes.

VIC provides a wide array of hydrologic outputs, typically including runoff, snow-water equivalent and evapotranspiration, which are routinely analyzed to assess climate change impacts on watershed hydrology. Also, note that all these outputs are produced at the native VIC grid cell resolution of 1/8° or ~12 km. Analysis of these hydrologic variables for the watershed is described in Chapter 3.

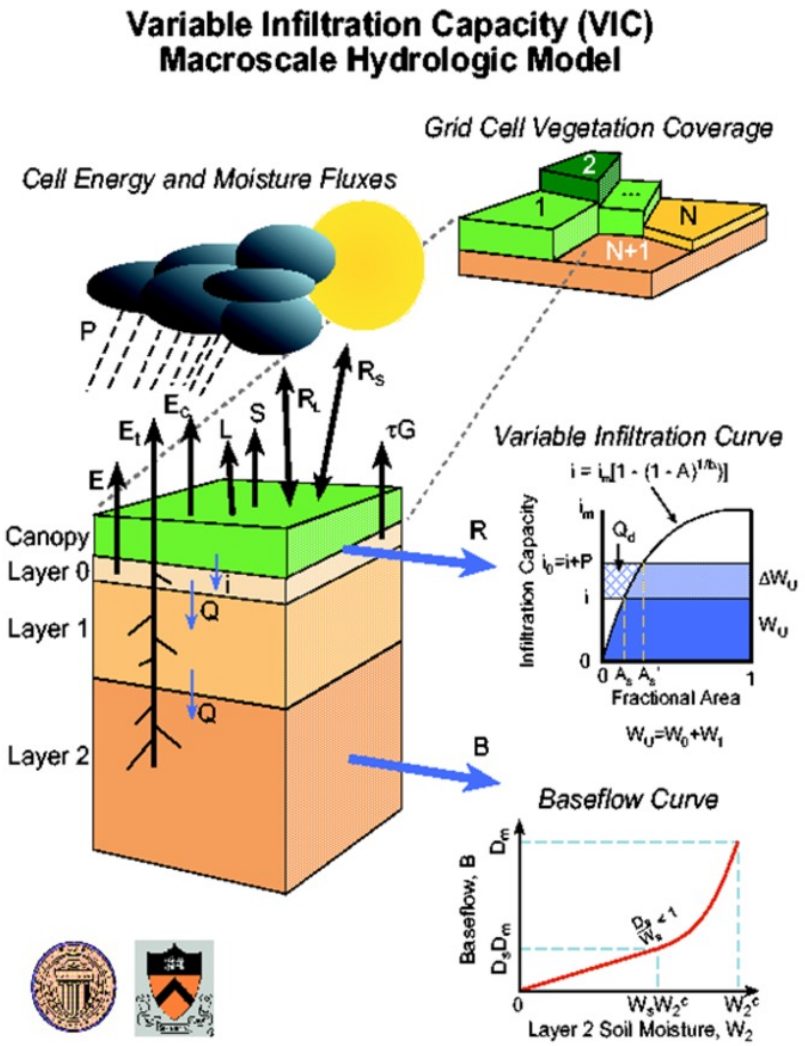


Figure 3: VIC macroscale hydrologic model

However, to analyze streamflow, gridded runoff was routed (Figure 4) to 36 gage locations (Table 1; Figure 5) within the Watershed using the Lohmann et al., (1998) routing model. Additional inputs to the routing model, developed for this Basin Study include, a routing network derived from 15 arc-second (~450 meters) Digital Elevation Model (DEM), flow accumulation, and flow direction data available from the United States Geological Survey (USGS) HydroSHEDS (hydrological data and maps based on Shuttle Elevation Derivatives at Multiple Scales) archive using ArcGIS™. The result of this approach is 112 unique sequences of natural flow under future climate projections. Further details on the development and choice of using the VIC model are available from Reclamation's West-Wide Climate Risk Assessments: Bias-Corrected and Spatially Downscaled Surface Water Projections (2011) report.

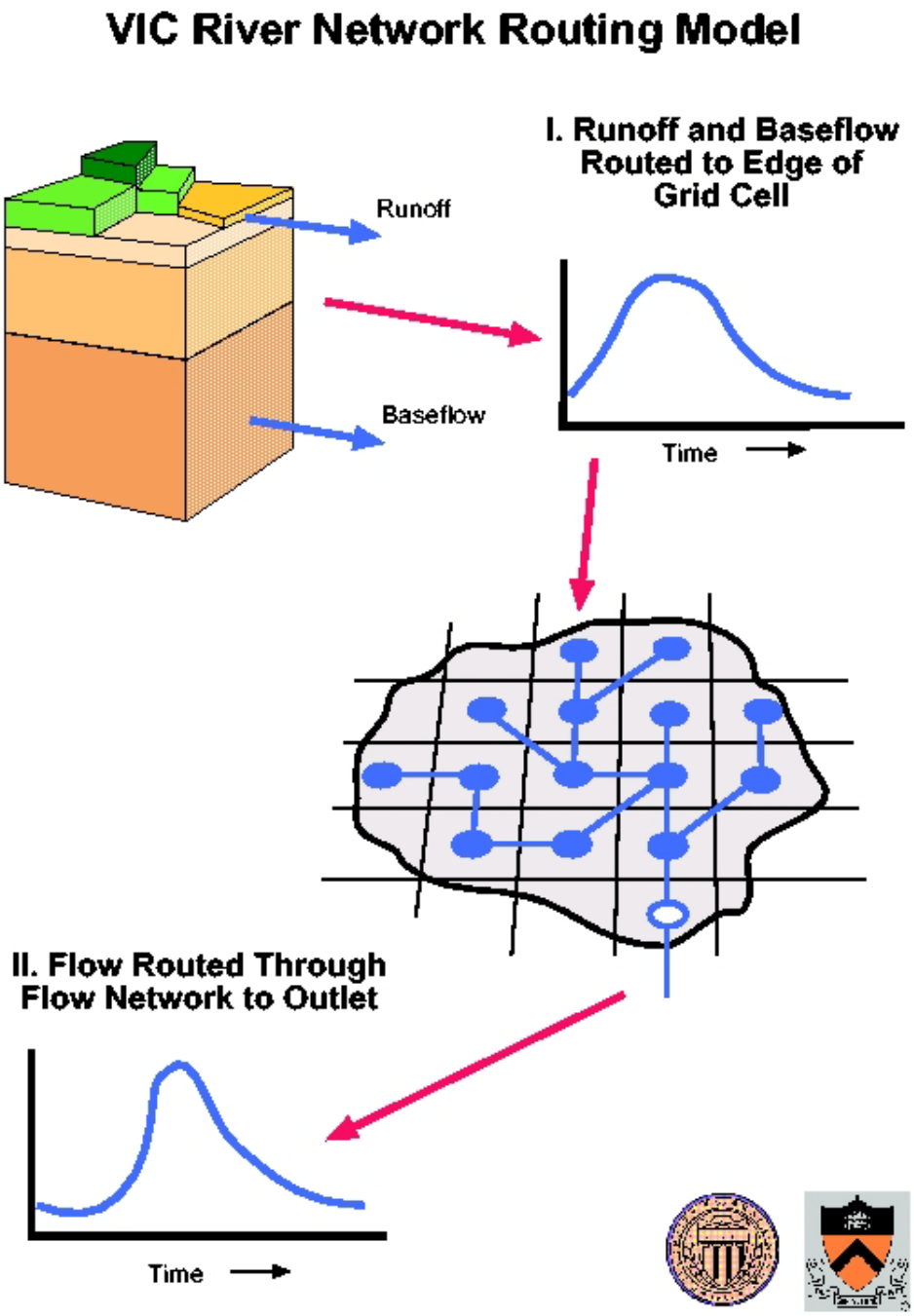


Figure 4: VIC routing model

Table 1: Routing locations in the Santa Ana River Watershed

ID	Latitude (decimal degree)	Longitude (decimal degree)	Site Description
1	33.675020160	-117.835611000	Peters Canyon Wash Tustin Gage
2	33.683909460	-117.745330710	Marshburn Channel Gage
3	33.681686820	-117.809499150	San Diego Creek Myford Rd Gage
4	33.725442191	-117.802408768	El Modina-Irvine Channel Gage
5	33.693809460	-117.823037908	Peters Canyon Wash Irvine Gage
6	33.672798000	-117.835888800	San Diego Creek Lane Rd Gage
7	33.655576290	-117.845611300	San Diego Creek Campus Dr Gage
8	33.885294816	-117.651816486	Santa Ana River Prado Dam Gage
9	33.872738742	-117.670852174	Santa Ana River County Line Gage
10	33.856404490	-117.790611220	Santa Ana River Imperial Highway Gage
11	33.855848910	-117.797555880	Santa Ana River AB SPRD Imperial Highway Gage
12	33.856404440	-117.800889300	Santa Ana River SPRD Imperial Highway Gage
13	33.888903530	-117.845335820	Carbon Creek Olinda Gage
14	33.889459080	-117.845335830	Carbon Creek Yorba Linda Gage
15	33.818812586	-117.873013779	Santa Ana River Ball Rd Gage
16	33.802238450	-117.878390750	Santa Ana River Katella Ave Gage
17	33.822794190	-117.776721310	Santiago Creek Villa Park Gage
18	33.822794190	-117.776721310	Santiago Creek Div Villa Park Gage
19	33.777261477	-117.878057039	Santiago Creek Santa Ana Gage
20	33.752045602	-117.906379262	Santa Ana River Santa Ana Gage
21	33.672033347	-117.943733939	Santa Ana River Adams St Gage
22	33.887792060	-117.926449600	Brea Channel Brea Dam Gage
23	33.873625670	-117.925893710	Brea Channel Fullerton Gage
24	33.895847650	-117.886170600	Fullteron Channel Fullerton Dam Gage
25	33.872875108	-117.902127395	Fullerton Channel Fullerton Gage
26	33.860696271	-117.929366516	Fullerton Channel Richman Ave Gage
27	33.810571570	-118.075342080	Coyote Creek Los Alamitos Gage
28	34.259256110	-117.330684440	Devils Canyon
29	33.968611110	-117.447500000	Santa Ana River AT Metropolitan Water District Crossing NR Arlington
30	34.064688346	-117.303911477	Santa Ana River AT E Street NR San Bernardino
31	33.889166670	-117.561944440	Temescal Creek AB Main Street AT Corona
32	33.982777780	-117.598611110	Cucamonga Creek NR Mira Loma
33	34.003888890	-117.726111110	Chino Creek AT Schaefer Avenue NR Chino
34	34.114206940	-117.096661940	Seven Oaks Dam Outlet
35	34.252500000	-117.525277780	Middle Fork Lytle Creek Gage
36	34.263888890	-117.401388890	Ridge Top Gage NR Devore

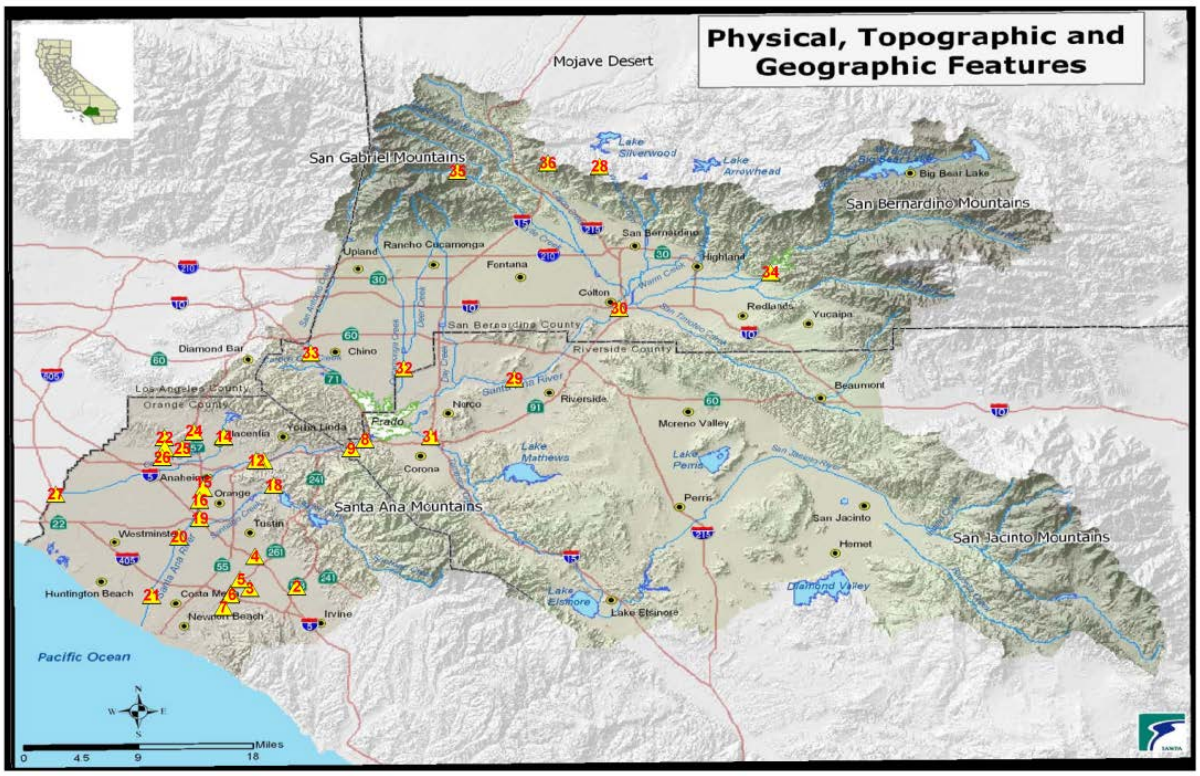


Figure 5: Distribution of routing locations

2.2.2 Groundwater

Changes in climate, population, land use, water management practices, and other natural and anthropogenic factors may affect the quantity and quality of future groundwater resources within the Watershed. Groundwater currently provides approximately 54% of total water supply in the watershed during an average year, and groundwater use is projected to increase over the next 20 years, according to the first OWOW plan (2010). The potential effects of natural and anthropogenic changes on future groundwater resources—including the potential effects of climate change—are therefore a critical component of water resources planning in the Watershed.

Changes in precipitation and temperature directly affect hydrologic processes at the land surface, including groundwater recharge. Changes in precipitation and temperature may also affect groundwater storage and discharge indirectly through changes in water demands. Accurately projecting the potential effects of climate change on groundwater resources within the Watershed, however, is a significant challenge due to the many local factors that govern groundwater recharge and use throughout the watershed. The Watershed encompasses 17 individual groundwater basins and sub-basins; however, only 4 have consistent historical data available, as shown in Figure 6 (California Department of Water Resources [DWR] Bulletin 118). Effects of changes in precipitation and temperature on

groundwater resources are likely to vary substantially between groundwater basins due to differences in local hydrologic, geologic, and topographic conditions, as well as differences in local water supplies, water demands, and water management practices between basins.

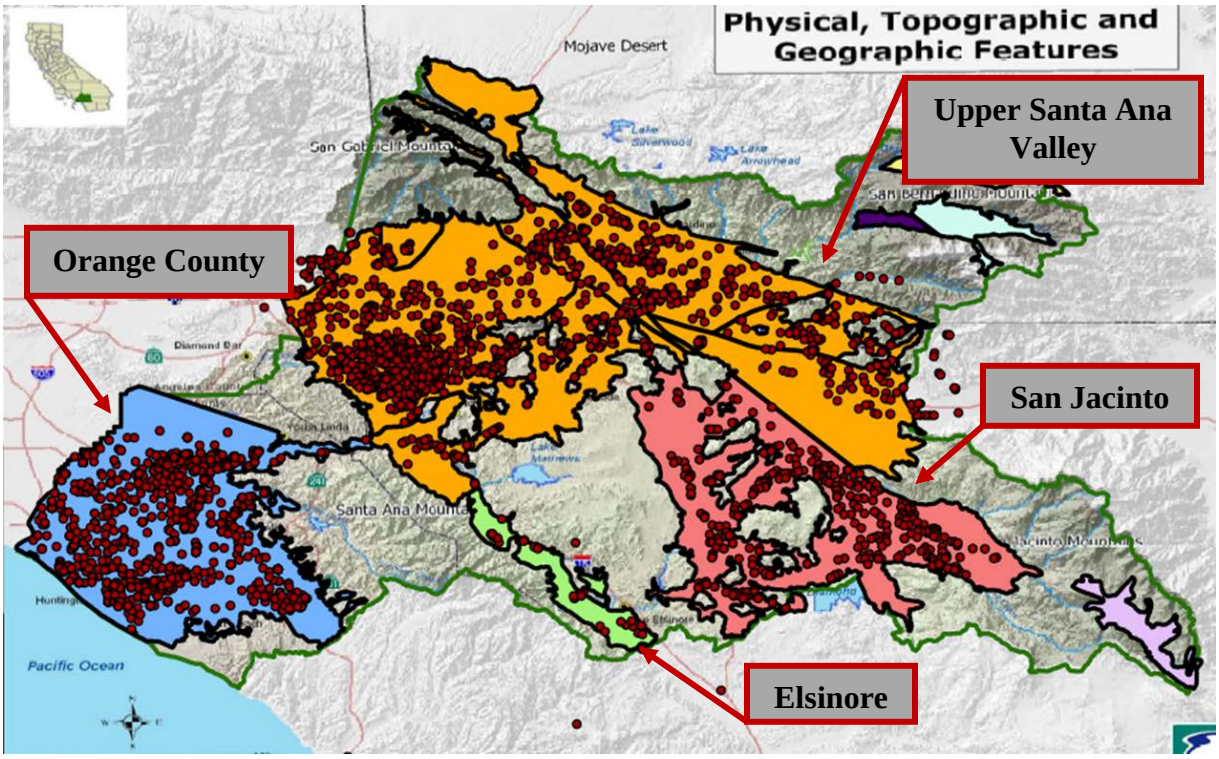


Figure 6: Groundwater basins and monitoring well locations (illustrated by red dots)

The effects of climate change on groundwater resources are commonly evaluated using a spatially distributed numerical model of the groundwater flow system in question, which may consist of a single aquifer or unit, multiple aquifers, or an entire groundwater basin or sub-basin. A numerical model of the groundwater flow system is constructed to represent the relevant physical properties of the system, including its geographic extent and orientation, the porosity and permeability of subsurface materials, and the location and extent of key features affecting groundwater flow such as faults, aquitards, and aquicludes. Historical inflows and outflows from the groundwater system are estimated from available data and formatted as model inputs, including spatially distributed recharge from precipitation, focused recharge from stream and canal seepage losses or deep percolation of irrigation water, groundwater abstraction by pumping, and other inflows and outflows. The model is then calibrated and verified with respect to available observations. A second set of groundwater inflows and outflows is then developed based on projected future climate conditions, and is again formatted as model inputs. Finally, the model is used to simulate groundwater flow and storage under historical and projected climate conditions and the resulting model

outputs are compared to evaluate the effects of climate change on groundwater resources.

The use of spatially-distributed numerical models to evaluate climate change impacts on groundwater is both data intensive and computationally intensive, and requires explicit representation of the many local factors that affect groundwater recharge and use. As a result, this approach generally bears a large cost and long timeline. Moreover, the use of spatially-distributed numerical models to evaluate climate change impacts on groundwater resources in the Watershed would require development of separate models for individual groundwater basins and sub-basins. The cost of such an analysis is therefore prohibitive at the watershed scale.

In order to evaluate basin-scale groundwater conditions in the Watershed under future climate, population, land use, and water management scenarios, a basin-scale groundwater screening tool was developed based on a simplified representation of individual groundwater basins. The groundwater screening tool estimates fluctuations in basin-scale groundwater levels in response to natural and anthropogenic drivers, including climate and hydrologic conditions, agricultural land use, municipal water demand, and trans-basin water imports. The tool allows users to quickly estimate basin-scale groundwater conditions under a broad range of future scenarios and provides insight into the primary factors driving basin-scale groundwater fluctuations.

A basin-scale groundwater screening tool was developed to facilitate evaluation of groundwater conditions within the Watershed under future climate, population, land use, and water management scenarios. The tool estimates fluctuations in average groundwater levels over a given groundwater basin, at a monthly time scale, in response to natural and anthropogenic drivers, including climate and hydrologic conditions, agricultural land use, municipal water demand, and trans-basin water imports. The tool allows users to quickly estimate changes in basin-average groundwater levels in response to projected changes in future climate, and provides insight into the primary factors driving basin-scale groundwater fluctuations.

In groundwater basins where groundwater is a primary source of water supply, fluctuations in basin-averaged groundwater level depend on both water availability and water demands. In general, higher than average water availability from precipitation, local streamflow, and imported water contributes to increased recharge and/or decreased groundwater pumping, resulting in rising groundwater levels. By contrast, higher than average water demands for municipal and agricultural uses and higher than average evaporative demand from native and landscaped vegetation contribute to decreased recharge and/or increased groundwater pumping, resulting in declining groundwater levels. In addition to supply and demand, large-scale management objectives in some groundwater basins such as pressurization of hydraulic barriers against sea water intrusion and

dewatering for hydraulic control of groundwater discharge may also affect basin-average groundwater levels.

The competing influences of water availability, water demand, and large-scale groundwater management objectives on basin-scale groundwater elevations are illustrated schematically in Figure 7, which forms the conceptual model for the basin-scale groundwater screening tool. This conceptual model considers fluctuations in basin-average groundwater elevations as a function of basin-scale drivers. As a result, use of the groundwater screening tool does not require detailed information regarding local hydrologic, geologic, climatic, and anthropogenic factors that may affect local groundwater fluctuations; however, it should be noted that as a result of this basin-scale approach, the groundwater screening tool is primarily applicable at the scale of individual groundwater basins or sub-basins, where the effects of local-scale conditions are largely averaged out and where subsurface inflows and outflows from surrounding areas are negligible.

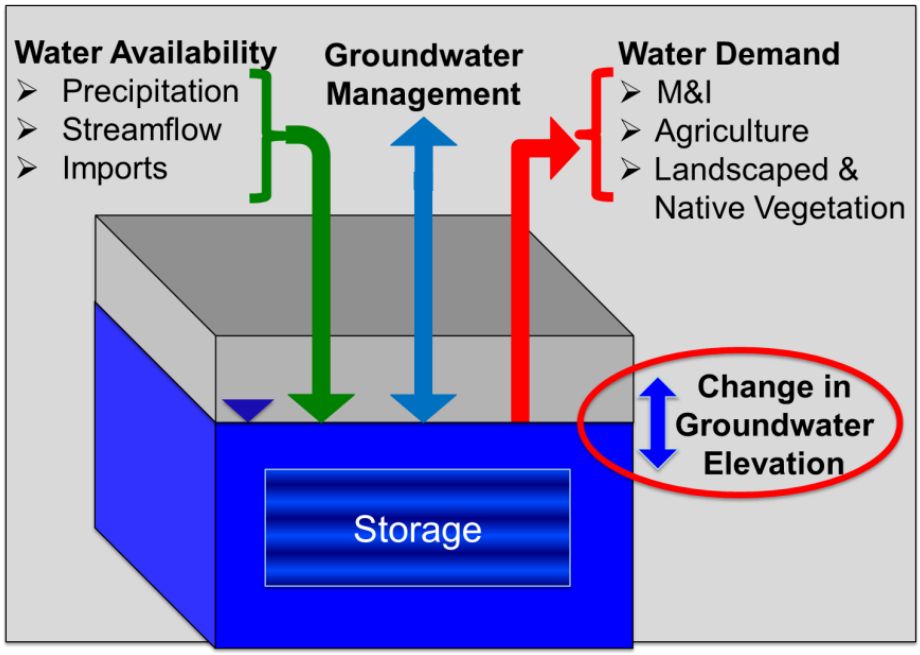


Figure 7: Conceptual model of basin-scale groundwater fluctuations used in developing the groundwater screening tool

In the basin-scale groundwater screening tool, fluctuations in groundwater elevation are estimated as a function of three inputs that characterize water availability (precipitation, local streamflow, and trans-basin imports), three inputs that characterize water demand (municipal and industrial demand, agricultural land use [irrigated acreage], and evaporative demand), and an optional exogenous input that represents groundwater management objectives that affect basin-scale groundwater levels. The functional relationship is implemented in the form of a multi-variate linear regression equation (Equation 1):

$$\frac{\Delta h}{\Delta t} = (C_1 \cdot P_t) + (C_2 \cdot E_t) + (C_3 \cdot Q_t) + (C_4 \cdot M_t) + (C_5 \cdot A_t) + (C_6 \cdot I_t) + (C_7 \cdot X_t) \quad \text{..... Eq. 1}$$

Where:

$\frac{\Delta h}{\Delta t}$ is the change in basin-averaged groundwater elevation (t is in months)

P_t is total precipitation over the groundwater basin

Q_t is streamflow at a representative location that reflects surface water availability in the basin

I_t is the volume of trans-basin water imports to the groundwater basin

M_t is municipal and industrial demand within the basin

E_t is evaporative demand from native and landscaped (non-agricultural) vegetation

A_t is agricultural water demand (applied water demand)

X_t is a timeseries of values representing the effect of a specific large-scale water management practice on groundwater levels within the basin

C_i are linear regression coefficients

Variables P_t, Q_t, and I_t represent the available water supplies within the groundwater basin during the given time period, whereas variables M_t, E_t, and A_t represent the primary water demands within the basin during the same period. Variable X_t is optional and can be used to reflect specific large-scale management activities that affect groundwater levels throughout the basin. Coefficients C_i are determined via linear regression (i.e., by fitting Equation 1 to historical observations). After the coefficient values have been determined, the groundwater screening tool uses Equation 1 to estimate future groundwater elevations under various future scenarios. For example, the tool can be used to estimate future groundwater elevations under climate change by modifying inputs P_t, Q_t, and E_t to reflect projected future climate conditions.

In addition to reduced data and computational requirements, implementation of the basin-scale conceptual model via linear regression provides broad flexibility in the development of inputs to the groundwater screening tool. The conceptual model represents the large-scale mass balance of groundwater in a given basin. However, accurate and comprehensive data for many of the inflow and outflow terms in the conceptual model are often unavailable for most groundwater basins.

For example, evaporative demand for native and landscaped vegetation generally is not readily available for most groundwater basins. The regression-based approach used here allows the user to substitute a related variable in place of the missing data. In the case of evaporative demand, the user may substitute temperature data for evaporative demand as temperature is strongly correlated with evaporative demand. As long as fluctuations in the substituted dataset (in this case temperature) are strongly correlated with fluctuations in the primary input variable (in this case evaporative demand), discrepancies in magnitudes of two variables are accounted for by the regression coefficient on this term.

Development of Groundwater Model Inputs

As detailed above, the groundwater screening tool estimates changes in basin-averaged groundwater levels over time as a function of seven natural and anthropogenic factors that govern groundwater recharge and discharge: precipitation, local streamflow, trans-basin water imports, municipal and industrial water demands, agricultural water demand, evaporative demand from native and landscaped vegetation (non-agricultural), and an optional exogenous input that represents groundwater management objectives that affect basin-scale groundwater levels. The regression-based approach used in the groundwater screening tool allows substitution of related datasets where accurate data for one or more model input is not available. This section summarizes the development of inputs to the groundwater screening tool for groundwater basins within the Watershed.

Historical Input Data (1990-2009)

Historical data were used to fit the regression coefficients in Equation 1 and to evaluate model performance over the historical period (1990-2009). For each groundwater basin, historical inputs are required for the six primary input variables to Equation 1. Additional inputs may be provided for the optional exogenous variable if desired. No exogenous inputs were developed for groundwater basins within the Watershed; however, exogenous inputs may be incorporated by water resources planners and decision makers in the watershed based on knowledge of management operations relevant to individual groundwater basins.

Groundwater Elevation (h_t)

The groundwater screening tool requires an input timeseries representative of historical monthly groundwater elevations within the basin for the period 1990-2009. For this study, a database of historical groundwater elevations from more than 4,000 monitoring wells within the Watershed was obtained from SAWPA. Monitoring well locations are shown in Figure 6. Well records were evaluated to determine the period of record, completeness of record, and occurrence of outlier or spurious values. Wells exhibiting records shorter than 10 consecutive years or exhibiting a high frequency of missing values were excluded from this analysis. For each well identified as having a sufficient period of record and sufficient sampling frequency, monthly mean groundwater elevations were calculated from the available instantaneous measurements. For months containing more than one

measurement, the monthly average was computed as the unweighted arithmetic average of the available measurements. For months with a single measurement, the single measurement was assumed to reflect average conditions during that month. It should be noted that individual outlier points were excluded from averaging; outliers likely reflect measurement errors, data transcription errors, or measurements taken during or after permeability testing was carried out (i.e., during or after a slug test or pump test). Lastly, monthly averages were linearly interpolated to develop a complete timeseries of monthly mean groundwater elevations over the period of record. Accuracy of monthly timeseries was evaluated by sub-sampling and cross-validation. Interpolated monthly timeseries were shown to accurately reflect raw measurements.

Monthly timeseries of basin-averaged groundwater elevations were then developed for each of the individual groundwater basins and sub-basins (defined by DWR) in the Watershed. Steps were required to avoid two sources of bias in calculating basin-average groundwater elevations: variations in the period of record between wells, and outlier wells that are not representative of large-scale groundwater fluctuations within a basin. These steps are described below.

Very few wells in the database used here exhibit complete monthly timeseries for the full historical period (1990-2009). As a result, simply taking the arithmetic average of well records over each groundwater basin results in a biased estimate of basin-average groundwater elevations. This bias occurs due to differences in the period of record of wells within a given basin: if the basin average for different months is based on a different sub-set of wells, and each well has a different mean groundwater elevation, then the resulting average reflects variations in the sub-set of well used. To minimize biases associated with varying record lengths, averaging was carried out based on monthly deviations rather than monthly groundwater elevations. This was done by computing monthly deviations (anomalies) for each record (i.e. for each well), where monthly deviations are calculated as the difference between the monthly mean value and the long-term average value for that month.

In addition to differences in record length, potential biases may occur in cases where individual well records reflect unique local conditions that are not broadly representative of groundwater fluctuations within the basin. This situation might occur when groundwater pumping throughout a basin is not driven primarily by municipal and industrial demand, but is driven by agricultural demand in one small area of the basin. Groundwater fluctuations in the agricultural portion of the basin are likely to exhibit substantially different behavior than groundwater fluctuations throughout the rest of the basin. In basins where a large number of monitoring wells are available, individual outliers have little effect on the basin-scale average and therefore do not need to be excluded from analysis. Where a small number of samples are available, however, individual outliers can disproportionately impact the basin average, resulting in potentially significant bias.

For this study, a correlation-based clustering procedure was developed to group wells into sub-sets exhibiting similar behavior. In basins and sub-basins where a large number of monitoring records were available, the majority of wells fell into a single cluster. For the purposes of this analysis, the largest cluster was assumed to reflect basin-average conditions, and basin-average groundwater elevations were calculated based on wells in this cluster. In basins and sub-basins where, only a small number of records were available, wells generally fell into a small number of similar size clusters. For the purposes of this analysis, these clusters were assumed to represent conditions in different portions of the basin where groundwater fluctuations were subject to different primary stressors. In these cases, averages were computed for each cluster and were evaluated separately. This report only presents results for basins where the majority of groundwater records fell into a single cluster.

Precipitation (P_t)

The groundwater screening tool requires an input timeseries that is representative of historical monthly precipitation over the groundwater basin for the period 1990-2009. Precipitation input may be basin-averaged monthly precipitation calculated from multiple gage records or from a gridded precipitation dataset. Alternatively, precipitation input may be derived from gage data at a single location or selected locations that represent key areas within the groundwater basin, such as areas of significant recharge or runoff. For this study, basin-average monthly precipitation was calculated for each groundwater basin based on the historical gridded daily precipitation dataset developed by Maurer et al. (2002), the same dataset used to derive the surface water projections. Area-weighted monthly total precipitation was computed for each basin based on groundwater basin polygons developed by DWR.

Evaporative Demand (E_t)

The groundwater screening tool requires an input timeseries that is representative of historical monthly evaporative demand from native and landscaped (non-agricultural) vegetation over the groundwater basin for the period 1990-2009. Because evaporative demand is generally not measured directly, monthly mean temperature or calculated monthly potential evapotranspiration (PET) may be used as surrogates for evaporative demand. For this study, basin-average monthly-mean temperature was calculated for each groundwater basin based on the historical gridded daily temperature dataset developed by Maurer et al. (2002), the same dataset used to derive the surface water hydrology projections. Area-weighted monthly-mean temperature was computed for each basin based on groundwater basin polygons developed by DWR.

Streamflow (Q_t)

The groundwater screening tool requires an input timeseries that is representative of historical monthly streamflow that contributed to water supply in the groundwater basin for the period 1990-2009. This streamflow excludes that

which is provided by trans-basin imported water. Locations selected for the streamflow inputs for the four basins can be seen in Figure 8; the latitude and longitude for each point can be found in Table 2. Locations were chosen to be representative of streamflow in the basin. The San Jacinto and Elsinore Basins are able to share a stream flow point because the point is representative of water leaving the San Jacinto Basin and water entering the Elsinore Basin. Streamflow input may be based on a single gage that is representative of natural streamflow conditions within the basin, or may be estimated natural flow in the absence of storage and trans-basin diversions (i.e., naturalized streamflow). For this study, simulated historical natural flow at a representative point was used for each basin, development of which is described in section 2.2.1.

Table 2: Streamflow locations for groundwater basins

Groundwater Basin	Latitude (decimal degree)	Longitude (decimal degree)
Orange County	33.85640444	-117.80088930
Upper Santa Ana Valley	33.88916667	-117.56194444
Elsinore/San Jacinto	33.66411200	-117.29397600

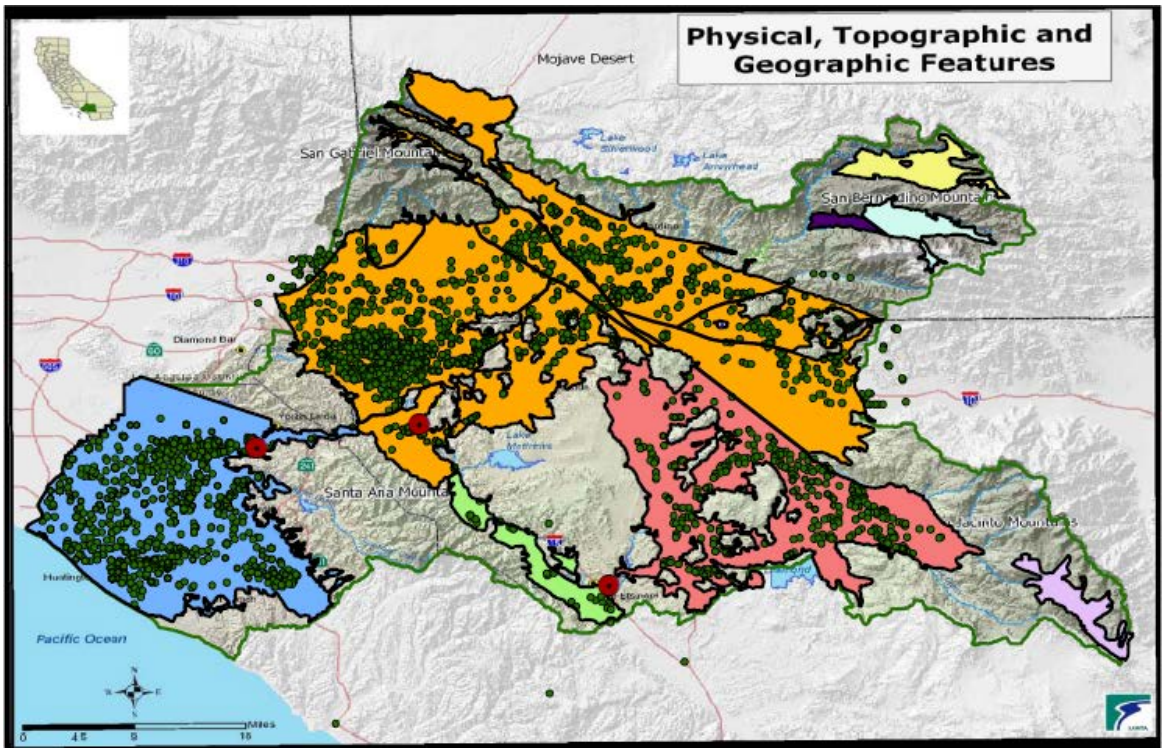


Figure 8: Locations for streamflow inputs (represented by red dots)

Municipal and Industrial Demand (M_t)

The groundwater screening tool requires an input timeseries that is representative of historical monthly municipal and industrial water demand within the groundwater basin for the period 1990-2009. Where municipal and industrial demand data are not directly available, demand may be estimated from available population and per capita water use data, interpolated as needed to obtain monthly data for the period 1990-2009. For this study, population within each groundwater basin was calculated from census tract data for years 1990, 2000, and 2010, and were interpolated to obtain monthly values. Data for annual per capita water use were obtained from urban water management plans for SAWPA member agencies and other water providers within each basin, and were similarly interpolated to obtain monthly values. Municipal and industrial demand was then estimated as the product of population and per capita use.

Agricultural Demand (A_t)

The groundwater screening tool requires an input timeseries that is representative of historical monthly agricultural water demand within the groundwater basin for the period 1990-2009. Accurate and consistent data on agricultural water use is not available for the groundwater basins within the Watershed. For this study, agricultural land area (irrigated acreage) was used as a surrogate for agricultural demand. For each groundwater basin, irrigated acreage was calculated from available land use datasets developed by the Southern California Association of Governments (SCAG). Available values were interpolated to obtain estimates of monthly values over the period 1990-2009. Where cropping patterns and irrigation practices are reasonably constant, agricultural acreage is strongly correlated with agricultural demand.

Trans-basin Imported Water (I_t)

The groundwater screening tool requires an input timeseries that is representative of historical monthly trans-basin water imported into the groundwater basin for the period 1990-2009. For this study, import data were obtained from SAWPA member agencies and associated, to the extent possible, with the corresponding groundwater basin. Initial analysis revealed that trans-basin imports are generally small compared to precipitation and natural streamflow for most groundwater basins in the watershed; as a result, uncertainties associated with the historical trans-basin import data used in this analysis is considered negligible.

Exogenous Variable (X_t)

The simplified approach used by the groundwater screening tool does not represent many of the complex and dynamic processes that may affect groundwater fluctuations within a given basin. For this purpose, the tool allows for an optional exogenous input, which provides the user an opportunity to account for a key driver that is not explicitly represented by the above inputs. Key drivers may include groundwater injection operations for a hydraulic barrier against sea water intrusion, dewatering for hydraulic control of groundwater

discharge, or other management objectives that affect groundwater levels. No exogenous variable was used in this study.

Projected (Future) Input Data (2010-2099)

The groundwater screening tool estimates future groundwater elevations over the period 2010-2099 based on input data reflecting projected water supply, water demand, and water management conditions over this period. Future inputs are required for each of the primary input variables to the screening tool. If an exogenous variable is used for the historical period, projected values of the same exogenous variable are required for the future period. As noted above, no exogenous inputs were developed for groundwater basins within the Watershed. It should also be noted that projected groundwater elevations are calculated by the screening tool; groundwater elevation is not an input for the future period.

Precipitation (P_t)

The groundwater screening tool allows users to provide up to 250 projections of future precipitation for a given basin. Consideration of multiple future projections provides insight into the range of future conditions corresponding to uncertainties in projected future climate. For this study, projected basin-average monthly precipitation for the period 2010-2099 was calculated based on an ensemble of 112 bias corrected and spatially disaggregated climate projections (see Section 2.2.1). For each projection, input timeseries were developed by calculating the area-weighted monthly total precipitation for groundwater basin polygons developed by DWR.

Evaporative Demand (E_t)

Similar to precipitation, the groundwater screening tool allows users to provide up to 250 projections of future evaporative demand for a given basin. For consistency with historical inputs, basin-average monthly-mean temperature was used to represent monthly evaporative demand over the future period. Projected basin-average monthly average temperature inputs were calculated for each groundwater basin based on an ensemble of 112 BCSD climate projections (see Section 2.2.1). For each projection, input timeseries were developed by calculating the area-weighted monthly average temperature for groundwater basin polygons developed by DWR.

Streamflow (Q_t)

Similar to precipitation and temperature, the groundwater screening tool allows users to provide up to 250 projections of streamflow for a given basin. For this study, projected natural flow at a representative point for the period 2010-2099 was used for each basin (see Section 2.2.1).

Municipal and Industrial Demand (M_t)

The groundwater screening tool requires a single timeseries input representing projected municipal and industrial demand for the future period. For the purposes of this study, it was assumed that future municipal and industrial demand will

remain at current levels. However, the tool allows water resources planners and decision makers to input alternative projections of future municipal and industrial demand based on various scenarios and planning objectives related to individual groundwater basins.

Agricultural Demand (A_t)

The groundwater screening tool requires a single timeseries input representing projected agricultural demand for the future period. For consistency with historical inputs, agricultural land area (irrigated acreage) was used to represent agricultural water demand in the future. For the purposes of this study, it was assumed that future agricultural land area will remain at current levels. However, the tool allows water resources planners and decision makers to input alternative projections of future agricultural demand based on various scenarios and planning objectives related to individual groundwater basins.

Trans-basin Imported Water (I_t)

The groundwater screening tool requires a single timeseries input representing projected trans-basin imported water for the future period. For the purposes of this study, it was assumed that future water imports will remain at the average historical level, calculated as the average over the period 1990-2009. However, the tool allows water resources planners and decision makers to input alternative projections of future water imports based on various scenarios and planning objectives related to individual groundwater basins.

Exogenous Variable (X_t)

As for the historical period, no exogenous variable was used in this study for the future period.

The methods described in this chapter were used to project hydroclimate conditions including surface water and groundwater supplies, which are presented in Chapter 3 along with projected demand.

3.0 Water Supply and Demand Projections

3.1 Water Supply

Future water supply projections were made using the CMIP3 projections and the VIC hydrology model. The CMIP3 archive provides a downscaled 12 kilometer resolution grid on a monthly time-series of precipitation and temperature from 1950-2099 for 112 climate projections.

3.1.1 Hydroclimate Projections

Timeseries Plots

This set includes projection specific annual timeseries plots for six hydroclimate indicator variables covering the period 1950–2099 (water years 1951-2099). The six variables are:

- Annual Total Precipitation
- Annual Mean Temperature
- April 1st Snow Water Equivalent
- Annual Runoff
- December–March Runoff
- April–July Runoff

The three variables—annual total precipitation, annual mean temperature, and April 1st SWE—vary spatially (at 1/8° or ~ 12-km-grid resolution) across the basins. To estimate total annual precipitation for the basin, basin-wide average precipitation (average across the grid cells in the basin) was first calculated for each month of the years 1950–2099. These basin average monthly precipitation values then were summed for each water year 1951-2099 to obtain the annual total precipitation.

To estimate basin mean temperature, average monthly temperature was calculated from all the grid cells in the basin for each month of the water years 1951–2099. These monthly temperatures for any given year next were averaged across the grid cells in the basin to estimate the basin-wide annual mean temperature.

SWE on April 1st of a given year is a widely used measure to assess snowpack and subsequent spring–summer runoff conditions in the snowmelt dominated basins of the western United States. SWE is one possible output from the VIC hydrology model. For each of the simulation water years, April 1st SWE was

saved from the simulations for each model grid cell in the basin. Gridded SWE on April 1st was averaged over all the grid cells for the given basin to calculate the basin-wide April 1st SWE for water years, 1950–2099.

Runoff for each of the 36 site locations (Table 1) was calculated for the annual timescale and for two seasonal timescales December–March (DJFM) total runoff depicting winter season runoff conditions and April–July (AMJJ) total runoff depicting spring–summer runoff conditions. For each of the simulation years 1950–2099, monthly runoff was aggregated on a water year basis to calculate water year specific total annual runoff, DJFM runoff, and AMJJ runoff.

The annual time series plots for the six hydrologic indicator variables for all 112 projections were calculated, and the results are presented to reflect ensemble central tendency and ensemble spread. The central tendency is measured using the ensemble median. The 5th and 95th percentiles from the 112 projections provide the lower and upper uncertainty bounds in the envelope of projections through time.

Figure 9 shows the projection ensemble for six hydroclimate indicators for the site Santa Ana River at Adams Street Gage (most downstream location): annual total precipitation (top left), annual mean temperature (top right), April 1st SWE (middle left), annual runoff (middle right), DJFM runoff season (bottom left), and AMJJ runoff season (bottom right). The heavy black line is the annual time series of 50th percentile values (i.e., ensemble-median). The shaded area is the annual time series of 5th to 95th percentiles.

The annual total precipitation over the basin shows a somewhat declining trend over the transient period going out to 2099. The uncertainty envelope does not appear to expand or contract over time. The mean annual temperature over the basin shows a monotonically increasing trend and a diverging uncertainty envelope over time. April 1st SWE also shows a decreasing trend. The annual runoff follows the long-term declining trend pattern similar to precipitation. The winter season DJFM runoff shows a declining trend, so does the AMJJ summer season runoff.

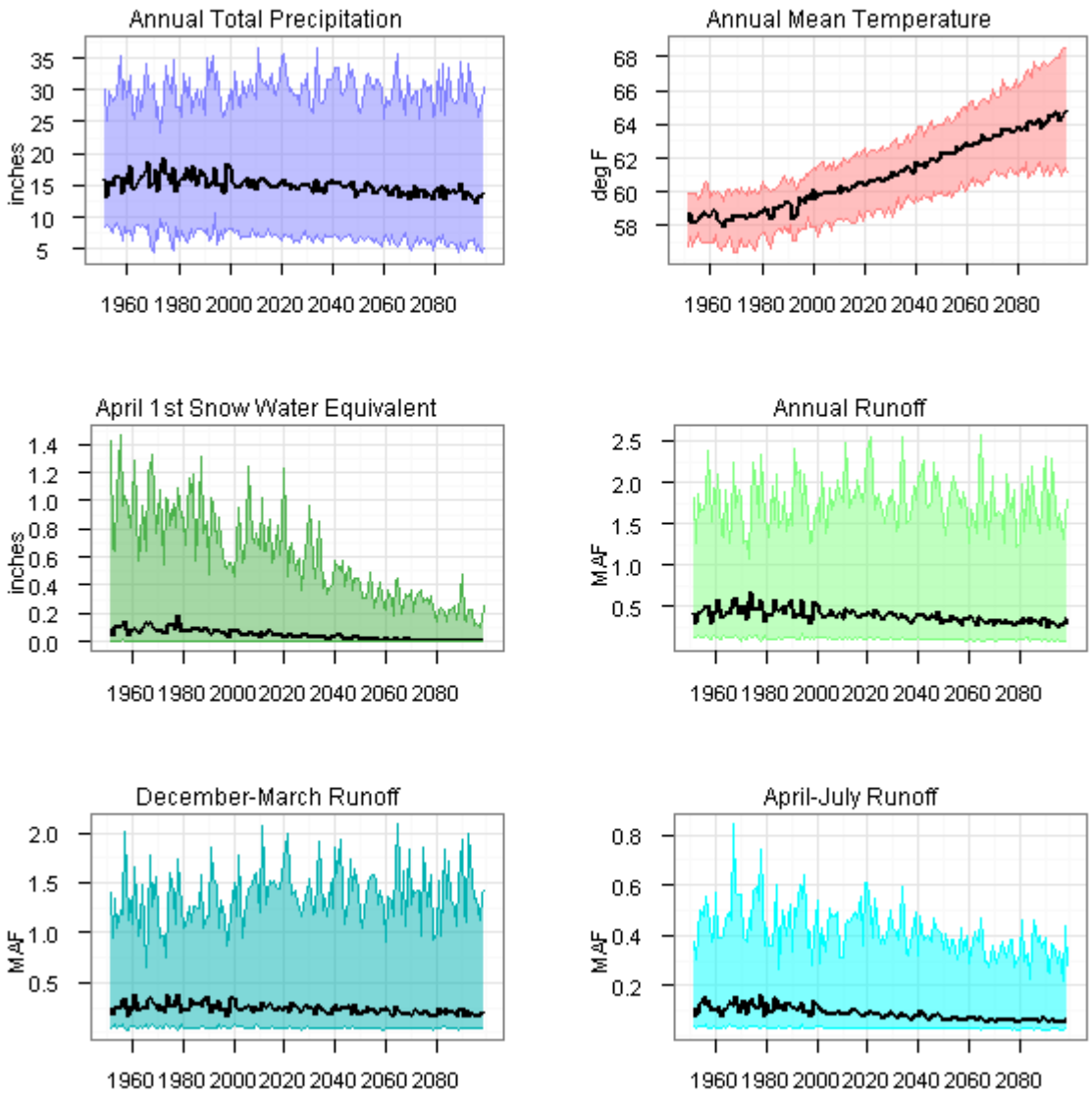


Figure 9: Projection ensemble for six hydroclimate indicators for the site Santa Ana River at Adams Street Gage

Spatial Plots

The next set of plots includes spatial plots of decade-mean precipitation, and temperature. These plots show the spatial distribution for the variables across the contributing basin. The spatial plots were developed on a water year basis for the reference decade of the 1990s (water years 1990–1999).

Spatial distribution of precipitation for the 1990s decade is presented as an ensemble median of the 112 projections. At each grid cell in the basin and for

each of the 112 projections, average total precipitation was calculated by averaging total precipitation from the 10 water years, 1990–1999. Next, for each grid cell, the ensemble median of the decade average total precipitation was calculated and used in developing the spatially varying precipitation plot.

Precipitation changes in each of the future decades – 2020s (represented by water years, 2020-2029), 2050s (represented by water years, 2050-2059), and 2070s (represented by water years, 2070-2079) – were calculated as follows. At each grid cell in the basin and for each of the 112 projections, average total precipitation was calculated by averaging total precipitation from the 10 water years in the respective future decades. Then, for a given projection and at a given grid cell, the percentage difference in average total precipitation between a given future decade and the reference 1990s decade was calculated. This percentage difference for a given cell was calculated only if the 1990's average total precipitation for that cell was greater than 0.01 millimeter. This step is necessary to threshold division by a small value, which would result in a numerically large change magnitude. Positive percentage change implies wetter conditions, while negative percentage change implies drier conditions from the 1990s reference decade.

After all projection-specific changes were calculated for a given future decade, the median change from the 112 projections was calculated. The median or 50th percentile change provides a measure of the central tendency of change in decade average total precipitation for a given future decade compared with the reference 1990s decade (Figure 10).

The 2020s decade shows some increase in the upper elevation parts of the watershed from the 1990s reference decade, but for the subsequent two decades – 2050s and 2070s – the precipitation shows consistent decline throughout the watershed.

The calculations for the spatial distribution of mean temperature are similar to the spatial distribution of precipitation calculation for the 1990s reference decade. The difference being, in case of temperature, mean annual temperature is first calculated from the 12 monthly values (in case of precipitation, it is the total precipitation) for each of the 10 water years, and subsequently, averaged to calculate the decade average mean annual temperature. The changes in mean annual temperature for the future decades are presented as magnitude changes and not as percentage change (as computed for precipitation). The median or 50th percentile change from the 112 projections represents the central tendency in decade-mean temperature distribution.

Figure 11 shows the spatial distribution of simulated decadal temperature. These results show that the watershed is expected to get hotter through the successive decades (2020s, 2050s and 2070s) compared with the 1990s reference decade.

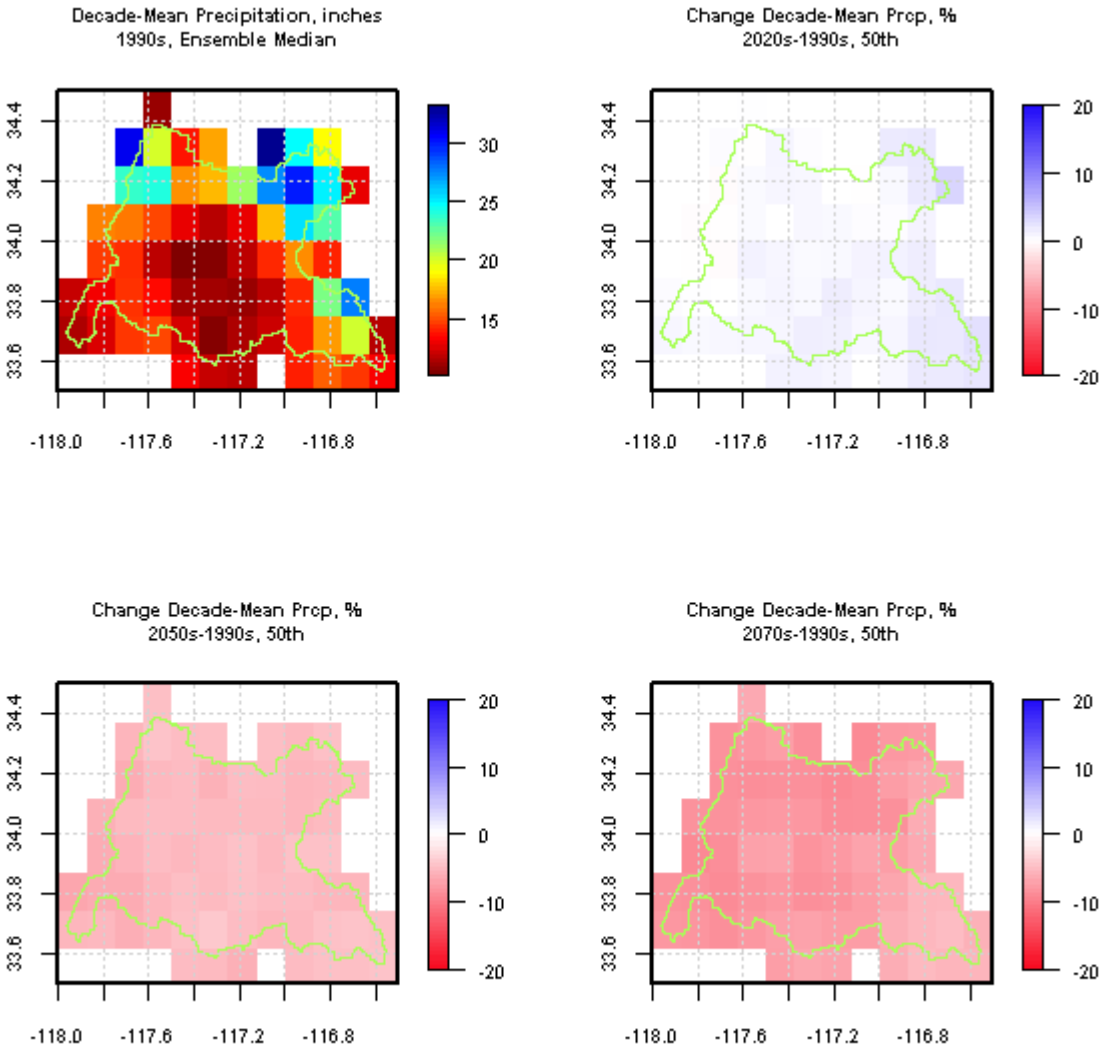


Figure 10: Spatial distribution of simulated decadal precipitation. The vertical axis represent latitude, the horizontal axis represent longitude

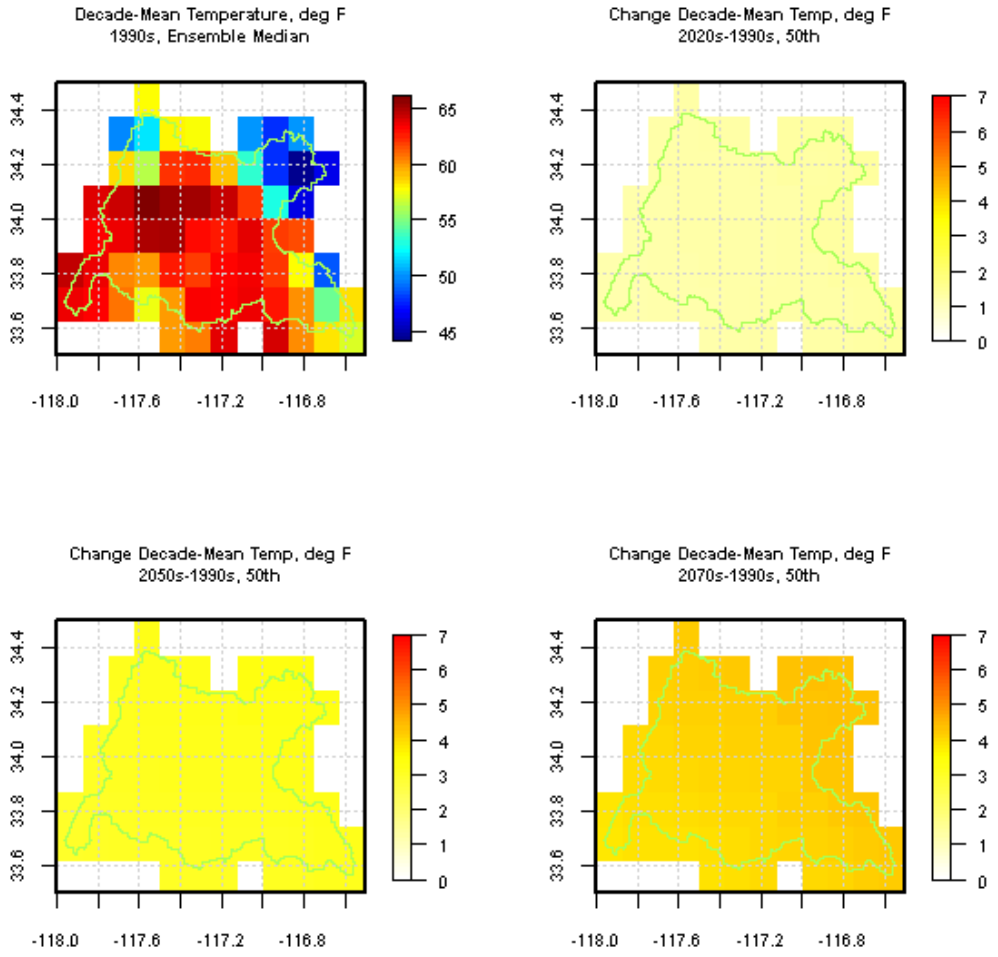


Figure 11: Spatial distribution of simulated decadal temperature. The vertical axis represent latitude, the horizontal axis represent longitude

3.1.2 Impacts on Runoff Annual and Seasonal Cycles

Similar to the calculations of precipitation and temperature changes, annual and seasonal runoff changes were calculated for all 36 sites listed in Table 1. Figure 12 shows mean annual and mean-seasonal runoff change for the site, Santa Ana River at Adams Street Gage (most downstream location). Changes in mean runoff (annual or seasonal) were calculated for the three future decades – 2020s, 2050s and 2070s – from the reference 1990s decade. For the 2050s and 2070s decade, there is a decline in the mean annual and seasonal runoff from the 1990s decade; for the 2020s decade the change in runoff is nominal. Similar change in runoff patterns was observed for all sites across the basin, as can be seen in Table 3.

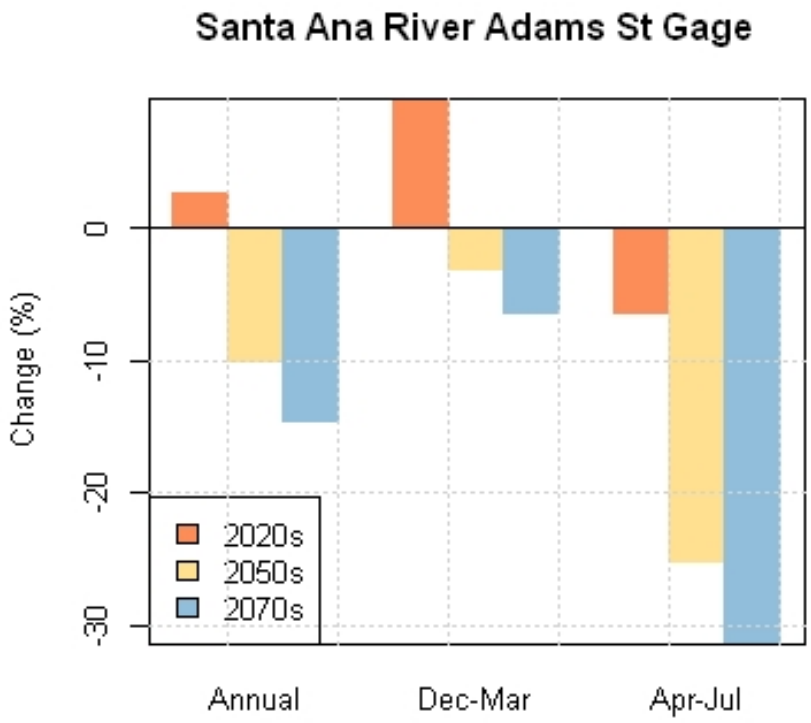


Figure 12: Simulated mean annual and mean-seasonal runoff change

Table 3: Percent change from 1990s for annual, DJFM, and AMJJ runoff

ID	Site Description	2020s			2050s			2070s		
		Annual Flow	DJFM	AMJJ	Annual Flow	DJFM	AMJJ	Annual Flow	DJFM	AMJJ
1	Peters Canyon Wash Tustin Gage	2.58	5.95	-6.08	-8.92	-1.19	-15.75	-11.82	-8.96	-19.06
2	Marshburn Channel Gage	5.10	6.76	-8.79	-6.41	-2.60	-21.70	-10.73	-8.12	-23.97
3	San Diego Creek Myford Rd Gage	4.40	6.98	-7.87	-8.36	-3.28	-18.67	-11.44	-7.34	-21.36
4	El Modina-Irvine Channel Gage	2.89	4.01	-3.50	-6.36	-3.54	-14.84	-9.05	-8.46	-15.37
5	Peters Canyon Wash Irvine Gage	2.59	5.98	-6.15	-8.86	-1.20	-15.77	-11.84	-8.98	-19.10
6	San Diego Creek Lane Rd Gage	2.58	5.93	-6.03	-8.95	-1.19	-15.73	-11.81	-8.95	-19.03
7	San Diego Creek Campus Dr Gage	4.37	6.48	-4.81	-7.74	-3.22	-13.80	-10.30	-8.42	-15.05
8	Santa Ana River Prado Dam Gage	2.71	9.76	-6.65	-10.69	-1.90	-26.04	-14.97	-7.19	-32.29
9	Santa Ana River County Line Gage	2.72	9.84	-6.66	-10.67	-2.20	-25.96	-14.95	-7.08	-32.24
10	Santa Ana River Imperial Highway Gage	2.69	9.87	-6.54	-10.57	-2.52	-25.88	-14.91	-6.92	-32.13
11	Santa Ana River AB SPRD Imperial Highway Gage	2.68	9.86	-6.54	-10.56	-2.53	-25.88	-14.91	-6.92	-32.13
12	Santa Ana River SPRD Imperial Highway Gage	2.68	9.86	-6.54	-10.56	-2.53	-25.88	-14.90	-6.92	-32.12
13	Carbon Creek Olinda Gage	3.06	6.96	-4.49	-3.09	-3.69	-17.86	-8.07	-6.58	-20.91
14	Carbon Creek Yorba Linda Gage	3.06	6.96	-4.49	-3.09	-3.69	-17.86	-8.07	-6.58	-20.91
15	Santa Ana River Ball Rd Gage	2.67	9.84	-6.53	-10.52	-2.60	-25.82	-14.88	-6.92	-32.07
16	Santa Ana River Katella Ave Gage	2.65	9.89	-6.55	-10.49	-2.83	-25.71	-14.85	-6.88	-32.01
17	Santiago Creek Villa Park Gage	2.90	8.35	-4.59	-5.09	-0.25	-18.15	-10.07	-7.81	-23.45
18	Santiago Creek Div Villa Park Gage	2.90	8.35	-4.59	-5.09	-0.25	-18.15	-10.07	-7.81	-23.45
19	Santiago Creek Santa Ana Gage	4.15	7.43	-5.11	-5.40	-1.30	-17.99	-10.42	-7.02	-20.97
20	Santa Ana River Santa Ana Gage	2.63	9.85	-6.39	-10.09	-3.01	-25.48	-14.69	-6.41	-31.70
21	Santa Ana River Adams St Gage	2.60	9.82	-6.35	-10.08	-3.01	-25.24	-14.61	-6.38	-31.39
22	Brea Channel Brea Dam Gage	1.99	5.34	-5.77	-3.37	-1.79	-19.51	-8.88	-7.33	-19.75
23	Brea Channel Fullerton Gage	1.73	4.97	-6.04	-3.54	-1.35	-19.91	-8.84	-7.45	-19.87
24	Fullteron Channel Fullerton Dam Gage	0.94	3.76	-5.87	-4.13	-1.47	-18.91	-8.98	-8.82	-18.91
25	Fullerton Channel Fullerton Gage	0.14	3.60	-5.68	-4.54	-3.08	-18.43	-9.14	-9.08	-16.44
26	Fullerton Channel Richman Ave Gage	2.15	4.95	-5.48	-4.55	-2.02	-17.80	-8.58	-7.34	-18.39
27	Coyote Creek Los Alamitos Gage	0.31	4.85	-4.60	-3.59	-3.16	-17.37	-9.54	-7.87	-16.51
28	Devils Canyon	2.94	5.12	-3.29	-13.23	-6.71	-22.69	-13.38	-10.72	-26.62
29	Santa Ana River AT MWD Crossing NR Arlington	2.73	10.54	-9.68	-11.36	-2.04	-30.55	-17.35	-7.84	-37.75
30	Santa Ana River AT E Street NR San Bernardino	3.03	10.66	-11.25	-10.86	-2.34	-31.89	-16.98	-7.35	-39.70
31	Temescal Creek AB Main Street AT Corona	5.50	9.02	-6.01	-7.65	-1.64	-18.68	-12.06	-5.03	-28.47
32	Cucamonga Creek NR Mira Loma	2.20	7.43	-3.35	-13.45	-8.76	-27.40	-17.51	-13.81	-33.20
33	Chino Creek AT Schaefer Avenue NR Chino	2.30	4.54	-3.62	-7.11	-2.05	-19.63	-11.19	-8.46	-19.83
34	Seven Oaks Dam Outlet	1.11	12.83	-19.49	-13.17	-4.07	-40.17	-19.29	-4.76	-48.65
35	Middle Fork Lytle Creek Gage	2.94	6.88	-9.22	-15.28	-8.14	-36.30	-21.35	-16.24	-40.80
36	Ridge Top Gage NR Devore	3.08	6.48	-6.72	-7.15	-1.54	-18.56	-6.26	-5.05	-21.65

3.1.3 Groundwater Impacts

The groundwater screening tool was applied to four groundwater basins (Orange County, Upper Santa Ana Valley, San Jacinto, and Elsinore) within the Watershed where sufficient data were available, including observed groundwater elevations, municipal and industrial demands, agricultural acreage, and trans-basin imported water.

Figure 13 illustrates observed and simulated monthly changes in groundwater elevation for the Orange County Coastal Plain groundwater basin for the period 1990-2009, as well as observed and simulated monthly basin-averaged groundwater elevations. Figure 13a shows that the groundwater screening tool realistically simulates the timing of month-to-month changes in groundwater elevation, but does not capture the peak magnitudes of drawdown and rise. Similarly, Figure 13c shows that the tool accurately simulates seasonal fluctuations in groundwater elevation as well as trends in groundwater elevation over the past two decades, but does not capture interannual variations in groundwater elevation, including the groundwater decline of the early 1990s and subsequent rebound during the late 1990s and early 2000s. Interannual fluctuations may be driven by local-scale non-linear processes that are not represented in the basin-scale screening tool, or by management objectives that are not included in this analysis. The correlation between simulated and observed changes in groundwater elevation is 0.618 (R^2 = 0.382), and correlation between simulated and observed groundwater elevation is 0.884 (R^2 = 0.782).

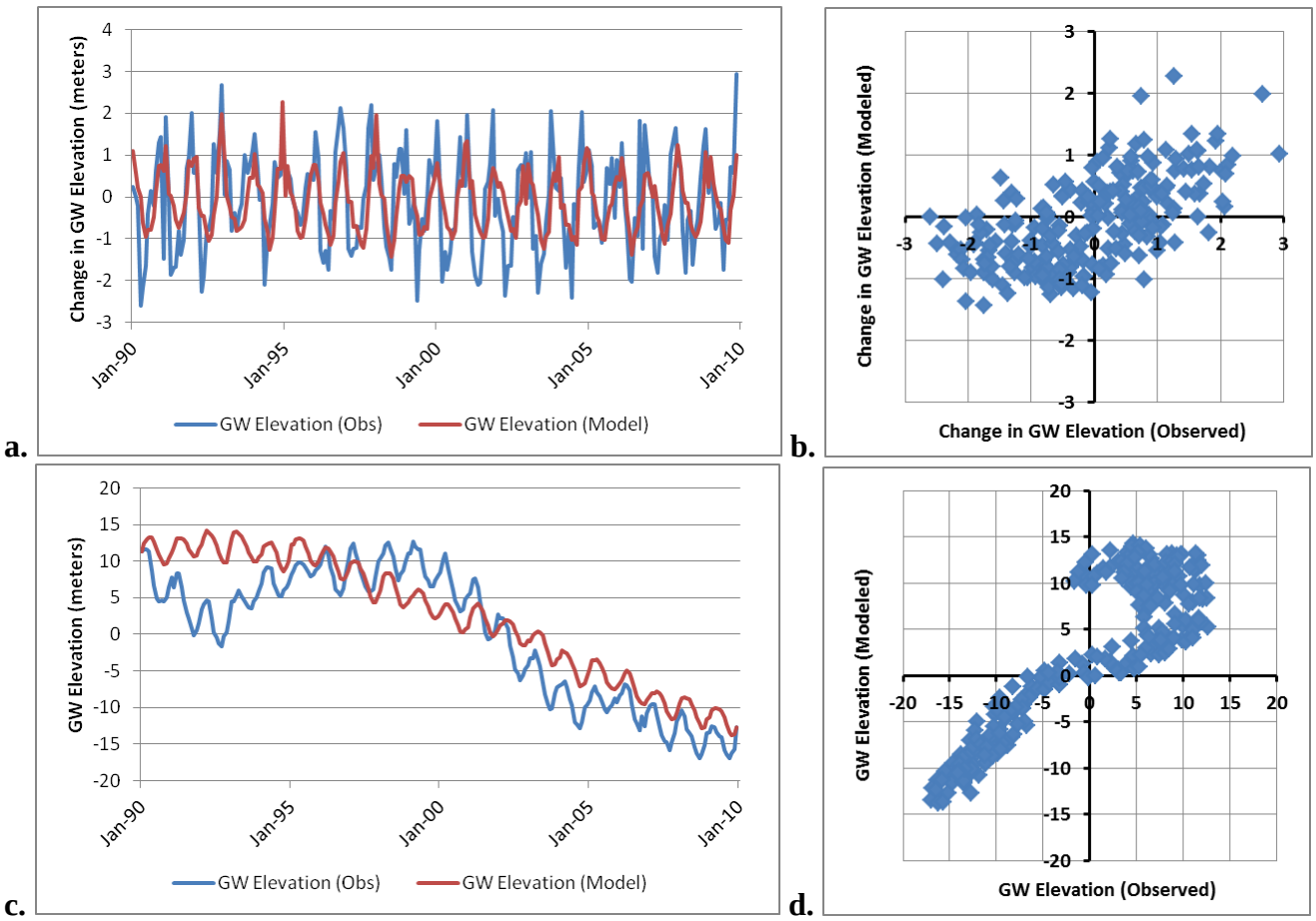


Figure 13: (a) Timeseries of observed and simulated fluctuations in monthly groundwater elevation for the period 1990-2009; (b) scatter plot of simulated monthly change in groundwater elevation as a function of observed change groundwater elevation; (c) Timeseries of observed and simulated monthly groundwater elevation for the period 1990-2009 (zero represents mean sea level); (d) scatter plot of simulated monthly groundwater elevation as a function of observed groundwater elevation (all plots are for Orange County groundwater basin)

Future groundwater availability in the Watershed will depend on future recharge from precipitation, stream seepage, and managed infiltration facilities, as well as future groundwater withdrawals to for municipal, industrial, and agricultural uses. Projected increases in temperature and decreases in precipitation will result in increased water demands and decreased groundwater recharge, respectively. Management actions will be required to protect groundwater resources under projected future climate conditions. Figure 14 illustrates the observed range of basin-averaged groundwater levels in the Orange County groundwater basin for 1990-2009, along with simulated groundwater levels under projected climate conditions. In the absence of groundwater management actions, groundwater levels are projected to decline significantly over the 21st century. It should be noted that projected declines are not constrained by the physical limits of the aquifer; for example, projected declines may exceed the actual amount of usable groundwater in the basin.

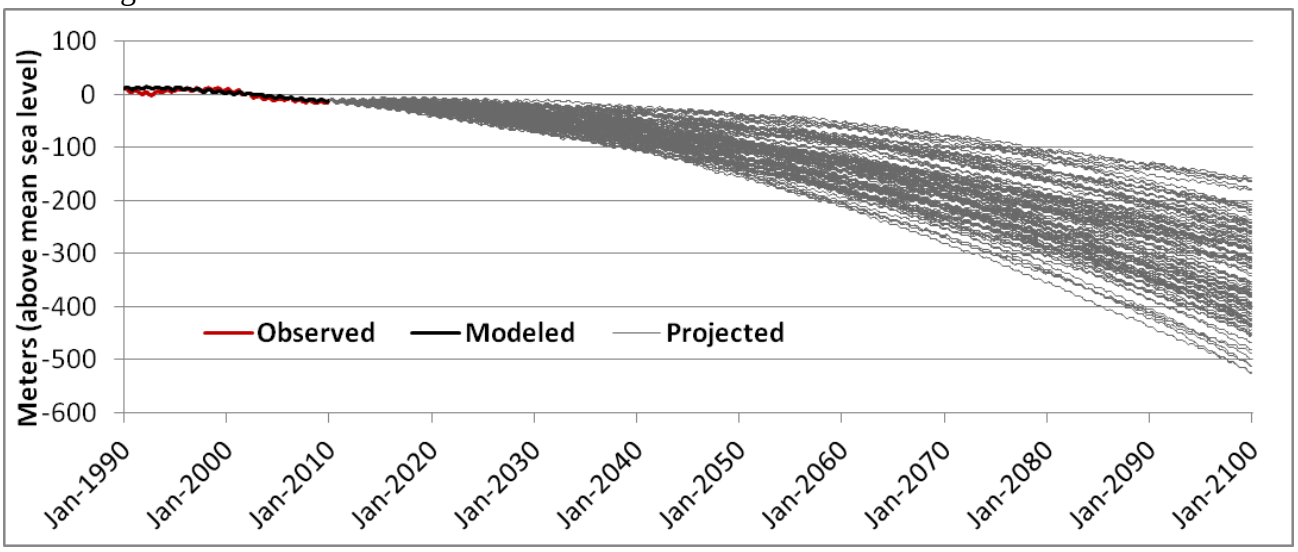


Figure 14: Projected groundwater elevations for Orange County for a no action scenario

The groundwater screening tool, developed by Reclamation for this Basin Study, can be used to evaluate potential deficiencies in future supplies and to develop sustainable management alternatives. As an example, potential actions to avoid projected water level declines in Orange County are listed below. Each alternative listed will protect against groundwater declines through 2060.

- Reduce M&I demand, gradual reduction of approx. 15% by 2020 (i.e., reduce per capita use from ~175 gallons per day in 2010 to ~150 gallons per day by 2020).
- Increase imports from the Colorado River Aqueduct and State Water Project gradually from ~30,000 acre-ft per year to ~105,000 acre-ft per

year (this may not be feasible due to cost, greenhouse gas emissions, or availability).

- Increase local water supplies by ~75,000 acre-ft per year through recycled water treatment capacity, development of seawater desalination capacity, and increase storm water capture efficiency.

Figures 15, 16, and 17 show the projected groundwater elevations for a no action scenario for the Upper Santa Ana Valley, San Jacinto, and Elsinore respectively. The groundwater screening tool can be used to develop and compare additional management alternatives in order to meet the projected growing demands that are discussed in the next section.

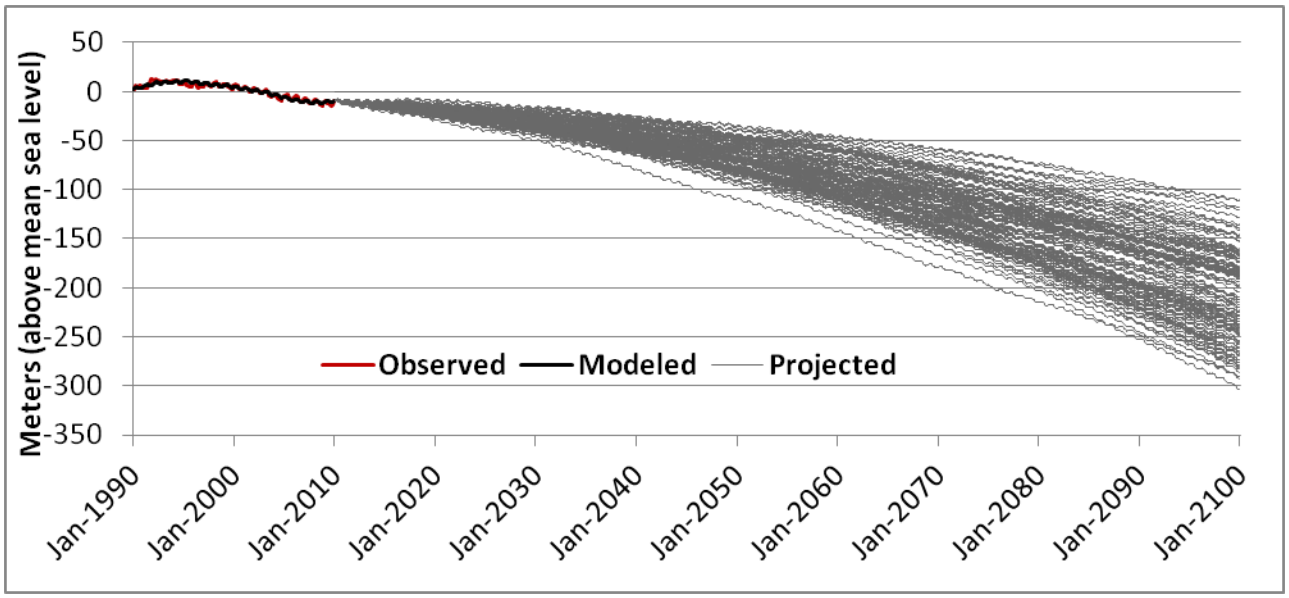


Figure 15: Projected groundwater elevations for Upper Santa Ana Valley for a no action scenario

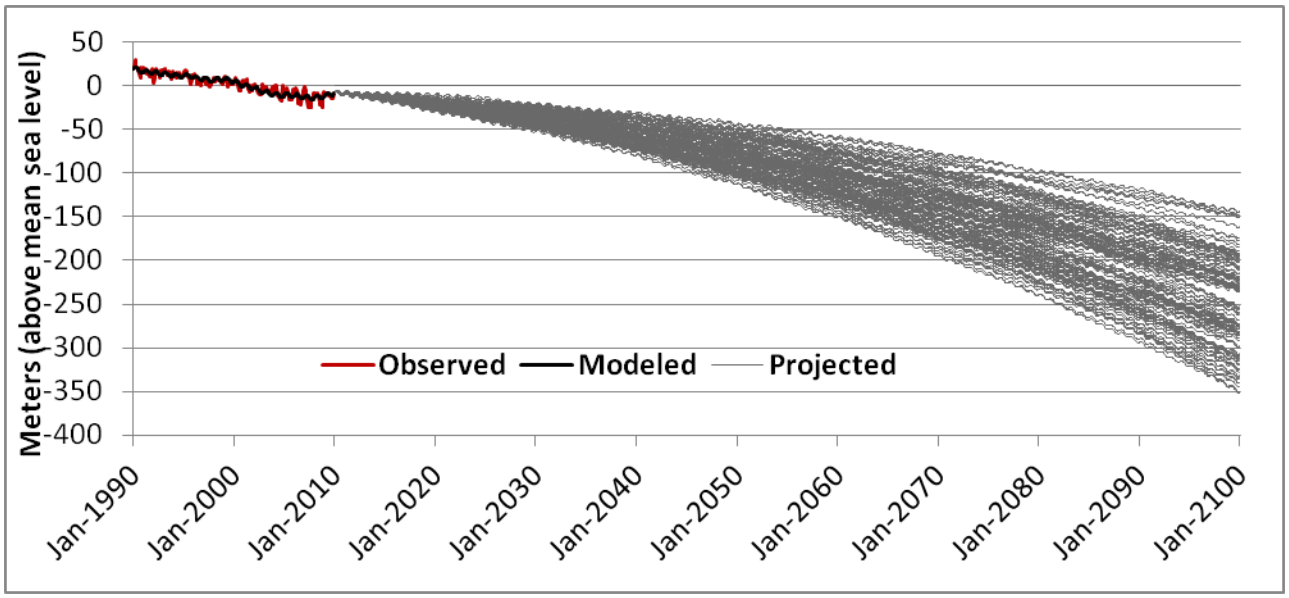


Figure 16: Projected groundwater elevations for San Jacinto for a no action scenario

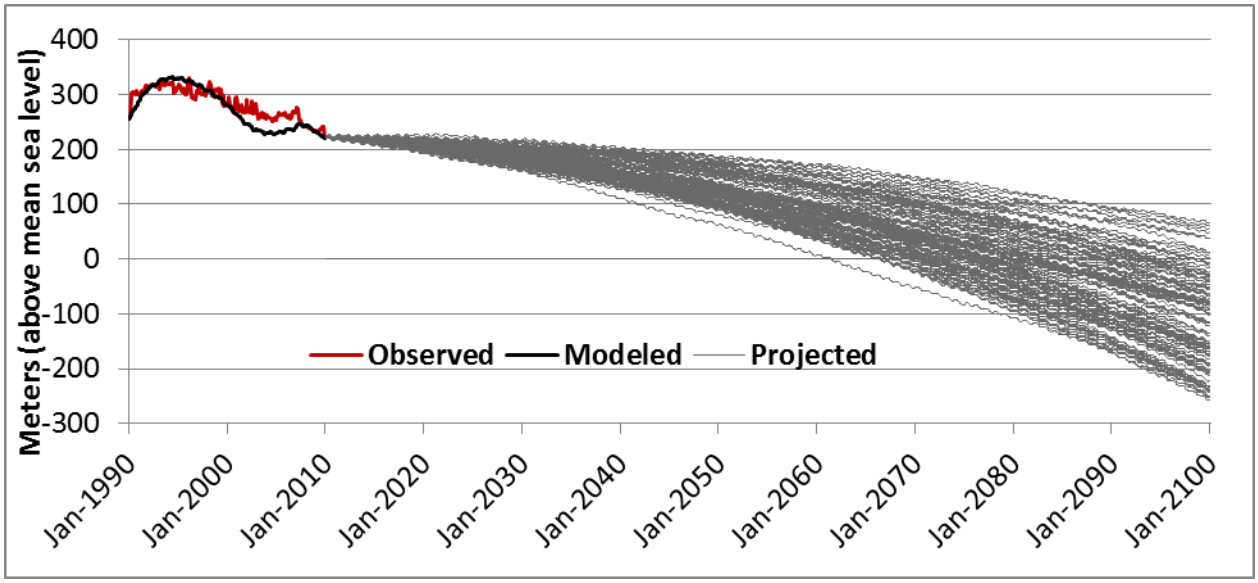


Figure 17: Projected groundwater elevations for Elsinore for a no action scenario

Note: The Elsinore groundwater basin projections, shown in Figure 17, are not as representative of what is actually happening in the basin as the other three basins. This is because the basin average groundwater timeseries is based on four wells, three of which are missing a fair amount of data, resulting in a poor model fit. More representative results could be obtained if a more complete input dataset were developed.

3.2 Water Demands

Many factors affect future water demands such as population growth, hydrologic conditions, public education, and economic conditions, among others. In 1990, 4.2 million people lived in the Watershed. In the 1990s, the population grew by 17.6%, and continued to grow to the present population of approximately 6.1 million, as shown in Figure 18. By 2050, the population is projected to reach 9.9 million (Santa Ana Integrated Watershed Plan, 2002).

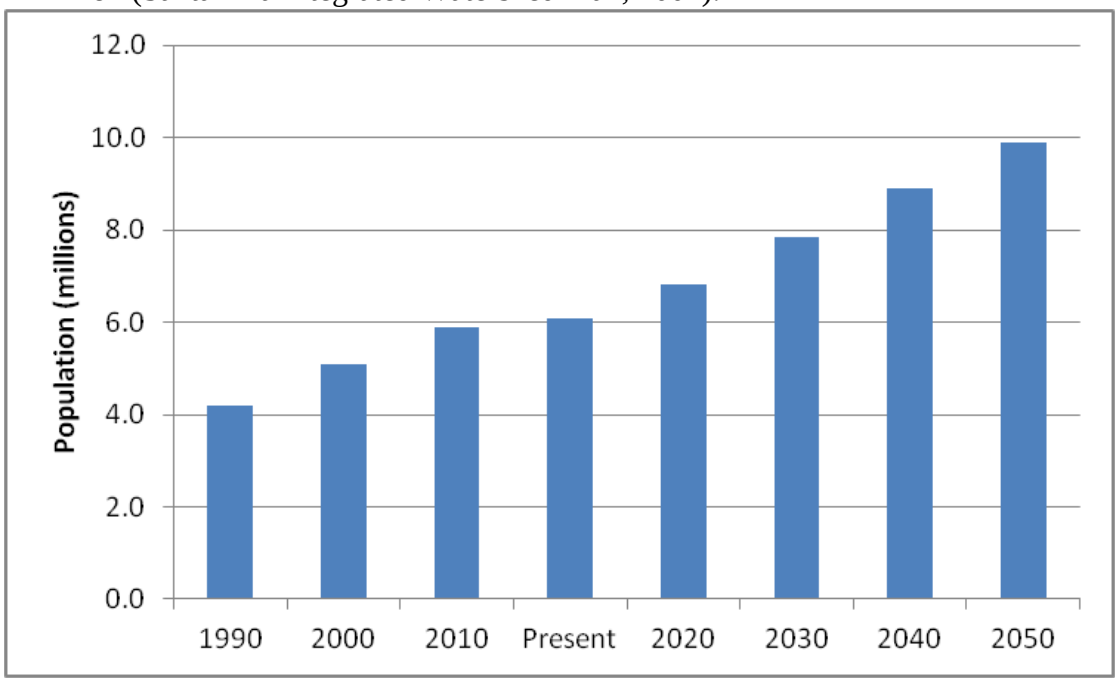


Figure 18: Population for the Santa Ana River Watershed

3.2.1 Water Demand Projections

Projected water demands out to 2050 were obtained from the various water resource plans for each of the individual member agencies. The projections, shown in Figure 19, include direct water demand for residential, municipal, commercial, and agricultural uses, but do not include recharge. Conservation is not taken into account in the projected demand. Aggressive conservation can drastically reduce the projected water demand, an example of which is shown in Chapter 5.

For the purpose of this study, the demand was calculated for the watershed, as a whole, every ten years from 1990-2050 (see Chapter 5 for a description of the tool used). The population projections from Figure 18 were used to determine the demand, and conservation was not taken into account. The results, found in Figure 20, are very similar (1% difference in 2050) to the demand projections calculated by the member agencies in Figure 16.

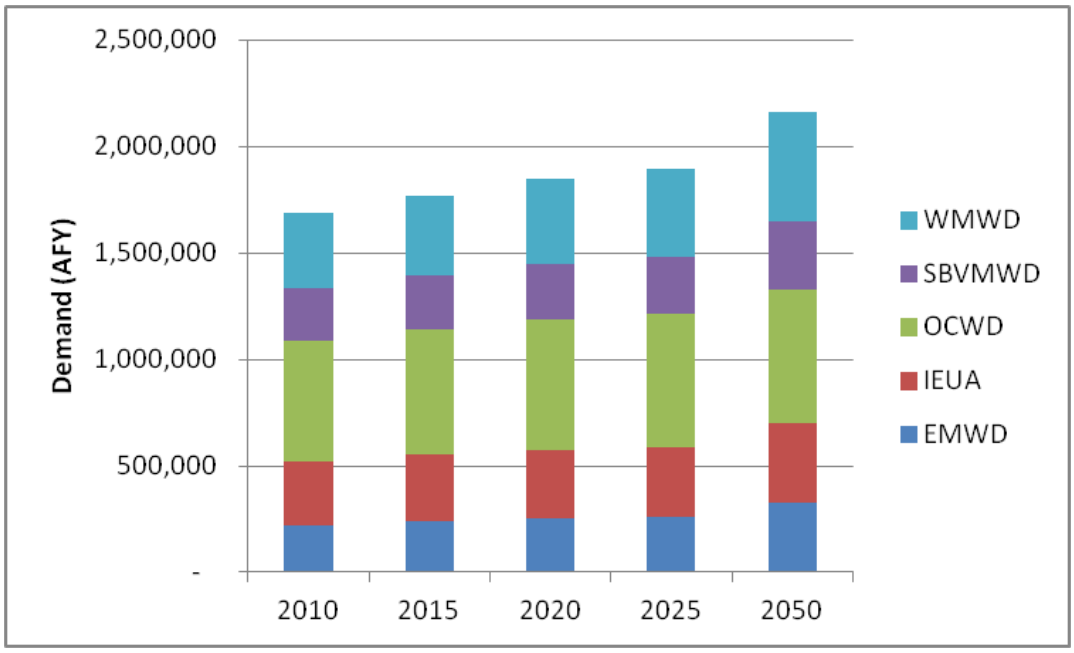


Figure 19: Water demand by member agency (Western Municipal Water District (WMWD); San Bernardino Valley Municipal Water District (SBVMWD); Orange County Water District (OCWD); Inland Empire Utilities Agency (IEUA); Eastern Municipal Water District (EMWD))

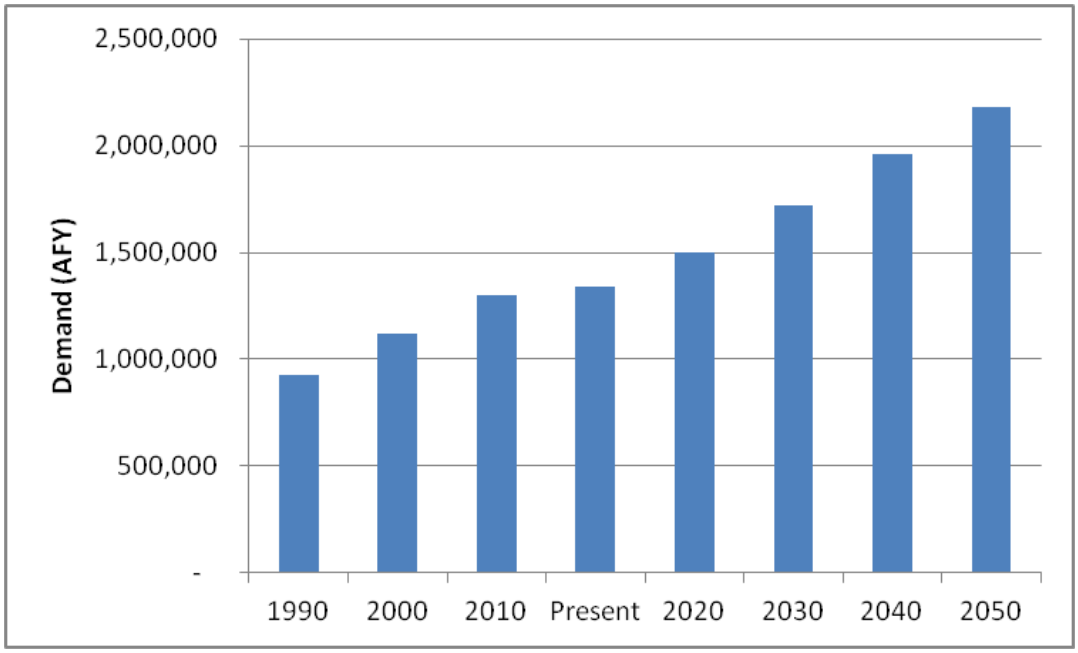


Figure 20: Santa Ana Watershed water demand calculated for this study

3.3 Supply and Demand Summary

Table 4 shows a summary of the project effects of climate change on a variety of hydroclimate metrics for three future periods (above the most downstream location, Adams St. Bridge). Table 5 shows a summary of projected water demands out to 2050.

Table 4: Summary of Effects of Climate Change on Supply

Hydroclimate Metric (change from 1990s)	2020s	2050s	2070s
Precipitation (%)	0.67	-5.41	-8.09
Mean Temperature (°F)	1.22	3.11	4.1
April 1st SWE (%)	-38.93	-80.4	-93.07
Annual Runoff (%)	2.6	-10.08	-14.61
Dec-Mar Runoff (%)	9.82	-3.01	-6.38
Apr-Jul Runoff (%)	-6.35	-25.24	-31.39

Table 5: Summary of Water Demand for the Santa Ana River Watershed

	1990	2000	2010	Present	2020	2030	2040	2050
Demand (MAFY)	**0.924**	**1.121**	**1.298**	**1.339**	**1.503**	**1.723**	**1.958**	**2.178**

Imported water for the SARW will also likely be affected by the changing climate. The 2011 SWP Reliability report projects a temperature increase of 1.3° to 4.0 °F by mid-century and 2.7° to 8.1° F by the end of the 21st century. It predicts that increased temperatures will lead to less snowfall at lower elevations and decreased snowpack. By mid-century they predict that Sierra Nevada snowpack will reduce by 25% to 40% of its historical average. Decreased snowpack is projected to be greater in the northern Sierra Nevada, closer to the origin of SWP water, than in the southern Sierra Nevada. Furthermore, an increase in "rain on snow" events may lead to earlier runoff. Given these changes, a water shortage worse than the 1977 drought could occur one out of every six to eight years by the middle of the 21st century and one out of every two to four years by the end of 21st century. Also, warmer temperatures might lead to increased demand. This factor, combined with declining flows, will likely lead to decreased carryover storage from year to year. Alternative water supply options such as recycled water, rainwater harvesting, and desalination may need to be relied upon in order to meet the continually growing demand.

4.0 Decision Support and Impact Assessment

The analyses presented in this chapter were performed using the climate and hydrological projections and models described in Chapter 3.

4.1 Impacts on Recreation in Lake Elsinore

4.1.1 Background

Lake Elsinore, shown in Figure 21, is southern California's largest natural lake and is situated at the bottom of the San Jacinto Watershed. Because Lake Elsinore is a terminal lake, historically fed only by rain and natural runoff, it has been impacted by low lake levels. As the climate continues to change it is likely that these impacts will become more severe. Lake Elsinore is used for recreation and is currently not considered a water supply source.

In 2005, Elsinore Valley Municipal Water District (EVMWD) began a two-year pilot project to introduce recycled water into Lake Elsinore to stabilize lake levels. Soon thereafter, a discharge permit was granted to EVMWD by the Santa Ana Regional Water Quality Control Board to allow recycled water to be delivered to the lake. In 2008, a 36-inch-diameter pipeline was constructed to deliver recycled water from EVMWD's Regional Wastewater Treatment Plant, funded by the State of California Proposition 40 Water Bond and the Lake Elsinore and San Jacinto Watersheds Authority. The project delivers approximately 5 million gallons per day (MGD) of recycled water to Lake Elsinore, and includes repair and retrofit of three local, shallow groundwater wells that deliver approximately 1 MGD. As part of the Basin Study, an analysis was done to determine if these measures would be enough to meet the minimum goal volume of 41,704 acre-ft (elevation 1,240 ft), avoid low lake levels (below 24,659 acre-ft, elevation 1,234 ft), and prevent the lake from drying up altogether (as occurred in the 1930s) under a changing climate.



Figure 21: Lake Elsinore and VIC model grid cell used to determine data for Lake Elsinore analysis

4.1.2 Methodology

Monthly streamflow and open water evaporation values from 1950-2099 were determined by using BCSD-CMIP3 climate projections and the VIC macro-scale hydrology model. Gridded daily meteorological forcings from Maurer et al., (2002) were used to simulate historical conditions from 1950-1999. The model accounted for the upstream contributing basin, the San Jacinto River subwatershed, feeding the inlet of Lake Elsinore, excluding the effect of any upstream regulation.

A mass balance analysis of Lake Elsinore was conducted, resulting in a natural volume, unregulated by upstream reservoirs. Change values were determined for each future period using modeled observed average annual volume applied to historic annual average volume. The operations of Canyon Lake, a reservoir upstream from Lake Elsinore, were not taken into account in this analysis.

4.1.3 Results

Figure 22 shows the distribution of projected average annual volume for two future periods, 2000-2049 and 2050-2099, based on 112 different climate change projections. The two future periods were also analyzed with the addition of the EVMWD project. For the 2000-2049 period there is greater than a 50% chance that the average annual lake level will meet the minimum goal; adding in the EVMWD project brings that likelihood up to above 75%. For the 2050-2099 period there is less than a 5% chance that the minimum goal will be met; adding the EVMWD project brings that likelihood to almost 50%. Both periods are likely to stay above low lake level, with the 2050-2099 period having less than a 10% chance of drying up completely.

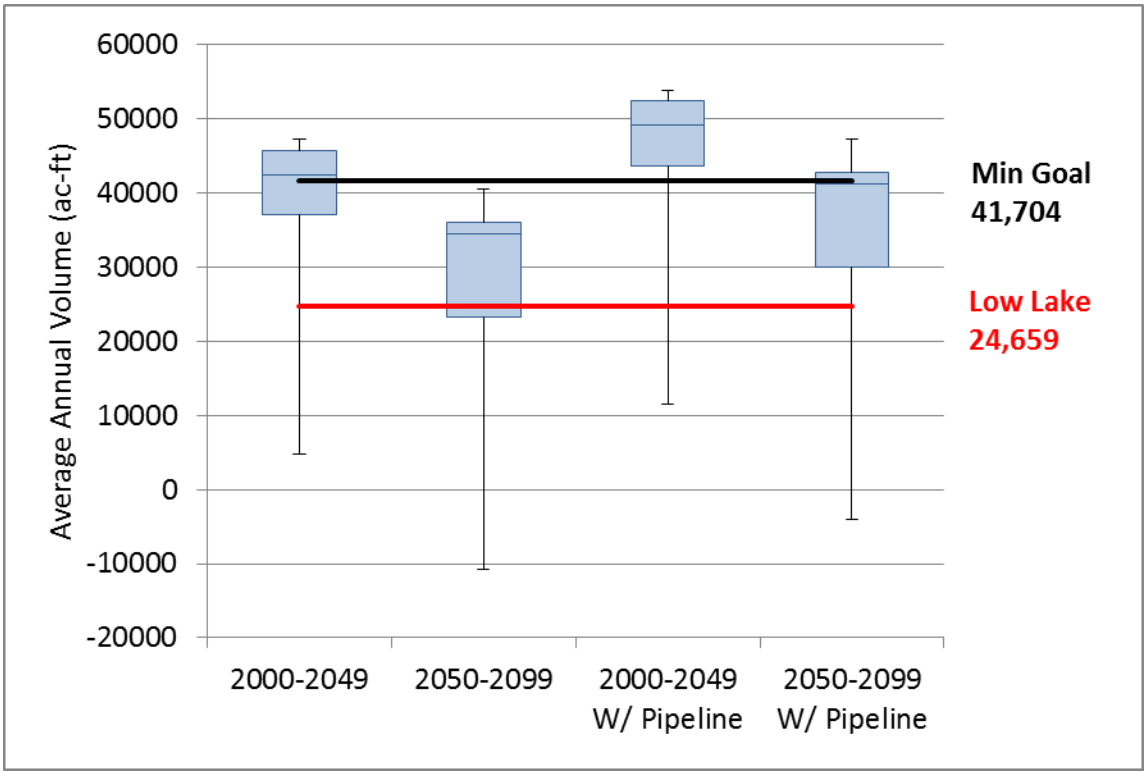


Figure 22: Projected average annual volumes for Lake Elsinore for two future periods, with and without EVMWD project

4.2 Alpine Climate Impacts

4.2.1 Background

An alpine climate is defined as the average weather for the region above the tree line. Climate change impacts could harm alpine recreation such as skiing. The Big Bear Mountain Resorts (Big Bear) are located in the San Bernardino Mountains within the SARW. They consist of two ski areas, Bear Mountain and Snow Summit, and provide nearly 750 skiable acres. They range in elevation from roughly 2,180 m to more than 2,600 m. Although Big Bear has the ability to cover 100% of its terrain with manmade snow using water from Big Bear Lake, there are still concerns about rising temperatures and decreased natural snowfall.

Member agencies of SAWPA extend to the San Bernardino Mountain, the San Gabriel Mountains, the San Jacinto Mountains and the Santa Ana Mountains. As such, potential climate change impacts to alpine ecosystems and recreational activities are an area of concern. In general, alpine ecosystems are characterized by cold temperatures and harsh growing conditions. One species of particular importance is the Jeffrey Pine. Jeffrey Pines are a coniferous species common to the area and extend through the Sierra Nevadas up to Oregon. They are a high altitude pine species that have the ability to grow in a diverse range of climates.

They can do well in harsh settings and infertile sites because they require a shorter growing season than some other species (Moore, 2006).

4.2.2 Methodology

Impacts to skiing near Big Bear Lake were analyzed by considering projected changes for April 1st SWE. April 1st SWE values from 1950 to 2099 were generated for 112 CMIP3 climate projections using the VIC model forced with downscaled (BCSD) climate variables. Each climate projection consists of 1/8° x 1/8° degree (~12 km x 12km) grid cell daily forcings. For this analysis, the locations of the Bear Mountain and Snow Summit ski areas were mapped to the single grid cell that contained them. Results shown in Section 4.2.3 summarize the median change (taken from the 112 projections) in April 1st SWE compared to the 1990s.

For comparison, results were also summarized from a study of climate change impacts in California by Hayhoe et al. (2004). They used climate forcing data generated with two GCMs of low (Parallel Climate Model, PCM) and medium (Hadley Center Climate Model version 3, HadCM3) sensitivity, forced using two emissions scenarios, one lower (B1) and one higher (A1fi). SWE results were generated using the VIC model forced with the BCSD temperature and precipitation. Results are provided in Section 4.2.3 on a statewide basis grouped by elevation.

Quantitative analysis of ecosystem impacts was not conducted as part of this work. Rather a literature review of existing climate change impact studies was conducted and the relevant findings are provided here.

4.2.3 Results

Recreation at Big Bear

It is likely that future snowpack at Big Bear will be significantly less than what is currently normal and accumulated snowpack will remain on the ground for a shorter season. Figures 23 and 24 illustrate future changes in April 1st SWE. Projected declines are between 30% and 40% by the 2020s, and are generally projected to be greater than 70% by the 2070s. These changes are largely a result of increased winter temperatures and potential declines in winter precipitation. Warmer temperatures will result in a delayed onset of the ski season, as well as earlier spring melting. Future precipitation is much more uncertain but many projections show decreased winter precipitation. Lower altitudes will likely be the most sensitive to increased temperature because small temperature changes can result in precipitation falling as rain rather than snow. Hayhoe et al. (2004) note that reductions in SWE are most pronounced below 3,000 m where roughly 80% of California's snowpack storage currently occurs. The Bear Mountain and Snow Summit ski areas both fall between roughly 2,100 and 2,600 m, making them vulnerable to increased temperatures.

While there is general consensus for a projected decrease in snowpack, it is also important to note that there is significant variability between climate projections. For example, the low sensitivity, low emissions scenario in Figure 24 projects only a 20% decrease in snowpack by 2070, while the other scenarios as well as the median, shown in Figure 23, project a greater than 70% decrease. Also, the grid resolution for both methodologies is 1/8° which is much larger than either ski area. As such, results include surrounding areas that are at lower elevations and beyond ski area itself. However, the overall findings in Figures 23 and 24 are consistent.

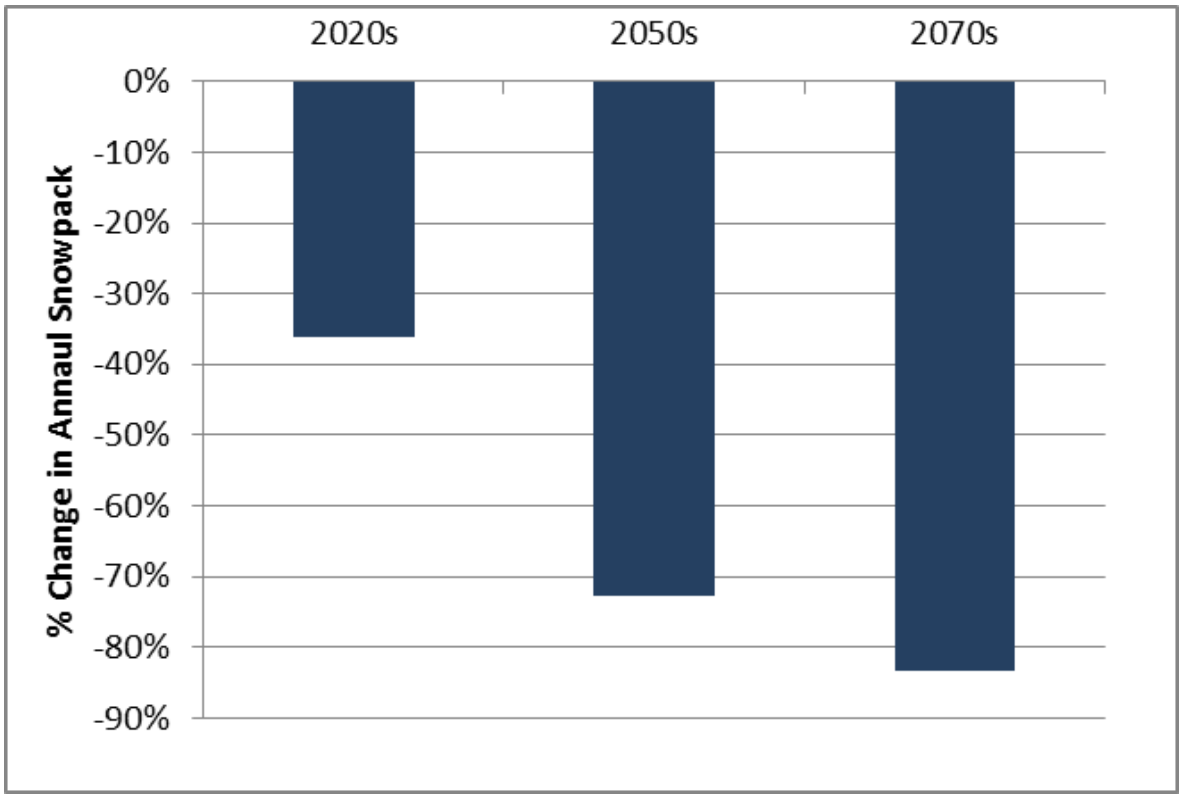


Figure 23: Median percent change (from 112 climate projections) in April 1st SWE for the grid cells containing the Bear Mountain and Snow Summit ski areas

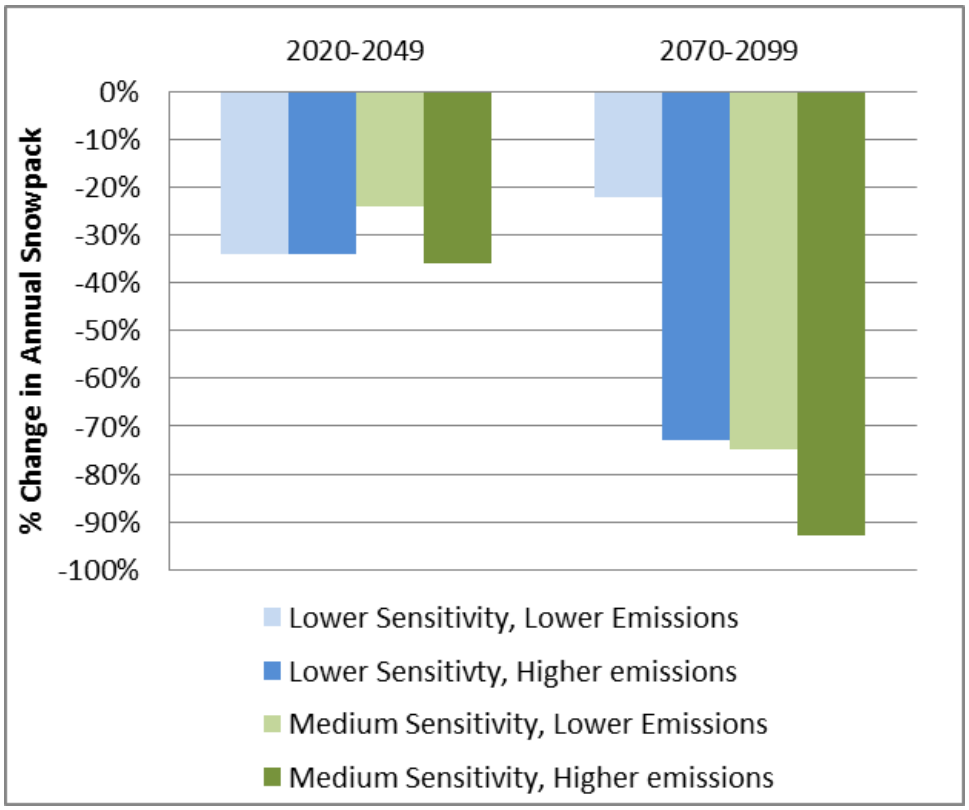


Figure 24: Percent change in April 1st SWE from Hayhoe et al. (2004) for areas of 2,000 to 3,000 m elevation

Jeffrey Pine Ecosystem

Predicting climate change impacts on ecosystems is very difficult because of the interconnections and dependencies among the large numbers of species present in any system. This is further complicated by uncertainty about future climate. For example, there is significant uncertainty about the role of increased carbon dioxide levels on forest productivity. In general, predictions about forest productivity are uncertain and will rely mainly on future precipitation. While there is variability among climate change scenarios, especially with respect to precipitation, all projections include increased temperature and increased levels of atmospheric carbon dioxide.

Based on projected climate, it is expected that warmer temperatures will cause trees to move northward and to higher elevations. Lenihan et al. (2008) project changes in total forest cover for the state of California will range from a 25% decrease to a 23% increase by 2100. Species with the smallest geographical and climate ranges are expected to be the most vulnerable to change because they will have limited ability to migrate. Alpine ecosystems are particularly vulnerable to increased temperatures because their habitat is already limited with little opportunities to shift to higher elevations. Lenihan et al. (2008) project that Alpine and subalpine forests will decrease in area by 50-70% by 2100, as shown in Figure 25.

Consistent with other tree species, it is likely that the Jeffery Pines (found at elevations of 2000-3100 m) will migrate to higher elevation and some lower elevation forest area will be lost. Several studies predict that warming temperatures will result in the displacement of evergreen conifer forests by mixed evergreen forests across California (Hayhoe et al., 2004; California, 2010). This trend is also shown by the decrease in conifer forests in Figure 25.

Figures 26 and 27 show projected change in viable Jeffery Pine habitat in southern California for three emissions scenarios looking out to 2030 and 2090, respectively (Crookston, 2009). The plots, generated using the Moscow Forestry Sciences Laboratory website http://forest.moscowfsl.wsu.edu/climate/species/speciesDist/Jeffrey-pine/, show significant decrease in viable Jeffery Pine habitat for many scenarios, and some of the most severe (e.g. A2 emission scenario) show no Jeffrey Pine habitat within the Watershed by 2090.

In addition to changes in forest area, warmer temperatures may also impact forest health. For example, extended droughts and earlier snowmelt could cause fire seasons to start earlier and last longer (California, 2010). Also, temperature increases may change the frequency and magnitude of infestations by pests, such as the pine beetle.

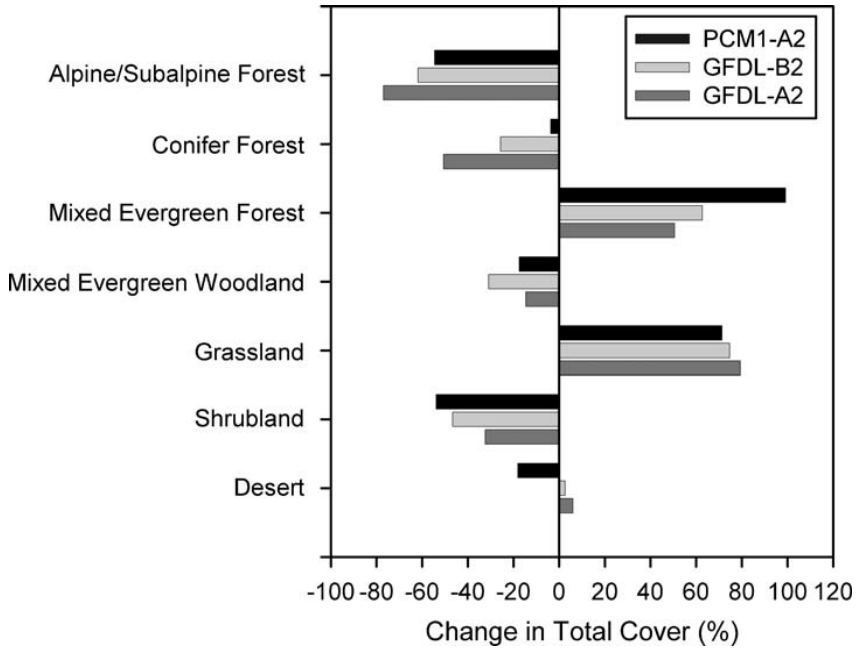


Figure 25: Fig. 4 from Lenihan et al., (2008). Percent change in total land cover for vegetation classes by 2100 for three climate change scenarios predicted using the MC1 Dynamic Vegetation Model

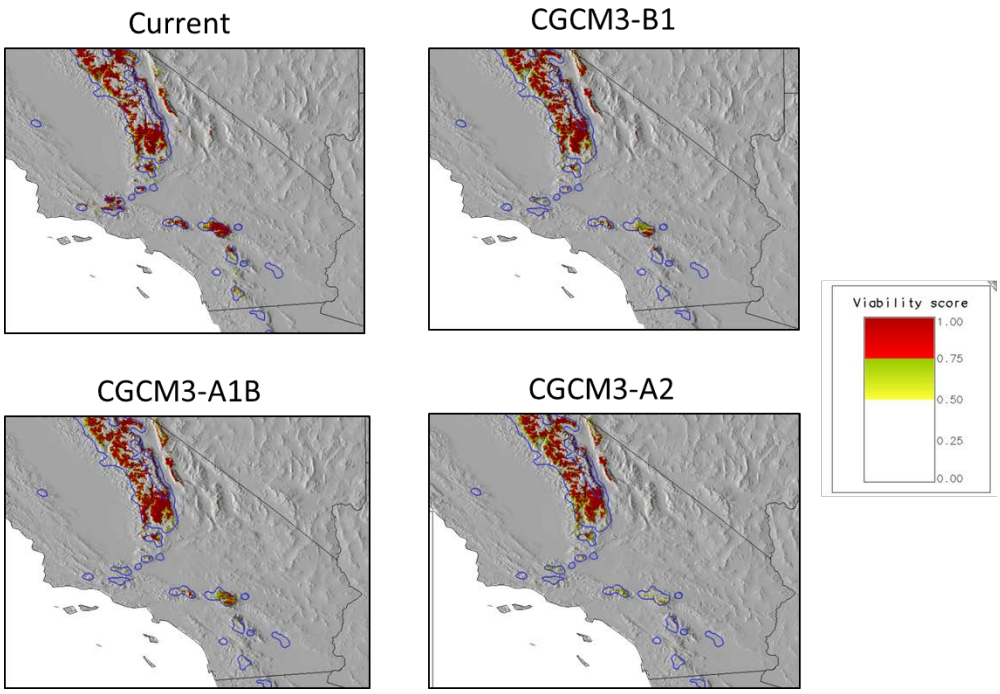


Figure 26: Viability scores for Jeffery Pine currently and for three future projections for 2030

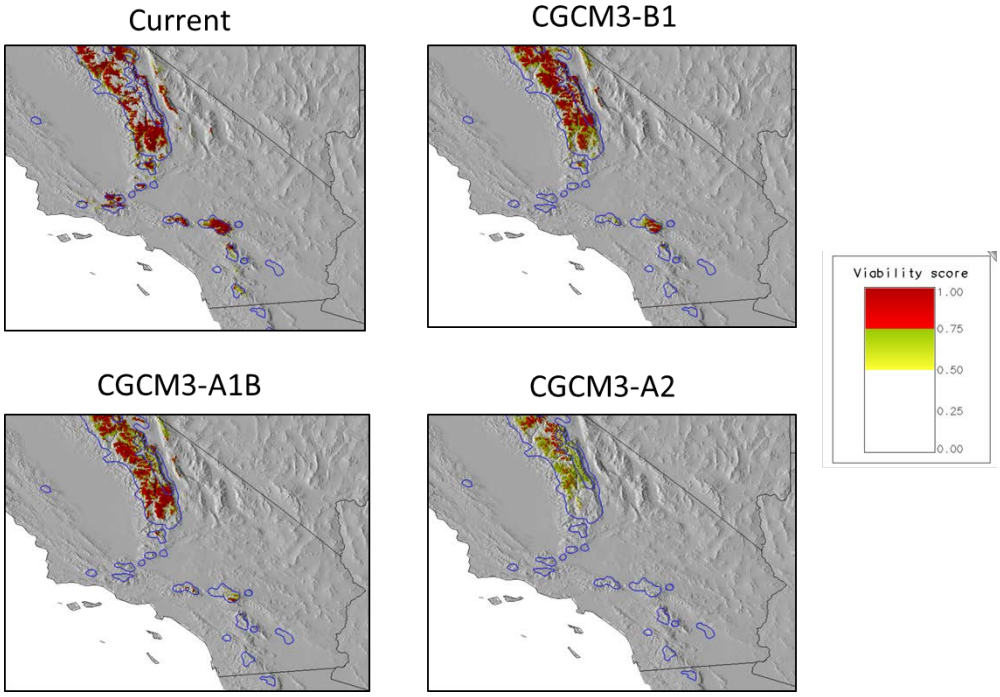


Figure 27: Viability scores for Jeffery Pine currently and for three future projections for 2090

Source: http://forest.moscowfsl.wsu.edu/climate/species/speciesDist/Jeffrey-pine/

4.3 Extreme Temperature Impacts

4.3.1 Background

There is no standard definition of an extreme heat event, commonly known as a "heat wave." It is most commonly defined as a period with more than three consecutive days of maximum temperatures at or above 90°F. However, temperature is only one component of heat, which also depends on humidity, wind speed and radiant load. Climate change is resulting in more frequent and severe heat waves (Dia, 2011). The increased heat could lead to additional air pollution in urban areas, bringing increased health risks.

In 2007, the IPCC concluded that "hot extremes" and "heat waves" are very likely (>90% probability of occurrence) to increase as our climate continues to change. This predicted temperature increase is particularly pronounced for night temperatures, resulting in reduced night-time relief from the heat. These changing weather conditions are a growing concern for individuals and communities in the Watershed.

4.3.2 Methodology

Daily maximum temperature values came from the BCSD-CMIP3 archive for 112 climate projections. Each projection has 1/8° x 1/8° (~12 km x 12 km) grid cell daily forcings that start on January 1, 1950 and run through December 31, 2099. For this analysis, the location of each city was matched to the single VIC grid cell that contains it. The data was analyzed and days with maximum temperatures over 95°F were considered to contribute to the results, found in Section 4.3.3, which summarize temperature trends for all 112 projections from 1950 to 2099 for the selected grid cell.

4.3.3 Results

Figure 28 shows the distribution of the annual number of days above 95°F from 1950-2099 for each of the cities (Anaheim, Riverside, and Big Bear City) for all 112 climate projections. As shown here, there is a clear, increasing trend in the number of days above 95°F for all three locations, with Riverside in the lead, followed by Anaheim. Big Bear City has the least number of days with a median of zero for all years prior to about 2030. The shaded area in Figure 28 shows the range of the 112 climate projections and demonstrates a large spread in projected results. Table 6 summarizes the median number of days above 95°F for each location for the historical time period (1951-1999) and three 30-year future time periods centered around 2020, 2050 and 2070. As shown in Table 6, the number of days increases for all stations advancing into the future. Changes are quite significant; for example, the median value for Anaheim quadrupled from 4 to 16 days between the historical time period and 2070. Similarly, the median value for Riverside nearly doubled between the historical time period and 2070 going from 43 to 82 days.

A study of warming trends in and around the city of Los Angeles also had similar findings (Hall et al., 2012). For this study they statistically and dynamically downscaled GCMs outputs for two emission scenarios ("Business as usual" RCP8.5 and "mitigation" RCP2.6) and compared results between a baseline period of 1981-2000 and future a future period from 2041-2060. Overall, they reported two to three times as many extreme days (i.e. greater than 95 °F) in coastal areas and within the Los Angeles Basin. Inland areas were noted to have three to five times the number of extremely hot days. Although the trends are the same, there are some differences between this report and the results presented in Table 6.

For example, in the Los Angeles study, they report that Riverside had a historical average of 9.6 day extreme heat days per year, while Table 6 reports 43 days. This difference is likely a result of differences in historical time periods (1981-2000 vs. 1950-1999), as well as differences in downscaling methodology. For example, the methodology used for this analysis did not include any bias correcting to match downscaled results to observed temperature gages. Similarly the future estimates provided in the Los Angeles report for Riverside range from 17 to 59 which is less than the 72 days reported in Table 6. Results for Big Bear are very similar between the reports because temperatures are much lower in Big Bear so the number of extreme days remains close to zero in all cases. However, in the Los Angeles report, they also repeated the extreme day analysis with locally derived temperature thresholds. For Big Bear, the local temperature threshold was set to 76.8 °F. Given this lower threshold, it was found that the number of extreme days increased from 7.3 days historically up to a range of 9 to 78 days by 2050. Anaheim was not covered in the Los Angeles report and so cannot be directly compared.

Table 6: Median annual number of days above 95°F for one historical (1951-1999), and three future (2005-2034, 2035-2064, 2055-2084) time periods

	Historical	2020	2050	2070
Anaheim	4	7	12	16
Riverside	43	58	72	82
Big Bear City	0	0	2	4

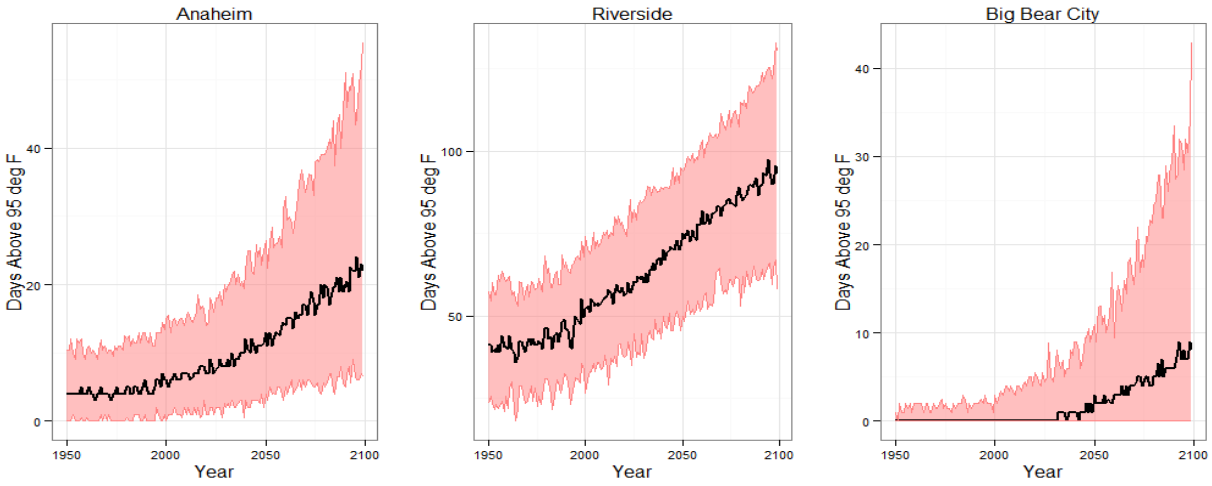


Figure 28: Projected annual number of days above 95°F. Solid black line is the median and the red shading denotes the 5th and 95th percentile bounds

4.4 Flood Impacts

4.4.1 Background

The Santa Ana River has a long history of flooding. In 1862, more than 30 days of rain resulted in flooding across California and destroyed the state capital (Hiltner, 2010). During this flood, it is estimated that the Santa Ana River flowed at roughly 320,000 cfs, about half the flow of the Mississippi River (Hiltner, 2010). Subsequently in 1916, flooding occurred along the Santa Ana River and Santiago Creek, washing out bridges and causing other damages (City of Santa Ana, 2006). In 1938 a flash flood inundated 68,400 acres, resulting in 19 fatalities and leaving 2,000 homeless (City of Santa Ana, 2006). This event led the U.S. Army Corps of Engineers to declare the Santa Ana River the biggest flood hazard west of the Mississippi (Hiltner, 2010). It also helped motivate the construction of Prado Dam and paved the way for a post-World War II construction boom that developed large agricultural areas (City of Santa Ana, 2006). Subsequently, another flood in 1969 caused extensive damage along tributaries. Most recently in 2005, an extended wet period put stress on Prado Dam. No flooding occurred, but the dam began to crack and downstream residents were temporarily evacuated.

As a result of historical floods, there have been a number of efforts to improve flood safety in the basin. In 1964, the Santa Ana River Mainstem Project (SARP) was initiated with a goal of providing flood protection to communities along 75 miles of the Santa Ana River in Orange, Riverside and San Bernardino counties. Today it provides increased flood protection to about 3.35 million people through improvement projects such as channel lining and dam construction (SARP, 2013). Although the flood control system has greatly improved safety, it's important to

note that increased development in the area has also increased impervious area and decreased the effectiveness of existing infrastructure.

Generally, the goal of flood frequency analysis is to determine the probability of occurrence for a range of flood values. Often this is expressed in terms of return periods (equal to the inverse of the threshold exceedance probability). If the probability of a given flood magnitude occurring in a given year is 1%, then the return interval is equal to 100-years (assuming every year is an independent sample from all years and that events are equally likely). There are two main approaches to flood frequency analysis. The extreme value approach uses historical flood data to generate a probability distribution that can be used to predict the flood magnitude for any number of return intervals. Alternatively, flood process can be modeled directly using physically-based hydrodynamic models driven by meteorological forcings. For this analysis we combine both approaches; first we simulate floods using a physically based hydrologic model, then we fit an extreme value distribution to the results.

Extreme value functions are designed to capture the distribution of extremes drawn from other distributions. Pearson Type III and Generalized Extreme Value (GEV) are two of the most commonly used distributions. The Gumbel and Weibul distributions are special cases of the GEV distribution that are commonly applied in hydrology. For this work we use the Log Pearson Type III distribution following the standard United States Government methodology presented in Bulletin 17B, "Guidelines for Determining Flood Flow Frequency" (Bulletin 17B, 1982).

Once an extreme value function has been chosen, the next task is to fit it to the observed data. There are three main approaches: plotting positions, method of moments, and maximum likelihood. Plotting positions is the simplest approach; it's based on visualizing the observed data and fitting a distribution visually or by minimizing errors (e.g. using least squares fitting). Although this method is very straightforward, it is not very commonly used because it is problematic when dealing with limited data. Also, when using least squares to fit, the errors are minimized between sample values and distribution values, but the error that should in fact be considered is frequency not value (FEMA, 2007).

To improve upon this, the method of moments fits distributions using the various moments of the observed data (e.g. mean, variance, skew, kurtosis) rather than the values themselves. For example, one can simply compute sample moments and distribution moments and solve for distribution parameters. This approach can also be difficult, because simple moments may not exist for a given distribution and higher order moments may be limited by sample size (FEMA, 2007). Probability-weighted moments and linear moments (L-Moments) can address these issues (Hosking and Wallis, 1997). Finally, the maximum likelihood approach calculates the likelihood of a sample given the assumed distribution. Parameters are determined by trying to maximize the likelihood or often (log

likelihood) for a chosen distribution. Once again following the standard methodology recommended in Bulletin 17B, we will fit distributions using the methods of moments for this analysis.

Before applying flood frequency analysis, it is important to understand key underlying assumptions. All extreme value distributions assume that annual max floods are independent samples from a population. Also the distribution approach assumes point data. If data is available from multiple sites, regional frequency analysis can be used to improve parameter estimation. Finally, most extreme value approaches, including the methodology used here, assume that the distribution that is fit to the observed data remains stationary throughout time. This assumption can be problematic in the face of changing climate in which we might expect increased frequency of extreme events. To address this issue, a number of studies have explored the use of non-stationary extreme value distributions in which distribution parameters are allowed to vary as a function of covariates such as time, precipitation or temperature (Katz and Naveau, 2002; Graffis and Stedinger, 2007). For this study, we fit the traditional stationary models. However, we do account for climate change through the physical modeling step by applying non-stationary climate forcings to simulate future floods.

4.4.2 Methodology

As previously noted, for this analysis we used a combined physical and statistical modeling approach. First, floods are modeled using the VIC physical model forced with climate data from 112 climate simulations. Next, Log Pearson distributions are fit to the annual maximum flood values for each simulation for a range of historical and future time periods. We consider three locations along the Santa Ana: Prado Dam, Seven Oaks Dam, and the Adams Street gage near the river outlet. Three 30-year periods are considered centered around: 2020, 2050 and 2070. The historical period spans 50 years from 1950 to 1999.

Annual maximum one-day flood values are calculated from the VIC outputs for each of the 112 150-year simulations. Flood frequencies are estimated following the standard United States Government method outlined in Bulletin 17-B. For each analysis time period (one historical and three 30-year futures) and climate scenario, a Log Pearson III distribution is fit to the annual maximum values using the L-moments approach. Note that each time period is treated separately. For example, each future period will have 30 values with which to fit the distribution. Using the parameters for the Log-Pearson III distributions, the 200-year return period flow values are estimated for every climate simulation and analysis period. The 200-year storm was used in order to fill the requirements set forth in the California Department of Water Resources' Climate Change Handbook for Regional Water Planning (Appendix B). The distribution is also used to calculate the return period for the median historical 200-year flood for each climate simulation and future time period.

4.4.3 Results

Figures 29 through 31 show results for the three analysis locations: Prado Dam, Seven Oaks Dam, and the Adams Street gage. The boxplots on the left show the distribution of 200-year flood flows estimated using the distributions fit to the 112 scenarios for each time period. The boxplots on the right show the simulated return period of the historical median 200-year flood flow. Tables 7 and 8 summarize the data presented in the boxplots. Table 7 provides the median and interquartile range of 200-year flood flow values. Table 8 provides similar information for the future return periods of the historical median flood flows.

For all stations, there is a clear trend of increasing median 200-year flood flow for each subsequent future analysis period. However, there is also large variability in the future flood projections. Still, in all cases, the bottom of the historical interquartile range (designated by the shaded box) falls below the projected future interquartile range. As would be expected, this results in a decreased return interval for the median historical 200-year flood (as shown in the figures on the right). On average, projections indicate that what was historically the 200-year flood may be closer to a 70-year flood.

Comparing results from station to station, the trends are very similar, increasing flood volumes and decreasing return intervals. This trend is most pronounced for the Seven Oaks Dam site where there is a clear increasing trend in 200-year flood volumes and dramatic decrease in return periods. Seven Oaks Dam also shows a clear decrease in the upper interquartile range for return periods in later future periods.

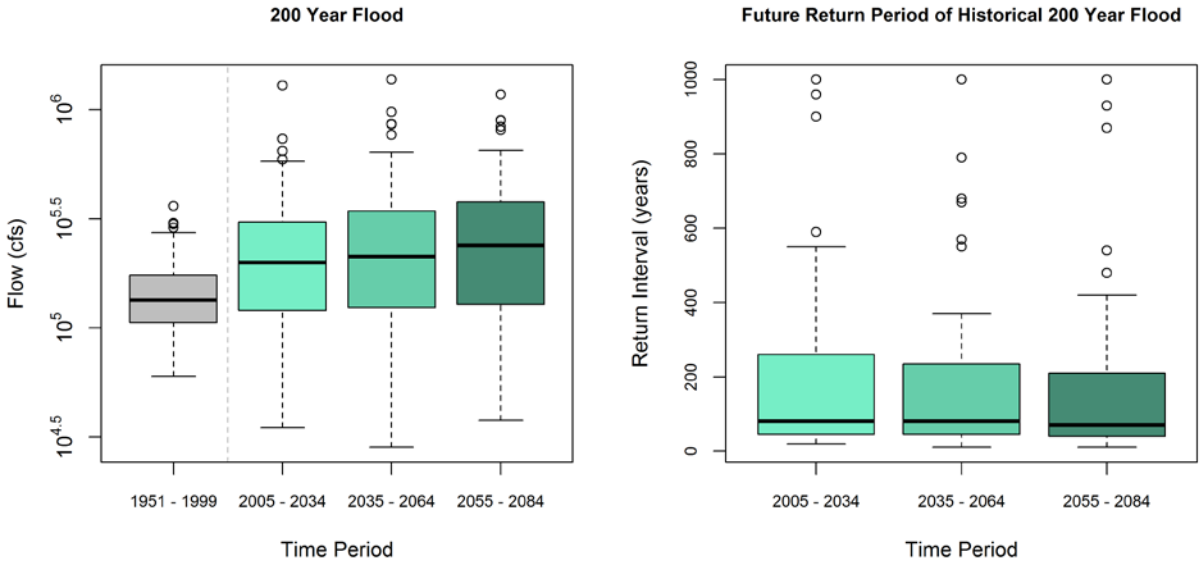


Figure 29: Station 8 Prado Dam - boxplots of 200-year flood volumes and future return periods for the median historical 200-year flood

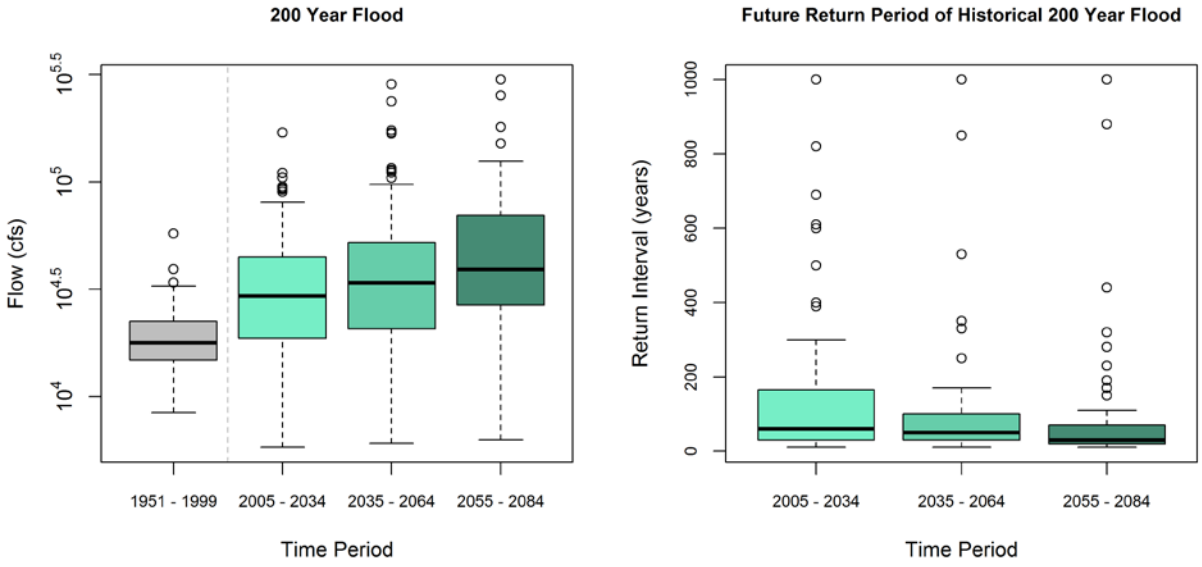


Figure 30: Station 34 Seven Oaks Dam - boxplots of 200-year flood volumes and future return periods for the median historical 200-year flood

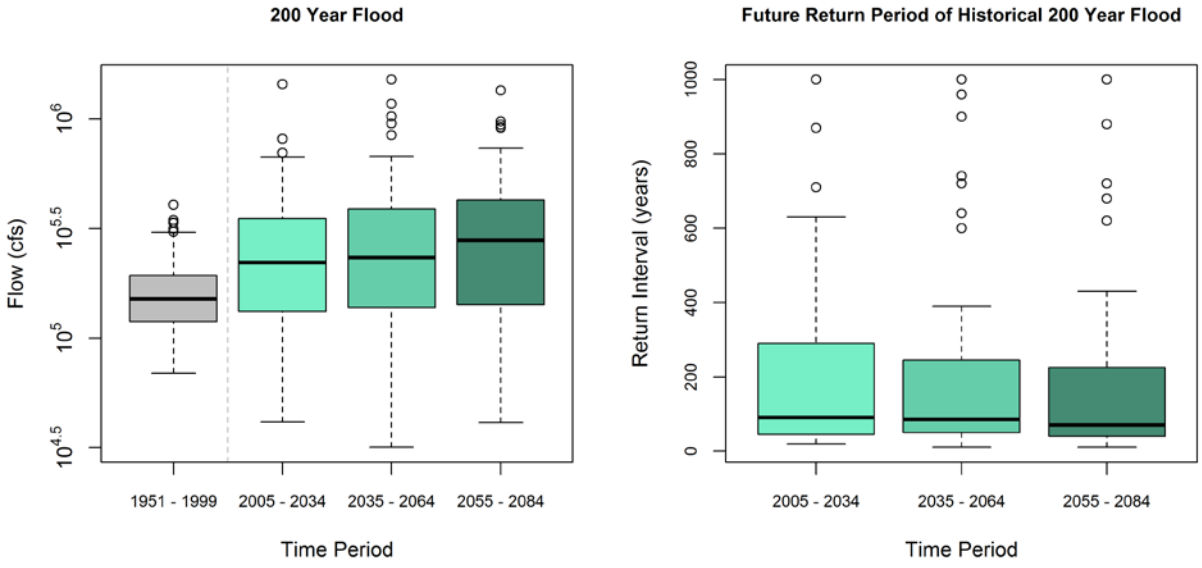


Figure 31: Station 21 Adams Street Gage - boxplots of 200-year flood volumes and future return periods for the median historical 200-year flood

Table 7: Summary of 200-year flood flows (cfs)

Station	Time Period	Percentile		
		25%	50%	75%
Prado Dam	Historical	106,289	134,170	174,018
	2020	120,616	199,623	302,401
	2050	124,369	212,392	335,621
	2070	129,706	239,359	377,660
Seven Oaks Dam	Historical	14,805	17,786	22,428
	2020	18,821	29,394	44,474
	2050	20,730	33,813	52,073
	2070	26,765	39,099	69,724
Adams Street Gage	Historical	119,084	151,084	192,357
	2020	132,923	221,375	347,943
	2050	137,749	232,974	385,438
	2070	142,980	279,004	424,881

Table 8: Summary of return periods, in years, for the median 200-year historical flood

Station	Time Period	Percentile		
		25%	50%	75%
Prado Dam	2020	48	80	260
	2050	48	80	233
	2070	40	70	205
Seven Oaks Dam	2020	30	60	163
	2050	30	50	100
	2070	20	30	70
Adam Street Gage	2020	48	90	285
	2050	50	85	243
	2070	40	70	223

Results from this analysis indicate increased risk of flooding in the future. This is demonstrated by increased 200-year flood magnitudes as well as decreased recurrence intervals for what was historically considered a 200-year flood. While these results show clear trends, it is also important to note that there is large variability between climate simulations. For the purposes of this analysis, it is assumed that all future scenarios are equally likely. Variability in the results reflects large underlying uncertainties with GCM outputs and downscaling methodologies. Additionally, the quality of results is necessarily limited by the ability of the VIC model to accurately generate flood flows from forcing data. While these constraints are acknowledged, it should be noted that this analysis follows standard methodologies and utilizes the best available input data.

4.5 Sea Level Rise Impacts

4.5.1 Background

Climate change will contribute to global sea level rise (SLR) through melting of glaciers and ice caps and thermal expansion of ocean waters, both of which increase the volume of water in the oceans. Regional SLR may be higher or lower than global SLR due to effects of regional ocean and atmospheric circulation.

California's 2,000 miles of coastline has experienced just under eight inches of sea level rise over the past decade (Cayan et al., 2009), a number that is likely to increase drastically as the climate continues to change. Critical infrastructure, such as roads, hospitals, schools, emergency facilities, wastewater treatment plants, power plants, and more will also be at increased risk of inundation, as are vast areas of wetlands and other natural ecosystems.

Flooding and erosion already pose a threat to communities along the California coast and there is compelling evidence that these risks will increase in the future. In areas where the coast erodes easily, sea level rise will likely accelerate shoreline recession due to erosion. Erosion of some barrier dunes may expose previously protected areas to flooding.

4.5.2 Methodology

Orange County Water District (OCWD) conducted a study to evaluate the potential effects of projected sea level rise on coastal Orange County groundwater conditions. Two locations were selected near the Talbert and Alamitos injection barriers, shown in Figure 32.

Projected sea level rise scenarios were developed by the California Climate Change Center (Cayan et al., 2009). For this analysis, the moderate projected sea level rise along the California coast was used. The projected time horizon or year is not critical for the model runs (described below), but rather just the sea level rise amount. Therefore, to bracket the entire range of projected moderate case sea

level rise values, OCWD chose to model a low end of 0.5 feet and an upper end of 3 feet. Separate model runs were conducted for these two sea level rise cases, both for the Talbert Barrier area using the basin model and for the Alamitos Barrier area using the Alamitos Barrier flow model.

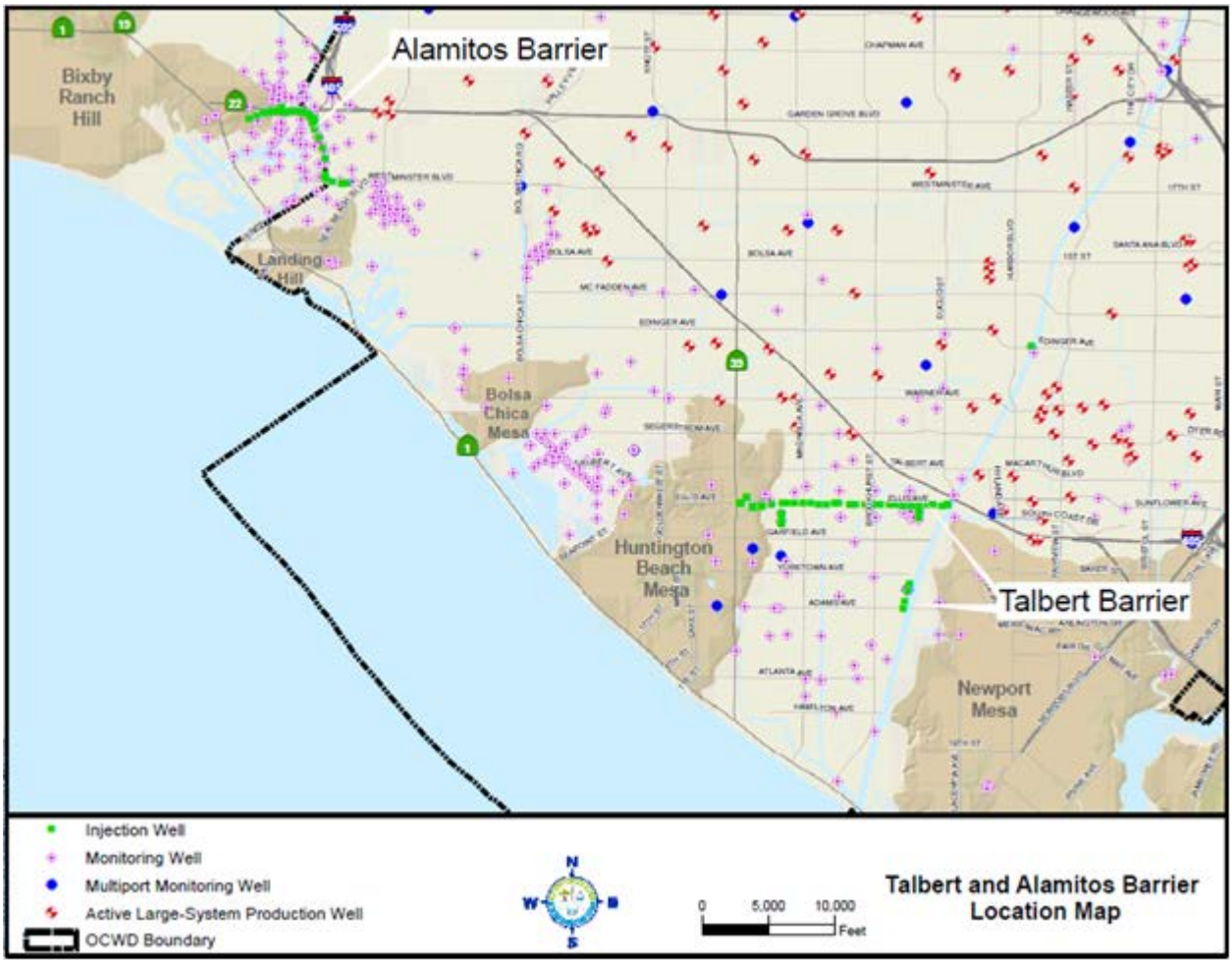


Figure 32: Locations selected for OCWD analysis

The model encompasses the entire basin and extends approximately three miles west into the Central Basin of Los Angeles County. The model grid cells are 500 by 500 feet and have vertical dimensions ranging from approximately 50 to 1,800 feet, depending on the thickness of each model layer at that grid cell location. The model accounts for time varying specified head boundaries, pumping rates, and recharge rates.

Model input data were obtained from well logs, aquifer pump tests, groundwater elevation measurements, hand-drawn contour maps, geologic cross sections, water budget spreadsheets, and other data stored in the OCWD Water Resources Management System (WRMS) database. The basin model was calibrated to transient conditions to achieve an acceptable match between simulated and actual observed conditions using monthly flow and water level data for the period 1990-1999.

4.5.3 Results

Increasing temperatures will melt ice sheets and glaciers and cause thermal expansion of ocean water, both of which will increase the volume of water in the oceans and thus contribute to global mean SLR. Regional SLR may be higher or lower than global mean SLR due to regional changes in atmospheric and ocean circulation patterns. Figure 33 shows the range of projected global mean SLR by 2100. Regional mean sea level along the Southern California coast is projected to rise by 40-300 mm (1.5-12 in) by 2030, 125-610mm (5-24 in) by 2050, and 405-1675 mm (16-66 in) by 2100.

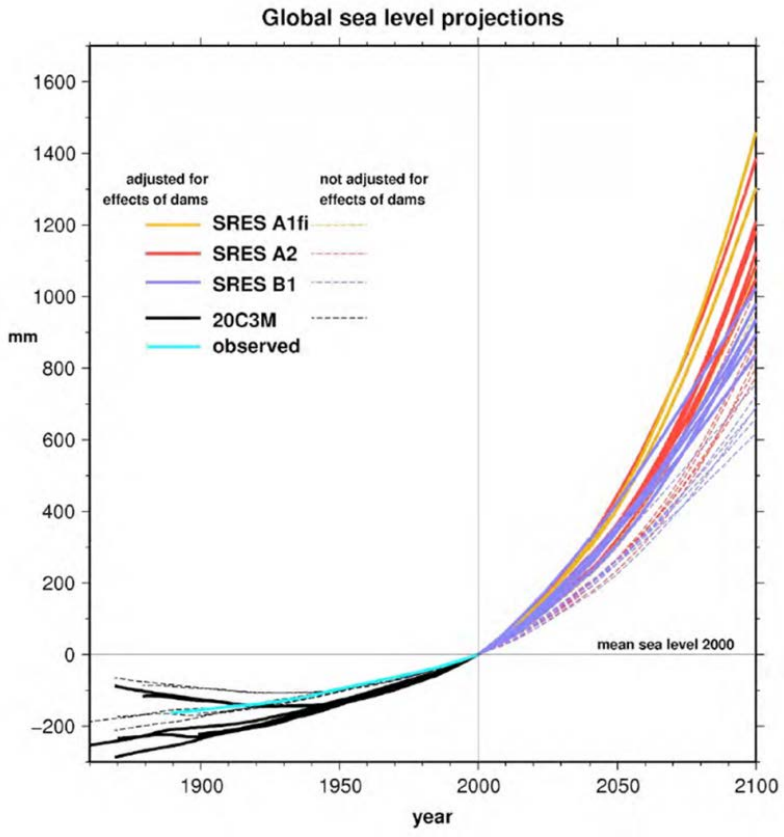
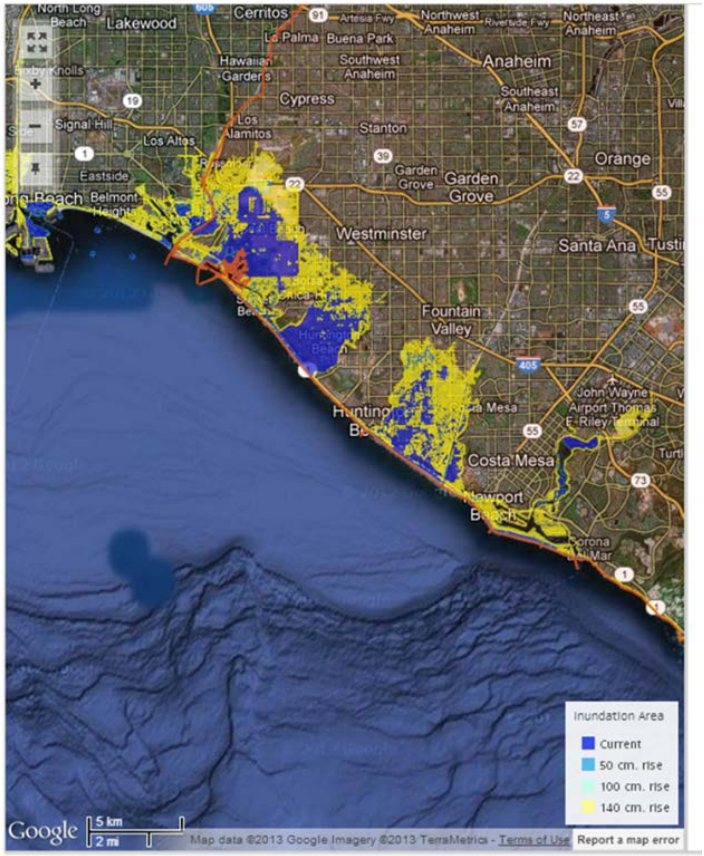


Figure 33: Projections of global mean sea level rise

Inundation due to SLR is likely to reduce the area of beaches and wetlands along the Southern California coast. In addition, SLR is likely to increase erosion of sea cliffs, bluffs, sand bars, dunes, and beaches along the California coast. However, the overall effects of climate change on local beaches will depend on changes in coastal ocean currents and storm intensities, which are less certain at this time. SLR is likely to increase the coastal area vulnerable to flooding during storm events. Figure 34 shows the areas of Orange County that are currently vulnerable to inundation due to a 100-year flood event (blue) and areas that will be vulnerable to inundation with a 1400 mm (55 in) rise in mean sea level (source: http://cal-adapt.org/sealevel/).

Detailed analysis carried out by Orange County Water District found that the Talbert Barrier would be effective at preventing seawater intrusions through the Tablert Gap under a 3-foot sea level rise. In the case of the Alamitos Barrier, seawater intrusion through the Alamitos Gap would likely be prevented once current plans to construct additional injection wells are implemented. At both barriers, however, shallow groundwater concerns could limit injection rates and thus reduce the effectiveness of barriers at preventing seawater intrusion under rising sea levels.



Source: http://cal-adapt.org/sealevel

Figure 34: Area at risk of inundation from 100-year flood event under current conditions (blue) and under 1400 mm sea level rise (yellow)

Average sea levels along the Southern California coast are projected to rise by 5 to 24 inches by 2050 and 16 to 66 inches by 2100. SLR is likely to inundate beaches and coastal wetlands and may increase coastal erosion. Effects on local beaches depend on changes in coastal ocean currents and storm intensity, which are highly uncertain at this time.

SLR will increase the area at risk of inundation due to a 100-year flood event. Existing barriers are sufficient to deter seawater intrusion at Talbert and Alamitos gaps under a 3-foot rise in sea levels. However, operation of barriers under SLR may be constrained by shallow groundwater concerns.

4.6 Decision Support and Impact Assessment Summary

A set of frequently asked questions (FAQs) were answered using the previous analyses. Those questions and the key findings are summarized below.

Will surface water supply decrease?

- Annual surface water is likely to decrease over future periods.
- Precipitation shows somewhat long-term decreasing trends.
- Temperature will increase, which is likely to cause increased water demand and reservoir evaporation.
- April 1st SWE will decrease.

Will groundwater availability be reduced?

- Groundwater currently provides approximately 54% of total water supply in an average year, and groundwater use is projected to increase over the next 20 years.
- Projected decreases in precipitation and increases in temperature will decrease natural recharge throughout the basin.
- Management actions such as reducing municipal and industrial water demands or increasing trans-basin water imports and recharge will be required in order to maintain current groundwater levels.
- A basin-scale groundwater screening tool was developed to facilitate analysis of basin-scale effects of conservation, increasing imported supply, changing agricultural land use, and other factors on basin-scale groundwater conditions.

Is Lake Elsinore in danger of drying up?

- Lake Elsinore has less than a 10% chance of drying up (2000-2099).
- In the 2000-2049 period, Lake Elsinore has a greater than 75% chance of meeting the minimum elevation goal of 1,240 ft.
- In the future period 2050-2099, Lake Elsinore has less than a 50% chance of meeting the minimum elevation goal of 1,240 ft.
- There is less than a 25% chance that Lake Elsinore will drop below low lake levels (1,234 ft) in either period.
- The Elsinore Valley Municipal Water District (EVMWD) project does aid in stabilizing lake levels; however, for the period 2050-2099 additional measures will likely be required to meet the minimum elevation goal of 1,240 ft.

Will the region continue to support an alpine climate and how will the Jeffrey Pine ecosystem be impacted?

- Warmer temperatures will likely cause Jeffrey pines to move to higher elevations and may decrease their total habitat.
- Forest health may also be influenced by changes in the magnitude and frequency of wildfires or infestations.
- Alpine ecosystems are vulnerable to climate change because they have little ability to expand to higher elevations.
- Across the State it is projected that alpine forests will decrease in area by 50-70% by 2100.

Will skiing at Big Bear Mountain Resorts be sustained?

- Simulations indicate significant decreases in April 1st snowpack that amplify throughout the 21st century.
- Warmer temperatures will also result in a delayed onset and shortened ski season.
- Lower elevations are most vulnerable to increasing temperatures.
- Both Big Bear Mountain Resorts lie below 3,000 m and are projected to experience declining snowpack that could exceed 70% by 2070.

How many additional days over 95°F are expected in Anaheim, Riverside and Big Bear City?

- All the climate projections demonstrate clear increasing temperature trends.
- Increasing temperatures will result in a greater number of days above 95°F in the future.
- The number of days above 95°F gets progressively larger for all cities advancing into the future.
- By 2070 it is projected that the number of days above 95°F will quadruple in Anaheim (4 to 16 days) and nearly double in Riverside (43 to 82 days). The number of days above 95°F at Big Bear City is projected to increase from 0 days historically to 4 days in 2070.

Will floods become more severe and threaten flood infrastructure?

- Simulations indicate a significant increase in flow for 200-year storm events in the future.
- The likelihood of experiencing what was historically a 200-year event will nearly double (i.e. the 200-year historical event is likely to be closer to a 100-year event in the future).
- Findings indicate an increased risk of severe floods in the future, though there is large variability between climate simulations.

How will climate change and sea level rise affect coastal communities and beaches?

- Climate change will contribute to global sea level rise (SLR) through melting of glaciers and ice caps and thermal expansion of ocean waters, both of which increase the volume of water in the oceans.
- Regional SLR may be higher or lower than global SLR due to effects of regional ocean and atmospheric circulation.
- Average sea levels along the Southern California coast are projected to rise by 5 to 24 inches by 2050 and 16 to 66 inches by 2100.
- SLR is likely to inundate beaches and coastal wetlands and may increase coastal erosion. Effects on local beaches depend on changes in coastal ocean currents and storm intensity, which are highly uncertain at this time.
- SLR will increase the area at risk of inundation due to a 100-year flood event.
- Existing barriers are sufficient to deter seawater intrusion at Talbert and Alamitos gaps under a 3-foot rise in sea levels. However, operation of barriers under SLR may be constrained by shallow groundwater concerns.

In order to adapt to the impacts of climate change described in this chapter, water managers need tools that enable them to make informed decisions. Reclamation has developed a tool, the Greenhouse Gas (GHG) Emissions Calculator, which can be used to inform adaptive strategies. This tool was used to conduct a demand management case study for Orange County. The tool and case study are presented in Chapter 5.

5.0 Demand Management to Inform Adaptive Strategies

5.1 Background

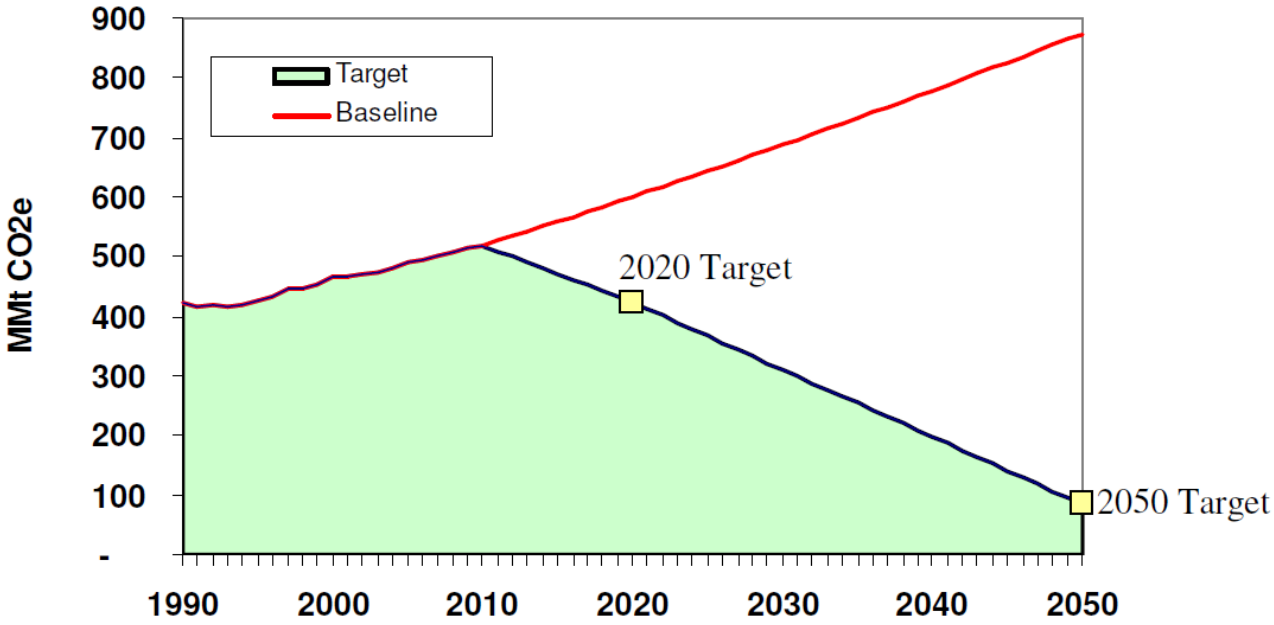
Water resource managers are currently being challenged to develop sustainable methods for adaptation and mitigation to climate change. Demands for treatment and transportation of water are increasing globally due to developments in industrial, agricultural and domestic water use, and water quality regulation (King and Webber, 2008). Large increases in energy use in the water sector are being driven by rising demand for food and bio-fuels, and their international trade, driving up irrigated cropland and cropping intensity (DOE, 2006). This estimate excludes the effects of climate change, which in many cases will put further pressure on water resources (IPCC, 2008). With increased irrigation, further development of ground water is highly likely. Declining ground water will compound energy use, as deeper wells require more carbon-intensive electric-driven pumps.

Growing populations are creating a higher water demand. In areas where water is already scarce, accelerated research will be required in order to develop sustainable mitigation and adaptation scenarios to climate change, while still meeting the demand. Consideration of alternative water supply systems, treatment technologies, or water allocation may have a tendency to overlook the carbon cost. This is particularly the case in the absence of regulatory pressure. The passing of California's Assembly Bill 32: The Global Warming Solutions Act (AB 32) is the first in a series of legislation forcing this issue to be addressed.

Climate change threatens California's natural environment, economic prosperity, public health, and quality of life (California Energy Commission, 2005; AB 32, 2006). Recognizing the need for action, California has put in place ambitious emission reduction goals in the form of AB 32. By requiring in law a reduction in GHG emissions, California has set the stage to transition to a sustainable, clean energy future, and put climate change mitigation on the national agenda, spurring action by many other states. AB 32 directly links anthropogenic GHG emissions and climate change, provides a timeline for statewide GHG emissions reduction, requires quantitative accounting of GHG emissions, and enforces disclosure of GHG emissions from ever major sector in the state.

AB 32 requires that every major sector in California reduce its GHG emissions to the 1990 levels by 2020, and to 80% below the 1990 levels by 2050, shown in Figure 35. These targets were developed from the levels of reduction climate

scientists agree is required to stabilize our climate (IPCC, 2008). The red line in Figure 35 represents the projected GHG emissions out to 2050, if no action is taken. In order to reach the GHG emissions target set by AB 32 for 2020, a reduction of approximately 30% is required from the no action scenario.



Source: http://ethree.com/documents/GHG6.10/CA_2050_GHG_Goals.pdf

Figure 35: AB 32 GHG Emission Reduction Targets

5.2 Methods

The methods used account for embodied energy and the subsequent GHG emissions of water consumption in a study area. Figure 36 illustrates the different energy consuming processes involved in the delivery and treatment of water. End-use of water is not considered in this analysis; for example, energy used for heating water in the home. The energy intensity of each of these processes, and the volume of water passing through each, will need to be known in order to accurately inventory emissions associated with water consumption. The degree to which each of the processes used to deliver water is identified, and the energy intensity of each of those processes is known, will define the accuracy of the methods for determining the GHG emissions from water consumption. Water conveyance can be the most impactful element in California. Communities in the south draw significant amounts of water from vast distances over elevated terrain.

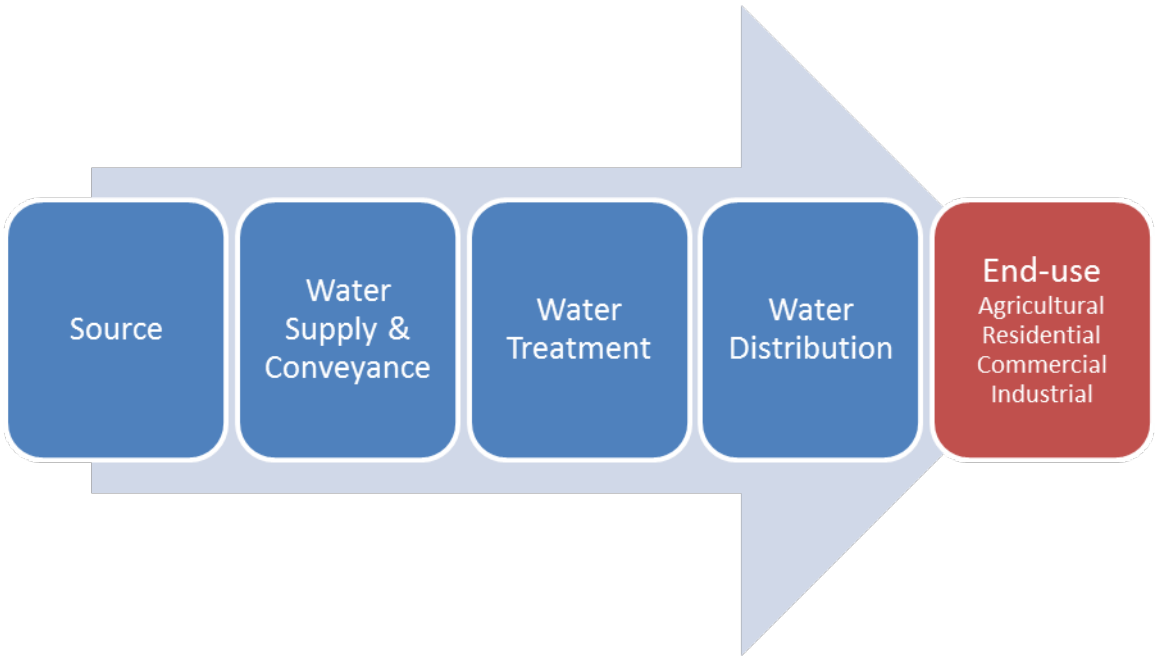


Figure 36: Energy Consuming Process in the Delivery and Treatment of Water (red not included in analysis)

Study area specific energy consumed per unit of water for each process of the water system is utilized. If site specific information is not available, southern California defaults are used. Default utility specific emission factors were obtained from the California Climate Action Registry Power/Utility Protocol reports. Annual average electricity emission factors came from the California Air Resources Board Greenhouse Gas Inventory (2007), and eGRID (2009).

Equation 2 depicts how total annual CO_2e emissions are calculated:

Annual CO_2e emissions = Extraction + Conveyance + Treatment + Distribution…….**Eq. 2**

Where:

Extraction =

$$\Sigma\,(\text{Source Percentage} * \text{Population} * \text{per capita Use} * \text{Process Energy Intensity}_{\text{GW Extraction}}) * \text{Energy Emissions Factor} * \text{Unit Conversions}$$

$$\text{Conveyance} = \Sigma\left(\text{Source Percentage} * \text{Population} * \text{per capita Use} * \text{Process Energy Intensity}_{\text{Conveyance}}\right) * \text{Energy Emissions Factor} * \text{Unit Conversions}$$

$$\text{Treatment} = \Sigma\left(\text{Source Percentage} * \text{Population} * \text{per capita Use} * \text{Process Energy Intensity}_{\text{Treatment}}\right) * \text{Energy Emissions Factor} * \text{Unit Conversions}$$

$$\text{Distribution} = \Sigma\left(\text{Source Percentage} * \text{Population} * \text{per capita Use} * \text{Process Energy Intensity}_{\text{Distribution}}\right) * \text{Energy Emissions Factor} * \text{Unit Conversions}$$

A GHG Emissions Calculator was developed by Reclamation to allow users to implement this method in order to easily and quickly evaluate how their water management decisions affect their water demand, energy use, and GHG emissions. A full technical report on the GHG Emissions Calculator will be published by fall 2013.

5.3 Application

In February 2008, California Governor Schwarzenegger directed state agencies to develop a plan to reduce statewide per capita urban water use by 20% by the year 2020. The GHG Emissions Calculator was used to evaluate whether this conservation measure alone would be enough to meet AB 32 targets (shown in Figure 35) in Orange County. The results show that a 20% reduction by the year 2020 allows Orange County to meet the 2020 target (back to 1990 levels), but do not meet the 2050 target of 80% below 1990 levels, as shown in Figure 37.

A 20% reduction in per capita water use every 10 years from 2020 to 2050 was evaluated in the GHG Emissions Calculator. These additional conservation measures only reach 50% below the 1990 GHG emission levels, as shown in Figure 38. In order to reach the AB 32 2050 target of 80% below the 1990 levels of GHG emissions through conservation alone, a per capita water use reduction of an additional 10% each decade would need to be achieved, results of which are shown in Figure 39. This level of conservation, shown in Table 9, may not be feasible for the area. In Figure 40, the three conservation scenarios described above are compared to the no action scenario, a task easily accomplished by the GHG Emissions Calculator. The GHG Emissions Calculator can also be used to

evaluate additional measures to reduce GHG emissions including changes to water supply portfolio, graywater reuse, and rainwater harvesting among many others. It is likely that a combination of measures will be required to meet the GHG emission reduction targets laid out in AB 32.

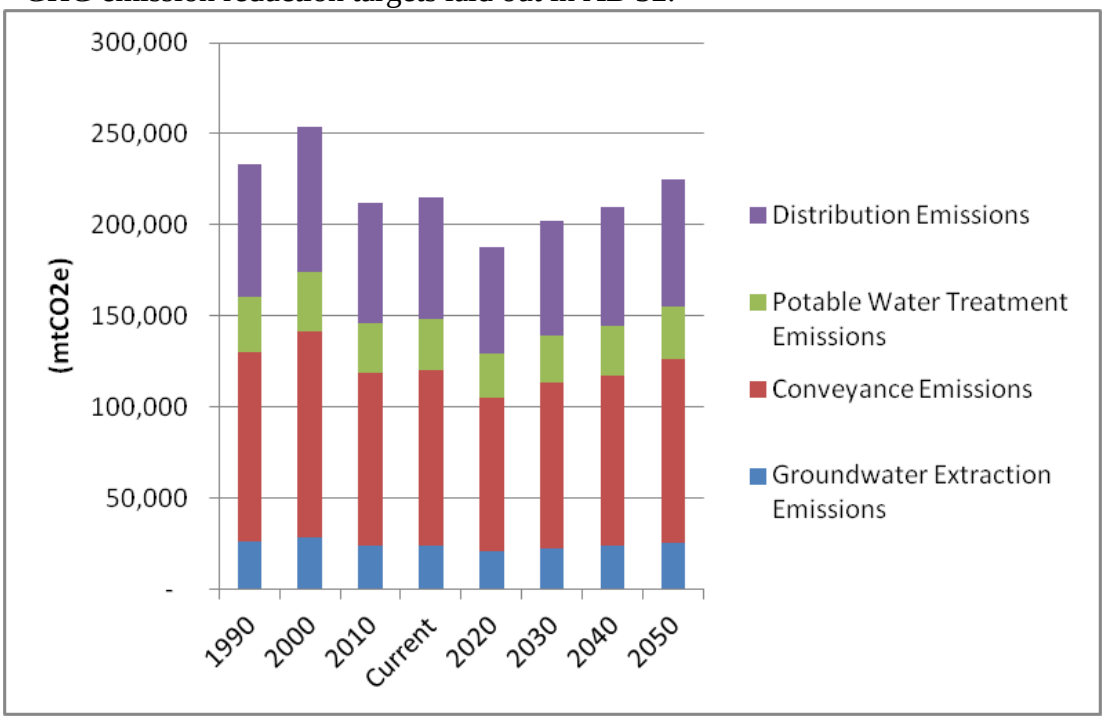


Figure 36: Conservation for Orange County to meet a 20% reduction in GHG emissions by 2020 (also referred to as 20x2020)

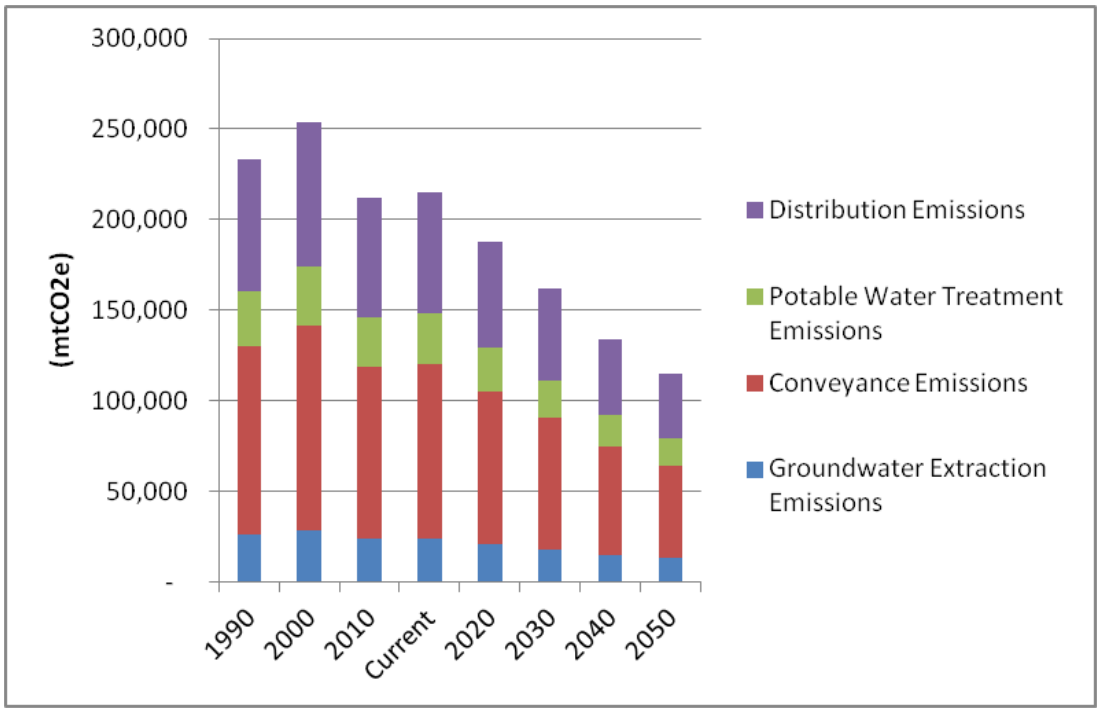


Figure 37: GHG emissions resulting from a 20% reduction in per capita water use every 10 years from 2020 to 2030 for Orange County

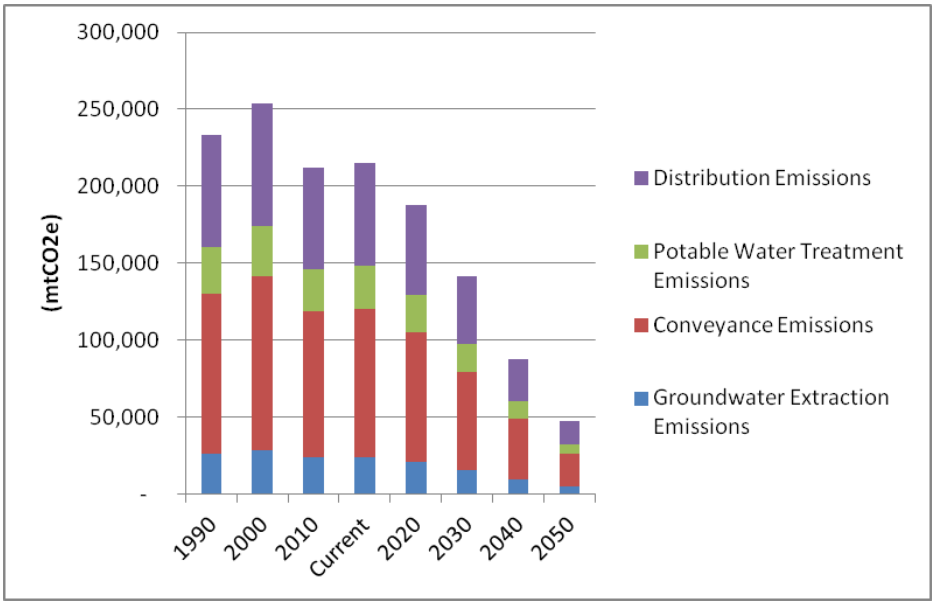


Figure 38: GHG emissions resulting from reductions in per capita water use shown in Table 9 for Orange County

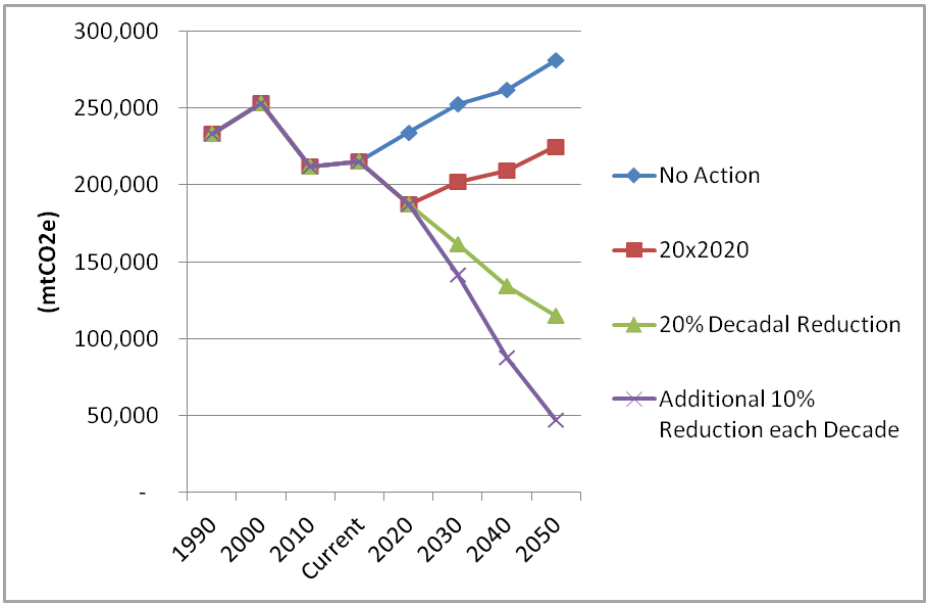


Figure 39: Comparison of GHG emissions resulting from conservation scenarios

Table 9: Conservation measures required to meet AB 32 2050 target

Historical and Projected Per Capita Water Use							
	1990	2000	2010	2020	2030	2040	2050
Per Capita Water Use (gpd)	240	221	175	140	98	59	29
Decadal Conservation Rate		-8%	-21%	-20%	-30%	-40%	-50%

6.0 Uncertainties

This analysis was designed to take advantage of best available datasets and modeling tools and to follow methodologies documented in peer-reviewed literature. However, there are a number of analytical uncertainties that are not reflected in study results, including uncertainties associated with the following analytical areas that can be grouped under two categories: climate projection information and assessing hydrologic impacts that inform many of the Basin Study FAQs.

6.1 Climate Projection Information

6.1.1 Global Climate Forcing

Although surface water hydrologic projections often consider future climate projections representing a range of future greenhouse emission paths, the uncertainties associated with these pathways are often not explored. Such uncertainties include those introduced by assumptions about technological and

economic developments, globally and regionally; how those assumptions translate into global energy use involving GHG emissions; and biogeochemical analysis to determine the fate of GHG emissions in the oceans, land, and atmosphere. Also, not all the uncertainties associated with climate forgings are associated with GHG assumptions. Considerable uncertainty remains associated with natural forcings, with the cooling influence of aerosols being regarded as the most uncertain on a global scale (e.g., figure SPM-2 in IPCC 2007).

6.1.2 Global Climate Simulations

While the activity presented in this report considers climate projections produced by state-of-the-art coupled ocean-atmosphere climate models, there are still uncertainties about the scientific understanding of physical processes that affect climate. For example, how to represent such processes in GCMs (e.g., atmospheric circulation, clouds, ocean circulation, deep ocean heat update, ice sheet dynamics, sea level, land cover effects from water cycle, vegetative, and other biological changes); and how to do so in a mathematically efficiently manner, given computational limitations. Still, these models have shown an ability to simulate the influence of increasing GHG emissions on global climate (IPCC 2007).

6.1.3 Climate Projection Bias Correction

Surface water hydrologic projections inherit GCM biases toward being too wet, too dry, too warm, or too cool. Such systematic biases in GCMs should be identified and accounted for through bias-correction of climate projections, prior to use in impacts studies. Bias correction of climate projections data affects results on incremental runoff and water supply response.

6.1.4 Climate Projection Spatial Downscaling

The Basin Study uses projections that have been spatially disaggregated on a monthly time step (following GCM bias correction on a monthly time step). Although this technique has been used to support numerous water resources impacts studies (e.g., Van Rheenan et al., 2004; Maurer, 2007; Anderson et al., 2008; Reclamation, 2008; Reclamation, 2010; Elsner et al., 2010), uncertainties remain about the limitations of empirical downscaling methodologies. One potential limitation relates to how empirical methodologies require historical reference information use on spatial climatic patterns at the downscaled spatial resolution. These finer-grid patterns are implicitly related to historical large-scale atmospheric circulation patterns, which presumably would change somewhat with global climate change. Application of the historical finer-grid spatial patterns to guide downscaling of future climate projections implies an assumption that the historical relationship between finer-grid surface climate patterns and large-scale atmospheric circulation is still valid under the future climate. In other words, the relationship is assumed to have statistical stationarity, meaning the joint probability distribution does not change when shifted in time or space. In actuality, it is possible that such stationarity will not hold at various space and time scales, over various locations, and for various climate variables. However,

the significance of potential non-stationarity in empirical downscaling methods, and the need to utilize alternative downscaling methodologies remains not well understood.

6.2 Assessing Hydrologic Impacts

6.2.1 Generating Weather Sequences Consistent with Climate Projections

The temporal disaggregation method developed first by Wood et al., (2002), was used in this Basin Study to translate monthly BCSD climate projections into daily VIC weather forcings. However, other techniques might have been considered. Choice of weather generation technique depends on aspects of climate change that are being targeted in a given study. Preference among available techniques remains to be established. Various characteristics, such as that the resampling approach, does not allow daily temperature ranges to vary from those selected with the sample, make the disaggregation approach unsuitable for studies focusing on potential changes in the diurnal range of temperature. In contrast, it may be sufficient for monthly time step hydrological assessments if the disaggregation is performed with thoughtful sampling constraints.

6.2.2 Natural Runoff Response

This Basin Study analyzes natural runoff response to changes in precipitation, temperature, and change in natural vegetation PET while holding other watershed features constant. Other watershed features might be expected to change as climate changes and affects runoff (e.g., vegetation affecting evapotranspiration and infiltration, etc.). On the matter of land cover response to climate change, the runoff models' calibrations would have to change if land cover changed, because the models were calibrated to represent the historical relationship between weather and runoff as mediated by historical land cover. Adjustment to watershed land cover and model parameterizations are difficult to consider due to lack of available information to guide such an adjustment. Eco-hydrological frameworks, perhaps involving dynamic vegetation response, may be suitable to represent such land surface changes for studies in which such sensitivities are important.

6.2.3 Hydrologic Modeling

The hydrology model used in the Basin Study excludes ground water interaction with surface water systems. The fate of precipitation is modeled as loss only to runoff and evapotranspiration; and loss of precipitation to deep percolation and return flows to stream channel networks are not considered in the VIC hydrology model. The groundwater impacts in the basin are simulated using a simplified tool.

6.2.4 Bias and Calibration

Where the VIC applications have been calibrated, they can reproduce historical natural streamflow with little bias. Where the VIC applications have not been

calibrated, they can exhibit significant bias. The location-specific implications of calibration, or lack thereof, on the conclusions of the study have not been quantified.

6.2.5 Time Resolution of the Applications

Simulations were conducted at daily time steps, while the applications were calibrated to reproduce monthly and annual runoff characteristics at a subset of locations in the basin. For this reason, users should cautiously interpret the daily hydrologic information coming from these simulations. The daily runoff information is physically consistent with assumed weather forcings and hydrologic model structure; however, there could be significant simulation biases at the submonthly level.

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Appendix F Climate Change Vulnerability Assessment Technical Memorandum

WESTERN MUNICIPAL WATER DISTRICT
Securing Your Water Supply

Technical Memorandum

To: Drought Contingency Plan Task Force

From: Drought Contingency Plan Development Team

CC: Melissa Matlock, Western Municipal Water District

Date: 4/22/2021

Re: Western Drought Contingency Plan – Climate Change Vulnerability Assessment

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Executive Summary

This technical memorandum (memo) describes the retrieval and analysis of climate data provided by the California Department of Water Resources (DWR) to project the impact of climate change on future water supplies and demands within Western Municipal Water District's (Western) service area. The DWR climate data is assembled from the results of 20 global climate models, which best represent California's climate processes. Biases in the climate model results have been adjusted using historical hydrologic data in the state. DWR projected climate change data is most appropriate for this analysis because it is the only climate projection dataset specifically developed to meet the requirements of water resources planners in California. Western is making this memo available to its retail agencies for their use in their respective water resource planning efforts to reduce the data processing burden on individual agencies. The results are intended for use by Western and its member agencies as they prepare the 2020 updates to their Urban Water Management Plan (UWMP) and a regional Drought Contingency Plan (DCP). This technical memo provides:

- A description of the area subject to the vulnerability assessment
- A description of the analysis approach and data sources chosen for the analysis
- Narrative discussions of the climate change factors calculated for local supply and demand conditions in multiple scenarios
- Discussion of the water supply and demand projections resulting from the vulnerability assessment

Summary of Findings

Projected changes in future water supplies and water demand are analyzed during a normal year, a single dry year and multi-year (5-year) droughts over the next 20 years, using climate projections developed for the water resources planning by DWR. This analysis of future climate impacts on water supplies and demands is based on the median projected change from the majority of the climate models selected for water resources planning in California. The results of this analysis show:

- Projected decreases in water supplies from Santa Ana and Santa Margarita River basins under normal and drought conditions relative to baseline conditions in 2020, due to projected decreases

in precipitation and projected increases in surface water evaporation caused by increasing temperatures.

- Smaller decreases in projected precipitation and natural recharge under normal and multi-year drought years. However, the single dry year was slightly wetter under future conditions compared to the baseline. Precipitation will occur during shorter rainy seasons with higher intensity.
- Outdoor water uses are projected to increase under normal, single dry, and multi-year drought conditions, caused by projected temperature increases, which lead to higher evapotranspiration (ET) rates for landscaping, irrigated crops, and native vegetation.

This technical memo also includes worksheets for using the vulnerability assessment results with Western's water supplies and growth-adjusted water demand forecasts for the Western's wholesale service area.

1. INTRODUCTION

The study of climate change impacts on water resources is continuously yielding new models and updated local and regional datasets. This continuous improvement makes it necessary to narrow the selection of data sources and methods of data analysis most applicable to local conditions. The scope of this vulnerability assessment is limited to improving our understanding of climate change impacts on future water demand in Western's wholesale service area and the sources of Western's water supplies during normal and drought periods.

The following section provides the background information for the requirements of both the DCP and the UWMP, a general description of the impacts analyzed in the vulnerability assessment, and information about Western's sources of information used in the assessment.

1.1 DCP and UWMP Requirements for Climate Change Analysis

In accordance with Sections 10610 to 10657 of the California Water Code, the UWMP requires the consideration of climate change impacts for drought planning because of the significant duration of recent droughts in California. This includes an analysis of projected future uses and the reliability of anticipated water supplies during a normal year, a single dry year and drought lasting 5 consecutive dry water years. This drought risk assessment (DRA) compares projected water supply sources with projected water use over the next 20-years, in 5-year increments.

A vulnerability assessment is required as part of the DCP to understand the characteristics and potential risk of future droughts and to develop appropriate mitigation and response actions. Since future droughts cannot be predicted by observed past drought information, the inclusion of a climate change analysis is needed to provide the incorporation of historic and future climate projections to assess the hydrological impacts of climate change on drought conditions, thereby creating a more effective plan. The DCP requires either a qualitative and/or quantitative assessment of a range of potential drought conditions derived from climate change information to determine potential the risk to critical resources.

Imported water projections are also required for preparing both the UWMP and DCP. However, the imported water projections for Western's service area are being developed by Metropolitan Water District (Metropolitan) as part of their 2020 UWMP Drought Risk Assessment and the 2020 Integrated Resources Plan (IRP). The current (November 2020) draft of Metropolitan's 2020 UMWP Drought Risk Assessment indicates that no service reliability concerns are projected for imported water during normal and drought periods before 2045. For purposes of the UWMP, imported water supplies to Western can be assumed to be unchanged during normal years, single dry years and 5-year droughts.

However, the 2020 IRP considered a range of more extreme potential future scenarios, which include: low demands with stable imported supplies, high demand with stable imported supplies, low demand with reduced imported supplies, and high demand with reduced imported supplies. The analysis found that service reliability issues could occur more frequently and generate increasingly more severe deficits of imported supplies under the high future demand scenarios. Options for managing these imported water supplies deficits will be explored more extensively as part of regional analysis for the DCP.

1.2 Prior Climate Studies

Climate change is primarily caused by increasing global concentrations of greenhouse gases which lead to increases in temperature, disruption of the hydrologic cycle, and increased variability of precipitation. The regional impacts of climate change analyzed in two previous studies for the region, California's Fourth Climate Change Assessment and the United States Bureau of Reclamation (USBR) Santa Ana Watershed Study, are summarized in this section.

The state of California produces periodic assessments on the potential impacts of climate change in the state and reports on potential adaptation responses as required by Executive Order #S-03-05. California's Fourth Climate Change Assessment includes a Statewide Summary Report (Bedsworth et al., 2018), nine regional summary reports, a climate justice summary report, and over 40 technical reports which translate climate science into actionable adaptation and resilience policies and plans. The Los Angeles Regional Report (Hall et al., 2018) summarizes climate science, impacts, and adaptation information for Ventura, Los Angeles, Orange, and the western parts of San Bernardino and Riverside Counties. This study projects regional increases in average maximum temperatures of around four to five degrees Fahrenheit (° F) by the mid-21st century, and five to eight ° F by the late 21st century. The hottest days of the year could become up to 10° F warmer for many locations in the region by the late 21st century.

California's report also projects small changes in average annual precipitation, and in the recurrence of extreme dry and wet years. However, rainfall intensification could result in more severe atmospheric river events and rainfall increases of up to 25 to 30% on the wettest days of the year. While these assessments provide information on the magnitude of regional climate impacts, they do not provide information about climate change impacts at a scale that is directly applicable to local watersheds, water supplies, and demands.

The USBR conducted a study of local climate change impacts in the Santa Ana River Watershed (USBR, 2013). The study used a groundwater screening tool to simulate monthly water balance changes in the Orange County, Upper Santa Ana Valley, and Elsinore/San Jacinto groundwater basins. Historical monthly time series of precipitation over the groundwater basin as well as municipal and industrial

water demand were analyzed for the period 1990-2009. Future water supply was analyzed for the Santa Ana River Watershed using a hydrologic model to simulate streamflow using 112 different future climate conditions. The results show future increases in water demand and reservoir evaporation due to increased temperature. Smaller, long-term decreases in precipitation are also projected. The combined impacts of these changes include decreases in annual available surface water and increased reliance on groundwater. In the 2013 USBR study, groundwater was estimated to provide approximately 54% of total water supply.

The 2013 USBR study does not account for analysis methods instituted for studying and avoiding adverse impacts under California's Sustainable Groundwater Management Act (SGMA) which was passed by the state legislature in 2014. In particular, the 2013 USBR study used a transient climate change analysis method to generate a continuous future projection from the present through end of century. The results of a such a transient climate analysis cannot be used to analyze extreme events such as a single dry year or a multi-year drought as required under the UWMP regulations.

In summary, prior studies which include statewide and regional climate assessments provide relevant background information. However, they do not provide information on climate change impacts on local water supplies and demands within the Santa Margarita basin and other service areas outside of the Santa Ana basin or on the changing severity of future drought periods. This climate change vulnerability assessment aims to provide a uniform analysis of climate impacts for all areas of Western's service area for use in regional water supply and drought planning.

1.3 Study Objectives

The objectives of this vulnerability study are to:

1. Identify the appropriate datasets for use in this analysis,
2. Project the magnitude of climate-driven changes in water supply and demand for Western's service area, and
3. Estimate the projected future impacts using the climate change factors applied to the water supply sources and water demands in the service area.

Temperatures increases and changes in precipitation patterns with climate change are expected to shift the balance between local water supply and demand within Western's service area and other parts of the state. Increases in temperature lead to increases in consumptive water use for irrigated agriculture and to maintain landscaping for residential, commercial, and recreational use. This increase in consumptive water use is compounded by increases in the portion of rainfall that is evaporated back into the atmosphere from open spaces and water bodies and consumed by native vegetation outside of urban areas. In addition, population growth within the plan area could also lead to expansion of demand.

Annual precipitation in southern California is highly variable and a significant portion of the regional rainfall is concentrated in winter months from November to April. There are typically years with much greater than average precipitation and years with much less than average precipitation. During wet years, seasonal precipitation replenishes aquifers, streams, rivers, and reservoirs which are the sources of water supply. During dry years, there is increased extraction of groundwater reserves to make up the

deficit. Climate change is expected to increase the year-to-year variability in precipitation within the region as well as in other parts of the state from which imported water is sourced. The second objective of this vulnerability study is to estimate the severity of future water supply and demand changes during drought years for use in drought management and mitigation planning for Western's service area.

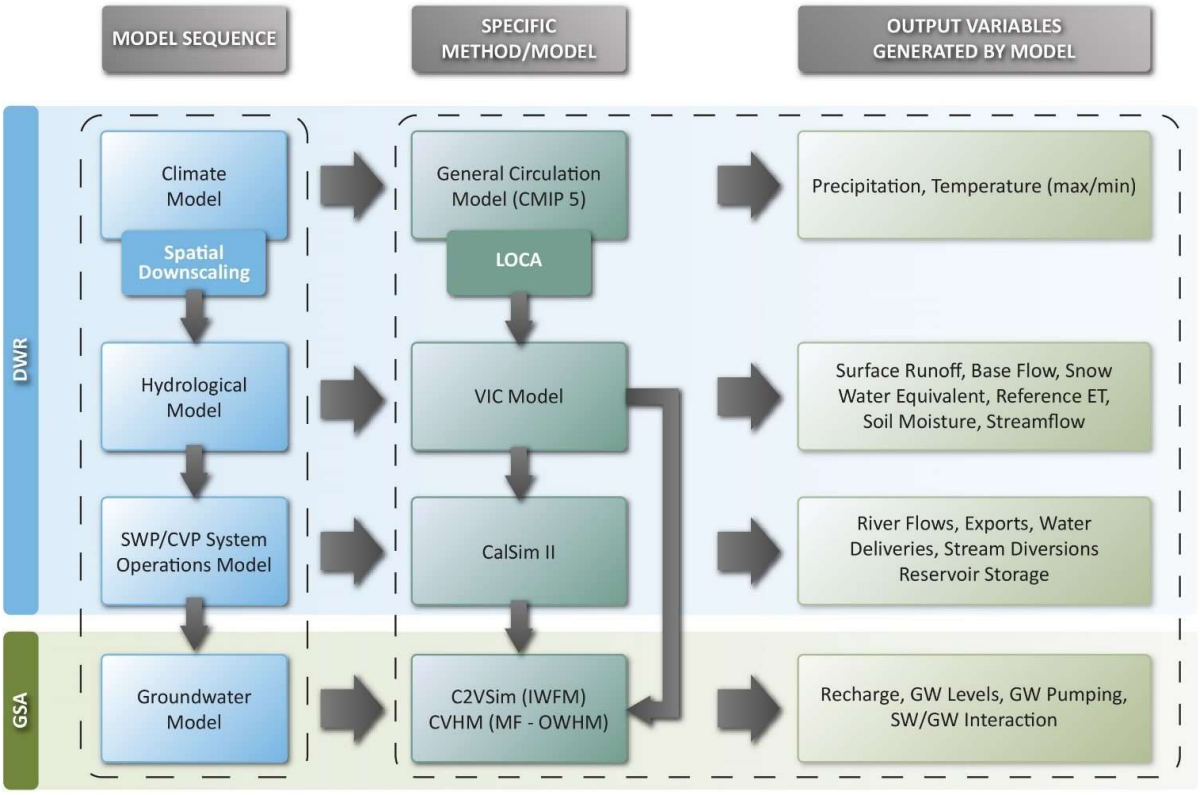
1.4 Description of Data Sources

DWR has developed statewide climate change datasets to for use in the water resource planning. The datasets depict climate conditions in California under historical and future climate conditions which are defined as follows:

- Year 2030 future condition with projected climate and sea level conditions for a 30-year period, centered at 2030
- Year 2070 future condition with projected climate and sea level conditions for a 30-year period, centered at 2070
- Year 1995 historical condition with climate and sea level conditions for a 30-year period, centered at 1995

The 2030 and 2070 climate projections are based on an ensemble of 20 global climate projections selected by the DWR Climate Change Technical Advisory Group (CCTAG) as the most appropriate projections for California water resources evaluation and planning (DWR CCTAG, 2015). The datasets are provided at a spatial resolution of 1/16th degree (approximately 3.75-mile grid cells) over California for each calendar month from 1915 through 2011.

Figure 1 shows an overview of the modeling processes used by DWR (highlighted with a blue background) in creating the statewide climate datasets which are used in this study. The lower section of the image (highlighted with a green background) shows how individual groundwater sustainability agencies are expected to use the data in groundwater models to model groundwater conditions as they collaborate to attain sustainability objectives.



DWR: Department of Water Resources; GSA: Groundwater Sustainability Agency; SWP: State Water Project; CVP: Central Valley Project; LOCA: Localized Constructed Analogs; VIC: Variable Infiltration Capacity; CalSim: SWP & CVP Operations Model; C2VSim: California Central Valley Groundwater - Surface Water Simulation Model; IWFM: Integrated Water Flow Model; CVHM: Central Valley Hydrologic Model; MF - OWHM: MODFLOW One Water Hydrologic Flow Model; ET: Evapotranspiration, SW: Surface Water; GW: Groundwater; CMIP 5: Coupled Model Intercomparison Project

Figure 1: Overview of Modeling Processes Used by DWR in Creating the Statewide Climate Datasets (SOURCE: DWR, 2018).

DWR has also run the climate datasets run through a hydrologic model called the Variable Infiltration Capacity (VIC) model to simulate future hydrologic conditions and route runoff to the outlet of subbasins defined by each eight-digit Hydrologic Unit Code (HUC) in California. Streamflow change projections from the VIC model are provided as monthly time series from 1915 through 2011 for each eight-digit HUC subbasin. As illustrated in Figure 2, the VIC model takes input climate variables such as precipitation and temperature, and it performs a series of hydrologic computations within each cell to output variables such as soil moisture, evapotranspiration, and surface runoff within each cell. The RVIC routing algorithm is then used to route runoff from each cell to its associated subbasin outlet.

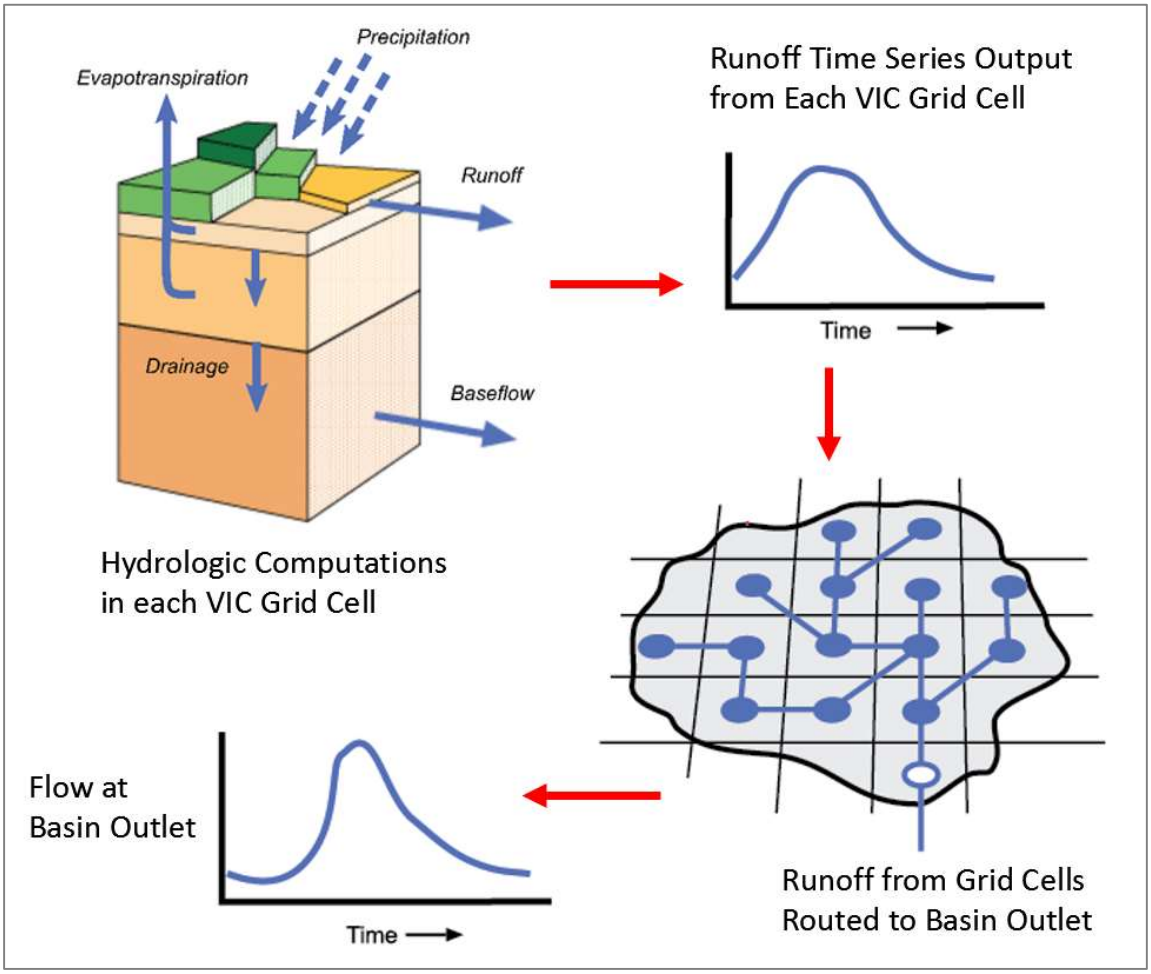


Figure 2: Schematic of the VIC Model Showing Hydrologic Computations Within Each Grid Cell and Runoff Routing

DWR has applied the VIC model to perform hydrologic simulations under historical climate conditions and under projected future climate conditions in 2030 and 2070 over 8,000 grid cells statewide. Runoff from these grid cells have also been routed to the outlet of each eight-digit HUC watersheds in the state for use in the water resource planning.

As previously shown in Figure 1, climate assessments are performed with a chain of models, each of which introduces some biases in the modeling process and derived products. To minimize the impact of such biases in decision processes, DWR presents the simulated climate projections in terms of relative change from historical conditions rather than as absolute values. For example, each monthly precipitation value simulated under 2030 conditions is divided by the precipitation value simulated for the same month under historical conditions, using the same chain of models. The resulting ratio of a simulated future value to the corresponding simulated historical value is referred to as a change factor. DWR has computed monthly time series of change factors for precipitation and evapotranspiration in each VIC grid cell and the streamflow for each HUC-8 watershed. The resulting change factor datasets are available for retrieval and use in water resources planning from the publicly accessible SGMA Data Viewer (https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer). A more complete description

of methods used in computing the climate datasets is provided in a publication entitled "Guidance for Climate Change Data Use During Groundwater Sustainability Plan Development" (California DWR, 2018).

2. CLIMATE ANALYSIS APPROACH

2.1. Preprocessing Data for Western's Service Area

The statewide climate datasets include 57 grid cells each with a spatial resolution of 1/16th degree (approximately 3.75-mile) for Western's service area are shown in Figure 3.

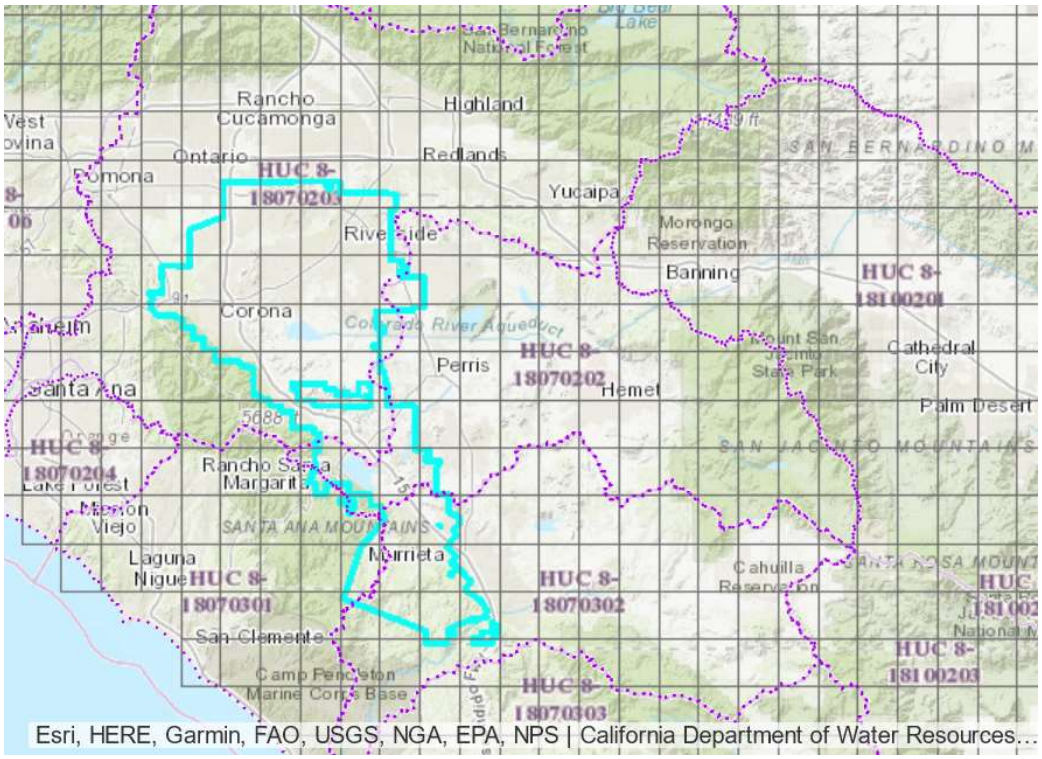


Figure 3: Climate Grid Cells and Watersheds Covering Western's service area.

Each grid cell contains 97 years of monthly time series (1915 to 2011) showing projected precipitation and evapotranspiration changes under 2030 and 2070 climate conditions relative to 1995 conditions. The area of each grid cell which falls within the service area is estimated by spatially intersecting feature layers of the climate grid and Western's service area boundary. Regional time series of projected precipitation and evapotranspiration changes are computed from the cell time series by using an area-weighted average of data from grid cells which fall wholly or partially within the service area. Projections of future streamflow change were also retrieved for the Santa Ana River (HUC- 18070203) and the Santa Margarita River (HUC- 18070302) basins which provide surface water supplies to portions of the service area.

2.2. Analysis of Normal, Single, and Multi-Year Drought Periods

Every urban water supplier is required to assess water service reliability in normal year, single-dry year, and multiple-dry years lasting 5-years. For imported water supplies, the normal and dry years used by Metropolitan are adopted for Western since it is the largest source of imported water. For local water supplies, year types are selected by reviewing time series data at two local precipitation gauges with long time historical records. The monthly time series for the gauge at Riverside Fire Station 3 are available online in the California DWR Bulletin 195 from back as far back as 1882 but were last updated in 2007. The CIMIS #44 gauge has more current data available from 1986 to present. For this analysis, the Riverside FS3 gauge is used because it has full coverage of the normal period of record (1922 to 2004) used in the imported water analysis.

Table 1: Analysis Periods for Normal, Single and Multi-Year Droughts

Year Type	Imported Supplies	Riverside FS3 Gauge	CIMIS #44 Gauge
Normal	1922 - 2004	1922 - 2004	1986 - 2020
Single Dry-Year	1977	1989	2007
Five-Year Drought	1988 - 1992	1971 - 1975	2005 - 2009

The results shown in Table 1 indicate that 1989 was the single driest year locally, while 1977 was the driest year for imported water. The driest 5-year period for local supplies was from 1971 to 1975, while imported water supplies were lowest from 1988 to 1992. Year types for the CIMIS #44 gauge are also provided in the table for reference.

2.3. Computing Water Supply Change Factors

Local water sources used within Western's service area include local groundwater from 12 different groundwater basins, surface water supplies from Santa Ana River and the Santa Margarita River basins, recycled water from indoor water use, and reclaimed groundwater. Groundwater systems are recharged through a variety of water sources. These sources of recharge can be described as:

- Natural recharge is the portion of precipitation that infiltrates to the underlying aquifer within the same grid cell in which precipitation occurs. Changes in natural recharge are directly related to changes in precipitation in the grid cell.
- Artificial recharge (including injection systems)) is water that is diverted from rivers and streams for the purpose of replenishing the underlying aquifer. Since artificial recharge relies on surface water and other remotely sourced water supplies, it is influenced by accumulative flow changes in the source watersheds.

Supplies of recycled water and reclaimed water which are sourced from indoor uses are largely insensitive to changes in climate. For this analysis, three different sets of climate change results are

computed for use with natural recharge, the Santa Ana River, and the Santa Margarita River sources, respectively.

For characterization of future changes in natural recharge, precipitation change projections from the DWR-provided climate change dataset is used. The 97-year monthly time series of precipitation for Western's service area is used to compute Water Supply Change Factors which show percentage changes in mean monthly and mean annual precipitation under future 2030 and 2070 climate conditions relative to historical conditions under 1995 conditions. The 2030 and 2070 Water Supply Change Factors for natural recharge are computed for normal year, single dry year, and 5-year drought periods.

Characterization of future changes in the Santa Ana and Santa Margarita River basins are based on streamflow projections from the VIC model under 2030 and 2070 climate conditions. The streamflow projections are used to compute Water Supply Change Factors which show percentage changes in mean monthly and mean streamflow under future 2030 and 2070 climate conditions relative to historical conditions under 1995 conditions. Change factors are similarly computed for normal year, single dry year, and 5-year drought periods.

Each set of Water Supply Change Factors is interpolated at 5-year intervals from 2020 to 2045. The 1995 to 2011 conditions are used to project climate change conditions out to 2030. Linear interpolation is used to determine the climate change factors between 2020 and 2030, based on the historic conditions from 2011 and the projected conditions for 2030. Different climate change conditions are anticipated between 2030 and 2070 because of the implementation of policies and practices that are expected to influence the rate of climate change further out in time. For the years between 2030 and 2070, linear interpolation is used for the 5-year increments based on the difference in projected conditions at 2030 and the projected conditions at 2070. Time series of Water Supply Change Factors are similarly interpolated at 5-year intervals for normal year, single dry year, and 5-year drought periods for application to local water sources for 2020 to 2045.

2.4 Computing Water Demand Change Factors

Indoor and outdoor water uses are computed separately when considering climate impacts. Outdoor water use, particularly landscape irrigation, is sensitive to changes in climate while indoor water use is generally not sensitive. Plants require more water to sustain growth in a warmer climate, and users respond to increases in temperature by increasing landscape irrigation to keep their plants alive and flourishing. This increase in water requirement is characterized in climate models using the rate of evapotranspiration which represents total amount of water released from soil, plants, and water bodies from the land surface to the atmosphere through evaporation and transpiration.

The DWR datasets includes 57 grid cells each with a spatial resolution of 1/16th degree (approximately 3.75-mile) for Western's service area. Each grid cell contains 96 years of monthly time series (1915 to 2011) showing projected evapotranspiration changes under 2030 and 2070 climate conditions. An area-weighted average of the evapotranspiration data from the 57 cells is first computed to generate a single time series for Western's service area. The regional time series is used to compute Water Demand Change Factors which show percentage changes in mean monthly and mean annual evapotranspiration under future 2030 and 2070 climate conditions relative to historical conditions under 1995 conditions.

Similar values of 2030 and 2070 Water Demand Change Factors are computed for normal year, single dry year, and 5-year drought periods.

The Water Demand Change Factors are computed for 5-year intervals from 2020 to 2045 by interpolation. The 1995 to 2011 conditions are used to project climate change conditions out to 2030. Linear interpolation is used to determine the climate change factors between 2020 and 2030, based on the historic conditions from 2011 and the projected conditions for 2030. Different climate change conditions are anticipated between 2030 and 2070 because of the implementation of policies and practices that are expected to influence the rate of climate change further out in time. For the years between 2030 and 2070, linear interpolation is used for the 5-year increments based on the difference in projected conditions at 2030 and the projected conditions at 2070. The 5-year time series of Water Demand Change Factors are similarly interpolated for normal year, single dry year, and 5-year drought periods for application to growth adjusted indoor water use projections for 2020 to 2045.

3. LOCAL CLIMATE CHANGE RESULTS

3.1. Water Supply Change Factor Results

The water supply change factors for precipitation and natural recharge are shown in Table 2. For normal years, precipitation and natural recharge are initially projected to decrease during the first decade before stabilizing during the second decade. The maximum projected range of decrease for normal year values is 1.7 percent. However, the projections show that droughts will initially be less severe from the perspective of local rainfall and recharge for the single dry year with increases of up to 1 percent. Recharge during 5-year droughts is projected to decrease by up to 2.3 percent by 2045.

Table 2: Water Supply Change Factors for Precipitation and Natural Recharge with 2020 as the Baseline Year

Year	Normal	Dry	5-year Dry
2020	100.0%	100.0%	100.0%
2025	99.1%	100.5%	99.5%
2030	98.3%	101.0%	98.9%
2035	98.5%	100.8%	98.5%
2040	98.7%	100.7%	98.1%
2045	98.9%	100.5%	97.7%

Table 3 shows the effects climate change on water supply change factors for use with the Santa Ana River basin water supplies using 2020 as the baseline year. Flows are projected to decrease for normal,

single dry, and multi-year periods. Normal year flows are projected to gradually decrease by up to 3.1 percent by 2045. Flow decreases of up to 7.2 percent during single dry years and 5.5 percent during multi-year droughts are projected by 2045.

Table 3: Water Supply Change Factors for the Santa Ana River Flows with 2020 as the Baseline Year

Year	Normal	Dry	5-year Dry
2020	100.0%	100.0%	100.0%
2025	99.6%	99.6%	99.0%
2030	99.1%	99.2%	98.1%
2035	98.4%	97.1%	96.9%
2040	97.6%	94.9%	95.7%
2045	96.9%	92.8%	94.5%

Table 4 shows the effects climate change on water supply change factors for the Santa Margarita River basin supplies using 2020 as the baseline year. The projected changes in normal year flows are very similar to those in the Santa Ana River basin with decreases reaching 3.6 percent by 2045. Flow decreases of up to 5 percent during single dry years and 5-year droughts are projected by 2045.

Table 4: Water Supply Change Factors for the Santa Margarita River Flows with 2020 as the Baseline Year

Year	Normal	Dry	5-year Dry
2020	100.0%	100.0%	100.0%
2025	99.7%	99.9%	99.5%
2030	99.3%	99.8%	98.9%
2035	98.4%	98.2%	97.6%
2040	97.4%	96.6%	96.3%
2045	96.4%	95.0%	95.0%

These water supply change projections indicate that as climate change progresses, local water systems which rely on natural recharge are likely to become more reliable water supply sources, while river supplies that are water sources for artificial recharge are likely to become less reliable. Natural groundwater recharge will still occur in normal and dry year, but the timing of available water will change as precipitation will increasingly fall during a shorter rainy season with a longer dry season each year. Furthermore, the increase in temperatures over time will also lead to increases in evaporation from surface water bodies and land surface which will decrease the volume of water available for diversion from rivers. diversions from rivers. Increased attention should be paid to understanding the adequacy and operational constraints of natural and artificial recharge systems in the service area.

3.2 Water Demand Change Factors Results

Table 5 shows water demand change factors for outdoor water uses for Western's service area. The impacts of climate change on outdoor water demand are projected to be similar during normal and drought years over the next two decades. This is because climate change datasets show that temperatures are projected to increase over time, regardless of hydrologic conditions. These projected increases in temperature are estimated to increase ET rates for landscaping, irrigated agriculture, and native vegetation. For all year types, outdoor water use is projected to increase by about 3 percent during the next two decades.

Table 5: Water Demand Change Factors for Outdoor Water Uses with 2020 as the Baseline Year

Year	Normal	Dry	5-year Dry
2020	100.0%	100.0%	100.0%
2025	100.6%	100.6%	99.8%
2030	101.2%	101.3%	101.2%
2035	101.8%	101.9%	101.8%
2040	102.4%	102.5%	102.4%
2045	103.1%	103.2%	103.0%

The water demand change factors are applied to outdoor water uses, which have been adjusted for future population growth and conservation measures. Indoor water uses are assumed to respond to future population growth and conservation as well but are not sensitive to climate change.

4. APPLYING RESULTS TO LOCAL WATER ANALYSIS

4.1. Computing Future Water Supply and Demand

Climate change impacts on future water supplies and demands must be considered by Western and its retail agencies when preparing the 2020 updates to their respective UWMPs, in accordance with California Water Code requirements, and will also inform development of the DCP.

This technical memo provides Western and its retail agencies with the ability to utilize the data in the DWR climate change projections and methods of climate change analysis for Western's service area to evaluate the impacts of climate change either qualitatively or quantitatively. If quantitative methods are used, computations needed to convert the percent change results presented in this memo into quantitative estimates of future water supply and demand are provided as worksheets included as Appendix A of this report. The worksheets consist of the following six tables:

- Table A1: Normal Year Water Supply Projections
- Table A2: Single Dry Year Water Supply Projections
- Table A3: Multi-Year Drought Water Supply Projections
- Table A4: Normal Year Water Demand Projections
- Table A5: Single Dry Year Water Demand Projections
- Table A6: Multi-Year Drought Water Demand Projections

If an agency desires to use these worksheets, an agency would enter its baseline water supply and demand values in Section 1 of each table. Section 2 of each table is prepopulated with the regional water supply and demand change factor results. Instruction for finalizing future water supply and demand values by multiplying values from section 1 with corresponding values from Section 2 of each table are includes in the "Notes" column of each table.

While not required for preparing the UWMPs, monthly change factors are useful for understanding how seasonal changes are contributing to the annual changes discussed in Section 3 of this report. Monthly values are also useful for planning management actions and mitigation actions in the DCP. Monthly water supply and demand change factors computed for the service area are presented in Appendix B which consists of the following six tables:

- Table B1: Monthly Water Supply Change Factors for Normal Year
- Table B2: Monthly Water Supply Change Factors for Single Dry Year
- Table B3: Monthly Water Supply Change Factors for Multi-Year Drought
- Table B4: Monthly Water Demand Change Factors for Normal Year
- Table B5: Monthly Water Demand Change Factors for Single Dry Year
- Table B6: Monthly Water Demand Change Factors for Multi-Year Drought

4.2. Constraints and Limitations

This technical memo presents planning-level projections of climate impacts on water supplies and demand for Western's service area during normal and drought periods. The results are intended for

use by Western in preparing climate-impacted water supply and demand projections for its wholesale UWMP and the regional DCP. This memo is also available for Western's retail agencies to use in their respective 2020 UWMPs if they choose to use the DWR climate change factors rather than another method of estimating projected climate change impacts to supply and demand. These agencies are required to develop adaptive management actions and projects as part of their 2020 UWMPs to address any deficits in future supply relative to future demand.

This analysis of future climate impacts on water supplies and demands is based on the median projected change from the majority of the climate models selected for water resources planning in California. DWR has also developed two more extreme climate scenarios for 2070, which were not used in the analysis presented in this technical memo. The first extreme scenario uses future projections from the 10 global climate models with least warming and least precipitation while the second extreme scenario using the 10 global models with the most warming and highest precipitation. These extreme scenarios have not been used in this round of planning. However, it would be prudent to analyze the extreme scenarios when preparing longer range plans and projects beyond mid-century.

The results are not intended for use in other applications such as flood resilience planning, infrastructure design, or for making decisions about operating any specific structure. Flood resilience planning requires analysis of daily or finer temporal resolution using statistical methods to fit frequency distributions to extreme values. Infrastructure design and operations applications require more detailed analysis and ground-truthing of site-specific characteristics, operations and regulations that are not considered in this report.

Climate change can also impact water resources indirectly. For example, wildfire hazards are projected to increase in southern California with climate change. Wildfires can impact water resources by increasing water requirements for firefighting, changing surface vegetation and runoff patterns in burn areas, causing debris flows, and increasing siltation of reservoirs and hydraulic structures. Such secondary impacts of climate change on water resource are not captured in this study.

Future water supplies and demands can also be impacted by policy and regulatory decisions made at the local, state, and federal level. It is difficult to anticipate and quantify the impacts of policy and regulatory considerations that have not yet been made. Therefore, it is not the intention of this report to anticipate future policy or regulatory decisions and their impacts to future water supplies or demands.

4.3. Next Steps

The next step in the planning process is for Western and its member agencies to use the change factors and analysis provided in this technical memorandum, if desired, to compute quantitative estimates of future supplies and demands during normal and drought years, incorporating the effects of climate change. The net change in future water supply for each member agency will depend on the percentage of their local water supply that is sourced from the direct precipitation and natural recharge, Santa Margarita, or Santa Ana basins. Similarly, the net change in future water demand will depend on the percentage of outdoor water use and projections of future growth within each member agency's service area. The difference between net future water supply and net future water demand, if any, is the net water deficit that the agency will need to address by developing new management actions and

projects. A calculated deficit, if any, would represent the minimum gap that would need to be addressed; however, it is prudent for water managers to consider additional management actions and projects to prepare for uncertain future conditions.

This technical memo provides Western and its retail agencies with the ability to utilize the data in the DWR climate change projections and methods of climate change analysis for Western's service area to evaluate the impacts of climate change either qualitatively or quantitatively. Should a retail agency choose to use the analysis presented in this technical memo, the agency may use the forms provided in Appendices A and B to compute quantitative estimates of their future water supplies, demands and deficits. For use in the DCP, the projections used in each agency's UWMP will be aggregated and quantitative estimations of the magnitude and location of regional water supplies, demands and deficits. The aggregated regional quantitative results would be discussed during future workshops to inform development of the DCP, regional project planning, and estimation of import requirements.

References

Bedsworth, Louise, Dan Cayan, Guido Franco, Leah Fisher, and Sonya Ziaja, 2018. Statewide Summary Report. California's Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-013.

California DWR, 2018, Guidance for Climate Change Data Use During Groundwater Sustainability Plan Development, Sustainable Groundwater Management Program.

Hall, Alex, Neil Berg, and Katharine Reich, 2018. Los Angeles Summary Report. California's Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-007.

US Bureau of Reclamation, 2013, Climate Change Analysis for the Santa Ana River Watershed, Santa Ana Watershed Basin Study, California. Technical Memorandum No. 86-68210-2013-02.

Appendix A: Projection Worksheets

Table A1: Normal Year Water Supply Projections

Agency: _____

Notes: _____

Row	Year Type	Variable	2025	2030	2035	2040	2045	Notes
1a	Normal Year	Current Water Supply from Natural Recharge (AFY)						Repeat 2020 Value for All Years
1b	Normal Year	Current Water Supply from Santa Ana River (AFY)						Repeat 2020 Value for All Years
1c	Normal Year	Current Water Supply from Santa Margarita River (AFY)						Repeat 2020 Value for All Years
2a	Normal Year	Water Supply Change Factor for Natural Recharge	99.1%	98.3%	98.5%	98.7%	98.9%	From Memo Results
2b	Normal Year	Water Supply Change Factor for Santa Ana River	99.6%	99.1%	98.4%	97.6%	96.9%	From Memo Results
2c	Normal Year	Water Supply Change Factor for Santa Margarita River	99.7%	99.3%	98.4%	97.4%	96.4%	From Memo Results
3a	Normal Year	Future Water Supply from Natural Recharge						Multiply Row 1a by Row 2a
3b	Normal Year	Future Water Supply from Santa Ana River (AFY)						Multiply Row 1b by Row 2b
3c	Normal Year	Future Water Supply from Santa Margarita River (AFY)						Multiply Row 1c by Row 2c
4	**Normal Year**	**Total Future Water Supply from Local Sources**						**Sum of Rows 3a, 3b and 3c**

Table A2: Single Dry Year Water Supply Projections

Agency: _____

Notes: _____

Row	Year Type	Variable	2025	2030	2035	2040	2045	Notes
1a	Single Dry Year	Current Water Supply from Natural Recharge (AFY)						Repeat 2020 Value for All Years
1b	Single Dry Year	Current Water Supply from Santa Ana River (AFY)						Repeat 2020 Value for All Years
1c	Single Dry Year	Current Water Supply from Santa Margarita River (AFY)						Repeat 2020 Value for All Years
2a	Single Dry Year	Water Supply Change Factor for Natural Recharge						From Memo Results
2b	Single Dry Year	Water Supply Change Factor for Santa Ana River						From Memo Results
2c	Single Dry Year	Water Supply Change Factor for Santa Margarita River						From Memo Results
3a	Single Dry Year	Future Water Supply from Natural Recharge (AFY)	100.5%	101.0 %	100.8%	100.7%	100.5%	Multiply Row 1a by Row 2a
3b	Single Dry Year	Future Water Supply from Santa Ana River (AFY)	99.6%	99.2%	97.1%	94.9%	92.8%	Multiply Row 1b by Row 2b
3c	Single Dry Year	Future Water Supply from Santa Margarita River (AFY)	99.9%	99.8%	98.2%	96.6%	95.0%	Multiply Row 1c by Row 2c
4	**Single Dry Year**	**Total Future Water Supply from Local Sources (AFY)**						**Sum of Rows 3a, 3b and 3c**

Table A3: Multi-Year Drought Water Supply Projections

Agency: _____

Notes: _____

Row	Year Type	Variable	2025	2030	2035	2040	2045	Notes
1a	5-Year Drought	Current Water Supply from Natural Recharge (AFY)						Repeat 2020 Value for all Years
1b	5-Year Drought	Current Water Supply from Santa Ana River (AFY)						Repeat 2020 Value for all Years
1c	5-Year Drought	Current Water Supply from Santa Margarita River (AFY)						Repeat 2020 Value for all Years
2a	5-Year Drought	Water Supply Change Factor for Natural Recharge	99.5%	98.9%	98.5%	98.1%	97.7%	From Memo Results
2b	5-Year Drought	Water Supply Change Factor for Santa Ana River	99.0%	98.1%	96.9%	95.7%	94.5%	From Memo Results
2c	5-Year Drought	Water Supply Change Factor for Santa Margarita River	99.5%	98.9%	97.6%	96.3%	95.0%	From Memo Results
3a	5-Year Drought	Future Water Supply from Natural Recharge (AFY)						Multiply Row 1a by Row 2a
3b	5-Year Drought	Future Water Supply from Santa Ana River (AFY)						Multiply Row 1b by Row 2b
3c	5-Year Drought	Future Water Supply from Santa Margarita River (AFY)						Multiply Row 1c by Row 2c
4	**5-Year Drought**	**Total Future Water Supply from Local Sources (AFY)**						**Sum of Rows 3a, 3b and 3c**

Table A4: Normal Year Water Demand Projections

Agency: _____

Notes: _____

Row	Year Type	Variable	2025	2030	2035	2040	2045	Notes
1a	Normal Year	Growth-Adjusted Outdoor Water Demand (AFY)						Different for Each Year
1b	Normal Year	Growth-Adjusted Indoor Water Demand (AFY)						Different for Each Year
2a	Normal Year	Water Demand Change Factor for Outdoor Use	100.6%	101.2%	101.8%	102.4%	103.1%	From Memo Results
3a	Normal Year	Climate-Adjusted Future Water Demand (AFY)						(Row 1a * Row 2a) + Row1b
3b	Normal Year	Climate-Adjusted Future Water Demand (AFY)						(Row 1a * Row 2a) + Row1b
4	**Normal Year**	**Total Climate-Adjusted Water Demand**						**Sum of Rows 3a, 3b and 3c**

Table A5: Single Dry Year Water Demand Projections

Agency: _____

Notes: _____

Row	Year Type	Variable	2025	2030	2035	2040	2045	Notes
1a	Single Dry Year	Growth-Adjusted Outdoor Water Demand (AFY)						Different for Each Year
1b	Single Dry Year	Growth-Adjusted Indoor Water Demand (AFY)						Different for Each Year
2a	Single Dry Year	Water Demand Change Factor for Outdoor Use	100.6%	101.3%	101.9%	102.5%	103.2%	From Memo Results
3a	Single Dry Year	Climate-Adjusted Future Water Demand (AFY)						(Row 1a * Row 2a) + Row1b
3b	Single Dry Year	Climate-Adjusted Future Water Demand (AFY)						(Row 1a * Row 2a) + Row1b
4	**Single Dry Year**	**Total Climate-Adjusted Water Demand**						**Sum of Rows 3a, 3b and 3c**

Table A6: Multi-Year Drought Water Demand Projections

Agency: _____

Notes: _____

Row	Year Type	Variable	2025	2030	2035	2040	2045	Notes
1a	Multi-Year Drought Year 1	Growth-Adjusted Outdoor Water Demand (AFY)						Enter Future Demand
1b	Multi-Year Drought Year 2	Growth-Adjusted Outdoor Water Demand (AFY)						Enter if Different from 1a
1c	Multi-Year Drought Year 3	Growth-Adjusted Outdoor Water Demand (AFY)						Enter if Different from 1a
1d	Multi-Year Drought Year 4	Growth-Adjusted Outdoor Water Demand (AFY)						Enter if Different from 1a
1e	Multi-Year Drought Year 5	Growth-Adjusted Outdoor Water Demand (AFY)						Enter if Different from 1a
1f	Normal Year	Growth-Adjusted Indoor Water Demand (AFY)						Enter Future Demand
2a	5-Year Drought	Water Demand Change Factor	99.8%	101.2%	101.8%	102.4%	103.0%	From Memo Results
3a	Multi-Year Drought Year 1	Climate-Adjusted Future Water Demand (AFY)						(Row 1a * Row 2a) + Row 1f
3b	Multi-Year Drought Year 2	Growth-Adjusted Outdoor Water Demand (AFY)						(Row 1b * Row 2a) + Row 1f
3c	Multi-Year Drought Year 2	Growth-Adjusted Outdoor Water Demand (AFY)						(Row 1c * Row 2a) + Row 1f
3d	Multi-Year Drought Year 2	Growth-Adjusted Outdoor Water Demand (AFY)						(Row 1d * Row 2a) + Row 1f
3e	Multi-Year Drought Year 2	Growth-Adjusted Outdoor Water Demand (AFY)						(Row 1e * Row 2a) + Row 1f

Appendix B: Monthly Change Factors

Table B1: Monthly Water Supply Change Factors for Normal Year

Precipitation and Natural Recharge

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2025	100.5%	99.4%	100.0%	100.4%	96.2%	99.5%	99.3%	100.8%	100.6%	96.4%	97.9%	99.0%
2030	101.0%	98.9%	100.0%	100.8%	92.3%	99.0%	98.7%	101.6%	101.2%	92.8%	95.8%	98.0%
2035	101.9%	99.2%	99.3%	97.7%	90.7%	98.3%	100.7%	102.6%	103.7%	91.5%	93.3%	97.3%
2040	102.7%	99.5%	98.5%	94.6%	89.0%	97.6%	102.8%	103.6%	106.1%	90.3%	90.9%	96.6%
2045	103.5%	99.7%	97.8%	91.5%	87.3%	97.0%	104.8%	104.5%	108.6%	89.0%	88.4%	95.9%

Santa Ana River Basin

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2025	100.6%	100.1%	99.3%	97.7%	96.2%	98.0%	99.4%	100.2%	100.5%	99.4%	98.9%	99.6%
2030	101.1%	100.3%	98.5%	95.4%	92.3%	95.9%	98.7%	100.4%	100.9%	98.9%	97.8%	99.2%
2035	101.2%	100.2%	97.3%	92.7%	89.8%	94.9%	98.4%	100.3%	101.8%	98.6%	96.9%	97.9%
2040	101.2%	100.2%	96.2%	90.0%	87.3%	93.9%	98.1%	100.1%	102.7%	98.3%	96.0%	96.6%
2045	101.3%	100.2%	95.0%	87.2%	84.7%	92.9%	97.8%	100.0%	103.6%	97.9%	95.1%	95.4%

Santa Margarita River Basin

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2025	100.3%	99.8%	99.5%	99.1%	98.8%	99.5%	99.6%	100.3%	100.3%	99.4%	98.9%	99.5%
2030	100.6%	99.6%	99.0%	98.2%	97.6%	99.0%	99.2%	100.6%	100.5%	98.9%	97.9%	98.9%
2035	100.4%	99.0%	97.5%	96.1%	96.2%	98.2%	99.0%	100.3%	101.4%	98.6%	96.9%	97.3%
2040	100.1%	98.4%	96.0%	94.0%	94.9%	97.5%	98.8%	99.9%	102.2%	98.3%	95.9%	95.7%
2045	99.9%	97.8%	94.5%	91.8%	93.6%	96.8%	98.5%	99.6%	103.0%	98.0%	94.9%	94.1%

Table B2: Monthly Water Supply Change Factors for Single Dry Year

Precipitation and Natural Recharge

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2025	100.9%	98.5%	100.7%	105.5%	98.1%	99.9%	100.0%	100.4%	100.0%	99.1%	99.8%	100.1%
2030	101.9%	97.1%	101.5%	111.1%	96.1%	99.8%	100.0%	100.8%	100.0%	98.2%	99.6%	100.2%
2035	102.8%	97.0%	100.9%	104.8%	95.2%	100.1%	100.0%	99.2%	100.0%	98.9%	94.4%	98.3%
2040	103.7%	96.9%	100.4%	98.6%	94.4%	100.4%	100.0%	97.6%	100.0%	99.5%	89.1%	96.5%
2045	104.6%	96.8%	99.8%	92.3%	93.5%	100.7%	100.0%	96.1%	100.0%	100.2%	83.9%	94.6%

Santa Ana River Basin

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2025	101.4%	98.1%	100.2%	98.1%	96.0%	96.5%	99.2%	100.5%	98.0%	98.9%	99.1%	98.4%
2030	102.8%	96.2%	100.4%	96.1%	91.9%	93.0%	98.4%	101.1%	96.0%	97.7%	98.3%	96.8%
2035	105.4%	95.8%	99.9%	94.3%	90.2%	91.9%	98.2%	99.9%	96.0%	97.6%	97.9%	94.4%
2040	108.0%	95.5%	99.5%	92.5%	88.4%	90.9%	98.0%	98.7%	95.9%	97.4%	97.5%	91.9%
2045	110.6%	95.1%	99.0%	90.7%	86.7%	89.8%	97.8%	97.6%	95.9%	97.3%	97.0%	89.4%

Santa Margarita River Basin

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2025	99.0%	98.8%	100.2%	99.7%	96.1%	99.0%	99.5%	104.8%	100.3%	100.1%	100.1%	100.5%
2030	98.0%	97.5%	100.4%	99.3%	92.3%	98.1%	99.0%	109.6%	100.7%	100.2%	100.3%	101.0%
2035	99.5%	97.8%	99.0%	98.7%	90.4%	97.6%	98.8%	104.0%	100.2%	99.9%	100.0%	97.6%
2040	100.9%	98.0%	97.7%	98.1%	88.5%	97.1%	98.6%	98.3%	99.6%	99.6%	99.7%	94.2%
2045	102.4%	98.3%	96.4%	97.4%	86.6%	96.7%	98.3%	92.7%	99.1%	99.3%	99.4%	90.9%

Table B3: Monthly Water Supply Change Factors for Multi-Year Drought

Precipitation and Natural Recharge

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2025	100.8%	100.2%	99.5%	100.8%	95.5%	100.1%	99.4%	100.2%	101.3%	96.1%	98.9%	98.1%
2030	101.6%	100.4%	98.9%	101.6%	91.0%	100.1%	98.7%	100.3%	102.7%	92.2%	97.8%	96.3%
2035	102.2%	100.5%	98.8%	98.7%	89.6%	99.0%	101.0%	100.6%	106.5%	90.4%	94.8%	96.3%
2040	102.7%	100.7%	98.6%	95.8%	88.1%	97.9%	103.3%	100.8%	110.4%	88.6%	91.8%	96.4%
2045	103.3%	100.9%	98.5%	92.9%	86.7%	96.7%	105.6%	101.1%	114.2%	86.8%	88.8%	96.4%

Santa Ana River Basin

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2025	100.8%	99.9%	99.2%	97.6%	96.5%	98.5%	99.5%	100.0%	100.0%	99.1%	99.3%	100.4%
2030	101.6%	99.8%	98.3%	95.2%	93.0%	96.9%	99.1%	100.1%	99.9%	98.3%	98.6%	100.7%
2035	102.2%	100.2%	97.6%	93.0%	90.9%	96.3%	98.9%	100.0%	100.3%	97.7%	97.8%	99.6%
2040	102.9%	100.5%	96.9%	90.7%	88.8%	95.7%	98.8%	99.9%	100.7%	97.2%	96.9%	98.4%
2045	103.5%	100.9%	96.2%	88.5%	86.6%	95.1%	98.6%	99.8%	101.1%	96.7%	96.1%	97.3%

Santa Margarita River Basin

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2025	100.4%	99.6%	99.1%	98.2%	98.7%	99.3%	99.6%	100.4%	99.9%	99.7%	99.6%	99.8%
2030	100.8%	99.2%	98.2%	96.3%	97.5%	98.6%	99.2%	100.8%	99.9%	99.3%	99.2%	99.7%
2035	101.2%	98.7%	97.1%	94.5%	96.4%	98.0%	99.0%	100.3%	100.1%	99.0%	98.7%	98.0%
2040	101.5%	98.2%	96.0%	92.7%	95.4%	97.4%	98.8%	99.8%	100.3%	98.7%	98.2%	96.3%
2045	101.9%	97.7%	95.0%	90.9%	94.4%	96.8%	98.6%	99.3%	100.5%	98.5%	97.7%	94.6%

Table B4: Monthly Water Demand Change Factors for Normal Year

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2025	101.0%	100.7%	100.4%	100.5%	100.8%	100.5%	100.5%	100.5%	100.6%	100.7%	100.9%	101.0%
2030	102.1%	101.3%	100.9%	101.1%	101.7%	101.1%	100.9%	101.1%	101.2%	101.4%	101.8%	102.0%
2035	102.8%	102.1%	101.6%	101.8%	102.4%	101.7%	101.3%	101.5%	101.6%	102.0%	102.7%	103.1%
2040	103.6%	102.9%	102.2%	102.5%	103.0%	102.3%	101.6%	101.9%	101.9%	102.6%	103.6%	104.2%
2045	104.4%	103.6%	102.9%	103.3%	103.7%	102.9%	102.0%	102.3%	102.3%	103.2%	104.5%	105.3%

Table B5: Monthly Water Demand Change Factors for Single Dry Year

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2025	101.0%	100.7%	100.6%	100.5%	101.0%	100.6%	100.5%	100.6%	100.6%	100.6%	100.6%	100.7%
2030	102.0%	101.5%	101.1%	100.9%	102.1%	101.3%	101.1%	101.1%	101.2%	101.3%	101.2%	101.4%
2035	102.5%	101.9%	101.7%	101.7%	103.1%	101.8%	101.5%	101.6%	101.8%	102.0%	102.2%	102.3%
2040	103.0%	102.3%	102.2%	102.4%	104.0%	102.4%	101.9%	102.1%	102.4%	102.8%	103.2%	103.3%
2045	103.5%	102.7%	102.8%	103.2%	105.0%	103.0%	102.3%	102.6%	103.0%	103.5%	104.2%	104.2%

Table B6: Monthly Water Demand Change Factors for Multi-Year Drought

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2020	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2025	101.0%	100.6%	100.4%	100.5%	100.9%	100.6%	100.5%	100.5%	100.6%	100.7%	100.8%	101.0%
2030	102.0%	101.3%	100.8%	101.1%	101.8%	101.1%	101.0%	101.0%	101.2%	101.4%	101.6%	101.9%
2035	102.8%	101.9%	101.4%	101.8%	102.5%	101.7%	101.3%	101.4%	101.6%	102.0%	102.4%	103.0%
2040	103.6%	102.6%	102.1%	102.5%	103.2%	102.3%	101.7%	101.8%	102.0%	102.6%	103.3%	104.0%
2045	104.4%	103.3%	102.7%	103.1%	103.9%	102.9%	102.1%	102.2%	102.4%	103.2%	104.1%	105.0%

G

Appendix G Metropolitan Purchase Order

PURCHASE ORDER FOR SYSTEM WATER TO BE PROVIDED BY THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

PURCHASER: WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY	**TERM** 10 years: January 1, 2015 – December 31, 2024
INITIAL BASE PERIOD DEMAND: 117,537 acre-feet	**EFFECTIVE DATE:** January 1, 2015
INITIAL TIER 1 MAXIMUM—Annual Average: 105,783 acre-feet	**INITIAL TIER 1 MAXIMUM—Cumulative:** 1,057,830 acre-feet
PURCHASE ORDER COMMITMENT—Annual Average: 70,522 acre-feet	**PURCHASE ORDER COMMITMENT—Cumulative:** 705,220 acre-feet

Definitions of capitalized terms used in this Purchase Order are provided in Attachment 1. Terms used in this Purchase Order and not defined in Attachment 1 are defined in Metropolitan's Administrative Code.

COMMITMENT TO PURCHASE:

In consideration of Purchaser's commitment to purchase System Water pursuant to this Purchase Order, Metropolitan agrees to sell such System Water to Purchaser during the Term at the Tier 1 Supply Rate in an amount up to the Tier 1 Maximum—Cumulative. All System Water sold to Purchaser during the Term in an amount greater than the Tier 1 Maximum—Cumulative shall be sold to the Purchaser at the Tier 2 Supply Rate. In connection with the purchase of System Water, the Purchaser also agrees to pay all other applicable rates and charges, as established by Metropolitan from time to time. The rates and charges applicable to System Water as of the Effective Date are shown in Attachment 2.

If Purchaser's applicable System Water purchases during the Term exceed Purchaser's Tier 1 Maximum, Purchaser may elect to:

a.) Subject to the provisions of paragraph c) below, pay any Tier 2 Supply Rate obligations at the end of the Term, in an amount equal to the difference between the Purchaser's applicable System Water purchases and the Tier 1 Maximum—Cumulative during the Term times the average of the Tier 2 Supply Rate in effect during the Term; or,

b.) Pay any Tier 2 Supply Rate obligations annually as purchases are incurred, in an amount equal to the difference between the Purchaser's applicable annual System Water purchases and the Tier 1 Maximum—Annual times the Tier 2 Supply Rate in effect during the calendar year. A true-up at the end of the Term will be performed to ensure that the Purchaser has received all Tier 1 Maximum—Cumulative purchases allowed by the Purchase Order.

c.) If, after the end of the first five years, Purchaser has accrued a cumulative Tier 2 Supply Rate obligation, Purchaser may elect to pay the initial five year cumulative Tier 2 Supply Rate obligation (i) in full at the end of year five of the Term, (ii) amortize it in five equal installments over the remaining five calendar years of the Term, or (iii) pay it at the end of the Term. Commencing in year 6 of the Term, Purchaser shall pay any additional Tier 2 Supply Rate obligation annually.

Purchaser agrees to purchase System Water from Metropolitan during the Term in an amount not less than the Purchase Order Commitment. If Purchaser's applicable System Water purchases during the Term are less than the Purchase Order Commitment, each acre-foot of unmet commitment will be reduced by the amount of production from a local resource project, measured in acre-feet, that commences operation on or after January 1, 2014. A local resource project includes any project type as approved by the Board.

Purchaser agrees to pay Metropolitan an amount equal to the difference between the sum total in acre-feet of water of the Purchase Order Commitment (minus the amount reduced by the amount of production from a local resource project) and the sum total in acre-feet of water of Purchaser's applicable System Water purchases during the Term, times the average of the Tier 1 Supply Rate in effect during the Term.

Purchaser agrees to pay all amounts owing to Metropolitan, whether to satisfy a Purchase Order Commitment or a Tier 2 Supply Rate obligation, within the next regular billing cycle following the reconciliation of all certifications for special programs that the Purchaser may participate in. The Purchaser may elect to pay such amount in twelve equal monthly payments over the course of the next twelve months beginning with the first regular billing cycle following the reconciliation of all outstanding certifications for special programs. If the Purchaser elects to pay such amount over the course of the next twelve months following the regular billing cycle any outstanding balance shall bear interest at Metropolitan's then current investment portfolio average yield. All other amounts payable under this Purchase Order shall be billed and paid in accordance with the Administrative Code.

WATER SERVICE:

Conditions of water service by Metropolitan to the Purchaser, including but not limited to (i) delivery points, (ii) water delivery schedules, and (iii) water quality, will be determined in accordance with Chapter 5 (Section 4500 through 4514, inclusive, as applicable) of Metropolitan's Administrative Code.

In accordance with its Administrative Code, Metropolitan shall use its reasonable best efforts to supply System Water in the quantities requested by the Purchaser, but is not obligated to dedicate any portion of System capacity for the conveyance, distribution, storage or treatment of System Water for the benefit of the Purchaser or any other member agency. Metropolitan shall use its reasonable best efforts to deliver the System Water when needed by the Purchaser during the Term; provided however, there shall be no default under this Purchase Order if Metropolitan fails to deliver water to the Purchaser in accordance with any such schedule of deliveries during the Term.

By execution of this Purchase Order, the Purchaser recognizes and agrees that it acquires no interest in or to any portion of the System or any other Metropolitan facilities or supplies, or any right to receive water delivered through the System, excepting the right to purchase up to Purchaser's Tier 1 Maximum—Cumulative at the Tier 1 Supply Rate provided that System Water is available. This Purchase Order governs pricing of the System Water delivered to the Purchaser pursuant to this Purchase Order and does not confer any entitlement to receive System Water.

System Water provided to the Purchaser under the terms of this Purchase Order shall be subject to reduction in accordance with the shortage allocation provisions of the Water Surplus and Drought Management Plan (the “WSDM Plan”) or other such policies and principles governing the allocation of System Water as adopted by the Board.

In the event that Metropolitan's Board or General Manager determines to reduce, interrupt or suspend deliveries of System Water, any outstanding balance of the Purchase Order Commitment at the end of the Term shall be reduced by the Purchase Order Commitment—Annual Average for each and every fiscal or calendar year that a reduction, interruption or suspension occurred.

MISCELLANEOUS:

This Purchase Order will be interpreted, governed and enforced in accordance with the laws of the State of California.

This Purchase Order will apply to and bind the successors and assigns of the Purchaser and Metropolitan.

No assignment or transfer of the rights of the Purchaser under this Purchase Order will be valid and effective against Metropolitan or the Purchaser without the prior written consent of Metropolitan and the Purchaser.

If at any time during the Term, by reason of error in computation or other causes, there is an overpayment or underpayment to Metropolitan by the Purchaser of the charges provided for under this Purchase Order, which overpayment or underpayment is not accounted for and corrected in the annual re-determination or reconciliation of said charges, the amount of such overpayment or underpayment shall be credited or debited, as the case may be, to the Purchaser. Metropolitan will notify the Purchaser in writing regarding the amount of such credit or debit, as the case may be. In no case will credits or debits for charges provided for under this Purchase Order be administered beyond the limit for billing adjustments as specified in Metropolitan's Administrative Code.

IN WITNESS WHEREOF, this Purchase Order is executed by the duly authorized officers of the Metropolitan Water District of Southern California and Western Municipal Water District of Riverside County, as of December __, 2014.

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

By: _____
Jeffrey Kightlinger
General Manager

WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY

By: _____

[Title] _____

APPROVED AS TO FORM AND CONTENT:

_____
General Counsel

By: _____

_____
General Counsel

By: _____

Attachment 1
Purchase Order for System Water
DEFINITIONS

"Act" means the Metropolitan Water District Act, California Statutes 1969, Chapter 209, as amended and supplemented from time to time.

"**Demand**" means the Purchaser's purchases of System Water supplies, including full service, seasonal shift, Conjunctive Use Program, Surface Storage Operating Agreement water, Recharge and Recovery Operating Agreement water, or any other water program deemed to be a purchase of System Water.

"**Effective Date**" means the effective date of this Purchase Order as specified above.

"Metropolitan" means The Metropolitan Water District of Southern California.

"Purchase Order Commitment" means:

i). if the Purchaser elects option a) under the Base Period Demand as defined in section 4122 of the Administrative Code, then 60% of the Purchaser's Initial Base Firm Demand times 10; or

ii). if the Purchaser elects option b) under the Base Period Demand, then 60% of the Purchaser's highest fiscal year Demand during the period from fiscal year 2002/03 through fiscal year 2013/14, times 10.

"Purchase Order" means this Purchase Order for System Water.

"Purchaser" means the member public agency specified above, a duly organized [city/water district/county water authority] of the State of California.

"System" means the properties, works and facilities operated and/or financed by Metropolitan necessary for the supply, development, storage, conveyance, distribution, treatment or sale of water.

"System Water" means water supplies developed by Metropolitan and delivered to the Purchaser through the System or other means (e.g. conjunctive use storage).

"Term" means the term of this Purchase Order as specified above.

"Tier 1 Maximum—Annual" means an amount equal to 90% of the Base Period Demand.

"Tier 1 Maximum—Cumulative" means an amount equal to the sum of the Tier 1 Maximum—Annual amounts during the Term.

"Tier 1 Supply Rate" means Metropolitan's per-acre-foot Tier 1 Supply Rate, as determined from time to time by Metropolitan's Board of Directors. The Tier 1 Rate effective January 1, 2015, is $158/AF.

"Tier 2 Supply Rate" means Metropolitan's per-acre-foot Tier 2 Supply Rate, as determined from time to time by Metropolitan's Board of Directors. The Tier 2 Rate effective January 1, 2015, is $290/AF.

"Water Surplus and Drought Management Plan (WSDM)" means Metropolitan's policy and procedures for managing supplies and drought conditions as adopted by the Board from time to time.

Attachment 2
Purchase Order for System Water
RATES AND CHARGES

	Effective January 1, 2015	Effective January 1, 2016
Tier 1 Supply Rate ($/AF)	$158	$156
Tier 2 Supply Rate ($/AF)	$290	$290
System Access Rate ($/AF)	$257	$259
System Power Rate ($/AF)	$126	$138
Water Stewardship Rate ($/AF)	$41	$41
Full Service Untreated Rate ($/AF):		
Tier 1	$582	$594
Tier 2	$714	$728
Treatment Surcharge ($/AF)	$341	$348
Full Service Treated Rate ($/AF):		
Tier 1	$923	$942
Tier 2	$1,055	$1,076
Readiness-to-Serve Charge ($ millions)	$158	$153
Capacity Charge ($/cfs)	$11,100	$10,900

H

Appendix H City of Riverside Surplus and Wheeling Agreement

2017 COOPERATIVE AGREEMENT
FOR LONG-TERM WHEELING AND SURPLUS WATER SALES

BETWEEN

CITY OF RIVERSIDE
AND
WESTERN MUNICIPAL WATER DISTRICT

RIVERSIDE – WESTERN
2017 COOPERATIVE AGREEMENT FOR
LONG-TERM WHEELING AND SURPLUS WATER SALES

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RIVERSIDE – WESTERN

2017 COOPERATIVE AGREEMENT FOR

LONG-TERM WHEELING AND SURPLUS WATER SALES

1. **PARTIES:** This Cooperative Agreement for Long-Term Wheeling and Surplus Water Sales ("Agreement") is made and entered into this _____ day of _____, 2017, by and between the **City of Riverside** ("Riverside"), a California charter city and municipal corporation, and the **Western Municipal Water District** ("Western"), a public agency. Both parties are organized and existing under the laws of the State of California and are hereinafter sometimes referred to jointly as the "Parties" or individually as a "Party."

2. **RECITALS:**

2.1 Riverside operates a municipal utility providing wholesale water and electric services to entities located within and outside of its service territory, and retail water and electric service to its customers located within its service territory.

2.2 Western operates a municipal water district providing wholesale and retail water and wastewater services to entities located within its service territory.

2.3 Each Party is subject to the terms of the judgment in *Western Municipal Water District v. East San Bernardino County Water District* (Riverside County Superior Court No. 78426) governing, among other things, the Parties' respective rights and obligations related to the beneficial use and maintenance of the Bunker Hill Basin, Rialto/Colton Basin, Riverside North Basin, and Riverside South Basin (collectively, the "Water Basins").

2.4 Pursuant to periodic agreement between Western and the Riverside Highland Water Company, Western has from time to time in the recent past secured the right to produce and export groundwater annually from the Bunker Hill Basin. Western is seeking to secure a long-term agreement and to make said supply available for the production, treatment, and conveyance services under this Agreement.

2.5 Pursuant to an August 23, 2001 "Reciprocal Use Agreement" between Western and the Elsinore Valley Municipal Water District, Western has the right to produce and export groundwater annually from the Bunker Hill Basin.

2.6 Western, from time to time, may have access to additional water which may or may not be stored or conserved groundwater in the Water Basins and would be subject to the production, treatment and/or conveyance services under this Agreement.

2.7 Riverside, from time to time, may have unused capacity in its groundwater production, treatment, water transmission, and/or water distribution facilities.

2.8 On March 30, 2009, the Parties entered into that certain Cooperative Agreement for Water Production and Conveyance ("2009 Agreement"), wherein Riverside agreed to operate its unused capacity in its groundwater production, treatment, water transmission, and/or water distribution facilities to produce and convey Western's annually allocated, stored, or conserved groundwater in the Water Basins to points of interconnection between the Parties' water utility systems. The Parties hereby agree that except for provisions in the 2009 Agreement, as amended, which apply to non-potable water, the balance of the provisions of the 2009 Agreement are amended and restated by this Agreement, meaning that the potable water provisions in the 2009 Agreement, as amended, shall be of no further force or effect.

2.9 Western, from time to time, may request that Riverside provide Production Services, Treatment Services and/or Conveyance Services, and Riverside shall provide such services using its water extraction, treatment and conveyance facilities to the extent that the provision of such services will not, in Riverside's sole judgment which shall not be unreasonably exercised, (i) adversely affect the quality, reliability or cost of service related to water deliveries by Riverside to its retail or wholesale customers and/or (ii) cause Riverside to violate the terms of any binding obligations existing as of the date of this Agreement with respect to the production, treatment or delivery of water.

2.10 The Parties desire to enter into this Agreement in order to: (a) provide for a new long-term wheeling agreement for the production, treatment and conveyance of a firm annual volume of Western-acquired water by Riverside (referred to herein as "wheeling"); (b) develop the pricing of Riverside's adjusted annual water right from the San Bernardino Basin Area ("SBBA") which is determined to be surplus to Riverside's retail needs (referred to herein as "Surplus Water Sales"); and (c) obtain system capacity to move local groundwater to Western customers.

2.11 The Parties agree to begin investigating ways to develop and deliver supplies from the Riverside Basin, as provided for in the 1969 Judgment, to maximize the benefit for users within Western while ensuring all provisions of the 1969 Judgment are up-held.

2.12 The Parties agree to meet and confer, in good faith, as to the provision of recycled water and non-potable water by Riverside to Western.

3. AGREEMENT: In consideration of the foregoing Recitals that are incorporated herein by this reference and the mutual terms and conditions herein, the Parties agree as follows:

4. DEFINITIONS: Terms used herein with initial capitalization, whether in singular or plural, shall have the following meanings:

4.1 1969 Judgment: The judgment rendered by the court in *Western Municipal Water District v. East San Bernardino County Water District* (Riverside County Superior Court No. 78426) and governing, among other things, the Parties' respective rights and obligations related to the beneficial use and maintenance of the Bunker Hill Basin, Rialto/Colton Basin, Riverside North Basin and Riverside South Basin.

4.2 AFY: Acre-feet per year.

4.3 Authorized Representative: The representative or their designee identified by each Party, in accordance with Section 12, to act on such Party's behalf with respect to those matters specified herein to be the functions of such Authorized Representative.

4.4 Bunker Hill Basin: The groundwater basin so defined and described in the 1969 Judgment.

4.5 Bunker Hill Export Allocation: Riverside's annual volumetric export right of groundwater from the Bunker Hill Basin as defined in the 1969 Judgment as amended from time to time.

4.6 Capital Recovery Component: The component of the Service Rate intended to recover Riverside's capital cost of providing Production, Treatment, and/or Conveyance Services along the flow path to Western.

4.7 Conveyance Services: Riverside's use of its water treatment, transmission and distribution systems to convey water from a Point of Receipt to a Point of Delivery.

4.8 Commodity Price: This term shall have the meaning set forth in Section 10.2.

4.9 Curtailment: Any shortage of water delivery relative to the Operating Plan as defined in Section 4.18. Curtailment is measured on a monthly basis and is assigned to Riverside (if unable to deliver water) or Western (if unable to receive water). The Curtailments for both Parties are summed at the end of the calendar year. Western's annual obligation to receive water is reduced by Riverside's Curtailment, and vice-versa. In any given month, where feasible and practical, Riverside may deliver more water and Western may receive more water than what is specified in the Operating Plan. These excesses are summed and will reduce any applicable Curtailment. If Riverside and Western agree to Make-Up water as defined in Section 4.38, any applicable Curtailment will be reduced by that amount.

4.10 Curtailment Payment: If Western has a Curtailment for any given year, Western shall make payment to Riverside as set forth in Sections 6.1.2 and 6.2.2.

4.11 Delivery Month: A month for which Western has requested Production, Treatment, Conveyance and/or Services in the Operating Plan.

4.12 Fiscal Year: The twelve (12) month period commencing each July 1 during the term of this Agreement and ending the following June 30.

4.13 Make-Up Water: By mutual consent of the Operating Committee, up to 500 AFY of Western Water and/or Riverside Water that is not delivered in the current calendar year may be eligible to be delivered the following calendar year. Make-up water is intended to be used during the following calendar year. Make-up water shall not be available in consecutive years unless approved by Riverside. Make-up water is not subject to Curtailment Payment. Non-delivered Western water shall be used for Make-Up Water before non-delivered Riverside Water, unless the Parties mutually agree otherwise for any given year.

4.14 MWD: The Metropolitan Water District of Southern California.

4.15 MWD Tier 1 cost: The published volumetric rate charged by MWD for full-service potable water supply. If MWD amends its rates such that the MWD Tier 1 cost is no longer applicable to the pricing under this Agreement, the parties agree to meet and confer and amend this Agreement to include an appropriate pricing reference.

4.16 Operation & Maintenance Component: The component of the Service Rate intended to recover Riverside's operating and maintenance cost of providing Production, Treatment, and/or Conveyance Services.

4.17 Operating Committee Meeting: The work group referenced in Section 6.4.

4.18 Operating Plan: The written plan, developed collaboratively by Western and Riverside, as set forth in Section 6.3. Attached hereto as Exhibit A and incorporated herein by reference is an example Operating Plan.

4.19 Point of Delivery: The Point of Interconnection where water is delivered to Western by Riverside in connection with Conveyance Services provided hereunder.

4.20 Point of Interconnection: A point where the water transmission and/or distribution systems of Riverside and Western interconnect.

4.21 Point of Receipt: The Point of Interconnection where water is delivered to Riverside by Western, or on Western's behalf, in connection with Conveyance Services provided hereunder. With respect to Riverside's simultaneous provision of both Production

Services and Conveyance Services, the well head discharge block valve shall be deemed to be the Point of Receipt.

4.22 Production Services: Riverside's extraction of groundwater for the benefit of Western using Riverside's water well(s) in the Water Basins.

4.23 Prudent Utility Practice: Any of the practices, methods, and acts which, in the exercise of reasonable judgment in light of the facts (including but not limited to the practices, methods, and acts engaged in or approved by a significant portion of the water utility industry prior thereto) known at the time the decision was made, which would have been expected to accomplish the desired result at the lowest reasonable cost consistent with good business practices, reliability, safety, and expedition, taking into account the fact that Prudent Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be a spectrum of possible practices, methods, or acts which could have been expected to accomplish the desired result. Prudent Utility Practice includes due regard for manufacturers' warranties and requirements of agencies of competent jurisdiction.

4.24 Rialto/Colton Basin: The groundwater basin so defined and described in the 1969 Judgment.

4.25 Riverside North Basin: The groundwater basin so defined and described in the 1969 Judgment.

4.26 Riverside South Basin: The groundwater basin so defined and described in the 1969 Judgment.

4.27 Riverside Water: The portion of Riverside's Bunker Hill Basin Export Allocation under the 1969 Judgment that in Riverside's sole judgment, which shall not be unreasonably exercised, is surplus to Riverside's retail and wholesale customer demand which is made available for purchase by Western.

4.28 SBBA: The groundwater basin defined and described in the 1969 Judgment.

4.29 Service Rate: The rate, expressed in dollars per acre-foot and rounded to nearest cent, to be paid by Western to Riverside in connection with Riverside's provision of Production, Treatment, and/or Conveyance Services.

4.30 Shared Benefit Methodology: This methodology shall have the meaning set forth in Exhibit D, attached hereto and incorporated by reference.

4.31 Storage Services: The retention and storage of water using Riverside's reservoir capability for later delivery of such water to Western.

4.32 Surplus Water Sales: This term shall have the meaning set forth in Section 2.12 herein.

4.33 Treatment Services: The use and operation of water treatment such as, but not limited to, ion exchange, granular activated carbon, membrane filtration, and/or blending to achieve compliance with State drinking water standards.

4.34 Uncontrollable Force: Any cause or event which is beyond the control of the Party affected, including, but not restricted to, failure of or threat of failure of facilities, flood, earthquake, storm, fire, lightning, epidemic, war, riot, civil disturbance or disobedience, labor dispute or strike, labor or material shortage, sabotage, restraint by court order or public authority and action or non-action by or failure to obtain the necessary authorizations or approvals from any governmental agency or authority which by exercise of due diligence such Party could not reasonably have been expected to avoid and which by exercise of due diligence it shall be unable to overcome.

4.35 Water Basins: This term shall have the meaning set forth in Section 2.3 herein.

4.36 Western Water: Any water secured by Western through separate agreement that is intended to be produced, treated and/or conveyed through Riverside's system.

4.37 Willful Misconduct: This term shall have the meaning set forth in Section 13.4 herein.

5. EFFECTIVE DATE AND TERM:

5.1 This Agreement shall be effective July 1, 2017. The terms of this Agreement pertaining to the production, treatment and/or conveyance of Western Water shall remain in effect until June 30, 2037, and the terms of this Agreement pertaining to Riverside Water shall remain in effect until June 30, 2027, unless earlier terminated as follows:

5.1.1 Upon advance written notice by either Party at least two (2) years prior to the specified date of termination; or

5.1.2 Upon ten (10) days advance written notice by the non-defaulting Party to the defaulting Party following a material breach of this Agreement.

5.2 Obligations incurred hereunder but not satisfied prior to termination of this Agreement shall survive such termination until fully discharged, including any payments due by one Party to the other Party hereunder.

5.3 Beginning upon expiration/termination of the terms of this Agreement pertaining to Riverside Water, Riverside shall make a reasonable good faith effort, subject to governing body approvals, to deliver up to 2,000 AFY of Riverside Water to Western in times of emergency shortage that may be caused by drought or infrastructure outage that negatively impacts Western's imported water supply. The price of this water will be based on the "Shared Benefit Methodology" described in this Agreement.

6. PRODUCTION, TREATMENT AND CONVEYANCE SERVICES:

6.1 Western Water:

6.1.1 Riverside shall utilize its water production, treatment and conveyance facilities during each Delivery Month as required to deliver Western Water to Western in accord with the duly approved Operating Plan established pursuant to Section 6.3. Riverside shall provide up to 5,408 AFY of Western Water over the next 20 years. For each acre-foot of Western Water so delivered by Riverside to Western, Western shall pay Riverside at the rate calculated in Section 10.

6.1.2 Western shall have the right to curtail delivery of the Western Water at any time and of the duration specified by Western by providing 30-days' notice for non-emergency curtailments and notice as soon as practically possible for emergency curtailments. However, Western agrees that if delivery is curtailed by Western, Western shall pay Riverside a Curtailment Payment equal to the Capital Recovery Component, as defined in 10.1.3, multiplied by the acre-feet of curtailed Western Water as compensation to Riverside for Riverside's commitment to annually provide to Western up to 5,408 AFY of production, treatment and conveyance capacity. Make-Up Water may be applied towards the amount of deliveries curtailed by Western in order to reduce or eliminate the amount of the Curtailment Payment. Should Riverside be unable to deliver any portion of the 5,408 AFY of Western Water during any year of this Agreement, Western shall not be obligated to such curtailment payment for that portion of the Western Water that Riverside is not able to deliver for that year.

6.1.3 Western is working to secure long-term arrangements for 5,408 AFY of Western Water. Should Western be unable to secure Western Water equal to 5,408 AFY for the term of this Agreement, Western agrees to notify Riverside in advance of an annual Operating Committee Meeting and the applicable Operating Plan shall reflect the actual volume of secured Western Water. Riverside agrees to modify the Curtailment Payment provision to match the actual volume of secured Western Water for the following calendar year and beyond.

6.1.4 In any calendar year, all Western Water shall be conveyed prior to any Riverside Water.

6.2 <u>Riverside Water:</u>

6.2.1 Riverside shall deliver a minimum of 2,000 AFY of Riverside Water to Western, over the next ten-years. If, in its sole judgment, Riverside has additional water in excess of the 2,000 AFY in a given year, Riverside will notify Western prior to the development of the Operating Plan. If Western is interested in purchasing some or all of the excess supplies and has the ability to receive it, those excess supplies will be incorporated

into the Operating Plan. The Western Water to be delivered to Western under this Agreement shall take delivery priority over Riverside Water, as set forth in the applicable Operating Plan. Supplies in excess of 2,000 AFY will not be subject to the curtailment payment set forth in Section 6.2.2. Delivery of Riverside Water in excess of 2,000 AFY will not require modification or amendment of this Agreement. For each acre-foot of Riverside Water extracted by Riverside on Western's behalf, Western shall pay Riverside the rate determined in accordance with Section 10.

6.2.2 Western shall have the right to curtail delivery of the Riverside Water at any time and of the duration specified by Western by providing 30-days' notice for non-emergency curtailments and notice as soon as practically possible for emergency curtailments. However, Western agrees that if delivery is curtailed, Curtailment Payment shall be equal to the Commodity Price, as defined in Section 10.2, multiplied by acre-feet of Curtailed Riverside Water, as compensation for Riverside's commitment to annually provide to Western a minimum of 2,000 AFY of production, treatment and conveyance capacity. Make-Up Water may be applied towards the amount of deliveries curtailed by Western in order to reduce or eliminate the amount of the Curtailment Payment. Should Riverside be unable to deliver any portion of the 2,000 AFY of Riverside Water during any year of this Agreement, Western shall not be obligated to such curtailment payment for that portion of the Western Water that Riverside is not able to deliver for that year.

6.2.3 Riverside Water shall not be subject to Curtailment Payment until January 1, 2018.

6.3 Operating Plan:

6.3.1 Western and Riverside will work collaboratively to develop a mutually agreeable Operating Plan, in the format of the example in Exhibit A. Two (2) original copies of the initial Operating Plan setting forth the services requested, signed by Western's Authorized Representative, shall be submitted to Riverside's Authorized Representative no

later than November 1 of each year for the following calendar year and shall specify the services requested by Western, including, but not limited to, the date(s) of service, the quantities of water involved, the origin of any water to be conveyed by Riverside, the groundwater basin of origin in the case of Production Services, and the Points of Receipt and Points of Delivery. The Operating Plan can be adjusted monthly by mutual agreement.

6.3.2 If Riverside's Authorized Representative reasonably determines that Western's initial proposed Operating Plan is feasible and consistent with Prudent Utility Practice and the operation of Riverside's water extraction, transmission, distribution and treatment systems, Riverside's Authorized Representative shall countersign both copies of the proposed Operating Plan and return one (1) fully executed copy to Western. Unless otherwise communicated in writing to Western, Riverside shall provide the Production, Treatment and Conveyance Services specified in the fully executed Operating Plan, subject to the terms of this Agreement. In the event Riverside reasonably determines that an Operating Plan is not feasible and/or is not consistent with Prudent Utility Practice, Riverside shall provide such notice to Western within 30 days and the Parties shall then engage in good faith negotiations to resolve said issues and to develop a mutually agreeable Operating Plan. The failure of Riverside to provide an executed copy of the Plan, or to provide notice within 30 days that a Plan is infeasible, shall constitute Riverside's approval of the Plan.

6.3.3 If an Operating Plan has not been countersigned by Riverside in accordance with Section 6.3.2, and Riverside has sent the notice in accordance with section 6.3.2, the General Managers from Western and Riverside will meet and confer to forge a compromise by January 1. Should the General Managers be unable to reach a resolution by January 1, both Parties agree to mediation and shall share the expense of mediation equally. Such mediation shall be completed by March 1, unless the Parties mutually agree to an extension.

6.3.4 Riverside shall provide Production, Treatment and Conveyance Services from October 1 through May 31 and shall make diligent good faith efforts to provide such services every month of the year.

6.4 Operating Committee Meetings: The Authorized Representatives shall annually conduct at least one coordination meeting during the term of this Agreement. It is anticipated that said meeting will take place in the fall of each year prior to November 1 and may include, for example and not by way of limitation, the following agenda items:

(a) Actual energy and Operations and Maintenance costs as well as reconciliation of payments for the previous year;

(b) Calculation of the Commodity Charge for Riverside Water;

(c) Operational challenges of the past year;

(d) Projected costs for the upcoming year;

(e) Operational planning for the upcoming year;

(f) A 5-year projection of capital improvements that may be necessary to fulfill deliveries to Western;

(f) Review components of and the cost calculation of the Capital Recovery Component; and

(g) Other items necessary to ensure successful fulfilment of the terms of this Agreement as determined in the discretion of each Party.

7. MEASUREMENT OF WATER PRODUCED OR CONVEYED:

7.1 Any metering devices used to measure the delivery of water under this Agreement at a Point of Interconnection shall be owned by Riverside and shall be installed, operated, calibrated, and maintained in accordance with Riverside's standard requirements. Any such metering devices shall be maintained directly by Riverside or by agents or subcontractors directly under Riverside's control.

7.2 Riverside shall inspect and test the metering devices at least once per calendar year, unless more frequent testing and inspection is appropriate as a result of repairs to or replacements of a metering device. Riverside shall provide reasonable advance notice to Western of any such testing or inspection in order to permit a representative of Western to witness such activities, and shall provide Western with copies of any periodic or special inspection or testing reports relating to the metering devices upon request by Western. Western, at its own expense, may request in writing that Riverside initiate additional testing and inspection of the metering devices, and Riverside shall comply with any such request as soon as practical after the request is made.

7.3 As part of this agreement, Riverside shall recalibrate or replace all existing metering devices prior to December 1, 2017.

8. [RESERVED]

9. <u>CONTINUITY OF SERVICE:</u>

9.1 Riverside reserves the right to curtail Production, Treatment and Conveyance Services hereunder; (i) upon reasonable advance notice to Western to make repairs, replacements, modifications, or to perform maintenance work, all for the purpose of maintaining continuity of Production, Treatment and Conveyance Services, or (ii) without notice to Western because of an existing or impending Uncontrollable Force, as determined in Riverside's sole judgment which shall not be unreasonably exercised.

9.2 Notwithstanding the provisions of Section 9.1, Riverside may interrupt or curtail Production, Treatment, and Conveyance Services to the extent that the continued provision of such services could, in Riverside's sole judgment which shall not be unreasonably exercised, (i) adversely affect the quality, reliability or cost of service related to water deliveries by Riverside to its retail customers, (ii) cause Riverside to violate the terms of any rule, regulation, or binding obligation it may otherwise have with respect to the production, treatment or delivery of water, (iii) Riverside experiences a significant loss of extraction capacity, export rights,

treatment capacity, and/or conveyance capacity in any portion of its water system, or (iv) in accordance with Prudent Utility Practice.

10. RATES AND CHARGES:

10.1 Western Water: For Western Water Production, Treatment and Conveyance Services rendered by Riverside to Western hereunder, Western shall pay the following rate(s) per acre-foot of water, or portion thereof, applicable to the service provided.

10.1.1 Energy Component: The Energy Component of the rates for Western Water Services shall be in accord with the pricing sheets referenced in Section 10.6 below. For fiscal year 2017-18, a single average energy unit cost of $115 per acre-foot will be used for the monthly energy costs. Prior to each November 1 of the Agreement term, the actual costs per Section 10 shall be reconciled against the prior invoiced costs and the difference shall be invoiced or credited in accordance with Section 10.4. Each subsequent year, the prior year's actual average unit costs for energy will be used in the monthly billing for the following 12-months until a new reconciliation occurs.

10.1.2 O&M Component: The O&M Component of the rates for Western Water shall be in accord with the pricing sheets referenced in Section 10.6 below. For fiscal year 2017-18, a single average O&M unit cost of $142 per acre foot will be used for the monthly O&M costs. Prior to each November 1 of the Agreement term, the actual costs per Section 10 shall be reconciled against the prior invoiced costs and the difference shall be invoiced or credited in accordance with Section 10.4. Each subsequent year, the prior year's actual average unit costs for O&M will be used in the monthly billing for the following 12-months until a new reconciliation occurs.

10.1.3 Capital Recovery Component: The Capital Recovery Component of the rates for Western Water shall be in accord with the pricing sheets referenced in Section 10.6 below. The Capital Recovery Component will be comprised of costs for the conveyance of Western Water, including but not limited to Riverside's Waterman Wells,

Waterman Supply Transmission Pipeline, Distribution System Transmission Lines, and Booster Stations, as further described and identified on the schematic illustration included in Exhibit C and incorporated herein by reference. For fiscal year 2017-18, an average blended rate of $260 per acre-foot will be used. The Capital Recovery Component shall be annually adjusted to reflect the percentage increase, if any, in the Consumer Price Index for all Urban Consumers for the Los Angeles-Anaheim-Riverside area published by the United States Department of Labor, Bureau of Labor Statistics (1982/84=100) ("CPI"). The Parties agree to annually review the cost elements and, if warranted by mutual consent of the Parties, reset the Capital Recovery Component to reflect then current costs. New or upgraded facilities that are constructed after the date of this agreement, which are clearly shown to benefit the Production, Treatment and Conveyance Services provided to Western, will be added to and incorporated into the Capital Recovery Component. Riverside shall only include costs for new or upgraded facilities which are used to convey water to Western.

10.2 Riverside Water: Western agrees to pay Riverside the Energy, O&M, and Capital Recovery Component charges, as described in Section 10.1, and a Commodity Price. Both Parties agree to use a "Shared Benefit Methodology" to calculate the Commodity Price of the Riverside Water and the savings to Western in relation to the MWD Tier 1 cost. The Shared Benefit Methodology is intended to establish an all-inclusive price that equally splits the difference between Riverside's rate to deliver Western Water, less Western's weighted average transmission and delivery costs at all current and future interconnections, and the MWD Tier 1 cost for that applicable year. The difference between the calculated all-inclusive price and Riverside's rate to deliver Western Water will be deemed to be the commodity price ("Commodity Price"). An example of said calculation and escalation is set forth below:

10.2.1 Example - If Riverside's cost to deliver Western Water is $517 per acre-foot, Western's pumping cost is $60 per acre-foot and the MWD Tier 1 cost is $979 per acre-foot, then the total cost to deliver Riverside Water to Western would be ($517 - $60 +

$979) / 2) = $718. MWD Tier 1 cost for the applicable year is _____.

10.2.2 The price would be set for fiscal year 2017-18 and calculated annually prior to November 1, through 2026 based on the cost structure described above.

10.2.3 Reconciliation: Prior to each November 1 of the Agreement term, the actual Commodity Price will be determined based on actual costs per Section 10.2 and the costs shall be reconciled against the prior invoiced costs and the difference shall be invoiced or credited in accordance, with Section 10.4. Each subsequent year, the prior year's actual average unit costs for energy and O&M, along with the Capital Recovery Component and the published MWD Tier 1 costs for the coming year will be used in the monthly billing for the following 12-months; or, until a new reconciliation occurs.

10.3 Basis of Billing: All costs shall be accrued based on the reading of Riverside's meter(s); all water produced and conveyed through Riverside's water system shall be billed based on the meter reading at the Point of Interconnection.

10.4 Invoicing and Reconciliation of Costs: For each monthly billing cycle, Riverside shall invoice Western in accordance with Section 11 of this Agreement for the costs detailed in this Section 10. Prior to each November 1 of the Agreement term, the actual costs per Section 10 shall be reconciled against the prior invoiced costs and the difference shall be invoiced or credited. Each subsequent year, the prior year's actual average unit costs for energy and O&M will be used in the monthly billing for the following 12-months; or, until a new reconciliation occurs.

10.5 Pricing Sheets: The pricing sheet for the Energy, Operations & Maintenance ("O&M") and Capital Recovery components to be charged by Riverside are set forth in Exhibit "B" attached hereto and incorporated herein by reference. The pricing sheet for the Western Water and the Riverside Water, including the Shared Benefit Methodology to be charged by Riverside, are set forth in Exhibit "D" attached hereto and incorporated herein by reference.

11. BILLING AND PAYMENT:

11.1 Riverside shall bill Western for charges due hereunder by the fifteenth (15^{th}) day of each month for services rendered during the prior month, including any required adjustments to bills previously paid by Western. Western shall pay such bills not later than the fifth (5^{th}) day of the month following the month in which bill is issued, or on the first business day thereafter if the fifth (5^{th}) day falls on a Saturday, Sunday, or holiday. Payments which are not made in full by said due dates shall thereafter accrue interest at the lesser of (i) one percent (1%) per month of the unpaid balance, or (ii) the maximum rate otherwise permitted by law applicable to this Agreement, prorated by days until payment is sent by Western.

11.2 In the event any portion of any bill is disputed, Western shall pay the bill, including the disputed amount, under protest when due. If the protested portion of the payment is found to be incorrect, Riverside shall promptly refund the protested portion, including interest at the lesser of (i) one percent (1%) per month, or (ii) the maximum rate otherwise permitted by law applicable to this Agreement, prorated by days from the date of payment by Western to the date the refund check is sent or the refund payment is otherwise made by Riverside.

11.3 If Western does not dispute in writing any billing within one hundred eighty (180) days after the bill was rendered by Riverside, Western shall be deemed to have waived any further or continuing right to dispute such bill.

11.4 Unless otherwise agreed by the Authorized Representatives, bills shall be rendered and remittances made by their submission to the following addresses:

Bills rendered by Riverside to Western:

Western Municipal Water District
14205 Meridian Parkway
Riverside, CA 92518

Payments made by Western to Riverside:

City of Riverside
Accounts Receivable
3900 Main Street
Riverside, CA 92522

11.5 If the Parties are each required to pay an amount to each other in the same calendar month under this Agreement, then such amounts with respect to each Party may be aggregated and the Parties may discharge their obligations to pay through netting of the respective amounts due, in which case the Party, if any, owing the greater aggregate amount may pay to the other Party the difference between the amounts owed.

11.6 The Parties shall conduct an audit at least once every five (5) years during the term of this Agreement in order to determine the accuracy of the calculations required to be performed for the costs and cost escalators under this Agreement. The Parties shall each pay one-half of the cost of said audits.

12. **AUTHORIZED REPRESENTATIVES:** The Parties warrant that their Authorized Representatives have the authority to bind the respective Party to all relevant commitments under this Agreement. Initially, the Parties' Authorized Representatives shall be the individuals holding the positions set forth in the notice provisions of Section 29. Any Party may at any time change the designation of its Authorized Representative by written notice to the Authorized Representatives of the other Party. Each Party's Authorized Representative is authorized to act on its behalf in the implementation of this Agreement and with respect to those matters contained herein which are the functions and responsibilities of the Authorized Representatives. Each Authorized Representative may delegate actual performance of such functions and responsibilities; provided, that any agreement of the Authorized Representatives required to be in writing shall be signed by the Authorized Representatives.

13. **LIABILITY AND INDEMNIFICATION:**

13.1 Limitation of Liability: Except as to the gross negligence or Willful

Misconduct of a Party, each Party shall release and hold harmless the other Party from and against any and all liability, loss, damage, and expense arising from, alleged to arise from, in connection with, or incident to the services rendered under this Agreement.

13.2 Limitation on Damages: No Party shall be liable for any consequential, incidental, punitive, special, or exemplary damages or lost opportunity costs, lost profit, or other business interruption damages, by statute or in tort or contract, under any provision of this Agreement.

13.3 Indemnification: Notwithstanding Section 13.1, each Party shall indemnify, defend, and hold harmless the other Party, its directors, members, officers, employees, and agents from and against any and all third-party claims, suits, or actions instituted on account of personal injuries or death of any person (including but not limited to workers and the public) or physical damage to property resulting from or arising out of the indemnitor's Willful Misconduct or grossly negligent act or omission while engaged in the performance of obligations or exercise of rights under this Agreement.

13.4 Definition of Willful Misconduct: For purposes of this Agreement, Willful Misconduct shall be defined as:

13.4.1 Action taken or not taken by a Party at the direction of its directors or other governing body, officers, or employees having management or administrative responsibility affecting its performance under this Agreement, which:

13.4.1.1 Is knowingly or intentionally taken or not taken with conscious indifference to the consequences thereof or with intent that injury or damage would result or would probably result therefrom;

13.4.1.2 Has been determined by final arbitration award or judgment or judicial decree to be a material default under this Agreement, and which action occurs or continues beyond the time specified in such arbitration award or judgment or judicial decree for curing such default, or, if no time to cure is specified therein, occurs or continues

thereafter beyond a reasonable time to cure such default; or

13.4.1.3 Is knowingly or intentionally taken or not taken with the knowledge that such action taken or not taken is a material default under this Agreement.

13.4.2 As used in this definition:

13.4.2.1 Willful Misconduct does not include any act or failure to act which is merely involuntary, accidental, or negligent.

13.4.2.2 The phrase "employees having management or administrative responsibility" means those employees of a Party who are responsible for one or more of the executive functions of planning, organizing, coordinating, directing, controlling, and supervising such Party's performance under this Agreement, with responsibility for results.

14. **RELATIONSHIP OF THE PARTIES:** The covenants, obligations, and liabilities of the Parties are intended to be several and not joint or collective, and nothing herein contained shall ever be construed to create an association, joint venture, trust, or partnership, or to impose a trust or partnership covenant, obligation, or liability on or with regard to any Party. Each Party shall be individually responsible for its own covenants, obligations, and liabilities as herein provided. No Party shall be under the control of or shall be deemed to control the other Party. Neither Party shall be the agent of or have a right or power to bind the other Party without such other Party's express written consent, except as provided in this Agreement.

15. **UNCONTROLLABLE FORCES:** If the existence of an Uncontrollable Force disables a Party from performing its obligations under this Agreement (except for such Party’s obligations to make payments hereunder), such Party shall not be considered to be in default in the performance of any such obligations while such disability of performance exists. A Party rendered unable to fulfill any of its obligations under this Agreement by reason of an Uncontrollable Force shall exercise due diligence to remove such inability with all reasonable dispatch. Nothing contained herein shall be construed so as to require a Party

to settle any strike or labor dispute in which it may be involved.

16. **AUDITS:** Each Party shall have the right to audit any costs, payments, settlements, or other supporting information pertaining to this Agreement. Any such audit shall be undertaken by the requesting Party or its representative at reasonable times and in conformance with generally accepted auditing standards. The audited Party shall fully cooperate with any such audit, the cost of which shall be paid by the requesting Party. The right to audit a billing shall extend for a period of three (3) years following the rendering of the bill. Each Party shall retain all necessary records or documentation for the entire length of such three (3) year period and shall, to the extent permitted by law, take all steps reasonably available to assure the confidentiality of the audited Party's accounting records and supporting documents.

17. **THIRD PARTY BENEFICIARIES:** Unless otherwise specified in this Agreement, there are no third party beneficiaries to this Agreement. This Agreement shall not confer any right or remedy upon any person or entity other than the Parties and their respective successors and assigns permitted under Section 19. This Agreement shall not release or discharge any obligation or liability of any third party to any Party or give any third party any right of subrogation or action over or against any Party.

18. **DISPUTE RESOLUTION:**

18.1 The Parties' Authorized Representatives shall attempt to amicably and promptly resolve any dispute arising between the Parties under this Agreement. Nothing in this Agreement shall preclude either Party from taking any lawful action it deems appropriate to enforce its rights under this Agreement.

18.2 Any action at law or in equity brought by either of the parties hereto for the purpose of enforcing a right or rights provided for by this Agreement shall be tried in the Superior Court of the County of Riverside, State of California, and the parties hereby waive all provisions of law providing for a change of venue in such proceedings to any other

county. This agreement shall be governed, construed, and enforced in accordance with the laws of the State of California, without regard to its conflict of laws rules.

18.3 In the event either party hereto shall bring suit to enforce any term of this Agreement or to recover any damages for and on account of the breach of any term or condition of this Agreement, it is mutually agreed that each party will bear their own attorneys' fees and costs.

19. **ASSIGNMENT OF INTERESTS:**

19.1 Neither Party shall assign this Agreement without the prior written consent of the other Party, which consent shall not be unreasonably withheld or delayed. Western expressly understands and agrees that it shall not be unreasonable for Riverside to withhold or delay its consent to any proposed or purported assignment by Western to any person or entity ("Assignee") that has not demonstrated to Riverside's reasonable satisfaction that Riverside's interests as contemplated herein will not be adversely effected thereby.

19.2 Any assignment by a Party of its interest in this Agreement which is made without the prior written consent of the other Party shall not relieve the assigning Party from primary liability for any of its duties and obligations under this Agreement, and in the event of any such assignment, the assigning Party shall continue to remain primarily liable for payment of any and all money due the other Party as provided under this Agreement, and for the performance and observance of all covenants, duties, and obligations to be performed and observed under this Agreement by the Party to the same extent as though no assignment had been made.

19.3 Whenever an assignment of a Party's interest in this Agreement is made with the written consent of the other Party, the assigning Party's assignee shall expressly assume in writing the duties and obligations under this Agreement of the assigning Party and, within thirty (30) days after any such assignment and assumption of duties and obligations, the assigning Party shall furnish, or cause to be furnished, to the other Party a true and correct

copy of such assignment and assumption of duties and obligations. Upon the effective date of such assignment, the assigning Party shall be relieved of its obligations and duties under this Agreement.

19.4 Subject to the foregoing restrictions on assignment, this Agreement shall be binding upon, inure to the benefit of and be enforceable by the Parties and their respective successors and assigns.

20. **NO DEDICATION OF FACILITIES:** Any undertaking by a Party to the other Party under this Agreement shall not constitute the dedication of the system, or any portion thereof, of that Party to the public or to the other Party, nor affect the status of that Party as an independent system.

21. **COMPLETE AGREEMENT:** This Agreement contains the entire agreement and understanding between the Parties as to the subject matter of this Agreement and supersedes all prior commitments, representations, and discussions between the Parties.

22. **CONSTRUCTION OF AGREEMENT:** Ambiguities or uncertainties in the wording of this Agreement shall not be construed for or against either Party, but shall be construed in a manner that most accurately reflects the intent of the Parties when this Agreement was executed and is consistent with the nature of the rights and obligations of the Parties with respect to the matter being construed.

23. **NONDISCRIMINATION:** During the performance of this Agreement, neither Party shall deny the Agreement's benefits to any person, nor shall either Party discriminate unlawfully against any employee or applicant for employment, on the ground or because of race, color, creed, national origin, ancestry, age, sex, sexual orientation, marital status, or disability including the medical condition of Acquired Immune Deficiency Syndrome (AIDS) or any condition related thereto. Each Party shall insure that the evaluation and treatment of employees and applicants for employment are free of such discrimination.

24. **EVENTS OF DEFAULT:** In the event that a Party shall materially default in the

performance of its obligations under this Agreement, the Authorized Representative of the non-defaulting Party may give written notice of the default to the Authorized Representative of the defaulting Party. If within thirty (30) days after the non-defaulting Party's Authorized Representative shall have given such written notice to the defaulting Party's Authorized Representative, the defaulting Party shall have failed to cure the default in its performance of this Agreement, or if such default requires more than thirty (30) days to cure and the defaulting Party fails to commence such cure and diligently prosecute such cure to completion, in addition to any other remedies provided by law, the non-defaulting Party may terminate this Agreement by written notice of termination as provided for in Section 5.2.2. In addition to any other cause of default arising hereunder, a Party shall be in default if:

24.1 It becomes insolvent; or

24.2 It makes a general assignment of substantially all of its assets for the benefit of its creditors, files a petition for bankruptcy or reorganization or seeks other relief under any applicable insolvency laws; or

24.3 It has filed against it a petition for bankruptcy, reorganization or other relief under any applicable insolvency laws and such petition is not dismissed within sixty (60) days after it is filed.

25. **AMENDMENTS:** This Agreement may be modified, supplemented or amended only by a writing duly executed by the Parties.

26. **WAIVERS:** Any waiver at any time by any Party of its rights with respect to a default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not be deemed a waiver with respect to any subsequent default or other matter arising in connection therewith. Any delay, short of the statutory period of limitation in asserting or enforcing any right, shall not be deemed a waiver of such right.

27. **SECTION HEADINGS:** All captions and headings appearing in this Agreement are inserted to facilitate reference and shall not govern, except where logically necessary, the

interpretations of the provisions hereof.

28. **GOVERNING LAW:** This Agreement shall be interpreted, governed by, and construed under the laws of the State of California or the laws of the United States as applicable, as if executed and to be performed wholly within the state of California.

29. **NOTICES:**

29.1 Any notice, demand or request provided for in this Agreement, or served, given or made in connection with it, shall be in writing and shall be deemed properly served, given or made if delivered in person or sent by United States mail, postage prepaid, to the persons specified below, unless otherwise provided for in this Agreement:

To City of Riverside:	**To Western:**
City of Riverside Public Utilities Department 3750 University Ave., 3rd floor Riverside, CA 92501 Attn: General Manager	Western Municipal Water District 14205 Meridian Parkway Riverside, CA 92518 Attn: General Manager

29.2 Either Party may at any time, by written notice to the other Party, change the designation or address of the person so specified as the one to receive notices pursuant to this Agreement.

30. **SIGNATURE CLAUSE:** The signatories hereto represent that they have been appropriately authorized to enter into this Cooperative Agreement for Water Production and Conveyance on behalf of the Party for whom they sign.

(signatures on following page)

CITY OF RIVERSIDE,
A California Charter City and
Municipal Corporation

By: _____
John A. Russo
City Manager

Date: _____

WESTERN MUNICIPAL WATER DISTRICT

By: _____
John V. Rossi
General Manager

Date: _____

Attest:

By: _____
Colleen J. Nicol
City Clerk

Date: _____

APPROVED AS TO FORM
CITY ATTORNEY'S OFFICE

BY _____
Deputy City Attorney

RIVERSIDE – WESTERN
2017 COOPERATIVE AGREEMENT FOR
LONG-TERM WHEELING AND SURPLUS WATER SALES

EXHIBIT A

EXAMPLE OPERATING PLAN

CALENDAR YEAR 2018 OPERATING PLAN

FOR

COOPERATIVE AGREEMENT FOR LONG-TERM WHEELING AND SURPLUS WATER SALES

BETWEEN THE CITY OF RIVERSIDE AND WESTERN MUNICIPAL WATER DISTRICT

The Operating Committee, comprised of representatives from the City of Riverside (Riverside) and Western Municipal Water District (Western) agree to the delivery schedule in Table 1 for Calendar Year 2018.

Table 1. Calendar Year 2018 Delivery Schedule (acre-feet)

Source Water	Jan	Feb	Mar	Apr	May	Jun*	Jul*	Aug*	Sep*	Oct	Nov	Dec	TOTAL
Western Water	925	925	925	925	925	*No guaranteed deliveries.				775	-	-	5400
Riverside Water	-	-	-	-	-	*If capacity exists, deliveries may occur.				150	925	925	2000
TOTAL	**925**	**925**	**925**	**925**	**925**					**925**	**925**	**925**	**7408**

Per the Cooperative Agreement, if the delivery schedule above is unattainable, the Operating Committee has the ability to, upon mutual agreement to adjust monthly delivery targets and/or make-up up to 500 acre-feet of deliveries in the next calendar year.

City of Riverside Authorized Designee

Signature: _____

Title: _____

Western Municipal Water District Authorized Designee

Signature: _____

Title: _____

RIVERSIDE – WESTERN
2017 COOPERATIVE AGREEMENT FOR
LONG-TERM WHEELING AND SURPLUS WATER SALES

EXHIBIT B

PRICING SHEETS FOR ELECTRICITY, O&M AND CAPITAL RECOVERY COMPONENTS

EXHIBIT 'B'

EXAMPLE PRICING SHEET FOR THE RIVERSIDE -WESTERN WHEELING & SURPLUS WATER SALES AGREEMENT

(Electricity, O&M, and Capital Recovery Components)

Not Part of the Agreement. For Example Only.

	Escalator	Mockingbird PS (Van Buren Highline)	Whitegates (Green Orchard BS)	Blended Rate
Electricity		$/AF	$/AF	$/AF
Average Electrical Pumping Cost Estimate[1]	Based on Actuals	$94	$157	$115
Operations & Maintenance (O&M)				
Supply Operations Cost[2]		$62	$62	$62
Distribution Operations Cost[3]	Based on	$42	$42	$42
Supply & Distribution Maintenance Cost[4]	Actuals	$2	$2	$2
Average Capitalized Pump & Well Maintenance Cost[5]		$36	$36	$36
O&M Subtotal:		$142	$142	$142
Capital Recovery				
Waterman Wells[6]		$44	$44	$44
Waterman Supply Transmission Pipeline[7]		$105	$105	$105
Distribution System Transmission Lines[8]	ENR LA Metro CCI	$66	$133	$89
Reservoir Storage[9]		$0	$0	$0
Booster Stations[10]		$12	$42	$22
Capital Recovery Subtotal:		$227	$324	$260
Total ($/AF):		$463	$623	$517
AFY to Deliver:		4,908	2,500	

Notes: (Capital Recovery & Maintenance costs related only to RPU Water Facilities along hydraulic path to Western Delivery Points.)

1. Average annual electrical unit cost for water delivery to Mockingbird & Whitegates Western Delivery Points based on actual electrical billings in 2015. Used average electrical cost from Amendment 1 as presented in Energy Cost Sheet.
   Electrical Charge, will be trued up at the end of each year. The previous years information will be used to establish a baseline for the coming year.
   At the end of each year, the costs will be trued-up based on actuals and a debit/credit will be issued.

2. Operations $/AF Unit Cost for Bunker Hill Basin (Waterman Supply Transmission Pipeline) Water Production. Calculated in Operations & Maint. Sheet, under Exhibit C.
   Water Fund Cost Center total spending proportional to share of power cost for water production of Waterman wells for FY 2013-2014.
   FY 2013-2014 Water Fund Cost Center 6200000 (Water Production & Operations) [41, 42, & 88 Only] Less Line Item Accounts:
   a. Settlement Reimbursements b. 422200 (Power Costs) c. 422923 (Capacity/Standby Charges) d. 447100 (Taxes and Assessments)
   The sum of the cost components divided by the total production of Waterman wells (including production associated with Western acquired supplies) will be the basis for the Supply Operations Cost.

3. Operations $/AF Unit Cost for Linden/Evans Reservoir (Potable Water System) Water Distribution. Calculated in Operations & Maint. Sheet, under Exhibit C.
   Water Fund Cost Center total spending proportional to share of power cost for water distribution for FY 2013-2014.
   FY 2013-2014 Water Fund Cost Center 6200000 (Water Production & Operations) [41, 42, & 88 Only] Less Line Item Accounts:
   a. 422200 (Power Costs) b. 422923 (Capacity/Standby Charges) c. 447100 (Taxes and Assessments)
   The sum of the cost components divided by the total potable water sales (including Western acquired supplies) will be the basis for the distribution Operations Cost.

4. Maintenance $/AF Unit Cost for Bunker Hill Basin (Waterman Supply Transmission Pipeline) Production and Linden/Evans Reservoir (Potable Water System) Distribution. Calculated in Operations & Maint. Sheet, under Exhibit C.
   Water Fund Cost Center total spending proportional to RPU retail water sales for FY 2013-2014.
   1a. Total capital replacement cost of Bunker Hill Basin (Waterman Supply Transmission Pipeline) production system divided by total water production from Waterman Wells (including Western acquired supplies)
   2a. Total capital replacement cost of Linden/Evans Reservoirs to 1200 Zone Mockingbird and 1700 Zone Whitegates Deliveries divided by total potable water sales (including Western acquired supplies)
   FY 2013-2014 Water Fund Cost Center 6205000 (PU Water Field Operations/Maintenance) divided by total RPU Water System capital replacement cost, equated to 0.58%
   1b. Resulting capital replacement cost ($/AF) multiplied by 0.58% for apportioned production system maintenance cost
   2b. Resulting capital replacement cost ($/AF) multiplied by 0.58% for apportioned distribution system maintenance cost
   Western's wheeled water flow weighted proportional unit cost obtained from resulting apportioned production & distribution system maintenance cos
   O&M, will be trued up at the end of each year. The previous years information will be used to establish a baseline for the coming year.
   At the end of each year, the costs will be trued-up based on actuals and a debit/credit will be issued.

5. Average Capitalized Maintenance Unit Cost for all RPU Pumps & Wells. Calculated in Operations & Maint. Sheet, under Exhibit C.
   FY 2013-2014 Water Fund Cost Center 6200000 (Facility Rehabilitation, 470803).
   Total Facility Rehab cost for FY 2013-2014 divided by the total potable water sales will be the basis for the Pump & Well Maintenance Cost.

6. $/AF Unit cost for replacement of existing RPU wells over 100 year life cycle at 5% interest. Calculated in Capital Recovery Sheets, under Waterman Wells.

7. $/AF Unit cost for replacement of existing RPU Waterman Supply Transmission Pipeline over 120 year life cycle at 5% interest. Calculated in Capital Recovery Sheets, under Waterman Supply Line.

8. $/AF unit cost for replacement of existing RPU Distribution System Transmission waterlines over 120 year life cycle at 5% interest. Calculated in Capital Recovery Sheets, under Distribution System Transmission Lines.

9. Reservoir usage not critical during non-firm deliveries. During high demands, reservoir capacity reserved for RPU Customers. During high demands, reservoir capacity reserved for RPU Customers.

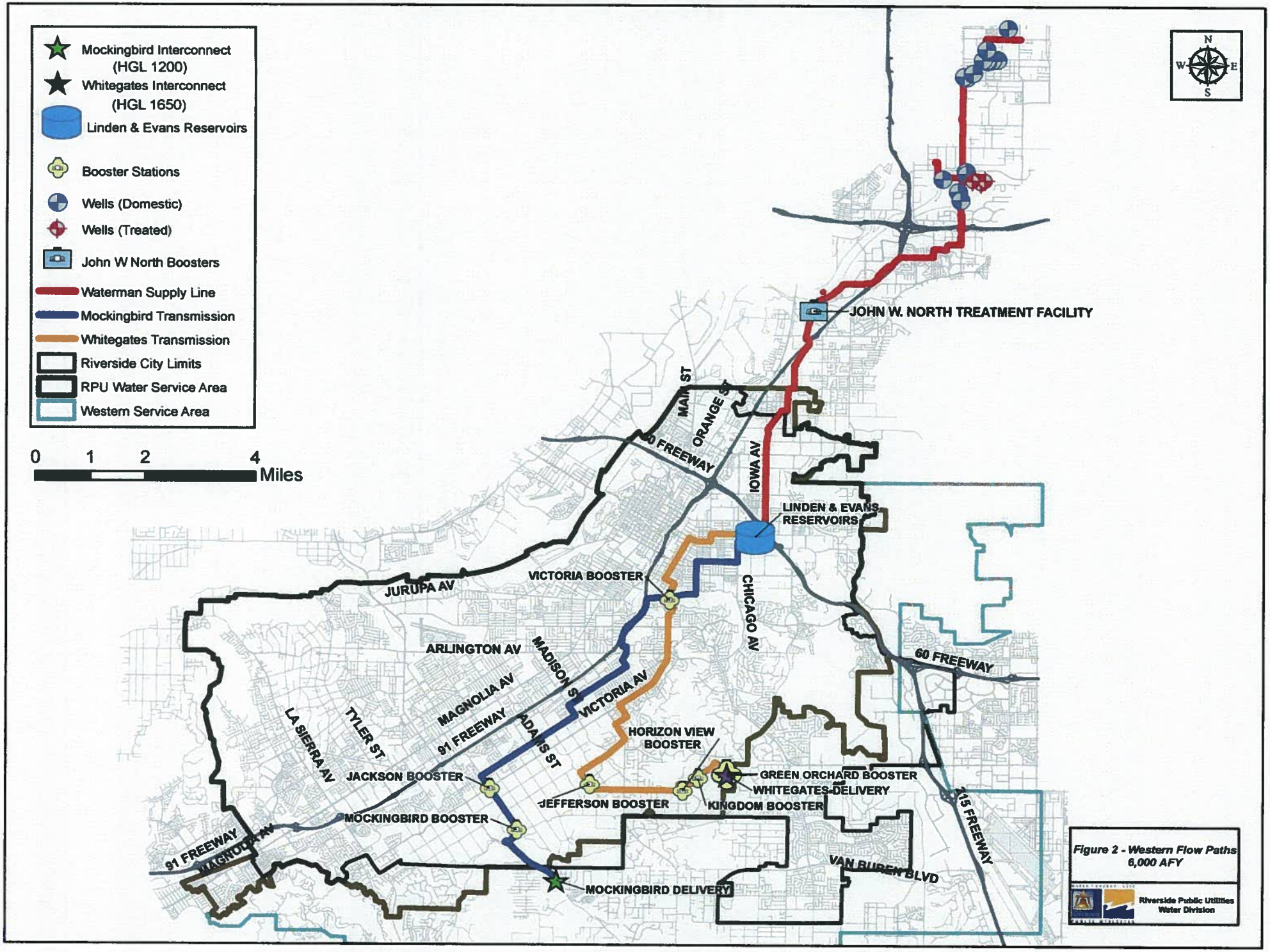
10. $/AF unit cost for replacement of existing RPU Booster Stations over 60 year life cycle at 5% interest. Calculated in Capital Recovery Sheets, under Pump Stations.

RIVERSIDE – WESTERN
2017 COOPERATIVE AGREEMENT FOR
WATER PRODUCTION AND CONVEYANCE

EXHIBIT C

FLOW PATH SCHEMATIC

Exhibit C – Flow Path Schematic



RIVERSIDE – WESTERN
2017 COOPERATIVE AGREEMENT FOR
WATER PRODUCTION AND CONVEYANCE

EXHIBIT D

WHEELING, SHARED SAVINGS AND SHARED BENEFIT METHODOLOGY

EXHIBIT 'D'

EXAMPLE PRICING SHEET FOR THE RIVERSIDE - WHEELING, SURPLUS WATER SALES, SHARED BENEFIT METHODOLOGY

Not Part of the Agreement. For Example Only.

	Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
WHEELING PRICE											
Volume (AF):		5,408									
Assumed inflation:		4%									
A	RPU Capital Recovery	$ 259	$ 269	$ 280	$ 291	$ 303	$ 315	$ 328	$ 341	$ 354	$ 369
B	Energy	$ 115	$ 120	$ 124	$ 129	$ 135	$ 140	$ 146	$ 151	$ 157	$ 164
C	O&M	$ 142	$ 148	$ 154	$ 160	$ 166	$ 173	$ 180	$ 187	$ 194	$ 202
D	Wheeling Unit Price	$ 516	$ 537	$ 558	$ 580	$ 604	$ 628	$ 653	$ 679	$ 706	$ 734
E	**Wheeling Revenue**	**$ 2,790,528**	**$ 2,902,149**	**$ 3,018,235**	**$ 3,138,964**	**$ 3,264,523**	**$ 3,395,104**	**$ 3,530,908**	**$ 3,672,144**	**$ 3,819,030**	**$ 3,971,791**

* Capital Recovery will be escalated at CPI. Energy and O&M charges are based on actual costs calculated annually.

		2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	
WHEELING PRICE - Continued												
A	RPU Capital Recovery	$ 383	$ 399	$ 415	$ 431	$ 449	$ 466	$ 485	$ 505	$ 525	$ 546	
B	Energy	$ 170	$ 177	$ 184	$ 191	$ 199	$ 207	$ 215	$ 224	$ 233	$ 242	
C	O&M	$ 210	$ 219	$ 227	$ 236	$ 246	$ 256	$ 266	$ 277	$ 288	$ 299	
D	Wheeling Unit Price	$ 764	$ 794	$ 826	$ 859	$ 894	$ 929	$ 966	$ 1,005	$ 1,045	$ 1,087	**20-YR Revenue**
E	**Wheeling Revenue**	**$ 4,130,663**	**$ 4,295,890**	**$ 4,467,725**	**$ 4,646,434**	**$ 4,832,292**	**$ 5,025,583**	**$ 5,226,607**	**$ 5,435,671**	**$ 5,653,098**	**$ 5,879,222**	**$ 83,096,562**

* Capital Recovery will be escalated at CPI. Energy and O&M charges are based on actual costs calculated annually.

SURPLUS WATER PRICE (SHARED SAVINGS)

		2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	
Volume (AF):		2,000										
Assumed inflation:		4%	In 2017, MWD has a published escalation rate of 4% over the next 10-yrs.									
F	MWD Projected Unit Price	$ 979	$ 1,015	$ 1,053	$ 1,092	$ 1,123	$ 1,164	$ 1,205	$ 1,249	$ 1,296	$ 1,344	
G	WMWD Additional Transmission Costs	$ 60	$ 62	$ 65	$ 67	$ 70	$ 73	$ 76	$ 79	$ 82	$ 85	
H	RPU Commodity Charge	$ 202	$ 208	$ 215	$ 222	$ 225	$ 232	$ 238	$ 246	$ 254	$ 262	
I	RPU Capital Recovery	$ 259	$ 269	$ 280	$ 291	$ 303	$ 315	$ 328	$ 341	$ 354	$ 369	
J	Energy	$ 115	$ 120	$ 124	$ 129	$ 135	$ 140	$ 146	$ 151	$ 157	$ 164	
K	O&M	$ 142	$ 148	$ 154	$ 160	$ 166	$ 173	$ 180	$ 187	$ 194	$ 202	
L	Surplus Water Sales Unit Price	$ 718	$ 745	$ 773	$ 802	$ 828	$ 859	$ 891	$ 925	$ 960	$ 997	**10-YR Revenue**
M	**Surplus Water Sales Revenue**	**$ 1,435,000**	**$ 1,489,240**	**$ 1,546,210**	**$ 1,604,938**	**$ 1,656,456**	**$ 1,718,794**	**$ 1,781,985**	**$ 1,849,065**	**$ 1,920,067**	**$ 1,993,030**	**$ 16,994,785**

* RPU Commodity Charge will be calculated annually based on splitting the difference between Riverside's wheeling cost (Capital Recovery, Energy, and O&M), less Western's weighted average transmission and delivery costs at all current and future interconnections, and MWD's Tier 1 costs.

SHARED BENEFIT METHODOLOGY

N	**Western's Savings**	**$ 403,000**	**$ 415,960**	**$ 429,998**	**$ 444,078**	**$ 449,161**	**$ 463,208**	**$ 476,176**	**$ 491,023**	**$ 507,704**	**$ 524,172**	**$ 4,604,482**
O	**RPU Commodity**	**$ 403,000**	**$ 415,960**	**$ 429,998**	**$ 444,078**	**$ 449,161**	**$ 463,208**	**$ 476,176**	**$ 491,023**	**$ 507,704**	**$ 524,172**	**$ 4,604,482**

Appendix I Meeks and Daley/EVMWD Lease Agreement

AGREEMENT BETWEEN THE ELSINORE VALLEY MUNICIPAL WATER DISTRICT AND THE WESTERN MUNICIPAL WATER DISTRICT REGARDING THE LEASE OF GROUNDWATER RIGHTS EXPORTABLE FROM THE SAN BERNARDINO BASIN AREA

THIS LEASE OF GROUNDWATER RIGHTS ("Lease") is entered into as of the latest date of signatory execution shown in Section 8.8, by and between ELSINORE VALLEY MUNICIPAL WATER DISTRICT ("EVMWD" or "Lessor"), a municipal water district and WESTERN MUNICIPAL WATER DISTRICT ("WESTERN" or "Lessee"), a municipal water district, each a "Party" and collectively referred to herein as "Party" or "Parties." This Lease shall take effect on January 1, 2021 (the "Effective Date").

RECITALS

A. Meeks & Daley Water Company ("MDWC"), a mutual water company and California corporation, or its predecessors in interest, is a party to the judgment known as Western Municipal Water District of Riverside County v. East San Bernardino County Water District. et al., Riverside County Superior Court Case No. 78426 (1969), as amended on February 28, 1992 (the "Judgment").

B. Pursuant to the Judgment, MDWC has 7,833 Acre Feet (AF) of water rights (the "Water Rights") to extract groundwater from the Bunker Hill Basin of the San Bernardino Basin Area (the "SBBA") as the SBBA is defined therein.

C. In 1989, EVMWD purchased the Temescal Water Company, which owned an interest and entitlement to water from MDWC. As a result of that purchase, EVMWD now owns a controlling interest in MDWC's right to produce and export 4,680.6 AF of groundwater (the "Lease Water") each year from the Bunker Hill Basin of the SBBA. Pursuant to the Judgment, the Lease Water shall increase or decrease in quantity as necessary to satisfy the "New Conservation" provision as that term is defined in the Judgment.

D. On August 23, 2001, Lessee and Lessor entered into the agreement entitled *Agreement Between the Western Municipal Water District of Riverside County and the Elsinore Valley Municipal Water District for the Reciprocal Use of Certain Assets Related to the Production and/or Conveyance of Water* (hereinafter "Reciprocal Use Agreement"), whereby Lessee may utilize Lessor's Lease Water in exchange for Lessor's utilization of Lessee's owned capacity in the Mills Gravity Pipeline. From 2001 to 2020, WESTERN received water from the Bunker Hill Basin of the SBBA pursuant to the Reciprocal Use Agreement and EVMWD's rights to MDWC water under the Judgment.

E. Lessee desires to lease the Lease Water from Lessor and Lessor desires to lease the Lease Water to Lessee pursuant to the terms of this Lease.

F. In 2017, Lessee entered into the Water Production, Conveyance and Surplus Sales Agreement (the "Wheeling Agreement") with the City of Riverside ("Riverside") whereby Riverside extracts and conveys to WESTERN both MDWC water and Riverside surplus water that it obtains from the SBBA. Pursuant to the Wheeling Agreement, Riverside will deliver Lease Water to WESTERN until 2037, unless extended.

OPERATIVE PROVISIONS

NOW, THEREFORE, in consideration of the facts set forth above and the covenants, conditions and promises set forth below, the Parties hereto agree as follows:

Section 1. Terms.

1.1 Incorporation of Recitals. The Parties hereby affirm the truth of the facts set forth in the Recitals and incorporate the Recitals as if set forth in full herein.

1.2 Lease of Lease Water. Lessor agrees to lease the Lease Water to Lessee and Lessee agrees to lease the Lease Water from Lessor pursuant to the terms herein.

Section 2. Lease Term.

2.1 Term of Lease. Subject to the early termination provisions in Section 8 below, this Lease shall have a term of twenty (20) years (the "Term") commencing on the Effective Date and terminating automatically on December 31, 2041, unless extended pursuant to Section 2.2.

2.2 Extensions. The Term in Section 2.1 may be extended in five (5) year increments up to four (4) times for an additional twenty (20) years if agreed to in writing by the Parties. Should WESTERN desire to extend the Term, it shall notify EVMWD in writing at least one hundred and eighty (180) days prior to the then applicable expiration date. Upon WESTERN providing written notification to EVMWD requesting a lease extension, EVMWD shall respond to WESTERN within ninety (90) days confirming approval or denial of the request for lease extension.

2.3 No Continuing Obligation to Provide Water Upon Expiration of Term. Lessor shall have no continuing obligation to Lessee: (i) to extend or renew the Term of this Lease, (ii) to lease the Lease Water following the expiration or early termination of this Lease, or (iii) pertaining to the Water Rights whatsoever following the expiration or early termination of this Lease.

Section 3. Rate, Guarantee and Payment.

3.1 Base Rate. In year one of this Lease, Lessee shall pay Lessor one hundred ninety-eight dollars and ninety one cents ($198.91) per acre foot (the "Base Rate") multiplied by 4,680.6 AF (the "Lease Water").

3.2 Guarantee. Unless one of the Payment Exceptions in section 3.5 applies, Lessee shall purchase the entire amount of "Lease Water" from Lessor every year.

3.3 Escalator. Beginning one (1) year after the Effective Date and continuing every year during the Term of this Lease, the Base Rate shall increase according to the non-seasonally adjusted, average Consumer Price Index (CPI-U) for all items and for all urban consumers in Los Angeles-Long Beach-Anaheim, CA, plus one (1) percent (the "Escalator"). However, the Escalator shall not be less than two and one quarter (2.25) percent or greater than four and one quarter (4.25) percent.

3.4 Yearly Escalation of Lease Rate. In the first year of the lease, EVMWD shall increase the Base Rate by the Escalator to determine the lease rate ("Lease Rate"). Every year thereafter, EVMWD shall increase the then current Lease Rate by the Escalator to determine the then current Lease Rate for the following year. Lessor shall calculate the Escalator annually, after the Effective Date, utilizing the August CPI-U. On or before October 1st, during the Term of the Lease, Lessor shall provide written notice to Lessee of the Escalator for the next calendar year based on Section 3.3 and the new Lease Rate

3.5 Payment Exceptions. Payment for Lease Water shall be reduced by the amount of water not delivered or available for delivery as a result of the following limited circumstances (the "Payment Exceptions") only:

3.5.1 Riverside, through no fault of Lessee, is unable or unwilling to deliver all of the Lease Water;

3.5.2 The Safe Yield of the SBBA, as that term is defined in the Judgment, is recalculated or otherwise revised by the Watermaster or a Court of competent jurisdiction, reducing the amount of Lease Water that may be extracted;

3.5.3 The parties to the Judgment agree to reduce extractions and/or exports from the SBBA, or WESTERN and EVMWD agree in writing to reduce extractions from the SBBA;

3.5.4 A court of competent jurisdiction or a regulatory agency with legal authority over the matter directs that the export of Lease Water by Lessee from the SBBA be reduced or curtailed; or

3.5.5 SBBA water quality prevents delivery of some or all of the Lease Water.

The payment for Lease Water shall not be reduced where all of the Lease Water is legally available for export under the Judgment.

3.5.6 Force Majeure

(a). The nonperformance of any of its obligations under the Lease was due to an unforeseen Force Majeure Event as defined in paragraph (b) of this subsection that prevents WESTERN from receiving Lease Water, on condition that the party complies with the conditions in paragraph (c) below.

(b). A Force Majeure Event shall mean an unforeseen act of God; war; riot; act of terrorism, domestic or foreign; embargo; governmental rule, regulation or decree; flood, fire, hurricane, tornado, or other casualty; earthquake; strike, lockout, or other labor disturbance; the unavailability of labor or materials to the extent beyond Lessee's control; pandemics, epidemics, local disease outbreaks, public health emergencies, and quarantines; or any other events or circumstances not within Lessee's reasonable control, whether similar or dissimilar to any of the foregoing.

(c). Upon occurrence of a Force Majeure Event, Lessee shall promptly notify Lessor that a Force Majeure Event has occurred, its anticipated effect on performance, including its expected duration and shall furnish Lessor with periodic reports regarding the progress of the Force Majeure Event. Lessee shall use reasonable diligence to minimize damages and resume performance. Disagreements over the applicability of this section shall be resolved per the Dispute Resolution provision in Section 9.4.

3.6 Payment of Lease Consideration. Lessee shall pay Lessor the Base Rate or the escalated Lease Rate in twelve equal monthly payments on or before the 15th day of the month (the "Due Date") starting in January 2021. It is Lessee's sole obligation to inform Lessor of any applicable Payment Exception pursuant to Section 3.5 above, should one exist, within 60 days of Lessee learning or receiving actual notice that the Payment Exception applies, or such Exception shall be deemed waived. Within 30 days of Lessor receiving notice of a valid Payment Exception, Lessor shall recalculate the amount of lease water to account for the Payment Exception and modify Lessee's monthly payment beginning on the date the Payment Exception was identified to account for the change.

3.7 Late Payment. Payments not submitted in full by said Due Date shall accrue interest at 1% per month multiplied by the unpaid balance applicable to this Agreement, prorated by the number of days between the Due Date and the date EVMWD receives the payment.

3.8 San Bernardino Water Conservation District Assessments. Lessor shall pay the groundwater extraction fee (also referred to as the Groundwater Charge Assessment or "pump tax") of $13.19 per AF of groundwater actually extracted to the San Bernardino Water Conservation District. Lessor acknowledges that the amount of this fee and the entity to which the fee is paid may change from time to time. Lessor and Lessee agree that should the Groundwater Charge Assessment exceed $20.00 per AF, Lessor and Lessee shall split equally the portion of the charge that exceeds $20.00 per AF.

Section 4. Production and Delivery of Lease Water.

4.1 Production and Delivery of Lease Water. Lessee shall be solely responsible for the production, treatment and delivery of the Lease Water.

4.2 Lessor Obligations. Lessor shall have no responsibilities or obligations whatsoever in regard to the extraction, production, treatment, or delivery of the Lease Water.

Section 5. No Warranties or Representations by Lessor.

5.1 Lease Water Leased As Is. Lessee acknowledges that Sections 3.5.5 and 7.6.2 shall be Lessee's only recourse should the quality, potability or fitness of the Lease Water be unacceptable. The Lease Water is being leased to Lessee on an "as is" basis, and Lessee leases such Lease Water from Lessor without reliance upon any representation, promise or inducement by Lessor, or any of its employees, agents or representative, or any other person, concerning the quality, potability, or fitness of the Lease Water, for Lessee's intended use.

5.2 No Representation or Warranty Concerning Lease Water. Lessee acknowledges that neither Lessor, nor any of its employees, agents or representatives, has made any written or oral representation, promise, warranty or statement, whether express or implied, concerning the Lease Water, its availability, its quality or potability, its fitness for Lessee's intended use or any other purpose or use, its value, or any other promise, representation or inducement not expressly set forth in this Lease.

Section 6. Indemnities.

6.1 Lessor and Lessee shall not be liable or accountable at any time or in any manner for any loss, damage, or injury whatsoever to the person or the property of any person or entity whatsoever, including but not limited to any employee, agent or contractor of Lessee, from any cause whatsoever arising out of or in connection with this Lease or the Lease Water, the quality of the Lease Water, the lack of availability of Lease Water, the inability to extract, produce or deliver the Lease Water, or directly or indirectly from any condition of the Lease Water.

6.2 Indemnity by Lessor. Lessor hereby indemnifies and agrees to defend and hold harmless Lessee and its affiliates, officers, employees and directors, from and against any and all demands, claims, actions, proceedings, damages, liabilities, losses, fees, costs or expenses (including without limitation reasonable attorneys' fees and the costs of any investigation) directly or indirectly arising from any lawsuit challenging Lessor's ownership right to the Lease Water including the right to obtain, pump, and control the Lease Water.

6.3 Indemnity by Lessee. Lessee hereby indemnifies and agrees to defend and hold harmless Lessor and its affiliates, officers, employees and directors, from and against any and all demands, claims, actions, proceedings, damages, liabilities, losses, fees, costs or expenses (including without limitation reasonable attorneys' fees and the costs of any investigation) directly or indirectly arising from the production of the Lease Water and the delivery of such water to Lessee's customers pursuant to this Agreement.

6.4 Ownership of Water Rights and Reporting. As part of the material consideration for this Lease, Lessor warrants that it has right, title, and ownership to and in the Water Rights and Lessee hereby covenants and promises never to assail or contest same. Lessor shall report WESTERN's lease of the Lease Water to the Watermaster as attributable to EVMWD's Meeks and Daley Water Rights as identified in the Judgment.

6.5 Compliance with Laws. Lessee shall keep itself fully informed of all existing and future state and federal laws and all county and city ordinances and regulations which in any manner affect the activities or rights of Lessee under this Lease, the storage and delivery of the Lease Water, and of all such orders and decrees of bodies or tribunals having jurisdiction or authority over same. Lessee shall at all times observe and comply with all applicable existing and future laws, ordinances, regulations, orders and decrees, and shall defend, protect and indemnify Lessor and its affiliates, officers, employees and directors from and against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order or decree, whether by Lessee or any person or entity holding title under Lessee.

6.6 Assignment and Sublease. Lessee shall not, without the prior written consent of Lessor (which shall not be unreasonably withheld) either voluntarily or by operation of law, assign, mortgage, hypothecate, sublease or otherwise transfer this Lease, or any portion of or interest in this Lease.

Section 7 Default and Termination.

7.1 Notice of Non-Compliance. Each Party shall have a reasonable opportunity to assert matters which it believes have not been undertaken in accordance with this Lease, to explain the basis for such assertion, and to receive from the other Party a justification of its position on such matters. If either Party concludes that the other Party has not complied in good faith with the terms of the Lease then such Party may issue a written "Notice of Non-Compliance" ("Notice of Non-Compliance") mailed to the non-complying Party, specifying the grounds therefore and all facts demonstrating such non-compliance. The Party receiving a Notice shall have thirty (30) days to cure or remedy the non-compliance identified in the Notice, or if such cure or remedy is not reasonably capable of being carried out to completion within such thirty (30) day period, to commence to cure or remedy the noncompliance and to diligently and in good faith prosecute such cure or remedy to completion. If the Party receiving the Notice does not believe it is out of compliance, it may contest the Notice of Non-Compliance by responding in writing within thirty (30) days after receipt. If a response to the Notice of Non-Compliance has not been received in the offices of the Party alleging the non-compliance within the prescribed time period, the Notice shall be conclusively presumed to be valid. If a Notice of Non-Compliance is contested, the Parties shall, for a period of not less than fifteen (15) days after receipt of the response, seek to arrive at a mutually acceptable resolution of the matter(s) occasioning such Notice. In the event a cure or remedy is not timely effected or, if the Notice of Non-Compliance is contested and the parties are not able to arrive at a mutually acceptable resolution of the matter(s) by the end of the fifteen (15) day period, the Party alleging the non-compliance may thereupon pursue the remedies provided in Section 7.2. After complying with this Section 7.1, either Party may seek termination of this Lease as set forth herein, and in the event this Lease is appropriately terminated, neither Party shall have any further obligation hereunder.

7.2 Remedies on Default. Should either Party breach this Lease, after complying with the provisions in Section 7.1, the other Party may terminate this Lease in addition to any other remedy provided for by law or in equity.

7.3 Waiver of Breach. The waiver of any breach of any term, covenant, or condition of this Lease shall not be deemed a continuing waiver of such term, covenant or condition, or a waiver of any subsequent breach of the same or any other term, covenant or condition contained in this Lease, unless such waiver is in writing signed by the waiving Party.

7.4 Cumulative Remedies. The remedies in Sections 7.1 and 7.2 above shall not be exclusive, but shall be cumulative and in addition to any and all other remedies now or hereafter allowed by law and the exercise of one or more of said rights, powers, elections or remedies shall not impair a Parties right to exercise any other right, power, election or remedy.

7.5 Right to Terminate Without Cause. Notwithstanding any other provision of this Lease, either Party shall have the right, in its sole and absolute discretion, for any reason, with or without cause, to terminate this Lease prior to its expiration, by giving eighteen (18) months written notice of termination to the other Party.

7.6 Lessee's Right to Terminate For Specified Occurrences. Notwithstanding any other provision of this Lease, Lessee shall have the right to terminate this Lease prior to its expiration, by giving twelve (12) months written notice of termination to Lessor, for any of the following reasons:

7.6.1 The Wheeling Agreement between WESTERN and Riverside is terminated for any reason or WESTERN is not otherwise able to take delivery of the Lease Water through no fault of its own; or

7.6.2 The water quality of the SBBA does not meet Lessee's quality objectives and such water quality deficiencies cannot be cured with reasonably available treatment technologies at a reasonable cost to the Lessee.

Section 8. Miscellaneous.

8.1 Notices. Any notice, payment or instrument required or permitted to be given or delivered by this Lease may be given or delivered by personal delivery, by email, or by depositing same in any reputable overnight mail carrier, postage prepaid, and addressed as follows:

To Lessor: Elsinore Valley Municipal Water District
Attn: General Manager
P.O. Box 3000
31315 Chaney Street
Lake Elsinore, CA 92531
Email: generalmanager@evmwd.net

If to Lessee: Western Municipal Water District
Attn: General Manager
14205 Meridian Parkway
Riverside, CA 92518
Email: generalmanager@wmwd.com

Notice may also be provided to such other person or address as either Party may direct in writing. Except where service is by personal delivery or by registered or certified mail, return receipt requested, service of any instrument or writing shall be deemed completed twenty-four (24) hours after deposit with a reputable overnight mail carrier. The Parties may agree in writing to other acceptable methods of providing notice per this Section, to include delivery of notice by email.

8.2 Warranty of Authority. Each representative of Lessor and Lessee affixing his or her signature to this Lease warrants and represents by such signature that he or she has the full legal authority to bind his or her respective party to all of the terms, conditions and provisions therein, that his or her respective party has the full legal right, power, capacity and authority to enter into

this Lease and perform all of its provisions and obligations, and that no other approvals or consents are necessary in connection therewith.

8.3 Headings. The titles and headings of Sections of this Lease, as herein set forth, have been inserted for the sake of convenience only, and are not to be taken, deemed or construed to be any part of the terms, covenants or conditions of this Lease, or to control, limit or modify any of the terms, covenants or conditions hereof.

8.4 Disputes. The Parties desire to informally resolve all disputes related to this Lease whenever possible, at the lowest possible level, and triggering of the dispute resolution procedures described herein shall only occur where the Parties after complying with the Notice of Non-Compliance provisions in Section 7.1, are unable to resolve matters without invoking formal dispute resolution procedures. Should compliance with Section 7.1 prove unsuccessful, the Parties agree to neutral facilitation/mediation of the dispute as a next step prior to filing a lawsuit or otherwise seeking judicial intervention. Where facilitation/mediation is unable to successfully resolve the dispute, then either Party, upon providing 30 days-notice to the other Party, may initiate judicial proceedings in the Superior Court for the County of Riverside.

In the event that any action is commenced by a Party to this Lease against the other to enforce its rights or obligations arising from this Lease or seeking to interpret this Lease, venue for such action shall be in Riverside County, California, and the prevailing party in such action (whether or not it is prosecuted to judgment), in addition to any other relief and recovery ordered by the court, shall be entitled to recover any applicable statutory costs, plus reasonable attorneys' fees and expert witness fees.

8.5 Integration, Construction and Amendment. This Lease represents the entire understanding of Lessor and Lessee as to those matters contained therein, and no prior oral or written understanding shall be of any force or effect with respect to those matters covered thereby. This Lease shall be governed by the laws of the State of California and construed as if drafted by both Lessor and Lessee. This Lease may not be modified, altered or amended except in writing signed by both Lessor and Lessee.

8.6 Successors. Subject to Section 7.5, all terms, conditions and provisions of this Lease shall inure to the benefit of and be binding on, Lessor, Lessee, and their respective successors and assigns.

8.7 Partial Invalidity. If any term, covenant, condition or provision of this Lease is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remainder of the provisions hereof shall remain in full force and effect and shall in no way be affected, impaired, or invalidated thereby.

8.8 Counterparts. This Lease may be signed in counterparts, each of which shall constitute an original and which collectively shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have executed this Lease to take effect on the Effective Date defined above.

"LESSOR"
Elsinore Valley Municipal Water District

Greg Thomas, General Manager

NOV 19, 2020
Date

"LESSEE"
Western Municipal Water District

Craig D. Miller, P.E., General Manager

11/18/2020
Date

J

Appendix J City of Riverside and Western 2021 Operating Plan

CALENDAR YEAR 2021 OPERATING PLAN

FOR

COOPERATIVE AGREEMENT FOR LONG-TERM WHEELING AND SURPLUS WATER SALES BETWEEN CITY OF RIVERSIDE AND WESTERN MUNICIPAL WATER DISTRICT

The Operating Committee, comprised of representatives from the City of Riverside (Riverside) and Western Municipal Water District (Western) agree to the estimated delivery targets in Table 1 for Calendar Year 2021. Monthly numbers are intended to be a guide. Actual monthly deliveries will be subject to capacity, system operability, and customer demand. Both Riverside and Western are interested in maximizing the delivery of local supplies and strive to exceed the monthly estimated targets, and thus the Annual Objective in Table 1, below.

Table 1. Calendar Year 2021 Delivery Schedule (acre-feet)

Source Water	Jan	Feb	Mar	Apr	May	Jun*	Jul*	Aug*	Sep*	Oct	Nov	Dec	Annual Objective
Western – M&D LLC	226.52												226.52
Western – M&D/EVMWD	263	525	625	700	700	600	600	600.6					4,680.6
Western – RHWC/Storage									300.88				300.88
Riverside – Surplus									232	625	600	543	2,000
TOTAL	**489.52**	**525**	**625**	**700**	**700**	**600**	**600**	**600.6**	**532.88**	**625**	**600**	**543**	**7,208**

*Riverside cannot guarantee deliveries June through September. IF capacity in RPU's system is available in these months, deliveries will occur.

**The Annual Objective is not intended to be a maximum cap. If more water and capacity are available, and demands exist, more water can be delivered.

Per the Cooperative Agreement, if the delivery schedule above is unattainable, the Operating Committee has the ability to, upon mutual agreement, to adjust delivery targets and/or make up to 500 acre-feet of deliveries in the next calendar year.

City of Riverside Authorized Designee

12/3/20

Signature and Date

Western Municipal Water District Authorized Designee

11/16/2020

Signature and Date

General Manager

K

Appendix K Santa Margarita Watershed Adjudication

The Santa Margarita Watershed Adjudication

IN THE UNITED STATES DISTRICT COURT

FOR THE SOUTHERN DISTRICT OF CALIFORNIA

SOUTHERN DIVISION

FILED
ENTERED
LODGED
RECEIVED
MAR 13 1989
CLERK, U.S. DISTRICT COURT
SOUTHERN DISTRICT OF CALIFORNIA
BY DEPUTY

UNITED STATES OF AMERICA,

Plaintiff,

vs.

FALLBROOK PUBLIC UTILITY DISTRICT, et al.,

Defendants

Civ. No. 1247-SD-T

ORDER FOR THE APPOINTMENT OF A WATERMASTER; POWERS AND DUTIES.

In 1951, the United States of America brought this case to seek a judicial determination of all respective water rights within the Santa Margarita River watershed. That litigation culminated in this Court's decision United States v. Fallbrook Public Utility District, et al., 193 F.Supp. 342 (S.D.Cal. 1961), aff'd in part and reversed in part 347 F.2d 48 (9th Cir. 1965) and finally in the Modified Final Judgment and Decree, entered April 6, 1966.

During the course of this litigation the Court appointed Lieutenant Colonel A. C. Bowen to collect water consumption data from substantial users within the watershed and to report to the Court on his findings. By Order of January 19, 1975, Colonel Bowen was appointed as Watermaster with broad powers to administer and enforce the provisions of the Court's Modified

MAR 17 1989

Final Judgment and Decree. Colonel Bowen served in this capacity until his death in 1981. No replacement has been appointed.

In June of 1988 the United States of America, Rancho California Water District and Fallbrook Utility District requested that this Court act to appoint a replacement for Colonel Bowen. After a hearing on June 13, 1988, this Court ordered the three parties to advertise for and interview prospective candidates for the position of Watermaster. That process having been completed, notice was given of this hearing for any party[1/] to show cause why this Court should not appoint the candidate recommended by the United States, Rancho California Water District and the Fallbrook Public Utility District. Having received no substantial objection to this candidate it is hereby Ordered, Adjudged and Decreed:

I

APPOINTMENT OF A WATERMASTER

James Jenks is hereby designated by this Court to act as Watermaster for the Santa Margarita River watershed, to administer and enforce the provisions of the Modified Final Judgment and Decree and subsequent instructions and orders of this Court.

1/ For the purpose of this Order, party shall mean any party to the original adjudication and their successors in interest.

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II

REPORTING DUTIES

Promptly after the end of each water year,[2] the Watermaster shall report to the Court, in writing, a summary of his findings and conclusions in accordance with paragraph V of this Order and as follows:

1. A summary of water availability within the Santa Margarita River watershed for the previous water year and, to the extent feasible, a forecast of the same for the upcoming water year. The summary shall include a compilation, by hydrologic sub-unit, of the following water quantities:

a. Surface Water:

1) Surface flow of the Santa Margarita River and its tributaries, with identification by quantity of the specific sources of such surface flow, including water from natural runoff, water imported from outside the watershed, and water from each of the subsurface sources identified in the applicable interlocutory judgments.

2) Diversions of surface water, with identification by quantity of the related consumptive uses, losses, and returns.

3) Water in surface storage on the last day of the previous water year.

b. Subsurface Water:

1) Extractions from each of the subsurface sources identified in the applicable interlocutory judgments, with identification by quantity of the related consumptive uses, losses, and returns.

2) For each such subsurface source, (i) the quantity of water in subsurface storage at the

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[2] For the purposes of this Order a "water year" shall be defined as that twelve-month period beginning on October 1 and ending September 30.

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end of the previous water year, (ii) the source and quantity of recharge.

c. The source and quantity of water imported for use within the Santa Margarita River watershed.

d. The source and quantity of water exported from the Santa Margarita River watershed.

2. A list of all water users within the Santa Margarita River watershed, including for each a description of vested rights and appropriative priority dates if any.

3. A report on the use of water by each substantial user[3/] within the Santa Margarita River watershed for the previous water year showing for each such user the amount of water diverted, extracted, impounded, or imported and the amount used according to category of use, including: domestic, irrigation, other agricultural, industrial, commercial, public and such other types of uses as the Watermaster may deem appropriate.

4. A list of all unauthorized water use within the Santa Margarita River watershed, along with an explanation of actions taken or recommended to be taken with respect to such use.

5. A statement of conditions and activities which, if continued, may pose a threat to the long-term water supply of the Santa Margarita River watershed.

6. Report on the water quality within the Santa Margarita River watershed by hydrologic sub-unit during the previous water year.

7. An update of the Watermaster's projected tasks, expenditures and requirements over the next five years.

3/ For the purposes of this Order, "substantial user" means any person that claims a right to use water under the orders, judgments or decrees of this Court in the above entitled action, and any person previously designated by this Court or the Watermaster to be a substantial user; any person using water or who claims a right to use water in an amount equal to or greater than or in a manner similar to the uses designated in Exhibit A to this Order; or any person using water within the Santa Margarita River watershed and designated by the Watermaster to be a substantial user.

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8. A proposed budget for the following water year, as more fully described in paragraph III, below.

A copy of the Watermaster's written report shall be mailed to each party listed on the Court approved mailing list, as attached to this Order, and to any party requesting a copy. In addition, five copies of the report will be made available for inspection by the public, during regular business hours, at the Fallbrook Public Utility District, 990 E. Mission Road, Fallbrook, California; at Rancho California Water District, 28061 Diaz Road, Temecula, California and at Anza, California.

Any party that objects to a portion of the Watermaster's report, including the Watermaster's designation of substantial users, may do so by filing written notice of his objection within thirty days of service of the Watermaster's report. Objections filed with this Court must refer to that portion of the Watermaster's report that is objectionable and state specifically the grounds for the objection. Thereafter, the Court may determine a date for hearing the noticed objection. Any party wishing to intervene on behalf of the objecting party or on behalf of the Watermaster may do so within the discretion of the Court.

III

OPERATING BUDGET

The Watermaster shall, within sixty days from the date of this Order, submit for approval by this Court a proposed operating budget for the 1989 water year. The Watermaster shall set forth the estimated expense for discharging his duties as described

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herein, including his recommendations for necessary staff, equipment and supplies. A copy of the proposed budget shall be mailed to each of the parties listed on the Court's approved mailing list and to any party that requests a copy of the proposed budget in writing. Any party may file objections to the proposed budget within thirty days of service. Thereafter the Court will set a date for hearing any objections filed.
If objections to the proposed budget are heard by the Court, then the final budget may be confirmed or adjusted in whole or part as the Court may deem proper.

Within 120 days of this Order the Watermaster shall submit for approval by this Court a proposed operating budget for the 1990 water year. Parties shall be served in accordance with paragraph II, above. Objections shall be filed and a hearing held in accordance with paragraph III, above. Thereafter, the Master shall submit his proposed budget for the following water year as a part of his annual report to the Court.

IV

FEES AND EXPENSES

The fees, compensation and expenses of the Watermaster hereunder initially shall be borne by the parties in the following proportions: One third by the United States; one third by the Fallbrook Public Utility District; and one third by Rancho California Water District. For the 1989 Water Year, the total assessment against the three parties shall not exceed $150,000.00. The Court shall retain the right upon its own

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☆ U.S. GPO: 1988-202-041/84933

motion or the motion of any party to assess any other party using water under the provisions of the applicable judgments, decrees and Orders for the Santa Margarita River watershed for the costs, fees and expenditures of the Watermaster.

Payment of the amount assessed to a party shall be paid 30 days prior to the beginning of the Water Year to which the final budget is applicable.

The Watermaster is directed to use the fund control and payroll services that shall be provided by Fallbrook Public Utility District, and as fully set forth in Exhibit B, for administration of the Watermaster Budget. An interest-bearing account shall be established at a local bank to maintain funds that may be contributed from time to time by the parties. An audit will be conducted annually by an independent auditor and copies of the report will be made available to the parties and provided to the Court.

The Watermaster may apply for appropriate relief from this Court for failure of any party to pay the amount assessed for a particular water year.

V

POWERS AND DUTIES OF THE WATERMASTER

The Watermaster shall have the following powers and duties:

1. To update the list of substantial users contained in Sections A, B and C of Exhibit A to this Order.

2. To collect water consumption data and require monthly reports from the substantial users including, for each such user, the amount of water diverted, extracted, impounded or imported and the amount of water used, as follows:

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☆ U.S. GPO: 1988—202-041/84933

a. To require every water user designated in Section A of Exhibit A to supply in writing the following factual data for each well owned or operated within the watershed:

1. The well owner;

2. The location of the well;

3. The quantity in acre-feet of water pumped during that month and the use by quantity to which the water was put; and

4. The depth in feet to water on or about the last day of that month and designate the zone(s) or aquifer(s) from which well casing perforations permit the production of water.

b. To require every water user designated in Section B of Exhibit A that diverts surface water to supply in writing the following factual data for each designated point of diversion within the watershed:

1. The diverter's name;

2. The location of the point of diversion;

3. The quantity in acre-feet of water diverted for the preceding month; and

c. To require every water user designated in Section C of Exhibit A to supply in writing the following factual data for each designated surface storage reservoir:

1. The reservoir owner;

2. The location of the storage facility;

3. The quantity, in acre-feet of water held in storage in such facility on the last day of the preceding month.

4. The purpose for which such water was stored.

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d. To require every water importer subject to this Order that imports water to supply in writing the following factual data:

1. The importer's name;

2. The discharge point or point of connection of such imported water;

3. The quantity in acre-feet, of water imported for the preceding month; and

e. To require every water user designated in Section A and B of Exhibit A and every importer of water within the Santa Margarita River Watershed to supply in writing the following factual data:

1. The user's name;

2. The quantity of water devoted to the uses listed below in each hydrologic sub-unit or area designated by the Watermaster:

A. Domestic

B. Agricultural irrigation

C. Other agriculture

D. Industrial

E. Commercial

F. Public

G. Others as Watermaster may deem appropriate.

f. To require every producer of reclaimed waster water subject to this Order to supply in writing the following factual data:

1. the producers' name;

2. The location of use or discharge of reclaimed water;

3. The quantity in acre-feet of reclaimed water produced, delivered and discharged for the preceding month.

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3. To make all reasonable efforts to collect and reconstruct water consumption data for the periods 1966 to date.

4. To obtain necessary pump efficiency data.

5. To operate and maintain gaging stations, investigate water availability and hydrology, and conduct water quality testing.

6. To perform such duties as are required under the Memorandum of Understanding and Agreement on Operation of Lake Skinner.

7. To take custody of existing records and reports, maintain proper records, and prepare periodic written reports as required by this Court.

8. To locate and investigate unauthorized water appropriations within the Santa Margarita River watershed.

9. To assist in locating, investigating and enjoining water quality violations within the Santa Margarita River Watershed.

10. The Watermaster shall have the authority to enter, upon reasonable notice and at reasonable times, upon the lands of any party to conduct such tests and measurements as he deems necessary to carry out the provisions of this, or any other order of the Court with respect to the duties enumerated above.

11. To the extent not superceded herein, this Order incorporates by reference the powers and duties granted by the Court in its Order filed January 27, 1966, as modified on April 6, 1966.

12. To design, print and distribute the forms necessary to convey the information required by this or any other applicable Order of the Court.

13. To report to the Steering Committee, established pursuant to Court Order, on a quarterly basis regarding the status of the Watermaster's investigation, proposed budget items for the upcoming water year and to respond to questions regarding the progress of any programs established by the Watermaster in implementing this Order.

14. To prepare a written plan within 120 days of the date of this Order stating the methodology and procedures for accomplishing the duties described above, including:

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a. A timetable for identifying substantial users and characterizing their use;

b. A list of locations, numbers and descriptions of existing and proposed gaging stations;

c. A detailed plan for the conduct of water quality testing to include collecting existing hydrological information and conducting additional tests of both surface and ground water;

The Watermaster shall serve the above-described plan to the parties in accordance with paragraph II, above.

VI

FAILURE TO COMPLY

Failure to comply with this Order in furnishing information and reports required herein may lead to an Order that the party is in default and whatever sanctions are appropriate.

VII

JURISDICTION

This Court retains jurisdiction, upon the application of any party or of the Watermaster or upon its own motion to make such further or supplemental orders or directions as may be necessary or appropriate for interpretation, enforcement or carrying out of this Court's judgments, decrees and orders with respect to the Santa Margarita River watershed.

13 MAR 1989

GORDON THOMPSON, JR.
UNITED STATES DISTRICT JUDGE

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☆ U.S. GPO: 1988-202-041/84933

FILED

APR 6 - 1966

CLERK, U.S. DISTRICT COURT
SOUTHERN DISTRICT OF CALIFORNIA
By DEPUTY

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF CALIFORNIA
SOUTHERN DIVISION

UNITED STATES OF AMERICA,
Plaintiff,
v.
FALLBROOK PUBLIC UTILITY DISTRICT, a public service corporation of the State of California, et al.,
Defendants.

No. 1247-SD-C Civil

MODIFICATION OF ORDER REQUIRING SUBMISSION OF FACTUAL DATA TO COLONEL BOWEN

It appearing that on January 27, 1966, this Court entered its "ORDER REQUIRING SUBMISSION OF FACTUAL DATA TO COLONEL BOWEN" to which was attached an exhibit entitled "Substantial Water Users in Santa Margarita River System," in which order this Court retained jurisdiction to modify the aforesaid exhibit and to designate additional water users not then set forth in the exhibit or to delete water users then set forth in the exhibit, and it further appearing from information presented to the Court by Colonel Bowen that some parties so designated should be deleted from that exhibit, and that additional parties should be designated as substantial water users in that exhibit; NOW, THEREFORE, IT IS HEREBY ORDERED THAT:

I

The exhibit attached to this Court's order of January 27,

EXHIBIT A 1 - 18

EXHIBIT A

1966, be and the same is hereby withdrawn, and exhibit "A" attache to this order be and the same is hereby substituted in place there as the current list of substantial water users in the Santa Margarita River stream system who are subject to the aforesaid order of January 27, 1966.

II

A copy of this order, including the exhibit hereto, ~~and a~~ copy of the aforesaid order of January 27, 1966, shall be forthwit served by certified mail on each of the parties hereby added to th list of substantial water users. Each party hereby deleted from that list shall also be notified of such action by mailing to him by certified mail a notice in substantially the following form:

(Case heading)

To _____:

You are hereby notified that by order of this Court dated _____, you are no longer required to furnish to the undersigned the information required to be so furnished by the order of the Court dated January 27, 1965, a copy of which was heretofore served upon you.

_____
Col. A. C. Bowen
Officer in Charge
Office of Ground Water Resource
Marine Corps Base
Camp Pendleton, California 920

DATED: This 6 day of April, 1966.

/s/ JAMES M. CARTER
JAMES M. CARTER, Judge
United States District Court

EXHIBIT A 1-13

SUBSTANTIAL WATER USERS IN SANTA MARGARITA RIVER SYSTEM

SECTION A - WELLS

Santa Margarita River

Name	Location
Henderson, M.	8S/3W 33Q1
Naval Enclave	9S/4W 14M1
	9S/4W 26M1
	9S/4W 29L1
	10S/4W 5D1
	10S/4W 7A2
	10S/4W 7E2
	10S/4W 7R2
	10S/4W 18E3
	10S/4W 18M4
	10S/5W 13R2
	10S/5W 23J1
	10S/5W 23K1
	10S/5W 26C1
	10S/5W 26F1
	11S/5W 2A1

Murrieta - Temecula Area

Name	Location
Armfield, Fronn	7S/3W 29A
	7S/3W 29A
Aub-Bren Construction Co.	7S/3W 28J
Barr, T. O.	7S/3W 28R
Bloemsma, A.	7S/3W 21Q
	7S/3W 28B
	7S/3W 28H
Cain, C.	7S/3W 21K
Cantarini, D.	7S/3W 27J
Chillingworth, S. C.	7S/3W 18L
	7S/3W 18L
	7S/3W 18Q

4/6/66

EXHIBIT A

EXHIBIT A 1-14

EXHIBIT A

Murrieta - Temecula Area

Name	Location
Clave, Ralph A. & Mickel, Paul E.	7S/3W 20Q
Contreras, G.	7S/3W 20R
Cox, T. A.	7S/3W 6D
	7S/3W 6E
	7S/3W 6K
	7S/4W 1A
	7S/4W 1A
	7S/4W 1E
	7S/4W 1E
Denny, F.	7S/3W 17M
Dillon, Ted	7S/3W 17J
Draucker, C. D.	7S/3W 27E
Dwyer, A.	7S/3W 27J
	7S/3W 27Q
El Rancho Trebol	7S/3W 18Q
	7S/3W 18Q
Gierson, E. W.	7S/3W 20E
Guenther's Murrieta Hot Springs	7S/3W 23A
	7S/3W 23A
	7S/3W 24D
Gwinn, W. A.	7S/3W 20L
	7S/3W 20L
Hasnault, W. J.	7S/3W 17M
	7S/3W 18J
Howell, G.	7S/3W 28C
Kidder, R. C.	7S/3W 18B
King, C.	7S/3W 27M
K & L Properties	7S/4W 2G
Lovelady, A. L. & F.	7S/4W 2E
Mardley Company	7S/3W 20E
Mayer, B. L.	7S/3W 17D
	7S/3W 17D

EXHIBIT A 4/15

Murrieta-Temecula Area

Name	Location	
Mayo, F.	7S/3W 21M	
McDaniel, R.	7S/3W 20Q	
	7S/3W 20Q	
	7S/3W 29B	
Mejia, A.	6S/4W 35F	
Morrow, H.	7S/3W 7R	
Morton, R. G.	7S/3W 28B	
Murrieta Mutual Water Company, Inc.	7S/3W 17R	Leasing, L. O. Lynch
	7S/3W 20C	Buying, C. W. Holliday
Murrieta Stud	7S/3W 20E	
	7S/3W 20Q	
Nelson, Leslie B. & Morton, Robert G.	7S/3W 21K	
Pascoe, W. T.	7S/3W 27Q	
	7S/3W 33B	
Querry, F.	8S/2W 19J	
Ramgren, D. A.	6S/4W 35L	

EXHIBIT A - 16

Murrieta - Temecula Area

Name	Location
Rancho California	7S/2W 25D (#6)
	7S/2W 26B (#4)
	7S/2W 27J (#1)
	7S/2W 30D1
	7S/2W 30D3
	7S/2W 33E1
	7S/2W 36J (#2)
	7S/3W 25R1
	7S/3W 35P1 (MV 93)
	7S/3W 35P2 (MV 132)
	7S/3W 36D (#5)
	8S/1W 6G (#3)
	8S/2W 7A1 (MV 131 Shrode Well)
	8S/2W 11H1
	8S/2W 11J1 (P.R. 30)
	8S/2W 11J2 (30-A)
	8S/2W 11J4 (Diesel)
	8S/2W 11J5 (P.R. 26)
	8S/2W 11L1 (No. 40)
	8S/2W 11P1 (P.R.U.C. well)
	8S/2W 11P2 (New C.C.C. well)
	8S/2W 12H1 (Windmill well)
	8S/2W 12J1 (No. 10)
	8S/2W 12K1 (J.K. well)
	8S/2W 14B (#7)
	8S/2W 15C1 (China Garden well)

EXHIBIT A-17

Murrieta - Temecula Area

Name	Location
Rancho California	8S/2W 15D1 (No. 50)
	8S/2W 16A1 (Dairy artesian)
	8S/2W 16G1 (Main Camp artesian)
	8S/2W 17F1 (Cantarini D)
	8S/2W 17G1 (Studley artesian)
	8S/2W 17N1 (Navy well)
	8S/2W 17Q1 (Cantarini A)
	8S/2W 18M1 (TF 3)
	8S/2W 18N1 (TF 2)
	8S/2W 18R2 (TF 4)
	8S/2W 18R1 (McSweeney Domestic)
	8S/2W 20B1 (P.R. 27)
	8S/2W 20B2 (P.R. 28)
	8S/2W 20B3 (P.R. 29)
	8S/2W 20B4 (Cantarini)
	8S/2W 20C1 (Cat)
	8S/2W 20C2
	8S/2W 20K1 (Cantarini Camp of Cant. Wm.)
	8S/2W 20L1 (Pen well)
	8S/2W 28C1 (Lody)
	8S/3W 1P2 (Cantarini - Murrieta)
	8S/3W 1P3 (O'Kell 14)
	8S/3W 1Q1 (MV 96)
	8S/3W 12B1 (MV 100)
	8S/3W 12C1 (MV 98)
	8S/3W 12C2 (MV 98A)
Reeves, G. H.	7S/3W 28D
Ribaudo, J.	6S/4W 35Q3 10

EXHIBIT A - 18

Murrieta - Temecula Area

Name	Location
Roripaugh, Leo	7S/3W 25E
	7S/3W 25E
	7S/3W 26Q
	7S/3W 34G
	7S/3W 35C
~~Shamel, J. B.~~	7S/3W 25M
	7S/3W 26R
	7S/3W 35B
Schirmer, L. B. Jr.	7S/3W 20F
Sykes, H. H.	7S/3W 17R
Talbert, T. V. & Romano, A. A.	6S/4W 35P
	6S/4W 35P
Thompson, W.	7S/3W 7R
	7S/3W 18A
Thralls, W. A., et al	7S/4W 1E
Turner, C. W.	7S/4W 28Z
	7S/3W 28G
	7S/3W 28G
	7S/3W 28G
	7S/3W 28K
Venable, W. E.	7S/3W 21G
Vessels, M.	7S/3W 18A
Weinstein, A.	7S/3W 7E
Wilks, T. E.	7S/4W 2A
	7S/4W 2B
Winter, H. C.	7S/3W 21P
Withrow, C. B.	6S/4W 35D
Yoder, M. J.	7S/3W 15Q
	7S/3W 15Q

EXHIBIT A-19

Murrieta - Temecula Area

Name	Location
Younger, H. C.	6S/4W 36N
	6S/4W 36P

Aguanga Area

Allen, W. H.	8S/1E 8Q
	8S/1E 17A
	8S/1E 17H
Cottle, W. H.	8S/1E 19K
	8S/1E 19K
Gibbon, Katherine C.	8S/1E 19Q
Marana, John L.	8S/1W 13K
Oviatt, J.	8S/1E 7J
	8S/1E 7N
	8S/1E 18B
	8S/1E 18B
Reed, John E.	8S/1E 33G
Trumbell, D.	8S/1E 28P
Yerkes, Virginia C	8S/1E 29K
	8S/1E 29K

Cahuilla Area

Minor, J.	7S/2E 32G
	7S/2E 32F
	7S/2E 32L
	7S/2E 32C
	7S/2E 32D

EXHIBIT A #20

SECTION B - SURFACE DIVERSIONS

Name	Location
Naval Enclave	
Weir Dam	9S/4W/5E
Naval Weapons Station	9S/4W/14N
Fallbrook Public Utility District	9S/3W/7D
Rancho California	8S/1W/10D
Cottle-Gibbon	8S/1E/29L
Yerkes, Virginia C.	8S/1E/29K

XIEX

EXHIBIT A #21

SECTION C - SURFACE IMPOUNDMENTS

Naval Enclave	Lake O'Neill
Rancho California	Vail Lake

EXHIBIT A #22

FALLBROOK
PUBLIC UTILITY DISTRICT

990 E. Mission Road, P.O. Box 932 — (619) 728-1125
FALLBROOK, CALIFORNIA 92028-2299

January 24, 1989

Mr. ~~Stanley T. Mills, Manager~~
Rancho California Water District
P. O. Box 174
Temecula, CA 92390-0174

Dear Stan:

The Fallbrook Public Utility District agrees to provide the following services to the Watermaster for the Santa Margarita River watershed commencing on or about April 1, 1989.

1. Office Space. 384 square feet, unfurnished 1 room building located on the District's Red Mountain Reservoir facility approximately 1 mile west of I-15 off East Mission Road. The building has electric service and an installed heat pump for heating and air conditioning. No water or toilet facilities are available. Water can be made available at the desire of the Watermaster and rental of a portable toilet facility by the Watermaster can be arranged. Electric and telephone service would be put in the name of the Watermaster.

Monthly Rental $200.00

2. Accounting, Payroll, and Financial Management. A Watermaster bank account will be established at a local bank. Initial working capital will be provided on or about April 1, 1989, by Fallbrook Public Utility District, Rancho California Water District and U.S. Marine Corps Base, Camp Pendleton, in the amount of $10,000 each. Disbursements will be made by the Fallbrook Public Utility District Treasurer upon request of the Watermaster based upon budgets approved by the U.S. District Court within guidelines to be established by the Court appointed Steering Committee. Quarterly financial statements will be provided to the Steering Committee and the Court. Additional capital funds will be requested of the three parties by the Fallbrook Public Utility District Treasurer based on quarterly requirements established by the Watermaster. An annual audit will be performed by a

EXHIBIT B — 1

BOARD OF DIRECTORS
Merritt S. Dunlap, *President*
A. Spencer Lehmann, *Vice President*
Directors Elwin Fuller
W.A. Morgan
C.J. Wolk, Jr.
Gordon W. Tinker, *General Manager and Chief Engineer*
Robert James, *General Counsel*

qualified independent accounting firm selected by the Steering Committee and approved by the Court.

Monthly Service Charge $200.00

Sincerely,

Gordon W. Tinker
General Manager
and Chief Engineer

GWT/am

EXHIBIT B + 2

Robert H. James
Counsel for F.P.U.D.
P. O. Box 427
Fallbrook, CA 92028

Mr. Art Kruegr
Riverside Co. Flood Control
P. O. Box 1033
Riverside, CA 92502

Mr. Jim Laughlin
Eastern MWD
P. O. Box 858
Hemet, CA 92343

Gene Madrigal
P. O. Box 2457
Escondido, CA 92025

Richard & Christine McMillan
Gary & Patricia McMillan
c/o McMillan Farm Management
29379 Rancho California Road
Suite 201
Temecula, CA 92390

Larry Minor
P. O. Box 38
San Jacinto, CA 92383

Murrieta County Water District
P. O. Box 949
Murrieta, CA 92362

Mr. John Perry
Rainbow MWD
4555 Highway 76
Fallbrook, CA 92028

Mr. Ben Price
Fallbrook Sanitary District
431 S. Main Street
Fallbrook, CA 92028

Randall B. Pyles, Esq.
United States of America
Counsel Western Bases
Camp Pendleton, CA 92055

Rancho California Water District
28061 Diaz Road
Temecula, CA 92390

Agri-Empire
P. O. Box 398
San Jacinto, CA 92383

Mr. George Buchanan
Metropolitan Water District
33740 Borel Road
Winchester, CA 92396

Thomas G. Cottle
42551 Highway 79
Aguanga, CA 92302

President, Board of
Directors
De Luz Heights MWD
990 E. Mission Road
Fallbrook, CA 92028

Elsinore Valley MWD
P. O. Box 3000
Lake Elsinore, CA 92330

Mr. David Hansen
Western MWD
P. O. Box 5286
Riverside, CA 92517

Mr. Leland Henderson
Margarita Land & Development
P. O. Box 584
Fallbrook, CA 92028

Myra Henderson
Riverside Co. Planning
4080 Lemon St., 9th Fl.
Riverside, CA 92501

Caroline Salvatierra
704 Third Street
Oceanside, CA 92054

James M. Seabourn
President, C.A.R.E. of
Anza Valley
H.C.2, Box 310
Anza, CA 92306

Mr. William D. Taylor
1650 San Luis Rey Avenue
Vista, CA 92083

Temecula Ranchos
c/o Milo Rowell
405 Rowell Building
Fresno, CA 93721

Thousand Trails
c/o James J. Jaeger
15325 S.E. 30th Place
Bellevue, Washington 98007-6595

L

Appendix L Western Judgment

Western Judgment

FILED
RIV. RECK COUNTY

APR 17 1969

DONALD D. [illegible], Clerk
By [illegible] Deputy

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF RIVERSIDE

WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY, a municipal water district; CITY OF RIVERSIDE, a municipal corporation; THE GAGE CANAL COMPANY, a corporation; AGUA MANSA WATER COMPANY, a corporation, MEEKS & DALEY WATER COMPANY, a corporation; RIVERSIDE HIGHLAND WATER COMPANY, a corporation, and THE REGENTS OF THE UNIVERSITY OF CALIFORNIA,

Plaintiffs,

-vs-

(A) EAST SAN BERNARDINO COUNTY WATER DISTRICT, et al.,

Defendants

No. 74/26 4726 4/7/69

JUDGMENT

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APPENDIX A -- Map showing San Bernardino Basin Area, Colton Basin Area, and Riverside Basin Area situated within San Bernardino County; Riverside Basin Area within Riverside County; Bunker Hill Dike; Riverside Narrows; and

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Boundaries of San Bernardino Valley Municipal Water District & Western Municipal Water District of Riverside County

APPENDIX B -- Extractions by Plaintiffs from San Bernardino Basin Area.

APPENDIX C -- Exports for Use on Lands not Tributary to Riverside Narrows

APPENDIX D -- Miscellaneous Data

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RECITALS

(a) Complaint. The complaint in this action was filed by certain parties exporting water from the area defined herein as the San Bernardino Basin Area for use within Western, and sought a general adjudication of water rights.

(b) Orange County Water District Action. Subsequently the Orange County Water District filed an action for the adjudication of the water rights of substantially all water users in the area tributary to Prado Dam in the Santa Ana River Watershed. A decree of physical solution has been entered in such action whereby individual water users were dismissed, and San Bernardino Valley and Western assumed responsibility for the deliveries of certain flows at Riverside Narrows and Prado respectively.

(c) Physical Solution. The Judgment herein will further implement the physical solution in the Orange County Water District action, as well as determine the rights of the hereinafter named Plaintiffs to extract water from the San Bernardino Basin Area, and provide for replenishment of the area above Riverside Narrows. Such Judgment is fair and equitable, in the best interests of the parties, and in furtherance of the water policy of the State. San Bernardino Valley has the statutory power and resources to effectuate this Judgment and accordingly the other defendants may be dismissed.

(d) Stipulation. The parties named herein through their respective counsel have proposed and filed a written stipulation agreeing to the making and entry of this Judgment. By reason of such stipulation, and good cause appearing

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therefor,

IT IS HEREBY ORDERED, ADJUDGED AND DECREED as follows:

I

ACTIVE PARTIES

(a) The parties to this Judgment are as follows:

(1) Plaintiff Western Municipal Water District of Riverside County, a California municipal water district, herein often called "Western", appearing and acting pursuant to Section 71751 of the Water Code;

(2) Plaintiff City of Riverside, a municipal corporation;

(3) Plaintiffs Riverside Highland Water Company, Agua Mansa Water Company and Meeks & Daley Water Company, each of which is a mutual water company and a California corporation;

(4) Plaintiff The Regents of the University of California, a California public corporation;

(5) Defendant San Bernardino Valley Municipal Water District, a California municipal water district, herein often called "San Bernardino Valley", appearing and acting pursuant to Section 71751 of the Water Code;

(b) This Judgment shall inure to the benefit of, and be binding upon, the successors and assigns of the parties.

II

DISMISSED PARTIES

All parties other than those named in the preceding Paragraph I are dismissed without prejudice.

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III

PRIOR JUDGMENTS

(a) The Judgment dated and entered on May 13, 1959, in that certain action filed in the Superior Court of the State of California in and for the County of San Bernardino, entitled and numbered "San Bernardino Valley Water Conservation District, a State Agency, Plaintiff v. Riverside Water Company, a corporation, et al., Defendants", No. 97031, is superseded effective January 1, 1971, and for so long as this Judgment remains in effect as to any party hereto that was a party to that action, and as to any party hereto that is a successor in interest to the rights determined in that action.

(b) The Judgment dated June 23, 1965, and entered on April 21, 1966, in that certain action filed in the Superior Court of the State of California in and for the County of San Bernardino entitled and numbered "San Bernardino Valley Water Conservation District, a State Agency, Plaintiff, v. Riverside Water Company, a corporation, et al., Defendants," No. 111614, is superseded effective January 1, 1971, and for so long as this Judgment remains in effect as to any party hereto that was a party to that action, and as to any party hereto that is a successor in interest to any rights determined in that action.

(c) As used in this Paragraph III only, "party" includes any person or entity which stipulates with the parties hereto to accept this Judgment.

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IV

DEFINITIONS

The following ground water basins and tributary areas are situated within the Santa Ana River watershed upstream from Riverside Narrows and are tributary thereto, and their approximate locations and boundaries for purposes of this Judgment are shown upon the map attached hereto as Appendix "A": San Bernardino Basin Area (the area above Bunker Hill Dike, but excluding certain mountainous regions and the Yucaipa, San Timoteo, Oak Glen and Beaumont Basins); Colton Basin Area, Riverside Basin Area within San Bernardino County, and Riverside Basin Area within Riverside County.

As used herein the following terms shall have the meanings herein set forth:

(a) Bunker Hill Dike - The San Jacinto Fault, located approximately as shown on Appendix "A", and forming the principal downstream boundary of the San Bernardino Basin Area.

(b) Riverside Narrows - That bedrock narrows in the Santa Ana River indicated on Appendix "A".

(c) Extractions - Any form of the verb or noun shall include pumping, diverting, taking or withdrawing water, either surface or subsurface, by any means whatsoever, except extractions for hydroelectric generation to the extent that such flows are returned to the stream, and except for diversions for replenishment.

(d) Natural Precipitation - Precipitation which falls naturally in the Santa Ana River watershed.

(e) Imported Water - Water brought into the Santa Ana River watershed from sources of origin outside such watershed.

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(f) Replenishment - Artificial recharge of the ground water body achieved through the spreading or retention of water for the purpose of causing it to percolate and join the underlying ground water body, or injection of water into the ground water resources by means of wells; provided that as used with reference to any obligation of Western to replenish the Riverside Basin Area in Riverside County, the term replenishment shall include any water caused to be delivered by Western for which credit is received by San Bernardino Valley against its obligation under the Orange County Judgment to provide base flow at Riverside Narrows.

(g) Safe Yield - Safe yield is that maximum average annual amount of water that could be extracted from the surface and subsurface water resources of an area over a period of time sufficiently long to represent or approximate long-time mean climatological conditions, with a given areal pattern of extractions, under a particular set of physical conditions or structures as such affect the net recharge to the ground water body, and with a given amount of usable underground storage capacity, without resulting in long-term, progressive lowering of ground water levels or other undesirable result. In determining the operational criteria to avoid such adverse results, consideration shall be given to maintenance of adequate ground water quality, subsurface outflow, costs of pumping, and other relevant factors.

The amount of safe yield is dependent in part upon the amount of water which can be stored in and used from the ground water reservoir over a period of normal water supply under a given set of conditions. Safe yield is thus related to factors which influence or control ground water recharge, and

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to the amount of storage space available to carry over recharge occurring in years of above average supply to years of deficient supply. Recharge, in turn, depends on the available surface water supply and the factors influencing the percolation of that supply to the water table.

Safe yield shall be determined in part through the evaluation of the average net groundwater recharge which would occur if the culture of the safe yield year had existed over a period of normal native supply.

(h) Natural Safe Yield - That portion of the safe yield of the San Bernardino Basin Area which could be derived solely from natural precipitation in the absence of imported water and the return flows therefrom, and without contributions from new conservation. If in the future any natural runoff tributary to the San Bernardino Basin Area is diverted away from that Basin Area so that it is not included in the calculation of natural safe yield, any replacement made thereof by San Bernardino Valley or entities within it from imported water shall be included in such calculation.

(i) New Conservation - Any increase in replenishment from natural precipitation which results from operation of works and facilities not now in existence, other than those works installed and operations which may be initiated to offset losses caused by increased flood control channelization.

(j) Year - A calendar year from January 1 through December 31. The term "annual" shall refer to the same period of time.

(k) Orange County Judgment - The final judgment in Orange County Water District v. City of Chino, et al., Orange County Superior Court No. 117628, as it may from time to

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time be modified.

(l) Return Flow - That portion of the water applied for use in any particular ground water basin which subsequently reaches the ground water body in that basin.

(m) Five Year Period - a period of five consecutive years.

V

EXTRACTIONS FROM THE SAN BERNARDINO BASIN AREA

(a) For Use by Plaintiffs. The average annual extractions from the San Bernardino Basin Area delivered for use in each service area by each Plaintiff for the five year period ending with 1963 are hereby determined to be as set forth in Table B-1 of Appendix "B". The amount for each such Plaintiff delivered for use in each service area as set forth in Table B-1 shall be designated, for purposes of this Judgment, as its "base right" for such service area.

(b) For Use by Others. The total actual average annual extractions from the San Bernardino Basin Area by entities other than Plaintiffs for use within San Bernardino County for the five year period ending with 1963 are assumed to be 165,407 acre feet; the correct figure shall be determined by the Watermaster as herein provided.

VI

SAN BERNARDINO BASIN AREA RIGHTS AND REPLENISHMENT

(a) Determination of Natural Safe Yield. The natural safe yield of the San Bernardino Basin Area shall be computed by the Watermaster, reported to and determined initially by supplemental order of this Court, and thereafter

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shall be subject to the continuing jurisdiction thereof.

(b) Annual Adjusted Rights of Plaintiffs.

1. The annual "adjusted right" of each Plaintiff to extract water from the San Bernardino Basin Area for use in each service area designated in Table B-1 shall be equal to the sum of the following:

(a) its base right for such service area, until the natural safe yield of the San Bernardino Basin Area is determined, and thereafter its percentage of such natural safe yield determined by the methods used in Table B-2; and (b) an equal percentage for each service area of any new conservation, provided the conditions of the subparagraph 2 below have been met.

2. In order that the annual adjusted right of each such Plaintiff shall include its same respective percentage of any new conservation, such Plaintiff shall pay its proportionate share of the costs thereof. Each Plaintiff shall have the right to participate in new conservation projects, under procedures to be determined by the Watermaster for notice to Plaintiffs of the planned construction of such projects. With respect to any new conservation brought about by Federal installations, the term "costs" as used herein shall refer to any local share required to be paid in connection with such project. Each Plaintiff shall make its payment at times satisfactory to the constructing agency, and new conservation shall be credited to any participating Plaintiff as such conservation is effected.

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3. In any five year period, each Plaintiff shall have the right to extract from the San Bernardino Basin Area for use in each service area designated in Table B-1 an amount of water equal to five times its adjusted right for such service area; provided, however, that extractions by each Plaintiff in any year in any service area shall not exceed such Plaintiff's adjusted right for that service area by more than 30 percent.

4. If the natural safe yield of the San Bernardino Basin Area has not been determined by January 1, 1972, the initial determination thereof shall be retroactive to that date and the rights of the Plaintiffs, and the replenishment obligation of San Bernardino Valley as hereinafter set forth, shall be adjusted as of such date. Any excess extractions by Plaintiffs shall be charged against their respective adjusted rights over the next five year period, or in the alternative, Plaintiffs may pay to San Bernardino Valley the full cost of any replenishment which it has provided as replenishment for such excess extractions. Any obligation upon San Bernardino Valley to provide additional replenishment, by virtue of such retroactive determination of natural safe yield, may also be discharged over such next five year period.

5. Plaintiffs and each of them and their agents and assigns are enjoined from extracting any more water from the San Bernardino Basin Area than is permitted under this Judgment. Changes in place

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of use of any such water from one service area to another shall not be made without the prior approval of Court upon a finding of compliance with Paragraph XV(b) of this Judgment. So long as San Bernardino Valley is in compliance with all its obligations hereunder, and Plaintiffs are allowed to extract the water provided for in this Judgment, Plaintiffs are further enjoined from bringing any action to limit the water extracted from the San Bernardino Basin Area for use within San Bernardino Valley.

6. Nothing in this Judgment shall prevent future agreements between San Bernardino Valley and Western under which additional extractions may be made from the San Bernardino Basin Area, subject to the availability of imported water not required by San Bernardino Valley, and subject to payment satisfactory to San Bernardino Valley for replenishment required to compensate for such additional extractions.

(c) San Bernardino Valley Replenishment. San Bernardino Valley shall provide imported water for replenishment of the San Bernardino Basin Area at least equal to the amount by which extractions therefrom for use within San Bernardino County exceed during any five year period the sum of: (a) five times the total average annual extractions determined under Paragraph V(b) hereof, adjusted as may be required by the natural safe yield of the San Bernardino Basin Area; and (b) any new conservation to which users within San Bernardino Valley are entitled. Such replenishment shall be

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supplied in the year following any five year period; provided that during the first five year period, San Bernardino Valley shall supply annual amounts on account of its obligations hereunder, and such amounts shall be not less than fifty percent of the gross amount of excess extractions in the previous year.

1. Against its replenishment obligation over any five year period San Bernardino Valley shall receive credit for that portion of such excess extractions that returns to the ground water of the San Bernardino Basin Area.

2. San Bernardino Valley shall also receive credit against any future replenishment obligations for all replenishment which it provides in excess of that required herein, and for any amounts which may be extracted without replenishment obligation, which in fact are not extracted.

(d) In this subparagraph (d), "person" and "entity" mean only those persons and entities, and their successors in interest, which have stipulated with the parties to this Judgment within six months after its entry to accept this Judgment.

San Bernardino Valley agrees that the base rights of persons or entities other than Plaintiffs to extract water from the San Bernardino Basin Area for use within San Bernardino Valley will be determined by the average annual quantity extracted by such person or entity during the five year period ending with 1963. After the natural safe yield of the San Bernardino Basin Area is determined hereunder, such

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base rights will be adjusted to such natural safe yield; the adjusted right of each such person or entity shall be that percentage of natural safe yield as determined hereunder from time to time which the unadjusted right of such person or entity is of the amount determined under Paragraph V(b).

San Bernardino Valley further agrees that in the event the right to extract water of any of such persons or entities in the San Bernardino Basin Area is adjudicated and legal restrictions placed on such extractions which prevent extracting of water by said persons or entities in an amount equal to their base rights, or after natural safe yield is determined, their adjusted rights, San Bernardino Valley will furnish to such persons or entities or recharge the ground water resources in the area of extraction for their benefit with imported water, without direct charge to such persons or entities therefor, so that the base rights, or adjusted rights, as the case may be, may be taken by the person or entity.

Under the provisions hereof relating to furnishing of such water by San Bernardino Valley, such persons or entities shall be entitled to extract in addition to their base rights or adjusted rights any quantities of water spread for repumping in their area of extractions, which has been delivered to them by a mutual water company under base rights or adjusted base rights included by the Watermaster under the provisions of Paragraph V (b) hereof. Extractions must be made within three years of spreading to so qualify.

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VII

WATER DISCHARGED ACROSS THE BUNKER HILL DIKE

San Bernardino Valley shall keep in force an agreement with the City of San Bernardino that the present annual quantity of municipal sewage effluent discharged across Bunker Hill Dike, assumed for all purposes herein to be 16,000 acre feet annually, shall be committed to the discharge of the downstream obligations imposed on San Bernardino Valley under this Judgment or under the Orange County Judgment, and that such effluent shall comply with the requirements of the Santa Ana River Basin Regional Water Quality Control Board in effect December 31, 1968.

VIII

EXTRACTIONS FROM COLTON BASIN AREA AND RIVERSIDE BASIN AREA IN SAN BERNARDINO COUNTY.

(a) The average annual extractions from the Colton Basin Area and that portion of the Riverside Basin Area within San Bernardino County, for use outside San Bernardino Valley, for the five year period ending with 1963 are assumed to be 3,349 acre feet and 20,191 acre feet, respectively; the correct figures shall be determined by the Watermaster as herein provided.

(b) Over any five year period, there may be extracted from each such Basin Area for use outside San Bernardino Valley, without replenishment obligation, an amount equal to five times such annual average for the Basin Area; provided, however, that if extractions in any year exceed such average by more than 20 percent, Western shall provide replenishment in the following year equal to the excess

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extractions over such 20 percent peaking allowance.

(c). To the extent that extractions from each such Basin Area for use outside San Bernardino Valley exceed the amounts specified in the next preceding Paragraph (b), Western shall provide replenishment. Except for any extractions in excess of the 20 percent peaking allowance, such replenishment shall be supplied in the year following any five year period, and shall not be from reclaimed water produced within San Bernardino Valley. Such replenishment shall also be of a quality at least equal to the water extracted from the Basin Area being recharged; provided, that water from the State Water Project shall be deemed to be of acceptable quality. Replenishment shall be supplied to the Basin Area from which any excess extractions have occurred and in the vicinity of the place of the excess extractions to the extent required to preclude influence on the water level in the three wells below designated; provided that discharge of imported water into the Santa Ana River or Warm Creek from a connection on the State Aqueduct near the confluence thereof, if released in accordance with a schedule approved by the Watermaster to achieve compliance with the objectives of this Judgment, shall satisfy any obligation of Western to provide replenishment in the Colton Basin Area, or that portion of the Riverside Basin Area in San Bernardino County, or the Riverside Basin Area in Riverside County.

(d) Extractions from the Colton Basin Area and that portion of the Riverside Basin Area within San Bernardino County, for use within San Bernardino Valley, shall not be limited. However, except for any required replenishment by Western, San Bernardino Valley shall provide the water to maintain the static water levels in the area, as determined by wells numbered

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1S 4W 21 Q3, 1S 4W 29 H1, and 1S 4W 29 Q1 at an average level no lower than that which existed in the Fall season of 1963. Such 1963 average water level is hereby determined to be 822.04 feet above sea level. In future years, the level shall be computed by averaging the lowest static water levels in each of the three wells occurring at or about the same time of the year, provided that no measurements will be used which reflect the undue influence of pumping in nearby wells, or in the three wells, or pumping from the Riverside Basin in Riverside County in excess of that determined pursuant to Paragraph IX(a) hereof.

(e) Extractions by Plaintiffs from the Colton Basin Area and the portion of the Riverside Basin Area in San Bernardino County may be transferred to the San Bernardino Basin Area if the level specified in Paragraph (d) above is not maintained, but only to the extent necessary to restore such 1963 average water level, provided that Western is not in default in any of its replenishment obligations. San Bernardino Valley shall be required to replenish the San Bernardino Basin Area in an amount equal to any extractions so transferred. San Bernardino Valley shall be relieved of responsibility toward the maintenance of such 1963 average water level to the extent that Plaintiffs have physical facilities available to accommodate such transfers of extractions, and insofar as such transfers can be legally accomplished.

(f) The Colton Basin Area and the portion of the Riverside Basin Area in San Bernardino County constitute a major source of water supply for lands and inhabitants in both San Bernardino Valley and Western, and the parties hereto have a mutual interest in the maintenance of water quality in these Basin Areas and in the preservation of such supply. If

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the water quality in such Areas, as monitored by the City of Riverside wells along the river, falls below the Objectives set therefor by the Santa Ana River Basin Regional Water Quality Control Board, the Court shall have jurisdiction to modify the obligations of San Bernardino Valley to include, in addition to its obligation to maintain the average 1963 water level, reasonable provisions for the maintenance of such water quality.

(g) The primary objectives of Paragraph VIII and related provisions are to allow maximum flexibility to San Bernardino Valley in the operation of a coordinated replenishment and management program, both above and below Bunker Hill Dike; to protect San Bernardino Valley against increased extractions in the area between Bunker Hill Dike and Riverside Narrows, which without adequate provision for replenishment might adversely affect base flow at Riverside Narrows, for which it is responsible under the Orange County Judgment; and to protect the area as a major source of ground water supply available to satisfy the historic extractions therefrom for use within Western, without regard to the method of operation which may be adopted by San Bernardino Valley for the San Bernardino Basin Area, and without regard to the effect of such operation upon the historic supply to the area below Bunker Hill Dike.

If these provisions should prove either inequitable or unworkable, the Court upon the application of any party hereto shall retain jurisdiction to modify this Judgment so as to regulate the area between Bunker Hill Dike and Riverside Narrows on a safe yield basis; provided that under such method of operation, (1) base rights shall be determined on the basis of total average annual extractions for use within San Bernardino Valley and Western, respectively, for the five year period ending

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with 1963; (2) such base rights for use in both Districts shall be subject to whatever adjustment may be required by the safe yield of the area, and in the aggregate shall not be exceeded unless replenishment therefor is provided; (3) in calculating safe yield, the outflow from the area at Riverside Narrows shall be determined insofar as practical by the base flow obligations imposed on San Bernardino Valley under the Orange County Judgment; and (4) San Bernardino Valley shall be required to provide replenishment for any deficiency between the actual outflow and the outflow obligation across Bunker Hill Dike as established by safe yield analysis using the base period of 1934 through 1960.

IX

EXTRACTIONS FROM THE PORTION OF RIVERSIDE BASIN AREA IN RIVERSIDE COUNTY WHICH IS TRIBUTARY TO RIVERSIDE NARROWS.

(a) The average annual extractions from the portion of the Riverside Basin Area in Riverside County which is tributary to Riverside Narrows, for use in Riverside County, for the five year period ending with 1963 are assumed to be 30,044 acre feet; the correct figures shall be determined by the Watermaster as herein provided.

(b) Over any five year period, there may be extracted from such Basin Area, without replenishment obligation, an amount equal to five times such annual average for the Basin Area; provided, however, that if extractions in any year exceed such average by more than 20 percent, Western shall provide replenishment in the following year equal to the excess extractions over such 20 percent peaking allowance.

(c) To the extent that extractions from such Basin Area exceed the amounts specified in the next preceding

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Paragraph (b), Western shall provide replenishment. Except for any extractions in excess of the 20 percent peaking allowance, such replenishment shall be supplied in the year following any five year period, and shall be provided at or above Riverside Narrows.

(d) Western shall also provide such replenishment to offset any reduction in return flow now contributing to the base flow at Riverside Narrows, which reduction in return flow results from the conversion of agricultural uses of water within Western to domestic or other uses connected to sewage or waste disposal systems, the effluent from which is not tributary to the rising water at Riverside Narrows.

X

REPLENISHMENT TO OFFSET NEW EXPORTS OF WATER TO AREAS NOT TRIBUTARY TO RIVERSIDE NARROWS.

Certain average annual amounts of water extracted from the San Bernardino Basin Area and the area downstream therefrom to Riverside Narrows during the five year period ending in 1963 have been exported for use outside of the area tributary to Riverside Narrows and are assumed to be 50,667 acre feet annually as set forth in Table C-1 of Appendix "C"; the correct amount shall be determined by the Watermaster as herein provided. Western shall be obligated to provide replenishment at or above Riverside Narrows for any increase over such exports by Western or entities within it from such areas for use within areas not tributary to Riverside Narrows. San Bernardino Valley shall be obligated to provide replenishment for any increase over the exports from San Bernardino Valley for use in any area not within Western nor tributary to Riverside Narrows as set forth in Table C-2 of

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Appendix "C", such amounts being subject to correction by the Watermaster, or for any exports from the San Bernardino Basin Area for use in the Yucaipa, San Timoteo, Oak Glen and Beaumont Basins.

XI

REPLENISHMENT CREDITS AND ADJUSTMENT FOR QUALITY

(a) All replenishment provided by Western under Paragraph IX and all credits received against such replenishment obligation shall be subject to the same adjustments for water quality applicable to base flow at Riverside Narrows, as set forth in the Orange County Judgment.

(b) Western shall receive credit against its replenishment obligations incurred under this Judgment for the following:

1. As against its replenishment obligation under Paragraph VIII, any return flow to the Colton Basin Area or the portion of the Riverside Basin Area within San Bernardino County, respectively, resulting from any excess extractions therefrom; and as against its replenishment obligation under Paragraph IX, any return flow to the portion of the Riverside Basin Area in Riverside County, which contributes to the base flow at Riverside Narrows, resulting from any excess extractions therefrom, or from the Riverside Basin Area in San Bernardino County, or from the Colton Basin Area.

2. Subject to adjustment under Paragraph (a) hereof, any increase over the present amounts of sewage effluent discharged from

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treatment plants within Riverside County which are tributary to Riverside Narrows, and which results from the use of imported water.

3. Any replenishment which may be provided in excess of that required; any amounts which hereunder are allowed to be extracted from the Colton and Riverside Basin Areas without replenishment obligation by Western, and which in fact are not extracted; any storm flows conserved between Bunker Hill Dike and Riverside Narrows by works financed solely by Western, or entities within it, which would not otherwise contribute to base flow at Riverside Narrows; and any return flow from imported water used in Riverside County which contributes to base flow at Riverside Narrows; provided, however, that such use of the underground storage capacity in each of the above situations does not adversely affect San Bernardino Valley in the discharge of its obligations at Riverside Narrows under the Orange County Judgment, nor interfere with the accomplishment by San Bernardino Valley of the primary objectives of Paragraph VIII, as stated in Subdivision (g).

(c) The replenishment obligations of Western under this Judgment shall not apply during such times as amounts of base flow at Riverside Narrows and the amounts of water stored in the ground water resources below Bunker Hill Dike and tributary to the maintenance of such flow are found by Order of the Court to be sufficient to satisfy any obligation which San Bernardino Valley may have under this Judgment, or under the

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Orange County Judgment, and if the Court further finds by Order that during such times any such increase in pumping, changes in use or exports would not adversely affect San Bernardino Valley in the future.

(d) The replenishment obligations of San Bernardino Valley under Paragraph X of this Judgment for increase in exports from the Colton and Riverside Basin Areas within San Bernardino Valley below the Bunker Hill Dike shall not apply during such times as the amounts of water in the ground water resources of such area are found by Order of the Court to be sufficient to satisfy the obligations which San Bernardino Valley may have to Plaintiffs under this Judgment, and if the Court further finds by Order that during such times any such increases in exports would not adversely affect Plaintiffs in the future.

XII

CONVEYANCE OF WATER BY SAN BERNARDINO VALLEY TO RIVERSIDE NARROWS.

If San Bernardino Valley determines that it will convey reclaimed sewage effluent, or other water, to or near Riverside Narrows, to meet its obligations under this or the Orange County Judgment, the City of Riverside shall make available to San Bernardino Valley for that purpose any unused capacity in the former Riverside Water Company canal, and the Washington and Monroe Street storm drains, without cost except for any alterations or capital improvements which may be required, or any additional maintenance and operation costs which may result. The use of those facilities shall be subject to the requirements of the Santa Ana River Basin Regional Water Quality Control Board and of the State Health Department, and compliance

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therewith shall be San Bernardino Valley's responsibility.

XIII

WATERMASTER

(a) This Judgment and the instructions and subsequent orders of this Court shall be administered and enforced by a Watermaster. The parties hereto shall make such measurements and furnish such information as the Watermaster may reasonably require, and the Watermaster may verify such measurements and information and obtain additional measurements and information as the Watermaster may deem appropriate.

(b) The Watermaster shall consist of a committee of two persons. San Bernardino Valley and Western shall each have the right to nominate one of such persons. Each such nomination shall be made in writing, served upon the other parties to this Judgment, and filed in Court. Such person shall be appointed by and serve at the pleasure of and until further order of this Court. If either Western or San Bernardino Valley shall at any time nominate a substitute appointee in place of the last appointee to represent it, such appointee shall be appointed by the Court in place of such last appointee.

(c) Appendix "D" to this Judgment contains some of the data which have been used in preparation of this Judgment, and shall be utilized by the Watermaster in connection with any questions of interpretation.

(d) Each and every finding and determination of the Watermaster shall be made in writing certified to be by unanimous action of both members of the Watermaster committee. In the event of failure or inability of such Watermaster Committee to reach agreement, the Watermaster committee may determine to submit the dispute to a third person to be selected

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by them, or if they are unable to agree on a selection, to be selected by the Court, in which case the decision of the third person shall be binding on the parties; otherwise the fact, issue, or determination in question shall forthwith be certified to this Court by the Watermaster, and after due notice to the parties and opportunity for hearing, said matter shall be determined by order of this Court, which may refer the matter for prior recommendation to the State Water Resources Control Board. Such order of the Court shall be a determination by the Watermaster within the meaning of this Judgment.

(e) The Watermaster shall report to the Court and to each party hereto in writing not more than seven (7) months after the end of each year, or within such other time as the Court may fix, on each determination made by it pursuant to this Judgment, and such other items as the parties may mutually request or the Watermaster may deem to be appropriate. All of the books and records of the Watermaster which are used in the preparation of, or are relevant to, such reported data, determinations and reports shall be open to inspection by the parties hereto. At the request of any party this Court will establish a procedure for the filing and hearing of objections to the Watermaster's report.

(f) The fees, compensation and expenses of each person on the Watermaster shall be borne by the District which nominated such person. All other Watermaster service costs and expenses shall be borne by San Bernardino Valley and Western equally.

(g) The Watermaster shall initially compute and report to the Court the natural safe yield of the San Bernardino Basin Area, said computation to be based upon the cultural

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conditions equivalent to those existing during the five calendar year period ending with 1963.

(b) The Watermaster shall as soon as practical determine the correct figures for Paragraphs V(b), VI(b)1, VIII(a), IX(a) and X, as the basis for an appropriate supplemental order of this Court.

XIV

CONTINUING JURISDICTION OF THE COURT

(a) The Court hereby reserves continuing jurisdiction of the subject matter and parties to this Judgment, and upon application of any party, or upon its own motion, may review and redetermine, among other things, the following matters and any matters incident thereto:

1. The hydrologic condition of any one or all of the separate basins described in this Judgment in order to determine from time to time the safe yield of the San Bernardino Basin Area.

2. The desirability of appointing a different Watermaster or a permanent neutral member of the Watermaster, or of changing or more clearly defining the duties of the Watermaster.

3. The desirability of providing for increases or decreases in the extraction of any particular party because of emergency requirements or in order that such party may secure its proportionate share of its rights as determined herein.

4. The adjusted rights of the Plaintiffs as required to comply with the provisions hereof with respect to changes in the natural safe yield of the San Bernardino Basin

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Area. If such changes occur, the Court shall adjudge that the adjusted rights and replenishment obligations of each party shall be changed proportionately to the respective base rights.

5. Conforming the obligations of San Bernardino Valley under this Judgment to the terms of any new judgment hereafter entered adjudicating the water rights within San Bernardino Valley, if inconsistencies of the two judgments impose hardship on San Bernardino Valley.

6. Adjusting the figures in Paragraphs V(b), VI(b) 1, VIII(a) IX(a), and X, to conform to determination by the Watermaster.

7. Credit allowed for return flow in the San Bernardino Basin Area if water levels therein drop to the point of causing undue hardship upon any party.

8. Other matters not herein specifically set forth which might occur in the future and which would be of benefit to the parties in the utilization of the surface and ground water supply described in this Judgment, and not inconsistent with the respective rights of the parties as herein established and determined.

(b) Any party may apply to the Court under its continuing jurisdiction for any appropriate modification of this Judgment if its presently available sources of imported water are exhausted and it is unable to obtain additional supplies of imported water at a reasonable cost, or if there is any substantial delay in the delivery of imported water through the State Water Project.

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XV

SAVING CLAUSES

(a) Nothing in this Judgment precludes San Bernardino Valley, Western, or any other party from exercising such rights as it may have or obtain under law to spread, store underground and recapture imported water, provided that any such use of the underground storage capacity of the San Bernardino Basin Area by Western or any entity within it shall not interfere with any replenishment program of the Basin Area.

(b) Changes in the place and kind of water use, and in the transfer of rights to the use of water, may be made in the absence of injury to others or prejudice to the obligations of either San Bernardino Valley or Western under Judgment or the Orange County Judgment.

(c) If any Plaintiff shall desire to transfer all or any of its water rights to extract water within San Bernardino Valley to a person, firm, or corporation, public or private, who or which is not then bound by this Judgment, such Plaintiff shall as a condition to being discharged as hereinafter provided cause such transferee to appear in this action and file a valid and effective express assumption of the obligations imposed upon such Plaintiff under this Judgment as to such transferred water rights. Such appearance and assumption of obligation shall include the filing of a designation of the address to which shall be mailed all notices, requests, objections, reports and other papers permitted or required by the terms of this Judgment.

If any Plaintiff shall have transferred all of its said water rights and each transferee not theretofore bound by this Judgment as a Plaintiff shall have appeared in this action

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and filed a valid and effective express assumption of the obligations imposed upon such Plaintiff under this Judgment as to such transferred water rights, such transferring Plaintiff shall thereupon be discharged from all obligations hereunder. If any Plaintiff shall cease to own any rights in and to the wate: supply declared herein and shall have caused the appearance and assumption provided for in the third preceding sentence with respect to each voluntary transfer, then upon application to this Court and after notice and hearing such Plaintiff shall thereupon be relieved and discharged from all further obligations hereunder. Any such discharge of any Plaintiff hereunder shall not impair the aggregate rights of defendant San Bernardino Valley or the responsibility hereunder of the remaining Plaintiffs or any of the successors.

(d) Non-use of any right to take water as provided herein shall not result in any loss of the right. San Bernardino Valley does not guarantee any of the rights set out herein for Western and the other Plaintiffs as against the claims of third parties not bound hereby. If Western or the other Plaintiffs herein should be prevented by acts of third parties within San Bernardino County from extracting the amounts of water allowed them by this Judgment, they shall have the right to apply to this Court for any appropriate relief, including vacation of this Judgment, in which latter case all parties shall be restored to their status prior to this Judgment insofar as possible.

(e) Any replenishment obligation imposed hereunder on San Bernardino Valley may be deferred until imported water first is available to San Bernardino Valley under its contract with the California Department of Water Resources and the

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obligation so accumulated may be discharged in five approximately equal annual installments thereafter.

(f) No agreement has been reached concerning the method by which the cost of providing replenishment will be financed, and no provision of this Judgment, nor its failure to contain any provision, shall be construed to reflect any agreement relating to the taxation or assessment of extractions.

XVI

EFFECTIVE DATE

The provisions of Paragraphs III and V to XII of this Judgment shall be in effect from and after January 1, 1971; the remaining provisions are in effect immediately.

XVII

COSTS

No party shall recover its costs herein as against any other party.

THE CLERK WILL ENTER THIS JUDGMENT FORTHWITH.

DATED: April 17, 1969

ENTERED

APR 17 1969

JUDGMENT BOOK 124 PG 42

JUDGE OF THE SUPERIOR COURT

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M

Appendix M Eastern Perris North Agreement

EMWD/WMWD
NORTH PERRIS GROUNDWATER BASIN PROGRAM
INTERAGENCY AGREEMENT

This Agreement is made and entered into this 20th day of November, 2020, by and between **EASTERN MUNICIPAL WATER DISTRICT**, (hereinafter "Eastern") and **WESTERN MUNICIPAL WATER DISTRICT**, (hereinafter "Western") public agencies duly formed and operating under the Municipal Water District Law of the State of California. Eastern and Western are sometimes collectively referred to herein as the "Party" or "Parties".

RECITALS

WHEREAS, Eastern provides retail water, wastewater, and recycled water services to customers throughout its service area, as well as wholesale water supply to various districts and municipalities within or adjacent to its territory; and

WHEREAS, Western provides retail and wholesale water, wastewater, and recycled water services throughout its service area, and is the retail water and sewer service provider to the March Air Reserve Base cantonment area (hereinafter "MARB"), and to Department of Defense facilities within non-cantonment areas (hereinafter the "MARB Parcels"). For the purposes of this Agreement, MARB and MARB Parcels will be jointly referred to hereinafter as Western's North Perris Basin Service Area and is generally depicted on **Exhibit A**, attached hereto and incorporated herein; and

WHEREAS, rising groundwater levels in the North Perris Groundwater Basin area may impact long-term activities and the sustainable operation of MARB; and

WHEREAS, historical contamination of groundwater sources extends beyond MARB and affects the North Perris Groundwater Basin as generally depicted on **Exhibit B**, attached hereto and incorporated herein; and

WHEREAS, due to the aforementioned groundwater levels and contamination, Eastern has developed the North Perris Groundwater Basin Program (hereinafter "the Program") with the objectives of remediating contamination within the North Perris Groundwater Basin; protecting non-contaminated areas of the Basin; developing a local source of water supply, including a secure potable supply for Eastern and Western's North Perris Basin Service Area; and providing long-term remediation of rising groundwater levels in the North Perris Groundwater Basin area; and

WHEREAS, elements of the Program include, but are not limited to, the planning, design, financing, construction, and operation of facilities necessary to produce, convey, blend, and treat groundwater for purposes of addressing Program objectives; and

WHEREAS, the aforementioned facilities consisting of groundwater production wells, wellhead treatment, blending stations, conveyance pipelines, and monitoring wells (together the "Project Facilities") are anticipated to exist wholly within Eastern's service area, except for monitoring wells that may be located within Western's service area. Eastern shall design, build, own, and operate all such Project Facilities as further described herein; and

WHEREAS, Western may, at its discretion, purchase quantities of water from Eastern that reflect solely the demands of Western's North Perris Basin Service Area as more fully described in the allocation schedule herein; and

WHEREAS, Eastern has executed a funding agreement with the California State Water Resources Control Board (hereinafter the "State Board") for grant funding supporting construction of the Project Facilities; and

WHEREAS, the price of water produced from the Program by Eastern and purchased by Western shall include Eastern's costs for operation and maintenance of the Project Facilities, as well as the amortized capital construction costs of such Facilities, less any grant funding received by Eastern, as more fully described herein; and

WHEREAS, the purpose of this Agreement is to set forth financial and other arrangements between Eastern and Western for development of the North Perris Groundwater Program, and to define the roles, obligations, and responsibilities associated with construction, ownership, and operation of the Project Facilities and the subsequent sale of Program water to Western, by Eastern.

NOW, THEREFORE, in consideration of the promises and covenants herein contained, the Parties agree as follows:

AGREEMENT

1. Incorporation of Recitals. The Recitals set forth above are incorporated into and are made a part of this Interagency Agreement.

2. Term. This Agreement shall be effective upon the date it is fully executed by the Parties hereto and shall remain in effect for a period of twenty (20) years following the date Eastern notifies Western in writing of the availability of water supplies from the Project Facilities. This Agreement may, thereafter, be extended in ten (10) year increments only by mutual written agreement of the Parties through written amendment.

3. Eastern's Responsibilities.

   Eastern shall design, build, own, operate and maintain all Project Facilities, including ownership of all real property and rights-of-way associated with such Project Facilities. Such responsibilities shall include, but are not limited to:

   a) Technical Development and Review. Eastern shall lead and direct the preparation of all technical development and support materials, including, but not limited to planning studies, engineering, regulatory and environmental compliance, modeling, property acquisition, permitting, and the development of all construction related documentation for the Project Facilities. Eastern shall utilize its own means and methods in completing all such Program elements and will solicit input from, and provide periodic updates to Western.

   b) External Communications and Program Advocacy. Eastern shall coordinate with Western for all external Program and Project Facilities-related communications and meetings, including, but not limited to those with all federal, state, and local entities. All of Western's external communications for the Program shall be coordinated with Eastern.

Meetings and communications with MARB staff will be jointly coordinated by the Parties, with Eastern leading such communications pertaining to the Program and Western leading those with regard to providing retail services to MARB. Meetings with MARB regarding the design, implementation, and construction of the Program shall be conducted by Eastern with an invitation extended to Western for attendance. Such meetings may include, but are not limited to, those involving the Stakeholder Advisory Committee, Technical Advisory Committee, Groundwater Model Advisory Panel, technical review sessions, and Groundwater Sustainability Plan development.

c) External Funding: External funding secured by Eastern and/or Western that is directly related to the Project Facilities shall be applied as a credit toward capital costs incurred by Eastern in planning, designing, and constructing the Project Facilities. Such funding shall be proportionally applied to the cost of water sold by Eastern to Western as further described in Section 5, below. Any external funding secured by Western that is not directly related to the Project Facilities shall be for the sole benefit of Western.

d) Eastern shall make water produced by the Program available for sale to Western at agreed upon metered points of connection which shall be set forth in a separate Operational Agreement to be developed by the Parties. Said points of connection may include those already in existence or future connections to be constructed by Western. In addition, Program water may be supplied in the form of an in-lieu transfer at the Metropolitan Water District's Mills Water Treatment Plant as provided in the aforementioned Operational Agreement. Such water shall be supplied by Eastern on a constant flow basis with no flow peaking, or long-term storage, and shall meet all federal, state, and local regulatory requirements for the supply of potable drinking water.

4. Western's Responsibilities.

Western may, at its discretion, purchase Program water from Eastern in accordance with the following:

a) Program Water Allocation. Western may, at its discretion, purchase Program water from Eastern in accordance with, and limited to, the Maximum Allocation Schedule described below. However, Western shall have the option to increase its acquisition of water from the Program within the limits established within the Maximum Allocation Schedule based solely on additional demands within Western's North Perris Basin Service Area as evidenced through Western's metered billings. Such evidence shall be provided to Eastern upon request.

Upon completion, the Project Facilities are anticipated to produce a maximum quantity of 6,750 acre-feet of water per year. Such maximum quantity is consistent with that identified in Eastern's executed funding agreement with the State Board. If, for any reason, there is a reduction in such anticipated State Board funding that reduces the production capacity, or a reduction in scale of the proposed Project Facilities for some other reason; or in the event that Eastern, in any given fiscal year (July through June), is unable to produce at least eighty percent of the aforementioned maximum quantity (5,400 acre-feet per year) due to unanticipated water quality, regulatory, operational, or any similar circumstance whatsoever, the Maximum Allocation Schedule set forth in subsection (b) below shall be proportionally reduced for such year(s) in accordance with the following formula:

Actual Annual Acre-Feet Production ÷ 6,750 Acre-Feet = Western's Proportionally Adjusted Percentage of the Maximum Allocation Schedule

b) Western's Maximum Allocation Schedule.

Western may purchase Program water from Eastern equal to a maximum of 500 acre-feet of water in the first initial year following Eastern's completion of the Project Facilities. The maximum amount of purchased water allowable in the first year is subject to the proportion of the fiscal year remaining. The proportion shall be calculated by dividing the number of days remaining in that initial first year prior to June 30 into the total days in a year. Thereafter, on or before June 1st of each year, Western shall inform Eastern, in writing, of the amount of Program water it intends to purchase over the following fiscal year. Such total shall be based on, and evidenced by, Western's deliveries to Western's North Perris Basin Service Area over the previous calendar year and shall not exceed the following Maximum Allocation Schedule:

i. In years two (2) through five (5) following the date of Eastern's written notification to Western of the availability of Program water, a maximum of 750 acre-feet of water per year beginning with the date of July 1 following the first delivery of water to Western.

ii. In years six (6) through ten (10) following the date of Eastern's written notification to Western of the availability of Program water, a maximum of 1,000 acre-feet of water per year beginning with July 1 of the sixth year, as described above, and extending through June 30 of year ten (10).

iii. After year ten (10), a maximum of 1,500 acre-feet of water per year beginning with the completion of year ten (10) following the date of Eastern's written notification to Western of the availability of Program water, and extending through expiration of this Agreement.

c) Western shall not install groundwater production wells within the Program area that interfere, in any way, as determined by Eastern, with Eastern's operation of the Project Facilities or groundwater remediation functions.

5. Water Rates and Billing.

Eastern shall prepare monthly billings to Western for water deliveries made pursuant to this Agreement. Such billings shall be paid by Western within thirty (30) calendar days following the date of Eastern's invoice.

The unit cost (rate) for water billed by Eastern shall be calculated by Eastern and based on the following components:

a) Amortized Capital Cost Component of the Project Facilities: The amortized capital cost rate component for Program water purchased by Western shall consist of the annualized capital costs incurred by Eastern for the planning, permitting, design, and construction of the Project Facilities, including, but not limited to the acquisition of any real property and rights-of-way associated therewith, less any external funding actually received in accordance with Section 3(c), above. Such resulting total shall be

divided by the quantity of water produced by the Project Facilities in any given fiscal year to determine the per acre-foot capital cost component of Western's rate.

It is hereby understood and agreed that the annualized capital costs specified above shall be based on a thirty (30) year amortization schedule incorporating Eastern's combined cost of debt service for the prior fiscal year as the interest rate. Eastern's combined cost of debt service for fiscal year 2019-2020 was 2.137%.

b) Operation and Maintenance Component of the Project Facilities: The operation and maintenance cost rate component for Program water purchased by Western shall consist of all fixed and variable operational costs incurred by Eastern including, but not limited to those for Project Facility maintenance and repair, water purchased for blending, energy, labor, chemicals, treatment media, and other similar consumables. Such total shall be divided by the quantity of water produced over the fiscal year to determine the per unit operations and maintenance cost component of Western's rate.

In addition to the foregoing, in the event that Eastern incurs expenditures for the overhaul or capital replacement of any Project Facility or related component in excess of $50,000, an amortization schedule covering Western's reimbursement to Eastern for such costs shall be negotiated and agreed upon between the Parties.

On or before March 15 of each calendar year, Eastern shall provide Western a projection of the aforementioned rate components to be used by Eastern in calculating the unit cost of water to be charged to Western over the upcoming fiscal year.

Additionally, on or before October 1 of each calendar year, Eastern shall provide Western a detailed reconciliation of the aforementioned rate components based on actual costs realized by Eastern in operating the Project Facilities over the prior fiscal year. Any overage in charges will be credited to Western within thirty (30) calendar days following completion of Eastern's reconciliation. Any under payment, or balance due Eastern based on such reconciliation shall be invoiced to Western by Eastern. Western shall remit such balance to Eastern within thirty (30) calendar days of the date of Eastern's invoice.

For water sold to Western pursuant to this Agreement, it is hereby understood and agreed that Eastern shall not apply the volumetric delivery charge, monthly fixed rate charge, and monthly replacement and reserve contribution as defined in the November 9, 2015 Interagency Agreement (as Amended on October 19, 2016) for the Eastern/Western Intertie Connection to Serve Western's North Perris Basin Service Area.

6. Entire Understanding.

This Agreement is intended by the Parties as a complete and exclusive statement of the terms of their agreement and supersedes all prior agreements, written or oral, as to the subject matter herein contained.

7. Amendments.

This Agreement may be amended or modified only in writing signed by the Parties.

8. Hold Harmless and Indemnification.

Western and Eastern agree that each party shall be responsible for its own actions, and the actions of its officers, employees and agents, in performing services under this Agreement. Western and Eastern each agree to indemnify and hold the other Party and its officers and agents harmless and agree to defend the other Party against any claim or asserted liability arising out of its actions, either willful or negligent, or the actions of its officers, employees and agents, in performing services pursuant to this Agreement. Such indemnity includes any losses relating to any claim made, whether or not a court action is filed, and attorney fees and administrative and overhead costs related to or arising out of such claim or asserted liability.

Notwithstanding the foregoing, Eastern shall indemnify, defend, save and hold harmless Western and its Board of Directors, officers, agents and employees, of and from any liabilities, claims, demands, suits, action and cause of action made by the United States Air Force regarding Eastern's operation of the Project Facilities. Such indemnification for Western, however, is conditioned and shall only be effective upon the United States Air Force, or other appropriate branch of the United States Government, entering into an agreement with Eastern for coordinated operations and a mutual release of claims.

9. Termination.

This Agreement may be terminated with the written mutual consent of both Parties, or in the event of a breach, this Agreement may be terminated at the election of the non-defaulting party. Eastern may terminate this Agreement at any time prior to providing Western written notification of the availability of Program water in the event of limitations or loss of external sources of funding, or other similar circumstance.

10. Force Majeure.

Neither Party shall be in default or otherwise liable for any delay in or failure of its performance under this Agreement for a period equal to the duration of the force majeure event, if such delay or failure arises by any reason beyond the Party's reasonable control, including any act of God, any acts of the common enemy, earthquakes, floods, fires, epidemics, riots, labor disputes, failures or delay in transportation or communications, or any act or failure to act by the other Party or such other Party's employees, agents or contractors.

11. Disputes.

In the event that any dispute between the Parties arises under this Agreement, the Parties shall first attempt to resolve such dispute at the staff level. If the dispute is not resolved at this level within a mutually acceptable period of time (not to exceed 60 calendar days from the date written notice of such dispute is delivered by any Party), the Parties shall attempt to resolve the dispute at the executive management level. If this process and the involvement of executive management does not result in resolution of the dispute within 60 days from the date of referral to executive management, then the dispute shall be referred to mediation to be conducted by a mutually agreed upon mediator. The Parties shall engage in good faith efforts to resolve any dispute at each of the dispute resolution levels set forth herein. In the event the dispute is not resolved through the above-mentioned dispute resolution procedures, then either Party may pursue resolution of the dispute through legal proceedings. The use of the foregoing

procedure is a condition precedent to the commencement of any legal proceedings hereunder.

12. Partial Invalidity.
If any provision of this Agreement is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions will nevertheless continue in full force and effect without being impaired or invalidated.

13. Governing Law and Venue:

This Agreement and the rights of the parties under hereto shall be governed by and enforced in accordance with the laws of the State of California. Venue of any action brought hereunder will be in Riverside County, California, and the parties hereto consent to the exercise of personal jurisdiction over them by any such courts for purposes of any such action or proceeding.

14. Agreement Enforcement.

In the event any action is commenced by a Party to this Agreement against the other to enforce its rights or obligations thereunder, the prevailing party in such action, in addition to any other relief and recovery ordered by the court, shall be entitled to recover all litigation and collection expenses, witness fees, court costs, plus reasonable attorneys' fees.

15. Preparation of this Agreement.

This Agreement shall not be construed against the Party preparing it but shall be construed as if both Parties prepared it.

16. Notices.

Any notice required by this Agreement to be given or delivered to any Party shall be deemed to have been received when personally delivered or mailed in the United States mail addressed as follows:

Eastern
Eastern Municipal Water District
Post Office Box 8300
Perris, CA 92572-8300
Attn: General Manager

Western
Western Municipal Water District
14205 Meridian Parkway
Riverside, CA 92518
Attn: General Manager

IN WITNESS WHEREOF, the Parties have executed this Interagency Agreement as of the day and year last executed.

WESTERN MUNICIPAL WATER DISTRICT

By: _____
Craig D. Miller, P.E., General Manager

Dated: 12/8/2020

EASTERN MUNICIPAL WATER DISTRICT

By: _____
Paul D. Jones II, P.E., General Manager

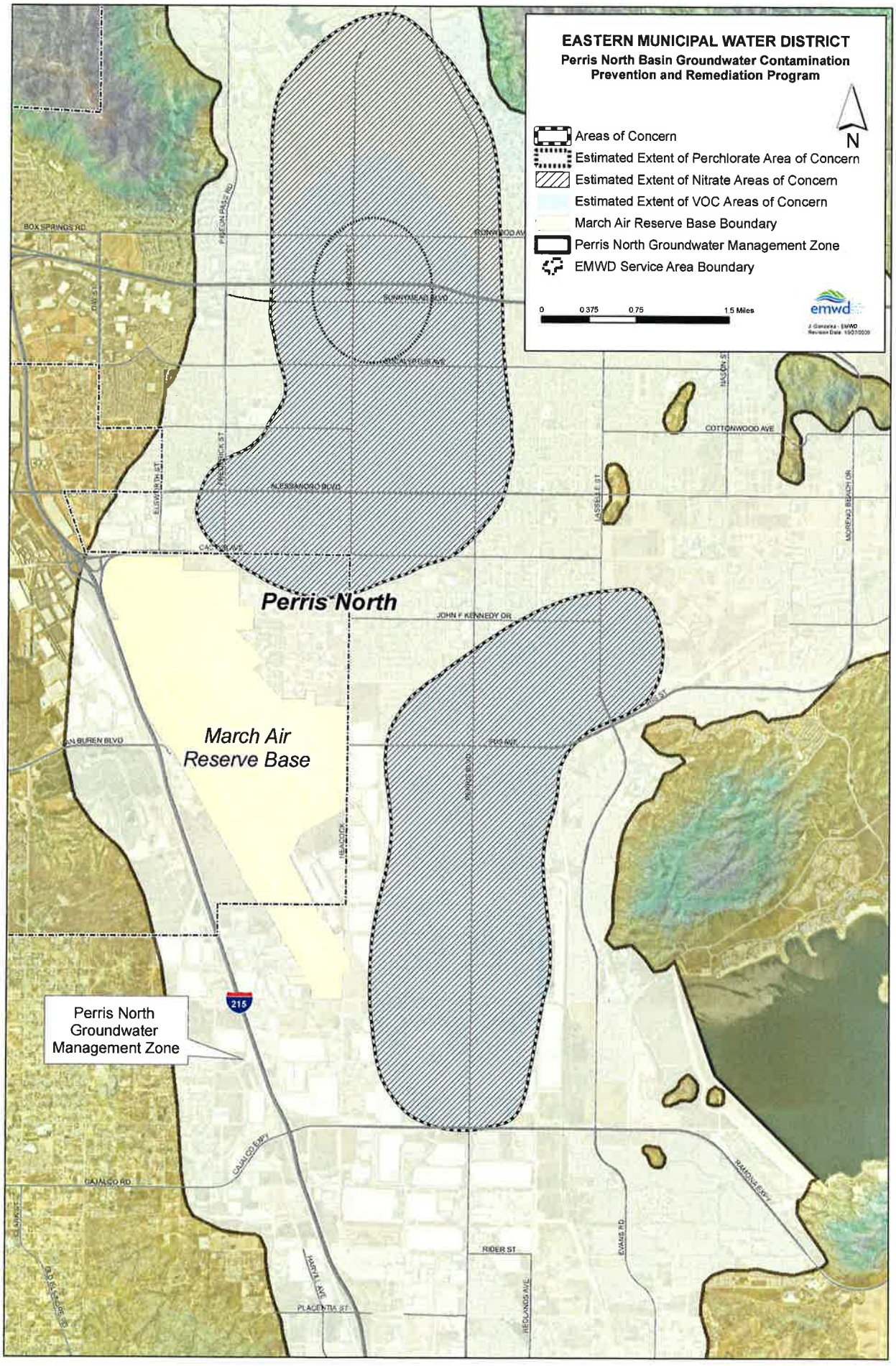
Dated: 12/17/20

Exhibit A:

Western Municipal Water District's North Perris Basin Service Area



EXHIBIT B: GROUNDWATER CONTAMINATION



N

Appendix N SBx7-7 Forms

SB X7-1 | Baseline Period Ranges

STATUS: Published

NOTES: -

Baseline	Parameter	Value	Units
10- to 15-year baseline period	**2008 total water deliveries**	31,300	Acre Feet (AF)
	2008 total volume of delivered recycled water	749	Acre Feet (AF)
	2008 recycled water as a percent of total deliveries	2.39%	Percent
	Number of years in baseline period[1, 2]	10	Years
	Year beginning baseline period range	1995	
	Year ending baseline period range[3]	2004	
5-year baseline period	**Number of years in baseline period**	5	Years
	Year beginning baseline period range	2003	
	Year ending baseline period range[4]	2007	

[1]If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period.

[2]The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.

[3]The ending year must be between December 31, 2004 and December 31, 2010.

[4]The ending year must be between December 31, 2007 and December 31, 2010.

SB X7-2 | Method for Population Estimates

STATUS:	Published
NOTES:	-

Method for Population Estimates	
No	**1. Department of Finance (DOF)** DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2010 - 2020) when available
No	**2. Persons-per-Connection Method**
Yes	**3. DWR Population Tool**
No	**4. Other** DWR recommends pre-review

SB X7-3 | Service Area Population

STATUS: Published

NOTES: -

Year		Population
10 to 15 Year Baseline Population		
Year 1	1995	40,327
Year 2	1996	41,400
Year 3	1997	42,474
Year 4	1998	43,547
Year 5	1999	44,621
Year 6	2000	45,694
Year 7	2001	48,874
Year 8	2002	52,054
Year 9	2003	55,234
Year 10	2004	58,414
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2003	55,234
Year 2	2004	58,414
Year 3	2005	61,595
Year 4	2006	73,158
Year 5	2007	77,101
2020 Compliance Year Population		
2020		94,898

SB X7-7 Table 4: 2020 Gross Water Use							
Compliance Year 2020	**2020 Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**2020 Deductions**					**2020 Gross Water Use**
		Exported Water *	**Change in Dist. System Storage*** (+/-)	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use***	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	
	24,986			-		-	**24,986**

*** Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.

NOTES:

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water *Fm SB X7-7 Table 4*	**2020 Population** *Fm SB X7-7 Table 3*	**2020 GPCD**
24,986	94,898	**235**
NOTES:		

SB X7-7 | 2020 Target Method

STATUS: Published

NOTES: -

Select Only One	
No	**Method 1.** Complete SB X7-7A below.
No	**Method 2.** Complete SB X7-7B,SB X7-7C, and SB X7-7D below.
No	**Method 3.** Complete SB X7-E below.
Yes	**Method 4.** Complete Method 4 Calculator below.

SB X7-8 | 2015 Interim Target GPCD

STATUS: Published

NOTES: -

Confirmed 2020 Target From SB X7-7-F	**10-15 year Baseline GPCD** From SB X7-5	**2015 Interim Target GPCD**
352	**430**	**391**

SB X7-7 Table 9: 2020 Compliance							
Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD Enter "0" if Adjustment Not Used Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]	TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
235	-	-	-	-	235	352	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

O

Appendix O 2018 Water Efficiency Master Plan



Engaging + Empowering Customers

Water Efficiency Master Plan

OCTOBER 2018

WESTERN MUNICIPAL WATER DISTRICT

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Section 1: Western Today

WESTERN INNOVATIONS DRIVE EFFICIENCY

Known for a decade of groundbreaking innovation, Western Municipal Water District (Western) has been a leading light for advancement in the water efficiency marketplace. Western has achieved industry leadership through creative thinking and demonstration of bold action. By challenging customers as well as peer agencies to drive for change, a number of program initiatives that once seemed radical are now the yardstick for others.

Innovation is the fulfillment of an unmet need. It challenges the convention by offering a new, creative way to accomplish the goal.

> Today Western uses innovation as the primary tool to drive water efficiency.

Western's water budget-based rate structure is the program that provides the foundation for all other programs. Implemented in 2011, this rate structure creates an equitable water budget for each customer based on persons per household and amount of irrigated area. Budgets provide enough water for efficient use with increased costs to the customer for going over budget.

Drought Drives New Innovations

Western's customers were severely impacted by the recent drought. In order to protect customers from future droughts, Western will strive to create "**drought-proof**" or resilient customers and empower them with the knowledge and tools that will help them weather future droughts.

What are Empowered Customers?

- Customers with the knowledge and skills required to drought-proof their landscapes.
- Customers who have access to relevant information through a variety of platforms.
- Customers who are District partners and advocates for water-use efficiency efforts in their communities.

What are Drought-proof Customers?

- Customers that understand the unique conditions of their local and regional landscapes.
- Customers who have resilient landscapes that are minimally affected by drought conditions.
- Customers who are the most efficient users of water.

Western has achieved industry leadership through creative thinking and demonstration of bold actions. Moving forward, we will develop new innovations to accomplish our goals to **empower** and **drought-proof** our customers.

DISTRICT GOALS

With an understanding that the principal targets are **single-family customers (in Tiers 3, 4, 5)** as well as **all outdoor irrigation sites**, Western will do the following:

- ✓ Continue to increase the number of customers who are within their water budgets
- ✓ Drive customer landscape budget efficiency from 0.7 ET to 0.5 ET
- ✓ Comply with new California State Framework mandates

Additionally, Western has established three overarching goals for its customers:

1. Western customers will transition **from** consumers of water service, programs and incentives **to** empowered water-efficiency partners and advocates.

2. Customers will become resilient or “drought-proof” in order to protect the District and residents from the impact of future drought cycles.

3. All homes and businesses with large landscapes will use water efficiently.

JUST THE FACTS

Annual Water Use

In any given year, single-family water use makes up approximately 60% of total usage, providing opportunities for significant water savings.

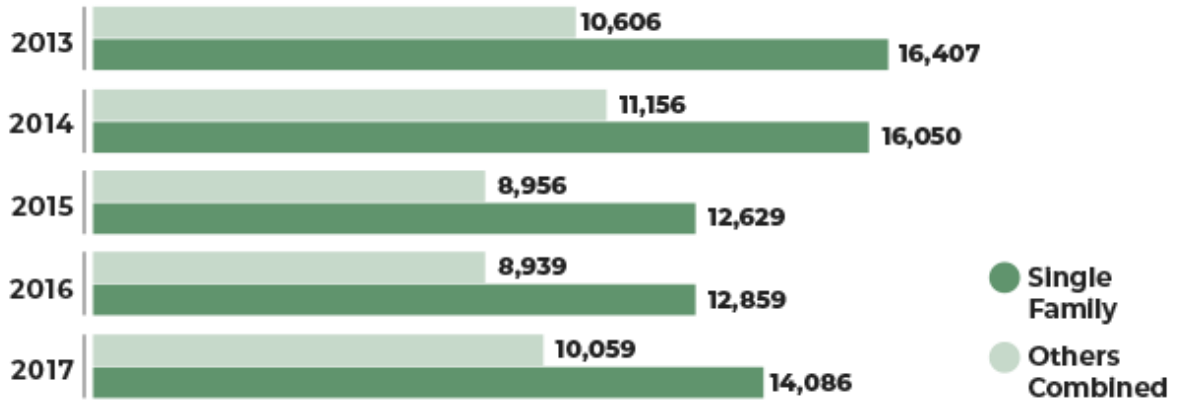


Figure 1: Annual Water Use in Acre-feet

Residential Per Capita Water Use

Western's residential per capita per day (R-GPCD) water use has decreased from 249 gallons per person per day (gpcd) in 2007 to 131 gpcd in 2017, a decrease of approximately 47%.

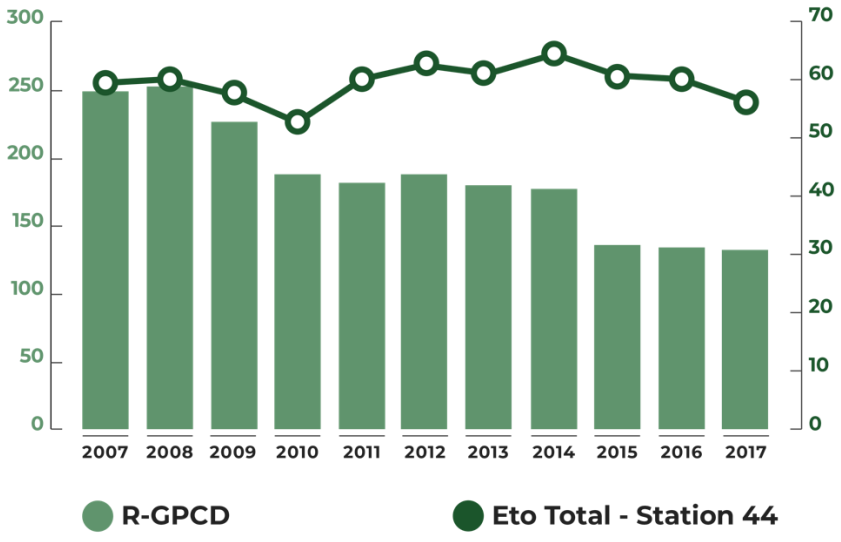


Figure 2: Single-family R-GPCD 2007-2017

Post drought, there has been a slight bounce back in R-GPCD as can be expected. People are no longer inundated with daily drought messaging and therefore have not been as diligent, causing usage to creep back up. The immediate urgency for water use reduction is gone. Moving forward, it is essential for Western to promote a **new** compelling reason for customers to use water efficiently as part of their daily lives, not just during times of drought.

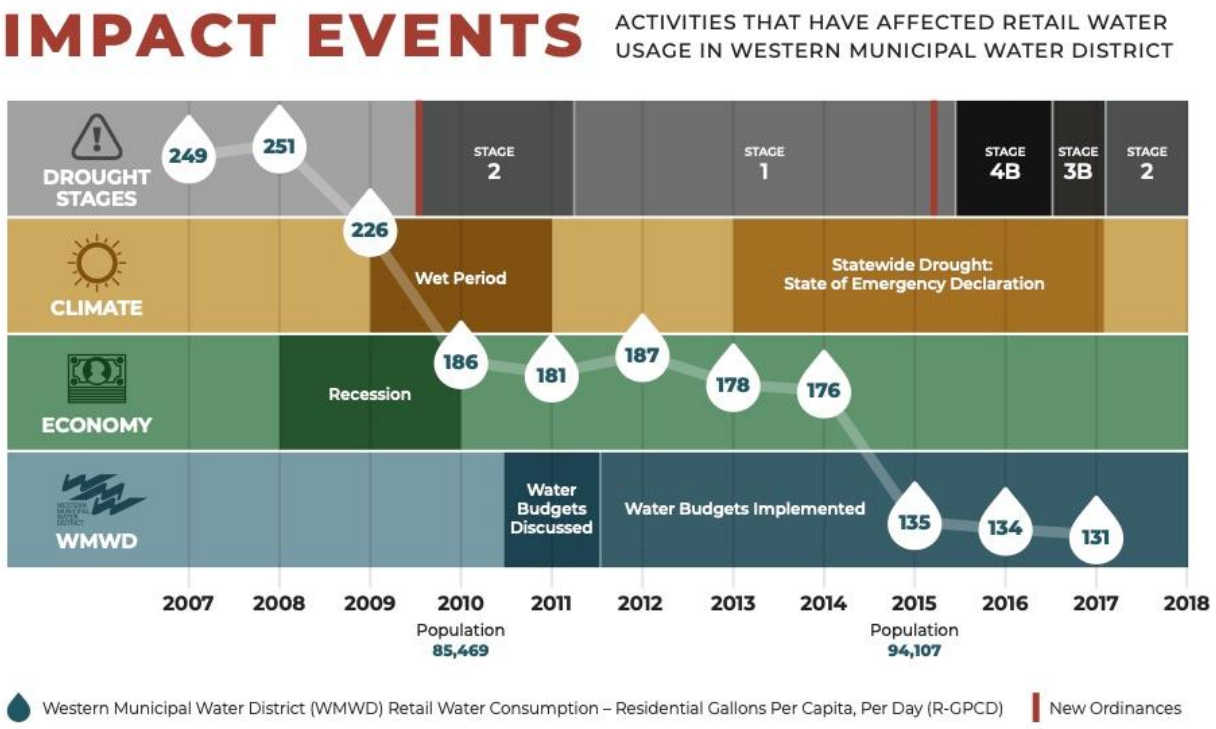


Figure 3: Events Affecting Water Use 2007-2018

The Impact Events chart, above, illustrates the effects of environmental, economic, and Western activities from 2007-2017, as it relates to Western's retail R-GPCD usage.

- From 2007 to 2011, R-GPCD fell from 249 GPCD to 181 R-GPCD, presumably due to the lingering effects of the national recession.
- In 2012, demand rose slightly to 187 R-GPCD, an observable occurrence that often takes place after times of shortage.
- Water usage in 2013 dropped down to 178 R-GPCD after Western's new rate structure, implemented in late 2011, took hold.
- As drought conditions worsened and State-mandated cutbacks were imposed, Western was able to modify its rate structure to significantly increase the price signal to further reduce demand by 23%, dropping R-GPCD to 131 in 2017.

As expected, the budget-based rates have managed to keep demand from rising further, despite population growth and higher-than-average evapotranspiration. The efficiency-based price signal has reduced usage from 176 gpcd in 2014 down to 131 gpcd in 2017.

Western's innovative rate structure provides an effective and flexible framework that encourages efficiency every day, but that can be modified to drive down demand during droughts or emergencies.

Tier 3 – 5 Customers

The major opportunity for additional R-GPCD water savings lies with Tier 3-5 customers. These households are operating above their budgeted allotment of water and Western's efficiency-based rate sends the pricing signal that more should be done to save. In Figure 4 below, the success of the pricing structure is demonstrated by the decrease in the percentage of Tier 3-5 customers in 2017, as compared to 2012.

Initially, approximately 65% of single-family customers were in budget. As customers adjusted to the water budget rate structure, the percentage of customers in budget rose to 80% in 2015 and has remained at that level.

To become budget compliant, the customer must reduce the amount of water over budget. Landscape changes offer the best opportunity. Turfgrass, specifically, is the highest water-using plant in most landscapes and, while the budget is enough to water turf, the rate structure incentivizes the customer to be more efficient if they want to pay lower rates.

This shows that with motivation, support, and programs, customers can, in fact, reduce areas of water waste and move to budget compliance.

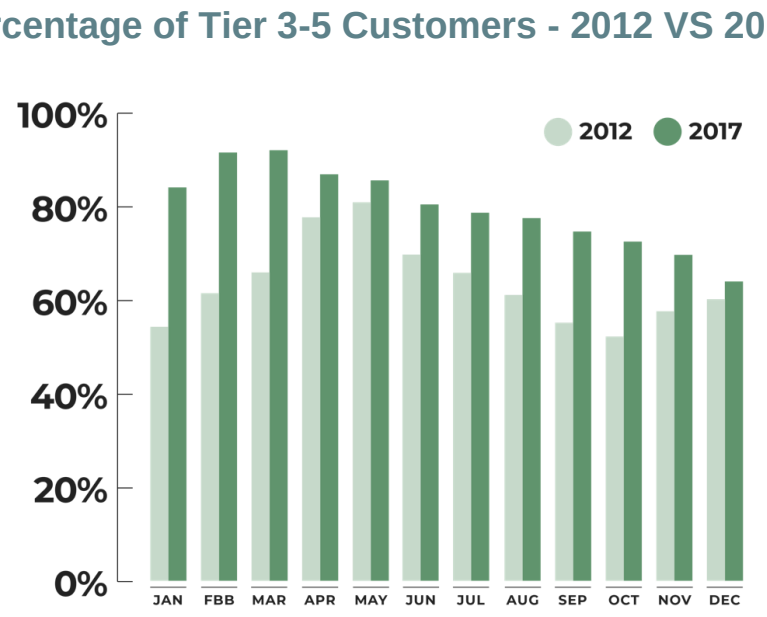


Figure 4: Percentage of Tier 3-5 Customers, 2012 VS 2017

Taking another look at water use reduction over the years, Figure 5, below, illustrates that customers are incrementally responding to lower their usage. As shown in Figure 5, the total amount of water from over budget customers declined from over 8,000 AF in 2013 to approximately 1,500 AF in 2017.

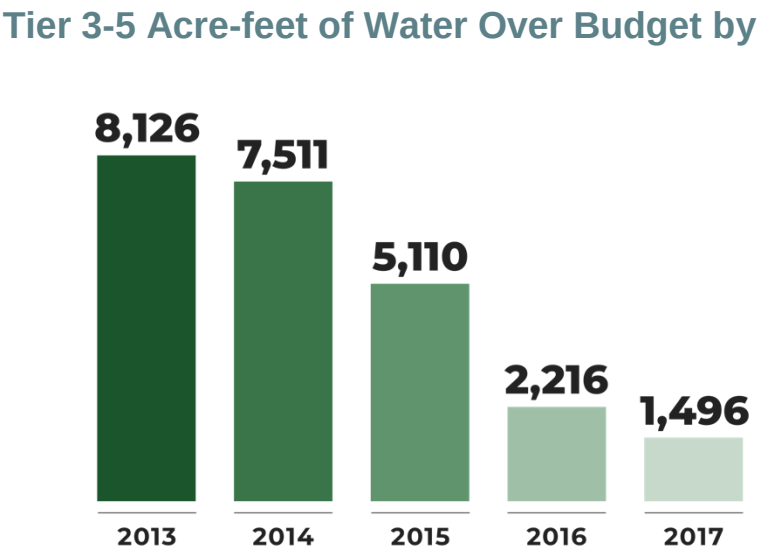


Figure 5: Tier 3-5 Acre-feet of Water Over Budget by Year 2013-2017

Landscape Water Use

Landscape water use represents 61% of total water use in Western's service area. For single-family customers, 63% of their use is for landscape watering. Irrigation meters obviously use 100% outdoors, while commercial customers use around 16% outdoors.

Total outdoor usage for all three of the customer classes equates to 11,675 acre-feet; a significant water use category.

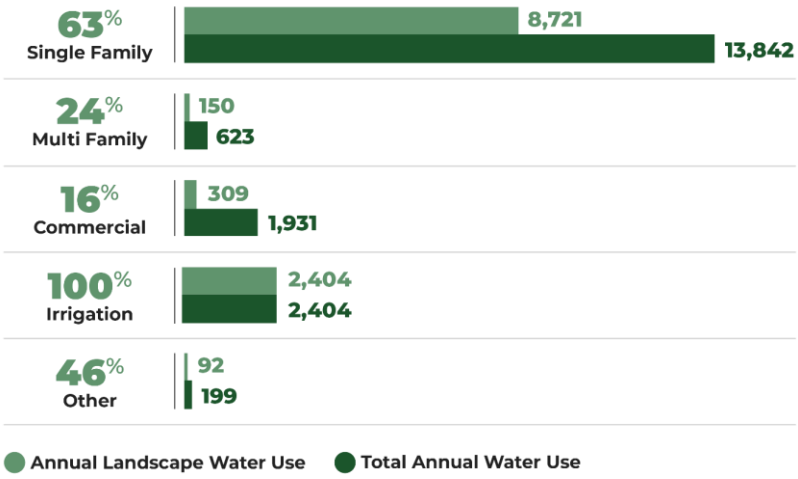


Figure 6: Landscape Water Use by Account Category

If Western **reduced landscape water use by just 10%** from current usage, that would bring about a reduction of 1,168 acre-feet annually. Twenty percent would deliver 2,335 acre-feet savings.



Figure 7: Landscape Acre-foot Reduction by Percent Reduced

It's clear, the major opportunity for water savings is landscape irrigation and within the landscape category, single-family tiers 3, 4 and 5 offer the prime opportunity for water savings.

To increase the number of efficient landscapes, Western will significantly increase communication and engagement with customers. Over-budget residential and commercial landscape customers, specifically, will be targeted by Western by an array of outreach mechanisms and offered a robust suite of programs and tools to assist them in creating water-efficient landscapes.

Section 2: Market Conditions

THE PROBLEM

Western has accomplished much to date, but the challenge ahead is to achieve **deeper** and **sustained** *per capita* water savings.

To achieve this, future strategies must surmount the persistent obstacles thwarting greater customer activity. We know that landscape efficiency is the key to goal achievement, but water agencies continue in their struggles to gain substantial headway in this difficult market.

Obstacles to deeper market penetration are:

- Customers lack motivation to reduce their water use.
- Most customers are unaware of, or overwhelmed by, landscape efficiency programs.
- Landscape efficiency solutions must be “customized” for each property.
- Water agencies do not currently have a deep understanding of their customers.
- Agencies do not possess the resources to uniquely target and engage their customers.

Perhaps most importantly, there is the foundational issue that customers have an emotional connection with their lawns.

What is It About Lawns?

The pride of single-family home ownership is deeply seated in the image of green yards and lush lawns. A lush green lawn is the envy of the neighborhood.

The reason for this ingrained landscape choice can be traced back more than three centuries; back to 18th century France and England. Wealthy Europeans desired to replicate the look of landscape paintings with expansive, verdant meadows. As a result, vast, sprawling lawns began to appear at the palaces and manor homes of the rich. Prosperous Colonialists took note of this au courant design trend and installed lush green lawns in the Colonies.

Throughout the following years, lawns were a luxury only for the rich. During the Post WWII era, government-financed mortgages allowed developers to construct large-scale tract house communities. The builders installed lawns as a sales feature, marketing this as a luxury item.

Today, lawns are still viewed by most people as a marker of success and beauty.

To accelerate landscape transformation, Western must market a new aesthetic to replace the old.

Some Inroads Have Been Made

Fortunately, Western is not starting at square one. Decades of landscape efficiency programs and education has had a modest, but progressive, impact on customer attitudes.

Resilient landscapes are beginning to be desirable and denote a modern version of success and beauty.

Based upon a **Western-UCR study** customers expressed the following views:

- Customers desire to have a beautiful landscape.
- Each customer has a different vision of what comprises landscape beauty.
- Most customers have considered converting their lawn, but they need help to do it.
- Customers confirmed that design support is the most important need.
- Incentives are necessary to pull the trigger on converting their lawn.
- There are a number of misperceptions that disconnect the customer from their actual water usage. They believe most water is used indoors; that they already have efficient equipment; and saving money is the main driver.

Section 3: Customer Solutions

THE SOLUTION – LANDSCAPE TRANSFORMATION

Western can increase the number of customers with resilient landscapes by promoting the installation of water-efficient plants. Landscape market transformation is a complex process. As such, it is necessary for Western to consider the incremental steps, emotional drivers, and individual pathways that influence a customer's decision to give up all, or part, of their lawn.

Much of the WUE plan will focus on single-family and landscape efficiency, specifically lawn removal; however, indoor and commercial programs will be offered as needed.

To impact single-family and landscape efficiency, it is imperative for Western customers to become fully **engaged** and **empowered**.

This necessitates Western to **develop the strategies and infrastructure** to target customers and motivate them to act.

Additionally, the emotional aspect of customer choices should be addressed and result in a focus on **beauty** when crafting messaging.

Western must help the customer along the way. Western will provide program participants with **easy access to help services** – a "live" customer support person, personalized messaging, web tutorials, and other assistance to answer a quick question or help solve a complicated problem.

Most importantly Western needs to create a heightened connection with all **customers by developing a customer continuum of engagement** to help them to connect better with the programs and ultimately **deepen their relationship** with Western.

This is Customer Engagement.

How Western Can Engage Customers

Customer-focused businesses understand that robust customer engagement tactics foster sales response, brand growth, and loyalty.

For Western, heightened customer engagement will translate to better program response, increased water savings, a more positive customer perception of Western, and advocacy and support for Western's endeavors.

There are specific tactics used to build an effective customer engagement strategy.

These are:



Learn

With today's data-rich world, companies are using information to learn and better understand their customer's preferences and needs. Western can learn about a customer's interests and ascertain their emotional drivers and the likelihood of program participation. This can be accomplished through the use of surveys, Big Data, analytics, feedback loops and other sources of information.

Personalize

Personalization is a means of meeting the customer's needs more effectively and efficiently and, consequently, increasing customer satisfaction and the likelihood of participation.

There are two means of personalization that Western will consider to improve water-use efficiency program response:

- The first is **personalized targeting**. Information harvested from surveys and data sources can be used to target program offers based on a customer's personalized characteristics. A "techie" responds favorably to product and technology program offers. An environmentalist is more likely to be interested in full turf replacement and watershed programs.

- The second is **personalized communication,** used to create strong customer ties. As we know, one of the most pleasing words to hear or see is one's own name. Personalized communication, via website, email, or phone call gets better receptivity when the customer's name is used.

Engage

Western can engage and build a close relationship with customers by creating compelling content, aiming to pique each customer's specific interests. A first-time homeowner would appreciate How-To video clips on various topics such as planting a tree or landscaping tips. These positive engagements will establish a favorable image of Western as a valuable resource and ally.

Assist

Western's customers want to know that they can get help when needed. Customer loyalty is the result of superior customer support. Western can build loyalty by providing easy access to program staff when they have a question or need assistance. Landscape programs, in particular, need to provide support services along the way. Western can reach out to customers when it seems that they might be abandoning a program. Assistance needs be an integral part of efficiency program design, woven into every major step in the program flow.

Appreciate

Western values their customers and is there to serve them. It's important that Western clearly communicate this. When customers feel appreciated, they will spread the efficiency message on Western's behalf. Affirmative gestures and small tokens of appreciation go a long way to solidify and maintain a positive relationship.

Create Advocates

Customers-as-advocates is the ultimate result of a successful customer engagement strategy. When you focus on BEING MORE for your customers, you gradually build a strong connection and a positive community of supporters. Western will accomplish this by employing the tactics described above.

Customer engagement is simply a strategy to show your customers that you CARE…

THIS IS THE BEST MARKETING STRATEGY

Section 4: Engaging Customers

LEARNING MORE ABOUT WESTERN CUSTOMERS

To cut *per capita* water use, it's necessary to drive more customers to take action. To accomplish this, Western needs to understand customers' likes and dislikes, patterns of behavior, and motivations to act.

Robust customer information will allow Western to:

- Target high-potential customers with a higher degree of success
- Match those customers with the appropriate level of program(s) and support
- Present compelling reasons to participate
- Deliver measurable water savings

Typically, water agencies cast a wide net and hope to secure the desired customer response rate. With today's data technologies Western can micro-target and optimize, not only the outreach, but the offer, and the motivations to participate.

One of the foundational methods to understand customer behaviors, drivers and barriers to efficiency is through customer surveys. Survey results provide deep insight about customer attitudes.

Western conducted a comprehensive customer attitudinal survey in partnership with the University of California, Riverside (UCR). The Western-UCR Residential Customer Survey was developed as an outcome of four focus groups (3 English, 1 Spanish language), ten in-depth interviews with Western customers, one pre-test, and extensive input from both Western staff and UCR researchers.

Although Western annually conducts a customer service survey, the Western-UCR Residential Customer Survey was designed to gain deeper knowledge and insight into customer attitudes and motivations as it pertains to water efficiency. All single-family residential customers with active Western accounts were informed about the survey and encouraged to participate.

First, emails were sent to all of the Western single-family residential active accounts, for which Western had email addresses. The emails were sent on June 19th and June 27th, 2018. A link to Western survey landing page was provided in the email, which also described—in both English and Spanish—the purpose of the survey. Second, on July 26th, 2018, a postcard in both English and Spanish was sent to all single-family residential customers.

Two issues surrounding the survey sample deserve attention:

First, all of the results presented in this section of the report are based on responses to the English version of the survey. There was just a single respondent who completed a Spanish version of the survey.

Second, as with any survey sample, one needs to be aware of sample selection issues and response bias. To address whether the responses were from a representative sample, UCR compared the sample irrigated area, water use, and number of people per household to the overall population of single-family residential accounts. The results showed that for each of these three measures, the sample is representative of the overall customer population.

The survey asked customers about the following topics:

1. What efficiency measures they implemented and why;
2. What are their specific interests;
3. What is holding them back from replacing their lawn and;
4. What help they need.

The survey resulted in 465 responses.

Here's what customers told Western….

Most Customers Take Care of their Landscape and Watering on their Own

Most customers perform their own landscape maintenance activities and watering schedules. Survey results stated that the majority of customers maintain their own landscaping and less than half (40%) utilize a gardener.



of respondents have **HIRED A GARDENER** to maintain their lawn or garden



of those with gardeners **HANDLE THE WATERING SCHEDULE ON THEIR OWN**

Nearly all customers manage the watering schedule for their properties. This corroborates Western's strategy to target the homeowner, and not landscape maintenance companies, with seasonal watering and landscape program messaging.

Survey results show that most customers live in homes independent of developments with HOA management of outdoor landscape areas. The response reinforces that residential housing stock appears to be predominantly traditional homes with owners as the water efficiency decision makers.



Customers are Confused about Outdoor Water Usage



About 1/3 of customers responded that they use more water indoors or that their usage is equal indoors versus outdoors.

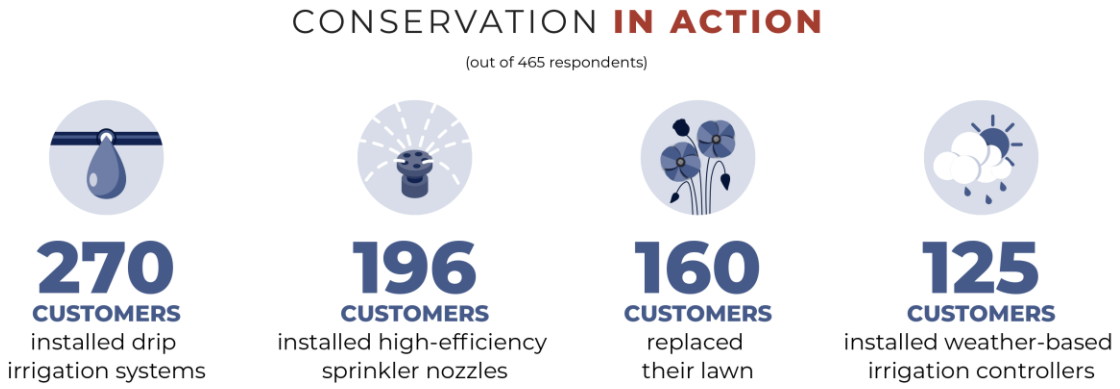
This response could be because, for decades, there was a singular focus on indoor water usage. This customer misperception impacts their view about the importance of outdoor water savings measures and, most certainly, diminishes the value of landscape transformation. While indoor water conservation has been ingrained in customers, the importance of outdoor water conservation remains a foreign concept to many.

The commitment to indoor water conservation practices stems from childhood lessons to turn off the water while brushing teeth and to take short showers. Additionally, indoor water usage is tactile—you turn the faucet at the sink and push the buttons on your dishwasher and clothes washer. We interact with it regularly.

Outdoor water use, on the other hand, is something more distant. Lawn watering happens, automatically, a few times a week, and often at night. Residents only fleetingly think about landscape water use and this may be why only 49% of survey respondents believed that outdoor conservation saves more water.

With these customer misconceptions comes an opportunity to educate customers about the magnitude of water used outdoors and the opportunity for savings.

Customers are Confused about their Property's Landscape & Irrigation Efficiency



Of the 465 survey respondents, just under 59% of survey-takers (270 customers) stated that they had a drip irrigation system installed at their property. It should be noted that the question does not specify whether a customer response is for a full drip irrigation system or a small area.

Survey responses showed 196 customers (46%) believe they have high-efficiency devices installed. Industry statistics, on the other hand, show that high-efficiency nozzle sales account for only 20% of all sprinkler nozzles sold. A high customer estimate was also seen in the Alliance for Water Efficiency's (AWE's) Landscape Transformation Study. A possible reason for this, is that the customer could have been told by a store representative or their contractor that they were buying "high-efficiency" nozzles when they were not. It is also possible that customers who purchased or received high-efficiency nozzles through a program could be more likely to respond to the survey.

Regarding turf replacement, just under 35% of homeowners (160 customers) say that they replaced their lawn. This number is much higher than saturation calculated by Western's analysts and studies done by Metropolitan where somewhere between 2%-11% of customers have taken out their lawn. Again, it is possible that customers who already took out their lawn were more likely to respond to the survey.

The survey results show that 27% of customers believe that they have weather-based irrigation controllers installed; this too is higher than the 20% cited as average industry sales. For the AWE Study, when customers were asked if they had a smart controller, 56% percent answered that they already have one, although industry numbers show this to be false.

The Western-UCR Residential Customer Survey and the AWE Study show that customers appear to have a misperception about the efficiency level of their existing irrigation equipment. These misunderstandings may be keeping otherwise-motivated customers from participating in landscape and irrigation efficiency programs.

Customers Replaced their Lawn Mainly for Potential Money Savings



Of customers who replaced their lawns, 44% took action with the primary motivation to save money, while 29% were looking foremost for the water savings. These same statistics cannot be applied to the non-respondents because it is quite possible that their motivations are not similarly aligned.

These response numbers conflict with responses from the AWE Landscape Transformation Study, where aesthetics was listed as the number one motivation for one question and water/energy saving was cited as the primary motivation for another question. This will require further analysis.

Relevant insight about customer motivation can be found in the *McKinsey study: Using a consumer segmentation approach to make energy efficiency gains in the residential marke*t. The study identifies five segments of customers, roughly equal in size, each with unique motivations for initiating efficiency measures. Savings, as the primary motivational driver, pertains to only a subset of customers.

Often the factors that motivate a customer come from specific hidden personal values. Behavioral psychologists state that people often don't truly understand what motivates them to act (www.insightsquared.com/2014/07/why-buyers-buy-the-psychology-of purchase-decisions). People make purchasing decisions rooted as much in emotional impulses as logical facts.

For the survey, customers likely answered what they thought was a pragmatic and factual response. They want to think that their decision is based upon pragmatism when, in actuality, decision making processes are much more complex and segmented.

Customers are Willing to do Their Part during Times of Shortages

Survey statistics show that customers are making efforts to conserve water in a variety of ways. It is particularly notable that 49% of customers state that they have let their lawn turn brown or die in order to conserve.

CONSERVATION **STRATEGIES**

Over the past 5 years...

83%
OF CUSTOMERS
avoided washing sidewalks or driveway

77%
OF CUSTOMERS
set irrigation timers to water less

71%
OF CUSTOMERS
changed their car washing habits

49%
OF CUSTOMERS
let their lawn die or get brown

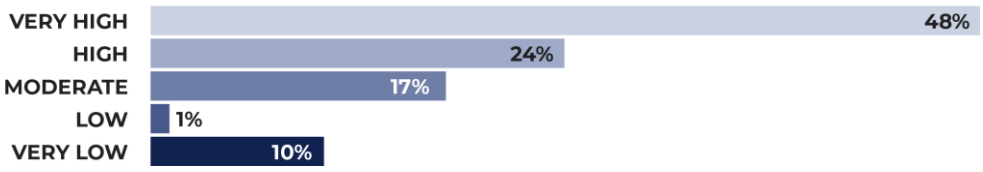
The long-term solution isn't to have neighborhoods with dead lawns, it is for all single-family sites to have attractive, resilient landscapes. Western wants customers not to feel deprived from their efforts, but to understand how to have a beautiful drought-proof and resilient landscape.

Customers Are Most Concerned About COST and Losing Their GREEN LAWNS

LAWN REPLACEMENT **FACTORS**

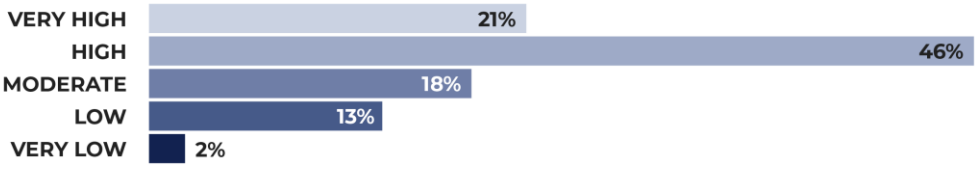
UPFRONT COST

Importance of upfront cost (after rebates):



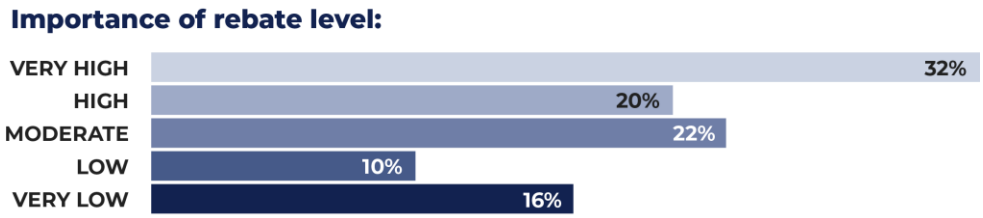
AESTHETICS

Importance of having a green front lawn:



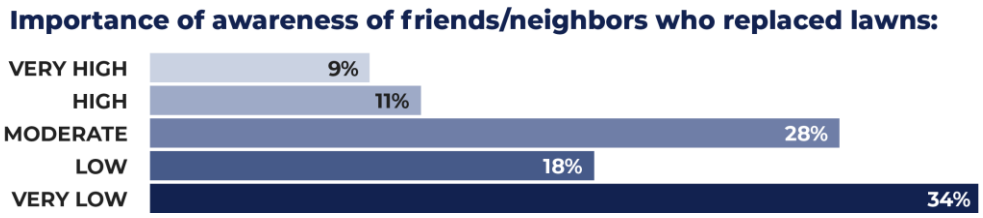


REBATE LEVEL





SOCIAL IMPACT



Customers identify cost as a major barrier to landscape transformation. They stated, overwhelmingly, that the upfront cost and rebate amount matter.

Nearly all water agency turf removal programs require a customer investment of several thousand dollars; a significant budget line item for most households. To increase program response, Western will need to increase cost coverage through higher incentives or convince customers that the outcome is worth the high price tag.

Finding and capitalizing on landscape change motivations is the key to deeper market penetration. There must be compelling reasons for customers to spend the required amount of money. For example, customers, who are not environmentalists, may have other reasons to make a change. An unhealthy lawn; a desire for a contemporary look; a desire for a bird friendly yard – these desires can drive changes to a customer's landscape.

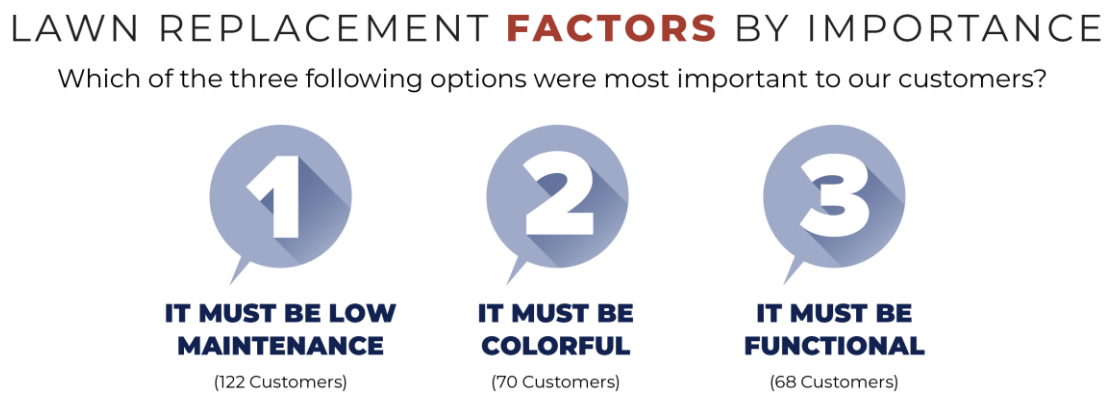
Customers Are Not Comfortable with Cutting Back on Lawn Watering



(17% - neither agree or disagree / 46% - disagree / 22% - strongly disagree)

Results show that people are not comfortable cutting back on their lawn watering and believe that less water will result in harm to their lawns.

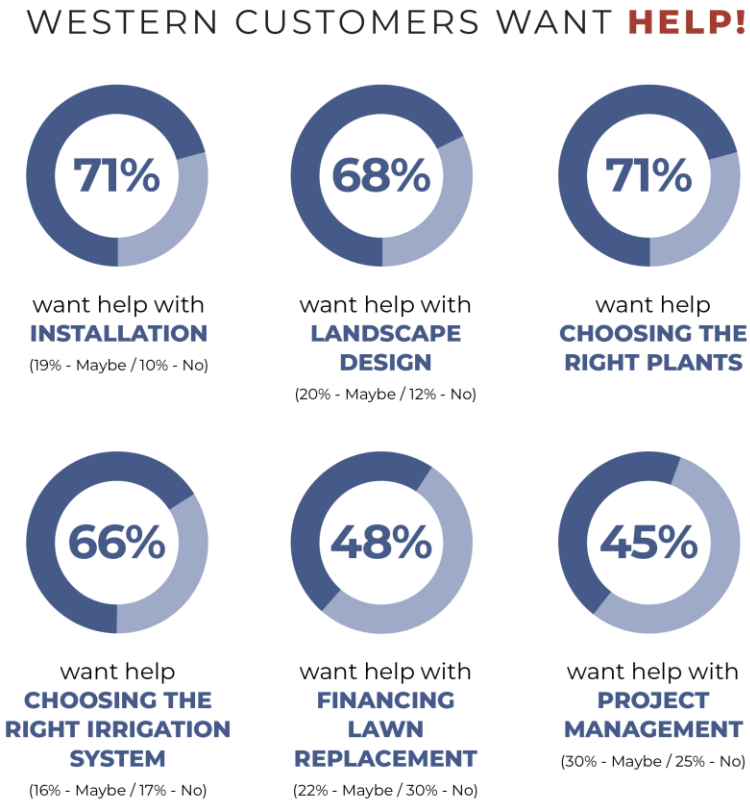
Customers Want Low Maintenance for their Landscapes



Results show that, when replacing their currents lawns, customers primarily desire little to no maintenance for their new landscape. They also would like it to be colorful and functional.

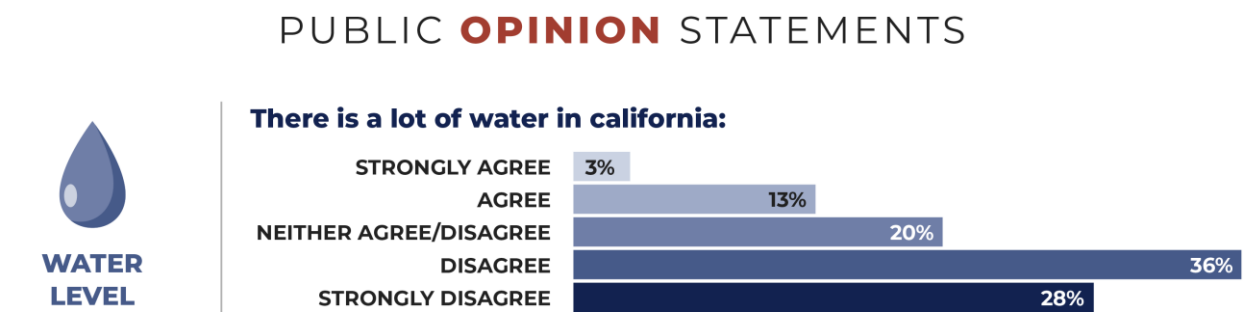
Customers Need Help When Considering Lawn Replacement

As illustrated by the responses in the chart below, the clear majority of customers believe they need assistance with a number of critical program tasks.



Water agencies recognize that there are many customer pitfalls along the path to program completion and, when unaddressed, lead to high program abandonment rates. Western strives to provide a higher level of customer assistance and communication in order to minimize these high numbers.

Customers Acknowledge Water Resource Limitations and Potential for Future Droughts



Sixty-four percent of Western customers surveyed disagree with that the statement: *There is a lot water in California.* Although the clear majority of customers recognize California's water resource limitations, the remaining 36% would benefit from additional water education.



Eighty-percent of surveyed customers believe that California will see severe droughts in the future. This should position Western well in leveraging the drought message in the outreach campaign.

Customers Believe Water Conservation is Good for the Environment

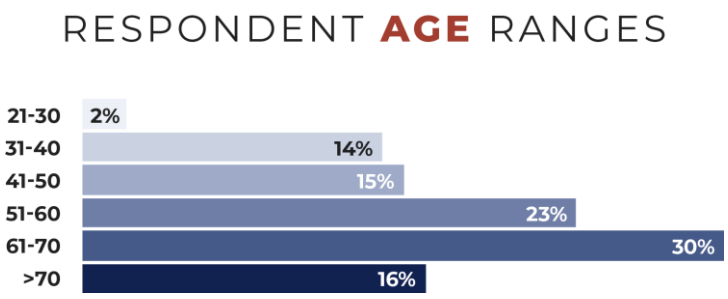


Customers overwhelmingly (88%) believe that water conservation is good for the environment. Again, this an opportunity for Western to connect customers with the conservation messaging.

Interesting Customers Responses

Interestingly, 78% of customers surveyed take walks around their neighborhood on a regular basis. Western may have an opportunity to promote water efficiency projects and programs through yard signs and neighborhood initiatives.





Almost 69% of survey respondents were over the age of 50. This age bias should be factored in when utilizing the results of the survey.

In summary, customer responses reveal issues that are imperative for Western to address:

1. Customers need water use education. They do not understand their water end uses and current landscape technology and therefore don't know how to effectively prioritize water efficiency options.
2. If Western wants to increase participation in the turf removal program, it will be necessary to provide a higher financial incentive. Many customers believe that the high cost is a major barrier to doing turf reduction or removal.
3. Most customers cannot execute turf removal activities on their own. Design and labor are major obstacles.
4. Customers care about beauty and low maintenance. Program marketing should focus more on this and less on just water savings.

The information garnered from the survey results is valuable in designing programs and marketing messages. It also can be merged with other available data to better learn about customer preferences and patterns. With the right IT systems, a robust database of customer information can aid Western in micro-targeting customers.

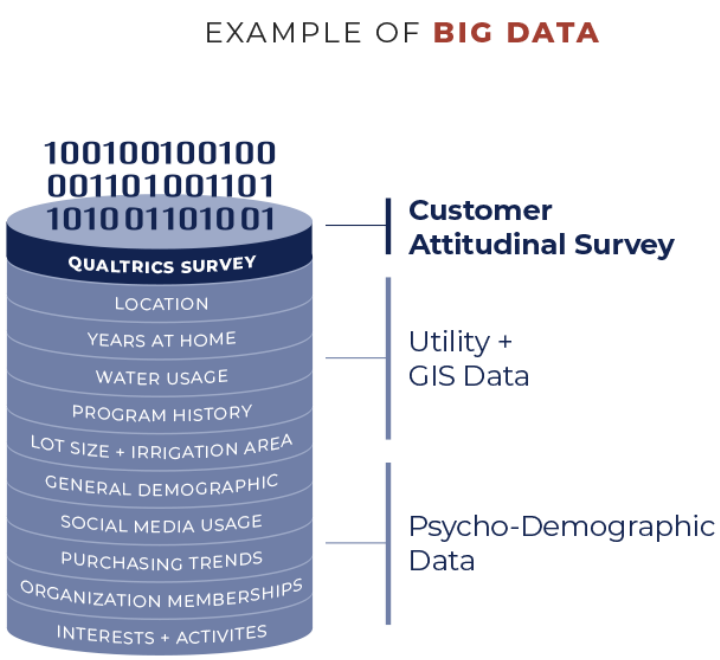
WHY BIG DATA AND ANALYTICS

Using the customer survey responses, along with other data sources, Western can do **what other successful businesses are doing--**using Big Data, analytics, customer segmentation, and personalization to increase response.

Big Data is a term used for **a collection of large datasets** that are integrated typically from both internal and external sources. The data sets are brought together and analyzed to discern patterns, trends, and associations, especially relating to human behavior and interactions.

Western can **pull together multiple data sources** from both internal and external sources. The data sets can then be **brought together and analyzed** to discern patterns, trends, and associations, especially relating to human behavior, preferred interactions, and motivations.

This is used to **understand customers on a deeper level**, create a profile, and predict and influence how customers make landscape and efficiency choices.



Western has information on property location, customer billing, water usage, program history, and other transactions as well as attitudes gained from customer surveys and focus groups. Western's databases can be cross-referenced with external information sources.

Examples of information sources include: social networks, government and GIS databases, real estate databases, usage patterns on mobile devices, and numerous specialized information sources.

The funding of analytics is an investment, however, over the next 10 years it will pay for itself through increased response and sustained savings.

These multiple sources can be overlaid to build a robust customer profile with the goal to move the homeowner from a landscape aesthetic involving excessive irrigation to one that requires little or no supplemental irrigation.

Big Data is valuable, but only with insight. **Data Analytics** provides information to help make educated choices as opposed to hypotheticals.

Predictive Analytics applies statistical models for predictive forecasting or classification. Using this methodology, Western can determine which customers are mostly likely to respond to an offer, what support they need, what water saving measures they might be interested in and how much they would be willing to spend.



SMART TARGETING

Moving forward, Western's residential customer base will be divided into three categories for program targeting:

- Out-of-budget (tiers 3, 4 and 5)
- New move-ins
- In-budget

As explained above, out-of-budget customers provide the biggest per-site water savings opportunity. Close behind are new-move-in customers. These customers may have less of a savings per site, however they might be more willing to make water-efficiency related improvements at their new home. Lastly, in-budget customers offer an opportunity to recognize and reward customers who have done what we have asked. These customers might also be more willing to cut their use even further.

For commercial customers, the target will be irrigation accounts and highest use sites which provide the largest water savings opportunities.

Each of these categories requires a uniquely crafted offer.

The strategy for new move-in customers and Tiers 3-5 customers is to offer efficiency evaluations as the first step. Evaluations are less about delivering immediate water savings and more about establishing the relationship with the customer, identifying site-specific opportunities and linking the customer with the most appropriate programs and services.

The objective for in-budget customers is to create a positive dialog and guide them towards an even more efficient water use and ultimately resulting in a drought-proof and resilient landscape.

PERSONALIZATION

The Role of Emotion

For decades water agencies have been promoting marketing messages grounded in logic — Save Water; Save Money.

These tag lines have brought results and a percentage of customers continue to respond to this inducement. The question is **why do these customers respond** to the Save Water/Save Money message?

Is it because the messages are logical, and people respond to commonsense offers OR is it that monetary savings and water savings resonates emotionally **with a particular subset** of the customer base? It's important to understand that the vast majority of customers don't have this reaction and, therefore, will never respond to program offers.

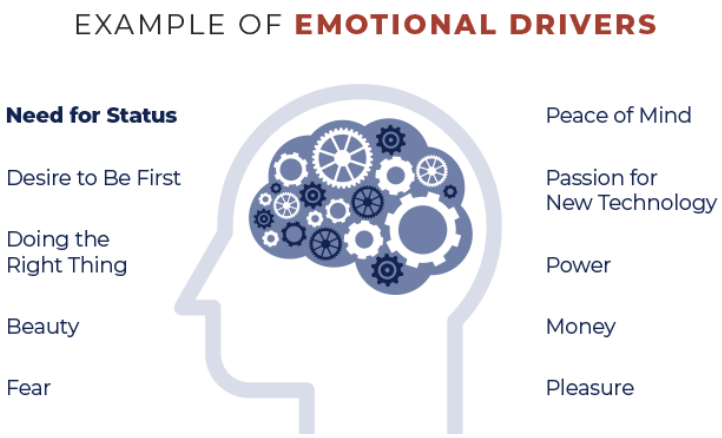
How does Western boost program response and reach the remainder of their customer base? What strikes an emotional chord with these customers? The answer is that **it varies from customer-to-customer and, for each customer, day-by-day**.

Example:

LET'S LOOK AT A THEORETICAL SALES TRANSACTION FOR ANOTHER BIG-TICKET ITEM, A CAR:

> Why on Thursday does Frank say that he can't justify buying a new car, but come Saturday, he's rolling down the driveway in a shiny new convertible?
>
> Logically, Frank knew it was more cost-effective to keep his old car, but on Saturday his emotions were swayed. The dealer made a sales pitch that appealed more strongly to Frank than did logic. He recognized Frank's desire for status. The dealer sold to Frank's emotions.

The role of emotion, as a sales driver, seems like a soft topic but it's actually foundational and powerful. When organizations effectively connect with customers' emotions, the payoff can be huge.



While an investment in lawn replacement is not identical to making a car purchase, the decision-making process is the same. The customer must first have a desire for the product. In other words, the product must appeal to a strong emotion and it needs to be strong enough that it drives the individual to spend the necessary money for the item.

THE WATER INDUSTRY HAS YET TO TAP DEEPLY INTO MESSAGING THAT INSPIRES EMOTIONAL CONNECTION AND RESPONSE.

There are innumerable emotional motivators that drive purchasing/participation choices. A customer's decision to "buy" is the result of several motivating factors in combination. While agencies have had success with a slim percentage of their customer base, there is great potential for more connectivity.

Personalize the Message + the Outreach

The success of Western's programs is largely dependent on the way customers respond to Western's marketing message and outreach vehicles. Through the use of big data and analytics, Western can **learn** about its customers - age, gender, lifestyle, interests, motivations and more - and can **create a profile** for every agency customer.

Analytics can also predict which of Western's **programs have the highest response potential** with a particular customer profile.

The next step is to create a message that entices a customer. In the past, a program message was the same for all customers. Today, people tune out irrelevant, one-size-fits-all messaging. In a world oversaturated with sales pitches, targeted messaging is the best way to pique customer interest and make a connection. This means that it is necessary for Western to **personalize messaging** and craft a "sales pitch" that particularly resonates with a distinct group of customers.

For instance, a retired engineer, Tier 4 customer, is more likely to favorably respond to a device-driven program with a message that includes facts about water and monetary savings. A young married couple, who just moved into a new home, are more likely to respond to a turf replacement

program with messaging that infers that grass is “out” and resilient properties are the new status symbol. The correct personalized message evokes an emotional attachment and heightens the probability of taking action.

This means that, **for the same program, Western may create four or five different messages**, designed to appeal to unique customer types with varied motivations.

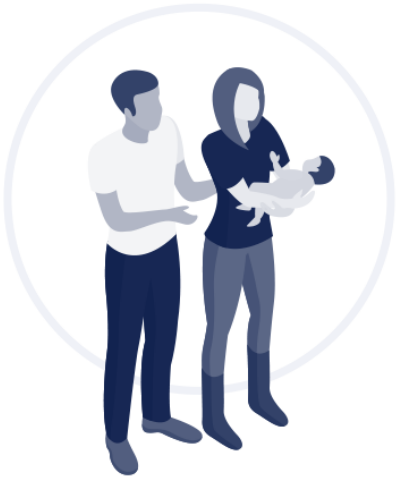
Beyond personalized messaging, customers also have differing ways in which they get information and communicate with others. This means that **outreach methods require personalization** as well. Referring again to the retired engineer, he checks his mail daily and thoroughly reads his bill stuffers. He also conducts thorough research on his computer, via how-to videos, before implementing any new project. The New Move-In couple is so busy with their new home and newborn baby that they rarely read through their mail or check their Facebook account.

Western has a high likelihood of connecting with the retired engineer through a bill insert or a social media link to a YouTube tutorial. For the New Move-In couple, if Western calls the customer, they are likely to jump at the opportunity to have the Field Evaluator visit their home and provide them with an on-site evaluation of their property.

The customers in Western’s territory have varying backgrounds, lifestyles, interests, and motivations. Program messaging and outreach must address this uniqueness in order to drive up response rates and, ultimately, water savings. Personalization also creates a closer connection with the customer and heightened brand loyalty.

The following are examples of three distinct customer types, demonstrating the difference in their profiles, highest potential response programs, and best messaging and outreach:

SAMPLE **“NEW MOVE-IN”** CUSTOMER



LEARN

Profile

- A married couple in their late 20s
- Sierra Club members
- Stay-at-home dad
- Wife is a professor at UCR

Highest Response Potential

- Full turf replacement with watershed approach

PERSONALIZE

Goals

- Secure budget compliance for customers presently out of budget
- Establish positive customer / agency communication pathways
- Heavily assist top target customers through program process
- Have them sign up for turf removal program

Marketing Message

- Status symbol to have watershed property
- Environmentally responsible
- Beauty

Recommended Outreach

- “Welcome” call by Engagement Consultant

Additional Strategies

- Initial “Welcome” outreach via phone call and offer audit
- Use audit to create strong customer / agency connection and identify “top target” customers

SAMPLE **"TIER 3, 4, OR 5"** CUSTOMER



LEARN

Profile

- A 60-year-old married male with 2 grown children
- Aerospace engineer
- Country club member
- Homeowner for 15 years: home on 2/3 acre lot
- Has never applied for a permit for property upgrades
- An avid Amazon Prime shopper
- High Summer Use

Highest Response Potential

- Smart Irrigation Package

PERSONALIZE

Goals

- Secure budget compliance for customers presently out of budget
- Establish positive customer / agency communication pathways
- Heavily assist top target customers through program process
- Have customer sign up for Smart Controller

Marketing Message

- High tech
- Programmable and pays for itself
- Easy to make changes
- DIY friendly

Recommended Outreach

- Bill stuffer with "practical" messaging
- FB ads with demos highlighting installation ease
- Youtube how to video links

Additional Strategies

- Utilize support services (design templates, video tutorials, blogs, etc.) to motivate and aid customer

SAMPLE **"IN BUDGET"** CUSTOMER



LEARN

Profile

- A 35-year-old single female
- Dental assistant
- Social media accounts include FB, Twitter, Instagram
- Actively uses Instagram and NextDoor; posts/clicks on enviro & animals
- Had service call for leak
- Received Rain Barrel Rebate

Highest Response Potential

- Front yard turf replacement
- Use of design support

PERSONALIZE

Goals

- Build loyalty & positive PR
- Thank them for operating within budget
- Motivate them to drive for .5 efficiency level
- Have them sign up for front yard turf replacement

Marketing Message

- Beauty & upscale look
- Entertain with style
- Happy dog

Recommended Outreach

- Short promo video clips on social media
- Bill stuffer with beauty messaging

Additional Strategies

- Send personalized "Thank You" message via desired communication form
- Provide a free 4" plant coupon from local nursery
- Communicate they can earn awards or tokens for Western prize raffles for activities (watch video on turf removal, water use reduction, over last year, 2 months in a row, answer survey questions, etc.)

ENGAGE + ASSIST

Generally speaking, Western's customers understand the critical need for water efficiency, and they showed this by rallying to save water during the last drought cycle. Why then aren't more customers participating in, and completing, the water efficiency programs offered to them?

The problem lies not with the programs, but instead with the ***breakdowns*** that occur at key junctures along the customer path, from sign-up to program completion.

Typical customer breakdowns:

- Doesn't respond to program offers
- Abandons application, half way through
- Signs up for a program but never implements the first step
- Starts the program process but simply loses interest
- Gets confused during a step of the process and stops

When not remedied, customer ***breakdowns*** result in ***program fails*** and an opportunity to capture water savings is lost.

Looking to the future, Western faces the daunting challenge to drive down *per capita* water use to a markedly new low level. It's essential that savings opportunities be maximized, and program fails be reduced.

Engagement Role

Successful customer engagement motivates and leads customers along the pathway to increased water use efficiency. The means to accomplish this is to:

- Communicate the value of the measures and programs
- Stop "breakdowns" from occurring
- Get a customer started OR back on track

These duties will be carried out by Western's Water Resources Specialists and require a significant amount of work to manage this amount of customer engagement.

These individuals will act as the customer motivator and problem solver. Like a concierge at a hotel, the Water Resources Specialist will help customers with their unique issues and facilitate the remedies. There are no absolute formulas when helping customers, therefore staff will need to think strategically and identify the best avenue to help each situation.

A COUPLE OF EXAMPLES OF THE ENGAGEMENT ROLE IN ACTION:

For Tier 3, 4, and 5 customers, as well as New Move-Ins, the Water Resources Specialist will **reach out to them** to schedule an on-line or on-site audit as the first step of engagement. For customers who are interested in specific measures, vouchers will be generated, and rebate information will be sent to these individuals.

To minimize program abandonment, the Water Resources Specialist will **generate automatic follow up communication** to customers in the midst of a program. The outreach will be personalized and designed to motivate the recipient. Most importantly, the message will be an offer of help from Western. The Water Resources Specialist will determine whether a customer should receive a phone call, email, postcard or other communication medium.

For turf replacement program participants that have shown **no progress over a long period of time**, the Water Resources Specialist will "check in" with each customer via phone call to see if they need any help. If the customer is still on track, they will be commended for their good work. If a customer is struggling with design layout, the Water Resources Specialist will dispatch the help they need. This might entail setting an on-site appointment with the Field Efficiency Evaluator or possibly sending a How-To video link to the customer's phone.

A customer often has a minor problem that can be **readily solved in a short interaction** with the Water Resources Specialist or Field Efficiency Evaluator. Instead of scheduling a time-consuming field visit, the Water Resources Specialist will, when possible, provide answers or send useful content to the customer. If the customer requires technical field information, the Water Resources Specialist may choose to arrange a phone call, Skype session, or site visit with the Field Efficiency Evaluator.

The engagement function is **essential**; creating solutions for problems and shepherding customers across the program finish line. Western staff is tasked with the responsibility to **identify the level of help required** and **deliver it** to the customer. The key is to keep following up with the customer until the project is completed. Performed effectively, this support will play a critical role in increasing overall water savings.

The following is a demonstration of the engagement process. These are actions that can be taken in varying combinations according to the specific customer situation.



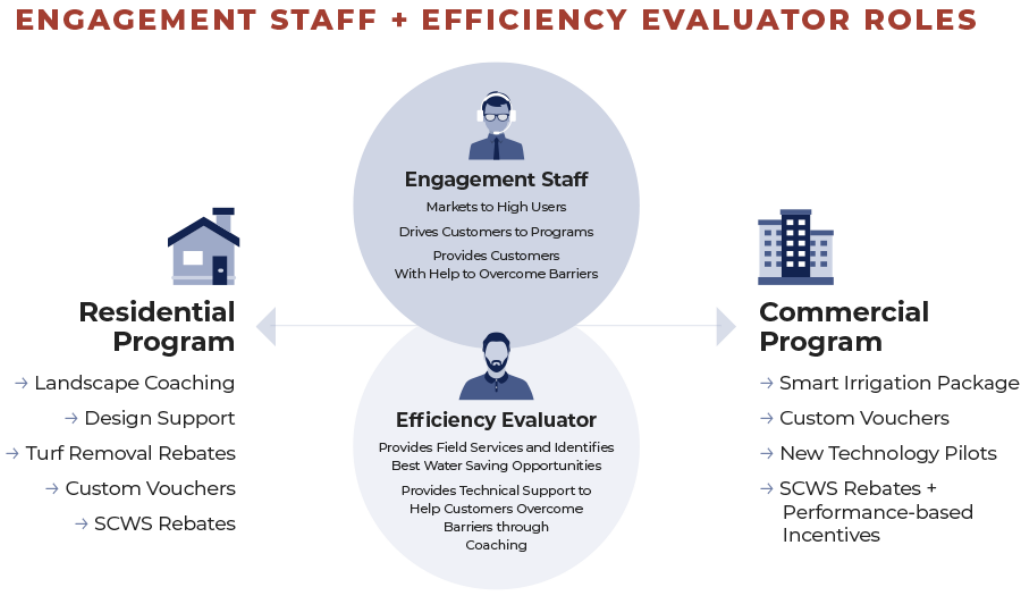
The Field Efficiency Evaluator

Practically speaking, the Water Resources Specialist and the Field Efficiency Evaluator need to be a close working team. While the Water Resources Specialist is working to keep customers on track from the office, the Field Efficiency Evaluator "carries the ball" from the field perspective. As the Water Resources Specialist identifies a customer-in-need, the Evaluator goes on-site, or if viable, via phone or Skype to give a customer the how-to coaching, design assistance and/or technical information needed to move forwards.

The Field Efficiency Evaluator can move the customer closer to a water-efficient property starting with the on-site audit. This is a prime opportunity to engage customers and show them where the best savings opportunities exist at their site.

The Evaluator can further advance the customer along the pathway by generating on-site delivery of vouchers and facilitation, with the Water Resources Specialist, to immediately sign the customer up for relevant programs.

Below is snapshot of support services provided by both individuals in their roles of connecting customers to appropriate programs.



Using Videos as an Engagement Tool

The influence of digital videos on our everyday culture is undeniable. People today are using educational videos as a tool for learning everything from changing a tire to the latest dance craze. Online video sharing sites such as YouTube and Facebook log millions of video page views per day.

Topics that once seemed difficult to teach and learn are now more accessible and understandable thanks to the availability of educational videos.

With digital videos well established in their popularity, it seems only natural that this familiar and widespread platform extends into the water agency and water use efficiency setting.

Studies have shown that the use of short video clips allows for more efficient processing and memory recall by the viewer. The visual and auditory nature of videos appeals to a wide audience and allows each user to process information in a way that's natural to them.

This makes videos an ideal medium for water agencies to engage and educate customers about water efficiency topics and programs.

Why Pinterest, ETSY or Similar Mobile Apps?

Videos are not the only way to educate customers and share information today.

This means Western can bring visitors to program websites by posting images of landscape designs and products on Pinterest.

Pinterest is one of the largest website traffic drivers in the world so Western can utilize it for increased awareness.

User engagement is high and attracts multiple generations.

Western can specifically track individual customer's interests.

Should deliver heightened program response.

Western has a three-fold objective for creating a video library:

1. To educate customers about the *value of water* and the *merit of Western's services*
2. Provide an answer as to *why it's so important to be water efficient*
3. How a customer can improve their water efficiency

Western can make use of videos as both a means of *engagement* and a way to provide *instructional How-to's* on a variety of topics such as the following:

- Soil / plant relationship and how to identify your soil
- Plants
- Watersheds / using rainwater
- Right plant, right place
- Watering based upon plant, soil and climate
- Knowing your landscape lifestyle / How you use your yard
- Plot plans
- Designing a water smart landscape
- Taking out your turf
- Irrigation systems
- Irrigation system troubleshooting
- Watering
- Programming your timer/smart controller
- Maintaining your water smart landscape

In addition, Western can use videos to educate customers about:

- Where water comes from and how it gets to you
- How water and wastewater are treated
- Water pricing
- What is the value of water
- Future water legislation/allocation/water budgeting
- What Western does (a day in the life, news from the trenches, fixing leaks, testing for quality)

When done effectively, creative and valuable-content-videos will build a stronger connection with the viewing customer. Western has the vision and innovative nature to create a video-based customer engagement strategy and library to further drive efficiency while creating a positive customer experience.

Creating Your Own Landscape Style

A successful landscape transformation has the right plants… in the right place… with the right style. When done well, the outcome is a proud homeowner with water-efficient landscaping that matches his or her design aesthetic.

This means creating landscapes with true Southern California style. Western's job is to support and empower each customer in reaching this positive end result.

With this aim, Western is developing a compendium of resources for customers to access, starting with **information about various plant options**. Customers will be able to browse through a database of plant collections that include pictures and detailed descriptions and recommendations. For inspiration, Western will provide photos and video of the beautiful array of plants at the historic Alessandro Gardens.

Knowing that customer styles vary, Western will have access to **an extensive compilation of landscape design collections** for the viewer to peruse, drill down on, and download. Western aims to include a variety of representative front yards within the service area, available to be indexed by size and characteristics.

Database of Landscape Style Categories for Customers to Explore:

Pollinator	*Butterfly*	*Native*	*Heritage*
Zen	*Flowery*	*Spring*	*Fall*
Feathered Friend	*Tasty*	*Shady*	*Desert*
Rain Only			

The property owner, designer, or contractor can reference the properties, along with the plant database, to build their preferred "style". In combination, these resources will improve the process required to create a landscape design.

Promoting Western's Landscape Resources

In the past, landscape program promotion was limited to a narrow list of traditional marketing activities. Moving into the future, Western is taking a more creative and proactive approach. Landscape transformation is a difficult market and Western recognizes the need for a broad range of outreach tactics including multi-directional strategies through both traditional and progressive channels.

Western, through marketing consultant JPW Communications, is in the process of designing new, creative program branding, messaging, strategies, and tactical campaigns. The program will have a stronger presence on social media to better capture customer interest and allow them to interact in a manner that best suits their style. Program posts will have click-throughs to the program's web pages, as well as the database collections of plants and landscape styles.

Messaging will be tailored to each customer's identified attitudes and motivations. Some customers will best respond to environmental and/or animal habitat themes, others may care more about community aesthetics or saving water. By tailoring the messaging, Western will be able to create communications that better connect with each customer. If successful, customers will steadily shift perceptions and move to a water-efficient landscape mindset.

Section 5: Creating Advocates

SHOWING APPRECIATION

William James, well-known psychologist and philosopher, said, “The deepest principle of human nature is a craving to be appreciated.” If an organization takes the time to express their heart-felt appreciation for something the customers has done, it boosts passion and purpose.

For water efficiency programs, customer appreciation can translate to **heightened activity** and **a positive bond** with Western. If customers **believe in Western** and they **believe in the benefits of the program,** they will **spread the word** on behalf of Western and the water efficiency cause.

There are two categories of customers, **those that have acted** and should receive a gesture of appreciation and those customers Western **seeks to ignite to act**.

Addressing both these customers will create a positive connection and good will which will advance the Western brand and water efficiency participation.

The goodwill can be leveraged by Western by asking participating customers to share their experiences and stories. Those that haven’t participated in the past may be more open to participation.

Western can thank customers for:

- Answering a survey
- Participating in the rebate program
- Taking out their lawn
- Recommending the program to a neighbor or friend
- Staying within their water budget allocation
- Paying their bills on time
- Being a customer for ten, twenty years

The form of the thank you can be any number of tactics. These gestures cost little to no money and build customer bond.

Appreciation examples include:

- Handwritten, personalized letters
- Follow back on social media
- Coupons and freebies
- Thank you breakfast and private events
- Recognition at Board meetings

- Reminding customers how Western is using their feedback
- Sharing their stories
- Sample devices
- Designating a specific day/week/month to customer appreciation

Regardless of the reasoning or methods, the *thank you* will fulfill the goals of a positive connection.

WHY SHOULD WESTERN DO ALL THIS?

An appreciated customer is likely to share their story and become an advocate.
It's well understood that the validation generated through **testimonials boosts credibility**. This applies to a review when buying a new pair of shoes as well as a customer's endorsement of a water efficiency program. Western already knows that a successful turf removal project can result in friends and neighbors following suit, possibly requiring no incentives.

Testimonials are stories and **storytelling is a powerful and credible tool** to enlist another supporter.

Research has shown that storytelling activates part of the brain and allows the listener to turn the story into their own ideas and experience. For instance, a person viewing a customer-to-customer video about their experience with their turf replacement project will begin to visualize their own landscape transformation.

Ways in which storytelling and sharing can occur:

- Instagram and Snapchat stories showing the before and after benefit of turf replacement
- Pinterest pictures and design ideas for customers
- Videos of the step-by-step turf removal process
- Postcards with testimonials with positive customer program experiences
- Customer-to-customer videos explaining how they personally used their water budget as a starting point to implement efficiency
- *"Ask the Expert"* blog or online channel to answer questions and provide how-to instruction
- Blog where customers can share experiences, recommendations and ideas (that Western cannot personally endorse)



PARTNERS AS ADVOCATES

There's a wide array of people, businesses and organization that can be advocates and advance the success of water efficiency programs.

This can be accomplished through a number of means including:

- Promoting the general efficiency message
- Providing funding
- Actively securing program participation

Western has five types of partners:

- Wholesale Agencies
- Local Businesses
- Regional Utilities and Organizations
- State and Federal Funding Agencies
- Industry Associations

Wholesale Agencies

Western has a strong, positive relationship with its wholesale agencies and, together, the partners have implemented a multitude of successful efficiency initiates. Western will continue to support wholesale agencies through funding and provision of tools, technical assistance and marketing

program templates. In addition, Western will work collaboratively to develop marketing campaigns, joint events, and other customer-focused activities.

These wholesale agency partnerships create a synergy of regional customer awareness, program response and, ultimately, water savings.

Moving into the future, Western will continue to prioritize Western-Wholesaler partnerships and provide a cadre of support services for these agencies. Key Western support services includes the following priority list:

1. **Supplemental funding and program assistance** - As available, Western will provide additional funding for local programs through both Western's budget and Metropolitan Member Agency Administered funds. In addition, Western is on hand to provide program design aid, including vendor RFPs templates, for any/all agencies requesting support.

2. **Program water savings analysis** – Western has analyzed and documented cost/savings numbers for a number of Western programs and measures. Western's analyst is available to work with wholesalers' staff to utilize this gained knowledge for local wholesale agency program analysis.

3. **Collaboration/Coordination of conservation program marketing** – Western has hired a marketing firm to create campaigns, messaging, social media, bill inserts, ad templates, and other materials. As appropriate, these will be made available to wholesale agencies for local implementation. Agencies will have access to survey results, customer targeting methodology, and successful campaigns. Additionally, Western will aid wholesale agencies with joint marketing of programs.

4. **Assistance on state framework legislation** – Western is available to support agencies with data and technical assistance to help wholesale agencies with 1) evaluation of compliance and 2) compliance achievement. This will include development of information, FAQs, and summary sheets.

5. **Aerial imagery assistance** – Aerial imagery is an invaluable informational tool for water budgets and programs, alike. Western will offer agencies technical support to separate out areas of turf, shrubs, and hardscape, as well as assist agencies to calculate targets.

6. **The Santa Ana Watershed Project Authority** (**SAWPA**) **North American Industry Classification System (NAICS) codes assistance –** Western will facilitate SAWPA's provision of NAICS code assignment of commercial, industrial, and institutional sites within each respective agency's territory. Upgraded code assignment will provide better understanding of the commercial base and aid in more refined commercial program targeting.

7. **Collaboration/Coordination of drought response/contingency plans** – With requirements for development of agency drought response/contingency plans, Western will collaborate with agencies to work through the necessary steps to generate drought response and contingency plans.

8. **Collaboration/Coordination of policies** – In order to provide strong messaging and less customer confusion, it is optimal for agencies to align policies whenever possible. Western will work with agencies on this coordination process to facilitate consensus of regional policies.

9. **Commercial audit assistance** – Western's vendor, Norris Consulting, is available, free of charge, to agencies for evaluation and audit services for commercial and large landscape customers.

10. **Landscape Design assistance** – A recommendation is for Western to hire or subsidize landscape designer(s) to provide support to customer's replacing their lawns. Western is prepared to aid agencies by administering the RFP for designers. Wholesale agencies would then market and schedule program services.

11. **Assistance with budget-based water rates** – Allocation-based rates have proven to be one of the most cost-effective water use efficiency programs. Western is available to provide support for rate analysis and design, staff training, and public outreach.

12. **Water loss assessment and reporting assistance** – With passage of SB 555, urban water suppliers are required to submit annual water loss reporting. Water audit reports are to be validated before being submitted to the state. Western is prepared to support wholesale agencies in meeting requirements through provision of a technical assistance vendor, and possibly payment for Level 1 Validator training.

13. **Coordinate "shared customers" programs with Riverside Public Utilities** – In order to minimize customer confusion, program overlap and budget dollars, Western will work with RPU to offer joint programs in common territory.

Local Businesses

Local businesses have direct relationships with the customers and much of the time are perceived as the expert. Customers go to them for answers about plants, landscaping, irrigation and plumbing. Working with local businesses, such as Ewing Irrigation**,** Louie's Nursery**,** Bonnett Irrigation, Kellog Supply, QWEL certified landscape contractors, as well as local green realtors, Western can leverage these connections to promote efficiency programs. Program activity will also drive business for these local companies.

These partnerships deliver mutual benefits: the business gains additional sales while Western secures water savings.

Regional Utilities + Organizations

Western has long worked with numerous regional utilities and organizations. Metropolitan Water District provides funding, programs, tools and other resources. Santa Ana Watershed Project

Authority pursues grant funding and facilitates funding to regional agencies. Western will continue leveraging these long-standing relationships.

Other potential regional agency partners are: SoCalGas**,** Southern California Edison**,** Riverside-Corona Resource Conservation District**,** Riverside Flood Control District, and Riverside County Master Gardeners**.** Through collaboration, these regional agencies can work together with Western to promote the water efficiency cause.

State + Federal Funding Agencies

Over the years Western has successfully received millions of dollars in grant funding from United States Bureau of Reclamation and Department of Water Resources**.**

These agencies will continue to provide substantial monetary benefits, aiding Western in implementing robust programs.

Industry Associations

Western participates in key industry associations, leveraging the partnerships, expertise and mutual visions of other leadership organizations actively involved in the water efficiency industry. Western participates in the following three major associations:

The California Water Efficiency Partnership: The California Water Efficiency Partnership (formerly the California Urban Water Conservation Council) is an innovative leader, voice, and expert on water efficiency in California, fostering collaboration among a wide variety of stakeholders. Western sits on the Board of CalWEP and will continue to play a leadership role.

Membership benefits include:

- Dedication to addressing California's unique issues, challenges and opportunities.
- Innovation, leadership and expertise on water efficiency.
- Collaboration with a wide variety of stakeholders.
- Information and tools to help members meet regulatory requirements and challenges.
- Information sharing, resources and networking.

The Alliance for Water Efficiency: Headquartered in Chicago, the Alliance serves as a North American advocate for water-efficient products and programs and provides research and data collection to advance water efficiency and spur market transformation.

The Alliance has embarked on seven key tasks to support and enhance water conservation efforts, providing benefit to water utilities, water conservation professionals, planners, regulators, and consumers:

- Stand as a clear and authoritative national voice for water efficiency.

- Provide comprehensive information about water-efficient products, practices, and programs--what works and what doesn't.
- Represent the interest of water efficiency in the development of codes and standards.
- Transform the market for fixtures and appliances.
- Coordinate with green building initiatives to institutionalize water efficiency.
- Train water conservation professionals.
- Educate water users.

Environmental Protection Agency, WaterSense Program: WaterSense is a voluntary public-private partnership program sponsored by the U.S. Environmental Protection Agency (EPA). It is both a label for water-efficient products and a resource for helping consumers save water.

The WaterSense label makes it simple to find water-efficient products, new homes, and programs that meet EPA's criteria for efficiency and performance. Items that meet WaterSense specifications must be independently tested and certified, and only then can they carry the WaterSense label. WaterSense-labeled products and services are certified to use at least 20 percent less water, save energy, and perform as well as or better than regular models. The EPA is actively developing new specifications to expand the WaterSense family.

Section 6: Past Programs

A LOOK BACK

In 2008, Western generated a Water Use Efficiency Implementation Strategy that documented a strategic vision and key tactics to deliver long-term water efficiency. The plan included a collection of customer-tailored solutions designed to achieve the water savings goals and change customer water-use behaviors.

There were three fundamental program tactics:

1. Develop a clear pricing signal for efficient use
2. Aggressively target high water use and pursue program participation
3. Find niche markets and conduct Pilot Programs directed at these markets

Western implemented the water budget rate structure in 2011. The higher price signal for inefficient use has provided customers with education and motivation to stay within budget. At present time, 80% of customers are within their budget during any given billing cycle. This is the first time customers understand how efficiently/inefficiently their property is using water. The water-budget rate structure is the foundational driver to water efficiency.

The plan included the potential for fifteen customer-focused programs. Western elected to implement ten. The selected programs performed well, and many are still being offered.

SELECTIVE EFFICIENCY EVALUATION PROGRAM

2009 - Present

Western began offering customers efficiency evaluations in 2009. The program was designed to be the introductory program by providing customers with a **site-specific efficiency assessment** and the link to programs. Norris Consulting was brought on board to conduct the audits.

Customers with irrigated landscapes are offered **free water use evaluations**. The focus of these evaluations is outdoor water use; however, an inventory of indoor devices and recommendations is also provided.

"This is one of the most useful reports I have RECEIVED, and I have implemented almost all of your recommendations. I intend to implement the remainder as time and money permits."

"Thanks, Tim!! This is AWESOME!!! I will take action immediately to implement your recommendations!!!"

In addition, the site visits include **educating the customer about water budgets** and billing. The key target is the single-family residential customer. Selected commercial sites are eligible for evaluations as well.

As the testimonials show, customers value the service**.** As importantly**,** a strong bond is created with Western**.**

Retail Program Activity	**Estimated Savings**
1,328 evaluations	5% per site

LARGE LANDSCAPE WBIC INSTALLATION PROGRAM

2009 – 2010

From 2009 – 2010, residential customers with greater than 1 acre of irrigated landscape received **free installation of smart controllers** and **high-efficiency sprinkler nozzles**. Through the program, 73 customers were served with 368 controllers and 11,253 nozzles being installed.

Outside funding for the program came from two sources:

1. Department of Water Resources Prop 50 grants
2. Metropolitan Member Agency Allocated funds

The program hit the goals of the grants with an estimated savings of 652 AF. Western's ability to leverage grant funding made this program **highly cost effective**.

Retail Program Activity	**Estimated Savings / Cost Effectiveness**
73 sites	14% per site
368 controllers 11,253 nozzles	$342 / AF

SMARTYARD PROGRAM

2010 -2011

The Smart Yard Program was a **self-sustaining, professional irrigation controller installation** program offered from 2010 to 2011. Designed as an innovative, public private partnership, Western installed top-tier weather-based irrigation controllers at participating residential customer sites. The customer paid for the controller on-bill over time, with Western paying for 1/2 of the cost. Participating homeowners paid the balance with zero-interest financing from Western, which placed a fixed fee, starting at $9.99, on their monthly water bill for a five-year timeframe.

Smart Yard was a turn-key program that included 1) a site audit to qualify the site as a "water over use" property and 2) professional controller installation to ensure quality workmanship and programming. Due to the extreme level of administrative and field labor requirements, Western

opted to sunset the program in 2012. Over the course of the Smart Yard Program, Western performed 461 installations.

Retail Program Activity	Estimated Savings / Cost Effectiveness
421 sites	5% per site
461 controllers	$2,073 / AF

TURF REPLACEMENT PROGRAM

2009 - 2014

Western offered turf replacement incentives from 2009 - 2015. Western customers were offered **an incentive per square foot** for the removal of turf and replacement with low water using landscape and efficient or low precipitation irrigation systems.

Metropolitan provided funds for the incentive and **Western staff processed the project paperwork and incentives**. The incentive started, briefly, at $.30/sf and ramped up to $2/sf at the program's peak during the drought.

In 2014, Metropolitan created a regional program administered by their vendor, EGIA. Western chose to continue operating the program internally with the objective to ensure high quality installations. Western's program had significantly more program requirements including site plans, plant coverage requirements, and irrigation system requirements.

In 2015, Western transitioned the program to Metropolitan's regional program. Although not as strict as Western's internal program, Metropolitan did allow agencies to add their specific requirements. The program ended in late 2015 when funds were exhausted.

In fiscal year 2018/19, **Metropolitan reintroduced the program with tighter program requirements** including pre- and post-site inspections and some form of onsite water retention. Western may elect to add funds to the $1 per square foot incentive offered by Metropolitan.

Retail Program Activity	Estimated Savings / Cost Effectiveness
227 customers	27% per site
792,185 square feet of turf removed	$1,888 / AF

REGIONAL DESIGN SUPPORT PROGRAM

As part of Western's Turf Replacement Program, customers were provided with **two hours of consultation and plan generation from a local landscape architect**. Free consulting covered landscape areas up to 6,000 square feet. The architect visited the customers site and working with

the customer identified layout and plant selection tailored for the property and customer preference. Back at their office, the landscape architect generated a landscape site plan. The site plan was then sent to customer.

Over 50 customers received design plans. Western required a customer deposit of $250, which was returned upon completion of the project. The vast majority of the projects were completed. The program ended when demand exceeded capability to provide support.

MULTI-FAMILY + HOTEL/MOTEL TOILET INSTALLATION PROGRAM

2011 - 2012

In 2011, Western hired Bottom Line Utility Solutions to market and implement the Multi-family & Hotel/Motel Toilet Installation Program.

Pre-1992 properties were targeted for **replacement of high-volume toilets with high-efficiency toilet**s, 1.28 gpf fixtures. The product and installation were provided at no cost to the customer.

A significant portion of Western's service area was built after 1992, therefore the remaining high-volume plumbing fixtures are limited. Western will continue to evaluate the potential replacement of post-1992 fixtures with the most efficient fixtures available in the market.

Retail Program Activity	**Estimated Lifetime Savings**
191 toilets	191 AF

DRIP IRRIGATION PILOT PROGRAM

2014

Prior to implementing an incentive for drip irrigation, Western aimed to better understand the required components and installation costs for a typical drip irrigation project.

In 2014, Western conducted a pilot in conjunction with Rain Bird installing drip irrigation at 11 sites. Sites with inefficient spray systems were identified through Western's Efficiency Evaluation Program. These customers were offered a retrofit of their existing spray heads to a drip system.

The installations resulted in more efficient irrigation but proved to be costly. Because these installations were retrofits of older systems, many times capping the heads caused leaks and other systems problems. Fixing these issues required additional labor and increased program costs. Due to the limited number of participants, Western was unable to determine water savings associated with this program. Western is currently considering offering vouchers for drip irrigation.

SOCAL WATER$MART REBATE PROGRAM

2007 - 2017

Metropolitan sponsors a region-wide program that offers single-family residents rebates for high-efficiency toilets, high-efficiency washers, smart irrigation controllers, high-efficiency sprinkler nozzles, and rain barrels. Metropolitan also offers incentives for commercial and multi-family customers that retrofit their plumbing fixtures, HVAC systems, food service equipment, cleaning equipment and medical equipment.

The program is administered by Metropolitan's regional vendor, EGIA. Metropolitan pays for the base incentive as well the administration. Western has added supplemental funding for toilets, washers, and weather-based irrigation controllers in the past. Western is currently evaluating water savings from these devices and will determine if it is worth adding supplemental funding in the future.

Over ten years, 2,616 single-family customers participated, representing 11% of Western's retail customer base.

SOCAL WATER$MART WATER SAVINGS INCENTIVE PROGRAMS

2013 - 2017

Metropolitan provides financial assistance to local businesses and industries to encourage investment in water-saving process improvements and large irrigation system upgrades.

The program is open to all public and private, commercial and industrial users within Metropolitan's service area. Financial assistance is provided for documented water savings derived from projects implemented that meet the qualifying criteria. This includes industrial process water use reduction and landscape efficiency improvement.

Western has had over a dozen participants in the WSIP program including:

- Altman Plants
- Big Tree HOA
- Trilogy at Glen Ivy Maintenance Association
- Horsethief Canyon Ranch Association
- GL Stephenson

- T.H. Nguyen
- Tuscany Hills Landscape and Recreation Corp
- Janet Van Arsdale
- Metal Container Corp.
- BH Beal
- Starbucks Corp

Retail Program Activity
2 projects:
Altman Plants
Big Tree HOA

Estimated Savings
Altman Plants: 3,420 AF
Big Tree HOA: 35 AF
Total: 3,456 AF

In addition to the programs contained in the 2008 plan, Western implemented a few other innovative and noteworthy programs including the FreeSprinklerNozzles.com and Urinal Upgrade Program.

FREESPRINKLERNOZZLES.COM

2010 – 2017

The FreeSprinklerNozzles.com Program provides participation water agencies with a full-service, minimal staff, approach to **distribute high-efficiency sprinkler nozzles** to its residential and commercial customers.

This program has been administered by Western on behalf of 28 participating water agencies – a **unique, first-of-a-kind program design** that reaches beyond Western's territory to deliver significant water savings at sites throughout California.

Western worked with over sixty irrigation suppliers and three irrigation manufacturers to distribute over 1.7 million nozzles. FSN.com is a public-private partnership, delivering benefits for all participating parties. The sprinkler manufacturers and irrigation suppliers benefit from the increased sales of nozzles; water agencies have an easy means to distribute water-saving nozzles in their service area and meet water saving goals; customers reap the benefit from the easy-to-use, free water efficient devices.

Since 2010, FSN.com, through participating agencies, has yielded overall water savings of approximately 22,500 acre-feet. **However, over the years, activity has waned** and Western is in the process of evaluating the program and redesigning the format.

Since 2010 over 640,000 nozzles have been distributed in Western's wholesale area.

Retail Program Activity	Estimated Lifetime Savings
60,592 single-family nozzles 52,105 commercial nozzles 112,697 total nozzles	806 AF

URINAL UPGRADE PROGRAM

2014 - 2017

The High-efficiency Urinal Flush Valve Upgrade Program is **a turnkey program for the replacement of the flush valve only**. The Program is funded in part through a United States Bureau of Reclamation WaterSMART grant.

Commercial customers within Western's wholesale and retail service area are targeted for participation. The customer is **offered free product and free installation** of the high-efficiency urinal flush valves. A high-efficiency flush valve is defined at flushing 0.5 gallons per flush.

1,258 urinal valves have been installed in commercial facilities throughout Western's wholesale area with savings estimated at 77 Acre-feet annually.

The program will continue until the goal of 2,000 urinal valve upgrades has been completed.

Retail Program Activity	Estimated Lifetime Savings
150 urinal valve upgrades	180 AF

Section 7 – Proposed Programs

MOVING FORWARD

EVALUATIONS, COACHING, DESIGN SUPPORT, VOUCHERS + REBATES

The plan moving forward includes program delivery formats deemed most valuable for customers. Audits, coaching and design support provide the education and instruction necessary to implement the water efficiency measures. Vouchers and rebates provide the mechanism for the incentive. Any measure can be incentivized through this means. Western will start with a set of measures most applicable to market opportunities today and the list will be updated as the market changes and new technologies become available.

Evaluations or audits are foundational, typically the first program contact with the customer. The evaluation identifies site-specific opportunities. The face-to-face format begins the personal connection with the customer and offers opportunity to direct the customer to the most appropriate programs and measures.

Coaching deals with a customer's specific area of landscape need. This could be replacing turf or fixing an irrigation system in disrepair. Coaching provides the customer with education about the topic and the steps to implement the project or reach the customer's desired outcome. The role of the coach is to not just provide information but to motivate, instruct, and guide the customer until the project is complete.

The Western-UCR customer survey showed a need for **design support** when initiating a turf replacement project. Customers get "hung up" with the design and many times abandon the project. A smartly crafted design assistance program can provide the needed support without requiring the lengthy hours and high-priced architect and consultant services.

Vouchers provide either minimal to no of out-of- pocket expenses for customers and make it easy to participate. Customers love them. Due to the low cost/no cost price tag these tend to be higher response programs. Voucher programs are scalable and can be applicable for most technologies and devices. Typically, they involve local businesses and work best with smaller community businesses. Vouchers are customizable and can be implemented as limited or seasonal offers.

Rebates are an old school yet effective way to drive installations of water efficiency measures. Rebates work for customers that don't need a lot of education, customers that don't mind the cash outlay, purchases of bigger ticket items, and lower priced products available through big box stores.

An added benefit is that Western can leverage Metropolitan's regional rebates, providing cost effective water savings. Western doesn't pay for administration or the base incentive and can add funds to selected devices.

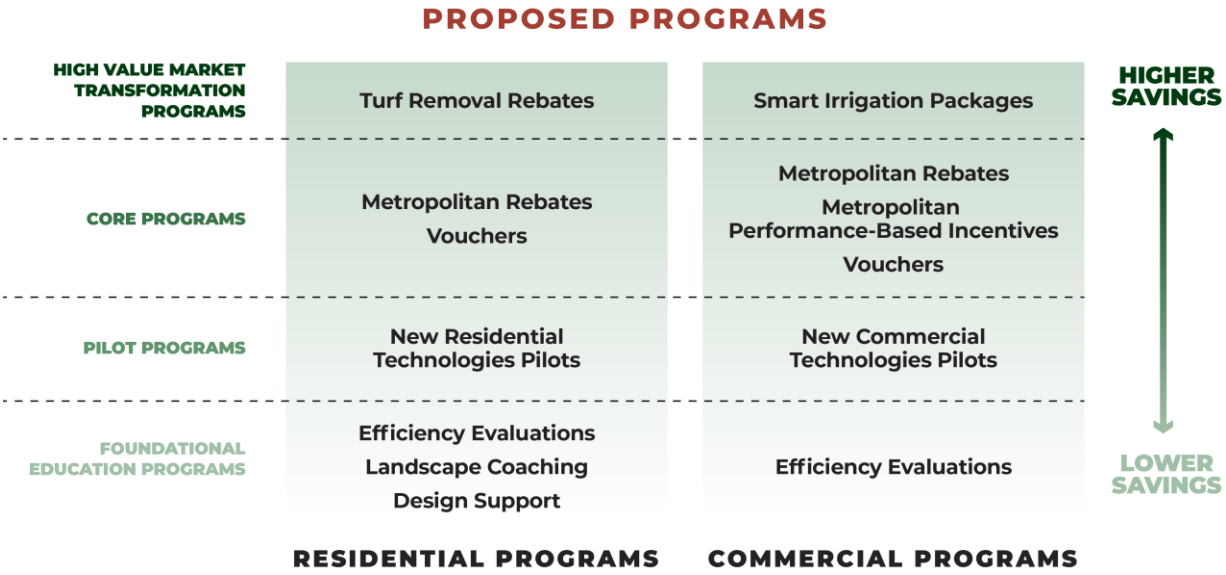
Although Metropolitan offers a limited selection of devices, they are the proven water savings devices. Metropolitan and its member agencies continually evaluate and update the devices offered and add devices as savings data becomes available or remove devices when markets become saturated.

PROPOSED PROGRAMS

Western has selected a portfolio of programs that best support the customer's journey to a water efficient home or business.

The programs:

- Match market opportunities best suited for each class of customer
- Maximize funding by leveraging Metropolitan funds
- Provide customer education, support, as well as incentives



EFFICIENCY EVALUATION PROGRAM

Western will continue the Efficiency Evaluation Program, using Norris Consulting. Future evaluations will focus on landscape and irrigation with target customers including new move-ins and out-of-budget customers.

LANDSCAPE COACHING



Landscape coaching will be offered for two purposes:

1. A customer is interested in a project
2. A customer is having problems during a project and needs assistance

Just like a personal trainer, mentor or business coach, the landscape coaching program will provide customers with one-on-one guidance through landscape upgrades. This could include such projects as upgrading an irrigation system, partial replacement of their lawn, full replacement of their lawn or implementation of a watershed plan. The goal of the coaching is to motivate and help customers overcome their particular barriers to complete the project.

Let's use as an example a customer that expresses interest in turf replacement during the evaluation. In reviewing the customer's record, staff notes no activity for 60 days. The Landscape Coach contacts the customer and finds out the customer is struggling with plant selection. The Landscape Coach then directs the customer to online plant databases, reviews plant options for their specific site, and possibly provides a voucher for free plants at Louie's, a local nursery.

Services could include:

- Personal coaching
- Landscape design tools and templates
- Plant lists
- How-to videos

DESIGN SUPPORT



The Design Support program would provide the services of a landscape designer to aid the customer in developing and completing their landscape plan. Customers would be given 1 to 2 hours of free services tailored specifically to their site and particular issues.

Services could include:

- Do's and don'ts of landscape design and turf removal
- Selecting climate appropriate plants and planting design
- Adding watershed and stormwater capture
- Water efficient irrigation plan designs

CONSERVATION CREDIT PROGRAM



It is the aim of Western to reward a customer's positive conservation efforts and, in doing so, create a stronger customer-as-advocate relationship.

Western has a fund dedicated to conservation activities among its retail customers and Water Use Efficiency staff wish to explore using this fund to implement a Conservation Credit Program. A Conservation Credit could award a customer a credit for conserving their water and not using their allocated monthly water amount (water budget). The Water Use Efficiency team will evaluate piloting this program for two years.

The goal of the Conservation Credit is to:

1. Reward customers that conserve water
2. Provide an incentive to customers using tiers 3 – 5 to conserve water
3. Provide an incentive for customers currently under their water budget to conserve more

LANDSCAPE TRANSFORMATION PROGRAM



Administered through Metropolitan, the new Landscape Transformation Program (previously called Turf Replacement) aims to combine turf removal, irrigation modification and rainwater retention or filtration. Every landscape transformation project now requires:

- Five plants per 100 square feet of area transformed
- Inclusion of a stormwater retention feature
- No hardscape within the transformed area, except permeable hardscape
- Replacement or modification of overhead spray sprinklers

Customers are now offered an incentive starting at $1.00 per square foot up to 1,500 square feet. Metropolitan pays the base incentive of $1.00. Western may add an additional $1.00 per square foot.

The previous version of the Turf Replacement Program had a high customer abandonment rate which needs to be better mitigated through customer support services. Western staff will track customer progress and routinely follow up with customers to identify barriers and deploy resources to assist customers.

ANY WAY YOU WANT VOUCHER

New

The web-based voucher format has proven to be successful with FreeSprinklerNozzles.com. Western will continue to offer sprinkler nozzles through this means and is currently revamping the program structure to become an on-line fulfillment program.

Future potential voucher programs may include:

- Low water use plants
- Drip irrigation/kits
- Pressure regulating spray heads
- Irrigation controllers
- Mulch

This could a be one-stop website, possibly using the FreeSprinklerNozzles.com platform, where customers are surveyed on their interests and issues and directed to the appropriate voucher measures for free or discounted product.

Most measures will be fulfilled through local business partners such as Louie's Nursery, Bonnett Irrigation, Kellogg Supply, and Ewing Irrigation and others.

SOCAL WATER$MART REBATES

Ongoing

The SoCal Water$mart Program offers residential and commercial customer rebates for a menu of indoor and outdoor devices. The program is funded and administered by Metropolitan.

Metropolitan pays for the base incentive and administration costs. Western can add funds to devices they want to promote. In addition to the standard rebates, Metropolitan offers performance-based incentives through the Water Savings Incentive Program under SoCal Water$mart.

Residential Measures:

- Rain Barrels & Cisterns
- Clothes Washers
- Irrigation Controllers
- Soil Moisture Sensors
- Sprinkler Nozzles
- Toilets

Commercial Measure:

- Cooling Tower Controllers
- Flow Restrictors
- Food Steamers
- Ice Machines
- Smart Controllers & Soil Moisture Sensors
- Plumbing Control Valves
- Soil Moisture Sensors
- Sprinkler Nozzles
- Toilets & Urinals

SMART IRRIGATION PACKAGE PILOT



Many commercial sites have expansive outdoor acreage which are typically maintained by landscape service professionals. These sites have high instances of irrigation system inefficiency with irrigation systems operating with mismatched, malfunctioning sprinkler heads and low technology controllers.

The Smart Irrigation program would offer customers a package of the most innovative, proven irrigation technologies available in the market. These devices, especially in combination, are considered industry best management practices. Western would solicit and enroll qualified contractors who would market the program to their customers and be paid the incentive for installing the irrigation package.

Measures:

- Smart Cloud-based Irrigation Controllers
- High-efficiency Sprinkler Nozzles
- Pressure Regulating Spray Heads and Check Valves
- Master Valves and Flow Sensors

NEW TECHNOLOGY PILOT PROGRAM



Promising new technologies will periodically enter the market. Western as an innovator, will test and incentivize the technologies that show positive results.

For example, once such emerging technology is Xeros Cleaning laundry machines. The machines use polymer beads to absorb stains and soils, resulting in lower water and chemical use. The product is currently available for commercial laundries and will be soon be available to the residential market.

Once Western has proof of technology, new technology incentives can be offered for this product. Other technologies will be considered as they emerge.

TECHNOLOGIES TO ENHANCE PROGRAM DELIVERY

Western continuously works to improve the customer experience utilizing technology innovation. Customers want technology to provide an easier, more customer-friendly experience. Self-service applications and websites can do just that while freeing up staff and providing the ability to scale

programs. Online tools allow customers to utilize program services on their own time, 24/7. In addition, these software solutions can easily track customer activity and collect valuable data.

Western has developed or is considering the following technologies:

AMI 

Western is in the process of implementing advanced metering infrastructure (AMI) systems that will meticulously track water usage and provide both Western and the customer with meaningful data. By providing key trends in water usage, AMI systems can drive water efficiency and influence change by providing customers with data to manage their use.

With periodic readings per day, as opposed to a few per year, AMI systems help provide a reliable baseline for comparison purposes. This data can be used to alert Western and/or the customer about anomalies in water use and trigger early response to leaks or other sudden increases in use.

Western will continue to deploy all aspects and benefits of AMI to further drive water efficiency.

CUSTOMER PORTAL 

Western partnered with local web developer, Droplet Technologies, to create a web-based customer friendly interface (portal). The portal helps customers understand their unique water budgets and provide a meaningful and visual representation of the information on the water bill.

Residential customers in Western's service area can log into their unique user profile 24 hours a day from a computer, tablet, or smart phone to view their past and current water budgets, update budget factors, and find the programs that can help them be more water efficient.

The format and layout of the portal is designed to increase understanding through simple icons and graphics that explain how individualized budget factors, such as the number of people in the household and landscape area affect their water budget. One of the main features is the budget calculator that allows users to manually select their budget factors and simultaneously see how the budget increases or decreases based on those changes.

In addition, the portal can maintain an on-line customer database with all program participation information, evaluation findings, recommendations, measures installed, and pertinent customer program information.

Western is currently considering a redesign of the portal and in the future may develop a portal for commercial customers as well.

EVALUATION "EVAL" APP



Working in collaboration with Droplet Technologies, Western created the "Eval App", a residential audit used by the evaluator in the field. The tool provides customers with an individualized report that communicates customer inefficiency immediately and in a compelling way – the tool delivers a graphical summary report via the tablet while in the field.

In addition, the app provides a specific roadmap for becoming more efficient by providing the customer access to available programs and incentives that will have the biggest impact on their property – a more comprehensive report is delivered via email with support tools and resources to conduct site repairs and make upgrades.

In the future, Western hopes to use the app as a means to keep the customer engaged through continued follow up, while tracking changes and encouraging next steps. The tool could incorporate automated follow up to customers to provide additional support, document when the repairs or upgrades are made, and give recognition to the customer.

For commercial customers, Western may consider promotion of EPA's EnergyStar Portfolio Manager that provides customers with water use intensity or benchmarking scores based on their type of business. Customers enter basic information about their site and business as well as their annual water use and receive back a score or intensity factor. This information illustrates how well a building is operating in regard to water use and can provide the trigger for customers to move forwards in evaluating potential efficiency project.

FREESPRINKLERNOZZLES.COM REDESIGN



With eight years of successful implementation, Western is looking to overhaul the FreeSprinklerNozzles.com program. The goal is for the new program to be a 100% online fulfillment program. Western is looking to streamline the sprinkler nozzle inventory process and deliver more accurate nozzle counts. In addition, Western wants to make the program more customer convenient with nozzle delivery direct to customer homes and businesses.

Western is evaluating the cost and benefits of developing a tool that would utilize aerial imagery for mapping the customer's landscaped area and irrigation system. The customer would use the tool to measure their irrigated area and note head locations. The system would then automatically generate a nozzle inventory which would be the sent to the irrigation fulfillment center electronically. The nozzles would then be shipped to the customer.

Section 8: The Details

STATE MANDATES + COMPLIANCE

On May 31, 2018 Gov. Jerry Brown signed into law two new bills that will require urban water providers throughout California to set new permanent water use targets for their service areas by 2022. Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman) provide a framework for setting water use targets, as well as implementing and enforcing the new water use requirements.

While many details for implementing the new water use requirements will be determined over the next several years, the overall framework includes:

- A standard for indoor residential water use of 55 gallons per person per day—dropping incrementally to 50 gallons in 2030.
- A standard for outdoor residential water use (to be determined) based upon a community's climate and the amount of landscaped area.
- A standard for water loss due to leaks in water system pipes (to be determined).
- A CII water use standard (to be determined)

The first three standards will be calculated and added together to represent an **overall water use target** (in gallons) for the water provider. Although Western already bases their rates on a water budget for each customer, the new state laws do not contain water use targets for individual residents or businesses.

These laws outline an **overall framework** to guide urban water providers in setting water use targets, which must be approved by the State Water Resource Control Board. However, urban water providers will determine how their service area can best achieve the new water use target. Urban water providers will set and monitor targets for their service area as a whole (not on an individual basis) and will determine how to help their customers collectively reach the new targets.

Urban water **providers who do not meet their targets can be fined** by the State Water Board (up to $1,000 per day during non-drought years and $10,000 per day during drought emergencies). Fines apply to the urban water provider and not to individuals. Once water provider-level targets are established in 2022 and implementation begins in 2023, **water providers may choose to work with individual households and businesses to increase their water efficiency** through available rebates, services and programs.

While the new laws do not set specific water use targets for business, they do outline a framework for creating new water efficiency performance measures for businesses—these are **recommended actions for specific business sectors** to improve water efficiency over time. Performance measures will be determined over the next several years, and the process will include opportunities for public input.

The new rules were prompted by California's frequent cycles of drought and are meant to better prepare California for the next drought and the future effects of climate change on the state's water supplies. The overall goal is to make water conservation a way of life in California and a permanent part of the state's culture.

Water providers must set new water conservation targets by 2022 and will be expected to begin implementing them by 2023 and every year after that.

The new laws create long term water use targets, not short-term conservation targets like those implemented during the drought. The long-term targets are meant to inspire greater efficiency over time rather than mandate short-term cutbacks that require extreme measures such as not watering your lawn or flushing the toilet less.

Western expects to be fully compliant with the State's new framework for water use targets. Western's Water Budget Rate Structure, in place for the last five years, models the framework targets at the individual property. As the final requirements are set Western will evaluate and report on compliance.

IMPLEMENTATION TIMELINE

Program implementation is forecast for two years based upon current outside funding and available technologies. Some of these components are well established and easily measurable, while others are pilot initiatives with savings results that are not yet fully established.

Western will track performance and, as necessary, will make modifications along the way in order to maximize effectiveness. At the conclusion of each year, Western will conduct a comprehensive assessment of the plan and overhaul or replace any underperforming elements in advance of the prior fiscal year budget process.



PLAN UPDATES

The WUE Plan is a working document and, as such, must be modified and updated as changes occur and program years roll out. Western will regularly review the plan and make adjustments accordingly.

Changes and/or reviews of the plan should take place in line with the following conditions:

- When programs are added, subtracted or modified
- On a yearly basis in order to meet the annual reporting requirements
- Every 5 years to meet the Urban Water Management Plan report cycle
- As the State's Framework policies are finalized

P

Appendix P AWWA Water Audits

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

American Water Works Association.

? Click to access definition

\+ Click to add a comment

Water Audit Report for: WMWD - RIVERSIDE

Reporting Year: 2016 1/2016 - 12/2016

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

<---------- Enter grading in column 'E' and 'J' ---------->

WATER SUPPLIED

						Pcnt:	Value:	
Volume from own sources:	n/a	0.000	acre-ft/yr					acre-ft/yr
Water imported:	5	31,186.000	acre-ft/yr	4				acre-ft/yr
Water exported:	5	11,746.000	acre-ft/yr	8				acre-ft/yr

Enter negative % or value for under-registration

Enter positive % or value for over-registration

WATER SUPPLIED: **19,440.000** acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	5	16,155.000	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	n/a	0.000	acre-ft/yr			
Unbilled unmetered:	5	48.600	acre-ft/yr		48.600	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: ? **16,203.600** acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) **3,236.400** acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		48.600	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	3	329.694	acre-ft/yr	2.00%		acre-ft/yr
Systematic data handling errors:		40.388	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? **418.681** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? **2,817.719** acre-ft/yr

WATER LOSSES: **3,236.400** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? **3,285.000** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	471.4	miles
Number of active AND inactive service connections:	7	20,654	
Service connection density:		44	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 5 100.0 psi

COST DATA

Total annual cost of operating water system:	10	$62,782,690	$/Year
Customer retail unit cost (applied to Apparent Losses):	9	$2.13	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	5	$781.78	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 58 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported

2: Customer metering inaccuracies

3: Billed metered

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

American Water Works Association

? Click to access definition

+ Click to add a comment

Water Audit Report for: WMWD - RIVERSIDE

Reporting Year: 2017 1/2017 - 12/2017

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

						Pcnt:	Value:	
Volume from own sources:	n/a	0.000	acre-ft/yr					
Water imported:	7	31,181.360	acre-ft/yr	n/a				acre-ft/yr
Water exported:	7	12,077.420	acre-ft/yr	n/a				acre-ft/yr

Enter negative % or value for under-registration

Enter positive % or value for over-registration

WATER SUPPLIED: 19,103.940 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	6	17,672.860	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	8	5.000	acre-ft/yr			
Unbilled unmetered:	5	47.800	acre-ft/yr		47.800	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 17,725.660 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 1,378.280 acre-ft/yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:	47.760	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	5	360.773	acre-ft/yr	2.00%	acre-ft/yr
Systematic data handling errors:		44.182	acre-ft/yr	0.25%	acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 452.715 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 925.565 acre-ft/yr

WATER LOSSES: 1,378.280 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 1,431.080 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	506.4	miles
Number of active AND inactive service connections:	7	20,810	
Service connection density:		41	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	8	100.0	psi

COST DATA

Total annual cost of operating water system:	10	$59,366,114	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$2.48	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	7	$1,068.43	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 71 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported

2: Billed metered

3: Customer metering inaccuracies

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Association

Click to access definition
Click to add a comment

Water Audit Report for: WMWD - RIVERSIDE
Reporting Year: 2018 | 1/2018 - 12/2018

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<-------- Enter grading in column 'E' and 'J' -------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

				Pcnt:	Value:	
Volume from own sources:	n/a	0.000	acre-ft/yr			
Water imported:	7	31,405.000	acre-ft/yr	n/a		acre-ft/yr
Water exported:	7	11,192.000	acre-ft/yr	n/a		acre-ft/yr
WATER SUPPLIED:		**20,213.000**	acre-ft/yr			

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Click here: for help using option buttons below

				Pcnt:	Value:	
Billed metered:	7	18,949.400	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	n/a	0.000	acre-ft/yr			
Unbilled unmetered:	8	1.000	acre-ft/yr		1.000	acre-ft/yr
AUTHORIZED CONSUMPTION:		**18,950.400**	acre-ft/yr			

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption) **1,262.600** acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		50.533	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	5	386.722	acre-ft/yr	2.00%	acre-ft/yr
Systematic data handling errors:		47.374	acre-ft/yr	0.25%	acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: **484.628** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **777.972** acre-ft/yr

WATER LOSSES: **1,262.600** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: **1,263.600** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	502.5	miles
Number of active AND inactive service connections:	8	21,054	
Service connection density:		42	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 8 — 100.0 psi

COST DATA

Total annual cost of operating water system:	10	$63,758,239	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$3.11	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	7	$1,296.12	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 71 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Customer metering inaccuracies
3: Billed metered

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

American Water Works Association

? Click to access definition

+ Click to add a comment

Water Audit Report for: WMWD - RIVERSIDE

Reporting Year: 2019 1/2019 - 12/2019

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

	Grading	Value		Grading	Pcnt:	Value:	
Volume from own sources:	n/a	0.000	acre-ft/yr				acre-ft/yr
Water imported:	7	26,881.900	acre-ft/yr	3	-4.00%		acre-ft/yr
Water exported:	7	9,159.600	acre-ft/yr	n/a			acre-ft/yr

Enter negative % or value for under-registration

Enter positive % or value for over-registration

WATER SUPPLIED: 18,842.379 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

	Grading	Value		Pcnt:	Value:	
Billed metered:	7	17,615.000	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	n/a	0.000	acre-ft/yr			
Unbilled unmetered:	8	1.000	acre-ft/yr		1.000	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 17,616.000 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 1,226.379 acre-ft/yr

Apparent Losses

	Grading	Value		Pcnt:	Value:	
Unauthorized consumption:		47.106	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	5	359.490	acre-ft/yr	2.00%		acre-ft/yr
Systematic data handling errors:		44.038	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 450.633 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 775.746 acre-ft/yr

WATER LOSSES: 1,226.379 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 1,227.379 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	502.4	miles
Number of active AND inactive service connections:	8	21,325	
Service connection density:		42	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	8	100.0	psi

COST DATA

Total annual cost of operating water system:	10	$ 61,677,189.29	$/Year
Customer retail unit cost (applied to Apparent Losses):	9	$3.18	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	7	$1,265.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 71 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported

2: Customer metering inaccuracies

3: Billed metered

Q

Appendix Q Reduced Delta Reliance

Quantifying Regional Self-Reliance and Reduced Reliance on Water Supplies from the Delta

1. Background

Under the Sacramento-San Joaquin Delta Reform Act of 2009, state and local public agencies proposing a covered action in the Delta, prior to initiating the implementation of that action, must prepare a written certification of consistency with detailed findings as to whether the covered action is consistent with applicable Delta Plan policies and submit that certification to the Delta Stewardship Council. Anyone may appeal a certification of consistency, and if the Delta Stewardship Council grants the appeal, the covered action may not be implemented until the agency proposing the covered action submits a revised certification of consistency, and either no appeal is filed, or the Delta Stewardship Council denies the subsequent appeal.

An urban water supplier that anticipates participating in or receiving water from a proposed covered action such as a multi-year water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Delta should provide information in their 2015 and 2020 Urban Water Management Plans (UWMPs) that can then be used in the covered action process to demonstrate consistency with Delta Plan Policy WR P1, Reduce Reliance on the Delta through Improved Regional Water Self-Reliance (WR P1).

WR P1 details what is needed for a covered action to demonstrate consistency with reduced reliance on the Delta and improved regional self-reliance. WR P1 subsection (a) states that:

> *(a) Water shall not be exported from, transferred through, or used in the Delta if all the following apply:*
>
> > *(1) One or more water suppliers that would receive water as a result of the export, transfer, or use have failed to adequately contribute to reduced reliance on the Delta and improved regional self-reliance consistent with all of the requirements listed in paragraph (1) of subsection (c);*
> >
> > *(2) That failure has significantly caused the need for the export, transfer, or use; and*
> >
> > *(3) The export, transfer, or use would have a significant adverse environmental impact in the Delta.*

WR P1 subsection (c)(1) further defines what adequately contributing to reduced reliance on the Delta in terms of (a)(1) above.

> *(c)(1) Water suppliers that have done all the following are contributing to reduced reliance on the Delta and improved regional self-reliance and are therefore consistent with this policy:*
>
> > *(A) Completed a current Urban or Agricultural Water Management Plan (Plan) which has been reviewed by the California Department of Water Resources for compliance with the applicable requirements of Water Code Division 6, Parts 2.55, 2.6, and 2.8;*
> >
> > *(B) Identified, evaluated, and commenced implementation, consistent with the implementation schedule set forth in the Plan, of all programs and projects included in the Plan that are locally cost effective and technically feasible which reduce reliance on the Delta; and*
> >
> > *(C) Included in the Plan, commencing in 2015, the expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance. The expected outcome for measurable reduction in Delta reliance and improvement in regional self- reliance shall be reported in the*

Plan as the reduction in the amount of water used, or in the percentage of water used, from the Delta watershed. For the purposes of reporting, water efficiency is considered a new source of water supply, consistent with Water Code section 1011(a).

The analysis and documentation provided below include all the elements described in WR P1(c)(1) that need to be included in a water supplier's UWMP to support a certification of consistency for a future covered action.

2. Demonstration of Regional Self-Reliance

The methodology used to determine Western Municipal Water District (Western)'s improved regional self-reliance is consistent with the approach detailed in the Department of Water Resources (DWR)'s UWMP Guidebook Appendix C (Guidebook Appendix C), including the use of narrative justifications for the accounting of supplies and the documentation of specific data sources. Key assumptions underlying Western's demonstration of reduced reliance include:

- All data were obtained from the current 2020 UWMP, previously adopted UWMPs or other planning reports or actual water use data.
- All analyses were conducted at the Western general service area level, and all data reflect the total contributions of Western and the retail agencies within the Western general service area boundary.
- No projects or programs that are described in the UWMPs as "Projects Under Development" were included in the accounting of supplies.

Baseline, Data and Expected Outcomes

To calculate the expected outcomes for measurable reduction in Delta reliance and improved regional self-reliance, a baseline is needed to compare against. This analysis uses a normal water year representation of 2010 as the baseline, which is consistent with the approach described in the Guidebook Appendix C. Data for the 2010 baseline were taken from Western's 2008 Integrated Water Management Plan (IRWMP), as the IRWMP includes a comprehensive set of supply and demand data for all retail agencies within Western's service area for a normal water year.

Consistent with the 2010 baseline data approach, the expected outcomes for reduced Delta reliance and improved regional self-reliance for 2015 was taken from the 2008 IRWMP.

There were no planning documents that provided a published comprehensive supply and demand projection for the year 2020 for Western's entire service area, and therefore, actual 2020 production data collected by Western from the retail agencies in their service area was used.

Data and expected outcomes for 2025-2045 was collected by Western from the retail agencies in their service area as part of the 2020 UWMP effort.

Documentation of the specific data sources and assumptions are included in the discussions below.

Service Area Demands without Water Use Efficiency

In alignment with the Guidebook Appendix C, this analysis uses normal water year demands, rather than normal water year supplies to calculate expected outcomes in terms of the percentage of water used. Normal water year demands serve as a proxy for the amount of supplies that would be used in a normal water year, which helps alleviate issues associated with how supply capability is presented to fulfill requirements of the UWMP Act versus how supplies might be accounted for to demonstrate consistency with WR P1.

Because WR P1 considers water use efficiency savings a source of water supply, water suppliers can calculate their embedded water use efficiency savings based on changes in forecasted per capita water use since the baseline. As explained in the Guidebook Appendix C, water use efficiency savings must be added back to the normal year demands to represent demands without water use efficiency savings accounted for; otherwise, the

effect of water use efficiency savings on regional self-reliance would be overestimated. Table C-1 shows the results of this adjustment for Western. Supporting narratives and documentation for all the data shown in Table C-1 are provided below.

Service Area Demands with Water Use Efficiency

The service area demands shown in Table C-1 represent the total water demands for Western's general service area, including Western Retail and other retail agencies. Demand data shown in Table C-1 were collected from the following sources:

- Baseline (2010): Western IRWMP 2008 Update, Table 4-3
- 2015: Western's IRWMP 2008 Update, Table 4-3
- 2020: Total Western demand developed by Metropolitan as part of Metropolitan's 2015 UWMP
- 2025-2045: Projections from Western and member agencies, collected as part of Western's 2020 UWMP effort

Non-Potable Water Demands

Recycled water demands were collected from the retail agencies respective 2010 and 2015 UWMPs and reported as actual 2010 and actual 2015 recycled water use.

Although Western and the other retail agencies in their service area also use other non-potable supplies, detailed data to form a baseline for 2010 was not available from published reports as potable and non-potable use was typically not reported separately in UWMPs prior to 2020. As a result, only recycled water demands are shown and the true improvement to regional self-reliance is expected to be greater than shown in this analysis.

Potable Service Area Demands with Water Use Efficiency

The "Potable Service Area Demands with Water Use Efficiency" was calculated by subtracting the "Non-Potable Water Demands" from "Service Area Demands with Water Use Efficiency."

Service Area Population

The population data shown in Table C-1 were collected from the following sources:

- Baseline (2010): Western 2005 UWMP, Appendix F. Populations for Western's service area developed by Metropolitan
- 2015: Western 2015 UWMP, Table 3-7
- 2020-2045: Western 2020 UWMP, Table 3-2

Estimated Water Use Efficiency Since Baseline

The "Estimated Water Use Efficiency Since Baseline" was calculated using "Potable Service Area Demands with Water Use Efficiency" divided by "Service Area Population" and then comparing with 2010 Per Capita Water Use.

Service Area Water Demands without Water Use Efficiency

In Table C-2, the "Service Area Demands with Water Use Efficiency" was added to the "Estimated Water Use Efficiency Since Baseline" to obtain the "Service Area Water Demands without Water Use Efficiency Accounted For".

Supplies Contributing to Regional Self-Reliance

For a covered action to demonstrate consistency with the Delta Plan, WR P1 subsection (c)(1)(C) states that water suppliers must report the expected outcomes for measurable improvement in regional self-reliance. Table

C-3 shows expected outcomes for supplies contributing to regional self-reliance both in amount and as a percentage. The values shown in Table C-3 represent efforts to improve regional self-reliance for Western's entire service area and include the total contributions of Western and its customers. For this analysis, Western is focusing on new investments in regional self-reliance since the 2010 baseline. Supporting narratives and documentation for all the data shown in Table C-3 are provided below.

Water Use Efficiency

The water use efficiency information shown in Table C-3 is taken directly from Table C-1.

Water Recycling

Estimates for the 2010 baseline and 2015 recycled water use was collected from the retail agencies respective 2010 and 2015 UWMPs and reported as actual 2010 and actual 2015 recycled water use.

Stormwater Capture and Use

The stormwater capture and use supply shown in Table C-3 represents the Victoria Recharge Basin. Western constructed the Victoria Recharge Basin in 2019 to capture stormwater runoff and recharge the Riverside-Arlington groundwater basin. The Victoria Recharge Basin is anticipated to provide up to 1,800 acre-feet per year (AFY).

Advanced Water Technologies

The region has invested in advanced water technologies at the Arlington, Chino, and Temescal Valley Desalters to recover unused local non-potable groundwater supplies by treating them for use as potable supplies. These facilities began operation prior to 2010 and have long contributed to regional self-reliance. In 2017, the Chino Desalter was expanded to produce an additional supply, of which 3,534 AFY is allocated to Western Retail and 3,533 AFY is allocated to Jurupa Community Services District, a retail water agency in Western's service area. Therefore, a total of 7,067 AFY of new supply is included in the analysis under the Advanced Water Technologies category.

3. Reliance on Water Supplies from the Delta Watershed

Metropolitan's service area, as a whole, reduces reliance on the Delta through investments in non-Delta water supplies, local water supplies, and regional and local demand management measures. Metropolitan's member agencies coordinate reliance on the Delta through their membership in Metropolitan, a regional cooperative providing wholesale water service to its 26 member agencies, which includes Western. Accordingly, regional reliance on the Delta can only be measured regionally—not by individual Metropolitan member agencies and not by the customers of those member agencies.

Metropolitan's member agencies, and those agencies' customers, indirectly reduce reliance on the Delta through their collective efforts as a cooperative. Metropolitan's member agencies do not control the amount of Delta water they receive from Metropolitan. Metropolitan manages a statewide integrated conveyance system consisting of its participation in the State Water Project (SWP), its Colorado River Aqueduct (CRA) including Colorado River water resources, programs and water exchanges, and its regional storage portfolio. Along with the SWP, CRA, storage programs, and Metropolitan's conveyance and distribution facilities, demand management programs increase the future reliability of water resources for the region. In addition, demand management programs provide system-wide benefits by decreasing the demand for imported water, which helps to decrease the burden on the district's infrastructure and reduce system costs, and free up conveyance capacity to the benefit of all member agencies.

Metropolitan's costs are funded almost entirely from its service area, except for grants and other assistance from government programs. Most of Metropolitan's revenues are collected directly from its member agencies. Properties within Metropolitan's service area pay a property tax that currently provides approximately 8 percent of the fiscal year 2021 annual budgeted revenues. The rest of Metropolitan's costs are funded through rates and charges paid by Metropolitan's member agencies for the wholesale services it provides to them. Thus, Metropolitan's member agencies fund nearly all operations Metropolitan undertakes to reduce reliance on the Delta, including Colorado River Programs, storage facilities, Local Resources Programs and Conservation Programs within Metropolitan's service area.

Because of the integrated nature of Metropolitan's systems and operations, and the collective nature of Metropolitan's regional efforts, it is infeasible to quantify each of Metropolitan member agencies' individual reliance on the Delta. It is infeasible to attempt to segregate an entity and a system that were designed to work as an integrated regional cooperative.

In addition to the member agencies funding Metropolitan's regional efforts, they also invest in their own local programs to reduce their reliance on any imported water. Moreover, the customers of those member agencies may also invest in their own local programs to reduce water demand. However, to the extent those efforts result in reduction of demands on Metropolitan, that reduction does not equate to a like reduction of reliance on the Delta. Demands on Metropolitan are not commensurate with demands on the Delta because most of Metropolitan member agencies receive blended resources from Metropolitan as determined by Metropolitan—not the individual member agency—and for most member agencies, the blend varies from month-to-month and year-to-year due to hydrology, operational constraints, use of storage and other factors.

Programs Implemented by Metropolitan to Reduce Delta Reliance

Colorado River Programs

As a regional cooperative of member agencies, Metropolitan invests in programs to ensure the continued reliability and sustainability of Colorado River supplies. Metropolitan was established to obtain an allotment of Colorado River water, and its first mission was to construct and operate the CRA. The CRA consists of five pumping plants, 450 miles of high voltage power lines, one electric substation, four regulating reservoirs, and 242 miles of aqueducts, siphons, canals, conduits and pipelines terminating at Lake Mathews in Riverside County. Metropolitan owns, operates, and manages the CRA. Metropolitan is responsible for operating, maintaining, rehabilitating, and repairing the CRA, and is responsible for obtaining and scheduling energy resources adequate to power pumps at the CRA's five pumping stations.

Colorado River supplies include Metropolitan's basic Colorado River apportionment, along with supplies that result from existing and committed programs, including supplies from the Imperial Irrigation District (IID)-Metropolitan Conservation Program, the implementation of the Quantification Settlement Agreement (QSA) and related agreements, and the exchange agreement with San Diego County Water Authority (SDCWA). The QSA established the baseline water use for each of the agreement parties and facilitates the transfer of water from agricultural agencies to urban uses. Since the QSA, additional programs have been implemented to increase Metropolitan's CRA supplies. These include the PVID Land Management, Crop Rotation, and Water Supply Program, as well as the Lower Colorado River Water Supply Project. The 2007 Interim Guidelines provided for the coordinated operation of Lake Powell and Lake Mead, as well as the Intentionally Created Surplus (ICS) program that allows Metropolitan to store water in Lake Mead.

Storage Investments/Facilities

Surface and groundwater storage are critical elements of Southern California's water resources strategy and help Metropolitan reduce its reliance on the Delta. Because California experiences dramatic swings in weather and hydrology, storage is important to regulate those swings and mitigate possible supply shortages. Surface

and groundwater storage provide a means of storing water during normal and wet years for later use during dry years, when imported supplies are limited. The Metropolitan system, for purposes of meeting demands during times of shortage, regulating system flows, and ensuring system reliability in the event of a system outage, provides over 1,000,000 acre-feet of system storage capacity. Diamond Valley Lake provides 810,000 acre feet of that storage capacity, effectively doubling Southern California's previous surface water storage capacity. Other existing imported water storage available to the region consists of Metropolitan's raw water reservoirs, a share of the SWP's raw water reservoirs in and near the service area, and the portion of the groundwater basins used for conjunctive-use storage.

Since the early twentieth century, DWR and Metropolitan have constructed surface water reservoirs to meet emergency, drought/seasonal, and regulatory water needs for Southern California. These reservoirs include Pyramid Lake, Castaic Lake, Elderberry Forebay, Silverwood Lake, Lake Perris, Lake Skinner, Lake Mathews, Live Oak Reservoir, Garvey Reservoir, Palos Verdes Reservoir, Orange County Reservoir, and Metropolitan's Diamond Valley Lake (DVL). Some reservoirs such as Live Oak Reservoir, Garvey Reservoir, Palos Verdes Reservoir, and Orange County Reservoir, which have a total combined capacity of about 3,500 AF, are used solely for regulating purposes. The total gross storage capacity for the larger remaining reservoirs is 1,757,600 AF. However, not all of the gross storage capacity is available to Metropolitan; dead storage and storage allocated to others reduce the amount of storage that is available to Metropolitan to 1,665,200 AF.

Conjunctive use of the aquifers offers another important source of dry year supplies. Unused storage in Southern California groundwater basins can be used to optimize imported water supplies, and the development of groundwater storage projects allows effective management and regulation of the region's major imported supplies from the Colorado River and SWP. Over the years, Metropolitan has implemented conjunctive use through various programs in the service area; the following table lists the groundwater conjunctive use programs that have been developed in the region.

Program	Metropolitan Agreement Partners	Program Term	Max Storage AF	Dry-Year Yield AF/Yr
Long Beach Conjunctive Use Storage Project (Central Basin)	Long Beach	June 2002-2027	13,000	4,300
Foothill Area Groundwater Storage Program (Monkhill/ Raymond Basin)	Foothill MWD	February 2003-2028	9,000	3,000
Orange County Groundwater Conjunctive Use Program	MWDOC OCWD	June 2003-2028	66,000+	22,000
Chino Basin Conjunctive Use Programs	IEUA TVMWD Watermaster	June 2003-2028	100,000	33,000
Live Oak Basin Conjunctive Use Project (Six Basins)	TVMWD City of La Verne	October 2002-2027	3,000	1,000
City of Compton Conjunctive Use Project (Central Basin)	Compton	February 2005-2030	2,289	763
Long Beach Conjunctive Use Program Expansion in Lakewood (Central Basin)	Long Beach	July 2005-2030	3,600	1,200
Upper Claremont Basin Groundwater Storage Program (Six Basins)	TVMWD	Sept. 2005- 2030	3,000	1,000
Elsinore Basin Conjunctive Use Storage Program	Western MWD Elsinore Valley MWD	May 2008- 2033	12,000	4,000
TOTAL			**211,889**	**70,263**

Metropolitan Demand Management Programs

Demand management costs are Metropolitan's expenditures for funding local water resource development programs and water conservation programs. These Demand Management Programs incentivize the development of local water supplies and the conservation of water to reduce the need to import water to deliver to Metropolitan's member agencies. These programs are implemented below the delivery points between Metropolitan's and its member agencies' distribution systems and, as such, do not add any water to Metropolitan's supplies. Rather, the effect of these downstream programs is to produce a local supply of water for the local agencies and to reduce demands by member agencies for water imported through Metropolitan's system. The following discussions outline how Metropolitan funds local resources and conservation programs for the benefit of all of its member agencies and the entire Metropolitan service area. Notably, the history of demand management by Metropolitan's member agencies and the local agencies that purchase water from Metropolitan's members has spanned more than four decades. The significant history of the programs is another reason it would be difficult to attempt to assign a portion of such funding to any one individual member agency.

Local Resources Programs

In 1982, Metropolitan began providing financial incentives to its member agencies to develop new local supplies to assist in meeting the region's water needs. Because of Metropolitan's regional distribution system, these programs benefit all member agencies regardless of project location because they help to increase regional water supply reliability, reduce demands for imported water supplies, decrease the burden on Metropolitan's infrastructure, reduce system costs and free up conveyance capacity to the benefit of all the agencies that rely on water from Metropolitan.

For example, the Groundwater Replenishment System (GWRS) operated by the Orange County Water District is the world's largest water purification system for indirect potable reuse. It was funded, in part, by Metropolitan's member agencies through the Local Resources Program. Annually, the GWRS produces approximately 103,000 acre-feet of reliable, locally controlled, drought-proof supply of high-quality water to recharge the Orange County Groundwater Basin and protect it from seawater intrusion. The GWRS is a premier example of a regional project that significantly reduced the need to utilize imported water for groundwater replenishment in Metropolitan's service area, increasing regional and local supply reliability and reducing the region's reliance on imported supplies, including supplies from the State Water Project.

Metropolitan's local resource programs have evolved through the years to better assist Metropolitan's member agencies in increasing local supply production. The following is a description and history of the local supply incentive programs.

Local Projects Program

In 1982, Metropolitan initiated the Local Projects Program (LPP), which provided funding to member agencies to facilitate the development of recycled water projects. Under this approach, Metropolitan contributed a negotiated up-front funding amount to help finance project capital costs. Participating member agencies were obligated to reimburse Metropolitan over time. In 1986, the LPP was revised, changing the up-front funding approach to an incentive-based approach. Metropolitan contributed an amount equal to the avoided State Water Project pumping costs for each acre-foot of recycled water delivered to end-use consumers. This funding incentive was based on the premise that local projects resulted in the reduction of water imported from the Delta and the associated pumping cost. The incentive amount varied from year to year depending on the actual variable power cost paid for State Water Project imports. In 1990, Metropolitan's Board increased the LPP contribution to a fixed rate of $154 per acre-foot, which was calculated based on Metropolitan's avoided capital and operational costs to convey, treat, and distribute water, and included considerations of reliability and service area demands.

Groundwater Recovery Program

The drought of the early 1990s sparked the need to develop additional local water resources, aside from recycled water, to meet regional demand and increase regional water supply reliability. In 1991, Metropolitan conducted the Brackish Groundwater Reclamation Study which determined that large amounts of degraded groundwater in the region were not being utilized. Subsequently, the Groundwater Recovery Program (GRP) was established to assist the recovery of otherwise unusable groundwater degraded by minerals and other contaminants, provide access to the storage assets of the degraded groundwater, and maintain the quality of groundwater resources by reducing the spread of degraded plumes.

Local Resources Program

In 1995, Metropolitan's Board adopted the Local Resources Program (LRP), which combined the LPP and GRP into one program. The Board allowed for existing LPP agreements with a fixed incentive rate to convert to the sliding scale up to $250 per acre-foot, similar to GRP incentive terms. Those agreements that were converted to LRP are known as "LRP Conversions."

Competitive Local Projects Program

In 1998, the Competitive Local Resources Program (Competitive Program) was established. The Competitive Program encouraged the development of recycled water and recovered groundwater through a process that emphasized cost-efficiency to Metropolitan, timing new production according to regional need while minimizing program administration cost. Under the Competitive Program, agencies requested an incentive rate up to $250 per acre-foot of production over 25 years under a Request for Proposals (RFP) for the development of up to 53,000 acre-feet per year of new water recycling and groundwater recovery projects. In 2003, a second RFP was issued for the development of an additional 65,000 acre-feet of new recycled water and recovered groundwater projects through the LRP.

Seawater Desalination Program

Metropolitan established the Seawater Desalination Program (SDP) in 2001 to provide financial incentives to member agencies for the development of seawater desalination projects. In 2014, seawater desalination projects became eligible for funding under the LRP, and the SDP was ended.

2007 Local Resources Program

In 2006, a task force comprised of member agency representatives was formed to identify and recommend program improvements to the LRP. As a result of the task force process, the 2007 LRP was established with a goal of 174,000 acre-feet per year of additional local water resource development. The new program allowed for an open application process and eliminated the previous competitive process. This program offered sliding scale incentives of up to $250 per acre-foot, calculated annually based on a member agency's actual local resource project costs exceeding Metropolitan's prevailing water rate.

2014 Local Resources Program

A series of workgroup meetings with member agencies was held to identify the reasons why there was a lack of new LRP applications coming into the program. The main constraint identified by the member agencies was that the $250 per acre-foot was not providing enough of an incentive for developing new projects due to higher construction costs to meet water quality requirements and to develop the infrastructure to reach end-use consumers located further from treatment plants. As a result, in 2014, the Board authorized an increase in the maximum incentive amount, provided alternative payment structures, included onsite retrofit costs and reimbursable services as part of the LRP, and added eligibility for seawater desalination projects. The current LRP incentive payment options are structured as follows:

- Option 1 – Sliding scale incentive up to $340/AF for a 25-year agreement term
- Option 2 – Sliding scale incentive up to $475/AF for a 15-year agreement term
- Option 3 – Fixed incentive up to $305/AF for a 25-year agreement term

On-site Retrofit Programs

In 2014, Metropolitan's Board also approved the On-site Retrofit Pilot Program which provided financial incentives to public or private entities toward the cost of small-scale improvements to their existing irrigation and industrial systems to allow connection to existing recycled water pipelines. The On-site Retrofit Pilot Program helped reduce recycled water retrofit costs to the end-use consumer which is a key constraint that limited recycled water LRP projects from reaching full production capacity. The program incentive was equal to the actual eligible costs of the on-site retrofit, or $975 per acre-foot of up-front cost, which equates to $195 per acre-foot for an estimated five years of water savings ($195/AF x 5 years) multiplied by the average annual water use in previous three years, whichever is less. The Pilot Program lasted two years and was successful in meeting its goal of accelerating the use of recycled water.

In 2016, Metropolitan's Board authorized the On-site Retrofit Program (ORP), with an additional budget of $10 million. This program encompassed lessons learned from the Pilot Program and feedback from member agencies to make the program more streamlined and improve its efficiency. As of fiscal year 2019/20, the ORP has successfully converted 440 sites, increasing the use of recycled water by 12,691 acre-feet per year.

Stormwater Pilot Programs

In 2019, Metropolitan's Board authorized both the Stormwater for Direct Use Pilot Program and a Stormwater for Recharge Pilot Program to study the feasibility of reusing stormwater to help meet regional demands in Southern California. These pilot programs are intended to encourage the development, monitoring, and study of new and existing stormwater projects by providing financial incentives for their construction/retrofit and monitoring/reporting costs. These pilot programs will help evaluate the potential benefits delivered by stormwater capture projects and provide a basis for potential future funding approaches. Metropolitan's Board authorized a total of $12.5 million for the stormwater pilot programs ($5 million for the District Use Pilot and $7.5 million for the Recharge Pilot).

Current Status and Results of Metropolitan's Local Resource Programs

Today, nearly one-half of the total recycled water and groundwater recovery production in the region has been developed with an incentive from one or more of Metropolitan's local resource programs. During fiscal year 2020, Metropolitan provided about $13 million for production of 71,000 acre-feet of recycled water for non-potable and indirect potable uses. Metropolitan provided about $4 million to support projects that produced about 50,000 acre-feet of recovered groundwater for municipal use. Since 1982, Metropolitan has invested $680 million to fund 85 recycled water projects and 27 groundwater recovery projects that have produced a cumulative total of about 4 million acre-feet.

Conservation Programs

Metropolitan's regional conservation programs and approaches have a long history. Decades ago, Metropolitan recognized that demand management at the consumer level would be an important part of balancing regional supplies and demands. Water conservation efforts were seen as a way to reduce the need for imported supplies and offset the need to transport or store additional water into or within the Metropolitan service area. The actual conservation of water takes place at the retail consumer level. Regional conservation approaches have proven to be effective at reaching retail consumers throughout Metropolitan's service area and successfully implementing water saving devices, programs and practices. Through the pooling of funding by Metropolitan's member agencies, Metropolitan is able to engage in regional campaigns with wide-reaching impact. Regional investments in demand management programs, of which conservation is a key part along with local supply programs, benefit all member agencies regardless of project location. These programs help to increase regional water supply reliability, reduce demands for imported water supplies, decrease the burden on Metropolitan's infrastructure, reduce system costs, and free up conveyance capacity to the benefit of all member agencies.

Incentive-Based Conservation Programs

Conservation Credits Program

In 1988, Metropolitan's Board approved the Water Conservation Credits Program (Credits Program). The Credits Program is similar in concept to the Local Projects Program (LPP). The purpose of the Credits Program is to encourage local water agencies to implement effective water conservation projects through the use of financial incentives. The Credits Program provides financial assistance for water conservation projects that reduce demands on Metropolitan's imported water supplies and require Metropolitan's assistance to be financially feasible.

Initially, the Credits Program provided 50 percent of a member agency's program cost, up to a maximum of $75 per acre-foot of estimated water savings. The $75 Base Conservation Rate was established based Metropolitan's avoided cost of pumping SWP supplies. The Base Conservation Rate has been revisited by Metropolitan's Board and revised twice since 1988, from $75 to $154 per acre-foot in 1990 and from $154 to $195 per acre-foot in 2005.

In fiscal year 2020 Metropolitan processed more than 30,400 rebate applications totaling $18.9 million.

Member Agency Administered Program

Some member agencies also have unique programs within their service areas that provide local rebates that may differ from Metropolitan's regional program. Metropolitan continues to support these local efforts through a member agency administered funding program that adheres to the same funding guidelines as the Credits Program. The Member Agency Administered Program allows member agencies to receive funding for local conservation efforts that supplement, but do not duplicate, the rebates offered through Metropolitan's regional rebate program.

Water Savings Incentive Program

There are numerous commercial entities and industries within Metropolitan's service area that pursue unique savings opportunities that do not fall within the general rebate programs that Metropolitan provides. In 2012, Metropolitan designed the Water Savings Incentive Program (WSIP) to target these unique commercial and industrial projects. In addition to rebates for devices, under this program, Metropolitan provides financial incentives to businesses and industries that created their own custom water efficiency projects. Qualifying custom projects can receive funding for permanent water efficiency changes that result in reduced potable demand.

Non-Incentive Conservation Programs

In addition to its incentive-based conservation programs, Metropolitan also undertakes additional efforts throughout its service area that help achieve water savings without the use of rebates. Metropolitan's non-incentive conservation efforts include:

- residential and professional water efficient landscape training classes
- water audits for large landscapes
- research, development and studies of new water saving technologies
- advertising and outreach campaigns
- community outreach and education programs
- advocacy for legislation, codes, and standards that lead to increased water savings

Current Status and Results of Metropolitan's Conservation Programs

Since 1990, Metropolitan has invested $824 million in conservation rebates that have resulted in a cumulative savings of 3.27 million acre-feet of water. These investments include $450 million in turf removal and other rebates during the last drought which resulted in 175 million square feet of lawn turf removed. During fiscal year 2020, 1.06 million acre-feet of water is estimated to have been conserved. This annual total includes Metropolitan's Conservation Credits Program; code-based conservation achieved through Metropolitan-sponsored legislation; building plumbing codes and ordinances; reduced consumption resulting from changes in water pricing; and pre-1990 device retrofits.

Infeasibility of Accounting Regional Investments in Reduced Reliance Below the Regional Level

The accounting of regional investments that contribute to reduced reliance on supplies from the Delta watershed is straightforward to calculate and report at the regional aggregate level. However, any similar accounting is infeasible for the individual member agencies or their customers. As described above, the region (through Metropolitan) makes significant investments in projects, programs and other resources that reduce reliance on the Delta. In fact, all of Metropolitan's investments in Colorado River supplies, groundwater and surface storage, local resources development and demand management measures that reduce reliance on the Delta are collectively funded by revenues generated from the member agencies through rates and charges.

Metropolitan's revenues cannot be matched to the demands or supply production history of an individual agency, or consistently across the agencies within the service area. Each project or program funded by the region has a different online date, useful life, incentive rate and structure, and production schedule. It is infeasible to account for all these things over the life of each project or program and provide a nexus to each member agency's contributions to Metropolitan's revenue stream over time. Accounting at the regional level allows for the incorporation of the local supplies and water use efficiency programs done by member agencies and their customers through both the regional programs and through their own specific local programs. As shown above, despite the infeasibility of accounting reduced Delta reliance below the regional level, Metropolitan's member agencies and their customers have together made substantial contributions to the region's reduced reliance.

Because of this infeasibility to separate out the individual member agency's reduced reliance on the Delta, Metropolitan has completed the analysis to demonstrate a regional wide reduction which is shown in Table C-4.

4. Summary of Expected Outcomes for Reduced Reliance on the Delta

As stated in WR P1(c)(1)(C), the policy requires that, commencing in 2015, UWMPs include expected outcomes for measurable reduction in Delta reliance and improved regional self- reliance. WR P1 further states that those outcomes shall be reported in the UWMP as the reduction in the amount of water used, or in the percentage of water used, from the Delta.

The expected outcomes for Western's reduced Delta reliance and regional self-reliance were developed using the approach and guidance described in the Guidebook Appendix C issued in March 2021.

Improved Regional Self-Reliance

The data used to demonstrate increased regional self-reliance in this analysis represent the total regional efforts of Western and the retail agencies in its service area and was developed in conjunction with Metropolitan as part of the UWMP coordination process.

The following provides a summary of the near-term (2025) and long-term (2045) expected outcomes for Western's regional self-reliance.

- Near-term (2025) – Normal water year regional self-reliance is expected to increase by approximately 120,000 AF from the 2010 baseline (Table C-3).
- Long-term (2045) – Normal water year regional self-reliance is expected to increase by approximately 115,000 AF from the 2010 baseline (Table C-3).

The results show that Western and the retail agencies in its service area are reducing reliance on the Delta and improving regional self-reliance through investing in local supplies, in conjunction with Metropolitan and other

member agency efforts. As discussed, additional investments in local supplies, such as recycled water, were not included in this analysis to be conservative due to gaps in comparable data between the 2010 baseline and future years. As a result, the improvement in regional self-reliance is expected to be even greater than demonstrated in this analysis.

Reduced Reliance on Supplies from the Delta Watershed

For reduced reliance on supplies from the Delta Watershed, the data used in this analysis represent the total regional efforts of Metropolitan, its member agencies (e.g., Western), and their customers, and were developed in conjunction with Western and other Metropolitan member agencies as part of the UWMP coordination process (as described in Section 5 of Metropolitan's 2020 UWMP). In accordance with UWMP requirements, Metropolitan's member agencies and their customers (many of them retail agencies) also report demands and supplies for their service areas in their respective UWMPs. The data reported by those agencies are not additive to the regional totals shown in Metropolitan's UWMP, rather their reporting represents subtotals of the regional total and should be considered as such for the purposes of determining reduced reliance on the Delta.

While the demands that Metropolitan's member agencies and their customers report in their UWMP's are a good reflection of the demands in their respective service areas, they do not adequately represent each water suppliers' individual contributions to reduced reliance on the Delta. To calculate and report their reliance on water supplies from the Delta watershed, water suppliers that receive water from the Delta through other regional or wholesale water suppliers would need to determine the amount of Delta water that they receive from the regional or wholesale supplier. Two specific pieces of information are needed to accomplish this, first is the quantity of demands on the regional or wholesale water supplier that accurately reflect a supplier's contributions to reduced reliance on the Delta and second is the quantity of a supplier's demands on the regional or wholesale water supplier that are met by supplies from the Delta watershed.

For water suppliers that make investments in regional projects or programs it may be infeasible to quantify their demands on the regional or wholesale water supplier in a way that accurately reflects their individual contributions to reduced reliance on the Delta. Due to the extensive, long-standing, and successful implementation of regional demand management and local resource incentive programs in Metropolitan's service area, this infeasibility holds true for Metropolitan's members as well as their customers. For Metropolitan's service area, reduced reliance on supplies from the Delta watershed can only be accurately accounted for at the regional level.

The results show that as a region, Metropolitan and its members (including Western) as well as their customers are measurably reducing reliance on the Delta and improving regional self-reliance.

5. UWMP Implementation

In addition to the analysis and documentation described above, WR P1 subsection (c)(1)(B) requires that all programs and projects included in the UWMP that are locally cost-effective and technically feasible, which reduce reliance on the Delta, are identified, evaluated, and implemented consistent with the implementation schedule. WR P1 (c)(1)(B) states that:

> *(B) Identified, evaluated, and commenced implementation, consistent with the implementation schedule set forth in the Plan, of all programs and projects included in the Plan that are locally cost effective and technically feasible which reduce reliance on the Delta[.]*

In accordance with Water Code Section 10631(f), water suppliers must already include in their UWMP a detailed description of expected future projects and programs that they may implement to increase the amount of water supply available to them in normal and single-dry water years and for a period of drought lasting five consecutive years. The UWMP description must also identify specific projects, include a description of the increase in water supply that is expected to be available from each project, and include an estimate regarding the implementation timeline for each project or program.

Chapters 4 and 9 of Western's 2020 UWMP summarizes the implementation plan and continued progress in developing a diversified water portfolio to meet the region's water needs.

6. 2015 UWMP Appendix Q

The information contained in this appendix is also intended to be a new Appendix Q to Western's 2015 UWMP consistent with WR P1 subsection (c)(1)(C) (Cal. Code Regs. tit. 23, § 5003). Western provided notice of the availability of the draft 2020 UWMP, 2020 WSCP, and the new Appendix Q to the 2015 UWMP and held a public hearing to consider adoption of the documents in accordance with CWC Sections 10621(b) and 10642, and Government Code Section 6066, and Chapter 17.5 (starting with Section 7290) of Division 7 of Title 1 of the Government Code. The public review drafts of the 2020 UWMP, 2020 WSCP, and Appendix Q to the 2015 UWMP were posted on Western's website, https://www.wmwd.com/215/Urban-Water-Management-Plan, in advance of the public hearing on June 16, 2021. The notice of availability of the documents was sent to Western's customers, as well as cities and counties in Western's service area. Copies of the notification letters are included in the 2020 UWMP Appendix B. Thus, this Appendix Q to Western's 2020 UWMP, which was adopted with Western's 2020 UWMP, will also be recognized and treated as Appendix Q to Western's 2015 UWMP.

Western held a public hearing for the draft 2020 UWMP, draft 2020 WSCP, and draft Appendix Q to the 2015 UWMP on June 16, 2021, at a regular Board of Directors (Board) meeting, held online due to COVID-19 concerns. Western's Board determined that the 2020 UWMP and the 2020 WSCP accurately represent the water resources plan for Western's service area. In addition, Western's Board determined that this appendix to both the 2015 UWMP and the 2020 UWMP includes all the elements described in Delta Plan Policy WR P1, Reduce Reliance on the Delta through Improved Regional Water Self-Reliance (Cal. Code Regs. tit. 23, § 5003), which need to be included in a water supplier's UWMP to support a certification of consistency for a future covered action. As stated in Resolutions 3154, 3155, and 3158, Western's Board adopted the 2020 UWMP, 2020 WSCP, and Appendix Q to the 2015 UWMP and authorized their submittal to the State of California. Copies of the resolutions are included in the 2020 UWMP Appendix D.

Table C-1: Optional Calculation of Water Use Efficiency -To be completed if Water Supplier does not specifically estimate Water Use Efficiency as a supply

Service Area Water Use Efficiency Demands (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Water Demands with Water Use Efficiency Accounted For	294,564	321,826	317,133	270,488	299,467	313,141	328,331	340,249
Non-Potable Water Demands	11,068	17,394	13,345	22,926	24,760	25,520	27,217	28,337
Potable Service Area Demands with Water Use Efficiency Accounted For	283,496	304,432	303,788	247,562	274,707	287,621	301,113	311,912

Total Service Area Population	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Population	838,200	955,531	979,634	1,026,150	1,072,666	1,119,183	1,151,427	1,183,671

Water Use Efficiency Since Baseline (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Per Capita Water Use (GPCD)	302	284	277	215	229	229	233	235
Change in Per Capita Water Use from Baseline (GPCD)		(18)	(25)	(87)	(73)	(73)	(68)	(67)
Estimated Water Use Efficiency Since Baseline		18,748	27,544	99,502	88,090	90,909	88,322	88,429

Table C-2: Calculation of Service Area Water Demands Without Water Use Efficiency

Total Service Area Water Demands (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Water Demands with Water Use Efficiency Accounted For	294,564	321,826	317,133	270,488	299,467	313,141	328,331	340,249
Reported Water Use Efficiency or Estimated Water Use Efficiency Since Baseline		18,748	27,544	99,502	88,090	90,909	88,322	88,429
Service Area Water Demands without Water Use Efficiency Accounted For	294,564	340,574	344,677	369,990	387,557	404,050	416,653	428,678

Table C-3: Calculation of Supplies Contributing to Regional Self-Reliance

Water Supplies Contributing to Regional Self-Reliance (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Water Use Efficiency		18,748	27,544	99,502	88,090	90,909	88,322	88,429
Water Recycling	11,068	17,394	13,345	22,926	24,760	25,520	27,217	28,337
Stormwater Capture and Use			1,800	1,800	1,800	1,800	1,800	1,800
Advanced Water Technologies			7,067	7,067	7,067	7,067	7,067	7,067
Conjunctive Use Projects								
Local and Regional Water Supply and Storage Projects								
Other Programs and Projects the Contribute to Regional Self-Reliance								
Water Supplies Contributing to Regional Self-Reliance	11,068	36,142	49,757	131,295	121,717	125,297	124,407	125,633

Service Area Water Demands without Water Use Efficiency (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Water Demands without Water Use Efficiency Accounted For	294,564	340,574	344,677	369,990	387,557	404,050	416,653	428,678

Change in Regional Self Reliance (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Water Supplies Contributing to Regional Self-Reliance	11,068	36,142	49,757	131,295	121,717	125,297	124,407	125,633
Change in Water Supplies Contributing to Regional Self-Reliance		25,074	38,689	120,227	110,649	114,229	113,339	114,565

Percent Change in Regional Self Reliance (As Percent of Demand w/out WUE)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Percent of Water Supplies Contributing to Regional Self-Reliance								
Change in Percent of Water Supplies Contributing to Regional Self-Reliance								

Table C-4: Calculation of Reliance on Water Supplies from the Delta Watershed

Water Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
CVP/SWP Contract Supplies	1,472,000	1,029,000	984,000	1,133,000	1,130,000	1,128,000	1,126,000	1,126,000
Delta/Delta Tributary Diversions								
Transfers and Exchanges	20,000	44,000	91,000	58,000	52,000	52,000	52,000	52,000
Other Water Supplies from the Delta Watershed								
Total Water Supplies from the Delta Watershed	1,492,000	1,073,000	1,075,000	1,191,000	1,182,000	1,180,000	1,178,000	1,178,000

Service Area Water Demands without Water Use Efficiency (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Water Demands without Water Use Efficiency Accounted For	5,493,000	5,499,000	5,219,000	4,925,000	5,032,000	5,156,000	5,261,000	5,374,000

Change in Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Water Supplies from the Delta Watershed	1,492,000	1,073,000	1,075,000	1,191,000	1,182,000	1,180,000	1,178,000	1,178,000
Change in Water Supplies from the Delta Watershed		(419,000)	(417,000)	(301,000)	(310,000)	(312,000)	(314,000)	(314,000)

Percent Change in Supplies from the Delta Watershed (As a Percent of Demand w/out WUE)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Percent of Water Supplies from the Delta Watershed	27.2%	19.5%	20.6%	24.2%	23.5%	22.9%	22.4%	21.9%
Change in Percent of Water Supplies from the Delta Watershed		-7.6%	-6.6%	-3.0%	-3.7%	-4.3%	-4.8%	-5.2%

R

Appendix R DWR Submittal Tables

2-1R | Public Water Systems

STATUS: Published

NOTES: -

Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020
CA3310049	WESTERN MWD	21,657	19,555
CA3310036	WESTERN MWD - MURRIETA DIVISION	2,946	2,233
CA3310076	WESTERN MWD (ID A - RAINBOW)	42	47
	Total:	**24,645**	**21,835**

2-2 | Public Water Systems

STATUS: Published

NOTES: -

Type of Plan	Member of RUWMP	Member of Regional Alliance	Name of RUWMP or Regional Alliance
Individual UWMP	No	No	

2-3 | Agency Identification

STATUS: Published

NOTES: cannot select both wholesale and retailer; override in word table

Type of Supplier	Year Type	First Day of Year		Unit Type
		DD	MM	
Retailer	Calendar Years			Acre Feet (AF)

Conversion to Gallons: *325851*
Conversion to Gallons per Day: *892.7425*

2-4R | Water Supplier Information Exchange

STATUS: Published

NOTES: -

Wholesale Water Supplier Name
Western Municipal Water District
1Western considers their retail system as a wholesale customer and imports water for their retail customers.

2-4W | Water Supplier Information Exchange

STATUS: Published

NOTES:

Supplier has informed more than 10 other water suppliers of water supplies available in accordance with Water Code Section 10631. Completion of the table below is optional.

If not completed, include a list of the water suppliers that were informed.

Location of List:

Wholesale Water Supplier Name
Box Springs Mutual Water District
City of Corona
City of Norco
Eagle Valley Mutual Water Company
Elsinore Valley Municipal Water District
Home Gardens County Water District
Jurupa Community Services District
Rancho California Water District
Riverside Highlands Water Company
Riverside Public Utilities
Rubidoux Community Services District
Santa Ana River Water Company
Temescal Valley Water District

3-1R | Current & Projected Population

STATUS: Published

NOTES:

Population Served	2020	2025	2030	2035	2040	2045
Riverside	79,044	87,652	97,260	107,981	120,293	134,013
Murrieta	15,676	18,011	20,610	23,506	26,389	29,621
Rainbow	178	202	231	262	294	324
Total	**94,898**	**105,865**	**118,101**	**131,749**	**146,976**	**163,958**

3-1W | Current & Projected Population

STATUS: Published

NOTES:

Population Served	2020	2025	2030	2035	2040	2045
Western Wholesale	979,634	1,025,334	1,077,603	1,131,288	1,177,721	1,225,915
Total	**979,634**	**1,025,334**	**1,077,603**	**1,131,288**	**1,177,721**	**1,225,915**

4-1R | Actual Demands for Water

STATUS: Published

NOTES:

Use Type	Additional Description	Level of Treatment When Delivered	2020 Volume
Single Family		Drinking Water	14,973
Multi-Family		Drinking Water	731
Commercial		Drinking Water	1,328
Industrial		Drinking Water	940
Landscape	Potable	Drinking Water	2,563
Agricultural irrigation	Potable	Drinking Water	397
Other	Military	Drinking Water	132
Other	Temporary	Drinking Water	159
Other	Fireline	Drinking Water	6
Losses		Drinking Water	602
Landscape	Non-Potable	Other Non-Potable Water	1,538
Agricultural irrigation	Non-Potable	Other Non-Potable Water	2,366
Losses	Non-Potable	Other Non-Potable Water	1,008
		Total:	**26,743**

Optional 4-1R | Actual Demands for Water: Potable

INCLUDE IN UWMP: Yes

Use Type	Additional Description	Level of Treatment When Delivered	2020 Volume
Single Family		Drinking Water	14,973
Multi-Family		Drinking Water	731
Commercial		Drinking Water	1,328
Industrial		Drinking Water	940
Landscape	Potable	Drinking Water	2,563
Agricultural irrigation	Potable	Drinking Water	397
Other	Military	Drinking Water	132
Other	Temporary	Drinking Water	159
Other	Fireline	Drinking Water	6
Losses		Drinking Water	602
		Total:	**21,831**

Optional 4-1R | Actual Demands for Water: Non-Potable

INCLUDE IN UWMP: Yes

Use Type	Additional Description	Level of Treatment When Delivered	2020 Volume
Landscape	Non-Potable	Other Non-Potable Water	1,538
Agricultural irrigation	Non-Potable	Other Non-Potable Water	2,366
Losses	Non-Potable	Other Non-Potable Water	1,006
		Total:	**4,910**

4-1W | Actual Demands for Water

STATUS: Published

NOTES:

Use Type	Additional Description	Level of Treatment When Delivered	2020 Volume
Sales/Transfers/Exchanges to Other Agencies	Box Springs Mutual Water District	Drinking Water	149
Sales/Transfers/Exchanges to Other Agencies	City of Corona	Drinking Water	1,229
Sales/Transfers/Exchanges to Other Agencies	City of Corona	Raw Water	16,637
Sales/Transfers/Exchanges to Other Agencies	City of Norco	Drinking Water	4,814
Sales/Transfers/Exchanges to Other Agencies	Eagle Valley	Raw Water	132
Sales/Transfers/Exchanges to Other Agencies	Elsinore Valley Municipal Water District	Drinking Water	15,115
Sales/Transfers/Exchanges to Other Agencies	Rancho California Water District	Drinking Water	10,886
Sales/Transfers/Exchanges to Other Agencies	Rancho California Water District	Raw Water	6,563
Sales/Transfers/Exchanges to Other Agencies	Temescal Valley Water District	Drinking Water	3,435
Sales/Transfers/Exchanges to Other Agencies	Western Retail	Drinking Water	12,004
Sales/Transfers/Exchanges to Other Agencies	Western Retail	Raw Water	1,819
		Total:	**72,783**

Optional 4-1W | Actual Demands for Water: Potable

INCLUDE IN UWMP: Yes

Use Type	Additional Description	Level of Treatment When Delivered	2020 Volume
Sales/Transfers/Exchanges to Other Agencies	Box Springs Mutual Water District	Drinking Water	149
Sales/Transfers/Exchanges to Other Agencies	City of Corona	Drinking Water	1,229
Sales/Transfers/Exchanges to Other Agencies	City of Norco	Drinking Water	4,814
Sales/Transfers/Exchanges to Other Agencies	Elsinore Valley Municipal Water District	Drinking Water	15,115
Sales/Transfers/Exchanges to Other Agencies	Rancho California Water District	Drinking Water	10,886
Sales/Transfers/Exchanges to Other Agencies	Temescal Valley Water District	Drinking Water	3,435
Sales/Transfers/Exchanges to Other Agencies	Western Retail	Drinking Water	12,004
		Total:	**47,632**

Optional 4-1W | Actual Demands for Water: Non-Potable

INCLUDE IN UWMP: Yes

Use Type	Additional Description	Level of Treatment When Delivered	2020 Volume
Sales/Transfers/Exchanges to Other Agencies	City of Corona	Raw Water	16,637
Sales/Transfers/Exchanges to Other Agencies	Eagle Valley	Raw Water	132
Sales/Transfers/Exchanges to Other Agencies	Rancho California Water District	Raw Water	6,563
Sales/Transfers/Exchanges to Other Agencies	Western Retail	Raw Water	1,819
		Total:	**25,151**

4-2R | Projected Demands for Water

STATUS: Published

NOTES:

Use Type	Additional Description	Projected Water Use				
		2025	2030	2035	2040	2045
Single Family		16,704	18,632	20,784	23,183	25,802
Multi-Family		815	909	1,015	1,132	1,260
Commercial		1,481	1,652	1,843	2,056	2,288
Industrial		1,049	1,170	1,305	1,456	1,620
Other	Military	148	165	184	205	228
Landscape		2,859	3,189	3,557	3,968	4,417
Agricultural irrigation		443	494	551	615	685
Other	Fireline	6	7	8	9	10
Other	Temporary	177	198	220	246	274
Losses		930	1,037	1,157	1,289	1,435
Agricultural irrigation	Non-Potable	1,779	2,058	2,296	2,561	2,857
Landscape	Non-Potable	2,737	3,166	3,532	3,940	4,396
Losses	Non-Potable	1,039	1,202	1,340	1,495	1,668
Total:		**30,167**	**33,879**	**37,792**	**42,155**	**46,940**

Optional 4-2R | Projected Demands for Water: Potable

INCLUDE IN UWMP: Yes

Use Type	Additional Description	Projected Water Use				
		2025	2030	2035	2040	2045
Single Family		16,704	18,632	20,784	23,183	25,802
Multi-Family		815	909	1,015	1,132	1,260
Commercial		1,481	1,652	1,843	2,056	2,288
Industrial		1,049	1,170	1,305	1,456	1,620
Other	Military	148	165	184	205	228
Landscape		2,859	3,189	3,557	3,968	4,417
Agricultural irrigation		443	494	551	615	685
Other	Fireline	6	7	8	9	10
Other	Temporary	177	198	220	246	274
Losses		930	1,037	1,157	1,289	1,435
Total:		**24,612**	**27,453**	**30,624**	**34,159**	**38,019**

Optional 4-2R | Projected Demands for Water: Non-Potable

INCLUDE IN UWMP: Yes

Use Type	Additional Description	Projected Water Use				
		2025	2030	2035	2040	2045
Agricultural irrigation	Non-Potable	1,779	2,058	2,296	2,561	2,857
Landscape	Non-Potable	2,737	3,166	3,532	3,940	4,396
Losses	Non-Potable	1,039	1,202	1,340	1,495	1,668
Total:		**5,555**	**6,426**	**7,168**	**7,996**	**8,921**

4-2W | Projected Demands for Water

STATUS: Published

NOTES: -

Use Type	Additional Description	Projected Water Use				
		2025	2030	2035	2040	2045
Sales/Transfers/Exchanges to Other Agencies	Box Springs	145	150	175	175	175
Sales/Transfers/Exchanges to Other Agencies	City of Corona	1,838	1,838	1,838	1,838	1,838
Sales/Transfers/Exchanges to Other Agencies	City of Corona	13,323	13,323	13,323	13,323	13,323
Sales/Transfers/Exchanges to Other Agencies	City of Norco	250	250	250	250	250
Sales/Transfers/Exchanges to Other Agencies	Eagle Valley Mututal Water Company	110	110	110	110	110
Sales/Transfers/Exchanges to Other Agencies	Elsinore Valley Municipal Water District	18,000	16,605	18,338	20,073	21,925
Sales/Transfers/Exchanges to Other Agencies	Elsinore Valley Municipal Water District	-	3,700	3,700	3,700	3,700
Sales/Transfers/Exchanges to Other Agencies	Jurupa Community Services District	10,000	10,000	10,000	10,000	10,000
Sales/Transfers/Exchanges to Other Agencies	Rancho California Water District	16,593	12,240	12,848	9,289	10,088
Sales/Transfers/Exchanges to Other Agencies	Rancho California Water District	13,286	13,286	13,286	17,625	17,625
Sales/Transfers/Exchanges to Other Agencies	Rubidoux Community Services District	1,200	2,000	2,000	2,000	2,000
Sales/Transfers/Exchanges to Other Agencies	Riverside Public Utilities	2,000	3,000	3,000	3,000	3,000
Sales/Transfers/Exchanges to Other Agencies	Temescal Valley Water District	3,720	3,800	3,800	3,800	3,800
Sales/Transfers/Exchanges to Other Agencies	Western Retail	14,680	19,306	22,293	26,181	31,928
Sales/Transfers/Exchanges to Other Agencies	Western Retail	1,671	1,300	1,300	1,300	1,681

Total:	**96,816**	**100,908**	**106,261**	**112,664**	**121,443**

Optional 4-2W | Projected Demands for Water: Potable

INCLUDE IN UWMP: Yes

Use Type	Additional Description	Projected Water Use				
		2025	2030	2035	2040	2045
Sales/Transfers/Exchanges to Other Agencies	Box Springs	145	150	175	175	175
Sales/Transfers/Exchanges to Other Agencies	City of Corona	1,838	1,838	1,838	1,838	1,838
Sales/Transfers/Exchanges to Other Agencies	City of Norco	250	250	250	250	250
Sales/Transfers/Exchanges to Other Agencies	Elsinore Valley Municipal Water District	18,000	16,605	18,338	20,073	21,925
Sales/Transfers/Exchanges to Other Agencies	Jurupa Community Services District	10,000	10,000	10,000	10,000	10,000
Sales/Transfers/Exchanges to Other Agencies	Rancho California Water District	16,593	12,240	12,848	9,289	10,088
Sales/Transfers/Exchanges to Other Agencies	Rubidoux Community Services District	1,200	2,000	2,000	2,000	2,000
Sales/Transfers/Exchanges to Other Agencies	Riverside Public Utilities	2,000	3,000	3,000	3,000	3,000
Sales/Transfers/Exchanges to Other Agencies	Temescal Valley Water District	3,720	3,800	3,800	3,800	3,800
Sales/Transfers/Exchanges to Other Agencies	Western Retail	14,680	19,306	22,293	26,181	31,928
	Total:	**68,426**	**69,189**	**74,542**	**76,606**	**85,004**

Optional 4-2W | Projected Demands for Water: Non-Potable

INCLUDE IN UWMP: Yes

Use Type	Additional Description	Projected Water Use				
		2025	2030	2035	2040	2045
Sales/Transfers/Exchanges to Other Agencies	City of Corona	13,323	13,323	13,323	13,323	13,323
Sales/Transfers/Exchanges to Other Agencies	Eagle Valley Mututal Water Company	110	110	110	110	110
Sales/Transfers/Exchanges to Other Agencies	Elsinore Valley Municipal Water District	-	3,700	3,700	3,700	3,700
Sales/Transfers/Exchanges to Other Agencies	Rancho California Water District	13,286	13,286	13,286	17,625	17,625
Sales/Transfers/Exchanges to Other Agencies	Western Retail	1,671	1,300	1,300	1,300	1,681
	Total:	**28,390**	**31,719**	**31,719**	**36,058**	**36,439**

4-3R | Total Gross Water Use

STATUS: Published

NOTES:

	2020	2025	2030	2035	2040	2045
Potable and Raw Water From Table 4-1R and 4-2R	24,985	28,227	31,281	34,312	38,123	42,908
Recycled Water Demand* From Table 6-4R	1,758	1,940	2,598	3,480	4,032	4,032
Total Water Use:	**26,743**	**30,167**	**33,879**	**37,792**	**42,155**	**46,940**

Optional 4-3R | Total Gross Water Use: Potable

INCLUDE IN UWMP: Yes

	2020	2025	2030	2035	2040	2045
Potable and Raw Water From Table 4-1R and 4-2R	21,831	24,612	27,453	30,624	34,159	38,019
Total Water Use	**21,831**	**24,612**	**27,453**	**30,624**	**34,159**	**38,019**

4-3R | Total Gross Water Use: Non-Potable

INCLUDE IN UWMP: Yes

	2020	2025	2030	2035	2040	2045
Recycled Water Demand* From Table 6-4R	1,758	1,940	2,598	3,480	4,032	4,032
Raw and Other Non-Potable From Table 4-1R and 4-2R	3,152	3,615	3,828	3,688	3,964	4,889
Total Water Use	**4,910**	**5,555**	**6,426**	**7,168**	**7,996**	**8,921**

4-3W | Total Water Use

STATUS: Published

NOTES: -

	2020	2025	2030	2035	2040	2045
Potable and Raw Water From Table 4-1W and 4-2W	72,783	96,816	100,908	106,261	112,664	121,443
Recycled Water Demand* From Table 6-4W	-	-	-	-	-	-
Total Water Demand:	**72,783**	**96,816**	**100,908**	**106,261**	**112,664**	**121,443**

4-3W | Total Water Use: Potable

INCLUDE IN UWMP: Yes

	2020	2025	2030	2035	2040	2045
Potable and Raw Water From Table 4-1W and 4-2W	47,632	68,426	69,189	74,542	76,606	85,004
Total Water Demand	**47,632**	**68,426**	**69,189**	**74,542**	**76,606**	**85,004**

4-3W | Total Water Use: Non-Potable

INCLUDE IN UWMP: Yes

	2020	2025	2030	2035	2040	2045
Recycled Water Demand* From Table 6-4W	-	-	-	-	-	-
Other Non-Potable Water From Tables 4-1W and 4-2W	25,151	28,390	31,719	31,719	36,058	36,439
Total Water Demand	**25,151**	**28,390**	**31,719**	**31,719**	**36,058**	**36,439**

4-4R | 12 Month Water Loss Audit Reporting

STATUS: Published

NOTES: -

Report Period Start Date		Volume of Water Loss*
MM	**YYYY**	
1	2016	3,251
1	2017	1,632
1	2018	1,300
1	2019	1,294
1	2020	666

4-4W | 12 Month Water Loss Audit Reporting

STATUS: Published

NOTES:

Report Period Start Date		Volume of Water Loss*
MM	YYYY	

4-5R | Inclusion in Water Use Projections

STATUS: Published

NOTES:

Are Future Water Savings Included in Projections? Refer to Appendix K of UWMP Guidebook.	No
Are Lower Income Residential Demands Included in Projections?	Yes

5-1R | Baselines & Targets Summary

STATUS: Published

NOTES: -

Baseline Period	Start Year	End Year	Average Baseline GPCD*	Confirmed 2020 Target *
10-15 Year	1995	2004	430	352
5 Year	2003	2007	370	352

*All values are in Gallons per Capita per Day (GPCD)

5-2R | 2020 Compliance

STATUS: Published

NOTES: -

Actual 2020 GPCD*	Optional Adjustments to 2020 GPCD					2020 GPCD (Adjusted if applicable)	Supplier Achieved Targeted Reduction in 2020
	Extraordinary Events*	Economic Adjustment*	Weather Normalization*	Total Adjustments*	Adjusted 2020 GPCD*		
235	0	0	0	0	235	235	Yes

Based on a retail population estimate of 94,898, calculated using DWR's population tool.

6-1R | Groundwater Volume Pumped

STATUS: Published

NOTES:

All or part of the groundwater described below is desalinated.						
Groundwater Type	**Location or Basin Name**	**2016**	**2017**	**2018**	**2019**	**2020**
Alluvial Basin	Temecula Valley	398	423	398	370	399
Alluvial Basin	San Bernardino Basin Area	227	227	227	227	227
	Total:	**625**	**650**	**625**	**597**	**626**

6-1W | Groundwater Volume Pumped

STATUS: Published

NOTES: -

All or part of the groundwater described below is desalinated.						
Groundwater Type	**Location or Basin Name**	**2016**	**2017**	**2018**	**2019**	**2020**
Alluvial Basin	Riverside-Arlington	4,880	4,754	5,433	4,449	4,814
	Total:	**4,880**	**4,754**	**5,433**	**4,449**	**4,814**

6-2R | Wastewater Collected within Service Area in 2020

STATUS: Published

NOTES:

The supplier will complete the table.

Percentage of 2020 service area covered by wastewater collection system (optional):	
Percentage of 2020 service area population covered by wastewater collection system (optional):	

Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	**Wastewater Volume Metered or Estimated**	**Wastewater Volume Collected from UWMP Service Area in 2020**	**Name of Wastewater Agency Receiving Collected Wastewater**	**Wastewater Treatment Plant Name**	**Wastewater Treatment Plant Located within UWMP Area**	**WWTP Operation Contracted to a Third Party**
Western Municipal Water District	Metered	1,758	**Western Municipal Water District**	Western Water Recycling Facility	Yes	No
Western Municipal Water District	Estimated	1,000	**Western Riverside County Regional Wastewater Authority**	Western Riverside County Regional Wastewater Treatment Plant	Yes	No
Rancho California Water District	Estimated	900	**Rancho California Water District**	Santa Rosa Water Reclamation Facility	No	Yes
Eastern Municipal Water District	Estimated	245	**Eastern Municipal Water District**	Temecula Valley Regional Water Reclamation Facility	No	Yes
	Total:	**3,903**				

6-3R | Wastewater Treatment & Discharge Within Service Area in 2020

STATUS: Published

NOTES:

The supplier will complete the table.

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number	Method of Disposal	Plant Treats Wastewater Generated Outside the Service Area	Treatment Level	2020 Volumes				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
Western Water Recycling Facility	Riverside National Cemetary, General Old Golf Course, various agricultural and landscape customers	re-use: landscaping, agriculture, parks, schools, nurseries		Land disposal	No	Tertiary	1,758	-	1,758	-	
Western Riverside County Regional Water Authority Treatment Plant	Santa Ana River	surface water		River or creek outfall	Yes	Tertiary	850	850	-	-	
						Total:	**2,608**	**850**	**1,758**	**-**	**-**

6-3W | Wastewater Treatment & Discharge Within Service Area in 2020

STATUS: Published

NOTES: -

The supplier will complete the table.											
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number	Method of Disposal	Plant Treats Wastewater Generated Outside the Service Area	Treatment Level	2020 Volumes				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
						Total:	-	-	-	-	-

6-4R | Recycled Water Direct Beneficial Uses Within Service Area

STATUS: Published

NOTES:

The supplier will complete the table.

Name of Supplier Producing (Treating) the Recycled Water:	Western
Name of Supplier Operating the Recycled Water Distribution System:	Western
Supplemental Volume of Water Added in 2020:	
Source of 2020 Supplemental Water:	Western Water Recycling Facility

Beneficial Use Type	Potential Beneficial Uses of Recycled Water	Amount of Potential Uses of Recycled Water	General Description of 2020 Uses	Level of Treatment	2020	2025	2030	2035	2040	2045
Landscape Irrigation (excludes golf courses)		AF	Landscape Nonpotable	Tertiary	879	970	1,299	1,740	2,016	2,016
Other		AF	Agriculture Nonpotable	Tertiary	879	970	1,299	1,740	2,016	2,016
				Total:	**1,758**	**1,940**	**2,598**	**3,480**	**4,032**	**4,032**
Internal Reuse (Not included in Statewide Recycled Water Volume).										

*IPR - Indirect Potable Reuse

6-4W | Current & Projected Retailers Provided Recycled Water within Service Area

STATUS: Published

NOTES: -

Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table.

Name of Receiving Supplier or Direct Use by Wholesaler	Level of Treatment	2020	2025	2030	2035	2040	2045
	Total:	-	-	-	-	-	-

6-5R | 2015 Recycled Water Use Projection Compared to 2020 Actual

STATUS: Published

NOTES: -

The supplier will complete the table.

Use Type	2015 Projection for 2020	2020 Actual Use
Other	1,600	1,758
Total:	**1,600**	**1,758**

6-5W | 2015 Recycled Water Use Projection Compared to 2020 Actual

STATUS:	Published
NOTES:	

Recycled water was not used or distributed by the supplier in 2015, nor projected for use or distribution in 2020. The supplier will not complete the table.

Name of Receiving Supplier or Direct Use by Wholesaler	2015 Projection for 2020	2020 Actual Use
Total:	**-**	**-**

6-6R | Methods to Expand Future Recycled Water Use

STATUS: Published

NOTES: -

The supplier will complete the table below.

Name of Action	Description	Planned Implementation Year	Expected Increase of Recycled Water Use
Projects	Expanded WWRF	2045	2,274
		Total:	**2,274**

Western plans to utilize all effluent from the WWRF within its Riverside service area as flows increase due to growth.

6-7R | Expected Future Water Supply Projects or Programs

STATUS: Published

NOTES:

The supplier will complete the table.

Name of Future Projects or Programs	Joint Project with Other Suppliers	Agency Name	Description	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Supplier
Perris North Project	Yes	Eastern Municipal Water District	Groundwater remediation and supply project	2025	All Year Types	500 - 1,500 AFY

6-7W | Expected Future Water Supply Projects or Programs

STATUS: Published

NOTES: -

The supplier will complete the table.

Page Location for Narrative in UWMP:

Name of Future Projects or Programs	Joint Project with Other Suppliers	Agency Name	Description	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Supplier
Santa Ana River Conservation and Conjunctive Use Program (SARCCUP)	Yes	Eastern Municipal Water District, Inland Empire Utilities Agency, Orange County Water District, San Bernardino Valley Municipal Water District	Store imported water during wet years for use in dry years	2023	Single-Dry and Multi-Dry Year	11,417

6-8R | Actual Water Supplies

STATUS: Published

NOTES: -

Water Supply	Additional Detail on Water Supply	2020		
		Actual Volume	Water Quality	Total Right or Safe Yield
Purchased or Imported Water	Metropolitan	12,004	Drinking Water	
Purchased or Imported Water	Metropolitan	1,819	Other Non-Potable Water	
Groundwater (not desalinated)	Western Water (wheeled through RPU)	227	Drinking Water	
Purchased or Imported Water	Leased Meeks and Daley	4,208	Drinking Water	
Purchased or Imported Water	RPU Surplus	3,163	Drinking Water	
Groundwater (not desalinated)	Murrieta Wells	399	Drinking Water	
Purchased or Imported Water	Eastern	1,834	Drinking Water	
Purchased or Imported Water	EVMWD	944	Other Non-Potable Water	
Purchased or Imported Water	RPU	388	Other Non-Potable Water	
Recycled Water	WWRF	1,758	Recycled Water	
	Total:	**26,744**		**-**

Optional 6-8R | Actual Water Supplies: Potable

INCLUDE IN UWMP: Yes

Water Supply	Additional Detail on Water Supply	2020		
		Actual Volume	Water Quality	Total Right or Safe Yield
Purchased or Imported Water	Metropolitan	12,004	Drinking Water	
Groundwater (not desalinated)	Western Water (wheeled through RPU)	227	Drinking Water	
Purchased or Imported Water	Leased Meeks and Daley	4,208	Drinking Water	
Purchased or Imported Water	RPU Surplus	3,163	Drinking Water	
Groundwater (not desalinated)	Murrieta Wells	399	Drinking Water	
Purchased or Imported Water	Eastern	1,834	Drinking Water	
	Total:	**21,835**		**-**

Optional 6-8R | Actual Water Supplies: Non-Potable

INCLUDE IN UWMP:	Yes

Water Supply	Additional Detail on Water Supply	2020		
		Actual Volume	Water Quality	Total Right or Safe Yield
Purchased or Imported Water	EVMWD	944	Other Non-Potable Water	
Purchased or Imported Water	RPU	388	Other Non-Potable Water	
Recycled Water	WWRF	1,758	Recycled Water	
Purchased or Imported Water	Metropolitan	1,819	Other Non-Potable Water	
	Total:	**4,909**		**-**

6-8W | Actual Water Supplies

STATUS: Published

NOTES:

Water Supply	Additional Detail on Water Supply	2020		
		Actual Volume	Water Quality	Total Right or Safe Yield
Purchased or Imported Water	Metropolitan Water District	42,817	Drinking Water	
Purchased or Imported Water	Metropolitan Water District	25,151	Other Non-Potable Water	
Desalinated Water - Groundwater	Arlington Desalter	4,814	Drinking Water	
	Total:	**72,782**		**-**

Optional 6-8W | Actual Water Supplies: Potable

INCLUDE IN UWMP: Yes

Water Supply	Additional Detail on Water Supply	2020		
		Actual Volume	Water Quality	Total Right or Safe Yield
Purchased or Imported Water	Metropolitan Water District	42,817	Drinking Water	
Desalinated Water - Groundwater	Arlington Desalter	4,814	Drinking Water	
	Total:	**47,631**		**-**

Optional 6-8W | Actual Water Supplies: Non-Potable

INCLUDE IN UWMP:	Yes

Water Supply	Additional Detail on Water Supply	2020		
		Actual Volume	Water Quality	Total Right or Safe Yield
Purchased or Imported Water	Metropolitan Water District	25,151	Other Non-Potable Water	
	Total:	**25,151**		**-**

6-8DS | Source Water Desalination

STATUS: Published

NOTES:

The supplier will complete the table below.

Plant Name or Well ID	Plant Capacity	Intake Type	Source Water Type	Influent TDS	Brine Discharge	Volume of Water Desalinated in AFY				
						2016	2017	2018	2019	2020
Chino Desalter (1)	28000	Vertical Well	Groundwater		Brine Line	3,534	3,534	3,534	3,534	3,534
Arlington Desalter (2)		Vertical Well	Groundwater		Brine Line	4,880	4,754	5,433	449	4,814
					Total:	**8,414**	**8,288**	**8,967**	**3,983**	**8,348**

Notes:
(1) Chino Desalter is a Western Retail supply and is described in Section 9.2 of the 2020 UWMP. Western Retail does not currently use this supply and leases it to another agency.
(2) Arlington Desalter is a Western Wholesale supply and is described in Section 4.2 of the 2020 UWMP.

6-9R | Projected Water Supplies

STATUS: Published

NOTES:

Water Supply	Additional Detail on Water Supply	Projected Water Supply									
		2025		2030		2035		2040		2045	
		Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield
Purchased or Imported Water	Metropolitan	14,680		19,306		22,293		26,181		31,928	
Desalinated Water - Groundwater	Chino Desalter	3,534		3,534		3,534		3,534		3,534	
Groundwater (not desalinated)	Temecula Valley	1,452		1,452		1,452		1,452		1,452	
Purchased or Imported Water	Leased Meeks and Daley	4,680		4,680		4,680		4,680		4,680	
Groundwater (not desalinated)	Western Owned Meeks and Daley	227		227		227		227		227	
Purchased or Imported Water	RPU Surplus	2,000		-		-		-		-	
Purchased or Imported Water	Eastern North Perris Agreement	500		1,000		1,500		1,500		-	
Purchased or Imported Water	Metropolitan - Non-Potable	1,671		1,300		1,300		1,300		1,681	
Groundwater (not desalinated)	Riverside Arlington Groundwater	2,500		3,171		3,104		3,465		4,100	
Recycled Water	WWRF	1,940		2,598		3,481		4,032		4,032	
Recycled Water	WRCWRA	920		997		1,079		1,169		1,266	
	Total:	**34,104**	**-**	**38,265**	**-**	**42,650**	**-**	**47,540**	**-**	**52,900**	**-**

Optional 6-9R | Projected Water Supplies: Potable

INCLUDE IN UWMP: Yes

Water Supply	Additional Detail on Water Supply	Projected Water Supply									
		2025		2030		2035		2040		2045	
		Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield
Purchased or Imported Water	Metropolitan	14,680		19,306		22,293		26,181		31,928	
Desalinated Water - Groundwater	Chino Desalter	3,534		3,534		3,534		3,534		3,534	
Groundwater (not desalinated)	Temecula Valley	1,452		1,452		1,452		1,452		1,452	
Purchased or Imported Water	Leased Meeks and Daley	4,680		4,680		4,680		4,680		4,680	
Purchased or Imported Water	RPU Surplus	2,000		-		-		-		-	
Purchased or Imported Water	Eastern North Perris	500		1,000		1,500		1,500		-	
Groundwater (not desalinated)	Western Owned Meeks and Daley	227		227		227		227		227	
	Total:	**27,073**	**-**	**30,199**	**-**	**33,686**	**-**	**37,574**	**-**	**41,821**	**-**

Optional 6-9R | Projected Water Supplies: Non-Potable

INCLUDE IN UWMP: Yes

Water Supply	Additional Detail on Water Supply	Projected Water Supply									
		2025		2030		2035		2040		2045	
		Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield
Purchased or Imported Water	Metropolitan - Non-Potable	1,671		1,300		1,300		1,300		1,681	
Groundwater (not desalinated)	Riverside Arlington Groundwater	2,500		3,171		3,104		3,465		4,100	
Recycled Water	WWRF	1,940		2,598		3,481		4,032		4,032	
Recycled Water	WRCWRA	920		997		1,079		1,169		1,266	
Total:		**7,031**	**-**	**8,066**	**-**	**8,964**	**-**	**9,966**	**-**	**11,079**	**-**

6-9W | Projected Water Supplies

STATUS: Published

NOTES:

Water Supply	Additional Detail on Water Supply	Projected Water Supply									
		2025		2030		2035		2040		2045	
		Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield
Desalinated Water - Groundwater	Arlignton Desalter	5,000		5,000		5,000		5,000		5,000	
Purchased or Imported Water	Metropolitan	91,816		95,908		101,261		107,664		116,443	
Total:		**96,816**	**-**	**100,908**	**-**	**106,261**	**-**	**112,664**	**-**	**121,443**	**-**

Optional 6-9W | Projected Water Supplies: Potable

INCLUDE IN UWMP: Yes

Water Supply	Additional Detail on Water Supply	Projected Water Supply									
		2025		2030		2035		2040		2045	
		Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield
Desalinated Water - Groundwater	Arlington Desalter	5,000		5,000		5,000		5,000		5,000	
Purchased or Imported Water	Metropolitan	63,426		64,189		69,542		71,606		80,004	
Total:		**68,426**	**-**	**69,189**	**-**	**74,542**	**-**	**76,606**	**-**	**85,004**	**-**

Optional 6-9W | Projected Water Supplies: Non-Potable

INCLUDE IN UWMP: Yes

Water Supply	Additional Detail on Water Supply	Projected Water Supply									
		2025		2030		2035		2040		2045	
		Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield	Reasonably Available Volume	Total Right or Safe Yield
Purchased or Imported Water	Metropolitan	28,390		31,719		31,719		36,058		36,439	
Total:		**28,390**	**-**	**31,719**	**-**	**31,719**	**-**	**36,058**	**-**	**36,439**	**-**

7-1R | Basis of Water Year Data (Reliability Assessment)

STATUS: Published

NOTES:

Quantification of available supplies is provided in this table as either volume only, percent only, or both.

Year Type	Base Year	Available Supply if Year Type Repeats	
		Volume Available	Percent of Average Supply
Average Year	1922		
Single-Dry Year	1977		100%
Consecutive Dry Years 1st Year	1988		100%
Consecutive Dry Years 2nd Year	1989		100%
Consecutive Dry Years 3rd Year	1990		100%
Consecutive Dry Years 4th Year	1991		100%
Consecutive Dry Years 5th Year	1992		100%

7-1W | Basis of Water Year Data (Reliability Assessment)

STATUS: Published

NOTES: -

Quantification of available supplies is provided in this table as either volume only, percent only, or both.

Year Type	Base Year	Available Supply if Year Type Repeats	
		Volume Available	Percent of Average Supply
Average Year	1922		
Single-Dry Year	1977		99%
Consecutive Dry Years 1st Year	1988		100%
Consecutive Dry Years 2nd Year	1989		100%
Consecutive Dry Years 3rd Year	1990		100%
Consecutive Dry Years 4th Year	1991		100%
Consecutive Dry Years 5th Year	1992		100%

7-2R | Normal Year Supply and Demand Comparison

STATUS: Published

NOTES:

	2025	2030	2035	2040	2045
Supply Totals From Table 6-9R	34,104	38,265	42,650	47,540	52,900
Demand Totals From Table 4-3R	30,167	33,879	37,792	42,155	46,940
Difference:	**3,937**	**4,386**	**4,858**	**5,385**	**5,960**

Optional 7-2R | Normal Year Supply and Demand Comparison: Potable

INCLUDE IN UWMP: Yes

	2025	2030	2035	2040	2045
Supply Totals From Optional Table 6-9R	27,073	30,199	33,686	37,574	41,821
Demand Totals From Optional Table 4-3R	24,612	27,453	30,624	34,159	38,019
Difference:	**2,461**	**2,746**	**3,062**	**3,415**	**3,802**

Optional 7-2R | Normal Year Supply and Demand Comparison: Non-Potable

INCLUDE IN UWMP: Yes

	2025	2030	2035	2040	2045
Supply Totals From Optional Table 6-9R	7,031	8,066	8,964	9,966	11,079
Demand Totals From Optional Table 4-3R	5,555	6,426	7,168	7,996	8,921
Difference:	**1,476**	**1,640**	**1,796**	**1,970**	**2,158**

7-2W | Normal Year Supply and Demand Comparison

STATUS: Published

NOTES:

	2025	2030	2035	2040	2045
Supply Totals From Table 6-9W	96,816	100,908	106,261	112,664	121,443
Demand Totals From Table 4-3W	96,816	100,908	106,261	112,664	121,443
Difference:	**0**	**0**	**0**	**0**	**0**

Optional 7-2W | Normal Year Supply and Demand Comparison: Potable

INCLUDE IN UWMP: Yes

	2025	2030	2035	2040	2045
Supply Totals From Optional Table 6-9W	68,426	69,189	74,542	76,606	85,004
Demand Totals From Optional Table 4-3W	68,426	69,189	74,542	76,606	85,004
Difference:	**0**	**0**	**0**	**0**	**0**

Optional 7-2W | Normal Year Supply and Demand Comparison: Non-Potable

INCLUDE IN UWMP: Yes

	2025	2030	2035	2040	2045
Supply Totals From Optional Table 6-9W	28,390	31,719	31,719	36,058	36,439
Demand Totals From Optional Table 4-3W	28,390	31,719	31,719	36,058	36,439
Difference:	**0**	**0**	**0**	**0**	**0**

7-3R | Single Dry Year Supply & Demand Comparison

STATUS: Published

NOTES: -

	2025	2030	2035	2040	2045
Supply Totals	34,104	38,265	42,650	47,540	52,900
Demand Totals	30,167	33,879	37,792	42,155	46,940
Difference:	**3,937**	**4,386**	**4,858**	**5,385**	**5,960**

Optional 7-3R | Single Dry Year Supply & Demand Comparison: Potable

INCLUDE IN UWMP: No

	2025	2030	2035	2040	2045
Supply Totals	27,073	30,199	33,686	37,574	41,821
Demand Totals	24,612	27,453	30,624	34,159	38,019
Difference:	**2,461**	**2,746**	**3,062**	**3,415**	**3,802**

Optional 7-3R | Single Dry Year Supply & Demand Comparison: Non-Potable

INCLUDE IN UWMP: No

	2025	2030	2035	2040	2045
Supply Totals	7,031	8,066	8,964	9,966	11,079
Demand Totals	5,555	6,426	7,168	7,996	8,921
Difference:	**1,476**	**1,640**	**1,796**	**1,970**	**2,158**

7-3W | Single Dry Year Supply & Demand Comparison

STATUS: Published

NOTES: -

	2025	2030	2035	2040	2045
Supply Totals	96,816	100,908	106,261	112,664	121,443
Demand Totals	96,816	100,908	106,261	112,664	121,443
Difference:	**0**	**0**	**0**	**0**	**0**

Optional 7-3W | Single Dry Year Supply & Demand Comparison: Potable

INCLUDE IN UWMP: Yes

	2025	2030	2035	2040	2045
Supply Totals	68,426	69,189	74,542	76,606	85,004
Demand Totals	68,426	69,189	74,542	76,606	85,004
Difference:	**0**	**0**	**0**	**0**	**0**

Optional 7-3W | Single Dry Year Supply & Demand Comparison: Non-Potable

INCLUDE IN UWMP: Yes

	2025	2030	2035	2040	2045
Supply Totals	28,390	31,719	31,719	36,058	36,439
Demand Totals	28,390	31,719	31,719	36,058	36,439
Difference:	**0**	**0**	**0**	**0**	**0**

7-4R | Multiple Dry Years Supply & Demand Comparison

STATUS: Published

NOTES: -

		2025	2030	2035	2040	2045
First Year	**Supply Totals**	34,104	38,265	42,650	47,540	52,900
	Demand Totals	30,167	33,879	37,792	42,155	46,940
	Difference:	**3,937**	**4,386**	**4,858**	**5,385**	**5,960**
Second Year	**Supply Totals**	34,104	38,265	42,650	47,540	52,900
	Demand Totals	30,167	33,879	37,792	42,155	46,940
	Difference:	**3,937**	**4,386**	**4,858**	**5,385**	**5,960**
Third Year	**Supply Totals**	34,104	38,265	42,650	47,540	52,900
	Demand Totals	30,167	33,879	37,792	42,155	46,940
	Difference:	**3,937**	**4,386**	**4,858**	**5,385**	**5,960**
Fourth Year	**Supply Totals**	34,104	38,265	42,650	47,540	52,900
	Demand Totals	30,167	33,879	37,792	42,155	46,940
	Difference:	**3,937**	**4,386**	**4,858**	**5,385**	**5,960**
Fifth Year	**Supply Totals**	34,104	38,265	42,650	47,540	52,900
	Demand Totals	30,167	33,879	37,792	42,155	46,940
	Difference:	**3,937**	**4,386**	**4,858**	**5,385**	**5,960**
Sixth Year	**Supply Totals**					
	Demand Totals					
	Difference:	**0**	**0**	**0**	**0**	**0**

Optional 7-4R | Multiple Dry Years Supply & Demand Comparison: Potable

		2025	2030	2035	2040	2045
First Year	**Supply Totals**	27,073	30,199	33,686	37,574	41,821
	Demand Totals	24,612	27,453	30,624	34,159	38,019
	Difference:	**2,461**	**2,746**	**3,062**	**3,415**	**3,802**
Second Year	**Supply Totals**	27,073	30,199	33,686	37,574	41,821
	Demand Totals	24,612	27,453	30,624	34,159	38,019
	Difference:	**2,461**	**2,746**	**3,062**	**3,415**	**3,802**
Third Year	**Supply Totals**	27,073	30,199	33,686	37,574	41,821
	Demand Totals	24,612	27,453	30,624	34,159	38,019
	Difference:	**2,461**	**2,746**	**3,062**	**3,415**	**3,802**
Fourth Year	**Supply Totals**	27,073	30,199	33,686	37,574	41,821
	Demand Totals	24,612	27,453	30,624	34,159	38,019
	Difference:	**2,461**	**2,746**	**3,062**	**3,415**	**3,802**
Fifth Year	**Supply Totals**	27,073	30,199	33,686	37,574	41,821
	Demand Totals	24,612	27,453	30,624	34,159	38,019
	Difference:	**2,461**	**2,746**	**3,062**	**3,415**	**3,802**
Sixth Year	**Supply Totals**					
	Demand Totals					
	Difference:	**0**	**0**	**0**	**0**	**0**

Optional 7-4R | Multiple Dry Years Supply & Demand Comparison: Non-Potable

		2025	2030	2035	2040	2045
First Year	**Supply Totals**	7,031	8,066	8,964	9,966	11,079
	Demand Totals	5,555	6,426	7,168	7,996	8,921
	Difference:	**1,476**	**1,640**	**1,796**	**1,970**	**2,158**
Second Year	**Supply Totals**	7,031	8,066	8,964	9,966	11,079
	Demand Totals	5,555	6,426	7,168	7,996	8,921
	Difference:	**1,476**	**1,640**	**1,796**	**1,970**	**2,158**
Third Year	**Supply Totals**	7,031	8,066	8,964	9,966	11,079
	Demand Totals	5,555	6,426	7,168	7,996	8,921
	Difference:	**1,476**	**1,640**	**1,796**	**1,970**	**2,158**
Fourth Year	**Supply Totals**	7,031	8,066	8,964	9,966	11,079
	Demand Totals	5,555	6,426	7,168	7,996	8,921
	Difference:	**1,476**	**1,640**	**1,796**	**1,970**	**2,158**
Fifth Year	**Supply Totals**	7,031	8,066	8,964	9,966	11,079
	Demand Totals	5,555	6,426	7,168	7,996	8,921
	Difference:	**1,476**	**1,640**	**1,796**	**1,970**	**2,158**
Sixth Year	**Supply Totals**					
	Demand Totals					
	Difference:	**0**	**0**	**0**	**0**	**0**

7-4W | Multiple Dry Years Supply & Demand Comparison

STATUS: Published

NOTES: -

		2025	2030	2035	2040	2045
First Year	**Supply Totals**	96,816	100,908	106,261	112,664	121,443
	Demand Totals	96,816	100,908	106,261	112,664	121,443
	Difference:	**0**	**0**	**0**	**0**	**0**
Second Year	**Supply Totals**	96,816	100,908	106,261	112,664	121,443
	Demand Totals	96,816	100,908	106,261	112,664	121,443
	Difference:	**0**	**0**	**0**	**0**	**0**
Third Year	**Supply Totals**	96,816	100,908	106,261	112,664	121,443
	Demand Totals	96,816	100,908	106,261	112,664	121,443
	Difference:	**0**	**0**	**0**	**0**	**0**
Fourth Year	**Supply Totals**	96,816	100,908	106,261	112,664	121,443
	Demand Totals	96,816	100,908	106,261	112,664	121,443
	Difference:	**0**	**0**	**0**	**0**	**0**
Fifth Year	**Supply Totals**	96,816	100,908	106,261	112,664	121,443
	Demand Totals	96,816	100,908	106,261	112,664	121,443
	Difference:	**0**	**0**	**0**	**0**	**0**
Sixth Year	**Supply Totals**					
	Demand Totals					
	Difference:	**0**	**0**	**0**	**0**	**0**

Optional 7-4W | Multiple Dry Years Supply & Demand Comparison: Potable

		2025	2030	2035	2040	2045
First Year	**Supply Totals**	68,426	69,189	74,542	76,606	85,004
	Demand Totals	68,426	69,189	74,542	76,606	85,004
	Difference:	**0**	**0**	**0**	**0**	**0**
Second Year	**Supply Totals**	68,426	69,189	74,542	76,606	85,004
	Demand Totals	68,426	69,189	74,542	76,606	85,004
	Difference:	**0**	**0**	**0**	**0**	**0**
Third Year	**Supply Totals**	68,426	69,189	74,542	76,606	85,004
	Demand Totals	68,426	69,189	74,542	76,606	85,004
	Difference:	**0**	**0**	**0**	**0**	**0**
Fourth Year	**Supply Totals**	68,426	69,189	74,542	76,606	85,004
	Demand Totals	68,426	69,189	74,542	76,606	85,004
	Difference:	**0**	**0**	**0**	**0**	**0**
Fifth Year	**Supply Totals**	68,426	69,189	74,542	76,606	85,004
	Demand Totals	68,426	69,189	74,542	76,606	85,004
	Difference:	**0**	**0**	**0**	**0**	**0**
Sixth Year	**Supply Totals**					
	Demand Totals					
	Difference:	**0**	**0**	**0**	**0**	**0**

Optional 7-4W | Multiple Dry Years Supply & Demand Comparison: Non-Potable

		2025	2030	2035	2040	2045
First Year	**Supply Totals**	28,390	31,719	31,719	36,058	36,439
	Demand Totals	28,390	31,719	31,719	36,058	36,439
	Difference:	**0**	**0**	**0**	**0**	**0**
Second Year	**Supply Totals**	28,390	31,719	31,719	36,058	36,439
	Demand Totals	28,390	31,719	31,719	36,058	36,439
	Difference:	**0**	**0**	**0**	**0**	**0**
Third Year	**Supply Totals**	28,390	31,719	31,719	36,058	36,439
	Demand Totals	28,390	31,719	31,719	36,058	36,439
	Difference:	**0**	**0**	**0**	**0**	**0**
Fourth Year	**Supply Totals**	28,390	31,719	31,719	36,058	36,439
	Demand Totals	28,390	31,719	31,719	36,058	36,439
	Difference:	**0**	**0**	**0**	**0**	**0**
Fifth Year	**Supply Totals**	28,390	31,719	31,719	36,058	36,439
	Demand Totals	28,390	31,719	31,719	36,058	36,439
	Difference:	**0**	**0**	**0**	**0**	**0**
Sixth Year	**Supply Totals**					
	Demand Totals					
	Difference:	**0**	**0**	**0**	**0**	**0**

7-5 | Five-Year Drought Risk Assessment Tables to Address Water Code Section 10635(b)

STATUS: Published

NOTES:

2021	**Gross Water Use**	27,394
	Total Supplies	33,446
	Surplus/Shortfall without WSCP Action	**6,052**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**6,052**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2022	**Gross Water Use**	28,062
	Total Supplies	31,677
	Surplus/Shortfall without WSCP Action	**3,615**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**3,615**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2023	**Gross Water Use**	28,747
	Total Supplies	31,913
	Surplus/Shortfall without WSCP Action	**3,166**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**3,166**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2024	**Gross Water Use**	29,449
	Total Supplies	32,153
	Surplus/Shortfall without WSCP Action	**2,704**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**2,704**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2025	**Gross Water Use**	30,167
	Total Supplies	32,896
	Surplus/Shortfall without WSCP Action	**2,729**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**2,729**
	Resulting Percent Use Reduction from WSCP Action	**0%**

Optional 7-5 | Five-Year Drought Risk Assessment Tables to Address Water Code Section 10635(b): Potable

INCLUDE IN UWMP:	Yes

2021	**Gross Water Use**	22,361
	Total Supplies	26,193
	Surplus/Shortfall without WSCP Action	**3,832**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**3,832**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2022	**Gross Water Use**	22,904
	Total Supplies	24,299
	Surplus/Shortfall without WSCP Action	**1,395**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**1,395**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2023	**Gross Water Use**	23,460
	Total Supplies	24,406
	Surplus/Shortfall without WSCP Action	**946**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**946**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2024	**Gross Water Use**	24,029
	Total Supplies	24,513
	Surplus/Shortfall without WSCP Action	**484**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**484**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2025	**Gross Water Use**	24,612
	Total Supplies	25,121
	Surplus/Shortfall without WSCP Action	**509**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**509**
	Resulting Percent Use Reduction from WSCP Action	**0%**

Optional 7-5 | Five-Year Drought Risk Assessment Tables to Address Water Code Section 10635(b): Non-Potable

INCLUDE IN UWMP:	Yes

2021	**Gross Water Use**	5,033
	Total Supplies	7,253
	Surplus/Shortfall without WSCP Action	**2,220**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**2,220**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2022	**Gross Water Use**	5,158
	Total Supplies	7,378
	Surplus/Shortfall without WSCP Action	**2,220**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**2,220**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2023	**Gross Water Use**	5,287
	Total Supplies	7,507
	Surplus/Shortfall without WSCP Action	**2,220**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**2,220**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2024	**Gross Water Use**	5,420
	Total Supplies	7,640
	Surplus/Shortfall without WSCP Action	**2,220**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**2,220**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2025	**Gross Water Use**	5,555
	Total Supplies	7,775
	Surplus/Shortfall without WSCP Action	**2,220**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**2,220**
	Resulting Percent Use Reduction from WSCP Action	**0%**

7-5 | Five-Year Drought Risk Assessment Tables to Address Water Code Section 10635(b)

STATUS: Published

NOTES:

2021	**Gross Water Use**	76,446
	Total Supplies	76,446
	Surplus/Shortfall without WSCP Action	**0**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**0**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2022	**Gross Water Use**	79,002
	Total Supplies	79,002
	Surplus/Shortfall without WSCP Action	**0**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**0**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2023	**Gross Water Use**	81,549
	Total Supplies	81,549
	Surplus/Shortfall without WSCP Action	**0**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**0**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2024	**Gross Water Use**	83,736
	Total Supplies	83,736
	Surplus/Shortfall without WSCP Action	**0**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**0**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2025	**Gross Water Use**	97,560
	Total Supplies	97,560
	Surplus/Shortfall without WSCP Action	**0**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**0**
	Resulting Percent Use Reduction from WSCP Action	**0%**

Optional 7-5 | Five-Year Drought Risk Assessment Tables to Address Water Code Section 10635(b): Potable

INCLUDE IN UWMP:	Yes

2021	**Gross Water Use**	52,015
	Total Supplies	52,015
	Surplus/Shortfall without WSCP Action	**0**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**0**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2022	**Gross Water Use**	53,401
	Total Supplies	53,401
	Surplus/Shortfall without WSCP Action	**0**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**0**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2023	**Gross Water Use**	54,744
	Total Supplies	54,744
	Surplus/Shortfall without WSCP Action	**0**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**0**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2024	**Gross Water Use**	55,782
	Total Supplies	55,782
	Surplus/Shortfall without WSCP Action	**0**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**0**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2025	**Gross Water Use**	68,426
	Total Supplies	68,426
	Surplus/Shortfall without WSCP Action	**0**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**0**
	Resulting Percent Use Reduction from WSCP Action	**0%**

Optional 7-5 | Five-Year Drought Risk Assessment Tables to Address Water Code Section 10635(b): Non-Potable

INCLUDE IN UWMP:	Yes

2021	**Gross Water Use**	24,431
	Total Supplies	24,431
	Surplus/Shortfall without WSCP Action	**0**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**0**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2022	**Gross Water Use**	25,601
	Total Supplies	25,601
	Surplus/Shortfall without WSCP Action	**0**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**0**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2023	**Gross Water Use**	26,775
	Total Supplies	26,775
	Surplus/Shortfall without WSCP Action	**0**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**0**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2024	**Gross Water Use**	27,954
	Total Supplies	27,954
	Surplus/Shortfall without WSCP Action	**0**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**0**
	Resulting Percent Use Reduction from WSCP Action	**0%**
2025	**Gross Water Use**	29,134
	Total Supplies	29,134
	Surplus/Shortfall without WSCP Action	**0**
	Planned WSCP Actions (Use Reduction and Supply Augmentation)	
	WSCP (Supply Augmentation Benefit)	
	WSCP (Use Reduction Savings Benefit)	
	Revised Surplus/Shortfall	**0**
	Resulting Percent Use Reduction from WSCP Action	**0%**

8-1R | Water Shortage Contingency Plan Levels

STATUS: Published

NOTES:

Shortage Level	Percent Shortage Range[1] (Numerical Value as a Percent)	Water Shortage Condition
1	At all times	Water Supply Watch
2	Up to 4%	Water Supply Alert
3	Up to 15%	Targeting Waste Reduction
4	Up to 50%	Targeting Outdoor Reductions
5	Greater than 50%	Mandatory Targeted Indoor/Outdoor Reductions - Catastrophic Failure or "Immediate Emergency"

[1] One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.

8-1W | Water Shortage Contingency Plan Levels

STATUS: Published

NOTES:

Shortage Level	Percent Shortage Range[1] (Numerical Value as a Percent)	Water Shortage Condition
1	Up to 10%	
2	Up to 20%	
3	Up to 30%	
4	Up to 40%	
5	Up to 50%	
6	Greater than 50%	

8-2R | Demand Reduction Actions

STATUS: Published

NOTES:

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap?	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement
All	Landscape - Other landscape restriction or prohibition	480	Adjust automatic irrigation timers for weather patterns and landscape requirements; Texas Living Waters	Yes
All	Other - Require automatic shut of hoses			Yes
All	Landscape - Limit landscape irrigation to specific times	4,800	Texas Living Waters	Yes
All	Other water feature or swimming pool restriction		Features and pools shall be equipped with re-circulating pumps.	Yes
All	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	6,000	EPA Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Costs	Yes

All	Landscape - Restrict or prohibit runoff from landscape irrigation			Yes
3 and Up	Implement or Modify Drought Rate Structure or Surcharge		Eliminate Adjustments to outdoor water budgets; Eliminate Tier in rates	Yes
4 and Up	Other		potable service connections, temporary meters, or permanent meters	No
4 and Up	Landscape - Other landscape restriction or prohibition		No new landscapes unless irrigated with recycled water.	No
5 and Up	Landscape - Prohibit all landscape irrigation			Yes

8-2W | Demand Reduction Actions

STATUS: Published

NOTES: -

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap?	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement
All	Expand Public Information Campaign		coordinate with retail agencies	No

8-3R | Supply Augmentation & Other Actions

STATUS: Published

NOTES: -

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier	How much is this going to reduce the shortage gap?	Additional Explanation or Reference
All	Other purchases		Depends on supply availability from neighboring agencies or Western Wholesale

8-3W | Supply Augmentation & Other Actions

STATUS: Published

NOTES: -

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier	How much is this going to reduce the shortage gap?	Additional Explanation or Reference
All	Stored emergency supply		Supply augmentation actions consisting of stored water and as-needed flexible supplies are expected to address between 0 to 100 percent of anticipated shortages for any shortage level, depending on availability of those supplies; in lesser WSCP shortage levels, it is more likely that shortages can be completely addressed through supply augmentation.

10-1R | Notification to Cities & Counties

STATUS: Published

NOTES: -

City	60 Day Notice	Notice of Public Hearing	Other
City of Corona	Yes	Yes	
City of Norco	Yes	Yes	
City of Riverside	Yes	Yes	
City of Lake Elsinore	Yes	Yes	
City of Murrieta	Yes	Yes	
City of Temecula	Yes	Yes	
City of Eastvale	Yes	Yes	
City of Jurupa Valley	Yes	Yes	
County	**60 Day Notice**	**Notice of Public Hearing**	**Other**
Home Gardens County Water	Yes	Yes	
County of Riverside	Yes	Yes	
Other	**60 Day Notice**	**Notice of Public Hearing**	**Other**
Riverside Public Utilities	Yes	Yes	
Eagle Valley Mututal Water Di	Yes	Yes	
Rubidoux Community Service	Yes	Yes	
Box Springs Mutual Water Co	Yes	Yes	
Temescal Valley Water Distric	Yes	Yes	
Rancho California Water Distr	Yes	Yes	
Elsinore Valley Municipal Wat	Yes	Yes	
Riverside Highland Water Cor	Yes	Yes	
Home Gardens Sanitary Distri	Yes	Yes	
Jurupa Community Services I	Yes	Yes	
Metropolitan Water District of	Yes	Yes	

10-1W | Notification to Cities & Counties

STATUS: In Progress

NOTES: -

Supplier has notified more than 10 cities or counties in accordance with Water Code Sections 10621 (b) and 10642. Completion of the table is not required. Provide a separate list of the cities and counties that were notified.

Page Location for List in UWMP: Appendix

City	60 Day Notice	Notice of Public Hearing	Other
City of Corona	Yes	Yes	
City of Norco	Yes	Yes	
City of Riverside	Yes	Yes	
City of Lake Elsinore	Yes	Yes	
City of Murrieta	Yes	Yes	
City of Temecula	Yes	Yes	
City of Eastvale	Yes	Yes	
City of Jurupa Valley	Yes	Yes	

County	60 Day Notice	Notice of Public Hearing	Other
Home Gardens County Water	Yes	Yes	
County of Riverside	Yes	Yes	

Other	60 Day Notice	Notice of Public Hearing	Other
Riverside Public Utilities	Yes	Yes	
Eagle Valley Mututal Water Di	Yes	Yes	
Rubidoux Community Service	Yes	Yes	
Box Springs Mutual Water Co	Yes	Yes	
Temescal Valley Water Distric	Yes	Yes	
Rancho California Water Distr	Yes	Yes	
Elsinore Valley Municipal Wat	Yes	Yes	
Riverside Highland Water Cor	Yes	Yes	
Home Gardens Sanitary Distri	Yes	Yes	
Jurupa Community Services I	Yes	Yes	
Metropolitan Water District of	Yes	Yes	

S

Appendix S CEQA Completion

STATE OF CALIFORNIA - THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME

ENVIRONMENTAL FILING FEE CASH RECEIPT

Receipt #: 21-292420

State Clearinghouse # (if applicable):

Lead Agency: WESTERN MUNICIPAL WATER DISTRICT *Date:* 06/17/2021

County Agency of Filing: RIVERSIDE *Document No:* E-202100598

Project Title: 2020 URBAN WATER MANAGEMENT PLAN, WATER SHORTAGE CONTINGENCY PLAN, APPENDIX

Project Applicant Name: WESTERN MUNICIPAL WATER DISTRICT *Phone Number:* (951) 571-7260

Project Applicant Address: 14205 MERIDIAN PARKWAY, RIVERSIDE, CA 92518

Project Applicant: LOCAL PUBLIC AGENCY

CHECK APPLICABLE FEES:

☐ *Environmental Impact Report*	
☐ *Negative Declaration*	
☐ *Application Fee Water Diversion (State Water Resources Control Board Only)*	
☐ *Project Subject to Certified Regulatory Programs*	
☐ *County Administration Fee*	$0.00
☐ *Project that is exempt from fees (DFG No Effect Determination (Form Attached))*	
☒ *Project that is exempt from fees (Notice of Exemption)*	
Total Received	$50.00

Signature and title of person receiving payment: Deputy

Notes: 2020 URBAN WATER MANAGEMENT PLAN, WATER SHORTAGE CONTINGENCY PLAN, APPENDIX Q: DEMONSTRATION OF REDUCED DELTA RELIANCE IN THE 2015 URBAN WATER SERVICE MANAGEMENT PLAN

NOTICE OF EXEMPTION

TO:	☐	Clerk of the Board of Supervisors or County Clerk County of: Riverside	FROM:	Western Municipal Water District 14205 Meridian Parkway Riverside, CA 92518

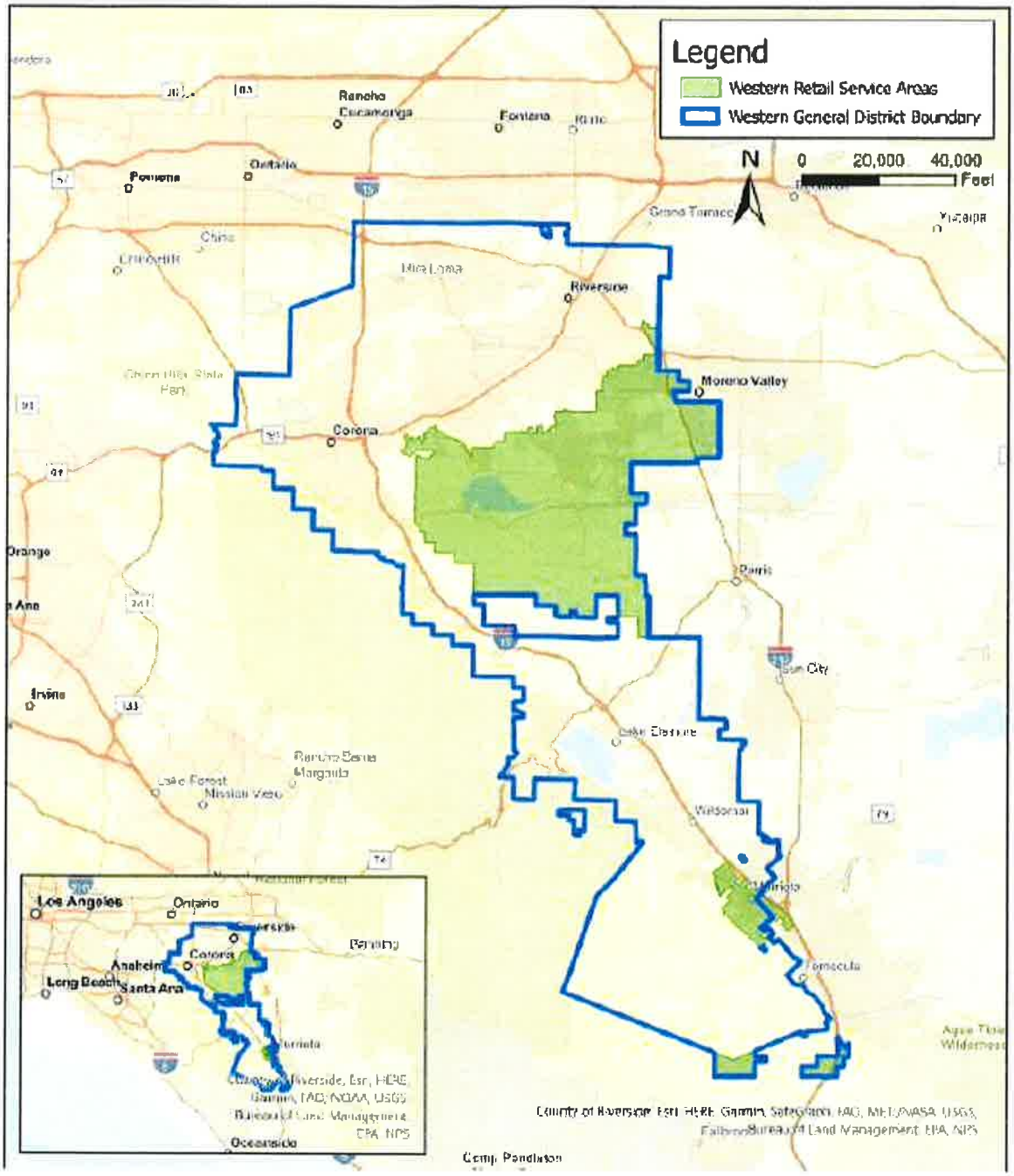
1.	Project Title:		2020 Urban Water Management Plan, Water Shortage Contingency Plan, Appendix Q: Demonstration of Reduced Delta Reliance in the 2015 Urban Water Management Plan
2.	Project Location – Identify street address and cross streets or attach a map showing project site (preferably a USGS 15' or 7 1/2' topographical map identified by quadrangle name):		Within Western Municipal Water District's service area. This is a planning document for the overall District region. Figure 1-1 shows the map of Western's Service Area.
3.	(a)	Project Location – City:	Riverside
	(b)	Project Location – County:	Riverside
4.	Description of nature, purpose, and beneficiaries of Project:		In 1983, the State of California Legislature (Legislature) enacted the Urban Water Management Planning Act (UWMP Act). The law required an urban water supplier, providing water for municipal purposes to more than 3,000 customers or serving more than 3,000 AF annually, to adopt an Urban Water Management Plan every five years demonstrating water supply reliability under normal as well as drought conditions. The UWMP Act applies to wholesale and retail suppliers. The current UWMP Act requirements are found in Sections 10610-10656 and 10608 of the California Water Code. The purpose of the UWMP and corresponding plans are for water suppliers to evaluate their long-term resource planning and establish management measures to ensure adequate water supplies are available to meet existing and future demands. The UWMP provides a framework to help water suppliers maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during drought conditions or other water supply interruptions.
5.	Name of Public Agency approving project:		Western Municipal Water District
6.	Name of Person or Agency carrying out project:		Western Municipal Water District
7.	Exempt status: (check one)		
	(a)	☐ Ministerial project.	
	(b)	☐ Not a project.	
	(c)	☐ Emergency Project.	
	(d)	☐ Categorical Exemption. State type and class number:	
	(e)	☐ Declared Emergency.	

F I L E D / P O S T E D
County of Riverside
Peter Aldana
Assessor-County Clerk-Recorder
E-202100598
06/17/2021 12:27 PM Fee: $ 50.00
Page 1 of 2
Removed: By: Deputy

	(f) ☒	Statutory Exemption. State Code section number:	California Water Code §10652
	(g) ☐	Other. Explanation:	
8.	Reason why project was exempt:		The Project is statutorily exempt from CEQA pursuant to California Water Code §10652 because CEQA does not apply to the preparation and adoption of an (urban water management plan/water shortage contingency plan) or to the implementation of the actions taken pursuant to such plans. Because this Project comprises of Lead Agency's urban water management plan/water shortage contingency plan and involves its implementation, no CEQA review is required.
9.	Contact Person:		Melissa Matlock
	Telephone:		951.571.7260
10.	Attach Preliminary Exemption Assessment (Form "A") before filing.		

Date Received for Filing: _____	_____ Signature (Lead Agency Representative)
(Clerk Stamp Here)	Water Resources Specialist II Title

Figure 1-1. Western Wholesale and Western Retail Service Area Boundaries



PRELIMINARY EXEMPTION ASSESSMENT

(Certificate of Determination
When Attached to Notice of Exemption)

11.	Name or description of project:	2020 Urban Water Management Plan, Water Shortage Contingency Plan, Appendix Q: Demonstration of Reduced Delta Reliance in the 2015 Urban Water Management Plan
12.	Project Location – Identify street address and cross streets or attach a map showing project site (preferably a USGS 15' or 7 1/2' topographical map identified by quadrangle name):	Within Western Municipal Water District's service area. This is a planning document for the overall District region. Figure 1-1 shows the map of Western's Service Area.
13.	Entity or person undertaking project:	A. Western Municipal Water District
		B. Other (Private)
		(1) Name
		(2) Address

14. Staff Determination:

The Lead Agency's Staff, having undertaken and completed a preliminary review of this project in accordance with the Lead Agency's "Local Guidelines for Implementing the California Environmental Quality Act (CEQA)" has concluded that this project does not require further environmental assessment because:

(a)	☐	The proposed action does not constitute a project under CEQA.	
(b)	☐	The project is a Ministerial Project.	
(c)	☐	The project is an Emergency Project.	
(d)	☐	The project constitutes a feasibility or planning study.	
(e)	☐	The project is categorically exempt.	
		Applicable Exemption Class:	
(f)	☒	The project is statutorily exempt.	
		Applicable Exemption:	California Water Code §1652
(g)	☐	The project is otherwise exempt on the following basis:	
(h)	☐	The project involves another public agency which constitutes the Lead Agency.	
		Name of Lead Agency:	

Date: 6/17/2021

Staff: _____

Melissa Matlock
Water Resources Specialist II

T

Appendix T Errata

2020 UWMP Errata Sheet

Western Municipal Water District (Western)

2020 Urban Water Management Plan (UWMP)

This errata sheet logs minor content errors that were identified after final adoption of Western's 2020 UWMP. The Department of Water Resources (DWR) has determined that these corrections are minor and do not require the UWMP to be amended.

☒ These data errors have been corrected in DWR's UWMP database at https://wuedata.water.ca.gov/secure/

☒ This errata sheet has been filed with the UWMP in all locations where it is made publicly available, including the California State Library. Errata may be submitted to State Library via email to cslgps@library.ca.gov

Name and agency of the person filing the errata sheet:

Melissa Matlock, Ph.D., P.M.P

Western Municipal Water District

Correction No.	Description of Correction	Location	Rational	Date Error Corrected
1	In Table 6-6R, the value for "Expected Increase of Recycled Water Use" was changed from 1,400 AF to 2,274 AF. Planned Implementation Year of 2045 was added.	UWMP document Appendix R	The "Expected Increase of Recycled Water Use" for Western Retail is 2,274 AF by 2045 and reflects the 2045 projected recycled water supply from the WWRF (4,032 AF) less 2020 actual recycled water use (1,758 AF). Table 6-6R in the WUE data portal contains the correct values. Table 6-6R in Appendix R of the document was entered incorrectly and is updated to match the WUE data portal. See updated table below.	3/30/2022
2	Footnotes added to Table 6-8DS to clarify the two desalter facilities and their relation to Western Wholesale or Western Retail supplies.	WUE data portal and UWMP document Appendix R	All Western desalter facilities were included in Table 6-8DS within the WUE data portal because separate tables for Wholesale and Retail are not available. Footnotes were added to clarify that the Chino Desalter is considered a Western Retail supply source and the Arlington Desalter is a Western Wholesale supply and refers to the appropriate sections of the UWMP document where each desalter is discussed. Table 6-8DS in the WUE data portal and Appendix R is updated to include these clarifying notes. See updated table below.	3/30/2022
3	Table 6-5W values removed.	UWMP document Appendix R	As noted on page 4-11 of the UWMP document, Western Wholesale does not currently use recycled water to meet wholesale demands. In the WUE portal, Table 6-5W correctly shows zero recycled water demand for wholesale and Table 6-5R correctly shows the recycled water demand for Western Retail. Table 6-5W in Appendix R was entered incorrectly and is updated to match the WUE data portal. See updated table below.	3/30/2022

Correction No.	Description of Correction	Location	Rational	Date Error Corrected
4	Revised 2020 GPCD calculation to include non-potable water use.	UWMP document: Executive Summary, Section 10.4.1, Appendix R Table 5-2R, Appendix N Table 4, 4-A, 5, 6, and 9 WUE data portal: Table 5-2R, SBX7-7 Tables 4, 4-A, 5, and 9	All non-potable water use was excluded from the Western Retail GPCD calculation for 2016-2020. It is not clear if the data used to set the GPCD baseline excluded any non-potable water so, to be conservative, Western's non-potable water use (excluding recycled water use) was added to the gross water use in the GPCD calculation. With the updated calculation, Western Retail 2020 GPCD was 235, still far exceeding the 2020 target of 352. Table 5-2R is updated in Appendix R and the WUE data portal. SBx7-7 Compliance Form tables 4, 4-A, 5, and 9 are also updated to reflect this revision. Figures depicting GPCD trends in the Executive Summary and Section 10.4.1 of the UWMP document are also updated.	3/30/2022

Correction No. 1: Table 6-6R

6-6R | Methods to Expand Future Recycled Water Use

STATUS: Published

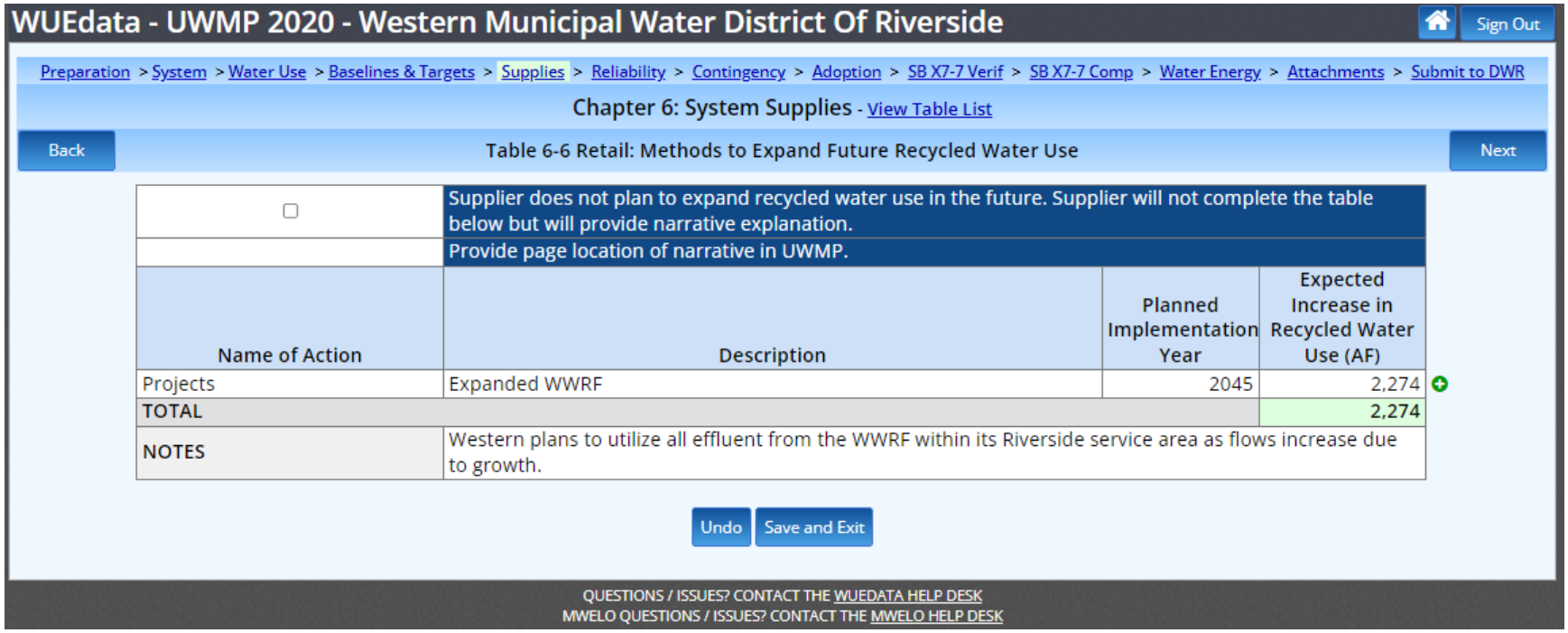
NOTES: -

The supplier will complete the table below.

Name of Action	Description	Planned Implementation Year	Expected Increase of Recycled Water Use
Projects	Expanded WWRF	2045	2,274
		Total:	**2,274**

Western plans to utilize all effluent from the WWRF within its Riverside service area as flows increase due to growth.

Correction No. 1: WUE Data Table (no changes)



WUEdata - UWMP 2020 - Western Municipal Water District Of Riverside

Sign Out

Preparation > System > Water Use > Baselines & Targets > Supplies > Reliability > Contingency > Adoption > SB X7-7 Verif > SB X7-7 Comp > Water Energy > Attachments > Submit to DWR

Chapter 6: System Supplies - View Table List

Back | Table 6-6 Retail: Methods to Expand Future Recycled Water Use | Next

☐	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.
	Provide page location of narrative in UWMP.

Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use (AF)
Projects	Expanded WWRF	2045	2,274
TOTAL			2,274
NOTES	Western plans to utilize all effluent from the WWRF within its Riverside service area as flows increase due to growth.		

Undo | Save and Exit

QUESTIONS / ISSUES? CONTACT THE WUEDATA HELP DESK
MWELO QUESTIONS / ISSUES? CONTACT THE MWELO HELP DESK

Correction No. 2: Table 6-8DS

6-8DS | Source Water Desalination

STATUS: Published

NOTES:

The supplier will complete the table below.

Plant Name or Well ID	Plant Capacity	Intake Type	Source Water Type	Influent TDS	Brine Discharge	Volume of Water Desalinated in AFY				
						2016	2017	2018	2019	2020
Chino Desalter (1)	28000	Vertical Well	Groundwater		Brine Line	3,534	3,534	3,534	3,534	3,534
Arlington Desalter (2)		Vertical Well	Groundwater		Brine Line	4,880	4,754	5,433	449	4,814
					Total:	**8,414**	**8,288**	**8,967**	**3,983**	**8,348**

Notes:
(1) Chino Desalter is a Western Retail supply and is described in Section 9.2 of the 2020 UWMP. Western Retail does not currently use this supply and leases it to another agency.
(2) Arlington Desalter is a Western Wholesale supply and is described in Section 4.2 of the 2020 UWMP.

Correction No. 2: WUE Data Table

WUEdata - UWMP 2020 - Western Municipal Water District Of Riverside

Sign Out

Preparation > System > Water Use > Baselines & Targets > Supplies > Reliability > Contingency > Adoption > SB X7-7 Verif > SB X7-7 Comp > Water Energy > Attachments > Submit to DWR

Chapter 6: System Supplies - View Table List

Back | OPTIONAL Table 6-8 DS: Source Water Desalination | Next

☐	Neither groundwater nor surface water are reduced in salinity prior to distribution									
Plant Name or Well ID	Plant Capacity	Intake Type	Source Water Type	Influent TDS	Brine Discharge	Volume of Water Desalinated (AF) 2016	2017	2018	2019	2020
Chino Desalter	28000	vertical well	groundwater		Brine Line	3,534	3,534	3,534	3,534	3,534
Arlington Desalter		vertical well	groundwater		Brine Line	4,880	4,754	5,433	449	4,814
TOTAL						8,414	8,288	8,967	3,983	8,348
NOTES	Chino Desalter is a Western Retail supply and is described in Section 9.2 of the 2020 UWMP. Western Retail does not currently use this supply and leases it to another agency. Arlington Desalter is a Western Wholesale supply and is described in Section 4.2 of the 2020 UWMP.									

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QUESTIONS / ISSUES? CONTACT THE WUEDATA HELP DESK
MWELO QUESTIONS / ISSUES? CONTACT THE MWELO HELP DESK

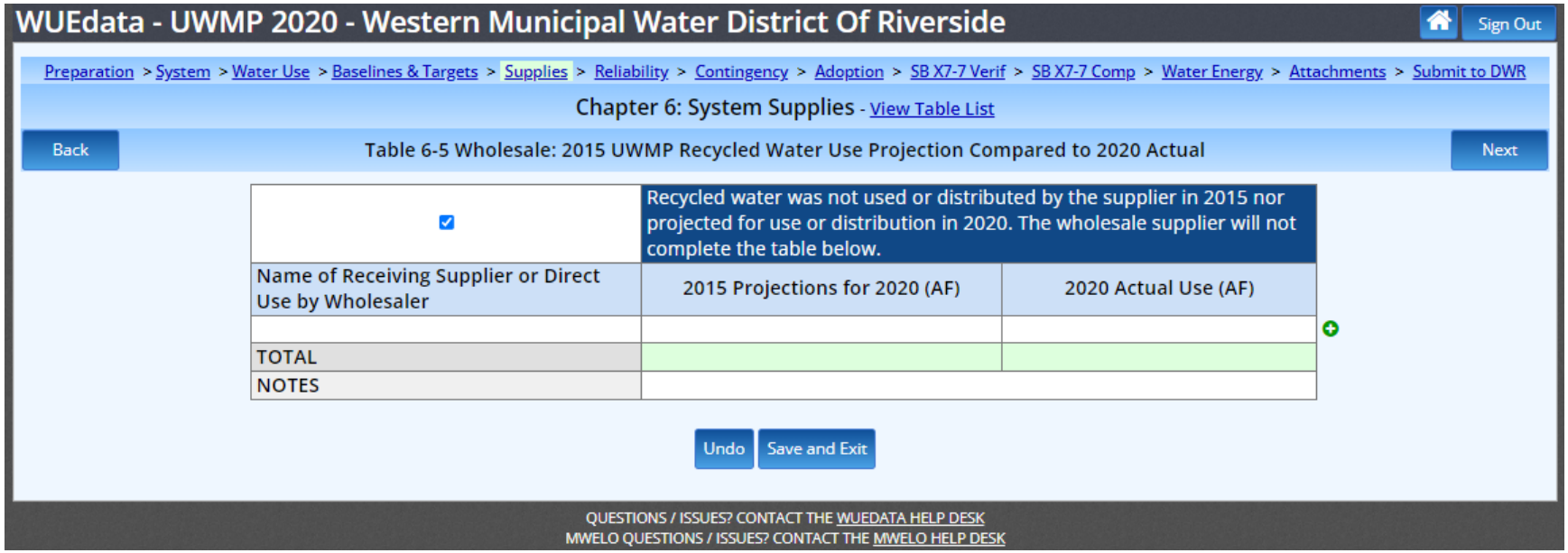
Correction No. 3: Table 6-5W

6-5W | 2015 Recycled Water Use Projection Compared to 2020 Actual

STATUS:	Published
NOTES:	

Recycled water was not used or distributed by the supplier in 2015, nor projected for use or distribution in 2020. The supplier will not complete the table.		
Name of Receiving Supplier or Direct Use by Wholesaler	**2015 Projection for 2020**	**2020 Actual Use**
Total:	-	-

Correction No. 3: WUE Data Table (no changes)



Correction No. 4: Table 5-2R (also SBx7-7 Compliance Form Table 9)

5-2R | 2020 Compliance

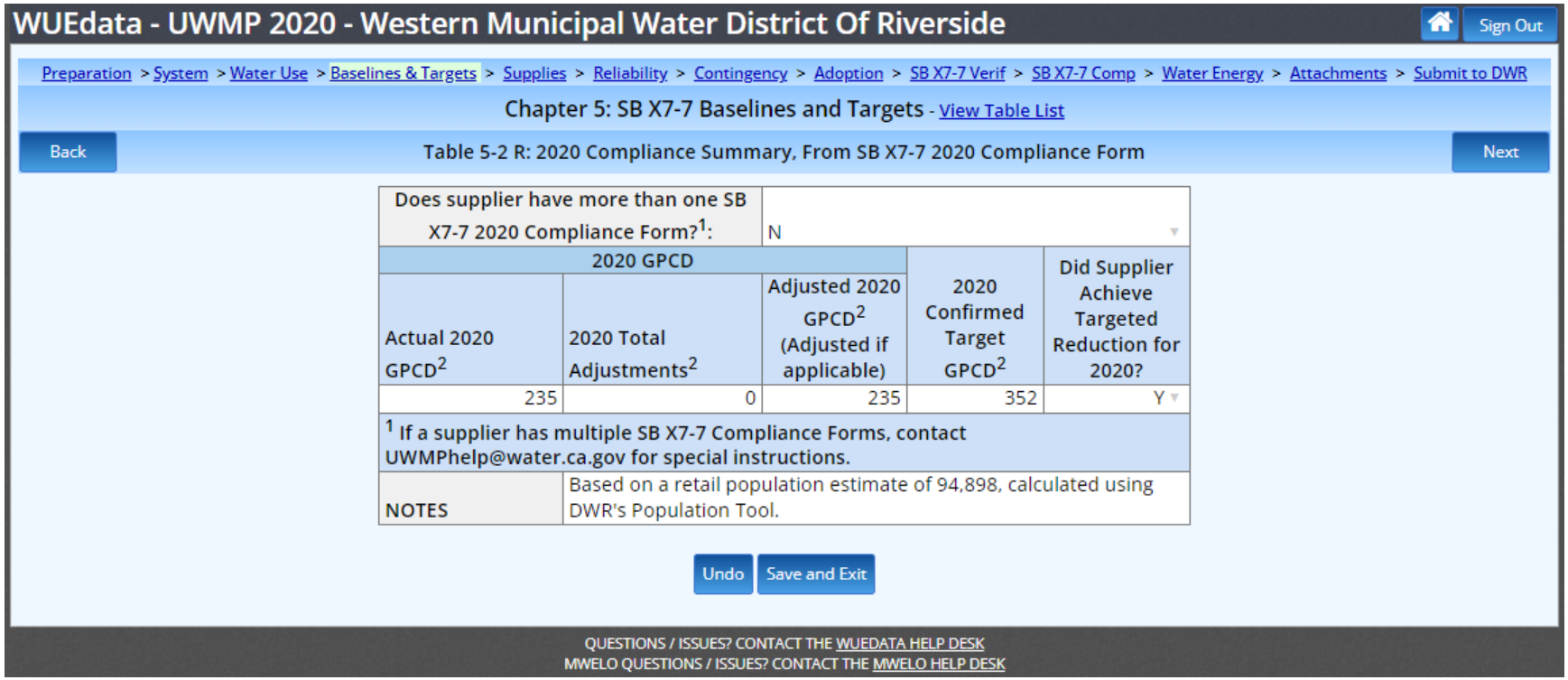
STATUS: Published

NOTES: -

Actual 2020 GPCD*	Optional Adjustments to 2020 GPCD					2020 GPCD (Adjusted if applicable)	Supplier Achieved Targeted Reduction in 2020
	Extraordinary Events*	Economic Adjustment*	Weather Normalization*	Total Adjustments*	Adjusted 2020 GPCD*		
235	0	0	0	0	235	235	Yes

Based on a retail population estimate of 94,898, calculated using DWR's population tool.

Correction No 4: Revised WUE Data Table 5-2R



WUEdata - UWMP 2020 - Western Municipal Water District Of Riverside

Sign Out

Preparation > System > Water Use > Baselines & Targets > Supplies > Reliability > Contingency > Adoption > SB X7-7 Verif > SB X7-7 Comp > Water Energy > Attachments > Submit to DWR

Chapter 5: SB X7-7 Baselines and Targets - View Table List

Back

Table 5-2 R: 2020 Compliance Summary, From SB X7-7 2020 Compliance Form

Next

Does supplier have more than one SB X7-7 2020 Compliance Form?[1]:	N

2020 GPCD				
Actual 2020 GPCD[2]	2020 Total Adjustments[2]	Adjusted 2020 GPCD[2] (Adjusted if applicable)	2020 Confirmed Target GPCD[2]	Did Supplier Achieve Targeted Reduction for 2020?
235	0	235	352	Y

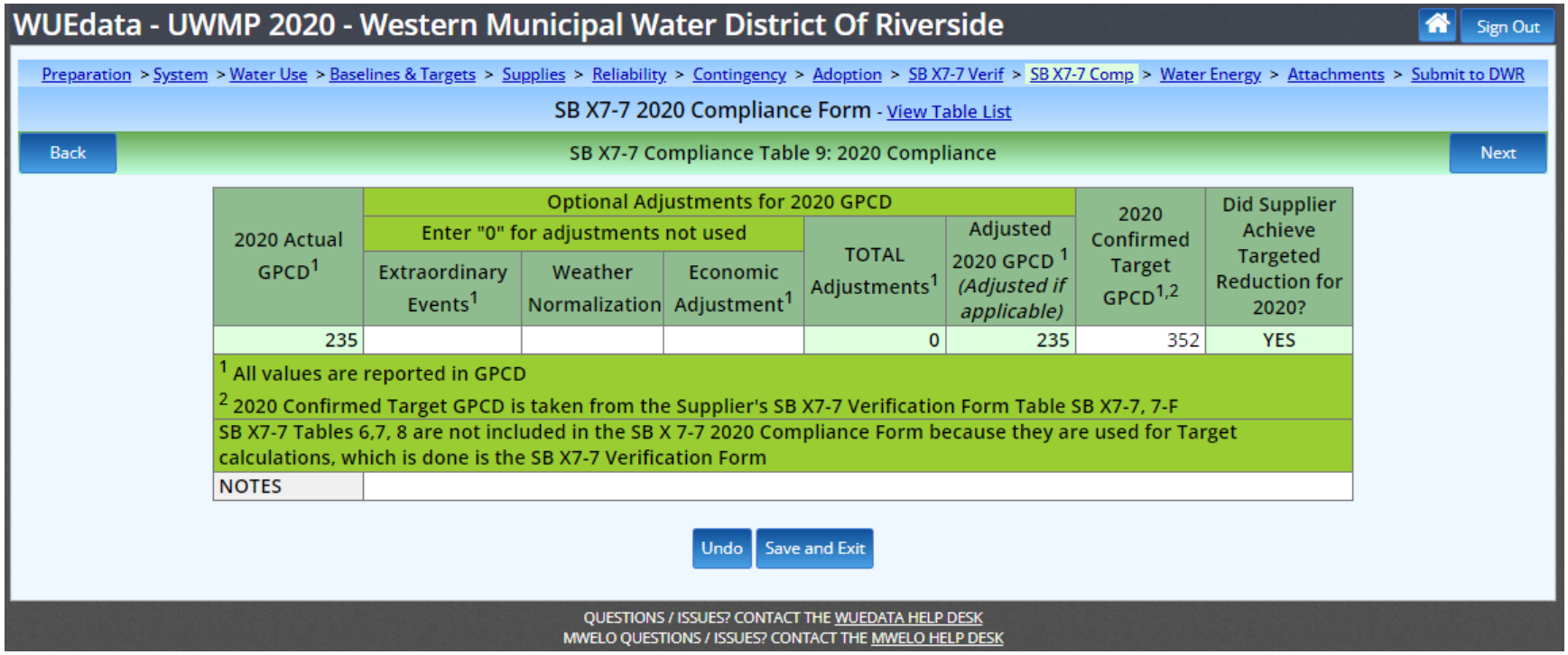
[1] If a supplier has multiple SB X7-7 Compliance Forms, contact UWMPhelp@water.ca.gov for special instructions.

NOTES	Based on a retail population estimate of 94,898, calculated using DWR's Population Tool.

Undo Save and Exit

QUESTIONS / ISSUES? CONTACT THE WUEDATA HELP DESK
MWELO QUESTIONS / ISSUES? CONTACT THE MWELO HELP DESK

Correction No 4: Revised WUE Data SBX7-7 Table 9



WUEdata - UWMP 2020 - Western Municipal Water District Of Riverside

Sign Out

Preparation > System > Water Use > Baselines & Targets > Supplies > Reliability > Contingency > Adoption > SB X7-7 Verif > SB X7-7 Comp > Water Energy > Attachments > Submit to DWR

SB X7-7 2020 Compliance Form - View Table List

Back | SB X7-7 Compliance Table 9: 2020 Compliance | Next

2020 Actual GPCD[1]	Optional Adjustments for 2020 GPCD (Enter "0" for adjustments not used)			TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD[1,2]	Did Supplier Achieve Targeted Reduction for 2020?
	Extraordinary Events[1]	Weather Normalization	Economic Adjustment[1]				
235				0	235	352	YES

[1] All values are reported in GPCD

[2] 2020 Confirmed Target GPCD is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F

SB X7-7 Tables 6,7, 8 are not included in the SB X 7-7 2020 Compliance Form because they are used for Target calculations, which is done is the SB X7-7 Verification Form

NOTES

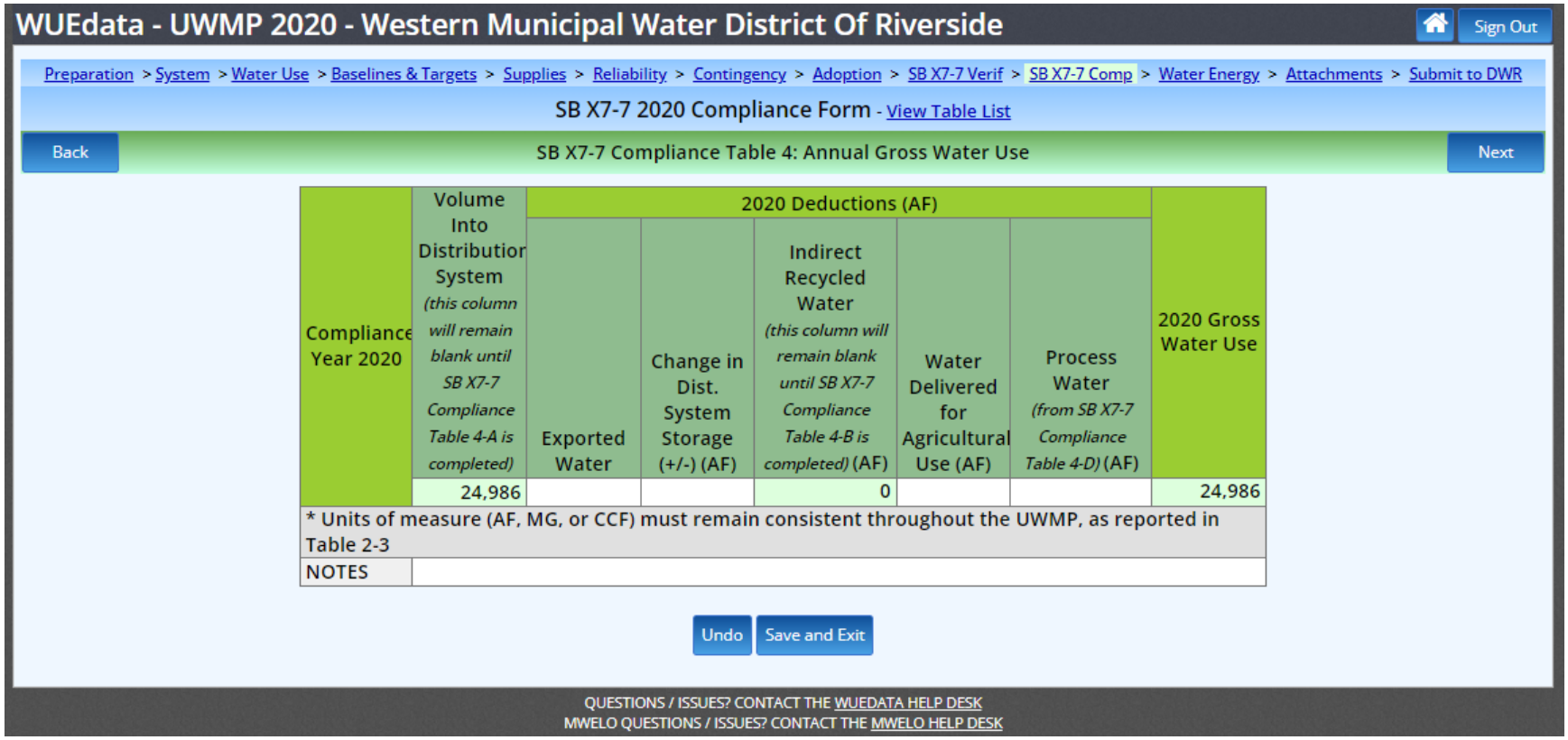
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QUESTIONS / ISSUES? CONTACT THE WUEDATA HELP DESK
MWELO QUESTIONS / ISSUES? CONTACT THE MWELO HELP DESK

Correction No 4: Revised SBx7-7 Compliance Table 4

SB X7-7 Table 4: 2020 Gross Water Use							
		2020 Deductions					
Compliance Year 2020	**2020 Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**Exported Water ***	**Change in Dist. System Storage* (+/-)**	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use***	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	**2020 Gross Water Use**
	24,986			-		-	**24,986**
*** Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.							
NOTES:							

Correction No 4: Revised WUE Data SBX7-7 Compliance Table 4



WUEdata - UWMP 2020 - Western Municipal Water District Of Riverside

Sign Out

Preparation > System > Water Use > Baselines & Targets > Supplies > Reliability > Contingency > Adoption > SB X7-7 Verif > SB X7-7 Comp > Water Energy > Attachments > Submit to DWR

SB X7-7 2020 Compliance Form - View Table List

Back

SB X7-7 Compliance Table 4: Annual Gross Water Use

Next

Compliance Year 2020	Volume Into Distribution System *(this column will remain blank until SB X7-7 Compliance Table 4-A is completed)*	2020 Deductions (AF)					2020 Gross Water Use
		Exported Water	Change in Dist. System Storage (+/-) (AF)	Indirect Recycled Water *(this column will remain blank until SB X7-7 Compliance Table 4-B is completed)* (AF)	Water Delivered for Agricultural Use (AF)	Process Water *(from SB X7-7 Compliance Table 4-D)* (AF)	
	24,986			0			24,986
* Units of measure (AF, MG, or CCF) must remain consistent throughout the UWMP, as reported in Table 2-3							
NOTES							

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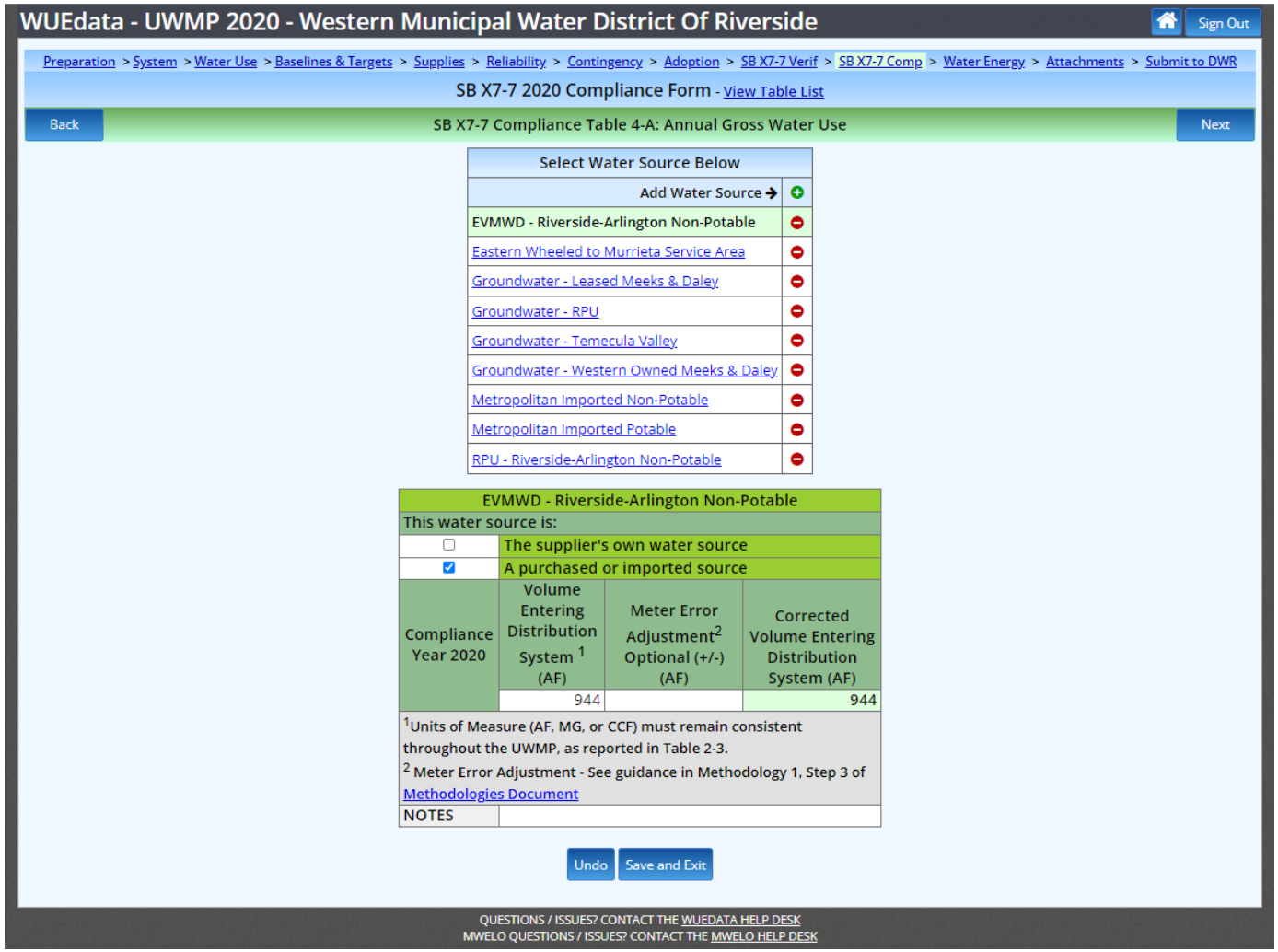
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QUESTIONS / ISSUES? CONTACT THE WUEDATA HELP DESK
MWELO QUESTIONS / ISSUES? CONTACT THE MWELO HELP DESK

Correction No. 4: SBx7-7 Compliance - Table 4-A Inputs

Source	Supplier's Own or Purchased Source	Volume Entering Distribution System (AF)
Eastern Wheeled to Murrieta Service Area	Supplier's Own Source	1,834
Groundwater – Leased Meeks & Daley	Purchased Source	4,208
Groundwater – RPU	Purchased Source	3,163
Groundwater – Temecula Valley	Supplier's Own Source	399
Western Owned Meeks & Daley	Supplier's Own Source	227
Metropolitan Imported Potable	Purchased Source	12,004
Metropolitan Imported Non-Potable	Purchased Source	1,819
EVMWD – Riverside-Arlington Non-Potable	Purchased Source	944
RPU – Riverside-Arlington Non-Potable	Purchased Source	388
	Total	**24,986**

Correction No 4: Revised WUE Data SBX7-7 Compliance Table 4-A



WUEdata - UWMP 2020 - Western Municipal Water District Of Riverside

Sign Out

Preparation > System > Water Use > Baselines & Targets > Supplies > Reliability > Contingency > Adoption > SB X7-7 Verif > SB X7-7 Comp > Water Energy > Attachments > Submit to DWR

SB X7-7 2020 Compliance Form - View Table List

Back | SB X7-7 Compliance Table 4-A: Annual Gross Water Use | Next

Select Water Source Below	
Add Water Source →	⊕
EVMWD - Riverside-Arlington Non-Potable	⊖
Eastern Wheeled to Murrieta Service Area	⊖
Groundwater - Leased Meeks & Daley	⊖
Groundwater - RPU	⊖
Groundwater - Temecula Valley	⊖
Groundwater - Western Owned Meeks & Daley	⊖
Metropolitan Imported Non-Potable	⊖
Metropolitan Imported Potable	⊖
RPU - Riverside-Arlington Non-Potable	⊖

EVMWD - Riverside-Arlington Non-Potable			
This water source is:			
☐	The supplier's own water source		
☑	A purchased or imported source		
Compliance Year 2020	Volume Entering Distribution System [1] (AF)	Meter Error Adjustment[2] Optional (+/-) (AF)	Corrected Volume Entering Distribution System (AF)
	944		944

[1] Units of Measure (AF, MG, or CCF) must remain consistent throughout the UWMP, as reported in Table 2-3.

[2] Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document

NOTES	

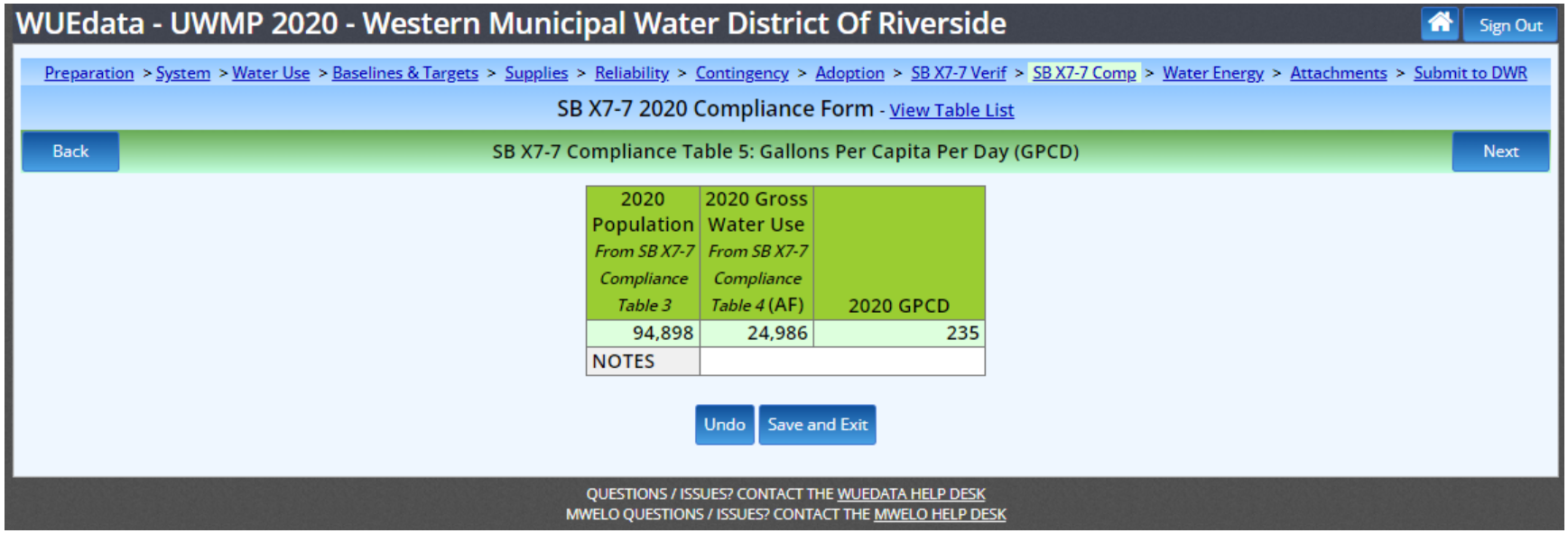
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QUESTIONS / ISSUES? CONTACT THE WUEDATA HELP DESK
MWELO QUESTIONS / ISSUES? CONTACT THE MWELO HELP DESK

Correction No. 4: SBx7-7 Compliance Form Table 5

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water *Fm SB X7-7 Table 4*	**2020 Population** *Fm SB X7-7 Table 3*	**2020 GPCD**
24,986	94,898	**235**
NOTES:		

Correction No. 4: WUE Data SBX7-7 Compliance Table 5



ORDINANCE NO. 2015-17

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF JURUPA VALLEY, CALIFORNIA, AMENDING CHAPTER 9.50 RELATING TO WATER EFFICIENT LANDSCAPE DESIGN IMPLEMENTING THE EMERGENCY REGULATIONS OF THE STATE WATER RESOURCES CONTROL BOARD; AND FINDING THAT THE NEW PROVISIONS ARE EXEMPT FROM CEQA PURSUANT TO CEQA GUIDELINES SECTIONS 15307, 15308 AND 15061

THE CITY COUNCIL OF THE CITY OF JURUPA VALLEY DOES ORDAIN AS FOLLOWS:

Section 1. Findings. The City Council hereby finds, determines and declares that:

A. On April 25, 2014, Governor Edmund G. Brown Jr. issued an executive order to strengthen the state's ability to manage water and habitat effectively in drought conditions and called on all Californians to redouble their efforts to conserve water. The executive order finds that the continuous severe drought conditions present urgent challenges across the state including water shortages in communities and for agricultural production, increased wildfires, degraded habitat for fish and wildlife, threat of saltwater contamination, and additional water scarcity if drought conditions continue into 2015.

B. The executive order refers to the Governor's Proclamation No. 1-17-2014, issued on January 17, 2014, declaring a State of Emergency to exist in California due to severe drought conditions. The January Proclamation notes that the state is experiencing record dry conditions, with 2014 projected to become the driest year on record. Since January, state water officials indicate that reservoirs, rainfall totals and the snowpack remain critically low. This follows two other dry or below average years, leaving reservoir storage at alarmingly low levels. The January Proclamation highlights the State's dry conditions, lack of precipitation and the resulting effects on drinking water supplies, the cultivation of crops, and the survival of animals and plants that rely on California's rivers and streams.

C. On April 1, 2015, Governor Brown issued Executive Order B-29-15 that, among other things, directed the Department of Water Resources to update the State Model Water Efficient Landscape Ordinance ("Model Ordinance") through expedited regulation.

D. The purpose of the updated Model Ordinance is to increase water efficiency standards for new and existing landscapes through more efficient irrigation systems, graywater usage, onsite storm water capture, and by limiting the portion of landscapes that can be covered in turf.

E. On July 15, 2015, the California Water Commission, acting on behalf of the Department of Water Resources, approved the 2015 update to the Model Ordinance.

F. The City Council is adopting amendments to Riverside County Ordinance No. 859, as adopted by the City of Jurupa Valley pursuant to Chapter 1.35 of the Jurupa Valley

Municipal Code, in order to promote the efficient use of water within the City and to comply with the Governor's Executive Order and Government Code Section 65595.

G. On October 7, 2015 the Planning Commission of the City of Jurupa Valley held a duly noticed public hearing on this Ordinance providing an opportunity for the public to comment on the Ordinance. After considering all written and oral comments received, the Planning Commission adopted Resolution No. 2015-10-7-01 recommending that the City Council adopt this Ordinance.

H. On November 5, 2015, the City Council of the City of Jurupa Valley held a duly noticed public hearing on this Ordinance providing an opportunity for the public to comment on the Ordinance. The City Council considered all written and oral comments received prior to its adoption of this Ordinance.

I. All legal prerequisites to the adoption of this Ordinance have been fulfilled.

Section 2. Adoption of Revised Water Efficient Landscape Design Ordinance. Chapter 9.50 ("Water Efficient Landscape Design Requirements") is hereby added to Title 9 ("Planning and Zoning") of the Jurupa Valley Municipal Code to read as follows:

"**Chapter 9.50**

WATER EFFICIENT LANDSCAPE DESIGN REQUIREMENTS

Sections:

9.50.010 Findings, Purpose and Intent.
9.50.020 Definitions.
9.50.030 Applicability.
9.50.040 Landscape Documentation Requirements.
9.50.050 Landscape Irrigation and Maintenance.
9.50.060 Compliance and Plan Submittal Process.

9.50.010 Findings, Purpose and Intent.

The City Council finds determines and declares that:

(a) The waters of the state are of limited supply and are subject to ever increasing demands.

(b) The continuation of California's economic prosperity is dependent on the availability of adequate supplies of water for future uses.

(c) It is the policy of the State of California to promote the conservation and efficient use of water and to prevent the waste of this valuable resource.

(d) Landscapes are essential to the quality of life in California by providing areas for active and passive recreation and as an enhancement to the environment by cleaning air and water, preventing erosion, offering fire protection, and replacing ecosystems lost to development.

(e) Landscape design, installation, maintenance and management can and should be water efficient.

(f) Section 2 of Article X of the California Constitution specifies that the right to use water is limited to the amount reasonably required for the beneficial use to be served and the right does not and shall not extend to waste or unreasonable method of use.

(g) Consistent with these findings, the purpose and intent of this chapter is to:

(1) Promote the values and benefits of landscaping practices that integrate and go beyond the conservation and efficient use of water;

(2) Establish a structure for planning, designing, installing, maintaining and managing water efficient landscapes in new construction and rehabilitated projects by encouraging the use of a watershed approach that requires cross-sector collaboration of industry, government and property owners to achieve the many benefits possible;

(3) Establish provisions for water management practices and water waste prevention for existing landscapes that conserve and promote the efficient use of water;

(4) Establish landscapes that are planned, designed, installed, managed and maintained with the watershed based approach that improve California's environmental conditions and provide benefits and realize sustainability goals. Such landscapes will make the urban environment resilient in the face of climatic extremes. Consistent with the legislative findings and purpose of the chapter, conditions in the urban setting will be improved by:

a. Creating the conditions to support life in the soil by reducing compaction, incorporating organic matter that increases water retention, and promoting productive plant growth that leads to more carbon storage, oxygen production, shade, habitat and esthetic benefits.

b. Minimizing energy use by reducing irrigation water requirements, reducing reliance on petroleum based fertilizers and pesticides, and planting climate appropriate shade trees in urban areas.

c. Conserving water by capturing and reusing rainwater and graywater wherever reasonably possible and selecting climate appropriate plants that need minimal supplemental water after establishment.

d. Protecting air and water quality by reducing power equipment use and landfill disposal trips, selecting recycled and locally sourced materials, and using compost, mulch and efficient irrigation equipment to prevent erosion.

e. Protecting existing habitat and creating new habitat by choosing local native plants, climate adapted non-natives and avoiding invasive plants.

(5) Reduce the water demands from landscapes without a decline in landscape quality;

(6) Retain flexibility and encourage creativity through appropriate design;

(7) Assure the attainment of water efficient landscape goals by requiring that landscapes not exceed a maximum water demand of fifty-five percent (55%) of its reference evapotranspiration (ETo) for residential landscape projects, and forty-five percent (45%) of ETo for non-residential projects or any lower percentage as may be required by state legislation, whichever is stricter;

(8) Eliminate water waste from overspray and/or runoff;

(9) Use water efficiently without waste by setting a Maximum Applied Water Allowance as an upper limit for water use and reduce water use to the lowest practical amount;

(10) Achieve water conservation by raising the public awareness of the need to conserve water through education and motivation to embrace an effective water demand management program;

(11) Promote the benefits of consistent landscape ordinances with neighboring local and regional agencies;

(12) Establish economic incentives that promote the efficient use of water, such as implementing a tiered-rate structure; and

(13) Implement the requirements of the California Water Conservation in Landscaping Act 2006, California Assembly Bill 1881 and the California Code of Regulations Title 23, Division 2, Chapter 2.7.

(14) Implement the requirements of the Jurupa Community Services District (JCSD) Water Conservation Ordinance No. 387;

(15) Adopt the necessary authority that implements and enforces the provisions of the Model Water Efficient Landscape Ordinance adopted by the State Water Commission.

9.50.020 Definitions.

The terms used in this chapter shall have the meaning set forth below:

(a) "Applied water" means the portion of water supplied by the irrigation system to the landscape.

(b) "Automatic irrigation controller" means an automatic timing device used to remotely control valves that operate an irrigation system. Automatic irrigation controllers shall be are able to self-adjust and schedule irrigation events using either evapotranspiration (weather-based) or soil moisture data.

(c) "Backfilling" means to refill an excavation, usually with excavated material.

(d) "Backflow prevention device" means a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

(e) "Certificate of Completion" means the document required under Section 9.50.050.

(f) "Certified landscape irrigation auditor" means a person certified to perform landscape irrigation audits by an accredited academic institution, a professional trade organization or other program such as the US Environmental Protection Agency's WaterSense irrigation auditor certification program and Irrigation Association's Certified Landscape Irrigation Auditor program.

(g) "Check valve" or "anti-drain valve" means a valve located under a sprinkler head or other location in the irrigation system to hold water in the system to prevent drainage from the sprinkler heads when the system is off.

(h) "Compost" means the safe and stable product of controlled biologic decomposition of organic materials that is beneficial to plant growth.

(i) "Drip irrigation" means any non-spray low volume irrigation system utilizing emission devices with a flow rate measured in gallons per hour. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

(j) "Ecological restoration project" means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

(k) "Emitter" means a drip irrigation emission device that delivers water slowly from the system to the soil.

(l) "Established landscape" means the point at which plants in the landscape have developed a significant root growth into the site. Typically, most plants are established after one or two years of growth. Native habitat mitigation areas and trees may need three to five years for establishment.

(m) "Estimated (pr) "Estimated Total Water Use" (ETWU) means the total water used for the landscape as described in Section 9.50.040(f).

(n) "ET adjustment factor" or "ETAF" means a factor of 0.55 for residential areas and 0.45 for non- residential areas, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape. The ETAF for a new and existing (non-rehabilitated) Special Landscape Areas shall not exceed 1.0. The ETAF for existing non-rehabilitated landscapes is 0.8.

(o) "Flow sensor" means an inline device installed at the supply point of the irrigation system that produces a repeatable signal proportional to flow rate. Flow sensors must be connected to an automatic irrigation controller, or flow monitor capable of receiving flow signals and operating master valves. This combination flow sensor/controller may also function as a landscape water meter or submeter.

(p) "Friable" means a soil condition that is easily crumbled or loosely compacted down to a minimum depth per planting material requirements, whereby the root structure of newly planted material will be allowed to spread unimpeded.

(q) "Fuel Modification Plan Guideline" means guidelines from a local fire authority to assist residents and businesses that are developing land or building structures in a fire hazard severity zone.

(r) "Graywater" means untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. "Graywater" includes, but is not limited to, wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs, but does not include wastewater from kitchen sinks or dishwashers. (Cal. Health & Saf. Code, § 17922.12.)

(s) "Hydrozone" means a portion of the landscaped area having plants with similar water needs. A hydrozone may be irrigated or non-irrigated.

(t) "Invasive species" are non-indigenous species (e.g. plants or animals) that adversely affect the habitats they invade economically, environmentally, or ecologically. Lists of invasive species are included within the Western Riverside County Multiple Species Habitat Conservation Plan and the Coachella Valley Multiple Species Habitat Conservation Plan. Said lists are hereby incorporated by reference.

(u) "Landscape architect" means a person who holds a license to practice landscape architecture in the State of California.

(v) "Landscaped area" or "LA" means all of the planting areas, turf areas, and water features in a landscape design plan subject to the Maximum Applied Water Allowance (MAWA) calculation. The landscape area does not include footprints of buildings, or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or impervious hardscapes, and other non-irrigated areas designated for non- development (e.g., open space and existing native vegetation).

(w) "Landscape water meter" means an inline device installed at the irrigation supply point that measures the flow of water into the irrigation system and is connected to a totalizer to record water use.

(x) "Local water purveyor" means any entity, including a public agency or private water company that provides retail water service to customers in the City of Jurupa Valley.

(y) "Low volume irrigation" means the application of irrigation water at low pressure through a system of tubing or lateral lines and low volume emitters such as drip, to apply small volumes of water slowly at or near the root zone of plants.

(z) "Master shut-off valve" is an automatic valve installed at the irrigation supply point which controls water flow into the irrigation system. When this valve is closed water will not be supplied to the irrigation system. A master valve will greatly reduce any water loss due to a leaky station valve.

(aa) "Maximum Applied Water Allowance" or "MAWA" means the upper limit of annual applied water allowed for the established landscaped area.

(bb) "Non-residential landscape" means landscapes in commercial, institutional, industrial and public settings that may have areas designated for recreation or public assembly. It also includes portions of common areas of common interest developments with designated recreational areas.

(cc) "Overhead sprinkler irrigation systems" means systems that deliver water through the air (e.g. pop ups, impulse sprinklers, spray heads and rotors, etc.).

(dd) "Recreational area" means areas, excluding private single family residential areas, designated for active play, recreation or public assembly in parks, sports fields, picnic grounds, amphitheaters or golf course tees, fairways, roughs, surrounds and greens.

(ee) "Reference evapotranspiration" or "ETo" means a standard measurement of environmental parameters which affect the water use of plants. ETo is given in inches per day, month, or year. Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowances so that regional differences in climate can be accommodated. Reference evapotranspiration numbers shall be taken from the most current EvapoTranspiration Zones Map developed by the California Department of Water Resources. For geographic areas not covered by the EvapoTranspiration Zones Map, data from nearby areas shall be used.

(ff) "Rehabilitated landscapes" means any re-landscaping of a project that requires a discretionary permit.

(gg) "Soil polymers" are a soil amendment designed to reduce plant watering by 50% reduce transplant shock, soil compaction, and remain effective in the soil for 3-5 years. These polyacrylamide crystals, mixed with soil at planting time, will absorb 200 to 300 times their weight in water and hold it in the root zone where the plant can use it.

(hh) "Special landscape area" means an area of the landscape dedicated to edible plants, recreational areas, areas irrigated with recycled water, or water features using recycled water. ii) "Temporarily irrigated" means irrigation for the purposes of establishing plants, or irrigation which will not continue after plant establishment. Temporary irrigation is for a period of six months or less.

(jj) "Water-intensive landscaping" means a landscape with a WUCOLS plant factor of 0.7 or greater.

(kk) "WUCOLS" means the publication entitled "Water Use Classification of Landscape Species" by the University of California Cooperative Extension, and the Department of Water Resources (2014 or most current version).

9.50.030 Applicability.

(a) The water-efficient landscape requirements set forth in this chapter shall be applicable to all of the following landscape projects:

(1) New public agency and private development projects with an aggregate landscape area equal to or greater than five hundred (500) square feet requiring a discretionary permit;

(2) Rehabilitated landscape projects with an aggregate landscape area equal to or greater than two thousand five hundred (2,500) square feet requiring a discretionary permit; and

(3) Existing landscapes limited to Section 9.50.040.

(b) In the event Covenants, Conditions and Restrictions are required for any permit subject to this chapter, a condition shall be incorporated into any project approval prohibiting the use of water-intensive landscaping and requiring the use of low water use landscaping pursuant to the provisions of this chapter in connection with common area/open space landscaping. Additionally, such a condition shall also require the Covenants, Conditions and Restrictions to incorporate provisions concerning landscape irrigation system management and maintenance. This chapter shall not be construed as requiring landscaping of common areas or open space that is intended to remain natural. Covenants, Conditions and Restrictions shall not prohibit use of low-water use plants or the replacement of turf with less water intensive plant species.

(c) Recognizing the special landscape needs of cemeteries, new and rehabilitated landscapes within a cemetery are subject only to the provisions set forth in Sections 9.50.050(a) and 9.50.050(b) of this chapter.

(d) For projects using treated or untreated graywater or rainwater captured on site, any lot or parcel within the project that has less than two thousand five hundred (2500) square feet of landscape and meets the lot's or parcel's landscape water requirement (Estimated Total Water Use) entirely with treated or untreated graywater or through stored rainwater

captured on site is subject only to the irrigation requirements of Appendix D, Prescriptive Compliance Option of the Water Efficient Landscape Worksheet.

(e) The following uses and projects are exempt from the provisions of this chapter:

(1) Registered local, state or federal historical sites;

(2) Ecological restoration projects that do not require a permanent irrigation system and have an establishment period of less than five (5) years;

(3) Mined land reclamation projects that do not require a permanent irrigation system; and

(4) Botanical gardens and arboretums open to the public.

9.50.040 Landscape Documentation Requirements.

(a) An applicant proposing any new or rehabilitated landscape for a project subject to Section 9.50.030 of this chapter shall prepare and submit to the Planning Director documentation that includes the following:

(1) Project information;

(2) A planting plan;

(3) An irrigation design plan;

(4) A soil management plan;

(5) A grading design plan; and

(6) The Model Water Efficient Landscape Worksheet.

(b) The most recent "Riverside County Guide to California Friendly Landscaping" (Landscaping Guide) is hereby incorporated by reference to assist in designing, constructing and maintaining a water efficient landscape and efficient irrigation system.

(c) It is recommended that an applicant proposing any new or rehabilitated landscape that is designated for recycled water use consult with the appropriate local water purveyor early in the development review process to ensure that future recycled water facilities meet the projected demand and that the aforementioned plans, when submitted, comply with the applicable standards, approvals and implementation requirements of this chapter, the local water purveyor and any applicable maintenance entity.

(d) Water systems for common open space areas shall use non-potable water if approved facilities are made available by the local water purveyor. Provisions for a non-potable water system shall be provided within the irrigation design plan. Water systems designed to utilize non-potable water shall be designed to meet all applicable standards of the

applicable Regional Water Quality Control Board and the Riverside County Health Department. Prior to construction, the project applicant shall submit a Landscape Documentation Package to the local agency.

(e) Project Information. The following items shall be submitted as part of the landscape documentation:

(1) Date;

(2) Name of applicant and contact information;

(3) Name of project owner and contact information;

(4) Project address including parcel and lot numbers;

(5) Total landscape area in square feet;

(6) Project type (e.g. new or rehabilitated, and residential, commercial, or industrial);

(7) Water supply (e.g. potable, well, recycled; use of recycled water is encouraged);

(8) Applicant's signature and date with statement, "I agree to comply with the requirements of Chapter 9.50 of Title 9 of the Jurupa Valley Municipal Code and submit a complete Landscape Documentation Package."

(f) Landscape Planting Plan Requirements.

(1) Plant types shall be grouped together in regards to their water, soil, sun and shade requirements and in relationship to the buildings. Plants with different water needs shall be irrigated separately. Plants with the following classifications shall be grouped accordingly: high and moderate, moderate and low, low and very low. Deviation from these groupings shall be not be permitted.

(2) Trees for shade shall be provided for residential, commercial and industrial buildings, parking lots and open space areas per the requirements in the Jurupa Valley Zoning Ordinance.. These trees can be deciduous or evergreen and are to be incorporated to provide natural cooling opportunities for the purpose of energy and water conservation.

(3) Plants shall be placed in a manner considerate of solar orientation to maximize summer shade and winter solar gain.

(4) Plant selection for projects in high fire hazard areas shall address fire safety and prevention. A defensible space or zone around a building or structure is required pursuant to Public Resources Code Section 4291 and Riverside County Ordinance No. 695, as adopted by the City of Jurupa Valley pursuant to Chapter 1.35 of the Jurupa Valley Municipal

Code. Fire-prone plant materials and highly flammable mulches shall be avoided. Refer to the local Fuel Modification Plan guidelines.

(5) Invasive species of plants such as those listed by the California Invasive Plant Council, shall be avoided especially near parks, buffers, greenbelts, water bodies, conservation areas/reserves and other open space areas because of their potential to cause harm to environmentally sensitive areas.

(6) Soil Preparation.

a. Prior to the planting of any materials, compacted soils shall be transformed to a friable condition. On engineered slopes, only amended planting holes need meet this requirement.

b. Soil amendments shall be incorporated according to recommendations of the soil report and what is appropriate for the plants selected (see Section 9.50.040(h)).

c. Soil polymers are recommended as a soil amendment as they absorb water and nutrients, increase air space in the soil and can reduce watering by half.

d. For landscape installations, compost at a rate of a minimum of four cubic yards per one thousand (1,000) square feet of permeable area shall be incorporated to a depth of six (6) inches into the soil.

e. Soils with greater than six percent (6%) organic matter in the top six (6) inches of soil are exempt from adding compost and tilling.

(7) All exposed surfaces of non-turf areas within the developed landscape area shall be mulched with a minimum three inch (3") layer of material, except in areas with groundcover planted from flats where mulch depth shall be one and one half inches (1 ½").

(8) Stabilizing mulching products shall be used on slopes.

(9) Turf areas shall be used in response to functional needs and in compliance with the water budget.

(10) Decorative water features shall use re-circulating water systems.

(11) Where available, recycled water shall be used as the source for irrigation and decorative water features.

(12) Planting plans shall identify and site the following:

a. New and existing trees, shrubs, ground covers, and turf areas within the proposed landscaped area;

b. A planting legend indicating all plant species by botanical name and common name, spacing, and quantities of each type of plant by container size;

c. Designation of hydrozones;

d. Area, in square feet, devoted to landscaping and a breakdown of the total area by landscape hydrozones;

e. Property lines, streets, and street names;

f. Building locations, driveways, sidewalks, retaining walls, and other hardscape features;

g. Appropriate scale and north arrow;

h. Any special landscape areas;

i. Type of mulch and application depth;

j. Type and surface area of water features;

k. Type installation details, and 24-hour retention or infiltration capacity of any applicable stormwater best management practices. Project applicants shall refer to the local agency or regional Water Quality Control Board for information on any applicable stormwater technical requirements; and

l. Planting specifications and details, including the recommendations from the soils analysis, if applicable.

(13) Planting Plans shall include the Water Efficient Landscape Worksheet in Appendix B of the Department of Water Resources Model Water Efficient Landscape Ordinance, adopted herein by this reference, that contains information on the plant factor, irrigation method, irrigation efficiency, and area associated with each hydrozone for calculating the Maximum Applied Water Allowance and the Estimated Annual Water Use.

a. Calculations must show that the evapotranspiration adjustment factor (ETAF) for the landscape project does not exceed a factor of 0.55 for residential areas and 0.45 for non- residential areas, exclusive of Special Landscape Areas. The ETAF for a landscape project is based on the plant factors and irrigation methods selected. The Maximum Applied Water Allowance is calculated based on the maximum ETAF allowed (0.55 for residential areas and 0.45 for non-residential areas) and expressed as annual gallons required. The Estimated Total Water Use (ETWU) is calculated based on the plants used and irrigation method selected for the landscape design. ETWU must be below the MAWA.

b. In calculating the Maximum Applied Water Allowance and Estimated Total Water Use, a project applicant shall use the ETo values from the Reference Evapotranspiration Table in Appendix A of the Department of Water Resources Model Water

Efficient Landscape Ordinance, adopted by the Department of Water Resources, adopted herein by this reference.

c. Water budget calculations shall adhere to the following requirements:

1. The plant factor used shall be from WUCOLS or from horticultural researchers with academic institutions or professional associations as approved by the California Department of Water Resources (DWR). The plant factor ranges from 0 to 0.1 for very low water using plants, 0.1 to 0.3 for low water use plants, from 0.4 to 0.6 for moderate water use plants, and from 0.7 to 1.0 for high water use plants.

2. All water features shall be included in the high water use hydrozone and temporarily irrigated areas shall be included in the low water use hydrozone.

3. All Special Landscape Areas shall be identified and their water use calculated per Appendix B of the Department of Water Resources Model Water Efficient Landscape Ordinance.

4. ETAF for new and existing (non-rehabilitated) Special Landscape Areas shall not exceed 1.0.

(14) Planting plans and Irrigation plans (Section 9.50.040(g)) shall be drawn at the same size and scale.

(15) The Planting plan shall be prepared by a Landscape Architect licensed by the State of California.

(g) Water Efficient Landscape Worksheet.

(1) A project applicant shall complete the Water Efficient Landscape Worksheet in Appendix A which contains information on the plant factor, irrigation method, irrigation efficiency, and area associated with each hydrozone. Calculations are then made to show that the evapotranspiration adjustment factor (ETAF) for the landscape project does not exceed a factor of 0.55 for residential areas and 0.45 for non-residential areas, exclusive of Special Landscape Areas. The ETAF for a landscape project is based on the plant factors and irrigation methods selected. The Maximum Applied Water Allowance is calculated based on the maximum ETAF allowed (0.55 for residential areas and 0.45 for non-residential areas) and expressed as annual gallons required. The Estimated Total Water Use (ETWU) is calculated based on the plants used and irrigation method selected for the landscape design. ETWU must be below the MAWA.

(2) In calculating the Maximum Applied Water Allowance and Estimated Total Water Use, a project applicant shall use the following ETo values:

an	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
2.3	2.4	4.1	4.9	6.4	7.0	7.8	7.4	5.7	4.1	2.6	2.2	56.7

(3) Water budget calculations shall adhere to the following requirements:

a. The plant factor used shall be from WUCOLS or from horticultural researchers with academic institutions or professional associations as approved by the California Department of Water Resources (DWR). The plant factor ranges from 0 to 0.1 for very low water using plants, 0.1 to 0.3 for low water use plants, from 0.4 to 0.6 for moderate water use plants, and from 0.7 to 1.0 for high water use plants.

b. All water features shall be included in the high water use hydrozone and temporarily irrigated areas shall be included in the low water use hydrozone.

c. All Special Landscape Areas shall be identified and their water use calculated as shown in Appendix A.

d. ETAF for new and existing (non-rehabilitated) Special Landscape Areas shall not exceed 1.0.

h) Irrigation Design Plan Requirements. This section applies to landscaped areas requiring permanent irrigation, not areas that require temporary irrigation solely for the plant establishment period.

(1) Irrigation systems shall be designed, maintained, and managed to meet or exceed an average irrigation efficiency of 0.75 for overhead spray devices and 0.81 for drip system devices.

(2) All irrigation systems shall be designed to prevent runoff, over-spray, lowhead drainage and other similar conditions where water flows off-site on to adjacent property, non-irrigated areas, walk, roadways, or structures. Irrigation systems shall be designed, constructed, managed, and maintained to achieve as high an overall efficiency as possible. The irrigation system shall be designed to ensure that the dynamic pressure at each emission device is within the manufacturer's recommended pressure range for optimal performance.

(3) Landscaped areas shall be provided with a smart irrigation controller utilizing non-volatile memory which automatically adjusts the frequency and/or duration of irrigation events in response to changing weather conditions unless the use of the property would otherwise prohibit use of a timer. The planting areas shall be grouped in relation

to moisture control zones based on similarity of water requirements (i.e., turf separate from shrub and groundcover, full sun exposure areas separate from shade areas, top of slope separate from toe of slope). Additional water conservation technology may be required, where necessary, at the discretion of the Planning Director.

(4) Water systems for common open space areas shall use non-potable water, if approved facilities are made available by the water purveyor. Provisions for the conversion to a non-potable water system shall be provided within the landscape plan. Water systems designed to utilize non-potable water shall be designed to meet all applicable standards of the California Regional Water Quality Control Board and the Riverside County Health Department.

(5) Graywater systems promote the efficient use of water and are encouraged to assist in on-site landscape irrigation. All graywater systems shall conform to the California Plumbing Code (California Code of Regulations Title 24, Part 5, Chapter 16) and any applicable local ordinance standards.

(6) Separate valves shall be provided for separate water use planting areas, so that plants with similar water needs are irrigated by the same irrigation valve. All installations shall rely on highly efficient state of the art irrigation systems to eliminate runoff and maximize irrigation efficiency as required by the Landscaping Guide.

(7) If the water pressure is below or exceeds the recommended pressure of the specified irrigation devices, the installation of a pressure regulating device is required to ensure that the dynamic pressure at each emission device is within the manufacturer's recommended pressure range for optimal performance.

(8) Static water pressure, dynamic or operating pressure and flow reading of the water supply shall be measured. These pressure and flow measurements shall be conducted at the design stage. If the measurements are not available at the design stage, the measurements shall be conducted at the installation.

(9) The capacity of the irrigation system shall not exceed:

a. The capacity required for peak water demand based on water budget calculations;

b. Meter capacity; or

c. Backflow preventer type and device capacity.

(10) Sprinkler heads and other emission devices shall have matched precipitation rates, unless otherwise directed by the manufacturer.

(11) In mulched planting areas, the use of low volume irrigation is required to maximize water infiltration into the root zone.

(12) Slopes greater than twenty-five percent (25%) shall not be irrigated with an application system with a precipitation rate exceeding 0.75 inches per hour. This restriction may be modified if the landscape designer specifies an alternative design or technology, as part of the landscape documentation required to be submitted pursuant to this chapter, and if there is a clear demonstration that no runoff or erosion will occur. Prevention of runoff and erosion must be confirmed during the irrigation audit.

(13) Areas less than ten (10) feet in width in any direction shall be irrigated with subsurface irrigation or other means that produce no runoff or overspray.

(14) Overhead irrigation shall not be permitted within twenty-four (24) inches of any non-permeable surface. There are no restrictions on the irrigation system type if the landscape area is adjacent to permeable surfacing and no overspray and runoff occurs.

(15) Overhead irrigation shall be limited to the hours of 8 p.m. to 9 a.m.

(16) All irrigation systems shall be equipped with the following:

a. A smart irrigation controller as defined in Section 5.50.040(g)(3) of this chapter;

b. A rain sensing device to prevent irrigation during rainy weather;

c. Anti-drain check valves installed at strategic points to minimize or prevent low-head drainage;

d. A manual shut-off valve shall be required as close as possible to the point of connection of the water supply, to minimize water loss in case of an emergency or routine repair;

e. A pressure regulator when the static water pressure is above the recommended operating pressure of the irrigation system;

f. Backflow prevention devices;

g. Flow sensors that detect high flow conditions created by system damage or malfunction on all non-residential landscapes and residential landscapes of five thousand (5,000) square feet or larger; and

h. Riser protection components for all risers adjacent to hardscapes or in high traffic areas.

(17) Master shut-off valves are required on all projects except landscapes that make use of technologies that allow for the individual control of sprinklers that are individually pressurized in a system equipped with low pressure shut down features.

(18) Landscape water meters, defined as either a dedicated water service meter or private submeter, shall be required for all non-residential irrigated landscapes of one thousand (1,000) square feet but not more than five thousand (5,000) square feet and residential irrigated landscapes of five thousand (5,000) square feet or greater.

(19) Irrigation design plans shall identity and site the following:

a. Hydrozones:

1. Each hydrozone shall be designated by number, letter or other designation.

2. A hydrozone information table shall be prepared for each hydrozone;

b. The areas irrigated by each valve;

c. Irrigation point of connection (POC) to the water system;

d. Static water pressure at POC;

e. Location and size of water meter(s), service laterals, and backflow preventers;

f. Location, size, and type of all components of the irrigation system, including automatic controllers, main and lateral lines, valves, sprinkler heads and nozzles, pressure regulator, drip and low volume irrigation equipment;

g. Total flow rate (gallons per minute), and design operating pressure (psi) for each overhead spray and bubbler circuit, and total flow rate (gallons per hour) and psi for each drip and low volume irrigation circuit;

h. Precipitation rate (inches per hour) for each overhead spray circuit; Irrigation legend with the manufacturer name, model number, and general description for all specified equipment, separate symbols for all irrigation equipment with different spray patterns, spray radius, and precipitation rate;

i. Irrigation system details for assembly and installation;

j. Recommended irrigation schedule for each month, including number of irrigation days per week, number of start times (cycles) per day, minutes of run time per cycle, and estimated amount of applied irrigation water, expressed in gallons per month and gallons per year, for the established landscape; and

k. Irrigation design plans shall contain the following statement, "I agree to comply with the criteria of Chapter 9.50 of Title 9 of the Jurupa Valley Municipal Code and to apply the criteria for the efficient use of water in the irrigation design plan."

(20) For each valve, two (2) irrigation schedules shall be prepared, one for the initial establishment period of six (6) months and one for the established landscape, which incorporate the specific water needs of the plants and turf throughout the calendar year.

(21) Irrigation design plans and planting plans (Section 5.50.040(f)) shall be drawn at the same size and scale.

(i) Soil Management Plan Requirements.

(1) After mass grading, the project applicant shall:

a. Perform a preliminary site inspection;

b. Determine the appropriate level of soil sampling and sampling method needed to obtain representative soil sample(s);

c. Conduct a soil probe test to determine if the soil in the landscape area has sufficient depth to support the intended plants; and

d. Obtain appropriate soil sample(s).

(2) The project applicant shall submit soil sample(s) to a laboratory for analysis and recommendation. The soil analysis shall include:

a. Soil texture;

b. Infiltration rate determined by laboratory test or soil texture infiltration rate tables;

c. pH;

d. Total soluble salts;

e. Sodium; and

f. Recommendations.

(3) The project applicant shall prepare documentation describing the following:

a. Soil type;

b. Identification of limiting soil characteristics;

c. Identification of planned soil management actions to remediate limiting soil characteristics; and

(4) The applicant shall submit the soil analysis report and documentation verifying implementation of soil analysis report recommendations to the City pursuant to the requirements of Section 9.50.060.

(j) Grading Design Plan Requirements. The landscape documentation submitted shall also include rough/precise grade elevations prepared for the project by a licensed civil engineer or licensed landscape architect.

9.50.050 Landscape Irrigation and Maintenance.

This section shall apply to all projects subject to the provisions of this chapter as set forth in Section 9.50.030.

(a) Two (2) irrigation schedules shall be prepared, one for the initial establishment period of six (6) months and one for the established landscape, which incorporate the specific water needs of the plants and turf throughout the calendar year. The irrigation schedule shall take into account the particular characteristics of the soil; shall be continuously available on site to those responsible for the landscape maintenance; and shall contain specifics as to optimum run time and frequency of watering, and irrigation hours per day. The schedule currently in effect shall be posted at the controller.

(b) A regular maintenance schedule and Certificate of Completion shall be submitted to the Planning Director, property owner, and water purveyor. A regular maintenance schedule shall include, but not be limited to, routine inspection, auditing, adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; topdressing with compost, replenishing mulch; fertilizing; pruning; weeding in all landscape areas and removing obstructions to irrigation devices. Repair of all irrigation equipment shall be done with the originally installed components or equivalent or with components with greater efficiency.

(c) All model homes shall be landscaped and use signs and written information to demonstrate the principles of water efficient landscapes described in this chapter. Signage shall include information about the site water use as designed per the local ordinance; specify who designed and installed the water efficient landscape; and demonstrate low water use approaches to landscaping such as using native plants, graywater systems, rainwater catchment systems and smart controllers.

(d) Information shall be provided to owners of new, single family residential homes regarding the design, installation, management, and maintenance of water efficient landscapes.

9.50.060 Compliance and Plan Submittal Process.

Prior to issuance of a building permit for the project, the project applicant shall:

(a) Submit all landscape documents required by Section 9.50.040 for review and approval by the Planning Director. The planting plan, irrigation design plan, and soils management plan shall be reviewed by an independent licensed landscape architect to ensure that all components of the plans adhere to the requirements of this chapter. The licensed landscape

architect shall sign all plans verifying that the plans comply with this chapter. Any plans submitted without the signature of a licensed landscape architect shall not be accepted for review.

(b) Prior to issuance of a certificate of occupancy or final inspection for the project, a regular maintenance schedule and a Certificate of Completion shall be submitted to the Planning Director certifying that the landscaping has been completed in accordance with the approved planting and irrigation design, soil management, and grading design plans for the project. The Certificate of Completion shall be signed by a licensed landscape architect and shall indicate:

1. Date;

2. Project information:

   a. Project name;

   b. Project applicant name, telephone and mailing address;

   c. Project address and location; and

   d. Property owner name and mailing address;

3. Prior to backfilling, evidence that the party responsible for irrigation installation conducted a preliminary field inspection of the irrigation system (evidence of field inspection shall be attached);

4. The landscaping has been installed in conformance with the approved planting and irrigation design plans;

5. Irrigation audit report performed by a certified landscape irrigation auditor after project installation (audit report shall be attached);

6. The smart irrigation controller has been set according to the irrigation schedule;

7. The irrigation system has been adjusted to maximize irrigation efficiency and eliminate overspray and runoff; and a copy of the approved landscape documentation (Section 9.50.040), the irrigation schedule (Section 9.50.050(a)) and the maintenance schedule (Section 9.50.060(b)) has been given to the property owner and local water purveyor.

8. The Model Water Efficient Landscape Worksheet; and

9. Verification that the maintenance schedule has been provided to the Planning Director.

(c) At a minimum, all landscape irrigation audits shall comply with the "Irrigation Association Certified Landscape Irrigation Auditor Training Manual" (2004 or most current) and shall be conducted by a certified landscape irrigation auditor. Landscape audits shall not be conducted by the person who designed the landscape or installed the landscape.

(d) In large projects or projects with multiple landscape installations (i.e. production home developments) an auditing rate of one (1) in seven (7) lots or approximately fifteen percent (15%) will satisfy this requirement.

(e) The Planning Director, or his or her designee, may enter upon the project site at any time before, during and after installation of the landscaping, to conduct inspections for the purpose of enforcing this chapter."

Section 3. CEQA Findings. This project is exempt from the California Environmental Quality Act (CEQA) pursuant to State CEQA Guidelines, 14 Cal. Code Regs. Section 15307 and 15308, as an action taken to assure the maintenance, restoration, or enhancement of a natural resource or the environment where the regulatory process involves procedures for protection of the environment. This Ordinance does not contemplate any construction activities and is limited to ensuring water efficient landscaping options to preserve water. There is no evidence to suggest that the Ordinance will result in a significant impact on the environment, including impacts due to unusual circumstances. The adoption of this Ordinance includes provisions that will result in the enhancement and protection of water resources in the City. Based on the foregoing and other substantial evidence in the record, the City Council hereby finds and determines that the Ordinance is exempt from the provisions of CEQA, pursuant to State CEQA Guidelines Sections 15307 and 15308. As a separate and independent ground, the City Council finds that the Ordinance is covered by the general rule that CEQA applies only to projects that have the potential for causing a significant effect on the environment. Because it can be seen with certainty that there is no possibility that the Ordinance will have a significant effect on the environment, the Ordinance is not subject to CEQA pursuant to State CEQA Guidelines Section 15061 (b)(3).

Section 4. Findings General Plan. The City Council hereby makes the following findings in adopting this Ordinance as required by the Jurupa Valley Ordinances and applicable state law:

A. The Zoning Amendment will be consistent with the Riverside County General Plan as adopted by the City of Jurupa Valley through Ordinance Nos. 2011-01 and 2011-10 (Chapter 1.35) because there are provisions relating to preservation of natural resources and this Ordinance is mandated by State law. As such, no consistency issues will result.

B. The City of Jurupa Valley is proceeding in a timely fashion with preparation of the City of Jurupa Valley General Plan. Additionally, the City Council finds that:

1) There is a high probability that the Zoning Amendment will be consistent with the general plan proposal being considered or studied or which will be studied within a reasonable time;

2) There is little or no probability of substantial detriment to or interference with the future adopted general plan if the proposed Zoning Amendment is ultimately inconsistent with the plan; and

3) The proposed Zoning Amendment complies with all other applicable requirements of state law and Jurupa Valley Ordinances.

Section 5. Effect of Ordinance. This Ordinance is intended to supersede any ordinance or resolution of the County of Riverside adopted by the City of Jurupa Valley through Ordinance Nos. 2011-01 and 2011-10 (Chapter 1.35) that may be in conflict with the terms of this Ordinance, including, without limitation, Chapter 17.276, Water Efficient Landscaping Regulations, of the Riverside County Code of Ordinances and Riverside County Ordinance No. 859.

Section 6. Severability. If any section, subsection, sentence, clause, or phrase of this Ordinance is for any reason held to be invalid or unconstitutional by a decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Ordinance. The City Council hereby declares that it would have passed this Ordinance and each and every section, subsection, sentence, clause or phrase not declared invalid or unconstitutional without regard to whether any portion of the Ordinance would be subsequently declared invalid or unconstitutional.

Section 7. The City Clerk shall certify to the passage and adoption of this Ordinance and shall cause the same to be published or posted in the manner required by law.

PASSED, APPROVED AND ADOPTED by the City Council of the City of Jurupa Valley on this 19th day of November, 2015.

Brad Hancock
Mayor

ATTEST:

Victoria Wasko, CMC
City Clerk

CERTIFICATION

STATE OF CALIFORNIA)
COUNTY OF RIVERSIDE) ss.
CITY OF JURUPA VALLEY)

I, Victoria Wasko, CMC, City Clerk of the City of Jurupa Valley, do hereby certify that the foregoing Ordinance No. 2015-17 was regularly introduced at a regular meeting of the City Council held on the 5th day of November, 2015 and thereafter at a regular meeting held on the 19th day of November, 2015, it was duly passed and adopted by the following vote of the City Council:

AYES: **BERKSON, HANCOCK, JOHNSTON, LAURITZEN, ROUGHTON**

NOES: **NONE**

ABSENT: **NONE**

ABSTAIN: **NONE**

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the City of Jurupa Valley, California, this 19th day of November, 2015.

Victoria Wasko, CMC
City Clerk

THE PRESS-ENTERPRISE

1825 Chicago Ave, Suite 100
Riverside, CA 92507
951-684-1200
951-368-9018 FAX

PROOF OF PUBLICATION
(2010, 2015.5 C.C.P)

Publication(s): The Press-Enterprise

PROOF OF PUBLICATION OF

Ad Desc.:

I am a citizen of the United States. I am over the age of eighteen years and not a party to or interested in the above entitled matter. I am an authorized representative of THE PRESS-ENTERPRISE, a newspaper in general circulation, printed and published daily in the County of Riverside, and which newspaper has been adjudicated a newspaper of general circulation by the Superior Court of the County of Riverside, State of California, under date of April 25, 1952, Case Number 54446, under date of March 29, 1957, Case Number 65673, under date of August 25, 1995, Case Number 267864, and under date of September 16, 2013, Case Number RIC 1309013; that the notice, of which the annexed is a printed copy, has been published in said newspaper in accordance with the instructions of the person(s) requesting publication, and not in any supplement thereof on the following dates, to wit:

11/19/2015

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date:
Nov 19, 2015
At: Riverside, California

CITY OF JURUPA VALLEY - CITY CLERK
8930 LIMONITE AVE
RIVERSIDE, CA 925095019

Ad Number: 0010111583-01

P.O. Number:

Ad Copy:

CITY OF JURUPA VALLEY
Office of the City Clerk

NOTICE OF PROPOSED ORDINANCE

NOTICE IS HEREBY GIVEN that on November 5, 2015, the City Council of the City of Jurupa Valley, California, introduced the following ordinance:

ORDINANCE NO. 2015-17- AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF JURUPA VALLEY, CALIFORNIA, AMENDING CHAPTER 9.50 RELATING TO WATER EFFICIENT LANDSCAPE DESIGN IMPLEMENTING THE EMERGENCY REGULATIONS OF THE STATE WATER RESOURCES CONTROL BOARD; AND FINDING THAT THE NEW PROVISIONS ARE EXEMPT FROM CEQA PURSUANT TO CEQA GUIDELINES SECTIONS 15307, 15308 AND 15061

Summary: The proposed ordinance makes amendments to the City's existing State mandated water efficient landscape regulations as required by Governor Brown's Drought Executive Order of April 1, 2015 (EO B-29-15). Executive Order, B-29-15 directed the Department of Water Resources (DWR) to update the 2009 State Mandated Model Water Efficient Landscape Ordinance through expedited regulation. The California Water Commission approved the revised Ordinance (the 2015 Model Ordinance) on July 15, 2015. Local agencies (cities and counties) have until December 1, 2015 to adopt the Ordinance or adopt their own "locally modified" ordinance, which must be at least as effective in conserving water as the State's Ordinance. Jurupa Valley is mandated to either use the DWR ordinance or update its own ordinance in a manner which is as effective as the DWR ordinance.

The proposed ordinance will be considered for adoption by the City Council at their November 19, 2015 meeting.

The full text of the ordinance is available for review in the City Clerk's Office, 8930 Limonite Avenue, Jurupa Valley, California (951) 332-6464.

Victoria Wasko, CMC
City Clerk

11/19

Affidavit of Publication

(2015.5 C.C.P.)

County of Riverside

State of California

Catherine Sypin-Barnes, being first duly sworn, deposes and says: That at all times hereinafter, mentioned that she was a citizen of the United States, over the age of eighteen years, and a resident of said County, and was at and during all said times the principal clerk of the printer and publisher of The Riverside County Record-News, a newspaper of general circulation, adjudicated by court decree, printed and published weekly in said County of Riverside, State of California, that said Riverside County Record-News is and was at all times herein mentioned, a newspaper of general circulation as that term is defined in section 4460 of the Political Code, and, as provided by that section, is published for the dissemination of local and telegraphic news and intelligence of a general character, having a bona fide subscription list of paying subscribers, and is not devoted to nor published for the interest, entertainment or instruction of a particular class, profession, trade, calling, race of denominations; that at all said time said newspaper has been established, printed and published in said County and State at regular intervals for more than one year preceding the date of publication of the notice hereinafter mentioned; that said notice was set in type not smaller than nonpareil and was preceded with words printed in black face type not smaller than nonpareil describing and expressing in general terms the purport and character of the notice intended to be given; that the

RIVERSIDE COUNTY RECORD NEWSPAPER

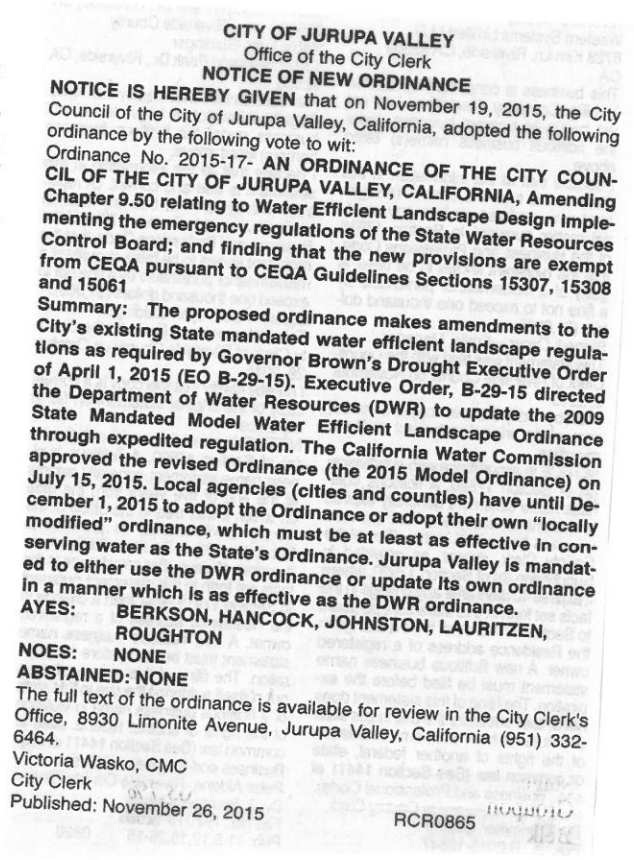
of which the annexed is a printed copy, published and printed in said newspaper in at least 1 weekly issues, as follows:

November 26, 2015

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Signature

Dated: November 26, 2015
at Riverside, California



CITY OF JURUPA VALLEY
Office of the City Clerk
NOTICE OF NEW ORDINANCE

NOTICE IS HEREBY GIVEN that on November 19, 2015, the City Council of the City of Jurupa Valley, California, adopted the following ordinance by the following vote to wit:

Ordinance No. 2015-17- **AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF JURUPA VALLEY, CALIFORNIA, Amending Chapter 9.50 relating to Water Efficient Landscape Design implementing the emergency regulations of the State Water Resources Control Board; and finding that the new provisions are exempt from CEQA pursuant to CEQA Guidelines Sections 15307, 15308 and 15061**

Summary: The proposed ordinance makes amendments to the City's existing State mandated water efficient landscape regulations as required by Governor Brown's Drought Executive Order of April 1, 2015 (EO B-29-15). Executive Order, B-29-15 directed the Department of Water Resources (DWR) to update the 2009 State Mandated Model Water Efficient Landscape Ordinance through expedited regulation. The California Water Commission approved the revised Ordinance (the 2015 Model Ordinance) on July 15, 2015. Local agencies (cities and counties) have until December 1, 2015 to adopt the Ordinance or adopt their own "locally modified" ordinance, which must be at least as effective in conserving water as the State's Ordinance. Jurupa Valley is mandated to either use the DWR ordinance or update its own ordinance in a manner which is as effective as the DWR ordinance.

AYES: BERKSON, HANCOCK, JOHNSTON, LAURITZEN, ROUGHTON
NOES: NONE
ABSTAINED: NONE

The full text of the ordinance is available for review in the City Clerk's Office, 8930 Limonite Avenue, Jurupa Valley, California (951) 332-6464.

Victoria Wasko, CMC
City Clerk
Published: November 26, 2015

RCR0865

AMENDED AND RESTATED

WATER PURCHASE AGREEMENT

Dated as of January 1, 2011

By and Between

CHINO BASIN DESALTER AUTHORITY

and

THE JURUPA COMMUNITY SERVICES DISTRICT

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AMENDED AND RESTATED WATER PURCHASE AGREEMENT

This Agreement, dated as of January 1, 2011, by and between the Chino Basin Desalter Authority (the "Authority"), a joint exercise of powers agency duly organized and existing pursuant to Article 1, Chapter 5, Division 7, Title 1 of the Government Code (the "Joint Powers Act"), commencing with Section 6500, and the Jurupa Community Services District (the "Purchaser").

WITNESSETH:

WHEREAS, the Purchaser and certain other Authority members who are water purveyors in the Chino Basin currently receive desalted water from the Authority pursuant to Water Purchase Agreements dated as of January 15, 2002.

WHEREAS, in accordance with the provisions of that certain Peace Agreement dated as of June 29, 2000, the Peace II Agreement, and Amendment No. 2 to Joint Exercise of Powers Agreement Creating the Chino Basin Desalter Authority, the Authority has agreed to expand the existing desalted water facilities of the Authority by addition of the Expansion Project, in order to: (1) increase the output thereof by a projected 10,600 acre-feet per year for a cumulative total of 35,200 acre-feet per year; and (2) sell such increased production to the Expansion Group; and (3) provide for increased reliability of desalted water deliveries from the Authority's existing facilities.

WHEREAS, such expansion of the Authority's existing desalter water facility is being undertaken through the design and construction of the Desalter Phase 3 Expansion Facilities ("Expansion Project"), which will be fully integrated with the Authority's existing desalter water facilities.

WHEREAS, the Expansion Project will be designed and constructed in accordance with direction received from Chino Basin Watermaster and in a manner that Chino Basin Watermaster believes will facilitate hydraulic control through reoperation in the Chino Basin, thereby creating an estimated additional 400,000 acre-feet of controlled overdraft which will be allocated in accordance with the Peace II Agreement.

WHEREAS, the Expansion Group has commenced the design and construction of the Expansion Project, in furtherance of which Western, on behalf of the Expansion Group, has entered into an Intergovernmental Agreement with the Authority, dated October 21, 2009, which provides for the design, construction and acceptance by the Authority of a portion of the Expansion Project.

WHEREAS, in furtherance of the design and construction of the Expansion Project, Western and the Authority are anticipated to enter into that certain Second Amended and Restated Intergovernmental Agreement dated concurrently with this Agreement, which provides for Western to act as Project Manager in connection with the design and construction of the Expansion Project.

WHEREAS, the Authority is entering into a new Water Purchase Agreement with Western and a series of Amended and Restated Water Purchase Agreements with all other members of the Authority to document its acceptance of the design and construction work for the Expansion Project already completed, to accept responsibility for the completion of the Expansion Project (but not the obligation to pay the cost of such work, except as specifically set forth in Section 13(k)) and the integration of the Expansion Project into the Authority's existing desalter water facilities, and to

document the obligations of all Purchasers and Authority members who are water purveyors with regard to its desalter water facility, including the Expansion Project as they are designed, constructed, become operational and are fully integrated with the Authority's existing desalter water facilities.

WHEREAS, the Expansion Group has agreed to pay all capital costs for the design and construction of the Expansion Project allocated to the Expansion Group, as set forth in Exhibit E, attached hereto and incorporated herein, financed independently by each Expansion Group member (or the Authority in the event of a default of an Expansion Group member), as provided in this Agreement.

WHEREAS, in consideration for its payment of the capital costs of the Expansion Project, each Expansion Group member will receive the new or additional Project Allotment set forth in the third column of Exhibit A.

WHEREAS, if any member of the Expansion Group defaults in its obligation to pay for its share of the capital costs of the Expansion Project, this Agreement authorizes the Authority to issue Authority Bonds to cover such unmet costs, which Authority Bonds will be secured solely by revenues generated by such defaulting Expansion Group member's water system and on a parity with such Expansion Group member's bond and contract obligations that constitute operation and maintenance expenses.

WHEREAS, each Expansion Group member shall not be responsible for Authority operations and maintenance costs associated with the Expansion Project unless and until the Expansion Project Completion Date.

WHEREAS, upon full integration of the Expansion Project into the existing desalter water facilities, the price of desalter product water (not including Debt Service on any Authority Bonds issued after execution of this Agreement and Debt Service on outstanding Authority Bonds previously paid by Authority members) delivered from the Authority's desalted water facilities, including the Expansion Project, shall be charged to all members of the Authority at a rate calculated to achieve a uniform melded pro-rata allocation of costs among all Authority members, except as expressly otherwise provided herein, based upon each member's proportionate firm commitment to purchase water from the Authority, as set forth in Exhibit A.

WHEREAS, the Authority and the Purchaser now wish to enter into this Amended and Restated Purchase Agreement to provide for the acquisition, construction, operation and financing of the expanded desalted water facilities, for the sale by the Authority to the Purchaser of the Purchaser's Project Allotment and certain other matters.

NOW THEREFORE, the parties hereto do agree as follows:

Section 1. Definitions.

The following terms shall, for all purposes of this Agreement have the following meanings:

"Administrative Costs" means the administrative costs allocable to the operation and management of the Authority, calculated in accordance with generally accepted accounting principles, including but not limited to insurance, taxes (if any), fees of auditors, accountants,

attorneys or engineers and insurance premiums, but shall not include Project Operation and Maintenance Expenses.

"Authority" shall have the meaning assigned thereto in the preamble hereto.

"Authority Bonds" means bonds, notes or other evidences of indebtedness issued by or on behalf of the Authority to finance or refinance the Project.

"Authority Fiscal Year" means the twelve month period commencing on July 1 of each calendar year and ending on the following June 30 or such other twelve month period which may be designated by the Authority as its fiscal year.

"Bonds" mean all bonds, notes or similar obligations (but not including Contracts) of the Purchaser authorized and issued by the Purchaser under and pursuant to applicable laws of the State of California after the date of execution of this Agreement, the principal of and interest on which are an operation and maintenance expense of the Purchaser Water System determined in accordance with generally accepted accounting principles and which are secured by a pledge or a lien on Purchaser Net Water System Revenues and which are on a parity with the obligations of the Purchaser under this Agreement.

"Bond Resolution" means the resolution or resolutions providing for the issuance of Authority Bonds and the terms thereof, and any indenture or trust agreement related thereto.

"Contract Payments" means:

(1) the interest payable during such Purchaser Fiscal Year on all outstanding Bonds, assuming that all outstanding term Bonds are redeemed or paid from sinking fund payments as scheduled (except to the extent that such interest is to be paid from the proceeds of the sale of any Bonds);

(2) that portion of the principal amount of all outstanding serial Bonds maturing during such Purchaser Fiscal Year;

(3) that portion of the principal amount of all outstanding term Bonds required to be redeemed or paid during such Purchaser Fiscal Year; and

(4) that portion of payments under Contracts (other than under this Agreement) constituting principal and interest required to be made at the times provided in the Contracts.

"Contracts" means this Agreement and all contracts of the Purchaser authorized and executed by the Purchaser under and pursuant to the applicable laws of the State of California after the date of execution of this Agreement, the payments under which are an operation and maintenance expense of the Purchaser Water System determined in accordance with generally accepted accounting principles and which are secured by a pledge of or lien on the Purchaser Net Water System Revenues and which are on a parity with the obligations of the Purchaser under this Agreement.

"Debt Service" means, as of the date of calculation and with respect to Authority Bonds, an amount equal to the sum of (i) interest payable during such Authority Fiscal Year on Authority Bonds, except to the extent that such interest is to be paid from capitalized interest, (ii) that portion of principal of Authority Bonds payable during such Authority Fiscal Year, (iii) amounts necessary to

replenish the Reserve Fund created pursuant to the Bond Resolution, and (iv) all letters of credit and other financing costs payable on a periodic basis. Such interest, principal installments and financing costs for such series shall be calculated on the assumption that no Authority Bonds outstanding at the date of calculation will cease to be outstanding except by reason of the payment of principal on the due date thereof;

provided further that, as to any such Authority Bonds bearing or comprising interest at other than a fixed rate, the rate of interest used to calculate Debt Service shall be one hundred ten percent (110%) of the greater of (a) the daily average interest rate on such Authority Bonds during the twelve (12) calendar months preceding the date of calculation (or the portion of the then current Authority Fiscal Year that such Authority Bonds have borne interest) or (b) the most recent effective interest rate on such Authority Bonds prior to the date of calculation; and

provided further that, as to any such Authority Bonds or portions thereof bearing no interest but which are sold at a discount and which discount accretes with respect to such Authority Bonds or portions thereof, such accreted discount shall be treated as interest in the calculation of Debt Service; and

provided further that the amount on deposit in a debt service reserve fund on any date of calculation of Debt Service shall be deducted from the amount of principal due at the final maturity of the Authority Bonds for which such debt service reserve fund was established and in each preceding Authority Fiscal Year until such amount is exhausted.

"Expansion Group" means the Purchaser, Western, and the City of Ontario.

"Expansion Project" means the facilities described in the Chino Desalter Phase 3 Comprehensive Predesign Report approved by the Authority Board of Directors on January 6, 2011. The Authority and the Purchaser acknowledge that portions of the Expansion Project are currently being designed or constructed and that the definition of the Expansion Project may be revised from time to time prior to commencement of construction with the approval of the Authority Board of Directors but without amendment to this Agreement.

"Expansion Project Completion Date" means the date that is thirty-five (35) days following recordation of the final notice of completion for the Expansion Project (which date shall not be prior to the date that the Expansion Project is operating substantially at design capacity).

"Facilities Acquisition Agreement" means the Facilities Acquisition Agreement, dated as of January 15, 2002, by and between SAWPA and the Authority, as such Facilities Acquisition Agreement may be amended or supplemented from time-to-time.

"Fixed Project Costs" means capital costs, including Debt Service, and reserves for repair and replacement and improvement to the Project and for payment of Debt Service of the Project, and all other amounts paid by the Authority other than Variable O&M Costs and Fixed O&M Costs.

"Fixed O&M Costs" means operation, maintenance, power, replacement and other costs, including Project Operation and Maintenance Expenses and a reasonable reserve for contingencies, in each case incurred by the Authority with respect to the Project, irrespective of the amount of water delivered to the Project Participants, including but not limited to amounts required to be deposited in the Membrane Replacement Fund, amounts payable under transportation agreements, including but

not limited to amounts payable to the Purchaser under the Agreement By And Between The Chino Basin Desalter Authority, Jurupa Community Services District, The City Of Ontario, The City Of Norco And Santa Ana River Water Company Providing For The Transportation Of Chino II Desalter Water, as it may be amended from time to time.

"Independent Certified Public Accountant" means any firm of certified public accountants appointed by the Purchaser, or the Authority, as the case may be, and each of whom is independent pursuant to the Statement on Auditing Standards No. 1 of the American Institute of Certified Public Accountants.

"Intergovernmental Agreement" means the Second Amended and Restated Governmental Agreement by and between the Authority and Western Municipal Water District of Riverside County, as such agreement may be amended or supplemented from time-to time.

"Joint Powers Agreement" means the Joint Exercise of Powers Agreement creating the Chino Basin Desalter Authority, as such agreement may be amended or supplemented from time to time.

"Lump Sum Past Administrative Costs" means $118,500.

"Peace II Agreement" means that certain Peace II Agreement: Party Support for Watermaster's OBMP Implementation Plan, – Settlement and Release of Claims Regarding Future Desalters, dated as of October 25, 2007.

"Project" means those certain facilities necessary to produce and deliver desalted water to the Project Participants, including the following: (i) the existing Chino I Desalter, (ii) the existing Chino I Expansion facilities, (iii) the existing Chino II Desalter, (iv) the Expansion Project and (v) related water pipelines, electric generators and associated facilities. The Authority and the Purchaser acknowledge that portions of the Expansion Project are currently being designed or constructed and that the definition of the Project may be revised from time-to-time prior to commencement of construction without amendment to this Agreement. The Project does not include any obligations of Western under the Peace II Agreement other than the obligation to construct and finance the Expansion Project.

"Project Allotment" means the volume of desalted water per year set forth on Exhibit A hereto.

"Project Operation and Maintenance Expenses" means the actual costs spent or incurred by the Authority for maintaining and operating the Project, calculated in accordance with generally accepted accounting principles and Section 9 hereof, including (among other things) the expenses of management and repair and other expenses necessary to maintain and preserve the Project, in good repair and working order, or charges required to be paid by it to comply with the terms of the Authority Bonds or of this Agreement, but excluding in all cases (i) depreciation, replacement and obsolescence charges or reserves therefor, (ii) amortization of intangibles or other bookkeeping entries of a similar nature, (iii) Administrative Costs, (iv) costs of capital additions, replacements, betterments, extensions or improvements to the Project, which under generally accepted accounting principles are chargeable to a capital account or to a reserve for depreciation and (v) Debt Service.

"Project Participant" means the Purchaser and each entity listed in Exhibit A hereto executing Water Purchase Agreements with the Authority.

"Purchaser" shall have the meaning assigned thereto in the preamble hereto.

"Purchaser Fiscal Year" means the twelve month period commencing on July 1 of each year and ending on the following June 30 or such other twelve month period which may be designated by the Purchaser as its fiscal year.

"Purchaser Net Water System Revenues" means, for any Purchaser Fiscal Year, the Purchaser Water System Revenues for such Purchaser Fiscal Year less the Purchaser Operation and Maintenance Expenses for such Purchaser Fiscal Year.

"Purchaser Operation and Maintenance Expenses" means the costs spent or incurred by the Purchaser for maintaining and operating the Purchaser Water System, calculated in accordance with generally accepted accounting principles, including (among other things) the expenses of management and repair and other expenses necessary to maintain and preserve the Purchaser Water System, in good repair and working order, and including administrative costs of the Purchaser, salaries and wages of employees, payments to the Public Employees Retirement System, overhead, insurance, taxes (if any), fees of auditors, accountants, attorneys or engineers and insurance premiums, and all other reasonable and necessary costs of the Purchaser, but excluding in all cases (i) depreciation, replacement and obsolescence charges or reserves therefor, (ii) amortization of intangibles or other bookkeeping entries of a similar nature, (iii) charges for the payment of principal and interest on Bonds or Contracts and (iv) payments under this Agreement.

"Purchaser Share" means the Purchaser's Project Allotment divided by the sum of all Project Participants' Project Allotments, all as set forth as Exhibit A hereto.

"Purchaser Water System" means properties and assets, real and personal, tangible and intangible, of the Purchaser now or hereafter existing, used or pertaining to the acquisition, treatment, reclamation, transmission, distribution and sale of water, including all additions, extensions, expansions, improvements and betterments thereto and equipment relating thereto; provided, however, that to the extent the Purchaser is not the sole owner of an asset or property or to the extent that an asset or property is used in part for the above described water purposes, only the Purchaser's ownership interest in such asset or property or only the part of the asset or property so used for water purposes shall be considered to be part of the Purchaser Water System.

"Purchaser Water System Revenues" means the income, rents, rates, fees, charges, and other moneys derived by the Purchaser from the ownership or operation of Purchaser Water System including, without limiting the generality of the foregoing, (i) all income, rents, rates, fees, charges or other moneys derived from the sale, furnishing, and supplying of water and other services, facilities, and commodities sold, furnished, or supplied through the facilities of Purchaser Water System, including standby and availability charges, capital water facilities fees for design, construction and reconstruction expenses, development fees and other fees allocable to the Purchaser Water System, (ii) taxes or assessments as may be imposed if the levy thereof and payment hereunder is permitted by law, and (iii) the earnings on and income derived from amounts set forth in clauses (i) and (ii) above, and shall not include (y) customers' deposits or any other deposits subject to refund until such deposits have become the property of the Purchaser and (z) proceeds of any taxes or assessments except taxes or assessments described in clause (ii) above.

"SAWPA" means the Santa Ana Watershed Project Authority, a joint exercise powers agency, including the successors and assigns thereof.

"Term Sheet" means the Integrated Chino-Arlington Desalters System Term Sheet, entered into by each of the Project Participants in 2001.

"Trustee" means the entity or entities designated by the Authority pursuant to any Bond Resolution to administer any funds or accounts required by such Bond Resolution or otherwise.

"Variable O&M Costs" means the operation, maintenance, power, replacement and other costs, including Project Operation and Maintenance Expenses incurred by the Authority in connection with the Project in an amount which is dependent upon and varies with the amount of water delivered to the Project Participants.

"Water Purchase Agreement" means this Amended and Restated Water Purchase Agreement and each Amended and Restated Water Purchase Agreement by and between the Authority and a Project Participant, as the same may be amended or supplemented from time to time.

"Western" means Western Municipal Water District of Riverside County, including the successor thereof.

Section 2. Purpose.

The purpose of this Agreement is for the Authority to sell Project Allotment to the Purchaser, to deliver Project Allotment to the Purchaser available from the Project, to provide the terms and conditions of such delivery and sale and to provide for the acquisition, construction and financing of the Project. The parties hereto confirm that this Agreement constitutes a contractual right to purchase desalted water and that no water right is being transferred by the Authority to any Project Participant under this Agreement.

Section 3. Financing, Construction and Operation.

The Authority will use its best efforts to cause or accomplish the acquisition, construction, operation and financing (subject to Section 13(k)) of the Project, the obtaining of all necessary authority and rights, consents and approvals, and the performance of all things necessary and convenient therefor, subject to compliance with all necessary federal and state laws, including but not limited to the California Environmental Quality Act ("CEQA"), the terms and conditions of the Authority's permits and licenses and all other agreements relating thereto. Notwithstanding the foregoing, the Authority acknowledges that the Purchaser intends to deposit with the Authority the Fixed Project Costs allocable to the Purchaser for the initial costs of the Expansion Project in accordance with Section 13(k) and that the Authority shall not have any obligation to finance the cost of the initial construction of the Expansion Project from any source of funds other than such deposit unless the Purchaser defaults in its obligation to make such deposits in accordance with Section 13(k). The Purchaser acknowledges and agrees that the Authority has contracted with Western to design, acquire and construct the Expansion Project in accordance with the Intergovernmental Agreement.

Section 4. Delivery of Water.

(a) Request by Purchaser. Pursuant to the terms of this Agreement, the Authority shall provide to the Purchaser, and the Purchaser shall take, or cause to be taken, in each Authority Fiscal Year an amount of water equal to the Purchaser's Project Allotment unless the Purchaser notifies the

Authority, pursuant to procedures to be developed by the Authority, that the Purchaser requires an amount of water less than the Purchaser's Project Allotment. Subject to the Project Participant's payment obligations hereunder, the Authority agrees to use its best efforts to deliver desalted water pursuant to this Agreement meeting the water quality standards set forth in Section 5.3 of the Joint Powers Agreement and all applicable local, state and federal water quality standards as such standards may be in effect from time to time.

(b) Points of Delivery; Flow Rate. The Authority will deliver or cause to be delivered to or for the account of the Purchaser the amount of water specified in each request at a flow rate and through delivery structures at a point along the Project to be agreed upon by the Authority and the Purchaser. The Authority will remain available to make or cause to be made all necessary and possible arrangements for transmission and delivery of such water in accordance with this Agreement.

(c) Delivery of Water Not Delivered in Accordance with Schedule. If in any Authority Fiscal Year the Authority, as a result of causes beyond its control, is unable to deliver any portion of the Purchaser's Project Allotment for such Authority Fiscal Year as provided for in the delivery schedule established for that Authority Fiscal Year, the Purchaser may elect to receive the amount of water which otherwise would have been delivered to it during such period at other times during the Authority Fiscal Year or subsequent to such Authority Fiscal Year, to the extent that such water is then available and such election is consistent with the Authority's overall delivery ability, considering the then current delivery schedules of all Project Participants and the Authority.

(d) SARWC Request. Pursuant to the Joint Powers Agreement, if Santa Ana River Water Company cannot receive the full 1,200 acre feet of water allocated thereto as provided in the Term Sheet, then the Purchaser and the City of Ontario will abate their deliveries of water from the Project on a pro-rata basis (based on the Project Allotment set forth in the second column of Exhibit A) to ensure that Santa Ana River Water Company can receive the full 1,200 acre feet of water from the Authority for such year. Notwithstanding the foregoing, the Purchaser and the City of Ontario shall only have such obligation if Santa Ana River Water Company's demand for water is constant or at a "steady-rate" of 744 gpm.

Section 5. Curtailment of Delivery for Maintenance Purposes.

(a) Authority May Curtail Deliveries. The Authority may temporarily discontinue or reduce the delivery of water to the Purchaser hereunder for the purposes of necessary investigation, inspection, maintenance, repair, or replacement of any of the Project facilities necessary for the delivery of water to the Purchaser. The Authority shall notify the Purchaser as far in advance as possible of any such discontinuance or reduction, except in cases of emergency, in which case notice shall be given as soon thereafter as possible.

(b) Purchaser May Receive Later Delivery of Water Not Delivered. In the event of any discontinuance or reduction of delivery of water pursuant to subsection (a) of this Section, the Purchaser may elect to receive the amount of water which otherwise would have been delivered to it during such period under the water delivery schedule for that Authority Fiscal Year at other times during the Authority Fiscal Year or subsequent to such Authority Fiscal Year to the extent that such water is then available and such election is consistent with the Authority's overall delivery ability, considering the then current delivery schedules of all Project Participants and the Authority.

Section 6. Shortage in Water Supply.

In any Authority Fiscal Year in which there may occur a shortage or interruption in the supply of water available for delivery to the Project Participants, including but not limited to shortages or interruptions caused by changes in laws, regulations or rulings relating to or affecting the Authority's permits and licenses, with the result that such supply is less than the total of the annual Project Allotments of all Project Participants for that Authority Fiscal Year, the Authority shall reduce the delivery of water to the Purchaser in accordance with the Joint Powers Agreement.

Section 7. Measurement of Water Delivered.

The Authority shall measure, or cause to be measured, all water delivered to the Purchaser and shall keep and maintain accurate and complete records thereof. For this purpose and in accordance with Section 4 hereof, the Authority shall install, operate, and maintain, or cause to be installed, operated and maintained, at all delivery structures for delivery of water to the Purchaser at the point of delivery determined in accordance with Section 4(b) such measuring devices and equipment as are satisfactory and acceptable to both parties. Said devices and equipment shall be examined, tested, and serviced by the Authority regularly to insure their accuracy. At any time or times, the Purchaser may inspect such measuring devices and equipment, and the measurements and records taken therefrom.

Section 8. Responsibility for Delivery and Distribution of Water.

(a) Neither the Authority nor any of its officers or agents shall be liable for the control, carriage, handling, use, disposal, or distribution of water supplied to the Purchaser after such water has passed the points of delivery established in accordance with Section 4(b) hereof; nor for claim of damage of any nature whatsoever, including but not limited to property damage, personal injury or death, arising out of or connected with the control, carriage, handling, use, disposal or distribution of such water beyond said points of delivery and including attorneys fees and other costs of defense in connection therewith; the Purchaser shall indemnify and hold harmless the Authority and its officers, agents, and employees from any such damages or claims of damages.

(b) Neither the Purchaser nor any of its officers, agents, or employees shall be liable for the control, carriage, handling, use, disposal, or distribution of water supplied to the Purchaser until such water has passed the points of delivery established in accordance with Section 4(b) hereof; nor for claim of damage of any nature whatsoever, including but not limited to property damage, personal injury or death, arising out of or connected with the control, carriage, handling, use, disposal or distribution of such water prior to such water passing said points of delivery and including attorneys fees and other costs of defense in connection therewith; the Authority shall indemnify and hold harmless the Purchaser and its officers, agents, and employees from any such damages or claims of damages.

Section 9. Rates and Charges.

(a) Establishment of Rates and Charges. The Authority shall fix charges to the Purchaser under this Agreement to produce revenues to the Authority from the Project equal to the amounts anticipated to be needed by the Authority to pay Administrative Costs and to pay the actual cost of producing the Purchaser's Project Allotment, which shall include the following costs of the Authority

to deliver the Purchaser's Project Allotment through the Project: (i) Fixed Project Costs, (ii) Fixed O&M Costs and (iii) Variable O&M Costs.

(b) Insufficiency of Funds. If Fixed Project Costs, Fixed O&M Costs and Variable O&M Costs collected by the Authority are insufficient to operate and maintain the Project as contemplated under the Joint Powers Agreement, the Authority shall notify the Purchaser of such insufficiency and the Purchaser shall pay to the Authority an amount of such insufficiency equal to such insufficiency multiplied by the Purchaser Share. The obligation of the Purchaser to pay Administrative Costs shall commence immediately upon the execution and delivery of this Agreement and shall continue so long as the Purchaser is a member of the Authority. The obligation of the Purchaser to pay Fixed Project Costs and Fixed O&M Costs shall commence immediately upon execution of this Agreement and continue to exist and be honored by the Purchaser whether or not water is furnished to it from the Project at all times or at all (which provision may be characterized as an obligation to pay all costs on a take-or-pay basis whether or not water is delivered or provided and whether or not the Project is completed or is operable).

(c) Source of Payments. The obligation of the Purchaser to make payments under this Agreement is a limited obligation of the Purchaser and not a general obligation thereof. The Purchaser shall make payments under this Agreement solely from Purchaser Water System Revenues as a Purchaser Operation and Maintenance Expense. The Purchaser shall make such payments on a parity with other Purchaser Operation and Maintenance Expenses and prior to any other payments other than Bonds or Contracts. Nothing herein shall be construed as prohibiting (i) the Purchaser from using any other funds and revenues for purposes of satisfying any provisions of this Agreement or (ii) from incurring obligations payable on a parity with the obligations under this Agreement so long as the Purchaser complies with Section 13(a) hereof.

(d) Obligation Is Not Subject To Reduction. The Purchaser shall make payments of Fixed Project Costs and Fixed O&M Costs under this Agreement whether or not the Project is completed, operable, operated or retired and notwithstanding the suspension, interruption, interference, reduction or curtailment of operation of the Project or of water contracted for in whole or in part for any reason whatsoever. Such payments are not subject to any reduction, whether offset or otherwise, and are not conditioned upon performance by the Authority or any other Project Participant under this Agreement or any other agreement.

(e) Several Obligation. The Purchaser shall not be liable under this Agreement for the obligations of any other Project Participant. The Purchaser shall be solely responsible and liable for performance of its obligations under this Agreement. The obligation of the Purchaser to make payments under this Agreement is a several obligation and not a joint obligation with those of the other Project Participants.

(f) Allocation of Costs and Expenses.

Except as expressly provided in Sections 3 and 13(k) for payment of Expansion Project Fixed Project Costs, the Authority shall not allocate costs and expenses in any way which discriminates among Project Participants.

(i) Method of Computation of Fixed Project Costs and Fixed O&M Costs. The Fixed Project Costs shall be sufficient to return to the Authority those capital costs of the Authority necessary to deliver water to the Purchaser. The Fixed O&M Costs shall be

sufficient to return to the Authority Project Operation and Maintenance Expenses and a reasonable reserve for contingencies, in each case incurred by the Authority with respect to the Project, irrespective of the amount of water delivered to the Project Participants. The total amount of Fixed Project Costs shall be allocated to the Purchaser by multiplying the Purchaser Share times all Fixed Project Costs. The total amount of Fixed O&M Costs shall be allocated to the Purchaser by multiplying the Purchaser Share times all Fixed O&M Costs. The Purchaser Share of Fixed Project Costs and Fixed O&M Costs shall initially be calculated using the figures in the second column on Exhibit A; commencing upon the Expansion Project Completion Date, the Purchaser Share of Fixed Project Costs and Fixed O&M Costs shall be calculated using the expanded Purchaser's Project Allotment described in the third column on Exhibit A.

(ii) Method of Computation of Variable O&M Costs. The Variable O&M Costs shall return to the Authority those costs of the Project which constitute Variable O&M Costs. There shall be computed for the Project a charge per acre-foot of water which will return to the Authority the total projected Variable O&M Costs of the Project for each Authority Fiscal Year. The parties confirm that if the Purchaser complies with the notice requirement of Section 4(a), no Variable O&M Costs will be allocated to the Purchaser for the portion of Project Allotment not produced by the Authority for the Purchaser.

(iii) Method of Computing Administrative Costs. Administrative Costs shall be sufficient to return to the Authority all costs of operating and managing the Authority, including reasonable reserves for contingencies. The total amount of Administrative Costs shall be allocable to the Purchaser by multiplying (i) the Project Allotment in the third column on Exhibit A divided by the total Project Allotment in the third column on Exhibit A, times (ii) all Administrative Costs.

(iv) Adjustments. The Authority shall update the values and amounts of Administrative Costs, Fixed Project Costs, Fixed O&M Costs and Variable O&M Costs on a quarterly basis, including year-to-date comparisons to the approved Administrative Costs budget and Project budget in order that the costs and expenses to the Purchaser may accurately reflect increases or decreases from Authority Fiscal Year to Authority Fiscal Year in Administrative Costs, Fixed Project Costs, Fixed O&M Costs and Variable O&M Costs. In addition, each such determination shall include an adjustment to be paid or received by the Purchaser for succeeding Authority Fiscal Years which shall account for the differences, if any, between projections of Administrative Costs, Fixed Project Costs, Fixed O&M Costs and Variable O&M Costs used by the Authority in determining the amounts of said Administrative Costs, Fixed Project Costs, Fixed O&M Costs and Variable O&M Costs for all preceding Authority Fiscal Years and actual Administrative Costs, Fixed Project Costs, Fixed O&M Costs and Variable O&M Costs incurred by the Authority for water delivered to the Purchaser during such Authority Fiscal Years.

(v) Interest Earnings. Interest earnings on all amounts paid by the Purchaser to the Authority shall be credited to the Purchaser through the budgeting process.

The Authority hereby acknowledges the right of the Purchaser to prepay all, or any portion of, the Purchaser's Project Share of Fixed Project Costs constituting Debt Service pursuant to this Agreement based on the Purchaser's Project Allotment, if and to the extent such prepayment is permitted under the applicable Bond Resolution. The Authority shall accept from the Purchaser

prepayments of all, or any portion of, the Purchaser's Project Share of Fixed Project Costs constituting Debt Service and apply such prepayments as set forth in this Section 9(f)(i). If and to the extent such prepayment is permitted under the applicable Bond Resolution, the Authority and the Purchaser agree that the Purchaser may prepay all or a portion of its obligation to pay Fixed Project Costs constituting Debt Service pursuant to this Section 9 by providing the Treasurer of the Authority written notice of (i) its intention to pay to the Trustee, on or before the Prepayment Date (as defined below), the Purchaser's Project Share of the principal amount of the Authority Bonds (the "Prepayment Amount"), and (ii) that the Purchaser has sufficient funds available to pay the Prepayment Amount on or before the Prepayment Date. The Prepayment Amount shall be calculated as: (1) a principal payment equal to the Purchaser's Project Share, as adjusted to reflect prepayments of Authority Bonds by any other Project Participant, of Authority Bonds then outstanding and being prepaid, in the principal amount and of the maturities designated in writing by the Purchaser; plus (2) accrued interest from the last date on which the Purchaser made a payment of the Purchaser's Project Share of Debt Service to the first date the Debt Service may be redeemed by the Authority after the Authority has received written notice from the Purchaser of its intention to prepay such Debt Service (the "Prepayment Date"); plus (3) any applicable redemption premium with respect to the Authority Bonds to be refunded on the Prepayment Date, less (4) a credit for the Purchaser's Project Share, as adjusted to reflect prepayments of Authority Bonds by any other Project Participant, of any cash funded reserve fund established for the Authority Bonds from proceeds of such Authority Bonds. After providing written notice to the Authority as described above, the Purchaser shall deposit with the Trustee the Prepayment Amount, in immediately available funds, no later than the last business day before the Prepayment Date. In the event the Authority issues additional Authority Bonds for the Project, the Purchaser may also prepay all or a portion of its allocable share of the principal amount of those Authority Bonds, calculated as set forth in the preceding sentence.

(g) Time and Method of Payment.

(i) Administrative Costs, Fixed Project Costs and Fixed O&M Costs. The Purchaser shall pay to the Authority, on or before January 15, April 15, July 15 and October 15 of each Authority Fiscal Year, 25% of the charge to the Purchaser for such Authority Fiscal Year of the Administrative Costs, Fixed Project Costs and Fixed O&M Costs. The parties acknowledge that Purchasers of Project Allotment allocable to the Expansion Project have no obligation to pay Fixed O&M Costs associated with the Expansion Project until the Expansion Project Completion Date.

(ii) Variable O&M Costs. The Purchaser shall pay to the Authority the charges to the Purchaser for the Variable O&M Costs for the three-month period commencing on the next succeeding January 1, April 1, July 1 or October 1 so that the Authority receives quarterly payments of Variable O&M Costs three months in advance of the time when such Variable O&M Costs will begin to be incurred by the Authority.

(iii) Contest of Accuracy of Charges. If the Purchaser questions or disputes the correctness of any billing statement by the Authority, it shall pay the Authority the amount claimed when due and shall, within thirty (30) days of the completion and delivery of the Authority's annual audit, request an explanation from the Authority. If the bill is determined to be incorrect, the Authority will adjust the bill to the Purchaser in the next Authority Fiscal Year, including an adjustment equal to the interest actually earned by the Authority on its general reserves during such period. If the Authority and the Purchaser fail to agree on the correctness of a bill within thirty (30) days after the Purchaser has requested an explanation,

the parties shall promptly submit the dispute to arbitration under Section 1280 et seq. of the Code of Civil Procedure.

Section 10. Annual Budget and Billing Statement.

The Authority will prepare a preliminary annual budget for each applicable Authority Fiscal Year for credits, costs and expenses relating to Administrative Costs and a preliminary annual budget for each applicable Authority Fiscal Year for credits, costs and expenses relating to the Project, including Variable O&M Costs, Fixed O&M Costs and Fixed Project Costs. The Authority shall submit a draft of such budgets to the Purchaser on or prior to each April 1 for review and comment. Authority staff shall use its best efforts to resolve any questions or concerns caused by a Project Participant during such review. The Board of Directors of the Authority will adopt the final annual budgets for the applicable Authority Fiscal Year on or before June 1 of each Authority Fiscal Year after at least one public hearing on the budgets and shall allow any Project Participant which may object to any provision of the budgets to present such objection during such hearing. The Authority shall supply a copy of said final annual budgets to the Purchaser on or before June 15 of each Authority Fiscal Year. Any amendment to a budget shall be submitted to the Purchaser for review and comment at least 30 days prior to action thereon by the Authority Board of Directors. Any such amendment shall be subject to the same hearing requirements applicable to the budgets set forth above.

Section 11. Obligation in the Event of Default.

(a) Written Demand. Upon failure of the Purchaser to (i) make any payment in full when due under this Agreement or (ii) to perform any other obligation hereunder, the Authority shall make written demand upon the Purchaser. If a failure described in clause (i) above is not remedied within thirty (30) days from the date of such demand or, if Authority Bonds are outstanding, for such additional time as is reasonably required, in the sole discretion of the Trustee, to correct the same, such failure shall constitute a default at the expiration of such period. If a failure described in clause (ii) cannot be remedied within thirty (30) days from the date of such demand but the Purchaser commences remedial action within such thirty (30) day period, such failure shall not constitute a default hereunder. Notice of any such demand shall be provided to each other Project Participant by the Authority. Upon failure of the Authority to perform any obligation of the Authority hereunder, the Purchaser shall make written demand upon the Authority, and if said failure is not remedied within thirty (30) days from the date of such demand or, if Authority Bonds are outstanding, for such additional time as is reasonably required, in the sole discretion of the Trustee, to correct the same, such failure shall constitute a default at the expiration of such period. Notice of such demand shall be provided to each Project Participant by the Purchaser making such written demand.

In addition to any default resulting from breach by the Authority or the Purchaser of any agreement, condition, covenant or term hereof, if the Authority or the Purchaser shall file any petition or institute any proceedings under any act or acts, state or federal, dealing with or relating to the subject of bankruptcy or insolvency or under any amendment of such act or acts, either as a bankrupt or as an insolvent or as a debtor or in any similar capacity, wherein or whereby the Authority or the Purchaser asks or seeks or prays to be adjudicated a bankrupt, or is to be discharged from any or all of its debts or obligations, or offers to its creditors to effect a composition or extension of time to pay its debts, or asks, seeks or prays for a reorganization or to effect a plan of reorganization or for a readjustment of its debts or for any other similar relief, or if the Authority or the Purchaser shall make a general or any assignment for the benefit of its creditors, then in each and

every such case the Authority or the Purchaser, as the case may be, shall be deemed to be in default hereunder.

(b) Transfer for Defaulting Purchaser's Account. Upon the failure of the Purchaser to make any payment which failure constitutes a default under this Agreement, the Authority shall use its best efforts to transfer for the Purchaser's account all or a portion of the Purchaser's Project Allotment for all or a portion of the remainder of the term of this Agreement. Notwithstanding that all or any portion of the Purchaser's Project Allotment is so transferred, the Purchaser shall remain liable to the Authority to pay the full amount of its share of costs hereunder as if such sale or transfer has not been made, except that such liability shall be discharged to the extent that the Authority shall receive payment from the transferee thereof.

(c) Termination of Entitlement to Project Allotment; Continuing Obligations. Upon the failure of the Purchaser to make any payment which failure constitutes a default under this Agreement and causes the Authority to be in default under any Bond Resolution, the Authority may (in addition to the remedy provided by subsection (b) of this Section) give notice of termination of the provisions of this Agreement insofar as the same entitle the Purchaser to its Project Allotment which notice shall be effective within 30 days thereof unless such termination shall be enjoined, stayed or otherwise delayed by judicial action. Irrespective of such termination, the Purchaser shall remain liable to the Authority to pay the full amount of costs hereunder.

(d) Enforcement of Remedies. In addition to the remedies set forth in this Section, upon the occurrence of an Event of Default as defined herein, the Authority or the Purchaser, as the case may be, shall be entitled to proceed to protect and enforce the rights vested in such party by this Agreement by such appropriate judicial proceeding as such party shall deem most effectual, either by suit in equity or by action at law, whether for the specific performance of any covenant or agreement contained herein or to enforce any other legal or equitable right vested in such party by this Agreement or by law. The provisions of this Agreement and the duties of each party hereof, their respective boards, officers or employees shall be enforceable by the other party hereto by mandamus or other appropriate suit, action or proceeding in any court of competent jurisdiction, with the losing party paying all costs and attorney fees.

(e) Trustee is Third Party Beneficiary. Any Trustee for Authority Bonds shall have the right, as a third party beneficiary, to initiate and maintain suit to enforce this Agreement to the extent provided in any Bond Resolution.

Section 12. Transfers, Sales and Assignments of Project Allotment or Purchaser Water System.

(a) Transfer of Project Allotment. The Purchaser has the right to make transfers, sales, assignments and exchanges (collectively "transfers") of its Project Allotment or its rights or obligations with respect thereto only as expressly provided in this Section. In no event shall any sale or other disposition of all or any portion of the Purchaser's Project Allotment relieve the Purchaser of any of its obligations hereunder. The Purchaser shall give notice to the Authority in accordance with rules and regulations approved by the Authority from time to time.

(b) Sale or Other Disposition of Project Allotment. If in any Fiscal Year the Purchaser determines in accordance with 4(a) not to receive all of the Project Allotment, the Authority shall offer such portion of the Project Allotment to the State of California at a price to be determined by

the Authority with the concurrence of the Purchaser. If the State of California declines to purchase such Project Allotment, the Purchaser shall have the right to sell such portion of the Project Allotment to another Project Participant or an entity which is not a Project Participant. No such sale of the Project Allotment shall relieve the Purchaser of any of its obligations hereunder. Any revenue received by the Authority in consideration for any portion of the Purchaser's Project Allotment shall be credited to the Purchaser. The requirement set forth in this Section 12(b) that the Purchaser offer the Purchaser's Project Allotment to the State of California before selling such Project Allotment to another Project Participant or any other entity is intended to implement the Term Sheet, shall be interpreted in a manner consistent with the Term Sheet, and shall only apply to the extent required by the Term Sheet.

Section 13. Covenants of the Purchaser.

The Authority and the Purchaser agree that the covenants contained in this Section shall only be enforced by the Authority to the extent necessary to enforce the payment provisions contained herein.

(a) Amount of Rates and Charges. The Purchaser will fix, prescribe and collect rates and charges for the Purchaser Water System which will be at least sufficient to yield during each Purchaser Fiscal Year Purchaser Net Water System Revenues (excluding Contract Payments, Administrative Costs, Fixed Project Costs, Fixed O&M Costs and Variable O&M Costs) equal to one hundred twenty-five percent (125%) of the Contract Payments, Administrative Costs, Fixed Project Costs, Fixed O&M Costs and Variable O&M Costs for such Purchaser Fiscal Year. The Purchaser may make adjustments from time to time in such rates and charges and may make such classification thereof as it deems necessary, but shall not reduce the rates and charges then in effect unless the Purchaser Net Water System Revenues from such reduced rates and charges will at all times be sufficient to meet the requirements of this section.

(b) Against Sale or Other Disposition of Property. Subject to Section 13(j), the Purchaser will not sell, lease or otherwise dispose of the Purchaser Water System or any part thereof unless the governing board of the Purchaser determines in writing that such sale, lease or other disposition will not materially adversely affect the Purchaser's ability to comply with subsection (a) of this Section and, in the case of a sale or other disposition, the entity acquiring the Purchaser Water System or such part thereof shall assume all obligations of the Purchaser, allocable to such Purchaser Water System or part thereof, under this Agreement. The Purchaser will not enter into any agreement or lease which impairs the operation of the Purchaser Water System or any part thereof necessary to secure adequate Purchaser Net Water System Revenues for the payment of the obligations imposed under this Agreement or which would otherwise impair the rights of the Authority with respect to the Purchaser Water System Revenues or the operation of the Purchaser Water System.

(c) Against Competitive Facilities. To the extent permitted by existing law and within the scope of its powers but only to the extent necessary to protect the rights of the owners of Authority Bonds, the Purchaser will not acquire, construct, maintain or operate and will use its best efforts not to permit any other public or private agency, corporation, district or political subdivision or any person whomsoever to acquire, construct, maintain or operate within the boundaries of the Purchaser any water system competitive with the Purchaser Water System which might have the effect of materially adversely affecting the Purchaser's ability to pay Administrative Costs, Fixed Project Costs, Fixed O&M Costs and Variable O&M Costs.

(d) Maintenance and Operation of the Purchaser Water System; Budgets. The Purchaser will maintain and preserve the Purchaser Water System in good repair and working order at all times and will operate the Purchaser Water System in an efficient and economical manner and will pay all Purchaser Operation and Maintenance Expenses as they become due and payable. On or before the first day of each Purchaser Fiscal Year thereafter, the Purchaser will adopt and file with the Authority a budget approved by the legislative body of the Purchaser, including therein in the estimated Administrative Costs, Fixed O&M Costs, Variable O&M Costs and Fixed Project Costs payable to the Authority. Any budget may be amended at any time during any Purchaser Fiscal Year and such amended budget shall be filed by the Purchaser with the Authority.

(e) Insurance. The Purchaser shall procure and maintain or cause to be procured and maintained insurance on the Purchaser Water System with responsible insurers so long as such insurance is available from reputable insurance companies, or, alternatively, shall establish a program of self-insurance, or participate in a joint powers agency providing insurance or other pooled insurance program, in such amounts and against such risks (including accident to or destruction of the Purchaser Water System) as are usually covered in connection with water systems similar to the Purchaser Water System.

(f) Accounting Records and Financial Statements.

(i) The Purchaser will keep appropriate accounting records in which complete and correct entries shall be made of all transactions relating to the Purchaser Water System, which records shall be available for inspection by the Authority and the Trustee at reasonable hours and under reasonable conditions.

(ii) The Purchaser will prepare and file with the Authority annually within two hundred ten (210) days after the close of each Purchaser Fiscal Year (commencing with the Purchaser Fiscal Year ending June 30, 2002) financial statements of the Purchaser for the preceding Purchaser Fiscal Year prepared in accordance with generally accepted accounting principles, together with a report of an Independent Certified Public Accountant thereon. The Purchaser will promptly furnish a copy of such report to the Authority and to the Trustee.

(g) Protection of Security and Rights of the Authority. The Purchaser will preserve and protect the rights of the Authority and the Trustee to the obligations of the Purchaser hereunder and will warrant and defend such rights against all claims and demands of all persons.

(h) Payment of Taxes and Compliance with Governmental Regulations. The Purchaser will pay and discharge all taxes, assessments and other governmental charges which may hereafter be lawfully imposed upon the Purchaser Water System or any part thereof or upon the Purchaser Water System Revenues when the same shall become due. The Purchaser will duly observe and conform with all valid regulations and requirements of any governmental authority relative to the operation of the Purchaser Water System or any part thereof, but the Purchaser shall not be required to comply with any regulations or requirements so long as the validity or application thereof shall be contested in good faith.

(i) Further Assurances. The Purchaser will adopt, deliver, execute and make any and all further assurances, instruments and resolutions as may be reasonably necessary or proper to effect the financing and refinancing of the Project and to allow the Authority to comply with reporting

obligations, to assure the Authority of the Purchaser's intention to perform hereunder and for the better assuring and confirming unto the Authority and the Trustee of the rights and benefits provided to them herein.

(j) Maintenance of Tax-Exempt Status of Authority Bonds. Notwithstanding any other provision of this Agreement, the Purchaser shall not take any action or omit to take any action, directly or indirectly, in any manner, which would result in any of the Authority Bonds being treated as an obligation not described in Section 103(a) of the Internal Revenue Code of 1986, as amended, by reason of classification of such Authority Bond as a "private activity bond" within the meaning of Section 141 of said Code or for any other reason.

(k) Expansion Project Fixed Project Costs. The Purchaser shall pay to the Authority its share of Expansion Project Fixed Project Costs allocable in accordance with Section 14(f) hereof. In the event that the Purchaser fails to pay any Fixed Project Costs on the date determined in accordance with Section 14(f), the Authority shall have the right, but not the obligation, to exercise all remedies set forth in Section 11 hereof and, in addition thereto, to issue Authority Bonds secured solely by payments by the Purchaser hereunder as Fixed Project Costs and apply the proceeds thereof to Expansion Project Fixed Project Costs, to enable Authority to satisfy its obligations under Section 3. The Purchaser shall pay all costs of issuance with respect to such Authority Bonds, including but not limited to Authority legal fees and expenses.

Section 14. Covenants of the Authority.

(a) Insurance. The Authority shall procure and maintain or cause to be procured and maintained insurance on the Project with responsible insurers so long as such insurance is available from reputable insurance companies, or, alternatively, shall establish a program of self-insurance, or participate in a joint powers agency providing insurance or other pooled insurance program, covering such risks, in such amounts and with such deductibles as shall be determined by the Authority and as may be required under the Authority Bonds. The Authority shall indemnify and hold harmless the Purchaser from any liability for personal injury or property damage resulting from any accident or occurrence arising out of or in any way related to the construction or operation of the Project.

(b) Accounting Records and Financial Statements.

(i) The Authority will keep appropriate accounting records in which complete and correct entries shall be made of all Authority transactions relating to the Project, which records shall be available for inspection, copying and audit by the Purchaser and its accountants, attorneys and agents at reasonable hours and under reasonable conditions.

(ii) The Authority will prepare annually within two hundred ten (210) days after the close of each Authority Fiscal Year (commencing with the Authority Fiscal Year ending June 30, 2011) financial statements of the Authority for the preceding Authority Fiscal Year prepared in accordance with generally accepted accounting principles, together with a report of an Independent Certified Public Accountant thereof. The Authority will promptly furnish a copy of such report to the Purchaser and to the Trustee.

(c) Compliance with Law. The Authority shall comply with all local, state and federal laws applicable to the Project.

(d) Against Sale or Other Disposition of Project. The Authority will not sell, lease or otherwise dispose of the Project or any part thereof unless the Board of Directors of the Authority determines that such sale, lease or other disposition will not materially adversely affect the Authority's ability to comply with its obligations hereunder and under the Authority Bonds.

(e) Maintenance and Operation of the Project. Subject to the payment obligations of the Project Participants hereunder, the Authority will maintain and preserve the Project in good repair and working order at all times and will operate the Project in an efficient and economical manner consistent with the Joint Powers Agreement. Notwithstanding the foregoing, no material portion of the Project shall be abandoned by the Authority without the consent of all Project Participants.

(f) Expansion Project Fixed Project Costs. The Authority shall give written notice to the Purchaser of its share of each contract for Expansion Project Fixed Project Costs 45 days prior to the Authority Board's award of such contract. The Purchaser's percentage share of Expansion Project Fixed Project Costs, with an estimate of said costs as of the date of execution of this Agreement, is set forth in Exhibit E. Such Expansion Project Fixed Project Costs shall be modified from time to time as set forth in the then-current Expansion Project capital budget approved by the Authority Board. The Purchaser shall deposit such amount with the Authority no later than 15 days prior to the date the Authority Board awards such contract; provided, however, with respect to contract(s) assigned by Western to the Authority pursuant to the Intergovernmental Agreement, the Purchaser shall deposit such amount (receiving full credit for amounts actually paid by Purchaser under such contract prior to the assignment) with the Authority prior to or concurrently with the effectiveness of the assignment of such contract(s) to the Authority.

(g) Future Fixed Project Costs. With respect to Fixed Project Costs (other than Expansion Project Fixed Project Costs, the payment of which is provided for in subdivision (f) of this Section 14) anticipated to be funded through the issuance of Authority Bonds, the Authority shall give written notice to the Purchaser of its share of Fixed Project Costs 90 days prior to the proposed date of issuance of Authority Bonds therefor. Unless the Purchaser deposits such Fixed Project Costs with the Authority no later than 30 days prior to the proposed date of issuance of Authority Bonds therefor, the Authority shall include such Fixed Project Costs in the Authority Bonds.

(h) Expansion Project Water Available Prior to the Expansion Project Completion Date. The parties agree that in the event that water is produced from the Expansion Project prior to the Expansion Project Completion Date, the Authority will negotiate with the Purchasers on an equitable allocation of such water as well as the allocation of Fixed O&M Costs and Variable O&M Costs relating thereto, determined by taking into account generally accepted accounting principles.

Section 15. Term.

(a) No provision of this Agreement shall take effect until it and Water Purchase Agreements with all Project Participants have been duly executed and delivered to the Authority together with an opinion for each Project Participant of an attorney or firm of attorneys in substantially the form attached hereto as Exhibit B and an opinion for the Authority of Stradling Yocca Carlson & Rauth, a Professional Corporation, General Counsel, in substantially the form attached hereto as Exhibit C. Within five (5) business days following notice that the Water Purchase Agreements are effective, the Purchaser will deposit the Lump Sum Past Administrative Costs with the Authority.

(b) Notwithstanding the delay in effective date of this Agreement until all Project Participants have complied with subsection (a) of this Section, it is agreed by the Purchaser that in consideration for the Authority's signature hereto, and for its commitment to use its best efforts to obtain the commitment of all Project Participants, the Purchaser upon its execution and delivery of this Agreement to the Authority along with the required opinion and any required evidence of compliance as required by subsection (a) of this Section shall be immediately bound not to withdraw its respective offer herein made to enter into this Agreement as executed and/or supplemented or to decrease or terminate its Project Allotment before March 31, 2011.

(c) The term of this Agreement shall continue until the later of January 15, 2031 or the final maturity of Authority Bonds. The parties hereto agree to negotiate in good faith to amend this Agreement on or prior to such date to extend the term hereof and to include terms and conditions as are mutually agreeable to the parties, provided that the price to be paid with respect to the Project Allotment in such amendment shall reflect the payment of capital costs to such date.

Section 16. Assignment.

The Authority may pledge and assign to any Trustee for Authority Bonds, all or any portion of the payments received under this Agreement from the Purchaser and the Authority's other rights and interests under this Agreement. Such pledge and assignment by the Authority shall be made effective for such time as the Authority shall determine and provide that the Trustee shall have the power to enforce this Agreement in the event of a default by the Authority under a Bond Resolution. The Purchaser may assign its rights or obligations under this Agreement only in accordance with Section 12 hereof.

Section 17. Amendments.

Except as otherwise provided in this Agreement, on and after the date Authority Bonds are issued and so long as any Authority Bonds are outstanding in accordance with the applicable Bond Resolution, Section 9, 11, 12, 13, 14 and 16 and this Section of this Agreement shall not be amended, modified or otherwise changed or rescinded by agreement of the parties without the consent of each Trustee for Authority Bonds whose consent is required under the applicable Bond Resolution. This Agreement may only be otherwise amended, modified, changed or rescinded in writing by each of the parties hereto.

The Authority agrees not to grant to the owners of Authority Bonds as individuals any rights relating to the amendment, modification or change of this Agreement.

Notwithstanding the foregoing, the sections of this Agreement set forth in the prior paragraph of this Section may be amended without the consent of each Trustee for Authority Bonds for any of the following purposes:

(a) to add to the agreements, conditions, covenants and terms contained herein required to be observed or performed by the Authority or the Purchaser other agreements, conditions, covenants and terms hereafter to be observed or performed by the Authority or the Purchaser, or to surrender any right reserved herein to or conferred herein on the Authority or the Purchaser, and which in either case shall not adversely affect the interests of the owners of any Authority Bonds;

(b) to make such provisions for the purpose of curing any ambiguity or of correcting, curing or supplementing any defective provision contained herein or in regard to questions arising hereunder which the Authority or the Purchaser may deem desirable or necessary and not inconsistent herewith, and which shall not materially adversely affect the interests of the owners of any Authority Bonds;

(c) to make any modifications or changes necessary or appropriate in the opinion of a firm of nationally recognized standing in the field of law relating to municipal bonds to preserve or protect the exclusion from gross income of interest on the Authority Bonds for federal income tax purposes;

(d) to make any modifications or changes to this Agreement in order to enable the execution and delivery of Authority Bonds on a parity with any Authority Bonds previously issued and to make any modifications or changes necessary or appropriate in connection with the execution and delivery of Authority Bonds;

(e) to make any other modification or change to the provisions of this Agreement which does not materially adversely affect the interests of the owners of any Authority Bonds;

(f) to make changes to the definition of "Project," as such changes may be approved by the Authority Board of Directors.

Section 18. Miscellaneous.

(a) Headings. The headings of the sections hereof are inserted for convenience only and shall not be deemed a part of this Agreement.

(b) Partial Invalidity. If any one or more of the covenants or agreements provided in this Agreement to be performed should be determined to be invalid or contrary to law, such covenant or agreement shall be deemed and construed to be severable from the remaining covenants and agreements herein contained and shall in no way affect the validity of the remaining provisions of this Agreement.

(c) Counterparts. This Agreement may be executed in several counterparts, all or any of which shall be regarded for all purposes as one original and shall constitute and be but one and the same instrument.

(d) Governing Law. THIS AGREEMENT SHALL BE GOVERNED BY AND CONSTRUED IN ACCORDANCE WITH THE LAWS OF THE STATE OF CALIFORNIA.

(e) Notices. Any notices required or permitted to be given hereunder shall be given in writing and shall be delivered (a) in person, (b) by certified mail, postage prepaid, return receipt requested, (c) by Federal Express or another reputable commercial overnight courier that guarantees next day delivery and provides a receipt, or (d) by telefacsimile or telecopy, and such notices shall be addressed as follows:

If to Purchaser: Jurupa Community Services District
11201 Harrel Street
Mira Loma, CA 91752
Attn: General Manager

With a copy to:	Aklufi and Wysocki 3403 Tenth Street, Suite 610 Riverside, CA 92501 Attn: Joe Aklufi
If to Authority:	Chino Basin Desalter Authority c/o City of Ontario 1425 South Bon View Avenue Ontario, CA 91761 Attn: Authority Coordinator
With a copy to:	Stradling Yocca Carlson & Rauth 660 Newport Center Drive Newport Beach, CA 92660 Attention: Douglas Brown

or to such other address as either party may from time to time specify in writing to the other party. Any notice shall be deemed delivered when actually delivered, if such delivery is in person, upon deposit with the U.S. Postal Service, if such delivery is by certified mail, upon deposit with the overnight courier service, if such delivery is by an overnight courier service, and upon transmission, if such delivery is by telefacsimile or telecopy.

(f) Merger of Prior Agreements. This Agreement and the exhibits hereto constitute the entire agreement between the parties and supersede all prior agreements and understandings between the parties relating to the subject matter hereof. This Agreement amends, restates and supersedes the Water Purchase Agreement between the Authority and the Purchaser, dated as of January 15, 2002, in its entirety. This Agreement is intended to implement, and should be interpreted consistent with, the Joint Powers Agreement.

(g) Time of the Essence. Time is of the essence in the performance of this Agreement.

(h) Purchaser Rights under Intergovernmental Agreement. The Authority acknowledges that, pursuant to Section 2.1.G. of the Intergovernmental Agreement, with respect to the performance of Services by Western under the Intergovernmental Agreement and prior to Authority Board action on a particular expenditure or contract, the Purchaser shall have the right to disapprove Western's actions or inactions as Project Manager under the Intergovernmental Agreement. Should Western be replaced by the Authority as Project Manager, the Authority shall use its best efforts to provide the Purchaser with comparable disapproval rights with respect to any such successor Project Manager.

IN WITNESS WHEREOF the Purchaser has executed this Agreement with the approval of its governing body, and caused its official seal to be affixed and the Authority has executed this Agreement in accordance with the authorization of its Board of Directors.

CHINO BASIN DESALTER AUTHORITY

By: _____
Chairperson

Attest:

By: _____
Secretary

JURUPA COMMUNITY SERVICES DISTRICT

By: _____
Jane F. Anderson, President

[SEAL]

Attest:

By: _____
Eldon Horst, Secretary

EXHIBIT A

Project Participant	Project Allotment Prior to Initial Delivery of Expansion Project Water (acre-feet)	Project Allotment After Initial Delivery of Expansion Project Water (acre-feet)
City of Chino	5,000	5,000
City of Chino Hills	4,200	4,200
City of Norco	1,000	1,000
City of Ontario	5,000	8,533
Jurupa Community Services District	8,200	11,733
Santa Ana River Water Company	1,200	1,200
Western Municipal Water District	0	3,534
	24,600	35,200

EXHIBIT B

[This opinion shall be delivered upon execution of the Amended and Restated Water Purchase Agreement]

_____ __, 2011

Chino Basin Desalter Authority

_____

_____

Jurupa Community Services District
11201 Harrel Street
Mira Loma, CA 91752

Ladies and Gentlemen:

We are acting as [special] counsel to the Jurupa Community Services District (the "Purchaser") under the Amended and Restated Water Purchase Agreement, dated as of January 1, 2011 (the "Agreement"), between the Chino Basin Desalter Authority (the "Authority") and the Purchaser, and have acted as general counsel to the Purchaser in connection with the matters referred to herein. As such counsel we have examined and are familiar with (i) documents relating to the existence, organization and operation of the Purchaser provided to us by the Purchaser, (ii) certifications by officers of the Purchaser, (iii) all necessary documentation of the Purchaser relating to the authorization, execution and delivery of the Agreement, and (iv) an executed counterpart of the Agreement. Terms used herein and not otherwise defined have the respective meanings set forth in the Agreement.

Based upon the foregoing and such examination of law and such other information, papers and documents as we deem necessary or advisable to enable us to render this opinion, including the Constitution and laws of the State of California, together with the resolutions, ordinances and public proceedings of the Purchaser, we are of the opinion that:

1. The Purchaser is a community services district, duly created, organized and existing under the laws of the State of California and duly qualified to furnish water service within its boundaries.

2. The Purchaser has legal right, power and authority to enter into the Agreement and to carry out and consummate all transactions reasonably contemplated thereby, and the Purchaser has complied with the provisions of applicable law relating to such transactions.

3. The Agreement has been duly authorized, executed and delivered by the Purchaser, is in full force and effect as to the Purchaser in accordance with its terms and, subject to the qualifications set forth in the second to the last paragraph hereof, and assuming that the Authority has all requisite power and authority, and has taken all necessary action, to authorize, execute and deliver such Agreement, the Agreement constitutes the valid and binding obligation of the Purchaser .

4. The obligations of the Purchaser to make payments under the Agreement from the Revenues of its Purchaser Water System or other lawfully available funds as provided in Section 10 of the Agreement is a valid, legal and binding obligation of the Purchaser enforceable in accordance with its terms.

5. No approval, consent or authorization of any governmental or public agency, authority or person is required for the execution and delivery by the Purchaser of the Agreement.

6. The authorization, execution and delivery of the Agreement and compliance with the provisions thereof will not conflict with or constitute a breach of, or default under, any instrument relating to the organization, existence or operation of the Purchaser, any commitment, agreement or other instrument to which the Purchaser is a party or by which it or its property is bound or affected, or any ruling, regulation, ordinance, judgment, order or decree to which the Purchaser (or any of its officers in their respective capacities as such) is subject or any provision of the laws of the State of California relating to the Purchaser and its affairs.

7. There is no action, suit, proceeding, inquiry or investigation at law or in equity, or before any court, public board or body, pending or, to our knowledge, threatened against or affecting the Purchaser or any entity affiliated with the Purchaser or any of its officers in their respective capacities as such, which questions the powers of the Purchaser referred to in paragraph 2 above or the validity of the proceedings taken by the Purchaser in connection with the authorization, execution or delivery of the Agreement, or wherein any unfavorable decision, ruling or finding would materially adversely affect the transactions contemplated by the Agreement, or which would adversely affect the validity or enforceability of the Agreement.

The opinion expressed in paragraphs 3 and 4 above are qualified to the extent that the enforceability of the Agreement may be limited by any applicable bankruptcy, insolvency, reorganization, arrangement, moratorium, or other laws affecting creditors' rights, to the application of equitable principles and to the exercise of judicial discretion in appropriate cases and to the limitations on legal remedies against public agencies in the State of California and provided that no opinion is expressed with respect to any indemnification or contribution provisions contained therein.

This opinion is rendered only with respect to the laws of the State of California and the United States of America and is addressed only to the Chino Basin Desalter Authority and the Purchaser . No other person is entitled to rely on this opinion, nor may you rely on it in connection with any transactions other than those described herein.

Very truly yours,

EXHIBIT C

[This opinion shall be delivered upon execution of the Amended and Restated Water Purchase Agreement]

_____ __, 2011

Chino Basin Desalter Authority

The Project Participants Listed on
Exhibit A attached hereto

Ladies and Gentlemen:

We are general counsel to the Chino Basin Desalter Authority (the "Authority") and are familiar with those certain Amended and Restated Water Purchase Agreements and that certain Water Purchase Agreement, each dated as of January 1, 2011 (each, an "Agreement"), between the Authority and each of the water contractors identified on Exhibit A attached hereto (each, a "City") in connection with the matters referred to herein. As special counsel we have examined and are familiar with (i) documents relating to the existence, organization and operation of the Authority provided to us by the Authority, (ii) certifications by officers of the Authority, (iii) all necessary documentation of the Authority relating to the authorization, execution and delivery of the Agreement, and (iv) an executed counterpart of the Agreement. Terms used herein and not otherwise defined have the respective meanings set forth in the Agreement.

Based upon the foregoing and such examination of law and such other information, papers and documents as we deem necessary or advisable to enable us to render this opinion, including the Constitution and laws of the State of California, together with the resolutions, ordinances and public proceedings of the Authority, we are of the opinion that:

1. The Authority is a joint exercise of powers agency duly created, organized and existing under the laws of the State of California.

2. The Authority has legal right, power and authority to enter into the Agreement and to carry out and consummate all transactions reasonably contemplated thereby, and the Authority has complied with the provisions of applicable law relating to such transactions.

3. The Agreement has been duly authorized, executed and delivered by the Authority, is in full force and effect as to the Authority in accordance with its terms and, subject to the qualifications set forth in the second to the last paragraph hereof, and assuming that each City has all requisite power and authority, and has taken all necessary action, to authorize, execute and deliver such Agreement, the Agreement constitutes the valid and binding obligation of the Authority.

4. No approval, consent or authorization of any governmental or public agency, authority or person is required for the execution and delivery by the Authority of the Agreement.

5. The authorization, execution and delivery of the Agreement and compliance with the provisions thereof will not conflict with or constitute a breach of, or default under, any instrument relating to the organization, existence or operation of the Authority, any commitment, agreement or other instrument to which the Authority is a party or by which it or its property is bound or affected, or, to the best of our knowledge, any ruling, regulation, ordinance, judgment, order or decree to which the Authority (or any of its officers in their respective capacities as such) is subject or any provision of the laws of the State of California relating to the Authority and its affairs.

6. There is no action, suit, proceeding, inquiry or investigation at law or in equity, or before any court, public board or body, pending or, to our knowledge, threatened against or affecting the Authority or any of its officers in their respective capacities as such, which questions the powers of the Authority referred to in paragraph 2 above or the validity of the proceedings taken by the Authority in connection with the authorization, execution or delivery of the Agreement, or wherein any unfavorable decision, ruling or finding would materially adversely affect the transactions contemplated by the Agreement, or which, in any way, would adversely affect the validity or enforceability of the Agreement.

The opinion expressed in paragraph 3 above is qualified to the extent that the enforceability of the Agreement may be limited by any applicable bankruptcy, insolvency, reorganization, arrangement, moratorium, or other laws affecting creditors' rights, to the application of equitable principles and to the exercise of judicial discretion in appropriate cases and to the limitations on legal remedies against public agencies in the State of California and provided that no opinion is expressed with respect to any indemnification or contribution provisions contained therein.

This opinion is rendered only with respect to the laws of the State of California and the United States of America and is addressed only to the Authority and the Project Participants. No other person is entitled to rely on this opinion, nor may you rely on it in connection with any transactions other than those described herein.

Respectfully submitted,

EXHIBIT D

LIST OF NOTES, BONDS OR OTHER OBLIGATIONS OF THE PURCHASER
AS OF THE DATE OF EXECUTION
TO WHICH PURCHASER WATER SYSTEM REVENUES ARE PLEDGED

[To be inserted.]

EXHIBIT E

EXPANSION PROJECT
FIXED PROJECT COST DISTRIBUTION

Table 8.10 Capital Cost Distribution for Option C (Expand Chino II to 22.7 mgd with Concentrate Reduction)
Chino Desalter Phase 3 PDR
JCSD/Ontario/WMWD

	Chino Phase 3 Sponsors						Non-Sponsors								TOTAL [a]	
	Ontario		JCSD		Western		Chino		Chino Hills		Norco		SARWC			
PRODUCT WATER ALLOCATION																
Phases 1 and 2 (Acre-Feet/Year)	20%	5,000	33%	8,200	0%	0	20%	5,000	17%	4,200	4%	1,000	5%	1,200	100%	24,600
Phase 3 (Acre-Feet/Year)	33%	3,533	33%	3,533	33%	3,534	0%	0	0%	0	0%	0	0%	0	100%	10,600
Total (Acre-Feet/Year)	24%	8,533	33%	11,733	10%	3,534	14%	5,000	12%	4,200	3%	1,000	3%	1,200	100%	35,200
RAW WATER SYSTEM CAPITAL COSTS:																
Wells:																
Wells CCWFA-1, 2, 3, 4, 5, and 6 + Monitoring Wells	33%	$6,729,365	33%	$6,729,365	33%	$6,731,270	0%	$0	0%	$0	0%	$0	0%	$0	100%	$20,190,000
Pipelines:																
Raw Water Pipeline from Well CCWFA-6 to Chino I	33%	$646,606	33%	$646,606	33%	$646,789	0%	$0	0%	$0	0%	$0	0%	$0	100%	$1,940,000
Raw Water Intertie Pipeline	33%	$1,979,813	33%	$1,979,813	33%	$1,980,374	0%	$0	0%	$0	0%	$0	0%	$0	100%	$5,940,000
Raw Water Pump Station																
Raw Water Intertie Pump Station	33%	$1,256,548	33%	$1,256,548	33%	$1,256,904	0%	$0	0%	$0	0%	$0	0%	$0	100%	$3,770,000
WATER TREATMENT FACILITIES CAPITAL COSTS:																
Chino I Modifications to Maintain Current Capacity (100% Sponsors)	33%	$873,251	33%	$873,251	33%	$873,498	0%	$0	0%	$0	0%	$0	0%	$0	100%	$2,620,000
Chino II 10.5 mgd RO/IX Expansion (100% Sponsors)	33%	$5,069,522	33%	$5,069,522	33%	$5,070,957	0%	$0	0%	$0	0%	$0	0%	$0	100%	$15,210,000
Chino II Transfer Pumps (48.8% CDA/51.2% Sponsors)	27%	$264,441	33%	$326,651	17%	$167,285	10%	$97,203	8%	$81,651	2%	$19,441	2%	$23,329	100%	$980,000
Chino II Chemical System Modifications (100% CDA)	24%	$2,424	33%	$3,333	10%	$1,004	14%	$1,420	12%	$1,193	3%	$284	3%	$341	100%	$10,000
Chino II Spare Parts (100% CDA)	24%	$106,663	33%	$146,663	10%	$44,175	14%	$62,500	12%	$52,500	3%	$12,500	3%	$15,000	100%	$440,000
HVAC Modifications (38% CDA/62% Sponsors)	28%	$88,004	33%	$103,327	21%	$64,079	8%	$23,943	6%	$20,112	2%	$4,789	2%	$5,746	100%	$310,000
Concentrate Redution Facilities (100% Sponsors)	33%	$10,735,654	33%	$10,735,654	33%	$10,738,692	0%	$0	0%	$0	0%	$0	0%	$0	100%	$32,210,000
PRODUCT WATER SYSTEM CAPITAL COSTS:																
Pipelines:																
Pipeline from Chino II to Riverside Dr./Hamner Ave. (Ontario Zone 1010)	61%	$5,089,151	0%	$0	39%	$3,280,849	0%	$0	0%	$0	0%	$0	0%	$0	100%	$8,370,000
Pipeline from Riverside Dr./Hamner Ave. to Detroit St.	0%	$0	0%	$0	100%	$17,920,000	0%	$0	0%	$0	0%	$0	0%	$0	100%	$17,920,000
Pump Stations:																
Chino II - JCSD Product Water (Clearwell to Zone 1110)	0%	$0	100%	$1,090,000	0%	$0	0%	$0	0%	$0	0%	$0	0%	$0	100%	$1,090,000
Chino II - Ontario/Western Product Water (Clearwell to Zone 1010)	61%	$1,653,822	0%	$0	39%	$1,066,178	0%	$0	0%	$0	0%	$0	0%	$0	100%	$2,720,000
Milliken Res - Ontario (Zone 1010 to Zone 1212)	100%	$2,750,000	0%	$0	0%	$0	0%	$0	0%	$0	0%	$0	0%	$0	100%	$2,750,000
Capital Costs Subtotal		**$37,245,263**		**$28,960,732**		**$49,842,053**		**$185,067**		**$155,456**		**$37,013**		**$44,416**		**$116,470,000**
Less Approved Grant Funding		($8,922,324)		($6,937,716)		($11,939,960)		$0		$0		$0		$0		($27,800,000)
Adjusted Capital Costs		**$28,322,939**		**$22,023,017**		**$37,902,092**		**$185,067**		**$155,456**		**$37,013**		**$44,416**		**$88,670,000**
30 Year Amortization Period																
5.0% Fixed Amortization Rate																
ANNUALIZED CAPITAL ($/YEAR)		**$1,842,448**		**$1,432,629**		**$2,465,586**		**$12,039**		**$10,113**		**$2,408**		**$2,889**		**$5,768,111**

Notes:
a. Capital costs are construction costs plus engineering/contingency and legal/administration costs escalated to construction midpoint.

AGREEMENT NO. 49960

GROUNDWATER STORAGE PROGRAM FUNDING AGREEMENT

BY AND AMONG

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

AND

INLAND EMPIRE UTILITIES AGENCY

AND

THREE VALLEYS MUNICIPAL WATER DISTRICT

AND

CHINO BASIN WATERMASTER

DATED AS OF _____, 2003

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GROUNDWATER STORAGE PROGRAM FUNDING AGREEMENT

THIS GROUNDWATER STORAGE PROGRAM FUNDING AGREEMENT (this "**Agreement**"), dated as of March 1, 2003, is entered into by and among THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA ("**Metropolitan**"), a public entity of the State of California, INLAND EMPIRE UTILITIES AGENCY, a municipal water district of the State of California ("**IEUA**"), THREE VALLEYS MUNICIPAL WATER DISTRICT, a municipal water district of the State of California ("**TVMWD**") and CHINO BASIN WATERMASTER, an entity established by the Superior Court of the State of California as described in Recital F below ("**Watermaster**").

I. RECITALS

A. In March 2000, California voters approved Proposition 13 ("**Prop. 13**") authorizing the State of California to sell $1.97 billion in general obligation bonds for water related projects throughout the State. The Governor's Budget Act for 2000, Chapter 52, Statutes of 2000, appropriated to the California Department of Water Resources ("**DWR**") local assistance grants for groundwater storage and supply reliability projects in the amount of $161,544,000 by budget item 3860-01-6027, payable from the Interim Reliable Water Supply and Water Quality Infrastructure and Managed Subaccount.

B. Metropolitan subsequently was selected by DWR as a grant recipient for $45 million (the "**Prop. 13 Funds**") to be used for groundwater storage projects within its service area. In a letter dated October 13, 2000 (the "DWR Funding Letter") (see Exhibit A attached hereto), DWR set forth the specific terms and conditions of the grant to Metropolitan.

C. On September 20, 2000, Metropolitan sent a letter to its twenty-six member public agencies (consisting of cities, municipal water districts and a county water authority within its 5,155 square-mile service area covering portions of Los Angeles, Orange, San Diego, Riverside, San Bernardino and Ventura Counties), requesting a list of groundwater storage projects to be considered for Prop. 13 Funding. On November 1, 2000, Metropolitan delivered to those member public agencies that indicated an interest in the Prop. 13 groundwater storage programs the Request for Proposals for Participation in Groundwater Storage Programs Using Proposition 13 Funds, RFP No. WRM-2 (the "**RFP**") (see Exhibit B attached hereto). Metropolitan subsequently conducted a Pre-Submittal Workshop, open to the public, on November 8, 2000, to address any concerns or questions regarding the RFP.

D. Metropolitan anticipated that programs funded by the Prop. 13 Funds would store water (by various methods) that Metropolitan imports from the State Water Project and the Colorado River. This stored water would be pumped by the member agency (or a sub-agency) with a corresponding reduction in surface water

deliveries from Metropolitan. As a result, Metropolitan would have a greater amount of water to distribute within its service area. In addition, such groundwater storage programs are part of a larger effort to meet water supply demands in Southern California, as specifically set forth in the Integrated Water Resources Plan ("IRP") approved by Metropolitan's Board of Directors in 1996, and the Groundwater Storage Principles (see Appendix A of Exhibit B attached hereto) adopted in connection therewith by Metropolitan's Board of Directors in January 2000.

E. IEUA and TVMWD are both municipal water districts formed in 1950 and have been member agencies of Metropolitan since their formation. IEUA was formerly known as Chino Basin Municipal Water District. IEUA serves a portion of San Bernardino County and has one or more designated representatives on Metropolitan's Board of Directors. TVMWD was formerly known as Pomona Valley Municipal Water District. TVMWD serves a portion of Los Angeles County and has one or more designated representatives on Metropolitan's Board of Directors.

F. The Watermaster was established under the Judgment in the Superior Court of California for County of San Bernardino, entitled, "Chino Basin Municipal Water District v. City of Chino, et al.," entered into on January 27, 1978 ("**Judgment**"). The Watermaster is responsible for managing the Chino Groundwater Basin ("Chino Basin") in the most beneficial manner and for equitably administering and enforcing the provisions of the Judgment.

G. Metropolitan has the following storage agreements with IEUA and Chino Basin Watermaster beginning in 1979:
1. Cyclic Storage Agreement approved by the Court in January 1979.
2. The MWD Trust Storage Agreement approved by the Court in August 1986.
3. The Short-Term Conjunctive Use Agreement (CB-5) approved in September 1993.

H. On January 19, 2001, the Proposal for Chino Basin Groundwater Storage Project (the "**Proposal**") was submitted by IEUA for Metropolitan's consideration (see Exhibit C attached hereto). On April 10, 2001, Metropolitan notified IEUA that the program described in its Proposal had been selected for further consideration (see Exhibit D attached hereto) and that it was eligible for up to $9 million of the Prop. 13 Funds. The Program is also eligible for disbursement of up to $ 18.5 million of other funds administered by Metropolitan. The Prop. 13 Funds plus the Metropolitan funds specifically allocated to the proposed Program are referred to herein as the "**Program Funds.**"

I. During further development of the Program, the City of Pomona was identified as a participating retail agency (Operating Party) for implementation of the Program. The City of Pomona is a sub-agency of TVMWD, and TVMWD has therefore joined this Agreement.

J. Accordingly, the parties hereto (each a "**Party**" and, collectively, the "**Parties**") desire to enter into a mutually beneficial agreement for a groundwater storage program funded by Program Funds that will achieve reasonable and beneficial conjunctive use of Metropolitan's water supply to provide 33,000 acre-feet of additional pumping capacity in the Chino Basin in accordance with this Agreement and the Groundwater Storage Principles referenced above. This Agreement describes the terms of the Program agreed to among Metropolitan, the Watermaster, IEUA, and TVMWD which includes the terms for the storage and delivery of stored water from Metropolitan, the construction of groundwater production facilities, and the funding of such facilities. All of the elements together as described in this Agreement shall constitute the "Program".

K. Pursuant to the provisions of California Environmental Quality Act (CEQA) and the State CEQA Guidelines, IEUA, acting as lead agency, prepared and processed a Final Program Environmental Impact Report (Final PEIR) for the Chino Basin Watermaster Optimum Basin Management Program (OBMP) which included conjunctive use Storage and Recovery Program of 500,000 acre-feet (the "**Storage and Recovery Program**"). Among other things, the Final PEIR evaluated the environmental effects associated with the construction activities that are tied to and funded by this Agreement. On July 12, 2000, IEUA certified the Final PEIR and approved the OBMP.

L. Subsequent to certification of the Final PEIR, IEUA found that it needed to make minor modifications to the proposed construction activities. IEUA determined that these modifications would not result in any significant new environmental effects, substantially increase the severity of previously identified effects, or require any new mitigation measures beyond those examined by and proposed in the Final PEIR. IEUA prepared a Finding of Consistency (i.e., Addendum) documenting this determination, which it certified on December 18, 2002.

M. TVMWD and Metropolitan, acting as responsible agencies, have reviewed the information contained in the Final PEIR and Finding of Consistency, and have adopted IEUA's findings concerning the environmental effects associated with the construction activities that are tied to and funded by this Agreement.

N. As of the date of this Agreement, no legal action has been filed challenging the Final PEIR, the Finding of Consistency, or any determination and approvals issued by IEUA, TVMWD or Metropolitan that relate to the Program or this Agreement.

O. IEUA and Watermaster are funding a $45 million Recharge Master Plan capital improvement program, separate and apart from this agreement, that will increase significantly the ability for Metropolitan to store water through direct replenishment into Metropolitan's storage account. Under the OBMP the parties to the Judgment have agreed to expand the existing Chino I Desalter from 8 mgd

to 14 mgd and build the Chino II Desalter at a capacity of 10 mgd to produce and treat approximately 25,000 AF per year of poor quality water to minimize downstream water quality impacts on the Orange County Water District (OCWD) consistent with the OBMP Program Environmental Impact Report and Chino I expansion/Chino II Desalter Environmental Impact Report and the Memorandum of Understanding with OCWD.

NOW, THEREFORE, in consideration of the foregoing Recitals, and for other good and valuable consideration the receipt and adequacy of which are hereby acknowledged, the Parties hereby agree as follows:

II. EFFECTIVE DATE AND TERM

A. Effective Date

Upon execution by all Parties, this Agreement shall be deemed effective as of March 1, 2003 (the "**Effective Date**").

B. Termination Date

This Agreement shall initially terminate on the date which is twenty-five years after the Effective Date, unless sooner terminated in accordance herewith (the "**Initial Termination Date**"). Notwithstanding the foregoing, this Agreement will renew for a five-year period commencing on the Initial Termination Date, and each fifth anniversary thereof (each, a "Renewal Date"), if written consent of all parties is filed with Metropolitan at least 90 days prior to each termination date. This Agreement shall absolutely terminate and be of no further force or effect on the date that is fifty years after the Effective Date (the "**Final Termination Date**").

III. CONDITIONS PRECEDENT TO FUNDING OBLIGATION AND PROGRAM IMPLEMENTATION

Metropolitan's funding obligations with respect to construction of the Facilities (as set forth in Article V below) are subject to the satisfaction of the following conditions precedent, or waiver of the condition(s) precedent, by Metropolitan:

A. CEQA.

Any and all environmental reviews and supporting documentation ("**CEQA Documents**") required to implement the Program and/or this Agreement shall have been completed, certified and approved by the Parties in accordance with CEQA and its guidelines. Further, the time period for commencing a legal action challenging any of these CEQA Documents, or challenging any certifications, findings, determinations, approvals or authorizations that are related to or based

upon such CEQA Documents, shall have lapsed with no such legal action having been filed.

B. DWR Commitment

The conditions necessary to receive Prop. 13 Funds under the DWR Funding Letter shall have been satisfied, and DWR shall be committed to disbursing the Prop. 13 Funds to Metropolitan in accordance with the DWR Funding Letter, the Schedule and the Budget.

C. Permits and Approvals

Any authorizations, consents, licenses, permits and approvals from any Governmental Authority (as defined hereafter) or person as may be required by applicable law to construct and operate the Program (including, without limitation, the approvals or consents from other groundwater users in the Chino Basin, or parties whose approval is required by any judgment in an adjudicated basin, and approval and recognition of this Agreement by the San Bernardino Superior Court with continuing jurisdiction over the Judgment (collectively, the "**Required Approvals**") shall have been obtained. IEUA shall have delivered reasonably satisfactory evidence of such Required Approvals to Metropolitan. None of the Required Approvals shall impose any condition to such approval that a Party finds unacceptable, and any acceptable conditions to the Required Approvals shall have been satisfied or waived by the person imposing such condition or will be satisfied by the Program as then contemplated. "**Governmental Authority**" means any federal, state, local or other governmental, regulatory or administrative agency, governmental commission, department, board, subdivision, court, tribunal, or other governmental arbitrator, arbitral body or other authority.

D. No Litigation

IEUA, TVMWD, and Watermaster shall have certified that, except as disclosed in writing to Metropolitan and accepted by Metropolitan in its reasonable discretion, there is no litigation, including any arbitration, investigation or other proceeding, pending before any court, arbitrator or Governmental Authority, nor any such litigation threatened, nor any decree, order or injunction issued by any court, arbitrator or Governmental Authority and remaining in effect, which relates to Program Funds or the Program or which prevents or hinders (or seeks to prevent or hinder) implementation of the Program, or which raises a question as to the validity of this Agreement, or any of the other Program agreements.

The date upon which each of the foregoing conditions has been satisfied or waived by Metropolitan, as set forth in a written notice from Metropolitan to IEUA, shall be the "**Funding Obligation Date.**"

IV. PROGRAM PLANNING AND CONSTRUCTION

A. Planning

1. General Description of Program

The Program includes the following components:

a. Metropolitan shall have the right to: (1) deliver and store imported water supplies in the Chino Basin at up to a rate of 25,000 acre-feet per year and up to 100,000 AF in storage at any time (**"Maximum Storage Amount"**), subject to higher amounts if approved in advance by the Chino Basin Watermaster, and (2) cause Chino Basin stored water to be produced at a rate of 33,000 AF per year, pursuant to the Exhibit G "Performance Criteria" of this Agreement, the Chino Basin Judgment and the Watermaster Rules and Regulations. Watermaster will provide for rights to store and extract water from the Chino Basin.

b. The proposed groundwater storage Program consists of the facilities described in Exhibit H (the **"Facilities"**). The agencies within the service areas of IEUA and TVMWD responsible for operating the respective Facilities (**"Operating Parties"**) are also listed in Exhibit H. IEUA and TVMWD will enter into agreements with the **Operating Parties** within their respective service areas that will require such **Operating Parties** to operate and maintain the Facilities.

c. Water provided for storage by Metropolitan hereunder (**"Program Water"**) will be untreated water, as defined in Section 4104 of Metropolitan's Administrative Code. Water stored by spreading or injection in the Chino Basin must meet the applicable water quality requirements as required by the Watermaster and any other regulatory agency with jurisdiction over the Chino Basin.

d. Metropolitan will fund the construction of the Facilities in accordance with this Agreement.

2. Operational Capacity Thresholds

The Program **"Operational Capacity Thresholds"** are:

a. *Storage.* Water can be stored in the following ways: (1) spreading, (2) injection, (3) in-lieu deliveries (pursuant to the administration procedures described in Exhibit F) and transfer from existing Metropolitan storage accounts consistent with the Chino Basin

Judgment. Metropolitan can store water in the Chino Basin at a rate of 25,000 AF per year, unless a greater amount is approved by the Watermaster.

b. *Extraction*. At a minimum, the Facilities, when combined with the existing groundwater production capacity of the Operating Parties as defined in Exhibit H, if necessary, shall be designed to have the capacity to extract water from the Chino Basin at a rate of 33,000 AF per year. Prior to the completion of all Facilities, the minimum extraction capacity shall be a pro rata portion of the extraction capacity based on the Facilities then completed.

3. Submission of Plans, Schedule and Budget

On or before September 1, 2004, IEUA shall deliver to Metropolitan the engineering and construction plans and specifications (the "**Plans**"), a construction schedule (the "**Schedule**") and a construction budget (the "**Budget**") for the Facilities . At a minimum:

a. The Plans shall describe in reasonable detail the construction and design of the Facilities, and shall conform to any requirements of DWR;

b. The Schedule shall state the date of construction commencement, the anticipated completion date (which shall occur no later than March 8, 2008,), key milestone dates in the interim (each a "**Milestone Date**") including timing of discrete program elements ("**Discrete Program Elements**") and major tasks ("**Tasks**") within them; and

c. The Budget shall contain an itemized summary of Program costs including costs of the contractors, consultants, and other service providers, and all materials anticipated to be purchased in connection with the Program. For the purpose of Metropolitan's payment of invoices from Program Funds ("**Invoice**") pursuant to Section V(D), the Budget shall be divided into phases corresponding to the Milestone Dates, Discrete Program Elements and Tasks set forth in the Schedule.

4. Review and Approval of Schedule and Budget

a. Metropolitan shall review and approve or disapprove, by written notice to IEUA, the Schedule and Budget for the Facilities within ten (10) business days after Metropolitan's receipt thereof (once so approved, the "**Approved Budget**" and the "**Approved Schedule**"). If Metropolitan has not acted on the schedule or budget within ten (10)

business days after Metropolitan's receipt, the schedule or budget shall be deemed approved.

b. For all Facilities funded in whole or part with Prop. 13 funds, all Metropolitan approvals shall be conditional upon DWR approvals. IEUA acknowledges and agrees that Metropolitan intends to submit the Schedule and Budget to the DWR for its review and approval, and Metropolitan shall disapprove the Schedule and/or Budget upon DWR's disapproval of the Schedule and/or Budget.

c. If Metropolitan (or DWR, if applicable) disapproves of the Schedule and/or Budget, Metropolitan shall specify the reasons for the disapproval in its disapproval notice to IEUA. Metropolitan shall thereafter promptly meet with IEUA to correct any deficiencies to the Schedule and/or Budget such that the Schedule and Budget are reasonably acceptable to Metropolitan, DWR (if applicable) and IEUA.

d. Notwithstanding any requirements of DWR as noted in clause (b) above, or any other terms or conditions set forth herein, neither DWR nor Metropolitan shall have any responsibility for reviewing or approving the Plans, and IEUA assumes all responsibility for the proper design, planning, and specifications of the Facilities.

e. IEUA, may, as warranted, update the Approved Schedule and Approved Budget for the Facilities to reflect changes as necessary. However, under no condition may the Completion Date exceed March 8, 2008, or the total budget exceed the specified amount allocated as Program Funds unless such overages shall be the responsibility of IEUA. Review and approval of the proposed update shall follow the above procedure.

B. Construction

1. Contracting

IEUA shall retain, or cause to be retained through agreements with the Operating Parties, qualified contractor(s) and consultants to design and construct the Facilities. All contracts let for project construction shall be let by competitive bid procedures that assure award of the contract to the lowest responsible bidder, except as may be otherwise authorized under the enabling authority for IEUA and/or the California Public Contract Code.

2. Construction Supervision and Responsibility

a. *Diligent Prosecution of Facility Construction.* IEUA agrees to faithfully and diligently complete, or cause to be completed, the construction of the Facilities in accordance with the Plans, Approved Budget and Approved Schedule.

b. *Supervision.* As among Metropolitan, IEUA, TVMWD, and the Watermaster, IEUA shall be responsible for all work in connection with the construction of the Facilities and for persons engaged in the performance of such work.

c. *Compliance with Laws.* IEUA shall ensure that all construction in connection with the Program complies with any applicable federal, state and local laws, rules and regulations, including, without limitation, environmental, procurement and safety laws, rules, regulations and ordinance.

d. *Contracting Disputes.* IEUA shall be responsible for any and all disputes arising out of its contracts for work on the Program, including, without limitation, any bid disputes and payment disputes with contractors or subcontractors. Metropolitan will not mediate disputes between IEUA, TVMWD, their Operating Parties and any other entity in connection herewith.

3. Inspection Right

During reasonable business hours, Metropolitan and/or the DWR, with respect to Facilities funded with Prop. 13 Funds (and any of their designated representatives or agents), may enter upon the Program site and inspect the on-going and/or completed construction activities. Metropolitan agrees to exercise commercially reasonable efforts to deliver advance written notice to IEUA of any such visit to the Program site (it being acknowledged, however, by IEUA that the DWR may inspect the Program site at any and all reasonable times without prior notice pursuant to the terms of the DWR Funding Letter).

4. Completion of Construction

a. *Completion Date.* IEUA shall assure that Completion of the Facilities occurs not later than March 8, 2008. "**Completion**" means (x) performance of the construction in a good and workmanlike manner, free and clear of mechanics', materialmens' and other liens or security interests, claims or encumbrances relating to such construction, subject only to completion of punch list items which do not materially interfere with the use or

functionality of the Facilities, and (y) the payment of all costs to the persons entitled thereto less retainage or reserves for punch list items.

b. *Completion Notification and Certification*. IEUA shall notify Metropolitan within ten business days after Completion of Facilities by each Operating Party. Such notification shall include a certification from the IEUA, the general contractor (if applicable) and a California Registered Civil Engineer affirming Completion and that the Facilities: (i) are as described in Exhibit H; (ii) have been constructed substantially in accordance with the Plans; (iii) have been adequately tested and meet the Operational Capacity Thresholds; and (iv) are otherwise sufficient to achieve the goals of the Program (as stated in Exhibit H).

5. Ownership of Project

Metropolitan will have no ownership interest in the Facilities. The Operating Parties shall have sole ownership and control of the Facilities, and the real property interests in connection therewith, subject to the rights and obligations of the Parties under this Agreement.

V. PROJECT CONSTRUCTION FUNDING (NOT INCLUDING OPERATION AND MAINTENANCE/ENERGY COST FUNDING)

A. Metropolitan Funding Obligation

1. After the Funding Obligation Date, subject to and in accordance with the terms and conditions of Section V(C) below, Metropolitan hereby agrees to fund the payment of eligible costs for constructing the Facilities in accordance with the Approved Budget (the "**Program Construction Costs**") in an amount not to exceed $27.5 million, inclusive of design and construction of Facilities and the costs to comply with CEQA. Of these Program Construction Costs, $9 million is being funded by Prop 13 Funds.

B. Cost Overruns

1. IEUA agrees to pay, and Metropolitan shall have no liability for, any costs of constructing the Facilities in excess of the amounts set forth in the applicable Approved Budget (on line-item and aggregate bases); provided, however, that upon written request from IEUA, Metropolitan shall approve, conditional upon DWR approval, reallocation of any demonstrated costs savings from one line-item of the Approved Budget to

another line item in order to cover any cost overruns for the $9 million funded by Prop. 13 Funds for specific Program facilities.

2. Should bids for construction of the Program Facilities exceed the Approved Budget by more than 5%, IEUA may review such cost increase with Metropolitan to determine the appropriate way to proceed with the Program. Metropolitan and IEUA may mutually agree to a cost share, a change in scope of the Program, or to discontinue the Program.

3. IEUA agrees to reimburse Metropolitan for any of its costs intended to be reimbursed with Prop. 13 Funds that are disapproved by DWR, within thirty (30) days of receipt of invoice from Metropolitan for such reimbursement. IEUA agrees to pay interest computed at an annual rate equal to that earned by Surplus Money Investment Fund (SMIF) rate as provided for in Government Code Sections 16480 et seq., calculated monthly, on any outstanding amounts so invoiced by Metropolitan, beginning thirty days after the date such invoice is received until paid.

C. **Disbursement Protocol**

1. Invoice Payment.

Commencing on the Funding Obligation Date, and continuing not more often than monthly thereafter, IEUA may submit for Metropolitan's consideration and payment from the Program Funds an Invoice for costs incurred. Each Invoice shall set forth in reasonable detail those Program Construction Costs that have been incurred since submittal of the prior Invoice and shall reference Discrete Program Elements and Tasks as outlined in the Approved Budget and Schedule. Each Invoice shall be accompanied by a Progress Report pursuant to Section X (B)(1). Work accomplished on each Discrete Program Element shall be briefly described, and the percent complete shall be presented with the percent and actual amounts expended to date on each Discrete Program Element. Metropolitan shall review and approve or disapprove (in part or whole) the Invoice and provide payment of Program Funds to IEUA for all approved portions of the Invoice within 30 days of receipt. If Metropolitan disapproves any portion of an Invoice, it shall state its reasons for such disapproval in writing and cooperate in good faith with IEUA, to promptly achieve a mutually acceptable revision to the disallowed portion of the Invoice. Metropolitan agrees to pay interest at the rate and in the manner specified in Section V(B)(2) on approved portions of invoices paid more than thirty (30) days after receipt of such invoice by Metropolitan.

2. Certification of Expenditures

With each Invoice submitted for Program Construction Costs, IEUA shall also provide its written certification and a written certification from the general contractor, if any, affirming that invoiced amounts were utilized exclusively for construction of the Facilities in accordance with the Plans and Approved Budget. Such certification shall be accompanied by evidence of payment for services and/or materials delivered in connection with the construction of the Facilities.

3. Disbursement of Program Funds

Upon Metropolitan's payment of Program Funds pursuant to an Invoice, Metropolitan shall have fulfilled its obligation with respect to such payment, and shall have no obligations to ensure disbursement to the appropriate Party(ies) entitled thereto.

VI. OPERATING COMMITTEE

A. Operating Committee

1. Composition of Committee.

A committee (the "**Operating Committee**") shall be established for the specific purposes specified herein. The Operating Committee shall have five members, two representatives from Metropolitan and three representatives chosen by IEUA, TVMWD, and Watermaster in any manner determined by IEUA, TVMWD, and Watermaster. The local agencies listed in Exhibit H may also attend meetings of the Operating Committee. With respect to any matter on which the Operating Committee cannot reach unanimous agreement, the Operating Committee shall submit such matter for determination by a consultant and/or arbitration panel in accordance with Section XIII(A).

2. Meeting of Operating Committee

The Operating Committee shall meet:

a. as reasonably often as necessary to implement operations and take other needed action pursuant to this Agreement. Such tasks will include preparation of Operating Committee's certification to Watermaster regarding monthly storage achieved utilizing methodology specified in Exhibit F (Accounting Methodology).

b. within thirty days after the execution of this Agreement; and thereafter at least sixty days prior to the end of each fiscal year

(which fiscal year shall run from July 1 through June 30) to develop Program Annual Operating Plan for the subsequent year and to review need for adjustments to Electrical Costs and Operation and Maintenance Costs; and

c. by August 31 of each year review prior fiscal year performance for storage and/or extraction in conformance with the Annual Operating Plan and Exhibit G, Performance Criteria; and for assessment of per-acre-foot Electrical Costs and Operation and Maintenance Costs to be paid by Metropolitan.

3. Annual Operating Plan

a. The Annual Operating Plan shall provide an estimated schedule and location for all storage and extraction under this Agreement and in conformance with Exhibit G (Performance Criteria) on a monthly basis for the upcoming fiscal year and documentation of adequate available capacity with respect to the Program Facilities capacity to accommodate Metropolitan's rights pursuant to Section VII hereof. Initial operation of the Metropolitan Storage Account prior to completion of Facilities funded under this Agreement shall be accomplished under the Annual Operating Plan. Until all Facilities are completed, partial performance shall be pro rata according to the proportion of Facilities listed in Exhibit H which are then complete.

b. The Annual Operating Plan shall provide sufficient information to allow the Operating Committee and Watermaster to assess potential impacts from the Program on the Chino Basin and the Judgment Parties, such as : (1) current and projected water levels in the basin; and (2) short-term and long-term projections of Chino Basin water supply and water quality. The Operating Committee and the Watermaster may request additional information from the Operating Parties.

c. Consistent with Section VIII(A) below, the Annual Operating Plan shall not limit Metropolitan's ability to modify its call for extraction or storage of water upon fifteen (15) days advance notice as provided in Sections VII(A) and VII(C). Watermaster reserves the right to approve the location and amount of storage and extraction pursuant to this Agreement, in accordance with the Judgment, OBMP and its policies applicable to the Judgment Parties.

d. Storage and extraction operations under this Agreement shall be in accordance with the provisions of the Annual Operating Plan as

adopted or as amended to accommodate changed circumstances or new information. The Annual Operating Plan may be amended: (1) at the request of a member of the Operating Committee and with the concurrence of the Operating Committee and approval of the Watermaster (2) as a requirement of the Watermaster in the implementation of the Judgment and OBMP with specific adjustments proposed by consensus of the Operating Committee and approved by the Watermaster.

4. Specific Duties

Without limiting the foregoing, the Operating Committee shall:

a. Properly account for the amounts of all water stored and extracted and submit a report of these amounts achieved for the Metropolitan Storage Account to Watermaster and Metropolitan on a monthly basis but not more than two months in arrears. At the end of the fiscal year, an annual reconciliation shall be performed of storage and extraction, and any adjustments to the monthly submittals shall be submitted to the Watermaster and to Metropolitan in a timely manner for consideration in the preparation of the Watermaster's annual assessment package.

b. Within two months following formal issuance of Watermaster's annual report, perform an annual reconciliation of Metropolitan and IEUA's and TVMWD's records with Watermaster's annual report and Metropolitan's water billing inclusive of credits for the Operation and Maintenance Costs and Electrical Costs, and prepare any needed paperwork for adjustments to the billing.

c. Consistent with Section VIII(A) below, confirm that sufficient excess operable production capacity was maintained for the conjunctive use Program during the prior year, unless different criteria are agreed upon by the Operating Committee.

d. Prepare and deliver to the Parties, on or before September 1 of each year, a written annual report outlining the Program Annual Operating Plan for the subsequent year, and the Operating Committee's actions during the prior year (the "**Operating Committee Annual Report**").

e. Every five years, commencing upon the Completion Date, the Operating Committee shall review the maintenance charge set forth in Section VI(D)(1) of this Agreement. To such end, the Operating Committee shall conduct a survey of operation and maintenance costs with respect to facilities within the Program

Basin and which are comparable to the Facilities. Based on such survey and other information the Operating Committee deems relevant, the Operating Committee shall approve a new Operation and Maintenance Cost for the next five-year period.

f. Every year commencing upon Completion Date, determine the electrical power unit rates(s) (dollars per AF of Stored Water Deliveries) for the respective Operating Party(ies) to extract water. The electrical power cost to extract Program Water (the "Electrical Costs") shall be equal to Stored Water Deliveries (as defined in Section VII(C) below) for the applicable period multiplied by the applicable electrical power unit rate(s) for the Operating Party(ies) that extracted the water. The Operating Committee shall ensure that the electrical power unit rate per acre-foot of extracted water calculated for each Operating Party is reflective of actual energy costs.

B. IEUA and TVMWD Obligations

Subject to Section VI(C), IEUA and TVMWD hereby agree to do, or to cause through agreements with the Operating Parties in their respective service areas, the following:

1. Cause the Facilities to be operated and maintained in as good and efficient condition as upon their construction, ordinary and reasonable wear and depreciation excepted, and otherwise in accordance with industry standards (and DWR standards and requirements, if any);

2. Provide for all repairs, renewals, and replacements necessary to the efficient operation of the Facilities;

3. To the extent existing facilities are utilized for the Program, provide for all repairs, renewals, and replacements necessary to the efficient operation of such existing facilities;

4. Certify the amount of water in the Metropolitan Storage Account pursuant to the Operating Committee accounting; and

5. Upon call by Metropolitan for Stored Water Delivery, operate Facilities, combined with the existing infrastructure, at Operational Capacity Thresholds necessary to meet performance targets as outlined in Exhibit G.

C. Watermaster Obligations

Watermaster hereby agrees to:

1. Maintain records of the amounts of all water stored in and extracted from the Chino Basin pursuant to this Agreement and consistent with the Judgment and Rules and Regulations, and provide to Metropolitan an amount specified in an account to be designated as the **Metropolitan Storage Account**. Watermaster will maintain a monthly statement regarding the account as information becomes available and will document in its annual report all water stored in and withdrawn from the Metropolitan Storage Account. Watermaster shall account for Metropolitan stored water as follows:

   a. The amount of any water stored in the Chino Basin on behalf of Metropolitan prior to the Effective Date of this Agreement shall be credited to the Metropolitan Storage Account on the Effective Date pursuant to the procedure set forth in Exhibit E.

   b. Watermaster shall credit water which Metropolitan delivers for storage to the Metropolitan Storage Account on an acre-foot for acre-foot basis, less any losses assessed.

   c. Losses assessed by Watermaster against the Metropolitan Storage Account will be equivalent to losses assessed Judgment parties for participation in the Storage and Recovery Program.

   d. Watermaster shall debit the Metropolitan Storage Account one acre-foot for each acre-foot of water produced from the account. Watermaster accounting for water produced from the Metropolitan Storage Account shall specify quantities produced by each Operating Party.

   e. Watermaster shall obtain from Operating Committee on a monthly basis its report of the amount of storage achieved using the methodology specified in Section VII(B) and Exhibit F of this Agreement.

2. Report the total active and inactive annual extraction capacity of the Operating Parties in the Watermaster's annual report.

D. Metropolitan Obligations

In accordance with the procedures set forth in clause (E) below, Metropolitan hereby agrees to:

1. Pay costs of operating and maintaining the Facilities at the unit rate (dollars per AF of Stored Water Deliveries) determined by the Operating Committee for the Operating Party(ies) that extracted water as adjusted when and as required by Section VI(A)(4)(e) (the "**Operation and**

Maintenance Costs"). Operation and Maintenance Costs will include a dollar per AF amount for each AF produced by an Operating Party from Metropolitan's Storage Account through the funded ion exchange facilities equal to the Operating Party's variable costs of treating Metropolitan's State Water Project surface deliveries (expressed as dollar per AF of treating such water). Such variable costs shall exclude capital, debt service, or replacement costs and include only variable operating and maintenance costs at the Water Facilities Authority Treatment Plant, CCWD Lloyd Michael Filtration Plant, or the Miramar Treatment Plant. The dollar per AF cost shall be calculated by dividing the variable costs by the quantity of water produced by the treatment plants. The dollar per acre-foot shall be determined by the Operating Committee pursuant to Section VI(A)(4)(e);

2. Pay the Electrical Costs as determined in Section VI(A)(4)(f) to extract water from the basin, if any, equal to **Stored Water Deliveries** (as defined in Section VII(C) below) for the applicable period for the Operating Party(ies) that extracted the water; and

3. From and after the first full year in which water is stored in the Program Basin on Metropolitan's behalf, and on or prior to July 1 of each subsequent year, pay an administrative fee in an annual amount of $132,000 to the Watermaster (as such amount is adjusted on each anniversary of the execution of this Agreement by the lesser of 2.5% or the Retail Consumer Price Index for the City of Los Angeles published by the Engineering News Record), for the incremental costs and expenses of administering the Program during such year. Such administrative fee is subject to adjustment from time to time as approved by the Operating Committee.

E. Payment of Operation and Maintenance Costs and Electrical Costs

1. Amounts owing by Metropolitan pursuant to Section VI(D) for Operation and Maintenance Costs and Electrical Costs shall be paid through a credit to Metropolitan's monthly invoice for the Stored Water Delivery to TVMWD or IEUA, as applicable, pursuant to Section VII(D). Upon the credit to Metropolitan's invoice for the Operation and Maintenance Costs and Electrical Costs, Metropolitan will have satisfied its funding obligations with respect thereto.

F. Annual Reconciliation

1. Reconciliation of Metropolitan Storage Account and Costs.

   As noted in Section VI(A)(4)(a) above, the Operating Committee will conduct an annual reconciliation of the prior year's credits and debits to

the Metropolitan Storage Account. If such reconciliation reveals that the actual amount of water delivered by Metropolitan for storage pursuant to Section VII(A)(1), or the actual amount of Stored Water Deliveries, as defined in Section VII(C) below, during the prior year were not accurately accounted for, then the Operating Committee shall reflect this in its year-end assessment of storage and extraction provided to the Watermaster. The Watermaster shall determine the manner in which any credits or debits to the Metropolitan Storage Account shall be made.

The Operating Committee shall complete its reporting and processing of any prior year adjustments to the Metropolitan water invoice within two months of the formal issuance of the Watermaster's annual report, as provided in Section VI(A)(4)(b).

VII. GROUNDWATER STORAGE AND EXTRACTION

A. Metropolitan's Storage Account Rights

1. During any fiscal year of the term of this Agreement, Metropolitan may deliver up to 25,000 AF of Program Water for storage in the Program Basin with an equivalent amount to be accounted for in the Metropolitan Storage Account pursuant hereto; provided, however, that total Program Water stored on behalf of Metropolitan in the Program Basin, pursuant to this Agreement, shall never exceed the Maximum Storage Amount unless approved by the Watermaster. Deliveries shall be subject to the prior approval of the Watermaster pursuant to the policies described in subsection 5 below. Metropolitan shall not be obligated to pay any fees associated with basin utilization.

2. Metropolitan may make such deliveries to IEUA or TVMWD on fifteen (15) days advance notice to such Party and Watermaster. Watermaster will credit the Metropolitan Storage Account by the amount of Program Water delivered to IEUA or TVMWD.

3. Upon notification by Metropolitan pursuant to Section VII(A)(2), IEUA or TVMWD and Watermaster may either: (a) directly store the amount of any such delivery of Program Water in the Chino Basin (e.g., by injection or spreading); or (b) store the amount of any such delivery of Program Water in the Chino Basin by in lieu storage, i.e., by reducing pumping from the Chino Basin by the amount of such delivery.

4. The quantity of Program Water delivered to the Metropolitan Storage Account in any given month shall be determined in accordance with the accounting methodology set forth in Exhibit F.

5. The Watermaster's Storage and Recovery Policies shall be applied to Program Water stored under this Agreement in a non-discriminatory manner consistent with the application of such policies to any other participant in the Storage and Recovery Program, including all parties to the Judgment. Furthermore, the Watermaster shall not impose any policies upon the Program Water, whether or not imposed on other parties, that would materially alter the benefits provided to or the obligations imposed upon Metropolitan under this Agreement. Without limiting the foregoing, the Watermaster shall not impose any policies that would create any significant discrepancies between the amount of Program Water delivered by Metropolitan for storage in the Program Basin and the amount of Program Water that Metropolitan is entitled to extract from such basin pursuant to this Agreement.

B. **Certification of Deliveries to Metropolitan Water Account**

1. Metropolitan shall deliver available Program Water to IEUA or TVMWD at the appropriate service connection for storage in the Metropolitan Storage Account consistent with the Annual Operating Plan. In any month where imported water is delivered to the Chino Basin through a Metropolitan service connection, the Party receiving Program Water shall certify the facts concerning the quantities of such deliveries to Metropolitan and Watermaster in writing or electronically in a format satisfactory to Metropolitan by a responsible officer of such Party.

2. Metropolitan will credit the appropriate IEUA or TVMWD invoice at the applicable rate for each acre-foot of water certified by such Party for that service connection.

3. Certifications of Program Water for a given billing period must be received by Metropolitan before 3:30 p.m. on the third working day after the end of the month to receive credit on the bill for that billing period or any preceding billing period.

4. No certification received after six months following the end of any month in which a credit for Program Water is claimed will be accepted.

C. **Extraction of Stored Water**

1. In lieu of providing all or some of its regular surface water deliveries to IEUA or TVMWD, Metropolitan may, on fifteen (15) days advance notice, deliver water to such Party on the first of the following month by requesting such Party to debit the Metropolitan Water Account (each such delivery being a "**Stored Water Delivery**"); provided, however, that unless permitted by Watermaster, such Stored Water Deliveries shall not, in any fiscal year exceed the lesser of (a) 33% of the Maximum Storage

Amount or (b) the amount then remaining in the Metropolitan Storage Account. Metropolitan's regular surface water deliveries to IEUA and TVMWD will be reduced by the amount of such Stored Water Delivery. During an emergency or unforeseen operational condition, IEUA and TVMWD will use their best efforts in responding to Metropolitan's request for a Stored Water Delivery.

2. IEUA and TVMWD, as applicable, shall pump the amount of the Stored Water Delivery from the Chino Basin in lieu of receiving its regular surface water deliveries in accordance with specific direction from the Watermaster.

3. IEUA and TVMWD shall have twelve months to comply with Metropolitan's extraction request in accordance with the performance criteria described in Exhibit "G" to this Agreement.

D. Payment for Extraction of Stored Water

Upon call by Metropolitan for Stored Water Delivery, Metropolitan shall invoice IEUA or TVMWD for the amount reported as extracted by the Operating Committee pursuant to Section VI(A)(4)(a), and such Party shall pay to Metropolitan the then applicable full-service rate (or its equivalent, as determined by Metropolitan in its reasonable discretion) as if such Stored Water Deliveries were surface water deliveries through its service connection. The invoice from Metropolitan shall include credits for the Operation and Maintenance Costs and the Electrical Costs associated with the Stored Water Delivery. Where prior storage accounts are credited to the Metropolitan Water Account pursuant to Section VI(C)(1)(a), this water shall constitute the Stored Water Delivery prior to any water credited to the Metropolitan Water Account after the Effective Date, and shall be paid for at the appropriate rate indicated in Exhibit E.

VIII. OTHER USES OF FACILITIES

A. Allowed Use

IEUA and TVMWD may use Program Facilities for purposes unrelated to the Program so long as such use does not interfere with the Program and the excess operable production capacity is maintained as necessary for performance under this Program, unless monthly operable production capacity on other than a monthly basis is agreed to by the Operating Committee.

B. IEUA and Watermaster shall certify to the Operating Committee that there will exist at all times excess operable production capacity in the Chino Basin of at least an annual extraction of 33,000AF or 33% of Maximum Storage Amount for performance under this conjunctive use Program.

IX. REPRESENTATIONS, WARRANTIES AND AFFIRMATIVE COVENANTS OF PARTIES

A. Of IEUA and TVMWD

IEUA and TVMWD respectively represent, warrant and covenant as follows:

1. Power and Authority

That it is a municipal water district, duly organized and validly existing under the laws of the State of California; that it has all necessary power and authority to enter into this Agreement and to perform its obligations hereunder on the terms set forth in this Agreement, and that the execution and delivery hereof by it and the performance of its obligations hereunder will not violate or constitute an event of default under the terms or provisions of any agreement, document or instrument to which it is a party or by which it is bound.

2. Authorization; Valid Obligation

That all proceedings required to be taken by or on behalf of such Party to authorize it to make, deliver and carry out the terms of this Agreement have been duly and properly taken, and that this Agreement is its valid and binding obligation enforceable in accordance with its terms, except as the same may be affected by bankruptcy, insolvency, moratorium or similar laws or by legal or equitable principles relating to or limiting the rights of contracting parties generally.

3. No Litigation

To the best of its knowledge, there is no litigation, proceeding or investigation pending or threatened, to which it is or would be a party, or which does or would bind or relate to the Program Basin, directly or indirectly, which, individually or in the aggregate, if adversely determined, might materially and adversely affect its ability to perform its obligations under this Agreement, or which raises a question as to the validity of this Agreement, or any action to be taken hereunder.

4. Compliance with Laws

In the performance of its obligations hereunder, such Party and its contractors and subcontractors will comply with all applicable laws, regulations and ordinances, including, without limitation:

a. the Fair Employment and Housing Act (Government Code, Section 12900 et seq.), and the regulations promulgated thereunder (California Code of Regulations, Title 2, Section 7285.0 et seq.);

b. Article 9.5, Chapter 1, Part 1, Division 3, Title 2 of the Government Code (Government Code, Sections 11135-11139.5) and the regulations or standards adopted by the DWR relating thereto;

c. the nondiscrimination program requirements of Government Code, Section 12990, and Title 2, California Code of Regulations, Section 8103;

d. Section 3700 of the California Labor Code, requiring every employer to be insured against liability for workers' compensation or to undertake self insurance in accordance with the provisions of that code, and such Party affirms that it will comply with such provisions before commencing the construction of the Facilities and will exercise best efforts to make the its contractors and subcontractors aware of this provision;

e. the Drug-Free Workplace Act of 1990 (Government Code 8350 et seq.) and have or will provide a drug-free workplace; and

f. the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) which prohibits discrimination on the basis of disability, as well as all applicable regulations and guidelines issued pursuant thereto.

Such party and its contractors and subcontractors will give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement. Such Party and its contractors will include the nondiscrimination and compliance provisions of this clause in all contracts and subcontracts let for the construction of the Facilities.

5. Compliance with DWR Requirements

The Plans comply with any DWR requirements, including any requirements set forth in the DWR Funding Letter. During the performance of its obligations herein, such Party will comply with any DWR requirements, including any requirements set forth in the DWR Funding Letter.

6. No Construction

That construction of the Facilities and related work (including planning activities) did not commence prior to the Effective Date.

7. Capacity

Such Party and its contractors, subcontractors and their respective agents will at all times act in an independent capacity and not purport to act as, or represent to others that they are, officers, employees, representatives or agents of Metropolitan, DWR or the State of California.

8. Oversight and Supervision of Construction

Such Party will oversee and supervise all contractors and keep control of all work and provisions of services and materials in connection with the Program.

9. Maintain Ownership of Program Property

Such Party will not sell, abandon, lease, transfer, exchange, mortgage, hypothecate or encumber in any manner whatsoever all or any portion of any real or other property necessarily connected or used in conjunction with the Program.

10. Protection of Others' Rights

Such Party will fully protect and preserve the rights of overlying landowners, other groundwater users or water rights holders, parties whose approval is required by any judgment in an adjudicated basin, and all groundwater management agencies or other applicable regulatory agencies, and will take the necessary actions (including groundwater monitoring and mitigation and/or limiting extraction of groundwater) to protect such rights.

B. Of Watermaster

Watermaster and its contractors, subcontractors and their respective agents will at all times act in an independent capacity and not purport to act as, or represent to others that they are, officers, employees, representatives or agents of Metropolitan, DWR or the State of California. Watermaster represents, warrants and covenants as follows:

1. Power and Authority

That Watermaster is a court-appointed entity created through the Judgement, duly organized and validly existing under the laws of the State

of California; that it has all necessary power and authority to enter into this Agreement and to perform its obligations hereunder on the terms set forth in this Agreement, and that the execution and delivery hereof by Watermaster and the performance by Watermaster of Watermaster's obligations hereunder will not violate or constitute an event of default under the terms or provisions of any agreement, document or instrument to which Watermaster is a party or by which Watermaster is bound.

2. Authorization; Valid Obligation

That all proceedings required to be taken by or on behalf of Watermaster to authorize it to make, deliver and carry out the terms of this Agreement have been duly and properly taken, and that this Agreement is a valid and binding obligation of Watermaster enforceable in accordance with its terms, except as the same may be affected by bankruptcy, insolvency, moratorium or similar laws or by legal or equitable principles relating to or limiting the rights of contracting parties generally.

3. No Litigation

To the best of Watermaster's knowledge, there is no litigation, proceeding or investigation pending or threatened, to which Watermaster is or would be a party, or which does or would bind or relate to the Chino Basin, directly or indirectly, which, individually or in the aggregate, if adversely determined, might materially and adversely affect the ability of Watermaster to perform its obligations under this Agreement, or which raises a question as to the validity of this Agreement, or any action to be taken hereunder.

4. Compliance with Laws

In the performance of its obligations hereunder, Watermaster will comply with all applicable laws, regulations and ordinances, including, without limitation:

a. the Fair Employment and Housing Act (Government Code, Section 12900 et seq.), and the regulations promulgated thereunder (California Code of Regulations, Title 2, Section 7285.0 et seq.);

b. Article 9.5, Chapter 1, Part 1, Division 3, Title 2 of the Government Code (Government Code, Sections 11135-11139.5) and the regulations or standards adopted by the DWR relating thereto;

c. the nondiscrimination program requirements of Government Code, Section 12990, and Title 2, California Code of Regulations, Section 8103;

d. Section 3700 of the California Labor Code, requiring every employer to be insured against liability for workers' compensation or to undertake self insurance in accordance with the provisions of that code, and Watermaster affirms that it will comply with such provisions before commencing the construction of the Facilities and will exercise best efforts to make the its contractors and subcontractors aware of this provision;

e. the Drug-Free Workplace Act of 1990 (Government Code 8350 et seq.) and have or will provide a drug-free workplace; and

f. the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) which prohibits discrimination on the basis of disability, as well as all applicable regulations and guidelines issued pursuant thereto.

Watermaster will give written notice of its obligations under this clause to labor organizations with which it has a collective bargaining or other agreement.

5. Compliance with DWR Funding Letter

During the performance of its obligations herein, Watermaster will comply with the terms and provisions of the DWR Funding Letter (Exhibit A), as applicable.

6. Capacity

Watermaster and its contractors, subcontractors and their respective agents will at all times act in an independent capacity and not purport to act as, or represent to others that they are, officers, employees, representatives or agents of Metropolitan, DWR or the State of California.

C. **Of Metropolitan**

Metropolitan represents, warrants and covenants as follows:

1. Power and Authority

That Metropolitan is a public agency and quasi-municipal corporation, duly organized and validly existing under the laws of the State of California; that it has all necessary power and authority to enter into this Agreement and to perform its obligations hereunder on the terms set forth

in this Agreement, and that the execution and delivery hereof by Metropolitan and the performance by Metropolitan of Metropolitan's obligations hereunder will not violate or constitute an event of default under the terms or provisions of any agreement, document or instrument to which Metropolitan is a party or by which Metropolitan is bound.

2. Authorization; Valid Obligation

That all proceedings required to be taken by or on behalf of Metropolitan to authorize it to make, deliver and carry out the terms of this Agreement have been duly and properly taken, and that this Agreement is a valid and binding obligation of Metropolitan enforceable in accordance with its terms, except as the same may be affected by bankruptcy, insolvency, moratorium or similar laws or by legal or equitable principles relating to or limiting the rights of contracting parties generally.

3. No Litigation

To the best of Metropolitan's knowledge, there is no litigation, proceeding or investigation pending or threatened, to which Metropolitan is or would be a party, directly or indirectly, which, individually or in the aggregate, if adversely determined, might materially and adversely affect the ability of Metropolitan to perform its obligations under this Agreement, or which raises a question as to the validity of this Agreement, or any action to be taken hereunder.

X. RECORD KEEPING, REPORTING, INSPECTION AND AUDIT

A. Record Keeping

1. IEUA shall maintain audit and accounting procedures and written accounts with respect to the Program that are in accordance with generally accepted accounting principles and practices, consistently applied. IEUA shall keep complete and accurate records of all receipts, disbursements, and interest earned on expenditures of Program Funds.

2. IEUA and its respective contractors and subcontractors shall maintain copies of all contracts, agreements, and other documents relating to the Program for a minimum of three years following Program completion.

3. IEUA and TVMWD shall keep on file, for the useful life of the Facilities, as-built plans and the specifications of the Facilities. Such documents shall be made available for inspection by the State, Metropolitan, and upon reasonable notice.

4. IEUA shall require its contractors and subcontractors to maintain books, records, and other documents pertinent to their work in accordance with generally accepted accounting principles and practices, consistently applied.

B. **Reporting**

1. Construction Progress Reports

During construction of the Facilities, a monthly progress report shall accompany each Invoice submitted by IEUA to Metropolitan (each a "**Progress Report**"), certified by a designated official of such Party, providing in reasonable detail, a description of (a) the work accomplished during the invoice period and the percent complete on each Discrete Program Element (b) and the amount of Program Construction Funds expended on each Discrete Program Element and Tasks, the purposes of those expenditures, the total amount expended and remaining of the budget for that Discrete Program Element. In the absence of a monthly Invoice, IEUA shall deliver the Progress Report detailing progress and expenditures for the month, and reporting on status of construction activities within 30-days after the month.

2. O&M Reports

Commencing on the first day of the month which is ninety days following the Completion Date, and unless otherwise determined by the Operating Committee, on a semi-annual basis thereafter throughout the term of this Agreement, IEUA and TVMWD shall deliver to Metropolitan and the Operating Committee a report (an "**O&M Report**") summarizing the operational and maintenance activities conducted in connection with the Program during the prior period.

C. **Inspection**

Metropolitan and the DWR may inspect the aforementioned books, records and any other Program-related information at any time, upon reasonable advance notice to IEUA or TVMWD, as applicable.

D. **Audit Rights and Obligations**

1. Pursuant to California Government Code Section 8546.7, IEUA and its contractors and subcontractors shall be subject to the examination and audit by the State Auditor for a period of three years after Program completion. IEUA agrees that, IEUA and its contractors and subcontractors shall be subject to examination and audit by Metropolitan and DWR for such period.

2. Within thirty days after the Completion of a Program Facility, IEUA shall, at its expense, cause an audit of all Program Construction Costs and expenses with respect to such Facility to be conducted by an independent certified public accountant and deliver to Metropolitan a report prepared by such accountant in connection therewith.

XI. INDEMNITY

A. General Indemnity

Each Party hereto shall indemnify, defend and hold harmless the other Party and its elected officials, officers and employees from and against any and all lawsuits, actions, causes of action, claims and damages and any and all court costs and attorneys' fees related thereto ("**Claims**"), in any way arising out of or connected with the performance or nonperformance of the indemnifying Party's duties or the discharge of or failure to discharge that Party's obligations hereunder to the maximum extent permitted by law.

B. IEUA Specific Indemnity

Without limiting the foregoing indemnity, IEUA hereby agrees to indemnify, defend and hold harmless TVMWD, Metropolitan and Watermaster, their elected officials, officers and employees from and against any and all Claims, in any way arising out of or connected with the Program, including any Claims by DWR or any other branch, agency or department of the State of California in connection with the Program (except for a breach of the DWR Funding Letter attributable to Metropolitan) or breach of its obligations hereunder, or otherwise to the extent of such Party's responsibility hereunder or to the extent that such Party caused or exacerbated such or other Claim(s).

C. TVMWD Specific Indemnity

Without limiting the foregoing indemnity, TVMWD hereby agrees to indemnify, defend and hold harmless IEUA, Metropolitan and Watermaster, their elected officials, officers and employees from and against any and all Claims, in any way arising out of or connected with the Program, including any Claims by DWR or any other branch, agency or department of the State of California in connection with the Program (except for a breach of the DWR Funding Letter attributable to Metropolitan) or breach of its obligations hereunder, or otherwise to the extent of such Party's responsibility hereunder or to the extent that such Party caused or exacerbated such or other Claim(s).

D. Watermaster Specific Indemnity

Without limiting the indemnity in clause(A) above, Watermaster hereby agrees to indemnify, defend and hold harmless Metropolitan and IEUA and TVMWD, and

their elected officials, officers and employees from and against any and all Claims, in any way arising out of or connected with the Program, including any Claims by DWR or any other branch, agency or department of the State of California in connection with the Program (except for a breach of the DWR Funding Letter attributable to Metropolitan or IEUA's and TVMWD's breach of its obligations hereunder), or otherwise to the extent of Watermaster's responsibility hereunder or to the extent that it caused or exacerbated such Claim(s).

E. **Metropolitan Specific Indemnity**

Without limiting the indemnity in clause (A) above, Metropolitan hereby agrees to indemnify, defend and hold harmless IEUA and TVMWD and Watermaster, their elected officials, officers and employees from and against any and all Claims arising out of or connected with a failure under or breach of the DWR Funding Letter by Metropolitan, or otherwise to the extent of Metropolitan's responsibility hereunder or to the extent that it caused or exacerbated such or other Claim(s).

XII. INSURANCE

A. **General Required Coverages**

IEUA and TVMWD through agreement with their respective Operating Parties shall procure, pay for and keep in full force and effect, at all times during the term of this Agreement the following insurance (to the extent not already maintained by IEUA and TVMWD or their respective Operating Parties):

1. Commercial general liability insurance insuring IEUA and TVMWD against liability for personal injury, bodily injury, death and damage to property (including the Facilities) arising from IEUA's and TVMWD's performance under this Agreement. Said insurance shall include coverage in an amount equal to at least Five Million Dollars ($5,000,000), and shall contain "blanket contractual liability" and "broad form property damage" endorsements insuring IEUA's and TVMWD's performance of its obligations to indemnify Metropolitan as set forth herein (the "**CGL Insurance**"); and

2. Pursuant to Section 3700 of the California Labor Code, workers' compensation insurance with employer's liability in the amounts required by any applicable laws (the "**Workers' Compensation Insurance**").

3. IEUA and TVMWD will provide proof of automobile liability insurance as required by the State of California Department of Motor Vehicles.

B. Specific Policy Requirements

Each policy of insurance required to be carried pursuant to this Agreement: (1) shall, except with respect to Worker's Compensation Insurance, name Metropolitan as an additional insured; (2) shall be in a form reasonably satisfactory to Metropolitan; (3) shall be carried with companies reasonably acceptable to Metropolitan; (4) shall provide that such policy shall not be subject to cancellation, lapse or change except after at least thirty (30) days prior written notice to Metropolitan, and (5) shall, except with respect to the Environmental Liability Insurance required under clause (D)below, be on an "occurrence" basis and not on a "claims-made" basis.

C. **Deductibles/Self-Insurance.**

The insurance required by this Section XII may contain deductibles or self-insured retentions. IEUA and TVMWD through agreement with their respective Operating Parties shall be solely responsible for any such deductibles and/or self-insured retentions applicable to the coverages specified in Section XII(A). Metropolitan, at its option, may require IEUA and TVMWD to secure a surety bond or an irrevocable and unconditional letter of credit in order to ensure payment of such deductibles or self-insured retention. Insurance policies that contain deductibles or self-insured retentions in excess of $25,000 per occurrence shall not be acceptable without the prior approval of Metropolitan.

1. Insurance Certificates.

Metropolitan reserves the right to require certified complete copies of any insurance certificates required by this Agreement but the receipt of such certificates shall not confer responsibility upon Metropolitan as to sufficiency of coverage.

2. Acceptability of Insurers

All insurance required by this Agreement shall be placed with insurers admitted to transact business in the State of California for the applicable class of insurance, as required by §700 of the California Insurance Code. Each insurer shall have a current Best Insurance Guide rating of not less than AVII, unless a lower rating is approved in writing by Metropolitan. Similarly, each self-insurer (including, if applicable, IEUA, TVMWD and/or its Operating Parties) shall have a self-insured liability program that is based upon excess liability policies rated at AVII or higher, unless otherwise approved in writing by Metropolitan.

D. Environmental Liability Insurance

1. If IEUA, TVMWD and Metropolitan agree to procure environmental liability insurance, IEUA and TVMWD shall obtain and Metropolitan shall pay 50% of the cost of the policy of environmental liability insurance that, at a minimum, shall cover: (1) the costs of on-site and off-site clean-up of pollution conditions relating to or arising from the Program (including natural resource damages, changes in water quality regulatory requirements and/or changes in the quality of water in the basin below original water quality readings); and (2) losses resulting from tort claims for bodily injury and property damage resulting from pollution conditions relating to or arising from the Program. Such insurance shall have limits of liability and terms and conditions (including premiums) reasonably approved by Metropolitan. Notwithstanding the foregoing, if Metropolitan reasonably agrees that, despite IEUA's and TVMWD's good faith and diligent efforts to obtain such environmental liability insurance, the coverage required herein is not available on commercially reasonable terms, IEUA and TVMWD shall obtain the coverage that most closely approximates the coverage required herein that is available on commercially reasonable terms or consider other risk financing alternatives. Metropolitan shall pay 50% of the cost of any such alternative coverage or risk financing alternative selected by IEUA and TVMWD, provided that the terms and conditions (including premiums) have been reasonably approved by Metropolitan.

2. For purposes of this Section XII(B), the "costs" of environmental liability insurance, alternative coverage or risk financing alternatives to be shared by the parties as provided in the prior paragraph shall include (1) insurance premiums and other up-front or periodic costs of coverage; (2) deductibles payable in connection with claims; and (3) any out-of-pocket costs (including court costs, attorneys' fees and other litigation expenses) incurred in connection with enforcement or collection under the policy, alternative coverage or other risk financing alternative.

XIII. DISPUTE RESOLUTION; DEFAULTS AND REMEDIES

A. Dispute Resolution

If any dispute arises between or among the Parties regarding interpretation or implementation of this Agreement (or the Operating Committee is unable to reach agreement on a matter being considered by it), the Parties will endeavor to resolve the dispute by using the services of a mutually acceptable consultant. The fees and expenses of the consultant shall be shared equally by the Parties. Except for disputes relating to exercises of Metropolitan discretion pursuant to Sections V(C); VII(A); VII(C); VII(D); XII(A) and XIII(B), if a consultant cannot be agreed upon, or if the consultant's recommendations are not acceptable to all

Parties (or, in the case of the Operating Committee, to the members thereof), and unless the Parties (or members of the Operating Committee) otherwise agree, such dispute shall be settled by arbitration in accordance with the Rules of the American Arbitration Association in the County of Los Angeles, California. The arbitration panel acting pursuant to said rules may order any legal or equitable relief permitted by California law, including, without limitation, (1) declaratory and injunctive relief, (2) SPECIFIC PERFORMANCE OF THE TERMS, CONDITIONS AND OBLIGATIONS OF THIS AGREEMENT, (3) monetary liability, or (4) any other relief (including, without limitation, termination of this Agreement, as set forth in Section XIII(B) below) consistent with the purposes of this Agreement and applicable to the matter. The arbitration panel shall also be empowered to make final and binding determinations with respect to matters before the Operating Committee, where the members of the Committee were unable to reach agreement. Judgment upon the award rendered by the arbitration panel may be entered and enforced by any court having jurisdiction thereof.

B. Defaults and Remedies

1. Should IEUA or TVMWD, each acting through agreement with its respective Operating Parties, fail to fully perform in the extraction of Program Water from the Metropolitan Water Storage Account in accordance with Exhibit G in response to a call from Metropolitan that has been approved by the Watermaster, and upon a determination by the Operating Committee that full performance could and should have occurred, then Metropolitan shall invoice to IEUA or to TVMWD, as appropriate, water delivered equal to the quantity in acre-feet of non-performance at two times the Tier 2 full service water rate (or its equivalent, as determined by Metropolitan in its reasonable discretion) currently then in effect ("**Nonperformance Penalty**").

2. Should the Operating Committee in its review of incomplete performance, as specified in paragraph B (1) above, determine that unanticipated operational or water quality considerations precluded full performance, the Operating Committee shall not recommend to Metropolitan that the Nonperformance Penalty be assessed. In such case, IEUA or TVMWD, whichever is the responsible Member Agency, shall work with the nonperforming Operating Party to promptly set out a mutually agreeable course of action and schedule to correct the deficiency and present such to the Operating Committee for its concurrence. Future nonperformance outside of the agreed-upon schedule (provided that the Operating Committee has concurred with such schedule) would be subject to the Nonperformance Penalty.

C. Termination

1. Notwithstanding anything to the contrary herein, upon a breach of any provision of this Agreement by IEUA, TVMWD or Watermaster or any of them, Metropolitan may terminate this Agreement as to the breaching Party, by written notice to IEUA, TVMWD and Watermaster. Upon such termination, the breaching Party shall be required to reimburse Metropolitan for all Program Funds advanced to such Party by Metropolitan pursuant to this Agreement. Further, Metropolitan may require the breaching Party to purchase in equal installments over a 5-year period, at Metropolitan's then applicable full-service rate (or its equivalent, as determined by Metropolitan in its reasonable discretion), the balance of any water then identified in the Metropolitan Water Account. Upon full reimbursement and payment of the amounts required pursuant to this Section XIII(C), this Agreement shall be fully terminated as to the breaching Party.

2. Notwithstanding anything to the contrary herein, upon a breach of any provision of this Agreement by Metropolitan, IEUA and TVMWD may terminate its participation in this Agreement by written notice to Metropolitan. Upon such termination, the terminating Party shall be responsible to purchase in equal installments over a 5 year period, at Metropolitan's then applicable full-service rate (or its equivalent as determined by Metropolitan in its reasonable discretion), the balance of any water then identified in the Metropolitan Storage Account.

D. Remedies Are Cumulative

The rights and remedies of the Parties are cumulative, and the exercise by any Party of one or more of such rights or remedies shall not preclude the exercise by it, at the same or different times, of any other rights or remedies for the same breach or any other breach by the other Party.

XIV. FORCE MAJEURE EVENTS

A. Excuse to Performance

In addition to specific provisions of the Agreement, lack of performance by any Party shall not be deemed to be a breach of this Agreement, where delays or defaults are due to acts of God, or the elements, accident, casualty, labor disturbances, unavailability or delays in delivery of any product, labor, fuel, service or materials, failure or breakdown of equipment, strikes, lockouts, or other labor disturbances, acts of the public enemy, orders or inaction of any kind from the government of the United States, the State of California, or any other governmental, military or civil authority (other than Metropolitan, IEUA, TVMWD or Watermaster), war, insurrections, riots, epidemics, landslides,

lightning, droughts, floods, fires, earthquakes, arrests, civil disturbances, explosions, freight embargoes, lack of transportation, breakage or accidents to vehicles, or any other inability of any Party, whether similar or dissimilar to those enumerated or otherwise, which are not within the control of the Party claiming such inability or disability, which such Party could not have avoided by exercising due diligence and care and with respect to which such Party shall use all reasonable efforts that are practically available to it in order to correct such condition (such conditions being herein referred to as "**Force Majeure Events**").

B. Responding to Force Majeure Events

The Parties agree that in the event of a Force Majeure Event which substantially interferes with the implementation of this Agreement, the Parties will use their best efforts to negotiate an interim or permanent modification to this Agreement which responds to the Force Majeure Event and maintains the principles pursuant to which this Agreement was executed.

XV. MISCELLANEOUS

A. Entire Agreement

This Agreement constitutes the entire agreement between the Parties pertaining to the matters provided for herein and, except as herein provided, supersedes all prior and/or contemporaneous agreements and understanding, whether written or oral, between the Parties relating to the matters provided for herein.

B. Interpretation

The Parties have participated in the drafting of this Agreement and the Agreement shall not be construed for or against any Party. The language in all parts of this Agreement shall be in all cases construed simply according to its fair meaning and not strictly for or against any of the Parties hereto and Section 1654 of the Civil Code has no application to interpretation of this Agreement. In addition, this Agreement shall be construed to the maximum extent possible in conformance with Prop. 13, the DWR Funding Letter, the IRP, the Groundwater Storage Principles, the RFP, and the Proposal. Notwithstanding anything to the contrary herein, to the extent this Agreement conflicts with the RFP and/or Proposal, this Agreement shall control.

C. Further Assurances

Each Party, upon the request of the other, agrees to perform such further acts and to execute and deliver such other documents as are reasonably necessary to carry out the provisions of this instrument.

D. Counterparts

This Agreement, and any document or instrument entered into, given or made pursuant to this Agreement or authorized hereby, and any amendment or supplement thereto may be executed in two or more counterparts, and by each party on a separate counterpart, each of which, when executed and delivered, shall be an original and all of which together shall constitute one instrument, with the same force and effect as though all signatures appeared on a single document. Any signature page of this Agreement or of such an amendment, supplement, document or instrument may be detached from any counterpart without impairing the legal effect of any signatures thereon, and may be attached to another counterpart identical in form thereto but having attached to it one or more additional signature pages. In proving this Agreement or any such amendment, supplement, document or instrument, it shall not be necessary to produce or account for more than one counterpart thereof signed by the Party against whom enforcement is sought.

E. Assignment

No Party shall transfer this Agreement, in whole or in part, or any of its interests hereunder, to any other person or entity, without the prior written consent of the other Parties. Any attempt to transfer or assign this Agreement, or any privilege hereunder, without such written consent shall be void and confer no right on any person or entity that is not a Party to this Agreement. Nothing contained herein shall prevent the Parties from subcontracting for the performance of obligations hereunder, provided, however, no such subcontracting shall relieve the Parties from the performance of their respective obligations hereunder.

F. Venue

Any legal actions initiated pursuant to this Agreement or otherwise with respect to its subject matter must be instituted in the Superior Court of the County of Los Angeles, State of California, or in the Federal District Court in the Central District of California.

G. Governing Law; Attorneys Fees and Costs

The laws of the State of California shall govern the interpretation and enforcement of this Agreement. The non-prevailing party in any claim, suit or other action, including use of the dispute resolution as provided for in Section XIII(A), brought by such party shall pay to the prevailing party the costs of such prevailing party's attorneys fees and expenses and all other costs and expenses incurred by the prevailing party in defense of such action.

H. Notice

Formal written notices, demands, correspondence and communications between the Parties authorized by this Agreement shall be sufficiently given if personally served or dispatched by registered or certified mail, first-class, postage prepaid, return receipt requested, to the Parties as follows:

To IEUA:	Inland Empire Utilities Agency General Manager P.O. Box 697 Rancho Cucamonga, CA 91729
To TVMWD:	Three Valleys Municipal Water District General Manager 1021 E. Miramar Avenue Claremont, CA 91711
To Watermaster:	Chino Basin Watermaster Chief Executive Officer 8632 Archibald Avenue, Suite 109 Rancho Cucamonga, CA 91730
To Metropolitan:	The Metropolitan Water District of Southern California Chief Executive Officer 700 No. Alameda Street Los Angeles, California 90012

Such written notices, demands, correspondence and communications may be sent in the same manner to such other persons and addresses as either Party may, from time to time, reasonably designate by mail as provided in this Section. Notice shall be deemed given when received by mail or when personally served.

I. Successors

This Agreement shall bind and inure to the benefit of the Parties, and their respective successors and assigns.

J. Severability

Should any provisions of this Agreement prove to be invalid or illegal, such invalidity or illegality shall in no way affect, impair or invalidate any other provisions hereof, and such remaining provisions shall remain in full force and effect; provided, however, if the illegality or invalidity of any provision

undermines the intent of the Parties, then the Parties shall attempt in good faith to amend the agreement in order to fulfill the intent of the Parties. If the Parties are unable to so amend the Agreement, then the Agreement shall terminate and be of no further force or effect.

K. **Time is of the Essence**

Time is of the essence with respect to the performance of every provision of this Agreement in which time of performance is a factor.

L. **Amendment**

This Agreement may be amended only in writing duly executed by the Parties hereto. Notwithstanding the foregoing, individual items listed in Exhibit H are subject to adjustment pursuant to the procedure set forth in Exhibit H.

[Remainder of Page Intentionally Blank – Signature Pages Follow]

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed as of the date first set forth above.

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

By: _____
Ronald R. Gastelum
Chief Executive Officer

Date: 6-12-03

APPROVED AS TO FORM:
Jeffrey Kightlinger
General Counsel

By: _____
Sydney Bennion
Assistant General Counsel

Date: 6/6/03

INLAND EMPIRE UTILITIES AGENCY

By: _____
Richard Atwater
General Manager

Date: JUNE 19, 2003

APPROVED AS TO FORM:

By: _____
Jean Cihigoyenetche
General Counsel

Date: 5-21-03

THREE VALLEYS MUNICIPAL WATER DISTRICT

By: _____
Richard W. Hansen
General Manager/Chief Engineer

Date: 6/19/03

APPROVED AS TO FORM:

By: _____
Steve Kennedy
District Counsel

Date: 6/4/03

CHINO BASIN WATERMASTER

By: _____
John V. Rossi
Chief Executive Officer

Date: 6/19/03

APPROVED AS TO FORM:

By: _____
Michael Fife
General Counsel

Date: 6-3-03

THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

By: _____

Ronald R. Gastelum
Chief Executive Officer

Date: 6/19/03

EXHIBIT A

DWR FUNDING LETTER

STATE OF CALIFORNIA -- THE RESOURCES AGENCY

GRAY DAVIS, *Governor*

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
13-5791

OCT 13 2000

Mr. Phillip J. Pace, Chairman
Board of Directors
Metropolitan Water District of
Southern California
Post Office Box 54153
Los Angeles, California 90054-0153

Interim Water Supply Construction Grant Commitment Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection Act (Proposition 13, Chapter 9, Article 4)

Dear Mr. Pace:

The Governor's Budget Act for 2000, Chapter 52, Statutes of 2000, appropriated to the Department of Water Resources local assistance grant funds in the amount of $161,544,000 by budget item 3860-01-6027, payable from the Interim Reliable Water Supply and Water Quality Infrastructure and Management Subaccount. The Metropolitan Water District's Southern California Water Supply Reliability Projects Program has been selected for funding from this appropriation. This letter agreement serves as our commitment of $45 million for these projects.

This letter sets forth the terms and conditions under which the transfer of funds will be made from DWR to MWD. Before the funds can be transferred your agency must complete the following:

- Submit to DWR a formally adopted resolution of your governing body, accepting the grant, designating a representative to sign this letter agreement, and designating a project director to be your agency's representative for the administration of the project and liaison with DWR for submission of required documents.

- Sign and date both originals of this agreement and return one signed original to:

  Division of Planning and Local Assistance
  Department of Water Resources
  Post Office Box 942836
  Sacramento, California 94236-0001
  Attention: Linda Buchanan Herzberg

- Provide to DWR a copy of all memoranda of understanding or other cooperative agreements between your agency and all other participating agencies for the program.

- Provide to DWR an itemized budget projection of project costs and an invoice, on your letterhead, stating the purpose of the funds as outlined in this letter agreement. In addition, please provide a summary of the sources and amounts of other funding for the program in addition to the grant provided by this letter agreement.

- Provide to DWR a detailed description of the proposed projects, including a narrative description that details the purpose and defines the scope of each project. Include with your description a detailed list of project components to be funded by this grant and a time line for completion with major benchmarks noted. In addition, attach a map indicating the locations of the projects.

By signature of this letter agreement the Metropolitan Water District of Southern California agrees to comply with the following terms and conditions for completion of your project:

1. Your agency agrees to faithfully and expeditiously perform or cause to be performed all project work, to apply State funds received only to eligible project costs and to expeditiously commence and to continue efficient and economical operation of the projects in accordance with applicable law. You further agree to provide for all repairs, renewals, and replacements necessary to the efficient operation of the projects; and to maintain them in as good and efficient condition as upon their construction, ordinary and reasonable wear and depreciation excepted.

2. Your agency, its contractors, subcontractors, and their respective agents and employees required for performing any work in connection with the projects shall act in an independent capacity and not as officers, employees or agents of the State.

3. Your agency is solely responsible for design, construction, operation and maintenance of the projects.

4. Your agency shall be responsible for obtaining any and all permits, licenses and approvals required for the design, construction or operation of the projects. You shall also be responsible for observing and complying with any applicable federal, State and local laws, rules or regulations affecting such work, specifically including, but not limited to, environmental, procurement and safety laws, rules, regulations and ordinances.

5. Your agency must comply with all applicable requirements of the California Environmental Quality Act and the National Environmental Policy Act and complete appropriate environmental documentation including, but not limited to, any required environmental impact reports, environmental impact statements, negative declarations, mitigation agreements and environmental permits, prior to beginning construction.

6. Your agency, its contractors and subcontractors shall comply with the provisions of the Fair Employment and Housing Act (Government Code, Section 12900 et seq.), the regulations promulgated thereunder (California Code of Regulations, Title 2, Section 7285.0 et seq.), the provisions of Article 9.5, Chapter 1, Part 1, Division 3, Title 2 of the Government Code (Government Code, Sections 11135-11139.5) and the regulations or standards adopted by the awarding State Agency to implement such article. Your agency, its contractors and subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement. Your agency shall include the nondiscrimination and compliance provisions of this clause in all contracts and subcontracts let for the construction of the project.

7. Your agency agrees, unless exempted, to comply with the nondiscrimination program requirements of Government Code, Section 12990, and Title 2, California Code of Regulations, Section 8103.

8. Your agency shall comply with the provisions of Section 3700 of the California Labor Code, requiring every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and you affirm that the agency will comply with such provisions before commencing the construction of the projects and will make the agency's contractors and subcontractors aware of this provision.

9. Your agency, its contractors or subcontractors agree to comply with the requirements of the Drug-Free Workplace Act of 1990 (Government Code 8350 et seq.) and have or will provide a drug-free workplace.

10. Your agency agrees to comply with the Americans with Disabilities Act of 1990, (42 U.S.C. 12101 et seq.), which prohibits discrimination on the basis of disability, as well as all applicable regulations and guidelines issued pursuant to the ADA.

11. Your agency shall be responsible for work and for persons or entities engaged in work, including, but not limited to, subcontractors, suppliers and providers of services. You shall give personal supervision to any work required for the projects or employ a competent representative with the authority to act for your agency. Your agency shall give attention to completion of the projects, and shall keep work under control.

12. Your agency shall be responsible for any and all disputes arising out of its contracts for work on the projects, including but not limited to bid disputes and payment disputes with your contractors and subcontractors. The State will not mediate disputes between your agency and any other entity concerning responsibility for performance of work.

13. All contracts let for project construction shall be let by competitive bid procedures that assure award of the contract to the lowest responsible bidder, except as may be otherwise authorized under your agency's enabling authority.

14. Procurement of necessary supplies or equipment shall be undertaken in such a manner as to encourage fair and competitive treatment of potential suppliers.

15. During project planning and construction, your agency shall provide semiannual progress reports detailing the activities completed for the reporting period, the amount of funds expended and the purpose of those expenditures. The first report shall be due six months from the date of your agency's signature on this letter agreement. Subsequent reports shall be due every six months thereafter.

16. The Southern California Water Supply Reliability Projects Program shall be completed not later than March 8, 2009.

17. Upon completion of each project your agency shall provide for a final inspection and a written certification by a California Registered Civil Engineer that the project has been completed in accordance with final plans and specifications and any modifications thereto. Such certification shall be submitted to the State with a copy of the final report of project expenditures required in Item 18 below. You shall keep on file, for the useful life of the projects, As Built plans and specifications for each project. Such documents shall be made available for inspection by the State upon reasonable notice.

18. Upon program completion your agency shall furnish to the State, within 60 days, a final statement of incurred eligible costs.

19. Within a period of 60 days from program completion, your agency shall remit to the State any unexpended funds that were disbursed that were not needed to pay eligible project costs.

20. Your agency shall account for the money disbursed separately from all other agency funds. You shall maintain audit and accounting procedures that are in accordance with generally accepted accounting principles and practices consistently applied. You shall keep complete and accurate records of all receipts, disbursements, and interest earned on expenditures of such funds. Your agency shall require its contractors or subcontractors to maintain books, records, and other documents pertinent to their work in accordance with generally accepted accounting principles and practices. Records are subject to inspection by the State at any and all reasonable times, upon reasonable notice.

21. All money disbursed for your program shall be deposited, administered, and accounted for pursuant to the provisions of law applicable to your agency.

22. During regular office hours, each of the parties to this letter agreement and their duly authorized representatives shall have the right to inspect and to make copies of any books, records, or reports of either party pertaining to the projects. Each of the parties shall maintain and shall make available at all times for such inspection accurate records of all its costs, disbursements, and receipts with respect to these projects.

23. Pursuant to Government Code Section 8546.7, your agency and its subcontractors shall be subject to the examination and audit of the State for a period of three years after program completion. All of your records or those of your subcontractors shall be preserved for this purpose for at least three years after program completion.

24. The State reserves the right to conduct an audit at any time between the execution of this letter agreement and the completion of the program, with the costs of such audit borne by the State. Within 60 days of program completion, the State shall require your agency to conduct, at your agency's expense, a final financial and compliance audit of revenue and expenditures. Such audit shall be conducted and a report prepared by an independent Certified Public Accountant in compliance with generally accepted auditing standards and California government auditing standards. Upon its completion, said report shall be submitted to the State for review and acceptance.

25. The State shall withhold 10 percent of the total program funding until the audit report, required in Item 24 above, is received and accepted by the State.

26. The State shall have the right to inspect the work being performed at any and all reasonable times during project construction. This right shall extend to any subcontracts, and your agency shall include provisions ensuring such access in all its contracts or subcontracts entered into for completion of the projects.

27. Your agency shall not sell, abandon, lease, transfer, exchange, mortgage, hypothecate, or encumber in any manner whatsoever all or any portion of any real or other property necessarily connected or used in conjunction with any of the projects, or with your agency's service of water, without prior approval of the State.

28. Your agency agrees to indemnify the State and its officers, agents, and employees against and to hold the same free and harmless from any and all claims, demands, damages, losses, costs, expenses, or liability due or incident to, either in whole or in part, and whether directly or indirectly, arising out of the program.

Your expeditious handling of this letter agreement is appreciated. If you have any questions, please contact Linda Buchanan Herzberg at (916) 327-1663.

Sincerely,

Approved as to Legal Form
and Sufficiency:

By: _____
Chief Counsel
Department of Water Resources

_____ for Bateni
Acting Chief
Division of Planning and Local Assistance

Metropolitan Water District of Southern California

By: _____ Date: 11/14/2000

Title: General Manager

Enclosure

cc: (See attached list.)

Ms. Linda Adams
Chief Deputy Assembly Relations
Governor's Office, First Floor
Sacramento, California 95814

Honorable Richard G. Polanco
Member of the Senate
State Capitol, Room 313
Sacramento, California 95814

Honorable Jim Costa
Member of the Senate
State Capitol, Room 5100
Sacramento, California 95814

Honorable Robert M. Hertzberg
Speaker of the Assembly
State Capitol, Room 320
Sacramento, California 95814

Honorable Thomas Calderone
Member of the Assembly
State Capitol, Room 2148
Sacramento, California 95814

Honorable Antonio Villaraigosa
Member of the Assembly
State Capitol, Room 219
Sacramento, California 95814

Mr. Robert Harding
Senior Engineer
Water Resource Management
Metropolitan Water District of
Southern California
700 North Alameda Street
Los Angeles, California 90012

Mr. Ronald R. Gastelum
General Manager
Metropolitan Water District of
Southern California
Post Office Box 54153
Los Angeles, California 90054-0153

Exhibit B

REQUEST FOR PROPOSAL

THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

REQUEST FOR PROPOSALS FOR PARTICIPATION IN GROUNDWATER STORAGE PROGRAMS USING PROPOSITION 13 FUNDS

RFP No. WRM-2

NOTICE:

Public Pre-Submittal Workshop
November 8, 2000
1:00 p.m. to 3:00 p.m.
700 North Alameda Street
Room US1-102
Los Angeles, California 90012
All potential applicants are encouraged to attend

Proposals will be received until 2:00 p.m. on January 5, 2001,
at the Metropolitan Water District of Southern California,
700 North Alameda Street, Room 3-132
Los Angeles, California, 90012

LOS ANGELES, CALIFORNIA
November 1, 2000

PARTICIPATION IN GROUNDWATER STORAGE PROGRAMS USING PROPOSITION 13 FUNDS

REQUEST FOR PROPOSALS

A. Background

B. Need for Groundwater Storage Programs

C. Process Overview

D. Who Can Submit?

E. Selection Process

F. Scoring Criteria

G. Schedule

H. Performance Targets and Adjustments

I. Proposal Guidelines

Figure 1 Groundwater Storage Program Implementation Process

Table 1 Performance Provisions

Exhibit 1 Economic Analysis Worksheet

Appendix A Metropolitan's Groundwater Storage Principles

Water Resources Management Groundwater Storage

In March 2000, 65 percent of California voters approved Proposition 13 (Prop 13) authorizing the state of California to sell $1.97 billion in general obligation bonds for water-related projects throughout the state. The Governor's Annual Budget Revision document in May 2000, included $763.3 million in expenditures from Prop 13. In June 2000, the State Senate and Assembly approved a budget bill for fiscal year 2000-01, which earmarked $69 million to fund water supply reliability programs within Metropolitan's service area. The Governor's office designated Metropolitan as the recipient of those Prop 13 funds. Of that $69 million, $45 million is specified to finance groundwater storage projects within the Metropolitan Water District of Southern California's (Metropolitan) service area.

This RFP is designed to promote an objective process for distributing this $45 million. Metropolitan invites your agency to submit a proposal for the development of groundwater storage projects that contribute to the overall water supply for its six-county service area. Selected projects will be eligible for financial assistance from funds received by Metropolitan through the passage of Prop 13. Contained within is information requested for analyzing proposals. All selected projects must conform to state of California and Metropolitan audit requirements.

Questions

Questions regarding the Request for Proposals (RFP) may be presented at the public pre-submittal workshop on November 8, 2000. Written questions regarding this RFP also may be submitted prior to the meeting. Responses to questions will be provided during or after the workshop and posted on Metropolitan's web site, www.mwd.dst.ca.us, under "Breaking News." Address written questions to:

Robert Harding
Metropolitan Water District of Southern California
Post Office Box 54153
Los Angeles, California 90054-0153
FAX (213) 217-6119

Inquiries regarding the schedule, location or mailing address should be directed to Robert Harding at bharding@mwd.dst.ca.us or (213) 217-6582

Public Pre-Submittal Workshop Notice

Purpose: Discuss the Prop 13 Groundwater Storage RFP and answer questions

Date: November 8, 2000

Time: 1:00 p.m. – 3:00 p.m.

Address: 700 North Alameda St., Rm. US1-102
Los Angeles, California 90012

While attendance is not mandatory, all interested parties and prospective applicants are encouraged to attend. Following the workshop, responses to questions, information updates and clarifications will be posted on Metropolitan's web site, www.mwd.dst.ca.us, under "Breaking News."

Due Date

Proposals will be accepted at The Metropolitan Water District of Southern California, 700 North Alameda St. – Room 3-132, Los Angeles, California, 90012 until **2:00 p.m. on January 5, 2001.** Six copies of each proposal must be submitted. Proposals received after the due date and time will be returned unopened.

A. BACKGROUND

Metropolitan is a California public agency. Metropolitan imports water from the Colorado River and the State Water Project (SWP) to supply its 27 Member Agencies that serve 17 million people living within a 5,200-square-mile service area. Existing Metropolitan facilities include the 242-mile-long Colorado River Aqueduct with five pumping plants, a distribution system featuring seven functional reservoirs, five water filtration plants, 43 pressure control structures, 16 power plants, and about 775 miles of pipelines. Metropolitan also participates in groundwater storage projects outside of its service area and develops local water resources to maintain regional supply reliability.

Metropolitan is one of 29 agencies that contracts with the California State Department of Water Resources (DWR) for SWP supplies. It is anticipated that programs submitted under this RFP would store water imported from the SWP and the Colorado River Aqueduct. Facilities funded under this RFP will pump previously stored water for delivery to overlying demand in the respective basin. There will be a corresponding reduction in surface deliveries to the agency. This will increase the amount of water available within Metropolitan's service area.

B. NEED FOR GROUNDWATER STORAGE

In January 1996, Metropolitan's Board of Directors approved the Integrated Water Resources Plan (IRP) that forms the framework for meeting demands within the service area out to the year 2020. Included within the IRP is a groundwater storage component of 450,000 acre-feet of total storage and 150,000 acre-feet per year of yield. The IRP identifies groundwater storage as a cost-effective way to meet projected dry-year demands, and Metropolitan is committed to

developing groundwater storage programs within its service area. In January 2000, to further and expand the use of groundwater storage as part of a regional, integrated resource reliability program, Metropolitan's Board approved principles (Appendix A) to guide the development of groundwater storage within the District's service area.

C. PROCESS OVERVIEW

Selected projects will be eligible to receive funding assistance only if an agreement for a groundwater storage program with Metropolitan is executed. A review committee (Section E) will evaluate project proposals. After the review committee's recommended project list is reported to Metropolitan's Board for information, MWD staff will meet with each project sponsor and respective member agency to negotiate agreement terms. Upon completion and approval of environmental documentation by the project sponsor's governing body, per the California Environmental Quality Act (CEQA), each project and the terms of the agreement will be forwarded to Metropolitan's Board for consideration. If approved by Metropolitan's Board, the agreement would be finalized and executed. Metropolitan will execute the agreement only after all other parties have signed. Program funds will be disbursed to the projects on a reimbursable basis. MWD retains the right to reject any and all proposals and revise the terms of this RFP.

D. WHO CAN SUBMIT?

The RFP is open to agencies that responded to Metropolitan's September 20, 2000 letter requesting a preliminary list of groundwater storage projects. Applications for Prop 13 funds for groundwater storage consideration must be made through the project sponsor's respective Metropolitan Member Agency.

E. SELECTION PROCESS

The review committee is expected to be comprised of five people, including three water resource professionals (consultants) selected by Metropolitan staff, and two members of Metropolitan's staff. The committee will provide an objective evaluation of project proposals and will identify the mix of project proposals that best meets the region's needs, consistent with Metropolitan's Board-adopted principles (Appendix A).

F. SCORING CRITERIA

Please refer to the Format/Content Requirements for a detailed description of the required proposal information.

The review committee will use the scoring criteria provided below to rank project proposals. The scoring categories are based on Metropolitan's Board-adopted principles for groundwater storage programs. In addition, based on regional water supply practices, the review committee will identify and weigh each proposal's significant strengths, weaknesses and miscellaneous

issues. Recommendations will reflect the collective findings of the committee. Interviews of project sponsors may be requested by the review committee. Projects that score zero in any of the categories listed below will be disqualified

1.	Regional Benefit	(0-20 points)
2.	Partnership (Local Support)	(0-15 points)
3.	Address Local Needs	(0-15 points)
4.	Water Quality or Supply Impacts	(0-15 points)
5.	Protect Metropolitan's Financial Integrity	(0-15 points)
6.	Meets Overlying Demand	(0- 5 points)
7.	Shared Risk	(0-15 points)
	Maximum Score:	100 points

G. SCHEDULE

Information on the recommended list of projects for inclusion in the Groundwater Storage Programs is expected to be reported to Metropolitan's Board in March 2001. Thereafter, Metropolitan staff will finalize agreement terms. Upon completion and approval of environmental documentation by the project sponsor's governing body, each project will be presented to Metropolitan's Board for consideration. The schedule is included as Figure 1. If approved by Metropolitan's Board, agencies will have until July 1, 2001 to finalize agreements. If an agreement is not finalized, another project may be selected for funding.

H. PERFORMANCE TARGETS AND ADJUSTMENTS

All groundwater storage agreements will include performance targets. Targets allow Metropolitan to adjust or withdraw financial commitments to projects that fail to meet proposed development and production commitments. Failure to meet performance provisions will result in Metropolitan adjusting its financial commitment to the project. The schedule for performance targets is included as Table 1.

I. PROPOSAL GUIDELINES

To ensure these projects are developed within Metropolitan's service area, a Metropolitan Member Agency must sponsor project proposals. Projects selected through this process will be subject to all state of California and Metropolitan audit guidelines. The proposal shall include a signed statement from the sponsoring MWD Member Agency's water manager to Metropolitan's General Manager supporting the project and requesting Prop 13 funding. Proposals shall include a transmittal letter signed by the project sponsor's manager. The letter must include the following language:

> "I am informed and believe and do certify under penalty of perjury that the information contained in this proposal is true and that the supporting data is accurate and complete."

The following format and content requirements shall be adhered to for project proposals to be considered responsive. Applicants should use the numbering and lettering system outlined in

these guidelines. Concise, informative proposals within the page limitations are encouraged. Ambiguous proposals will result in lower scores.

Limitations for each section of the proposal follow and must not be exceeded. The proposal must be on 8 1/2 x 11-inch paper, with black and white text (with font no smaller than 12-point, and table/graphics with text no smaller than 10 point). The proposals must be stapled on the left side or upper left hand corner; no other type of binding will be accepted. **Proposals that are not in conformance with the following format/content requirements will be considered non-responsive and shall be rejected.**

FORMAT/CONTENT REQUIREMENTS

For the purposes of these proposals, "project sponsor" shall mean the agency that is contractually responsible for project implementation.

1. Minimum Requirements (4 pages maximum)

   Explain how the project complies with each of the following minimum requirements for Groundwater Storage Program participation.

   1A. The project must meet Metropolitan's Board-approved principles described in No. 3 below.

   1B. The project must include construction of substantive new facilities. New facilities are those that increase the ability of the entity to pump, store, treat or transport water to be conjunctively used to increase dry-year yield for Metropolitan's service area.

   1C. The project must comply with the Metropolitan Water District Act and all other applicable laws, specifically any required state and Metropolitan audit requirements.

   1D. Proposals shall include the anticipated date of environmental certification. The project shall comply with the provisions of the California Environmental Quality Act (CEQA) before Metropolitan's Board considers its approval. Metropolitan anticipates functioning as a Responsible Agency. Metropolitan may reject participation in a project solely on failure to comply with CEQA.

   1E. The project shall not be existing or under construction prior to agreement execution. Projects that have entered Design-Build contracts are considered under construction.

2. Project Description (8 pages maximum plus maps and/or figures)

   Provide a thorough description of the project including:

2A. Project title and lead sponsoring agency, and information related to the management of the basin, including AB 3030 plans, management entities, or the adjudication.

2B. Project participants/cooperating agencies;

2C. Project schedule including design, environmental documentation, construction, operation, production and major milestones;

2D. Project cost factors including grants, capital, O&M and financing. Use the Economic Analysis Worksheet attached as Exhibit 1 to show the estimated cost in dollars per acre-foot. Exhibit 1 is enclosed on a computer disk as an Excel worksheet.

2E. Provide project map(s) showing location of proposed project, primary facilities and proposed user sites including interties and points of connection;

2F. Describe existing water supply/distribution facilities and user sites related to the project service area, and discuss existing water quality issues within the basin.

3. Detailed Information for Scoring (4 pages maximum per scoring item)

3A. Regional Benefit (scoring range 0-20 points)

Describe the regional benefit of the facilities constructed.

3A(i) Describe how the project will produce a dry-year yield for regional benefit.

3A(ii) Describe the seasonal nature, if any, of project production.

3A(iii) Describe the institutional arrangements for curtailing imported firm water deliveries during a three-year shortage.

3A(iv) Discuss the project's and groundwater basin's ability to sustain production during a three-year shortage.

3A(v) Explain how the change in basin operations will be incorporated into the basin management plan or adjudication.

3B. Project Partnership (scoring range 0-15 points)

3B(i) Describe the level of local and regional support for the program and how the entities involved or potentially affected are supporting the project.

3B(ii) Provide status of CEQA documentation and schedule.

3B(iii) Discuss uncertainties, if any, in project planning.

3B(v) Describe the governing body endorsements needed for approval of the project.

3B(viii) Describe any positive or negative community reaction to the proposed project.

3B(ix) Describe any Metropolitan actions required by the project in addition to the requested financial assistance.

3B(x) Provide the status of any feasibility or engineering studies needed for the project.

3C. Local Needs Addressed (scoring range 0-15 points)

3C(i) Show how the project will address the needs of the local proponents.

3C(ii) Show how the project will protect the interests of local entities that are not participating in the program.

3D. Water Supply or Water Quality Impacts (scoring range 0-15 points)

3D(i) Describe how the proposed project would impact water supply or water quality with in the basin.

3D(ii) Describe how any negative impacts would be mitigated. Unmitigated impacts will result in a score of zero (0) in this section 3D.

3D(iii) Describe anticipated regulatory requirements for the project.

3D(iv) Address status and schedule for acquiring regulatory approvals and permits.

3E. Address Potential Impacts to Metropolitan's Financial Integrity (scoring range 0-15 points)

3E(i) Address whether the project would affect purchase of imported surface water supplies from Metropolitan.

3E(ii) Describe how any negative impacts would be mitigated. Unmitigated impacts will result in a score of zero (0) in this section 3E.

3E(iii) Discuss status and strategy for project financing.

3E(iv) Show the cost per acre-foot of dry-year yield as determined by the methodology shown in Exhibit 1.

3F. Describe How Project will meet overlying demand (scoring range 0-5 points)

3F(i) Show how the total amount of program storage can be stored within a four-year period.

3F(ii) Show how the program meets the IRP goal of a 3:1 ratio of total storage capacity to annual yield.

3G. Describe how participating entities will share the project risk (scoring range 0-15 points)

3G(i) Describe the project risks.

3G(ii) Describe how these will be managed.

3G(ii) Describe any indemnification necessary to implement the project.

Figure 1
Groundwater Storage Program
Implementation Process
And Schedule

Initial Timeline

January 2000	Adopted Principles for Groundwater Storage
October 2000	Board Resolution for Proposition 13 Funds
November 1, 2000	Issue Request for Proposals
November 8, 2000	Pre-submittal Meeting
January 5, 2001	Proposals Received
January 2001	Review Proposals
January 2001	Interviews (If necessary)
February 2001	Select Projects
March 2001	Information Letter to Metropolitan Board
By July1, 2001	Finalize Agreements
September 2002	Metropolitan Board Approval Execute Agreements

Table 1

Performance Targets

Date	Target	Consequence if Target Not Achieved
January 5, 2001	Receive Proposals	Proposal will be rejected
July 1, 2001	Finalize Agreements	Proposal will be rejected
September 1, 2002	Completion and certification of all environmental documents necessary to comply with CEQA.	Proposal will be rejected
September 2003	Construction Initiated	Agreements Terminated

EXHIBIT 1 - ECONOMIC ANALYSIS WORKSHEET

(See Excel Spreadsheet: RFP Cost Template.xls)

Exhibit C

THE PROPOSAL

Inland Empire
UTILITIES AGENCY

9400 Cherry Ave., Bldg. A • Fontana, CA 92335
P.O. Box 697 • Rancho Cucamonga, CA 91729
TEL (909) 357-0241 • FAX (909) 357-3884
www.ieua.org
A Municipal Water District

Richard W. Atwater
Chief Executive Officer
General Manager

January 18, 2001

Board of Directors

John L. Anderson
President

Terry Catlin
Vice President

Anne W. Dunihue
Secretary/Treasurer

Wyatt L. Troxel
Director

[illegible] Koopman
[illegible]ctor

Mr. Ronald R. Gastelum, General Manager
The Metropolitan Water District of Southern California
700 N. Alameda Street
Los Angeles, California 90012

Subject: Proposal for Groundwater Storage Programs Using Proposition 13 Funds (MWD) (RFP No. WRM-2)

Dear Mr. Gastelum:

On behalf of the Chino Basin Watermaster (and the stakeholders to the Chino Basin Optimum Basin Management Program (OBMP)), and in cooperation with Western Municipal Water District and Three Valleys Municipal Water District, Inland Empire Utilities Agency is pleased to submit this proposal for participation in MWD's Groundwater Storage Programs (utilizing Prop.13 funds). This proposal is consistent with the OBMP "Peace Agreement" and the Programmatic EIR (certified by IEUA in July, 2000).

The key benefits of the approach presented in this proposal are summarized below:

- Provides a potential dry year yield of more than 149,000 acre-feet per year (AFY).
- Reduces summertime peaking on MWD's Rialto Pipeline, which allows additional low TDS SWP supplies to be blended at the Weymouth and Diemer filtration plants.
- Delivers SWP supplies to Chino Basin area via East Branch/Rialto Pipeline to meet SARWQCB Basin Plan salinity objectives.
- Improves the water quality of the Chino Basin through well-head treatment facilities.
- Minimizes (or eliminates) MWD surface water deliveries during future drought/emergencies, the goal is to have sufficient local production to meet peak summer retail water demands.
- Allows MWD to export stored water into Upper Feeder (or Rialto Pipeline) for delivery to other member agencies.
- Provides peaking benefits, which allow MWD both short-term and long-term operation flexibility, including the ability to load shed SWP pumping during periods when energy is limited.

- Provides significant regional economic benefits to the entire Metropolitan service area/avoids $250 million MWD capital expenditures and allows potential salinity benefits/energy savings of over $7 million per year.

IEUA's current MWD purchases (fiscal year 2000-2001) exceed 60,000 AF. The adopted IEUA Urban Water Management Plan (December, 2000) forecasts MWD deliveries to the IEUA service area will increase to over 100,000 AFY by 2020. Therefore, the proposed Chino Basin Groundwater Conjunctive Use Program would enhance Metropolitan's "Financial Integrity."

Lastly, a conjunctive use storage program with the Chino Basin has multiple benefits to MWD. Attached is a table which illustrates the type of benefits for the current MWD groundwater storage projects. We believe these multiple water supply/water quality benefits make Chino Basin storage unique in meeting the regional needs identified in MWD's adopted Integrated Water Resources Plan.

As requested on Page 6 of Metropolitan's Request for Proposal (RFP), I am informed and believe and do certify under penalty of perjury that the information contained in this proposal is true and that the supporting data is accurate and complete.

On behalf of IEUA, the Watermaster, and the Chino Basin stakeholders, I wish to express our excitement about the opportunity to work with Metropolitan. We look forward to your review of the proposal and would be pleased to meet to discuss the individual projects described in the Chino Basin proposal.

Sincerely,

INLAND EMPIRE UTILITIES AGENCY

Richard W. Atwater
Chief Executive Officer
General Manager

Enclosure

cc: Traci Stewart, Chief of Watermaster Services, CBWM
Rick Hansen, Three Valleys MWD
Don Harriger, Western MWD

MWD GROUNDWATER STORAGE PROGRAM BENEFITS

TYPE OF BENEFITS

	Drought Dry Year Carryover	Emergency and Operational Shutdown	Seasonal Winter Storage	MWD System Peaking	Water Quality
SAN JOAQUIN VALLEY					
Semitropic	X				X
Arvin Edison	X				X
Others	X				
COLORADO RIVER AQUEDUCT					
Desert-Coachella	X				X
Cadiz	X				X
Hayfield	X				
Lower Coachella	X				
MWD SERVICE AREA					
North Las Posas	X	X	X	X	X
Raymond Basin	X	X	X	X	X
Chino Basin	X	X	X	X	X

PROPOSAL TO

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

FOR

PARTICIPATION IN GROUNDWATER STORAGE PROGRAMS USING PROPOSITION 13 FUNDING

PREPARED BY

INLAND EMPIRE UTILITY AGENCY

ON BEHALF OF THE

CHINO BASIN WATERMASTER

January 19, 2001



SECTION 1.0
MINIMUM REQUIREMENTS

This section of our proposal presents Inland Empire Utility Agency's (IEUA's) program concept for requested Proposition 13 project funding and addresses the five issues (1A through 1E) identified in Metropolitan's Request for Proposal (RFP).

IEUA - in cooperation with the Chino Basin Watermaster and the stakeholders in the Chino Basin Optimum Basin Management Plan (OBMP) - proposes a program concept for project selection and implementation. This proposal describes 38 projects, each of which will meet one or more of Metropolitan's project principles. (See Table 1-1.) The projects are divided into three categories, summarized in Table 1-2 and depicted geographically on Figure 1-1.

From this menu of projects, we will work with Metropolitan to achieve the optimum combination of "firming projects" to provide dry year supplies when not available from Metropolitan and to increase Metropolitan's operational flexibility. We will give Metropolitan a performance contract, guaranteeing a specified amount of water "on demand." These projects will set the framework for ultimate conjunctive use throughout the Basin with the eventual development of supplies that could be exported to other parts of Metropolitan's service area.

1A. COMPLIANCE WITH METROPOLITAN'S PRINCIPLES

Metropolitan's Board of Directors has approved seven principles with which candidate projects must comply. As shown in Table 1-1, the projects we propose match well with the Board-approved principles.

TABLE 1-1
Summary of Compliance with Metropolitan's Principles

PRINCIPLE	PROJECT BENEFITS
Regional Benefits	37 of the projects will produce a dry-year yield, achieving more than 149,000 AFY at full implementation.
Project Partnerships	The proposed projects represent the consensus of the OBMP stakeholders.
Local Needs	Collectively, the projects will provide seasonal peaking benefits, dry-year yield, and improved water quality and will help balance recharge of the Basin.
Water Supply/Water Quality	36 of the projects will produce improved water quality within the Basin, and 37 of the projects will provide opportunities for Metropolitan to enhance blending of State Water Project and Colorado River water.
Metropolitan's Financial Integrity	Project implementation will not decrease Metropolitan sales to IEUA. Sales will actually increase by more than 25,000 AFY in future normal and wet years.
Overlying Demand	The regional conjunctive use program will effectively meet overlying demands via in-lieu deliveries. The complete program can actually exceed IRP goals of a 3:1 ratio.
Risk Management	By providing diversification and allowing Metropolitan to avoid the risk of stored water losses, our proposed program is virtually "risk-free."

TABLE 1-2
Summary of Projects

ITEM	CATEGORY 1	CATEGORY 2	CATEGORY 3	TOTAL
No. of Projects	13	18	7	38
Project Type	Wellhead treatment with IX	Assorted production facilities	New wells	
On-line Date[1] Range	March 2002-November 2003	March 2002-June 2003	March 2002-June 2003	
Range of Dry Year Yield Increase Per Project (AFY)	1,450 AFY to 13,441 AFY	1,600 AFY to 11,000 AFY	2,900 AFY to 5,000 AFY	
Total Dry Year Yield Increase (AFY)	73,491	52,925	22,900	149,316
Water Quality Improvement Projects	13	16	7	36
Metropolitan's Benefits				
Blending	$38,160,000	$28,170,000	$12,670,000	$79,000,000
Deferral of R.P. Expansion	$100,000,000	$100,000,000	$100,000,000	$100,000,000
Peaking Capacity	$6,614,000	$4,763,000	$2,061,000	$13,438,000
Estimated Cost	$48,744,000	$23,839,000	$7,500,000	$80,083,000
Grant Request (50%)	$24,372,000	$11,920,000	$7,500,000	$40,042,000
MWD Unit Cost of Water[2]	$159	$110	$194	–
MWD Benefit ($/AF)[3]	$1,163	$1,222	$1,459	–

1 Reflects schedule if Metropolitan can fund prior to August 2001.
2 Calculated using Metropolitan's preferred methodology. More details are provided in Section 3E.
3 Includes value of water at $435/AF.

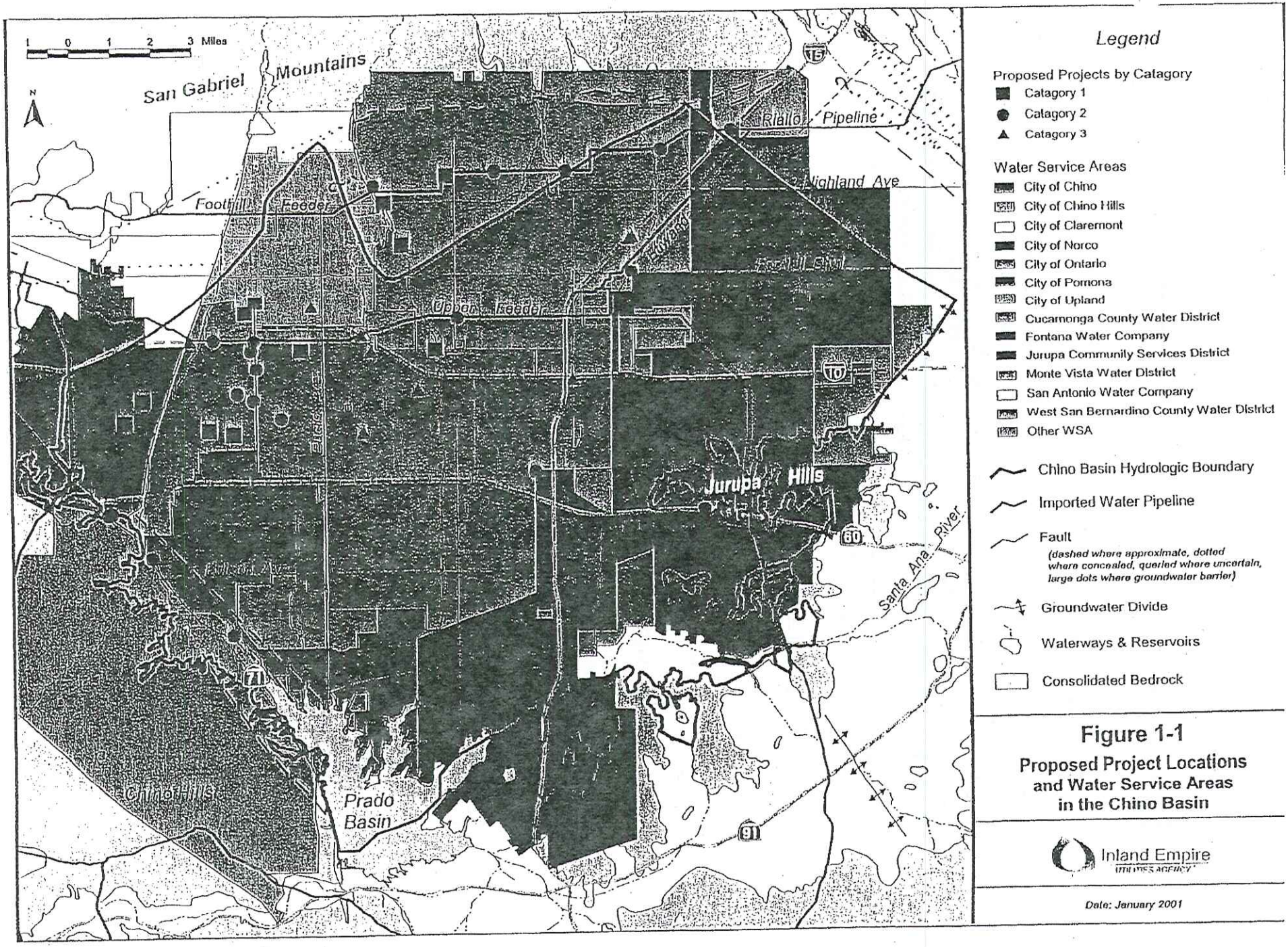


Figure 1-1

Proposed Project Locations and Water Service Areas in the Chino Basin

Inland Empire Utilities Agency

Date: January 2001

1B. CONSTRUCTION OF SUBSTANTIVE NEW FACILITIES

All of the proposed projects include construction of substantive new facilities that will provide local redundancy to Metropolitan's supplies during times of drought or emergency and will allow Metropolitan increased flexibility to meet the needs of other parts of its service area. All projects will be configured so that new capacity can be used in lieu of taking water from the Rialto Pipeline. The projects will also provide peaking benefits and possible deferral of major new delivery facilities, such as double-barreling of the Rialto Pipeline. In addition, the projects provide a quantifiable benefit to Metropolitan in terms of enhanced blending capability at the Weymouth and Diemer Water Treatment Plants.

1C. METROPOLITAN REQUIREMENTS

All of the proposed projects will comply with the Metropolitan Water District Act and all other applicable laws, specifically any required state financial accounting standards and Metropolitan audit requirements.

1D. ENVIRONMENTAL CERTIFICATION

Tables 2-1, 2-2, and 2-3 in Section 2 include environmental certification information. All 38 proposed projects fall under the Program Environmental Impact Report (EIR) prepared for the OBMP. As specific projects move forward, additional review will be required. It is anticipated that most of the projects will qualify for a negative Declaration or a Categorical Exemption. All projects are expected to meet California Environmental Quality Act (CEQA) requirements.

1E. AGREEMENT EXECUTION

We understand that projects shall not be existing or under construction prior to agreement execution. We also understand that Metropolitan considers that projects that have entered Design-Build contracts are considered under construction.

SECTION 2.0
PROJECT DESCRIPTIONS

This section of our proposal presents more detailed information on the 38 projects introduced in Section 1. For each project, we address the requirements listed on Page 8 of Metropolitan's RFP. Following introductory text, we present detailed tables for the Category 1, Category 2, and Category 3 Projects (Tables 2-1, 2-2, and 2-3, respectively). These categories represent a menu of options by project type and do not represent priority.

We also present an overview map showing how the projects are configured with respect to Metropolitan's Rialto Pipeline. Following the overview map, we present 11 project location maps tied to participating agencies: City of Chino, City of Chino Hills, Cucamonga County Water District, Fontana Water Company, IEUA, Jurupa Community Services District, Monte Vista Water District, City of Ontario, City of Pomona, San Antonio Water Company, and the City of Upland.

2A MANAGEMENT INFORMATION

IEUA is the sponsoring agency in conjunction with the Watermaster stakeholders. Because the proposed projects comply with the OBMP, they will meet AB 3030 and other requirements for groundwater management plans.

2B PROJECT PARTICIPANTS/PARTICIPATING AGENCIES

The 11 participating agencies are identified in the second paragraph above.

2C PROJECT SCHEDULE

As shown in Table 2-1, 2-2, and 2-3, the on-line date for the 38 projects ranges from November 2001 to November 2003. This assumes funding available in August of this year. If funding could be made available sooner, the on-line dates would range from August 2001 through July 2003 (see Table 1-2).

2D COST FACTORS

The three tables also present cost information. This information, discussed in more detail in Sections 3E(iii) and 3E(iv), was developed using Metropolitan's Economic Analysis Worksheet. Costs assume a 50 percent capital contribution from Metropolitan. Operation costs were averaged for the range of projects based on "typical" costs for treatment, pumping, and replenishment. Treatment costs (for Category 1 projects only) were assumed at $85/AF. Well pumping (all categories) was assumed at $60/AF. Replenishment (all categories) was assumed at $90/AF. Replenishment costs assume Metropolitan would be responsible for the replenishment obligation and that $90/AF reflects the cost of pumping SWP water through

the East Branch. All other costs associated with the projects were assumed to be borne by the local agencies.

2E MAPS

As stated above, project maps are provided at the end of this section showing locations of proposed projects, primary facilities and proposed user sites, and other requested information.

2F WATER SUPPLY/DISTRIBUTION AND WATER QUALITY ISSUES

IEUA's strategic location relative to Metropolitan's service area enables the Program Concept presented in this proposal to offer you unusual flexibility and exciting conjunctive use opportunities.

The Chino Basin is one of the largest groundwater basins in Southern California with about 5 million acre-feet (MAF) of water in the Basin and an unused storage capacity of about 1 MAF. Through the cooperative program envisioned by IEUA, the Watermaster, and the OBMP stakeholders, these twin resources - groundwater and unused storage capacity - can be put to beneficial use.

Figure 2-1 on the following page shows the mix of resources needed to meet the 2020 demand with and without the projects identified in this proposal. The figure also shows the current resources mix to meet existing demand, based on IEUA's Urban Water Management Plan 2000 (adopted December 7, 2000). Figure 2-1 also shows additional water that could be available within the Upper and Lower Feeder service area during dry years. By 2020, up to an additional 100,000 acre-feet of water could be available for potential export to Metropolitan. During wet years, the projects would be utilized and the Basin would take additional deliveries of water to offset any excess pumping that occurred during dry periods.

An additional benefit to Metropolitan – as California grapples with a serious energy crises – would be the ability to shed electrical load by reducing State Water Project pumping during critical periods when energy supplies are limited.

Figure 2-1
Chino Basin Water Resource Mix

(1) IEUA Urban Water Management Plan Year 2000

TABLE 2-1
Summary of Category I Projects

Project No.	Project Title/Lead Agency/ Part. Agency	Dry Year Yield (AFY)	Schedule Milestones		Cost Factors	
1	Nitrate Removal Water Treatment Plant City of Chino (preservation of existing well capacity)	13,441	Design (mo.) CEQA Construction (mo.) Online Date[1]	3 Ongoing 18 05/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$2,156,500 $4,313,000
2	Reservoir 2A Wellhead Treatment Facility Cucamonga County Water District	6,300	Design (mo.) CEQA Construction (mo.) Online Date[1]	9 ND-1[4] 12 05/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$3,561,000 $7,122,000
3	Reservoir 3 Wellhead Treatment Facility Cucamonga County Water District	9,700	Design (mo.) CEQA Construction (mo.) Online Date[1]	9 ND-1[4] 12 05/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$3,397,000 $6,794,000
4	Reservoir 3A Wellhead Treatment Facility Cucamonga County Water District	3,500	Design (mo.) CEQA Construction (mo.) Online Date[1]	6 ND-1[4] 10 12/02	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$925,000 $1,850,000
5	Wellhead Ion-Exchange Treatment #1 Fontana Water Company	3,700	Design (mo.) CEQA Construction (mo.) Online Date[1]	4 ND-1[4] 8 08/02	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$2,000,000 $4,000,000
6	Wellhead Ion-Exchange Treatment #2 Fontana Water Company	6,000	Design (mo.) CEQA Construction (mo.) Online Date[1]	4 ND-1[4] 8 08/02	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$3,200,000 $6,400,000
7	Wellhead Ion-Exchange Treatment Jurupa Community Service District	4,000	Design (mo.) CEQA (mo.) Construction (mo.) Online Date[1]	4 3 12 08/02	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$2,500,000 $5,000,000
8	Wellhead Ion-Exchange for 2 Wells at Plant 4 Monte Vista Water District	4,700	Design (mo.) CEQA (mo.) Construction (mo.) Online Date[1]	6 7 9 11/02	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$1,075,000 $2,150,000
9	Wellhead Ion-Exchange Treatment at Well 2 Monte Vista Water District	1,450	Design (mo.) CEQA (mo.) Construction (mo.) Online Date[1]	3 7 6 05/02	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$437,500 $875,000
10	Wellhead Ion-Exchange & Transmission Line City of Ontario	5,000	Design (mo.) CEQA Construction (mo.) Online Date[1]	12 ND-1[4] 15 11/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$1,750,000 $3,500,000

Project No.	Project Title/Lead Agency/ Part. Agency	Dry Year Yield (AFY)	Schedule Milestones		Cost Factors	
11	Anion Exchange Plant Expansion & Upgrade City of Pomona	10,000	Design (mo.) CEQA Construction (mo.) Online Date[1]	6 NR[5] 12 01/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$850,000 $1,700,000
12	Retrofit well and Wellhead Ion-Exchange Treatment San Antonio Water Company Ontario, Upland, MWD	3,000	Design (mo.) CEQA (mo.) Construction (mo.) Online Date[1]	4 5 6 03/02	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$1,020,000 $2,040,000
13	Wellhead Ion-Exchange Treatment City of Upland	2,700	Design (mo.) CEQA Construction (mo.) Online Date[1]	4 ND-1[4] 8 08/02	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$1,500,000 $3,000,000

[1] Based on fund availability August, 2001
[2] As described in Section 2-D
[3] Remaining capital will be paid by each local agency
[4] Negative Declaration
[5] Not Required

TABLE 2-2
Summary of Category 2 Projects

Project No.	Project Title/Lead Agency/ Part. Agency	Dry Year Yield (AFY)	Schedule Milestones		Cost Factors	
1	**Benson/Palo Verde ASR** City of Chino/MVWD (New production)	5,040	Design (mo.) CEQA (mo.) Construction (mo.) Online Date[1]	3 7 18 05/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$719,000 $1,438,000
2	**State/Benson ASR** City of Chino (Preservation of existing GW)	4,480	Design (mo.) CEQA (mo.) Construction (mo.) Online Date[1]	3 7 18 05/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$238,000 $476,000
3	**Phillips/ Central ASR** City of Chino (Preservation of existing GW)	6,160	Design (mo.) CEQA (mo.) Construction (mo.) Online Date[1]	3 7 18 05/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$1,001,000 $2,002,000
4	**Interagency Connection & Distribution** City of Chino Chino Hills, MWD, Ontario	5,377	Design (mo.) CEQA (mo.) Construction (mo.) Online Date[1]	9 6 9 02/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$2,630,500 $5,261,000
5	**Well 13 Blending station** City of Chino Hills (Enables more desalted water to Chino & Ontario)	2,100	Design (mo.) CEQA Construction (mo.) Online Date[1]	1 ND-1 1 11/01	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$45,000 $90,000
6	**Well No. 36** Cucamonga County Water District	2,500	Design (mo.) CEQA Construction (mo.) Online Date[1]	2 ND-1[4] 4 03/02	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$425,000 $850,000
7	**CCWD/MWD Chino Basin Groundwater Use Project** Cucamonga County Water District	11,000	Design (mo.) CEQA Construction (mo.) Online Date[1]	6 ND-2[4] 12 02/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$1,973,500 $3,947,000
8	**Cucamonga Basin Recharge Project** Cucamonga County Water District	4,000	Design (mo.) CEQA Construction (mo.) Online Date[1]	6 MND-6[5] 18 05/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$1,300,000 $2,600,000
9	**Reactivate MWD Connections** Inland Empire Utility Agency	-	Design (mo.) CEQA Construction (mo.) Online Date[1]	N/A NR N/A 07/02	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$275,000 $550,000
10	**Rehabilate or New Well (ASR) - Plant 1** Monte Vista Water District	2,167	Design (mo.) CEQA (mo.) Construction (mo.) Online Date[1]	6 6 12 03/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$500,000 $1,000,000

Project No.	Project Title/Lead Agency/ Part. Agency	Dry Year Yield (AFY)	Schedule Milestones		Cost Factors	
11	Rehabilitate or New Well (ASR) - Plant 9 Monte Vista Water District	2,167	Design (mo.) CEQA (mo.) Construction (mo.) Online Date[1]	6 6 12 03/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$500,000 $1,000,000
12	Rehabilitate or New Well (ASR) - Plant 12 Monte Vista Water District	2,167	Design (mo.) CEQA (mo.) Construction (mo.) Online Date[1]	6 6 12 03/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$500,000 $1,000,000
13	Rehabilitate or New Well (ASR) - Plant 17 Monte Vista Water District	2,167	Design (mo.) CEQA (mo.) Construction (mo.) Online Date[1]	6 6 12 03/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$500,000 $1,000,000
14	Well 15 Blending Station City of Ontario	2,000	Design (mo.) CEQA Construction (mo.) Online Date[1]	6 ND-1[4] 9 12/02	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$100,000 $200,000
15	Jurupa Connection City of Ontario JCSD, SAWPA	-	Design (mo.) CEQA Construction (mo.) Online Date[1]	6 ND-1[4] 6 09/02	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$37,500 $75,000
16	Chino II Desalter Transmission Facilities City of Ontario JCSD, SAWPA	-	Design (mo.) CEQA Construction (mo.) Online Date[1]	N/A N/A 6 12/02	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$425,000 $850,000
17	Well No. 36 City of Pomona	1,600	Design (mo.) CEQA Construction (mo.) Online Date[1]	6 ND[4] 12 02/03	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$200,000 $400,000
18	Booster 16A&B & Pipeline City of Pomona	-	Design (mo.) CEQA Construction (mo.) Online Date[1]	6 ND[4] 4 07/02	Grant (50%) Capital O&M ($/AF)[2] Financing[3]	$550,000 $1,100,000

[1] Based on Fund Availability August, 2001

[2] As described in Section 2-D

[3] Remaining capital will be paid by each local agency

[4] Negative Declaration

[5] Mitigated Negative Declaration

TABLE 2-3
Summary of Category 3 Projects

Project No.	Project Title/Lead Agency/Part. Agency	Dry Year Yield (AFY)	Schedule Milestones		Cost Factors	
1	2 New Wells Cucamonga County Water District	5,000	Design (mo.) CEQA Construction (mo.) Online Date[2]	3 ND-1[1] 8 08/02	Grant (50%) Capital O&M ($/AF)[3] Financing[4]	$750,000 $1,500,000
2	New Well - Plant 28 Monte Vista Water District	2,900	Design (mo.) CEQA Construction (mo.) Online Date[2]	2 Approved 12 11/02	Grant (50%) Capital O&M ($/AF)[3] Financing[4]	$500,000 $1,000,000
3	New Well #1 City of Ontario	3,000	Design (mo.) CEQA Construction (mo.) Online Date[2]	Complete ND-1[1] 12 09/02	Grant (50%) Capital O&M ($/AF)[3] Financing[4]	$500,000 $1,000,000
4	New Well #2 City of Ontario	3,000	Design (mo.) CEQA Construction (mo.) Online Date[2]	9 ND-1[1] 12 06/03	Grant (50%) Capital O&M ($/AF)[3] Financing[4]	$500,000 $1,000,000
5	New Well #3 City of Ontario	3,000	Design (mo.) CEQA Construction (mo.) Online Date[2]	9 ND-1[1] 12 06/03	Grant (50%) Capital O&M ($/AF)[3] Financing[4]	$500,000 $1,000,000
6	New Well #4 City of Ontario	3,000	Design (mo.) CEQA Construction (mo.) Online Date[2]	9 ND-1[1] 12 06/03	Grant (50%) Capital O&M ($/AF)[3] Financing[4]	$500,000 $1,000,000
7	New Well San Antonio Water Company Ontario, Upland, MWD	3,000	Design (mo.) CEQA (mo.) Construction (mo.) Online Date[2]	6 4 6 03/02	Grant (50%) Capital O&M ($/AF)[3] Financing[4]	$500,000 $1,000,000

[1] Negative Declaration
[2] Based on fund availability August, 2001
[3] As described in Section 2-D
[4] Remaining capital will be paid by each local agency

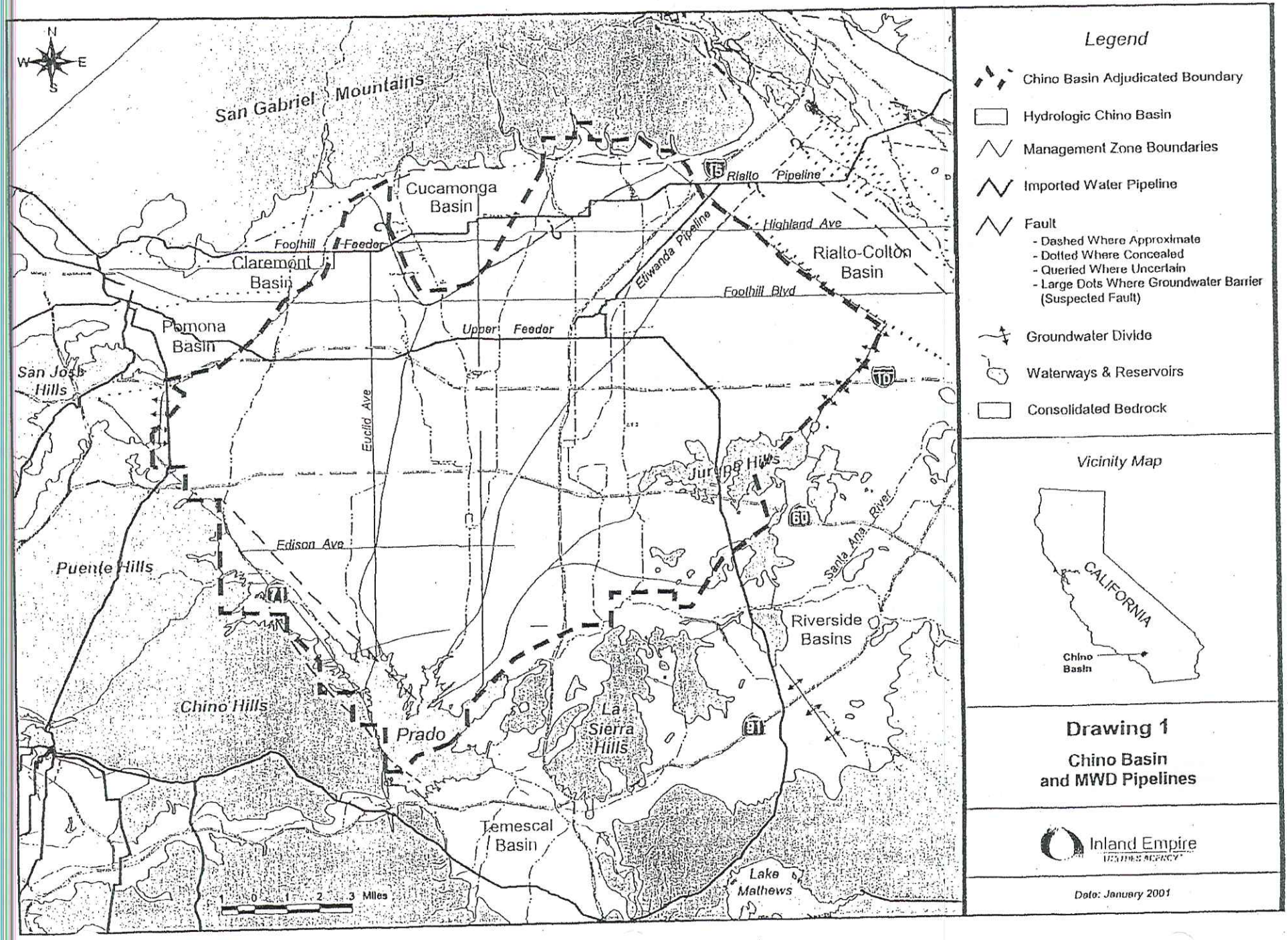
DRAWINGS/MAPS

PROJECT DRAWING LIST

The first drawing shows Metropolitan's Rialto/Etiwanda/Upper Feeder Service Area. The subsequent drawings show the location of proposed projects, primary facilities, and proposed user sites including interties and points of connection. Most of the major purveyors in the Chino Basin Area have existing interconnections to Metropolitan's water system and, by overproducing in dry years, can provide immediate dry year yield to Metropolitan. Agencies in the Chino Basin that do not have a direct connection to Metropolitan's system also can provide water through an exchange. Fontana Water Company would use existing interconnections through Cucamonga County Water District for water supply. Jurupa Community Service District would use an existing or new intertie with the City of Ontario, and San Antonio Water Company would use an existing or a new point of connection with the City of Upland water distribution system. The drawings are presented in the following order:

		CATEGORIES		
		1	2	3
1.	MWD/Rialto/Etiwanda/Upper Feeder Service Area	N/A	N/A	N/A
2.	City of Chino Projects	1	4	-
3.	City of Chino Hills Project	-	1	-
4.	Cucamonga County Water District Projects	3	3	1
5.	Fontana Water Company Projects	2	-	-
6.	IEUA Project	-	1	-
7.	Jurupa Community Service District Project	1	-	-
8.	Monte Vista Water District Projects	2	4	1
9.	City of Ontario Projects	1	3	4
10.	City of Pomona Projects	1	2	-
11.	San Antonio Water Company Projects	1	-	1
12.	City of Upland Project	1	-	-

N/A – Not Applicable

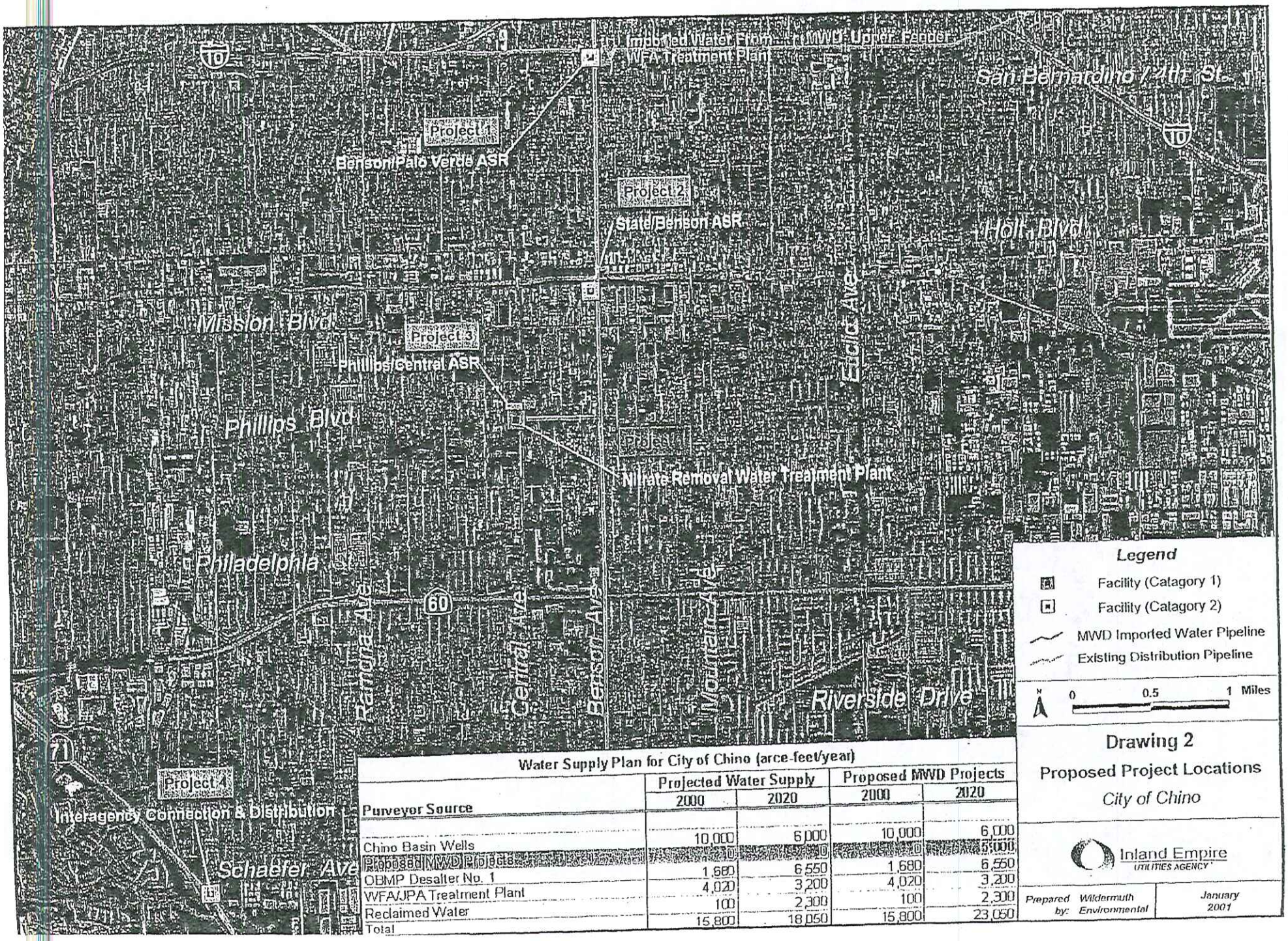


Drawing 1

Chino Basin and MWD Pipelines

Inland Empire Utilities Agency

Date: January 2001



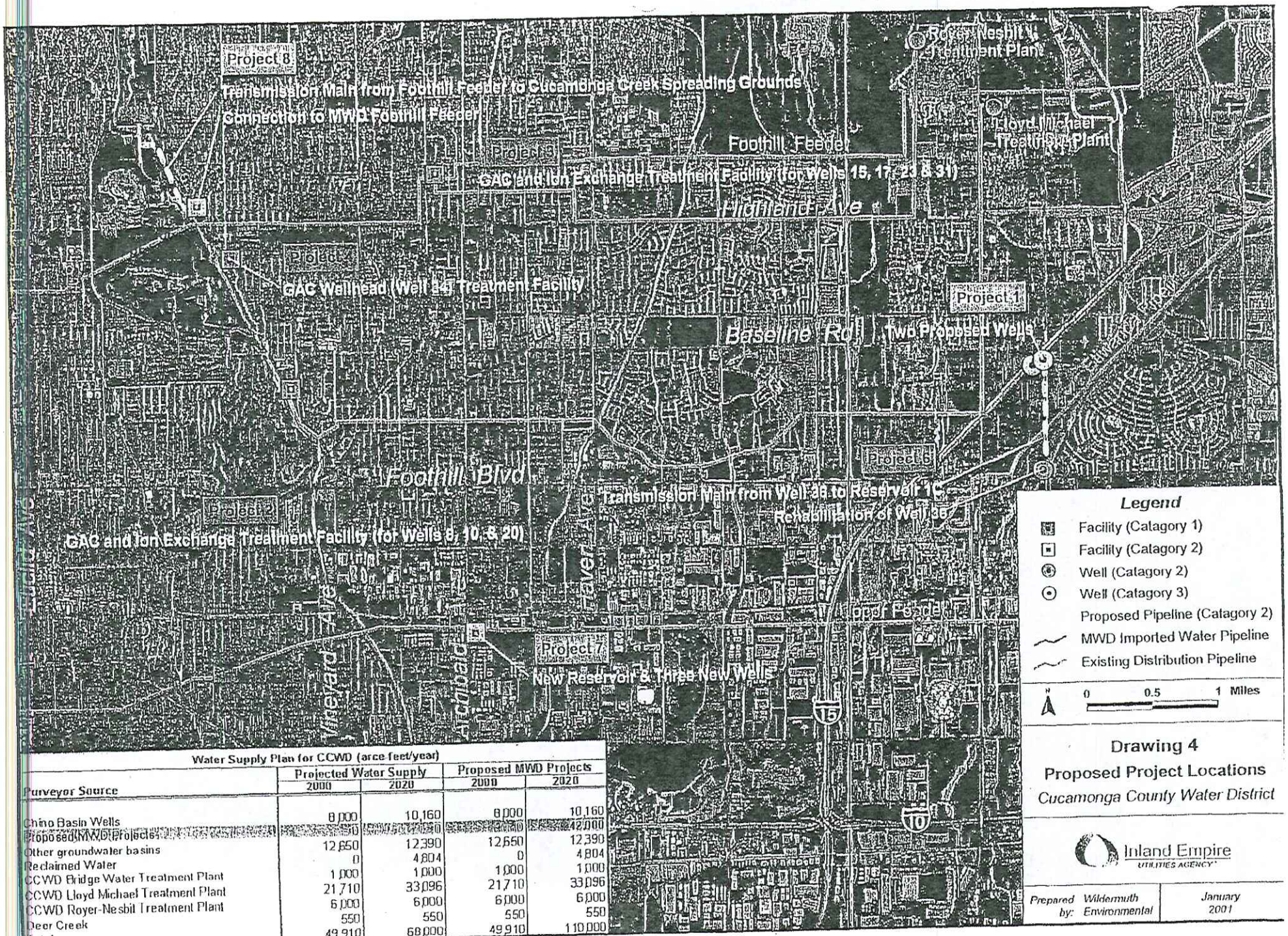
Water Supply Plan for City of Chino (arce-feet/year)

Purveyor Source	Projected Water Supply 2000	Projected Water Supply 2020	Proposed MWD Projects 2000	Proposed MWD Projects 2020
Chino Basin Wells	10,000	6,000	10,000	6,000
Proposed MWD Projects	0	0	0	5,000
OBMP Desalter No. 1	1,680	6,550	1,680	6,550
WFA/JPA Treatment Plant	4,020	3,200	4,020	3,200
Reclaimed Water	100	2,300	100	2,300
Total	15,800	18,050	15,800	23,050



Water Supply Plan for City of Chino Hills (acre-feet/year)

Purveyor Source	Projected Water Supply 2000	Projected Water Supply 2020	Proposed MWD Projects 2000	Proposed MWD Projects 2020
Chino Basin Wells	3,610	3,610	3,610	3,610
Proposed MWD Projects	0	0	0	21,100
CBMP Desalter No. 1	1,120	7,540	1,120	7,540
Reclaimed Water	400	2,610	400	2,610
MWD Sup Chino GW)	12,510	9,480	12,510	9,480
	17,640	23,240	17,640	25,340



Water Supply Plan for CCWD (acre-feet/year)

Purveyor Source	Projected Water Supply 2000	Projected Water Supply 2020	Proposed MWD Projects 2000	Proposed MWD Projects 2020
Chino Basin Wells	8,000	10,160	8,000	10,160
Proposed MWD Projects	0	0	0	42,000
Other groundwater basins	12,650	12,390	12,650	12,390
Reclaimed Water	0	4,804	0	4,804
CCWD Bridge Water Treatment Plant	1,000	1,000	1,000	1,000
CCWD Lloyd Michael Treatment Plant	21,710	33,096	21,710	33,096
CCWD Royer-Nesbit Treatment Plant	6,000	6,000	6,000	6,000
Deer Creek	550	550	550	550
Total	49,910	68,000	49,910	110,000

Drawing 4

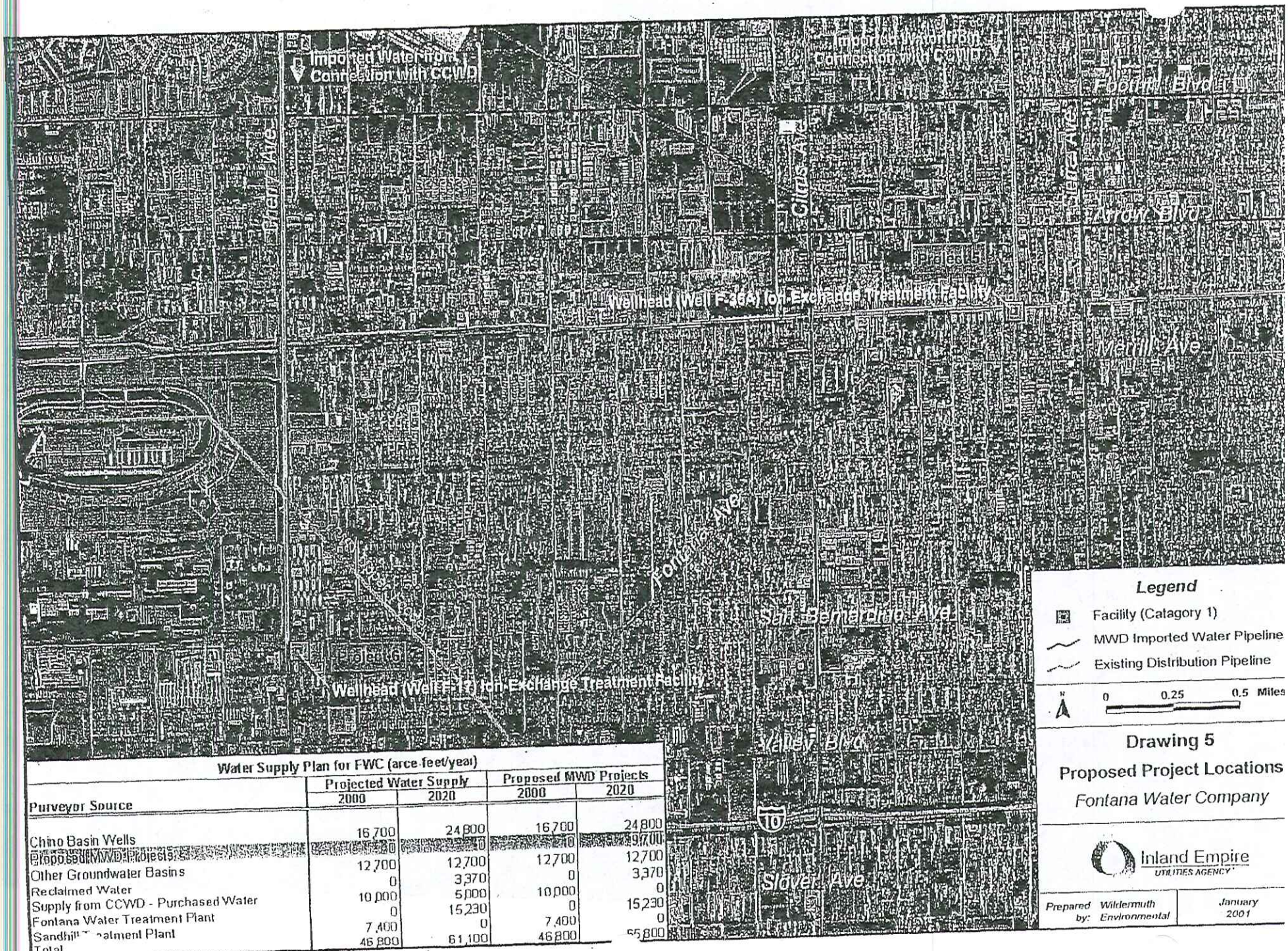
Proposed Project Locations

Cucamonga County Water District

Inland Empire Utilities Agency

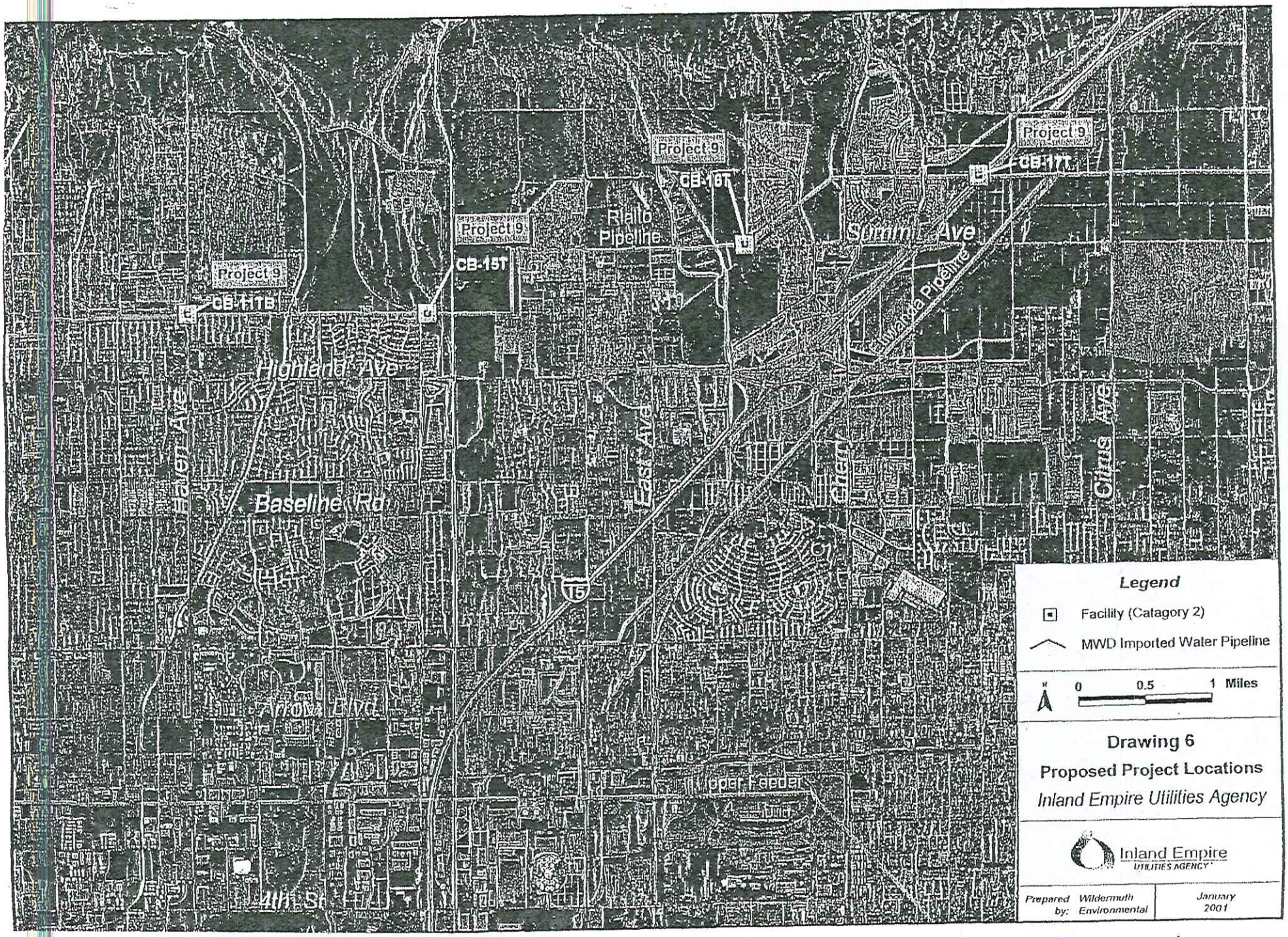
Prepared by: Wildermuth Environmental

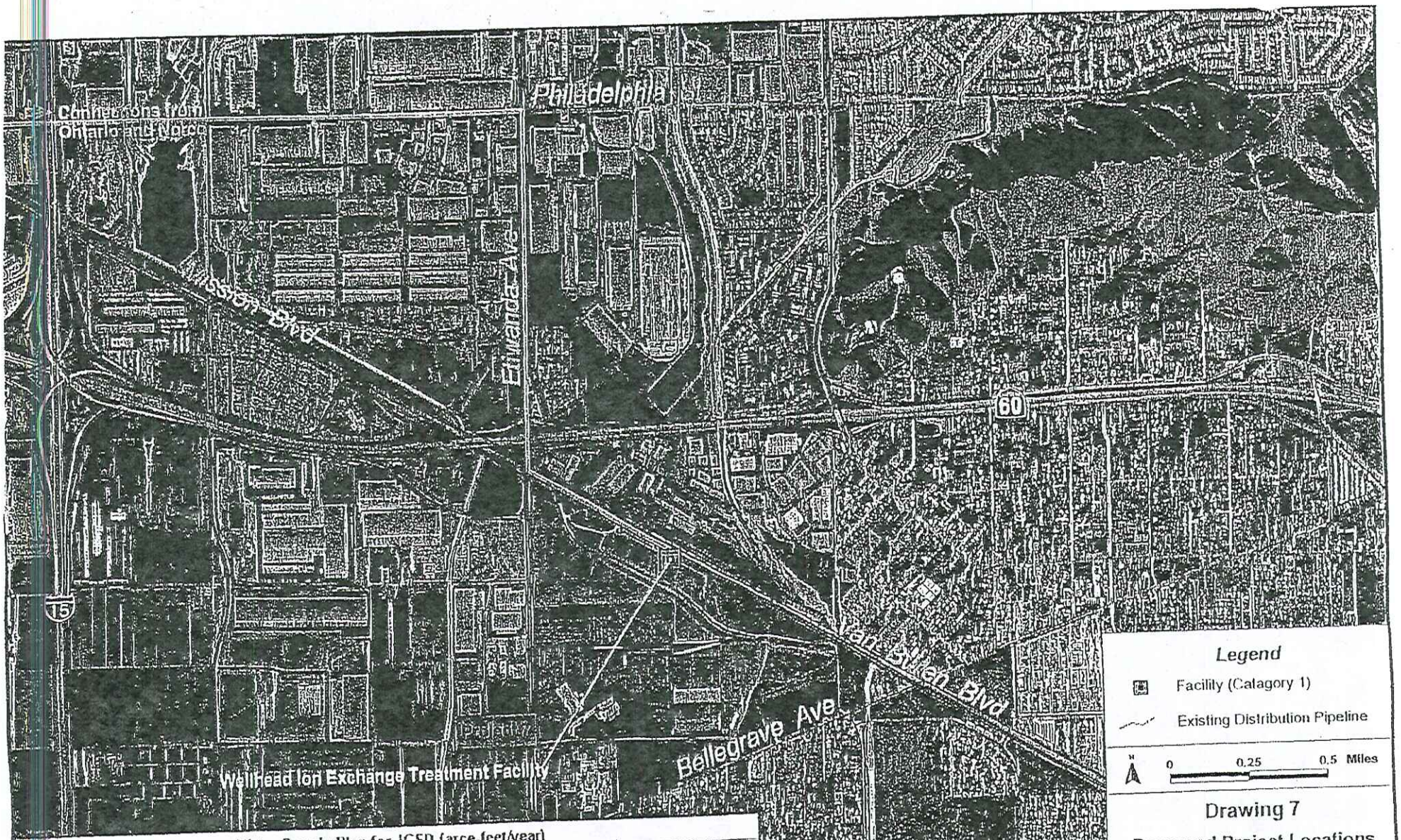
January 2001



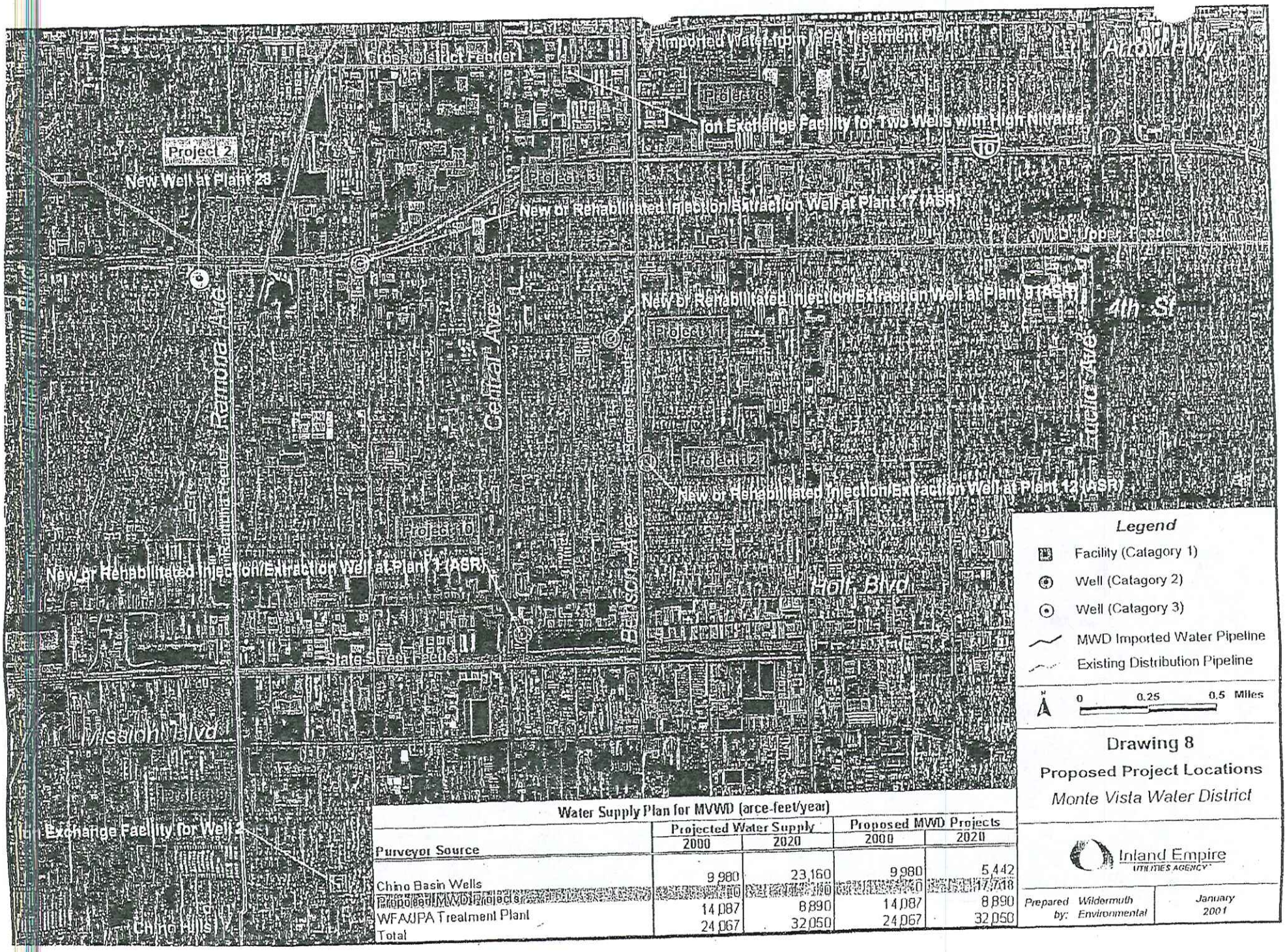
Water Supply Plan for FWC (arce-feet/year)

Purveyor Source	Projected Water Supply 2000	Projected Water Supply 2020	Proposed MWD Projects 2000	Proposed MWD Projects 2020
Chino Basin Wells	16,700	24,800	16,700	24,800
Proposed MWD Projects	0	0	0	9,700
Other Groundwater Basins	12,700	12,700	12,700	12,700
Reclaimed Water	0	3,370	0	3,370
Supply from CCWD - Purchased Water	10,000	5,000	10,000	0
Fontana Water Treatment Plant	0	15,230	0	15,230
Sandhill Treatment Plant	7,400	0	7,400	0
Total	46,800	61,100	46,800	65,800


Project 9
CB-11T
Project 9
CB-10T
Rialto Pipeline
Project 9
CB-15T
Project 9
CB-11TB
Highland Ave
Baseline Rd
Arrow Blvd
4th St
Upper Feeder
Summit Ave
Cajalco Pipeline
East Ave
Cherry Ave
Citrus Ave
15
Legend
Facility (Catagory 2)
MWD Imported Water Pipeline
N
0
0.5
1 Miles
Drawing 6
Proposed Project Locations
Inland Empire Utilities Agency
Inland Empire
UTILITIES AGENCY
Prepared by: Wildermuth Environmental
January 2001

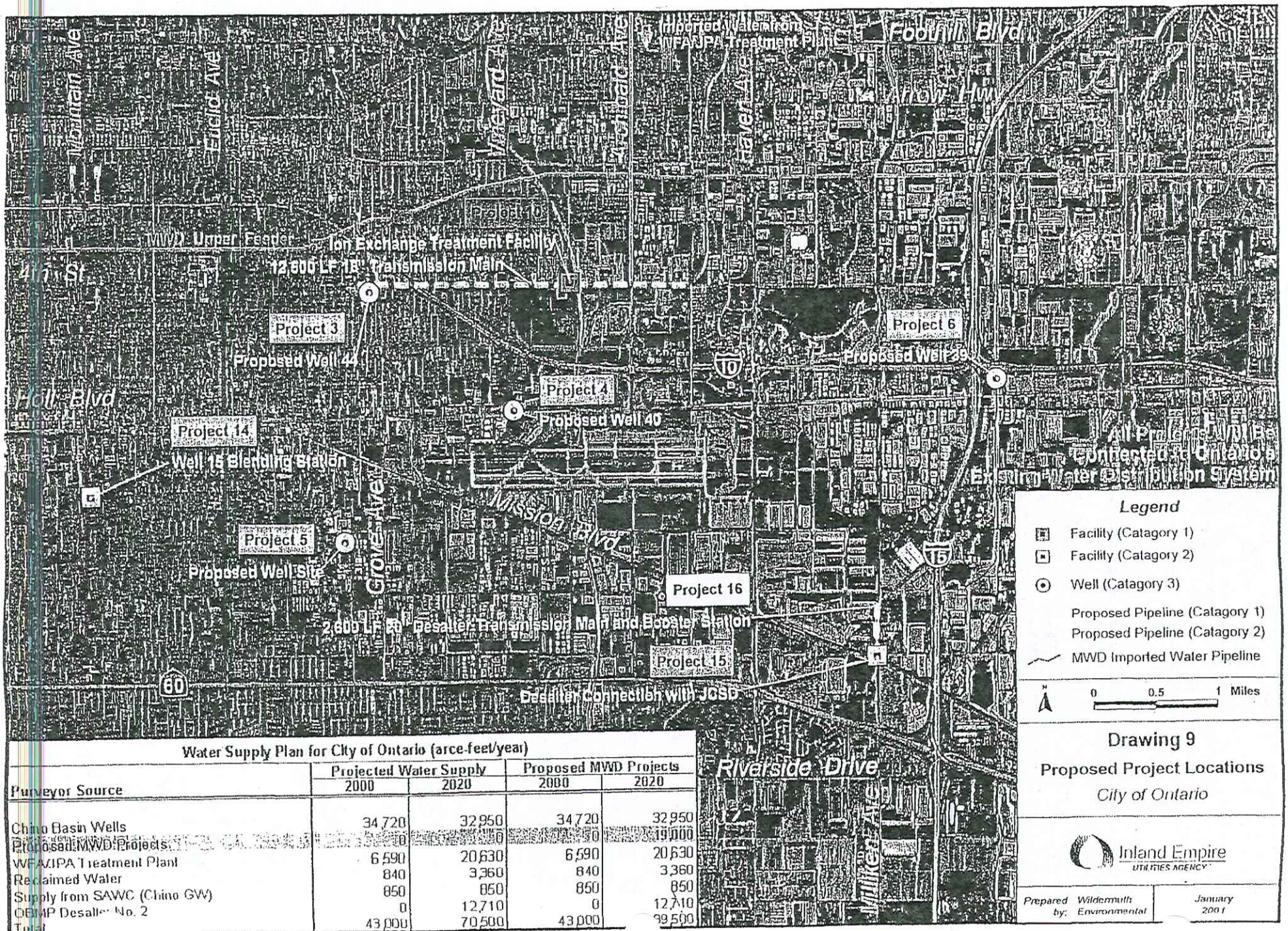


Water Supply Plan for JCSD (arce-feet/year)				
	Projected Water Supply		Proposed MWD Projects	
Purveyor Source	2000	2020	2000	2020
Chino Basin Wells -- potable	12,475	17,715	12,475	17,715
Chino Basin Wells -- non potable	50	850	50	850
Proposed MWD Projects	0	0	0	4,000
Other groundwater basins	500	4,500	500	4,500
SAWPA Desa[illegible] (8 mgd Plant)	3,600	5,000	3,600	5,000
Imported W[illegible] om City of Ontario	0	0	0	0
			16,625	12,065



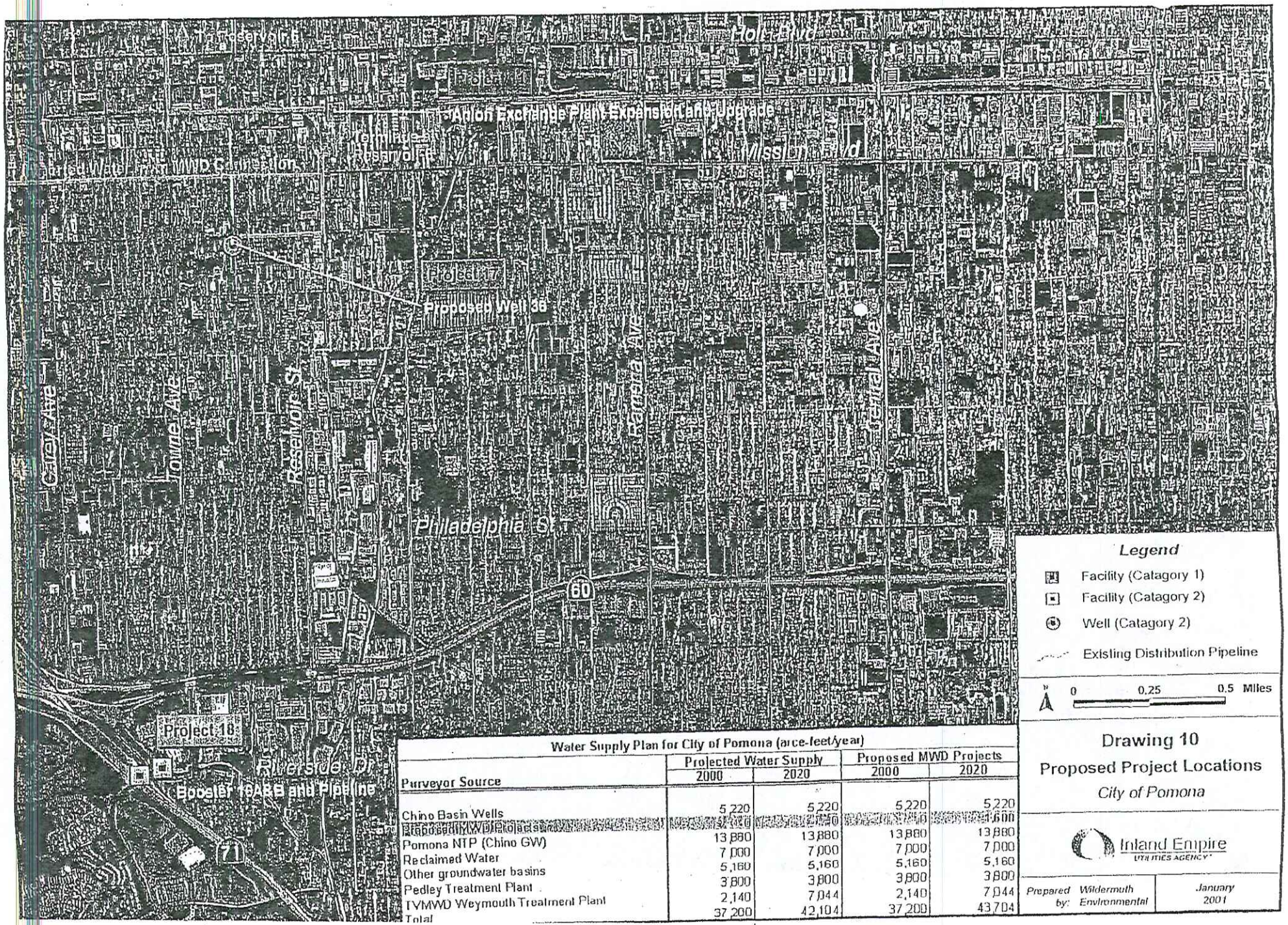
Water Supply Plan for MVWD (arce-feet/year)

Purveyor Source	Projected Water Supply 2000	Projected Water Supply 2020	Proposed MWD Projects 2000	Proposed MWD Projects 2020
Chino Basin Wells	9,980	23,160	9,980	5,442
Proposed MWD Projects	0	0	0	17,718
WFA/JPA Treatment Plant	14,087	8,890	14,087	8,890
Total	24,067	32,050	24,067	32,050



Water Supply Plan for City of Ontario (arce-feet/year)

Purveyor Source	Projected Water Supply 2000	Projected Water Supply 2020	Proposed MWD Projects 2000	Proposed MWD Projects 2020
Chino Basin Wells	34,720	32,950	34,720	32,950
Proposed MWD Projects	0	0	0	19,000
WFA/JPA Treatment Plant	6,590	20,630	6,590	20,630
Reclaimed Water	840	3,360	840	3,360
Supply from SAWC (Chino GW)	850	850	850	850
OBMP Desalter No. 2	0	12,710	0	12,710
Total	43,000	70,500	43,000	89,500



Water Supply Plan for City of Pomona (arce-feet/year)

Purveyor Source	Projected Water Supply 2000	Projected Water Supply 2020	Proposed MWD Projects 2000	Proposed MWD Projects 2020
Chino Basin Wells	5,220	5,220	5,220	5,220
Proposed MWD Projects	1,600	1,600	1,600	1,600
Pomona NTP (Chino GW)	13,880	13,880	13,880	13,880
Reclaimed Water	7,000	7,000	7,000	7,000
Other groundwater basins	5,160	5,160	5,160	5,160
Pedley Treatment Plant	3,800	3,800	3,800	3,800
IVMWD Weymouth Treatment Plant	2,140	7,044	2,140	7,044
Total	37,200	42,104	37,200	43,704

Drawing 10

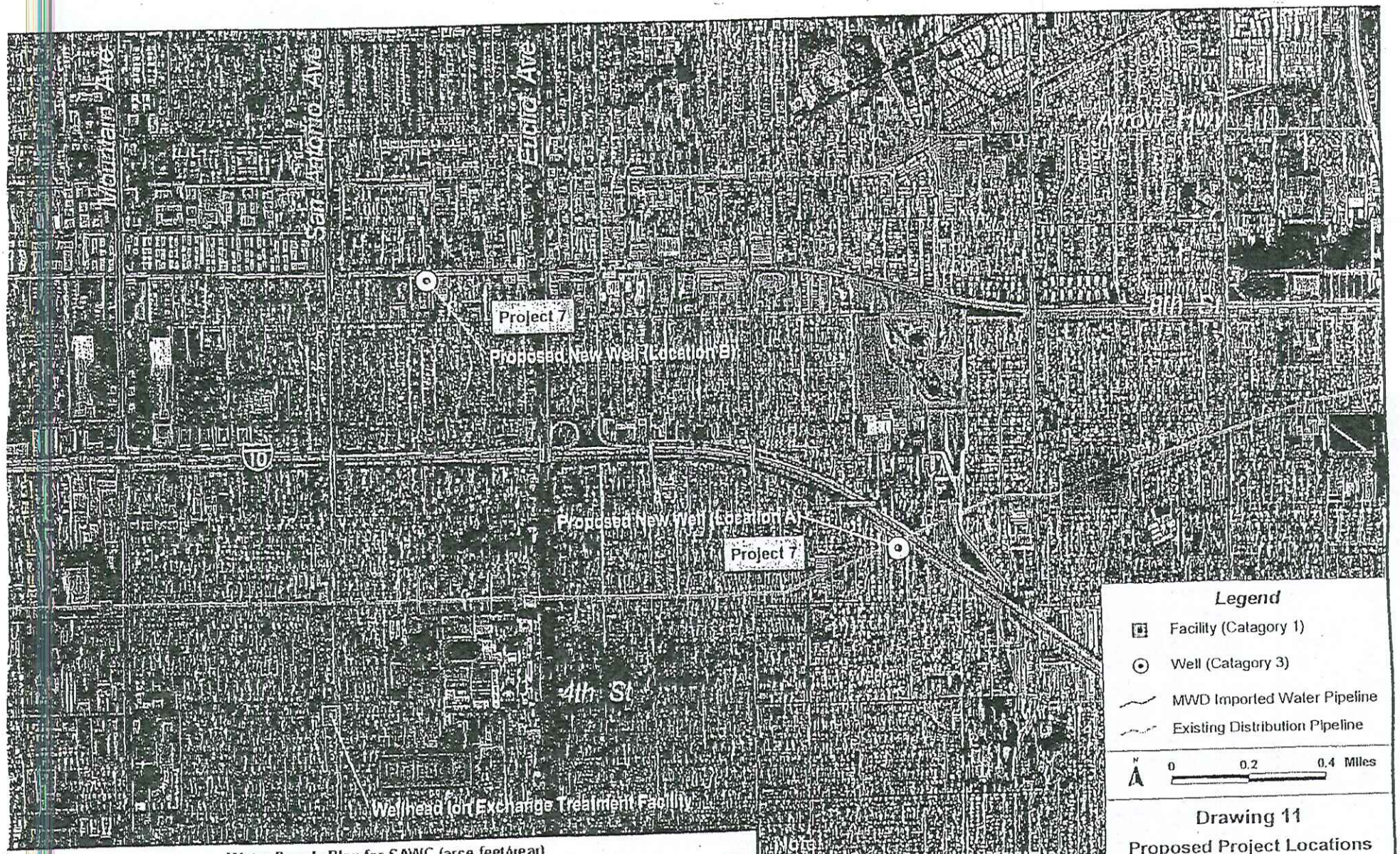
Proposed Project Locations

City of Pomona

Inland Empire Utilities Agency

Prepared by: Wildermuth Environmental

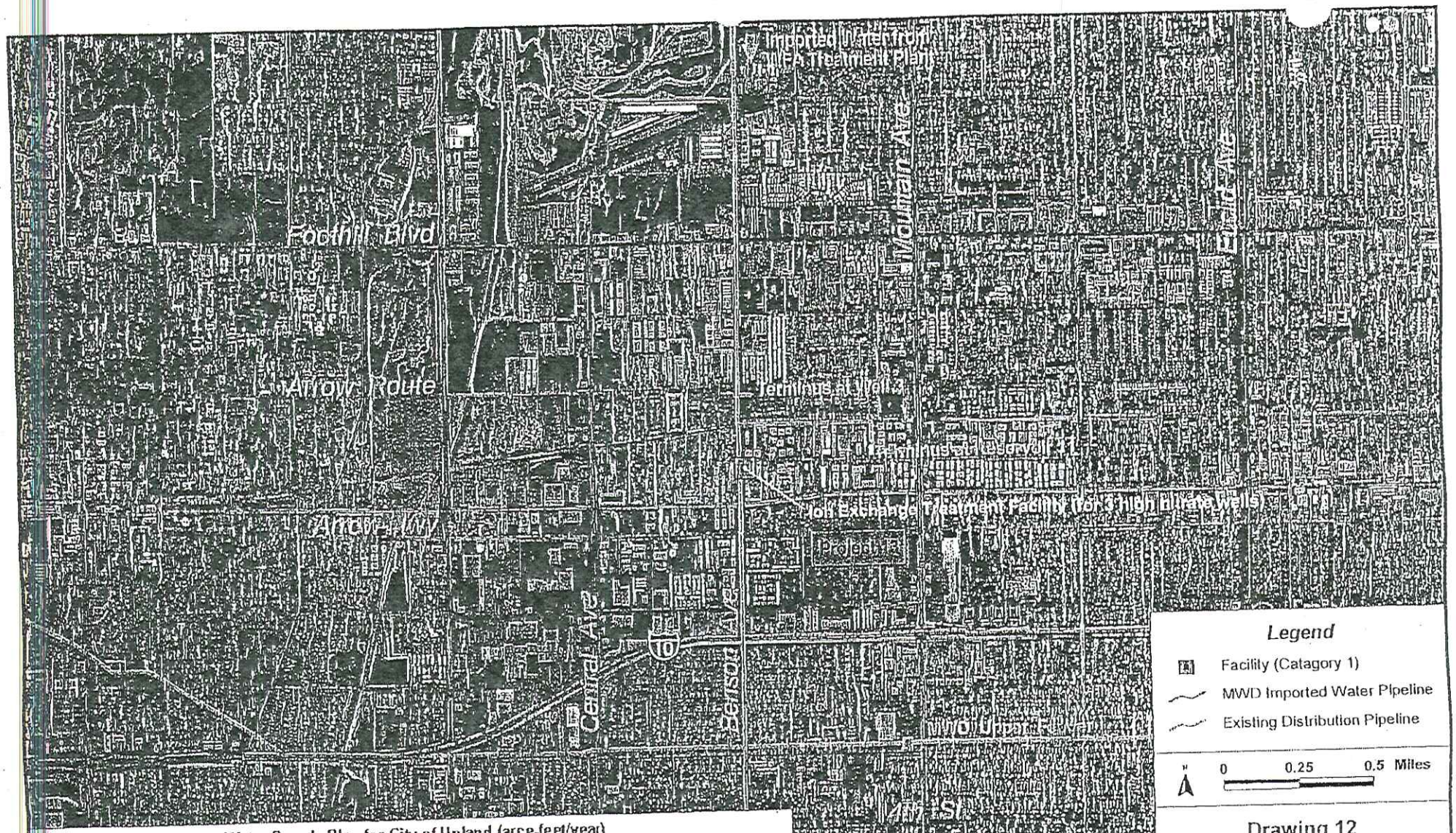
January 2001



Water Supply Plan for SAWC (arce-feet/year)

Purveyor Source	Projected Water Supply 2000	Projected Water Supply 2020	Proposed MWD Projects 2000	Proposed MWD Projects 2020
Chino Basin	70	1,110	70	1,110
Proposed MWD Projects	0	0	0	6,000
Other groundwater basins	400	400	400	400
San Antonio C[illegible]on	0	0	0	0
[illegible]	1,020	1,020	1,020	1,020

Note:
Due to the proximity to MWD's Upper Feeder pipeline, the facility and the well could be easily equipped to serve as a [illegible] location for conjunctive use storage and recovery.



Water Supply Plan for City of Upland (acre-feet/year)

Purveyor Source	Projected Water Supply 2000	Projected Water Supply 2020	Proposed MWD Projects 2000	Proposed MWD Projects 2020
Chino Basin Wells	2,429	3,050	2,429	3,050
Proposed MWD Projects	0	0	0	2,700
Supply from SAWC (non-Chino GW)	4,920	4,520	4,920	4,520
Supply from SAWC (San Antonio Canyon TP)	2,411	2,690	2,411	2,690
Supply from WECWC (Chino GW)	0	1,500	0	1,500
Supply from WECWC (other GW basins)	4,650	4,650	4,650	4,650
WFA Treatment Plant	7,590	7,590	7,590	7,590
Total	22,000	24,000	22,000	26,700

SECTION 3.0

DETAILED INFORMATION FOR SCORING

3A. REGIONAL BENEFIT

Since February 1998, the Chino Basin stakeholders have met twice per month to develop the Optimum Basin Management Program (OBMP). Development of the OBMP required three parallel processes: institutional, engineering, and financial. The institutional process defined the management agenda, directed the engineering and financial processes, and built institutional support for OBMP implementation. The engineering process developed planning data and management elements, and evaluated the technical and economic financing plans for the management elements. The financial process developed alternative financing plans for the OBMP through its evolution.

In June 1998, the stakeholders began the process of developing management goals for the OBMP that address the issues, needs, and interests of the Chino Basin producers. The four management goals of the OBMP are as follows:

- Enhance Basin Water Supplies
- Protect and Enhance Water Quality
- Enhance Management of the Basin
- Equitably Finance the OBMP

3A(i) Dry-Year Yield for Regional Benefit

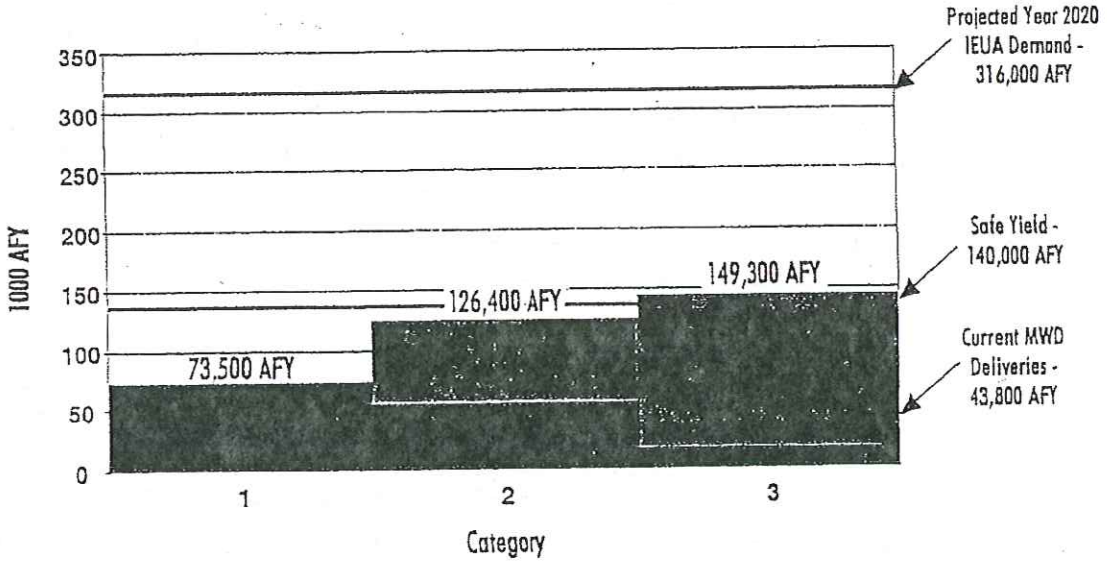
The proposed projects will enhance Metropolitan's dry-year yield while providing a regional benefit for Chino Basin agencies. This additional dry-year yield is realized through increased groundwater production capacity, expanded ASR (Aquifer Storage and Recovery) capabilities, increased wellhead treatment capacity, and enhanced water-wheeling potential. Each of the 38 proposed projects provides Metropolitan with increased dry year yield capacity while providing the facilities necessary to implement a regional conjunctive use program. Such a program would provide Chino Basin agencies with increased water supply reliability, redundancy and future drought protection.

The dry year yield potential of the proposed projects can be summarized via four types of projects. These project types include groundwater production facilities, ASR facilities, wellhead treatment facilities, and transmission and interconnection improvements. The groundwater production projects include the construction of new wells and appurtenant facilities. The construction of new wells will provide an increase in groundwater production capacity necessary to meet demands during periods of reduced Metropolitan supply. New ASR facilities, including new injection wells and modifications to existing ones, will enhance replenishment capabilities and the ability to implement a regional conjunctive use program. ASR facilities also provide a water quality benefit.

The construction of new wellhead treatment facilities will enable the use of previously inactive wells taken off-line due to poor groundwater quality, thus providing increased basin production capacity. The proposed wellhead treatment facilities include new ion-exchange (IX) facilities, modifications to existing IX facilities, and blending stations. Finally, improvements to existing agency interconnections and construction of new transmission capacity will enhance the ability to wheel water between agencies, thus increasing the water supply reliability and water system redundancy necessary to increase Metropolitan's dry year yield.

Currently, Metropolitan deliveries to the IEUA service area have exceeded 50,000 AFY during the past several years and are projected to increase to approximately 100,000 AFY in 2020. The projected year 2020 IEUA total water demand is approximately 316,000 AFY, which constitutes an increase in approximately 74,000 AFY from current demands. This 30 percent increase in water demand will to a large extent be met through an increase in interruptible imported water deliveries and recycled water. Implementing the proposed projects will enable Metropolitan to meet this increase in imported water demand during dry periods, thereby providing Metropolitan with an increase in dry year yield. Figure 3A-1 summarizes the dry-year yield benefit provided to Metropolitan through the implementation of Category 1, 2, and 3 projects.

FIGURE 3A-1
Dry Year Yield Benefits



Implementation of all of these projects, when combined with the safe yield, will provide dry year reliability. Because prolonged use of these local supplies would exceed the Basin's safe yield, Metropolitan can be assured that these projects would only be used during dry years and that Metropolitan's deliveries would not be reduced in normal and wet years.

3A(ii) Seasonal Nature of Project Production

The proposed projects will be constructed with the flexibility of operating year-round. The facilities and provisions necessary to achieve year-round production will be constructed, which will reduce the impact of not being able to produce during periods of reduced imported water deliveries. The facilities have been sized for operation during critical peak dry year periods. This ensures that the projects can reliably reduce imported water deliveries, even during peak or critical dry periods.

3A(iii) Institutional Arrangements for Curtailing Firm Deliveries

In order for any regional project to be successfully implemented, coherence between participating agencies must be formed and maintained. The agencies identifying the proposed projects have previously worked together under the guidance of the Chino Basin Watermaster to develop the historic Peace Agreement. The Peace Agreement provides the framework for the collaborative effort of Chino Basin agencies to implement the proposed projects.

The specific institutional arrangements required for those projects involving transmission and interconnection improvements are covered by the intent of the Peace Agreement. Final institutional arrangements among the participating agencies, the Watermaster, and Metropolitan would be required to define an appropriate delivery schedule to efficiently distribute both in-lieu or direct Metropolitan deliveries.

3A(iv) Ability To Sustain Production During a Three-year Shortage

The Chino Basin is the largest basin available for conjunctive use in Southern California (5 million AF of storage). Members of the Chino Basin appropriative pool already conduct interagency storage account transfers and the construction of the proposed facilities would enhance this capability. At the end of the 1999/2000 fiscal year, the total volume of groundwater in the storage accounts was approximately 170,000 AF. Assuming a worst-case scenario, the total volume of groundwater available in the Chino Basin is more than adequate to supplement approximately three years of imported supply. Implementation of all of the projects presented in this proposal, would make available approximately 149,000 AF — more than what Metropolitan would provide over a three-year period (approximately 129,000 AF).

The construction of the proposed facilities would also enhance the recharge capability of the Chino Basin agencies. During periods of surplus imported supply (wet years), the Chino Basin storage account could be replenished via direct or in-lieu deliveries and/or recharged via direct or in-lieu spreading facilities or injection wells (e.g., ASR), such as those proposed. Also, the Chino Basin Watermaster is currently developing a recharge master plan intended to further the recharge capacity of the Chino Basin and in turn, increase the Basin's ability to sustain production during a three-year shortage of imported supply.

3A(v) Incorporation of Change in Basin Operations into Management Plan

Any changes in Basin operations would be documented accordingly. The projects being submitted under this proposal are consistent with the goals of the OBMP. As previously stated, the basin management plan submitted under the OBMP provides the basis for future projects to ensure regional support and enhancement of Chino Basin resources. Any project and subsequent policy issues have already been addressed in the OBMP and the Programmatic EIR (certified by IEUA in July 2000). Changes to the existing adjudication are not necessary. It is inherent that the proposed projects benefit the members of the Chino Basin while providing Metropolitan with increased dry year yield.

3B. PROJECT PARTNERSHIPS

Many agencies are involved in water management within the Chino Basin. IEUA is working in cooperation with each of these agencies to achieve water supply reliability, water quality, and watershed management goals for the Santa Ana River Watershed and the Southern California region. We present our Program Concept to Metropolitan with confidence because our proposed projects represent a high level of interagency cooperation and support.

3B(i) Local and Regional Support

IEUA serves the Cities of Chino, Chino Hills, Montclair, Ontario, and Upland, as well as Monte Vista Water District, Cucamonga County Water District, and Fontana Water Company. Approximately 700,000 people reside in the Agency's 242 square-mile service area. These agencies and the people they represent support wise water management, as exemplified by the 38 projects named in this proposal.

IEUA also has a representative on the Chino Basin Watermaster Board. The Watermaster was established in 1978 in a Judgment entered in the Superior Court of California. The Watermaster has the responsibility for developing and implementing the Chino Basin OBMP. In July 2000, the Watermaster's planning process culminated in the adoption of a "Peace Agreement." The Peace Agreement outlines the schedule and actions for implementing the OBMP. The Watermaster and the OBMP stakeholders are in concurrence with the concepts and projects presented herein.

The proposed projects will benefit all Chino Basin agencies. They will be implemented to meet the goals of the OBMP and to confirm the Basin's ability and desire to participate in a regional conjunctive use project. Committees in the Chino Basin met to develop a list of projects to be submitted under this proposal. These 38 projects are part of a collective effort to enhance the management of the Chino Basin and provide a regional conjunctive use benefit. The projects are supported by the historic Peace Agreement to collectively manage the Basin. Our proposal is being submitted from all of the agencies in the Chino Basin through IEUA as a representative agency.

3B(ii) CEQA Status

Tables 2-1, 2-2, and 2-3 in Section 2 include environmental certification information. All 38 proposed projects fall under the Program Environmental Impact Report (EIR) prepared for the OBMP. As specific projects move forward, additional review will be required. It is anticipated that most of the projects will qualify for a negative Declaration or a Categorical Exemption. All projects are expected to meet California Environmental Quality Act (CEQA) requirements.

3B(iii) Potential Planning Uncertainties

The projects presented in this proposal have an unusually low degree of planning uncertainties. These projects were developed as part of a regional program to collectively and efficiently manage the resources of the Chino Basin. The Peace Agreement confirms the Basin's interest in providing such a regional benefit. The development of the OBMP and the effort behind implementing the Peace Agreement are the bases for the planning effort of the proposed projects.

3B(iv) Endorsements Needed for Project Approval

The 1978 Judgment requires that the Watermaster develop a management plan for the Chino Groundwater Basin that meets water quality and water quantity objectives for the region, and approval of the projects identified in this proposal would be through the Watermaster. As already stated, the Watermaster and the OBMP stakeholders concur with the concepts presented in this proposal.

3B(v) Community Reaction

Community reaction should be positive. Any attempt to improve the quality and availability of good-quality drinking water would be perceived as favorable.

Flows that otherwise would be lost will remain within the Basin, contributing to yield maintenance. In addition, the projects will help keep the poor quality rising groundwater from creating adverse environmental impacts associated with prolonged inundation of sensitive wetland habitats in the Prado Basin.

The projects will also help recover poor quality groundwater. When poor quality groundwater is withdrawn, treated, and reused, the water returning to the groundwater table will be of higher quality. This should have an immediate positive impact on downstream sources (the Santa Ana River) and ultimately have a beneficial water quality impact within the Basin itself.

3B(vi) Metropolitan Actions

As described in Section 2C, the schedule for the proposed projects could be accelerated. We are ready to go! Since the Programmatic EIR has been completed per the OBMP, it is hoped that Metropolitan would be able to accelerate the funding schedule.

3B(vii) Project Status

The 38 projects listed in this proposal have evolved from the OBMP Phase 1 Report (August 1999) and the Program EIR (May 2000). A recharge master plan is now underway. In addition, the OBMP stakeholders have met to identify the range of Category 1, Category 2, and Category 3 projects to increase dry year yield, improve water quality, and accomplish the other objectives described in this proposal.

As stated in Section 1, all of the proposed projects include construction of substantive new facilities that will provide local redundancy to Metropolitan's supplies during times of drought or emergency and will allow Metropolitan increased flexibility to meet the needs of other parts of its service area. All projects will be configured so that new capacity can be used in lieu of taking water from the Rialto Pipeline. This not only provides Metropolitan with water supply benefits, but has a quantifiable benefit in terms of enhanced blending capability at the Weymouth and Diemer Water Treatment Plants.

The projects are also available to provide flow to local agencies during periods of high demand when the hydraulic capacity of the Rialto Pipeline is exceeded. This supply redundancy will allow Metropolitan to possibly defer costly expansion of the Rialto Pipeline.

The schedules for the various projects are summarized in Tables 2-1, 2-2, and 2-3 in Section 2. As shown in the tables, the on-line date for the 38 projects ranges from November 2001 to November 2003. This assumes funding available in August of this year. If funding could be made available sooner, the on-line dates would be accelerated by approximately four months (see Table 1-2).

3C. LOCAL NEEDS ADDRESSED

3C(i) Addressing the Needs of Local Proponents

The proposed projects meet the interests and needs of the Chino Basin agencies, as defined in the OBMP. As previously stated, the OBMP presents the foundation for future water resources development and recommends facilities that would optimize the Chino Basin's water resources and conjunctive use potential. The following section summarizes how the local needs of the project proponents are addressed through the implementation of the proposed projects.

The needs of the local proponents are addressed through a regional management approach of the Chino Basin service area. Implementation of the proposed projects will be coordinated with the OBMP effort to ensure efficient water resources management. The projects will enable local agencies to maximize the beneficial use of local groundwater supplies, providing the region with new local water sources and a "drought-proofing" strategy.

Figure 3C-1 summarize the benefits realized through the implementation of the proposed projects shown in Table 3C-1. The local benefits include improved water quality, balanced recharge capabilities, enhanced storage capabilities, increased seasonal peaking abilities, and

FIGURE 3C-1
Benefits Breakdown for Collective Projects

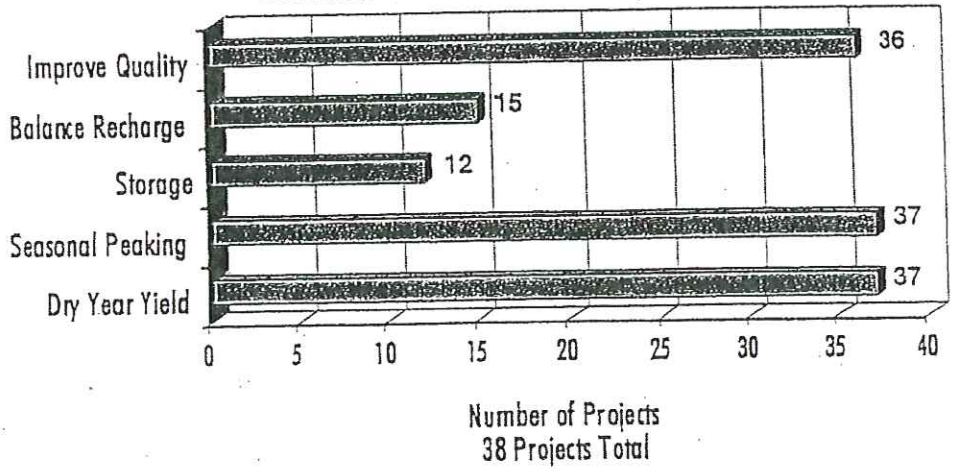


TABLE 3C-1
Summary of Projects

Project Name	Description	Quantity New Yield (AFY)	Project Cost
Category 1			
Nitrate Removal Water Treatment Plant / City of Chino (Chino)	Reclaim poor water quality GW for beneficial use	13,441	$4,313,000
Reservoir 2A Wellhead Treatment Facility / Cucamonga County Water District (CCWD)	Construct GAC treatment facility for 3 wells	6,300	$7,122,000
Reservoir 3 Wellhead Treatment Facility / CCWD	Construct GAC treatment facility for 4 wells	9,700	$6,794,000
Reservoir 3A Wellhead Treatment Facility / CCWD	Construct GAC treatment facility	3,500	$1,850,000
Wellhead Ion-Exchange (IX) #1 / Fontana Water Company (FWC)	Facilities for high nitrate and TDS and distribution	3,700	$4,000,000
Wellhead IX #2 / FWC	Wellhead treatment facilities for high nitrate and TDS and distribution	6,000	$6,400,000
Wellhead IX / Jurupa Community Service District	Treat 3,500 gpm well water with nitrates and connection to Ontario	4,000	$5,000,000
Wellhead IX for 2 Wells at Plant 4 / Monte Vista Water District (MVWD)	Nitrate removal and new production of 4,700 AFY	4,700	$2,150,000
Wellhead IX at Well 2 / MVWD	Nitrate removal and new production of 1,450 AFY	1,450	$875,000
Wellhead IX & Transmission Line / City of Ontario (Ontario)	Construct approx. 12,500 LF of 18" main and an ion-exchange treatment facility	5,000	$3,500,000
Anion Exchange Plant Expansion & Upgrade / City of Pomona (Pomona)	Modify existing 15 MGD plant to treat nitrate	10,000	$1,700,000
Retrofit Well & Wellhead IX / San Antonio Water Company (SAWC)	Facilities for high nitrates w/ future connection to Ontario, Upland or other MWD user agency	3,000	$2,040,000
Wellhead IX / City of Upland	Construct treatment facilities for 3 high nitrate wells	2,700	$3,000,000
TOTAL		73,491	$48,744,000
Category 2			
Benson/Palo Verde ASR / Chino & MVWD	Construct high volume well - convey WFA water to site for injection and production (new production)	5,040	$1,438,000
State/Benson ASR / Chino	Modifications to existing GW production facilities (preservation of existing GW)	4,480	$476,000
Phillips/Central ASR / Chino	Modifications to existing GW production facilities	6,160	$2,002,000
West Chino Basin Interagency Connection & Distribution / Chino	Enable regional distribution of Chino Basin Groundwater. Interconnections between water systems	5,377	$5,261,000

Project Name	Description	Quantity New Yield (AFY)	Project Cost
Well 13 Blending Station / City of Chino Hills	Well 13 Nitrate Blending Station	2,100	$90,000
Well No. 36 / CCWD	Rehabilitate existing well and install new pumping & discharge line to Reservoir 1C.	2,500	$850,000
CCWD/MWD Chino Basin Groundwater Use / CCWD	Expansion of existing facilities at Res. #1 to deliver ground water into MWD system	11,000	$3,947,000
Cucamonga Basin Recharge Project / CCWD	Increase water production capabilities from new gw sources w/in Chino Basin to deliver gw to MWD	4,000	$2,600,000
Reactivate MWD Connect. / IEUA	Facilities to reactivate dismantled MWD connections	n/a	$550,000
Rehabilitate or Build New Well (ASR) - Plant 1 / MVWD	Construct an injection/extraction well near Benson Feeder where GW nitrate levels are high	2,167	$1,000,000
Rehabilitate or Build New Well (ASR) - Plant 9 / MVWD	Construct an injection/extraction well near Benson Feeder where GW nitrate levels are high	2,167	$1,000,000
Rehabilitate or Build New Well (ASR) - Plant 12 / MVWD	Construct an injection/extraction well near Benson Feeder where GW nitrate levels are high	2,167	$1,000,000
Rehabilitate or Build New Well (ASR) - Plant 17 / MVWD	Construct an injection/extraction well near Ramona Feeder where GW nitrate levels are high	2,167	$1,000,000
Well 15 Blending Station / City of Ontario (Ontario)	Blend 34 mg/l nitrate water with water from well (1660 gpm) prior to entering distribution system	2,000	$200,000
Jurupa Desalter II Connection / Ontario	Construct 18" interconnection between Ontario and JCSD dist. System (participating agencies: JCSD and SAWPA)	n/a	$75,000
Chino II Desalter Transmission Facilities / Ontario	Construct approx. 2,600 LF of 20" pipeline (participating agencies: JCSD and SAWPA)	n/a	$850,000
Well No. 36 / Pomona	High nitrate well that will connect anion's exchange plant	1,600	$400,000
Booster 16A&B and Pipeline / Pomona	Provide backup to existing booster No.12	n/a	$1,100,000
TOTAL		52,925	$23,839,000
Category 3			
2 New Wells / CCWD)	Construct 2 wells at District's Res. 1C site	5,000	$1,500,000
New Well - Plant 28 / MVWD	Construct new well - water to be used at a nitrate blending station	2,900	$1,000,000
New Well #1 / Ontario	Construct & equip well	3,000	$1,000,000
New Well #2 / Ontario	Construct & equip well	3,000	$1,000,000
New Well #3 / Ontario	Construct & equip well	3,000	$1,000,000
New Well #4 / Ontario	Construct & equip well	3,000	$1,000,000
New Well / SAWC	Construct and equip new well with future connection to Ontario, Upland or other MWD user agency	3,000	$1,000,000
TOTAL		22,900	$7,500,000
GRAND TOTAL		149,316	$80,083,000

3C(ii) Protecting the Interests of Non-Participating Entities

As part of the OBMP development, the Chino Basin stakeholders adopted several core values as a guide for future basin management. Each of the 38 projects submitted under this proposal addresses the following core values: water quality, long view, increased local supplies, groundwater storage/conjunctive use, and cost of groundwater supplies. As described below, the proposed projects address these core values, while balancing the use of imported/local supplies to increase water reliability.

- *Water quality.* All producers in the Chino Basin desire to produce water of a quality that is safe and suitable for the intended beneficial use. Increased wellhead treatment capacity as well as blending facilities will ensure compliance with this core value.
- *Long view.* Each of the Chino Basin producers desires a long-term and stable planning environment to develop local water resources management projects. The producers, independently and through the Chino Basin Watermaster, strive to take the long view in their planning assumptions and decisions to ensure a stable and robust management program. The proposed projects were identified with this core value in mind and represent the forward thinking necessary to implement a regional conjunctive use program.
- *Increased local supplies.* All producers are dependent on high-quality imported water for direct uses and for groundwater replenishment. Because imported supplies may be less available during dry periods, the producers will strive to minimize their dependency on imported water and to increase use of local supplies during drought. The proposed projects address this core value by adding additional groundwater production capacity, thereby reducing dependency on imported supplies and increasing local water system redundancy, thus providing Metropolitan with an increase in dry-year yield.
- *Groundwater storage/conjunctive use.* Unused groundwater storage capacity in the Chino Basin is a precious natural resource. The producers will manage the unused storage capacity to maximize the water quality and reliability and minimize the cost of water supply for all producers. The groundwater storage core value was administered to encourage the development of a regional conjunctive use program. The proposed projects will enable such a project to be implemented.
- *Cost of groundwater supplies.* The producers are committed to finding ways to subsidize the cost of using poor quality groundwater in a cost-effective and efficient manner. Increased groundwater production and wellhead treatment capacity will increase Metropolitan's dry-year yield and with Metropolitan's assistance, will provide an affordable and additional reliable water resource during periods of drought.

3D. WATER SUPPLY OR WATER QUALITY IMPACTS

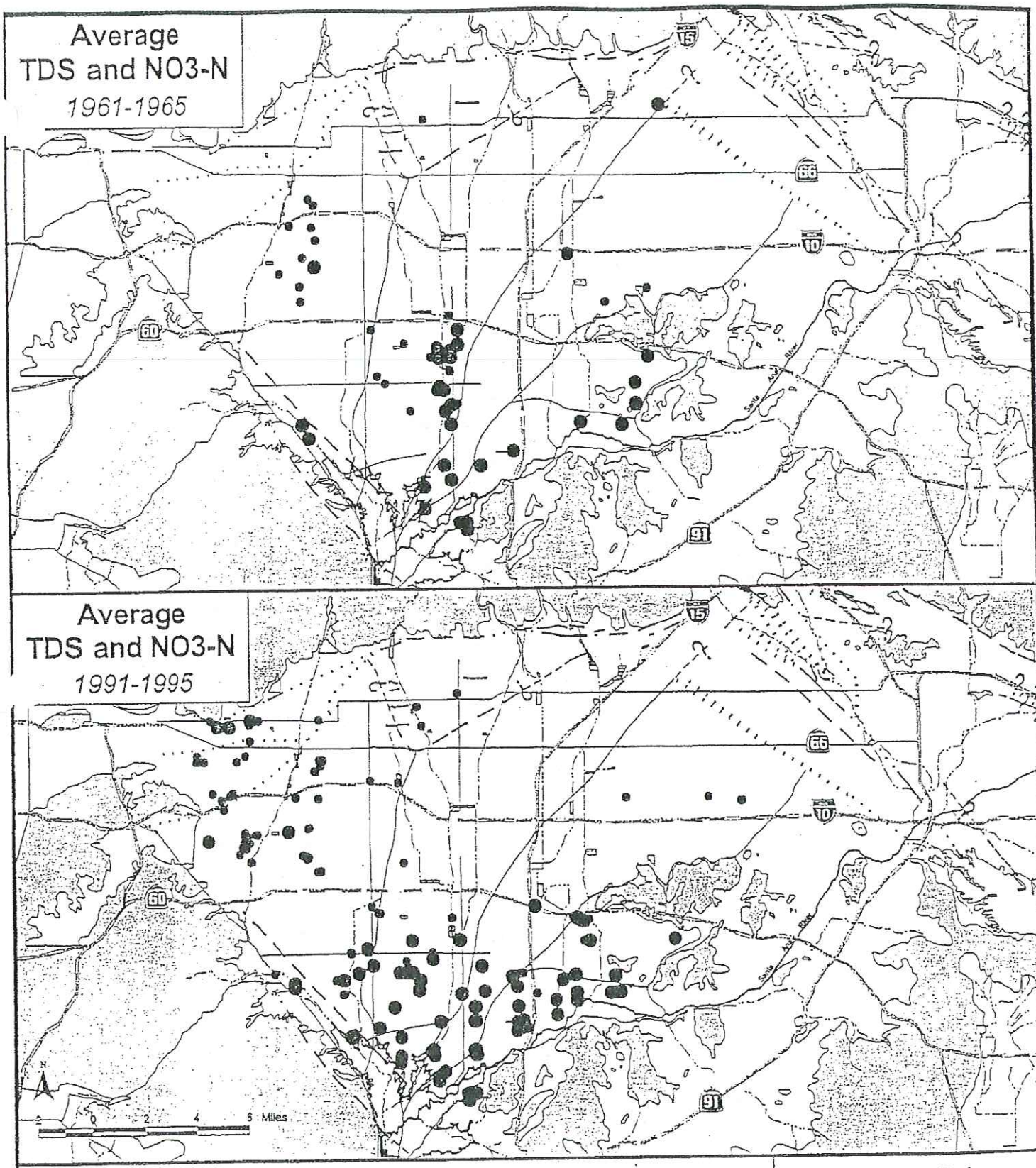
As discussed throughout this proposal, the water supply and water quality impacts of the proposed projects would be positive.

3D(i) Water Supply/Quality Impacts within the Basin

OBMP related water quality studies show that high concentrations of Total Dissolved Solids (TDS) and nitrates exists in the southern portion of the Basin. Figure 3D-1 shows the past and most recent water quality data throughout the Basin. It is apparent that groundwater quality has been deteriorating greatly with time. As shown on Figure 3C-1, 36 of the 38 projects presented in this proposal would have a water quality benefit to the Basin. These projects involve pumping and treating groundwater from various locations throughout the Basin to achieve drinking water standards. Groundwater pumped from the Basin, treated, reused and returned to the Basin will ultimately have a beneficial impact on water quality by lowering TDS and nitrate levels before returning water to the Basin. Although not all of these projects are exactly similar to other Metropolitan storage programs, they still provide Metropolitan with the same end results: a dry year supply. They also provide other regional benefits.

From a perspective of water supply, our approach provides Metropolitan dry year supply in advance of placing any water in storage. Depending on the total amount of financing from Metropolitan, we can make available more than 149,000 AF. Metropolitan can use these supplies not only for long-term dry-year yield, but on a short-term basis when there is a high demand for water, and/or energy is limited.

Given the State's current energy crisis, it may become necessary for Metropolitan to stop pumping. Chino Basin supply availability could allow Metropolitan to reduce pumping of State Water Project supplies by more than 149,000 AF. By the ability to shed electrical load at critical periods when energy supplies are limited, Metropolitan could save millions of dollars in energy costs and help prevent rolling blackouts.



Legend

- Well with Average NO3-N > 10 m/L
- Well with Average TDS > 500 m/L
- Hydrologic Chino Basin
- Management Zone Boundary

Figure 3D-1
Impaired Groundwater in the Chino Basin
TDS and NO3-N

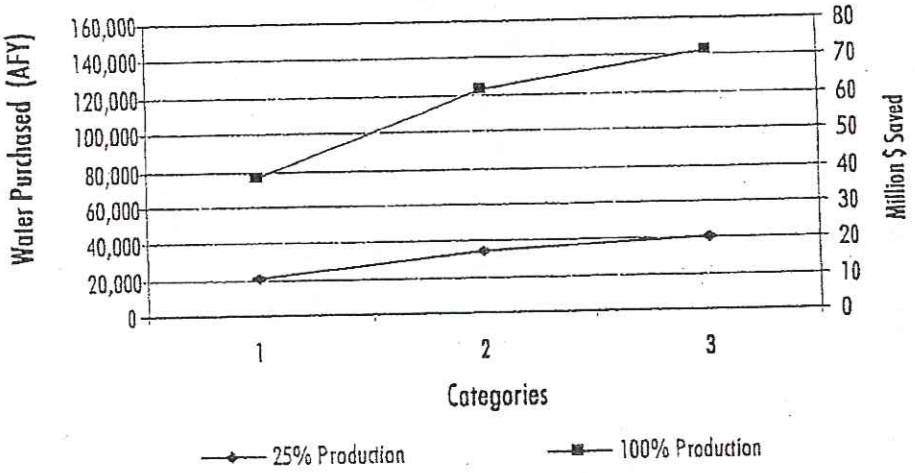
Inland Empire Utilities Agency

Date: January 2001

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Implementation of the proposed projects could provide Metropolitan an additional water quality benefit. The recently-completed Salinity Management Study Final Report (June 1999) indicated a benefit of $95 million for every 100 mg/L of TDS reduction in Metropolitan's water supply. Thus, if the proposed projects are implemented, additional State Project water would be available for blending at the Weymouth and Diemer Water Filtration Plants. Figure 3D-2 quantifies the water quality savings benefit for the Category 1, 2, and 3 projects at 100 percent and 25 percent production levels.

FIGURE 3D-2
Water Quality Benefits



The cumulative projected dry-year yield for the 38 projects is more than 149,000 AFY, which exceeds the amount of imported water currently used within the Basin. This assumes that all of the projects are completed and reach 100 percent of their projected production. It may be more accurate to assume that not all of the projects will be in full production all of the time. However, even if only 25 percent of production is achieved, Metropolitan would realize substantial water quality benefits.

3D(ii) Potential Negative Impacts

No negative impacts are anticipated. Construction of the proposed projects will improve water quality and increase water supply availability for the Chino Basin.

3D(iii) Anticipated Regulatory Requirements

The Department of Health Services (DOHS) requires permits for all water sources. The local agencies will obtain the required new water supply permits from DOHS.

The Final Program EIR for the OBMP shows that it is necessary to maintain the production capacity of the Basin to prevent a loss in safe yield. Without implementing measures to maintain the safe yield, approximately 40,000 AFY would flow out of the Basin and into the Santa Ana River. A number of these projects achieve the goals of the OBMP and are therefore included in the Draft EIR. However, further environmental regulatory requirements will be necessary for each separate project.

3D(iv) Status and Schedule

It is estimated to take approximately two to four months for a new water source permit to be approved by the DOHS. The status and schedule for acquiring other regulatory approvals varies for each independent project and will be addressed as the projects proceed.

3E. POTENTIAL IMPACT TO METROPOLITAN'S FINANCIAL INTEGRITY

This section discusses a potential implementation and financial plan for the Chino Basin groundwater storage projects that contribute within Metropolitan's service area.

3E(i) Effects on Purchase of Imported Surface Water

Funding of the submitted projects will reduce Metropolitan's imported water more than 149,000 AF in dry years. These "firming" projects for the Chino Basin would provide flexibility and reliability for Metropolitan's system by allowing the Basin to be self-sufficient when imported supplies are unavailable (drought or emergency periods).

Participating agencies would commit to the purchase of fixed amounts of imported water supply from Metropolitan and would not affect purchase of imported surface water supplies. Depending on the level of supplies available, Metropolitan would have the flexibility to determine water delivery to the Chino Basin. During dry or drought years, Metropolitan would request the agencies to produce water within the Basin to meet overlying demand in-lieu of surface delivery. Following the end of the drought periods, the resultant Chino Basin replenishment obligation would be handled at least in part in the same manner.

The Chino Basin, with an unused storage capacity of about 1 MAF, is located in a strategic position for the Metropolitan distribution system. Construction of the project facilities would meet the demand in the Chino Basin and also have the ability to export extra pumping capacity into Metropolitan's system. Aside from reducing imported water demand within the Chino Basin to provide Metropolitan dry year yield, Metropolitan would be able to utilize the facilities beyond the internal needs of the Basin. In the future, Metropolitan would have the ability to pump portions of this water back into the system, to increase water deliveries and improve water quality. The projects submitted for funding would make available increased groundwater pumping in the Basin and allow future development of these supplies for other Metropolitan service areas.

The proposed projects would provide the needed redundancy and flexibility to Metropolitan's system. The local dry year projects would provide regional savings and increase reliability resulting from the development of local resources.

The facilities would provide short term "firming" supply for dry year yield. As future water demands increase in the Chino Basin, the demand for direct delivery of imported water for the Chino Basin is projected to increase from about 50,000 acre-feet in 2000 to 100,000 acre-feet by 2020, as indicated in IEUA's Urban Water Management Plan Year 2000 Update. This increase in demand will require more imported water from Metropolitan to meet the region's needs.

If funded, these projects would sustain water production during shortage and enhance recharge capability and allow the Basin to be managed conjunctively. The following list shows the benefits from implementing Chino Basin projects:

(1) Provide more than 149,000 AFY dry year supply.
(2) Reduce summertime peaking on Metropolitan's Rialto Pipeline.
(3) Deliver more State Water Project supplies to the Weymouth and Diemer plants via the East Branch/Rialto Pipeline to meet Basin Plan Salinity Objectives.
(4) Minimize (or eliminate) Metropolitan's surface water deliveries during future droughts/emergencies.
(5) Allow Metropolitan to possibly export water into the Upper and Lower Feeder service areas for other Member Agencies.

3E(ii) Mitigation of Negative Impacts

No negative impacts are anticipated to result from construction of the proposed projects. The conjunctive use programs would not result in adverse water quality impact on the Chino Basin nor to Metropolitan. Development of these local resources reduces the demand on Metropolitan's system and therefore reduces the need for additional investment in regional infrastructure. The development of the local projects would defer the time when Metropolitan would need to expand the Rialto Pipeline. Metropolitan will have the flexibility to dictate the amount of imported water to service the Basin through the transmission line during crucial periods such as droughts or in cases of emergency.

3E(iii) Project Financing

This proposal present 38 projects for funding consideration. These projects have been categorized into three groups: Category 1, Category 2, and Category 3. This subsection discusses a potential implementation and financing plan for the proposed projects. A 6 percent interest rate and an amortization period of 20 years with an inflation rate on costs of 3 percent is presented along with a discussion of Proposition 13 funding needed to prioritize and equitably finance the facilities discussed in this proposal.

The Chino Basin stakeholders and applicants have agreed and are submitting 38 projects for 50 percent Proposition 13 funding. The remaining funding would be developed by the respective project sponsoring agency through local financing payment using various local resources.

3E(iv) Cost Per Acre-Foot Dry-Year Yield

Modifications to the economic analysis methodology provided in Metropolitan's RFP were done to accurately reflect the cost and funding required on the proposed projects. The modifications provide a financial approach using an overall menu of projects on a category basis. Financial analyses were done for Categories 1, 2, and 3, rather than per each of the 38 projects. This approach was taken to meet the format and page requirement of Metropolitan's RFP. Economic analysis worksheets have been developed for each Category 1, 2, and 3 project, and are available upon request.

These programs provide flexibility and redundancy in Metropolitan's system. This would give Metropolitan the ability to provide water services in a more efficient and reliable way to its service area. For example, if, during a dry year, Chino Basin overpumps an extra 20,000 AFY above the allotted safe yield (140,000 AFY), or 160,000 AFY, the overproduction would need to be replenished. Therefore, during wet years and normal years, an additional 20,000 AFY of imported water would need to be provided by Metropolitan to meet this replenishment obligation. The Chino Basin agencies will have the ability to take extra water "in-lieu" of pumping the groundwater. The economic analysis methodology spreadsheet has been modified to reflect these types of operating conditions.

The economic analyses assume takes from Chino Basin at five-year interval starting in year 2005. Puts to storage would occur the following year for the same total annual take capacity. Category 1 economic analyses assume Metropolitan would provide 50 percent capital funding from Proposition 13, an $85/AF O&M cost for wellhead treatment, $60/AF pumping cost associated with takes from storage, and a $90/AF replenishment cost, which corresponds to put to storage. Categories 2 and 3 assume that Metropolitan would provide 50 percent capital funding as well as pumping and replenishment costs.

Table 3E-1 summarizes the project cost per acre-foot of dry year yield for the three categories.

TABLE 3E-1
Project Cost per Acre-Foot Dry-Year Yield

PROJECT DESCRIPTION	COST PER ARCE-FOOT OF DRY YEAR YIELD
Category 1	$159
Category 2	$110
Category 3	$194

3F. DESCRIBE HOW PROJECTS WILL MEET OVERLYING DEMAND

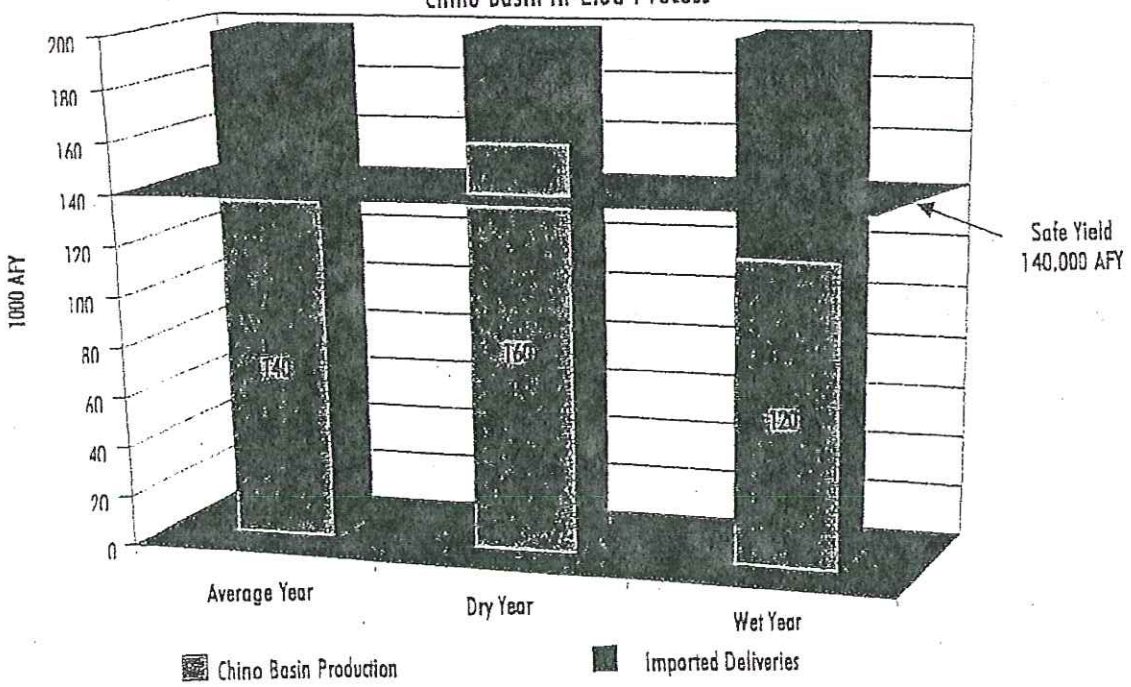
3F(i) Storage Within a Four-year Period

The Chino Basin is the largest basin available for conjunctive use in Southern California. The Basin has 5 MAF of storage of which 1 MAF is unused. Currently, water agencies have approximately 170,000 AF of storage in excess of the Basin's safe yield. The OBMP Peace Agreement has approved 500,000 AF for additional dry year storage. This storage capacity would be sufficient to accommodate several years of imported deliveries. The proposed projects would enable the basin to be recharged during periods of surplus imported supply via direct deliveries in-lieu of groundwater production.

Figure 3F-1 illustrates how the existing Chino Basin groundwater resources can be utilized in-lieu of direct imported deliveries.

This example on the figure shows that an additional 20,000 AF of groundwater could be extracted during a dry year to meet demand. Implementation of these projects would allow Chino Basin pumpers to significantly increase their dry year pumping ability. The magnitude of the Basin allows overproduction for considerably more than four years.

Figure 3F-1
Chino Basin In-Lieu Process



The Chino Basin is in a unique position to develop a regional conjunctive use program that will efficiently meet overlying demands via in-lieu deliveries. Several of the proposed projects, including injection wells and other ASR facilities, will increase the Chino Basin's "put and take" capacity, while new wells and wellhead treatment projects primarily will increase the "take" capacity of the Basin.

3F(ii) Meeting the IRP 3:1 Goal

As shown in the discussion above, the complete program presented in this proposal could actually exceed RIP goals of a 3:1 ratio.

3G RISK MANAGEMENT

The projects described in this proposal are virtually "risk free."

3G(i) Description of Project Risks

Metropolitan can be assured that high quality water supplies would be available as needed, without threat of loss of or contamination of stored supplies. Several of the proposed projects provide treatment to ensure the water produced meets all regulatory standards. Furthermore, since these projects do not require Metropolitan to prestore water in the Chino Basin, concerns over loss of or contamination of stored water would be eliminated.

3G(ii) Approach to Risk Management

Our Program Concept approach provides a menu of alternatives in-lieu of a single project. This diversification minimizes Metropolitan's risks by not putting "all of Metropolitan's eggs into one basket."

The Chino Basin stakeholders through the Peace Agreement have reached accord on the OBMP, which outlines ("requires") management of the available groundwater resource to optimize not only the local area resources, but also our regional resources.

The variety of projects we have developed accomplishes these goals both locally and regionally. Assisting the local agencies with project implementation provides Metropolitan the flexibility to utilize groundwater resources when imported supplies are short. Under the Peace Agreement, the Chino Basin agencies need Metropolitan's help to finance projects that provide the redundancy to allow them to work with Metropolitan or over produce the groundwater basin when imported supplies are not readily available.

The Chino Basin agencies look forward to entering into a cooperative agreement with Metropolitan to start the implementation of these projects that will ultimately lead to being able to produce more than 149,000 AF of water. The agencies are ready to enter into a contract with and to guarantee these supplies to Metropolitan.

3G(iii) Indemnification

The OBMP is mandated by the Court. Metropolitan is thus assured that, with the implementation of these projects, the contract supplies would be available when needed.

Exhibit D

METROPOLITAN AWARD LETTER

MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Office of the General Manager

April 10, 2001

Mr. Richard W. Atwater
Chief Executive Officer/General Manager
Inland Empire Utilities Agency
P.O. Box 697
Rancho Cucamonga, CA 91729-0697

Chino Basin Programs
Participation in Groundwater Storage Programs Using Proposition 13 Funding

Thank you for your submittal to the Request for Proposal for Participation in Groundwater Storage Programs Using Proposition 13 Funding (RFP No. WRM-2). We are pleased to inform you that the Selection Committee has identified your proposal to be included in the shortlist to receive Prop 13 funding.

In April 2001, the Metropolitan Board of Directors directed staff to finalize agreement terms for conjunctive-use program included in the shortlist. Several milestone targets are identified in the RFP as requirements for continued consideration for funding (Table 1 - Performance Targets from RFP WRM-2). Each proposal is required to meet the targets and deadlines to receive funding. If a shortlisted proposal does not meet all of the requirements specified in the RFP, Metropolitan will have the option to disqualify such proposal and finalize agreement terms with a proposal in the waitlist.

We anticipate sending a draft agreement in the near future. As noted in the enclosed schedule, the RFP requires program agreement terms to be finalized by August 2001.

Please contact Robert Harding at (213) 217-6582 if you have any questions.

Very truly yours,

Ronald R. Gastelum
General Manager

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Enclosure

ENCLOSURE 1

REQUEST FOR PROPOSALS FOR PARTICIPATION IN GROUNDWATER STORAGE PROJECTS USING PROPOSITION 13 FUNDS (RFP No. WRM-2)

TABLE 1
PERFORMANCE TARGETS

Date	Target	Consequence if Target is Not Achieved
January 19, 2001	Receive Proposals	Proposal will be rejected
August 1, 2001	Finalize Agreement Terms	Proposal will be rejected
September 1, 2002	Completion and certification of all environmental documents necessary to comply with CEQA	Proposal will be rejected
September 2003	Construction Initiated	Agreements Terminated

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Exhibit E

PROCEDURE FOR INITIAL CALCULATION OF METROPOLITAN STORAGE ACCOUNT

Exhibit E is to itemize a pre-existing storage account to be rolled over into Metropolitan's Storage Account. This rollover water is to be called and sold to IEUA on a first in/first out basis. The applicable water rate to be paid for each rolled over account is specified in this exhibit, as is the responsibility for extraction costs, facility maintenance fees, etc.

Water Account	Quantity of Water Transferred (Acre-feet)	Water Rate to be Paid when called under this Agreement for firm delivery	Responsibility for Costs: Electrical and Operation & Maintenance Costs	Losses
Trust Storage Account	4,739	Untreated replenishment rate at the time the water is called under this Agreement	IEUA	None
Trust Storage Account (2003 Interim Conjunctive Use Program)	X[1]	Untreated replenishment rate at the time the water is called under this Agreement	IEUA	None

[1] Acre-feet of water stored by Metropolitan in the Chino Basin with the authorization of the Watermaster since March 1, 2003 under the 2003 Interim Conjunctive Use Program letter agreement dated April 4, 2003.

Exhibit F

ACCOUNTING METHODOLOGY

Annual Operating Plan

Commencing upon the Effective Date of this Agreement and thereafter prior to the beginning of each fiscal year, the Operating Committee will develop an Annual Operating Plan to forecast IEUA's and TVMWD's operations for the coming year in terms of groundwater production and imported water delivery absent the Program, as well as intended storage through in-lieu deliveries, injection and direct spreading, and extraction. Deliveries to the Metropolitan Storage Account through in-lieu deliveries, injection, or direct spreading will be determined using methodologies detailed in this Exhibit F.

The Annual Operating Plan must reflect IEUA's and TVMWD's monthly operations in terms of groundwater production and imported water deliveries absent the Program. If water is to be stored through direct injection or spreading or in-lieu deliveries, the Annual Operating Plan must indicate the months when the deliveries to the Chino Basin are expected to occur. If water is to be extracted, the operating schedule must reflect the amount of imported water that will be delivered from the Metropolitan Storage Account each month.

Upon call by Metropolitan for storage or extraction, the Operating Committee shall prepare a revision to the Annual Operating Plan for submission to Metropolitan, IEUA, TVMWD, and Watermaster, which would indicate the revised monthly storage or extraction amounts for the Metropolitan Storage Account. Metropolitan shall invoice for extracted Stored Water Delivery on a monthly basis at the firm water rate minus pumping and Operations and Maintenance Costs, according to the revised Annual Operating Plan. Any adjustments to the quantities billed shall be made during the year-end reconciliation.

Calculation of Storage and Extraction

IEUA and TVMWD shall account for all water stored and extracted in the Chino Basin by their respective subagencies and each submit its certification of these total amounts and the subset of these amounts achieved for the Metropolitan Storage Account. IEUA and TVMWD shall each submit this certification to Metropolitan and the Watermaster on a monthly basis. At the end of each fiscal year, IEUA and TVMWD shall perform an annual assessment of total storage and extraction and the subset achieved for the Metropolitan Storage Account. Any adjustments to the monthly submittals shall be provided by IEUA to Metropolitan and to the Watermaster in a timely manner for consideration in the preparation of the Watermaster's annual report.

All accounting for the Metropolitan Storage Account shall conform to the following unless otherwise agreed by Metropolitan, IEUA, TVMWD, and Watermaster:

a. Initial storage balance upon execution of this Agreement shall be consistent with Exhibit E "Procedure for Initial Calculation of Metropolitan Storage Account". This initial storage balance is firm water to be billed at the rate designated in Exhibit E upon its extraction. This water, when extracted, shall be part of IEUA's firm water allocation pursuant to the rate structure. This water shall be first in, and first out of the Metropolitan Storage Account.

b. All other water delivered to the Metropolitan Storage Account shall be "new wet-water storage" to the Chino Basin, and not accomplished through an accounting transfer of pre-existing storage. New storage is achieved through demonstrated in-lieu delivery spreading, or injection of imported water supplied by Metropolitan.

c. Monthly amounts certified by IEUA or TVMWD as in-lieu storage cannot exceed:

1. extraction capacity available within IEUA's or TVMWD's service area in the month certified, and

2. amount of firm water purchased by IEUA or TVMWD from Metropolitan in the month certified.

In-lieu storage amount will be equal to the difference between the amount pumped during the year and the sum of the pumping rights, but in no case shall be larger than the quantity of water purchased from Metropolitan or the pumping capacity.

Within two months following the formal issuance of Watermaster's annual report, the Operating Committee shall perform an annual reconciliation of Metropolitan and IEUA's and TVMWD's records with the Watermaster report with respect to total storage and/or extraction from the Metropolitan Storage Account and Metropolitan's water billing inclusive of credits for the Operation and Maintenance Costs and Electrical Costs, and prepare any needed paperwork for adjustments to the billing.

Exhibit G

Chino Basin Conjunctive Use "Dry Year" Storage Project
Performance Criteria

Metropolitan may, on fifteen (15) days notice, require Program Agency to meet the objectives of the project as follows:

1) IEUA and TVMWD agree to reduce imported water deliveries by approximately 33,000 AF from the preceding 12 month period during the next 12 month period; and
2) IEUA, TVMWD and Chino Basin Watermaster through their agreements with Operating Parties will cause to be pumped during the next 12 months 33,000 AF from the Metropolitan Storage Account; and
3) Chino Basin pumping by the Operating Parties in the Dry Year program within the Chino Basin appropriative pool will increase over the previous year by 33,000 AF.

All three performance targets do not need to be met precisely (+ or – 10 percent.) As an example, IEUA and TVMWD would meet the objectives of the program if all three of the following occurred:

30,000 AF	Reduced imported full service deliveries when compared to the preceding 12 months.
31,000 AF	Pump from Metropolitan Storage Account.
34,000 AF	Increase pumping by Operating Parties, when compared to the preceding year.

However, the Operating Committee may mutually agree that performance targets are met even though a performance target is not met(a scenario when retail conservation were to exceed 15 – 25 percent or if other local supplies were developed, e.g., dramatic increase in recycled water use, may reduce the opportunity for the retail agencies to pump 33,000 AF from the Metropolitan Storage Account.) In this case, the Operating Committee would need to agree on the variance procedures for accepting a modified performance target after the episode. It should be generally agreed that additional use and production of all local supplies native to the Chino Basin area should not be restricted or cause IEUA, TVMWD or Chino Basin Watermaster (or the Operating Parties) to be out of compliance of the performance target. It should also be agreed that if IEUA and TVMWD retailers demand firm water from Metropolitan over the twelve month period, the pumped water would come from the Metropolitan Storage Account up to 33,000AF.

The objective of the program is to provide 33,000 acre-feet of additional pumping capacity in the Chino Basin for dry year use, to allow Metropolitan, IEUA and TVMWD the flexibility to utilize the Facilities in the most efficient manner possible (including normal year and wet years) and to ensure that upon a call of Metropolitan's stored water, Facilities will be used to provide an additional supply of water to meet IEUA's and TVMWD's needs. A partial call will be addressed through a pro rata performance of all three objectives .

Exhibit H

DESCRIPTION OF PROGRAM FACILITIES & OPERATING PARTIES

Ion Exchange Nitrate Removal Facility	Capacity	Funding Allocation	Location
Pomona	2,000 AFY	$1,700,000	First & San Lorenzo
Monte Vista County Water District	1,544 AFY	$1,428,200	Palo Verde & Benson
City of Chino	1,159 AFY	$1,072,043	Palo Verde & Benson
City of Upland	3,001 AFY	$2,776,064	Ninth & Mountain
City of Chino Hills	1,448 AFY	$1,338,938	Chino Hills Pkwy & Ramona
Cucamonga County Water District	3,088 AFY	$2,856,400 (1)	Amethyst & Apricot
City of Ontario	1,544 AFY	$1,428,200 (1)	Cucamonga & 4th
Fontana Water Company	1,733 AFY	$1,293,065	San Bernardino & Cherry; Juniper & Ceres
Jurupa Community Services District	2,000 AFY	$1,494,000	Etiwanda & 60-fwy
Total Treatment Facilities Capacity :	17,517 AFY	$15,386,910	---
ell Facilities	Capacity	Funding Allocation	Location
Monte Vista County Water District	2,419 AFY	$1,572,581	Monte Vista & Richton
Cucamonga County Water District	6,532 AFY	$4,245,968 (1)	East Avenue & I-15; Cleveland & 7th
City of Ontario	6,532 AFY	$4,245,968 (1)	3 of 5 potential sites around City of Ontario
Total Well Capacity:	15,483 AFY	$10,064,517	---
Total Extraction Capacity (Treatment + Well Capacity):	33,000 AFY	$25,451,427 (2)	

1). Some of the facilities constructed by the City of Ontario and Cucamonga County Water District will be funded by Proposition 13 Funds.
2). The Total Program Costs is $27.5 million. This exhibit estimates that $2 million will be spent on CEQA, pre-design, and modeling plus $48,573 in unallocated reserve funds.

The foregoing list is a preliminary list of the Parties as of the Effective Date. Individual items on this Exhibit H may be adjusted from time to time by written notice from IEUA or TVMWD, as applicable, and Watermaster to Metropolitan. Each such notice shall specify the items to be adjusted and the amount of adjustment and shall certify to Metropolitan that after making such adjustment the Operational Capacity Thresholds continue to be met. Each notice which meets the requirements of this paragraph shall modify this Exhibit H to the extent provided in the notice.

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AMENDMENT NUMBER 1 TO

AGREEMENT BY AND BETWEEN THE CITY OF ONTARIO AND JURUPA COMMUNITY SERVICES DISTRICT ESTABLISHING AN OPERATIONAL PLAN FOR METROPOLITAN WATER DISTRICT/CHINO BASIN GROUNDWATER STORAGE PROGRAM, PROVIDING FOR WATER SUPPLY TO ONTARIO'S NEW MODEL COLONY AND INTERCONNECTION TO INCREASE WATER SUPPLY RELIABILITY

This Amendment Number 1 is entered into as of November 21, 2014 by and among the City of Ontario (Ontario), a General Law City, and Jurupa Community Services District (JCSD), a Community Services District, collectively referred to hereafter as the "Parties," for the purposes of revising and clarifying Dry Year Yield (DYY) program commitments.

RECITALS

WHEREAS, Ontario and JCSD are both parties to a Local Agency Agreement with the Inland Empire Utilities Agency for participation in a Groundwater Storage Project Funding Agreement with Metropolitan Water District of Southern California (MWD), also known as the Dry Year Yield (DYY) program.

WHEREAS, MWD, IEUA and the DYY program participating agencies have been in discussion for several years regarding modifications to the DYY program in order to further clarify and demonstrate the performance criteria.

WHEREAS, Under the DYY program, Ontario and JCSD are mutually obligated to reduce MWD deliveries and produce local Chino Basin groundwater when MWD "calls" for the stored water in its storage account.

WHEREAS, One of the key modifications to the DYY program is a three year rolling average imported water baseline that is used to determine the required amount of reduction in imported water, when MWD makes a "call."

WHEREAS, JCSD has previously met its "call" obligation by delivering 2,000 AFY to Ontario (above Ontario's CDA entitlement) and Ontario has made an additional 2,000 AFY reduction in WFA water purchases.

WHEREAS, JCSD has interest in establishing a DYY program imported water baseline via Ontario, equal to its "call" obligation of 2,000 AFY, and Ontario has the capability and infrastructure to increase imported water purchases from the Water Facilities Authority (WFA) treatment plant, located in Upland, California.

WHEREAS, JCSD has the infrastructure to adjust Chino Basin Desalter Authority (CDA) deliveries and Ontario has entitlement to CDA deliveries via JCSD infrastructure.

WHEREAS, The Parties acknowledge that this agreement provides JCSD with an interruptible alternative for participation and compliance with the DYY program.

NOW, THEREFORE, in consideration of the foregoing Recitals and following provisions, the Parties agree as follows:

Definitions:

Baseline Years – any year, within the term of the DYY program, that is not considered a "call" year, and includes a 3- year rolling average analysis

Call Years – any year in which MWD makes "call" for the water in their storage account.

Established DYY Program Imported Water Baseline – an increase in WFA imported water purchases by Ontario, which is utilized by JCSD for DYY program commitments.

Section 1. Water Purchases and Related Costs (Baseline Years)

A. Ontario will deliver CDA water to JCSD and increase its purchases from the WFA, during baseline years. Both Parties acknowledge that 8,000 AFY of additional WFA purchases by Ontario is the required amount for Ontario to establish a DYY program imported water baseline that covers their full DYY program "call" obligation. Both Parties acknowledge that 2,000 AFY of additional WFA purchases by Ontario, on behalf of JCSD, is the required amount for JCSD to establish a DYY program imported water baseline that covers their full DYY program "call" obligation.

B. Any JCSD baseline below 2,000 AFY will have an impact on JCSD's requirements in "call" years (see Section 2 and Attachment 1).

C. Both parties acknowledge that the established DYY program imported water baseline is in support of the DYY program and is supplemental and interruptible in nature. Either Party may discontinue the delivery of Ontario's CDA water to JCSD and/or related increased purchases from the WFA. In this event, JCSD shall meet its "call" obligation by delivering 2,000 AF to Ontario in "call" years. However, the Parties agree to make best efforts to implement the DYY Program consistent with the annual Operations Plan.

   Any request by JCSD to purchase above 2,000 AFY of Ontario's CDA water must be identified in the Operations Plans prior to July 1 of each year (see Section 4). Approval of this request will be approved at the sole discretion of Ontario.

D. The deliveries of Ontario CDA water will originate from Ontario's CDA allocation and be retained in JCSD's distribution system.

E. JCSD will reimburse Ontario the cost of WFA water, including capital, at the corresponding fiscal year rate at the time of delivery (see Attachment 2).

F. Attachment 1 demonstrates how the baseline 3 year rolling average will be calculated.

Section 2: Water Purchases and Related Costs (Call Years)

A. If JCSD's established imported water baseline is 2,000 AFY:

1) Ontario will decrease imported water deliveries from the WFA by the total combined "call" amount for both Ontario and JCSD (10,000 afy). Both Parties recognize and acknowledge that this includes both Ontario and JCSD performance obligations.

2) Ontario will cease delivering CDA water to JCSD. The mechanism for this will be JCSD's delivery of the full Ontario CDA entitlement to Ontario's distribution grid.

B. If JCSD's established imported water baseline is below 2,000 AFY:

1) Ontario will decrease imported water deliveries from the WFA by the total combined "call" amount for both Ontario and JCSD (10,000 afy). Both Parties recognize and acknowledge that this includes both Ontario and JCSD performance obligation, provided that JCSD performs the required action described in Section 2.B.2 below.

2) JCSD will be required to deliver wet water to Ontario through interties at a location and flow rate that is acceptable to both Parties. The quantity of water will be the difference between JCSD's established imported water baseline and 2,000 AFY. Alternatively, if both parties agree, JCSD may transfer stored water to Ontario in place of delivering wet water.

3) Ontario will cease delivering CDA water to JCSD. The mechanism for this will be JCSD's delivery of the full Ontario CDA entitlement to Ontario's distribution grid.

C. JCSD will be obligated to compensate Ontario for the cost of MWD's stored water at the time of extraction, in an amount equal to their established DYY program imported water baseline (2,000 af).

D. In order to receive DYY Operations and Maintenance (O&M) credits, Ontario and JCSD will increase their Chino Basin groundwater production above their groundwater baselines.

E. Ontario will coordinate the DYY program reporting and accounting and process all applicable O&M credits to JCSD.

F. Both parties agree to mutually coordinate and process all materials and funds in a timely manner.

G. Attachment 2 illustrates the current WFA rate for Fiscal Year 2014/15 and demonstrates how the call year rate will be calculated on an annual basis.

Section 3. Established DYY Program Imported Water Baseline Participation

A. It is the mutually beneficial goal of both Parties for JCSD to establish a DYY program imported water baseline via Ontario, as part of DYY program participation.

B. It is recognized that JCSD's annual established DYY program imported water baseline participation is elective.

C. In order to establish and prepare appropriate DYY program budgetary allocations, JCSD will provide annual notification to Ontario, no later than March 1st, of its continued participation.

D. However, it is further recognized that, once initiated, JCSD's imported water baseline participation does impact and will increase Ontario's WFA costs.

E. These increased costs include fees that are now based on multi-year rolling averages and are illustrated in Attachment 3.

F. In the event that JCSD or Ontario chooses not to participate, on an on-going basis, in establishing the imported water baseline, both Parties agree that JCSD would have a "residual obligation" to compensate Ontario for the increased WFA costs in a proportional manner.

Section 4. Operational Plans and DYY Program Coordination

A. Both Parties agree to annually develop an Operations Plan for both imported water baseline participation and CDA deliveries, prior to July 1 of each year. Elements of Operations Plan will include:

1) Delivery Plan & Schedule
2) Previous Program Year Delivery
3) Analysis of WFA Production and 10-Year Rolling Average Calculations
4) Communication and Scheduling
5) Ontario Reporting of WFA import/CDA deliveries
6) JCSD reporting of groundwater production
7) Certification of flows to IEUA
8) Billing & Operations and Maintenance Credits

Section 5. Term

A. This amendment shall be effective upon execution by both Parties and shall terminate June 30, 2028 (consistent with the current end date in the Groundwater Storage Project Funding Agreement).

B. If JCSD's established DYY imported water baseline requires Ontario to incur the annual costs described in Attachment 3 beyond June 30, 2028, then JCSD will be required to reimburse Ontario.

AMENDMENT NUMBER 1 TO

AGREEMENT BY AND BETWEEN THE CITY OF ONTARIO AND JURUPA COMMUNITY SERVICES DISTRICT ESTABLISHING AN OPERATIONAL PLAN FOR METROPOLITAN WATER DISTRICT/CHINO BASIN GROUNDWATER STORAGE PROGRAM, PROVIDING FOR WATER SUPPLY TO ONTARIO'S NEW MODEL COLONY AND INTERCONNECTION TO INCREASE WATER SUPPLY RELIABILITY

SIGNATURE PAGE

CITY OF ONTARIO:

_____ DATED: 12/16/14

Al C. Boling, City Manager

JURUPA COMMUNITY SERVICES DISTRICT:

_____ DATED: 11/24/2014

Todd M. Corbin, General Manager

Attachment 1
Illustrative Example of
JCSD Purchases/Deliveries

Imported Water Purchases for DYY Program Baseline Years (AF)				JCSD "Call" Year Actions (AF)	
2015	2016	2017	Baseline (Average)	Payment to Ontario	Delivery to Ontario
0	0	0	0	0	2,000
1,500	1,500	1,500	1,500	1,500	500
2,000	2,000	2,000	2,000	2,000	-
2,500	2,500	2,500	2,500	2,000	N/A

Attachment 2
Illustrative Example of
DYY Imported Water Unit Costs ($/AF)*

FY 14/15 Imported Water Budget @ 2,000 AF		JCSD Baseline Years @ 2,000 AF	JCSD Call Years @ 2,000 AF
Category	Unit Cost	Unit Cost	Unit Cost
Tier 1 (WFA)	$593	$593	$593
Fixed (WFA)	$65	$65	$65
Variable (WFA)	$57	$57	NA
Debt Service (WFA)	$71	$71	NA
Capital (WFA)	$7	$7	$7
AF Surcharge (IEUA)	$14	$14	$14
RTS (IEUA)	$58	$58	$58
	$865	$865	**$808**

*Note: the above example uses 2,000 AF as a way of describing JCSD costs; however, actual costs will be based on actual purchases and the established DYY program imported water baseline.

Attachment 3
Illustrative Example of
Increased Charges to Ontario due to JCSD Purchases

Charge	Description	Pre-JCSD Purchases ($/month)	Post-JCSD Purchases ($/month)	JCSD Costs ($/month)
WFA's Indirect Operating Costs	These costs are based on a 10-year rolling average of purchases	$ 35,000	$ 40,250	$ 5,250
MWD's Readiness-to-Serve	These costs are based on a 10-year rolling average of purchases	$ 60,000	$ 69,000	$ 9,000
MWD's Capacity Charge	These costs are based on a 3-year rolling average of peak-day usage	$ 10,000	$ 11,500	$ 1,500
	TOTAL	$ 105,000	$ 120,750	$ 15,750

Notes:

Example based on a 15% increase in purchases.

Costs based on actual FY 13/14 monthly charges.

APPENDIX G

CHINO GROUNDWATER BASIN ADJUDICATION

JUDGMENT No. 164327, January 2, 1975

JUDGMENT
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DONALD D. STARK
A Professional Corporation
Suite 201 Airport Plaza
2061 Business Center Drive
Irvine, California 92715
Telephone: (714) 752-8971

CLAYSON, ROTHROCK & MANN
601 South Main Street
Corona, California 91720
Telephone: (714) 737-1910
Attorneys for Plaintiff

SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO

CHINO BASIN MUNICIPAL WATER DISTRICT, Plaintiff, v. CITY OF CHINO, et al. Defendants.	No. 164327 JUDGMENT

I. INTRODUCTION

1. Pleadings, Parties and Jurisdiction. The complaint herein was filed on January 2, 1975, seeking an adjudication of water rights, injunctive relief and the imposition of a physical solution. A first amended complaint was filed on July 16, 1976. The defaults of certain defendants have been entered, and certain other defendants dismissed. Other than defendants who have been dismissed or whose defaults have been entered, all defendants have appeared herein. By answers and order of this Court, the issues have been made those of a full inter se adjudication between the

parties. This Court has jurisdiction of the subject matter of this action and of the parties herein.

2. Stipulation For Judgment. Stipulation for entry of judgment has been filed by and on behalf of a majority of the parties, representing a majority of the quantitative rights herein adjudicated.

3. Trial; Findings and Conclusions. Trial was commenced on December 16, 1977, as to the non-stipulating parties, and findings of fact and conclusions of law have been entered disposing of the issues in the case.

4. Definitions. As used in this Judgment, the following terms shall have the meanings herein set forth:

(a) Active Parties. All parties other than those who have filed with Watermaster a written waiver of service of notices, pursuant to Paragraph 58.

(b) Annual or Year -- A fiscal year, July 1 through June 30, following, unless the context shall clearly indicate a contrary meaning.

(c) Appropriative Right -- The annual production right of a producer from the Chino Basin other than pursuant to an overlying right.

(d) Basin Water -- Ground water within Chino Basin which is part of the Safe Yield, Operating Safe Yield, or replenishment water in the Basin as a result of operations under the Physical Solution decreed herein. Said term does not include Stored Water.

(e) CBMWD -- Plaintiff Chino Basin Municipal Water District.

(f) Chino Basin or Basin -- The ground water basin underlying the area shown as such on Exhibit "B" and within the boundaries described in Exhibit "K".

(g) Chino Basin Watershed -- The surface drainage area tributary to and overlying Chino Basin.

(h) Ground Water -- Water beneath the surface of the ground and within the zone of saturation, i.e., below the existing water table.

(i) Ground Water Basin -- An area underlain by one or more permeable formations capable of furnishing substantial water storage.

(j) Minimal Producer -- Any producer whose production does not exceed five acre-feet per year.

(k) MWD -- The Metropolitan Water District of Southern California.

(l) Operating Safe Yield -- The annual amount of ground water which Watermaster shall determine, pursuant to criteria specified in Exhibit "I", can be produced from Chino Basin by the Appropriative Pool parties free of replenishment obligation under the Physical Solution herein.

(m) Overdraft -- A condition wherein the total annual production from the Basin exceeds the Safe Yield thereof.

(n) Overlying Right -- The appurtenant right of an owner of lands overlying Chino Basin to produce water from the Basin for overlying beneficial use on such lands.

(o) Person. Any individual, partnership, association, corporation, governmental entity or agency, or other organization.

(p) PVMWD -- Defendant Pomona Valley Municipal Water District.

(q) Produce or Produced -- To pump or extract ground water from Chino Basin.

(r) Producer -- Any person who produces water from Chino Basin.

(s) Production -- Annual quantity, stated in acre feet, of water produced.

(t) Public Hearing -- A hearing after notice to all parties and to any other person legally entitled to notice.

(u) Reclaimed Water -- Water which, as a result of processing of waste water, is suitable for a controlled use.

(v) Replenishment Water -- Supplemental water used to recharge the Basin pursuant to the Physical Solution, either directly by percolating the water into the Basin or indirectly by delivering the water for use in lieu of production and use of safe yield or Operating Safe Yield.

(w) Responsible Party -- The owner, co-owner, lessee or other person designated by multiple parties interested in a well as the person responsible for purposes of filing reports hereunder.

(x) Safe Yield -- The long-term average annual quantity of ground water (excluding replenishment or stored water but including return flow to the Basin from use of replenishment or stored water) which can be produced from the Basin under cultural conditions of a particular year without causing an undesirable result.

(y) SBVMWD -- San Bernardino Valley Municipal Water

District.

(z) State Water -- Supplemental Water imported through the State Water Resources Development System, pursuant to Chapter 8, Division 6, Part 6 of the Water Code.

(aa) Stored Water -- Supplemental water held in storage, as a result of direct spreading, in lieu delivery, or otherwise, for subsequent withdrawal and use pursuant to agreement with Watermaster.

(bb) Supplemental Water -- Includes both water imported to Chino Basin from outside Chino Basin Watershed, and reclaimed water.

(cc) WMWD --Defendant Western Municipal Water District of Riverside County.

5. List of Exhibits. The following exhibits are attached to this Judgment and made a part hereof:

"A" -- "Location Map of Chino Basin" showing boundaries of Chino Basin Municipal Water District, and other geographic and political features.

"B" -- "Hydrologic Map of Chino Basin" showing hydrologic features of Chino Basin.

"C" -- Table Showing Parties in Overlying (Agricultural) Pool.

"D" -- Table Showing Parties in Overlying (Non-agricultural Pool and Their Rights.

"E" -- Table Showing Appropriators and Their Rights.

"F" -- Overlying (Agricultural) Pool Pooling Plan.

"G" -- Overlying (Non-agricultural) Pool Pooling Plan.

"H" -- Appropriative Pool Pooling Plan.

"I" -- Engineering Appendix.

"J" -- Map of In Lieu Area No. 1.

"K" -- Legal Description of Chino Basin.

II. DECLARATION OF RIGHTS

A. HYDROLOGY

6. Safe Yield. The Safe Yield of Chino Basin is 140,000 acre feet per year.

7. Overdraft and Prescriptive Circumstances. In each year for a period in excess of five years prior to filing of the First Amended Complaint herein, the Safe Yield of the Basin has been exceeded by the annual production therefrom, and Chino Basin is and has been for more than five years in a continuous state of overdraft. The production constituting said overdraft has been open, notorious, continuous, adverse, hostile and under claim of right. The circumstances of said overdraft have given notice to all parties of the adverse nature of such aggregate over-production.

B. WATER RIGHTS IN SAFE YIELD

8. Overlying Rights. The parties listed in Exhibits "C" and "D" are the owners or in possession of lands which overlie Chino Basin. As such, said parties have exercised overlying water rights in Chino Basin. All overlying rights owned or exercised by parties listed in Exhibits "C" and "D" have, in the aggregate, been limited by prescription except to the extent such rights have been preserved by self-help by said parties. Aggregate preserved overlying rights in the Safe Yield for agricultural pool use, including the rights of the State of California, total 82,800 acre feet per year. Overlying rights for non-agricultural pool use

total 7,366 acre feet per year and are individually decreed for each affected party in Exhibit "D". No portion of the Safe Yield of Chino Basin exists to satisfy unexercised overlying rights, and such rights have all been lost by prescription. However, uses may be made of Basin Water on overlying lands which have no preserved overlying rights pursuant to the Physical Solution herein. All overlying rights are appurtenant to the land and cannot be assigned or conveyed separate or apart therefrom.

9. Appropriative Rights. The parties listed in Exhibit "E" are the owners of appropriative rights, including rights by prescription, in the unadjusted amounts therein set forth, and by reason thereof are entitled under the Physical Solution to share in the remaining Safe Yield, after satisfaction of overlying rights and rights of the State of California, and in the Operating Safe Yield in Chino Basin, in the annual shares set forth in Exhibit "E".

(a) Loss of Priorities. By reason of the long continued overdraft in Chino Basin, and in light of the complexity of determining appropriative priorities and the need for conserving and making maximum beneficial use of the water resources of the State, each and all of the parties listed in Exhibit "E" are estopped and barred from asserting special priorities or preferences, inter se. All of said appropriative rights are accordingly deemed and considered of equal priority.

(b) Nature and Quantity. All rights listed in Exhibit "E" are appropriative and prescriptive in nature. By reason of the status of the parties, and the provisions of Section

storage capacity of Chino Basin for storage of supplemental water; provided that no such use shall be made except pursuant to written agreement with Watermaster, as authorized by Paragraph 28. In the allocation of such storage capacity, the needs and requirements of lands overlying Chino Basin and the owners of rights in the Safe Yield or Operating Safe Yield of the Basin shall have priority and preference over storage for export.

III. INJUNCTION

13. Injunction Against Unauthorized Production of Basin Water. Each party in each of the respective pools is enjoined, as follows:

(a) Overlying (Agricultural) Pool. Each party in the Overlying (Agricultural) Pool, its officers, agents, employees, successors and assigns, is and they each are ENJOINED AND RESTRAINED from producing ground water from Chino Basin in any year hereafter in excess of such party's correlative share of the aggregate of 82,800 acre feet allocated to said Pool, except pursuant to the Physical Solution or a storage water agreement.

(b) Overlying (Non-Agricultural) Pool. Each party in the Overlying (Non-agricultural) Pool, its officers, agents, employees, successors and assigns, is and they each are ENJOINED AND RESTRAINED from producing ground water of Chino Basin in any year hereafter in excess of such party's decreed rights in the Safe Yield, except pursuant to the provisions of the Physical Solution or a storage water agreement.

(c) Appropriative Pool. Each party in the

Appropriative Pool, its officers, agents, employees, successors and assigns, is and they are each ENJOINED AND RESTRAINED from producing ground water of Chino Basin in any year hereafter in excess of such party's decreed share of Operating Safe Yield, except pursuant to the provisions of the Physical Solution or a storage water agreement.

14. Injunction Against Unauthorized Storage or Withdrawal of Stored Water. Each party, its officers, agents, employees, successors and assigns is and they each are ENJOINED AND RESTRAINED from storing supplemental water in Chino Basin for withdrawal, or causing withdrawal of, water stored by that party, except pursuant to the terms of a written agreement with Watermaster and in accordance with Watermaster regulations. Any supplemental water stored or recharged in the Basin, except pursuant to such a Water-master agreement, shall be deemed abandoned and not classified as Stored Water. This paragraph has no application, as such, to supplemental water spread or provided in lieu by Watermaster pursuant to the Physical Solution.

IV. CONTINUING JURISDICTION

15. Continuing Jurisdiction. Full jurisdiction, power and authority are retained and reserved to the Court as to all matters contained in this judgment, except:

(a) The redetermination of Safe Yield, as set forth in Paragraph 6, during the first ten (10) years of operation of the Physical Solution;

(b) The allocation of Safe Yield as between the several pools as set forth in Paragraph 44 of the Physical Solution;

at least 30 days' notice thereof, and after hearing thereon, to make such further or supplemental orders or directions as may be necessary or appropriate for interpretation, enforcement or carrying out of this Judgment, and to modify, amend or amplify any of the provisions of this Judgment.

V. WATERMASTER

A. APPOINTMENT

16. Watermaster Appointment. CBMWD, acting by and through a majority of its board of directors, is hereby appointed Watermaster, to administer and enforce the provisions of this Judgment and any subsequent instructions or orders of the Court hereunder. The term of appointment of Watermaster shall be for five (5) years. The Court will by subsequent orders provide for successive terms or for a successor Watermaster. Watermaster may be changed at any time by subsequent order of the Court, on its own motion, or on the motion of any party after notice and hearing. Unless there are compelling reasons to the contrary, the Court shall act in conformance with a motion requesting the Watermaster be changed if such motion is supported by a majority of the voting power of the Advisory Committee.

B. POWERS AND DUTIES

17. Powers and Duties. Subject to the continuing supervision and control of the Court, Watermaster shall have and may exercise the express powers, and shall perform the duties, as provided in this Judgment or hereafter ordered or authorized by the Court in the exercise of the Court's continuing jurisdiction.

18. Rules and Regulations. Upon recommendation by the

Advisory Committee, Watermaster shall make and adopt, after public hearing, appropriate rules and regulations for conduct of Watermaster affairs, including meeting schedules and procedures, and compensation of members of Watermaster at not to exceed $25 per member per meeting, or $300 per member per year, whichever is less, plus reasonable expenses related to activities within the Basin. Thereafter, Watermaster may amend said rules from time to time upon recommendation, or with approval of the Advisory Committee after hearing noticed to all active parties. A copy of said rules and regulations, and of any amendments thereof, shall be mailed to each active party.

19. Acquisition of Facilities. Watermaster may purchase, lease, acquire and hold all necessary facilities and equipment; provided, that it is not the intent of the Court that Watermaster acquire any interest in real property or substantial capital assets.

20. Employment of Experts and Agents. Watermaster may employ or retain such administrative, engineering, geologic, accounting, legal or other specialized personnel and consultants as may be deemed appropriate in the carrying out of its powers and shall require appropriate bonds from all officers and employees handling Watermaster funds. Watermaster shall maintain records for purposes of allocation of costs of such services as well as of all other expenses of Watermaster administration as between the several pools established by the Physical Solution.

21. Measuring Devices. Watermaster shall cause parties, pursuant to uniform rules, to install and maintain in good operating condition, at the cost of each party, such necessary measuring

devices or meters as Watermaster may deem appropriate. Such measuring devices shall be inspected and tested as deemed necessary by Watermaster, and the cost thereof shall constitute an expense of Watermaster.

22. Assessments. Watermaster is empowered to levy and collect all assessments provided for in the pooling plans and Physical Solution.

23. Investment of Funds. Watermaster may hold and invest any and all Watermaster funds in investments authorized from time to time for public agencies of the State of California.

24. Borrowing. Watermaster may borrow from time to time amounts not exceeding the annual anticipated receipts of Watermaster during such year.

25. Contracts. Watermaster may enter into contracts for the performance of any powers herein granted; provided, however, that Watermaster may not contract with or purchase materials, supplies or services from CBMWD, except upon the prior recommendation and approval of the Advisory Committee and pursuant to written order of the Court.

26. Cooperation With Other Agencies. Subject to prior recommendation or approval of the Advisory Committee, Watermaster may act jointly or cooperate with agencies of the United States and the State of California or any political subdivisions, municipalities or districts or any person to the end that the purpose of the Physical Solution may be fully and economically carried out.

27. Studies. Watermaster may, with concurrence of the Advisory Committee or affected Pool Committee and in accordance with Paragraph 54 (b), undertake relevant studies of hydrologic

conditions, both quantitative and qualitative, and operating aspects of implementation of the management program for Chino Basin.

28. Ground Water Storage Agreements. Watermaster shall adopt, with the approval of the Advisory Committee, uniformly applicable rules and a standard form of agreement for storage of supplemental water, pursuant to criteria therefore set forth in Exhibit "I". Upon appropriate application by any person, Watermaster shall enter into such a storage agreement; provided that all such storage agreements shall first be approved by written order of the Court, and shall by their terms preclude operations which will have a substantial adverse impact on other producers.

29. Accounting for Stored Water. Watermaster shall calculate additions, extractions and losses and maintain an annual account of all Stored Water in Chino Basin, and any losses of water supplies or Safe Yield of Chino Basin resulting from such Stored Water.

30. Annual Administrative Budget. Watermaster shall submit to Advisory Committee an administrative budget and recommendation for each fiscal year on or before March 1. The Advisory Committee shall review and submit said budget and their recommendations to Watermaster on or before April 1, following. Watermaster shall hold a public hearing on said budget at its April quarterly meeting and adopt the annual administrative budget which shall include the administrative items for each pool committee. The administrative budget shall set forth budgeted items in sufficient detail as necessary to make a proper allocation of the expense among the several pools, together with Watermaster's proposed allocation. The budget shall contain such additional comparative information

or explanation as the Advisory Committee may recommend from time to time. Expenditures within budgeted items may thereafter be made by Watermaster in the exercise of powers herein granted, as a matter of course. Any budget transfer in excess of 20% of a budget category during any budget year or modification of such administrative budget during any year shall be first submitted to the Advisory Committee for review and recommendation.

31. Review Procedures. All actions, decisions or rules of Watermaster shall be subject to review by the Court on its own motion or on timely motion by any party, the Watermaster (in the case of a mandated action), the Advisory Committee, or any Pool Committee, as follows:

(a) Effective Date of Watermaster Action. Any action, decision or rule of Watermaster shall be deemed to have occurred or been enacted on the date on which written notice thereof is mailed. Mailing of copies of approved Watermaster minutes to the active parties shall constitute such notice to all parties.

(b) Noticed Motion. Any party, the Watermaster (as to any mandated action), the Advisory Committee, or any Pool Committee may, by a regularly noticed motion, apply to the Court for review of any Watermaster's action, decision or rule. Notice of such motion shall be served personally or mailed to Watermaster and to all active parties. Unless otherwise ordered by the Court, such motion shall not operate to stay the effect of such Watermaster action, decision or rule.

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(c) Time for Motion. Notice of motion to review any Watermaster action, decision or rule shall be served and filed within ninety (90) days after such Watermaster action, decision or rule, except for budget actions, in which event said notice period shall be sixty (60) days.

(d) De Novo Nature of Proceedings. Upon the filing of any such motion, the Court shall require the moving party to notify the active parties, the Watermaster, the Advisory Committee, and each Pool Committee, of a date for taking evidence and argument, and on the date so designated shall review de novo the question at issue. Watermaster's findings or decision, if any, may be received in evidence at said hearing, but shall not constitute presumptive or prima facie proof of any fact in issue.

(e) Decision. The decision of the Court in such proceeding shall be an appealable supplemental order in this case. When the same is final, it shall be binding upon the Watermaster and all parties.

C. ADVISORY AND POOL COMMITTEES

32. Authorization. Watermaster is authorized and directed to cause committees of producer representatives to be organized to act as Pool Committees for each of the several pools created under the Physical Solution. Said Pool Committees shall, in turn, jointly form an Advisory Committee to assist Watermaster in performance of its functions under this judgment. Pool Committees shall be composed as specified in the respective pooling plans, and the Advisory Committee shall be composed of not to exceed ten (10) voting representatives from each pool, as designated by the

respective Pool Committee. WMWD, PVMWD and SBVMWD shall each be entitled to one non-voting representative on said Advisory Committee.

33. Term and Vacancies. Members of any Pool Committee, shall serve for the term, and vacancies shall be filled, as specified in the respective pooling plan. Members of the Advisory Committee shall serve at the will of their respective Pool Committee.

34. Voting Power. The voting power on each Pool Committee shall be allocated as provided in the respective pooling plan. The voting power on the Advisory Committee shall be one hundred (100) votes allocated among the three pools in proportion to the total assessments paid to Watermaster during the preceding year; provided, that the minimum voting power of each pool shall be

(a) Overlying (Agricultural) Pool 20,

(b) Overlying (Non-agricultural) Pool 5, and

(c) Appropriative Pool 20.

In the event any pool is reduced to its said minimum vote, the remaining votes shall be allocated between the remaining pools on said basis of assessments paid to Watermaster by each such remaining pool during the preceding year. The method of exercise of each pool's voting power on the Advisory Committee shall be as determined by the respective pool committees.

35. Quorum. A majority of the voting power of the Advisory Committee or any Pool Committee shall constitute a quorum for the transaction of affairs of such Advisory or Pool Committee; provided, that at least one representative of each Pool Committee shall be required to constitute a quorum of the Advisory Committee. No Pool Committee representative may purposely absent himself or

herself, without good cause, from an Advisory Committee meeting to deprive it of a quorum. Action by affirmative vote of a majority of the entire voting power of any Pool Committee or the Advisory Committee shall constitute action by such committee. Any action or recommendation of a Pool Committee or the Advisory Committee shall be transmitted to Watermaster in writing, together with a report of any dissenting vote or opinion.

36. Compensation. Pool or Advisory Committee members may receive compensation, to be established by the respective pooling plan, but not to exceed twenty-five dollars ($25.00) for each meeting of such Pool or Advisory Committee attended, and provided that no member of a Pool or Advisory Committee shall receive compensation of more than three hundred ($300.00) dollars for service on any such committee during any one year. All such compensation shall be a part of Watermaster administrative expense. No member of any Pool or Advisory Committee shall be employed by Watermaster or compensated by Watermaster for professional or other services rendered to such Pool or Advisory Committee or to Watermaster, other than the fee for attendance at meetings herein provided, plus reimbursement of reasonable expenses related to activities within the Basin.

37. Organization.

(a) Organizational Meeting. At its first meeting in each year, each Pool Committee and the Advisory Committee shall elect a chairperson and a vice chairperson from its membership. It shall also select a secretary, a treasurer and such assistant secretaries and treasurers as may be appropriate, any of whom may, but need not, be members of

such Pool or Advisory Committee.

(b) Regular Meetings. All Pool Committees and the Advisory Committee shall hold regular meetings at a place and time to be specified in the rules to be adopted by each Pool and Advisory Committee. Notice of regular meetings of any Pool or Advisory Committee, and of any change in time or place thereof, shall be mailed to all active parties in said pool or pools.

(c) Special Meetings. Special meetings of any Pool or Advisory Committee may be called at any time by the Chairperson or by any three (3) members of such Pool or Advisory Committee by delivering notice personally or by mail to each member of such Pool or Advisory Committee and to each active party at least 24 hours before the time of each such meeting in the case of personal delivery, and 96 hours in the case of mail. The calling notice shall specify the time and place of the special meeting and the business to be transacted. No other business shall be considered at such meeting.

(d) Minutes. Minutes of all Pool Committee, Advisory Committee and Watermaster meetings shall be kept at Watermaster's offices. Copies thereof shall be mailed or otherwise furnished to all active parties in the pool or pools concerned. Said copies of minutes shall constitute notice of any Pool or Advisory Committee action therein reported, and shall be available for inspection by any party.

(e) Adjournments. Any meeting of any Pool or Advisory Committee may be adjourned to a time and place specified in the order of adjournment. Less than a quorum may so adjourn

from time to time. A copy of the order or notice of adjournment shall be conspicuously posted forthwith on or near the door of the place where the meeting was held.

38. Powers and Functions. The powers and functions of the respective Pool Committees and the Advisory Committee shall be as follows:

(a) Pool Committees. Each Pool Committee shall have the power and responsibility for developing policy recommendations for administration of its particular pool, as created under the Physical Solution. All actions and recommendations of any Pool Committee which require Watermaster implementation shall first be noticed to the other two pools. If no objection is received in writing within thirty (30) days, such action or recommendation shall be transmitted directly to Watermaster for action. If any such objection is received, such action or recommendation shall be reported to the Advisory Committee before being transmitted to Watermaster.

(b) Advisory Committee. The Advisory Committee shall have the duty to study, and the power to recommend, review and act upon all discretionary determinations made or to be made hereunder by Watermaster.

[1] Committee Initiative. When any recommendation or advice of the Advisory Committee is received by Watermaster, action consistent therewith may be taken by Watermaster; provided, that any recommendation approved by 80 votes or more in the Advisory Committee shall constitute a mandate for action by Watermaster consistent therewith. If Watermaster is unwilling or unable to act

pursuant to recommendation or advice from the Advisory Committee (other than such mandatory recommendations), Watermaster shall hold a public hearing, which shall be followed by written findings and decision. Thereafter, Watermaster may act in accordance with said decision, whether consistent with or contrary to said Advisory Committee recommendation. Such action shall be subject to review by the Court, as in the case of all other Watermaster determinations.

[2]. Committee Review. In the event Watermaster proposes to take discretionary action, other than approval or disapproval of a Pool Committee action or recommendation properly transmitted, or execute any agreement not theretofore within the scope of an Advisory Committee recommendation, notice of such intended action shall be served on the Advisory Committee and its members at least thirty (30) days before the Watermaster meeting at which such action is finally authorized.

(c) Review of Watermaster Actions. Watermaster (as to mandated action), the Advisory Committee or any Pool Committee shall be entitled to employ counsel and expert assistance in the event Watermaster or such Pool or Advisory Committee seeks Court review of any Watermaster action or failure to act. The cost of such counsel and expert assistance shall be Water-master expense to be allocated to the affected pool or pools.

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VI. PHYSICAL SOLUTION

A. GENERAL

39. Purpose and Objective. Pursuant to the mandate of Section 2 of Article X of the California Constitution, the Court hereby adopts and orders the parties to comply with a Physical Solution. The purpose of these provisions is to establish a legal and practical means for making the maximum reasonable beneficial use of the waters of Chino Basin by providing the optimum economic, long-term, conjunctive utilization of surface waters, ground waters and supplemental water, to meet the requirements of water users having rights in or dependent upon Chino Basin.

40. Need for Flexibility. It is essential that this Physical solution provide maximum flexibility and adaptability in order that Watermaster and the Court may be free to use existing and future technological, social, institutional and economic options, in order to maximize beneficial use of the waters of Chino Basin. To that end, the Court's retained jurisdiction will be utilized, where appropriate, to supplement the discretion herein granted to the Watermaster.

41. Watermaster Control. Watermaster, with the advice of the Advisory and Pool Committees, is granted discretionary powers in order to develop an optimum basin management program for Chino Basin, including both water quantity and quality considerations. Withdrawals and supplemental water replenishment of Basin Water, and the full utilization of the water resources of Chino Basin, must be subject to procedures established by and administered through Watermaster with the advice and assistance of the Advisory and Pool Committees composed of the affected producers. Both the

quantity and quality of said water resources may thereby be preserved and the beneficial utilization of the Basin maximized.

42. General Pattern of Operations. It is contemplated that the rights herein decreed will be divided into three (3) operating pools for purposes of Watermaster administration. A fundamental premise of the Physical Solution is that all water users dependent upon Chino Basin will be allowed to pump sufficient waters from the Basin to meet their requirements. To the extent that pumping exceeds the share of the Safe Yield assigned to the Overlying Pools, or the Operating Safe Yield in the case of the Appropriative Pool, each pool will provide funds to enable Watermaster to replace such overproduction. The method of assessment in each pool shall be as set forth in the applicable pooling plan.

B. POOLING

43. Multiple Pools Established. There are hereby established three (3) pools for Watermaster administration of, and for the allocation of responsibility for, and payment of, costs of replenishment water and other aspects of this Physical Solution.

(a) Overlying (Agricultural) Pool. The first pool shall consist of the State of California and all overlying producers who produce water for other than industrial or commercial purposes. The initial members of the pool are listed in Exhibit "C".

(b) Overlying (Non-agricultural) Pool. The second pool shall consist of overlying producers who produce water for industrial or commercial purposes. The initial members of this pool are listed in Exhibit "D".

(c) Appropriative Pool. A third and separate pool shall

consist of owners of appropriative rights. The initial members of the pool are listed in Exhibit "E".

Any party who changes the character of his use may, by subsequent order of the Court, be reassigned to the proper pool; but the allocation of Safe Yield under Paragraph 44 hereof shall not be changed. Any non-party producer or any person who may hereafter commence production of water from Chino Basin, and who may become a party to this physical solution by intervention, shall be assigned to the proper pool by the order of the Court authorizing such intervention.

44. Determination and Allocation of Rights to Safe Yield of Chino Basin. The declared Safe Yield of Chino Basin is hereby allocated as follows:

Pool	Allocation
Overlying (Agricultural) Pool	414,000 acre feet in any five (5) consecutive years.
Overlying (Non-agricultural) Pool.	7,366 acre feet per year.
Appropriative Pool	49,834 acre feet per year.

The foregoing acre foot allocations to the overlying pools are fixed. Any subsequent change in the Safe Yield shall be debited or credited to the Appropriative Pool. Basin Water available to the Appropriative Pool without replenishment obligation may vary from year to year as the Operating Safe Yield is determined by Watermaster pursuant to the criteria set forth in Exhibit "I".

45. Annual Replenishment. Watermaster shall levy and collect assessments in each year, pursuant to the respective pooling plans, in amounts sufficient to purchase replenishment water to replace production by any pool during the preceding year which exceeds that

pool's allocated share of Safe Yield in the case of the overlying pools, or Operating Safe Yield in the case of the Appropriative Pool. It is anticipated that supplemental water for replenishment of Chino Basin may be available at different rates to the various pools to meet their replenishment obligations. If such is the case, each pool will be assessed only that amount necessary for the cost of replenishment water to that pool, at the rate available to the pool, to meet its replenishment obligation.

46. Initial Pooling Plans. The initial pooling plans, which are hereby adopted, are set forth in Exhibits "F", "G" and "H", respectively. Unless and until modified by amendment of the judgment pursuant to the Court's continuing jurisdiction, each such plan shall control operation of the subject pool.

C. REPORTS AND ACCOUNTING

47. Production Reports. Each party or responsible party shall file periodically with Watermaster, pursuant to Watermaster rules, a report on a form to be prescribed by Watermaster showing the total production of such party during the preceding reportage period, and such additional information as Watermaster may require, including any information specified by the affected Pool Committee.

48. Watermaster Report and Accounting. Watermaster's annual report, which shall be filed on or before November 15 of each year and shall apply to the preceding year's operation, shall contain details as to operation of each of the pools and a certified audit of all assessments and expenditures pursuant to this Physical Solution and a review of Watermaster activities.

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D. REPLENISHMENT

49. Sources of Supplemental Water. Supplemental water may be obtained by Watermaster from any available source. Watermaster shall seek to obtain the best available quality of supplemental water at the most reasonable cost for recharge in the Basin. To the extent that costs of replenishment water may vary between pools, each pool shall be liable only for the costs attributable to its required replenishment. Available sources may include, but are not limited to:

(a) Reclaimed Water. There exist a series of agreements generally denominated the Regional Waste Water Agreements between CBMWD and owners of the major municipal sewer systems within the basin. Under those agreements, which are recognized hereby but shall be unaffected and unimpaired by this judgment, substantial quantities of reclaimed water may be made available for replenishment purposes. There are additional sources of reclaimed water which are, or may become, available to Watermaster for said purposes. Maximum beneficial use of reclaimed water shall be given high priority by Watermaster.

(b) State Water. State water constitutes a major available supply of supplemental water. In the case of State Water, Watermaster purchases shall comply with the water service provisions of the State's water service contracts. More specifically, Watermaster shall purchase State Water from MWD for replenishment of excess production within CBMWD, WMWD and PVMWD, and from SBVMWD to replenish excess production within SBVMWD's boundaries in Chino Basin, except to the

extent that MWD and SBVMWD give their consent as required by such State water service contracts.

(c) Local Import. There exists facilities and methods for importation of surface and ground water supplies from adjacent basins and watersheds.

(d) Colorado River Supplies. MWD has water supplies available from its Colorado River Aqueduct.

50. Methods of Replenishment. Watermaster may accomplish replenishment of overproduction from the Basin by any reasonable method, including:

(a) Spreading and percolation or Injection of water in existing or new facilities, subject to the provisions of Paragraphs 19, 25 and 26 hereof.

(b) In Lieu Procedures. Watermaster may make, or cause to be made, deliveries of water for direct surface use, in lieu of ground water production.

E. REVENUES

51. Production Assessment. Production assessments, on whatever basis, may be levied by Watermaster pursuant to the pooling plan adopted for the applicable pool.

52. Minimal Producers. Minimal Producers shall be exempted from payment of production assessments, upon filing of production reports as provided in Paragraph 47 of this Judgment, and payment of an annual five dollar ($5.00) administrative fee as specified by Watermaster rules.

53. Assessment Proceeds -- Purposes. Watermaster shall have the power to levy assessments against the parties (other than minimal pumpers) based upon production during the preceding period

of assessable production, whether quarterly, semi-annually or annually, as may be determined most practical by Watermaster or the affected Pool Committee.

54. Administrative Expenses. The expenses of administration of this Physical Solution shall be categorized as either (a) general Watermaster administrative expense, or (b) special project expense.

(a) General Watermaster Administrative Expense shall include office rental, general personnel expense, supplies and office equipment, and related incidental expense and general overhead.

(b) Special Project Expense shall consist of special engineering, economic or other studies, litigation expense, meter testing or other major operating expenses. Each such project shall be assigned a Task Order number and shall be separately budgeted and accounted for.

General Watermaster administrative expense shall be allocated and assessed against the respective pools based upon allocations made by the Watermaster, who shall make such allocations based upon generally accepted cost accounting methods. Special Project Expense shall be allocated to a specific pool, or any portion there of, only upon the basis of prior express assent and finding of benefit by the Pool Committee, or pursuant to written order of the Court.

55. Assessments -- Procedure. Assessments herein provided for shall be levied and collected as follows:

(a) Notice of Assessment. Watermaster shall give written notice of all applicable assessments to each party on

or before ninety (90) days after the end of the production period to which such assessment is applicable.

(b) Payment. Each assessment shall be payable on or before thirty (30) days after notice, and shall be the obligation of the party or successor owning the water production facility at the time written notice of assessment is given, unless prior arrangement for payment by others has been made in writing and filed with Watermaster.

(c) Delinquency. Any delinquent assessment shall bear interest at 10% per annum (or such greater rate as shall equal the average current cost of borrowed funds to the Watermaster) from the due date thereof. Such delinquent assessment and interest may be collected in a show-cause proceeding herein instituted by the Watermaster, in which case the Court may allow Watermaster its reasonable costs of collection, including attorney's fees.

56. Accumulation of Replenishment Water Assessment Proceeds. In order to minimize fluctuation in assessment and to give Watermaster flexibility in purchase and spreading of replenishment water, Watermaster may make reasonable accumulations of replenishment water assessment proceeds. Interest earned on such retained funds shall be added to the account of the pool from which the funds were collected and shall be applied only to the purchase of replenishment water.

57. Effective Date. The effective date for accounting and operation under this Physical Solution shall be July 1, 1977, and the first production assessments hereunder shall be due after July 1, 1978. Watermaster shall, however, require installation of

meters or measuring devices and establish operating procedures immediately, and the cost of such Watermaster activity (not including the cost of such meters and measuring devices) may be recovered in the first administrative assessment in 1978.

VII. MISCELLANEOUS PROVISIONS

58. Designation of Address for Notice and Service. Each party shall designate the name and address to be used for purposes of all subsequent notices and service herein, either by its endorsement on the Stipulation for Judgment or by a separate designation to be filed within thirty (30) days after Judgment has been served. Said designation may be changed from time to time by filing a written notice of such change with the Watermaster. Any party desiring to be relieved of receiving notices of Watermaster or committee activity may file a waiver of notice on a form to be provided by Watermaster. Thereafter such party shall be removed from the Active Party list. Watermaster shall maintain at all times a current list of all active parties and their addresses for purposes of service. Watermaster shall also maintain a full current list of names and addresses of all parties or their successors, as filed herein. Copies of such lists shall be available, without cost, to any party, the Advisory Committee or any Pool Committee upon written request therefor.

59. Service of Documents. Delivery to or service upon any party or active party by the Watermaster, by any other party, or by the Court, of any item required to be served upon or delivered to such party or active party under or pursuant to the Judgment shall be made personally or by deposit in the United States mail, first

class, postage prepaid, addressed to the designee and at the address in the latest designation filed by such party or active party.

60. Intervention After Judgment. Any non-party assignee of the adjudicated appropriative rights of any appropriator, or any other person newly proposing to produce water from Chino Basin, may become a party to this judgment upon filing a petition in intervention. Said intervention must be confirmed by order of this Court. Such intervenor shall thereafter be a party bound by this judgment and entitled to the rights and privileges accorded under the Physical Solution herein, through the pool to which the Court shall assign such intervenor.

61. Loss of Rights. Loss, whether by abandonment, forfeiture or otherwise, of any right herein adjudicated shall be accomplished only (1) by a written election by the owner of the right filed with Watermaster, or (2) by order of the Court upon noticed motion and after hearing.

62. Scope of Judgment. Nothing in this Judgment shall be deemed to preclude or limit any party in the assertion against a neighboring party of any cause of action now existing or hereafter arising based upon injury, damage or depletion of water supply available to such party, proximately caused by nearby pumping which constitutes an unreasonable interference with such complaining party's ability to extract ground water.

63. Judgment Binding on Successors. This Judgment and all provisions thereof are applicable to and binding upon not only the parties to this action, but also upon their respective heirs, executors, administrators, successors, assigns, lessees and

licensees and upon the agents, employees and attorneys in fact of all such persons.

64. Costs. No party shall recover any costs in this proceeding from any other party.

Dated: 1/27/78.

/s/ Howard B. Wiener

Judge

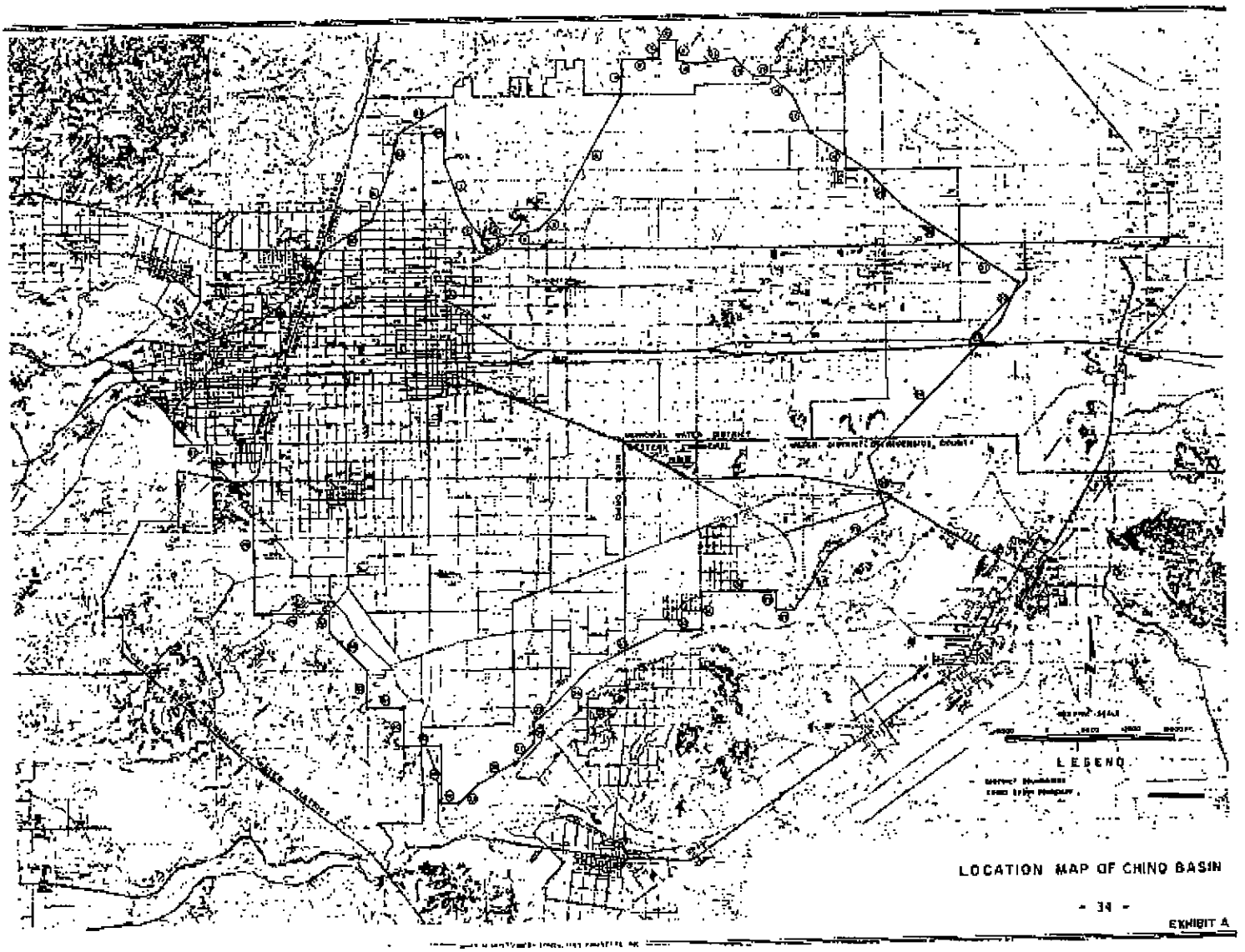
DONALD D. STARK
A Professional Corporation
Suite 201 Airport Plaza
2061 Business Center Drive
Irvine, California 92715
Telephone: (714) 752-8971
CLAYSON, ROTHROCK & MANN
601 South Main Street
Corona, California 91720
Telephone: (714) 737-1910
Attorneys for Plaintiff

SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO

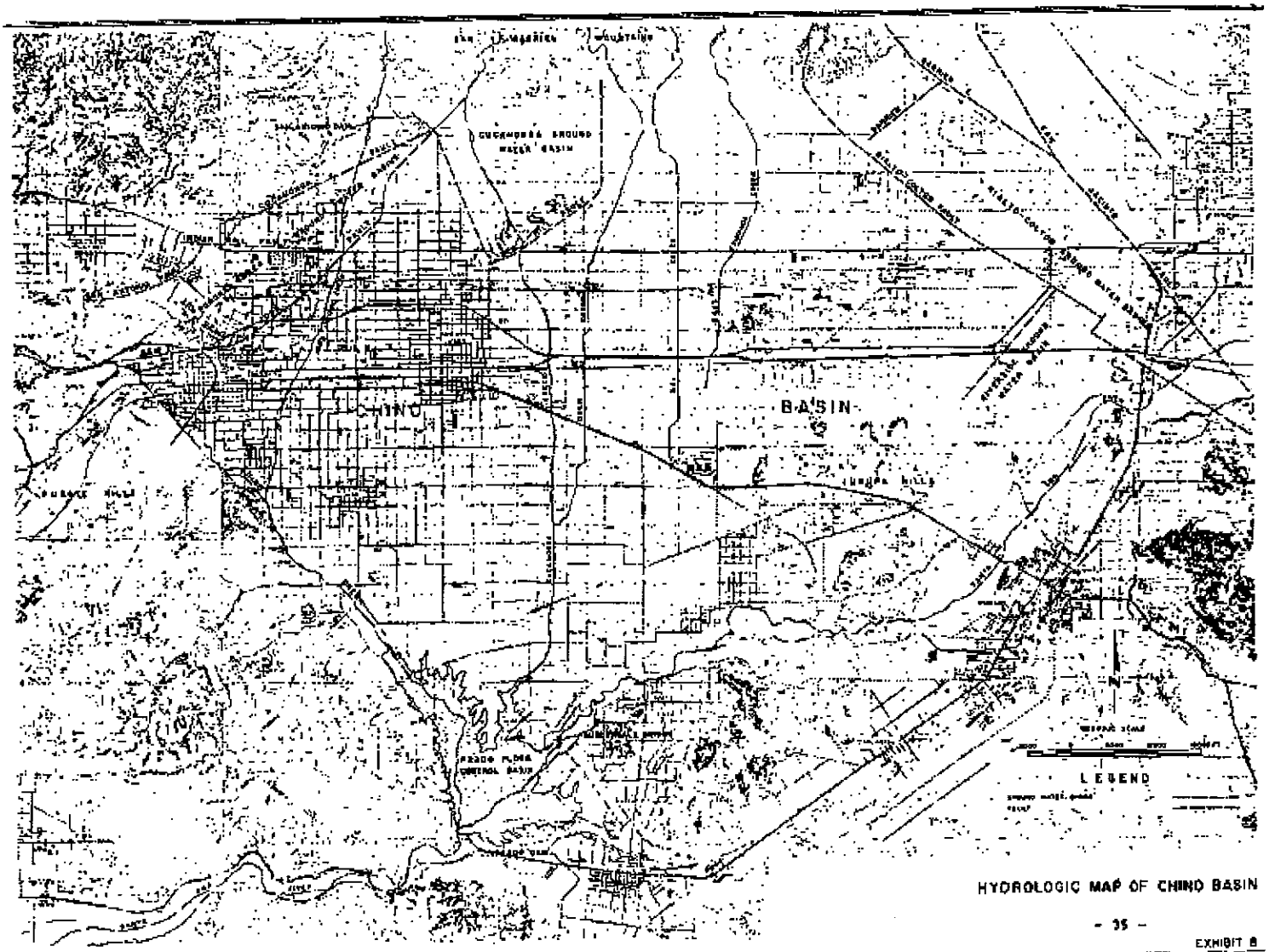
CHINO BASIN MUNICIPAL WATER DISTRICT, Plaintiff, v. CITY OF CHINO, et al. Defendants.	No. 164327

JUDGMENT



LOCATION MAP OF CHINO BASIN

EXHIBIT A



HYDROLOGIC MAP OF CHINO BASIN

EXHIBIT 8

STIPULATING OVERLYING AGRICULTURAL PRODUCERS

STATE OF CALIFORNIA

COUNTY OF SAN BERNARDINO

Abacherli, Dairy, Inc.

Abacherli, Frank

Abacherli, Shirley

Abbona, Anna

Abbona, James

Abbona, Jim

Abbona, Mary

Agliani, Amelia H.

Agman, Inc.

Aguerre, Louis B.

Ahmanson Trust Co.

Akiyama, Shizuye

Akiyama, Tomoo

Akkerman, Dave

Albers, J.N.

Albers, Nellie

Alewyn, Jake J.

Alewyn, Normalee

Alger, Mary D.

Alger, Raymond

Allen, Ben F.

Allen, Jane F.

Alta-Dena Dairy

Anderson Farms

Anguiano, Sarah L.S.

Anker, Gus

Aphessetche, Xavier

Arena Mutual Water Assn.

Armstrong Nurseries, Inc.

Arretche, Frank

Arretche, Jean Pierre

Arvidson, Clarence F.

Arvidson, Florence

Ashley, George W.

Ashley, Pearl E.

Atlas Farms

Atlas Ornamental Iron Works, Inc.

Aukeman, Carol

Aukeman, Lewis

Ayers, Kenneth C., aka
Kelley Ayers

Bachoc, Raymond

Baldwin, Edgar A.

Baldwin, Lester

Banbury, Carolyn

Bangma Dairy

Bangma, Arthur

Bangma, Ida

Bangma, Martin

Bangma, Sam

Barba, Anthony B.

Barba, Frank

Barcellos, Joseph

Barnhill, Maurine W.

EXHIBIT "C"

Barnhill, Paul

Bartel, Dale

Bartel, Ursula

Bartel, Willard

Barthelemy, Henry

Barthelemy, Roland

Bassler, Donald V., M.D.

Bates, Lowell R.

Bates, Mildred L.

Beahm, James W.

Beahm, Joan M.

Bekendam, Hank

Bekendam, Pete

Bello, Eugene

Bello, Olga

Beltman, Evelyn

Beltman, Tony

Bergquist Properties, Inc.

Bevacqua, Joel A.

Bevacqua, Marie B.

Bidart, Bernard

Bidart, Michael J.

Binnell, Wesley

Black, Patricia E.

Black, Victor

Bodger, John & Sons Co.

Boer, Adrian

Boersma and Wind Dairy

Boersma, Angie

Boersma, Berdina

Boersma, Frank

Boersma, Harry

Boersma, Paul

Boersma, Sam

Boersma, William L.

Bohlander & Holmes, Inc.

Bokma, Peter

Bollema, Jacob

Boonstoo, Edward

Bootsma, Jim

Borba, Dolene

Borba, Dolores

Borba, Emily

Borba, George

Borba, John

Borba, John & Sons

Borba, John Jr.

Borba, Joseph A.

Borba, Karen E.

Borba, Karen M.

Borba, Pete, Estate of

Borba, Ricci

Borba, Steve

Borba, Tom

Bordisso, Alleck

Borges, Angelica M.

EXHIBIT "C"

Borges, Bernadette
Borges, John O.
Borges, Linda L.
Borges, Manual Jr.
Borges, Tony
Bos, Aleid
Bos, Gerrit
Bos, John
Bos, John
Bos, Margaret
Bos, Mary
Bos, Mary Beth
Bos, Tony
Bosch, Henrietta
Bosch, Peter T.
Boschma, Betty
Boschma, Frank
Boschma, Greta
Boschma, Henry
Bosma, Dick
Bosma, Florence G.
Bosma, Gerrit
Bosma, Jacob J.
Bosma, Jeanette Thea
Bosman, Frank
Bosman, Nellie
Bosnyak, Goldie M.
Bosnyak, Martin
Bothof, Roger W.
Bouma, Cornie
Bouma, Emma
Bouma, Henry P.
Bouma, Martin
Bouma, Peter G. & Sons Dairy
Bouma, Ted
Bouman, Helen
Bouman, Sam
Bower, Mabel E.
Boys Republic
Breedyk, Arie
Breedyk, Jessie
Briano Brothers
Briano, Albert
Briano, Albert Trustee for
Briano, Albert Frank
Briano, Lena
Brink, Russell N.
Brinkerhoff, Margaret
Brinkerhoff, Robert L.
Britschgi, Florence
Britschgi, Magdalena Garetto
Britschgi, Walter P.
Brommer, Marvin
Brookside Enterprizes, dba
Brookside Vineyard Co.
Brothers Three Dairy

EXHIBIT "C"

Brown, Eugene
Brun, Martha M.
Brun, Peter Robert
Buma, Duke
Buma, Martha
Bunse, Nancy
Bunse, Ronnie L.
Caballero, Bonnie L.
Caballero, Richard F.
Cable Airport Inc.
Cadlini, Donald
Cadlini, Jesse R.
Cadlini, Marie Edna
Cambio, Anna
Cambio, Charles, Estate of
Cambio, William V.
Cardoza, Florence
Cardoza, Olivi
Cardoza, Tony
Carnesi, Tom
Carver, Robt M., Trustee
Cauffman, John R.
Chacon Bros.
Chancon, Elvera P.
Chacon, Joe M.
Chacon, Robert M.
Chacon, Virginia L.
Chez, Joseph C.
Chino Corona Investment
Chino Water Co.
Christensen, Leslie
Christensen, Richard G.
Christian, Ada R.
Christian, Harold F.
Christy, Ella J.
Christy, Ronald S.
Cihigoyenetche, Jean
Cihigoyenetche, Leona
Cihigoyenetche, Martin
Clarke, Arthur B.
Clarke, Nancy L.
Clarke, Phyllis J.
Coelho, Isabel
Coelho, Joe A. Jr.
Collins, Howard E.
Collins, Judith F.
Collinsworth, Ester L.
Collinsworth, John E.
Collinsworth, Shelby
Cone Estate (05-2-00648/649)
Consolidated Freightways Corp.
of Delaware
Corona Farms Co.
Corra, Rose
Costa, Dimas S.
Costa, Laura

EXHIBIT "C"

Costa, Myrtle
Costamagna, Antonio
Costamagna, Joseph
Cousyn, Claus B.
Cramer, Carole F.
Cramer, William R.
Crossroads Auto Dismantlers, Inc.
Crouse, Beatrice I.
Crouse, Roger
Crowley, Juanita C.
Crowley, Ralph
Cucamonga Vintners
D'Astici, Teresa
Da Costa, Cecilia B.
Da Costa, Joaquim F.
Daloisio, Norman
De Berard Bros.
De Berard, Arthur, Trustee
De Berard, Charles
De Berard, Chas., Trustee
De Berard, Helan J.
De Berard, Robert
De Berard, Robert Trustee
De Bie, Adrian
De Bie, Henry
De Bie, Margaret M.
De Bie, Marvin
De Boer, Fred
De Boer, L.H.
De Boer, Sidney
De Bos, Andrew
De Graaf, Anna Mae
De Graaf, Gerrit
De Groot, Dick
De Groot, Dorothy
De Groot, Ernest
De Groot, Henrietta
De Groot, Jake
De Groot, Pete Jr.
De Haan, Bernadena
De Haan, Henry
De Hoog, Adriana
De Hoog, Joe
De Hoog, Martin
De Hoog, Martin L.
De Hoog, Mitch
De Hoog, Tryntje
De Jager, Cobi
De Jager, Edward D.
De Jong Brothers Dairy
De Jong, Cornelis
De Jong, Cornelius
De Jong, Grace
De Jong, Jake
De Jong, Lena
De Leeuw, Alice

EXHIBIT "C"

De Leeuw, Sam

De Soete, Agnes

De Soete, Andre

De Vries, Abraham

De Vries, Case

De Vries, Dick

De Vries, Evelyn

De Vries, Henry, Estate of

De Vries, Hermina

De Vries, Jack H.

De Vries, Jane

De Vries, Janice

De Vries, John

De Vries, John J.

De Vries, Neil

De Vries, Ruth

De Vries, Theresa

De Wit, Gladys

De Wit, Peter S.

De Wyn, Evert

De Zoete, Hattie V.

Do Zoete, Leo A.

Decker, Hallie

Decker, Henry A.

Demmer, Ernest

Di Carlo, Marie

Di Carlo, Victor

Di Tommaso, Frank

Dirkse, Catherine

Dirkse, Charles C.

Dixon, Charles E.

Dixon, Geraldine A.

Doesberg, Hendrica

Doesburg, Theodorus, P.

Dolan, Marion

Dolan, Michael H.

Dominguez, Helen

Dominguez, Manual

Donkers, Henry A.

Donkers, Nellie G.

Dotta Bros.

Douma Brothers Dairy

Douma, Betty A.

Douma, Fred A.

Douma, Hendrika

Douma, Herman G.

Douma, Narleen J.

Douma, Phillip M.

Dow Chemical Co.

Dragt, Rheta

Dragt, William

Driftwood Dairy Farm

Droogh, Case

Duhalde, Marian

Duhalde, Lauren

Duits, Henrietta

EXHIBIT "C"

Duits, John

Dunlap, Edna Kraemer,
Estate of

Durrington, Glen

Durrington, William F.

Dusi, John Sr.

Dykstra, Dick

Dykstra, John

Dykstra, John & Sons

Dykstra, Wilma

Dyt, Cor

Dyt, Johanna

E and S Grape Growers

Eaton, Thomas, Estate of

Echeverria, Juan

Echeverria, Carlos

Echeverria, Pablo

Eilers, E. Myrle

Eilers, Henry W.

El Prado Golf Course

Ellsworth, Rex C.

Engelsma, Jake

Engelsma, Susan

Escojeda, Henry

Etiwanda Grape Products Co.

Euclid Ave. Investment One

Euclid Ave. Investment Four

Euclid Ave. Three Investment

Excelsior Farms

F.D.I.C.

Fagundes, Frank M.

Fagundes, Mary

Fernandes, Joseph Jr.

Fernandes, Velma C.

Ferraro, Ann

Ferreira, Frank J.

Ferreira, Joe C. Jr.

Ferreira, Narcie

Fillippi, J. Vintage Co.

Filippi, Joseph

Filippi, Joseph A.

Filippi, Mary E.

Fitzgerald, John R.

Flameling Dairy Inc.

Flamingo Dairy

Foss, Douglas E.

Foss, Gerald R.

Foss, Russel

Fred & John Troost No. 1 Inc.

Fred & Maynard Troost No. 2 Inc.

Freitas, Beatriz

Freitas, Tony T.

Gakle, Louis L.

Galleano Winery, Inc.

Galleano, Bernard D.

Galleano, D.

Galleano, Mary M.

EXHIBIT "C"

Garcia, Pete
Gardner, Leland V.
Gardner, Lola M.
Garrett, Leonard E.
Garrett, Patricia T.
Gastelluberry, Catherine
Gastelluberry, Jean
Gilstrap, Glen E.
Gilstrap, Marjorie J.
Godinho, John
Godinho, June
Gonsalves, Evelyn
Gonsalves, John
Gorzeman, Geraldine
Gorzeman, Henry A.
Gorzeman, Joe
Govea, Julia
Goyenetche, Albert
Grace, Caroline E.
Grace, David J.
Gravatt, Glenn W.
Gravatt, Sally Mae
Greydanus Dairy, Inc.
Greydanus, Rena
Griffin Development Co.
Haagsma, Dave
Haagsma, John
Hansen, Mary D.
Hansen, Raymond F.
Hanson, Ardeth W.
Harada, James T.
Harada, Violet A.
Haringa, Earl and Sons
Haringa, Herman
Haringa, Rudy
Haringa, William
Harper, Cecilia de Mille
Harrington, Winona
Harrison, Jacqueline A.
Hatanaka, Kenichi
Heida, Annie
Heida, Don
Heida, Jim
Heida, Sam
Helms, Addison D.
Helms, Irma A.
Hermans, Alma I.
Hermans, Harry
Hettinga, Arthur
Hettinga, Ida
Hettinga, Judy
Hettinga, Mary
Hettinga, Wilbur
Heublein, Inc., Grocery Products Group
Hibma, Catherine M.

EXHIBIT "C"

Hibma, Sidney

Hicks, Kenneth I.

Hicks, Minnie M.

Higgins Brick Co.

Highstreet, Alfred V.

Highstreet, Evada V.

Hilarides, Bertha as Trustee

Hilarides, Frank

Hilarides, John as Trustee

Hindelang, Tillie

Hindelang, William

Hobbs, Bonnie C.

Hobbs, Charles W.

Hobbs, Hazel I.

Hobbs, Orlo M.

Hoekstra, Edward

Hoekstra, George

Hoekstra, Grace

Hoekstra, Louie

Hofer, Paul B.

Hofer, Phillip F.

Hofstra, Marie

Hogeboom, Jo Ann M.

Hogeboom, Maurice D.

Hogg, David V.

Hogg, Gene P.

Hogg, Warren G.

Hohberg, Edith J.

Hohberg, Harold C.

Hohberg, Harold W.

Holder, Arthur B.

Holder, Dorothy F.

Holmes, A. Lee

Holmes, Frances P.

Hoogeboom, Gertrude

Hoogeboom, Pete

Hoogendam, John

Hoogendam, Tena

Houssels, J. K. Thoroughbred Farm

Hunt Industries

Idsinga, Ann

Idsinga, William W.

Imbach Ranch, Inc.

Imbach, Kenneth E.

Imbach, Leonard K.

Imbach, Oscar K.

Imbach, Ruth M.

Indaburu, Jean

Indaburu, Marceline

Iseli, Kurt H.

Ito, Kow

J & B Dairy Inc.

Jaques, Johnny C. Jr.

Jaques, Mary

Jaques, Mary Lou

EXHIBIT "C"

Jay Em Bee Farms

Johnson Bro's Egg Ranches, Inc.

Johnston, Ellwood W.

Johnston, George F. Co.

Johnston, Judith H.

Jones, Leonard P.

Jongsma & Sons Dairy

Jongsma, Diana A.

Jongsma, Dorothy

Jongsma, George

Jongsma, Harold

Jongsma, Henry

Jongsma, John

Jongsma, Nadine

Jongsma, Tillie

Jordan, Marjorie G.

Jordan, Troy O.

Jorritsma, Dorothy

Juliano, Albert

Kamper, Cornelis

Kamstra, Wilbert

Kaplan, Lawrence J.

Kasbergen, Martha

Kasbergen, Neil

Kazian, Angelen Estate of

Kingsway, Const. Corp.

Klapps Market

Kline, James K.

Knevelbaard, John

Knudsen, Ejnar

Knudsen, Karen M.

Knudsen, Kenneth

Knudson, Robert

Knudson, Darlene

Koel, Helen S.

Koetsier, Gerard

Koetsier, Gerrit J.

Koetsier, Jake

Koning, Fred W.

Koning, Gloria

Koning, J. W. Estate

Koning, James A.

Koning, Jane

Koning, Jane C.

Koning, Jennie

Koning, John

Koning, Victor A.

Kooi Holstein Corporation

Koolhaas, Kenneth E.

Koolhaas, Simon

Koolhaas, Sophie Grace

Koopal, Grace

Koopal, Silas

Koopman, Eka

Koopman, Gene T.

Koopman, Henry G.

EXHIBIT "C"

Koopman, Ted

Koopman, Tena

Koot, Nick

Koster, Aart

Koster, Frances

Koster, Henry B.

Koster, Nellie

Kroes, Jake R.

Kroeze, Bros

Kroeze, Calvin E.

Kroeze, John

Kroeze, Wesley

Kruckenberg, Naomi

Kruckenberg, Perry

L. D. S. Welfare Ranch

Labrucherie, Mary Jane

Labrucherie, Raymond F.

Lako, Samuel

Landman Corp.

Lanting, Broer

Lanting, Myer

Lass, Jack

Lass, Sandra L.

Lawrence, Cecelia, Estate of

Lawrence, Joe H., Estate of

Leal, Bradley W.

Leal, John C.

Leal, John Craig

Leck, Arthur A.

Leck, Evelyn M.

Lee, Harold E.

Lee, Helen J.

Lee, Henrietta C.

Lee, R. T. Construction Co.

Lekkerkerk, Adriana

Lekkerkerk, L. M.

Lekkerkerker, Nellie

Lekkerkerker, Walt

Lewis Homes of California

Livingston, Dorothy M.

Livingston, Rex E.

Lokey, Rosemary Kraemer

Lopes, Candida A.

Lopes, Antonio S.

Lopez, Joe D.

Lourenco, Carlos, Jr.

Lourenco, Carmelina P.

Lourenco, Jack C.

Lourenco, Manual H.

Lourenco, Mary

Lourenco, Mary

Luiten, Jack

Luiz, John M.

Luna, Christine I.

Luna, Ruben T.

Lusk, John D. and Sons
A California corporation

EXHIBIT "C"

Lyon, Gregory E.

Lyon, Paula E.

M & W Co. #2

Madole, Betty M.

Madole, Larry B.

Marquez, Arthur

Marquine, Jean

Martin, Lelon O.

Martin, Leon O.

Martin, Maria D.

Martin, Tony J.

Martins, Frank

Mathias, Antonio

Mc Cune, Robert M.

Mc Masters, Gertrude

Mc Neill, J. A.

Mc Neill, May F.

Mees, Leon

Mello and Silva Dairy

Mello and Sousa Dairy

Mello, Emilia

Mello, Enos C.

Mello, Mercedes

Mendiondo, Catherine

Mendiondo, Dominique

Meth. Hosp. - Sacramento

Metzger, R. S.

Metzger, Winifred

Mickel, Louise

Miersma, Dorothy

Meirsma, Harry C.

Minaberry, Arnaud

Minaberry, Marie

Mistretta, Frank J.

Mocho and Plaa Inc.

Mocho, Jean

Mocho, Noeline

Modica, Josephine

Montes, Elizabeth

Montes, Joe

Moons, Beatrice

Moons, Jack

Moramarco, John A. Enterprise

Moreno, Louis W.

Moss, John R.

Motion Pictures Associates, Inc.

Moynier, Joe

Murphy, Frances V.

Murphy, Myrl L.

Murphy, Naomi

Nanne, Martin Estate of

Nederend, Betty

Nederend, Hans

Norfolk, James

Norfolk, Martha

Notrica, Louis

EXHIBIT "C"

Nyberg, Lillian N.
Nyenhuis, Annie
Nyenhuis, Jim
Occidental Land Research
Okumura, Marion
Okumura, Yuiche
Oldengarm, Effie
Oldengarm, Egbert
Oldengarm, Henry
Oliviera, Manuel L.
Oliviera, Mary M.
Olson, Albert
Oltmans Construction Co.
Omlin, Anton
Omlin, Elsie L.
Ontario Christian School Assn.
Oord, John
Oostdam, Jacoba
Oostdam, Pete
Oosten, Agnes
Oosten, Anthonia
Oosten, Caroline
Oosten, John
Oosten, Marinus
Oosten, Ralph
Orange County Water District
Ormonde, Manuel
Ormonde, Pete, Jr.
Ormonde, Viva
Ortega, Adeline B.
Ortega, Bernard Dino
Osterkamp, Joseph S.
Osterkamp, Margaret A.
P I E Water Co.
Palmer, Eva E.
Palmer, Walter E.
Parente, Luis S.
Parente, Mary Borba
Parks, Jack B.
Parks, Laura M.
Patterson, Lawrence E. Estate of
Payne, Clyde H.
Payne, Margo
Pearson, Athelia K.
Pearson, William C.
Pearson, William G.
Pene, Robert
Perian, Miller
Perian, Ona E.
Petrissans, Deanna
Petrissans, George
Petrissans, Jean P.
Petrissans, Marie T.
Pickering, Dora M.
(Mrs. A. L. Pickering)
Pierce, John

EXHIBIT "C"

Pierce, Sadie

Pietszak, Sally

Pine, Joe

Pine, Virginia

Pires, Frank

Pires, Marie

Plaa, Jeanne

Plaa, Michel

Plantenga, Agnes

Plantenga, George

Poe, Arlo D.

Pomona Cemetery Assn.

Porte, Cecelia, Estate of

Porte, Garritt, Estate of

Portsmouth, Vera McCarty

Ramella, Mary M.

Ramirez, Concha

Rearick, Hildegard H.

Rearick, Richard R.

Reinalda, Clarence

Reitsma, Greta

Reitsma, Louis

Rice, Bernice

Rice, Charlie E.

Richards, Karin

(Mrs. Ronnie Richards)

Richards, Ronald L.

Ridder, Jennie Wassenaar

Righetti, A. T.

Riley, George A.

Riley, Helen C.

Robbins, Jack K.

Rocha, John M.

Rocha, Jose C.

Rodrigues, John

Rodrigues, Manuel

Rodrigues, Manuel, Jr.

Rogrigues, Mary L.

Rodriquez, Daniel

Rogers, Jack D.

Rohrer, John A.

Rohrer, Theresa D.

Rohrs, Elizabeth H.

Rossetti, M. S.

Roukema, Angeline

Roukema, Ed.

Roukema, Nancy

Roukema, Siebren

Ruderian, Max J.

Russell, Fred J.

Rusticus, Ann

Rusticus, Charles

Rynsburger, Arie

Rynsburger, Berdena, Trust

Rynsburger, Joan Adele

Rynsburger, Thomas

EXHIBIT "C"

S. P. Annex, Inc.

Salisbury, Elinor J.

Sanchez, Edmundo

Sanchez, Margarita O.

Santana, Joe Sr.

Santana, Palmira

Satragni, John B. Jr.

Scaramella, George P.

Schaafsma Bros.

Schaafsma, Jennie

Schaafsma, Peter

Schaafsma, Tom

Schaap, Andy

Schaap, Ids

Schaap, Maria

Schacht, Sharon C.

Schakel, Audrey

Schakel, Fred

Schmid, Olga

Schmidt, Madeleine

Schoneveld, Evert

Schoneveld, Henrietta

Schoneveld, John

Schoneveld, John Allen

Schug, Donald E.

Schug, Shirley A.

Schuh, Bernatta M.

Schuh, Harold H.

Scott, Frances M.

Scott, Linda F.

Scott, Stanley A.

Scritsmier, Lester J.

Serl, Charles A.

Serl, Rosalie P.

Shady Grove Dairy, Inc.

Shamel, Burt A.

Shelby, Harold E.

Shelby, John A.

Shelby, Velma M.

Shelton, Alice A.

Sherwood, Robert W.

Sherwood, Sheila J.

Shue, Eva

Shue, Gilbert

Sieperda, Anne

Sieperda, James

Sigrist, Hans

Sigrist, Rita

Silveira, Arline L.

Silveira, Frank

Silveira, Jack

Silveira, Jack P. Jr.

Simas, Dolores

Simas, Joe

Singleton, Dean

Singleton, Elsie R.

EXHIBIT "C"

Sinnott, Jim
Sinnott, Mildred B.
Slegers, Dorothy
Slegers, Hubert J.
Slegers, Jake
Slegers, Jim
Slegers, Lenwood M.
Slegers, Martha
Slegers, Tesse J.
Smith, Edward S.
Smith, Helen D.
Smith, James E.
Smith, Keith J.
Smith, Lester W.
Smith, Lois Maxine
Smith, Marjorie W.
Soares, Eva
Sogioka, Mitsuyoshi
Sogioka, Yoshimato
Sousa, Sam
Southern Pacific Land Co.
Southfield, Eddie
Souza, Frank M.
Souza, Mary T.
Spickerman, Alberta
Spickerman, Florence
Spickerman, Rudolph
Spyksma, John
Staal, John
Stahl, Zippora P.
Stampfl, Berta
Stampfl, William
Stanley, Robert E.
Stark, Everett
Stellingwerf, Andrew
Stellingwerf, Henry
Stellingwerf, Jenette
Stellingwerf, Shana
Stellingwerf, Stan
Stelzer, Mike C.
Sterk, Henry
Stiefel, Winifred
Stiefel, Jack D.
Stigall, Richard L.
Stigall, Vita
Stockman's Inn
Stouder, Charlotte A.
Stouder, William C.
Struikmans, Barbara
Struikmans, Gertie
Struikmans, Henry Jr.
Struikmans, Henry Sr.
Struikmans, Nellie
Swager, Edward
Swager, Gerben
Swager, Johanna

EXHIBIT "C"

Swager, Marion

Swierstra, Donald

Swierstra, Fanny

Sybrandy, Ida

Sybrandy, Simon

Sytsma, Albert

Sytsma, Edith

Sytsma, Jennie

Sytsma, Louie

Te Velde, Agnes

Te Velde, Bay

Te Velde, Bernard A.

Te Velde, Bonnie

Te Velde, Bonnie G.

Te Velde, George

Te Velde, George, Jr.

Te Velde, Harm

Te Velde, Harriet

Te Velde, Henry J.

Te Velde, Jay

Te Velde, Johanna

Te Velde, John H.

Te Velde, Ralph A.

Te Velde, Zwaantina, Trustee

Ter Maaten, Case

Ter Maaten, Cleone

Ter Maaten, Steve

Terpstra, Carol

Terpstra, Theodore G.

Teune, Tony

Teunissen, Bernard

Teunissen, Jane

Thomas, Ethel M.

Thommen, Alice

Thommen, Fritz

Tillema, Allie

Tillema, Harold

Tillema, Klaas D.

Timmons, William R.

Tollerup, Barbara

Tollerup, Harold

Trapani, Louis A.

Trimlett, Arlene R.

Trimlett, George E.

Tristant, Pierre

Tuinhout, Ale

Tuinhout, Harry

Tuinhout, Hilda

Tuls, Elizabeth

Tuls, Jack S.

Tuls, Jake

Union Oil Company of California

United Dairyman's Co-op.

Urquhart, James G.

Usle, Cathryn

Usle, Faustino

EXHIBIT "C"

V & Y Properties

Vaile, Beryl M.

Valley Hay Co.

Van Beek Dairy Inc.

Van Canneyt Dairy

Van Canneyt, Maurice

Van Canneyt, Wilmer

Van Dam, Bas

Van Dam, Isabelle

Van Dam, Nellie

Van Den Berg, Gertrude

Van Den Berg, Joyce

Van Den Berg, Marinus

Van Den Berg, Marvin

Van Der Linden, Ardith

Van Der Linden, John

Van Der Linden, Stanley

Van Der Veen, Kenneth

Van Diest, Anna T.

Van Diest, Cornelius

Van Diest, Ernest

Van Diest, Rena

Van Dyk, Bart

Van Dyk, Jeanette

Van Foeken, Martha

Van Foeken, William

Van Hofwegen, Steve

Van Hofwegen, Adrian A.

Van Hofwegen, Clara

Van Hofwegen, Jessie

Van Klaveren, A.

Van Klaveren, Arie

Van Klaveren, Wilhelmina

Van Klaveren, William

Van Leeuwen, Arie C.

Van Leeuwen, Arie C.

Van Leeuwen, Arlan

Van Leeuwen, Clara G.

Van Leeuwen, Cornelia L.

Van Leeuwen, Harriet

Van Leeuwen, Jack

Van Leeuwen, John

Van Leeuwen, Letie

Van Leeuwen, Margie

Van Leeuwen, Paul

Van Leeuwen, William A.

Van Ravenswaay, Donald

Van Ryn Dairy

Van Ryn, Dick

Van Surksum, Anthonetta

Van Surksum, John

Van Veen, John

Van Vliet, Effie

Van Vliet, Hendrika

Van Vliet, Hugo

Van Vliet, Klaas

EXHIBIT "C"

Vande Witte, George

Vanden Berge, Gertie

Vanden Berge, Gertie

Vanden Berge, Jack

Vanden Berge, Jake

Vanden Brink, Stanley

Vander Dussen, Agnes

Vander Dussen, Cor

Vander Dussen, Cornelius

Vander Dussen, Edward

Vander Dussen, Geraldine Marie

Vander Dussen, James

Vander Dussen, John

Vander Dussen, Nelvina

Vander Dussen, Rene

Vander Dussen, Sybrand Jr.

Vander Dussen, Sybrand Sr.

Vander Dussen Trustees

Vander Eyk, Case Jr.

Vander Eyk, Case Sr.

Vander Feer, Peter

Vander Feer, Rieka

Vander Laan, Ann

Vander Laan, Ben

Vander Laan, Bill

Vander Laan, Corrie

Vander Laan, Henry

Vander Laan, James

Vander Laan, Katie

Vander Laan, Martin Jr.

Vander Laan, Tillie

Vander Leest, Anna

Vander Leest, Ann

Vander Meer, Alice

Vander Meer, Dick

Vander Poel, Hank

Vander Poel, Pete

Vander Pol, Irene

Vander Pol, Margie

Vander Pol, Marines

Vander Pol, William P.

Vander Schaaf, Earl

Vander Schaaf, Elizabeth

Vander Schaaf, Henrietta

Vander Schaaf, John

Vander Schaaf, Ted

Vander Stelt, Catherine

Vander Stelt, Clarence

Vander Tuig, Arlene

Vander Tuig, Sylvester

Vander Veen, Joe A.

Vandervlag, Robert

Vander Zwan, Peter

Vanderford, Betty W.

Vanderford, Claud R.

Vanderham, Adrian

EXHIBIT "C"

Vanderham, Cornelius

Vanderham, Cornelius P.

Vanderham, Cory

Vanderham, E. Jane

Vanderham, Marian

Vanderham, Martin

Vanderham, Pete C.

Vanderham, Wilma

Vasquez, Eleanor

Veenendaal, Evert

Veenendaal, John H.

Veiga, Dominick, Sr.

Verbree, Jack

Verbree, Tillie

Verger, Bert

Verger, Betty

Verhoeven, Leona

Verhoeven, Martin

Verhoeven, Wesley

Vermeer, Dick

Vermeer, Jantina

Vernola Ranch

Vernola, Anthonietta

Vernola, Anthony

Vernola, Frank

Vernola, Mary Ann

Vernola, Pat F.

Vestal, Frances Lorraine

Vestal, J. Howard

Visser, Gerrit

Visser, Grace

Visser, Henry

Visser, Jess

Visser, Louie

Visser, Neil

Visser, Sam

Visser, Stanley

Visser, Tony D.

Visser, Walter G.

Von Der Ahe, Fredric T.

Von Euw, George

Von Euw, Majorie

Von Lusk, a limited partnership

Voortman, Anna Marie

Voortman, Edward

Voortman, Edwin J.

Voortman, Gertrude Dena

Wagner, Richard H.

Walker, Carole R.

Walker, Donald E.

Walker, Wallace W.

Wardle, Donald M.

Warner, Dillon B.

Warner, Minnie

Wassenaar, Peter W.

Waters, Michael

EXHIBIT "C"

Weeda, Adriana
Weeda, Daniel
Weeks, O. L.
Weeks, Verona E.
Weidman, Maurice
Weidman, Virginia
Weiland, Adaline I.
Weiland, Peter J.
Wesselink, Jules
West, Katharine R.
West, Russel
West, Sharon Ann
Western Horse Property
Westra, Alice
Westra, Henry
Westra, Hilda
Westra, Jake J.
Weststeyn, Freida
Weststeyn, Pete
Whitehurst, Louis G.
Whitehurst, Pearl L.
Whitmore, David L.
Whitmore, Mary A.
Whitney, Adolph M.
Wiersema, Harm
Wiersema, Harry
Wiersma, Ellen H.
Wiersma, Gladys J.
Wiersma, Jake
Wiersma, Otto
Wiersma, Pete
Winchell, Verne H., Trustee
Wind, Frank
Wind, Fred
Wind, Hilda
Wind, Johanna
Woo, Frank
Woo, Sem Gee
Wybenga, Clarence
Wybenga, Gus
Wybenga, Gus K.
Wybenga, Sylvia
Wynja, Andy
Wynja, Iona F.
Yellis, Mildred
Yellis, Thomas E.
Ykema-Harmsen Dairy
Ykema, Floris
Ykema, Harriet
Yokley, Betty Jo
Yokley, Darrell A.
Zak, Zan
Zivelonghi, George
Zivelonghi, Margaret
Zwaagstra, Jake
Zwaagstra, Jessie M.
Zwart, Case

EXHIBIT "C"

NON-PRODUCER WATER DISTRICTS

Chino Basin Municipal Water District

Chino Basin Water Conservation District

Pomona Valley Municipal Water District

Western Municipal Water District of Riverside County

DEFAULTING OVERLYING AGRICULTURAL PRODUCERS

Cheryl L. Bain
Warren Bain
John M. Barcelona
Letty Bassler
John Brazil
John S. Briano
Lupe Briano
Paul A. Briano
Tillie Briano
Arnie B. Carlson
John Henry Fikse
Phyllis S. Fikse
Lewellyn Flory
Mary I. Flory
L. H. Glazer
Dorothy Goodman
Sidney D. Goodman
Frank Grossi
Harada Brothers
Ellen Hettinga
Hein Hettinga
Dick Hofstra, Jr.
Benjamin M. Hughey
Frieda L. Hughey
Guillaume Indart
Ellwood B. Johnston, Trustee
Perry Kruckenberg, Jr.
Roy W. Lantis
Sharon I. Lantis
Frank Lorenz
Dagney H. MacDonald
Frank E. Martin
Ruth C. Martin
Connie S. Mello
Naldiro J. Mello
Felice Miller
Ted Miller
Masao Nerio
Tom K. Nerio
Toyo Nerio
Yuriko Nerio
Harold L. Rees
Alden G. Rose
Claude Rouleau, Jr.
Patricia M. Rouleau
Schultz Enterprises
Albert Shaw
Lila Shaw
Cathy M. Stewart
Marvin C. Stewart
Betty Ann Stone
John B. Stone
Vantoll Cattle Co., Inc.
Catherine Verburg

EXHIBIT "C"

Martin Verburg

Donna Vincent

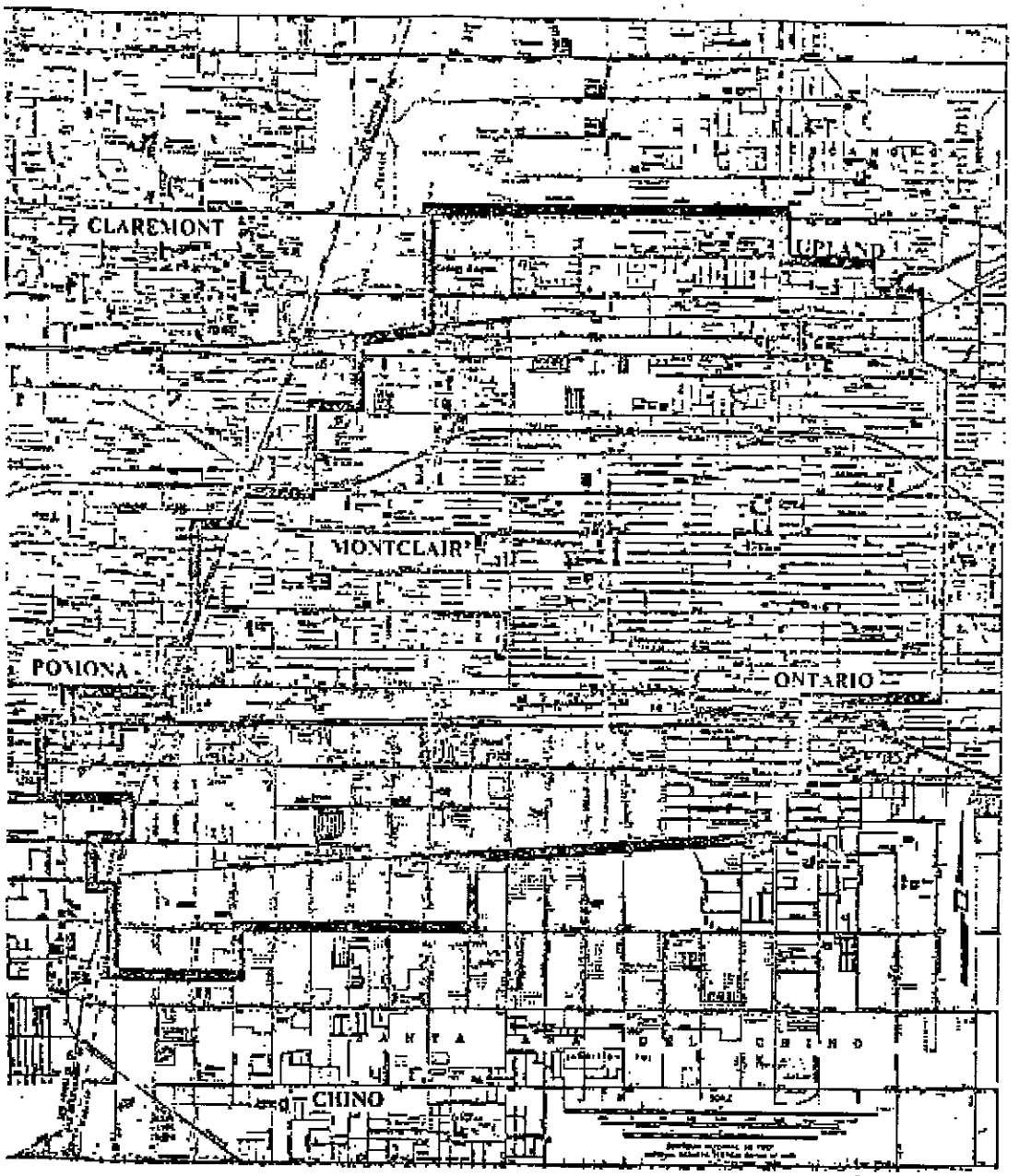
Larry Vincent

Cliff Wolfe & Associates

Ada M. Woll

Zarubica Co.

EXHIBIT "C"



CHINO BASIN

IN LIEU AREA NO. 1

EXHIBIT "J"

EXHIBIT "D"

OVERLYING NON-AGRICULTURAL RIGHTS

Party	Total Overlying Non-Agricultural Rights (Acre Feet)	Share of Safe Yield (Acre Feet)
Ameron Steel Producers	125	97.858
County Of San Bernardino	171	133.870
Conrock Company	406	317.844
Kaiser Steel Corporation	3,743	2,930.274
Red Star Fertilizer	20	15.657
Southern California Edison Co.	1,255	982.499
Space Center, Mira Loma	133	104.121
Southern Service Co., dba Blue Seal Linen	24	18.789
Sunkist, Orange Products Division	2,393	1,873.402
Carlsberg Mobile Home Properties, Ltd. '73	593	464.240
Union Carbide Corporation	546	427.446
Quaker Chemical Co.	0	0
Totals	9,409	7,366.00

EXHIBIT "E"

APPROPRIATIVE RIGHTS

Party	Appropriative Right (Acre Feet)	Share of Initial Operating Safe Yield (Acre Feet)	Share of Operating Safe Yield (Percent)
City of Chino	5,271.7	3,670.067	6.693
City of Norco	289.5	201.545	0.368
City of Ontario	16,337.4	11,373.816	20.742
City of Pomona	16,110.5	11,215.852	20.454
City of Upland	4,097.2	2,852.401	5.202
Cucamonga County Water District	4,431.0	3,084.786	5.626
Jurupa Community Services District	1,104.1	768.655	1.402
Monte Vista County Water District	5,958.7	4,148.344	7.565
West San Bernardino County Water District	925.5	644.317	1.175
Etiwanda Water Company	768.0	534.668	0.975
Felspar Gardens Mutual Water Company	68.3	47.549	0.087
Fontana Union Water Co.	9,188.3	6,396.736	11.666
Marygold Mutual Water Co.	941.3	655.317	1.195
Mira Loma Water Co.	1,116.0	776.940	1.417
Monte Vista Irr. Co.	972.1	676.759	1.234
Mutual Water Company of Glen Avon Heights	672.2	467.974	0.853
Park Water Company	236.1	164.369	0.300
Pomona Valley Water Co.	3,106.3	2,162.553	3.944
San Antonio Water Co.	2,164.5	2,506.888	2.748
Santa Ana River Water Company	1,869.3	1,301.374	2.373
Southern California Water Company	1,774.5	1,235.376	2.253
West End Consolidated Water Company	1,361.3	947.714	1.728
TOTAL	78,763.8	54,834.000	100.000

EXHIBIT 'E'

EXHIBIT "F"
OVERLYING (AGRICULTURAL) POOL
POOLING PLAN

1. Membership in Pool. The State of California and all producers listed in Exhibit "C" shall be the initial members of this pool, which shall include all producers of water for overlying uses other than industrial or commercial purposes.

2. Pool Meetings. The members of the pool shall meet annually, in person or by proxy, at a place and time to be designated by Watermaster for purposes of electing members of the Pool Committee and conducting any other business of the pool. Special meetings of the membership of the pool may be called and held as provided in the rules of the pool.

3. Voting. All voting at meetings of pool members shall be on the basis of one vote for each 100 acre feet or any portion thereof of production from Chino Basin during the preceding year, as shown by the records of Watermaster.

4. Pool Committee. The Pool Committee for this pool shall consist of not less than nine (9) representatives selected at large by members of the pool. The exact number of members of the Pool Committee in any year shall be as determined by majority vote of the voting power of members of the pool in attendance at the annual pool meeting. Each member of the Pool Committee shall have one vote and shall serve for a two-year term. The members first elected shall classify themselves by lot so that approximately one-half serve an initial one-year term. Vacancies during any term shall be filled by a majority of the remaining members of the Pool Committee.

5. Advisory Committee Representatives. The number of

representatives of the Pool Committee on the Advisory Committee shall be as provided in the rules of the pool from time to time but not exceeding ten (10). The voting power of the pool on the Advisory Committee shall be apportioned and exercised as determined from time to time by the Pool Committee.

6. Replenishment Obligation. The pool shall provide funds for replenishment of any production by persons other than members of the Overlying (Non-agricultural) Pool or Appropriator Pool, in excess of the pool's share of Safe Yield. During the first five (5) years of operations of the Physical Solution, reasonable efforts shall be made by the Pool Committee to equalize annual assessments.

7. Assessments. All assessments in this pool (whether for replenishment water cost or for pool administration or the allocated share of Watermaster administration) shall be in an amount uniformly applicable to all production in the pool during the preceding year or calendar quarter. Provided, however, that the Agricultural Pool Committee, may recommend to the Court modification of the method of assessing pool members, inter se, if the same is necessary to attain legitimate basin management objectives, including water conservation and avoidance of undesirable socio-economic consequences. Any such modification shall be initiated and ratified by one of the following methods:

(a) Excess Production. - In the event total pool production exceeds 100,000 acre feet in any year, the Pool Committee shall call and hold a meeting, after notice to all pool members, to consider remedial modification of the assessment formula.

(b) Producer Petition. - At any time after the fifth full year of operation under the Physical Solution, a petition by ten percent (10%) of the voting power or membership of the Pool shall compel the holding of a noticed meeting to consider revision of said formula of assessment for replenishment water.

In either event, a majority action of the voting power in attendance at such pool members' meeting shall be binding on the Pool Committee.

8. Rules. The Pool Committee shall adopt rules for conducting meetings and affairs of the committee and for administering its program and in amplification of the provisions, but not inconsistent with, this pooling plan.

EXHIBIT "G"
OVERLYING (NON-AGRICULTURAL) POOL
POOLING PLAN

1. Membership in Pool. The initial members of the pool, together with the decreed share of the Safe Yield of each, are listed in Exhibit "D". Said pool includes producers of water for overlying industrial or commercial (non-agricultural) purposes, or such producers within the Pool who may hereafter take water pursuant to Paragraph 8 hereof.

2. Pool Committee. The Pool Committee for this pool shall consist of one representative designated by each member of the pool. Voting on the committee shall be on the basis of one vote for each member, unless a volume vote is demanded, in which case votes shall be allocated as follows:

The volume voting power on the Pool Committee shall be 1,484 votes. Of these, 742 votes shall be allocated on the basis of one vote for each ten (10) acre feet or fraction thereof of decreed shares in Safe Yield. (See Exhibit "D") The remaining 742 votes shall be allocated proportionally on the basis of assessments paid to Watermaster during the preceding year.*

3. Advisory Committee Representatives. At least three (3) members of the Pool Committee shall be designated by said committee to serve on the Advisory Committee. The exact number of such representatives at any time shall be as determined by the Pool Committee. The voting power of the pool shall be exercised in the

*Or production assessments paid under Water Code Section 72140 et seq., as to years prior to the second year of operation under the Physical Solution hereunder.

Advisory Committee as a unit, based upon the vote of a majority of said representatives.

4. Replenishment Obligation. The pool shall provide funds for replenishment of any production in excess of the pool's share of Safe Yield in the preceding year.

5. Assessment. Each member of this pool shall pay an assessment equal to the cost of replenishment water times the number of acre feet of production by such producer during the preceding year in excess of (a) his decreed share of the Safe Yield, plus (b) any carry-over credit under Paragraph 7 hereof. In addition, the cost of the allocated share of Watermaster administration expense shall be recovered on an equal assessment against each acre foot of production in the pool during such preceding fiscal year or calendar quarter; and in the case of Pool members who take substitute ground water as set forth in Paragraph 8 hereof, such producer shall be liable for its share of administration assessment, as if the water so taken were produced, up to the limit of its decreed share of Safe Yield.

6. Assignment. Rights herein decreed are appurtenant to the land and are only assignable with the land for overlying use thereon; provided, however, that any appropriator who may, directly or indirectly, undertake to provide water service to such overlying lands may, by an appropriate agency agreement on a form approved by Watermaster, exercise said overlying right to the extent, but only to the extent necessary to provide water service to said overlying lands.

7. Carry-over. Any member of the pool who produces less than its assigned water share of Safe Yield may carry such unexercised

right forward for exercise in subsequent years. The first water produced during any such subsequent year shall be deemed to be an exercise of such carry-over right. In the event the aggregate carry-over by any pool member exceeds its share of Safe Yield, such member shall, as a condition of preserving such surplus carry-over, execute a storage agreement with Watermaster.

8. Substitute Supplies. To the extent that any Pool member, at the request of Watermaster and with the consent of the Advisory Committee, takes substitute surface water in lieu of producing ground water otherwise subject to production as an allocated share of Safe Yield, said party shall nonetheless remain a member of this Pool.

9. Rules. The Pool Committee shall adopt rules for administering its program and in amplification of the provisions, but not inconsistent with, this pooling plan.

EXHIBIT "H"
APPROPRIATIVE POOL
POOLING PLAN

1. Qualification for Pool. Any city, district or other public entity and public utility -- either regulated under Public Utilities Commission jurisdiction, or exempt therefrom as a non-profit mutual water company (other than those assigned to the Overlying (Agricultural) Pool) -- shall be a member of this pool. All initial members of the pool are listed in Exhibit "E", together with their respective appropriative rights and acre foot allocation and percentage shares of the initial and subsequent Operating Safe Yield.

2. Pool Committee. The Pool Committee shall consist of one (1) representative appointed by each member of the Pool.

3. Voting. The total voting power on the Pool Committee shall be 1,000 votes. Of these, 500 votes shall be allocated in proportion to decreed percentage shares in Operating Safe Yield. The remaining 500 votes shall be allocated proportionally on the basis of assessments paid to Watermaster during the preceding year.* Routine business of the Pool Committee may be conducted on the basis of one vote per member, but upon demand of any member a weighted vote shall be taken. Affirmative action of the Committee shall require a majority of the voting power of members in attendance, provided that it includes concurrence by at least one-third of its total members.

4. Advisory Committee Representatives. Ten (10) members of

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*Or production assessments paid under Water Code Section 72140 et seq., as to years prior to the second year of operation under the Physical Solution hereunder.

the Pool Committee shall be designated to represent this pool on the Advisory Committee. Each major appropriator, i.e., the owner of an adjudicated appropriative right in excess of 3,000 acre feet, shall be entitled to one representative. The remaining members representing the Appropriative Pool on the Advisory Committee shall be elected at large by the remaining members of the pool. The voting power of the Appropriative Pool on the Advisory Committee shall be apportioned between the major appropriator representatives in proportion to their respective voting power in the Pool Committee. The remaining two representatives shall exercise equally the voting power proportional to the Pool Committee voting power of all remaining appropriators; provided, however, that if any representative fails to attend an Advisory Committee meeting, the voting power of that representative shall be allocated among the representatives of the Appropriator Pool in attendance in the same proportion as their own respective voting powers.

5. Replenishment Obligation. The pool shall provide funds for purchase of replenishment water to replace any production by the pool in excess of Operating Safe Yield during the preceding year.

6. Administrative Assessment. Costs of administration of this pool and its share of general Watermaster expense shall be recovered by a uniform assessment applicable to all production during the preceding year.

7. Replenishment Assessment. The cost of replenishment water required to replace production from Chino Basin in excess of Operating Safe Yield in the preceding year shall be allocated and recovered as follows:

(a) For production, other than for increased export, within CBMWD or WMWD:

(1) Gross Assessment. 15% of such replenishment water costs shall be recovered by a uniform assessment against all production of each appropriator producing in said area during the preceding year.

(2) Net Assessment. The remaining 85% of said costs shall be recovered by a uniform assessment on each acre foot of production from said area by each such appropriator in excess of his allocated share of Operating Safe Yield during said preceding year.

(b) For production which is exported for use outside Chino Basin in excess of maximum export in any year through 1976, such increased export production shall be assessed against the exporting appropriator in an amount sufficient to purchase replenishment water from CBMWD or WMWD in the amount of such excess.

(c) For production within SBVMWD or PVMWD:

By an assessment on all production in excess of an appropriator's share of Operating Safe Yield in an amount sufficient to purchase replenishment water through SBVMWD or MWD in the amount of such excess.

8. Socio-Economic Impact Review. The parties have conducted certain preliminary socio-economic impact studies. Further and more detailed socio-economic impact studies of the assessment formula and its possible modification shall be undertaken for the Appropriator Pool by Watermaster no later than ten (10) years from the effective date of this Physical Solution, or whenever total

production by this pool has increased by 30% or more over the decreed appropriative rights, whichever is first.

9. Facilities Equity Assessment. Watermaster may, upon recommendation of the Pool Committee, institute proceedings for levy and collection of a Facilities Equity Assessment for the purposes and in accordance with the procedures which follow:

(a) Implementing Circumstances. - There exist several sources of supplemental water available to chino Basin, each of which has a differential cost and quantity available. The optimum management of the entire Chino Basin water resource favors the maximum use of the lowest cost supplemental water to balance the supplies of the Basin, in accordance with the Physical Solution. The varying sources of supplemental water include importations from MWD and SBVMWD, importation of surface and ground water supplies from other basins in the immediate vicinity of Chino Basin, and utilization of reclaimed water. In order to fully utilize any of such alternate sources of supply, it will be essential for particular appropriators having access to one or more of such supplies to have invested, or in the future to invest, directly or indirectly, substantial funds in facilities to obtain and deliver such water to an appropriate point of use. To the extent that the use of less expensive alternative sources of supplemental water can be maximized by the inducement of a Facilities Equity Assessment, as herein provided, it is to the long-term benefit of the entire basin that such assessment be authorized and levied by Watermaster.

(b) Study and Report. - At the request of the Pool

Committee, Watermaster shall undertake a survey study of the utilization of alternate supplemental supplies by members of the Appropriative Pool which would not otherwise be utilized and shall prepare a report setting forth the amount of such alternative supplies being currently utilized, the amount of such supplies which could be generated by activity within the pool, and the level of cost required to increase such uses and to optimize the total supplies available to the basin. Said report shall contain an analysis and recommendation for the levy of a necessary Facilities Equity Assessment to accomplish said purpose.

(c) Hearing. - If the said report by Watermaster contains a recommendation for imposition of a Facilities Equity Assessment, and the Pool Committee so requests, Watermaster shall notice and hold a hearing not less than 60 days after distribution of a copy of said report to each member of the pool, together with a notice of the hearing date. At such hearing, evidence shall be taken with regard to the necessity and propriety of the levy of a Facilities Equity Assessment and full findings and decision shall be issued by Watermaster.

(d) Operation of Assessment. - If Watermaster determines that it is appropriate that a Facilities Equity Assessment be levied in a particular year, the amount of additional supplemental supplies which should be generated by such assessment shall be estimated. The cost of obtaining such supplies, taking into consideration the investment in necessary facilities shall then be determined and spread equitably among the producers within the pool in a manner so that those

producers not providing such additional lower cost supplemental water, and to whom a financial benefit will result, may bear a proportionate share of said costs, not exceeding said benefit; provided that any producer furnishing such supplemental water shall not thereby have its average cost of water in such year reduced below such producer's average cost of pumping from the Basin. In so doing, Watermaster shall establish a percentage of the total production by each party which may be produced without imposition of a Facilities Equity Assessment. Any member of the pool producing more water than said percentage shall pay such Facilities Equity Assessment on any such excess production. Watermaster is authorized to transmit and pay the proceeds of such Facilities Equity Assessment to those producers who take less than their share of Basin water by reason of furnishing a higher percentage of their requirements through use of supplemental water.

10. Unallocated Safe Yield Water. To the extent that, in any five years, any portion of the share of Safe Yield allocated to the Overlying (Agricultural) Pool is not produced, such water shall be available for reallocation to members of the Appropriative Pool, as follows:

(a) Priorities. - Such allocation shall be made in the following sequence:

(1) to supplement, in the particular year, water available from Operating Safe Yield to compensate for any reduction in the Safe Yield by reason of recalculation thereof after the tenth year of operation hereunder.

(2) pursuant to conversion claims as defined in Subparagraph (b) hereof.

(3) as a supplement to Operating Safe Yield, without regard to reductions in Safe Yield.

(b) Conversion Claims. - The following procedures may be utilized by any appropriator:

(1) Record of Land Use Conversion. Any appropriator who undertakes, directly or indirectly, during any year, to permanently provide water service to lands which during the immediate preceding five (5) consecutive years was devoted to irrigated agriculture may report such change in land use or water service to Watermaster. Watermaster shall thereupon verify such change in water service and shall maintain a record and account for each appropriator of the total acreage involved and the average annual water use during said five-year period.

(2) Establishment of Allocation Percentage. In any year in which unallocated Safe Yield water from the Overlying (Agricultural) Pool is available for such conversion claims, Watermaster shall establish allocable percentages for each appropriator based upon the total of such converted acreage recorded to each such appropriator's account.

(3) Allocation and Notice. Watermaster shall thereafter apply the allocated percentage to the total unallocated Safe Yield water available for special allocation to derive the amount thereof allocable to

each appropriator; provided that in no event shall the allocation to any appropriator as a result of such conversion claim exceed 50% of the average annual amount of water actually applied to the areas converted by such appropriator prior to such conversion. Any excess water by reason of such limitation on any appropriator's right shall be added to Operating Safe Yield. Notice of such special allocation shall be given to each appropriator and shall be treated for purposes of this Physical Solution as an addition to such appropriator's share of the Operating Safe Yield for the particular year only.

(4) Administrative Costs. Any costs of Watermaster attributable to administration of such special allocations and conversion claims shall be assessed against appropriators participating in such reporting.

11. In Lieu Procedures. There are, or any develop, certain areas within Chino Basin where good management practices dictate that recharge of the basin be accomplished, to the extent practical, by taking surface supplies of supplemental water in lieu of ground water otherwise subject to production as an allocated share of Operating Safe Yield.

(a) Method of Operation. - An appropriator producing water within such designated in lieu area who is willing to abstain for any reason from producing any portion of such producer's share of Operating Safe Yield in any year may offer such unpumped water to Watermaster. In such event, Watermaster shall purchase said water in place, in lieu of spreading replenishment water, which is otherwise required to

make up for over production. The purchase price for in lieu water shall be the lesser of:

(1) Watermaster's current cost of replenishment water, whether or not replenishment water is currently then obtainable, plus the cost of spreading; or

(2) The cost of supplemental surface supplies to the appropriator, less

a. said appropriator's average cost of ground water production, and

b. the applicable production assessment were the water produced.

Where supplemental surface supplies consist of MWD or SBVMWD supplies, the cost of treated, filtered State water from such source shall be deemed the cost of supplemental surface supplies to the appropriator for purposes of such calculation.

In any given year in which payments may be made pursuant to a Facilities Equity Assessment, as to any given quantity of water the party will be entitled to payment under this section or pursuant to the Facilities Equity Assessment, as the party elects, but not under both.

(b) Designation of In Lieu Areas. - The first in lieu area is designated as the "In Lieu Area No. 1" and consists of an area wherein nitrate levels in the ground water generally exceed 45 mg/l, and is shown on Exhibit "J" hereto. Other in lieu areas may be designated by subsequent order of Watermaster upon recommendation or approval by Advisory Committee. Said in lieu areas may be enlarged, reduced or

eliminated by subsequent orders; provided, however, that designation of In Lieu Areas shall be for a minimum fixed term sufficient to justify necessary capital investment. In Lieu Area No. 1 may be enlarged, reduced or eliminated in the same manner, except that any reduction of its original size or elimination thereof shall require the prior order of Court.

12. Carry-over. Any appropriator who produces less than his assigned share of Operating Safe Yield may carry such unexercised right forward for exercise in subsequent years. The first water produced during any such subsequent year shall be deemed to be an exercise of such carry-over right. In the event the aggregate carry-over by any appropriator exceeds its share of Operating Safe Yield, such appropriator shall, as a condition of preserving such surplus carry-over, execute a storage agreement with Watermaster. Such appropriator shall have the option to pay the gross assessment applicable to such carry-over in the year in which it accrued.

13. Assignment, Transfer and Lease. Appropriative rights, and corresponding shares of Operating Safe Yield, may be assigned or may be leased or licensed to another appropriator for exercise in a given year. Any transfer, lease or license shall be ineffective until written notice thereof is furnished to and approved as to form by Watermaster, in compliance with applicable Watermaster rules. Watermaster shall not approve transfer, lease or license of a right for exercise in an area or under conditions where such production would be contrary to sound basin management or detrimental to the rights or operations of other producers.

14. Rules. The Pool Committee shall adopt rules for

administering its program and in amplification of the provisions, but not inconsistent with, this pooling plan.

EXHIBIT "I"

ENGINEERING APPENDIX

1. Basin Management Parameters. In the process of implementing the physical solution for Chino Basin, Watermaster shall consider the following parameters:

(a) Pumping Patterns. - Chino Basin is a common supply for all persons and agencies utilizing its waters. It is an objective in management of the Basin's waters that no producer be deprived of access to said waters by reason of unreasonable pumping patterns, nor by regional or localized recharge of replenishment water, insofar as such result may be practically avoided.

(b) Water Quality. - Maintenance and improvement of water quality is a prime consideration and function of management decisions by Watermaster.

(c) Economic Considerations. - Financial feasibility, economic impact and the cost and optimum utilization of the Basin's resources and the physical facilities of the parties are objectives and concerns equal in importance to water quantity and quality parameters.

2. Operating Safe Yield. Operating Safe Yield in any year shall consist of the Appropriative Pool's hare of Safe Yield of the Basin, plus any controlled overdraft of the Basin which Watermaster may authorize. In adopting the Operating Safe Yield for any year, Watermaster shall be limited as follows:

(a) Accumulated Overdraft. - During the operation of this Judgment and Physical Solution, the overdraft accumulated from and after the effective date of the Physical

Solution and resulting from an excess of Operating Safe Yield over Safe Yield shall not exceed 200,000 acre feet.

(b) Quantitative Limits. - In no event shall Operating Safe Yield in any year be less than the Appropriative Pool's share of Safe Yield, nor shall it exceed such share of Safe Yield by more than 10,00 acre feet. The initial Operating Safe Yield is hereby set at 54,834 acre feet per year. Operating Safe Yield shall not be changed upon less than five (5) years' notice by Watermaster.

Nothing contained in this paragraph shall be deemed to authorize, directly or indirectly, any modification of the allocation of shares in Safe Yield to the overlying pools, as set forth in Paragraph 44 of the Judgment.

3. Ground Water Storage Agreements. Any agreements authorized by Watermaster for storage of supplemental water in the available ground water storage capacity of Chino Basin shall include, but not be limited to:

(a) The quantities and term of the storage right.

(b) A statement of the priority or relation of said right, as against overlying or Safe Yield uses, and other storage rights.

(c) The procedure for establishing delivery rates, schedules and procedures which may include:

[1] spreading or injection, or

[2] in lieu deliveries of supplemental water for direct use.

(d) The procedures for calculation of losses and annual accounting for water in storage by Watermaster.

(e) The procedures for establishment and administration of withdrawal schedules, locations and methods.

CHINO BASIN

IN LIEU ARE NO. 1 (MAP)

EXHIBIT "J"

LEGAL DESCRIPTION

OF CHINO BASIN

Preamble

All of the townships and ranges referred to in the following legal description are the San Bernardino Base and Meridian. Certain designated sections are implied as the System of Government Surveys may be extended where not established. Said sections are identified as follows:

Section 20, T1N, R8W is extended across Rancho Cucamonga;

Section 36, T1N, R8W is extended across the City of Upland;

Sections 2,3, and 4, T1S, R7W are extended across Rancho Cucamonga;

Section 10, T1S, R8W is extended across the City of Claremont;

Sections 19, 20, 21, 30, 31 and 32, T1S, R8W are extended across the City of Pomona;

Sections 4, 5, and 28, T2S, R8W are extended across Rancho Santa Ana Del Chino;

Sections 15 and 16, T3S, R7W are extended across Rancho La Sierra; and

Sections 17 and 20, T3S, R7W are extended across Rancho El Rincon.

Description

Chino Basin is included within portions of the Counties of San Bernardino, Riverside and Los Angeles, State of California, bounded by a continuous line described as follows:

BEGINNING at the Southwest corner of Lot 241 as shown on Map of Ontario Colony Lands, recorded in Map Book 11, page 6, Office of the County Recorder of San Bernardino County, said corner being the Point of Beginning;

1. Thence Southeasterly to the Southeast corner

of Lot 419 of said Ontario Colony Lands;

2. Thence Southeasterly to a point 1300 feet North of the South line and 1300 feet East of the West line of Section 4, T1S, R7W;

3. Thence Easterly to a point on the East line of Section 4, 1800 feet North of the Southeast corner of said Section 4;

4. Thence Easterly to the Southeast corner of the Southwest quarter of the Northeast quarter of Section 3, T1S, R7W;

5. Thence Northeasterly to a point on the North line of Section 2, T1S, R7W, 1400 feet East of the West line of said Section 2;

6. Thence Northeasterly to the Southwest corner of Section 18, T1N, R6W;

7. Thence Northerly to the Northwest corner of said Section 18;

8. Thence Easterly to the Northeast corner of said Section 18;

9. Thence Northerly to the Northwest corner of the Southwest Quarter of Section 8, T1N, R6W;

10. Thence Easterly to the Northeast corner of said Southwest quarter of said Section 8;

11. Thence Southerly to the Southeast corner of said Southwest Quarter of said Section 8;

12. Thence Easterly to the Northeast corner of Section 17, T1N, R6W;

13. Thence Easterly to the Northeast corner of Section 16, T1N, R6W;

14. Thence Southeasterly to the Northwest corner of the Southeast quarter of Section 15, T1N, R6W;

15. Thence Easterly to the Northeast corner of said Southeast quarter of said Section 15;

16. Thence Southeasterly to the Northwest corner of the Northeast quarter of Section 23, T1N, R6W;

17. Thence Southeasterly to the Northwest corner of Section 25, T1N, R6W;

EXHIBIT "K"

18. Thence Southeasterly to the Northwest corner of the Northeast quarter of Section 31, T1N, R5W;

19. Thence Southeasterly to the Northeast corner of the Northwest quarter of Section 5, T1S, R5W;

20. Thence Southeasterly to the Southeast corner of Section 4, T1S, R5W;

21. Thence Southeasterly to the Southeast corner of the Southwest quarter of Section 11, T1S, R5W;

22. Thence Southwesterly to the Southwest corner of Section 14, T1S, R5W;

23. Thence Southwest to the Southwest corner of Section 22, T1S, R5W;

24. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 6, T2S, R5W;

25. Thence Southeasterly to the Northeast corner of Section 18, T2S, R5W;

26. Thence Southwesterly to the Southwest corner of the Southeast quarter of Section 13, T2S, R6W;

27. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 26, T2S, R6W;

28. Thence Westerly to the Southwest corner of the Northwest quarter of said Section 26;

29. Thence Northerly to the Northwest corner of said Section 26;

30. Thence Westerly to the Southwest corner of Section 21, T2S, R6W;

31. Thence Southerly to the Southeast corner of Section 29, T2S, R6W;

32. Thence Westerly to the Southeast corner of Section 30, T2S, R6W;

33. Thence Southwesterly to the Southwest corner of Section 36, T2S, R7W;

34. Thence Southwesterly to the Southeast corner of Section 3, T3S, R7W;

35. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 10, T3S, R7W;

36. Thence Southerly to the Northeast corner of the Northwest quarter of Section 15, T3S, R7W;

37. Thence Southwesterly to the Southeast corner of the Northeast quarter of Section 16, T3S, R7W;

38. Thence Southwesterly to the Southwest corner of said Section 16;

39. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 20, T3S, R7W;

40. Thence Westerly to the Southwest corner of the Northwest quarter of said Section 20;

41. Thence Northerly to the Northwest corner of Section 17, T3S, R7W;

42. Thence Westerly to the Southwest corner of Section 7, T3S, R7W;

43. Thence Northerly to the Southwest corner of Section 6, T3S, R7W;

44. Thence Westerly to the Southwest corner of Section 1, T3S, R8W;

45. Thence Northerly to the Southeast corner of Section 35, T2S, R8W;

46. Thence Northwesterly to the Northwest corner of said Section 35;

47. Thence Northerly to the Southeast corner of Lot 33, as shown on Map of Tract 3193, recorded in Map Book 43, pages 46 and 47, Office of the County Recorder of San Bernardino County;

48. Thence Westerly to the Northwest corner of the Southwest quarter of Section 28, T2S, R8W;

49. Thence Northerly to the Southwest corner of Section 4, T2S, R8W;

50. Thence Westerly to the Southwest corner of Section 5, T2S, R8W;

51. Thence Northerly to the Southwest corner of Section 32, T1S, R8W;

52. Thence Westerly to the Southwest corner of Section 31, T1S, R8W;

53. Thence Northerly to the Southwest corner of Section 30, T1S, R8W;

54. Thence Northeasterly to the Southwest corner of Section 20, T1S, R8W;

55. Thence Northerly to the Northwest corner of the Southwest quarter of the Southwest quarter of said Section 20;

56. Thence Northwesterly to the Northeast corner of the Southeast quarter of the Southeast quarter of the Northwest quarter of Section 19, T1S, R8W;

57. Thence Easterly to the Northwest corner of Section 21, T1S, R8W;

58. Thence Northeasterly to the Southeast corner of the Southwest quarter of the Southwest quarter of Section 10, T1S, R8W;

59. Thence Northeasterly to the Southwest corner of Section 2, T1S, R8W;

60. Thence Northeasterly to the Southeast corner of the Northwest quarter of the Northwest quarter of Section 1, T1S, R8W;

61. Thence Northerly to the Northeast corner of the Northwest quarter of the Northeast quarter of Section 36, T1N, R8W;

62. Thence Northerly to the Southeast corner of Section 24, T1N, R8W;

63. Thence Northeasterly to the Southeast corner of the Northwest quarter of the Northwest quarter of Section 20, T1N, R7W; and

64. Thence Southerly to the Point of Beginning.

EXHIBIT "K"

Sections Included

Said perimeter description includes all or portions of the following Townships, Ranges and Sections of San Bernardino Base and Meridian:

T1N, R5W - Sections:	30, 31 and 32
T1N, R6W - Sections:	8, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36
T1N, R7W - Sections:	19, 20, 24, 25, 26, 29, 30, 31, 32, 35 and 36
T1N, R8W - Sections:	25 and 36
T1S, R5W - Sections:	4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 28, 29, 30, 31 and 32
T1S, R6W - Sections:	1 through 36, inclusive
T1S, R7W - Sections:	1 through 36, inclusive
T1S, R8W - Sections:	1, 2, 10, 11, 12, 13, 14, 15, 16, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36
T2S, R5W - Sections:	6, 7 and 18
T2S, R6W - Sections:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 29, 30 and 31
T2S, R7W - Sections:	1 through 36, inclusive
T2S, R8W - Sections:	1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 35 and 36
T3S, R7W - Sections:	2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17 and 20
T3S, R8W - Sections:	1.

EXHIBIT "K"

NOSSAMAN, GUTHNER, KNOX & ELLIOT
FREDERIC A. FUDACZ, STATE BAR NO. 050546
JOHN OSSIFF, STATE BAR NO. 120149
445 South Figueroa Street
Thirty-First Floor
Los Angeles, California 90071
Telephone: (213) 612-7800
Facsimile: (213) 612-7801

Attorneys for
CHINO BASIN WATERMASTER

SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO - WEST DISTRICT

CHINO BASIN MUNICIPAL WATER DISTRICT, Plaintiff, v. CITY OF CHINO, Defendant.	Case No.: RCV 51010 ORDER APPROVING AMENDMENTS TO JUDGMENT DATE: November 17, 1995 TIME: 2:00 p.m. DEPT: WD-2 Specially assigned to the Honorable Judge Ben T. Kayashima

On November 17, 1995, at 2:00 p.m., the petition and motion of the Chino Basin Watermaster for an order approving amendments to the judgment to simplify conversion claim procedures came on regularly for hearing, the Honorable Judge Ben T. Kayashima presiding.

Frederic A. Fudacz and John Ossiff, of Nossaman, Guthner, Knox & Elliot, appeared on behalf of Chino Basin Watermaster. No other appearances were made.

No opposition having been received and good cause appearing therefore

IT IS HEREBY ORDERED:

1. That the petition and motion of Watermaster is granted.

2. Paragraph 10(b), "Conversion Claims" of Exhibit "H" of the Judgment is hereby deleted and replaced with a new Paragraph 10(b), attached hereto as Exhibit 1.

Date: _____

_____
Ben T. Kayashima
Judge, San Bernardino County Superior Court

EXHIBIT "1"

AMENDMENT TO JUDGMENT

NEW PARAGRAPH 10(B) OF EXHIBIT "H"

(b) Conversion Claims. The following procedures may be utilized by any appropriator:

(1) Record of Uncoverted Agricultural Acreage.

Watermaster shall maintain on an ongoing basis a record, with appropriate related maps, of all agricultural acreage within the Chino Basin subject to being converted to appropriative water use pursuant to the provisions of this subparagraph. An initial identification of such acreage as of June 30, 1995 is attached hereto as Appendix 1.

(2) Record of Water Service Conversion. Any appropriator who undertakes to permanently provide water service to lands subject to conversion may report such intent to change water service to Watermaster. Watermaster should thereupon verify such change in water service and shall maintain a record and account for each appropriator of the total acreage involved. Should, at any time, converted acreage return to water service from the Overlying (Agricultural) Pool, Watermaster shall return such acreage to uncoverted status and correspondingly reduce or eliminate any allocation accorded to the appropriator involved.

(3) Allocation of Safe Yield Rights.

(i) In any year in which sufficient unallocated Safe Yield from the Overlying (Agricultural) Pool is available for such conversion claims, Watermaster shall allocate to each appropriator with a conversion claim 1.3 acre-

feet of unallocated Safe Yield water for each converted acre for which conversion has been approved and recorded by the Watermaster.

(ii) In any year in which the unallocated Safe Yield water from the Overlying (Agricultural) Pool is not sufficient to satisfy all outstanding conversion claims pursuant to subparagraph (i) herein above, Watermaster shall establish allocation percentages for each appropriator with conversion claims. The percentages shall be based upon the ratio of the total of such converted average approved and recorded for each appropriator's account in comparison to the total of converted acreage approved and recorded for all appropriators. Watermaster shall apply such allocation percentage for each appropriator to the total unallocated Safe Yield water available for conversion claims to derive the amount allocable to each appropriator.

(4) Notice and Allocation. Notice of the special allocation of Safe Yield water pursuant to conversion claims shall be given to each appropriator and shall be treated for purposes of this physical solution as an addition to such appropriator's share of the operating Safe Yield for the particular year only.

(5) Administrative Costs. Any costs of Watermaster attributable to the administration of such special allocations and conversion claims shall be assessed against the appropriators participating in such reporting, apportioned in accordance with the total amount of converted acreage held by each appropriator participating in the conversion program.

NOSSAMAN, GUTHNER, KNOX & ELLIOT
FREDERIC A. FUDACZ, STATE BAR NO. 050546
JOHN OSSIFF, STATE BAR NO. 120149
445 South Figueroa Street
Thirty-First Floor
Los Angeles, California 90071
Telephone: (213) 612-7800
Facsimile: (213) 612-7801

Attorneys for
CHINO BASIN WATERMASTER

SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO - WEST DISTRICT

CHINO BASIN MUNICIPAL WATER DISTRICT, Plaintiff, v. CITY OF CHINO, Defendant.	) Case No.: RCV 51010)) ~~(Amended Proposed)~~))) ORDER FOR AMENDMENTS TO) THE JUDGMENT REGARDING) CHANGES IN POOLING PLANS) AND APPROPRIATIVE POOL) REPRESENTATION OF THE) ADVISORY COMMITTEE)))) DATE: September 18, 1996) TIME: 10:00 a.m.) DEPT: H))) Specially assigned to the Honorable) Judge J. Michael Gunn

On September 18, 1996, the motion for amendments to the Judgment to change Appropriative Pool representation on the Advisory Committee came on regularly for hearing in this matter, the Honorable J. Michael Gunn, Judge, Presiding.

The matter having been duly presented, all arguments having been heard

and good cause appearing therefore,

IT IS HEREBY ORDERED:

1. That the petition and motion of Watermaster is granted.

2. That Paragraph 4, "Advisory Committee Representatives," of Exhibit "H" to the Judgment is hereby deleted and replaced with a new Paragraph 4, attached hereto as Exhibit 1.

3. That Paragraph 32, "Authorization," to the Judgment is hereby deleted and replaced with a new Paragraph 32, attached hereto as Exhibit 1.

Date: _____

_____

J. Michael Gunn

Judge, San Bernardino County Superior Court

AMENDMENT TO JUDGMENT

New Exhibit "H" Paragraph 4 to Judgment

4. Advisory Committee Representatives. Members of the Pool Committee shall be designated to represent this pool on the Advisory Committee on the following basis: Each major appropriator, i.e. the owner of an adjudicated appropriative right in excess of 3,000 acre feet, or each appropriator that produces in excess of 3,000 acre feet based upon the prior year's production, shall be entitled to one representative. Two additional representatives of the Appropriative Pool on the Advisory Committee shall be elected at large by the remaining members of the pool. The voting power of the Appropriative Pool on the Advisory Committee shall be apportioned between the major appropriator representatives in proportion to their respective voting power in the Pool Committee. The two representatives of the remaining appropriators shall exercise equally the voting power proportional to the Pool Committee voting power of said remaining appropriators; provided, however, that if any representative fails to attend an Advisory Committee meeting, the voting power of that representative shall be allocated among the representatives of the Approporiative Pool in attendance in the same proportion as their own

respective voting powers.

New Paragraph 32 to the Judgment:

32. Authorization. Watermaster is authorized and directed to cause committees of producer representatives to be organized to act as Pool Committees for each of the several pools created under the Physical Solution. Said Pool Committees shall, in turn, jointly form an Advisory Committee to assist Watermaster in performance of its functions under this judgment. Pool Committees shall be composed as specified in the respective pooling plans, and the Advisory Committee shall be composed of voting representatives from each pool, as designated by the repective Pool Committee in accordance with each pool's pooling plan. WMWD, Three Valleys Municipal Water District (Successor to PVMWD) and SBVMWD shall each be entitled to one non-voting representative on said Advisory Committee.

SCOTT SLATER (State Bar No. 117317)

MICHAEL FIFE (State Bar No. 203025)

HATCH AND PARENT

21 East Carrillo Street

Santa Barbara, CA 93101-2782

Telephone: (805) 963-7000

Facsimile: (805) 965-4333

Attorneys for Chino Basin Watermaster

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF SAN BERNARDINO

	) CASE NO. RCV 51010
CHINO BASIN MUNICIPAL	)
WATER DISTRICT,	) Judge: Honorable J. MICHAEL GUNN
Plaintiff,	)
vs.	)
CITY OF CHINO, et al.,	) MOTION TO AMEND JUDGMENT
Defendants.	)
	)
	)
	) Date: September 28, 2000
	) Time: 2:00 pm.
	)
	)
	)
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I.

BACKGROUND

In 1978, judgment was entered in *Chino Basin Municipal Water District v. City of Chino,* a groundwater adjudication of the Chino Basin. This Judgment imposed a physical solution in order to halt the decline of the groundwater levels in the Basin. The Judgment also required the parties to develop an Optimum Basin Management Program ("OBMP") in order to provide a comprehensive program that would offer a long-term solution to the many issues facing the Basin. On June 29, 2000 a final OBMP for the Chino basin was submitted to the Court, and on

July 13, 2000 the Court approved the OBMP and ordered Watermaster to proceed in accordance with its terms.

In the final months prior to completion of the OBMP, the parties negotiated a Peace Agreement that resolved the issues inhibiting finalization of the OBMP. During these negotiations it was recognized that certain minor but necessary amendments would need to be made to the Judgment so that the final OBMP would be fully consistent with the Judgment. The negotiating parties consented to these modifications and they became a part of the Peace Agreement (Article IV, section 4).

In its July 13, Order approving the OBMP, the Court ordered that a hearing would be held on September 28, 2000 to, in part, hear arguments on proposed amendments to the Judgment. Part II of this brief describes Watermaster's recommended amendments to the Judgment in conformance with the Peace Agreement.

II

Proposed Amendments to the Judgment

Watermaster recommends the following amendments to the Judgment:

(a) The Judgment shall be amended so that the last sentence of Paragraph 8 of the Judgment reads:

All overlying rights are appurtenant to the land and cannot be assigned or conveyed separate of apart therefrom for the term of the Peace Agreement except that the members of the Overlying (Non-Agricultural) Pool shall have the right to Transfer or lease their quantified production rights within the Overlying (Non-Agricultural) Pool or to Watermaster in conformance with the procedures described in the Peace Agreement between the Parties therein, dated June 29, 2000.

(b) Paragraph 6 of Exhibit "G" to the Judgment regarding the Overlying Non- Agricultural Pool shall be amended to read:

Assignment. Rights herein decreed are appurtenant to that land and are

Only assignable with the land for overlying use thereon; provided, however, (a) that any appropriator who may, directly or indirectly, undertake to provide water service to such overlying lands may, by an appropriate agency agreement on a form approved by Watermaster, exercise said overlying right to the extent, but only to the extent necessary to provide water service to said overlying lands, and (b) the members of the pool shall have the right to Transfer or lease their quantified production rights within the pool or to Watermaster in conformance with the procedures described in the Peace Agreement between the Parties therein, dated June 29, 2000 for the term of the Peace Agreement.

(c) The 1995 Amendment to the Judgment shall be amended as follows: Section 10(b)(3)(i) shall now read:

"For the term of the Peace Agreement, in any year in which sufficient unallocated Safe Yield from the Overlying (Agricultural) Pool is available for such conversions claims, Watermaster shall allocate to each appropriator with a conversion claim, 2.0 acre-feet of unallocated Safe Yield water for each converted acre for which conversion has been approved and recorded by the Watermaster."

Appendix 1 to the Judgment shall be construed to be consistent with this amendment. All other parts of the 1995 Amendment shall remain the same.

III

Conclusion

The Peace Agreement is a carefully constructed balance of the various interests in the Basin that has enabled the OBMP to be finalized. One part of the negotiation of the Peace Agreement was an agreement on the necessary amendments to the Judgment in order to make the Peace Agreement and the Judgment fully consistent with one another. The signatories have agreed that the amendments described above are the only *necessary* amendments in order to

achieve consistency.

Neither the signatories to the Peace Agreement nor Watermaster believe any other proposed amendments are necessary at this time and accordingly urge this Court to make only those changes necessary so that the final OBMP is consistent with the Judgment. The Judgment has created a stable institutional framework in the Chino Basin that has made the development of the OBMP possible. Changes to this framework should be made only where absolutely necessary so as to cause minimal disruption to this stability. Watermaster has determined that the amendments proposed above are the only necessary changes that need to be made consistent with the Peace Agreement.

The parties have made a monumental effort to craft a solution that will fulfill the overriding goal of managing the Chino Basin on a sustainable basis for the benefit of all. Watermaster respectfully request that the Court approve the above referenced amendments in furtherance of the physical solution.

Dated: August __, 2000.

HATCH & PARENT

By: _____

Scott S. Slater

Michael Fife

Attorneys for Chino Basin Watermaster

SUPERIOR COURT FOR THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO

	) CASE NO. RCV 51010
CHINO BASIN MUNICIPAL WATER	)
DISTRICT,	) ORDER CONCERNING
Plaintiff,	) MOTION TO AMEND JUDGMENT
vs.	)
CITY OF CHINO, et al.,	)
Defendants.	) Date: September 28, 2000
	) Dept: 8
	) Time: 2:00 p.m.
	)
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Background

On February 19, 1998, the Court directed Watermaster to prepare an optimum basin management program ("OBMP") for the Chino Basin. On July 13, 2000, the Court found, subject to certain conditions precedent, that Watermaster's support and approval of the Peace Agreement regarding the Chino Groundwater Basin, dated June 29, 2000, hereinafter "Peace Agreement," and Watermaster's commitment to implement the OBMP Phase I Report through the provisions of the OBMP Implementation Plan as expressly set forth in Article V of the Peace Agreement satisfied Watermaster's obligation to prepare an OBMP. One of the conditions precedent to that finding is Court approval of all Judgment modifications in furtherance of the OBMP.

On August 15, 2000, Watermaster filed a Motion to Amend the Judgment. No other party has submitted proposed Judgment modifications in furtherance of the OBMP, nor has opposition been filed to Watermaster's motion. Watermaster asserts that the parties to the Peace Agreement have agreed that the proposed amendments are the only Judgment modifications necessary to achieve consistency between the OBMP and the Judgment. Consequently, the parties have not provided comprehensive briefing on Judgment modification issues.

Discussion

Special Referee Anne Schneider has provided the Court (and the parties) with a thoughtful

analysis of various provisions in the Peace Agreement that appear to be in conflict with the Judgment. Watermaster's motion recognizes some of these conflicts. However, the Special Referee's Report and Recommendation Regarding Watermaster's Motion to Amend Judgment notes several provisions in the Peace Agreement which appear to conflict with the Judgment, for which no modification is proposed. For example, Watermaster proposes to modify the amended Judgment Exhibit H conversion provisions to allow 2.0 acre-feet of unallocated Safe Yield water for each converted acre. However, no revision is proposed with respect to Appendix 1, which explains the basis for the existing 1.3 acre-feet per acre provision. Another example is the Peace Agreement provision which permits "Early Transfer" allocations of 32,800 acre-feet of water to occur annually, yet the Overlying (Agricultural) Pool is still entitled to pump 82,800 acre-feet per year without reduction. There are several other provisions of the Peace Agreement noted by the Special Referee which appear to conflict with the Judgment, for which no Judgment amendment is sought.

Order

The Court has considered the Special Referee's Report and Recommendation Regarding Motion to Amend Judgment and hereby issues its ruling accepting the Report and adopting the Recommendation of Anne Schneider.

The Court incorporates herein by reference the entirety of the Special Referee's Report and Recommendation Regarding Motion to Amend Judgment. Watermaster's Motion to Amend the Judgment is granted subject to the following: the parties are directed to file a post-hearing brief (s) clarifying their intent with respect to the Peace Agreement provisions discussed in Sections IIB through IIF in the Special Referee's Report and Recommendation Regarding Watermaster's Motion to Amend Judgment. The post-hearing brief(s) shall be submitted no later than October 26, 2000.

Dated: September 28, 2000.

s/s J. Michael Gunn

J. MICHAEL GUNN, Judge

SUPERIOR COURT FOR THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO

CHINO BASIN MUNICIPAL WATER DISTRICT, Plaintiff, vs. CITY OF CHINO, et al., Defendants.	) CASE NO. RCV 51010)) ORDER CONCERNING) MOTION TO EXTEND NINE-MEMBER) BOARD)) Date: September 28, 2000) Dept: 8) Time: 2:00 p.m.))

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Background

On February 19, 1998, the Court appointed a nine-member board consisting of representatives from the Overlying (Agricultural) Pool, the Overlying (Non-agricultural) Pool, the Appropriative Pool, and three municipal water districts to serve as Interim Watermaster for the Chino Groundwater Basin (hereinafter sometimes referred to as "Basin"). Watermaster was directed to notice a hearing on or before October 28, 1999, to consider all parties' input as to the continuance of the nine-member board. The Court informed the parties that one of the measures that would be used in determining the effectiveness of the nine-member board, in functioning as a steward of the Basin,

would be the progress made on the adoption of an optimum basin management program ("OBMP") for the Basin. The OBMP was to be submitted to the Court no later than September 30, 1999, and a hearing was set on October 28, 1999, to consider whether to approve and order full implementation of the

program. The deadline for approval of the OBMP was continued several times. The Court finally approved the OBMP, consisting of the Phase I Report and Implementation Plan, subject to certain conditions precedent, on July 13, 2000.

Discussion

Extension of Appointment of Nine-member Board

On August 30, 2000, Watermaster filed a Motion to Extend the Nine-Member Board for a Full Five-Year Term. The motion requests the Court to order that the current nine-member structure of the Watermaster board continue in effect for a full five-year term. Watermaster asserts that all of the conditions precedent set forth in the Court's July 13, 2000, Order have been satisfied. However, as noted in Special Referee Anne Schneider's Report and Recommendation Concerning Motion to Extend Nine-Member Board, there are several outstanding issues that must be resolved before it can be said that all of the conditions have been satisfied. First, it is not clear that unanimous approval of the Peace Agreement regarding the Chino Groundwater Basin, dated June 29, 2000, hereinafter "Peace Agreement," has been obtained. Western Municipal Water District's "ratification" of the Peace Agreement was conditional. Watermaster reports the need for further negotiations related to the purchase of desalted water. Second, Watermaster states that the California Legislature has appropriated $235,000,000 for the benefit of the Santa Ana Watershed Project Authority ("SAWPA") and allocated this sum to the state Water Resources Control Board ("SWRCB") for distribution. Watermaster further states that SAWPA has submitted an application to SWRCB for distribution of these funds, including $56,000,000 to be used to fund the Chino II desalter and an expansion of the Chino I desalter. However, Watermaster has not explained how the $121,000,000 condition precedent is satisfied when only $56,000,000 of the funds allocated to SAWPA are to be used for the Chino Basin desalter project. Third, while Watermaster has submitted a schedule and process for submission to the Court of detailed periodic reports regarding compliance with the Implementation Plan for the OBMP, the schedule has

some omissions. For example, Program Elements 3 and 5, which encompass the desalter project, are not included in the schedule.

It must be noted that the City of Chino has filed an Opposition to Motion to Extend the Nine-Member Board for a Full Five-Year Term. Although it supports the continuation of the current nine-member board structure, the City of Chino asserts that Court guidance is needed with respect to the establishment of "criteria, procedures and schedules for the rotation of Appropriative Pool members" serving on the nine-member board. Watermaster responds that several groups must determine a procedure for rotation: Overlying (Agricultural) Pool, Overlying (Non-agricultural) Pool, and the three municipal districts that hold seats on the board and the Appropriative Pool. Watermaster is hopeful that a complete consensus will emerge prior to October 31, 2000, and requests the Court to allow the consensus-building process to continue and give the parties until October 31, 2000, to resolve their differences. An inability to reach consensus on the rotation issue is of considerable concern to the Court. The Court is unwilling to extend the appointment of the board unless and until the rotation Issue is resolved.

Periodic Reporting Requirements

In the exercise of its continuing jurisdiction, the Court shall require periodic progress reports regarding implementation of the OBMP to ensure that the Watermaster is performing its independent function and keeping to the schedule
adopted for OBMP implementation. The Court adopts the following schedule for

OBMP reporting:

Report No. 1	March 31, 2001
Report No. 2	September 30, 2001
Report No. 3	March 31, 2002

Report No. 4	September 30, 2002
Report No. 5	March 31, 2003
Report No. 6	September 30, 2003
Report No. 7	March 31, 2004
Report No. 8	September 30, 2004
Report No. 9	March 31, 2005
Report No. 10	September 30, 2005

Report No. 10 coincides with the end of the appointment of the Nine-Member Board. The OBMP progress reports, together with independent assessment of OBMP implementation status, including verification of data to be provided by the Special Referee and her technical expert, will be the basis for consideration of continuing the appointment. The Court may schedule hearings to coincide with some or all of these reports. Alternatively, the Court may, from time to time, direct the Special Referee to conduct a workshop in lieu of a court hearing. The reports should follow the format prescribed in Special Referee Anne Schneider's Report and Recommendation Concerning Motion to Extend Nine Member Board.

Future Desalters

The Court wants to particularly note that the Peace Agreement predicates any future desalting capacity on a reevaluation of the need for additional desalting after the earlier of ten years or the conversion of 20,000 acres of agricultural land. The Court is mindful that while the parties to the Peace Agreement contemplate the construction of future desalters and/or expansion of Chino I and/or Chino II

Desalters, there are no provisions in the Peace Agreement that effectively ensure that they will be built. In effect, future desalters (and any expansions of the Chino I and II Desalters) will be built "if and only If' funding from sources other than the Parties can be secured. The OBMP (Phase I Report and Phase II Implementation Plan) calls for some 40,000 acre-feet per year of desalting capacity to be installed in the southern part of the Basin by 2020. The Court hereby gives notice to the parties that a primary concern of the Court in any future application for reappointment of the nine-member board will be the parties' continued commitment to provide for future desalters and preserve safe yield in accordance with the OBMP.

Order

Watermaster seeks an order continuing the current nine-member structure of the Watermaster Board in effect for a full five-year term and authorizing it to perform all managerial and administrative functions as specified in the Judgment, including the execution of all administrative and employment contracts. Watermaster states that it will propose a schedule for rotation of its board members no later than October 31, 2000.

The Court is not inclined to extend unconditionally the reappointment of the nine-member board until both the rotation and the Western Municipal Water District issues have been resolved. Therefore, the appointment shall be made subject to certain conditions. The failure of any one of these conditions shall be considered by the Court as a compelling reason to reconsider the appointment of the nine member board. Therefore, subject to the continuing jurisdiction of the Court and satisfaction of conditions numbers 1 - 5 below, the Court hereby issues its order:

The Court has considered the Special Referee's Report and Recommendation Concerning Motion to Extend Nine-Member Board and hereby issues its ruling accepting the Report and adopting the Recommendation of Anne Schneider, except to the extent that it recommends continuation of the appointment for only three years. The Court incorporates herein by reference the entirety of the Special Referee's Report and Recommendation Concerning the Motion to Extend Nine-Member Board. The nine-member board is hereby appointed for an additional five-year term, until September 30, 2005, subject to the continuing jurisdiction of the Court to reconsider the appointment in the event Watermaster fails to timely comply with the following conditions:

1. Watermaster's report on the status of its efforts to resolve the terms and conditions applicable to the purchase of desalted water and to secure a recission of Western Municipal Water District's conditional execution of the Peace Agreement no later than December 31, 2000; and

2. Watermaster adoption and Court approval of Revised Rules and Regulations for Chino Basin by February 1, 2001; and

3. Submission of Reports Nos. 1 through 10 in accordance with the schedule set forth in the discussion above; and

4. Inclusion in such reports of schedule and budget information essentially in a form equivalent to Exhibit "E" and Table 4-14 of the Phase I Report; and

5. Watermaster cooperation in the independent assessment and verification of the data

included in Reports No. 1 through 10 to be provided to the Court by the Special Referee and her technical expert.

The parties are forewarned that any future application for reappointment of the nine-member board may be conditioned on the development of a detailed plan to reach the OBMP goal of 40,000 acre-feet per year of desalting capacity to be installed in southern part of the Basin by 2020.

Dated: September 28, 2000.

s/s J. Michael Gunn

J. MICHAEL GUNN, Judge

SCOTT SLATER (State Bar No. 117317)

MICHAEL FIFE (State Bar No. 203025)

HATCH AND PARENT

21 East Carrillo Street

Santa Barbara, CA 93101-2782

Telephone: (805) 963-7000

Facsimile: (805) 965-4333

Attorneys for Chino Basin Watermaster

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF SAN BERNARDINO

	) CASE NO. RCV 51010
CHINO BASIN MUNICIPAL	)
WATER DISTRICT,	)
Plaintiff,	)
vs.	)
CITY OF CHINO, et al.,	) NOTICE OF ENTRY OF ORDER
Defendants.	) CONCERNING MOTION TO
	) EXTEND NINE-MEMBER BOARD
	) AND ORDER CONCERNING
	) MOTION TO AMEND JUDGMENT
	)
	)
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	)
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TO ALL PARTIES AND THEIR ATTORNEYS OF RECORD;

Please take notice that on September 28, 2000, the Court entered its Order Concerning Motion to Extend Nine-Member Board and Order Concerning Motion to Amend Judgment. A true and correct copy of these Orders are attached hereto and made a part hereof by this reference.

The Court also provided guidance on the factors that it will consider when deciding to reappoint the Nine-Member Watermaster Board in 2005. These factors are:

(1) All production meters will be installed;

(2) Basin Monitoring will be completely in place and will have been the basis for semi-annual reports specified in the Order;

(3) The Recharge Master Plan will be complete and appropriate recharge facilities will have been installed;

(4) The OBMP Desalter I Expansion and Desalter II will be installed and operational, with demonstrated delivery of desalter water for municipal use in the Basin.

In addition, the Court wishes to schedule a hearing on February 1, 2001 at 2:00 pm. The purpose of the hearing will be to:

(1) Approve the Revised Rules and Regulations for the Chino Basin;

(2) Approve the post-Order memorandum which will be filed on October 26, 2000;

(3) Receive a report on the status Western Municipal Water District's recission of its conditional execution of the Peace Agreement; and

(4) Receive Watermaster's Annual Report.

The Revised Rules and Regulations for the Chino Basin should be submitted to the Court by December 31, 2000.

Dated: September 28, 2000

HATCH & PARENT

By: s/s Michael Fife

Michael Fife

Attorneys for Chino Basin Watermaster

APPENDIX 1

To Chino Basin Watermaster
Amendment Regarding Land Use Conversions

The purpose of the amendment is to simplify the methodology and procedure for land use conversions under the 1978 Judgment. The basic nature of the commitment undertaken by the parties who negotiated the Judgment is not intended to be changed. The methodology used to develop the recommended 2.0 [1] per acre (af/ac) conversion factor can best be described as a gross water duty method. Essentially, the total water use was divided by the total acreage remaining to be converted to develop the gross average water use per acre.

At the Land Use Conversion Workshop held on January 10, 1995, there was a consensus among the parties to the Judgment that the large agricultural acreage within the purveyor service areas must still be converted. To depict the large southern area remaining to be converted, Watermaster staff proposed the establishment of Conversion Area No. 1 (see attached map). This area can generally be described as the area that is south of the 60 Freeway, outside the current city boundaries of Chino, Chino Hills and Ontario and for the most part, the portion of Jurupa Community Services District (JCSD) that is west of Etiwanda. The southernmost boundary of the area is taken as the Army Corps of Engineers' Prado Basin take line, unless a specific agricultural well exists inside the take line. To obtain the acreage for Conversion Area No. 1, the Santa Ana Watershed Project Authority (SAWPA), used its Geographic Information System (GIS) and determined the total acreage shown in Conversion Area No. 1 to be approximately 27,133 acres.

Also at the January 10 Land Use Conversion Workshop, the appropriators were asked to submit the proposed remaining convertible acreage inside their established service areas. Submissions of the parcels proposed as eligible for conversion, both inside and outside Conversion area No. 1 began arriving in early March 1995, and were received as late as June 29, 1995. Watermaster staff worked with each appropriator to identify the proposed acreage by assessor's parcel number. The lists of parcels and the approximate acreage of each parcel, by appropriator, are included with Appendix 1 as Tables 2A - 2G for reference. The maps corresponding to these lists are on file with the Watermaster. The eligibility of most of the parcels submitted has been determined; however, the specific eligibility of some parcels is still in question. The eligibility criteria utilized by staff requires that the land:

1. has not been receiving water provided by an appropriator;
2. was not already included in the establishment of the appropriator's production rights; and
3. has been used for irrigated agriculture within the last five years if it is located outside Conversion Area No. 1

[1] Amended from 1.3 af/ac by Order dated September 28, 2000.

The appropriators were also asked which parcels they were proposing to convert for the production year 1994/95. The parcels proposed for conversion in FY 94/95 are included with Appendix 1 as Tables 3A - 3C. Any parcels converted for production year 1994/95 will affect the assessments and available unallocated safe yield from that production year in fiscal year 1995/96. Table 1 is a summary of the total acreage submitted by each appropriator as being eligible for conversion and of the acreage requested by that appropriator for conversion in FY 94/95, if any. Staff has evaluated the parcels requested for conversion in FY 94/95 and finds that all of those requested, or a total of 2, 185 acres, are eligible for conversion based on the above criteria.

When the 27,133 acres in Conversion Area No. 1 is added to the 5,209 acres (Table 1) proposed for conversion that is outside Conversion Area No. 1, there is a total of 32,343 acres remaining to be converted in the Chino Basin.
The 1978 agricultural water use was 84,095 acre-feet. When this is divided by the 32,343 acres, it results in a use of 2.6 af/ac. The value is still approximately 2.6 af/ac if the average annual post-judgment allocation of 82,800 af is divided and all acres were able to be converted as currently prescribed in the judgment, 50% of this per acre use would be allocated to an appropriator, and the appropriator would receive 1.3 acre-feet per acre. This would be a maximum use per acre. In 1994, the agricultural water use was reported as 44,092 acre-feet per acre. If this use is divided by the 32, 343 acres, it results in a present average use of 1.36 acre-feet per acre.

There was a consensus at the workshops and at the pool committee meetings that many of the conversions that potentially could have taken place since 1978, were not submitted by the appropriators. This is probably because of a lack of the right type of information to make the appropriate use-per-parcel determinations and because of the time and money that would be required if they were pursued extensively. Because of this, there was a consensus that the 1.3 af/ac conversion water use determinations were based only on 50% of the current average use.

Watermaster staff anticipates that each appropriator with remaining convertible acreage will request conversion on that acreage each year that they undertake to serve the land. If the service is anticipated to be permanent, they can request permanent conversion. For the acreage outside Conversion Area No. 1, the above criteria will be applied annually to make an eligibility determination. Also, an appropriator will be required to certify that the land is not currently using water that is being reported as agricultural pool production and Watermaster staff will field verify that agricultural activities have ceased, or that the appropriator is actually satisfying the agricultural use.

Chino Basin Watermaster

Unconverted Acreage

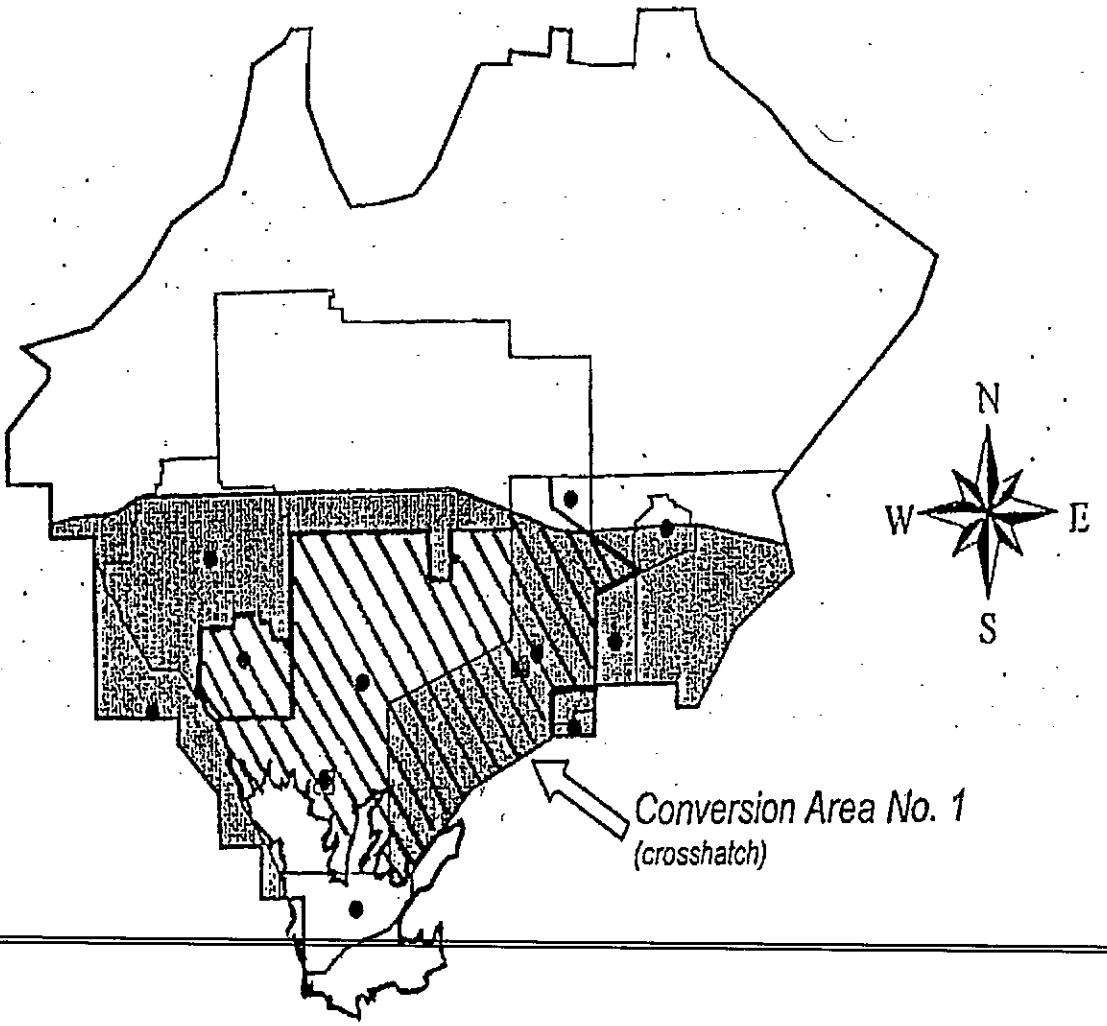


TABLE 1

Chino Basin Watermaster
Proposed Conversion Acres
Revised August 3, 1995

Appropriator	Outside Conversion Area #1		Inside Conversion Area #1	Total FY 94/95 Acres Proposed
	Total Acres Submitted	*Acres Proposed FY 94/95*	*Acres Proposed FY 94/95*	
Chino, City of	**1923**	**519**	**0**	**519**
Chino Hills, City of	**1053**	**0**	**0**	**0**
Cucamonga CWD	**460**	**0**	**0**	**0**
Fontana WC	**417**	**0**	**0**	**0**
Jurupa CSD	**835**	**327**	**758**	**1085**
Monte Vista WD	**43**	**0**	**0**	**0**
Ontario, City of	**544**	**544**	**37**	**581**
Total	**5209**	**1390**	**795**	**2185**

Chino
AGRICULTURAL LAND - WATER SUPPLY STUDY
OUTSIDE CONVERSION AREA NO. 1 LIST B

Property No.	Acreage	ADDRESS N/S - E/W	APN	GENERAL NOTES
1	11	4800/12150	1016-121-4,5,6,7,8	ROSES RESIDENCE ON CITY WATER
2	16	4700/12200	1016-131-1,2,3	ROSES CROP ACREAGE SUPPLIED BY PVT.WELL ON No.2
3	10	5350/11750	1014-381-1,2,3,4	BERRY
4	21	5600/12400	1015-261-2,3	TRUCK FARMING MISCELLANEOUS VEGETABLES
			1015-253-9	
5	6	5400/12450	1015-281-21	BERRY
6	7	4000/13000	1019-071-20,21	CHRISTMAS TREE GROWER
	-		1019-081-2,11	
7	38	4800/13250	1019-191-1,2,5	RANCHING DOMESTIC SERVICE ONLY - OTHER USES WELL
			1019-201-1,3	
8	10	3600/13650	1019-611-28,39,40	RANCHING DOMESTIC SERVIE ONLY UNDER DEVELOPMENT
			1019-611-41,42,43,49	
9	21	3700/13750	1022-041-4	LANDSCAPE NURSERY
			1022-05-3,4	
10	31	3900/14000	1022-031-2	GREEN FEED
			1022-26-4	
			1022-27-4	
			1022-082-1,2,8,9,10	
11	58	4000/14200	1022-38-3	GREEN FEED
			1022-39-4	
			1022-40-3	
			1022-58-2	
12	54	4150/13900	1022-10-5,6,7,8	DAIRY
			1022-24-3	
13	142	4300/14300	1022-42-6,7,8	GREEN FEED
			1022-41-5	
			1022-58-2	
			1022-53-11,12,13	
			1022-431-8	
			1022-441-8	
			1022-541-3	
14	18	4200/14550	1022-55-3	GREEN FEED
			1025-10-5,7,8,9	
15	51	4350/14700	1025-09-1	GREEN FEED
			1025-12-1,2,5,6,7	
			1025-21-8,9,12 thru 23	
16	40	4800/14400	1022-50-1,2,3	DAIRY DOMESTIC SERVICE ONLY
			1022-49-1,3,4	
17	320	4900/14700	1025-13-1 thru 6	DAIRY & FARMING GREEN FEED
			1025-20-5,6	
			1025-19-6,7	
			1025-15-1 thru 8	
			1021-471-3,4,6,8	
			1021-461-2,3,4,6,7,8	
			1021-481-1,2,3	
			1024-491-1,2	
			1021-511-1,2,3	
			1021-501-1,2	
			1021-521-1,2,3,4	
			1021-531-1,2	
18	70	5300/15400	1028-201-13,17	DOMESTIC SERVICE ONLY
			1028-511-1 thru 20	
			1028-501-1 thru 25	
			1028-491-1 thru 9	
19	10	6200/12800	1015-511-27	BERRY
20	29	6200/13000	1020-131-1,2	BERRY
			1020-121-21,24	
21	18	6000/14050	1021-291-1,2	GREEN FEED
22	38	6200/14000	1021-261-1,2,3,4	RANCHING DOMESTIC SERVICE ONLY
			1021-231-2	
			1021-101-2,3,4	
23	26	6400/13900	1021-251-1,20	DAIRY
			1021-241-2,3	
24	17	6850/12850	1051-502-31	CORN/BERRY
			1051-631-2	

Chino
AGRICULTURAL LAND - WATER SUPPLY STUDY
OUTSIDE CONVERSION AREA NO. 1 - LIST B

Property No.	Acreage	ADDRESS N/S - E/W	APN	GENERAL NOTES
25	11	6800/13200	1052-301-1,3,4	DAIRY
26	64	6600/13500	1052-331-1,2,3	DAIRY
			1052-341-1,2,3,4	
			1052-631-1,2,3	
27	28	6800/13500	1052-611-1,2	GREEN FEED
			1052-601-2	
28	15	6800/13900	1053-261-3,4,41,71	GREEN FEED
			1053-231-4,31	
29	39.5	6600/13900	1053-251-1,2,3,4	NURSERY
			1053-241-68	
			1053-011-2 thru 5	
30	99	5700/14150	1021-351-1,2	AYALA PARK
			1021-321-1,2	
			1021-311-1,2	
			1021-281-1	
			1026-011-1	
31	80	6800/14300	1053-621-1,2	DAIRY
			1053-491-1 thru 11,13,14,17	
			1053-461-1,2,3	
			1053-451-1,2	
32	61	6950/13100	1052-051-1 thru 18	DOMESTIC SERVICE ONLY
			1052-051-20 thru 25	
33	61	6950/13500	1052-361-1,2,3,4	DAIRY
			1052-371-1,2,3	
			1052-591-1,2	
			1052-581-1,2	
34	61	6950/13900	1053-051-3,4	DAIRY
			1053-061-3,4	
			1053-221-1,2	
			1053-271-1 thru 8	
35	61	6950/14300	1053-441-1 thru 9,12,13	DAIRY
			1053-431-1,2	
			1053-501-1,2,3,4	
			1053-611-1,2,3	
36	10	5250/11550	1014-301-3,4,5	NURSERY & CHRISTMAS TREES
37	20	5350/11600	1014-271-1	NURSERY & CHRISTMAS TREES
			1014-281-4	
40	32	4400/13000	1019-111-27 thru 73	RECENTLY CONVERTED BERRY FARMING TO RESIDENTIAL
			1019-122-1 thru 48	
			1019-123-1 thru 54	
41	30	4600/13500	1019-441-3,4	RANCHING
			1019-511-6,7	
			1019-501-1	
42	10	5250/14150	1021-361-21,22	NURSERY
43	18	5350/13600	1020-571-3,4,6	BERRY
			1020-461-1,2,3	
44	80	5600/13900	1021-041-1 thru 4,6,9	DAIRY DOMESTIC SERVICE ONLY - OTHER USES WELL
			1021-131-1,2	
			1021-201-1,2	
			1021-331-1	
			1021-301-1	
45	10	5950/13750	1021-061-1,2	DAIRY
46	5	6450-13350	1021-381-5	BERRY
TOTAL	1857.5			

Table 2B

THE CITY OF CHINO HILLS
PROPOSED PARCELS FOR
LAND USE CONVERSION

THE CITY OF CHINO HILLS
PUBLIC WORKS DEPARTMENT
GEOGRAPHIC INFORMATION SYSTEM
101 GRAND AVENUE
CHINO HILLS CA 91711
(909)

ID	APN	OWNER	ACREAGE
1	1022-291-09	Boys Republic	4.63
2	1022-291-10	Boys Republic	44.49
3	1022-291-05	Boys Republic	2.32
4	1022-591-02	Boys Republic	28.46
5	1022-291-08	Boys Republic	118.04
6	1025-461-01	De Groot	8.92
7	1025-461-02	De Groot	2.01
8	1025-461-03	De Groot	7.12
9	1025-481-02	De Groot	8.23
10	1025-471-04	De Groot	4.12
11	1025-471-03	De Groot	1.72
12	1025-481-01	De Groot	9.62
13	1025-511-01	De Groot	6.66
14	1025-471-01	City of Chino Hills	6.38
15	1025-471-02	Greening	1.00
16	1025-561-04	Greening	47.24
17	1028-471-01	Greening	66.82
18	1028-351-01	Kramer	1.54
20	1028-351-13	Higgins	4.04
21	1028-351-23	Higgins	38.24
22	1028-351-11	Higgins	7.64
23	1028-201-03	Von Lusk	1.91
24	1028-201-02	Von Lusk	77.57
25	1028-201-74	Von Lusk	54.77
26	1028-201-75	Von Lusk	37.57
27	1028-351-07	Bahan	28.27
28	1017-231-21	Amato	1.79
29	1017-231-22	Trapani	5.65
30	1017-241-14	Richland Pinehurst LP	82.37
31	1017-491-01	Richland Pinehurst LP	78.63
32	1027-492-01	Richland Pinehurst LP	43.31
33	1027-121-07	Richland Pinehurst LP	15.94
34	1057-261-06	Abacherli	128.26
35	1057-261-05	Abercherli	10.00
36	1021-561-01	Van Klavern	13.62
	1021-591-01	Van Klavern	9.50
	1021-591-03	Van Klavern	11.60
	1021-601-04	Van Klavern	8.28
	1021-601-01	Van Klavern	9.16
37	1028-351-16	Higgins	2.60
38	1028-351-14	Higgins	11.21
39	1028-351-18	Weeda	12.16
		TOTAL:	**1053.40**

CONVERSION

CUCAMONGA COUNTY WATER DISTRICT
West gate specific plan property west of Cherry

APN		Acreage	
226-112-08		7.07	
228-012-05		108.62	
06		7.54	
00	(adjacent to Cherry)	110.00	(estimated)
228-092-03		37.36	
14		9.61	
15		9.61	
16		9.61	
17		7.57	
20		11.54	
19		9.73	
22		25.40	
228-091-12		18.68	
24		5.43	
25		9.00	
28		35.51	
07		38.00	(estimated)
	Totals	460.28	

APN maps attached

JT:dc(CCWDCOVS.DOC)
6/26/95

CONVERSION

FONTANA WATER COMPANY
West gate specific plan property east of Cherry

APN		Acreage
228-021-28		142.35
27		8.50
226-121-21		12.50
18		137.83
226-091-46		45.78
62		70.04
	Total	417.00

JT:dc(FWCCONVR.DOC)
6/26/95

Jurupa Community Services District
LAND CONVERSION REQUESTS FY 94-95
OUTSIDE OF CONVERSION AREA NO. 1

PARCEL NUMBER	PARCEL ADDRESS		NUMBER OF ACRES	MAP NO	LOT NO
156020026	12400	PHILADELPHIA	10.25	A	1
156020027	12350	PHILADELPHIA	15.41	A	2
156020030			8.79	A	3
156160018	3791	DE FOREST	10.75	B	1
156160035	3065	DULLES	5.21	B	2
156160036	3058	DULLES	9.42	B	3
156160037			7.31	B	4
156160038			5.03	B	5
156160039	3178	DULLES	5.11	B	6
156160046	3431	DE FOREST	5.10	B	7
156160058			2.45	B	8
156160059			1.60	B	9
156160060			0.19	B	10
156160061			0.22	B	11
156160065	3450	DULLES	5.50	B	12
156160066	3204	DE FOREST	5.20	B	13
156160067			5.37	B	14
156160068			5.00	B	15
156160069	3384	DE FOREST	5.00	B	16
156160070			5.21	B	17
156160071	3725	NOBEL	7.88	B	18
156160072			3.55	B	19
156160073	3444	DE FOREST	1.20	B	20
156160074	3590	DE FOREST	10.66	B	21
156160080			5.16	B	22
156160081			6.25	B	23
156160082	10885	INLAND	11.43	B	24
156160084	10980	INLAND	2.51	B	25
156160087	3305	DULLES	20.47	B	26
156160088	3305	DULLES	44.37	B	27
156160089	3305	DULLES	8.40	B	28
156160095	3038	DEERE	12.94	B	29
156160096	3371	DE FOREST	25.03	B	30
156160097			23.97	B	31
183030007	7545	JURUPA	9.90	C	3
183030008	7585	JURUPA	1.99	C	2
183030033	7491	JURUPA	5.69	C	1
183080010	7371	JURUPA	7.55	D	1
		TOTAL ACRES	327.07		

Jurupa Community Services District
LAND CONVERSION REQUESTS FY 95-96
AFTER WATERMASTER VERIFICATION

PARCEL NUMBER	PARCEL ADDRESS		NUMBER OF ACRES	MAP NO	LOT NO
162200006	9894	60TH	5.00	A	1
162200007		60TH	5.00	A	2
162200008		LIMONITE	5.00	A	3
162200009		LIMONITE	4.95	A	4
162200010	9951	LIMONITE	9.65	A	5
162210011	10001	LIMONITE	9.76	A	6
162210001	9709	60TH	5.00	B	1
162210002	6067	BEACH	5.00	B	2
162210003		LIMONITE	5.00	B	3
162210004		LIMONITE	5.00	B	4
165050001	8618	54TH	2.50	C	1
165050002	8646	54TH	2.50	C	2
165050005	5424	PEDLEY	5.00	C	3
165050006	5494	PEDLEY	5.00	C	4
165060001	5419	PEDLEY	5.00	D	1
165060002	5455	PEDLEY	2.86	D	2
165060003	5489	PEDLEY	2.86	D	3
165060013	5511	PEDLEY	3.01	D	4
165080003	5723	PEDLEY	3.25	E	1
165080004	5733	PEDLEY	3.25	E	2
165080005	5793	PEDLEY	7.00	E	3
165080007	5760	PEDLEY	3.00	E	4
165080009	8705	58TH	5.00	E	5
165080010	8695	58TH	2.39	E	6
165080012	8696	56TH	5.00	E	7
165091015	5685	PEDLEY	3.85	F	1
165092004	5690	5685	1.82	F	2
165140008	5935	5685	5.89	G	1
165140029	5831	5685	4.50	G	2
165140030	5853	5685	2.16	G	3
165160001	8626	58TH	3.82	H	1
165160002	8662	58TH	2.50	H	2
165160003	8710	58TH	2.50	H	3
166030025	8238	JURUPA	9.22	I	1
166030023	4800	STONE	14.52	I	2
166030011	4992	STONE	4.63	I	3
166050008	4695	TYROLITE	3.36	J	1
166060005	4911	TYROLITE	8.93	K	1
166060006	4799	TYROLITE	6.19	K	2
166070001	5040	AGATE	4.85	L	1
166070030	5070	AGATE	2.33	L	2
166070009	5025	STONE	2.69	L	3
166070011	5065	STONE	3.63	L	4
166090001	5289	STONE	9.82	M	1
166090002	5250	STONE	5.28	M	2
166090004	5256	AGATE	12.88	M	3
166090023	8440	54TH	2.26	M	4
166090026	5340	AGATE	4.67	M	5
166190017	8600	58TH	10.00	N	1
167020002		GALENA	33.71	O	1

Jurupa Community Services District
LAND USE CONVERSION REQUESTS FY 95-96
AFTER WATERMASTER VERIFICATION

PARCEL NUMBER	PARCEL ADDRESS		NUMBER OF ACRES	MAP NO	LOT NO
167020006		GALENA	9.70	O	2
167020007		GALENA	29.20	O	3
167020008		GALENA	33.70	O	4
167110008	9440	GALENA	10.93	P	1
167160042	4777	FELSPAR	9.37	Q	1
169070006	8705	MISSION	2.57	R	1
169210008	8721	GALENA	1.40	S	1
169270018	4930	AGATE	4.71	T	1
169280020	4945	PEDLEY	2.45	U	1
169280022	8864	PEDLEY	2.71	U	2
169290011	5015	PEDLEY	5.00	V	1
169290020	5071	PEDLEY	4.77	V	2
169290021	5151	PEDLEY	4.77	V	3
169300003	5339	PEDLEY	7.50	W	1
169300005	5355	PEDLEY	8.35	W	2
169300007	5335	PEDLEY	2.39	W	3
169300008	5261	PEDLEY	2.39	W	4
169300009	5235	PEDLEY	2.39	W	5
169300010	5205	PEDLEY	2.38	W	6
169310002	5074	PEDLEY	3.01	X	1
169310003	5071	AGATE	2.72	X	2
169310026	5329	AGATE	2.48	X	3
169310028	5271	AGATE	2.48	X	4
170310041	9200	MISSION	4.14	X	1
171040027	3851	PYRITE	15.41	Y	1
171050013	4100	AGATE	7.69	Z	1
171090011	8531	MISSION	3.22	AA	1
171190004	7868	MISSION	10.96	BB	1
171220002	7837	GALENA	9.64	CC	1
173160020	9150	GRANITE HILL	4.03	DD	1
173160024	8931	GRANITE HILL	2.06	DD	2
173160032	8951	HIGHWAY	4.13	DD	3
183030014	7586	JURUPA	6.92	EE	1
		TOTAL ACRES	508.56		

Monte Vista Water District
P.O. Box 71
Montclair, CA 91763-0071

Proposed Conversion Acres
Submitted by Gil Martinez, August 2, 1995

Property No.	Approximate Acreage	APN (Lot No.)
A	4.3	1013-131-15,17,19
A1	2.4	1013-131-15,17,19 (Lot 1 & 6)
C	8.0	1013-171-1 thru 5
E	9.6	1013-271-1
		1013-531-5
G	9.0	1013-291- 6 & 7
I	10.0	1013-521-4 (Lot 1)
N	.5	1016-101-1
	43.66	

Prepared by J.R. Theirl
August 14, 1995
Based on information provided by Gil Martinez of MVWD on August 2, 1995.

City of Ontario
Existing Agricultural Uses
Exhibit A

Identification	APN	Address	Acreage
1	11335102	1348 S GROVE AV	11.500
2	11336103	1550 S PARCO AV	7.231
3	11336104	1460 S PARCO AV	0.904
4	11336105	1442 S PARCO AV	0.454
5	11336106	1436 S PARCO AV	0.232
6	11336107	1410 S PARCO AV	5.518
7	11336116	1551 S GROVE AV	12.255
8	11336118	1405 S GROVE AV	11.642
9	11341421	1704 S VINEYARD AV	3.677
10	11343105	1160 S MILDRED AV	51.026
11	11351208	O E AIRPORT--OIA	8.524
12	11351210	O E AIRPORT --OIA	7.400
13	21019210	572 N TURNER AV	22.343
14	21121104	3000 E JURUPA ST	20.039
15	21121109	1200 S ARCHIBALD AV	19.395
16	21121111	2900 E JURUPA ST	65.765
17	21131203	O E MISSION BL	4.020
18	21131204	O E MISSION BL	2.022
19	21134101	O S SEAGULL AV	0.615
20	21134102	O E JURUPA ST	0.782
21	21134103	O E JURUPA ST	0.534
22	21134104	O E JURUPA ST	0.530
23	21134105	O E JURUPA ST	0.532
24	21134106	O S AVIATION DR	0.786
25	21134107	O S AVIATION DR	1.016
26	21808103	2300 S MILLIKEN AV	46.266
27	21808105	O E MISSION BL	0.263
28	21808108	O E MISSION BL	49.657
61	21809124	O S MILLIKEN AV	15.280
29	23801131	1000 N ROCHESTER AV	2.270
30	23801219	O E INLAND EMPIRE BL	10.664
31	23801223	O E FOURTH ST	13.856
32	23808140	O S WINEVILLE AV	2.655
33	23824110	5010 E AIRPORT DR	0.000
34	101120109	1241 W STATE ST	0.000
35	101120110	1211 W STATE ST	2.434
36	101120111	520 S MAGNOLIA AV	2.409
37	101122102	616 OAKS AV	0.000
38	101142109	O S ELDERBERRY AV	0.942
39	101142111	O S ELDERBERRY AV	1.942
40	101152112	O S ELDERBERRY AV	1.005
41	101153103	O S BENSON AV	2.566
42	101153104	O S BENSON AV	1.860
43	101143105	O S BENSON AV	4.781
44	101412103	O S OAKS AV	0.063
45	101412104	O S OAKS AV	1.705
46	101421112	1320 W FRANCIS ST	7.281
47	104921105	720 E SUNKIST ST	0.000
48	104930105	752 W PARK ST	2.668
49	104930106	720 W PARKS ST	2.685
50	104942104	1310 S CUCAMONGA AV	4.694
51	104950102	1125 S SULTANA AV	0.207

City of Ontario
Existing Agricultural Uses
Exhibit A

Identification	APN	Address	Acreage
52	105013102	1518 S CUCAMONGA AV	0.000
53	105013103	1558 S CUCAMONGA AV	6.028
53	105016103	1556 S GRPVE AV	0.000
55	105017102	1642 S GROVE AV	9.563
56	105018103	1743 S CUCAMONGA AV	8.970
57	105020101	1687 S BON VIEW AV	9.547
58	105036108	1844 S FERN AV	0.000
59	105045104	1921 S BON VIEW AV	4.740
60	105046109	1056 E FRANCIS ST	9.064
61	011340102	1533 S PARCO AVE	29.000
62	101121106	1300 W MISSION BLVD	1.000
63	101138204	1055 W MISSION BLVD	1.000
64	101446205	1951 S PALMETTO AVE	1.000
65	105115103	1256 E PHILADELPHIA ST	6.000
66	105157177	NW CORNER GROVE AVE & RIVERSIDE DR	1.000
67	104947204	CAMPUS (N OF FRANCIS, S OF PHILLIPS)	6.000
68	011008107	1633 E HOLT BLVD	5.000
69	105144103	NW CORNER EUCLID AVE & RIVERSIDE DR	10.000
		Total	544 Acres

City of Chino
CHINO BASIN LAND USE CONVERSION
PARCELS TO BE CONVERTED IN FY 94/95

PROPERTY No.	ACREAGE	ADDRESS N/S - E/S	APN	GENERAL NOTES
8	10	3600/13650	1019-611-28,39,40	IRRIGATED LANDSCAPE/UNDER DEVELOPMENT
			1019-611-41,42,43,49	
10	31	3900/14000	1022-031-2	ENTERTAINMENT COMPLEX
			1022-26-4	
			1022-27-4	
			1022-082-1,2,8,9,10	
13	142	4300/14300	1022-42-6,7,8	COMM/IND - WAREHOUSE
			1022-41-5	
			1022-56-2	
			1022-53-11,12,13	
			1022-431-8	
			1022-441-8	
			1022-541-3	
18	70	5300-15400	1028-201-13,17	COMM/IND (MISSION LAUNDRY)
			1028-511-1 thru 20	
			1028-501-1 thru 25	
			1028-491-1 thru 9	
23	26	6400/13900	1021-251-1,20	RESIDENTIAL DEVELOPMENT/COMMERCIAL PARK
			1021-241-2,3	
29	39.5	6600/13900	1053-251-1,2,3,4	RESIDENTIAL DEVELOPMENT
			1053-241-68	
			1053-011-2 thru 5	
30	99	5700/14150	1021-351-1,2	AYALA PARK
			1021-321-1,2	
			1021-311-1,2	
			1021-281-1	
			1026-011-1	
32	61	6950/13100	1052-051-1 thru 18	DOMESTIC SERVICE ONLY/RESIDENTIAL
			1052-051-20 thru 25	
*	41	3950/13900	1022-082-1 thru 11	COMMERCIAL DEVELOPMENT
			1022-251-3 thru 14	
TOTAL	519.5			

*** acreage above property number 11 (MAJESTIC SPECTRUM POWER CENTER)**

Jurupa Community Services District
LAND CONVERSION REQUESTS FY 94-95
OUTSIDE OF CONVERSION AREA NO. 1

PARCEL NUMBER	PARCEL ADDRESS		NUMBER OF ACRES	MAP NO	LOT NO
156020026	12400	PHILADELPHIA	10.25	A	1
156020027	12350	PHILADELPHIA	15.41	A	2
156020030			8.79	A	3
156160018	3791	DE FOREST	10.75	B	1
156160035	3065	DULLES	5.21	B	2
156160036	3058	DULLES	9.42	B	3
156160037			7.31	B	4
156160038			5.03	B	5
156160039	3178	DULLES	5.11	B	6
156160046	3431	DE FOREST	5.10	B	7
156160058			2.45	B	8
156160059			1.60	B	9
156160060			0.19	B	10
156160061			0.22	B	11
156160065	3450	DULLES	5.50	B	12
156160066	3204	DE FOREST	5.20	B	13
156160067			5.37	B	14
156160068			5.00	B	15
156160069	3384	DE FOREST	5.00	B	16
156160070			5.21	B	17
156160071	3725	NOBEL	7.88	B	18
156160072			3.55	B	19
156160073	3444	DE FOREST	1.20	B	20
156160074	3590	DE FOREST	10.66	B	21
156160080			5.16	B	22
156160081			6.25	B	23
156160082	10885	INLAND	11.43	B	24
156160084	10980	INLAND	2.51	B	25
156160087	3305	DULLES	20.47	B	26
156160088	3305	DULLES	44.37	B	27
156160089	3305	DULLES	8.40	B	28
156160095	3038	DEERE	12.94	B	29
156160096	3371	DE FOREST	25.03	B	30
156160097			23.97	B	31
183030007	7545	JURUPA	9.90	C	3
183030008	7585	JURUPA	1.99	C	2
183030033	7491	JURUPA	5.69	C	1
183080010	7371	JURUPA	7.55	D	1
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7	11336116	1551 S GROVE AV	12.255
8	11336118	1405 S GROVE AV	11.642
9	11341421	1704 S VINEYARD AV	3.677
10	11343105	1160 S MILDRED AV	51.026
11	11351208	O E AIRPORT--OIA	8.524
12	11351210	O E AIRPORT --OIA	7.400
13	21019210	572 N TURNER AV	22.343
14	21121104	3000 E JURUPA ST	20.039
15	21121109	1200 S ARCHIBALD AV	19.395
16	21121111	2900 E JURUPA ST	65.765
17	21131203	O E MISSION BL	4.020
18	21131204	O E MISSION BL	2.022
19	21134101	O S SEAGULL AV	0.615
20	21134102	O E JURUPA ST	0.782
21	21134103	O E JURUPA ST	0.534
22	21134104	O E JURUPA ST	0.530
23	21134105	O E JURUPA ST	0.532
24	21134106	O S AVIATION DR	0.786
25	21134107	O S AVIATION DR	1.016
26	21808103	2300 S MILLIKEN AV	46.266
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31	23801223	O E FOURTH ST	13.856
32	23808140	O S WINEVILLE AV	2.655
33	23824110	5010 E AIRPORT DR	0.000
34	101120109	1241 W STATE ST	0.000
35	101120110	1211 W STATE ST	2.434
36	101120111	520 S MAGNOLIA AV	2.409
37	101122102	616 OAKS AV	0.000
38	101142109	O S ELDERBERRY AV	0.942
39	101142111	O S ELDERBERRY AV	1.942
40	101152112	O S ELDERBERRY AV	1.005
41	101153103	O S BENSON AV	2.566
42	101153104	O S BENSON AV	1.860
43	101143105	O S BENSON AV	4.781
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City of Ontario
Existing Agricultural Uses
Exhibit A

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53	105013103	1558 S CUCAMONGA AV	6.028
53	105016103	1556 S GRPVE AV	0.000
55	105017102	1642 S GROVE AV	9.563
56	105018103	1743 S CUCAMONGA AV	8.970
57	105020101	1687 S BON VIEW AV	9.547
58	105036108	1844 S FERN AV	0.000
59	105045104	1921 S BON VIEW AV	4.740
60	105046109	1056 E FRANCIS ST	9.064
61	011340102	1533 S PARCO AVE	29.000
62	101121106	1300 W MISSION BLVD	1.000
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67	104947204	CAMPUS (N OF FRANCIS, S OF PHILLIPS)	6.000
68	011008107	1633 E HOLT BLVD	5.000
69	105144103	NW CORNER EUCLID AVE & RIVERSIDE DR	10.000
		Total	544 Acres

****** NOTICE OF HEARING ******

TO - ALL ACTIVE CHINO BASIN PARTIES, CASE NO. 164327

WHEN - JANUARY 5, 1979, 1:30 P.M.

WHERE - SAN BERNARDINO SUPERIOR COURT, DEPARTMENT 2
351 NORTH ARROWHEAD AVENUE, SAN BERNARDINO, CALIF.

WHAT - THE FOLLOWING ITEMS ARE FOR APPROVAL.

1. FIRST ANNUAL WATERMASTER REPORT.
2. 1977/78 PRODUCTION SUMMARY.
3. FORM OF LOCAL STORAGE AGREEMENT.
4. M.W.D. CYCLIC STORAGE AGREEMENT.
5. INTERVENTIONS AND ASSIGNMENTS.

YOUR PRESENCE AT THIS HEARING IS NOT REQUIRED, BUT YOUR ATTENDANCE IS WELCOME.

NOTE - FILING WITH THE DIVISION OF WATERRIGHTS IS NO LONGER NECESSARY, JUST RETURN THEIR FORMS INDICATING YOU REPORT TO THE CHINO BASIN WATERMASTER.

FRAN BROMMENSCHENKEL
987-1712

APPENDIX H

ORANGE COUNTY ADJUDICATION

JUDGMENT No. 117628, April 17, 1969

JUDGMENT

FILED
APR 17 1969
W. E. ST JOHN, County Clerk
CB
Deputy

ENTERED IN
JUDGMENT BOOK
No. 362 Page 303
Date APR 17 1969

SUPERIOR COURT FOR THE STATE OF CALIFORNIA
FOR THE COUNTY OF ORANGE

ORANGE COUNTY WATER DISTRICT,
Plaintiff,
v.
CITY OF CHINO, et al.,
Defendants.

CITY OF CHINO, et al.,
Cross-Complainants,
v.
CITY OF ANAHEIM, et al.,
Cross-Defendants.

No. 117628
JUDGMENT

CORONA FOOTHILL LEMON COMPANY, et al.,
Cross-Complainants,
v.
CITY OF ANAHEIM, et al.,
Cross-Defendants.

CITY OF POMONA, a municipal corporation,
Cross-Complainant,
v.
CITY OF ANAHEIM, et al.,
Cross-Defendants.

CITY OF RIVERSIDE, et al.,

Cross-Complainants,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

BEAR VALLEY MUTUAL WATER COMPANY, et al.,

Cross-Complainants,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT, a municipal water district,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

EAST SAN BERNARDINO COUNTY WATER DISTRICT, a county water district,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

CITY OF SAN BERNARDINO, a municipal corporation,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

CITY OF REDLANDS, a municipal corporation,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

CITY OF COLTON, a municipal corporation,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

SAN BERNARDINO VALLEY WATER CONSERVATION DISTRICT, a water conservation district,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

CITY OF RIALTO, a municipal corporation,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

BIG BEAR MUNICIPAL WATER DISTRICT, a municipal water district,

Cross-Complainant,

v.

CITY OF ANAHEIM, et al.,

Cross-Defendants.

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RECITALS

a. Complaint. The complaint herein was filed on October 18, 1963, seeking an adjudication of water rights against substantially all water users in the area tributary to Prado Dam in the Santa Ana River Watershed.

b. Cross-Complaints. Thirteen cross-complaints were subsequently filed in the period of February 22 to March 22, 1968, by which said adjudication of rights was extended to substantially all water users within the Santa Ana River Watershed downstream from Prado Dam.

c. Physical and Legal Complexities. The physical and legal complexities of the case as framed by the complaint and cross-complaints are unprecedented. In excess of 4,000 individual parties have been served and the water supply and water rights of an entire stream system extending over 2,000 square miles and into four counties have been brought into issue. Every type and nature of water rights known to California law, excepting only Pueblo rights, is in issue in the case. Engineering studies by the parties jointly and severally leading toward adjudication of these rights or, in the alternative, to a physical solution, have required the expenditure of over four years' time and many hundreds of thousands of dollars.

d. Need for Physical Solution. It is apparent to the parties and to the Court that development of a physical solution based upon a formula for inter-basin allocation of obligations and rights is in the best interests of all the parties and is in furtherance of the water policy of the State. For purposes of such a physical solution, it is neither necessary nor helpful to define individual rights of all claimants within the watershed. Nontributary supplemental sources of water are or will be available to the parties in quantities sufficient to assure implementation of a solution involving inter-basin allocation of the natural water

supply of the Santa Ana River system. Sufficient information and data of a general nature are known to formulate a reasonable and just allocation as between the major hydrologic sub-areas within the watershed, and such a physical solution will allow the public agencies and water users within each such major hydrologic sub-area to proceed with orderly water resource planning and development.

e. Parties. Orange County Water District, Chino Basin Municipal Water District, Western Municipal Water District of Riverside County and San Bernardino Valley Municipal Water District are public districts overlying, in the aggregate, substantially all of the major areas of water use within the watershed. Said districts have the statutory power and financial resources to implement a physical solution. Accordingly, dismissals have been entered as to all defendants and cross-defendants other than said four public districts.

f. Cooperation by Dismissed Parties. As a condition of dismissal of said defendants and cross-defendants, certain of said parties have stipulated to cooperate and support the inter-basin water quality and water management objectives of the physical solution and this Judgment.

DECREE

NOW, THEREFORE, IT IS HEREBY ORDERED, ADJUDGED AND DECREED:

1. Jurisdiction. The Court has jurisdiction of the subject matter of this action and of the parties herein.

2. Exhibits. The following exhibits are attached to this Judgment and made a part hereof.

(a) Exhibit A -- map entitled "Santa Ana River Watershed", showing boundaries and other relevant features of the area subject to this Judgment.

(b) Exhibit B -- Engineering Appendix.

3. Definitions. As used in this Judgment, the following

terms shall have the meanings herein set forth:

(a) OCWD -- Orange County Water District, appearing and acting individually and in a representative capacity for and on behalf of all riparian, overlying and other landowners, water users and inhabitants within said District pursuant to Subdivision 7 of Section 2 of the Orange County Water District Act, as amended.

(b) CBMWD -- Chino Basin Municipal Water District, appearing and acting pursuant to Section 71751 of the California Water Code.

(c) WMWD -- Western Municipal Water District of Riverside County, appearing and acting pursuant to said Section 71751.

(d) SBVMWD -- San Bernardino Valley Municipal Water District, appearing and acting pursuant to said Section 71751.

(e) Upper Districts -- CBMWD, WMWD and SBVMWD.

(f) Upper Area -- The area on Exhibit A which lies upstream from Prado.

(g) Lower Area -- The area on Exhibit A which lies downstream from Prado.

(h) Prado -- Said term shall be synonomous with Prado Dam, a facility constructed and maintained by the United States Corps of Engineers, as shown on Exhibit A.

(i) Riverside Narrows -- That bedrock narrows in the Santa Ana River indicated as such on Exhibit A.

(j) Storm Flow -- That portion of the total surface flow passing a point of measurement, which originates from precipitation and runoff without having first percolated to ground water storage in the zone of saturation, calculated in accordance with procedures

referred to in Exhibit B.

(k) Base Flow -- That portion of the total surface flow passing a point of measurement, which remains after deduction of Storm Flow, and modified as follows:

(1) At Prado. Base Flow shall:

(i) include any water caused to be delivered by CBMWD or WMWD directly to OCWD, pursuant to its direction and control and not measured at the gages at Prado;

(ii) exclude any nontributary water or reclaimed sewage water purchased by OCWD and delivered into the river upstream and which subsequently passes Prado, and

(iii) exclude water salvaged from evapo-transpiration losses by OCWD on lands presently owned by it above Prado.

(2) At Riverside Narrows. Base Flow shall:

(i) include any water caused to be delivered by SBVMWD directly to CBMWD or WMWD pursuant to their direction and control, or directly to OCWD with the consent of CBMWD and WMWD and pursuant to the direction and control of OCWD, and not measured at the gage at Riverside Narrows;

(ii) exclude any nontributary water purchased by CBMWD, WMWD or OCWD and delivered into the river upstream and which subsequently passes Riverside Narrows; and

(iii) exclude any effluent discharged from the City of Riverside sewage treatment plant.

(l) TDS -- Total dissolved solids determined as set forth in Exhibit B.

(m) Water Year -- The period from October 1 to the following September 30. Where reference is made herein to "year" or "annual", such terms shall be construed as referring to Water Year, unless the context indicates otherwise.

(n) Adjusted Base Flow -- Actual Base Flow in each year adjusted for quality as provided hereinbelow. Compliance with the respective obligations under Paragraph 5 shall be measured by the Adjusted Base Flow.

4. Declaration of Rights. Substantially all of the parties to this action, whether situate in Upper Area or Lower Area have or claim rights to the use of a portion of the water supply of the Santa Ana River system. In the aggregate, water users and other entities in Lower Area have rights, as against all Upper Area claimants, to receive an average annual supply of 42,000 acre feet of Base Flow at Prado, together with the right to all Storm Flow reaching Prado Reservoir. Water users and other entities in Upper Area have rights in the aggregate, as against all Lower Area claimants, to divert, pump, extract, conserve, store and use all surface and ground water supplies originating within Upper Area without interference or restraint by Lower Area claimants, so long as Lower Area receives the water to which it is entitled under this Judgment and there is compliance with all of its provisions.

5. Physical Solution. The Court hereby declares the following physical solution to be a fair and equitable basis for satisfaction of all said rights in the aggregate between Lower Area and Upper Area. The parties are hereby ordered and directed to comply with this Physical Solution and such compliance shall constitute full and complete satisfaction of the rights declared in

Paragraph 4 hereof.

(a) General Format. In general outline, SBVMWD shall be responsible for the delivery of an average annual amount of Base Flow at Riverside Narrows. CBMWD and WMWD shall jointly be responsible for an average annual amount of Base Flow at Prado. Insofar as Lower Area claimants are concerned, Upper Area water users and other entities may engage in unlimited water conservation activities, including spreading, impounding and other methods, in the area above Prado Reservoir, so long as Lower Area receives the water to which it is entitled under the Judgment and there is compliance with all of its provisions. Lower Area water users and other entities may make full conservation use of Prado Dam and reservoir, subject only to flood control use.

(b) Obligation of SBVMWD. SBVMWD shall be responsible for an average annual Adjusted Base Flow of 15,250 acre feet at Riverside Narrows. A continuing account, as described in Exhibit B, shall be maintained of actual Base Flow at Riverside Narrows, with all adjustments thereof and any cumulative debit or credit. Each year the obligation to provide Base Flow shall be subject to the following:

(1) Minimum Annual Quantities. Without regard to any cumulative credits, or any adjustment for quality for the current Water Year under subparagraph (2) hereof, SBVMWD each year shall be responsible at Riverside Narrows for not less than 13,420 acre feet of Base Flow plus one-third of any cumulative debit; provided, however, that for any year

commencing on or after October 1, 1986, when there is no cumulative debit, or for any year prior to 1986 whenever the cumulative credit exceeds 10,000 acre feet, said minimum shall be 12,420 acre feet.

(2) Adjustment for Quality. The amount of Base Flow at Riverside Narrows received during any year shall be subject to adjustment based upon the weighted average annual TDS in such Base Flow, as follows:

If the Weighted Average TDS in Base Flow at Riverside Narrows is:	Then the Adjusted Base Flow shall be determined by the formula:
Greater than 700 ppm	$Q - \frac{11}{15,250} Q (TDS-700)$
600 ppm - 700 ppm	Q
Less than 600 ppm	$Q + \frac{11}{15,250} Q (600-TDS)$

Where: Q = Base Flow actually received.

(3) Periodic Reduction of Cumulative Debit. At least once in any ten (10) consecutive years subsequent to October 1, 1976, SBVMWD shall provide sufficient quantities of Base Flow at Riverside Narrows to discharge completely any cumulative debits. Any cumulative credits shall remain on the books of account until used to offset any subsequent debits, or until otherwise disposed of by SBVMWD.

(c) Obligation of CBMWD and WMWD. CBMWD and WMWD shall be responsible for an average annual Adjusted Base Flow of 42,000 acre feet at Prado. A continuing account, as described in Exhibit B, shall

be maintained of actual Base Flow at Prado, with all adjustments thereof and any cumulative debit or credit. Each year the obligation to provide Base Flow shall be subject to the following:

(1) Minimum Annual Quantities. Without regard to any cumulative credits, or any adjustments for quality for the current Water Year under subparagraph (2) hereof, CBMWD and WMWD each year shall be responsible for not less than 37,000 acre feet of Base Flow at Prado, plus one-third of any cumulative debit; provided, however, that for any year commencing on or after October 1, 1986, when there is no cumulative debit, or for any year prior to 1986 whenever the cumulative credit exceeds 30,000 acre feet, said minimum shall be 34,000 acre feet.

(2) Adjustment for Quality. The amount of Base Flow at Prado received during any year shall be subject to adjustment based upon the weighted average annual TDS in Base Flow and Storm Flow at Prado as follows:

If the Weighted Average TDS in Base Flow and Storm Flow at Prado is:	Then the Adjusted Base Flow shall be determined by the formula:
Greater than 800 ppm	$Q - \frac{35}{42,000} Q\ (TDS-800)$
700 ppm - 800 ppm	Q
Less than 700 ppm	$Q + \frac{35}{42,000} Q\ (700-TDS)$

Where: Q = Base Flow actually received.

(3) Periodic Reduction of Cumulative Debit. At least once in ten (10) consecutive years subsequent to October 1, 1976, CBMWD and WMWD shall

provide sufficient quantities of Base Flow at Prado to discharge completely any cumulative debits. Any cumulative credits shall remain on the books of account until used to offset any subsequent debits, or until otherwise disposed of by CBMWD and WMWD.

(d) Inter-basin Export. Upper Districts are hereby restrained and enjoined from exporting water from Lower Area to Upper Area, directly or indirectly. OCWD is enjoined and restrained from pumping, producing and exporting or directly or indirectly causing water to flow from Upper to Lower Area, except as to salvage of evapo-transpiration losses, as follows: OCWD owns certain lands within and above Prado Reservoir on which it has or claims certain rights to salvage evapo-transpiration losses by pumping or otherwise. Pumping for said salvage purposes shall not exceed 5,000 acre feet of ground water in any water year. Only the actual net salvage, as determined by the Watermaster, shall be excluded from Base Flow.

(e) Inter-basin Acquisition of Rights. The acquisition by Upper Districts or other Upper Area entities of Lower Area water rights shall in no way affect or reduce Lower Area's entitlement; and the acquisition of Upper Area water rights by OCWD or other Lower Area entities shall be deemed to be included within the aggregate entitlement of Lower Area and shall not increase said entitlement.

(f) Effective Date. Obligations under this physical solution shall accrue from and after October 1, 1970.

6. Prior Adjudications. So long as SBVMWD is in

compliance with the terms of the physical solution herein, OCWD is enjoined and restrained from enforcing the judgments listed below against SBVMWD or any entities within or partially within SBVMWD which have stipulated to accept and adopt such physical solution. So long as WMWD and CBMWD are in compliance with the terms of the physical solution, OCWD is enjoined and restrained from enforcing the judgments listed below against WMWD and CBMWD or any entities within or partially within WMWD or CBMWD which have stipulated to accept and adopt such physical solution.

(a) The Irvine Company, plaintiff, Orange County Water District, intervenor, vs. San Bernardino Valley Water Conservation District, et al., defendants, U. S. Dist. Ct., S.D. Cal. Civ. No. Y-36-M, judgments entered September 11, 1942 (Judgment Book 11 page 134), and recorded Book 1540 page 251 and Book 1541 page 85, Official Records of San Bernardino County.

(b) Orange County Water District vs. City of Riverside, et al., San Bernardino Superior Court No. 84671.

7. Watermaster. The Watermaster, when appointed by the Court, shall administer and enforce the provisions of this Judgment and the instructions and subsequent orders of this Court.

(a) Composition, Nomination and Appointment. The Watermaster shall consist of a committee composed of five (5) persons. CBMWD, WMWD and SBVMWD shall each have the right to nominate one representative and OCWD shall have the right to nominate two (2) representatives to the Watermaster committee. Each such nomination shall be made in writing, served upon the other parties to the Stipulation for this Judgment and filed with the Court. Said Watermaster representatives shall be appointed by and serve at

the pleasure of and until further order of this Court.

(b) Watermaster Determinations. Each and every finding and determination of the Watermaster shall be made in writing certified to be by unanimous action of all members of the Watermaster Committee. In the event of failure or inability of said Watermaster Committee to reach unanimous agreement, the fact, issue, or determination in question shall forthwith be certified to this Court by the Watermaster, and after due notice to the parties and opportunity for hearing, said matter shall be determined by order of this Court.

(c) Annual Report. The Watermaster shall report to the Court and to each party in writing not more than five (5) months after the end of each Water Year, each of the items required by Paragraph 4 of the Engineering Appendix, Exhibit B hereto, and such other items as the parties may mutually request or the Watermaster may deem to be appropriate. All of the books and records of the Watermaster which are used in the preparation of, or are relevant to, such reported data, determinations and reports shall be open to inspection by the parties to the Stipulation for Judgment herein.

(d) Watermaster Service Expenses. The fees, compensation and expenses of each representative on the Watermaster shall be borne by the district which nominated such person. All other Watermaster service costs and expenses shall be borne by the parties in the following proportions:

OCWD - 40%

CBMWD - 20%

SBVMWD - 20%

WMWD - 20%

The Watermaster may from time to time in its discretion require advances of operating capital from the parties in said proportions.

8. Continuing Jurisdiction of the Court. Full jurisdiction, power and authority are retained and reserved by the Court for the purpose of enabling the Court, upon application of any party or of the Watermaster by motion and upon at least 30 days' notice thereof, and after hearing thereon:

(a) To make such further or supplemental orders or directions as may be necessary or appropriate for the construction, enforcement or carrying out of this Judgment, and

(b) To modify, amend or amplify any of the provisions of this Judgment whenever substantial changes or developments affecting the physical, hydrological or other conditions dealt with herein may, in the Court's opinion, justify or require such modification, amendment or amplification; provided, however, that no such modification, amendment or amplification shall change or alter (1) the average annual obligation of CBMWD and WMWD for delivery of 42,000 acre feet of Base Flow per year at Prado, (2) the average annual obligation of SBVMWD for delivery of 15,250 acre feet of Base Flow per year at Riverside Narrows, (3) the respective minimum Base Flows at Riverside Narrows and Prado, nor (4) the right of the parties to this Judgment or of those who stipulate to accept and adopt the physical solution herein to conserve or store flows.

9. Notices. All notices, requests, objections, reports and other papers permitted or required by the terms of this

Judgment shall be given or made by written document and shall be served by mail on each party and its attorney entitled to notice and where required or appropriate, on the Watermaster. For all purposes of this paragraph, the mailing address of each party and attorney entitled to notice shall be that set forth below its signature in the Stipulation for Judgment, until changed as provided below. If any party or attorney for a party desires to change its designation of mailing address, it shall file a written notice of such change with the Clerk of this Court and shall serve a copy thereof by mail on the Watermaster. Upon receipt of any such notice, the Watermaster shall promptly give written notice thereof. Watermaster addresses for notice purposes shall be as specified in the orders appointing each representative on the Watermaster.

10. Successors. No party shall dissolve, nor shall it abandon or transfer all or substantially all of its powers or property, without first providing for its obligations under this Judgment to be assumed by a successor public agency, with the powers and resources to perform hereunder. Any such successor shall be approved by the Court after notice to all parties and an opportunity for hearing.

11. Future Actions. In the event that any Lower Area claimant shall in the future obtain from any court of competent jurisdiction a decree awarding to such claimant a right to receive a stated amount of water from the Upper Area for use in the Lower Area, any water delivered pursuant to such decree shall be considered as part of Base Flow. In the event that the relief obtained by any such claimant is in the form of a restriction imposed upon production and the use of water in Upper Area, rather than a right to receive a stated amount of water, then notwithstanding the proviso in Paragraph 8, any Upper District may apply to the Court to modify the physical solution herein.

12. Costs. None of the parties shall recover any costs from any other party.

Dated: April 17, 1969

John P. McMurray
Judge

APPENDIX I

WESTERN-SAN BERNARDINO ADJUDICATION

JUDGMENT No. 78426, April 17, 1969

JUDGMENT

FILED
RIVERSIDE COUNTY
APR 17 1969
DONALD D. SULLIVAN, Clerk
By _____ Deputy

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF RIVERSIDE

WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY, a municipal water district; CITY OF RIVERSIDE, a municipal corporation; THE GAGE CANAL COMPANY, a corporation; AGUA MANSA WATER COMPANY, a corporation, MEEKS & DALEY WATER COMPANY, a corporation; RIVERSIDE HIGHLAND WATER COMPANY, a corporation, and THE REGENTS OF THE UNIVERSITY OF CALIFORNIA,

Plaintiffs,

-vs-

(A) EAST SAN BERNARDINO COUNTY WATER DISTRICT, et al.,

Defendants

No. 78426 78426
4/7/69

JUDGMENT

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APPENDIX A -- Map showing San Bernardino Basin Area, Colton Basin Area, and Riverside Basin Area situated within San Bernardino County; Riverside Basin Area within Riverside County; Bunker Hill Dike; Riverside Narrows; and

Boundaries of San Bernardino Valley Municipal Water District & Western Municipal Water District of Riverside County

APPENDIX B -- Extractions by Plaintiffs from San Bernardino Basin Area.

APPENDIX C -- Exports for Use on Lands not Tributary to Riverside Narrows

APPENDIX D -- Miscellaneous Data

RECITALS

(a) Complaint. The complaint in this action was filed by certain parties exporting water from the area defined herein as the San Bernardino Basin Area for use within Western, and sought a general adjudication of water rights.

(b) Orange County Water District Action. Subsequently the Orange County Water District filed an action for the adjudication of the water rights of substantially all water users in the area tributary to Prado Dam in the Santa Ana River Watershed. A decree of physical solution has been entered in such action whereby individual water users were dismissed, and San Bernardino Valley and Western assumed responsibility for the deliveries of certain flows at Riverside Narrows and Prado respectively.

(c) Physical Solution. The Judgment herein will further implement the physical solution in the Orange County Water District action, as well as determine the rights of the hereinafter named Plaintiffs to extract water from the San Bernardino Basin Area, and provide for replenishment of the area above Riverside Narrows. Such Judgment is fair and equitable, in the best interests of the parties, and in furtherance of the water policy of the State. San Bernardino Valley has the statutory power and resources to effectuate this Judgment and accordingly the other defendants may be dismissed.

(d) Stipulation. The parties named herein through their respective counsel have proposed and filed a written stipulation agreeing to the making and entry of this Judgment. By reason of such stipulation, and good cause appearing

therefor,

IT IS HEREBY ORDERED, ADJUDGED AND DECREED as follows:

I

ACTIVE PARTIES

(a) The parties to this Judgment are as follows:

(1) Plaintiff Western Municipal Water District of Riverside County, a California municipal water district, herein often called "Western", appearing and acting pursuant to Section 71751 of the Water Code;

(2) Plaintiff City of Riverside, a municipal corporation;

(3) Plaintiffs Riverside Highland Water Company, Agua Mansa Water Company and Meeks & Daley Water Company, each of which is a mutual water company and a California corporation;

(4) Plaintiff The Regents of the University of California, a California public corporation;

(5) Defendant San Bernardino Valley Municipal Water District, a California municipal water district, herein often called "San Bernardino Valley", appearing and acting pursuant to Section 71751 of the Water Code;

(b) This Judgment shall inure to the benefit of, and be binding upon, the successors and assigns of the parties.

II

DISMISSED PARTIES

All parties other than those named in the preceding Paragraph I are dismissed without prejudice.

III

PRIOR JUDGMENTS

(a) The Judgment dated and entered on May 13, 1959, in that certain action filed in the Superior Court of the State of California in and for the County of San Bernardino, entitled and numbered "San Bernardino Valley Water Conservation District, a State Agency, Plaintiff v. Riverside Water Company, a corporation, et al., Defendants", No. 97031, is superseded effective January 1, 1971, and for so long as this Judgment remains in effect as to any party hereto that was a party to that action, and as to any party hereto that is a successor in interest to the rights determined in that action.

(b) The Judgment dated June 23, 1965, and entered on April 21, 1966, in that certain action filed in the Superior Court of the State of California in and for the County of San Bernardino entitled and numbered "San Bernardino Valley Water Conservation District, a State Agency, Plaintiff, v. Riverside Water Company, a corporation, et al., Defendants," No. 111614, is superseded effective January 1, 1971, and for so long as this Judgment remains in effect as to any party hereto that was a party to that action, and as to any party hereto that is a successor in interest to any rights determined in that action.

(c) As used in this Paragraph III only, "party" includes any person or entity which stipulates with the parties hereto to accept this Judgment.

IV

DEFINITIONS

The following ground water basins and tributary areas are situated within the Santa Ana River watershed upstream from Riverside Narrows and are tributary thereto, and their approximate locations and boundaries for purposes of this Judgment are shown upon the map attached hereto as Appendix "A"; San Bernardino Basin Area (the area above Bunker Hill Dike, but excluding certain mountainous regions and the Yucaipa, San Timoteo, Oak Glen and Beaumont Basins); Colton Basin Area, Riverside Basin Area within San Bernardino County, and Riverside Basin Area within Riverside County.

As used herein the following terms shall have the meanings herein set forth:

(a) Bunker Hill Dike - The San Jacinto Fault, located approximately as shown on Appendix "A", and forming the principal downstream boundary of the San Bernardino Basin Area.

(b) Riverside Narrows - That bedrock narrows in the Santa Ana River indicated on Appendix "A".

(c) Extractions - Any form of the verb or noun shall include pumping, diverting, taking or withdrawing water, either surface or subsurface, by any means whatsoever, except extractions for hydroelectric generation to the extent that such flows are returned to the stream, and except for diversions for replenishment.

(d) Natural Precipitation - Precipitation which falls naturally in the Santa Ana River watershed.

(e) Imported Water - Water brought into the Santa Ana River watershed from sources of origin outside such watershed.

(f) Replenishment - Artificial recharge of the ground water body achieved through the spreading or retention of water for the purpose of causing it to percolate and join the underlying ground water body, or injection of water into the ground water resources by means of wells; provided that as used with reference to any obligation of Western to replenish the Riverside Basin Area in Riverside County, the term replenishment shall include any water caused to be delivered by Western for which credit is received by San Bernardino Valley against its obligation under the Orange County Judgment to provide base flow at Riverside Narrows.

(g) Safe Yield - Safe yield is that maximum average annual amount of water that could be extracted from the surface and subsurface water resources of an area over a period of time sufficiently long to represent or approximate long-time mean climatological conditions, with a given areal pattern of extractions, under a particular set of physical conditions or structures as such affect the net recharge to the ground water body, and with a given amount of usable underground storage capacity, without resulting in long-term, progressive lowering of ground water levels or other undesirable result. In determining the operational criteria to avoid such adverse results, consideration shall be given to maintenance of adequate ground water quality, subsurface outflow, costs of pumping, and other relevant factors.

The amount of safe yield is dependent in part upon the amount of water which can be stored in and used from the ground water reservoir over a period of normal water supply under a given set of conditions. Safe yield is thus related to factors which influence or control ground water recharge, and

to the amount of storage space available to carry over recharge occurring in years of above average supply to years of deficient supply. Recharge, in turn, depends on the available surface water supply and the factors influencing the percolation of that supply to the water table.

Safe yield shall be determined in part through the evaluation of the average net groundwater recharge which would occur if the culture of the safe yield year had existed over a period of normal native supply.

(h) Natural Safe Yield - That portion of the safe yield of the San Bernardino Basin Area which could be derived solely from natural precipitation in the absence of imported water and the return flows therefrom, and without contributions from new conservation. If in the future any natural runoff tributary to the San Bernardino Basin Area is diverted away from that Basin Area so that it is not included in the calculation of natural safe yield, any replacement made thereof by San Bernardino Valley or entities within it from imported water shall be included in such calculation.

(i) New Conservation - Any increase in replenishment from natural precipitation which results from operation of works and facilities not now in existence, other than those works installed and operations which may be initiated to offset losses caused by increased flood control channelization.

(j) Year - A calendar year from January 1 through December 31. The term "annual" shall refer to the same period of time.

(k) Orange County Judgment - The final judgment in Orange County Water District v. City of Chino, et al., Orange County Superior Court No. 117628, as it may from time to

time be modified.

(l) Return Flow - That portion of the water applied for use in any particular ground water basin which subsequently reaches the ground water body in that basin.

(m) Five Year Period - a period of five consecutive years.

V

EXTRACTIONS FROM THE SAN BERNARDINO BASIN AREA

(a) For Use by Plaintiffs. The average annual extractions from the San Bernardino Basin Area delivered for use in each service area by each Plaintiff for the five year period ending with 1963 are hereby determined to be as set forth in Table B-1 of Appendix "B". The amount for each such Plaintiff delivered for use in each service area as set forth in Table B-1 shall be designated, for purposes of this Judgment, as its "base right" for such service area.

(b) For Use by Others. The total actual average annual extractions from the San Bernardino Basin Area by entities other than Plaintiffs for use within San Bernardino County for the five year period ending with 1963 are assumed to be 165,407 acre feet; the correct figure shall be determined by the Watermaster as herein provided.

VI

SAN BERNARDINO BASIN AREA RIGHTS AND REPLENISHMENT

(a) Determination of Natural Safe Yield. The natural safe yield of the San Bernardino Basin Area shall be computed by the Watermaster, reported to and determined initially by supplemental order of this Court, and thereafter

shall be subject to the continuing jurisdiction thereof.

(b) Annual Adjusted Rights of Plaintiffs.

1. The annual "adjusted right" of each Plaintiff to extract water from the San Bernardino Basin Area for use in each service area designated in Table B-1 shall be equal to the sum of the following:

(a) its base right for such service area, until the natural safe yield of the San Bernardino Basin Area is determined, and thereafter its percentage of such natural safe yield determined by the methods used in Table B-2; and (b) an equal percentage for each service area of any new conservation, provided the conditions of the subparagraph 2 below have been met.

2. In order that the annual adjusted right of each such Plaintiff shall include its same respective percentage of any new conservation, such Plaintiff shall pay its proportionate share of the costs thereof. Each Plaintiff shall have the right to participate in new conservation projects, under procedures to be determined by the Watermaster for notice to Plaintiffs of the planned construction of such projects. With respect to any new conservation brought about by Federal installations, the term "costs" as used herein shall refer to any local share required to be paid in connection with such project. Each Plaintiff shall make its payment at times satisfactory to the constructing agency, and new conservation shall be credited to any participating Plaintiff as such conservation is effected.

3. In any five year period, each Plaintiff shall have the right to extract from the San Bernardino Basin Area for use in each service area designated in Table B-1 an amount of water equal to five times its adjusted right for such service area; provided, however, that extractions by each Plaintiff in any year in any service area shall not exceed such Plaintiff's adjusted right for that service area by more than 30 percent.

4. If the natural safe yield of the San Bernardino Basin Area has not been determined by January 1, 1972, the initial determination thereof shall be retroactive to that date and the rights of the Plaintiffs, and the replenishment obligation of San Bernardino Valley as hereinafter set forth, shall be adjusted as of such date. Any excess extractions by Plaintiffs shall be charged against their respective adjusted rights over the next five year period, or in the alternative, Plaintiffs may pay to San Bernardino Valley the full cost of any replenishment which it has provided as replenishment for such excess extractions. Any obligation upon San Bernardino Valley to provide additional replenishment, by virtue of such retroactive determination of natural safe yield, may also be discharged over such next five year period.

5. Plaintiffs and each of them and their agents and assigns are enjoined from extracting any more water from the San Bernardino Basin Area than is permitted under this Judgment. Changes in place

of use of any such water from one service area to another shall not be made without the prior approval of Court upon a finding of compliance with Paragraph XV(b) of this Judgment. So long as San Bernardino Valley is in compliance with all its obligations hereunder, and Plaintiffs are allowed to extract the water provided for in this Judgment, Plaintiffs are further enjoined from bringing any action to limit the water extracted from the San Bernardino Basin Area for use within San Bernardino Valley.

6. Nothing in this Judgment shall prevent future agreements between San Bernardino Valley and Western under which additional extractions may be made from the San Bernardino Basin Area, subject to the availability of imported water not required by San Bernardino Valley, and subject to payment satisfactory to San Bernardino Valley for replenishment required to compensate for such additional extractions.

(c) San Bernardino Valley Replenishment. San Bernardino Valley shall provide imported water for replenishment of the San Bernardino Basin Area at least equal to the amount by which extractions therefrom for use within San Bernardino County exceed during any five year period the sum of: (a) five times the total average annual extractions determined under Paragraph V(b) hereof, adjusted as may be required by the natural safe yield of the San Bernardino Basin Area; and (b) any new conservation to which users within San Bernardino Valley are entitled. Such replenishment shall be

supplied in the year following any five year period; provided that during the first five year period, San Bernardino Valley shall supply annual amounts on account of its obligations hereunder, and such amounts shall be not less than fifty percent of the gross amount of excess extractions in the previous year.

1. Against its replenishment obligation over any five year period San Bernardino Valley shall receive credit for that portion of such excess extractions that returns to the ground water of the San Bernardino Basin Area.

2. San Bernardino Valley shall also receive credit against any future replenishment obligations for all replenishment which it provides in excess of that required herein, and for any amounts which may be extracted without replenishment obligation, which in fact are not extracted.

(d) In this subparagraph (d), "person" and "entity" mean only those persons and entities, and their successors in interest, which have stipulated with the parties to this Judgment within six months after its entry to accept this Judgment.

San Bernardino Valley agrees that the base rights of persons or entities other than Plaintiffs to extract water from the San Bernardino Basin Area for use within San Bernardino Valley will be determined by the average annual quantity extracted by such person or entity during the five year period ending with 1963. After the natural safe yield of the San Bernardino Basin Area is determined hereunder, such

base rights will be adjusted to such natural safe yield; the adjusted right of each such person or entity shall be that percentage of natural safe yield as determined hereunder from time to time which the unadjusted right of such person or entity is of the amount determined under Paragraph V(b).

San Bernardino Valley further agrees that in the event the right to extract water of any of such persons or entities in the San Bernardino Basin Area is adjudicated and legal restrictions placed on such extractions which prevent extracting of water by said persons or entities in an amount equal to their base rights, or after natural safe yield is determined, their adjusted rights, San Bernardino Valley will furnish to such persons or entities or recharge the ground water resources in the area of extraction for their benefit with imported water, without direct charge to such persons or entities therefor, so that the base rights, or adjusted rights, as the case may be, may be taken by the person or entity.

Under the provisions hereof relating to furnishing of such water by San Bernardino Valley, such persons or entities shall be entitled to extract in addition to their base rights or adjusted rights any quantities of water spread for repumping in their area of extractions, which has been delivered to them by a mutual water company under base rights or adjusted base rights included by the Watermaster under the provisions of Paragraph V (b) hereof. Extractions must be made within three years of spreading to so qualify.

VII

WATER DISCHARGED ACROSS THE BUNKER HILL DIKE

San Bernardino Valley shall keep in force an agreement with the City of San Bernardino that the present annual quantity of municipal sewage effluent discharged across Bunker Hill Dike, assumed for all purposes herein to be 16,000 acre feet annually, shall be committed to the discharge of the downstream obligations imposed on San Bernardino Valley under this Judgment or under the Orange County Judgment, and that such effluent shall comply with the requirements of the Santa Ana River Basin Regional Water Quality Control Board in effect December 31, 1968.

VIII

EXTRACTIONS FROM COLTON BASIN AREA AND RIVERSIDE BASIN AREA IN SAN BERNARDINO COUNTY.

(a) The average annual extractions from the Colton Basin Area and that portion of the Riverside Basin Area within San Bernardino County, for use outside San Bernardino Valley, for the five year period ending with 1963 are assumed to be 3,349 acre feet and 20,191 acre feet, respectively; the correct figures shall be determined by the Watermaster as herein provided.

(b) Over any five year period, there may be extracted from each such Basin Area for use outside San Bernardino Valley, without replenishment obligation, an amount equal to five times such annual average for the Basin Area; provided, however, that if extractions in any year exceed such average by more than 20 percent, Western shall provide replenishment in the following year equal to the excess

extractions over such 20 percent peaking allowance.

(c) To the extent that extractions from each such Basin Area for use outside San Bernardino Valley exceed the amounts specified in the next preceding Paragraph (b), Western shall provide replenishment. Except for any extractions in excess of the 20 percent peaking allowance, such replenishment shall be supplied in the year following any five year period, and shall not be from reclaimed water produced within San Bernardino Valley. Such replenishment shall also be of a quality at least equal to the water extracted from the Basin Area being recharged; provided, that water from the State Water Project shall be deemed to be of acceptable quality. Replenishment shall be supplied to the Basin Area from which any excess extractions have occurred and in the vicinity of the place of the excess extractions to the extent required to preclude influence on the water level in the three wells below designated; provided that discharge of imported water into the Santa Ana River or Warm Creek from a connection on the State Aqueduct near the confluence thereof, if released in accordance with a schedule approved by the Watermaster to achieve compliance with the objectives of this Judgment, shall satisfy any obligation of Western to provide replenishment in the Colton Basin Area, or that portion of the Riverside Basin Area in San Bernardino County, or the Riverside Basin Area in Riverside County.

(d) Extractions from the Colton Basin Area and that portion of the Riverside Basin Area within San Bernardino County, for use within San Bernardino Valley, shall not be limited. However, except for any required replenishment by Western, San Bernardino Valley shall provide the water to maintain the static water levels in the area, as determined by wells numbered

1S 4W 21 Q3, 1S 4W 29 H1, and 1S 4W 29 Q1 at an average level no lower than that which existed in the Fall season of 1963. Such 1963 average water level is hereby determined to be 822.04 feet above sea level. In future years, the level shall be computed by averaging the lowest static water levels in each of the three wells occurring at or about the same time of the year, provided that no measurements will be used which reflect the undue influence of pumping in nearby wells, or in the three wells, or pumping from the Riverside Basin in Riverside County in excess of that determined pursuant to Paragraph IX(a) hereof.

(e) Extractions by Plaintiffs from the Colton Basin Area and the portion of the Riverside Basin Area in San Bernardino County may be transferred to the San Bernardino Basin Area if the level specified in Paragraph (d) above is not maintained, but only to the extent necessary to restore such 1963 average water level, provided that Western is not in default in any of its replenishment obligations. San Bernardino Valley shall be required to replenish the San Bernardino Basin Area in an amount equal to any extractions so transferred. San Bernardino Valley shall be relieved of responsibility toward the maintenance of such 1963 average water level to the extent that Plaintiffs have physical facilities available to accommodate such transfers of extractions, and insofar as such transfers can be legally accomplished.

(f) The Colton Basin Area and the portion of the Riverside Basin Area in San Bernardino County constitute a major source of water supply for lands and inhabitants in both San Bernardino Valley and Western, and the parties hereto have a mutual interest in the maintenance of water quality in these Basin Areas and in the preservation of such supply. If

the water quality in such Areas, as monitored by the City of Riverside wells along the river, falls below the Objectives set therefor by the Santa Ana River Basin Regional Water Quality Control Board, the Court shall have jurisdiction to modify the obligations of San Bernardino Valley to include, in addition to its obligation to maintain the average 1963 water level, reasonable provisions for the maintenance of such water quality.

(g) The primary objectives of Paragraph VIII and related provisions are to allow maximum flexibility to San Bernardino Valley in the operation of a coordinated replenishment and management program, both above and below Bunker Hill Dike; to protect San Bernardino Valley against increased extractions in the area between Bunker Hill Dike and Riverside Narrows, which without adequate provision for replenishment might adversely affect base flow at Riverside Narrows, for which it is responsible under the Orange County Judgment; and to protect the area as a major source of ground water supply available to satisfy the historic extractions therefrom for use within Western, without regard to the method of operation which may be adopted by San Bernardino Valley for the San Bernardino Basin Area, and without regard to the effect of such operation upon the historic supply to the area below Bunker Hill Dike.

If these provisions should prove either inequitable or unworkable, the Court upon the application of any party hereto shall retain jurisdiction to modify this Judgment so as to regulate the area between Bunker Hill Dike and Riverside Narrows on a safe yield basis; provided that under such method of operation, (1) base rights shall be determined on the basis of total average annual extractions for use within San Bernardino Valley and Western, respectively, for the five year period ending

with 1963; (2) such base rights for use in both Districts shall be subject to whatever adjustment may be required by the safe yield of the area, and in the aggregate shall not be exceeded unless replenishment therefor is provided; (3) in calculating safe yield, the outflow from the area at Riverside Narrows shall be determined insofar as practical by the base flow obligations imposed on San Bernardino Valley under the Orange County Judgment; and (4) San Bernardino Valley shall be required to provide replenishment for any deficiency between the actual outflow and the outflow obligation across Bunker Hill Dike as established by safe yield analysis using the base period of 1934 through 1960.

IX

EXTRACTIONS FROM THE PORTION OF RIVERSIDE BASIN AREA IN RIVERSIDE COUNTY WHICH IS TRIBUTARY TO RIVERSIDE NARROWS.

(a) The average annual extractions from the portion of the Riverside Basin Area in Riverside County which is tributary to Riverside Narrows, for use in Riverside County, for the five year period ending with 1963 are assumed to be 30,044 acre feet; the correct figures shall be determined by the Watermaster as herein provided.

(b) Over any five year period, there may be extracted from such Basin Area, without replenishment obligation, an amount equal to five times such annual average for the Basin Area; provided, however, that if extractions in any year exceed such average by more than 20 percent, Western shall provide replenishment in the following year equal to the excess extractions over such 20 percent peaking allowance.

(c) To the extent that extractions from such Basin Area exceed the amounts specified in the next preceding

Paragraph (b), Western shall provide replenishment. Except for any extractions in excess of the 20 percent peaking allowance, such replenishment shall be supplied in the year following any five year period, and shall be provided at or above Riverside Narrows.

(d) Western shall also provide such replenishment to offset any reduction in return flow now contributing to the base flow at Riverside Narrows, which reduction in return flow results from the conversion of agricultural uses of water within Western to domestic or other uses connected to sewage or waste disposal systems, the effluent from which is not tributary to the rising water at Riverside Narrows.

X

REPLENISHMENT TO OFFSET NEW EXPORTS OF WATER TO AREAS NOT TRIBUTARY TO RIVERSIDE NARROWS.

Certain average annual amounts of water extracted from the San Bernardino Basin Area and the area downstream therefrom to Riverside Narrows during the five year period ending in 1963 have been exported for use outside of the area tributary to Riverside Narrows and are assumed to be 50,667 acre feet annually as set forth in Table C-1 of Appendix "C"; the correct amount shall be determined by the Watermaster as herein provided. Western shall be obligated to provide replenishment at or above Riverside Narrows for any increase over such exports by Western or entities within it from such areas for use within areas not tributary to Riverside Narrows. San Bernardino Valley shall be obligated to provide replenishment for any increase over the exports from San Bernardino Valley for use in any area not within Western nor tributary to Riverside Narrows as set forth in Table C-2 of

Appendix "C", such amounts being subject to correction by the Watermaster, or for any exports from the San Bernardino Basin Area for use in the Yucaipa, San Timoteo, Oak Glen and Beaumont Basins.

XI

REPLENISHMENT CREDITS AND ADJUSTMENT FOR QUALITY

(a) All replenishment provided by Western under Paragraph IX and all credits received against such replenishment obligation shall be subject to the same adjustments for water quality applicable to base flow at Riverside Narrows, as set forth in the Orange County Judgment.

(b) Western shall receive credit against its replenishment obligations incurred under this Judgment for the following:

1. As against its replenishment obligation under Paragraph VIII, any return flow to the Colton Basin Area or the portion of the Riverside Basin Area within San Bernardino County, respectively, resulting from any excess extractions therefrom; and as against its replenishment obligation under Paragraph IX, any return flow to the portion of the Riverside Basin Area in Riverside County, which contributes to the base flow at Riverside Narrows, resulting from any excess extractions therefrom, or from the Riverside Basin Area in San Bernardino County, or from the Colton Basin Area.

2. Subject to adjustment under Paragraph (a) hereof, any increase over the present amounts of sewage effluent discharged from

treatment plants within Riverside County which are tributary to Riverside Narrows, and which results from the use of imported water.

3. Any replenishment which may be provided in excess of that required; any amounts which hereunder are allowed to be extracted from the Colton and Riverside Basin Areas without replenishment obligation by Western, and which in fact are not extracted; any storm flows conserved between Bunker Hill Dike and Riverside Narrows by works financed solely by Western, or entities within it, which would not otherwise contribute to base flow at Riverside Narrows; and any return flow from imported water used in Riverside County which contributes to base flow at Riverside Narrows; provided, however, that such use of the underground storage capacity in each of the above situations does not adversely affect San Bernardino Valley in the discharge of its obligations at Riverside Narrows under the Orange County Judgment, nor interfere with the accomplishment by San Bernardino Valley of the primary objectives of Paragraph VIII, as stated in Subdivision (g).

(c) The replenishment obligations of Western under this Judgment shall not apply during such times as amounts of base flow at Riverside Narrows and the amounts of water stored in the ground water resources below Bunker Hill Dike and tributary to the maintenance of such flow are found by Order of the Court to be sufficient to satisfy any obligation which San Bernardino Valley may have under this Judgment, or under the

Orange County Judgment, and if the Court further finds by Order that during such times any such increase in pumping, changes in use or exports would not adversely affect San Bernardino Valley in the future.

(d) The replenishment obligations of San Bernardino Valley under Paragraph X of this Judgment for increase in exports from the Colton and Riverside Basin Areas within San Bernardino Valley below the Bunker Hill Dike shall not apply during such times as the amounts of water in the ground water resources of such area are found by Order of the Court to be sufficient to satisfy the obligations which San Bernardino Valley may have to Plaintiffs under this Judgment, and if the Court further finds by Order that during such times any such increases in exports would not adversely affect Plaintiffs in the future.

XII

CONVEYANCE OF WATER BY SAN BERNARDINO VALLEY TO RIVERSIDE NARROWS.

If San Bernardino Valley determines that it will convey reclaimed sewage effluent, or other water, to or near Riverside Narrows, to meet its obligations under this or the Orange County Judgment, the City of Riverside shall make available to San Bernardino Valley for that purpose any unused capacity in the former Riverside Water Company canal, and the Washington and Monroe Street storm drains, without cost except for any alterations or capital improvements which may be required, or any additional maintenance and operation costs which may result. The use of those facilities shall be subject to the requirements of the Santa Ana River Basin Regional Water Quality Control Board and of the State Health Department, and compliance

therewith shall be San Bernardino Valley's responsibility.

XIII

WATERMASTER

(a) This Judgment and the instructions and subsequent orders of this Court shall be administered and enforced by a Watermaster. The parties hereto shall make such measurements and furnish such information as the Watermaster may reasonably require, and the Watermaster may verify such measurements and information and obtain additional measurements and information as the Watermaster may deem appropriate.

(b) The Watermaster shall consist of a committee of two persons. San Bernardino Valley and Western shall each have the right to nominate one of such persons. Each such nomination shall be made in writing, served upon the other parties to this Judgment, and filed in Court. Such person shall be appointed by and serve at the pleasure of and until further order of this Court. If either Western or San Bernardino Valley shall at any time nominate a substitute appointee in place of the last appointee to represent it, such appointee shall be appointed by the Court in place of such last appointee.

(c) Appendix "D" to this Judgment contains some of the data which have been used in preparation of this Judgment, and shall be utilized by the Watermaster in connection with any questions of interpretation.

(d) Each and every finding and determination of the Watermaster shall be made in writing certified to be by unanimous action of both members of the Watermaster committee. In the event of failure or inability of such Watermaster Committee to reach agreement, the Watermaster committee may determine to submit the dispute to a third person to be selected

by them, or if they are unable to agree on a selection, to be selected by the Court, in which case the decision of the third person shall be binding on the parties; otherwise the fact, issue, or determination in question shall forthwith be certified to this Court by the Watermaster, and after due notice to the parties and opportunity for hearing, said matter shall be determined by order of this Court, which may refer the matter for prior recommendation to the State Water Resources Control Board. Such order of the Court shall be a determination by the Watermaster within the meaning of this Judgment.

(e) The Watermaster shall report to the Court and to each party hereto in writing not more than seven (7) months after the end of each year, or within such other time as the Court may fix, on each determination made by it pursuant to this Judgment, and such other items as the parties may mutually request or the Watermaster may deem to be appropriate. All of the books and records of the Watermaster which are used in the preparation of, or are relevant to, such reported data, determinations and reports shall be open to inspection by the parties hereto. At the request of any party this Court will establish a procedure for the filing and hearing of objections to the Watermaster's report.

(f) The fees, compensation and expenses of each person on the Watermaster shall be borne by the District which nominated such person. All other Watermaster service costs and expenses shall be borne by San Bernardino Valley and Western equally.

(g) The Watermaster shall initially compute and report to the Court the natural safe yield of the San Bernardino Basin Area, said computation to be based upon the cultural

conditions equivalent to those existing during the five calendar year period ending with 1963.

(h) The Watermaster shall as soon as practical determine the correct figures for Paragraphs V(b), VI(b)1, VIII(a), IX(a) and X, as the basis for an appropriate supplemental order of this Court.

XIV

CONTINUING JURISDICTION OF THE COURT

(a) The Court hereby reserves continuing jurisdiction of the subject matter and parties to this Judgment, and upon application of any party, or upon its own motion, may review and redetermine, among other things, the following matters and any matters incident thereto:

1. The hydrologic condition of any one or all of the separate basins described in this Judgment in order to determine from time to time the safe yield of the San Bernardino Basin Area.

2. The desirability of appointing a different Watermaster or a permanent neutral member of the Watermaster, or of changing or more clearly defining the duties of the Watermaster.

3. The desirability of providing for increases or decreases in the extraction of any particular party because of emergency requirements or in order that such party may secure its proportionate share of its rights as determined herein.

4. The adjusted rights of the Plaintiffs as required to comply with the provisions hereof with respect to changes in the natural safe yield of the San Bernardino Basin

Area. If such changes occur, the Court shall adjudge that the adjusted rights and replenishment obligations of each party shall be changed proportionately to the respective base rights.

5. Conforming the obligations of San Bernardino Valley under this Judgment to the terms of any new judgment hereafter entered adjudicating the water rights within San Bernardino Valley, if inconsistencies of the two judgments impose hardship on San Bernardino Valley.

6. Adjusting the figures in Paragraphs V(b), VI(b) 1, VIII(a) IX(a), and X, to conform to determination by the Watermaster.

7. Credit allowed for return flow in the San Bernardino Basin Area if water levels therein drop to the point of causing undue hardship upon any party.

8. Other matters not herein specifically set forth which might occur in the future and which would be of benefit to the parties in the utilization of the surface and ground water supply described in this Judgment, and not inconsistent with the respective rights of the parties as herein established and determined.

(b) Any party may apply to the Court under its continuing jurisdiction for any appropriate modification of this Judgment if its presently available sources of imported water are exhausted and it is unable to obtain additional supplies of imported water at a reasonable cost, or if there is any substantial delay in the delivery of imported water through the State Water Project.

XV

SAVING CLAUSES

(a) Nothing in this Judgment precludes San Bernardino Valley, Western, or any other party from exercising such rights as it may have or obtain under law to spread, store underground and recapture imported water, provided that any such use of the underground storage capacity of the San Bernardino Basin Area by Western or any entity within it shall not interfere with any replenishment program of the Basin Area.

(b) Changes in the place and kind of water use, and in the transfer of rights to the use of water, may be made in the absence of injury to others or prejudice to the obligations of either San Bernardino Valley or Western under Judgment or the Orange County Judgment.

(c) If any Plaintiff shall desire to transfer all or any of its water rights to extract water within San Bernardino Valley to a person, firm, or corporation, public or private, who or which is not then bound by this Judgment, such Plaintiff shall as a condition to being discharged as hereinafter provided cause such transferee to appear in this action and file a valid and effective express assumption of the obligations imposed upon such Plaintiff under this Judgment as to such transferred water rights. Such appearance and assumption of obligation shall include the filing of a designation of the address to which shall be mailed all notices, requests, objections, reports and other papers permitted or required by the terms of this Judgment.

If any Plaintiff shall have transferred all of its said water rights and each transferee not theretofore bound by this Judgment as a Plaintiff shall have appeared in this action

and filed a valid and effective express assumption of the obligations imposed upon such Plaintiff under this Judgment as to such transferred water rights, such transferring Plaintiff shall thereupon be discharged from all obligations hereunder. If any Plaintiff shall cease to own any rights in and to the water supply declared herein and shall have caused the appearance and assumption provided for in the third preceding sentence with respect to each voluntary transfer, then upon application to this Court and after notice and hearing such Plaintiff shall thereupon be relieved and discharged from all further obligations hereunder. Any such discharge of any Plaintiff hereunder shall not impair the aggregate rights of defendant San Bernardino Valley or the responsibility hereunder of the remaining Plaintiffs or any of the successors.

(d) Non-use of any right to take water as provided herein shall not result in any loss of the right. San Bernardino Valley does not guarantee any of the rights set out herein for Western and the other Plaintiffs as against the claims of third parties not bound hereby. If Western or the other Plaintiffs herein should be prevented by acts of third parties within San Bernardino County from extracting the amounts of water allowed them by this Judgment, they shall have the right to apply to this Court for any appropriate relief, including vacation of this Judgment, in which latter case all parties shall be restored to their status prior to this Judgment insofar as possible.

(e) Any replenishment obligation imposed hereunder on San Bernardino Valley may be deferred until imported water first is available to San Bernardino Valley under its contract with the California Department of Water Resources and the

obligation so accumulated may be discharged in five approximately equal annual installments thereafter.

(f) No agreement has been reached concerning the method by which the cost of providing replenishment will be financed, and no provision of this Judgment, nor its failure to contain any provision, shall be construed to reflect any agreement relating to the taxation or assessment of extractions.

XVI

EFFECTIVE DATE

The provisions of Paragraphs III and V to XII of this Judgment shall be in effect from and after January 1, 1971; the remaining provisions are in effect immediately.

XVII

COSTS

No party shall recover its costs herein as against any other party.

THE CLERK WILL ENTER THIS JUDGMENT FORTHWITH.

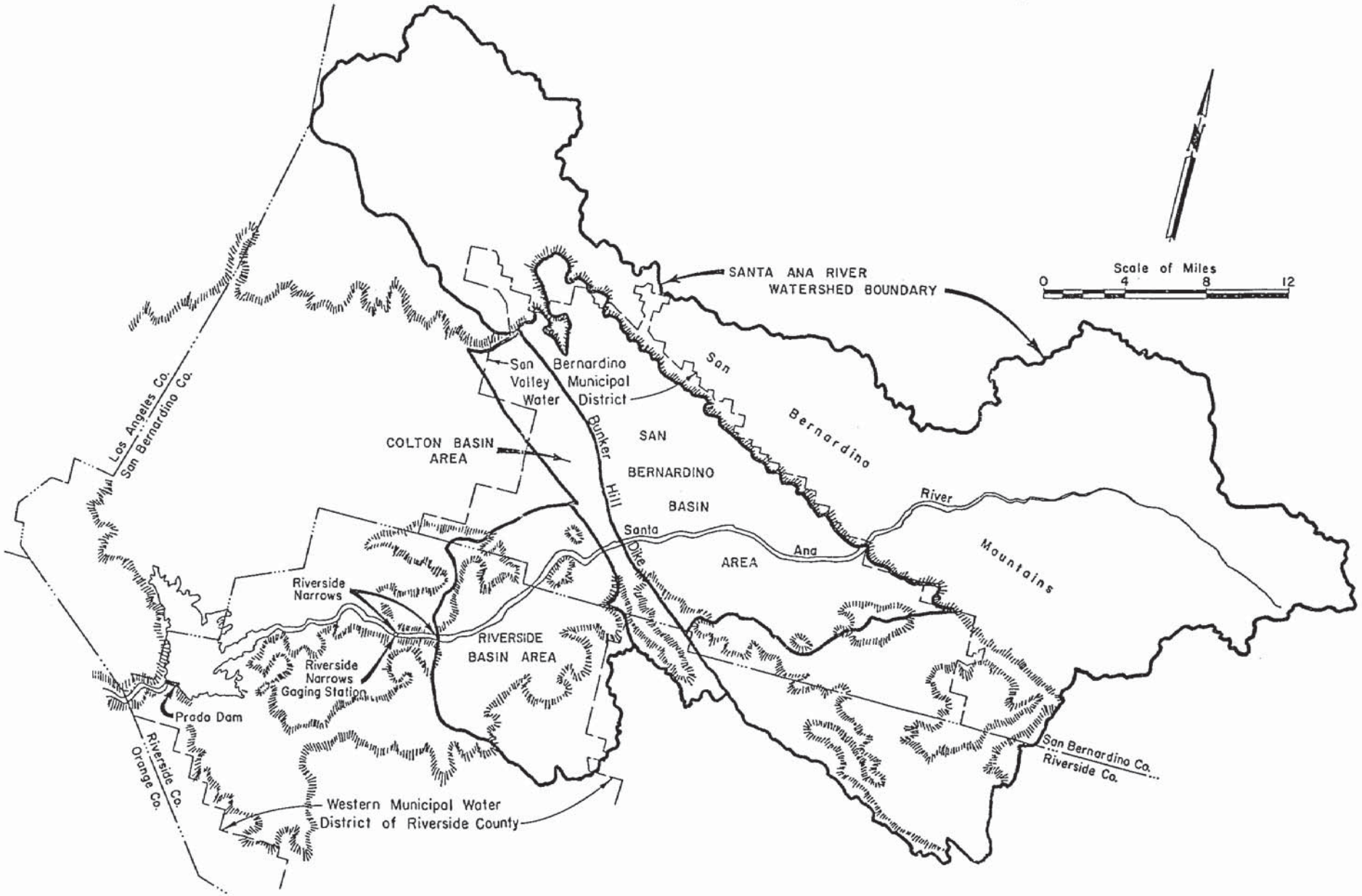
DATED: April 17, 1969

ENTERED

APR 17 1969

Albert P. McDonnell
JUDGE OF THE SUPERIOR COURT

JUDGMENT BOOK 124 PG 42



MAP SHOWING

SAN BERNARDINO BASIN AREA, COLTON BASIN AREA, AND RIVERSIDE BASIN AREA SITUATED WITHIN SAN BERNARDINO COUNTY; RIVERSIDE BASIN AREA WITHIN RIVERSIDE COUNTY; BUNKER HILL DIKE; RIVERSIDE NARROWS; AND BOUNDARIES OF SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT & WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY.

APPENDIX B
TABLE B-1

EXTRACTIONS BY PLAINTIFFS FROM THE SAN BERNARDINO BASIN AREA FOR AVERAGE OF 5-YEAR PERIOD ENDING WITH 1963

(All Values in Acre Feet)
Classified According to Service Area

Plaintiff	Total Extractions in San Bernardino Basin Area	Delivery to San Bernardino Basin Area	Delivery to Colton Basin Area & Riverside Basin Area in San Bernardino County	Delivery to Areas Outside San Bernardino Valley
City of Riverside (including those rights acquired as successor to the Riverside Water Company and The Gage Canal Company)	53,448	1462	1260	50,726
Riverside High-Land Water Company	4,399	0	2509	1,890
Agua Mansa Water Company, and Meeks & Daley Water Company	8,026	0	326	7,700
The Regents of the University of California	581	0	0	581
Total	66,454	1,462	4,095	60,897

APPENDIX B
TABLE B-2

PLAINTIFFS' PERCENTAGES OF BASE RIGHT TO TOTAL PRODUCTION FROM SAN BERNARDINO VALLEY BASIN AREA,
231,861 Acre Feet Annually,
For 5-Year Average Ending With 1963
Classified According to Service Area

Plaintiff	Delivery to San Bernardino Basin Area	Delivery to Colton Basin Area & Riverside Basin Area in San Bernardino County	Delivery to Areas Outside San Bernardino Valley
City of Riverside (including those rights acquired as successor to the Riverside Water Company and The Gage Canal Company)	.630	.543	21,878
Riverside Highland Water Company		1,082	0.815
Aqua Mansa Water Company, and Meeks & Daley Water Company		.141	3.321
The Regents of the University of California			0.250
Total	.630	1.766	26.264

APPENDIX C
TABLE C-1

EXTRACTIONS FOR USE WITHIN WESTERN
FROM
THE SAN BERNARDINO BASIN AREA, COLTON BASIN AREA,
AND THE RIVERSIDE BASIN AREA
FOR USE ON LANDS THAT ARE NOT TRIBUTARY
TO THE RIVERSIDE NARROWS FOR
AVERAGE OF FIVE-YEAR PERIOD ENDING IN 1963

Extractor	Five-Year Average Ac. Ft.
City of Riverside, including Irrigation Division water extracted by Gage Canal Co. and former Riverside Water Co.	30,657
Meeks & Daley Water Co., Agua Mansa Water Co., and Temescal Water Co., including water received from City of Riverside	13,731
Extractions delivered by West Riverside Canal received from Twin Buttes Water Co., La Sierra Water Co., Agua Mansa Water Co., Salazar Water Co., West Riverside 350" Water Co., and Jurupa Water Co.	5,712
Rubidoux Community Services District	531
Jurupa Hills Water Co.	36
TOTAL	50,667

APPENDIX C
TABLE C-2

EXTRACTIONS FOR USE WITHIN SAN BERNARDINO COUNTY
FROM
SAN BERNARDINO BASIN AREA AND COLTON BASIN AREA
FOR USE ON LANDS NOT TRIBUTARY TO
SANTA ANA RIVER OR ITS TRIBUTARIES
FIVE-YEAR PERIOD ENDING WITH 1953

(ALL VALUES IN ACRE FEET)

Entity	San Bernardino Basin Area	Colton Basin Area	Total
Fontana Union Water Co.	14,272	365	14,637
West San Bernardino County Water District	2,961	947	3,908
City of Rialto			700
TOTAL			19,245

APPENDIX D
TABLE D-1

EXTRACTIONS FROM SAN BERNARDINO BASIN AREA
FOR THE AVERAGE OF FIVE-YEAR PERIOD ENDING WITH 1963
FOR USE WITHIN SAN BERNARDINO COUNTY

(ALL VALUES IN ACRE FEET)

Basin	Five Year Avg. 1959-63
Beaumont	10,064
Big Bear	1,171
Borea Canyon	91
Bunker Hill	181,600
City Creek	337
Cook Canyon	197
Devil Canyon	3,326
Devil Creek	42
Lower Cajon	2,090
Little San Creek	15
Lytle	29,364
Mill Creek	11,084
Oak Glen	935
Plunge Creek	1,265
Santa Ana	1,790
Strawberry Creek	291
San Timoteo	2,272
Waterman Canyon	367
Yucaipa	13,837
Upper Basin Total	260,139
Less: Beaumont Oak Glen San Timoteo Yucaipa	27,107
Subtotal	233,032
Less Big Bear	1,171
Subtotal	231,861
Less extractions for use outside San Bernardino County	60,897
Extractions from San Bernardino for use in San Bernardino County	170,964

APPENDIX D
TABLE D-2

EXTRACTIONS FROM
COLTON BASIN AREA FOR AVERAGE OF
FIVE-YEAR PERIOD ENDING WITH 1963
BY SAN BERNARDINO AND RIVERSIDE COUNTY ENTITIES
FOR USE WITHIN EACH COUNTY

(VALUES IN ACRE FEET)

Extractor	Place of Use		Total
	San Bernardino Co.	Riverside Co.	
San Bernardino County Entities	8,480	0	8,480
Riverside County Entities	147	3,349	3,496
TOTAL EXTRACTIONS	8,627	3,349	11,976

APPENDIX D
TABLE D-3

EXTRACTIONS FROM
RIVERSIDE BASIN AREA IN SAN BERNARDINO COUNTY
FOR AVERAGE FIVE-YEAR PERIOD ENDING WITH 1963
BY SAN BERNARDINO AND RIVERSIDE COUNTY ENTITIES
FOR USE WITHIN EACH COUNTY

(VALUES IN ACRE FEET)

Extractor	Place of Use		Total
	San Bernardino Co.	Riverside Co.	
San Bernardino County Entities	9,582	0	9,582
Riverside County Entities	3,929	20,191	24,120
TOTAL EXTRACTIONS	13,511	20,191	33,702

APPENDIX D
TABLE D-4

EXTRACTIONS FROM
SAN BERNARDINO BASIN AREA, COLTON BASIN AREA
AND RIVERSIDE BASIN AREA USED WITHIN
RIVERSIDE COUNTY FOR THE AVERAGE
FIVE-YEAR PERIOD ENDING WITH 1963

(ALL VALUES IN ACRE FEET)

Basin	Five-Year Average
San Bernardino Basin Area	60,897
Colton Basin Area	3,349
Riverside Basin Area in San Bernardino County	20,191
Riverside Basin Area in Riverside County	30,044
TOTAL	114,481

APPENDIX D
TABLE D-5

IRRIGATED ACREAGE IN RIVERSIDE BASIN AREA IN RIVERSIDE COUNTY PRESENTLY TRIBUTARY TO RIVERSIDE NARROWS WHICH UPON CONVERSION TO URBAN USES REQUIRING SEWAGE DISPOSAL THROUGH THE RIVERSIDE TREATMENT PLANT WILL BE DISCHARGED TO THE RIVER BELOW RIVERSIDE NARROWS

Entity Serving Acreage	Acres
Gage Canal	1,752
Alta Mesa Water Co.	65
East Riverside Water Co.	926
Riverside Highland Water Company	1,173
TOTAL	3,916

Amendment No. 1

To Inter-Agency Operating Agreement for the Use of the JCSD-RCSD Jewel Street Booster Station and Pipeline Interconnection

(Adjustment in the Price for Water Delivered Through the Interconnection)

WHEREAS, Jurupa Community Services District ("JCSD") and Rubidoux Community Services District ("RCSD") have entered into an Operating Agreement ("Agreement") for the construction and use of a water system connection between JCSD and RCSD called the "Jewel Street Station" to provide for the flow of potable water from either party's retail water system into the other party's retail water system to cope with operational needs or temporary shortages in supply, or to deliver one party's surplus supplies to the other party if surplus supplies are available; and

WHEREAS, the term of the Agreement commenced on September 1, 2014, and continues for a period of 20 years unless extended by further written agreement between the parties; and

WHEREAS, Section 6 of the Agreement establishes the unit price to be paid by either party for the receipt of water from the other party pursuant to the Agreement, and provides for adjustment of the unit price by the general managers of both parties to reflect changes in production and treatment costs up to five percent. If an adjustment of more than five percent is needed to recover any party's production and treatment costs such adjustment must be approved by each party's Board of Directors; and

WHEREAS, RCSD has added treatment facilities to their own local wells and is in the process of interconnecting their water supply system to West Valley Water District "(WVWD"), both of which have significantly higher operational costs than contemplated in the initial Agreement; and

WHEREAS, the intent of the Agreement originally anticipated only the sales of local groundwater produced and treated by either RCSD or JCSD to the other however both agencies have, or anticipate having, access to potable water other than locally produced and treated groundwater such as from WVWD, or Chino Basin Desalter Authority ("CDA"); and

WHEREAS, WVWD water is made available to RCSD pursuant to an Agreement To Provide Water To RCSD, attached hereto as Exhibit A. RCSD can acquire up to 2,000 acre-feet per year ("AFY") of water priced pursuant to Sections 4 and 6 of the Agreement that may change from time to time; and

WHEREAS, in addition to diversification of its water supply portfolio, RCSD will use water from WVWD to lower the concentration of total dissolved solids ("TDS") in its overall potable water supply so after a use increment by RCSD customers of potable water, the annual average of TDS in sewage collected within RCSD's service area has a TDS concentration equal

to or just less than the maximum TDS concentration limit set by the City of Riverside for sewage discharged by RCSD to the City of Riverside for treatment and disposal; and

WHEREAS, groundwater produced and treated by RCSD along with any water acquired from WVWD is commingled in RCSD's 1066 Pressure Zone; and

WHEREAS, the Jewel Street Intertie is supplied water from RCSD's 1066 Pressure Zone for delivery to JCSD; and

WHEREAS, the parties acknowledge each acre-foot of local groundwater produced and treated by RCSD for delivery to JCSD may necessitate the purchase of water from WVWD as diluent water to lower the overall TDS of local groundwater produced as the groundwater and WVWD is commingled in RCSD's 1066 Pressure Zone; and

WHEREAS, as needed to achieve any necessary dilution of TDS in potable water delivered to RCSD customers, RCSD estimates the ratio of locally produced groundwater to purchased low TDS water from WVWD is 84:16; and

WHEREAS, JCSD has access to low TDS Chino Basin Desalter Authority (CDA) water that from time to time may be available for conveyance to RCSD.

WHEREAS, to recover the full cost of production and treatment of its own water supplies and purchase of imported water from WVWD for deliveries of potable water to JCSD when water is delivered from the RCSD system to the JCSD or from the JCSD CDA system pursuant to the Agreement, an adjustment of the pricing terms set forth in Section 6 of the Agreement is necessary; and

WHEREAS, the parties wish to continue the policy of equal pricing for local groundwater supply delivered from either party's retail water system to the other party's water system.

NOW, THEREFORE, JCSD and RCSD do hereby amend Section 6 of the Agreement to provide as follows:

6. Water Rate.

The Parties agree the Water Rate will vary based on the composition of supply delivered:

Supply Option A. Local groundwater produced and treated (only)

For potable groundwater produced, treated, and delivered by either party to the other party pursuant to this Agreement, the base unit rate for the water shall be $600.00 per acre-foot ("AF").

i) Annual adjustments to the unit rate for Supply Option A may be administratively negotiated by the parties' general managers, upward or downward, at any time during the term of this Agreement utilizing the Bureau of Labor Statistics Consumer Price Index (CPI-All Items)

for the Riverside-San Bernardino-Ontario Area for the then most recently reported 12-month period, or as otherwise agreed by the parties. In the event an annual adjustment higher than five percent rate change is required, such change will require consideration and approval by each party's Board of Directors.

Supply Option B. Local groundwater produced and treated by RCSD plus WVWD for lowering TDS concentration

Water delivered to JCSD under this Supply Option B will be the weighted average of the cost of water under Supply Option A and the cost of WVWD water purchased as diluent to lower TDS concentration. It is estimated the amount WVWD required as diluent is based on a ratio of sixteen percent (16%) for each acre-foot of produced local groundwater. For example:

Total Water Used = 7,000 AFY (RCSD 5,000 AFY + JCSD 2,000 AFY)

WVWD Water Required: 16% of Total Water Used: 0.16 x 7,000 AF = 1,120 AF

$$\text{Unit cost for Supply Option B} = \frac{\text{5,880 AF (Supply Option A)} + \text{1,120 AF (WVWD Cost)}}{\text{7,000 AF}}$$

i) Annual adjustments to the unit rate for Supply Option A may be administratively negotiated by the parties' general managers, upward or downward, at any time during the term of this Agreement utilizing the Bureau of Labor Statistics Consumer Price Index (CPI-All Items) for the Riverside-San Bernardino-Ontario Area for the then most recently reported 12-month period, or as otherwise agreed by the parties. In the event an annual adjustment higher than five percent rate change is required, such change will require consideration and approval by each party's Board of Directors.

ii) The unit cost for WVWD water is based on an Agreement To Provide Water To Rubidoux Community Services District, Exhibit A.

iii) The Parties agree in the event an annual adjustment higher than five percent rate change is required for Supply Option B, such change will require consideration and approval by each party's Board of Directors.

Supply Option C: Supply Option B plus JCSD buys additional WVWD water

Water delivered to JCSD under this Supply Option C will be the cost of water purchased under Supply Option B plus the cost for WVWD supply for each acre-foot of WVWD water purchased over and beyond that needed for Supply Option B. For example:

Total Water Used = 7,500 AF (7,000 AF Supply Option B + JCSD 500 AF of WVWD)

$$\text{Unit Cost to JCSD} = \frac{\text{2,000 AF (Supply Option B unit cost)} + \text{500 AF (WVWD Cost)}}{\text{2,500 AF}}$$

i) Annual adjustments to the unit rate for Supply Option A may be administratively negotiated by the parties' general managers, upward or downward, at any time during the term of this Agreement utilizing the Bureau of Labor Statistics Consumer Price Index (CPI-All Items) for the Riverside-San Bernardino-Ontario Area for the then most recently reported 12-month period, or as otherwise agreed by the parties. In the event an annual adjustment higher than five percent rate change is required, such change will require consideration and approval by each party's Board of Directors.

ii) The unit cost for WVWD water is based on an Agreement To Provide Water To Rubidoux Community Services District, Exhibit A.

iii) The Parties agree in the event an annual adjustment higher than five percent rate change is required for Supply Option C, such change will require consideration and approval by each party's Board of Directors.

Supply Option D: RCSD buys CDA water

In addition to water deliveries under Supply Option A supplied by JCSD to RCSD, at times JCSD has access to additional CDA water supplies. When RCSD requests potable water deliveries from JCSD exceeding quantities in excess of what JCSD can provide under Supply Option A, the water delivered to RCSD under this Supply Option D will be CDA water at the cost of water JCSD pays to purchase water from CDA. For example:

RCSD Requested CDA Water = 500 AF

Unit Cost to RCSD = 500 AF (CDA Cost)

i) The unit cost for CDA water is based on the CDA Operating Costs (Exhibit B).

iii) The Parties agree in the event an annual adjustment higher than five percent rate change is required for Supply Option D, such change will require consideration and approval by each party's Board of Directors.

This Amendment No. 1 shall become effective immediately upon execution by the last of the parties to sign below.

<signatures on following page>

RUBIDOUX COMMUNITY SERVICES DISTRICT

By: _____

Jeff Sims

General Manager

Date: _____

JURUPA COMMUNITY SERVICES DISTRICT

By: _____

Chris Berch

General Manager

Date: 4/20/2022

Adopted by JCSD Board on 3/28/2022

Attach:

Exhibit A: Agreement To Provide Water To Rubidoux Community Services District
Exhibit B: JCSD CDA Operating Cost

Exhibit A

AGREEMENT NO. 530
AGREEMENT TO PROVIDE WATER TO RUBIDOUX COMMUNITY SERVICES DISTRICT

This Agreement to Provide Water to Rubidoux Community Services District (Agreement) is entered by The Metropolitan Water District of Southern California (Metropolitan), San Bernardino Valley Municipal Water District (Valley District), West Valley Water District (West Valley), Rubidoux Community Services District (Rubidoux), and Western Municipal Water District (Western), collectively the "Parties."

RECITALS

A. Metropolitan is a metropolitan water district organized under the Metropolitan Water District Act, codified at section 109-1, et seq. of West's Appendix to the California Water Code, and is engaged in developing, storing, and distributing water in the counties of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura. Metropolitan has an existing agreement with San Gabriel Valley Municipal Water District that allows for the delivery of water through the San Gabriel Valley Devil Canyon – Azusa Pipeline, of which Valley District also has 50% of capacity right up to Riverside Avenue in the City of Rialto.

B. West Valley is a County Water District, a public agency of the State of California, providing retail water to approximately 95,000 customers. West Valley's service area overlaps five political jurisdictions: The Cities of Rialto, Fontana, Colton, and Jurupa Valley; and unincorporated areas of San Bernardino County, including the community of Bloomington.

C. Valley District is a public agency incorporated under the Municipal Water District Act of 1911 (California Water Code Section 71000 et seq., as amended) that is engaged in wholesale delivery of water in portions of the counties of San Bernardino and Riverside. Valley District is a State Water Contractor that primarily imports water into its service area through the State Water Project. Valley District has an existing connection on the San Gabriel Valley Devil Canyon – Azusa Pipeline that can also be used to deliver imported supplies from Metropolitan to a portion of Western's service area.

D. Western is a municipal water district incorporated under the Municipal Water District Act of 1911 (California Water Code Section 71000 et seq., as amended) that is engaged in retail and wholesale delivery of water to customers in western Riverside County. Western purchases imported water from Metropolitan and helps provide water to over 1,000,000 people in its service area.

E. Rubidoux is a California community services district providing retail potable water, non-potable water, sewer collection and treatment, solid waste collection, fire protection services, street lighting, and weed abatement services to approximately 40,000 customers in its service area located in the City of Jurupa Valley. Rubidoux currently has no imported water supply and is reliant solely on local groundwater sources.

F. The Parties desire to enter into this Agreement in order to provide water to Rubidoux for use within Western's service area (which is also within Metropolitan's service area).

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing recitals and the representations which are incorporated herein by this reference, warranties, covenants, and agreements contained in this Agreement and for other good and valuable consideration, the Parties hereby agree to the following terms and conditions of this Agreement.

1. Requests for Water. Rubidoux will coordinate with Valley District, West Valley, and Western on determining the monthly amount of imported water Rubidoux needs from Metropolitan, up to a maximum amount of 2,000 acre-feet per calendar year. After coordinating, Western will request delivery of the water from Metropolitan in accordance with Sections 2 through 4 below, inclusive. The requested water must be used within Metropolitan's service area.

2. Metropolitan Deliveries. To the extent there is sufficient unused capacity in the San Gabriel Valley Devil Canyon-Azusa Pipeline, Metropolitan will deliver the water to Valley District at Valley District's connection (Lytle Creek, Station, 1747+00) on the San Gabriel Valley Devil Canyon – Azusa Pipeline. The maximum amount of water that Metropolitan may deliver under this Agreement is 2,000 acre-feet per calendar year.

3. Valley District Deliveries. Valley District will deliver the water that Metropolitan delivers pursuant to Section 2 to West Valley.

4. West Valley Deliveries. West Valley will treat and deliver the water to Rubidoux, per terms identified in a separate agreemement between West Valley and Rubidoux, for use within Western's service area by Rubidoux, and Rubidoux will provide Western and West Valley with a meter read report of the amounts delivered by 3:00 p.m. on the fifth business day after the end of the month.

5. Monthly Amounts. Western will inform Metropolitan and Valley District of the amounts of water delivered to Rubidoux by 3:00 p.m. on the tenth business day after the end of the month to account for the supplies. Reconciliation of water deliveries will be allowed in subsequent monthly accounting.

6. Billing and Payment. Western will pay Metropolitan's rate for full service untreated water in effect at the time of the delivery of the water to Valley District's connection for use by Rubidoux within Western's service area. The delivery is subject to the capacity charge, readiness-to-serve charge, and all volumetric water rates then in effect, in the same manner as deliveries made to Western through Metropolitan's distribution system and connections. Metropolitan will bill Western, and Western will pay Metropolitan, in accordance with the billing and payment provisions of Metropolitan's Administrative Code, as amended over time. Rubidoux will reimburse Western for all payments Western makes to Metropolitan under this Agreement. Valley District and West Valley shall have no responsibility for the cost of water delivered to Valley District's connection for use within Western's service area by Rubidoux.

7. Department of Water Resources. Metropolitan will be responsible for any Department of Water Resources charges for the State Water Project supplies delivered to Valley District's connection under this Agreement.

8. Term. Upon execution, this Agreement is effective as of June 1, 2022 and terminates on December 31, 2035, provided that if the terms of the State Water Contracts are extended beyond December 31, 2035, then the term of this Agreement will likewise be extended to match the term of the State Water Contracts.

9. Cancellation. Notwithstanding Section 8, any Party may terminate this Agreement by providing at least 30 days written notice to all the other Parties provided that the

notifying party is not in default under this Agreement.

10. Liability and Indemnification. Liability and indemnification shall be governed by section 4502 of Metropolitan's Administrative Code. Valley District, West Valley, and Rubidoux each agree to the provisions of section 4502 of Metropolitan's Administrative Code, which provisions are incorporated here by this reference, and agree to its enforceability by or against each of them under this Agreement in the same manner and to the same extent as that section applies to Western.

11. No Third-Party Rights. This Agreement is made solely for the benefit of the Parties and their respective permitted successors and assigns (if any). Except for such a permitted successor or assign, no other person or entity may have or acquire any right by virtue of this Agreement.

12. Ambiguities. Each Party and its counsel have participated fully in the drafting, review and revision of this Agreement. No rule of construction to the effect that ambiguities are to be resolved against the drafting Party shall be applied in the interpretation of this Agreement or any amendments or modifications thereof.

13. Entire Agreement. This Agreement constitutes the final, complete, and exclusive statement of the terms of the Agreement among the Parties pertaining to the subject matter and supersedes all prior and contemporaneous understandings or agreements of the Parties. No Party has been induced to enter into this Agreement by, nor is any Party relying on, any representation or warranty outside those expressly set forth in this Agreement.

14. Counterparts. This Agreement may be executed in two or more counterparts, each of which, when executed and delivered, shall be an original and all of which together shall constitute one instrument, with the same force and effect as though all signatures appeared on a single document.

15. Relationship of Parties. Nothing contained in this Agreement shall be construed as creating a joint venture, partnership or any other similar arrangement among any of the Parties. No Party to this Agreement shall be deemed to be a representative, an agent or an employee of any other Party. Unless otherwise expressly specified in this Agreement, no Party shall have any authority or right to assume or create any obligation of any kind or nature, express or implied, on behalf of, or in the name of any other Party, nor bind any other Party in any respect, without the specific prior written authorization of another Party. The obligations of the

Parties shall be several and not joint.

16. Amendments. No change, amendment or modification of this Agreement shall be valid or binding upon the Parties unless such change, amendment or modification is in writing and duly executed by all Parties.

17. Time of the Essence. Time is of the essence in the execution and performance of this Agreement.

[signatures on following page]

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

_____ _____
Adel Hagekhalil Dated
General Manager

APPROVED AS TO FORM:

_____ _____
Marcia L. Scully Dated
General Counsel

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

_____ _____
Heather Dyer Dated
General Manager

APPROVED AS TO FORM:

_____ _____
Brad Neufeld Dated
General Counsel

WEST VALLEY WATER DISTRICT

_____ _____
Shamindra Manbahal Dated
General Manager

APPROVED AS TO FORM:

_____ _____
Robert Tafoya Dated
General Counsel

WESTERN MUNICIPAL WATER DISTRICT

_____ _____

Craig Miller Dated
General Manager

APPROVED AS TO FORM:

_____ _____

Jeff Ballinger Dated
Legal Counsel

RUBIDOUX COMMUNITY SERVICES DISTRICT

_____ _____

Jeff Sims Dated
General Manager

APPROVED AS TO FORM:

_____ _____

John Harper Dated
Legal Counsel

Exhibit B

JCSD CDA Operating Cost

Adopted Budget for FY 2021/22 for JCSD CDA Allocation and Costs are as follows:

1. Entitlement: 11,733 AFY
2. Administrative Costs: $501,734
3. CIP Debt Service: $2,072,759
4. Fixed Project Costs: $631,084
5. Fixed O&M Costs: $3,750,131
6. Variable O&M: $4,971,104

Total Annual Costs: $11,926,812

Cost Per AF: $1,017/AF

Kenneth J. McLaughlin, President
Jane F. Anderson, Vice President
Lupe R. Nava, Director
Bart Moreno, Director
Betty Folsom, Director



COMMUNITY SERVICES DISTRICT

Proudly serving Jurupa Valley and Eastvale

June 10, 2022

Western Municipal Water District
14205 Meridian Parkway
Riverside, CA 92518
Attn: Craig Miller, General Manager

Re: Memorandum of Understanding By and Between Jurupa Community Services District and Western Municipal Water District Providing for the Temporary Assignment and Purchase of Water Produced from the Chino Desalters

Dear Mr. Miller:

On March 15, 2017, Jurupa Community Services District (JCSD) and Western Municipal Water District (WMWD) executed the attached Memorandum of Understanding (MOU) providing for the temporary assignment and purchase of water produced from the Chino Desalters (CDA), enabling beneficial use of all WMWD's CDA water allocation. Within this MOU, the Water Price to JCSD is defined as "the CDA budgeted rate to WMWD per their adopted budget, minus the "CDA Fixed Project Costs Non-Debt", minus the "CDA Administration Cost", plus the three-year average interest expense on WMWD's debt associated with the CDA expansion projection".

In response to several discussions, staff from WMWD and JCSD identified the opportunity to assign a portion of the Metropolitan Water District of Southern California Local Resources Program (LRP) funding to JCSD, a retail water provider within WMWD's general service area, for each acre-foot of CDA water received. It was agreed by both Parties that effective with the September 2019 billing period and through June 30, 2020, WMWD would provide a monthly invoice credit of $78 per acre-foot to JCSD for each acre-foot of WMWD's CDA water delivered to JCSD. A reconciliation shall occur at the end of the term of this agreement to ensure WMWD actually received a like amount in LRP funding.

This new letter agreement extends the arrangement between the Parties through December 31, 2022. However, with the current long-term imported water delivery discussions occurring between the Parties, there are a few additional provisions included in this letter agreement.

- While this extension goes through December 31, 2022, the Parties are developing a longer-term Wholesale Enterprise MOU with the intent of optimizing the existing wholesale water supplies and regional infrastructure. Upon execution of the Wholesale Enterprise MOU, the arrangements under this letter agreement and attached MOU will become null and void.

- The Metropolitan Water District has implemented mandatory conservation measures in State Water Project Dependent areas. Should these mandates impact Western in the future, the provisions of this agreement pertaining to volume of water available to JCSD will be reconsidered with 30-days' notice.

- If MWD recalculates LRP funding or eligibility, the LRP funding that is passed on to JCSD will be adjusted or eliminated accordingly.

To officially document this extension of the agreement to December 31, 2022, please sign below and return to Maria Ayala at JCSD MAyala@jcsd.us. Please feel free to contact me if you have any further questions.

Sincerely,

Chris Berch, PE
General Manager

Enc: September 19, 2019 signed agreement 2017 MOU
Approved extension to December 31, 2021
Fiscal Year 2022-23 Western CDA Rate

Craig Miller, General Manager
Western Municipal Water District

Chris Berch

Chris Berch, General Manager
Jurupa Community Services District
BY Steven Rapelan
ACTING GM

Western Municipal Water District

Fiscal Year 2022-23 Rate for Western's CDA Water

Updated May 19, 2022

	Amount	Acre Feet Basis	Rate per Acre Foot	
CDA Rate to Western	$ 3,477,533	3,534	$ 984.02	Based on FY 2022-23 CDA Adopted Budget
Less "Fixed Proj Costs Capital"	$ 223,892	3,534	$ (63.35)	Based on FY 2022-23 CDA Adopted Budget
Less Budgeted Admin Costs	$ 159,057	3,534	$ (45.01)	Based on FY 2022-23 CDA Adopted Budget
Plus Interest on Western Debt Service	$ 619,065	3,534	$ 175.17	Based on WMWD debt service schedule 3-year average
Plus Principal on Western Debt Service	$ 504,495	3,534		Based on WMWD debt service schedule 3-year average
Less 75% of the MWD LRP Credit per Agreement dated XXX			$ (78.00)	
Total			**$ 972.83**	

WMWD CDA Expansion Debt Service

Fiscal Year	Interest	Principal	Total	Interest per AF	Principal per AF
2023	$ 636,624	$ 489,547	$ 1,126,171	$ 180.14	$ 138.52
2024	$ 619,628	$ 504,495	$ 1,124,123	$ 175.33	$ 142.75
2025	$ 600,942	$ 519,443	$ 1,120,385	$ 170.05	$ 146.98
Average	$ 619,065	$ 504,495		**Average** **$ 175.17**	**$ 142.75**

CDA FY 2022-23 Budget - Western's Share

	Annual	Quarterly
Admin	$ 159,057	$ 39,764
Fixed Proj D/S	$ -	$ -
Fixed Proj Capital	$ 223,892	$ 55,973
Fixed O&M	$ 1,330,671	$ 332,668
Variable O&M	$ 1,763,913	$ 440,978
Total	$ 3,477,533	$ 869,383
AF	3,534	
Total/AF	**$ 984.02**	

Our current year rate	$ 972.83	FY23
Our prior year rate	$ 845.40	FY22
Change	**15.1%**	

Betty Folsom, President
Kenneth J. McLaughlin, Vice President
Jane F. Anderson, Director
Lupe R. Nava, Director
Bart Moreno, Director

COMMUNITY SERVICES DISTRICT

January 25, 2021

Western Municipal Water District
14205 Meridian Parkway
Riverside, CA 92518
Attn: Craig Miller, General Manager

Re: Memorandum of Understanding By and Between Jurupa Community Services District and Western Municipal Water District Providing for the Temporary Assignment and Purchase of Water Produced from the Chino Desalters

Dear Mr. Miller:

On March 15, 2017, Jurupa Community Services District (JCSD) and Western Municipal Water District (WMWD) executed the attached Memorandum of Understanding (MOU) providing for the temporary assignment and purchase of water produced from the Chino Desalters (CDA), enabling beneficial use of all WMWD's CDA water allocation. Within this MOU, the Water Price to JCSD is defined as "the CDA budgeted rate to WMWD per their adopted budget, minus the "CDA Fixed Project Costs Non-Debt", minus the "CDA Administration Cost", plus the three-year average interest expense on WMWD's debt associated with the CDA expansion projection".

In response to several discussions, staff from WMWD and JCSD identified the opportunity to assign a portion of the Metropolitan Water District of Southern California Local Resources Program (LRP) funding to JCSD, a retail water provided within WMWD's general service area, for each acre-foot of CDA water received. It was agreed by both Parties that effective with the September 2019 billing period and through June 30, 2020, WMWD would provide a monthly invoice credit of $78 per acre-foot to JCSD for each acre-foot of WMWD's CDA water delivered to JCSD. A reconciliation shall occur at the end of the term of this agreement to ensure WMWD actually received a like amount in LRP.

This new letter agreement extends the arrangement between the Parties through December 31, 2021. However, with the current long-term imported water delivery discussions occurring between the Parties, there are a few additional provisions included in this letter agreement.

- During the first 6-months (January – June 2021), there will be no changes to the terms of the attached MOU and prior letter agreements.

- Beginning July 1, 2021, if there is not a long-term imported water delivery agreement in place then the three-year average principal expense on WMWD's debt associated with the CDA expansion will be added to the price JCSD pays for WMWD's CDA water. This is currently calculated to be $134 per acre-foot.

- There will be two 3-month check-ins (September 30, 2021, December 31, 2021) where the Parties will convene and determine if a new long-term imported water agreement has been executed, in which case the arrangements under this letter agreement and attached MOU will become null and void. However, as long as the Parties are working collaboratively and in good faith towards a long-term agreement, then WMWD agrees to provide pass-through regional system water to JCSD. Until such time that the long-term imported water agreement is executed, JCSD will pay the actual cost for the pass-through water, plus the actual wheeling costs (O&M and Capital as applicable).

    - The Parties agree that in the case a long-term imported water agreement is not in place, and WMWD delivers pass-through water, to develop an operating schedule to ensure delivery expectations understood and can be met.

To officially document this extension of the agreement to December 31, 2021, please sign below and return to Julie Saba at JCSD at jsaba@jcsd.us. Please feel free to contact me if you have any further questions.

Sincerely,

Chris Berch, PE
General Manager

Enc: September 19, 2019 signed agreement
2017 MOU

Approved extension to December 31, 2021:

Craig Miller, General Manager
Western Municipal Water District

Chris Berch, General Manager
Jurupa Community Services District

Richard "Dickie" Simmons, President
Betty Folsom, Vice President
Kenneth J. McLaughlin, Director
Betty A. Anderson, Director
Jane F. Anderson, Director

jurupa
COMMUNITY SERVICES DISTRICT

April 3, 2020

Western Municipal Water District
14205 Meridian Parkway
Riverside, CA 92518
Attn: Craig Miller, General Manager

Re: Memorandum of Understanding By and Between Jurupa Community Services District and Western Municipal Water District Providing for the Temporary Assignment and Purchase of Water Produced from the Chino Desalters

Dear Mr. Miller:

On March 15, 2017, Jurupa Community Services District (JCSD) and Western Municipal Water District (WMWD) executed the attached Memorandum of Understanding (MOU) providing for the temporary assignment and purchase of water produced from the Chino Desalters (CDA), enabling beneficial use of all WMWD's CDA water allocation. Within this MOU, the Water Price to JCSD is defined as "the CDA budgeted rate to WMWD per their adopted budget, minus the "CDA Fixed Project Costs Non-Debt", minus the "CDA Administration Cost", plus the three-year average interest expense on WMWD's debt associated with the CDA expansion projection".

In response to several discussions, staff from WMWD and JCSD identified the opportunity to assign a portion of the Metropolitan Water District of Southern California Local Resources Program (LRP) funding to JCSD, a retail water provided within WMWD's general service area, for each acre-foot of CDA water received. It was agreed by both Parties that effective with the September 2019 billing period and through June 30, 2020, WMWD would provide a monthly invoice credit of $78 per acre-foot to JCSD for each acre-foot of WMWD's CDA water delivered to JCSD. A reconciliation shall occur at the end of the term of this agreement to ensure WMWD actually received a like amount in LRP funding.

The attached letter dated September 19, 2019, was approved by both Parties to document the above agreement through June 30, 2020. It is desired by both parties to extend this agreement through December 31, 2020.

11201 Harrel Street, Jurupa Valley, CA 91752 * Phone (951) 685-7434 * Fax (951) 727-3501

To officially document this extension of the agreement through December 31, 2020, please sign below and return to Julie Saba at JCSD at jsaba@jcsd.us. Please contact me if you have any questions.

Sincerely,

Chris Berch, PE
General Manager

Enc: September 19, 2019 signed agreement
2017 MOU

Approved extension through December 31, 2020:

Craig Miller, General Manager
Western Municipal Water District

Chris Berch, General Manager
Jurupa Community Services District

Jane F. Anderson, President
Richard "Dickie" Simmons, Vice President
Betty Folsom, Director
Kenneth J. McLaughlin, Director
Betty A. Anderson, Director

Jurupa Community Services District

September 16, 2019

Western Municipal Water District
14205 Meridian Parkway
Riverside, CA 92518
Attn: Craig Miller, General Manager

Re: Memorandum of Understanding By and Between Jurupa Community Services District and Western Municipal Water District Providing for the Temporary Assignment and Purchase of Water Produced from the Chino Desalters

Dear Mr. Miller:

On March 15, 2017, Jurupa Community Services District (JCSD) and Western Municipal Water District (WMWD) executed the attached Memorandum of Understanding (MOU) providing for the temporary assignment and purchase of water produced from the Chino Desalters (CDA), enabling beneficial use of all WMWD's CDA water allocation. Within this MOU, the Water Price to JCSD is defined as "the CDA budgeted rate to WMWD per their adopted budget, minus the "CDA Fixed Project Costs Non-Debt", minus the "CDA Administration Cost", plus the three-year average interest expense on WMWD's debt associated with the CDA expansion projection".

In response to several discussions, staff from WMWD and JCSD have identified the opportunity to assign a portion of the Metropolitan Water District of Southern California Local Resources Program (LRP) funding to JCSD, a retail water provided within WMWD's general service area, for each acre-foot of CDA water received. Effective with the September 2019 billing period and through June 30, 2020, WMWD will provide a monthly invoice credit of $78 per acre-foot to JCSD for each acre-foot of WMWD's CDA water delivered to JCSD.

To officially document the agreement above, please sign below and return to Julie Saba at JCSD at jsaba@jcsd.us. Please feel free to contact me if you have any further questions.

Sincerely,

Chris Berch, PE
General Manager

Enc: 2017 MOU

Approved as written in statement on page 1:

Craig Miller, General Manager
Western Municipal Water District

Chris Berch, General Manager
Jurupa Community Services District

MEMORANDUM OF UNDERSTANDING BY AND BETWEEN WESTERN MUNICIPAL WATER DISTRICT AND THE JURUPA COMMUNITY SERVICES DISTRICT PROVIDING FOR THE TEMPORARY ASSIGNMENT AND PURCHASE OF WATER PRODUCED FROM THE CHINO DESALTERS

This Memorandum of Understanding (MOU), dated March 15, 2017, is entered into by and between Western Municipal Water District (WMWD) and the Jurupa Community Services District (JCSD), sometimes individually or collectively referred to herein as "Party" or "Parties", respectively.

RECITALS

A. The JCSD 2015 Urban Water Management Plan (UWMP) indicates that the growing communities served by JCSD will require supplemental water supplies of approximately 5,000 acre-feet per year (AFY) in 2020 and 10,000 AFY in 2030.

B. WMWD, a member agency of the Metropolitan Water District of Southern California (MWD), has access to imported supply from MWD. WMWD has access to, and continues to pursue, access to local water supplies through separate regional purchase, exchange, and storage agreements. WMWD is committed to assisting JCSD, and the other retail water agencies within its general service area, to secure water supplies to meet future demands as well as mitigate shortages and drought through regional collaboration.

C. The Parties to this MOU are two of eight member agencies of the Chino Basin Desalter Authority (CDA). The CDA is a joint exercise of powers authority which owns and operates facilities to treat groundwater extracted from the lower Chino Basin to California Division of Drinking Water (DDW) potable water standards and distributes the drinking water to its member agencies. WMWD and JCSD respectively own 3,534 and 11,733 AFY of capacity rights in CDA facilities. These capacity rights entitle the Parties to take delivery of water through CDA facilities subject to the applicable policies of CDA (CDA Deliveries).

D. WMWD's CDA Deliveries were obtained as part of the Chino Desalter Phase 3 Expansion Project (Expansion Project). The production capabilities of the Expansion Project will be complete and on-line prior to the completion of the new distribution pipeline for WMWD's portion of the Expansion Project. Therefore, since WMWD will not be able to take its CDA Deliveries from the Expansion Project until WMWD's distribution pipeline is complete, WMWD desires to sell its CDA Deliveries to JCSD until WMWD's pipeline is complete, thereby ensuring that the CDA remain fiscally sound and meets annual production and corresponding member agency purchase obligations.

E. WMWD and the City of Norco (Norco) entered into a Memorandum of Understanding by and Between Western Municipal Water District and the City of Norco Providing for the Assignment and Exchange of Water Produced from the Arlington Desalter and the Chino Desalters (Western-Norco MOU) dated October 16, 2013, that,

among other things, provides that Norco will take WMWD's full CDA Deliveries of up to 3,534 AFY in lieu of Norco taking 3,534 AFY from WMWD's Arlington Desalter. The in lieu exchange of these supplies will ultimately result in 3,534 AFY of new supplies for delivery to WMWD retail agencies. As of the date of this MOU, such CDA Deliveries to Norco have not taken place since the Expansion Project, which is necessary to deliver CDA Deliveries to Norco, has not been completed. As a result, the CDA Deliveries are available for delivery to JCSD under this MOU. At the time that the Expansion Project is complete and on-line, WMWD anticipates that it will have sufficient supplies in order to make the CDA Deliveries to JCSD under this MOU and to Norco under the Western-Norco MOU.

F. Until such time as planned regional conveyance facilities are complete, and longer-term agreements are executed for the delivery of supplemental supplies, JCSD has the desire and ability to temporarily take delivery of WMWD's CDA Deliveries totaling no more than 3,534 AFY.

G. In the interest of securing the long-term supplemental supply identified in the JCSD 2015 UWMP, the Parties will collaborate to identify potential sources of supply and cost-effective conveyance that may include imported water, CDA supplies, regional groundwater, or a blend of some or all of these sources.

NOW, THEREFORE, IN CONSIDERATION OF THE FOREGOING RECITALS, WHICH ARE INCORPORATED HEREIN, AND THE FOLLOWING PROVISIONS, THE PARTIES ENTER INTO THE FOLLOWING UNDERSTANDINGS:

Section 1. Purchased Water. Subject to the terms and conditions set forth in this MOU and the provisions of the WMWD/CDA Water Purchase Agreement dated March 15, 2017, WMWD and JCSD agree to the following temporary assignment, delivery, and purchase of WMWD's CDA Deliveries:

1. Minimum Delivery/Purchase – WMWD shall temporarily assign and deliver a minimum of 2,500 AFY of its CDA Deliveries to JCSD. JCSD will purchase a minimum of 2,500 AFY of WMWD's CDA Deliveries.

2. Maximum Delivery/Purchase – WMWD shall temporarily assign and deliver a maximum of 3,534 AFY of its CDA Deliveries to JCSD. JCSD will purchase a maximum of 3,534 AFY of WMWD's CDA Deliveries.

WMWD reserves the right to temporarily assign and deliver any amount of its CDA Deliveries above the Minimum Delivery/Purchase to the other CDA members in the event WMWD receives such requests prior to the deadline for JCSD to provide its requested

amount each year to WMWD as set forth in Section 4. JCSD shall retain the right to match the offer on an annual basis.

Section 2. Water Price. The per acre-foot price that JCSD will pay WMWD for CDA water (Water Price) shall be determined by the rates and charges established in the CDA Adopted Annual Budgets and WMWD's Interest on Debt Service for capital costs associated with the CDA. The Water Price will be recalculated on an annual basis, with the intent to establish a price for each fiscal year in advance of the April 1 deadline as described in Section 5 of this MOU. The Water Price will be calculated as follows: the CDA budgeted rate to WMWD per their adopted budget, minus the "CDA Fixed Project Costs Non-Debt", minus the "CDA Administration Cost", plus the three-year average interest expense on WMWD's debt associated with the CDA expansion projection (based on WMWD full share of CDA production of 3,534 AFY).

The Water Price for Fiscal Year 2016–2017 shall be $756 per acre-foot. The Water Price for Fiscal Year 2017–2018 cannot be precisely calculated until the CDA has adopted a budget for the Fiscal Year. At the time of this Agreement execution, the CDA had not adopted a budget for Fiscal Year 2017–2018. Following CDA budget adoption, the Water Price shall be calculated as described above. For the purposes of calculating the Water Price for Fiscal Year 2017–2018, WMWD's interest expense component will remain unchanged from Fiscal Year 2016–2017.

At any time the Water Price is recalculated because of changes in the CDA budget, WMWD and JCSD will use the reconciliation process described in Section 3 to balance payments to WMWD made by JCSD and actual costs invoiced by CDA to WMWD plus interest on WMWD's debt associated with the CDA expansion projection as described and agreed upon herein.

Section 3. Payment. JCSD shall pay WMWD a per acre-foot sum as calculated using the methodology described in Section 2 of this MOU for the delivery of WMWD's CDA Deliveries. WMWD will invoice JCSD monthly for prior month CDA Deliveries with payment due from JCSD by the 30th day after the invoice date (due date). Invoiced amounts not paid by the due date shall be subject to interest charges. Interest will be calculated at a rate of one-half percent (0.5%) per month. The CDA performs an annual reconciliation of budgeted dollar amounts with actual dollar amounts. The CDA will issue a credit or a charge to each agency accordingly. Any credit or increased charge associated with deliveries to JCSD for WMWD water would be passed on to JCSD as a credit or payment due.

Section 4. Delivery Point. JCSD shall coordinate and maintain operational flexibility regarding point of entry into the JCSD distribution system. WMWD's CDA Deliveries may occur via the existing 1100 JCSD pressure zone system or may utilize the newly constructed 1010 product water pipeline turnout into JCSD's system. JCSD and WMWD

staff shall mutually coordinate with CDA staff regarding appropriate flow settings and accounting for said deliveries.

Section 5. Delivery Schedule. JCSD shall notify WMWD prior to April 1 of each fiscal year, while this MOU is in effect, as to the specific quantity of water, between the minimum and maximum amount defined in Section 1 of this Agreement that it intends to purchase for the following fiscal year. JCSD will purchase all of WMWD's CDA Deliveries produced in the last quarter of Fiscal Year 2016–2017.

Section 6. WMWD Assignment of CDA Production. Nothing in this MOU or the Assignment of CDA Production will change either Party's obligations or benefits to the Chino Basin Watermaster including, but not limited to, obligations or benefits under the Judgment, Peace Agreement, and/or the Peace II Measures.

Section 7. Term. The term of this MOU shall commence as of the date the Expansion Project begins producing and delivering CDA Deliveries and shall remain in effect for two (2) years unless earlier terminated by WMWD because it has determined that it has the capability to take its CDA Deliveries. WMWD shall be responsible for notifying JCSD at least 90 days in advance for any early termination. Upon mutual agreement, this MOU may be extended beyond the original term.

Section 8. Emergency Contingency. In the event that: (a) during the term of this MOU, WMWD has completed the facilities that allow for the delivery of CDA Deliveries to WMWD; (b) JCSD is still receiving CDA Deliveries under the terms of this MOU; and (c) WMWD experiences an emergency whereby its deliveries of MWD imported water and/or local groundwater supplies are interrupted, JCSD will make every reasonable attempt to free up WMWD's CDA Deliveries so that they can be delivered to WMWD.

Section 9. Promulgating Agreements. The Parties may determine to enter into one or more agreements for purposes of promulgating provisions of this MOU, or related assignment or other agreements with CDA or other parties in connection with furthering the understandings set forth herein.

By: _____

John V. Rossi, General Manager
Western Municipal Water District

By: _____

Todd M. Corbin, General Manager
Jurupa Community Services District

ATTEST:

_____
Julie B. Saba
Board Secretary

jurupa
COMMUNITY SERVICES DISTRICT
Proudly serving Jurupa Valley and Eastvale

For Immediate Release

Contact: Arman Tarzi, Community Affairs Supervisor
(951) 685-7434

11201 Harrel St.
Jurupa Valley, CA 91752

Jurupa Community Services District Secures Nearly $25 Million in State Funding for Recycled Water Project

Jurupa Valley, CA **(May 26, 2022) –** Jurupa Community Services District (JCSD) has secured nearly $25 million in state funding for its Recycled Water Project (Project) through a grant award and low-interest loan.

JCSD was recently awarded a $5 million grant through Proposition 68 funding for the Project. Proposition 68 was approved by California voters in June 2018 to fund parks, water, environmental, and flood protection infrastructure projects throughout the state.

The grant award is supplemented by JCSD's recent agreement with the State Water Resources Control Board (SWRCB) for a loan of $19.4 million through the Clean Water State Revolving Fund (CWSRF). The funding has an extremely low-interest rate of 0.8% over a 30-year term. CWSRF is a financial assistance program for a wide range of valuable water infrastructure projects through a partnership between the United States Environmental Protection Agency and state governments.

"JCSD is committed to innovative solutions such as recycled water that help diversify our water portfolio with a drought-resilient water supply," said JCSD Board President Kenneth McLaughlin. "Securing these funds helps offset a significant portion of the amount that JCSD has budgeted for the Project."

As California's drought conditions worsen, the Project plays a critical role in JCSD's long-term response to drought and water conservation. Upon completion, the Project will offset precious potable water supplies by serving nearly 200 million gallons of recycled water to irrigation customers in Eastvale and Jurupa Valley. Irrigation customers include parks, schools, landscape irrigation along streets, and commercial properties.

JCSD works aggressively to identify grants and other funding opportunities for its projects to offset costs to its ratepayers. Earlier this year, JCSD sought additional grant funding from the United States Bureau of Reclamation's Title XVI program, with a decision expected in the coming months.

Founded in 1956, the Jurupa Community Services District is a public governmental agency which provides services and programs to the cities of Jurupa Valley and Eastvale. It is governed by five elected representatives (Board of Directors) from both cities. Serving over 130,000 people in a 40-square-mile area, JCSD provides a variety of community services and programs, including water, wastewater, street lights, frontage landscape maintenance, graffiti abatement, and parks and recreation services.

###



Jurupa
COMMUNITY SERVICES DISTRICT
Proudly serving Jurupa Valley and Eastvale

Recycled Water PROJECT

Recycled water is coming to the Jurupa Community Services District and soon you will begin to see purple pipe in certain JCSD service areas!

Many communities already distribute recycled water in purple pipes at parks, schools, roadway medians and golf courses. The **purple pipe system** is a safe way to reuse our most precious resource – **water**, with a drought resilient water supply.

Recycled water (also called reclaimed water) is treated wastewater that is safe to use to irrigate landscaping, certain crops, parks, schools, golf courses, and other commercial and industrial uses.

This water is transported through **purple-colored** pipes to avoid potential cross connections to drinking water pipes. Recycled water is strictly federally, state, and locally regulated and monitored to meet all public health and safety guidelines. JCSD's goal is to annually deliver 215 million gallons of recycled water. That's enough to offset the supply of drinking water to 1,320 homes for a year!

The recycled water treatment process mirrors and accelerates the *NATURAL* water cycle.

The project was made financially possible through grant awards totaling more than $16 million, plus $21.7 million to date in a low interest loan. JCSD continues to identify and seek additional grant funding to offset project costs.

Community Benefits of Recycled Water



CREATES
a Valuable Water Resource
Converts wastewater into recycled water making a new water source



PROVIDES
a Reliable Water Supply
Rain or shine, there will always be recycled water



SAVES
Drinking Water for Drinking
Reduces the overall amount of water taken from groundwater aquifers



PRESERVES
Greenery at Parks & Schools
Recycled water is not restricted during droughts



KEEPS *OUR* Water in *OUR* Community

Recycled water will be made available to certain public entities, schools and businesses that meet the required criteria and are located near the planned distribution pipeline. JCSD's contractors will contact eligible customers directly to discuss the project.

Construction to install the purple pipeline is scheduled to begin in mid-2023 and distribution of the recycled water is expected to begin in mid-2024.

Visit **www.JCSD.us/RecycledWater** or call **(951) 727-8009** for more information.



The *Many Uses* of Recycled Water

Recycled Water Uses the ***RIGHT*** Water, the ***RIGHT*** Way

- **Landscape irrigation**
  - Parks
  - Schools
  - Roadway medians
  - Other landscaping areas
- **Irrigation of certain edible crops**
- **Cooling water or process water**
- **Dust control at construction sites**
- **Toilet flushing** (if building is dual plumbed)
- **Vehicle washing**
- **Mixing concrete**
- **Decorative pools, fountains, ponds and other aesthetic features** (no human contact)

Visit **www.JCSD.us/RecycledWater** or call **(951) 727-8009** for more information.

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

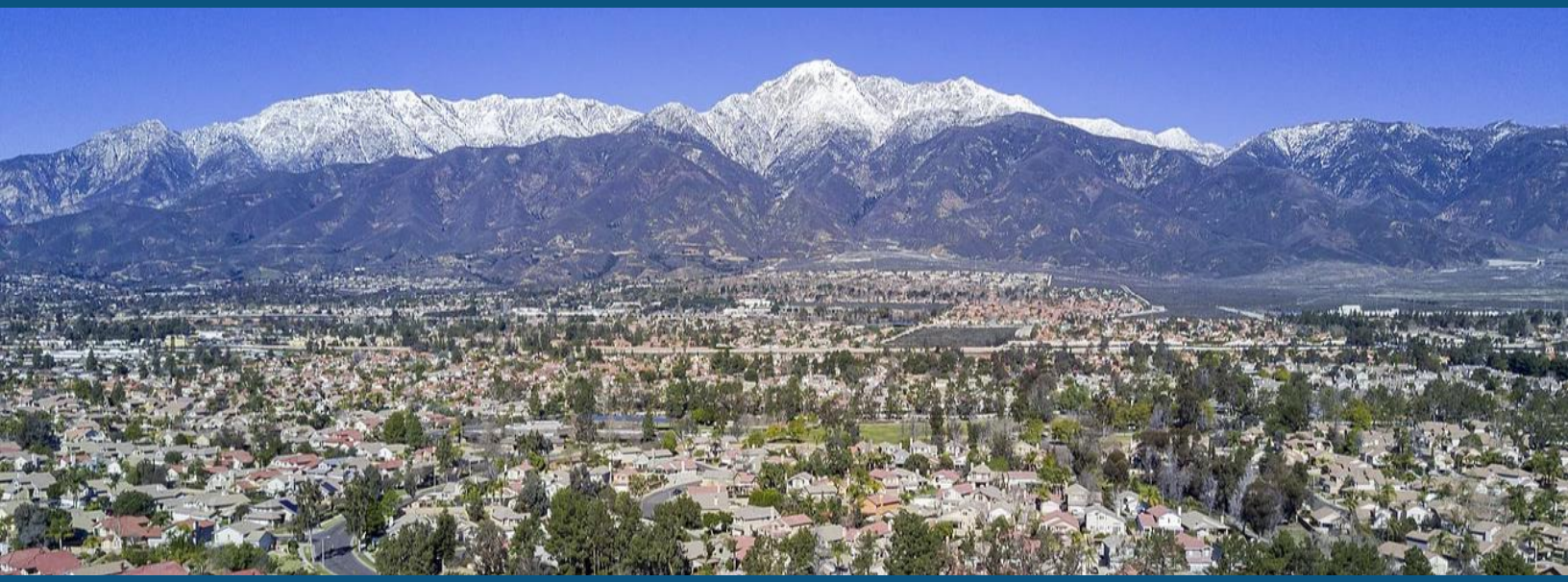
June 2021

K/J 2044518*00

Revision 1, December 2021

2020 Urban Water Management Plan

FINAL



Kennedy Jenks

Kennedy Jenks

300 N. Lake Ave, Suite 1020
Pasadena, CA 91101
626-568-4300

2020 Urban Water Management Plan
FINAL

29 June 2021



6/29/2021

Prepared for

Inland Empire Utilities Agency
6075 Kimball Avenue
Chino, CA 91708

KJ Project No. 2044518.00

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Acronyms

The following abbreviations and acronyms are used in this report.

°F	degree Fahrenheit
µg/L	micrograms per liter
%	percent
1,1-DCE	1,1-dichloroethene
1,2,3-TCP	1,2,3-Trichloropropane
AB	Assembly Bill
Act	Urban Water Management Planning Act
AF	acre-feet
AFY	acre-feet per year
Agency	Inland Empire Utilities Agency
AWE	Alliance for Water Efficiency
AWPF	Advanced Water Purification Facility
BMP	best management practice
CBFIP	Chino Basin Facilities Improvement Program
CBWCD	Chino Basin Water Conservation District
CBWM	Chino Basin Watermaster
CCAP	Climate Change Action Plan
CCR	California Code of Regulations
CCWRF	Carbon Canyon Water Recycling Facility
CDA	Chino Basin Desalter Authority
cfs	cubic feet per second
Chino Basin	Chino Groundwater Basin
CII	Commercial, Industrial, and Institutional
CIM	California Institution for Men
CIMIS	California Irrigation Management Information System
CRA	Colorado River Aqueduct
CUWCC	California Urban Water Conservation Council
CVWD	Cucamonga Valley Water District
CWC	California Water Code
DAC	Disadvantaged Community
DCP	Drought Contingency Plan
DDW	State Water Resources Control Board Division of Drinking Water
Delta	Sacramento-San Joaquin Delta

Acronyms (cont'd)

DMM	Demand Management Measure
DRA	Drought Risk Assessment
DWR	Department of Water Resources
EDU	equivalent service unit
EPA	U.S. Environmental Protection Agency
EMP	Energy Management Plan
ETo	evapotranspiration
Freon 39	dichloromethane
FWC	Fontana Water Company
FY	Fiscal Year
GMZ	Groundwater Management Zone
GPCD	gallons per capita per day
HAL	Health Advisory Level
HET	high efficiency toilet
IEBL	Inland Empire Brine Line
IEUA	Inland Empire Utilities Agency
IRP	Integrated Water Resources Plan
IRP Model	2020 IRP Regional Water Supply Infrastructure Model
IX	ion exchange
JPA	Joint Powers Authority
kWh	kilowatt-hour
LEAP	Landscape Evaluation and Audit Program
LRP	Local Resources Program
LUBDM	Land Use-Based Demand Model
M&I	municipal and industrial
MAF	million acre-feet
MCL	maximum contaminant level
Metropolitan	Metropolitan Water District of Southern California
MG	million gallons
mg/L	milligrams per liter
MGD	million gallons per day
MHI	Median Household Income
MOU	Memorandum of Understanding
MVWD	Monte Vista Water District
MWD	Metropolitan Water District of Southern California
MWELO	Model Water Efficiency Landscape Ordinance

Acronyms (cont'd)

NDMA	N-Nitroso dimethylamine
NDEA	N-Nitrosodiethylamine
ng/L	nanograms per liter
NL	Notification Level
No.	number
NPDES	National Pollutant Discharge Elimination System
NRWS	non-reclaimable wastewater system
NTC	National Theater for Children
OBMP	Optimum Basin Management Program
OBMPU	Optimum Basin Management Program Update
OCSD	Orange County Sanitation District
OSY	Operating Safe Yield
OWOW	“One Water One Watershed”
PCE	tetrachloroethene
pCi/L	picocuries per liter
PFAS	poly- and per-fluorinated compounds
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PHG	Public Health Goal
Plan	Urban Water Management Plan
ppm	parts per million
ppt	parts per trillion
PRV	Pressure Regulating Valve
RO	reverse osmosis
RP	Recycling Plant
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RUWMP	Regional Urban Water Management Plan
RWIP	Recycled Water Implementation Plan
RWQCB	Regional Water Quality Control Board
RWPS	Recycled Water Program Strategy
SARWQCB	Santa Ana Regional Water Quality Control Board
SAWCo	San Antonio Water Company
SAWPA	Santa Ana Watershed Project Authority
SB	Senate Bill
SBCFCD	San Bernardino County Flood Control District
SBX7-7	Senate Bill 7 of Special Extended Session 7 aka Water Conservation Act of 2009

Acronyms (cont'd)

SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCWS	SoCal Water Smart
SGMA	Sustainable Groundwater Management Act
SWP	State Water Project
TAF	thousand acre-feet
TAZ	Transportation Analysis Zone
TCE	trichloroethylene
TDS	Total Dissolved Solids
TYCIP	Ten-Year Capital Improvement Plan
TYF	Ten-Year Forecast
UWMP	Urban Water Management Plan
UWMP Act	Urban Water Management Planning Act of 1983
VOC	volatile organic compound
Watermaster	Chino Basin Watermaster
WFA	Water Facilities Authority
WSAP	Water Supply Allocation Plan
WSCP	Water Shortage Contingency Plan
WUE	Water Use Efficiency
WUEBP	Water Use Efficiency Business Plan
WVWD	West Valley Water District

Section 1: Introduction/Lay Person Description

1.1 Overview

This document presents the 2020 Urban Water Management Plan (UWMP, Plan) for the Inland Empire Utilities Agency (IEUA or Agency) wholesale water service area. This section describes the general purpose of the Plan, discusses Plan implementation, and provides general information about IEUA and service area characteristics.

The State of California mandates that all urban water suppliers within the state prepare an UWMP. Detailed information on what must be included in these plans, as well as whom must complete them can be found in California Water Code (CWC) sections 10610 through 10657. According to the Urban Water Management Planning Act (UWMP Act) of 1983, an urban water supplier is defined as a supplier, either public or private, that provides water for municipal purposes either directly or indirectly to more than 3,000 customers or supplies more than 3,000 acre-feet (AF) annually. Urban water suppliers are required to prepare, adopt, and file an UWMP with the California Department of Water Resources (DWR) every 5 years. The 2020 UWMP updates are due to DWR by July 1, 2021.

1.2 Purpose

An UWMP is a planning tool that generally guides the actions of urban water suppliers. It provides managers and the public with a broad perspective on a number of water supply issues. It is not a substitute for project-specific planning documents, nor was it intended to be when mandated by the State Legislature. For example, the Legislature mandated that a plan include a section which "…describes the opportunities for exchanges or water transfers on a short-term or long-term basis." [Wat. Code, § 10631, subd. (d)]. The identification of such opportunities and the inclusion of those opportunities in a plan's general water service reliability analysis neither commits an urban water supplier to pursue a particular water exchange/transfer opportunity, nor precludes it from exploring exchange/transfer opportunities never identified in its plan. Before an urban water supplier is able to implement any potential future sources of water supply identified in a plan, detailed project plans are prepared and approved, financial and operational plans are developed, and all required environmental analysis is completed.

"A plan is intended to function as a planning tool to guide broad-perspective decision making by the management of water suppliers." [Sonoma County Water Coalition v. Sonoma County Water Agency (2010) 189 Cal. App. 4th 33, 39.] It should not be viewed as an exact blueprint for supply and demand management. Water management in California is not a matter of certainty and planning projections may change in response to a number of factors. "[L]ong-term water planning involves expectations and not certainties. Our Supreme Court has recognized the uncertainties inherent in long-term land use and water planning and observed that the generalized information required . . . in the early stages of the planning process are replaced by firm assurances of water supplies at later stages." (Id., at 41.) From this perspective, it is appropriate to look at the UWMP as a general planning framework, not a specific action plan. It is an effort to generally answer a series of planning questions such as:

- What are the potential sources of supply and what amounts are estimated to be available from them?

- What is the projected demand, given a reasonable set of assumptions about growth and implementation of water management practices?

- How do the projected supply and demands compare and relate to each other?

Using these "framework" questions and resulting answers, the implementing agency will pursue feasible and cost-effective options and opportunities to develop long-term supplies and sustainably meet demands.

Water suppliers can explore enhancing basic supplies from traditional sources such as local groundwater and imported water, as well as other options. These include groundwater extraction, water exchanges and transfers, water conservation, recycling, brackish water desalination, and water banking/conjunctive use. Additional specific planning efforts may be undertaken in regard to each option, involving detailed evaluations of how each option would fit into the overall supply/demand framework, potential environmental impacts, and how each option would affect customers.

The UWMP Act requires preparation of a plan that, among other things:

- Accomplishes water supply planning over a 20-year period in 5-year increments. (IEUA is going beyond the requirements of the Act by developing a plan which spans 25 years.)

- Identifies and quantifies existing and projected water supply opportunities, including recycled water, for existing and future demands, in normal, single-dry, and multiple-dry years.

- Implements conservation and efficient use of urban water supplies.

Additionally, Senate Bill (SB) 7 of Special Extended Session 7 (SBX7-7) was signed into law in November 2009, which calls for progress towards a 20 percent (%) reduction in per capita water use statewide by 2020. SBX7-7, otherwise referred to as the Water Conservation Act of 2009, requires each urban retail water supplier to develop and report a water use target in its 2010 UWMP, and to develop and report an interim 2015 water use target, baseline daily per capita use, and 2020 compliance daily per capita use, along with the basis for determining those estimates. Beginning in 2016, retail water suppliers were required to comply with the water conservation requirements in SBX7-7 in order to be eligible for State water grants or loans. Water suppliers have the ability to revisit the SBX7-7 baseline and water use targets determined in the 2010 UWMPs and update them in the 2020 UWMP.

In addition to the relatively new requirements of SBX7-7, a number of other changes to the Water Code have been enacted since 2010 which apply to the preparation of the 2020 Plan. These changes include:

- UWMP Submittal Date: 2020 UWMP updates must be adopted and submitted to DWR by July 1, 2021.
- Reporting on Compliance with SBX7-7 Targets: The 2020 UWMP will be required to document compliance with the 20% reduction described in the 20 by 2020 Water Conservation Plan, and a comparison of actual water use against the target.
- 5-year Drought Risk Assessment: In past UWMPs, suppliers were to conduct a drought risk assessment assuming a period of drought lasting 3 consecutive years. This requirement has changed, and suppliers must now assess a drought lasting 5 years.
- Sustainable Groundwater Management Act (AB 1739, SB1168, and SB1319): Requires UWMPs to show consistency with Groundwater Sustainability Plan (GSP) supply protections, if applicable.
- Seismic Risk Assessment (SB 664): If applicable, requires an urban water supplier to include within its plan a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities.
- Water Shortage Contingency Plan (WSCP) Updates: State requirements call for an update to the existing WSCP and that it be formally adopted as a stand-alone plan. The WSCP must be updated in parallel with the UWMP.
- Making Water Conservation a California Way of Life [Assembly Bill (AB) 1668 and SB 606]: Regulations targeting indoor water demand and affecting the need for additional water use efficiency in the State.
- Annual Water Supply and Demand Assessments: Assessments will be required, starting June 2022, and the process to do the assessment must be described in the 2020 UWMP.
- Items optional in the past, but now required, include: calculating the energy intensity of water, incorporation of land use changes in demand forecasting, and estimating water savings from codes and standards.

A checklist to ensure compliance of this Plan with the UWMP Act requirements is provided in Appendix A.

1.3 IEUA UWMP Preparation

In accordance with the CWC, urban water suppliers with 3,000 or more service connections, or supplying 3,000 or more acre-feet of water per year (AFY), are required to prepare a UWMP every 5 years. The 2020 UWMP must be approved and submitted to DWR by July 1, 2021.

This 2020 UWMP is an update of IEUA's portion of the IEUA and Water Facilities Authority (WFA) 2015 UWMP. In 2015, IEUA prepared a Regional UWMP (RUWMP) in collaboration with WFA, a wholesale supplier of imported water (State Water Project water) purchased from Metropolitan Water District of Southern California (MWD or Metropolitan) via IEUA. WFA provides services to five retail agencies that are encompassed within IEUA's service area, including the Cities of Chino, Chino Hills, Ontario, Upland, and Monte Vista Water District (MVWD). This 2020 Wholesale UWMP was not prepared as an RUWMP and was developed by IEUA individually in coordination with its retail agencies.

While this 2020 UWMP provides water demand, water supply, and supply reliability assessment for the entire IEUA region, all requirements of the CWC for each of IEUA's retail agencies will be met through each retail agency's individual 2020 UWMP. Additionally, as reported in the 2015 UWMP, IEUA formed a regional alliance consisting of seven of its retail agencies (all retail agencies excluding SAWCo and WVWD) to comply with SB x7-7 goals. The regional alliance will also allow IEUA and its retail agencies to continue to cooperatively participate in developing Water Use Efficiency (WUE) programs and meeting water conservation goals. Table 1-1 identifies this as an individual UWMP prepared by IEUA. Table 1-2 indicates that IEUA is a wholesale supplier.

A water supplier may report on a fiscal year or calendar year basis but must clearly state in its UWMP the type of year that is used for reporting. The type of year should remain consistent throughout the Plan. All data in this Plan is reported in fiscal years and volumes are reported in AF, as shown in Table 1-2.

Table 1-1: DWR Plan Identification (DWR Table 2-2)

Select Only One	Type of Plan	Name of RUWMP or Regional Alliance if applicable
X	Individual UWMP	
	Water Supplier is also a member of a RUWMP	
	Water Supplier is also a member of a Regional Alliance	
	RUWMP	

Notes:

Table 1-2: DWR Supplier Identification (DWR Table 2-3)

	DWR Supplier (select one)
X	Supplier is a wholesaler
	Supplier is a retailer
	Fiscal or Calendar Year (select one)
	UWMP Tables are in calendar years
X	UWMP Tables are in fiscal years
If using fiscal years provide month and date that the fiscal year begins (mm/dd)	
	07/01
	Units of measure used in UWMP
	AF

1.3.1 Relationship to Other Planning by IEUA

IEUA has developed plans to expand and provide an adequate water supply for its retail agencies. The plans include:

- 2020 Water Use Efficiency Business Plan (WUEBP) – The WUEBP is updated every 5 years with input from IEUA's regional WUE partners to increase regional sustainability through using water more efficiently, eliminating water waste, and drought-proofing the region through increased use of recycled water, groundwater, stormwater, and other local water supplies. The 2020 WUEBP is currently in development and will provide updated analyses and recommended methods to improve efficiency and achieve regional sustainability.

- 2020 Regional Drought Contingency Plan (DCP) – The DCP was developed to define regional shortage conditions, identify vulnerabilities, build resiliency through mitigation and response actions, and facilitate consistent communication within the service area while ensuring equity and fairness. The DCP was also developed to support the needs of the WSCP, a requirement of this 2020 UWMP.

- 2015 Integrated Water Resources Plan (IRP) and 2020 Modeling – The IRP and modeling was conducted to support regional and local water supply planning by assessing water supply vulnerabilities and evaluate collaborative infrastructure and management strategies to increase water supply resiliency in the region.

- 2018 Climate Change Action Plan (CCAP) – The CCAP was developed to identify local impacts of climate change and lay the groundwork for projects and management practices that will allow IEUA to continue providing reliable services to the region while remaining a steward to the environment.

- 2015 Recycled Water Program Strategy (RWPS) Report – The purpose of the RWPS Report was to update recycled water Direct Use demand projections and changes to IEUA's groundwater recharge program, as well as investigate operational changes to the recycled water conveyance system as a result of increasing reuse of the recycled water supply availability.

- 2015 Energy Management Plan (EMP) – The EMP analyzed historical energy usage, established a current energy and Greenhouse Gas emissions baseline, forecasted future demand, examined procurement strategies, and explored measures to ease IEUA's energy load while cultivating a reliable and sustainable energy infrastructure across its facilities.

1.3.2 Relationship to Water Shortage Contingency Plan

Several elements of the 2020 UWMP, especially Section 7, Reliability Planning, and Section 8, Demand Management Measures, are coordinated with the WSCP which is a separate document. The WSCP is a detailed plan of how IEUA intends to act in the case of water shortage conditions. The WSCP identifies specific response actions that align with six standard

water shortage levels. The information in the WSCP was prepared using the information developed in the 2020 DCP. The 2020 WSCP is included in Appendix B.

1.4 Structure and Organization of the Plan

The content presented in this UWMP corresponds to the outline of the Act, specifically Article 2, Contents of Plans, which correspond to the CWC Sections 10631, 10632, and 10633. The organization of the report differs slightly from the DWR UWMP Guidebook's organization in order to reflect the unique characteristics of IEUA's systems, as well as to be as consistent as possible with IEUA's IRP and Water Use Efficiency Business Plan. This UWMP is organized as follows:

- Section 1 – Introduction
- Section 2 – Water Demands
- Section 3 – SBX7-7 Baseline and Targets
- Section 4 – Water Resources
- Section 5 – Recycled Water and Reuse
- Section 6 – Water Quality
- Section 7 – Reliability Planning
- Section 8 – Demand Management Measures
- Section 9 – Energy Intensity Reporting
- Section 10 – Seismic Risk Assessment

The UWMP Checklist has been completed, which identifies the location of the UWMP Act requirements in this UWMP and is included in Appendix A.

1.5 System Description

IEUA was formed as a municipal water district by popular vote of its residents in June 1950 to become a member agency of MWD for the purpose of importing water to its retail agencies. IEUA has significantly expanded its water and wastewater utility services since 1950 to also include wastewater treatment, recycled water production and distribution, co-composting of green waste and municipal biosolids, desalination of brackish water, and disposal of non-reclaimable industrial wastewater and brine. IEUA is governed by a five-member Board of Directors. Each Director is publicly elected for a 4-year term and represents one of the five divisions:

- Division 1 – Upland, Montclair, portion of Ontario, and portion of Rancho Cucamonga.
- Division 2 – Ontario, portion of Chino, and portion of Fontana.

- Division 3 – Chino and Chino Hills.
- Division 4 – Fontana, portion of Rialto, and portion of Bloomington.
- Division 5 – Rancho Cucamonga and portion of Fontana.

2021 IEUA Board members are:

- Marco Tule – Director, Division 1.
- Paul Hofer – Director, Division 2.
- Steven Elie – Secretary/Treasurer, Division 3.
- Jasmin Hall – President, Division 4.
- Michael Camacho – Vice President, Division 5.

IEUA owns and operates four regional water recycling plants in its service area: Regional Water Recycling Plant Number (No.) 1, Regional Water Recycling Plant No. 4, Regional Water Recycling Plant No. 5, and the Carbon Canyon Water Recycling Facility (RP-1, RP-4, RP-5, and the CCWRF). IEUA's regional recycled water plants produce disinfected, tertiary treated recycled water in compliance with California's Title 22 regulations. Wastewater is collected with regional wastewater interceptors and two non-reclaimable wastewater pipeline systems. Biosolids produced at the water recycling plants are handled by three facilities: RP-1 Solids Handling Facility, Regional Water Recycling Plant No. 2 (RP-2) Solids Handling Facility, and the Inland Empire Regional Composting Facility. IEUA owns and operates sewer lines and recycled water pipelines. The recycled water systems include pump stations, reservoirs, and pressure regulating stations to serve numerous pressure zones. IEUA also operates groundwater recharge facilities in cooperation with the Chino Basin Watermaster (CBWM or Watermaster), San Bernardino County Flood Control District (SBCFCD), and the Chino Basin Water Conservation District. The Chino I Desalter is managed by IEUA under an agreement with the Chino Basin Desalter Authority (CDA). IEUA does not own or operate drinking water facilities.

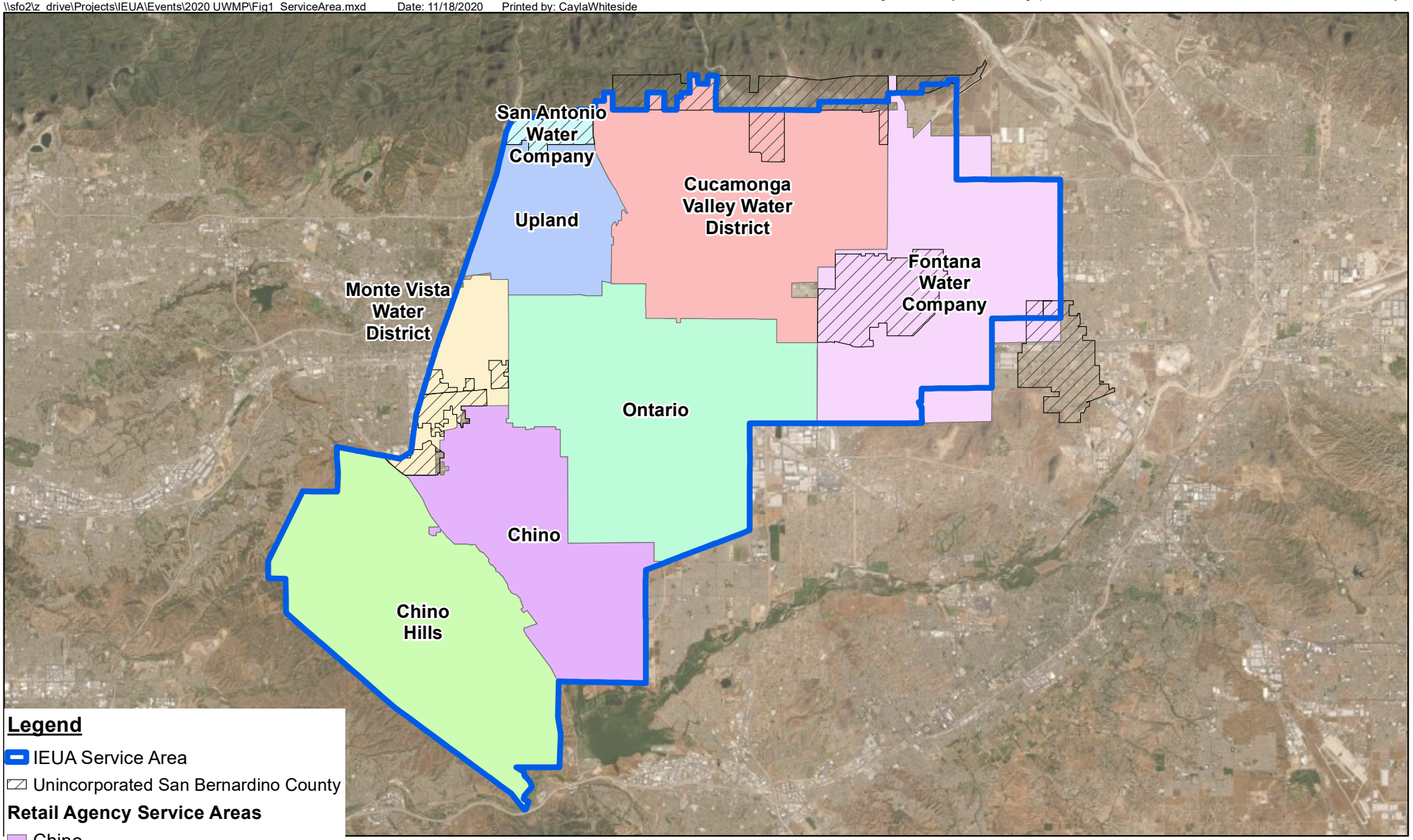
1.5.1 Service Area

IEUA provides a number of services for the southwestern section of San Bernardino County in the Santa Ana River Watershed. The IEUA service area almost entirely overlies the Chino Groundwater Basin (Chino Basin). The 242-square mile service area encompasses the Chino Basin which consists of a relatively flat alluvial valley from east to west and slopes from north to south at a 1 to 2% grade. Valley elevation ranges from about 2,000 feet above sea level in the foothills below the San Gabriel Mountains to about 500 feet near Prado Dam. Figure 1 shows the IEUA service area and its retail agencies.

IEUA's service area population has grown quickly in the past decade and is expected to increase in the future. The region's growth underlies the need for careful water resources planning and management to ensure adequate water supplies and address water quality challenges.

\\sfo2\z_drive\Projects\IEUA\Events\2020 UWMP\Fig1_ServiceArea.mxd Date: 11/18/2020 Printed by: CaylaWhiteside

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

- IEUA Service Area
- Unincorporated San Bernardino County

Retail Agency Service Areas

- Chino
- Chino Hills
- Cucamonga Valley Water District
- Fontana Water Company
- Monte Vista Water District
- Ontario
- San Antonio Water Company
- Upland

N

0 12,500 25,000

Scale: Feet

Kennedy Jenks

Inland Empire Utilities Agency
Chino, CA

IEUA & Retail Agency Service Areas

K/J 2044518*00
November 2020

Figure 1

1.5.2 Retail Agencies

The IEUA service area consists of the cities of Chino, Chino Hills, Montclair, Upland, Ontario, Rancho Cucamonga, and Fontana, and unincorporated areas within San Bernardino County. There are nine retail water agencies within IEUA's service area which are described in Table 1-3. Two of IEUA's retail water agencies, (Fontana Water Company (FWC) and Cucamonga Valley Water District (CVWD)) purchase untreated water directly from IEUA and provide their own treatment. Five of IEUA's retail water agencies purchase treated water from WFA. WFA purchases untreated imported water from IEUA, treats and delivers the water to the cities of Chino, Chino Hills, Ontario, Upland, and MVWD. IEUA also provides wastewater services to seven agencies including the cities of Chino, Chino Hills, Fontana, Montclair, Ontario, Upland, and CVWD in the city of Rancho Cucamonga.

Table 1-3: IEUA Retail Agencies

Agency Name	Description
City of Chino	The City of Chino serves water to a population of approximately 74,000 in the City and some unincorporated areas in San Bernardino County.
City of Chino Hills	The City of Chino Hills provides water to a population of approximately 77,600 in the City within its 46 square mile service area that also includes small portions of Chino and Pomona.
Cucamonga Valley Water District	CVWD is a special district that provides water to approximately 200,460 residents within a 47-square mile area comprised mainly of the City of Rancho Cucamonga. CVWD also provides water to small portions of the cities of Upland, Ontario, Fontana, and unincorporated areas of San Bernardino County.
Fontana Water Company	Fontana Water Company is a retail investor-owned utility company that provides water to approximately 215,500 residents mainly in the City of Fontana, and also serves portions of the cities of Rancho Cucamonga and Rialto, outside the IEUA service area.
Monte Vista Water District	MVWD is a county water district that provides retail water services to a population of approximately 54,200 in the City of Montclair, portions of the City of Chino, and unincorporated areas of San Bernardino County between Chino, Ontario, and Pomona. MVWD is also a wholesale water supplier to the City of Chino Hills, providing up to 21 MGD of water.
City of Ontario	The City of Ontario supplies water to a population of approximately 168,780 in the city and some unincorporated areas of San Bernardino County. The City of Ontario also serves a small portion of the City of Rancho Cucamonga.
San Antonio Water Company	SAWCo is a mutual water company organized as a private non-profit corporation, with more than 70% of shares owned by municipalities. SAWCo wholesales surface water from San Antonio Creek and potable groundwater to Upland, Ontario, and irrigation customers.
City of Upland	The City of Upland encompasses 15 square miles and serves water to approximately 75,790 people.
West Valley Water District	WVWD is a retail water agency serving over 80,000 residents, some of which fall into an overlapping service area with IEUA. Through an assistance agreement, WVWD has the potential to receive imported water for up to 1,500 AFY through San Bernardino Valley Municipal Water District and MWD during supply outages, emergencies, or loss of local water supply through December 2035.

1.6 Population

The Southern California Association of Governments (SCAG) conducts a forecast process every 4 years to project growth in employment, population, and households at the regional, county, jurisdictional, and sub-jurisdictional levels for use in its Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and other planning documents. The forecasting process includes a review of US Census Bureau and California Department of Finance projections, development of key input assumptions, and meetings with all 197 local jurisdictions one-on-one to review the draft growth forecast. The growth forecast for population, household, and employment are developed for the years 2020, 2030, 2035, and 2045. The preliminary range of growth figures are produced first at the county level and then refined to smaller areas, called city and transportation analysis zones (TAZs), which are then released to local jurisdictions for comments and input. Once the growth forecasts for these TAZs are finalized, they are adopted by the Regional Council.

The 2020 SCAG RTP/SCS data and associated TAZs for San Bernardino County were obtained and used to calculate the current and projected population within IEUA's service area. A geospatial analysis was used to identify the TAZs within the IEUA service area and the population associated with each of these zones was summed to find the total population within IEUA's service areas for the years provided by SCAG. It should be noted that the FWC is only partially within the service area and only the population within IEUA's service boundary is considered in this UWMP. For 2025 and 2040, the population value was interpolated between the years provided before and after.

From these calculations, IEUA's service area currently serves a population of approximately 906,046 in 2020 and has an expected growth rate of approximately 0.90% per year. With this growth rate, IEUA's service area is expected to reach a population of 1,119,568 in 2045. Table 1-4 shows the projected population for every 5 years from 2020 through 2045. Table 1-4 is equivalent to DWR Table 3-1; all tables within the Plan that are DWR Standardized Tables have the DWR Table number in parentheses in the title. All completed DWR Standardized Tables are included in Appendix C.

Table 1-4: IEUA Population – Current and Projected (DWR Table 3-1)

Population Served	2020	2025	2030	2035	2040	2045
	906,046	945,849	987,401	1,031,771	1,074,773	1,119,568

Note: Population projections calculated using the 2020 Southern California Association of Governments population forecast.

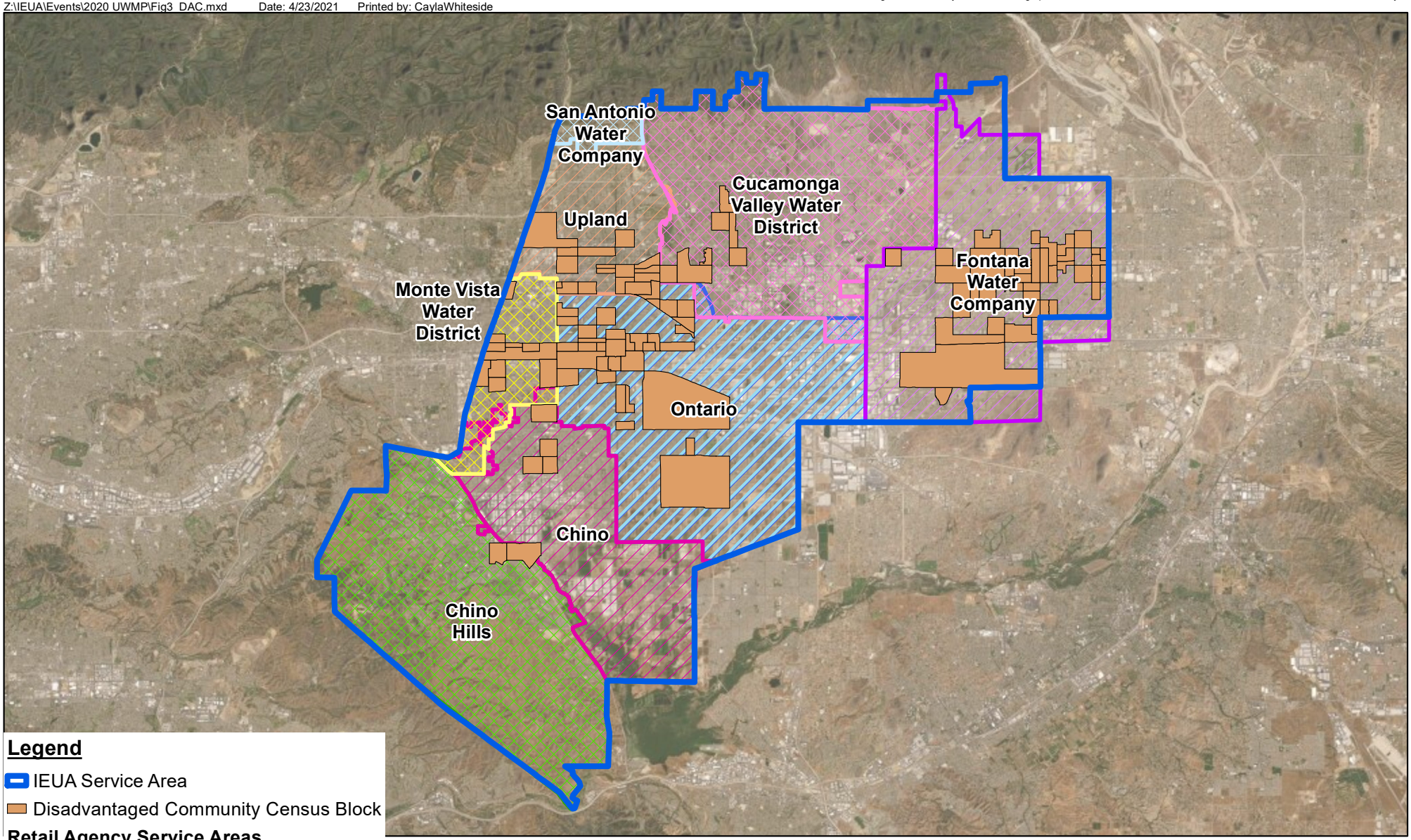
1.7 Demographics and Socioeconomics

Approximately 25% of the IEUA service area population is considered a designated disadvantaged community (DAC) based on the American Community Survey Median Household Income (MHI) data. Census tracts are determined to be disadvantaged when the average household income is 80% or less than statewide median household income. The city of Montclair is a DAC, as is a large portion of the FWC's service area. There are also additional census tract areas that are designated as disadvantaged communities based on the MHI

throughout the service area, primarily between HWY 10 and Mission Boulevard in the cities of Ontario and Montclair and between HWY 10 and HWY 66 in Rancho Cucamonga and Upland. The disadvantaged communities in the region are shown on Figure 2.

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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

- IEUA Service Area
- Disadvantaged Community Census Block

Retail Agency Service Areas

- Chino
- Chino Hills
- Ontario
- Cucamonga Valley Water District
- Fontana Water Company
- Monte Vista Water District
- San Antonio Water Company
- Upland

Source: Department of Water Resources' Disadvantaged Communities Mapping Tool using U.S. Census (American Community Survey) 2018 data.

N

0 12,500 25,000

Scale: Feet

Kennedy Jenks

Inland Empire Utilities Agency
Chino, CA

Disadvantaged Community Areas

K/J 2044518*00
April 2021
Figure 2

1.8 COVID-19 Impacts

As with most water service agencies in the state of California, the COVID-19 pandemic beginning in fiscal year 19/20 period impacted IEUA and its service area's operations. Transitions were made to remote or virtual activities where possible, and some capital improvement projects experienced delays until proper safety attire, such as masks, could be secured to ensure work could be continued safely. Some in-person public outreach and education events were cancelled. In addition, IEUA deferred its equivalent service unit (EDU) rate for 12 months and held water connection fees constant to compensate for the economic downturn and job loss in its service area. On May 6, 2020, the IEUA Board voted to defer the increase in sewer EDU rates established in Resolution No. 2019-11-2; the sewer EDU rate increase will be deferred 12 months, until July 1, 2021. IEUA held water connection fees constant from fiscal year 19/20 to fiscal year 20/21 as outlined in Resolution No. 2020-7-11. IEUA remains considerate of the continuation of the ongoing impacts of the pandemic and how it may impact future activities and operations.

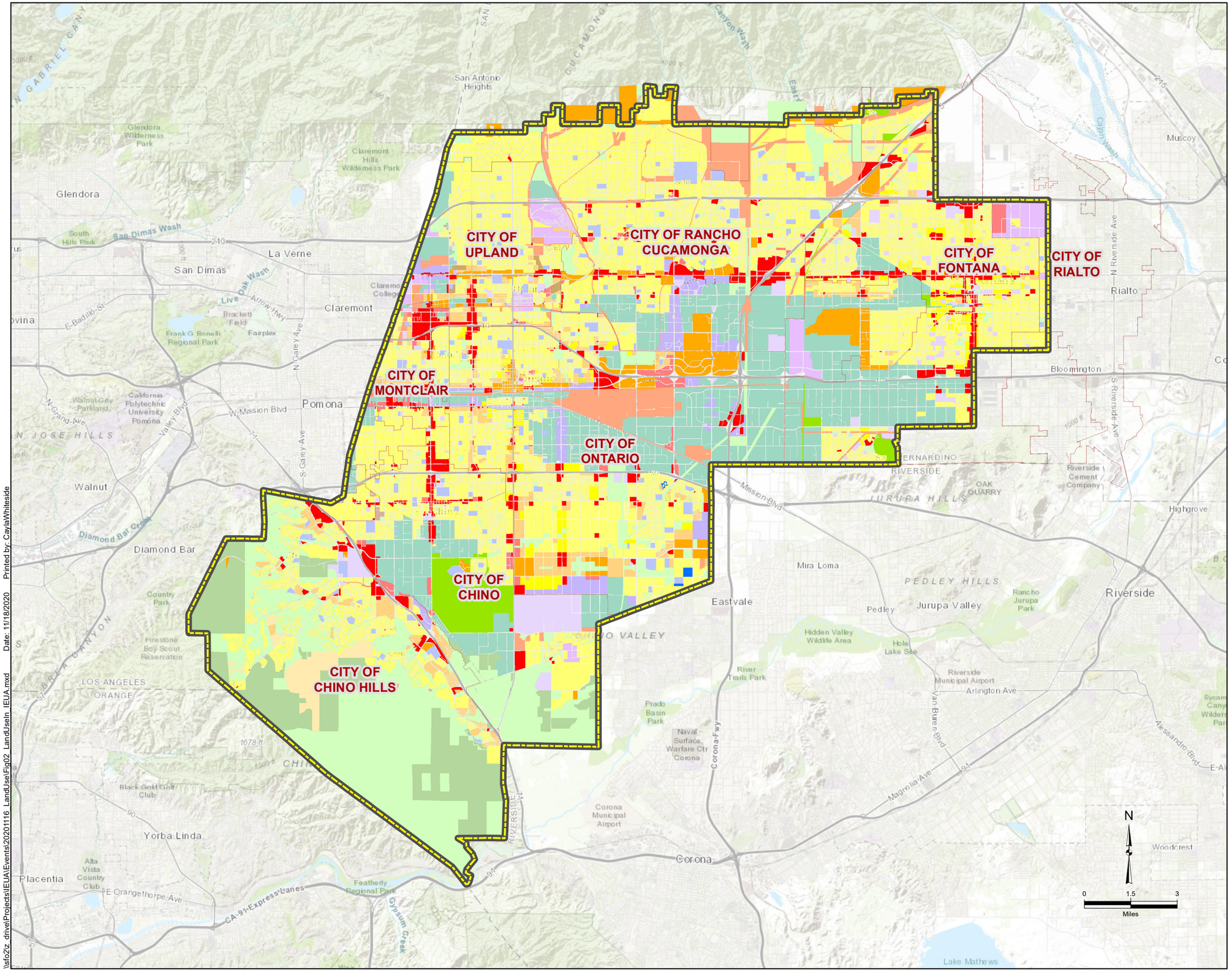
1.9 Land Use in the Service Area

When IEUA was formed in 1950, its service area was primarily field crops, citrus, and vineyards with a total urban area land use of less than 8%. Since 1950, urban areas have expanded significantly and replaced most agricultural land in the northern and central portions of the Chino Basin. The conversion of agricultural land to urban development is anticipated to continue within the Chino Basin.

SCAG's 2020 RTP/SCS includes land use information. The SCAG worked with the region's 197 local jurisdictions to refine their land use dataset that was drafted in 2016. The most recent update was finalized on April 29, 2020. The land use dataset includes general plan land use, specific plan land use, zoning code, and existing land use. Figure 3 shows the land use code present in the IEUA service area. The majority of the service area is comprised of single family residential, industrial, and commercial areas. There are also large areas of open space in the service area, such as the Chino Hills State Park.

The 2015 Land Use Based Demand Model evaluated the existing and planned land uses within the service area out to 2040. The future land uses were calculated based on the general plans for each city in the service area using city spheres of influence as boundaries to prevent overlap. Residential land use is expected to have the largest growth, approximately 31% by 2040. Medium, high, and very high-density residential land uses are projected to increase more than low and very low-density residential land use. Industrial land use is projected to grow at 20%, while vacant land will decrease 98%and agriculture use will decrease by 96%.

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



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Legend

- IEUA Service Area

Land Use

- Agriculture
- Commercial and Services
- Education
- Facilities
- General Office
- Industrial
- Mixed Commercial and Industrial
- Mixed Residential
- Mixed Residential and Commercial
- Mobile Homes and Trailer Parks
- Multi-Family Residential
- Open Space and Recreation
- Rural Residential
- Single Family Residential
- Specific Plan
- Transportation, Communications, and Utilities
- Undefined
- Undevelopable or Protected Land
- Water

Source:

Southern California Association of Government's 2020 Land Use GIS Dataset. Updated April 29, 2020.

Kennedy Jenks

Inland Empire Utilities Agency
Chino, CA

Land Use in IEUA Service Area

K/J 2044518*00
November 2020

Figure 3

1.10 Climate

IEUA is located within the South Coast Air Basin (SCAB) that encompasses all of Orange County and the urban areas of Los Angeles, San Bernardino, and Riverside counties. The SCAB climate is characterized as "Mediterranean" with a semi-arid environment with mild winters, warm summers, and moderate rainfall. The average annual rainfall in the IEUA water service area is approximately 15 inches, most of which occurs during the winter months.

Temperatures range in average from 41 to 67 degrees Fahrenheit (°F) during the winter and from 60 to 90°F degrees during the summer. Table 1-5 presents the region's annual average climate data. The temperature, rainfall, and standard monthly average evapotranspiration (ETo) is provided by the California Irrigation Management Information System (CIMIS) Station Number 78 in Pomona.

Table 1-5: IEUA Service Area Annual Climate

Month	Standard Monthly Average Evapotranspiration (ETo) (inches)	Average Total Rainfall (inches)	Average Temperature (degrees Fahrenheit)	
			Max	Min
January	1.97	3.22	67.46	42.29
February	2.36	3.34	68.03	42.91
March	3.67	2.16	70.13	45.21
April	4.68	1.10	73.20	47.24
May	5.22	0.40	76.10	51.71
June	5.90	0.18	81.95	56.38
July	6.61	0.09	87.56	60.34
August	6.49	0.16	89.31	60.36
September	4.96	0.45	87.17	58.41
October	1.74	0.84	80.07	52.75
November	2.35	1.06	73.32	45.86
December	1.78	2.41	66.74	40.98

Source: California Irrigation Management System (CIMIS) data provided from Station No. 78 in Pomona, Los Angeles County, March 14, 1989 to October 31, 2020 http://wwwcimis.water.ca.gov/cimis/welcome.jsp.

1.11 Potential Effects of Climate Change

1.11.1 Overview

The topic of growing interest and research for water planners and managers is climate change and the potential impacts it could have on California's future water supplies. DWR's California Water Plan considers how climate change may affect water availability, water use, water quality, and the ecosystem. The California Water Plan Update 2018 builds upon previous updates and provides recommended actions, funding scenarios, and an investment strategy to meet the challenges and goals laid out in the prior 2013 Plan.

Chapter 3 of the California Water Plan, "Actions for Sustainability", and Volume 1, Chapter 5 of the California Water Plan, "Managing an Uncertain Future," evaluated three different scenarios of future water demand based on alternative but plausible assumptions on population growth, land use changes, water conservation and future climate change (DWR 2019). Future updates

will test different response packages, or combinations of resource management strategies, for each future scenario. These response packages help decision-makers, water managers, and planners develop integrated water management plans that provide for resource sustainability and investments in actions with more sustainable outcomes. The 2018 Update provides recommended actions in order to support each of the identified goals of the plan. The goals are 1) Improve Integrated Watershed Management, 2) Strengthen Resiliency and Operational Flexibility of Existing and Future Infrastructure, 3) Restore Critical Ecosystem Functions, 4) Empower California's Under-Represented or Vulnerable Communities, 5) Improve Inter-Agency Alignment and Address Persistent Regulatory Challenges, and 6) Support Real-Time Decision-Making, Adaptive Management, and Long-Term Planning (DWR 2019).

California faces the prospect of additional water management challenges due to a variety of issues including population growth, regulatory restrictions, and climate change. Climate change is of particular interest because of the range of possibilities and their potential impacts on essential operations. The most likely scenarios involve increased temperatures, which will reduce the Sierra Nevada snowpack and shift more runoff to winter months, and accelerated sea level rise. The other much-discussed climate change scenario is an increase in precipitation variability, with more extreme drought and flood events posing additional challenges to water managers (DWR 2014). Even without population changes, water demand could increase. Precipitation and temperature influence water demand for outdoor landscapes and irrigated agriculture. Lower spring rainfall increases the need to apply irrigation water. Further, warmer temperatures increase crop evapotranspiration, which increases water demand. Water-related resources that are considered important and potentially sensitive to future climate change include water demands, water supplies, water quality, sea level rise, flooding, and ecosystem and habitat.

1.11.2 IEUA Climate Change Vulnerabilities

Climate analysis conducted for the 2015 IRP suggests that temperatures within the IEUA service area will rise over the coming decades and that precipitation will continue to be highly variable, with no consensus on a trend towards wetter or drier conditions. It is therefore important to identify water management options that will ensure future demand can be met under a variety of different hydrologic circumstances. Despite uncertainty over the specific effect of climate change on IEUA's water supply, the various projections showed an overall tendency of future decreases in supply sources. The largest potential impact on supply is the vulnerability of imported water from the State Water Project (SWP), indicating a need to improve regional sustainability and decrease dependency on the SWP supply. The 2015 IRP analysis identified recycled water supplies as a critical asset in bolstering a flexible management portfolio since these supplies are generated locally and not impacted by climate. In conjunction with maximizing recycled water supplies, the 2015 IRP also found that the implementation of additional water use efficiency programs would bolster the resiliency of IEUA's water portfolio against climate impacts.

The 2020 Regional DCP also assessed climate change vulnerabilities within the regional's water supply sources. The DCP found that while precipitation variability is expected to align with historical trends, the wet years will likely be wetter and the dry years drier, exacerbating an already highly variable water supply reliability factor (DCP 2020). It is anticipated that the groundwater supply will be adversely impacted by increased temperatures and drought.

Groundwater elevation and water quality are both dependent upon rainfall and supplemental sources of recharge. Droughts similar to the 2011 to 2017 drought could significantly decrease natural groundwater recharge and an increased intensity of storm events could lead to an inability to capture and recharge stormwater (DCP 2020). Stormwater is a high-quality water source that can improve the quality of groundwater supplies once it has infiltrated and blended with the aquifer; a reduction in stormwater recharge could result in a degradation of groundwater quality. In addition, reduced rainfall and increased groundwater withdrawal may lead to more salinity buildup and increased concentrations of salt, nitrate, and other constituents, requiring the need for additional water supply for blending or investment in advanced treatment technologies (DCP 2020). Applications for recycled water in the basin become constrained if the salinity in the basin rises beyond the Regional Water Quality Control Board's (RWQCB's) specified limits.

The largest potential climate change impact on supply is the effect of shifting snowmelt and resulting runoff patterns on the SWP. The SWP's infrastructure was designed to capture snowmelt from the Sierra Nevada snowpack, and when snow melts during the spring and summer months, a combination of reservoirs and conveyance facilities provide a steady water supply throughout the year. The reservoirs were sized based on historical precipitation patterns, so with more precipitation falling as rain instead of snow in the winter months, more water will be required to be released from reservoirs and will not be available during the higher summer demand periods (DCP 2020). The reliability of imported SWP is expected to decrease as the changes in precipitation caused by climate change continue. This decrease in reliability indicates a need to improve regional sustainability and decrease dependency on the SWP supply. The 2015 IRP analysis identified recycled water supplies and WUE as a critical asset in bolstering a flexible management portfolio since these supplies are generated locally and not impacted by climate. In addition, MWD is considering investments in Delta conveyance to minimize potential SWP reductions and has developed a conceptual 150 million gallons per day (MGD) Regional Recycled Water program to further reduce climate change impacts on the SWP.

Local surface water is also an important resource for retail agencies within the IEUA service area. These supplies are dependent on precipitation and temperature, which are influenced by climate change. Extreme precipitation events can result in short periods with high volumes of runoff that will be difficult to capture, while extended droughts or dry years will result in long periods without these supplies. Higher temperatures will also cause more evaporation and transpiration, reducing the volume of water bodies such as lakes, as well as the amount of soil moisture. Reduced soil moisture means that soil may absorb and hold more water when rain occurs, which would reduce the amount of water flowing into creeks and streams.

The climate change effects and their potential to impact supply and demand are considered throughout this document.

1.12 Implementation of the Plan

This subsection provides a cooperative framework within which the Plan will be implemented including agency coordination, public outreach, and resources maximization.

1.12.1 Preparation of the Plan

IEUA's water supply planning relates to the policies, rules, and regulations of its regional and local water providers. IEUA's service area is dependent on imported water from MWD, its regional wholesaler. As such, this 2020 UWMP was developed from a wholesale perspective. While the Wholesale UWMP provides water demand, water supply, and supply reliability assessment for the service area, all requirements of the CWC for each of IEUA's retail agencies will be met through each retail agency's individual 2020 UWMP. This Plan was prepared at a wholesale level, in coordination with retail water agencies within IEUA's service area for consistency. Table 1-6 summaries the varying levels of contribution. Furthermore, IEUA regularly coordinates with retail and regional water agencies for the planning of this UWMP and other documents to support the long-term water planning and management for the region. A detailed description of regional water agency coordination is included in Section 1.13.

Table 1-6: Coordination with Appropriate Agencies

Agency Name	Participated in Plan Development	Commented on Draft	Attended Public Meetings	Sent Notice of Plan in Preparation[a]	Received Copy of Draft Plan[b]	Sent Notice of Intent to Adopt[a]	Received Copy of Adopted Plan[b]
City of Chino	Yes	No	No	Yes	Yes	Yes	Yes
City of Chino Hills	Yes	No	No	Yes	Yes	Yes	Yes
Cucamonga Valley Water District	Yes	No	No	Yes	Yes	Yes	Yes
Fontana Water Company	Yes	No	No	Yes	Yes	Yes	Yes
Monte Vista Water District	Yes	No	No	Yes	Yes	Yes	Yes
City of Ontario	Yes	No	No	Yes	Yes	Yes	Yes
San Antonio Water Company	No	No	No	Yes	Yes	Yes	Yes
City of Upland	Yes	No	No	Yes	Yes	Yes	Yes
West Valley Water District	No	No	No	Yes	Yes	Yes	Yes
Chino Basin Desalter Authority	No	No	No	Yes	Yes	Yes	Yes

Agency Name	Participated in Plan Development	Commented on Draft	Attended Public Meetings	Sent Notice of Plan in Preparation[(a)]	Received Copy of Draft Plan[(b)]	Sent Notice of Intent to Adopt[(a)]	Received Copy of Adopted Plan[(b)]
Chino Basin Water Master	No	Yes	No	Yes	Yes	Yes	Yes
Chino Basin Water Conservation District	No	No	No	Yes	Yes	Yes	Yes
Formation Commission for San Bernardino County	No	No	No	Yes	Yes	Yes	Yes
Metropolitan Water District	Yes	No	No	Yes	Yes	Yes	Yes
City of Montclair	No	No	No	Yes	Yes	Yes	Yes
San Bernardino County Flood Control District	No	No	No	Yes	Yes	Yes	Yes
San Bernardino County Planning Department	No	No	No	Yes	Yes	Yes	Yes
Santa Ana Watershed Project Authority	No	No	No	Yes	Yes	Yes	Yes
Santa Ana Regional Water Quality Control Board	No	No	No	Yes	Yes	Yes	Yes
Water Facilities Authority	Yes	No	No	Yes	Yes	Yes	Yes

Notes:

(a) IEUA sent notice of plan in preparation in November of 2020 and notice of intent to adopt in April 2021 to all retail agencies, except for WVWD; IEUA sent notice of preparation and notice of intent to adopt with WVWD in May 2021. Both notices are included in Appendix E.
(b) IEUA posted the draft 2020 UWMP to its website on 11 May 2021 and the adopted final 2020 UWMP to its website by July 1, 2021.

1.12.2 Plan Adoption and Amendment Process

IEUA began preparation of this Plan in October 2020. The final version of the Plan was adopted by IEUA Board on June 16, 2021 and submitted to DWR within 30 days of Board approval. The Board Resolution stating the adoption of the 2020 UWMP (Resolution No. 2021-6-10) is included in Appendix D.

Notification of IEUA's intent to amend the UWMP was posted on IEUA's website and provided to the relevant agencies at least 60 days prior to the public hearing. Table 1-7 lists the relevant water suppliers and agencies that IEUA sent a Letter of Notification on November 24 and 30, 2020 that it was in the process of preparing an updated UWMP. A copy of the Letter of Notification is included in Appendix E. A public hearing was held and the final amended UWMP was adopted by the IEUA Board on June 16, 2021 and submitted to DWR within 30 days of Board approval. The amended final UWMP was also submitted to the California State Library, City and County.

This plan includes all information necessary to meet the requirements of the Water Conservation Act of 2009 (Wat. Code, §§ 10608.12-10608.64) and the Urban Water Management Planning Act (Wat. Code, §§ 10610-10656).

Table 1-7: DWR Wholesale: Water Supplier Information Exchange (DWR Table 2-4)

Select One	Supplier
X	Supplier has informed more than 10 other water suppliers of water supplies available in accordance with Water Code Section 10631. Completion of the table below is optional. If not completed, include a list of the water suppliers that were informed.
	Supplier has informed 10 or fewer other water suppliers of water supplies available in accordance with Water Code Section 10631.
	Water Supplier or Agency Name
	Chino Basin Water Master
	Chino Basin Desalter Authority
	City of Chino
	City of Chino Hills
	Cucamonga Valley Water District
	Fontana Water Company
	Local Agency Formation Commission for San Bernardino County
	City of Montclair
	Monte Vista Water District
	Metropolitan Water District
	City of Ontario
	City of Rancho Cucamonga
	Santa Ana Regional Water Quality Control Board
	San Antonio Water Company
	Santa Ana Watershed Project Authority
	San Bernardino County Planning Department
	Three Valleys Municipal Water District
	City of Upland
	Water Facilities Authority
	West Valley Water District

1.12.3 Public Outreach

IEUA encouraged community and public interest involvement in the plan update through a public hearing and inspection of the draft document on June 16, 2021. Public hearing notifications were published in local newspapers. A copy of the published Notice of Public Hearing is included in Appendix E. The hearing provided an opportunity for all residents and employees in the service area to learn and ask questions about their water supply in addition to IEUA's plans for providing a reliable, safe, high-quality water supply. Copies of the draft plan were made available for public inspection at the IEUA headquarters and website.

Table 1-8 presents a timeline for external coordination and outreach during the development of the Plan. A copy of the public outreach materials is provided in Appendix E.

Table 1-8: External Coordination and Outreach

Date	Milestone	External Coordination and Outreach
November 24 and 30, 2020	Notification of Preparation	Encouraged public involvement
April 5, 2021	Notice of Intent to Adopt	Notified the public of the intent to adopt the UWMP and WSCP
May 11, 2021	Draft UWMP and WSCP	Draft UWMP and WSCP released to solicit input
June 16, 2021	Public Hearing	Review contents of Draft UWMP and WSCP and take comments
June 16, 2021	Board Adoption	UWMP and WSCP considered for approval by the Board
By July 1, 2021	Made UWMP and WSCP Available to the Public	Posted on IEUA's website for public access (no later than 30 days after filing with DWR)
By July 13, 2021	Submittal to Library and City/County	Submit the UWMP and WSCP to the California State Library and city or county within service area (no later than 30 days after adoption)

1.12.4 Resource Maximization

Several documents have been developed to enable IEUA and the region to maximize the use of available water resources, including IEUA's 2015 UWMP, the plans described in Section 1.3.1, DWR's 2019 State Water Project Delivery Capability Report (DWR 2019), IEUA's draft 2020 Water Use Efficiency Business Plan, IEUA's Water Shortage Contingency Plan, and communication with IEUA staff. A complete reference list is provided in Section 11 of this Plan.

1.13 Regional Water Agency Coordination

There are many agencies involved in water management within the service area. IEUA is working in cooperation with each of these agencies to achieve water supply reliability, water quality, and watershed management goals for the Santa Ana River Watershed and the Inland Empire. This section provides a description of these agencies.

1.13.1 Metropolitan Water District of Southern California

IEUA is a member agency of MWD, which is a public agency that provides supplemental imported water from the northern California SWP and the Colorado River Aqueduct (CRA) to 26 member agencies located in the Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties. Nearly 90%of the population within these counties, approximately 19 million people, resides within MWD's 5,200-square mile service area.

As a water wholesaler, MWD has no retail customers. It distributes treated and untreated imported water from the CRA and SWP to its member agencies. MWD provides an average of 50% of the municipal, industrial, and agricultural water used within its service area. The remaining 50% comes from local groundwater, local surface water, recycling, and from the City of Los Angeles' Owen's Valley Aqueduct in the eastern Sierra Nevada. MWD prepares its own UWMP. MWD currently provides financial support for local water projects and water conservation projects implemented by its member agencies that increase the reliability of water supplies to the region.

MWD sponsors the Local Resources Program (LRP), established in June 1998, to encourage member agencies to develop and use recycled water and recover groundwater to reduce dependence on imported water supplies. IEUA currently receives financial contributions from MWD from the following programs:

- Conservation Credits Program – MWD pays the lesser of one-half the program cost or the equivalent of $195 per AF of water saved through conservation. A variation of this policy provides funding for programs that document water savings.

MWD also provides financial and technical assistance to its member agencies for implementing the water conservation measures, such as Best Management Practices (BMP), that were initiated by the California Urban Water Conservation Council (CUWCC) Best Management Practices Memorandum of Understanding. CUWCC is now known as the California Water Efficiency Partnership. IEUA currently receives financial contribution from MWD for the following conservation programs:

- Residential and Commercial SoCal Water Smart Program - MWD sponsors a region-wide program that offers single family residents' rebates for high efficiency toilets (HET) and washers, weather-based irrigation controllers, rotating nozzles, and synthetic turf. MWD also provides rebates for plumbing fixture upgrades, landscaping devices, turf replacement, and some industry specific technologies for commercial, industrial, and institutional (CII) customers.

- Residential Landscape Retrofit Program - MWD sponsors outdoor irrigation evaluations and retrofits of high efficiency landscape devices for residential water customers with lot sizes of ¼ acre or larger.

- Residential Pressure Regulation Program – MWD funding supports installation of pressure regulating valves (PRVs) at meters, homes, or at the point-of-connection for irrigation systems to automatically reduce high incoming water pressure from water mains and provide a lower, more functional pressure distribution. PRVs ensure that end-

use plumbing fixtures operate at the intended flow rate and reduce the incidence of excessively leaky pipes and fixtures.

- Residential Education, Survey, and Controller Upgrade Program – Focused on the higher water use demographic within the small residential landscape sector, this program promotes an improved understanding of landscape irrigation control technologies while ensuring more efficient scheduling and operation of automated irrigation systems through required training class attendance, landscape evaluations, and smart controller technology upgrades.

- FreeSprinklerNozzles.com Program - This program, which ended in 2019, enabled residential and commercial customers within IEUA's service area to obtain a voucher for free high efficiency irrigation spray nozzles through a web-based portal.

1.13.2 Santa Ana Watershed Project Authority

The Santa Ana River Watershed faces enormous challenges as it strives to adapt to changing conditions, many of which are at an unprecedented scale in its modern history. The Santa Ana Watershed Project Authority (SAWPA) acts as the Regional Water Management Group and its mission is to facilitate communication, identify emerging opportunities, develop regional plans, secure funding, implement programs, build projects, and operate and maintain facilities.

IEUA is a member of SAWPA, which was formed in 1972. SAWPA is a Joint Powers Authority (JPA) that coordinates regional planning within the Santa Ana River Watershed to address water quality and supply improvements. SAWPA is comprised of the five major water supply and wastewater management agencies within the Santa Ana Watershed including: IEUA, Eastern Municipal Water District, Orange County Water District, San Bernardino Valley Municipal Water District, and Western Municipal Water District.

Since the early 1970s, SAWPA has played a key role in developing and updating the Regional Basin Plan for the California Regional Water Quality Control Board. SAWPA conducts water-related investigations and planning studies, and builds facilities needed for regional water supply and water quality remediation.

The "One Water One Watershed" (OWOW) is the Santa Ana River Watershed's integrated regional water management plan. This plan reflects a collaborative planning process that addresses all aspects of water resources throughout the region and watershed. OWOW integrates different disciplines such as: water supply, water quality, recycled water, stormwater management, water use efficiency, land use, energy use, climate change, and habitat. It includes planning of future water demands and supplies over a 20-year time horizon within the watershed as a hydrologic and interconnected system. The plan represents collaboration across jurisdictions, and political boundaries involving multiple agencies, stakeholders, individuals, and groups; and attempts to address the issues and differing perspectives of all the entities involved through mutually beneficial solutions. The plan's comprehensive view of the watershed and water issues is one in which all types of water (imported, local surface and groundwater, stormwater, and wastewater effluent) are viewed as components of a single water system, inextricably linked to land use and land cover.

1.13.3 Chino Basin Watermaster

IEUA is a member of the CBWM Board of Directors. CBWM was established in 1978 by a judgment entered by the Superior Court of California. The judgment requires that the CBWM develop a management plan for the Chino Groundwater Basin that meets water quality and quantity objectives for the region.

In 1998, CBWM developed an integrated set of water management goals and actions for the Chino Basin known as the Optimum Basin Management Program (OBMP) that describes nine program elements to meet the water quality and local production objectives in the Chino Groundwater Basin. The OBMP encourages the increased use of local supplies to help "drought proof" the Chino Basin.

In July 2000, CBWM adopted the "Peace Agreement" that ended over 15 years of litigation within the Chino Basin. The Peace Agreement outlined the schedule and actions for implementing the OBMP. In December 2007, CBWM adopted the "Peace II Agreement" that redefined the future programs and actions required to implement the OBMP, based on the 9 years of experience and accomplishments in implementing the OBMP. Between 2009 and 2010, CBWM updated the Groundwater Recharge Master Plan in response to changes in demand, recharge capacity, safe yield, and other factors.

CBWM recently concluded the 2020 OBMP Update through a year-and-a-half long process that gathered input from all stakeholders. The management plan contained in the 2020 OBMP outlines a series of activities proposed by the stakeholders to achieve the goals of the 2020 OBMP which are: 1) Enhance Basin Water Supplies, 2) Protect and Enhance Water Quality, 3) Enhance Management of the Basin, and 4) Equitably Finance the OBMP. Implementation of the management plan will require an updated Implementation Plan, and amendments to the Peace Agreement. This is especially true of the storage management component of the OBMP, which needs to be updated and adopted by the Court before June 30, 2021.

As the environmental review of the 2020 OBMP Update has not yet been completed, CBWM developed a Local Storage Limitation Solution addendum, which allows the continued temporary utilization of managed storage under the 2000 OBMP. The efforts to fully complete the 2020 OBMP Update environmental review and Implementation Plan should advance in a timely manner to ensure the adequate protection of the regional groundwater supply. The Chino Ground Basin is a very important resource that the region relies on for supporting its vibrant economy and growing population. The 2020 OBMP and future Implementation Plan, including the revised Storage Management Plan is essential to reliably maintain this significant groundwater resource.

1.13.4 Chino Basin Water Conservation District

The Chino Basin Water Conservation District (CBWCD) was established in 1949 to protect and replenish the Chino Groundwater Basin with rainfall and stormwater runoff from the San Gabriel Mountains. CBWCD uses an extensive system of percolation ponds and spreading grounds to augment the natural capacity of the region to capture runoff for recharge. CBWCD also promotes water conservation through public education programs. IEUA works closely with the CBWCD. IEUA, CBWM, the San Bernardino County Flood Control District, and CBWCD jointly

sponsor the Chino Basin Recycled Water Groundwater Recharge Program that is an integral part of basin water management.

1.13.5 Santa Ana Regional Water Quality Control Board

The Santa Ana Regional Water Quality Control Board (SARWQCB) is responsible for the development and enforcement of water quality objectives to meet the requirements of the Federal Clean Water Act, California Porter-Cologne Act, and the National Pollutant Discharge Elimination System (NPDES).

In 1975, the SARWQCB completed the Water Quality Control Plan for the upper portion of the Santa Ana Watershed. The plan outlined specific water quality management actions to address water quality and salt build up, in the form of total dissolved solids (TDS) within the Chino Groundwater Basin. These included the construction of a large well field and desalters in the lower part of the Chino Basin to extract and treat poor quality water, and construction of a pipeline to export brine from the upper Basin to the Orange County Sanitation District (OCSD) Plant 1. The Water Quality Control Plan was updated in 1995, 2008, 2011, 2016, and 2019.

The Inland Empire Brine Line (IEBL), previously known as the Santa Ana River Interceptor, was built and has been in operation since 1975. The 2020 OBMP Update by CBWM has been developed to meet the requirements of the 1975 Plan.

1.13.6 Chino Basin Desalter Authority

The CDA is a JPA consisting of the cities of Chino, Chino Hills, Norco and Ontario, the Jurupa Community Services District, the Santa Ana River Water Company, Western Municipal Water District, and IEUA. The CDA treats brackish groundwater from the lower Chino Basin with the Chino I and II Desalter facilities along with distribution of drinking water to retail agencies. IEUA operates and maintains the Chino I Desalter while Jurupa Community Services District operates and maintains the Chino II Desalter. These desalter facilities consist of groundwater wells and associated raw water pipelines, treatment facilities, pumps, and water distribution pipelines. Treatment processes include ion exchange (IX) and reverse osmosis (RO). Three of the nine retail agencies currently purchase desalted water as part of their water supply.

1.13.7 San Bernardino County Flood Control District

The SBCFCD is partnering with IEUA, CBWM, and CBWCD in implementation of the Chino Basin Groundwater Recharge Master Plan. The implementation is known as Chino Basin Facilities Improvement Program (CBFIP). The CBFIP includes modifications to several SBCFCD basins and flood control channels including the installation of five rubber dams and three drop inlet diversion structures to divert imported, storm and recycled water to 16 groundwater recharge sites.

1.14 Fundamental Findings of the Urban Water Management Plan

It is the stated goal of the IEUA to deliver a reliable and high-quality water supply to its service area, even during dry periods. The analysis in this Plan documents that IEUA and its service area will have sufficient supply to meet water use demands out to 2045 during all considered dry period scenarios. The region has also successfully achieved its goal of reducing water use by 20% by 2020 as part of SBX7-7. The Plan documents IEUA's commitment to conservation and support of water use efficiency programs for its retail agencies to continue water demand reduction. IEUA has identified recycled water use as an important source of supply currently and in the future and continues to explore other potential supply opportunities which are described throughout the document. Finally, the Plan considers potential impacts to each of its supply sources due to climate change, regulations, and water quality changes and addresses potential future actions needed to increase the resiliency of the region.

Section 2: Water Demands

This section describes historical, current, and projected water usage and demands within IEUA's service area. Regional water demands represent the total demand of all agencies within IEUA's service area over the planning horizon. These demands are broken down by retail agency in the following subsections.

Since the 1990s, approximately 90% of the region's water demands have come from urban municipal and industrial (M&I) users with the remaining 10% coming from agricultural users. Overall urban water demand since 1995 has increased by approximately 20%, despite a regional growth of 30% (approximately 200,000 more residents). This is indicative of new water use behaviors, such as efficient irrigation and the use of more efficient indoor fixtures, which prolong the availability of current regional water supplies into the future. Water use efficiency measures implemented by IEUA and its retail agencies are discussed in detail in Section 8.

The 2015 UWMP projected 2020 total urban demand to be approximately 210,500 AFY. However, actual demands have decreased over the past 5 years from 200,000 AF in FY 14/15 to 192,202 AF in FY 19/20. Over the past 5 years, the average water usage has been even lower, approximately 187,500 AFY (ranging from 168,800 AF in FY 15/16 to 203,400 AF in FY 17/18). This decrease is in part due to slow population growth (approximately 0.9% growth per year), changes in plumbing codes, implementation of water use efficiency programs, and the increased education and of consumers about California drought conditions and their subsequent conservation measures.

While IEUA anticipates a slight increase in water usage in the future due to the growing population in the region and the projected temperature increases, long-term demands are not expected to exceed the peak 10-year demand of 227,586 AF reached during the FY 13/14 drought. The 2015 Integrated Water Resources Plan demand modeling found that new developments in the region are more efficient due to changes in the plumbing code, higher density developments with less landscaping, and compliance with landscape ordinance requirements set forth in AB 1881. A continued focus on water use efficiency and per capita reductions, as required in SBX7-7, AB 1668, and SB 606, is anticipated to continue reducing overall water demands.

The impact of state-wide mandates has also affected demand in the region. The Water Conservation Act of 2009 (SBX7-7) provides the regulatory framework to support the statewide reduction in urban per capita water use described in the 20x2020 Water Conservation Plan (DWR 2010). As detailed in Section 3, the IEUA region has reduced its gallons per capita per day water usage by more than 20% compared to the baseline value calculated in 2010.

These findings suggest that future developments will require less water than in the past, reducing the previous projected regional need for additional water supplies. This shift has significant implications for future wastewater and recycled water planning. Regional treatment plants may not need to be expanded for hydraulic capacity as quickly as previously thought; however, treatment plants will have to be expanded to treat increased wastewater strength due to greater solids concentration, and future available recycled water supplies may be lower than previously expected.

Several factors can affect demands and associated projections, including:

- Land use revisions
- New regulations
- Consumer choice
- Economic conditions
- Transportation needs
- Environmental factors
- Conservation programs
- Building and plumbing codes.

These factors affect the amount of water needed, as well as the timing of when it is needed. During an economic recession, there is a major downturn in development and a subsequent slowing of the projected demand for water. The projections in this Plan do not attempt to forecast recessions or droughts. Likewise, no speculation is made about future building and plumbing codes or other regulatory changes.

2.1.1 Demand Projection Methodology

IEUA has been working with its consultant and its contracting agencies on wastewater and recycled water land use-based demand forecasts. The goal of this effort is to develop potential demand projections that disaggregates regional data to the agency level. The project is collecting and compiling data, developing flow factors, unit demands, and agency demands in 5-year increments, and preparing a spreadsheet model and technical memorandum. The effort is estimated to be completed by the submission of IEUA's 2020 UWMP. Draft projections were provided for inclusion in this 2020 UWMP.

In addition, projections on local water supply and demand and retail agency demands on IEUA were gathered from each of IEUA's retail agencies. These projections were prepared by retail agencies for use in their respective 2020 UWMPs. Retail agencies within the service area used various methodologies based on the best available data, land use changes, climate change, and conservation efforts to create their retail demand projections. These agencies also worked with others, such as developers and municipal departments, to refine their projections. Retail agency projections were also informed by the comprehensive IEUA IRP developed in 2014-2016 and the 2020 IRP Regional Water Supply Infrastructure Model (IRP Model). These planning documents were developed in collaboration with IEUA's retail agencies for the purpose of assessing water supply vulnerabilities and evaluating infrastructure and management strategies that will improve near-term and long-term water resources management for the region. The IRP evaluated new growth, development, and water demand patterns within the service area and assessed water needs and supply source vulnerabilities under climate change. The IRP provided aggregated water demand projections based on an econometric demand forecasting model. The IRP Model incorporated existing regional and local supplies, key local

and regional infrastructure, interconnections between agencies, and current and projected annual potable water demands to simulate requirements for imported water or other sources to blend with and utilize wells with impaired groundwater quality. The IRP Model evaluated multiple scenarios to identify areas with unmet water demands and areas with water surpluses.

IEUA coordinated with its retail agencies to collect retail supply and demand data that was gathered into regional totals. Additional details on the demand projection methodology completed by each retail agency can be found in their respective 2020 UWMPs. Coordination with land use agencies to develop water projections for both IEUA and its retail agencies are detailed in the following section.

2.1.2 Coordination with Land Use Agency to Develop Water Projections

It is important to have city land use planners identify anticipated timing of development as they are the most knowledgeable of development activities, growth patterns, and trends within their city. The 2015 IRP and 2015 Land Use-Based Demand Model (LUBDM) included significant considerations of land use and coordination with regional agencies to develop accurate water projections that were again referenced for the development of the 2020 UWMP water projections. Land use data used for the 2015 LUBDM were sourced from the General Plans of the cities in the region, the Metropolitan Water District's 2010 water demand model, and regional growth plans, such as SCAG's 2012-2035 RTP/SCS. The 2015 LUBDM and IRP were created to provide consistently developed agency demand projections through 2040. In addition to the sources mentioned, this model developed land use designations for the service area using existing land use geospatial information system databases, Google Earth, windshield surveys, and meetings with community development departments. The 2015 IRP project team met with planning or community development departments for each City within IEUA's service area: the cities of Chino, Chino Hills, Fontana, Montclair, Ontario, Rancho Cucamonga, and Rialto. These meetings focused on confirmation of general plan land use for vacant land that is developable and confirmation of boundaries and existing land uses. The extensive effort to improve the classification accuracy of over 70% of the existing land use resulted in a detailed database of existing land use.

Additional details on land use agency coordination conducted by retail agencies for the 2020 planning effort can be found in each individual retail agencies' 2020 UWMP.

2.1.3 Current and Projected Land Use

As discussed in Section 1.7, when IEUA was formed, land use within the service area was primarily field crops, citrus, and vineyards. Since then, urban areas have expanded significantly and replaced many agricultural uses in the northern and central portions of the Chino Basin. The conversion of agricultural land to urban developments is anticipated to continue for land use within the Chino Basin based on the region's general plans. Residential land use is expected to grow significantly over the next two decades, while vacant and agricultural land is expected to decrease by over 85%. Industrial land use is projected to increase as well, although not as much as residential land use.

2.2 Non-Potable Versus Potable Water Use

Water use in IEUA's service area includes both potable and non-potable water. While IEUA does have a non-reclaimable water system, which includes industrial wastewater that cannot be feasibly reclaimed and exported for disposal, the only non-potable water reported in this UWMP is recycled water. Within Section 3, gross water use indicates water use that does not include recycled water. IEUA water demands have been split into imported water and recycled water for clarity. It is important to distinguish between potable and non-potable demands because recycled water supplies have limited permitted uses. Where possible, retail agencies' demands have been split into potable and non-potable demand. Additional details on recycled water uses and projections are included in Section 5.

It should be noted that water use may shift from potable to non-potable water use or vice versa. As IEUA works to maximize and optimize recycled water use and decrease reliance on imported water, some potable water demands may shift over time to become non-potable water demands. In addition, there is some overlap between recycled water demands and potable water supplies. Recycled water that is used for groundwater recharge will eventually be used as potable local groundwater supply.

2.3 Past, Current, and Projected Water Use by Sector

Retail suppliers must identify water use for at least each of the 10 water use sectors identified in Water Code Section 10631(d), which include:

- Single-family residential
- Multi-family
- Commercial
- Industrial
- Institutional and governmental
- Landscape
- Sales to other agencies
- Saline water intrusion barriers, groundwater recharge, or conjunctive use
- Agricultural
- Distribution system water losses.

Wholesale suppliers are only required to report their direct uses but may choose to report an aggregation of all customer reported water uses by sector. Additional water use sectors may be necessary to account for the entirety of an agencies water uses. "Other" water use sectors may

include exchanges, surface water augmentation, transfers, wetlands or wildlife habitat, or other, as appropriate.

IEUA has worked with its retail agencies to provide water use data for IEUA as a wholesaler and by retail agency for the purposes of transparency and comprehensive future planning. IEUA's retail agencies have also prepared 2020 UWMPs that include details on their individual water use by sector.

2.3.1 IEUA Water Use

As a wholesaler, IEUA supplies untreated imported water that is purchased from MWD and supplied to its retail agencies. In FY 2019-2020, 66,438 AF of untreated imported water was supplied to its retail agencies, as shown in Table 2-1.

Table 2-1: Demands for Potable and Non-Potable Water – Actual (DWR Table 4-1)

		2020 Actual	
Use Type	**Additional Description**	**Level of Treatment When Delivered**	**Volume (acre-feet)**
Sales to other agencies	MWD Imported Water	Raw Water	66,438
		TOTAL	**66,438**

Note: Volume values from IEUA Annual Water Use Database.

2.3.2 Water Use by Retail Agency

The total water use of IEUA's eight retail agencies for FY 19-20 is shown in Table 2-2. Total water use includes recycled water for direct use but not recycled water for groundwater recharge. The total water use for FY 19-20 was 192,100 AF. The water use of the retail agencies is met by local surface water, stormwater, Chino Basin groundwater, non-Chino groundwater, and the Chino Basin Desalters, in addition to the imported water supplies by MWD through IEUA and the recycled water for direct use shown in Table 2-1.

Table 2-2: Water Demand by Retail Agency – Actual

Retail Agency	**Volume in Acre-Feet (2020 Actual)**
City of Chino	19,303
City of Chino Hills	14,493
Cucamonga Valley Water District	47,059
Fontana Water Company[(a)]	37,804
Monte Vista Water District	9,035
City of Ontario	39,666
San Antonio Water Company	6,219
City of Upland	18,520
TOTAL	**192,100**

Notes: Volume values from FY 19/20 Annual Water Use Report; includes recycled water for direct use; does not include recycled water for groundwater recharge. Interagency transfers within the region are not included.
(a) Includes demands within IEUA service area only.

2.4 Distribution System Water Losses

In addition to the traditional demand sources, there is another component that impacts water resources – "water losses." Water losses are typically defined as the difference between water production and water sales. These water losses can come from authorized, but unmetered sources, such as firefighting and main flushing, or unauthorized sources such as leakage, illegal connections, and inaccurate flow meters. Retail water agencies are required to calculate their current and projected water losses using the American Water Works Association Method (Title 23 California Code of Regulations Section 638.1 et seq).

Wholesale suppliers are not required to perform water loss audits or report any distribution system losses, although it is recommended that they estimate losses for reliability planning and projecting water needs.

IEUA does not own or operate any potable water infrastructure, and therefore, does not have any distribution losses to report.

2.5 Projected Water Use

Estimating future water demand is a function of several factors. Water usage is influenced by geographic location, topography, land use, demographics, and water system characteristics (i.e., system pressures, water quality, and metering of connections).

2.5.1 IEUA Projected Water Use

A key component of the 2020 UWMP is to provide insight into the future water demand outlook of the region in addition to IEUA's service area. Demand is met through a diverse portfolio of groundwater, purchased imported water from MWD, local surface water, desalinated water, and recycled water (all of which are described in Section 4). IEUA, as the regional wholesaler, is responsible for the purchase of imported water and the provision of recycled water.

Table 2-3 identifies IEUA's projected demand for imported water, which is the maximum volume its retail agencies are contracted to purchase within a given year. Resolution No. 2014-12-1 (also known as the Purchase Order Agreement) establishes the allocations for the purchase of imported water from IEUA by WFA, CVWD, and FWC for a volume less than or equal to 69,572 AFY. Under the IEUA-MWD contract, IEUA is able to purchase up to 93,283 AFY of imported water from MWD at the Tier 1 rate. If the projected imported water demand for a retail agency increases above the values in Resolution No. 2014-12-1, updates to the Resolution may be required. The quantity of imported water available may be less than the contract amount during drought years; water supply reliability is discussed in detail in Section 7. In FY19/20, IEUA's service area purchased 66,438 AF of imported water from MWD, which met 35% of the region's total water use. IEUA and its retail agencies aim to decrease their reliance on imported water by pursuing a variety of water use efficiency and conservation strategies, along with maximizing the recycled water use within the region. While efforts are being made to reduce IEUA's imported water demand to less than its contract amount with the retail agencies in the future, conservative planning assumptions are being made by retail agencies regarding imported water needs in case projects are delayed and/or savings are not realized. This conservative planning approach, and the relatively low imported water use compared to historical use in FY

19/20, accounts for the increase in potable and raw water use between 2020 and 2025 in Table 2-4.

Table 2-4 identifies IEUA's total water demands, which includes the imported water demand projections and the recycled water demand projections. Recycled water demand is projected to increase modestly over the planning horizon, to approximately 9% of total demands by 2045. For additional details on IEUA's recycled water program, refer to Section 5. IEUA currently meets 37% of total water demands within the region; this percentage is expected to decrease to 32% of total demands within the service area by 2045. The IEUA region plans to meet future demand through the diversification of local supply sources, water use efficiency measures, improved groundwater basin management, and the maximization of recycled water use.

Table 2-3: Use for Potable and Raw Water – Projected (DWR Table 4-2)

Use Type	Additional Description	Projected Water Use				
		2025	2030	2035	2040	2045
Sales to other agencies		77,416	79,630	81,974	84,021	84,065
TOTAL		**77,416**	**79,630**	**81,974**	**84,021**	**84,065**

Note: Values from retail agency projections for use of imported water from MWD through IEUA.

Table 2-4: Total Water Use (Potable and Non-Potable) (DWR Table 4-3)

	2020	2025	2030	2035	2040	2045
Potable and Raw Water	66,438	77,416	79,630	81,974	84,021	84,065
Recycled Water Demand	30,496	39,300	41,297	42,162	44,191	44,691
TOTAL WATER DEMAND	**96,934**	**116,716**	**120,927**	**124,136**	**128,212**	**128,756**

Note: 2020 Values from FY 19/20 Recycled Water Annual Report and Annual Water Use Database. Projected potable and raw water volumes is the sum of each retail agency's expected use of imported water from MWD through IEUA. Recycled water direct use projections from retail agencies and groundwater recharge projections from IEUA.

2.5.2 Projected Water Use by Retail Agency

Table 2-5 presents the water demands for the IEUA service area by retail agency for the years 2020 to 2045. These demands include imported water, surface water, groundwater, desalinated water, and recycled water.

Table 2-5: Water Demand by Retail Agency – Projected

Retail Agency	2025	2030	2035	2040	2045
City of Chino	20,843	22,310	23,087	23,963	25,108
City of Chino Hills	17,120	17,334	17,678	17,725	17,769
Cucamonga Valley Water District	53,369	58,092	59,650	60,949	60,949
Fontana Water Company	45,593	46,909	47,665	50,442	51,943
Monte Vista Water District	14,232	14,564	15,175	15,437	15,706
City of Ontario	52,550	58,513	63,406	73,668	73,668
City of Upland	25,328	25,328	25,328	25,328	25,328
TOTAL	**229,035**	**243,050**	**251,989**	**267,512**	**270,471**

Note: Provided by retail agencies in preparation of their respective 2020 UWMPs. SAWCo is not included in the table because transfers from SAWCo are reported within receiving member agency values. Wholesale demands from MVWD to Chino Hills are reflected under Chino Hills' retail demands.

2.5.3 Water Use Projections for Lower Income Households

SB 1087 requires that water use projections of an UWMP include the projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county in the service area of the supplier. This requirement only applies to retail suppliers; therefore, IEUA is exempt from this requirement. Details on water use projections for lower income households completed by IEUA's retail agencies can be found in each individual retail agency's UWMP.

2.6 Effects of Climate Change on Water Usage

A major factor that affects water usage is weather. Historically, when the weather is hot and dry, water usage increases. The amount of increase varies according to the number of consecutive years of hot, dry weather and the conservation activities imposed. During cool, wet years, historical water usage has decreased, reflecting less water usage for exterior landscaping. Therefore, even without population changes, water demand could increase as a result of climatic conditions. Precipitation and temperature influence water demand for outdoor landscaping and irrigated agriculture. Lower spring rainfall increases the need to apply irrigation water. Further, warmer temperatures increase crop evapotranspiration, which increases water demand.

Climate projections suggest that temperatures within the IEUA service area will rise over the coming decades; there is also expected to be an increase in the frequency, magnitude, and duration of heat waves, causing longer, drier, and more frequent periods of drought. The 2015 IRP found that water demand in its service area may increase by 4.3% for a 3.6^{o} F temperature increase by 2040. In addition, dry years are expected to result in increased water demand; IEUA estimates that 1 dry year would increase demand by up to 5.6% by 2040 while a longer period of dry weather (3+ years) would increase demand by up to 8.9% by 2040.

2.7 Effects of Codes, Standards, and Ordinances

In recent years, water conservation has become an increasingly important factor in water supply planning and management in California. Over the past 10 years there have been a number of regulatory changes related to conservation including new standards for plumbing fixtures, a new statewide landscape ordinance, a state universal retrofit ordinance, new Green Building standards, demand reduction goals and more. In 2018, the California State Legislature enacted Assembly Bill 1668 and Senate Bill 606 to establish a new foundation for long-term improvements in water conservation and drought planning to adapt to climate change and the resulting longer and more intense droughts in California. The California plumbing code has also instituted requirements for new construction that mandate the installation of ultra-low-flow toilets and low-flow showerheads. It is assumed that these changes in water use behavior will continue as the state continues to pass legislation like AB 1668 and SB 606 that create a long-term water conservation framework. A summary of current codes, standards, and regulations impacting regional water demand is included in Table 2-6.

Residential, commercial, and industrial usage can be expected to further decrease as a result of the implementation of more aggressive water conservation practices. In southern California, the greatest opportunity for conservation is in developing greater efficiency and reduction in landscape irrigation. The irrigation demand can typically represent as much as 70% of the water demand for residential customers depending on lot size and amount of irrigated turf and plants. Conservation efforts will increasingly target this component of water demand. IEUA's WUEBP includes "passive" policy initiatives, such as landscape ordinances, and "active savings" that reduce water demand.

"Passive" water saving initiatives that IEUA has employed include residential and commercial high-efficiency toilets, high efficiency clothes washers, and turf replacement. Table 8-6 in Section 8 shows the estimated annual water savings to be achieved over the next 5 years. More details on IEUA's conservation efforts are provided in Section 8.

Table 2-6: Codes, Standards, and Regulations Impacting Water Demand

Regulatory Statute	Requirements	Agency or Regional Implementation	Approach
Assembly Bill 1668 and Senate Bill 606	Compliance with new water use targets, development of Water Shortage Contingency Plans, water loss audits	Implemented locally by water agency	Continuation of water use efficiency programs and policy initiatives. Development of WSCP and 5-year Drought Risk Assessment within the UWMP
20x2020 (SB X7-7)	Reduce per capita water use 20% over baseline by 2020	Implemented by the Regional Alliance	Implementing active water use efficiency programs and policy initiatives within the region
AB1881 – Model Water Efficiency Landscape Ordinance	ETo Allowances: Residential 0.55 Commercial 0.45	Implemented locally by city and/or county	Agencies need to educate customers and developers about ordinance requirements
Assembly Bill 715	Requires any toilet or urinal sold or installed in California cannot have a flush rating exceeding 1.28 and 0.125, respectively	Manufacturers, distributors, retailers, plumbers, and customers must all adhere to new standards	Supply chain removes non-conforming fixtures from marketplace and supplies only efficient and conforming fixtures
Senate Bill 407	Requires existing buildings comply with 1992 standards	Implemented locally by city and county	Difficult to enforce. Could be added to current criteria for change of ownership inspections and reporting

Regulatory Statute	Requirements	Agency or Regional Implementation	Approach
CalGreen	20% reduction of water use. Designated irrigation controllers shall be weather- or soil moisture-based	Implemented locally by city and county	Difficult to enforce. Could be added to current criteria for change of ownership inspections and reporting
Senate Bill 555	Requires water agencies to submit annual water loss reports	Implemented by Agencies	Agencies compile data and submit report to DWR
Assembly Bill 1	City or county cannot fine customers for failure to water	Local agencies to follow requirements of the bill	Agencies need to communicate requirements with cities and counties
Assembly Bill 349	HOAs cannot prohibit installation of artificial turf and allows for turf removal and installation of low water use plants	Local agencies to follow requirements of the bill	Agencies need to work with HOA's and community groups to educate about the bill

Section 3: SB X7-7 Baseline and Targets

3.1 Existing and Target Per Capita Water Use

The Water Conservation Act of 2009 (SBX7-7) is one of four policy bills enacted as part of the November 2009 Comprehensive Water Package (Special Session Policy Bills and Bond Summary). The Water Conservation Act of 2009 provides the regulatory framework to support the statewide reduction in urban per capita water use described in the 20x2020 Water Conservation Plan (DWR 2010). Consistent with SBX7-7, each water supplier must determine and report its existing baseline water consumption and establish water use targets in gallons per capita per day (GPCD) and compare actual water use against the target; reporting began with the 2010 UWMP. The primary calculations required by SBX7-7 are summarized in Table 3-1.

IEUA, as an urban wholesale water supplier, is not required to develop a baseline or set reduction targets to achieve a 20% reduction in GPCD by 2020. However, as the statute does require urban retail water suppliers to comply, IEUA prepared a regional approach establishing a baseline and setting targets based on regional demands in support of its retail agencies. All retail agencies within IEUA's service area have agreed to the formation of a regional alliance and will continue to cooperatively participate in developing WUE programs and meeting water conservation goals.

As a wholesale water supplier, IEUA is required to provide an assessment of its present and proposed WUE measures, programs, and policies that will help its retail water suppliers achieve their water reduction goals. IEUA and its retail agencies have developed core strategies to meet compliance requirements through a collaborative process that focuses on aligning activities with established regional water use efficiency principles and goals.

Table 3-1: SBX7-7 Calculation Requirements

	2010 UWMP	2015 UWMP	2020 UWMP
Base Daily Water Use calculation (average GPCD used in past years)	First calculated and reported in the 2010 plan	May be revised in 2015 Plan; must be revised if 2010 Census data not used in original calculation	NA
Interim Water Use Target (target GPCD in 2015)	First calculated and reported in 2010 Plan	May be revised in 2015 Plan; must be revised if 2010 Census data not used in original calculation	NA
Compliance Water Use Target (target GPCD in 2020)	First calculated and reported in 2010 Plan	May be revised in 2015 Plan; must be revised if 2010 Census data not used in original calculation	NA
Actual 2015 Water Use (in GPCD)	NA	In 2015, Plan must compare actual 2015 GPCD against 2015 target	NA

	2010 UWMP	2015 UWMP	2020 UWMP
Actual 2020 Water Use (in GPCD)	NA	NA	In 2020, Plan must compare actual 2020 GPCD against 2020 target

In the 2020 UWMP, a water supplier must demonstrate compliance with the target established in 2015. Compliance is done through the review of the SBX7-7 Verification Tables submitted with the 2020 Plan (included as Appendix F).

The Base Daily Water Use calculation is based on gross water use by an agency in each year and can be based on a 10-year average ending no earlier than 2004 and no later than 2010, or a 15-year average if 10% of 2008 demand was met by recycled water. Base Daily Water Use must account for all water sent to retail customers, excluding:

- Recycled water
- Water sent to another water agency
- Water that went into storage.

It is at an agency's discretion whether to exclude agricultural water use from the Base Daily Water Use Calculation. If agricultural water use is excluded from the Base Daily Water Use calculation, it must also be excluded from the calculation of actual water use in later urban water management plans. IEUA did not adjust for agriculture exclusions in the SBX7-7 calculations.

Finally, the selected Compliance Water Use Target must be compared against what DWR calls the "Maximum Allowable GPCD." The Maximum Allowable GPCD is based on 95% of a 5-year average base gross water use ending no earlier than 2007 and no later than 2010. The Maximum Allowable GPCD is used to determine whether a supplier's 2015 and 2020 per capita water use targets meet the minimum water use reduction requirements of SBX7-7. If an agency's Compliance Water Use Target is higher than the Maximum Allowable GPCD, the agency must instead use the Maximum Allowable GPCD as its target.

3.1.1 Historical Demand, Selected Baseline, and 20x2020 Targets

In the 2010 UWMP, the baseline and water use targets for the IEUA regional alliance were calculated using an aggregate of individual agency water use and population information to calculate one baseline GPCD for the whole IEUA region. To do this, IEUA along with its retail agencies analyzed historical retail demand data from 1995 to 2010 and selected a 10-year baseline period (1999 to 2008). The aggregate of individual agency water use and population information for the same period were used to calculate the regional alliance's baseline GPCD and water use targets for 2015 and 2020. The targets set in the 20x2020 Water Conservation Plan do not include recycled water use. Thus, recycled water use was subtracted from historical recycled water production to get retail demands for non-recycled supplies. The 2015 interim target and the 2020 target was a 10 and 20% reduction from the baseline GPCD, respectively.

The GPCD baselines and targets found using the regional aggregate approach are summarized in Table 3-2.

Table 3-2: 2010 Regional Alliance GPCD Baseline and Targets

Baseline Period	Baseline	2015 Target (10% Reduction)	2015 Actual	2020 Target (20% Reduction)
1999-2008	251	226	160	201

Note: From 2010 IEUA UWMP.

In 2015, an alternative approach to calculating the regional water use targets was carried out to compare findings. For this method, each water supplier in the regional alliance first calculated its individual target in its retail UWMP as if it were complying individually. Then, the individual targets were weighted by each supplier's population and averaged over all members in the alliance to determine the regional water use target. The GPCD baseline and target found for the 10-year baseline period using the population weighted average approach is summarized in Table 3-3. The 2020 Target in Table 3-3 is used to determine 2020 compliance.

In the 2015 UWMP, IEUA demonstrated compliance with its regional alliance 2015 interim target, indicating that the alliance was on track to meet the 2020 water use target.

Table 3-3: 2015 Regional Alliance GPCD Baseline and Targets (DWR Table 5-1R)

Baseline Period	Year Span	Average Baseline[(a)]	2020 Target[(a)] (20% Reduction)
10 year	1995 – 1999 to 2004 - 2008	245	193

Notes:
The 10-year baseline period was selected for the 2020 Compliance Water Use Target.
The 5-year period average baseline value in included in DWR Table 5-1 in Appendix C.
(a) All values reported as gallons per capita per day (GPCD).

3.1.2 2020 Compliance

In this 2020 UWMP, the regional alliance must demonstrate compliance with its 2020 water use target. IEUA chose to use the same approach that was completed in 2015. Each of IEUA's retail agencies first calculated its individual target in its retail UWMP, then the individual targets were weighted by each supplier's population over the total population in the IEUA region to determine the 2020 water use in GPCD.

The 2020 population for the total IEUA region, the sum of the populations of each of its retail agencies, is 905,816. This population includes IEUA's total service area, as well as areas outside the service area that are part of its retail agencies, as is the case for Fontana Water Company. This population is used for the calculation of the regional alliance's 2020 GPCD. The retail agencies used different sources for calculating their service area populations, including

SCAG, the DWR Population Tool, and the California Department of Finance. All retail agencies selected compliance method 1.

Table 3-4 summarizes the baseline, 2015 target, 2015 actual, and 2020 target GPCDs as calculated in the 2015 UWMP and includes the 2020 actual GPCD reported by each retail agency. The resulting weighted IEUA region GCPD for 2020 is included in the table.

The actual 2020 water use in the region is 171 GPCD, approximately 11% lower than the 2020 Target of 193 GPCD, indicating compliance and the success of the collective efforts of IEUA and its retail agencies to reduce water use in the region. These efforts include regional and local actions such as:

1. Water Use Efficiency Active Programs – offering customers a portfolio of programs including cost-effective indoor and outdoor water efficiency measures.

2. WUE Passive Policy Initiatives – including building codes and landscape ordinances.

3. Recycled Water Use – reducing demand for potable water by increasing recycled water supply.

IEUA and its retail agencies did not have any applicable optional adjustments for extraordinary events, economic adjustments, or weather normalization, as shown in DWR Table 5-2 in Appendix C, DWR's SBX7-7 compliance verification table.

Table 3-4: 2020 Regional Alliance GPCD Compliance by Retail Agency

Retail Agency	10-15-yr Baseline (GPCD)	2020 Target (GPCD)	2020 Service Area Population	2020 Actual (GPCD)
Chino	237	189	80,808	169
Chino Hills	217	173	82,409	157
CVWD	290	232	198,979	206
Fontana	216	176	229,041	154
MVWD	205	167	57,787	124
Ontario	245	196	178,409	161
Upland	275	220	78,383	210
IEUA Region	**245**	**193**	**905,816**	**171**

Note: Data provided by retail agencies. IEUA Regional values calculated using weighted average of population and demand.

Section 4: Water Resources

4.1 Overview

IEUA and its retail agencies have developed a diverse portfolio of water supply sources, including groundwater from the Chino Basin and other basins (Cucamonga, Rialto, Lytle Creek, Colton, and the Six Basins groundwater basins), local surface water from creeks originating in the San Gabriel Mountains, recycled water produced locally, and imported water from the SWP via MWD. This section describes the water resources available to IEUA and its service area for the 25-year period covered by the Plan. Both currently available and planned supplies are discussed. Table 4-1 includes the 2020 actual water supplies available for each of IEUA's retail agencies. Table 4-2 shows the projected water supply by category for each of the retail agencies out to 2045. IEUA's supply for its retail agencies, both actual and projected, are included in Section 4.3, which discusses imported water from MWD.

Table 4-1: Retail Agency Water Supplies – Actual (DWR Table 6-8R)

		2020		
Water Supply	**Additional Detail on Water Supply**	**Actual Volume**	**Water Quality**	**Total Right or Safe Yield *(optional)***
Purchased or Imported Water	MWD/IEUA	66,438	Other Non-Potable Water	
Groundwater (not desalinated)	Chino Basin	51,749	Drinking Water	
Groundwater (not desalinated)	Other Basins	26,436	Drinking Water	
Surface water (not desalinated)		16,652	Drinking Water	
Recycled Water	IEUA	16,278	Recycled Water	
Desalinated Water - Groundwater	Chino Desalter Authority	14,649	Drinking Water	
Total		**192,108**		

Note: Data from IEUA Annual Water Use Report Database. Includes recycled water for direct use; does not include recycled water for groundwater recharge. Excludes interagency transfers within the region.

Table 4-2: Retail Agency Water Supplies – Projected (DWR Table 6-9)

Water Supply	Additional Details on Water Supply	2025 Reasonably Available Volume	2030 Reasonably Available Volume	2035 Reasonably Available Volume	2040 Reasonably Available Volume	2045 Reasonably Available Volume
City of Chino						
Purchased or Imported	WFA	5,353	5,353	5,353	5,353	5,353
Groundwater	Chino Basin	5,990	7457	8,734	9,810	10,955
Groundwater - Desalinated	CDA	5,000	5000	5,000	5,000	5,000
Recycled	IEUA	4,500	4500	4,000	3,800	3,800
City of Chino Hills						
Purchased or Imported	IEUA	14,258	14,258	14,258	14,258	14,258
Purchased or Imported	MVWD	8,407	8,407	8,407	8,407	8,407
Groundwater	Chino Hills Wells	4,158	4,158	4,158	4,158	4,158
Groundwater - Desalinated	CDA	4,200	4,200	4,200	4,200	4,200
Recycled	IEUA	2,661	2,661	2,661	2,661	2,661
Cucamonga Valley Water District						
Purchased or Imported	IEUA	28,369	28,369	28,369	28,369	28,369
Groundwater	Other	10,250	14,773	16,331	17,630	17,630
Groundwater	Cucamonga Basin	10,000	10,000	10,000	10,000	10,000
Surface	Cucamonga Canyon	800	800	800	800	800
Surface	Deer Canyon	50	50	50	50	50
Surface	Day/East Canyon	2,100	2,100	2,100	2,100	2,100
Recycled	IEUA	1,800	2,000	2,000	2,000	2,000
Fontana Water Company						
Purchased or Imported	IEUA	15,000	15,000	15,000	15,000	15,000
Purchased or Imported	SBVMWD	3,200	3,200	3,200	3,200	3,200
Groundwater	Chino Basin	9,278	9,983	10,128	12,293	13,183
Groundwater	Rialto – Colton Basin	5,865	5,976	6,087	6,199	6,310
Groundwater	Lytle Basin	6,390	6,390	6,390	6,390	6,390
Groundwater	No Man's Land Basin	4,860	4,860	4,860	4,860	4,860
Surface	Lytle Creek	1,000	1,500	2,000	2,500	3,000

Water Supply	Additional Details on Water Supply	2025 Reasonably Available Volume	2030 Reasonably Available Volume	2035 Reasonably Available Volume	2040 Reasonably Available Volume	2045 Reasonably Available Volume
Monte Vista Water District						
Purchased or Imported	IEUA/WFA	5,000	5,000	5,000	5,000	5,000
Purchased or Imported	SAWCo	671	671	671	671	671
Groundwater	Chino Basin	7,461	7,793	8,404	8,666	8,935
Recycled	IEUA	1,100	1,100	1,100	1,100	1,100
City of Ontario						
Purchased or Imported	IEUA/WFA	20,249	22,915	24,943	31,476	31,476
Groundwater	Chino Basin	11,000	13,000	15,000	17,000	17,000
Groundwater - Desalinated	CDA	8,533	8,533	8,533	8,533	8,533
Surface	SAWCo	600	600	600	600	600
Recycled	IEUA	12,168	13,465	14,330	16,059	16,059
City of Upland						
Purchased or Imported	IEUA/WFA	5,541	5,541	5,541	5,541	5,541
Purchased or Imported	SAWCo	6,857	6,857	6,857	6,857	6,857
Groundwater	Chino Basin	5,743	5,743	5,743	5,743	5,743
Groundwater	Six Basins	4,122	4,122	4,122	4,122	4,122
Groundwater	Cucamonga Basin	683	683	683	683	683
Surface	SAWCo	1,679	1,679	1,679	1,679	1,679
Recycled	IEUA	703	703	703	703	703
Total		**245,599**	**259,400**	**267,995**	**283,471**	**286,386**

Note: Data provided to IEUA from retail agencies as part of their 2020 UWMP with adjustments made by IEUA to account for interagency transfers. SAWCo transfers/purchases are reported within receiving member agency values. Data shown above includes a transfer from MVWD to Chino Hills of 8,407 AFY.

4.2 Historical and Current Local Water Supplies

4.2.1 Local Surface Water

Several of the retail agencies within the northern part of IEUA's service area have long standing legal rights to divert and treat water supplies from local surface sources in the Santa Ana River watershed. These sources include San Antonio Canyon, Cucamonga Canyon, Day Creek, Deer Creek, Lytle Creek, and several smaller surface streams (DCP 2020). IEUA does not provide local surface water directly to its retail agencies, although it does participate in the capture and recharge of stormwater caused by surface water runoff. Stormwater is discussed in Section 4.2.3.

Production from surface supplies varies dramatically depending on climate conditions. However, when available, local surface water is an extremely valuable resource as it is essentially "free,"

with the only cost to retail agencies being the operation of necessary facilities to capture, treat and distribute this water (DCP 2020). This is due in part to the high quality of local surface water. Nevertheless, surface water is treated to state and federal drinking water quality standards before it can be served for public use.

4.2.2 Groundwater

4.2.2.1 Historical Groundwater Pumping

Retail agencies within IEUA's service area use local groundwater as a significant source of the water supply. Most of the groundwater comes from the Chino Basin, which is detailed in the following section. Historical groundwater pumping by retail agency for the last 5 years is presented in Table 4-3. The groundwater pumping volume HAS decreased every year since 2016.

Table 4-3: Groundwater Volume Pumped Over Past 5 Years by Retail Agencies

Groundwater Type	Location or Basin Name	2016	2017	2018	2019	2020
Alluvial Basin	Chino Basin Groundwater	76,302	71,272	63,255	60,417	51,749
Alluvial Basin	Other Groundwater Basins	26,607	28,490	28,819	24,294	26,436
	TOTAL	**102,909**	**99,762**	**92,074**	**84,711**	**78,185**

Note: Groundwater volume pumped by IEUA retail agencies. Years represent fiscal year ending. Data from Annual Water Use Reports and Annual Water Use Report Database.

4.2.2.2 Chino Basin Groundwater

The Chino Basin is one of the largest groundwater basins in southern California, containing approximately 5 million acre-feet (MAF) of water with an unused storage capacity of approximately 1 MAF for a total potential of 6 MAF. Groundwater from the Chino Basin accounts for approximately 45% to 60% of the total water used by IEUA's retail agencies in IEUA's service area over the last 10 years. The Chino groundwater basin is managed by the Chino Basin Watermaster established under the 1978 Judgment. IEUA does not provide groundwater directly to its retail agencies.

Approximately 5% of Chino Basin is located in Los Angeles County, 15% in Riverside County, and 80% in San Bernardino County. Chino Basin is bounded by Cucamonga Basin and the San Gabriel Mountains to the north, the Temescal Basin to the south, Chino Hills and Puente Hills to the southwest, San Jose Hills, Pomona, and Claremont basins on the northwest, and the Rialto/Colton Basins on the east. IEUA's service area overlies approximately 70% of Chino Basin.

San Bernardino County Superior Court created the CBWM in 1978 as a solution to lawsuits over historical water right allocations. CBWM is responsible for managing Chino Basin in accordance with the 2000 Peace Agreement, 2007 Peace II Agreement, and the OBMP. CBWM is governed by three stakeholder groups, called Pools. The three Pools consist of:

- Overlying Agricultural Pool: Representing dairymen, farmers, and the State of California

- Overlying Non-Agricultural Pool: Representing area industries

- Appropriative Pool: Representing local cities, public water districts, and private water companies.

Although groundwater is an important local supply, the water quality in the lower Chino Basin area has been impacted by historical agricultural uses and now has high levels of nitrates and TDS (OBMPU 2020). There are also some areas that exceed standards for perchlorate and volatile organic compounds (VOCs). These groundwater supplies require additional treatment, and/or blending with higher quality imported water before it can be used as a potable supply. CBWM works in partnership with municipalities, IEUA, and the SARWQCB to address these water quality problems and to manage the groundwater basin sustainably. Water quality of the Chino Basin groundwater is discussed in detail in Section 6.

Chino Basin is hydrologically subdivided into five groundwater zones or systems, referred to as management zones. Each management zone has a unique hydrology, and actions within one zone have little or no impact on adjacent zones. Management zones are used to characterize the groundwater level, storage, production, and water quality conditions. Throughout these management zones, there are 19 existing spreading basins that have the capability of recharging stormwater, recycled water, and/or imported water into the Chino Basin (OBMPU 2020). A description of each of the management zones is listed below.

- Management Zone 1: This zone is bounded on the southwest by Chino and Puente Hills, on the northwest by the San Jose fault that separates the Chino Basin from the Pomona and Claremont Heights Basins, on the north by an unnamed non-echelon fault system, and on the east by a line that stretches from the southernmost edge of the Red Hill fault to Prado Dam. Groundwater generally flows south with some localized flows to the west in response to groundwater production.

- Management Zone 2: This zone is bounded on the west by Management Zone 1, on the north by the Red Hill fault, on the northeast by a segment of the Rialto-Colton fault, and on the east by a segment of Barrier J. Groundwater generally flows in a southwesterly direction in the northern half of the zone and then due south in the southern half of the zone.

- Management Zone 3: This zone is bounded on the west by Management Zone 2, on the northeast by the Rialto Colton fault, and on the southeast by the Bloomington divide. Groundwater generally flows in a southwesterly direction.

- Management Zone 4: This zone is bounded on the west by Management Zone 3, on the north by the Jurupa Hills, on the southeast by the Pedley Hills, and on the south by Management Zone 5. Groundwater flows west.

- Management Zone 5: This zone is bounded on the north and west by Management Zones 3 and 4, on the east by the Riverside Narrows, and on the south by the La Sierra area and Temescal Basin.

4.2.2.2.1 Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA), passed in 2014 and amended in 2015, creates a framework for sustainable, local groundwater management in California. SGMA directed DWR to identify priority groundwater basins for the purpose of implementing SGMA. SGMA requirements to create sustainable groundwater management agencies and sustainable groundwater management plans no later than 2022 applies only to high and medium priority basins. SGMA exempts adjudicated groundwater basins – those that already operate under a court-ordered water management plan – from the requirements of designating a Groundwater Sustainability Agency and developing a Groundwater Sustainability Plan. The Chino Basin is an adjudicated basin and is included in SGMA's list of exempt basins. The Chino Basin priority is "very low" as established by the DWR in the 2019 Basin Prioritization Report.

4.2.2.2.2 Chino Basin Management and Safe Yield

The Chino Basin is managed according to the 1978 Judgement described in Section 1. In 1998, the Chino Basin Watermaster developed an integrated set of water management goals and actions for the basin known as the Optimum Basin Management Program (OBMP). The goals of the OBMP are to enhance basin water supplies, protect and enhance water quality, enhance basin management, and equitably finance the OBMP.

The court judgement allocates groundwater rights by establishing an annual pumping "safe yield" for each Pool described above. The Operating Safe Yield (OSY) is the annual amount of groundwater that can be pumped from the Chino Basin by the Pool parties free of replenishment obligations. For planning purposes, controlled overdraft for the Appropriative Pool was not included. Annual groundwater production in excess of the OSY is allowed by the adjudication, provided that the pumped water is replaced and recharged back into the groundwater basin.

In 2011, the OSY for the basin was reassessed and was estimated to be 135,000 AFY for the period FY 2010/2011 to FY 2019/20. The next effort to recalculate the Safe Yield was recently completed in 2020 for the period FY 2020/21 to FY 2029/30 at 131,000 AFY.

As discussed in Section 1, the land use in the region has changed from primarily agricultural to primarily urban in the past several decades. It was anticipated that municipal pumping would be less than the agricultural pumping. The Chino Basin Desalters were identified as the optimal multi-benefit project to replace the expected decrease in agricultural production while also pumping and treating contaminated and high-salinity groundwater.

4.2.2.3 Chino Basin Desalter Facilities

The Chino Basin Desalters provide a local source of potable water supply through treatment of unusable groundwater. They also provide hydraulic control of the lower Chino Groundwater Basin. These facilities are critical to the continued use of recycled water in the region as well as the improvement of groundwater quality and yield in the Chino Basin. IEUA operates one of the facilities (Chino I Desalter) under contract with the CDA. The City of Chino, City of Chino Hills, and City of Ontario purchase water from the CDA.

The CDA was formed to manage the production, treatment, and distribution of highly treated potable water to cities and water agencies throughout the Chino Basin. A Joint Exercise of

Powers Agency, the CDA was formed by the Jurupa Community Services District; Santa Ana River Water Company; Western Municipal Water District; the Cities of Chino, Chino Hills, Norco, and Ontario; and IEUA to treat brackish groundwater extracted from the lower portion of the Chino Basin. Brackish water is water that has more salt [about 1,000 parts per million (ppm) of TDS] than fresh water, but not as high as seawater (about 35,000 ppm of TDS).

The Chino I Desalter was constructed in 2000 through a Joint Participation Agreement among five agencies: SAWPA, Western Municipal Water District, Orange County Water District, MWD, and IEUA. The Chino II Desalter was constructed in 2007 and provides a supplemental supply to the Cities of Chino, Chino Hills, and Ontario located within IEUA's service area as well as to the Jurupa Community Services District, City of Norco and the Santa Ana River Water Company located outside of IEUA's service area. The treatment processes at the Chino I and Chino II Desalters include RO and IX for the removal of nitrate and TDS. The treatment processes at Chino I Desalter also includes air stripping for the removal of VOCs.

These facilities serve three purposes. First, they convert unusable groundwater into a reliable potable water supply for the region and are part of a long-term pollution cleanup strategy for the Chino Basin. Second, they provide hydraulic control over the lower Chino Basin, which prevents the migration of poor-quality water into the Santa Ana River as well as downstream impacts on groundwater basins in Orange County. Third, they maintain and enhance groundwater yield for the Chino Basin.

Currently, there are 31 Chino Desalter wells with the capacity to pump about 37,600 AFY of groundwater from the southern portion of the Chino Basin, but not all wells are in operation (OBMPU 2020). Over the last 5 years, the Chino I and Chino II Desalters have produced between 28,100 and 30,000 AFY, averaging 29,200 AFY of treated groundwater combined (OBMPU 2020). IEUA retail agencies who receive water from the Desalter facilities as part of their water supply portfolios include the cities of Chino, Chino Hills, and Ontario. The Phase III expansion of the program was completed in 2016 which provided an additional 10,000 AFY of capacity. This final expansion of the system allows the Desalters to meet the 40,000 AFY pumping per the OBMP Peace Agreements. Table 4-4 shows the amount of groundwater purchased by IEUA retail agencies from the CDA for water from the Chino I Desalter over the past 5 years. IEUA retail agencies only purchase a portion of the total groundwater produced; the Western Municipal Water District also purchases groundwater from the CDA.

Table 4-4: CDA I Volume (AFY) Purchased by IEUA Retail Agencies Over Past 5 Years (DWR Table 6-8ds)

Plant Name or Well ID	Plant Capacity (AFY)	Intake Type	Source Water Type	Influent TDS	Brine Discharge	2016	2017	2018	2019	2020
Chino Desalter Authority	40,000	Open water Intake	Ground water	1,000 ppm	Brine Line	11,883	12,292	13,242	15,010	14,649
					TOTAL	**11,883**	**12,292**	**13,242**	**15,010**	**14,649**

Note: Purchased by the cities of Chino, Chino Hills, and Ontario from Chino I Desalter. These three IEUA retail agencies only purchase a portion of the total water produced by the CDA. Data from the IEUA FY 19/20 Annual Water Use Report.

4.2.2.4 Other Groundwater

Local groundwater supplies from basins other than the Chino Basin are a significant supplemental source of water for the retail water agencies within IEUA's service area. These basins include the Cucamonga, Rialto, Lytle Creek, Colton, and the Six Basins groundwater basins. The Six Basins is comprised of the Ganesha, Live Oak, Pomona, Lower Claremont Heights, Upper Claremont Heights, and Canyon Basin.

IEUA's retail agencies that use groundwater from all or some of these basins include the City of Upland, CVWD, and FWC. IEUA does not provide groundwater directly to its retail agencies.

4.2.3 Stormwater

Stormwater is water that originates during rainfall and snow melt. IEUA does not provide stormwater directly to its retail agencies. The stormwater primarily comes from surface water runoff from rain and snow that falls in the San Gabriel Mountains and moves down through the Santa Ana watershed. In undeveloped areas, the soil absorbs much of the runoff and helps retain the water within the groundwater basin. However, developed areas with a significant amount of impermeable surfaces tent to accumulate runoff in large quantities in a relatively short amount of time. Stormwater runs off roofs, through streets, and into regional storm drains, which are largely diverted into the region's flood control channels.

There are six major flood control channels spread throughout the Chino Basin region. These channels collect and manage the stormwater generated within the watershed. Major flood control channels that convey stormwater within IEUA's service area include:

- San Sevaine Creek
- Day Creek
- Deer Creek
- Cucamonga Creek
- West Cucamonga Creek
- San Antonio Creek.

Located adjacent to the channels are detention basins that are operated regionally under a multiple-use agreement for both flood control and groundwater recharge operations. IEUA, the Chino Basin Watermaster, the Chino Basin Water Conservation District and others work closely with the San Bernardino Flood Control District to maximize the amount of stormwater that can be captured and recharged into the Chino Groundwater Basin. These channels also carry dry weather runoff from excessive outdoor irrigation. Stormwater percolates to groundwater and is not utilized directly as a supply type but is counted in the volume of annual groundwater supply.

Runoff that is not captured by detention basins ultimately flows to the Santa Ana River. While there are efforts by agencies further downstream to capture these flows, large amounts of water discharge into the ocean during storm events.

4.2.4 Recycled Water and Reuse

IEUA has produced and distributed high quality recycled water since 1972 when the Agency expanded its services to include regional wastewater treatment. IEUA serves recycled water for both indirect use (outdoor irrigation, industrial processing) and groundwater recharge.

IEUA owns and operates four regional recycled water plants that produce disinfected and filtered tertiary treated recycled water in compliance with California's Title 22 regulations. The four water recycling plants are: Regional Water RP-1, RP-4, and RP-5, and the CCWRF. These four plants treated 55,233 AF of wastewater and produced approximately 30,495 AF of recycled water during FY 2019-20. The volume not used for recycled water (24,715 AF) was discharged to the discharge locations described in Table 5-1. IEUA also owns an additional regional recycled water plant, RP-2, which only performs solids handling and is scheduled for decommissioning due to its location. More details about IEUA's recycled water system are included in Section 5.

4.2.5 Transfers, Exchanges, and Groundwater Banking Programs

Water transfers are a water management tool used to alleviate water shortages in IEUA's service area and the Santa Ana River Basin. Water transfers allow an agency to move or sell water from one service area to another, even when the agencies are not connected by pipelines. Water transfers can be effective during periods of severe drought or emergencies and take multiple forms to increase local reliability among agencies. The Chino Basin is a valuable resource for water transfers because it acts as a storage facility that has a capacity of up to 6 MAF.

IEUA provides imported water from MWD to WFA, CVWD, and FWC directly. WFA provides water via interconnections to Upland, Ontario, MVWD, and the City of Chino. MVWD has an interconnection that provides an annual supplemental water supply to the City of Chino Hills. In FY 19-20, MVWD sold approximately 7,707 AFY to the City of Chino Hills. Interconnections also exist between CVWD and FWC. Upland has interconnections with SAWCo, CVWD, Ontario, and Chino. The CDA's Chino I and Chino II Desalters have interconnections with all participating agencies with a common supply with booster pumps and storage reservoirs that provide flexibility and reliability during emergencies and drought conditions. The CDA provides water to Chino, Chino Hills, Ontario, and other external agencies.

The Chino Basin Recycled Water Groundwater Recharge Program was created as part of the Chino Basin OBMP and is jointly sponsored by IEUA, CBWM, CBWCD, and the SBCFCD. The purpose of the program is to enhance water supply reliability and improve drinking water quality throughout the basin. A network of pipelines direct stormwater run-off, imported water, and IEUA recycled water to 16 recharge sites throughout the IEUA service area. These recharge basins hold the water so it can percolate into the ground and replenish the groundwater supply. Currently, only 10 of the 16 groundwater recharge basins are permitted to receive recycled water.

4.3 Historical and Current Imported Supplies

4.3.1 Metropolitan Water District

IEUA was originally formed in 1950 to act as a municipal wholesale water district in order to provide regional municipalities with imported water purchased from MWD as a supplemental source of water. Due to water quality considerations in the Chino Basin, IEUA only purchases State Water Project water from MWD for its supplies. Table 4-5 and Table 4-6 show the current and projected amount of water supplies that IEUA will have available to supply its retail agencies.

Table 4-5: IEUA Water Supplies – Actual (DWR Table 6-8)

		2020		
Water Supply	**Additional Detail on Water Supply**	**Actual Volume**	**Water Quality**	**Total Right or Safe Yield *(optional)***
Purchased or Imported Water	MWD	66,438	Raw Water	
Recycled Water	Direct Use and Groundwater Recharge	30,495	Recycled Water	
	Total	**96,933**		

Note: Recycled water supply includes recycled water for both direct use and groundwater recharge. From IEUA Annual Water Use Database and FY 19/20 Recycled Water Annual Report.

Table 4-6: IEUA Water Supplies – Projected (DWR Table 6-9)

		Projected Water Supply Report to the Extent Practicable									
		2025		2030		2035		2040		2045 *(opt)*	
Water Supply	Additional Detail on Water Supply	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*
Purchased or Imported	MWD	93,283		93,283		93,283		93,283		93,283	
Recycled Water	Direct Use and Groundwater Recharge	60,073		63,207		64,142		66,836		66,836	
	Total	**152,356**		**156,490**		**157,425**		**160,119**		**160,119**	

Note: Purchased or Imported Water from MWD is IEUA's maximum contract amount for MWD water from Resolution 2014-12-1. Recycled Water projections from draft wastewater plant flow projections.

4.3.2 Imported Water Rates

The IEUA Board of Directors established the most recent rates for the delivery of imported water supplies on July 15, 2020. Effective July 1, 2020 and January 1, 2021, IEUA's rates for imported water are listed in Table 4-7 for the 2020, 2021, and 2022 Calendar Years (IEUA, Resolution No. 2020-7-7, July 2020).

Table 4-7: MWD Imported Water Rates

Rate Type	2020	2021	2022
Tier 1 Full Service Untreated	$755 per AF	$777 per AF	$799 per AF
Tier 2 Full Service Untreated	$842 per AF	$819 per AF	$841 per AF
WSAP Penalty[(a)]	2 X Tier 1 (100% - 115%) 4 X Tier 2 (115% or greater) Imposed by MWD		
Capacity Charge	$8,800 per cfs	$10,700 per cfs	$12,200 per cfs

Notes:

(a) Metropolitan Water Supply Allocation Plan (WSAP) Penalty rates are applied for exceedances of reduced imported water allocations from MWD caused by the adoption of a WSAP. Any penalty rates are "passed through" to the appropriate agency that caused the imposition of a penalty rate by MWD.

cfs = cubic feet per second

4.4 Planned Water Supply Projects and Programs

IEUA's Ten-Year Forecast (TYF) includes wastewater, recycled water, groundwater, stormwater, and conservation projects to enhance local supplies and reliability for the service area. These projects provide supply reliability and consist of groundwater recharge basin improvements, improving treatment and distribution of wastewater and recycled water facilities, and increasing conservation. These plans are described generally in the following sections and a summary of these projects are included in Table 4-8.

Table 4-8: IEUA's Expected Future Water Supply Projects or Programs (DWR Table 6-7)

X	Some or all the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format in this section (Section 4.4).

Name of Future Projects or Programs	Joint Project with other suppliers?	Description	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Supplier
Recharge Basin Improvements	Yes, Chino Basin Watermaster	See Section 4.4.5	2021	All Year Types	11,852 AF

Name of Future Projects or Programs	Joint Project with other suppliers?	Description	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Supplier
Water Use Efficiency Business Plan	Yes, Retail Agencies, MWD, and others	See Section 4.4.1 and Section 8	2020/2025	All Year Types	9,008 AF
Recycled Water Interties	Yes, Western Riverside County Regional Wastewater Authority	See Section 4.4.3	To be determined	All Year Types	6,000 AFY
RP-5 Liquids Treatment Expansion	No	See Section 4.4.3	2020/2025	All Year Types	See Note
RP-1 Liquids Capacity Recovery and Solids Treatment Expansion	No	See Section 4.4.3	2030/2035	All Year Types	See Note

Note: The projects and schedule detailed in this table are subject to change. Expected Increase in Water Supply is not compatible with some of these projects as they give IEUA the capacity to meet flows and do not provide water on their own. Recharge Basin improvements increase the amount of stormwater and recycled water that can be recharged to the Chino Basin.

4.4.1 Water Management Tools

Resource optimization such as groundwater recharge minimizes IEUA's reliance on imported water. Optimization efforts are typically led by regional agencies in collaboration with local/retail agencies. The 2020 WUEBP is under development, and may focus on using water more efficiently, eliminating water waste, and drought-proofing the region. The plan identifies inefficient water use within the region and provides recommended programs and tools that can be implemented by IEUA's retail agencies to continue increasing water use efficiency.

4.4.2 Transfer or Exchange Opportunities

Since IEUA receives its SWP imported water through MWD, any transfer or exchange opportunities related to SWP allocation would be coordinated by MWD. IEUA does not have any current projects or plans related to the transfer or exchange of its imported water.

The Chino Basin area itself is a large area and consists of many other water agencies outside of IEUA's retail agencies. To increase water supplies and provide flexibility, IEUA is continuing conversations amongst water agencies within the Santa Ana River Watershed and its retail agencies to further explore the opportunity to secure long-term partnerships. Various inter-agency connections would also enhance flexibility and increase reliability in local areas, as well as regional supplies. This would allow IEUA and its retail agencies to have a more robust system for aid during outages, emergencies and to optimize the use of local water supplies.

4.4.3 Non-Potable Reuse Opportunities

By emphasizing local water supply development within the service area, the region has developed and will continue to develop cost-effective supplies that reduces the dependence on imported supplies. Non-potable reuse of current supplies, as well as expansion and robust improvement of facilities and standards will further help IEUA and the region answer challenges and increase supply benefits.

One of the larger supply projects is the expansion of the liquids treatment and the construction of a wastewater solids handling facility at RP-5. The solids handling will replace the solids handling currently at RP-2, since the plant is located in a flood zone and will be decommissioned. There are also potential recycled water connections to neighboring agencies being explored to increase non-potable reuse and improve recycled water supply reliability for the region. These potential connections include extending pipelines and adding pumping facilities to serve additional recycled water to the eastern portion of its service area and the construction of a pipeline that will function as a recycled water intertie between the Western Riverside County Regional Wastewater Authority and IEUA, as well as a potential recycled water intertie between the City of Rialto and IEUA.

A future Advanced Water Purification Facility (AWPF) is also included in the TYF to ensure compliance with regulatory requirements, as well as a long-term component of regional water supply enhancement. This project was included in the IEUA Master Plan, IRP, and TYF to anticipate compliance with future standards expected in the 2030s. The project may potentially include the evaluation and forecasting of the AWPF, injection wells, and conveyance and other auxiliary facilities. IEUA is regularly monitoring its compliance metrics to address TDS and other regulatory challenges.

A liquids capacity recovery and solids treatment expansion of the Regional Water RP-1 project is expected to begin construction in FY 2026/27.

TYF recycled water projects to increase both direct use and groundwater recharge are expected to provide approximately 30,000 AFY of direct use and 18,700 AFY of groundwater recharge supply by as early as 2025.

4.4.4 Desalination Opportunities

The UWMP Act requires a discussion of potential opportunities for use of desalinated water (Water Code Section 10631[i]). IEUA operates and maintains the Chino I Desalter that is managed by the CDA. The CDA Program is a significant source of groundwater production for the region. Since the completion of the Phase III expansion project in 2016, the total pumping capacity of the CDA program is approximately 40,000 AFY of potable water. Over the last 5 years, the Chino I and Chino II Desalters have produced between 28,100 and 30,000 AFY, averaging 29,200 AFY of treated groundwater combined. In 2020, the Chino I and II Desalter's produced approximately 30,246 AFY of treated groundwater, of which approximately 14,649 AFY was delivered to IEUA retail agencies.

The future AWPF mentioned above is also an opportunity to increase available groundwater desalination supply. Advanced treatment would sufficiently reduce the salinity of brackish

groundwater and remove other possible contaminants to create additional water supply for the region.

4.4.5 Groundwater Recharge

Groundwater recharge and production are an integral part of IEUA's water system due to the substantial storage in the Chino Basin. As part of IEUA's commitment to its retail agencies and region, there are various projects working towards efficient means of groundwater production and increasing recharge capacity for the area.

As part of the Recharge Master Plan Update completed in 2013, IEUA and the CBWM evaluated 27 yield enhancing capital projects for the Chino Basin. In 2017, CBWM and IEUA approved the implementation of recharge improvements as part of the Update for the following basins: Wineville Basin, Jurupa Basin, Victoria Basin, Lower Day Basin, and Montclair Basin. The recharge improvement project design began in 2017, construction started in 2018, and project completion is expected to occur in 2020/2021. The next Recharge Master Plan Update is scheduled to be kicked off in 2021 and completed by 2023, as a collaborative effort to continue evaluating recent efforts and explore further enhancements.

In conjunction with CBWM, IEUA and retail agencies also worked with the region on the 2020 Optimum Basin Management Program Update (OBMPU). This Update includes multiple potential improvements to recycled water, groundwater, stormwater, and other existing systems. Potential improvements are outlined for existing facilities and operations and new facilities to achieve additional stormwater recharge potential alongside other program elements in the Update. IEUA has also worked with its retail agencies and the larger region to explore concepts for possible future enhancements through its Integrated Water Resources Plan and modeling effort. To answer challenges associated with groundwater contamination and increasing regulations, concepts discussed include use of turnouts as extra supply for hard reaching areas, well-head treatment, and the benefit of centralized treatment plants. These plans are currently only in the conceptual phase and may be further modeled and explored in the coming years.

4.4.6 Stormwater Management

It is widely recognized that the patterns of urban development, including hard surfacing (roads, roofs) and storm water management systems (concrete channels) have resulted in a significant reduction in natural infiltration of storm water into the groundwater within southern California and throughout the nation. CBWM estimated that the Chino Basin was losing on average about 40,000 AF of stormwater annually that previously replenished the groundwater basin because of historical patterns of development. The 2020 OBMPU identifies maximizing stormwater recharge as a primary goal for the Basin and has identified improvements to existing facilities and operations to be made. The theoretical average annual stormwater discharge available for diversion is about 74,000 AFY and the annual average stormwater recharge volume is approximately 15,000 AFY (OBMPU). In 2018, IEUA and the CBWM identified potential new stormwater recharge projects. Due to the unit cost of the new projects, which was greater that the projected cost of imported water supplied by MWD, no project was recommended for implementation at that time. The evaluation of stormwater recharge projects will again be completed in the 2021 Recharge Master Plan Update.

4.5 Effects of Climate Change

As discussed in Section 1.10.2, IEUA's service area faces hydrologic changes and uncertainty caused by the effects of climate change that may impact its water supplies. In general, the IEUA region expects an overall decrease in supply sources, caused by increased temperatures, increased intensity of extreme weather events, and shifting snowmelt and runoff patterns.

IEUA's imported water supply may be impacted by shifting snowmelt and runoff patterns that affect the capture and storage of snowmelt for the SWP. The reliability of SWP water is expected to decrease as climate change-caused precipitation changes continue. This decrease in reliability indicates a need to improve regional sustainability and decreased dependency on the SWP. In order to increase its resiliency in the face of climate change impacts, IEUA and the region plans to further develop its recycled water and local water supplies.

Local supplies are not immune to the effects of climate change, however. Local surface water supplies are dependent on precipitation and temperature, which are influenced by climate change. Extreme precipitation events can result in short periods with high volumes of runoff that will be difficult to capture, while extended droughts or dry years will result in long periods without these supplies. Higher temperatures will also cause more evaporation and transpiration, reducing the volume of water bodies such as lakes, as well as the amount of soil moisture.

Local groundwater may be adversely impacted by increased temperatures as well. Groundwater elevation and water quality may decrease during periods of drought or by the inability to capture and recharge stormwater due to increased storm intensity. Reduced rainfall and increased groundwater withdrawal may lead to more salinity buildup and increased concentrations of nitrate and other constituents, requiring the need for additional water supply for blending or investment in advanced treatment technologies (DCP 2020). Reductions in groundwater recharge caused by lower levels or precipitation or stormwater infiltration could impact the quality of the groundwater and result in regulatory violations that preclude the use of the source. A description of the water quality concerns and their possible impacts on reliability within the IEUA region is included in Section 6.

The 2018 CCAP identified recycled water supplies as a critical asset in bolstering a flexible management portfolio since these supplies are generated locally and not impacted by climate. While not directly impacted by climate change effects, applications for recycled water in the basin may become constrained if the salinity in the basin rises beyond the RWQCB's specified limits. In addition, reduced wastewater flows during drought periods due to conservation mandates may impact the volume of recycled water available for use.

The impacts of climate change of the region's water supplies are not insignificant and must be addressed to ensure the availability of sufficient water supplies. IEUA will continue assessing and addressing climate change vulnerabilities moving forward through development of its CCAP, development of its WUEBP, and participation in MWD's Local Resource Program to develop local supplies.

4.6 Reduced Delta Reliance

The Delta Plan is a comprehensive, long-term resource management plan for the Sacramento-San Joaquin Delta (Delta) that was developed as part of the Delta Reform Act of 2009 (Water code section 85000 et seq) and includes both regulatory policies and recommendations, aimed at promoting a healthy Delta ecosystem. Delta Plan Policy WR P1 [California Code of Regulations (CCR), Title 23, § 5003] is one of 14 regulatory policies in the Delta Plan. WR P1 identifies UWMPs as the tool to demonstrate consistency with state policy to reduce reliance on the Delta for any Supplier that is participating in or carrying out a proposed covered action or receiving Delta water from a proposed covered action. Within the supplier's UWMP, information should be provided that can be used to demonstrate consistency with this policy. Section (c)(1) of WR P1 states that suppliers that have (A) completed an urban water management plan, (B) implemented the efficiency measures in that plan, and (C) shown a measurable reduction in Delta reliance and improvement in regional self-reliance in the plan, are contributing to reduced reliance on the Delta and are therefore consistent with WR P1 [CCR, Title 23, § 5003(c)(1)].

IEUA is an urban water supplier and a member agency of MWD. As a recipient of imported water delivered via MWD, IEUA may indirectly receive water through a proposed project (covered action) and/or receive water from the Delta. MWD has prepared a detailed analysis that demonstrates consistency with the Delta Plan Policy (MWD 2020 UWMP, Appendix 11). In addition, IEUA has completed its own analysis, which is included in Appendix G. The analysis show that IEUA expects to increase its supplies contributing to regional self-reliance as a percent of demand by approximately 17.5% by 2045. As a recipient of water from MWD, it is infeasible for IEUA to determine the volume of its imported water supplies that come directly from the Delta. Therefore, IEUA's calculation of reduced reliance on Delta water supplies comes from MWD's regional analysis. This analysis shows that MWD's expects to reduce the percent of water supplies expected to come from the Delta by 5.2% by 2045.

In addition, this document also identifies future local supply opportunities (Section 4.3) and WUE measures (Section 8) that will increase IEUA's regional self-reliance and reduce demand for imported water. IEUA is continuing to look into local, cost-effective, and technically feasible water supply sources, as described in these sections and its WUEBP. A measurable reduction in Delta reliance and improvement in regional self-reliance can be seen from the achievements of the past 5 years of WUE and the projections for recycled water use. Over the past 5 years, IEUA's water use efficiency program has saved approximately 30,974 AF of water over the lifetime of the measure (Section 8.8). Over the next 5 years, the WUE program expects to save an additional 9,008 AF of water. By 2045, the IEUA region expects 10% of its supply to come from recycled water. Non-potable reuse is expected to increase through 2045 to 30,424 AFY and groundwater recharge is expected to increase to 16,420 AFY by 2025 and remain fairly constant through 2045 (Section 5.4). IEUA and its retail agencies remain committed to enhancing local supply and implementing water use efficiency measures to reduce their demand on imported water, thereby reducing reliance on the Delta.

Section 5: Recycled Water and Reuse

5.1 Recycled Water Planning

Recycled water opportunities have continued to grow in southern California as public education and the need to expand local water supplies continues to be a priority. Recycled water also provides a degree of flexibility and added reliability during drought conditions when imported water supplies are restricted. Recycled water is wastewater that is treated through primary, secondary, and tertiary processes and is acceptable for most non-potable water purposes such as irrigation, and commercial and industrial process water following Title 22 requirements.

IEUA began providing recycled water to customers in 1972. Initially, recycled water was delivered to a few large water users such as the Whispering Lakes Golf Course and Westwind Park in the City of Ontario, and Prado Park and Golf Course in the City of Chino.

In the early 1990s, IEUA began the construction of the first phase of the CCWRF that included treatment facilities and distribution pipelines to serve customers in Chino and Chino Hills. In conjunction with the construction of the first phase of the CCWRF, IEUA began planning for a regional recycled water delivery system to provide recycled water throughout its service area. This planning effort culminated with the completion of the IEUA Regional Recycled Water Program Feasibility Study in January 2002.

In 2004, IEUA developed a regional recycled water program implementation plan to prioritize the phased construction of the adopted 2002 Recycled Water Program Feasibility Study. This major planning effort resulted in the completion of the 2005 Recycled Water Implementation Plan (RWIP).

In 2007, IEUA developed the Recycled Water Three-Year Business Plan. The Business Plan was intended to guide the expansion of IEUA's recycled water system. The Plan focused on the most cost effective and quickest ways to increase the amount of recycled water available and used within IEUA's service area. The Plan focused on the following 3 years, to be revised and updated on an annual basis. Metrics and an annual use goal were identified for each year. Revisions/updates to the Plan were made with an FY 2010-11 update memo, the Wastewater Facilities Master Plan in 2014, the RWPS in 2015, and the IEUA FY 2015-16 Budget and Ten-Year Capital Improvement Plan (TYCIP).

More recently, the IEUA FY 2020-21 TYF, the 2018 CCAP, and the 2020 Regional Drought Contingency Plan have been used to evaluate future recycled water system projects that would benefit IEUA and its retail agencies. All three reports identified the goal of maximizing recycled water production and usage as crucial for increasing IEUA's independence from imported water supply and its resiliency during drought scenarios. As discussed in Section 2.1.2, additional studies related to wastewater flows and recycled water production are currently underway.

5.2 Regional Facilities

Regional recycled water facilities are plants, pipelines, pump stations, and reservoirs that serve recycled water to a recharge site or to more than one contracting agency. Regional facilities are

constructed, owned, and operated by IEUA. Local facilities deliver recycled water from the regional facilities to customers within a contracting agency's service area and are maintained by the contracting agency. These local facilities consist mainly of pipelines (local laterals) but can also include pump stations and reservoirs. Joint regional/local facilities can be financed by IEUA to ensure timely implementation of the recycled water program. Local agencies are responsible for the planning, design, construction, and operation of local laterals and other local recycled water facilities. IEUA works closely with each agency to coordinate their recycled water planning efforts.

The regional recycled water facilities consist of a looped pipeline system that connects all four Regional Water RPs. The treated effluent from the four regional wastewater recycling effluent pump stations is delivered to the recycled water retail agencies and customers through five pressure zones, several hundred miles of pipelines, three booster pump stations, three storage reservoirs, and pressure regulating stations. The IEUA recycled water system is shown on Figure 4.

Recycled Water Distribution System

Legend Key

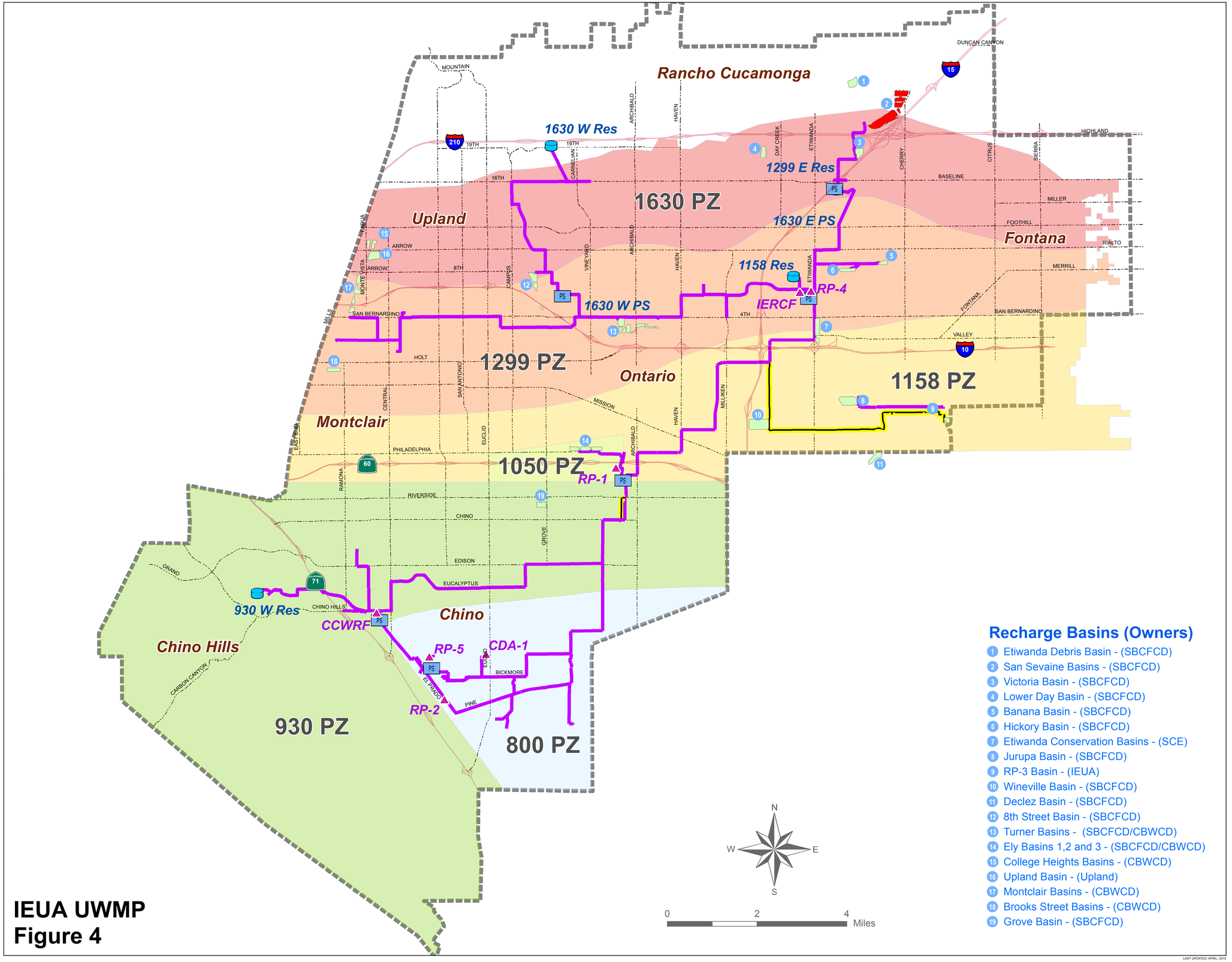
Pipeline Status
- Design
- Bid
- Construction
- Operating

Pump Station Status
- Design
- Bid
- Construction
- Operating

Reservoirs Status
- Design
- Bid
- Construction
- Operating

Recharge Improvement Status
- Design
- Bid
- Construction
- Operating

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT



Recharge Basins (Owners)

1. Etiwanda Debris Basin - (SBCFCD)
2. San Sevaine Basins - (SBCFCD)
3. Victoria Basin - (SBCFCD)
4. Lower Day Basin - (SBCFCD)
5. Banana Basin - (SBCFCD)
6. Hickory Basin - (SBCFCD)
7. Etiwanda Conservation Basins - (SCE)
8. Jurupa Basin - (SBCFCD)
9. RP-3 Basin - (IEUA)
10. Wineville Basin - (SBCFCD)
11. Declez Basin - (SBCFCD)
12. 8th Street Basin - (SBCFCD)
13. Turner Basins - (SBCFCD/CBWCD)
14. Ely Basins 1,2 and 3 - (SBCFCD/CBWCD)
15. College Heights Basins - (CBWCD)
16. Upland Basin - (Upland)
17. Montclair Basins - (CBWCD)
18. Brooks Street Basins - (CBWCD)
19. Grove Basin - (SBCFCD)

IEUA UWMP
Figure 4

LAST UPDATED: APRIL, 2015

5.2.1 Wastewater Collection and Treatment

IEUA manages the Regional Sewage Service within its 242-square mile service area to collect, treat, and dispose of wastewater delivered by contracting local agencies. IEUA's facilities serve seven contracting agencies: cities of Chino, Chino Hills, Fontana, Montclair, Ontario, and Upland, and the CVWD. A system of regional trunk and interceptor sewers convey sewage to regional recycled water plants that are owned and operated by IEUA. Local sewer systems are owned and operated by local agencies.

IEUA also operates a non-reclaimable wastewater system (NRWS) that includes pipelines and pump stations that export the high-salinity industrial wastewater generated within the service area for treatment and eventual discharge to the Pacific Ocean. These water sources are not suitable for non-potable reuse. The NRWS is comprised of two separate collection systems independent of the regional wastewater system. The North System which discharges to the Sanitation District of Los Angeles County treatment facility in the city of Carson, and the South System which discharges to the Santa Ana Watershed Project Authority and the Orange County Sanitation District facility in Fountain Valley. The treated brine is then discharged to the Pacific Ocean.

5.2.2 Wastewater Treatment Plants

The wastewater collected in the regional sewer system is treated at the four RPs that IEUA owns and operates. The recycled water produced at the RPs meets Title 22 standards for non-potable reuse and groundwater recharge. All the RPs have primary, secondary, and tertiary treatment and recycled water pumping facilities that are interconnected in a regional network that IEUA also owns and operates. Effluent that is not beneficially reused from the RPs is discharged to nearby creeks that feed into the Santa Ana River where a portion of the water is recharged into the Chino Basin.

The four regional facilities are the RP-1, RP-4, RP-5, and CCWRF. RP-1 and RP-4 serve mostly the northern parts of the service area and RP-5 and CCWRF serve mostly the southern parts of the service area.

RP-1 is located in the City of Ontario and was originally commissioned in 1948. The current wastewater treatment capacity of RP-1 is 44 MGD, although it currently treats approximately 21 MGD. There are three sets of effluent pump stations that pump from RP-1 to four different pressure zones. RP-1 also has a 60 MGD biosolids treatment capacity, to treat biosolids which come from both RP-1 and RP-4. The stabilized, dewatered solids are trucked from RP-1 to the Inland Empire Regional Composting Facility for further treatment to produce Grade A compost.

RP-4 is located in the City of Rancho Cucamonga and has been in operation since 1997. RP-4 has a capacity of 14 MGD, and currently treats approximately 10 MGD. Waste sludge from RP-4 is discharged back to the sewer and flows by gravity to RP-1. RP-4 serves three pressure zones.

RP-5 is located in the City of Chino and has been in operation since 2004. The plant has a 15 MGD capacity for raw sewage and 1.3 MGD capacity for solids processing from RP-2. Currently, RP-5 is treating approximately 8.4 MGD. Ultimately, RP-5 is planned to treat up to

60 MGD of wastewater and 68 MGD of solids combined from both RP-5 and the CCWRF. The disinfected effluent from RP-5 flows to a common channel where it can be discharged to a creek or pumped to a single pressure zone.

The CCWRF is located in the City of Chino and has been in operation since 1992. The plant was designed to treat up to 11.4 MGD and currently treats approximately 9.5 MGD. The removed biosolids are pumped to RP-2 for processing. RP-2 is an older plant that is owned by IEUA and is only used for solids handling. RP-2 is scheduled for decommissioning within the next 10 years. The CCWRF serves one pressure zone.

IEUA uses bypass and diversion facilities to optimize flow and capacity within the system through the San Bernardino Avenue Lift Station, Montclair Lift Station and Diversion Structure, RP-4 and CCWRF influent bypass (CCWRF influent bypass), RP-1 primary effluent diversion, and Etiwanda Trunk Line. Flows are routed between RPs to maximize recycled water deliveries while minimizing overall pumping and treatment costs. Aside from the San Bernardino Avenue Lift Station and the Montclair Lift Station, IEUA also operates the Prado Park Lift Station and RP-2 Lift Station in the sewer collection system to shift flows from one portion of the service area to another, and to pump from low points to high points.

5.3 Historical and Current Wastewater Flows

IEUA uses sewage bypass and diversion facilities to optimize the flows and capacity utilization. In general, flows are routed between plants to maximize recycled water deliveries and recharge while minimizing overall pumping and treatment costs. Currently, the regional interceptors can bypass flow from RP-4 to RP-1 and from CCWRF to RP-5. Primary effluent can also be bypassed from the RP-1 equalization basins to RP-5. The four sewer lift stations are also used to balance flows and keep water in the northern portion of the service area. Table 5-1 shows wastewater treated, recycled, and disposed of in IEUA's service area in FY 2019-20.

Over the past decade, the region has experienced increased indoor water use efficiency as a result of drought, public policy, more efficient building codes and devices, and effective conservation program campaigns. At regional facilities, this has resulted in a decrease in the volume of sewage flows of approximately 10% since 2013, as reported in the FY 2020-21 TYF. Despite this decrease, the population has increased, resulting in increased sewage strength. Even with decreasing wastewater flows, IEUA has been able to recycle more water through diversion with the Montclair and San Bernardino Avenue Lift Stations. These lift stations provide the RPs in the northern service area with more wastewater as the recycled system has been expanded and is near the groundwater recharge basins.

In FY 19-20, a total of 56,384 AF of wastewater was treated, of which 25,899 AF was discharged and 30,495 AF was recycled within the IEUA service area. The wastewater treatment and discharge volumes for FY 19-20 are included in Table 5-1.

The 2015 Wastewater Facilities Master Plan Update projections were revised in 2020 to account for reduced wastewater flows observed at the treatment plants. The revised projected wastewater flows are expected to reach approximately 56 MGD by 2040. Forecast flows are based on historical flow trends and future growth provided by contracting agencies. As discussed in Section 2.1.2, wastewater flow projections are currently being updated.

Table 5-1: Wastewater Treatment and Discharge Within Service Area in 2020 (DWR Table 6-3)

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(Optional)*	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
RP-1	DP-001	Prado Lake	8 332818001	Lake outfall	Yes	Tertiary	26,932	25,889	30,495	0	N/A
	DP-002	Cucamonga Creek	8 332818001	River or creek outfall	Yes	Tertiary				0	N/A
RP-4	DP-002	Cucamonga Creek	8 332818001	River or creek outfall	Yes	Tertiary	10,718			0	N/A
RP-5	DP-003	Chino Creek	8 332818001	River or creek outfall	No	Tertiary	9,699			0	N/A
CCWRF	DP-004	Chino Creek	8 332818001	River or creek outfall	No	Tertiary	9,035			0	N/A
			Total				**56,834**	**25,889**	**30,495**	**0**	N/A

Note:
Data from FY 19/20 Recycled Water Annual Report and wastewater treatment plant flow data. Flow data is in acre-feet.

5.4 Current Recycled Water Uses

IEUA's recycled water distribution facilities consist of a pipeline network, booster pump stations, pressure regulating stations, and reservoirs as shown previously on Figure 4. These facilities allow distribution of recycled water into six pressure zones for non-potable reuse and groundwater recharge. A large transmission line connects RP-1 and RP-4 and serves the northern portion of IEUA's service area. The Edison and San Antonio Channel Pipelines were constructed to provide recycled water to areas of Ontario, Chino, and Montclair. Another transmission line ties RP-1 into RP-5 and CCWRF. Four storage reservoirs provide operational storage and have capacities varying from 3 million gallons (MG) to 5 MG. The three booster pump stations provide water from lower to higher pressure zones and three pressure reducing stations provide flow from higher pressure zones to lower pressure zones when the pressure drops below a certain point (Stantec, Recycled Water Program Strategy, April 2015). This system provides water for irrigating parks and golf courses. CCWRF's distribution system delivers water to the cities of Chino and Chino Hills.

Currently, there are over 1,300 recycled water metered connections to the recycled water distribution system. Delivered recycled water is beneficially reused for a variety of applications, including landscape and agricultural irrigation, school yards, commercial car washes and laundries, industrial process water, construction, dust control, and groundwater recharge.

A network of pipelines also directs stormwater run-off, imported water, and IEUA recycled water to 16 recharge sites throughout the IEUA service area. These recharge basins hold the water so it can percolate into the ground and replenish the groundwater supply. Currently,10 of the 16 groundwater recharge basins are permitted to received recycled water. Annually over the last 5 years, IEUA has recharged approximately 10,000 to 15,000 AF, the majority of which is recycled water.

In addition to the direct use demands and groundwater recharge program, IEUA maintains an annual base flow to the Santa Ana River at Prado Dam of up to 17,000 AF, which is currently met with recycled water. Groundwater recharge was the largest use in FY 2018/19, accounting for 41% of recycled water, followed by landscape irrigation (33%), and agricultural irrigation (21%).

In FY 2019-20, IEUA's recycled water usage was approximately 30,495 AF, of which approximately 16,278 AF was used for non-potable reuse (outdoor irrigation, industrial processes, and agriculture) by IEUA member agencies, approximately 773 AF was used directly by IEUA, and approximately 65 AF was used by San Bernardino County. An additional 13,381 AF was used for groundwater recharge. The total recycled water demand was 8% greater than FY 2018-19, with recycled water recharge up 16% and direct use up 2%. The remaining 25,889 AF wastewater not used for recharge or recycling was discharged to the Santa Ana River. Recycled water demands for the combined direct use and recharge purposes were approximately 57% of available supply, with a maximum demand of approximately 75% of available supply occurring during July through September.

Current and projected recycled water volumes through 2045 are shown in Table 5-2. Non-potable direct use is expected to increase to 27,571 AFY by 2045 and groundwater recharge is expected to increase to 16,420 AFY by 2025 and then remain constant through 2045.

Table 5-2: Current and Projected Retailers Provided Recycled Water Within Service Area (DWR Table 6-4)

Name of Receiving Supplier or Direct Use by Wholesaler	Level of Treatment	2020	2025	2030	2035	2040	2045 *(opt)*
Direct Use	Tertiary	17,115	22,880	25,742	25,742	27,771	28,271
Groundwater Recharge	Tertiary	13,381	16,420	16,420	16,420	16,420	16,420
Total		**30,495**	**39,300**	**41,297**	**42,162**	**44,191**	**44,691**

Note: 2020 value from FY 19/20 Recycled Water Annual Report. Projected values from retail agencies. No projections were made for 2045, so the projected volume is held constant from 2040. Groundwater recharge projections from IEUA projections based on groundwater recharge annual report data. 2020 Direct Use Value includes 16,278 AF from IEUA's member agencies, 773 AF used by IEUA, and 65 AF used by San Bernardino County.

The projected 2015 recycled water use from IEUA's 2015 UWMP was compared to the 2020 actual recycled water use as shown in Table 5-3. Recycled water direct use for 2020 was projected higher in 2015 than the actual recycled water direct use in 2020. The recycled water groundwater recharge volume projected for 2020 in 2015 is approximately the same as the 2020 actual recycled groundwater recharge volume. The discrepancy between the 2015 projected recycled water direct use and the 2020 actual recycled water direct use is largely due to significant land use conversions from agricultural to commercial and residential in IEUA's service area.

Table 5-3: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual (DWR Table 6-5)

	2015 Projection for 2020	2020 Actual Use
Direct Use	30,757	17,115
Groundwater Recharge	13,977	13,381
Total	**44,734**	**30,495**

Note: From 2015 IEUA UWMP and FY 19/20 Recycled Water Annual Report.

5.5 Potential and Projected Recycled Water Uses

The regional recycled water program is committed to maximizing the beneficial use of recycled water. IEUA will continue to develop, expand, and provide flexibility to allow the region to use available recycled water supplies. Expansion of the recycled water program relies on the treatment capacity of the water reclamation facilities and wastewater flow projections. IEUA's overall goal is to achieve maximum reuse of available recycled water within its service area.

5.5.1 Non-Potable Reuse

Major projects to be completed in the next 10 years are outlined in the TYF. There are several projects planned for the recycled water facilities. RP-1 projects include mechanical upgrades, effluent conveyance and flare system improvements, and energy recovery. For RP-4, process improvements, outfall repairs, and a potential plant expansion are planned for the next decade. The CCWRF has projects planned for headworks rehabilitation, aeration blower replacement, and odor control system replacement. There are no major expansion projects planned for the

CCWRF in the next 30 years. The RP-2 is located within the redefined flood zone behind Prado Dam, and since the plant does not have physical flood protection, the solids handling done at RP-2 will be relocated to RP-5 by 2023 and RP-2 will be decommissioned. RP-5 will also undergo an expansion of its liquid treatment capacity and the construction of a wastewater solids handling facility within the next 10 years. A liquids capacity recovery and solids treatment expansion of the Regional Water RP-1 project is expected to begin construction in FY 2026/27.

Another major potential project is the recycled water interties to neighboring agencies within the Santa Ana River Watershed that will increase the availability of local, resilient recycled water supplies within the IEUA service area. The construction of a pipeline that will function as a recycled water interties between the Western Riverside County Regional Wastewater Authority and the City of Rialto with IEUA are also being considered. As detailed in Section 4.4.3, a future AWPF was considered in the TYF to increase recycled water use. TYF recycled water projects to increase both direct use and groundwater recharge are expected to provide approximately 30,000 AFY of direct use and 16,420 AFY of groundwater recharge supply by 2025.

5.5.2 Indirect Potable Reuse

In conjunction with CBWM, CBWCD, and SBCFCD, IEUA conducts the groundwater recharge program within Chino Basin to replenish and maintain the Chino Groundwater Basin. Recharged water includes captured stormwater, recycled water, and imported water. The groundwater recharge projects are a means to diversify the water supply for the region and maximize the beneficial reuse of recycled water and the yield of the Chino Basin. Recycled water recharge is a key component of the region's water supply portfolio. The more recycled water that is recharged into the Chino Groundwater Basin, the more resilient the region becomes.

5.6 Recycled Water Rates

IEUA's recycled water volumetric rate reflects the costs associated with the operations and maintenance of its water recycling and distribution facilities, operating costs for groundwater basins, associated administration expenses, and debt service costs related to the financing of infrastructure construction. Total recycled water sales in FY19-20 were approximately $15.8 million. Adopted recycled water rates for 2019-2020 are included in Table 5-4. This table also includes the rates from the 2015 UWMP and the adopted rate for FY 20-21. A rate study will be initiated in 2021 to evaluate and provide recommendations on the future recycled water rates; FY 22-23 rates and beyond will be updated as needed based on the study and related efforts.

Table 5-4: IEUA Recycled Water Program Rates

Rate Description	2015-16	2019-20	2020-21
Direct Delivery ($/AF)	$350	$490	$490
Groundwater Recharge ($/AF)	$410	$550	$550
Effective Date	10/01/15	7/01/19	7/01/20
Deliveries (AF)	32,619	30,495	-

Notes: Current rate Resolution No. 2020-7-9 is effective through June 30, 2022.
FY 2020-21 total deliveries volume not available until July 1, 2021.

5.7 Methods to Encourage Recycled Water Use

In May 2002, IEUA's Board adopted Ordinance No. 75 establishing incentives and the mandatory use of recycled water when available. Under the provisions of Ordinance No. 75, which is consistent with the CWC Sec 13550 and the SWRCB guidelines, potential recycled water customers who do not use recycled water when it is available are subject to a 50% surcharge on their potable water rate.

IEUA also provides technical assistance to prepare necessary engineering reports and coordinate SWRCB, Division of Drinking Water (DDW) approval of recycled water use at each customer's site. IEUA has also retained experts in industrial water use and quality to assist customers in assessing operational needs associated with using recycled water.

5.7.1 Funding

Implementation of the regional recycled water program has historically been coordinated with the availability of state and federal funds to minimize use of regional capital funds. IEUA has adopted a TYF that has a budget that breaks out the federal, state, and local funding for recycled water projects. Local funding will be through the Regional Capital Fund, state grants, loans through DWR and the SWRCB, and federal grant funding through the US Bureau of Reclamation's Title XVI program.

The proposed FY 2020 TYF cost is $920.6 million, which includes water, wastewater, and recycled water projects, including the RP-1 Capacity Recovery project. The TYF is funded by a combination of pay-as-you-go, low interest State Revolving Fund loans, IEUA revenues, grants, and contributions.

Section 6: Water Quality

The quality of any natural water is dynamic in nature. This is true of local groundwater basins with the quality of water changing over the course of a year. Depending on water depth, groundwater will pass through different layers of rock and sediment and leach different materials from those strata. During periods of drought, the mineral content of groundwater increases. Water quality is not a static feature of water, and these dynamic variables must be recognized.

Water quality regulations also change. This is the result of the discovery of new contaminants, changing understanding of the health effects of previously known, as well as new contaminants, development of new analytical technology, and the introduction of new treatment technology. All water purveyors are subject to drinking water standards set by the U.S. Environmental Protection Agency (EPA) and the SWRCB DDW.

Planning efforts of IEUA, the CBWM, and retail agencies emphasize the importance of water quality. The region generally enjoys good water quality, but isolated areas of poor quality require blending of certain water sources or treatment to meet drinking water standards. Significant increases in the use of groundwater, recycled water, and demineralized groundwater can reduce reliance on imported MWD water and increase focus on local water quality monitoring. It is projected that a significant portion of urban water demand will continue to be met using Chino Basin groundwater. Thus, the discussion of water quality focuses primarily on water quality in the Chino Basin.

This section provides a general description of the water quality of the local supplies, the Chino Basin supply, and a discussion of potential water quality impacts on the reliability of these supplies.

6.1 Local Supplies

Local water supplies include surface water from nearby mountain streams, recycled water from IEUA treatment plants, recovered groundwater from the Chino Basin Desalters, and groundwater extracted from the Chino Basin and other groundwater basins in the area.

6.1.1 Surface Water

Surface water from local sources that originate in the San Antonio Canyon, Cucamonga Canyon, Day Creek, Deer Creek, Lytle Creek, and other smaller surface streams is generally of high quality since these creeks are fed by snowmelt and other precipitation in the San Gabriel Mountains. Surface water sources are treated prior to introduction to the potable water supply to ensure bacteriological quality and compliance with state and federal water quality standards.

6.1.2 Recycled Water

Recycled water holds the greatest potential as a new source of supply in the Chino Basin and in the southern California region as a whole. By the year 2045, direct recycled water use is

projected at 27,571 AFY and another 16,420 AFY of recycled water will be used for groundwater replenishment.

All IEUA water recycling treatment plants produce recycled water suitable for full body contact recreation and generally meet the more stringent aquatic habitat criteria. The continued use of recycled water is driven by compliance with regulatory limitations for IEUA's recycled water and groundwater recharge operations. In the event of non-compliance, assets would become stranded and IEUA would need to supplement its water supply portfolio with more expensive and/or less reliable sources. Numeric limitations for TDS are imposed upon recycled water and groundwater recharge. In addition, an ambient water quality TDS concentration, a statistical construct that represents an estimate of the volume-weighted TDS concentration of groundwater, is established to determine the assimilative capacity within the basin.

The ambient TDS concentration in the Chino Basin groundwater has been gradually increasing over the past several years, due to climate change, conservation, and drought periods, thus reducing the basin's assimilative capacity. In addition, emerging contaminants of concern, such as 1,2,3-Trichloropropane (1,2,3-TCP), perfluorooctanoic acid (PFOA), and microplastics could impact IEUA's ability to maximize recycled water use. The April 2020 Regulatory Challenges memorandum prepared by IEUA evaluates water quality regulatory challenges for the future of its water supply.

During the 2012 to 2016 drought, the 12-month running-average TDS concentration in recycled water approached the permit limit for TDS due to an increase in TDS concentration from water supplies used by retail agencies and indoor water conservation. The Regulatory Challenges memorandum estimated that, without taking additional action, TDS limit for recycled water use may be exceeded within the next 10 years. IEUA and the CBWM petitioned the RWQCB to consider updating the maximum-benefit Salt and Nutrient Management Plan to incorporate a revised compliance metric for recycled water TDS and nitrate to allow a longer-term averaging period, which would provide an average concentration that is less susceptible to exceedances during drought. This evaluation is currently ongoing. As of the last annual report, submitted in April 2019, the TDS and nitrate maximum concentration limits have never been exceeded; however, the IEUA-established "trigger limit", which is 20 milligrams per liter (mg/L) below the permit limit and triggers a water quality evaluation, was reached in 2015.

Poly- and per-fluorinated compounds (PFAS) are known to be present in recycled water and any new regulatory standards for PFAS could impact the ability to reuse recycled water without treatment. 1,2,3-TCP is a chlorinated hydrocarbon with high chemical stability that is very persistent in groundwater and the regional water recycling facilities IEUA operates were not designed to remove it. During 2019, recycled water used for groundwater recharge exceeded the 1,2,3-TCP maximum contaminant limit (MCL) and PFOA notification level (NL) and went into an accelerated monitoring schedule for 16 weeks. Corrective action reports were submitted to the DDW and RWQCB in February 2020 and source evaluation for both compounds is ongoing. Advanced treatment may be required to meet future regulations of these two contaminants.

Finally, there are other contaminants of emerging concern, such as microplastics, which are likely to emerge over the next 10 years which could also require advanced treatment to continue recharge of recycled water, further underscoring the need for advanced treatment in the region.

Based on these water quality trends, IEUA has concluded that the implementation of AWPFs may likely be required to address increasing salinity in the 2030s. Though there are a number of solutions that IEUA could implement to address groundwater quality challenges, none are as optimal as the implementation of advanced treatment. Advanced treatment would address TDS levels for both direct use and groundwater recharge while also addressing contaminants of emerging concern. In addition, advanced water purification has the potential to be integrated into future recycled water uses, such as direct potable reuse.

6.1.3 Treated Groundwater

Treated groundwater from the Chino Desalters 1 and 2 is very high quality since it is treated by RO, IX, and air stripping. Groundwater from the lower part of the Chino Basin is treated by the desalters, as it has high TDS and nitrate concentration. TDS and nitrate are reduced by the RO process and nitrate concentration is further reduced by the IX process. Two of the Chino Desalter 2 expansion wells are being used to capture groundwater contaminants from the South Archibald plume. Some of the groundwater wells for Desalter 1 have been impacted by a VOC plume located near the Chino Airport. VOCs are removed by an air stripping facility at Desalter 1. Other identified plumes (CIM plume and an Ontario Airport Plume) could impact desalter wells and increase treatment needs. The operation of the Chino Desalters 1 and 2 is a critical component of maximum benefit commitments under the Basin Plan and a long-term salinity management strategy that enables the region to use recycled water within the Chino Basin.

6.1.4 Other Groundwater Basins

Limited information is available on water quality from the groundwater basins surrounding Chino Basin. Most of the basins have elevated concentrations of nitrate. Use of these local groundwater supplies by retail water agencies for potable water supply suggests that any present water quality issues can be resolved by blending or well head treatment.

6.1.5 Imported Water

MWD supplies about half the water used in southern California from its two main sources of water: 1) water from the SWP delivered via the California Aqueduct and 2) water from the Colorado River delivered via the Colorado River Aqueduct. The TDS in the Colorado River water averages about 700 mg/L during normal water years. Water supplies from the SWP have significantly lower TDS levels, averaging 275 mg/L. IEUA's service area is a SWP-exclusive area, only importing MWD water from the SWP in order to meet TDS objectives in the Chino Basin.

Other major water quality concerns include:

- Perchlorate in local groundwater supplies
- Hexavalent chromium in groundwater
- 1,2,3-TCP in groundwater
- Disinfection by-products.

6.2 Chino Basin Groundwater Quality

Chino Basin groundwater is a critical resource to the entire Santa Ana River Watershed. The Chino Basin Watermaster performed monitoring of over 600 wells in the period from 1999 to 2001 to establish a baseline of groundwater quality for the basin to assist with the implementation of the Optimum Basin Management Program. Groundwater quality data has been obtained periodically since 1990. Since 2000, the Chino Basin Watermaster has assessed groundwater quality in the basin using data compiled through its own monitoring activities and the efforts of other cooperating entities, and has reported on the water quality trends and findings related to regulated contaminates and contaminants of emerging concern in a biannual State of the Basin report. The water monitoring program has been periodically refined as needed to support the detection of water quality anomalies and contaminants of concern.

The most recent groundwater quality data comes from sampling done over the 5-year period from July 2013 to June 2018. This included 141 “active municipal supply wells” (wells that pumped groundwater anytime during 2017 or 2018), other municipal supply wells not determined to be active, and private agricultural, non-agricultural, and monitoring wells, whether recently active or not.

From these groundwater monitoring results, the three most common contaminants that exceed a primary MCL in the Chino Basin at active municipal wells are nitrate (71 wells), 1,2,3-TCP (33 wells), and perchlorate (27 wells). Of the recently active 141 municipal supply wells, 45 have at least one drinking water contaminant, 17 wells have two contaminants, 14 have three contaminants, five have four contaminants, and five have five contaminants. The wells with drinking water contaminants are located in the southern (south of the 60 freeway) and western (west of Euclid Avenue) areas of the basin. Of the 141 recently active municipal supply wells, only two wells shown an exceedance of a California NL for 1,4-dioxane. There may be additional exceedances for 1,4-dioxane and other contaminants, but since the monitoring of contaminants with an NL is not required by DDW or testing may be performed using analytical methods with the lowest detection limits that are greater than the NLs. Table 6-1 and Table 6-2 provide a summary of active municipal supply wells with exceedances of primary MCLs and NLs.

Perchlorate and hexavalent chromium are also the two contaminants characterized in the basin that are undergoing review and consideration by the DDW for a primary MCL revision.

Table 6-1: Summary of Drinking Water Contaminants with Primary MCLs

Analyte	Primary CA MCL	Number of Active Municipal Supply Wells with Exceedance of MCL	Number of Municipal Supply Wells with Exceedance of MCL	Number of Total Wells in the Chino Basin with Exceedance of MCL
Nitrate-Nitrogen	10 mg/L	71	80	553
1,2,3-Trichloropropane	0.005 µg/L	33	36	111
Perchlorate	6 µg/L	27	30	387

Analyte	Primary CA MCL	Number of Active Municipal Supply Wells with Exceedance of MCL	Number of Municipal Supply Wells with Exceedance of MCL	Number of Total Wells in the Chino Basin with Exceedance of MCL
Trichloroethylene (TCE)	5 µg/L	11	14	269
Gross Alpha	15 pCi/L	6	7	14
Chromium	50 µg/L	4	4	4
Arsenic	0.01 mg/L	3	5	74
1,2-Dibromo-3-chloropropane	0.2 µg/L	3	3	4
Tetrachloroethene (PCE)	5 µg/L	3	3	96
Trihalomethanes	10 µg/L	2	3	2
Nitrite-Nitrogen	1 mg/L	2	2	17
1,1-Dichloroethene (1,1-DCE)	5 µg/L	1	1	13
Dichloromethane (Freon 39)	5 µg/L	1	1	91
Uranium	20 pCi/L	1	1	1

Notes: Data collected for FY 2013/2014 to FY 2017/2018. "Active" Municipal supply wells are those that have been pumped at least once during the years 2017 and 2018.
µg/L = micrograms per liter; pCi/L = picocuries per liter

Table 6-2: Summary of Drinking Water Contaminants with Notification Levels

Analyte	CA Drinking Water NL	Number of Active Municipal Supply Wells with Exceedance of NL	Number of Municipal Supply Wells with Exceedance of NL	Number of Total Wells in the Chino Basin with Exceedance of NL
1,4-Dioxane	1 µg/L	2	2	133
Manganese	0.5 mg/L	0	0	118
N-Nitroso dimethylamine (NDMA)	0.01 µg/L	0	0	60
Vanadium	0.05 mg/L	0	0	55
Naphthalene	0.017 mg/L	0	0	48
1,2,4-Trimethylbenzene	0.33 mg/L	0	0	26
1,3,5-Trimethylbenzene	0.33 mg/L	0	0	19
Methyl Isobutyl Ketone	0.12 mg/L	0	0	11
n-Propyl benzene	0.26 mg/L	0	0	11
HMX (Octogen)	0.35 mg/L	0	0	11
Chlorate	0.8 mg/L	0	0	4

Analyte	CA Drinking Water NL	Number of Active Municipal Supply Wells with Exceedance of NL	Number of Municipal Supply Wells with Exceedance of NL	Number of Total Wells in the Chino Basin with Exceedance of NL
formaldehyde	0.1 mg/L	0	0	3
N-Nitrosodiethylamine (NDEA)	0.01 µg/L	0	0	3
Ethylene Glycol	14 mg/L	0	0	1
n-Butylbenzene	0.26 mg/L	0	0	1

Note: Data collected for FY 2013/2014 to FY 2017/2018. "Active" Municipal supply wells are those that have been pumped at least once during the years 2017 and 2018.

6.2.1 1,2,3-TCP

The occurrence of 1,2,3-TCP in nearly 25% of active municipal supply wells is noteworthy. The MCL for 1,2,3-TCP is 0.005 micrograms per liter (µg/L), which is 5 parts per trillion (ppt). This is the lowest numerical value for a MCL established to date in California. Unlike newly adopted MCLs, the MCL for 1,2,3-TCP became immediately effective upon its adoption in December 2017, requiring municipal water agencies to either cease using active wells with 1,2,3-TCP concentrations in excess of the new MCL immediately or implement treatment or blending to ensure their water supplies have concentrations below the MCL. Before 2018, municipal water supplies were not routinely tested for 1,2,3-TCP, or when testing occurred it was not always done using the lowest available detection limit. For this reason, the DDW also required municipal water agencies to perform quarterly compliance monitoring in 2018 using laboratory detection limits low enough to test for concentrations equivalent to the MCL of 0.005 µg/L. The wells producing 1,2,3-TCP concentrations equal to or greater than the MCL are primarily located in the western half of the Basin. At least three agencies within the IEUA service area have had to shut down supply wells or modify operations as a result of the new MCL.

6.2.2 Perchlorate

An MCL of 6 µg/L was established in 2007. The Public Health Goal (PHG) for perchlorate was reduced from 6 µg/L to 1 µg/L in 2015 after scientific literature indicated the possible health effects to infants from exposure to perchlorate in drinking water. The DDW thereby lowered its required detection limit for the purposes of reporting from 4 µg/L to 1 or less µg/L to gather state-wide data to determine whether a revision to the MCL is warranted.

Over the 5-year period of measurement, 49% of the wells in the Chino Basin had a 5-year maximum concentration that exceeds the MCL of 6 µg/L and 95% of the detectable concentrations of perchlorate in the basin were above the PHG of 1 µg/lL Perchlorate is prevalent throughout the basin. If the MCL were lowered from 6 µg/L, treatment facilities could be required across most of the Chino Basin.

6.2.3 Hexavalent Chromium

Hexavalent Chromium (Chromium VI) is produced from by-products of industrial applications and the manufacturing of stainless steel and other alloys as well as occurring naturally in some locations. The PHG for Chromium VI is 0.02 µg/L. In 2013, DDW adopted an MCL for Chromium

VI of 10 µg/L, which was then challenged in court. In 2017, a judgment was issued invalidating the Primary MCL for drinking water since there was no consideration of the economic feasibility of complying with it. The court ordered DDW to conduct an economic evaluation and establish and adopt a new MCL, which could be the same or different from the now invalidated MCL of 10 µg/L. 7% of all wells sampled in the basin have a concentration above 10 µg/L; 127 of the 141 municipal wells have detectable concentrations of Chromium VI, and nine of the 141 active municipal wells exceeded 10 µg/L. Hexavalent chromium is not a widespread compliance issue based on the 10 µg/L, but compliance could be problematic in the future if a new, lower MCL is established.

6.2.4 Poly- and Per-fluorinated Compounds

In 2009, the EPA published provisional Health Advisory Levels (HALs) for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) of 400 nanograms per liter (ng/L) and 200 ng/L, respectively. In 2016, the EPA significantly lowered the HAL for PFOA and PFOS to a combined 70 ng/L and in 2018, the DDW established NLs for PFOA and PFOS of 14 and 13 ng/L, respectively. The majority of wells in the Chino Basin have not been sampled for either of these contaminants. The 30 wells that have been sampled were tested in 2015 using laboratory detection limits of 20 and 40 ng/L, which is higher than the current NLs. Monitoring or recycled water recharge blending sources shows that many of the sources have detectable concentrations of PFOA and PFAS, some of which are above the NLs. The EPA and DDW have indicated that they are moving forward with adopting MCLs for PFOA and PFAS in the near future. The occurrence of these contaminants in Chino Basin groundwater as of March 2019 is not well characterized and there are recharge water sources with concentrations above the NLs. Widespread monitoring is necessary to understand the occurrence of PFOA and PFAS in the basin to plan for compliance with potential future drinking water regulations.

6.2.5 Total Dissolved Solids and Salts

During the development of the 2000 OBMP, IEUA and the Watermaster recognized that implementing a recycled water recharge and reuse program would require large scale treatment and mitigation of salt loading for TDS and nitrate. The Watermaster and IEUA petitioned the RWQCB to establish a maximum benefit-based salt and nutrient management plan that involved increasing the TDS and nitrate objectives for the Chino-North groundwater management zone (GMZ) to numerically higher value to enable recycled water reuse without mitigation or treatment. The plan included the implementation of a monitoring, analysis, and reporting program, the construction and future expansion of the Chino Basin Desalters to attain hydraulic control of the GMZ to protect the Santa Ana River, the construction of recharge facilities to increase storm and recycled water recharge, and a commitment to future treatment of recycled water or groundwater, as needed, to protect beneficial uses and comply with the maximum benefit TDS and nitrate objectives. The maximum benefit SNMP was incorporated into the Basin Plan in January 2004.

TDS has a California secondary MCL of 500 mg/L. Over the 5-year period from July 2013 to June 2018, 61% of wells measured had 5-year maximum values exceeding the MCL. The average and median values were 778 and 614 mg/L, respectively. The wells with the highest TDS concentrations are predominantly located south of Highway 60 in the area of historical and

current agricultural land uses. It is expected that TDS concentrations in the basin will increase over time since it is operated as a closed basin.

Nitrate has a primary MCL of 10 mg/L. Over the 5-year period, 68% of the wells measured had 5-year maximum values exceeding the MCL. The average and median values were 26 and 17 mg/L, respectively. As with TDS, the wells with the highest nitrate concentrations are located in the historical and current agricultural land use areas.

6.2.6 Other Contaminants

There are other active municipal supply wells with exceedances of primary MCLs in the IEUA service area, as listed in Table 6-1, including trichloroethylene (TCE), gross alpha, chromium, arsenic, 1,2-dibromo-3-chlorpropane, tetrachloroethene (PCE), trihalomethanes, nitrite-nitrogen, 1,1-dichloroethene (1,1-DCE), dichloromethane (Freon 39), and uranium. The percentage of wells with 5-year maximum concentrations exceeding the primary MCLs for some of these contaminants are 14% for arsenic, 26% for TCE, 10% for PCE, and 6% for 1,2-DCA.

The number of active municipal wells with exceedances for any of these contaminants is less than 11, indicating they are not widespread compliance issues. However, these contaminants should be observed, and planning should be conducted to ensure the ability to adapt to any increases in the number of wells with exceedances or changes to MCLs for these contaminants that could cause future water supply issues.

6.3 Water Quality Impacts on Reliability

Maintaining the quality of the groundwater and other water supply increases the reliability by ensuring that deliveries are not interrupted due to water quality concerns. A direct result from the degradation of any water supply is increased treatment cost before consumption. The poorer the quality of the source water, the greater the treatment cost. Water may degrade in quality to the point that it is not economically feasible for treatment. In this scenario, the degraded source water is taken off-line. This in turn can decrease water supply reliability by potentially decreasing the total supply and increasing demands on alternative water supplies.

Groundwater quality impairment has impacted significant supplies across the basin. Including CDA, approximately one-third of existing groundwater supply capacity is currently offline due to impairment or requires clean water for blending purposes to meet water quality regulations. Water quality issues are constantly evolving, and IEUA will have to continue to take action to protect and treat water supplies when needed. Potential future impacts to water supply reliability could be caused by increasing TDS concentration in recycled water, revisions on DDW MCLs, and changes in contamination plume characteristics.

The use of recycled water could become more difficult in the future because the ambient TDS concentration in the Chino Basin groundwater is increasing, thereby reducing assimilative capacity. Increases in TDS concentration from water supplies used by retail agencies and from the SWP could further increase the TDS concentration of recycled water, especially if coupled with an increase in indoor water conservation.

The Watermaster monitors and delineates the extents of the contaminant plumes located in the basin, including the Chino Airport and South Archibald plumes, General Electric Test Cell and Flatiron plumes, the former Kaiser Steel Mill Facility plume, the California Institution for Men plume, the Stringfellow plume, and the Milliken Landfill plume. Currently, the Chino Airport and South Archibald plumes are undergoing remedial strategies using the Chino Basin Desalters for pumping and treating the contaminated groundwater. Any subsequent movement of contaminant plumes could affect additional groundwater wells and the water supply of the basin, and therefore, the water supply reliability of IEUA.

Changes in DDW MCL values can also affect groundwater supply in the Chino Basin. The adoption of an immediately effective MCL for 1,2,3-TCP as discussed above resulted in the cessation of use of wells with concentrations in excess of the new MCL. Some supply wells were shut down or had to modify their operations due to this new MCL. The EPA is currently developing MCLs for PFOA and PFOS. Given that recycled water used for groundwater recharge exceeded the PFOA notification level in 2019, a newly established MCL would impact the ability to use both recycled water and groundwater sources. Similarly, revisions in primary MCL values for perchlorate and hexavalent chromium could cause compliance issues in the future if new, lower MCLs are established. Prolonged reductions in groundwater pumping due to groundwater contamination could reduce the safe yield and potentially contribute to the loss of hydraulic control and the spread of contamination in the basin. It will become increasingly necessary to pump and treat groundwater to comply with drinking water standards and maintain Safe Yield and hydraulic control of the basin.

Section 7: Reliability Planning

7.1 Overview

The UWMP Act requires urban water suppliers to assess water supply reliability that compares total projected water use with the expected water supply over the next 20 years in 5-year increments. The UWMP Act also requires an assessment for a single-dry year and multiple-dry years. Water Code section 10635(b) is a new requirement for the 2020 UWMPs and requires suppliers to prepare a drought risk assessment, which enables suppliers to evaluate their risk under a severe drought period lasting for 5 consecutive years starting in 2021. This section presents the reliability and drought risk assessments for the IEUA service area.

7.2 Supply Challenges

As discussed throughout this document, especially in Sections 2, 4, 5, and 6, supply can be affected by a variety of factors, including water quality regulations and climate change impacts. Some sources are more vulnerable to seasonal or climatic shortage than others. The supply challenges for each of the region's water sources are discussed in this section. A summary of the factors that may result in inconsistency of supply for each source in IEUA's service area are included in Table 7-1.

Table 7-1: Factors Resulting in Inconsistency of Supply

Water Supply Source	Legal	Environmental	Water Quality	Climatic
Local Surface Water	None identified.	None identified.	None identified.	Shifting precipitation patterns; reduced snowpack; increased evaporation.
Stormwater	None identified.	Increases in impervious surfaces.	Storm water quality may require treatment prior to infiltration	Reduced infiltration rates and stormwater capture.
Chino Basin Groundwater	Development of new MCLs for contaminants present in the basin.	Safe yield operating constraints.	Contaminants exceeding MCLs.	Changes in rainfall frequency and intensity; impacts to recharge and runoff.
Other Groundwater	Development of new MCLs for contaminants present.	Safe yield operating constraints.	Contaminants exceeding MCLs.	Reduced natural infiltration.

Water Supply Source	Legal	Environmental	Water Quality	Climatic
Chino Basin Desalter	Groundwater replenishment obligation.	None identified.	Shifts in contaminant plume characteristics or location.	None identified.
Recycled Water	Changes in water quality requirements.	None identified.	Increasing TDS levels. See Legal.	Reduction in amount of wastewater and impacted by increase in imported water TDS during drought periods
Imported Water	Potential cutbacks.	None identified.	Disinfection byproduct precursors; arsenic; nutrient levels.	Shifts in precipitation patterns; reduced snowpack; and potential for increased TDS in drought periods

7.2.1 Local Surface Water

Local surface water is impacted by climate due to its dependence on precipitation and snow melt. Changes in precipitation patterns and earlier snow melt due to increased temperatures will affect local surface water both in quantitatively and temporally. Higher temperatures could also result in increased evaporation of soil moisture or exposed water bodies, reducing surface water supplies. Surface water supplies are also highly variable on a yearly basis.

Surface water is generally of high quality and is anticipated to be unaffected by water quality changes.

7.2.2 Stormwater

Increases in temperature and evaporation rates can dry out soil, resulting in increased water runoff as water is unable to penetrate dry soil. Climate change is expected to cause higher intensity rainfall storms on a more infrequent basis, which could also reduce the amount of stormwater runoff able to be captured. Annual snow melt patterns are also expected to change, which could affect water supply planning and stormwater capture.

Other challenges include reductions in natural infiltration into the ground due to channelization, new development, increased outdoor water efficiency, and open space conversion. Construction of additional stormwater recharge facilities may be limited in the highly urbanized service area. Water quality of stormwater may require treatment, especially in green infrastructure, integrated with stormwater recharge facilities.

7.2.3 Chino Basin Groundwater

Chino Basin groundwater supplies are dependent on rainfall and supplemental sources for recharge, as well as the ability of soil to absorb water during rainfall events. These dependencies make this groundwater supply vulnerable to climate change impacts, such as warmer temperatures and drought increasing the dryness of soil, resulting in less absorption and an increase of water runoff instead of percolation through the soil. Chino Basin groundwater supplies are not impacted by climate once the water is stored in the groundwater basin.

As discussed in Section 6, there are several common contaminants that exceed primary MCLs or NLs in the basin at active municipal wells, including nitrate, 1,2,3-TCP, perchlorate, hexavalent chromium, and 1,4-dioxane. Increases in the prevalence of these, and other contaminants, may result in the closure of supply wells which would impact water supply reliability. In addition, the use of recycled water could become more difficult in the future due to increasing TDS concentration in the groundwater. Finally, any changes in or development of new MCLs or other legislative concentration requirements would affect groundwater supply.

7.2.4 Other Groundwater

Climate effects on non-Chino Basin groundwater is expected to be similar to those identified for the Chino Basin, including a reduction in reduced natural infiltration, safe yield operating constraints, and water quality issues.

7.2.5 Chino Basin Desalter

Water supply from the Chino Basin Desalters is not affected by climate change, but may be affected by the outstanding obligation for groundwater replenishment to the Chino Basin through the duration of the Peace Agreement and the high energy needs and costs of the treatment of brackish water and brine disposal. In addition, any changes or movement of the contaminant plumes that are being treated by the Desalters could affect nearby groundwater wells or result in increased treatment costs.

7.2.6 Recycled Water

Recycled water holds the greatest potential as a source of reliable supply in the IEUA service area. Recycled water is the most climate resilient water supply available to the region as wastewater flows were shown not to be impacted by climate according to the 2015 IEUA IRP. However, since the service area's water supply can include 20 to 30% of SWP imported water, droughts have resulted in higher salinity levels in source water supply, which directly impacts the salinity in the treated recycled water. Additionally, increases in more efficient indoor water use may reduce the amount of wastewater available for recycled water in the future.

Recycled water is also vulnerable to increasingly strict regulatory and environmental issues related to the construction and operation of recycled water systems, especially the high amount of energy consumption required in recycled water treatment. Recycled water requires the highest level of treatment to meet Title 22 water quality requirements, which can be very energy intensive.

7.2.7 Imported Water

Changing climate patterns are expected to shift precipitation patterns and affect water supply. The areas of concern for California include a reduction in Sierra Nevada Mountain snowpack, increased intensity and frequency of extreme weather events, rising sea levels causing increased risk of Delta levee failure, seawater intrusion of coastal groundwater basins, and potential cutbacks on SWP to meet ecological and other needs. The major impact in California is that without additional surface and groundwater storage, the earlier and heavier runoff (rather than snowpack retaining water in storage in the mountains), will result in more water being lost to the oceans. A heavy emphasis on storage is needed in the State of California.

MWD is responsible for providing high quality potable water throughout its service area. Over 300,000 water quality tests are performed per year on MWD's water to test for regulated contaminants and additional contaminants of concern to ensure the safety of its waters.

The key water quality issues for SWP waters are disinfection byproduct precursors, in particular, total organic carbon and bromide. Disinfection byproducts result from total organic carbon and bromide in the source water reacting with disinfectants at the water treatment plant. MWD has resolved these treatment restrictions by using ozone disinfection at its treatment plants. All MWD's treatment plants currently have ozone treatment facilities.

Arsenic is also of concern in some groundwater storage/transfer programs that MWD participates in. Groundwater inflows into the California Aqueduct are managed to comply with water quality regulations and protect downstream water quality while meeting supply targets. Additionally, nutrient levels in SWP system are relatively high, leading to the potential for algal related taste and odor issues that can affect water management strategies. MWD is engaged in efforts to protect the quality of SWP water from potential increases in nutrient loading from wastewater treatment plants (MWD, 2020 UWMP, June 2021).

Imported SWP water is an important water supply source for the water agencies in the Chino Basin, and its TDS concentration is an important consideration in the salt and nutrient management plan in the Basin Plan. The TDS concentration in SWP water at Lake Silverwood, the point from which SWP water is distributed to the Chino Basin, has historically varied from 74 to 430 mg/L, with the lower TDS concentrations associated with above normal to wet hydrologic conditions and the higher TDS concentrations associated with below normal to dry hydrologic conditions.

7.3 Supply and Demand Comparisons

IEUA's service area relies on a variety of supply types, as detailed above. The available baseline water supply projections for the entire IEUA region by source type are included in Table 7-2 below. The imported water supply type is broken into imported water to be supplied by IEUA via MWD and imported water delivered to IEUA retail agencies from other wholesale agencies.

While this summary of baseline regional water supply sources is useful for IEUA's planning purposes, the reliability assessment was completed using only supplies/demands for imported water from MWD and IEUA recycled water, as these are the water supply sources that IEUA manages. Each retail agency is completing its own reliability assessment which are included in

their respective 2020 UWMPs. IEUA's ability to satisfy demands during three scenarios: a normal water year, single-dry year, and multiple-dry years was completed and described in the following sections.

The available imported water supply is not expected to decrease or change for these years due to the redundancy and reliability provided by MWD's extensive storage and water management system. As discussed in MWD's 2020 UWMP, MWD does not anticipate a shortfall in water supply for any of the dry year scenarios. While the California Aqueduct supplies are anticipated to decrease during dry years, overall, MWD does not expect any shortfall due to their diligent efforts to increase resiliency to drought over the past several years by using off-stream storage and other means. While IEUA only receives water from the California Aqueduct, they still expect to receive up to their full contract amount for both single dry and multiple dry years. The recycled water supply is not expected to dramatically decrease during drought periods; however, there are some slight fluctuations due to changes in water use behaviors during drought periods.

Since imported water is expected to be available during all year types, the basis of water year data that was used for the reliability assessment is therefore based on recycled water conditions. The average year supply is the average recycled water supply (total wastewater plant effluent flows) for FY 15/16 through FY 19/20. The single dry year supply basis is the wastewater treatment plant flows during FY 15/16, a hydrologically dry year with relatively low wastewater plant flows. This year was one of the last years of California's historic 2011-2017 drought, when almost 80% of the state was in a state of severe drought from 2013 through 2017 (National Oceanic and Atmospheric Administration, n.d.). The basis water years were limited to the past 5 years to accurately account for the growth in recycled water supply and demand that has occurred. The multiple dry year supply basis is based on repeated FY 15/16 conditions. Table 7-3 shows the basis of water year data used to define each scenario. The single and multiple dry year percentage of average supply was used as a multiplier to calculate the reduced volume of supplies available in the single dry and multiple dry years scenario. Since recycled water is not strongly influenced by drought periods, the available supply during the dry year scenarios is just 26 AF less than the average year supplies, which rounds to 100% of average year supplies.

Table 7-2: Projected Regional Baseline Water Supply Sources

Supply Type	2020	2025	2030	2035	2040	2045
Imported Water – IEUA	66,438	92,928	94,928	96,928	98,928	98,928
Imported Water – Other	17,667	10,728	10,728	10,728	10,728	10,728
Chino Basin Groundwater	51,749	63,129	72,822	78,441	89,776	92,080
Other Groundwater	26,436	27,060	27,171	27,282	27,394	27,505
Surface Water	16,652	10,089	10,089	10,089	10,089	10,089
Recycled Water - Direct Use	16,278	23,932	25,929	26,794	28,823	29,323
Recycled Water - Groundwater Recharge	13,381	16,420	16,420	16,420	16,420	16,420
Chino Basin Desalter	14,649	17,733	17,733	17,733	17,733	17,733
Water Use Efficiency	3,292	9,788	11,984	17,257	22,570	27,802
TOTAL	**226,542**	**271,807**	**287,804**	**301,672**	**322,461**	**330,608**

Note: Roll up of retail agency projections except for 2020, which are actual values. SAWCo is not included in the table because transfers from SAWCo are reported within receiving member agency values. The values in this table match the retail agency water supplies shown in Table 4-2, with the additional inclusion of recycled water for

groundwater recharge and water use efficiency as supply sources. For the "Imported water – IEUA" supply, water purchases in excess of Tier 1 allocation of Resolution 2014-12-01 will be assessed at the Tier 2 rate.

Table 7-3: IEUA Service Area: Basis of Water Year Data (Reliability Assessment) (DWR Table 7-1)

Year Type	Base Year *If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 1999-2000, use 2000*	Available Supplies if Year Type Repeats	
			Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP Location:
		X	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available (acre-feet)	**% of Average Supply**
Average Year	FY 15/16 - FY 19/20	147,503	100%
Single-Dry Year	FY 15/16	147,477	100%
Multiple-Dry Years 1st Year	FY 15/16	147,477	100%
Multiple-Dry Years 2nd Year	FY 15/16	147,477	100%
Multiple-Dry Years 3rd Year	FY 15/16	147,477	100%
Multiple-Dry Years 4th Year	FY 15/16	147,477	100%
Multiple-Dry Years 5th Year	FY 15/16	147,477	100%

Note: Average year is the average of FY 15/16 through FY 19/20 wastewater plant flows plus the MWD contract amount from Resolution 2014-12-1. Single and multiple dry years is FY 2015/16.

As described in the sections that follow, Table 7-4 through Table 7-6 present the supplies and demands under the various water year scenarios for the 25-year planning period in 5-year increments for combined potable (imported) and non-potable (recycled) water sources.

7.3.1 Normal Water Year

The normal water year is a year in the historical sequence that most closely represents median runoff levels and patterns. Table 7-4 shows the expected imported and recycled water supplies available over the planning period during an average/normal year and compares them to demands for the same period. The expected imported water supply is equivalent to IEUA's purchase order agreement amount with MWD. The expected recycled water supply is based on wastewater plant flow projections from Table 4-6.

The numbers in Table 7-4 demonstrate that the IEUA region anticipates adequate supplies for 2025 to 2045 under normal water conditions.

7.3.2 Single-Dry Year

The water supplies and demands for the IEUA service area over the 25-year planning period were analyzed in the event that a single-dry year occurs. FY 15/16 was selected as a representative single dry year since it was one of the last years of the historic 2011-2017 drought and was hydrologically dry year with low wastewater plant flows that still reflects current recycled water supply and demand trends. Table 7-5 shows the IEUA supply available to meet demands during a single-dry year based on its contract with MWD and 100% of the recycled water projections available during a normal year. As noted above, the imported supply is not expected to decrease during a 5-year drought. The recycled water supplies are based on the percentage of average influent water flows available during FY15/16. The 2015 IRP found that demand during a single dry year is expected to increase by up to 3.74% more than normal year demands by 2040. To account for this increase in demand, a demand increase factor was applied to each 5-year period, ramping up from a 0.62% increase in 2025 to a 3.74% increase in 2040. The 3.74% increase was also applied to calculate the increased demand for 2045.

Despite the demand increase, Table 7-5 still shows a surplus for each 5-year period under single-dry year conditions.

7.3.3 Multiple-Dry Year (5-Year)

The water supplies and demands for the IEUA service area over the 25-year planning period were analyzed in the event that a multiple-dry year occurs, specifically a 5-year drought period. This drought is considered to be equivalent to 5 years of conditions similar to FY 15/16. Table 7-6 shows the supply available to meet demands during a multiple-dry year. As noted above, the imported supply is not expected to decrease during a 5-year drought. The recycled water supplies are based on the percentage of average influent water flows available during FY 15/16. However, the 2015 IRP found that demand during a prolonged drought year is expected to increase by up to 5.98% more than normal year demands by 2040. To account for this increase in demand, a demand increase factor was applied to each 5-year period, ramping up from a 1% increase in 2025 to a 5.98% increase in 2040. This 5.98% increase was also used to calculate the increased demand for 2045.

Despite the demand increase, Table 7-6 still shows a surplus for each 5-year period for each year of the 5-year drought conditions.

Table 7-4: IEUA Service Area: Normal Year Supply and Demand Comparison – in Acre-Feet (DWR Table 7-2)

	2025	2030	2035	2040	2045
Supply totals	153,356	156,490	157,425	160,119	160,119
Demand totals	116,716	120,927	124,136	128,212	128,756
Difference	**36,640**	**35,563**	**33,289**	**31,907**	**31,363**

Note: Normal year based on the average of FY 2015/16- FY 2019/20 conditions.

Table 7-5: IEUA Service Area: Single Dry Year Supply and Demand Comparison - in Acre-Feet (DWR Table 7-3)

	2025	2030	2035	2040	2045
Supply totals	153,329	156,462	157,397	160,091	160,091
Demand totals	118,899	123,938	128,009	133,007	133,571
Difference	**34,431**	**32,524**	**29,388**	**27,084**	**26,519**

Note: IEUA considers FY 15/16 to represent the single dry year hydrologic conditions. The expected supply is 100% of normal year supply. The IEUA IRP forecasts a regional demand increase of 3.74% by 2040 for a single dry year due to above normal temperature and reduced wet periods (IEUA IRP Appendix E, 2016). Demand increase for prior years is interpolated (from 0.62% in 2015 to 3.74% in 2040). The demand increases for 2045 is assumed to be the same as 2040.

Table 7-6: IEUA Service Area: Multiple Dry Years Supply and Demand Comparison – in Acre-Feet (DWR Table 7-4)

Dry Years	Supply	2025	2030	2035	2040	2045
First year	Supply totals	153,329	156,462	157,397	160,091	160,091
	Demand totals	120,206	125,752	130,318	135,879	136,456
	Difference	**33,124**	**30,710**	**27,079**	**24,212**	**23,635**
Second year	Supply totals	153,329	156,462	157,397	160,091	160,091
	Demand totals	120,206	125,752	130,318	135,879	136,456
	Difference	**33,124**	**30,710**	**27,079**	**24,212**	**23,635**
Third year	Supply totals	153,329	156,462	157,397	160,091	160,091
	Demand totals	120,206	125,752	130,318	135,879	136,456
	Difference	**33,124**	**30,710**	**27,079**	**24,212**	**23,635**
Fourth year	Supply totals	153,329	156,462	157,397	160,091	160,091
	Demand totals	120,206	125,752	130,318	135,879	136,456
	Difference	**33,124**	**30,710**	**27,079**	**24,212**	**23,635**
Fifth year	Supply totals	153,329	156,462	157,397	160,091	160,091
	Demand totals	120,206	125,752	130,318	135,879	136,456
	Difference	**33,124**	**30,710**	**27,079**	**24,212**	**23,635**

Note: IEUA considers FY 15/16 to represent each year of the multiple dry year hydrologic conditions. The expected supply is 100% of normal year supply. The IEUA IRP forecasts a regional demand increase of 5.98% by 2040 for a multi-dry year due to above normal temperature and reduced wet periods (IEUA IRP Appendix E, 2016). Demand increase for prior years is interpolated (from 1.00% in 2015 to 5.98% in 2040). The demand increases for 2045 is assumed to be the same as 2040. The supply and demand for each year of the multi-year drought is expected to be the same.

7.4 Summary of Comparisons

As shown in the analyses above, IEUA has adequate supplies to meet demands during normal, single-dry, and multiple-dry years throughout the 25-year planning period. Based on the reliability analysis completed by MWD for their 2020 UWMP, no decrease in imported water from MWD is expected during dry years due to MWD's extensive storage, transfer, and water supply management efforts. Recycled water supplies are also not expected to decrease overall during drought periods since wastewater flows are typically not significantly affected by drought periods. While IEUA does not expect a shortfall under the scenarios considered, they continue to support reduction in water use through demand management measures, as described in Section 8, and consideration of other supply opportunities to increase the resiliency of their water supply. IEUA is also aware of the potential disruption of supply due to water quality changes and is considering future actions that will help to mitigate any impacts, as discussed in Section 6.

7.5 Drought Risk Assessment

The California Legislature created the new Drought Risk Assessment (DRA) requirement for the 2020 UWMP in part because of the significant duration of recent California droughts and the predictions about hydrological variability attributable to climate change. The DRA requires suppliers to assess water supply reliability over a 5-year period from 2021 to 2025 that examines water supplies, water uses, and the resulting water supply reliability under a reasonable prediction for 5 consecutive dry years. Table 7-7 shows the expected water use (in AF) and the expected total supplies for each year from 2021 to 2025 for both potable water from MWD and IEUA recycled water. As with the reliability assessment, the water supplies and demands only include imported water from MWD and recycled water. The water use for each year was found by interpolating between the 2020 actual water demand total (from the FY 19/20 Annual Water Use Report and the FY 19/20 Recycled Water Annual Report) and the 2025 projected water use during a multiple-year drought (from Table 7-6 above). The expected total supplies were calculated by interpolating between the average year supply estimate from Table 7-1 and the 2025 projected supply available during a multiple year drought (from Table 7-6 above).

As shown in Table 7-7, IEUA expects to have a surplus for each of the 5 years of the consecutive 5-year drought. Therefore, no Water Shortage Contingency Plan actions are required to be implemented. However, in the case of a shortfall in supply, the use reduction and supply augmentation measures described in the WSCP (see Appendix B) are available to be implemented. In addition, IEUA is aware of future impacts to their water supplies and is always considering additional potential opportunities for water supplies or use reduction. IEUA may explore the future water supply projects and programs described in Section 4-4 to further increase their resiliency to drought conditions.

Table 7-7: DWR Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b) (DWR Table 7-5)

2021	Total
Total Water Use (AF)	100,497
Total Supplies (AF)	148,650

2021	Total
Surplus/Shortfall w/o WSCP Action (AF)	48,153
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (AF)	0
WSCP - use reduction savings benefit (AF)	0
Revised Surplus/(shortfall) (AF)	**48,153**
Resulting % Use Reduction from WSCP action	0%
2022	**Total**
Total Water Use (AF)	105,098
Total Supplies (AF)	149,806
Surplus/Shortfall w/o WSCP Action (AF)	44,708
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (AF)	0
WSCP - use reduction savings benefit (AF)	0
Revised Surplus/(shortfall) (AF)	**44,708**
Resulting % Use Reduction from WSCP action	0%
2023	**Total**
Total Water Use (AF)	109,911
Total Supplies (AF)	150,972
Surplus/Shortfall w/o WSCP Action (AF)	41,061
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (AF)	0
WSCP - use reduction savings benefit (AF)	0
Revised Surplus/(shortfall) (AF)	**41,061**
Resulting % Use Reduction from WSCP action	0%
2024	**Total**
Total Water Use (AF)	114,943
Total Supplies (AF)	152,146
Surplus/Shortfall w/o WSCP Action (AF)	37,203
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (AF)	0
WSCP - use reduction savings benefit (AF)	0
Revised Surplus/(shortfall) (AF)	**37,203**
Resulting % Use Reduction from WSCP action	0%
2025	**Total**
Total Water Use (AF)	120,206
Total Supplies (AF)	153,329
Surplus/Shortfall w/o WSCP Action (AF)	33,124
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (AF)	0
WSCP - use reduction savings benefit (AF)	0
Revised Surplus/(shortfall) (AF)	**33,124**
Resulting % Use Reduction from WSCP action	0%

Note: Years 2021 through 2024 are interpolated between the 2020 actual supply and use values and the 2025 projected supply and use for multi-year drought (from Table 7-4). 2020 actual supply is the average year supply from Table 7-1.

7.6 Description of Management Tools and Options

While IEUA does not anticipate any shortfall during drought periods, they are committed to supporting the water reliability of the region overall. Some of the management tools and options available to IEUA for increasing their regional water supply and reducing water demand have been described within other sections of this document. These tools and options include prioritizing maximizing the use of local water resources and minimizing the need for imported water due to the vulnerability of MWD imported water to climate change impacts such as changing precipitation patterns. IEUA also has a robust water use efficiency program detailed in Section 8 that identifies the most effective water use efficiency measures and partnerships for implementation in the region. This program coupled with savings from codes and standards and increased conservation-related messaging during drought periods can be a strong tool for reducing water use. IEUA has also made increasing the use of their recycled water a priority for future planning efforts, which will increase this source of supply for the region. Additional tools available to the region include water agency interconnections, service line capital improvements by MWD, and mutual aid agreements with other local agencies. Finally, enhanced groundwater management efforts and improvements in regional water management and coordination are also important for maintaining and enhancing the long-term overall resiliency of the region.

Section 8: Demand Management Measures

The purpose of the Demand Management Measures (DMMs) section of this UWMP is to (a) provide a description of the past water conservation programs that IEUA has implemented since 2015 to support its retail agencies in meeting their urban water use reduction targets and (b) describe the activities and actions IEUA may implement in the future.

8.1 Demand Management

For the purposes of this UWMP, DMMs are categorized as "Foundational" and "Other" DMMs. Listed below are those DMMs that the UWMP Act and Water Code specifically mention for wholesalers:

a) Metering
b) Public education and outreach
c) Water conservation program coordination and staffing support.

Activities in addition to the Foundational DMMs that encourage lower water use in the Agency's service area fall in the "Other DMM" category.

In addition, wholesalers must include a narrative description of its distribution system asset management and wholesale supplier assistance programs. In IEUA's case, the majority of its "Other DMMs" are included in the wholesale supplier assistance programs section (Section 8.7), which has been broken into the following categories: residential; CII; and landscape.

8.1.1 Legislative and Regulatory Requirements

As can be expected in a state with ongoing water resource challenges, California's governing entities have issued a number of regulatory requirements and policies over the past decade. Some of the regulations focus on manufacturing standards while others aim to achieve higher levels of water conservation.

State water use efficiency standards are included in SB X7-7, which requires 20% per capita water use reduction by 2020, and Assembly Bill 1881, the Model Water Efficiency Landscape Ordinance (MWELO). The Indoor efficiency standard is set at 55 gallons per person per day and the outdoor efficiency standard is set at 80% of the local evapotranspiration for existing landscapes (2015 WUEBP).

In 2018, the California State Legislature enacted AB 1668 and SB 606 to establish a new foundation for long-term improvements in water conservation and drought planning to adapt to climate change and the resulting longer and more intense droughts in California. The two bills were developed based on Governor Brown's "Making Water Conservation a California Way of Life" Executive Order B-37-16 signed in May 2016, which sets forth actions to use water wisely, eliminate water waste, strengthen local drought resilience, and improve agricultural water use efficiency and drought planning. The two bills provide requirements that affect water use efficiency and drought planning for urban water suppliers, agricultural water suppliers, and small

water suppliers and rural communities. The bills also require water suppliers to develop a Water Shortage Contingency Plan and conduct 5-year Drought Risk Assessment every 5 years. IEUA's WSCP and Drought Risk Assessment are included in this UWMP (Appendix B and Section 7.5, respectively).

There are other relevant standards and regulations that establish water use requirements for water agencies and customers that are included in Table 2-8 in Section 2. IEUA's water use efficiency programs and planning efforts comply with all current state legislative and regulatory requirements and increase the resiliency and sustainability of the region's water supplies. IEUA plans to continue its demand management measures to meet any potential future WUE legislation and regulations.

8.1.2 COVID-19 Considerations for FY 19/20

As noted throughout the following sub-sections, the COVID-19 pandemic that began towards the end of FY 19/20 affected IEUA and its retail agencies' delivery and participation of in-person programs. Staff at the retail agencies and IEUA rethought delivery of each program to keep customers, staff, and contractors safe. Programs were adapted to be contactless or virtual where possible. It is a testament to the resiliency and creativity of IEUA's retail agencies and contractors that the programs were adapted and continued with minimal downtime. Despite the pandemic, activity actually increased year-over-year.

While the future remains uncertain, most agree that the impacts of COVID-19 will be felt for some time. As IEUA and its retail agencies look toward the implementation of WUE programs in this new environment, they remain committed to ensuring the health and safety of its personnel, contractors, and customers. The WUE programs will look to leverage this new normal and come up with fresh ideas for the implementation of traditional programs. Among the accommodations and new practices, IEUA foresees a continued shift towards virtual or video-based workshops and services, a greater emphasis of bill savings in promotional materials, and evaluation of alternative program formats such as online stores and direct delivery of free and discounted products.

8.2 Commitment to Water Use Efficiency

Over the last 5 years, the State of California, specifically the southern California region, has reached a critical point in water supply reliability with the convergence of several key factors that include unseasonably low rainfall, critically dry conditions, drought, economic recession, and significant population increases. As a result of these conditions, water use efficiency has become a statewide priority, and most State and local leaders recognize it as a vital component in meeting current and future water supply needs and reliability.

IEUA and retail agencies have recognized the need for developing programs that protect existing water resources so that adequate water supplies will be available for sustainability and future growth. The development of reliable local resources has been critical to maintaining current and future water supplies. In September 1991, IEUA became one of the first water agencies to sign the CUWCC's Memorandum of Understanding Regarding Urban Water Conservation (MOU), accepting and supporting to implement a prescribed set of urban water conservation BMPs. CUWCC is now known as the California Water Efficiency Partnership.

As the regional wholesale supplier of imported water for the area, IEUA has assumed the role of coordinating the region's activities and programs to reduce demand. IEUA has worked closely with IEUA's retail agencies to facilitate the installation of thousands of water saving technologies and devices, as well as the implementation of public outreach and education programs throughout the region. IEUA retail agencies, whose direct contact with retail customers is crucial to the implementation of water use efficiency measures, have co-funded these efforts with IEUA and taken a proactive approach in educating and working with their customers to conserve water.

In light of these circumstances, IEUA and its retail agencies' commitment to conservation has increased over the past 25 years as demonstrated through financial investments, policies, authorization of a broad range of WUE and conservation programs, expansion of the regional recycled water program, support for legislation, and local ordinance implementation. Moving forward, IEUA will continue to implement active and code-based BMP-related activities using strategies identified in the 2020 Regional WUEBP that is currently in development (discussed in the next section).

The future still presents uncertainties and significant challenges in maintaining regional water supply reliability, especially as the impacts of climate change begin to exacerbate the already existing challenges. The continued development of new and expanded local resources is vital to sustaining current and future water sources. Conservation and the efficient use of water is the most cost-effective source of water supply and essential to meeting the regions demand, today and for years to come.

8.3 Water Use Efficiency Business Plan

Over the past 28 years, IEUA and its regional partners have made great progress to attain environmental stewardship and sustainability through the development of local water supplies and reduced dependence on costly and increasingly unreliable imported water. A large part of that progress has come through the implementation of WUE programs and measures. WUE is universally regarded as the most cost-effective method to reduce water demand within a region. WUE encompasses a wide range of programs, services, devices, and innovations that IEUA captures in its Regional WUEBP, which is updated every 5 years. The most recent WUEBP is currently in development in collaboration with IEUA's regional partners. In general, the elements in the WUEBP may focus on using water more efficiently, eliminating water waste, and drought proofing the region through increased use of recycled water, groundwater, stormwater, and other local water supplies.

The WUEBP may focus on identifying target customers that are the most inefficient water users, educating them about WUE attainment, and providing a "road map" to accomplish this. To create the WUEBP, a thorough review of current, past, and potential new programs is being conducted, with calculations to be performed for costs, savings, and overall benefits to the region. The WUEBP may also evaluate developing WUE trends, emerging technologies, and potential MWD funding availability or other grants. The WUEBP may provide a portfolio of recommended programs with direct quantifiable and cost-effective water savings. Each retail agency may elect to modify the design of the programs presented in the WUEBP and may choose to participate in all programs or only a select few. IEUA collaborates with each retail

agency to continually evaluate and modify the plan to meet the goals and objectives of the region.

Each year, IEUA prepares a comprehensive annual report that captures all the implemented activities from the past fiscal year. The annual report tracks the progress that has been made against the goals and objectives, identified in the WUEBP, and provides the retail agencies with service area specific data. As part of its annual report, IEUA quantifies the water savings by sector and by measure. The lifetime water savings by measure as of FY 19/20 are shown in Table 8-1. Savings from HETs dominate the lifetime water savings by measure table, at 42% of total savings, followed by turf removal and smart controllers.

The WUEBP is a working document and, as such, must be modified and updated as changes occur, and program years roll out. IEUA regularly reviews the plan and adjusts accordingly. Changes and/or reviews of the plan take place: when programs are added, subtracted, or modified; on an annual basis to meet the annual reporting requirements; every 5 years in parallel with UWMP updates; and as the State's framework policies are finalized.

The 2020 WUEBP in development may identify the future suite of water use efficiency programs for implementation and focuses on increased efforts in landscape management and reducing outdoor water use. Programs are designed to positively impact long-term behavior regarding efficient use of water. Those activities may include device rebates for residential and commercial customers, sprinkler system tune-ups, leak detection system rebates, turf replacement incentives, landscape evaluations, and landscape retrofits which incorporate hardware and climate appropriate plant recommendations that are consistent with landscape ordinances. This is combined with the ability to initiate a comprehensive marketing, education, and outreach program which includes the combined efforts of IEUA and its retail agencies. Details on the 2020 WUEBP in development and its possible selected programs are included in Section 8.9 and throughout the rest of Section 8.

Table 8-1: Lifetime Savings by Measure for Past Achieved Conservation

Measure	Lifetime Savings (AF)	Percent of Total Savings
High Efficiency and Ultra Low Flow Toilets (all markets)	47,448	42%
Turf Removal (all markets)	11,938	11%
Smart Controllers (all markets)	11,106	10%
Residential Landscape Retrofits (small & large)	8,554	8%
High Efficiency Sprinkler Nozzles (all markets)	8137	7%
Ultra-Low Volume Urinals	7,123	6%
High Efficiency Clothes Washers (all markets)	6,502	6%
Landscape Evaluations (all markets)	5,309	5%
Fontana USD Retrofits	4,170	4%
Plumbing Control Valves	476	0.4%
Water Brooms	416	0.4%
Pre-rinse Spray Valves	379	0.3%
X-ray Film Processors	304	0.3%

Measure	Lifetime Savings (AF)	Percent of Total Savings
Sprinkler System Tune-ups	284	0.3%
Laminar Flow Restrictors	247	0.2%
Pressure Regulating Valves	178	0.2%
Cooling Tower Controllers	155	0.1%
Leak Detection Devices	83	0.1%
Pool Covers	28	0.0%
Large Rotary Nozzles	22	0.0%
Air-Cooled Ice Machines	18	0.0%
Rain Barrels & Cisterns	13	0.0%
Total	**112,890**	-

Note: Water savings are active savings only.

8.3.1 Core Water Use Efficiency Strategies for the Region

There are five key elements to the WUE strategy within the IEUA region:

- **Promote Water Resource Management.** Manage effective WUE programs at a regional level using sound business decision-making practices to develop and implement strategies to meet water use efficiency targets and stretch limited water resources.

- **Develop and Implement Regional Programs.** Take advantage of economies of scale and stretch the limited regional WUE budget by implementing programs on a regional basis. It is recognized that some programs may only be implemented at the individual agency level, such as budget-based tiered rate structures and WUE ordinances.

- **Build IEUA Retail Agency Cooperation.** Foster cooperation, collaboration, and active participation of all IEUA retail agencies for the successful development and implementation of WUE programs. It is recognized that successful development and implementation of regional WUE programs requires retail agency cooperation in obtaining accurate water demand data, by customer class, in a timely manner, and promotion of cost-effective programs to customers.

- **Develop Incentive-Based Programs.** Develop effective incentive programs that encourage participation, provide public benefit, and achieve quantifiable water savings.

- **Public Recognition.** Provide recognition to customers who have implemented measures resulting in extraordinary water use efficiency achievements.

8.4 Foundational DMMs

8.4.1 Metering

IEUA does not have any direct connections to potable customers. All imported water supplied to the area through IEUA is delivered through direct connections owned by MWD.

8.4.2 Public Education and Outreach

Developed over the last 15 years and in cooperation with its local retail agencies, IEUA participates in and offers an array of regional educational outreach activities. These programs help provide support to the local retailers to help them meet their DMM requirements.

The following is a list of programs and activities implemented over the last 5 years that will continue to be foundational elements of IEUA's regional programs:

National Theater for Children (NTC) Program: Delivers a package of live theater, student curriculum, and teacher guides focused on uses of water, the importance of water, ways water gets polluted, and ways to conserve water to elementary schools throughout the region. In FY 19/20, NTC visited 40 elementary schools throughout the IEUA service area and conducted 74 shows.

Shows that Teach: Fun, theatrical-style productions which teach students about water science, the value of water, and the importance of conservation. Over FY19/20, this program conducted 23 performances at 12 schools. Retail agencies have decided to focus efforts on only one school education program moving forward and the Shows that Teach program will be eliminated.

Water Discovery Field Trip Program: Prior to the COVID-19 pandemic, IEUA provided free educational field trips to the Chino Creek wetlands and Educational Park to promote understanding of the value of natural treatment wetlands, the creation of habitat for endangered/sensitive species, and environmental stewardship. Due to the pandemic, IEUA shifted all education programs from in-person to virtual. In April 2020, IEUA launched Owlie's Virtual Adventures, a program featuring virtual tours, a series of At-Home Activities, how-to videos, and more.

Community Outreach: IEUA annually participates in the following community outreach activities in coordination with its retail agencies: San Bernardino County Water Conference, Landscape and Water Conservation Fair, CVWD's Earth Day, Earth Day at the Chino Creek Wetlands and Educational Park, and the Smart Irrigation Month Hose Nozzle Giveaway. IEUA also participates in other community outreach events that vary year to year.

IEUA's Social Media Outreach: IEUA continues to offer updates via Facebook, YouTube, Twitter, Instagram, and two educational blogs. On these social media platforms, IEUA provides up-to-the-minute information on events, news, education programs, drought updates, water-wise tips, park updates, and wildlife facts.

IEUA's Regional "Water is Life" Student Art/Poster Contest: IEUA hosts its annual "Water is Life" student art/poster contests for grades K-12. The theme "Water is Life" is used to help students express their creativity while focusing on the importance of water. IEUA typically receives over 500 entries annually. The top five winners from each category (K-5; 6-8; 9-12) are entered into MWD's regional contest.

Solar Cup Competition: The annual Solar Cup competition is held each year in May at MWD's Lake Skinner reservoir in the Temecula Valley. High school students from surrounding areas designed, built, equipped, and raced solar-powered boats. This competition encourages well-

thought-out boat design, high speed, and endurance, which require participants to use an alternative power source in a real-world application. IEUA co-sponsors three local highs school teams annually. The May 2020 competition was transitioned to a virtual competition that consisted of 12 virtual challenges due to the health precautions related to the COVID-19 pandemic.

The Water Education – Water Awareness Committee: Since 1989, the committee promotes the importance of water conservation in southern California through coordination and participation in community outreach projects and providing grant funded opportunities for local educators. Projects include hosting booths at local resource and educational fairs, conducting water education workshops at local schools, offering grant and scholarship opportunities for educators and students, and sponsoring an annual water conservation video contest and broadcast media and digital art contest.

8.4.3 Water Use Efficiency Program Coordination and Staffing Support

IEUA's WUE Program consists of two full time employees and two interns. Consultants are also hired to help with reports and larger initiatives, like the 5-year WUEBP. In addition, IEUA collaborates with CBWCD, MWD, and two vendors for funding and implementation of specific WUE programs.

Currently, IEUA's WUE program budget is approximately $2.7 million annually, $1.6 million of IEUA funding and another $1.1 million of outside funding. These revenues are collected with the support and cooperation of the retail water agencies. IEUA's revenue collection for water use efficiency and conservation comes from a Meter Equivalent Unit charge, which is the number of active water accounts of each meter served by an IEUA retail agency. Over the past 5 years, IEUA has dedicated an average of $1,600,000 annually to Wholesale Assistance Programs, of which $300,000 goes to education and outreach programs. These local funds are augmented with external funding from sources such as MWD, DWR, and the U.S. Bureau of Reclamation, and other inter-agency partnering programs.

The 2020 WUEBP in development may provide annual regional WUE program budgets with line items dedicated to specific WUE activities for the next 5 years. The draft projected annual budget for each year is shown in Table 8-2. This budget is still in development and may be subject to change. The budget amount reflects the financial commitment of IEUA only and are exclusive of MWD or other external financial contributions. The budgets presented do not align exactly with actual costs because the figures are based upon estimated WUE programming activity that vary depending upon program participation rates.

Table 8-2: IEUA Annual Water Use Efficiency Programs Budget

Fiscal Year	Annual Water Savings (AF)
2020/21	$1,600,000
2021/22	$1,600,000
2022/23	$1,600,000
2023/24	$1,600,000

Fiscal Year	Annual Water Savings (AF)
2024/25	$1,600,000
Total	**$8,000,000**

Notes:
Budget includes IEUA regional program costs exclusive of outside funding.
Budget does not include administrative overhead costs.
Budget includes $300,000 per year for education and outreach programs.
Budget subject to change during 2020 WUEBP development.

8.5 Other DMMs

IEUA has also provided the following programs to support its retail agencies water use efficiency over the past 5 years:

Member Agency Administered Program: This program provides funding support for retail agency implemented local water use efficiency projects that demonstrate water savings. Members submit proposals that include a project scope of work, estimated water savings, and cost. Proposed project may not be duplicative of existing regional programs.

Technology Based Software: IEUA sponsored the development of agency-specific dashboards that allowed its retail agencies to locate high water use landscapes, identify over water-use parcels, track agency use against set State WUE objectives, and direct WUE programs to customer specific needs. These data analytics tools allow IEUA's retail agencies to identify customers more accurately with excess water usage and communicate with them on how their usage compares to accepted WUE standards.

Budget-Based Water Rates: This is one of the most cost effective WUE programs since there is no cost to implement. These rate structures allocate each individual account an amount of water that would be required for efficient indoor and outdoor water use, adjusted to real-time actual weather and customer characteristics. Customers are able to compare their individualized water budget with their actual usage and the appropriate economic signal rewards efficient use. With a clear financial incentive, the customer is motivated to maintain efficient use patterns. Over the last 5 years, three of IEUA's retail agencies have adopted budget-based rate structures within their respective service areas.

Additional "other" DMMs implemented by IEUA are described in the Section 8.7, Wholesale Agency Support.

8.6 Asset Management

IEUA does not own or operate a potable water distribution system, and therefore, does not have any potable water asset management programs.

8.7 Wholesale Agency Support

IEUA provides financial assistance to each of the local retail agencies in an effort to support local WUE implementation efforts. Each retail agency is eligible to receive an annual grant of

$2,000 to support special events, customer surveying, outreach materials, conservation devices, and vehicle magnets. In addition, IEUA covers dues costs for memberships in the Alliance for Water Efficiency and the California Water Efficiency Partnership on behalf of its retail agencies and conducts annual technical workshops that provide retail agencies with information related to specific water use efficiency initiatives, programs, BMP implementation and compliance with new statutory requirements. This is part of IEUA's commitment to the DMMs (Wholesaler Assistance Programs) which requires a wholesaler to provide financial and/or technical assistance to their local retail agencies to implement DMMs.

IEUA has an annual average WUE budget of approximately $1.6 million that is dedicated to supporting the local retail agencies in implementing WUE and conservation related programs. The following subsections detail residential, CII, landscape, and other programs offered by IEUA and its retail agencies over the last 5 years.

8.7.1 Residential Programs

Between 2015 and 2020, IEUA and its retail agencies continued implementing a variety of WUE and conservation programs and products that have led to significant accomplishments in demand reduction and sustained water savings. These programs have consisted of incentives for homeowners and businesses, landscape efficiency, and educational programs. Most of these programs have been very successful and others were introduced as pilots.

The following is a list of activities and programs that were accomplished by IEUA and its retail agencies from 2015 to 2020. Savings as reported by the WUE annual report for FY 19/20 are also included below. Additional details can be found in the annual report.

MWD SoCalWater$mart.com Residential Rebate Program: IEUA's foundational WUE rebate program for residential customers provides incentives for HETs, washing machines, sprinkler nozzles, weather-based irrigation controllers, and rain barrels. IEUA and its retail agencies dedicate funding specifically for enhancing MWD's base rate rebate amounts to attract greater customer participation. In FY 19/20, this program had an annual water savings of 57 AF for a total lifetime savings of 731 AF. A total of 7,051 devices, from over 1,500 residential and commercial customers, were rebated in FY 19/20. High efficiency sprinkler nozzles and HETs are the largest numbers of devices rebated by residential customers. This program has the lowest cost per AF of water savings.

Turf Replacement Program: As part of the Turf Replacement Program, residential customers within IEUA's service area are eligible for a $3 per square-foot rebate partially funded by MWD. In FY 19/20, approximately 184,286 square feet of residential turf was replaced, for an estimated annual water savings of 24 AF and a total lifetime savings of 243 AF.

Residential Pressure Regulation Program: This program, launched in June 2016, installs PRVs at meters, homes, or at the point-of-connection for irrigation systems to automatically reduce high incoming water pressure from water mains and provide a lower, more functional pressure distribution. PRVs ensure that end-use plumbing fixtures operate at the intended flow rate and reduce the incidence of excessively leaky pipes and fixtures. To date, this program has replaced 1,287 PRVs throughout the IEUA service area with projected savings of 4 AF per year and lifetime savings of 45 AF over the life of the devices. MWD completed a study of the water

savings following installation of PRVs, these savings are lower than previously expected; however, IEUA's retail agencies have elected to continue with the program because of its highly valued customer service. The program is now provided on a case-by-case basis for customers experience issues with pressure.

Leak Detection Incentive Program: Recent studies of leak detection programs show a reduction in water use of 8% to 18%, with approximately 70% of customers finding leaks. This program, which was starting as a pilot program at the beginning of FY 19/20, provides a point of purchase discount for the Flume Smart Water System. The Flume app provides real time alerts notifying customers of excessively high volume or long duration water usage. It allows customers to better understand their water usage through user-friendly visuals. Demand for this program was unprecedented and the program is being expanded in FY 20/21. This program has an annual savings of approximately 8 AF per year and a lifetime savings of 83 AF.

IEUA Regional Residential Landscape Retrofit Program – DWR/MWD: Initially launched in April 2011, this program provides outdoor irrigation evaluations and retrofits of high efficiency landscape devices for residential water service customers with lot sizes of ¼ acre or larger. Since program inception, a total of 1,672 site retrofits were completed with annual water savings from device upgrades amounting to 932 AF per year and a lifetime savings of 7,962 AF.

IEUA Residential Education, Survey, and Controller Upgrade Program: Focused on the higher water use demographic within the small residential landscape sector, this program promotes an improved understanding of landscape irrigation control technologies while ensuring more efficient scheduling and operation of automated irrigation systems through required training class attendance, landscape evaluations, and smart controller technology upgrades. In FY 19/20, over 450 smart controllers were installed. Program water savings to date is approximately 20 AF per year for an average lifetime savings of 196 AF.

Santa Ana River Conservation and Conjunctive Use Program Smartscape Residential Tune-Up Program: This pilot program was starting in April 2019 to provide services to maximize the efficiency of a customer's existing irrigation system. In partnership with ConservInc., Orange County Coastkeeper, and Inland Empire Water Keeper, the program includes services such as sprinkler repairs, valve replacements, drip irrigation couplers and emitter replacements, minor lateral irrigation line repairs, and a general audit. Final water savings from the program are still being determined.

FreeSprinklerNozzles.com Voucher Program: Launched in April 2011, this program enabled residential and commercial customers within IEUA's service area to obtain a voucher for free high efficiency irrigation spray nozzles through a web-based portal. Since program inception, a total of 2,214 vouchers have been redeemed by residents for a total of 60,591 nozzles and an estimated water savings of 267 AF per year with a lifetime savings of 1,333 AF.

Water Softener Rebate Program: IEUA incentivizes customers through a rebate to remove residential self-regenerating water softeners. Over the course of the program, 901 water softeners have been removed, for water savings of approximate 17 AF per year in addition to the removal of more than 200 tons of salt.

8.7.2 Commercial, Industrial, Institutional Programs

IEUA's service area hosts a diverse range of CII activities, including numerous service industries (such as hotels and restaurants), manufacturing, agriculture and health care, and a large number of schools and colleges. Each of these sectors present unique opportunities to reduce water consumption. Although commercial accounts comprise only 5% of the total number accounts in the IEUA area, they use approximately 17% of overall demand.

The following is a list of activities and programs that were accomplished by IEUA and its retail agencies from 2015 to 2020:

MWD SoCalWater$mart.com CII Rebate Program: IEUA's foundational water use efficiency rebate program for CII customers provides incentives that include plumbing fixtures, landscaping devices, and some industry specific technologies. IEUA and its retail agencies dedicate funding specifically for enhancing MWD's base rate rebate amounts to attract greater customer participation. In FY 19/20, this program had an annual water savings of 93 AF for a total lifetime savings of 1,043 AF. Laminar flow restrictors and HETs are the largest numbers of devices rebated by commercial customers. This program has the lowest cost per AF of water savings.

Turf Replacement Program: As part of the Turf Replacement Program, commercial customers within IEUA's service area are eligible for a $3 per square-foot rebate, partially funded by MWD. In FY 19/20, approximately 318,778 square feet of commercial turf was replaced, for an estimated annual water savings of 42 AF and a total lifetime savings of 421 AF.

Garden in Every School Program: Each year, the Garden in Every School Program awards either a $4,500 grant per school for up to four schools for the establishment of a new water-wise garden or a $1,000 mini-grant to participating schools to support the sustainability of existing gardens. Due to the COVID-19 pandemic, the program was put on hold through FY 20/21.

8.7.3 Landscape Programs

The semi-arid climate of the IEUA service area, with only 15 inches of average rainfall, combined with the lush landscaping aesthetic that is popular in the region, creates a significant water demand for irrigation of outdoor landscaping. The IEUA service area reflects this demand, where outdoor water use is estimated to be nearly 60% of total demand across all sectors. Many of the residential programs detailed in Section 8.7.1 are landscape programs that are categorized as residential programs.

IEUA and its retail agencies have also completed the following list of activities and programs over the last 5 years:

Sprinkler Tune-Up Program: Begun as a pilot in FY 18/19, the program was operated during FY 19/20 by Conserv Inc, IEUA's existing vendor for smart controller installation programs. There was unprecedented customer demand for this program, with a 275% increase in activity year-over-year. The program provides customers with a free landscape irrigation tune-up that includes recommendations for repairs and upgrades, replacement or adjustment of sprinkler heads and nozzles, reparation of valves and bad wiring, controller programming and scheduling,

and minor lateral irrigation line repairs. In FY 19/20, 450 tune-up services were performed, and the program achieved an annual water savings of 104 AF for a total lifetime savings of 209 AF.

IEUA/Chino Basin Water Conservation District Landscape Evaluation and Audit Program (LEAP): The LEAP program provides landscape and irrigation evaluations for residential and CII customers. This program was launched in 2007 through a grant from DWR and is available region-wide annually. In FY 19/20, 91 residential and 53 commercial properties were evaluated. The program has an annual savings of 43 AF and a total lifetime savings of 213 AF, the majority of which comes from commercial customers.

IEUA Regional Landscape Training Workshops: In a series of IEUA-sponsored courses, customers learn the latest ways to create sustainable landscape and improve landscape efficiency to reduce outdoor water usage through workshops. The courses cover information on landscape design and preparation, water wise landscaping, mulching, and composting, and more. Only four in-person workshops were held in FY 19/20, in part due to COVID-19 health precautions but also because of decline in customer demand.

Residential Landscape Transformation Program: From October 2012 to June 2016, this program offered residential participants contractor services that included landscape design, selection of climate appropriate plants, removal of living turf, installation of weed barriers and plants, and conversion of overhead sprinklers to drip irrigation. A total of 263 sites were completed removing 232,655 square feet of turf, resulting in an estimated water savings of 34 AF and a lifetime savings of 341 AF.

Landscape Design Assistance Program: This program delivers a comprehensive landscape design package to support front and backyard renovations at no cost to participants. The service has a market value of approximately $500. A partnership between IEUA, the CBWCD, and IEUA's retail agencies, this program is designed to provide participants with a clear and inspiring design that is easily usable by residents who have no experience reading landscape plans. Since the program launch in February 2018, 32 residential landscape designs have been created, eight turf replacement projects were completed, and 19 projects are in progress.

Residential Landscape Guidebook: The step-by-step instruction book includes "how-to's" on resilient landscape design, building healthy soils, selecting climate appropriate plants, and installing efficient irrigation systems. The Guidebook is located online at www.ieua.org/usewaterwisely/landscaping.

Water Saving Garden Friendly: This program helps customers find the resources they need to be water efficient in their landscape. The program developed a micro-website called "Water Saving Garden friendly in the Inland Empire", an online plant database climate specific to the region. The website also includes garden tours, a garden gallery, a search engine for plants, problem solving plant lists, plant and garden information report printouts, a garden resources section, and water conservation tips. The micro-site can be found at www.watersavinggardenfriendly.com.

8.8 Demand Management Achievements (2015-2020)

The above sections detailed recent savings for each program. Majority of these values come from the Alliance for Water Efficiency (AWE) Conservation Tracking Tool, which IEUA uses to plan for and track water conservation program activity and results. The tool helps estimate the effects of plumbing/appliance standards and planned conservation programs on future water use, utility costs and sales revenue, and average customer rates and bills. Data from the region's locally administered programs as well as MWD's regional rebate programs has been collected and entered into the AWE tracking tool for every year back to 1995.

Using the AWE Tracking Tool, for calendar year 2020, IEUA's annual water savings was approximately 408 AF and 3,292 AF over the life of the measures (excludes national plumbing standards). The majority of the annual water savings come from single-family and commercial programs, which are 49% and 44% of annual water savings, respectively. Table 8-3 shows the FY 19/20 lifetime savings by sector, the year's conservation savings through the lifespan of each measure, which varies measure by measure. Again, the single-family sector accounts for the majority of the water savings, at 64%, which comes predominantly through landscape measures, followed by 29% from the commercial sector. Due to the categorization of the programs, there are no annual water savings for the multi-family sector.

Table 8-3: Water Savings by Sector

Sector	Lifetime Water Savings (AF)	Percent of Total Water Savings
Single-Family	13,954	64%
Multi-Family	0	0%
Commercial	6,372	29%
Irrigation	1,515	7%
Total	**21,841**	

The eight major IEUA WUE programs with verifiable water savings are:

- SoCal WaterSmart Rebates (accounts for 37% of FY 19/20 annual savings and 54% of the lifetime savings)
- Sprinkler Tune-Ups (accounts for 25% of FY 19/20 annual savings and 6% of the lifetime savings)
- Turf Replacement (accounts for 16% of FY 19/20 annual savings and 20% of the lifetime savings)
- Landscape Audit and Evaluations (accounts for 11% of FY 19/20 annual savings and 7% of the lifetime savings)
- Smart Controller Upgrades
- Large Landscape Retrofits

- Leak Detection Incentives
- Pressure Regulation.

The quantifiable savings by program that have been achieved over the last 5 years are included in Table 8-4. As shown in these tables, HETs and turf removal have achieved the most savings both over the last 5 years and over all time (as shown previously in Table 8-1), followed by smart controllers and residential landscape retrofits. It should be noted that the HET program was phased out in FY 2015/16 but still are most of the lifetime savings.

Table 8-4: Savings by Program (FY 2015/16 – FY 2019/20)

Measure	Lifetime Savings (AF)	Percent of Total Savings
High Efficiency Toilets (all markets)	10,775	35%
Turf Removal (all markets)	9,027	29%
Residential Landscape Retrofits (small & large)	4,450	14%
Smart Controllers (all markets)	2,025	7%
High Efficiency Sprinkler Nozzles (all markets)	1872	6%
High Efficiency Clothes Washers (all markets)	890	3%
Landscape Evaluations (all markets)	704	2%
Plumbing Control Valves	476	2%
Sprinkler System Tune-ups	284	1%
Pressure Regulating Valves	178	1%
Laminar Flow Restrictors	142	0.5%
Leak Detection Devices	83	0.3%
Ultra-Low Volume Urinals	29	0.1%
Air-Cooled Ice Machines	14	0.0%
Cooling Tower Controllers	13	0.0%
Rain Barrels & Cisterns	12	0.0%
Total	**30,974**	-

8.9 2020 WUEBP and Future Demand Management Measures

IEUA recognizes that conserving water and increasing water use efficiency is an integral component of a responsible water management strategy. The IEUA region has achieved its 2020 SBX7-7 water use target largely by focusing on offering customers a portfolio of programs to increase indoor and outdoor water efficiency measures, developing building codes and landscape ordinances, and reducing demand for potable water by increasing recycled water supply. IEUA is committed to providing its customers with the education and tools to maintain and even lower their current water use.

The most recent WUEBP is currently in development and will be completed in 2021. The document may be split into two phases. The first phase may cover the WUE plans for the next 2 years. The second phase may be released as an addendum to the WUEBP and will cover the subsequent 3 years of the 5-year planning period. This potential breakdown into two phases

would allow IEUA and its regional partners to collaborate more effectively and give more time to dive into its plans to meet upcoming water use regulations. In general, the elements in the WUEBP may focus on using water more efficiently, eliminating water waste, and drought proofing the region through increased use of recycled water, groundwater, stormwater, and other local water supplies. As of the time of this writing, the 2020 WUEBP is still in development; any information included in Section 8 related to the 2020 WUEBP is therefore, subject to change.

As part of the development of the 2020 WUEBP, a possible a portfolio of recommended programs and new technologies have been identified for implementation over the next 5 years that will help the region achieve a prolonged, increased level of water efficiency. While the IEUA regional alliance is currently exceeding water use targets set by SBX7-7, IEUA will continue to implement the DMMs to further lower water uses in anticipation of future water use objectives. The programs, policies, and technologies detailed in the WUEBP will assist in helping IEUA's retail agencies to maintain the conservation levels to allow them to stay in compliance with the SBX7-7 2020 target as described in Section 3 of this UWMP.

Along with continuing its education and outreach programs, the development of the 2020 WUEBP identified possible selected programs for implementation as shown in Table 8-5 below. The table also includes a summary of the reasoning behind the potential selection and the support actions required for each program. These selected programs are subject to change with the further development of the 2020 WUEBP.

Table 8-5: Selected Programs and Reasoning

Program	Reasoning	Support Actions
Landscape Evaluations	• Links customer with WUE Programs • Provides one-on-one customer education • Starts relationship with customer	• Prioritize large landscape customers – if possible, customers that are above their water budget allocation • Provide more in-depth cost/benefit information • Provide personalized follow-up and support
Sprinkler System Tune-Up	• Nearly all irrigation systems need repairs • Repairs are necessary before efficiency upgrades are made otherwise new products will not work as designed • There are millions of sprinkler nozzles in the IEUA territory that are not high efficiency and need to be retrofitted • Measures are professionally installed by qualified contractors	• Nearly all irrigation systems need repairs • Repairs are necessary before efficiency upgrades are made otherwise new products will not work as designed • There are millions of sprinkler nozzles in the IEUA territory that are not high efficiency and need to be retrofitted • Measures are professionally installed by qualified contractors
Large Landscape Retrofit	• Targets large water use • Site visit verifies there will be savings • Professional installations and programming of controller	• Identify customers through Tune-up Program • Additionally, market locally • Provide electronic follow-up with customer to ensure sustained savings

Program	Reasoning	Support Actions
Small Smart Controller Upgrade	• Offering to smaller lots provides bigger pool of potential customers • Site visits verifies there will be savings • Educational workshop ensures customer can program and maintain controller and therefore, sustain savings	• Use water budget and potential savings to show return on investment • Consider providing video conferencing for controller programming assistance • Consider customer co-pay to lower costs
Turf Replacement Incentive	• There are hundreds of thousands of square feet of irrigated turf in IEUA territory • Replacing turf with regionally appropriate plants aids in transforming the market • Program provides long term savings	• Provide easier access to support services • Link customers with design services • Follow up with customers to assist them through process
SoCal Water Smart Rebates	• MWD funding • MWD administration • Most cost-effective program • Ease of implementation	• Continue to add incentive dollars to priority measures • Promote through all other programs • Market locally
Leak Detection Incentive	• Many homes have leaks, currently industry estimates 10% • Most leaks go undetected and customers are not aware for months until they get their bill • Repairing water damage caused by leaks can cost thousands of dollars for a typical homeowner • Providing customers with data on their water use gives them the necessary information and motivation to make efficiency changes	• Finalize program delivery – standard rebate vs home delivery • Market locally
Low Income Leak Repair	• Addresses equity and affordability issues – especially increasing financial impacts of COVID-19 • Repairing water damage caused by leaks can cost thousands of dollars for a typical homeowner • Financially vulnerable population cannot afford to fix leaks • Customers value service and builds relationship with water agency • Program provides excellent PR	• Consider partnering with housing agencies or energy utility • Conduct outreach to targeted population • Identify leaks through water use analysis and preemptively reach out to customers
Pressure Regulating Valve Installations	• Many home plumbing systems have leaks and operate above the intended flow rate due to high pressure	• Consider customer co-pay option to lower costs • Target customers with complaints about high water pressure • Use as a means for promoting other conservation measures

Note: Information from Draft 2020 WUEBP, information subject to change.

The draft 2020 WUEBP currently estimates that its water conservation programs will save approximately 9,008 AF of water over the next 5 years, at a cost of $52/AF. This cost falls well below the region's cost of purchasing imported water from MWD, which is $1,122/AF. Table 8-6 shows the potential projected annual water savings to be achieved through the 5-year plan currently being outlined in the 2020 WUEBP. These plans are subject to change with further development of the 2020 WUEBP.

Table 8-6: Projected Annual Water Savings

Fiscal Year	Annual Water Savings (AF)
2020/21	691
2021/22	1,340
2022/23	1,851
2023/24	2,333
2024/25	2,792
Total	**9,008**

Note: Values from Draft 2020 WUEBP, information is subject to change.

These potential projected annual water savings come from the projected annual activity for each measure, shown in Table 8-7 below.

Table 8-7: Annual Activities by Measure (units vary)

Measure	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25
SCWS Premium Efficiency Toilet Rebates	550	550	550	550	550
SCWS Res High Efficiency Clothes Washer Rebates	600	600	600	600	600
SCWS Res High Efficiency Sprinkler Nozzle Rebates	1,200	1,200	1,200	1,200	1,200
SCWS Res Smart Controller Rebates	600	600	600	600	600
Large Landscape Retrofit Program	200	200	200	200	200
SCWS Res Turf Removal Rebate - IEUA $1 (sf)	200,000	200,000	200,000	200,000	200,000
SCWS CII Premium Efficiency Toilet Rebate	2,000	2,000	2,000	2,000	2,000
SCWS CII Smart Controller Rebate	100	100	100	100	100
SCWS CII High Efficiency Sprinkler Nozzle Rebates	1,000	1,000	1,000	1,000	1,000
SCWS Laminar Flow Restrictor Rebates	1,000	1,000	1,000	1,000	1,000
CBWCD Res Landscape Evaluation	50	50	50	50	50
CBWCD CII Landscape Evaluation	50	50	50	50	50
SCWS Rain Barrel Rebates	50	50	50	50	50
SCWS CII Turf Removal Rebates - IEUA $1 (sf)	250,000	250,000	250,000	250,000	250,000
Pressure Regulating Valve Program	50	50	50	50	50
SCWS Plumbing Flow Control Rebates	350	350	350	350	350
Smart Controller Upgrade Program	250	250	250	250	250
Sprinkler Tune-Up Program	450	450	450	450	450
Landscape & Irrigation Pay for Performance Incentive	25	25	25	25	25
Leak Repair Program - DAC Low Income	100	100	100	100	100

Notes: SCWS = SoCal Water Smart. Res = Residential. CII = Commercial, Industrial, and Institutional.
DAC = Disadvantaged Communities
Information from Draft 2020 WUEBP, information is subject to change.

Section 9: Energy Intensity Reporting

9.1 Overview

Water and energy resources are inherently connected. The California Energy Commission estimates that the transport and treatment of water, treatment and disposal of wastewater, and the energy used to heat and consume water account for nearly 20% of the total electricity and 30% of non-power plant related natural gas consumed in California. In 2015, California issued new rules requiring 50% of its power to come from renewables, along with a reduction in greenhouse gas emissions to 40% below 1990 levels by 2030. In 2018, Governor Jerry Brown signed Senate Bill 100 (SB100) into law, committing California to 100% carbon-free energy by 2045. IEUA has voluntarily reported the energy intensity of its wastewater and recycled water operations to assist with this goal. IEUA does not own or operate any potable water facilities.

The methodology for calculating water energy intensity outlined in Appendix O of the UWMP Guidebook was adapted from the California Institute for Energy Efficiency exploratory research study titled “Methodology for Analysis of the Energy Intensity of California’s Water Systems” (Wilkinson 2000). The study defines water energy intensity as the total amount of energy, calculated on a whole-system basis, required for the use of a given amount of water in a specific location.

UWMP reporting is limited to energy intensity associated with water management processes occurring within an urban water supplier’s direct operational control. Operational control is defined as authority over normal business operations at the operational level. Any energy embedded in water supplies imparted by an upstream water supplier (e.g., water wholesaler) or consequently by a downstream water purveyor (e.g., retail water provider) is not included in the UWMP energy intensity tables. IEUA’s calculations for wastewater treatment and recycled water conform to methodologies outlined in the UWMP Guidebook and Wilkinson study.

The water supply energy intensity and wastewater and recycled water energy intensities were calculated for the 2019-2020 fiscal year (July 1st through June 30th). The energy use associated with the wastewater and recycled water processes is shown below in Table 9-1. IEUA’s administrative facilities do not have dedicated energy consumption meters and instead share meters with the connected wastewater and recycled water facilities. As such, the per facility energy usage below includes administrative energy use. Excluding imported electricity that may come from renewable sources, approximately 32% of the total energy associated with IEUA’s wastewater and recycled water operations came from renewable sources, specifically solar, wind, and biogas capture.

Table 9-1: Energy Use for FY 19-20 Wastewater and Recycled Water Processes

Facility	Electricity (kWh)	Natural Gas (kWh)	Diesel (kWh)	Propane (kWh)	Biogas (kWh)	Renewables (kWh)
Wastewater Operations (FY 19-20)						
CCWRF	6,093,490	2,491	20,515	3,643	-	291,104
RP-1	19,764,610	137,798	121,964	132,753	19,682,446	1,472,002
RP-2	2,127,332	51,597	67,851	607	7,164,301	-
RP-4	7,040,126	4,922	27,336	2,226	-	311,110
RP-5	8,612,362	2,288,982	23,293	607	-	1,938,054
Biosolids Handling	-	-	875,072	-	-	-
Montclair Lift Station	93,351	-	-	-	-	-
Philadelphia Lift Station	651,913	-	-	-	-	-
San Bernardino Lift Station	492,701	-	-	-	-	-
Prado Dechlorination Station	59,073	-	-	-	-	-
Prado Lift Station	893	-	-	-	-	-
Recycled Water Operations (FY 19-20)						
CCWRF	3,186,402	-	-	-	-	-
RP-1	6,910,814	-	-	-	-	-
RP-2	-	-	-	-	-	-
RP-4	2,614,994	-	-	-	-	-
RP-5	2,518,862	-	-	-	-	-
1630 E. Station	1,108,112	-	-	-	-	-

Notes:
1. Data collected for FY 2019/2020 from metered data.
2. Energy use data includes energy used for administrative buildings.
3. Diesel numbers are based on purchases and are an average of FY18-19 and FY19-20.
4. The Philadelphia Lift Station energy use is not included in the calculation of wastewater energy intensity; the lift station pumps high strength brine to the non-reclaimable wastewater system.

kWh = kilowatt-hour

9.2 Water Supply Energy Intensity

IEUA is a wholesale distributor of imported water and treats and delivers recycled water to retail agencies and some large retail agricultural customers for the purposes of agriculture, municipal irrigation, industrial uses, and groundwater replenishment. Recycled water is not included in the water supply energy intensity calculations but is included in the following section with wastewater. Since IEUA does not own any water supply infrastructure, it does not have any energy use related to its water supply and distribution, resulting in an energy intensity of zero kilowatt-hours per acre-foot. Table 9-2 (DWR's Table O-1A) is included below with this information in the narrative section.

Table 9-2: Water Supply Energy Intensity

Urban Water Supplier: *IEUA*

Water Delivery Product (If delivering more than one type of product use Table O-1C)

Wholesale Non-Potable Deliveries

Table 9-2: Water Supply Energy Intensity

Table O-1A: Recommended Energy Intensity - Water Supply Process Approach									
Enter Start Date for Reporting Period	7/1/2019	Urban Water Supplier Operational Control							
End Date	6/29/2020	Water Management Process						Non-Consequential Hydropower (if applicable)	
		Extract and Divert	Place into Storage	Conveyance	Treatment	Distribution	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process (AF)		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Energy Consumed (kWh)		*0*	*0*	*0*	*0*	*0*	*0*		*0*
Energy Intensity (kWh/AF)		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*

Quantity of Self-Generated Renewable Energy

0 kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

Metered Data

Data Quality Narrative:

Narrative:

IEUA does not use any energy for stormwater management. Any energy associated with imported water is associated with the infrastructure owned and operated by MWD. IEUA therefore has no energy use associated with its water management process. Any energy associated with groundwater recharge is included in the wastewater and recycled water energy intensity calculations. Any upstream embedded energy consumed prior to IEUA taking control of its imported MWD water or downstream embedded energy consumed by IEUA's member agencies to treat or distribute this water is not included in this analysis.

9.3 Wastewater and Recycled Water Energy Intensity

IEUA manages regional sewage service within its 242-square mile service area to collect, treat, and dispose of wastewater delivered by contracting local agencies. A system of regional trunk and interceptor sewers conveys sewage to five regional wastewater treatment plants owned and operated by IEUA. Wastewater facilities use tertiary treatment to produce recycled water meeting Title 22 standards for non-potable reuse and groundwater replenishment. Recycled water that is not reused is discharged to the Santa Ana River. IEUA delineates wastewater from recycled water at the point following chlorination and prior to the recycled water pump stations.

In addition to wastewater and recycled water infrastructure, IEUA also operates the Prado Dechlorination Facility, Inland Empire Regional Composting Facility, and Chino Creek Wetlands & Educational Park. While operationally controlled by IEUA, the Inland Empire Regional Composting Facility and Chino Creek Wetlands & Educational Park are not directly related to the collection, treatment, or distribution of wastewater or recycled water and thus considered outside the reporting boundaries. While the UWMP Guidebook energy intensity definition considers the energy consumed for all Wastewater Management Processes (collect, treat, and discharge wastewater) and energy consumed for all Recycled Water Management Processes (convey, treat, and distribute recycled water supplies) IEUA has also included the energy consumption from administrative buildings, such as IEUA's headquarters facility, in the energy intensity calculation. This is because IEUA administrative facilities are directly connected to and share energy meters with wastewater and recycled water facilities. The energy associated with the NRWS is not included in the energy intensity calculations.

Over FY 19-20, IEUA collected and treated 55,245 AF of wastewater. 30,495 AF of recycled water was produced, of which 17,115 AF was distributed to retail agencies and retail customers and the remaining 13,381 AF was recharged. Any wastewater that was not recycled was discharged to the Santa Ana River; in FY 19-20 this volume was 24,750. Wastewater volume is based on metered data at the recycling plants.

Table 9-3 shows the energy intensity calculated for the wastewater and recycled water operations using the energy use provided in Table 9-1. The volume of wastewater entering the process is the amount of wastewater treated at the regional water recycling plants RP-1, RP-4, RP-5, and CCWRF. The wastewater is tertiary treated to recycled water meeting Title 22 quality standards for non-potable use and groundwater recharge. Of this volume, a portion is dechlorinated and then discharged to the Santa Ana River. There is no energy associated with the collection or conveyance of recycled; this energy is captured within the energy use for the wastewater operations collection and conveyance. The Philadelphia Lift Station conveys non-reclaimable wastewater to Los Angeles County; the volume and energy use associated with this lift station is therefore, not included in the wastewater energy intensity calculations.

A portion of the energy used in the wastewater and recycled water processes comes from self-generated renewable energy. In FY 19-20, the amount of renewable energy used was 30,859,017 kWh, of which 4,012,270 kWh was from renewable energy sources (solar and wind) and 26,846,747 kWh comes from the capture of biogas. A portion of biogas produced during wastewater treatment is captured and beneficially used as part of IEUA's treatment process. Unused biogas is flared to convert methane to carbon dioxide and reduce greenhouse gas emissions from the facilities. All the self-generated renewable energy is used in the wastewater treatment process. Not included in this amount of renewable energy is the portion of purchased

electricity that is supplied through sustainable sources. IEUA purchases electricity from Southern California Edison. On average, 30% of the electricity purchased is considered sustainable.

Table updated 12/2/2021

Table 9-3: Wastewater and Recycled Water Energy Intensity

Urban Water Supplier: *Inland Empire Utility Agency*

Table O-2: Recommended Energy Intensity - Wastewater & Recycled Water					
Enter Start Date for Reporting Period	7/1/2019	Urban Water Supplier Operational Control			
End Date	6/29/2020	Water Management Process			
		Collection / Conveyance	Treatment	Discharge / Distribution	Total
Volume of Wastewater Entering Process (AF)		*56,384*	*56,384*	*25,889*	*56,384*
Wastewater Energy Consumed (kWh)		*586,945*	*88,867,952*	*0*	*89,454,897*
Wastewater Energy Intensity (kWh/AF)		*10.4*	*1576.1*	*0.0*	*1586.5*
Volume of Recycled Water Entering Process (AF)		*30,496*	*30,496*	*30,496*	*30,496*
Recycled Water Energy Consumed (kWh)		*0*	*15,231,073*	*1,108,112*	*16,339,185*
Recycled Water Energy Intensity (kWh/AF)		*0.0*	*499.4*	*36.3*	*535.8*

Quantity of Self-Generated Renewable Energy related to recycled water and wastewater operations

34,713,912 kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

Metered Data

Data Quality Narrative:

Volume of water entering process based on metered data. Metering completed at each wastewater treatment plant.

Narrative:

The volume of wastewater entering the process is the amount of wastewater treated at the regional water recycling plants RP-1, RP-4, RP-5, and CCWRF. The wastewater is tertiary treated to recycled water meeting Title 22 quality standards for non-potable use and groundwater recharge. A portion is dechlorinated and then discharged to the Santa Ana River. The Philadelphia lift station pumps brine to the non-reclaimable water system and is therefore not included in the wastewater energy intensity calculations. All other wastewater discharge flows by gravity to the Santa Ana River. There is no energy associated with the collection or conveyance of recycled water since the volume just moves within the regional water recycling plants.

A portion of the energy used in the wastewater and recycled water processes comes from self-generated renewable energy. In FY 19-20, the amount of renewable energy used was 34,713,912 kWh, of which 7,867,165 kWh was from renewable energy sources (solar and wind) and 26,846,747 kWh comes from the capture of biogas. This amount is approximately 32% of IEUA's total energy use. A portion of biogas produced during wastewater treatment is captured and beneficially burned as part of IEUA's treatment process. Unused biogas is flared to convert methane to carbon dioxide and reduce greenhouse gas emissions from the facilities. All the self-generated renewable energy is used in the wastewater treatment process. Not included in this amount of renewable energy is the portion of purchased electricity that is supplied through sustainable sources. IEUA purchases electricity from Shell and Southern California Edison (SCE). On average, 30% of the electricity purchased from Shell and SCE is considered sustainable.

IEUA also operates the Inland Empire Regional Composting Facility and the Chino Creek Wetlands & Education Park. While operationally-controlled by IEUA, these facilities are not directly related to the collecction, treatment, or discharge of wastewater or recycled water and are considered outside the reporting boundaries. Similarly, while much of IEUA's headquarters and vehicles are dedicated to supporting wastewater and recycled water operations, to maintain consistency with the UWMP Guidebook, energy consumption from these operations has been excluded.

9.4 Key Findings

Calculating operational energy intensities helps agencies understand the water-energy nexus as it relates to their operations and processes. However, there is still work that needs to be done to better understand upstream and downstream water-energy impacts. Reporting boundaries are important to consider when comparing energy intensities between providers and water supply sources, since these boundaries exclude any embedded energy impacts on downstream users. Engaging the upstream and downstream supply chain can lead to more informed decisions that benefit the environment and the engaged parties.

IEUA has taken advantage of its renewable resources by developing a diverse energy portfolio, but additional planning is needed to address changing environmental regulations that may dictate available technologies. To continue providing reliable services to the region while remaining a steward of the environment, IEUA completed a CCAP in 2018. This plan outlined four business goals: maximizing local water supplies, maintaining the health of the groundwater aquifer, maximizing system efficiencies, and measuring performance. These goals will not only guide the agency's energy use but will minimize the agency's impact on the environment. Excluding imported electricity from renewable sources, approximately 32% of the total energy associated with IEUA's wastewater and recycled water operations came from renewable sources, specifically solar, wind, and biogas capture.

Section 10: Seismic Risk Assessment

Per the Water Code Section 10632.5, suppliers are required to assess seismic risk to water supplies as part of their WSCP. The plan also must include a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities.

Pursuant to Water Code, the seismic risk assessment must include a description of the vulnerability of each of its water system(s) facilities. Suppliers are encouraged to assess the vulnerability of external facilities or components that extend outside the supplier's service distribution area (e.g., transmission pipes, delivery canals, surface water diversion pumps) since failure of them would still ultimately disrupt the supplier's ability to serve their customers.

As a wholesaler, IEUA does not own or operate any potable water supply infrastructure and therefore, did not conduct a seismic risk assessment. IEUA purchases imported water from MWD, which conducted a seismic risk assessment as part of its 2020 UWMP. A brief summary of MWD's Seismic Risk Assessment and Mitigation Plan (Appendix 9 of MWD'S 2020 UWMP) is included here.

MWD has developed a holistic strategy for seismic resiliency that includes providing a diversified water supply portfolio, establishing system flexibility and emergency storage, preventing damage to infrastructure during seismic or other extreme events, and minimizing water delivery interruptions through a dedicated emergency response and recovery organization. MWD's water conveyance and distribution facilities are designed either to withstand a maximum probable seismic event or to minimize the potential repair time in the event of damage. MWD's ongoing program works to evaluate the seismic risk of aboveground structures, dams, and pipelines based on the current state of practice, operating conditions, seismicity criteria, and asset management strategies. Infrastructure will be prioritized for rehabilitation based on the results of these evaluations. MWD also conducts special seismic assessments periodically to increase understanding of the vulnerability of its assets and operations to various seismic hazards. In addition, MWD is working with the State of California on the Delta Risk Management Strategy to reduce impacts of a seismic event in the Delta that would cause levee failure and disruption of SWP deliveries (MWD 2021). Further information on MWD's seismic risk assessment and resiliency plan can be found in MWD's 2020 UWMP, Appendix 9.

IEUA delivers imported water to its retail agencies via MWD's infrastructure. These retail agencies then distribute the imported water via their own collection and distribution system infrastructure. As part of each retail agencies' 2020 UWMP, they have conducted seismic risk assessments to identify any existing vulnerabilities and identify mitigation measures for implementation. Details of these risk assessments can be found within each respective agencies' 2020 UWMP.

IEUA designs, builds, and operates recycled water treatment and distribution system infrastructure. The recycled water infrastructure owned by IEUA is all designed and constructed in compliance with the most recent California Building Code (CCR Title 24, Part 2) and the standards and practices in place in the time of design. The majority of IEUA's recycled water

infrastructure was constructed or retrofitted after 1994, when the 6.7 magnitude earthquake in Northridge occurred. This landmark earthquake motivated significant revisions to the California Building Code to include stronger seismic resilience design requirements, which were finalized in 1998. IEUA's first major regional recycled water pipeline was constructed in 1995 and a backbone recycled water distribution system was installed in Chino and Chino Hills from CCWRF in 1997. Some of its water recycling plants were constructed prior to 1994 but have since been updated to comply with the current seismic design standards.

Section 11: References

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Appendix A

UWMP Checklist

DWR Checklist for 2020 UWMP
Checklist Arranged by Subject

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location *(e.g. Section(s), page number(s), table/figure number(s) or briefly describe why CWC section does not apply)*
10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	Chapter 5	Section 3; Tables 3-2, 3-3, and 3-4.
10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.7.2	Section 3; Tables 3-2, 3-3, and 3-4.
10608.24(a)	Retail suppliers shall meet their water use target by December 31, 2020.	Baselines and Targets	Section 5.7	Section 3.1.2; Table 3-4.
10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Sections 5.2 and 5.5.7	Not applicable.
10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	Section 5.1	Section 8.7.
10608.4	Retail suppliers shall report on their progress in meeting their water use targets. The data shall be reported using a standardized form.	Baselines and Targets	Section 5.8 and App E	Section 3.1.2, Tables 3-3 and 3-4. Also Appendix F.
10631(e)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years.	Demand Management Measures	Sections 9.2 and 9.3	Not applicable.
10631(e)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Sections 9.1 and 9.3	Section 8.4, 8.5, 8.6, 8.7, and 8.8.
10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.	Plan Adoption, Submittal, and Implementation	Chapter 10	Not applicable.
10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.	Plan Adoption, Submittal, and Implementation	Section 10.2.1	Section 1.12; Tables 1-6, 1-7, 1-8. Appendix E.
10621(f)	Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.	Plan Adoption, Submittal, and Implementation	Sections 10.3.1 and 10.4	IEUA will comply with this provision.
10635(c)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 60 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	Sections 8.12, 10.4	Appendices B and Appendix E.
10642	Provide supporting documentation that the urban water supplier made the plan and contingency plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan and contingency plan.	Plan Adoption, Submittal, and Implementation	Sections 10.2.2, 10.3, and 10.5	Section 1.12; Tables 1-6, 1-7, 1-8. Also Appendices E and B.
10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Section 10.2	Section 1.12; Tables 1-6, 1-7, 1-8. Appendix E.
10642	Provide supporting documentation that the plan and contingency plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.1	Section 1.12; Tables 1-6, 1-7, 1-8. Also Appendix D. [pending]
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.5	Section 1.12; Tables 1-6, 1-7, 1-8. Also Appendix D. [pending]
10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.5	Section 1.12; Tables 1-6, 1-7, 1-8. Also Appendix D. [pending]
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Sections 10.4.1 and 10.4.2	IEUA will comply with this provision.

DWR Checklist for 2020 UWMP
Checklist Arranged by Subject

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location *(e.g. Section(s), page number(s), table/figure number(s) or briefly describe why CWC section does not apply)*
10645(a)	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5	IEUA will comply with this provision. Section 1.12; Tables 1-6, 1-7, 1-8. Also Appendix D.
10645(b)	Provide supporting documentation that, not later than 30 days after filing a copy of its water shortage contingency plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5	Appendix B.
10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.1	IEUA complies with this provision.
10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 2.5.2	Section 1.12 and 1.13.
10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan and contingency plan.	Plan Preparation	Section 2.6	Section 1.12; Tables 1-6, 1-7, 1-8. Also Appendix E.
10630.5	Each plan shall include a simple description of the supplier's plan including water availability, future requirements, a strategy for meeting needs, and other pertinent information.	Summary	Chapter 1	Section 1.
10631(a)	Describe the water supplier service area.	System Description	Section 3.1	Section 1.5.1.
10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3	Section 1.10.
10631(a)	Provide population projections for 2025, 2030, 2035, 2040 and optionally 2045.	System Description	Section 3.4	Section 1.6; Table 1-4.
10631(a)	Describe other social, economic, and demographic factors affecting the supplier's water management planning.	System Description	Section 3.4	Section 1.7.
10631(a)	Describe the land uses within the service area.	System Description	Section 3.5	Section 1.9.
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4	Section 1.6.
10631(b)	Identify and quantify the existing and planned sources of water available for 2020, 2025, 2030, 2035, 2040 and optionally 2045.	System Supplies	Section 6.2.8	Section 4; Tables 4-3, 4-4, 4-5, 4-6, 4-8.
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2	Section 4.2.2; Table 4-3.
10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought.	System Supplies	Section 6.2	Section 7; Tables 7-2, 7-3, 7-4, 7-5, 7-6, 7-7.
10631(b)(2)	When multiple sources of water supply are identified, describe the management of each supply in relationship to other identified supplies.	System Supplies	Section 6.1	Section 4.
10631(b)(3)	Describe measures taken to acquire and develop planned sources of water.	System Supplies	Section 6.1	Section 4.4; Table 4-8.
10631(b)(4)(A)	Indicate whether a groundwater sustainability plan or groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	Section 6.2.2	Section 4.2.2.2.1.

DWR Checklist for 2020 UWMP
Checklist Arranged by Subject

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location *(e.g. Section(s), page number(s), table/figure number(s) or briefly describe why CWC section does not apply)*
10631(b)(4)(B)	Describe the groundwater basin.	System Supplies	Section 6.2.2	Section 4.2.2.
10631(b)(4)(B)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.2.2	Section 4.2.2.2.1.
10631(b)(4)(B)	For unadjudicated basins, indicate whether or not the department has identified the basin as a high or medium priority. Describe efforts by the supplier to coordinate with sustainability or groundwater agencies to achieve sustainable groundwater conditions.	System Supplies	Section 6.2.3	Not applicable.
10631(b)(4)(C)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	System Supplies	Section 6.2.4	Section 4.2.2.1; Table 4-3.
10631(b)(4)(D)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Section 6.2	Not applicable, IEUA does not pump groundwater.
10631(c)	Describe the opportunities for exchanges or transfers of water on a short-term or long- term basis.	System Supplies	Section 6.7	Section 4.4.2.
10631(f)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single- dry, and for a period of drought lasting 5 consecutive water years.	System Supplies	Section 6.8	Section 4.4 and 7.6.
10631(g)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6	Section 4.4.3.
10631(h)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) - if any - with water use projections from that source.	System Supplies	Section 2.5.1	Not applicable.
10631(h)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	Section 2.5.1	Appendix E.
10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	Section 6.2	Section 5.3; Table 5-1.
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.2	Section 5.3; Table 5-1.
10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.2	Section 5.4 and 5.5; Table 5-2.
10633(e)	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	Section 6.2	Section 5.4 and 5.5; Tables 5-2, 5-3.
10633(f)	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	Section 6.2	Section 5.7.
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.2	Section 5.7.
10631(d)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2	Section 2.3 and 2.5. Tables 2-1, 2-2, 2-3, 2-4, 2-5.
10631(d)(3)(A)	Report the distribution system water loss for for each of the 5 years preceding the plan update.	System Water Use	Section 4.3	Not applicable.
10631(d)(3)(C)	Retail suppliers shall provide data to show the distribution loss standards were met.	System Water Use	Section 4.2	Not applicable.
10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.5	Not applicable.
10632(a)	Provide a water shortage contingency plan (WSCP) with specified elements below.	Water Shortage Contingency Planning	Chapter 8	Appendix B.
10632(a)(2)(A)	Provide the written decision-making process and other methods that the supplier will use each year to determine its water reliability.	Water Shortage Contingency Planning	Section 8.2	Appendix B.
10632(a)(2)(B)	Provide data and methodology to evaluate the supplier's water reliability for the current year and one dry year pursuant to factors in the code.	Water Shortage Contingency Planning	Section 8.2	Appendix B.

DWR Checklist for 2020 UWMP
Checklist Arranged by Subject

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location *(e.g. Section(s), page number(s), table/figure number(s) or briefly describe why CWC section does not apply)*
10632(a)(3)(A)	Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and greater than 50 percent shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic interruption of supply.	Water Shortage Contingency Planning	Section 8.3	Appendix B.
10632(a)(3)(B)	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Water Shortage Contingency Planning	Section 8.3	Appendix B.
10632(a)(4)(A)	Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation actions.	Water Shortage Contingency Planning	Section 8.4	Appendix B.
10632(a)(4)(B)	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Water Shortage Contingency Planning	Section 8.4	Appendix B.
10632(a)(4)(C)	Specify locally appropriate operational changes.	Water Shortage Contingency Planning	Section 8.4	Appendix B.
10632(a)(4)(D)	Specify additional mandatory prohibitions against specific water use practices that are in addition to state- mandated prohibitions are appropriate to local conditions.	Water Shortage Contingency Planning	Section 8.4	Appendix B.
10632(a)(4)(E)	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Water Shortage Contingency Planning	Section 8.4	Appendix B.
10632(a)(5)(A)	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Water Shortage Contingency Planning	Section 8.5	Appendix B.
10632(a)(5)(B) 10632(a)(5)(C)	Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other relevant communications.	Water Shortage Contingency Planning	Section 8.5, 8.6	Appendix B.
10632(a)(7)(A)	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Water Shortage Contingency Planning	Section 8.7	Appendix B.
10632(a)(7)(B)	Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3.	Water Shortage Contingency Planning	Section 8.7	Appendix B.
10632(a)(7)(C)	Provide a statement that the supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency.	Water Shortage Contingency Planning	Section 8.7	Appendix B.
10632(a)(8)(A)	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.8	Appendix B.
10632(a)(8)(B)	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.8	Appendix B.
10632(a)(8)(C)	Describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought.	Water Shortage Contingency Planning	Section 8.8	Appendix B.
10632(a)(9)	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Water Shortage Contingency Planning	Section 8.9	Appendix B.
10632(a)(10)	Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Water Shortage Contingency Planning	Section 8.10	Appendix B.
10632(b)	Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.	Water Shortage Contingency Planning	Section 8.11	Appendix B.
10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.4	Section 4.6.
10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Chapter 7	Section 6; Tables 6-1, 6-2.

DWR Checklist for 2020 UWMP
Checklist Arranged by Subject

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location *(e.g. Section(s), page number(s), table/figure number(s) or briefly describe why CWC section does not apply)*
10635(a)	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.3	Section 7.3, 7.4. Tables 7-2, 7-3,7-4, 7-5, 7-6.
10635(b)	Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects.	Water Supply Reliability Assessment	Section 7.3	Section 7.5; Table 7-7.
10635(b)(1)	Include a description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts 5 consecutive years.	Water Supply Reliability Assessment	Section 7.3	Section 7.5.
10635(b)(2)	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Water Supply Reliability Assessment	Section 7.3	Section 7.2, 7.3, 7.4. Tables 7-2, 7-3, 7-4, 7-5, 7-6.
10635(b)(3)	Include a comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.	Water Supply Reliability Assessment	Section 7.3	Section 7.3, 7.4. Tables 7-2, 7-3, 7-4, 7-5, 7-6.
10635(b)(4)	Include considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change condition, anticipated regulatory changes, and other locally applicable criteria.	Water Supply Reliability Assessment	Section 7.3	Section 1.11 and 4.5.
10631.2(a)	The UWMP must include energy intensity information as stated in the code.	System Suppliers, Energy Intensity	Section 6.4 and Appendix O	Section 9. Tables 9-2, 9-3.

Appendix B

Water Shortage Contingency Plan Dated June 2021



FINAL

June 2021

KJ 2044518*00

2020 Water Shortage Contingency Plan

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Kennedy Jenks

Kennedy Jenks

300 N. Lake Ave, Suite 1020
Pasadena, CA 91101
626-568-4300

Water Shortage Contingency Plan
FINAL

29 June 2021



6/29/2021

Prepared for

Inland Empire Utilities Agency
6075 Kimball Avenue
Chino, California 91708

KJ Project No. 2044518*00

Kennedy Jenks

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Section 1: Overview of 2020 IEUA Water Shortage Contingency Plan

The Inland Empire Utilities Agency (IEUA) is a wholesale water agency that treats and delivers recycled water and purchases imported water supplies[1] from Metropolitan Water District of Southern California (MWD) and distributes it to its seven retail agencies. Two of IEUA's retail water agencies, [Fontana Water Company (FWC) and Cucamonga Valley Water District (CVWD)] purchase untreated water directly from IEUA and provide their own treatment. Five of IEUA's retail water agencies purchase treated water from the Water Facilities Authority (WFA). WFA purchases untreated imported water from IEUA, treats and delivers the water to the cities of Chino, Chino Hills, Ontario, Upland, and Monte Vista Water District. IEUA does not operate any facilities connecting its retail water agencies to MWD's system.

MWD water supplies account for approximately 25 to 30% of the region's annual water supplies, plus additional water is stored by MWD in the Chino Basin for use in dry years. Each of the retail agencies has other water sources including groundwater and local surface water. Each retail agency has agency-specific Water Shortage Contingency Plans (WSCPs) that account for the reliability of each suppliers' unique water portfolio. The IEUA WSCP focuses on a regional representation of the reliability of imported water supplied by MWD with additional supply reliability from IEUA's recycled water supplies and then outlines the actions that IEUA may take to support its retail agencies during water shortage conditions. The WSCP may also apply to more generalized water shortage conditions that are not necessarily attributable to imported water shortages.

This WSCP is founded on several IEUA source documents, including the 2020 Regional Drought Contingency Plan (2020 DCP, included in WSCP Appendix A), the draft 2020 Water Use Efficiency Business Plan (WUEBP), the Annual Water Use Efficiency (WUE) Reports, and the 2010 and 2015 Urban Water Management Plans. In addition, there is overlapping content with the 2020 UWMP, especially the Supply Reliability (UWMP Section 4). It also draws upon the MWD 2020 WSCP.

This WSCP covers the required elements as set forth by CWC Section 10632. It should also be noted that statute recognizes the WSCP as viable a tool for use during drought emergencies as noted in Water Code section 10632.3 indicating that the State defers to the locally adopted WSCP to the extent practicable.

[1] As of this writing, all MWD supplies are from imported water sources. However, MWD is considering a potential 150 mgd potable reuse project. For more information, please see mwdh2o.com/rrwp

Because IEUA is a wholesale urban water supplier, some of the elements that pertain only to retail water suppliers may not be addressed in this WSCP[2]. For example. IEUA's WUEBP, which is updated every 5 years and Annual WUE Reports, address monitoring and tracking of WUE measures implemented which is not a requirement of wholesalers.

This WSCP document contains 11 sections. The first section is an introduction that explains the purpose of the WSCP and gives background on IEUAs service area. Section 2 is a summary of the water reliability available to IEUA, pursuant to CWC Section 10635. Section 3 is a description of the Annual Water Supply and Demand Assessment (Annual Assessment). Section 4 explains the WSCP's six standard water shortage levels and the relationship to the DCP shortage stages. Section 5 describes the WSCP's shortage response actions that align with the defined shortage levels and the evaluation of effectiveness. Section 6 addresses communication protocols and procedures to inform customers, the public, interested parties, and local, regional, and state governments, regarding any current or predicted shortages and any resulting shortage response actions. Section 7 describes mechanisms to determine water use reductions. Section 8 is a description of the financial consequences of and responses for drought conditions. Section 9 describes actions to prepare for catastrophic interruption. Section 10 addresses reevaluation and improvement procedures for monitoring and evaluating the functionality of the WSCP. Section 11 describes the process to adopt, submit, and amend the WSCP.

It is important to note that outcomes of the various planning processes are not a "cast in stone" series of actions that become mandated procedures, requiring stakeholder adherence. Instead, the plan acts as a resource and general guide for IEUA and its retail agencies. It is understood that each retail agency has its own distinct supply portfolio, operating principals, and customer characteristics. As such, there may be instances when a retail agency is not experiencing the same drought or water shortage impacts and will choose to take a modified course of action. As summarized in WSCP Section 5 and detailed in the DCP, a Drought Response Taskforce of staff from IEUA and its retail agencies may be convened in the event of a water shortage to identify the specific actions of IEUA and the retail agencies as appropriate to the particular shortage condition.

1.1 Relationship to the Urban Water Management Plan

Water Code Section 10632(a) requires that every urban water supplier prepare and adopt a water shortage contingency plan as part of its urban water management plan. While the water shortage contingency plan is a stand-alone document it is updated and adopted in concert with the UWMP. Content of the WSCP is informed by the analysis of water supply reliability conducted pursuant to Water Code Section 10635 (contained in the UWMP). The reliability analysis of the UWMP considered under "normal", "single-dry", and "5-year drought" conditions.

[2] WSCP elements that apply specifically to retailer water suppliers are: (1) a description of customer compliance, enforcement, appeal, and exemption procedures for triggered response actions [CWC Section 10632(a)(6)]; (2) a description of the cost of compliance with Chapter 3.3 (commencing with Section 365) of Division 1 [CWC Section 10632(a)(8)(c)]; and (3) monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance and to meet state reporting requirements [CWC Section 10632(a)(9)] (MWD 2020).

The analysis in the UWMP documents that the IEUA region has sufficient supplies to meet normal, single-dry, and multi-dry-year demands. An area of overlap between the UWMP and WSCP is a new requirement to prepare a Drought Risk Assessment (DRA) (Section 7.5 of the 2020 UWMP) to account for the significant duration of recent California droughts and the predictions about hydrological variability attributable to climate change.

The DRA requires suppliers to assess water supply reliability over a 5-year period from 2021 to 2025 that examines water supplies, water uses, and the resulting water supply reliability under a reasonable prediction for 5 consecutive dry years. Table 1-1 (Table 7-7 in the UWMP) shows the expected gross water use [in acre-feet (AF)] and the expected total supplies for each year from 2021 to 2025. The water supplies and demands were aggregated on a regional basis to reflect the entire IEUA service area. The gross water use for each year was found by interpolating between the 2020 actual regional water demand total (from the FY 19/20 Annual Water Use Report and the FY 19/20 Recycled Water Annual Report) and the 2025 projected water use during a multiple-year drought (from UWMP Table 7-7).

As shown in Table 1-1, the IEUA region expects to have a surplus for each of the 5 years of the consecutive 5-year drought from 2021-2025. Therefore, no Water Shortage Contingency Plan actions are anticipated to be implemented. However, in the case of a shortfall in supply, the use reduction and supply augmentation measures described in Section 5 of this WSCP are available to be implemented.

Table 1-1: DWR Five-Year Drought Risk Assessment Tables to Address Water Code Section 10635(b) (DWR Table 7-5)

2021	**Total**
Total Water Use (AF)	99,898
Total Supplies (AF)	148,650
Surplus/Shortfall w/o WSCP Action (AF)	48,752
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (AF)	0
WSCP - use reduction savings benefit (AF)	0
Revised Surplus/(shortfall) (AF)	**48,752**
Resulting % Use Reduction from WSCP action	0%
2022	**Total**
Total Water Use (AF)	103,850
Total Supplies (AF)	149,806
Surplus/Shortfall w/o WSCP Action (AF)	45,957
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (AF)	0
WSCP - use reduction savings benefit (AF)	0
Revised Surplus/(shortfall) (AF)	**45,957**
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use (AF)	107,958
Total Supplies (AF)	150,972
Surplus/Shortfall w/o WSCP Action (AF)	43,014
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (AF)	0
WSCP - use reduction savings benefit (AF)	0
Revised Surplus/(shortfall) (AF)	**43,014**
Resulting % Use Reduction from WSCP action	0%
2024	**Total**
Total Water Use (AF)	112,228
Total Supplies (AF)	152,146
Surplus/Shortfall w/o WSCP Action (AF)	39,918
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (AF)	0
WSCP - use reduction savings benefit (AF)	0
Revised Surplus/(shortfall) (AF)	**39,918**
Resulting % Use Reduction from WSCP action	0%
2025	**Total**
Total Water Use (AF)	116,667
Total Supplies (AF)	153,329
Surplus/Shortfall w/o WSCP Action (AF)	36,662
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (AF)	0
WSCP - use reduction savings benefit (AF)	0
Revised Surplus/(shortfall) (AF)	**36,662**
Resulting % Use Reduction from WSCP action	0%

Note: Years 2021 through 2024 are interpolated between the 2020 actual supply and use values and the 2025 projected supply and use for multi-year drought (from Table 7-4). 2020 actual supply is the average year supply from Table 7-1.

Section 2: Water Supply Reliability Analysis

This section addresses overall water supply reliability for IEUA and meets Water Code Section 10635. Information from the 2010 UWMP which focused on IEUA's role as a wholesaler, information from the 2015 UWMP which included IEUA and Water Facilities Authority (WFA), a retailer, and information from Section 4 of the 2020 UWMP, the 2020 DCP and MWD's draft WSCP issued in February 2021 are used to analyze supply reliability for this section. MWD has taken the lead in drought planning for the southern California region. This is particularly relevant to IEUA, as IEUA is a wholesaler of MWD water.

2.1 MWD Water Supply Reliability

As described in MWD's draft WSCP issued in March 2021, MWD continuously engages in planning for various aspects of its water management, including operations, long-term reliability, and emergency response. These MWD planning efforts include the 1996 Integrated Water Resources Plan (MWD IRP) and its three updates in 2004, 2010, and 2015; the 2020 MWD IRP (currently in development); the draft 2020 WSCP; the annual Water Surplus and Drought Management (WSDM) Plan; the Water Supply Allocation Plan (WSAP); the annually calculated Emergency Storage Objective; and the 2020 Seismic Risk Assessment and Mitigation Plan. These efforts provide a policy framework, operating guidelines, and resource targets for MWD to ensure regional water supply reliability. MWD's WSCP is designed to be consistent with its WSDM Plan and WSAP as described below.

2.1.1 Water Surplus and Drought Management Plan

In 1998, MWD's Board of Directors adopted the WSDM Plan, which addresses both surplus and shortage operating strategies (reference MWD WSDM Plan, April 1998). The WSDM plan reflects anticipated drought responses based on the water supplies available to Metropolitan. Similar in concept to MWD's WSCP, the WSDM Plan provides an overall vision for operational supply management and characterizes a flexible sequence of actions to minimize the probability of severe shortages and reduce the likelihood of extreme shortages. WSDM Plan principles guide the specific actions to be taken under MWD WSCP shortage stages. Data collection, continual analysis, and monthly reporting processes of WSDM Plan implementation will form the basis for MWD's Annual Water Supply Demand Assessment that will be provided annually to the state beginning in July 2022. Because managing MWD's water supply resources requires timely and accurate information on supply and demand conditions that change throughout the year, MWD evaluates available water supplies and existing water storage levels on a monthly basis to determine the appropriate actions identified in the WSDM Plan.

Table 2-1 (referenced from the 2010 MWD UWMP) lists the definitions used by MWD in the WSDM Plan for surplus, shortage, severe shortage, and extreme shortage conditions. Except in severe or extreme shortages or emergencies, MWD's resource management will allow imported water shortages to be mitigated without impacting municipal and industrial customers, including IEUA and IEUA's retail agencies. The WSDM Plan is detailed in Chapter 4 of the MWD UWMP.

Table 2-1: MWD WSDM Plan Definitions

Surplus	Metropolitan can meet full-service and interruptible program demands, and it can deliver water to local and regional storage.
Shortage	Metropolitan can meet full-service demands and partially meet or fully meet interruptible demands, using stored water or water transfer, as necessary.
Severe Shortage	Metropolitan can meet full-service demands only by using stored water, transfers, and possibly calling for extraordinary conservation. In a Severe Shortage, Metropolitan may have to curtail Interim Agricultural Water Program deliveries.
Extreme Shortage	Metropolitan must allocate available supply to full-service customers.

The shortage stages presented in this section apply to IEUA's imported water supply only. The water shortage actions specific to IEUA's water shortage stages are discussed in Section 5.

2.1.2 Water Supply Allocation Plan

MWD's Board of Directors also adopted the WSAP in February 2008 in anticipation of possible water supply shortages. The WSAP provides guidance for allocating limited water supplies to member agencies should the need arise. The WSAP is integral to MWD's WSCP's shortage response strategy in the event that MWD determines that supply augmentation (including storage) and demand reduction measures would not be enough to meet a projected shortage.

MWD's WSAP was developed in consideration of the principles and guidelines in MWD's 1999 WSDM Plan. The WSAP's formula seeks to balance the impacts of a shortage at the retail level while still maintaining equity at the wholesale level for supply shortages of up to 50 percent (%). The formula takes into account the impact on retail customers and the economy, growth and population, changes in supply conditions, investments in local resources, demand hardening aspects of non-potable recycled water use, implementation of conservation savings program, participation in MWD's interruptible programs, and investments in facilities.

In order to implement the WSAP, the MWD Board annually determines the level of the regional shortage based on specific criteria each April; this information is incorporated into IEUA's Annual Water Supply and Demand Assessment discussed in MWD WSCP Section 3. MWD's allocations, if deemed necessary, go into effect in July of the same year and remain in effect for a 12-month period. The WSAP includes an annual review of all MWD supplies and regional shortages to determine overall reliability for the year under review.

The WSAP is MWDs policy and formula for equitably allocating available water supplies to the member agencies during extreme water shortages when MWD determines it is unable to meet all its demands.

2.1.3 Emergency Storage Objective

The MWD Emergency Storage Objective, which is the regional planning estimate for emergency storage, is based on the potential for a major earthquake that would damage all supply aqueducts, isolating Southern California from its imported water sources, or a similar disaster.

In 2019, MWD and its member agencies completed a process to update the planning estimate of MWD's Emergency Storage Objective. This emergency storage represents the amount of water that MWD would store for the region in preparation for a catastrophic earthquake that would damage the aqueducts that transport imported water supplies to Southern California, including: the Colorado River Aqueduct, both the East and West branches of the California Aqueduct of the State Water Project (SWP), and the Los Angeles Aqueduct. The emergency storage allows MWD to deliver reserve supplies to the member agencies to supplement local production. This helps avoid severe water shortages during periods when the imported water aqueducts may be out of service.

Beginning January 2020, CWC Section 10632.5 mandates that urban water suppliers include in their UWMP a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities. For IEUA, this requirement was addressed as part of developing its resilience strategy and is presented in detail in MWD's seismic resiliency reports in Appendix 9 to MWD's 2020 UWMP.

2.2 IEUA Water Supply Reliability

IEUA's imported water supply reliability is directly tied to MWD's supply reliability and if imported shortages occur, MWD uses the WSAP to allocate the available water. Fortunately, IEUA's exposure to potential MWD shortages is minimized in that imported water represents only 25 to 30%of the total regional supplies. Member agencies have rights to local surface and groundwater for the remaining 70 to 75% of the supply needed. Moreover, IEUA provides recycled water and is able to capture stormwater during rain events to replenish the Chino Basin to maximize water reuse and offset potable water demands. The 2020 DCP included a detailed analysis to evaluate potential impacts of book end or worst-case water supply shortages in the IEUA service area; the DCP Scenarios 2 and 3 considered the following:

1. **Imported water was reduced by 67.5% (Shortage Allocation Index 9 of MWD's WSAP)** In the 2020 DCP Scenario 2 analysis, which assumed local supplies were still available, the region had an overall surplus of water supply, while three agencies that depend heavily on imported water resulted in potential shortages. The 2020 DCP Scenario 3 assumed reductions in imported and local supplies as a result of a 5-year drought. DCP Scenario 3 predicted that while two agencies showed surpluses, overall, the region has a deficit of 13% of demand with current supplies. Under DCP Scenario 3, the loss of 67.5% of the imported water supply will result in the increased reliance on local surface and groundwater sources with associated water quality impacts. The ability to use some local wells may be affected by two water quality factors as detailed in item 2 below. It should be noted that MWD's IRP indicates only one scenario in which significant shortages would be anticipated to occur; the scenario assumed no future investments which is a conservative assumption. In fact, MWD continues to provide investments towards the development of local supply projects and is considering investments in Delta conveyance and a 150 million gallon per day (mgd) Regional Recycled Water facility in-region that may further improve MWD's overall water supply reliability and minimize the occurrence of requiring a MWD WSAP Shortage Allocation Index 9. Additionally, it should be noted that demands on MWD for water supplies has dropped in half from a high of approximately 2.4 million acre-feet per year to approximately 1.2 million acre-feet today. This remarkable reduction in demand for

MWD's water supplies is due to reductions in water use at the customer level along with the development of local supply projects throughout MWD's service territory.

2. **Reductions in local supply, due to potential impairments to groundwater quality, pose the most significant water reliability risk to the IEUA service area**. Nearly all the retail agencies rely on local groundwater to meet their annual demands. DCP Scenario 3 results indicate that agencies with groundwater supplies that currently require blending lose higher quality imported blending water and agencies with impaired supplies that do not require blending would be required to blend as groundwater quality declines. Therefore, conditions related to groundwater quality and reduced water available for blending could reduce the availability and reliability of groundwater in the future. DCP Scenario 3 illustrates that reduced groundwater quality combined with a loss of imported water could cause significant shortages for multiple agencies within the service area.

It should be noted that the 2020 DCP is a forward-looking planning document that provides insight for potential future 2035 conditions for IEUA and its retail agencies. The Drought Risk Assessment for 2021-2025 presented in Section 1, is based on MWD's estimates of supply availability for the near future which does not anticipate that longer-term worst-case conditions as described in the 2020 DCP will occur.

Section 3: Annual Water Supply and Demand Assessment Procedures

This section describes annual supply and demand assessment procedures, known as the Annual Assessment, to be performed by IEUA and submitted to DWR each year starting on July 1, 2022. The information in this section is highly reliant on the analyses presented in the 2020 DCP and UWMPs. IEUA will coordinate with both MWD and its retail agencies to meet the annual water supply and demand requirements of Water Code Section 10632(a)(2).

3.1 Drought Monitoring

The framework for drought monitoring largely relies on the knowledge and expertise of IEUA's retail agencies in order to interpret real time local conditions and analyze future supplies. IEUA's role is to act as a facilitator and gather supply data from all retail agencies, consolidate all collected data, and calculate the supply-demand index. Additionally, IEUA tracks potential imported water shortages through MWD and the MWD Board's annual determination each April of the level of the regional shortage based on the WSAP criteria. It is important to note that supply types and portfolios within the IEUA service area are extremely diverse and availability of supply types are dependent on several different factors.

The four primary components of the drought monitoring framework are outlined in the IEUA 2020 DCP and are as follows:

- **Indicator Data Collection and Distribution.** Key imported water availability indicators will be compiled and provided to the retail agencies annually.
- **Member Agency Reporting**. Based on the provided indicator data and their own monitoring activities, participating retail agencies will provide their annual projections for supplies and demands within their service area once a year.
- **Regional Supply-Demand Index Calculation**. The agency projections will be combined to formulate a regional supply-demand ratio (or index). The Supply-Demand Index Calculation is further described in Section 3.2.
- **Shortage Classification.** The regional index will be used to classify the level of water shortage (if any).

The monitoring framework allows current and projected water supplies to be compared against current and projected demands. Should there be a downward shift in available water supplies or an increase in customer demand, IEUA and its retail agencies will determine the severity of the change, the categorized stage level, and the required response. Figure 3-1 gives a graphic representation of the monitoring framework.

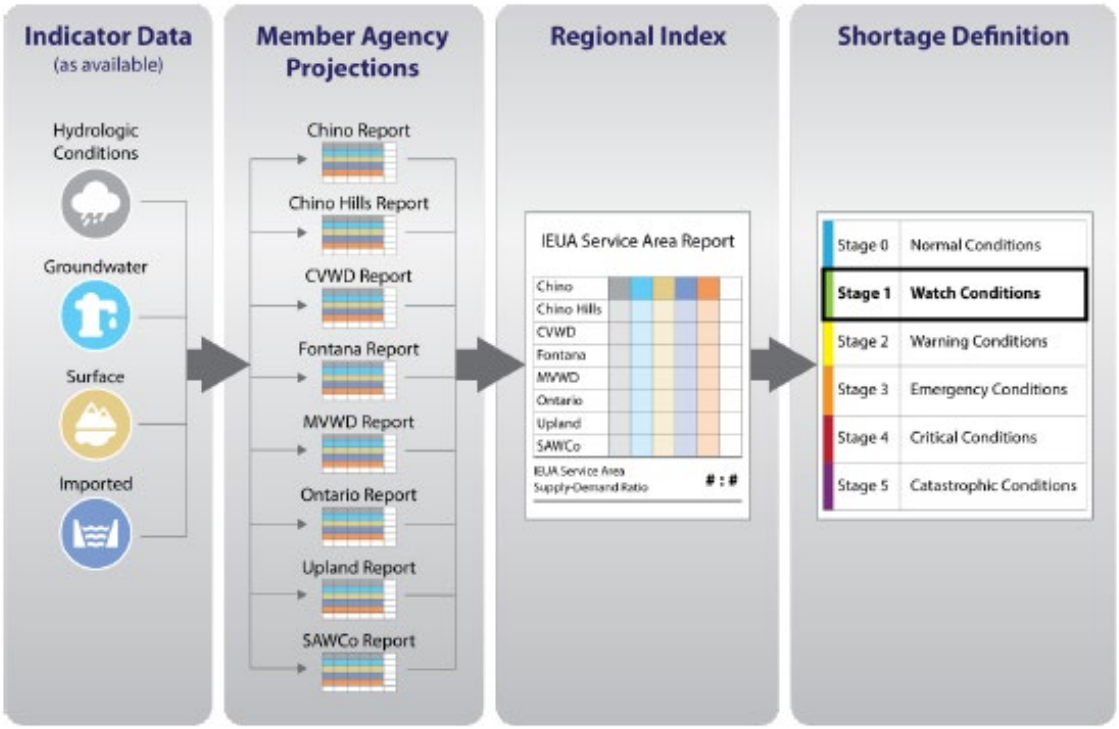


Figure 3-1: IEUA Regional Drought Monitoring Framework (2020 DCP)

3.1.1 Regional Collaborative Reporting Framework

IEUA has an established regular forum to provide and receive updates from the retail agencies on water supply conditions. Retail agencies submit annual data regarding water demands for the prior year between July and August of each year. IEUA hosts regular meetings with retail agency General Managers and IEUA also communicates with retail agency Water Managers in meetings that occur on an as-needed basis. Prior to 2020, the Water Managers typically met every 2 months. These meetings serve as a forum wherein the Water Managers review supply conditions, demand shifts, and regulatory changes that may impact supply. IEUA also prepares a Newsletter for retail agencies to communicate imported water and other regulatory conditions. If local circumstances or external drivers significantly shift, IEUA will request updated local supply data from respective retail agencies. As with the annual reporting, this information will be used to determine whether there is a regional water shortage due to these factors.

IEUA's monitoring process specific to drought will be based on an annual determination of potential drought shortage conditions, triggering the formation of a regional Drought Response Task Force that will meet periodically, as conditions warrant, and will trigger a two-step decision-making process as follows:

1. Key water supply indicators for imported water, discussed in Section 3.2, will be compiled into a standardized report and distributed to the water managers from each retail agency. A meeting with Water Managers' may be convened if needed. This will include projected deliveries of imported water from MWD as described in Section 3.2 in

addition to any potential forecasts for shortages. IEUA will also provide estimated demand projections to the participating retail agencies, as a reference or guide, based on a 5-year historical average.

2. Each retail agency will report their projected local supplies and demand for the coming year to IEUA. Table 3-1 below is a sample of the information obtained from each retail agency used to generate the supply-demand ratio.

Table 3-1: Sample Reporting Framework for IEUA Member Agencies (2020 DCP)

Agency	Local Groundwater	Surface Water	Imported Water	Annual Demand	Supply Shortage
Chino					
Chino Hills					
Fontana Water Company					
Ontario					
Upland					
Cucamonga Valley Water District					
Monte Vista Water District					
San Antonio Water Company					

This reporting process and structure was selected because it uses the annual reporting timeframe conducted by IEUA, the retail agencies, and MWD.

3.2 Imported Water WSAP Monitoring

IEUA began importing supplemental Colorado River water to the Chino Basin from MWD in 1951. In the late 1970's, MWD began delivering water from northern California via the State Water Project (SWP), offering IEUA an opportunity to connect to MWD's Rialto pipeline and switch to 100% SWP supplies after disconnecting from MWD's Upper Feeder pipeline as shown on Figure **3-2** that follows. The SWP became IEUA's exclusive source of imported water supplies in order to achieve groundwater quality requirements.

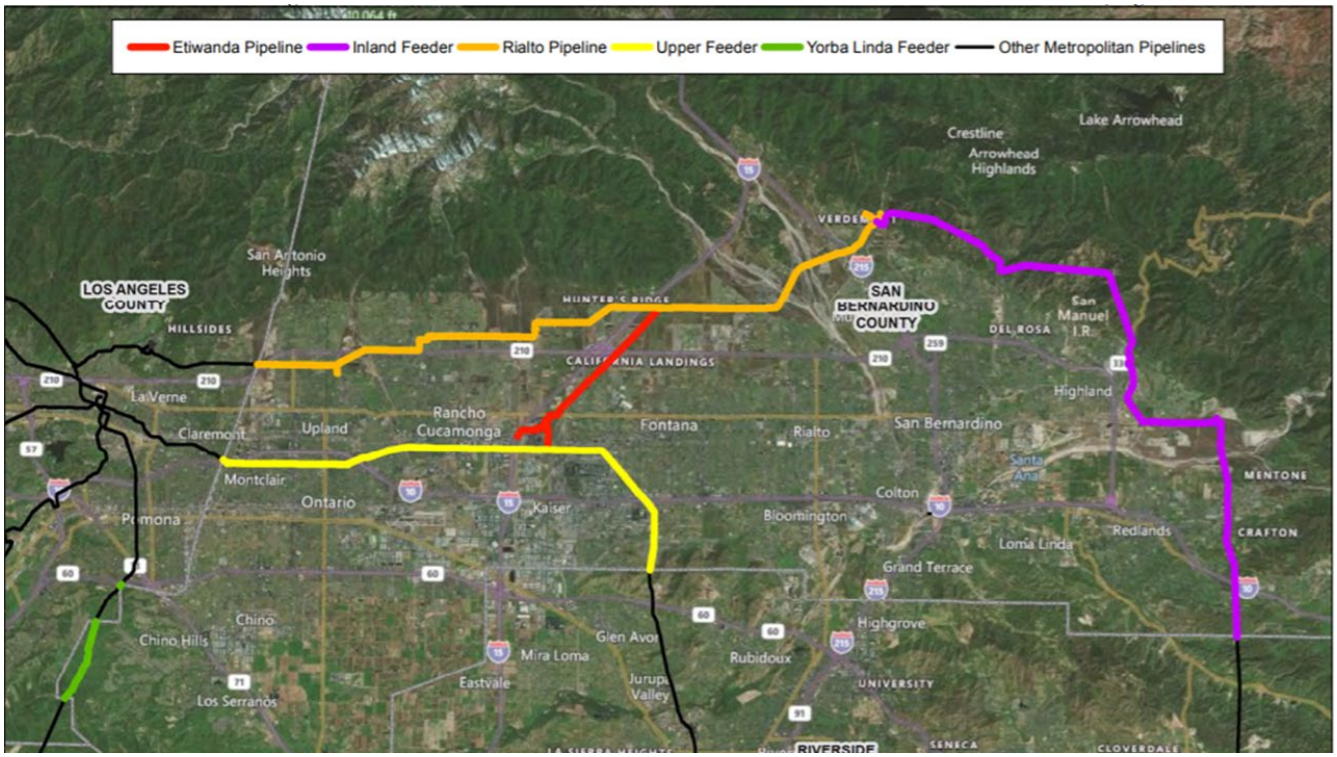


Figure 3-2: MWD Imported Water Pipeline Network

The SWP originates along the Feather River (a tributary to the Sacramento River) hundreds of miles north of IEUA. The SWP utilizes facilities to pump and convey water from the Sacramento-San Joaquin River Delta (Delta) to Southern California, as well as to the San Francisco Bay Area, the San Joaquin Valley, and the Central Coast. From 2009 to 2018, SWP imported water supplies delivered by MWD account for roughly 25-30% of the water supplies in the IEUA service area.

MWD actively monitors and manages the water supplies it imports to the region to assess availability and predict shortages. In response to critically dry conditions in the early 2000s and federal court rulings to protect the Delta Smelt in 2007 (which tightened regulations on Delta exports), as discussed in Section 2.1.2, MWD developed the WSAP to help manage uncertainty in the future water availability from their portfolio of sources and storage. Should a water shortage be declared by MWD's Board, the WSAP establishes MWD member agency supply allocations in a fair and reasonable way based on pre-determined formulas and key implementation elements needed to administer an allocation.

The framework of the WSAP includes an allocation year that spans from July to June, with a declaration in April. The key dates for MWD's WSAP monitoring and declaration process include the following:

January to March: Water Surplus and Drought Management reporting process provides updated information on storage reserve levels, projected supply, and demand conditions to the MWD Water Planning and Stewardship Committee meetings. Consideration of a potential allocation situation would be announced during this time.

April: Assuming supply conditions did not improve, MWD member agencies would report their projected local supplies for the coming allocation year (July to June) to update MWD's projected total supplies. Staff analysis of MWD storage reserves and projected supply and demand conditions would provide an allocation recommendation to the MWD Board of Directors. The allocation would be effective starting July 1 and held through the following June 30.

A 10-level WSAP Shortage Allocation Index would determine the Wholesale Minimum Allocation and the Maximum Retail Impact Adjustment. A "Wholesale Minimum Allocation" is defined as the minimum amount of MWD-supplied wholesale water service provided to each member agency. The Maximum Retail Impact Adjustment ensures that agencies with a high level of dependence on MWD do not encounter unequal retail shortages when experiencing a reduction in wholesale supplies.

In addition to the Wholesale Minimum Allocation and Retail Impact Adjustment, a Conservation Demand Hardening Credit and Minimum Per-Capita Water Use Credit would be considered to determine each Member Agency's WSAP Allocation. The allocation to an agency for its municipal and industrial retail demand is the sum of the above described four components, which are described in detail in the Appendix of the WSAP.

July to June: Member agencies would be requested by MWD to submit their local production on a monthly basis and certify the end of allocation year local supply use. Local production data must be reported to MWD by the end of the month following the month of use (i.e., use in July must be reported by the end of August). The production and supply use information is then combined with MWD sales information to track retail water use throughout MWD's service area. Each month, MWD reports on member agency water sales compared to their allocation amounts.

June 30: Allocation year would be complete.

August: MWD calculates potable water use based on supply certifications and actual sales data for the previous allocation year (July to June). Allocation surcharges are assessed for usage above a given member agency's final adjusted allocation.

It is important to note that while MWD's analysis focuses on combined SWP and Colorado River supply sufficiency, it is capable of focusing singularly on SWP-only supply sufficiency for IEUA and any other SWP-exclusive member agencies, if needed.

3.3 Supply/Demand Ratio

As detailed in the 2020 DCP, the supply and demand ratios for each year will be calculated based on the projections provided by the water managers. The data will be compiled into a singular supply-demand ratio for the IEUA service area and reported to the Water Managers. The regional supply-demand ratio calculation and a comparison to the DCP Drought Stages, discussed in Section 4 will then assist in determining whether there is a regional water shortage requiring action.

Figure 3-3 provides an example compilation of member agency projections and calculation of the regional supply-demand ratio. There will be considerations for expected shortages for individual retail agencies that may not be reflected in the regional ratio.

Between reporting periods, the participating retail agencies will continue their individual monitoring activities. Each of the retail agencies have developed their own approach to monitoring their supplies and have established unique definitions and responses for localized shortage conditions. “Appendix B: Summary of Member Agency Water Shortage Stages” in the 2020 DCP provides an overview of each agencies’ shortage definitions and responses.

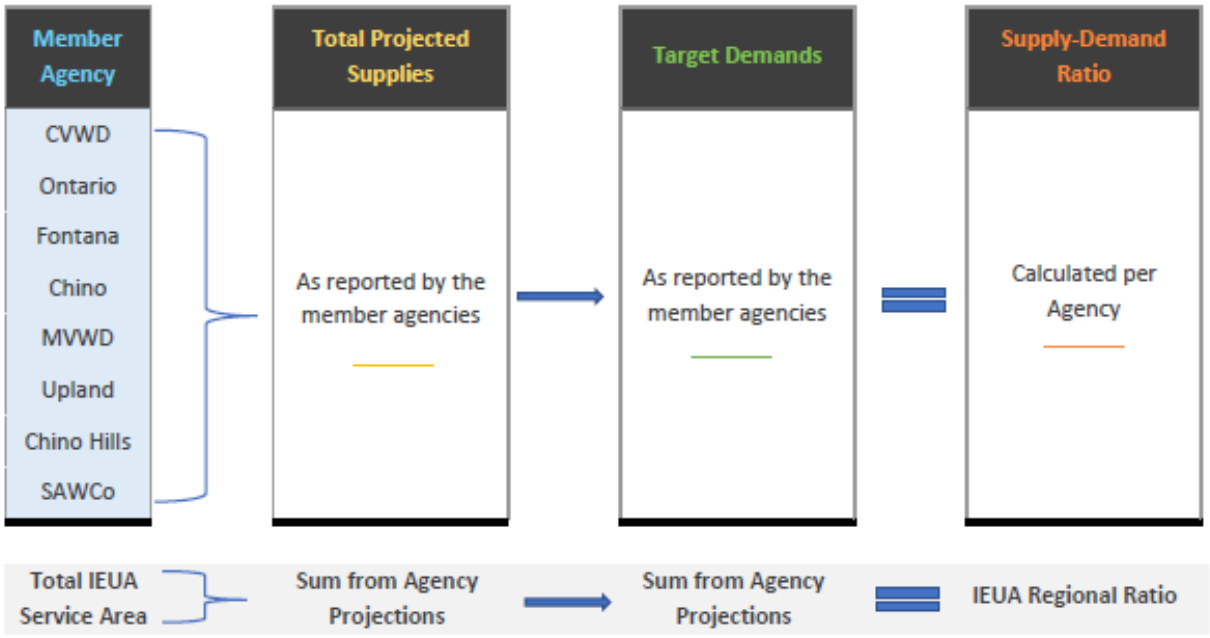


Figure 3-3: Annual Regional Supply and Demand Projections for IEUA Service Area (2020 DCP)

Section 4: Shortage Stages

This section describes the water shortage stages as defined by IEUA. The water shortage stages presented meet the requirements of Water Code Section 10632(a)(3).

4.1 Overview of Shortage Stages

The water shortage stages described in this section are in compliance with state legislation (SB 606 and AB 1668), which now requires drought plans to be standardized, as well as include six stages of drought severity. These stages were developed in consultation with each of the member agency's own definitions for local drought or water shortage levels and can be viewed in "Appendix B: Summary of Member Agency Water Shortage Stages" in the IEUA 2020 DCP. Additionally, each member agency may have their own Water Shortage Contingency Plan for use at the retail level.

The Water Shortage Stages are defined based on the calculated supply-demand ratios for the IEUA service area and are shown into DWRs shortage levels.

Table 4-1. These stages are used to help the Drought Response Taskforce identify the most appropriate regional responses for the anticipated shortages. Table 4-1 also contains the cross reference from the DCP shortage stage to DWRs shortage levels.

Table 4-1: IEUA Regional Water Shortage Stages (IEUA, 2020) Cross Reference with DWR Shortage

2020 DCP			2020 WSCP PER DWR	
Drought Stage	**Stage Descriptions**	**Triggers**	**2020 WSCP Level**	**Shortage Level**
Stage 0	Normal Conditions	No water shortages anticipated.	-	
Stage 1	Watch Conditions	IEUA regional ratio is predicting shortages between 1% and 5%.	1	≤10%
Stage 2	Warning Conditions	IEUA regional ratio is predicting shortages between 6% and 15%.	2	10 – 20%
Stage 3	Emergency Conditions	IEUA regional ratio is predicting shortages between 16% and 25%.	3	20 – 30%
Stage 4	Critical Conditions	IEUA regional ratio is predicting shortages between 26% and 50%.	4 5	30 – 40% 40 – 50%
Stage 5	Catastrophic Conditions	IEUA regional ratio is predicting shortages greater than 50%.	6	>50%

It is important to note that while the water shortage stage at the time of a drought is calculated and declared for the overall region, a local retail agency may have a water supply level that varies from the regional stage due to the uniqueness of their water supply mix. When this

occurs, the local agency may develop customer messaging that is specifically applicable to their retail service area.

4.2 Water Shortage Stage Declaration

In the event of an emergency, IEUA may declare a Water Shortage Emergency and assemble the Drought Response Taskforce who will help inform the decision with tasks that include reviewing regional shortage conditions, deciding regional actions, budget generation and an implementation timeline. Coordination efforts may include retail agencies, MWD, Board of Directors, and regional stakeholders.

Typically, IEUA implements various stages of conservation actions based on the degree of water shortage before a state emergency is declared. If an emergency declaration is made, IEUA will coordinate with both its retail agencies and MWD to comply with all governing regulations. An unexpexted or sudden loss of water supplies may result in the expidited declaration of a water shortage emergency and associated activities.

Section 5: Shortage Response Actions (by Water Shortage Stage)

This section describes the water shortage stage response actions as defined by IEUA and are based on IEUA's definitions of the water shortage stages. The response actions presented in this section are heavily reliant on the 2020 DCP and its UWMPs. The response actions meet the requirements of Water Code Section 10632(a)(4).

5.1 Shortage Response Actions Overview

With growing populations and the inevitability of future drought cycles, IEUA, has invested in local supply and demand management programs with the aim of building regional, long-term resiliency to drought and climate change that will aid the region to be able to withstand future water shortages without extreme hardships.

By leveraging funding and programs from MWD and other regional stakeholders, IEUA and its retail agencies have partnered to help reduce per capita water use by re-shaping customers' attitudes about water use efficiency and their personal role in achieving water shortage resiliency. Through education, messaging, and investments of approximately $1.6 million, annually in water use efficiency programs, IEUA has been assisting customers to make significant equipment and lifestyle changes at their homes and businesses. The more our region is able to be self-sufficient with its water supplies, the less impactful any imported water supply shortages will be.

In 2018, California chaptered into law legislation (AB 1668 and SB 606) requiring all retail water agencies to annually establish a Water Use Objective (WUO) that will serve as a standard for assuring community-wide water-use efficiency. Each of IEUA's retail water agencies is required to submit their WUO's to a State agency by November 2023. If actual water use in their service territory is lower than their WUO, then that agency's customers are considered to be using water efficiently. Some assumed values in the calculation of the WUO will reduce over time, such as the assumed per capita water used indoors in residential properties, which will start at 55 gallons per capita per day (gpcd) in 2023 and reduce to 50 gpcd after 2030. The penalty for non-compliance is up to $10,000 per day per retail water agency.

Beyond regional efforts to establish efficient water-use practices and sustainable lifestyles, extraordinary conservation may be required during periods of droughts or during other water shortages, in order to reduce regional demands sufficiently to meet allocation goals. This will need to be driven by an escalation in marketing, increased programming and services, and enhanced incentives that increase as drought stages escalate. Also, MWD and potentially the retail agencies have the option to institute water pricing mechanisms to encourage reduced water use during shortage conditions.

Several response actions for achieving extraordinary conservation are available and can be deployed relatively quickly, including increased customer messaging content and frequency, expanded outreach channels, enhanced water-use efficiency incentives and programs, and as necessary, water usage restrictions and pricing mechanisms as detailed below. Future

responses to future water shortage considerations should be mindful, however, of the effects that “demand hardening” will have on the customers’ ability to reduce water use. Demand hardening recognizes that as per capita water uses reduce down towards health and safety standards, there will be fewer discretionary uses of water that can be curtailed.

During water shortage conditions, IEUA makes itself available to assist retail agencies in implementing certain actions to alert the region to the need for extraordinary conservation by the measures identified below, , most of which are existing programs.

- **Messaging:** Creative and attention-grabbing content are needed to secure customers’ attention and motivate them to take action. Public Service Announcements (PSAs) are an effective tool for messaging the civic responsibility for undertaking extraordinary conservation efforts during water shortage conditions.

- **Expanded Outreach:** Customer attitudes and expectations continue to evolve over time. In our customer-centric world, water agencies are competing for attention. Grabbing attention requires a modern approach to outreach, including social media and potentially influencer marketing. As the need for reduced demands continues and intensifies, cities and counties and other large water users such as CalTrans will be encouraged to reduce irrigation of public lands and other highly visible reductions in water use may be required to intensify the call for reductions in per capita water use.

- **Programs:** Water efficiency programs provide customers with the means and guidance to lower their properties’ water usage. Customer-friendly programs, higher incentives, direct installation options, and strong support services drive stronger response rates. The greater the services and incentives, the greater the customer response.

- **Restrictions:** Watering restrictions further reduce water-use while reinforcing the message of community importance of “doing your part”, are highly effective in securing immediate water savings, and are a powerful tool for agencies. However, they set an authoritarian tone, which may result in negative public perceptions if the rationale is not well defined.

The Drought Taskforce, described in Section 5.7.2, can be convened to focus and coordinate the activities related to shortage response actions between IEUA and the retail agencies.

5.2 Strategy Per Drought Stage

Different drought stages require varying strategies. In general, drought actions will expand as drought stages escalate. As increased drought stages are declared, agencies may increase customer support and provide a higher level of program incentives and services.

Once a drought enters a specific stage, the Taskforce will assemble to finalize the Response Plan for that stage, begin the implementation process for target-marketing and increased outreach. The DCP stages and actions are summarized below and are included in Table 5-1 by stage and DWR’s defined drought response actions.

- **At DCP Stage Zero**, a non-drought stage, programs and incentives will continue to be offered to customers at standard levels. During this time, the goal will be to encourage and incentivize customers to create drought sustainable properties in advance of an emergency. The focus will be on turf replacement programs and customer education offerings.

- At **DCP Stage 1 (1-5% decrease),** customers and micro-target high potential customers will be profiled, utilizing messaging that will best resonate with those customers.

- The strategic focus for **DCP Stage 2 (6-15% decrease)** is to expand activity for irrigation equipment and direct installation programs, and to ramp up influencer marketing.

- Tactics for **DCP Stage 3 (16-25% decrease)** require incentive increases for landscape and irrigation measures, and an expansion in customer outreach.

- **DCP Stage 4 (26-50% decrease)** requires heightened messaging of urgency and put forth a community “call to action”. Additionally, there will be an increase in penalties, implementation of emergency alerts, and expanded news media coverage.

- During **DCP Stage 5 (water use for essential functions only), IEUA may consider modifying or suspending landscape and irrigation programs to focus** on indoor plumbing, property leak detection programs and other associated efforts. All landscape and irrigation programs will be suspended, and IEUA will implement crisis messaging, announcing water for essential use only.

Table 5-1 Demand Reduction Actions (DWR Table 8-2)

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? *Include volume units used.*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
1	Expand Public Information Campaign	Minimum 1-5% of water use	Begin outreach, appealing to civic duty to reduce water use, identify high water waste reduction potential customers. Develop messaging that will best resonate with those customers	No
1	Provide Rebates on Plumbing Fixtures and Devices		SoCal WaterSmart Residential and Commercial Rebates	No
1	Provide Rebates for Landscape Irrigation Efficiency		Residential Irrigation Tune-Up, Home Surveys, Landscape Workshops, and Design Services	No
1	Provide Rebates for Turf Replacement		Turf Replacement Program	No
2	Expand Public Information Campaign	Minimum 6-15% of water use	Ramp up outreach messaging to emphasize importance of taking action. Continue targeting high water waste potential customers	No
2	Provide Rebates on Plumbing Fixtures and Devices		Implement direct installation programs	No
2	Provide Rebates for Landscape Irrigation Efficiency		Expand Landscape Design Services; offer more frequent landscape workshops and home surveys	No
2	Provide Rebates for Landscape Irrigation Efficiency		Continue Turf Replacement Program and consider increased funding	No

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? *Include volume units used.*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
3	Expand Public Information Campaign	Minimum 16-25% of water use	Continue to expand outreach and marketing efforts to mid-tier water waste potential customers	No
3	Provide Rebates on Plumbing Fixtures and Devices		Continue base programs; Consider increase incentive amounts for certain programs; continue smart irrigation direct installation programs	No
3	Provide Rebates for Landscape Irrigation Efficiency		Continue Stage 2 Actions	No
3	Provide Rebates for Turf Replacement		Consider increase incentive amounts	No
4, 5	Expand Public Information Campaign	Minimum 24-50% of water use	Strengthen message of urgency and community call to action	No
4, 5	Provide Rebates on Plumbing Fixtures and Devices		Continue exploring incentive increase and smart irrigation direct installation programs	No
4, 5	Provide Rebates for Landscape Irrigation Efficiency		Continue Stage 2 Actions	No
4, 5	Provide Rebates for Turf Replacement		Consider increase incentive amounts	No

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? *Include volume units used.*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
6	Expand Public Information Campaign	Minimum 50% of water use	Implement catastrophic messaging, explore essential use only	No
6	Provide Rebates on Plumbing Fixtures and Devices		Continue exploring incentive increase and smart irrigation direct installation programs.	No
6	Provide Rebates for Landscape Irrigation Efficiency		Consider modifying or suspending programs to support other efforts	No
6	Provide Rebates for Turf Replacement		Consider modifying or suspending programs to support other efforts	No

Note: Each IEUA retail agency has local authority to enforce local water waste ordinances; details of the restrictions by agency can be found in the 2020 DCP and each individual retail agency's 2020 WSCP. Additional details on drought response actions can be found in the IEUA's 2020 DCP and WSCP.

5.3 Supply Augmentation Actions

While IEUA and its retail agencies recognize the need for additional supply during drought years, as a wholesaler, IEUA is limited in its ability to implement water supply augmentation actions. The applicable DWR supply augmentation actions that may be available to IEUA during a water shortage condition are presented in Table 5-2.

Table 5-2: Supply Augmentation and Other Actions (DWR Table 8-3)

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier	How much is this going to reduce the shortage gap? *Include volume units used.*	Additional Explanation or Reference *(optional)*
1 through 6	Other actions (describe)	Undetermined amount	IEUA is always exploring opportunities for supplemental recycled water connections and conjunctive use to increase supply and flexibility.
6	Other purchases	Up to 23,531AFY (MWD Contract Amount)	Difference between Resolution No. 2014-12-1 imported amount of 69,752 AFY and MWD tier 1 imported water annual maximum of 93,283 AFY

Note:.

The supply augmentation actions overlap other long-term regional supply reliability activities identified in the IRP as described below; it should be noted that not all IRP activities address a specific water shortage condition in the region.

Additional stored water, in the form of new groundwater production facilities, Chino Desalters with new water transmission lines, pumping plants, and storage tanks significantly increase local supplies and reliability to meet shortages and emergency outages by individual agencies. Interconnections between utilities also allow for mutual supply arrangements and enhances local reliability.

Additionally, through the existing and ongoing regional plans, such as the IRP, there has been considerable effort and extensive stakeholder engagement aimed specifically at developing mitigation-type actions to improve regional water supply reliability.

The mitigation actions identified through the IRP fall into two core strategies.

1. **Invest in Cost-Effective Local Supplies**: As the availability of imported water potentially becomes less reliable in the future, it will be ever more important to continue to invest in cost-effective forms of local water supplies, including groundwater, surface water, and recycled water and conjunctive management of all supplies. It should be noted that MWD is considering investments in new supply projects, both in and out of region. As such, analysis should be undertaken to find the balance of supply-reliability being developed by MWD, IEUA and its retail agencies in any given moment. Building the right amount of local water supply capacity decreases reliance on imported supplies and improves resiliency for the regional water supply portfolio.

2. **Enhance Groundwater Availability**: Groundwater is the most heavily relied on local water supply type. The Chino Groundwater Basin provided approximately 40% of the regional water supply portfolio over the last decade. The vulnerability assessment for the DCP illustrated how compromised groundwater quality poses a significant threat to local water supply reliability and can be compounded as other supplies currently used for blending, such as imported water, become less reliable. Enhancing groundwater treatment and groundwater recharge opportunities will be crucial as groundwater quality issues mount within the basin and dependence on groundwater potentially increases as other sources become less reliable. Groundwater recharge with good quality water sources provides the benefits of both groundwater quality management and increased groundwater storage.

5.4 Prohibitions, Penalties, and Consumption Reduction Methods

This section describes several prohibitions, penalties, and consumption reduction methods including drought ordinances and restrictions.

5.4.1 Emergency Drought Ordinances within IEUA Service Area

IEUA does not have its own drought ordinances concerning drought measures. However, IEUA's retail agencies have several ordinances and measures in place concerning water waste, conservation efforts, and more. Table 5-3 from the DCP lists several ordinances for IEUA's retail agencies.

Table 5-3: Water Waste Ordinance by Agency (IEUA 2020)

Agency	Ordinance/Code Title
City of Chino	Municipal Code Water Conservation 13.-5.010 – 13.05.120
City of Chino Hills	Ordinance 300u
Cucamonga Valley Water District	Ordinance 2019-5-1
Fontana Water Company	San Gabriel Valley Water Company Rule No. 14 & Schedule 14.1
Monte Vista Water District	Ordinance 33
City of Ontario	Municipal Code Water Conservation Plan Title 6, Section 8A
City of Upland	Municipal Code 13.16.020 & 13.16.05.050

5.4.2 Voluntary and Mandatory Restrictions

Both voluntary and mandatory restrictions are coupled with public education campaigns to provide customers with information about the purpose for the restriction(s) and the call-to-action. Restrictions are typically highly publicized through local media, web pages, social media, mailings, and water bills.

Mandatory restrictions are a more effective tool for drought coping than voluntary measures; however, mandatory restrictions may create heightened negativity directed at the customer's water provider.

Common restrictions include partial or total prohibitions against using hoses to wash paved areas, limits on car washing and filling or refilling swimming pools, and restrictions on watering times.

As drought stages are declared, each agency will implement voluntary and mandatory restrictions as dictated by their respective Water Waste Ordinance. It is important to note the following:

1. Each ordinance is unique to a specific water provider and the ordinances differ slightly from one another.

2. Ordinance stages are locally declared and therefore, may not align with other agencies or a regionally declared stage.

Although enforcement is difficult to maintain, each agency is responsible for locally enforcing each ordinance. In order to accomplish this, agencies must add field staffing, coordinate with administration of the water waste ordinance, and manage the increased level of customer phone calls.

Enforcement has been critical to the integrity of the ordinance in the past and remains critical for future water shortages as well. Without action and penalties, the ordinance will not be taken seriously by customers, which then nullifies the effectiveness of the initiative. Typically, violations are reported by community members or visually seen by agency staff. Enforcement staff will then send letters, visit customer properties, and educate customers on the importance of adherence for both the resident and the overall community.

5.5 Operational Changes

IEUA does not operate any imported water systems and therefore, does not require operational changes during a water shortage. Changes to supply augmentation are described in Section 5.3 and consumption reduction methods are described in Section 5.4.

5.6 Customer Compliance, Enforcement and Appeal, and Exemption Procedures for Triggered Response Actions

IEUA does not have direct retail customers. However, IEUA is part of the Drought Response Taskforce (described in Section 5.7.2), which supports retail agencies with various resources for coordination, outreach, enforcement and more. The Taskforce coordinates with retail agencies and staff to identify resource and funding needs. Further explanation of the current funds and the funding process is described in the Regional Water Use Efficiency Business Plan (IEUA 2019).

5.7 Description of Legal Authorities to Implement and Enforce Shortage Response Actions

This section describes the legal authorities that implement and enforce shortage response actions, including their roles and responsibilities. Additionally, mutual aid agreements are described.

5.7.1 Roles and Responsibilities

IEUA: IEUA serves as the administrative facilitator of all components of the DCP. IEUA is responsible for developing regional demand and supply projections, calculating supply/demand ratio, communicating outcomes, convening the Drought Response Taskforce, implementing response strategies and actions as determined by the Drought Response Taskforce, conducting vulnerability assessments, evaluating and implementing IEUA controlled mitigation actions, and updating the plan.

Retail Agencies: Retail agencies are responsible for providing demand and supply projections, implementing agency-selected local mitigation actions, participating on the Drought Taskforce, and implementing response actions including local water waste restrictions.

5.7.2 Drought Response Taskforce Process

Once the drought monitoring framework indicates that the region has reached a specific stage of drought conditions, several actions will occur.

First, the Drought Response Taskforce (Taskforce) will assemble. The Drought Response Taskforce is the organizational group empowered to:

1. Create the Drought Response Plan blueprint.

2. Assemble the Taskforce to finalize strategic response actions during drought condition stages.

3. Work with their respective organization to implement response actions, according to plan.

The Taskforce is comprised of representatives from each of the retail agencies, in addition to personnel from IEUA. The group works in a collaborative effort to gain consensus on appropriate regional response actions.

The Taskforce will make decisions about the level of programming and services, restrictions, and messaging to regional customers. Additionally, the group determines the level taken for each element of the plan.

It is important to note that during a regional drought, an individual retail agency may not be experiencing a drought condition due to their local supply mix. In this circumstance, the agency may elect the capacity in which to participate on the Taskforce. The agency may determine how

best to communicate with its customers when there are no water supply issues, locally while the region is undergoing a drought stage.

Moving forward, the Taskforce will work to balance the effectiveness of regional messaging with the differing needs of individual retail agencies. There are no pre-determined mandates regarding service offerings, restrictions, communications, or budgets. The Taskforce will collaborate on policies, while fully supporting flexibility for each agency.

The group will review the proposed actions set forth in the existing plan and make modifications, as necessary. The plan was intended to be flexible and changeable. Modifications to the plan might include a change in incentive levels or program delivery mechanisms. There may also be a new water-saving technology that may be available to customers. The Taskforce may be able to secure additional grant funds, as well. Once the action plan is finalized, the Taskforce will implement the programs, penalties, and communications plan, as agreed upon.

An overview of the DCP drought response process is provided on Figure 5-1.

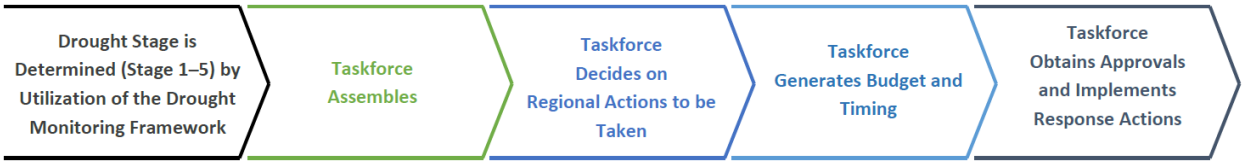


Figure 5-1 Drought DCP Response Process

5.7.3 Mutual Aid Agreements

IEUA currently has no mutual agreements except those concerning the sanitary sewer system. Additionally, retail agencies typically coordinate with other agencies to balance water uses.

5.8 Effectiveness of Shortage Response Actions (by Water Shortage Stage)

This section describes the annual review of the shortage response actions outlined in Section 5.1. Additional reviews for effectiveness are outlined in the WUE Business Plan (IEUA 2020), which is updated every 5 years.

The Drought Response Taskforce process described in Section 5.7.2 resulted in several programs that would address water shortages. The following process was used to determine the effectiveness of each program. It is important to note that the ranking process provides general consensus and structure for planning, but program ranking is fluid and, as circumstances evolve in the future, selected programs and priority levels may change.

1. Each of the selected programs addressing water shortages were ranked by agency representatives to determine its viability during each advancing drought stage. The selection process for these programs and services was conducted by having agency representatives individually rank viable programs as a high (3 points), medium (2 points), or low (1 point) at each respective drought stage level.

2. This ranking criterion was based on the level of feasibility, appropriateness, and overall impact provided by that program/service at each drought stage. Budgets and program scalability were additional considerations factored into the ranking process. The group also assessed the effect and motivation that escalating drought stages would have on customers and how that, in turn, might drive customers' response for each program/service.

3. The results were totaled and averaged for each program/service at each drought stage. Higher numbers reflected a greater expected effectiveness for that program or service. Lower numbers indicated reduced support for the program or service and less likelihood for inclusion in the list of program offerings.

4. Using the high, medium, or low point rubric program rankings were compiled and recorded.

In general, it was found that the higher the drought stage, the more program services were to be provided by agencies. It was also found that there is heightened customer response and program participation during higher drought stages. This is especially true when customers are provided with free installation and low-cost product or, as with turf incentives, the rebate level is enticingly high. Additionally, as stages escalate, agencies are prepared to ramp up activity for all programs, but will rely most heavily on Turf Replacement, FreeSprinklerNozzles.com, and direct installation of landscape measures. The number of home surveys, workshops, and design services may also increase. Home Leak Detection was ranked as the lowest priority program during Stage 0 and Stage 1, and only ramps up significantly in the later drought stages.

At each drought stage, it is anticipated that the highest-ranking programs will be those most actively promoted, and those offering attractive customer enticements to participate.

However, it is important to reinforce that the program and services rankings are not absolute and are a suggested template to be adjusted according to circumstances that exist at each actual drought stage. Actual incentives, services, and roll out schedules will be determined by the Taskforce when the drought stage is declared and the group is assembled.

Section 6: Communication Protocols

This section describes communication protocols as outlined in the 2020 DCP.

6.1 Messaging and Outreach

Communication and outreach play as crucial a role in the delivery of water savings as the programs themselves. A strong plan will ensure that IEUA reaches the target audience, boosts awareness, and ultimately, delivers water savings. For this reason, the Response Plan communication must:

- Be heard by the right customers, understood, and favorably received.
- Clearly inform the customer of the current stage, tell them what action is desired, and motivate them to respond to the request.

Ultimately, all forms of communications and outreach must work together throughout the region to raise response and increase water savings per household. The combination of regional drought messaging paired with the retail agencies' individual outreach efforts will create a stronger, more unified message.

6.2 Requirements for An Effective Message and Campaign

The key principles of a successful outreach and communication campaign are:

1. Know Your Customer.
2. Get the Message Right.
3. Craft an Outreach Plan that Drives Customer Response.

6.2.1 Know Your Customer

An organization must understand each customer's needs in order to provide the "I can't say no" offer. Companies experience much higher response rates when they understand and effectively respond to customers' needs.

Target audiences are single family households with high water-use and large landscape customers. Reaching these customers requires data analysis, creation of customer personas, and micro-targeting. There are numerous analytics programs available today that help agencies identify distinct customer groups and personas. Statistics show that micro-targeting greatly boosts customer response, which in turns leads to higher water savings as well.

6.2.2 Get the Messaging Right

Marketing campaigns are highly successful when they evoke emotion and resonate with a human need. An emotional message strategy uses feeling, which is a much more powerful motivator than logic, to sell. An outreach vehicle using this tactic will make the target audience feel an emotional connection to the agency, program, water efficiency measure, and/or call-to-action. IEUA will need to utilize the following messaging strategies to garner interest and participation from customers:

- **Emphasize the benefits**: What does this specific customer need? Present a solution to their problem.
- **Keep it simple**: A confused mind says “no.” People worry that deceit is hidden amongst complexity.
- **Make it Fun**: Draw customers in by using fun and catchy messaging, stories, eye-catching visuals, and humor.
- **Use Authority**: Influencing others is easier if customers view the person making the pitch as an authority figure. We all like to listen to and follow an expert. We trust that they know what they are doing.

6.2.3 Two Types of Messaging Required

There are reasons for creating and driving mass audiences through broad messaging as opposed to targeted action messaging directed to specific audiences. IEUA will need to effectively provide both types of communication during drought conditions.

1. **Broad Messaging:** Broad messaging (delivered via news stories, radio/TV ads, billboards, etc.) provides the widest reach and allows IEUA to communicate overarching messages including:
    a. Water Scarcity Issue
    b. Urgency to Act
    c. Commitment to continue to provide safe, reliable water supply.
2. **Targeted Action Messaging:** Targeted action messaging is typically aimed at specific groups of customers (i.e., those most likely to respond to your request for program participation or water-use reduction). To promote action, IEUA and the retail agencies must create messaging content and outreach such as those described below.
    a. Design messaging to motivate landscape changes for single family customers
    b. Post success stories: community members, people of prominence, business leaders
    c. Promote stories from micro-influencers: Q&A blogs with customers, homeowner success stories, “Did You Know?” educational snippets

d. Consider the utilization of third-party influencers: these individuals are more trusted than a company itself

e. Create a community call to action: “your community needs your help” messaging.

6.2.4 Craft an Outreach Plan that Drives Customer Response

Successful outreach campaigns utilize the following strategies:

- Profile your customers to understand customer’s persona
- Micro-target to prospect the right customers for each offer
- Incorporate your strong messaging and influencer authority figures in all offers
- Add personalization
- Demonstrate value and generous offer
- Include a call to action
- Make it easy for customers to say “YES”
- Follow up
- Track results
- As stages advance, increase frequency, urgency, and intensity.

IEUA and its retail agencies will need a creative and dynamic approach in order to increase customer response and water use reduction, especially during higher drought stages.

6.3 Successful Outreach Methods

There are major outreach mechanisms to be utilized for general categories of customers. Each outreach approach should be personalized to the group being targeted, as follows:

- Direct outreach to high users via personalized means (phone, letter, email, etc.)
- Regional outreach through broad media channels
- Earned media
- Social media
- Grassroots and community outreach.

6.4 Importance of Influencers and Relationships

Influencer marketing is another effective strategy to enhance response. Influencers are trusted individuals who have a large audience and can reach across media and social platforms. Because of their high level of “trust-ability”, they’re often able to persuade (or “influence”) readers and viewers to purchase products or endorse causes that they promote.

Influencer marketing is a highly effective way to reach interested customers and dramatically increase response. They act as a trusted and respected “friend”, as customers trust third party influencers more than a company itself. Those prominent in the Inland Empire include:

- Well known business owners/leaders
- Local sports or entertainment figures
- Elected officials
- Active Parent Teacher Association members
- High profile community organizers.

6.5 Drought Outreach Matrix

The urgency for communications increases as drought stages escalate. Because customers are essential to water-savings solutions, it is imperative that they understand each drought stage and what is required of them. Quality messaging will clearly communicate the current drought stage, define the condition, request a desired customer behavior, and direct them to tangible solutions. Table 6-1 shows the DCP drought outreach matrix for IEUA, which outlines the possible outreach methods for each water shortage stage.

Table 6-1: DCP Drought Outreach Matrix for IEUA

Stages	0	1	2	3	4	5
Messaging	Overall preparedness and drought resiliency. Drought will be regular occurrence.	What ***Watch*** Condition Means	What ***Warning*** Condition Means	What ***Emergency*** Condition Means	What ***Critical*** Condition Means	What ***Catastrophic*** Condition Means
Desired Behavior	Get customers to install drought resilient landscapes & smart irrigation prior to the next drought.	Minimum 1-5% decrease in water use.	Minimum 6-15% decrease in water use.	Minimum 16-25% decrease in water use.	Minimum 25-50% decrease in water use.	Water used for only essential functions.
Outreach Strategies	Evaluate your specific community and the customers in your service territory to determine a compressive plan using a combination of the following strategies and tactics. Each approach should be personalized to the group you are targeting. - Direct outreach to high users - Regional outreach through broad media channels - Social media outreach - Grassroots and community outreach					

Section 7: Mechanism to Determine Reductions in Water Use and to Meet State Reporting Requirements

Water Code Section 10632(a)(9) is not applicable for IEUA, as it is a requirement for urban retail water suppliers. However, the IEUA WUE Business Plan addresses methodologies for and the effectiveness of attaining water use efficiency. The IEUA WUE Business Plan is a working document and, as such, must be modified and updated as changes occur, and program years roll out. IEUA regularly reviews the plan and makes adjustments accordingly.

Changes and/or reviews of the plan take place in line with the following conditions:

- When programs are added, subtracted, or modified.
- On a yearly basis in order to meet the annual reporting requirements.
- Every 5 years to meet the Urban Water Management Plan report cycle.
- As the State's Framework policies are finalized.

Section 8: Impacts to Revenue

This section addresses Water Code Section 10632(a)(8).

If a drought is declared, financial impacts to the local retail water agencies will vary from one agency to another. As a wholesale water agency, IEUA is simply a “pass-through” wholesaler, so loss of revenue has no significant impacts. One exception may include the loss of revenue due to conservation programs that receive a portion of funding through a surcharge on each acre-foot of imported water sold. Otherwise, IEUA’s revenue is no longer based on water sales. Revenue is currently based on the number of meters as well as meter size within its area.

Current rates are outlined in Resolution No. 2019-6-1.

Section 9: Actions to Prepare for Catastrophic Supply Interruption

This section largely relies on the analyses performed in previous UWMPs and meets Water Code Section 10632(a)(3).

9.1 Planning for a Catastrophe

Southern California's three imported water supplies (State Water Project, Colorado River Aqueduct, and Los Angeles Aqueduct) cross the San Andreas Fault. Many other fault lines bisect major water facilities throughout the region. Experts consider it likely that one or more of these supplies will be disrupted in the event of a major earthquake. Given the great distances that imported supplies travel to reach the Inland Empire, the region is vulnerable to imported water interruptions along hundreds of miles of aqueducts, pipelines and other facilities associated with delivering the supplies to the region.

MWD has comprehensive plans for stages of actions it would undertake to address a catastrophic interruption in water supplies through its WSDM and WSAP. MWD also developed an Emergency Storage Requirement to mitigate against potential interruption in water supplies resulting from catastrophic occurrences within the southern California region, including seismic events along the San Andreas Fault. For MWD, the required planning is captured in its Emergency Storage Objective, Seismic Resiliency Reports, and Emergency Response Plans. For greater detail on MWD's planned responses to catastrophic interruption, please refer to MWDs 2020 UWMP.

MWD estimates that restoring service on any of these facilities following a catastrophic outage could take up to 6 months. This, in turn, could reduce annual deliveries by roughly up to 50% for MWD-supplied water. The UWMP requires agencies to consider the effect of a 50% cutback in water supplies. This corresponds approximately to the degree of cutback contemplated by MWD's earthquake disruption scenario.

IEUA is unique among MWD member agencies in that it only has access to imported water off the eastern branch of the State Water Project and does not have access to most of MWD's in-region surface storage supplies. Therefore, a catastrophic interruption of SWP supplies would be particularly impactful on IEUA.

In September 2005, IEUA adopted federal emergency response procedures called NIMS (National Incident Management System) which can be implemented by IEUA personnel for a localized event such as an accident at one of IEUA's facilities or on a broader based regional event such as an earthquake or flood. This system provides a consistent nationwide template to enable federal, state, and local governments (and local private sector and non-governmental organizations) to work together effectively and efficiently to prepare for, prevent, respond to, and recover from domestic incidents, regardless of cause, size, or complexity, including acts of terrorism. Complementary to NIMS, IEUA has completed Mutual Aid Agreements between itself and its local retail agencies (see Appendix R of 2010 UWMP).

9.2 Supply Augmentation Actions

The methods described in Section 5.3 will apply during emergencies.

9.3 Emergency Curtailment of Imported Water

In June 2004, MWD conducted an unplanned shutdown of the Rialto Feeder pipeline. The pipeline was discovered to be in danger of collapse and repairs were needed immediately. Because the Rialto Feeder is the only source of significant imported water deliveries to the IEUA and the Three Valleys Municipal Water District (TVMWD) service areas, the loss of that supply during the summer when municipal and industrial water demand was high, could have had a devastating impact on local agencies. The Rialto Pipeline Shutdown occurred from Monday, June 7, 2004 through Saturday, June 12, 2004.

To prepare their customers for the shutdown, the local agencies coordinated among themselves, MWD, and the local television and newspaper media. Water agencies asked their largest customers to stop irrigating their landscapes and stop all non-essential water uses during the 5-day shutdown for repairs. Also, local agencies asked their residential customers to eliminate landscape irrigation and to reduce or eliminate their non-essential water use practices. Because each local agency has a different resource mix, each agency was affected somewhat differently by the shutdown. Some retail agencies rely on imported water to supply a large portion (as much as 50%) of their demand during that time of the year.

One retail agency determined that the best course of action was to declare a “state of water supply emergency” and issued an emergency shutdown notice to all their customers. Their customers responded well to the request by reducing overall water use by 60% during the repairs. This response allowed CVWD to successfully meet all essential municipal and industrial demands, as well as fire flow requirements. Other local agencies saw similar responses from their customers.

In the weeks following the shutdown, MWD, IEUA, and TVMWD issued a survey questionnaire to the affected water agencies asking for their assessment of the way the shutdown was handled.

The responses to the survey showed, that overall, the lead agencies response to the shutdown and coordination with local media were reasonably successful. There was some confusion by commercial and residential properties owners on how to operate their irrigation controllers. As a result, a few landscapes remained watered during the first days of the shutdown. There was also some confusion by the public as to why several large landscapes in certain cities were being watered. As it turned out, these sites were using recycled water to irrigate. Ultimately, the irrigation was turned off to avoid further confusion.

Each of the agencies learned valuable lessons during this water emergency. Clearly, when the public is informed about the issue, water supply officials can expect a generally positive response from the public. The coordination with local agencies, the distribution of information, and conservation suggestions to the residents are the keys to maintaining credibility and confidence with the public.

MWD has initiated a program to rehabilitate 100 miles of pre-stressed concrete cylinder pipe (PCCP) on five at-risk major feeders with ongoing monitoring, evaluation, and prioritization for immediate repair and rehabilitation over 20 years. MWD is closely coordinating with IEUA and its retail agencies to help mitigate immediate emergency concerns on the Rialto Pipeline by continuing regular inspection and monitoring for stray currents and/or installation of cathodic protection and performing individual segment repairs as needed. MWD has also developed an extensive rehabilitation effort expected to cost over $600 million for the Rialto Pipeline alone that is in its early stages of planning and design.

Section 10: Reevaluation and Improvement Procedures

The WSCP is founded on several planning documents including the IEUA WUE Business Plan. The IEUA WUE Business Plan outlines methodologies and sets goals that measure the effectiveness of water use efficiency programming. The IEUA WUE Business Plan is a working document and, as such, must be modified and updated as changes occur and program years roll out. IEUA reviews the plan every 5 years in conjunction with the UWMP and adjusts accordingly. The WSCP will also be evaluated and updated on the same 5-year cycle.

IEUA is in the process of updating the 2015-2020 Water Use Efficiency Business Plan. The State is tentatively scheduled to finalize the new water use efficiency standard/objective and establish water use objectives for Retailers by 2023. IEUA's WUE Business Plan is being completed in two phases. Phase I will cover FY 2021-2023 and incorporate existing and newly proposed programs and measures. Phase II will cover FY 2023-2025, expand on Phase I existing and new programming, and develop a pathway to meet or exceed compliance with the new State regulations.

Section 11: Water Shortage Contingency Plan – Adoption Resolution

11.1 Overview

During the process of preparation of the UWMP, IEUA also reviewed related information from regional and local agencies and developed this WSCP, which was largely founded on the 2020 DCP. An extensive coordination effort occurred during the DCP preparation between September 2017 to September 2019 which included five workshops, as well as four Response Action Taskforce meetings. IEUA also encouraged public involvement in the UWMP and WSCP by holding a public hearing for residents to learn and ask questions about their water supply.

This section provides the information required in Water Code Section 10632(a)(c) related to adoption and implementation of the WSCP. Table 11-1 summarizes external coordination and outreach activities carried out by the IEUA and the corresponding dates.

Table 11-1: External Coordination and Outreach

External Coordination and Outreach	Date	Reference
Notification of Preparation; Encouraged public involvement	November 24 and 30, 2020	WSCP Appendix B
Notified city or county within supplier's service area that water supplier is preparing an updated UWMP (at least 60 days prior to public hearing)	April 5, 2021	WSCP Appendix C
Newspaper notice of public hearing and intent to adopt UWMP and WSCP	May 17 and May 24, 2021	WSCP Appendix D
Adopted UWMP and WSCP by Resolution	June 16, 2021	WSCP Appendix E
Submitted UWMP and WSCP to DWR (no later than 30 days after adoption)	By July 1, 2021	-
Made UWMP and WSCP available for public review (no later than 30 days after filing with DWR)	By July 1, 2021	-
Submitted UWMP and WSCP to the California State Library and city or county within the supplier's service area (no later than 30 days after adoption)	By July 13, 2021	-

The UWMP and WSCP was adopted by IEUA's Board of Directors on June 16, 2021. A copy of the adopted resolution is provided in WSCP Appendix E.

IEUA also notified any city or county within its service area at least 60 days prior to the public hearing. As indicated in Table 11-2, IEUA sent a Letter of Notification to the County of San Bernardino and cities within its service area in November 2020 and again in April 2021 to state that it was in the process of preparation to meet the DWR requirements (WSCP Appendices A and B).

Table 11-2:Notification to Cities and Counties (DWR Table 10-1)

☑	Supplier has notified more than 10 cities or counties in accordance with Water Code Sections 10621 (b) and 10642. **Completion of the table below is not required. Provide a separate list of the cities and counties that were notified.**	
Table 11-2 of the WSCP	Provide the page or location of this list in the UWMP.	
	Supplier has notified 10 or fewer cities or counties. **Complete the table below.**	
City Name	**60 Day Notice**	**Notice of Public Hearing**
Add additional rows as needed		
City of Chino	☑	☑
City of Chino Hills	☑	☑
Cucamonga Valley Water District	☑	☑
Fontana Water Company	☑	☑
Monte Vista Water District	☑	☑
City of Ontario	☑	☑
San Antonio Water Company	☑	☑
City of Upland	☑	☑
City of Rancho Cucamonga	☑	☑
City of Montclair	☑	☑
West Valley Water District	☑	☑
County Name	**60-Day Notice**	**Notice of Public Hearing**
Add additional rows as needed		
San Bernardino County	☑	☑

Notes: In addition, the following agencies were also given a 60-Day Notice and Notice of Public Hearing: Chino Basin Water Master, Chino Basin Desalter Authority, Local Agency Formation Commission for San Bernardino County, Metropolitan Water District, Santa Ana Regional Water Quality Control Board, Santa Ana Watershed Project Authority, Three Valleys Municipal Water District, and the Water Facilities Authority.
Notification letters were sent out in November 2020 and April 2021. Copies of these notification letters are included in WSCP Appendices A and B.

11.2 Public Participation

IEUA encouraged community and public interest involvement in the plan update through a public hearing and inspection of the draft document on June 16, 2021. Public hearing notifications were published in local newspapers. A copy of the published Notice of Public Hearing is included in WSCP Appendix D. The hearing provided an opportunity for all residents and employees in the service area to learn and ask questions about their water supply in addition to the IEUA's plans for providing a reliable, safe, high-quality water supply. Copies of the draft plan were made available for public inspection at the IEUA headquarters and website.

11.3 Agency Coordination

IEUA's water supply planning relates to the policies, rules, and regulations of its regional and local water providers. IEUA is dependent on imported water from MWD, its regional wholesaler. As such, IEUA involved the water providers in this 2020 UWMP at various levels of contribution as summarized in Table 11-3.

11.4 WSCP Submittal

IEUA's five-member Board of Directors reviewed and approved the Final 2020 WSCP on June 16, 2021 (Resolution No. 2021-06-10). See WSCP Appendix E for the resolution approving the Plan.

By July 1, 2021, the adopted 2020 WSCP was filed with DWR and posted to IEUA's website. By July 13, 2021, the adopted 2020 WSCP was filed with the California State Library, County of San Bernardino, and cities within its service area, if applicable.

Table 11-3: Coordination with Appropriate Agencies

Agency Name	Participated in Plan Development	Commented on Draft	Attended Public Meetings	Sent Notice of Plan in Preparation[(a)]	Received Copy of Draft Plan[(b)]	Sent Notice of Intent to Adopt[(a)]	Received Copy of Adopted Plan[(b)]
City of Chino	No	No	No	Yes	Yes	Yes	Yes
City of Chino Hills	No	No	No	Yes	Yes	Yes	Yes
Cucamonga Valley Water District	No	No	No	Yes	Yes	Yes	Yes
Fontana Water Company	No	No	No	Yes	Yes	Yes	Yes
Monte Vista Water District	No	No	No	Yes	Yes	Yes	Yes
City of Ontario	No	No	No	Yes	Yes	Yes	Yes
San Antonio Water Company	No	No	No	Yes	Yes	Yes	Yes
City of Upland	No	No	No	Yes	Yes	Yes	Yes
Chino Basin Desalter Authority	No	No	No	Yes	Yes	Yes	Yes
Chino Basin Water Master	No	No	No	Yes	Yes	Yes	Yes

Agency Name	Participated in Plan Development	Commented on Draft	Attended Public Meetings	Sent Notice of Plan in Preparation[(a)]	Received Copy of Draft Plan[(b)]	Sent Notice of Intent to Adopt[(a)]	Received Copy of Adopted Plan[(b)]
Chino Basin Water Conservation District	No	No	No	Yes	Yes	Yes	Yes
Formation Commission for San Bernardino County	No	No	No	Yes	Yes	Yes	Yes
Metropolitan Water District	No	No	No	Yes	Yes	Yes	Yes
City of Montclair	No	No	No	Yes	Yes	Yes	Yes
San Bernardino County Flood Control District	No	No	No	Yes	Yes	Yes	Yes
San Bernardino County Planning Department	No	No	No	Yes	Yes	Yes	Yes
Santa Ana Watershed Project Authority	No	No	No	Yes	Yes	Yes	Yes
Santa Ana Regional Water Quality Control Board	No	No	No	Yes	Yes	Yes	Yes
Water Facilities Authority	No	No	No	Yes	Yes	Yes	Yes

Notes:

(a) IEUA sent notice of plan in preparation in November of 2020 and notice of intent to adopt in April 2021. Both notices are included in WSCP Appendices A and B.
(b) IEUA posted the draft 2020 WSCP to its website on 11 May 2021 and the adopted final 2020 WSCP to its website prior to July 1, 2021.
(c) While stakeholders did not participate directly in the development of the WSCP, stakeholders participated in the development of the foundational 2020 DCP, provided supply and demand data, and/or provided input to the Draft 2020 Water Use Efficiency Business Plan.

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WSCP Appendix A

Regional Drought Contingency Plan



Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Inland Empire Utilities Agency Regional Drought Contingency Plan

April 2020

Contact Information:
Jesse Pompa P.E., BCEE
Manager of Grants, Inland Empire Utilities Agency
6075 Kimball Ave., Chino, California 91708
Tel: 909-993-1545 / E-mail: jpompa@ieua.org / Website: www.ieua.org

BUREAU OF RECLAMATION

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Appendix D. 2015 Integrated Water Resource Plan: Mitigation Actions

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Acronyms and Abbreviations

AF	acre feet
AFY	acre feet per year
CBWM	Chino Basin Watermaster
CCAP	Climate Change Action Plan
CCCA	California's Climate Change Assessment
CCWRF	Carbon Canyon Water Recycling Facility
CDA	Chino Basin Desalter Authority
CVWD	Cucamonga Valley Water District
Delta	Sacramento-San Joaquin River Delta
DCP	Regional Drought Contingency Plan
FWC	Fontana Water Company
IEUA	Inland Empire Utilities Agency
IRP	IEUA Integrated Water Resources Plan
Model	Chino Basin Regional Water Supply Infrastructure Model
MVWD	Monte Vista Water District
MWD	Metropolitan Water District of Southern California
OBMP	Optimum Basin Management Program
OSY	Operating Safe Yield
RCAs	Regional Contracting Agencies
RCP	Representative Concentration Pathways
RMPU	Recharge Master Plan Update
RWPS	Recycled Water Program Strategy
RWQCB	Regional Water Quality Control Board
SAR	Santa Ana River
SAWCo	San Antonio Water Company
SCAB	South Coast Air Basin
SRI	Sacramento River Index
SWP	State Water Project
TDS	total dissolved solids

USBR U.S. Bureau of Reclamation

UWMP Urban Water Management Plan

VOCs volatile organic chemicals

WFA Water Facilities Authority

WFMP Wastewater Facilities Master Plan

WSAP Water Supply Allocation Plan

IEUA is a wholesale distributor of imported water and a regional wastewater treatment agency, serving 875,000 residents over 242 square miles.

As a public agency, IEUA purchases imported water from the MWD Water District of Southern California (MWD) and is situated on the largest groundwater storage basin in Southern California.

IEUA wholesales water purchased from Metropolitan Water District of Southern California (MWD) to cities, municipal water districts, investor-owned utilities and special districts. IEUA's retail agencies include: the cities of Chino, Chino Hills, Ontario, and Upland, Cucamonga Valley Water District in the city of Rancho Cucamonga, the Fontana Water Company in the city of Fontana, Monte Vista Water District in the city of Montclair, and San Antonio Water Company in the city of Upland.

What Defines a Drought?

A *drought* is a natural prolonged period of abnormally low rainfall, leading to a shortage of water. Drought is a weather-related recurring feature in Southern California and the Inland Empire region.

While drought cannot be prevented by local water management, the impacts can be mitigated by preparing the region for the eventuality of a future drought cycle.

What Defines a Water Shortage?

A *water shortage* is the lack of sufficient available water resources to meet the demands of water usage within a region, either for a short-term or long-term duration. The shortage can be caused by a variety of reasons including groundwater contamination or other water quality constraints.

While noting the distinction between drought and water shortage, both of these conditions are impactful. The Inland Empire may find that there is a situation wherein there isn't a drought, but instead, a groundwater quality issue, causing a shortage that impacts the entire area.

IEUA and its member agencies are acutely cognizant that preparedness for either occurrence is critical to the region.

1 Introduction

A Look Back

IEUA created the 2009 Drought Plan at the time when the region was in the midst of a prolonged three-year drought. The main objective of the plan was to implement Metropolitan Water District's Water Supply Allocation Plan. This well-reasoned plan provided a fair and equitable process for allocating potential future limited water supplies.

Two years later, IEUA and its member agencies faced one of the most intense droughts in California history (2011 – 2017); with the period of late 2011 through 2014 being the driest in California's recorded history.

Gaining Insight

With tremendous collective efforts on the part of IEUA and retail member agencies, the region endured the demanding years of these drought cycles. Despite the many dead lawns and unwashed cars, thanks to regional and local response actions, adequate supply was never a question.

The numerous challenges that arose during this time period yielded much gained insight for water resource managers throughout the State.

It was clear that the great majority of customer sites were not drought resilient going in, or coming out, of the drought. Water savings came about predominantly through restrictions; not customer drought preparedness.

Breaking from this trend, customers in the IEUA service area did respond to the turf removal program; removing over 7 million square feet of turf AND customers rallied and reduced water usage by over 30%. While this occurred rather late in the drought cycle, the focus on long term drought preparedness was a welcomed sight.

The 2011 – 2017 drought illustrated the growing evidence that climate change is causing longer and more frequent droughts. The 2009 Drought Plan, while appropriate for its time, needed to be expanded.

USBR Grant Funding

Coinciding with the need for a more robust plan, the United States Bureau of Reclamation (USBR) provided a funding opportunity for development of Drought Contingency Plans (DCP), with the aim of building long-term resiliency to drought and climate change.

In 2016, IEUA submitted a proposal and received grant award for development of a DCP. The objectives of the planning process, as put forth by USBR, were to help resource planners to 1) recognize drought in

its early stages; 2) identify the effects of drought or water shortages; and 3) provide water supply protection into the future.

As required under this grant, IEUA has documented the input and participation of our multiple stakeholders, factored climate change impacts to drought conditions, and identified potential drought mitigation and response actions, to enhance the IEUA region's resilience to drought, as exacerbated by climate change.

The DCP, as a federally sanctioned plan, not only provides the IEUA region with an increased level of proactivity and preparedness, it also better positions IEUA and its member agencies, should there be a need for federal emergency relief funds.

Goals of the Drought Contingency Plan

The DCP is a comprehensive plan, designed to:

- ✓ **Define regional shortage conditions** to tailored stages, responses, and mitigation actions for the IEUA service area needs and resources.
- ✓ **Build resiliency** by identifying and facilitating investment in local projects that strengthen and further diversify water portfolios within the service area (i.e. conservation, recycled water, interconnections, and groundwater recharge).
- ✓ **Facilitate consistent communication** for the service area to ensure consistency and effectiveness during times requiring reduced water usage.
- ✓ Maintain a commitment to **sustainability and environmental stewardship** by meeting the needs of the present without compromising the ability of future generations to meet their own needs.
- ✓ **Maintain consistency** with Metropolitan Water District's Water Shortage Allocation Plan and Dry Year Yield policies, as well as other IEUA and member agency water resource planning documents.
- ✓ Ensure **equity and fairness** throughout the service area.

Plan Components

There are five distinct components to IEUA's plan, as required by the USBR grant:

1. The Drought Monitoring Framework
2. The Vulnerability Assessment

3. Mitigation Actions
4. Response Actions (Drought Communications & Outreach Plan)
5. The Operational & Administrative Framework

The **Drought Monitoring Framework** provides the tools and data metrics necessary to determine the existence and severity of a drought or water shortage.

The **Vulnerability Assessment** identifies and quantifies the key factors that can negatively affect water supply reliability.

The **Mitigation Actions** are prioritized projects and strategies that can be implemented prior to a drought situation in order to lessen the risks and impacts of water shortages.

The **Response Actions** provide a blueprint for deployment of strategic response actions for each stage of water shortage or drought condition.

The **Operational and Administrative Framework** describes the roles, responsibilities and procedures to implement each element of the Plan.

Plan Development Process

The development of the drought plan was intentionally crafted to be a highly collaborative and inclusive process.

IEUA launched the project by assembling a taskforce, inclusive of each retail agency's management, planning and conservation staff as well as other regional stakeholders.

GEI Consultants, one of nations leading engineering firms with a known capability for drought planning, was awarded the contract to develop the plan.

Periodic taskforce meetings were held to present the outcomes of each planning component. Taskforce members were solicited for feedback, after which final technical memos were produced for:

1) Drought Monitoring
2) Vulnerability Assessment
3) Mitigation Actions

Additionally, consultant Maureen Erbeznik, a conservation program design and implementation expert, was hired to develop the response actions also known as the Communications & Outreach Plan. Four additional stakeholder workshops were convened with IEUA and retail member agency conservation staff. Over the course of the four workshops, the group ranked and selected programs best suited for drought response, established a strategy for restrictions & enforcement, identified communication

tactics, and aligned these response actions with drought stages. The Communications & Outreach Plan was then integrated with the technical memos produced by the taskforce to create the final Drought Contingency Plan.

It is important to note that outcomes of the planning process are not a "cast in stone" series of actions that become mandated procedures, requiring stakeholder adherence. Instead the plan results act as a resource and general guide for IEUA and the member agencies. It is understood that each retail agency has its own distinct supply portfolio, operating principals, and customer characteristics. As such, there may be instances when a retail agency is not experiencing the same drought or water shortage impacts and will choose to take a modified course of action.

When the time comes and a regional drought is declared, a Drought Response Taskforce will be assembled with representatives from each agency. This group will review the recommended response actions for that particular drought stage, modify according to the "real life" conditions, set a budget, and finalize the drought response course of action.

Additional Benefits of the Plan

The USBR grant has allowed IEUA and the member agencies to create a plan that will deliver an increased level of proactivity and preparedness in advance of future water shortages. It integrates multiple local drought planning initiatives, tools and resources under one umbrella. At the same time, it increases the speed that drought response actions can be rolled out by providing a more detailed guide.

The plan provides a medium to document and attest to the completeness of drought planning activities. In addition, the plan meets federal and states "checklists" for drought and water shortage contingency planning. The DCP not only meets the requirements for USBR grants, but also directly aligns with the State of California's requirements for a Water Shortage Contingency Plan (WSCP).

In other words, the retail agencies are each required to create a WSCP as part of their Urban Water Management Plans. Should the agencies choose to create, instead, a Regional WSCP, the Drought Contingency Plan provides nearly all of the component requirements of the Regional WSCP.

Table 1 below lists and compares the contents of the DCP with the requirements of the WSCP:

Table 1 . DCP Components Compared to Water Shortage Contingency Plan Requirements

Contents	DCP	WSCP
Analysis of water supply reliability	✓	✓
Written decision making process to determine water supply reliability	✓	✓
Key data inputs and assessment methodology used to evaluate the water supply reliability	✓	✓
Unconstrained demand, considering weather, growth, and other influencing factors	✓	✓
Available supply, considering hydrological and regulatory conditions in the current year and one dry year	✓	✓
Existing infrastructure capabilities and plausible constraints	✓	✓
Evaluation criteria water supply and demand assessment	✓	✓
Description and quantification of each source of water supply	✓	✓
Six standard water shortage levels corresponding to progressive ranges of up to 10, 20, 30, 40, and 50 percent shortages and greater than 50 percent shortage	✓	✓
Water shortage response actions that align with the defined shortage level	✓	✓
Mandatory prohibitions against specific water use practices	✓	✓
Communication protocols and procedures	✓	✓
Description of the financial consequences of, and responses for, drought conditions	--	✓
Mitigation actions needed to address revenue reductions and expense increases	--	✓
Monitoring and reporting requirements and procedures	✓	✓
Monitoring and evaluating the functionality of the water shortage contingency plan to ensure mitigation strategies are implemented as needed	✓	✓

2 Background

2.1 IEUA Service Area

Formed in 1950, Inland Empire Utilities Agency was originally created with a mission to supply supplemental imported water purchased from the Metropolitan Water District of Southern California (MWD) to municipalities in the Chino Groundwater Basin.

Since then, IEUA has expanded its mission and, today is focused on providing the following key areas of service:

- Securing and supplying imported water.
- Collecting and treating wastewater.
- Producing high-quality renewable products such as recycled water, compost, and energy.
- Promoting sustainable use of groundwater and development of local water supplies.

The area is relatively flat alluvial valley from east to west and slopes from north to south at a one to two percent grade. Valley elevation ranges from about 2,000 feet above sea level in the foothills below the San Gabriel Mountains to about 500 feet near Prado Dam.

The IEUA service area almost entirely overlies the Chino Groundwater Basin and covers approximately 242 square miles in western San Bernardino County (see Figure 1).

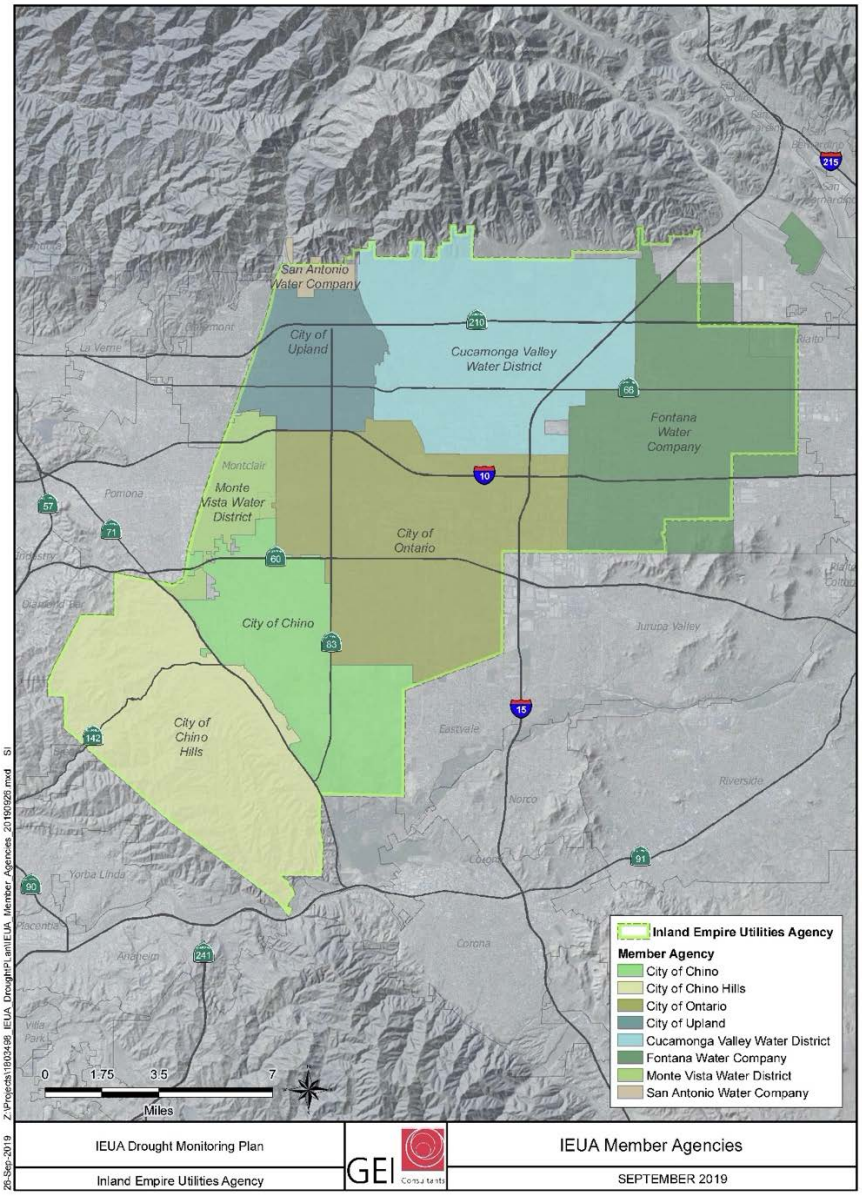


Figure 1. IEUA Service Boundary Map

2.2 CLIMATE

IEUA is located within the South Coast Air Basin (SCAB) that encompasses all of Orange County and the urban areas of Los Angeles, San Bernardino, and Riverside counties. The SCAB climate is characterized as "Mediterranean" with a semi-arid environment and mild winters, warm summers, and moderate rainfall. A summary of the annual precipitation is provided in Figure 2.

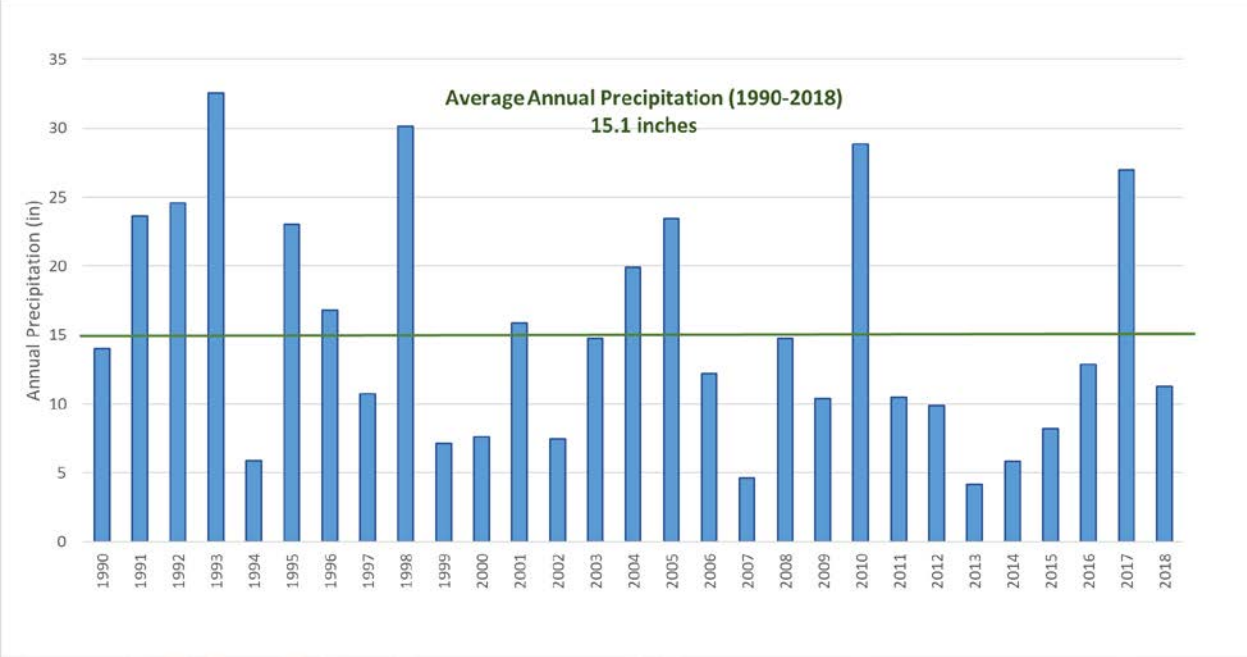


Figure 2. Historical Annual Regional Rainfall (Pomona CIMIS Station #78)

2.3 Regional Water Demand Forecasts

Within the IEUA service area, water demand since 1995 has increased by approximately 20 percent, despite a regional growth of 30 percent. This is indicative of new water use behaviors, including increasing efficiency in outdoor irrigation and indoor fixtures. This improved efficiency prolongs the availability of current regional water supplies into the future.

More recently, census data for 2014 to 2017 shows that annual population growth rates have been slightly less than one percent per year. Table 2 provides the regional municipal and industrial (M&I) water demand forecasts for 2020 and 2040 as reported in the IEUA 2015 Integrated Water Resources Plan (IRP). The IRP demand forecasts were developed based on the member agencies' Urban Water Management Plans (UWMPs). Three ranges of growth were reported based on varying assumptions related to future developments, housing density, and water practices.

Table 2. M&I Regional Demand Forecast (from 2015 IRP)

Total Regional Demand Forecast (AC-FT)	2020	2040
High Demand Forecast[1]	230,000	267,000
Medium Demand Forecast[2]	220,000	238,000
Low Demand Forecast[3]	212,000	217,400

1. *Traditional development and current usage patterns (55 GPCD indoor water use).*

2. *Higher density development based on the Southern California Association of Governments (SCAG) Regional Transportation Plan (RTP) average housing density. Existing outdoor use is limited to 70% of reference evapotranspiration (ETo). Future outdoor use is limited to 60% ETo, and indoor water use is reduced from 55 GPCD in 2015 to 35 GPCD by 2040 for new development.*
3. *High density development based on the SCAG RTP high housing density. Existing outdoor use is limited to 70% of reference ETo and future outdoor use is limited to 60% ETo. Indoor water use is reduced from 55 GPCD in 2015 to 35 GPCD by 2040 for new development.*

2.4 Planning Steps

The Drought Contingency Plan was developed following the USBR "*Guidance Regarding the Drought Contingency Planning Process"* as a framework. Below are the steps undertaken to develop the plan, resources utilized, and the associated deliverables.

Table 3. Planning Steps

Approach/Steps	Resources Utilized	Deliverable
Step 1		
Reviewed regional and local master planning documents and determined goals and factors impacting the DCP.	▪ 2009 IEUA Drought Response Plan ▪ 2015 IEUA Integrated Water Resources Plan ▪ 2015 IEUA Water Use Efficiency Business Plan update ▪ 2015 Urban Water Management Plans – local and regional ▪ Recharge Master Plan Update ▪ MWD Water Surplus & Drought Management Plan ▪ MWD Water Savings Allocation Plan ▪ Existing IRP modeling data	Drought Goals documented
Step 2		
Created a framework for predicting and confirming future droughts by establishing data metrics used to indicate drought conditions in the region.	▪ Input and collaboration from the *DCP Taskforce* meetings	Drought Monitoring Technical Memo
Step 3		
Evaluated the risks and impact of current and future drought in the IEUA service area. Assessed the region's vulnerabilities in terms of water supply reliability for each water supply type and effects by climate change, growth and other reliability factors.	▪ 2015 IEUA Integrated Water Resources Plan ▪ Chino Basin Regional Water Supply Infrastructure Model results	Vulnerability Assessment Technical Memo

Approach/Steps	Resources Utilized	Deliverable
Step 4		
Developed mitigation actions	▪ Chino Basin Water Master's Optimum Basin Management Program (2000) ▪ Chino Basin Organics Management Strategy (2001) ▪ Recycled Water System Feasibility Study (2002) ▪ Wastewater Facilities Master Plan (2002) ▪ 2015 IEUA Integrate Resource Plan	Mitigation Actions Technical Memo
Step 5		
Developed strategies and response actions for each stage of drought condition.	▪ Consensus outputs from *Response Actions Taskforce* meetings ▪ 2015 IEUA WUE Business Plan ▪ 2015 – 2018 WUE Program Activity and Final Reports ▪ 2011 – 2017 Customer Water Use	Drought Response Action Plan (Communications & Outreach Plan)
Step 6		
Developed and documented the roles, responsibilities and procedures for ongoing monitoring, vulnerability assessment, mitigation and response actions.	▪ Feedback and outcomes from taskforce meetings	Operational & Administrative Framework
Step 7		
Produced comprehensive Drought Contingency Plan.	▪ Drought Monitoring Technical Memo ▪ Vulnerability Assessment Technical Memo ▪ Mitigation Actions Technical Memo ▪ Drought Response Action Plan (Communications & Outreach Plan)	Drought Contingency Plan

The DCP was developed in coordination with IEUA's eight retail member agencies. IEUA invited representatives from each member agency's management, planning and conservation groups as well as other stakeholders including representatives from Chino Basin Watermaster, Water Facilities Authority and the Chino Basin Water Conservation District.

There were five workshops held over a two-year period, starting in September 2017 and concluding in September 2019. The Drought Contingency Taskforce members were given the opportunity to review and comment on technical memorandums for each plan component and the draft DCP, as well as to guide the development of the plan.

Below is the list of DCP Taskforce participants and their respective organizations:

IEUA	
Joshua Aguilar	*Elizabeth Hurst*
Andrea Carruthers	*Lisa Morgan-Perales*
Pietro Cambiaso	*Kenneth Tam*
Shivaji Deshmukh	
Sylvie Lee	

Retail Member Agencies	
May Atencio CITY OF FONTANA	*Courtney Jones* CITY OF ONTARIO
Joslyn Blakely CITY OF CHINO	*Mark Kinsey* MONTE VISTA WATER DISTRICT
Amy Bonczewski ONTARIO MUNICIPAL UTILITIES COMPANY	*Praseetha Krishnan* CUCAMONGA VALLEY WATER DISTRICT
John Bosler CUCAMONGA VALLEY WATER DISTRICT	*Teri Layton* SAN ANTONIO WATER COMPANY
Scott Burton ONTARIO MUNICIPAL UTILITIES COMPANY	*Brian Lee* SAN ANTONIO WATER COMPANY
Noel Castillo CITY OF MONTCLAIR	Michelle Licea MONTE VISTA WATER DISTRICT
Amanda Coker CITY OF CHINO	*Gisela Lopez* MONTE VISTA WATER DISTRICT
David Crosley CITY OF CHINO	*Jake Loukeh* CITY OF CHINO HILLS
Ron Craig CITY OF CHINO HILLS/RBF	*Michelle Madriz* CITY OF UPLAND
Gabriela De La Cruz MONTE VISTA WATER DISTRICT	*Dennis Mejia* ONTARIO MUNICIPAL UTILITIES COMPANY
Nicole deMoet CITY OF UPLAND	*Erin Morales* CUCAMONGA VALLEY WATER DISTRICT
Chris Diggs CITY OF POMONA	*Harrison Nguyen* CITY OF UPLAND
Kelley Donaldson MONTE VISTA WATER DISTRICT	*Jerry Perez* CITY OF FONTANA
Eduardo Espinosa CUCAMONGA VALLEY WATER DISTRICT	*Darron Poulsen* CITY OF POMONA

Retail Member Agencies (con't)

Cris Fealy
FONTANA WATER COMPANY

Raul Garibay
CITY OF POMONA

Katie Gienger
ONTARIO MUNICIPAL UTILITIES COMPANY

Eric Grubb
CUCAMONGA VALLEY WATER DISTRICT

Chris Hamilton
FONTANA WATER COMPANY

Chuck Hays
CITY OF FONTANA

Rob Hills
CUCAMONGA VALLEY WATER DISTRICT

Rosemary Hoerning
CITY OF UPLAND

Van Jew
MONTE VISTA WATER DISTRICT

John Robles
CITY OF UPLAND

Justin Scott-Coe
MONTE VISTA WATER DISTRICT

Patrick Soto
FONTANA WATER COMPANY

Josh Swift
FONTANA WATER COMPANY

Kevin Watson
CITY OF UPLAND

Mark Wiley
CITY OF CHINO HILLS

Braden Yu
CUCAMONGA VALLEY WATER DISTRICT

Seth Zielke
FONTANA WATER COMPANY

Other Regional Stakeholders

Chris Berch
JURUPA COMMUNITY SERVICES DISTRICT

Vivian Castro
CHINO BASIN WATER CONSERVATION DISTRICT

Terry Catlin
WATER FACILITIES AUTHORITY

Leslie Cleveland
UNITED STATE BUREAU OF RECLAMATION

Lindsay Kaufman
JURUPA COMMUNITY SERVICES DISTRICT

Peter Kavounas
CHINO BASIN WATERMASTER

Scott Kleinrock
CHINO BASIN WATER CONSERVATION DISTRICT

Matthew Litchfield
THREE VALLEYS MWD

Nadia Loukeh
WEST VALLEY WATER DISTRICT

Todd Minten
CHINO BASIN DESALTER AUTHORITY

Tom O'Neill
CHINO BASIN DESALTER AUTHORITY

Jason Pivovaroff
WESTERN MWD

Ben Peralta
THREE VALLEYS MWD

Steven Popelar
JURUPA COMMUNITY SERVICES DISTRICT

Ryan Shaw
WESTERN MWD

Jake Stepp
WATER FACILITIES AUTHORITY

Elizabeth Skrzat
CHINO BASIN WATER CONSERVATION DISTRICT

Edgar Tellez Foster
CHINO BASIN WATERMASTER

Kristen Weger
CHINO BASIN WATER CONSERVATION DISTRICT

Consultants	
Samantha Adams WILDERMUTH ENVIRONMENTAL INC.	*Roger Putty* GEI CONSULTANTS
Mark Cowin GEI CONSULTANTS	*Carolina Sanchez* WILDERMUTH ENVIRONMENTAL INC.
Ashlee Casey GEI CONSULTANTS	*Abhishek Singh* INTERA
Maureen Erbeznik MAUREEN ERBEZNIK & ASSOC.	*Mark Wildermuth* WILDERMUTH ENVIRONMENTAL INC.

The first workshop on December 11, 2017, served as an initial kick-off meeting to review the purpose and scope of the DCP, as well as to establish the participants for future workshop. The subsequent four workshops were held to review the results for each component of the plan.

The dates and topics discussed for each of the workshops are shown in Figure 3. Also shown in Figure 3 are the interim draft materials that were shared for review and comment by the taskforce, including the:

- Annotated DCP outline
- Drought Monitoring Technical Memorandum
- Vulnerability Assessment Technical Memorandum
- Mitigation Actions Technical Memorandum

In addition, one-on-one meetings were held between IEUA and member agencies as needed in order to provide an added forum for discussion and clarification.

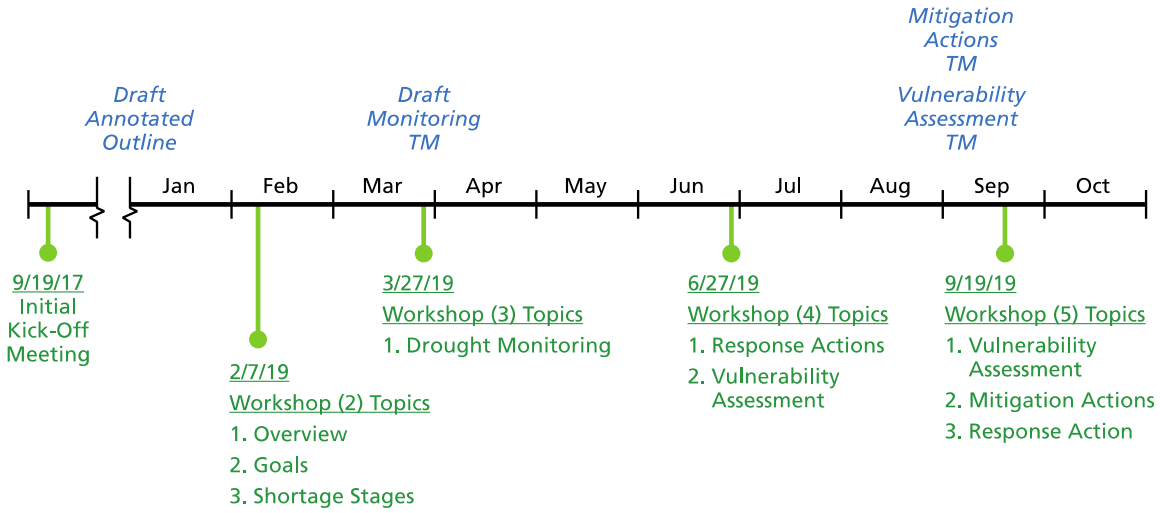


Figure 3. DCP Technical Taskforce Workshop Schedule

During this same time period, a Response Actions Taskforce was operating with the mission to create the Response Action (Communication & Outreach) Plan. The response action taskforce was comprised of retail member agency conservation staff and IEUA.

Below are the IEUA and Retail Agency participants:

Response Actions Taskforce Participants	
Lisa Morgan-Perales INLAND EMPIRE UTILITIES AGENCY	*Michelle Madriz* CITY OF UPLAND
Joslyn Blakely CITY OF CHINO	*Erin Morales* CUCAMONGA VALLEY WATER DISTRICT
Amy Bonczewski ONTARIO MUNICIPAL UTILITIES COMPANY	*Aaron Ramirez* INLAND EMPIRE UTILITIES AGENCY
Chris Garcia INLAND EMPIRE UTILITIES AGENCY	*Elizabeth Skrzat* CHINO BASIN WATER CONSERVATION DISTRICT
Gisela Lopez MONTE VISTA WATER DISTRICT	*Patrick Soto* FONTANA WATER COMPANY
Scott Kleinrock CHINO BASIN WATER CONSERVATION DISTRICT	*Kristen Weger* CHINO BASIN WATER CONSERVATION DISTRICT
Jake Loukeh CITY OF CHINO HILLS	

Over the course of the four workshops, the group ranked and selected programs best suited for drought response, identified a strategy for restrictions & enforcement, and aligned these response actions with drought stages.

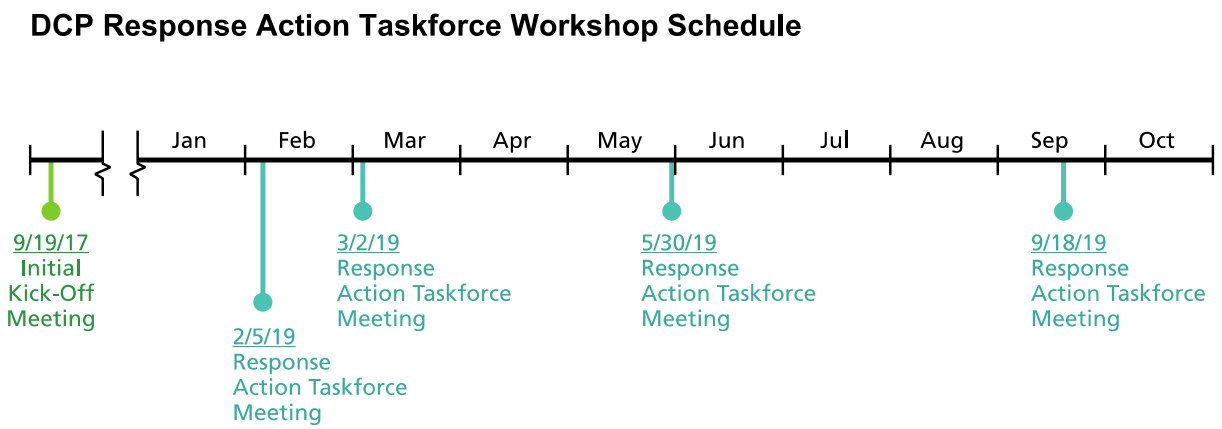


Figure 4: DCP Response Action Taskforce Workshop Schedule

3 Drought Monitoring

The **Drought Monitoring Framework** provides the tools to determine the existence and severity of a drought or water shortage.

This framework will rely largely on the knowledge and expertise of IEUA's member agencies for interpretation of real time conditions and prediction of future supply. IEUA's role is to act as the facilitator to, track potential water shortages through MWD, gather supply data from retail member agencies, consolidate the data and calculate the supply-demand index. It's important to note that the supply types and portfolios within the IEUA service area are extremely diverse, and the availability of supply types can depend on many factors.

There are four primary components to the drought monitoring framework:

1. **Indicator Data Collection and Distribution**- Key imported water availability indicators will be compiled and provided to the member agencies annually.

2. **Member Agency Reporting**- Based on the provided indicator data and their own monitoring activities, the member agencies will provide their annual forecast for available local supplies and demands.

3. **Regional Supply-Demand Index Calculation**- The agency projections will be combined to formulate a regional supply-demand ratio (or index).

4. **Shortage Classification**- The regional index will be used to classify the level of water shortage (if any).

Simply stated, the assessment looks at current and future projected water supplies as compared to current and projected water demand. Should there be a downward shift in available water supplies or an increase in customer demand, IEUA and its member agencies will determine the severity of the change, the categorized stage level, and the determine the required response.

This Drought Monitoring section:

- Provides background and operational information on the IEUA service area supply types and their conditions.
- Summarizes and describe the data to be used for monitoring each of the water supplies (also called indicators).
- Describes the member agency reporting process for the drought monitoring framework.
- Defines the water shortage stages to be implemented within the drought monitoring framework and associated regional supply-demand index calculation.

3.1 Drought Indicators

Given the diversity in the supply types and portfolios within the IEUA service area, the data available to inform water supply availability and conditions are abundant and often interconnected. The supply types reviewed here include Chino Basin groundwater, non-Chino Basin groundwater, imported water, and local surface water.

3.1.1 Groundwater

Chino Basin Groundwater

The Chino Basin is an adjudicated groundwater basin and is one of the largest groundwater basins in Southern California. San Bernardino County Superior Court created the Chino Basin Watermaster (CBWM) in 1978 as a solution to lawsuits over water rights. The CBWM is responsible for management of the Chino Basin in accordance with the Judgement, 2000 Peace Agreement, 2007 Peace II Agreement, and the Chino Basin Optimum Basin Management Program (OBMP).

Water rights in the Chino Basin are held by representatives of three stakeholder groups, called Pools. The three Pools are:

- Overlying Agricultural Pool: representing dairymen, farmers, and the State of California
- Overlying Non-agricultural Pool: representing area industries
- Appropriative Pool: representing local cities, public water districts, and private water companies

The court judgment allocates groundwater rights by establishing an annual pumping "safe yield" for each Pool. The Operating Safe Yield (OSY) is the annual amount of groundwater that can be pumped from the basin by the Pool parties, free of replenishment obligations. Annual groundwater production in excess of the OSY is allowed by the adjudication, provided that the pumped water is replaced and recharged back into the groundwater basin. In addition, stakeholders within the different Pools can reach agreements to exchange groundwater rights for other water sources. For example, there have been agreements between dairymen in the agricultural pool and purveyors in the appropriative pool to exchange recycled water for groundwater rights. The OSY and the average total groundwater production since 1978 for each Pool is summarized in Table 4.

Table 4. Chino Basin Groundwater Operational Safe Yield and Historical Production

Stakeholder Pool	Operational Safe Yield[1] (AF)	Average Groundwater Production[2] 1977-2017 (AF)
Agricultural	82,800	42,248
Non-agricultural	7,366	3,984
Appropriative	54,834	97,215
Total	145,000	143,447

[1] Values represent the OSY from 1978 to June 2018. The appropriative rights toward the safe yield were reduced by 5,000 AF to 49,834 AF in June 2018.
[2]Based on the 41st Annual Chino Basin Report (Fiscal Year 2017-18) (http://www.cbwm.org/rep_annual.htm**)**

The quantity of groundwater stored in the Chino Basin has been carefully managed by the CBWM. Currently, there are numerous efforts to increase the amount of groundwater recharge. There are 19 active spreading basins that are operated to capture stormwater, recycled water, and/or imported water for recharge into the Chino Basin. The safe storage for the groundwater basin was previously defined as 500,000 acre-feet (AF), and there are investigations underway regarding the feasibility of increasing that storage to as much as 1,000,000 AF.

The water quality in the southern portion of the Chino Basin has been impacted by historical agricultural uses and now has high levels of nitrate and total dissolved solids (TDS) in certain areas. There are also some areas that exceed standards for perchlorate and volatile organic chemicals (VOCs). Most recently, there have been growing concerns around the occurrence of perfluorinated chemicals (PFOS and PFOA) and there are efforts to understand their occurrence in the regional water supply as they may become subject to regulatory limits.

Lower quality groundwater requires additional treatment, and/or blending with higher quality imported water. The CBWM works in partnership with local municipalities, IEUA, and the Santa Ana Regional Water Quality Control Board to address these water quality issues. In addition, IEUA is part of a Joint Powers Agency, the Chino Basin Desalter Authority (CDA), which was formed to manage the production, treatment, and distribution of treated potable water. Treatment occurs at two plants – Chino I and II Desalters – to remove salts and volatile organic chemicals through reverse osmosis, ion-exchange, and air stripping. A detailed summary of the general conditions of the Chino Basin can be found in the 2016 State of the Basin Report on the CBWM website. The 2016 State of the Basin is an atlas-style report with maps and figures displaying the conditions and trends within the basin.

Because of these conditions, the availability of Chino Basin groundwater is largely driven by quality as opposed to quantity. For example, for the period of 2009 to 2018, Chino Basin groundwater comprised roughly 15 percent of the total water supply for the Chino Hills service area (not including the water received from the CDA, which comprised 26 percent of the annual supplies for the same time period). However, in 2018, quality concerns in their area required that all groundwater wells within the service

area be taken offline for an extended duration and alternative water supplies be utilized. The resiliency of the regional supply portfolio and the interconnections between the member agencies facilitated access to alternative water supplies.

The availability of real-time groundwater quality data within the Chino Basin varies significantly depending on location, well type, and constituent of interest, complicating the selection of groundwater availability indicators for the IEUA drought monitoring framework. However, due to the active management and monitoring of the basin by the CBWM, along with each of the IEUA member agencies and other stakeholders, the conditions and availability of the groundwater are generally known by the stakeholders. The drought monitoring framework will rely on the collective expertise of the IEUA member agencies and their water managers to define groundwater availability conditions and inform the regional drought monitoring framework.

Non-Chino Basin Groundwater

There are four agencies within the IEUA service area that utilize groundwater from basins adjacent to the Chino Basin as a water supply source: Upland, Cucamonga Valley Water District (CVWD), Fontana Water Company (FWC), and San Antonio Water Company (SAWCo). The additional basins include Cucamonga, Rialto, Lytle Creek, Colton, and the Six Basins groundwater basins. The Six Basins are comprised of the Ganesha, Live Oak, Pomona, Lower Claremont Heights, Upper Claremont Heights and Canyon Basin. These basins combined provided approximately 13 percent of the regional water supply portfolio between 2009 and 2018.

The trends and conditions in other groundwater basins are unique and the supply availability has specific implications for each member agency. The drought monitoring framework will allow the member agencies relying on non-Chino Basin groundwater to provide their insights into the conditions of each of the groundwater basins. The member agencies' individual insights will serve as the key indicators for non-Chino Basin groundwater.

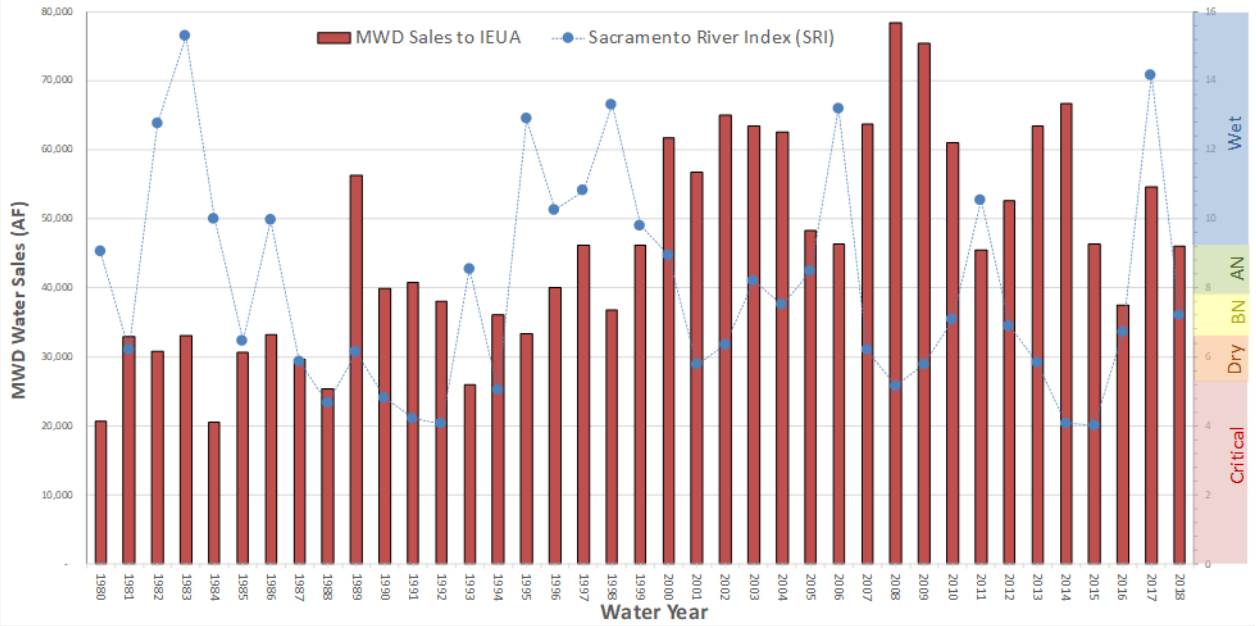
3.1.2 Imported Water

IEUA began importing supplemental surface water to the Chino Basin from MWD in 1951. While MWD also imports water from the Colorado River, the State Water Project (SWP) is the primary source of imported water supplies delivered to IEUA. The SWP originates along the Feather River (a tributary to the Sacramento River), hundreds of miles north of IEUA, and includes facilities to pump and convey water from the Sacramento-San Joaquin River Delta (Delta) to Southern California as well as to the San Francisco Bay Area, the San Joaquin Valley, and the Central Coast. From 2009 to 2018, imported water supplies delivered by MWD have accounted for roughly 25 percent of the water supplies in the IEUA service area.

There are numerous conditions that contribute to the relative availability of the imported water supplies, including current hydrologic conditions along the Feather and Sacramento Rivers and in the Delta, the regulatory restrictions on Delta exports, the amount of water remaining in SWP storage

facilities from previous years, the conditions of the conveyance infrastructure south of the Delta, the water management strategies of MWD, and numerous other operational and legal constraints. While some of these constraints can be difficult to quantify or consolidate, there are several metrics available to quantify the hydrologic conditions of the Feather and Sacramento Rivers that may be useful in predicting the availability of imported supplies.

The Sacramento River Index (SRI) published by DWR provides a quantification of Delta inflows from the Sacramento River by estimating the sum of runoff for the four major rivers within the river basin (Sacramento, Feather, Yuba, and American Rivers). The SRI is reflective of the overall water year and classifies each year as wet, above normal, below normal, dry, or critical. The historical relationship between imported water availability in the IEUA service area and the hydrologic conditions in the Sacramento River basin was examined by comparing the SRI to historical MWD deliveries to IEUA (see Figure 5). This comparison indicates that hydrologic conditions in the Sacramento River basin are not directly correlated with imported water deliveries in that year.



Note: A data request was fulfilled by MWD for all water sales to IEUA from water years 1980 to 2018. Categories include: Agricultural, Full Service, Interruptible Programs, Local Projects, and Storage Programs. Of these categories, Full Service and Interruptible Programs were summed to determine MWD deliveries that meet municipal demand. Agency Sales Report data for 29 water years (1980 to 2018).

Figure 5. MWD Water Sales to IEUA with the Sacramento River Index (SRI)

Since water year 2000, the largest and second largest MWD sales occurred in critical and dry years, respectively. Deliveries for water years classified as wet or above normal typically coincide with relatively average deliveries. This indirect relationship between hydrologic conditions and water deliveries is indicative of MWD and IEUA's long-term water management strategies, including use of carryover storage from year to year and real-time portfolio management to optimize use of available sources of water to meet water demands in any given year.

MWD actively monitors and manages the water supplies it imports to the region to assess availability and predict shortages. In response to critically dry conditions in the early 2000s and federal court rulings to protect the Delta Smelt in 2007 (which tightened regulations on Delta exports), MWD developed the Water Supply Allocation Plan (WSAP) to help manage uncertainty in the SWP's future water availability. The WSAP includes the specific formulas for determining member agency supply allocations in a fair and reasonable way and the key implementation elements needed to administer an allocation should a shortage be declared. The framework of the WSAP includes an allocation year that spans from July to June, with a declaration in April.

The key dates for the WSAP monitoring and declaration process are as follows:

January to March: Water Surplus and Drought Management reporting process provides updated information on storage reserve levels, projected supply, and demand conditions to the MWD Water Planning and Stewardship Committee meetings.

April: Member agencies report their projected local supplies for the coming allocation year (July to June) to update projected supplies. Staff analysis of storage reserves and projected supply and demand conditions provide an allocation recommendation to the MWD Board of Directors. This allocation is effective starting July 1 and held through the following June 30.

A 10-level Shortage Allocation Index determines the Wholesale Minimum Allocation and the Maximum Retail Impact Adjustment. Wholesale Minimum Allocation is defined as the minimum amount of MWD-supplied wholesale water service provided to each member agency. The Maximum Retail Impact Adjustment ensures that agencies with a high level of dependence on MWD do not encounter unequal retail shortages when experiencing a reduction in wholesale supplies.

In addition to the Wholesale Minimum Allocation and Retail Impact Adjustment, a Conservation Demand Hardening Credit and Minimum Per-Capita Water Use Credit are considered to determine the total WSAP Allocation. The allocation to an agency for its municipal and industrial retail demand is the sum of these four calculations, which are described in detail in the Appendix of the WSAP.

July to June: Member agencies are requested to submit their local production on a monthly basis and certify end of allocation year local supply use. Local production data must be reported to MWD by the end of the month following the month of use (i.e., use in July must be reported by the end of August). This information is combined with MWD sales information to track retail water use throughout MWD's service area. Each month MWD reports on member agency water sales compared to their allocation amounts.

June 30: Allocation year is complete.

August: MWD calculates potable water use based on supply certifications and actual sales data for the previous allocation year (July to June). Allocation surcharges are assessed for usage above a given member agency's final adjusted allocation.

Given the complexity of the various factors influencing the availability of imported water, the drought monitoring framework will rely on the monitoring efforts and allocation procedures of MWD to inform the availability of the imported supplies.

3.1.3 Local Surface Water

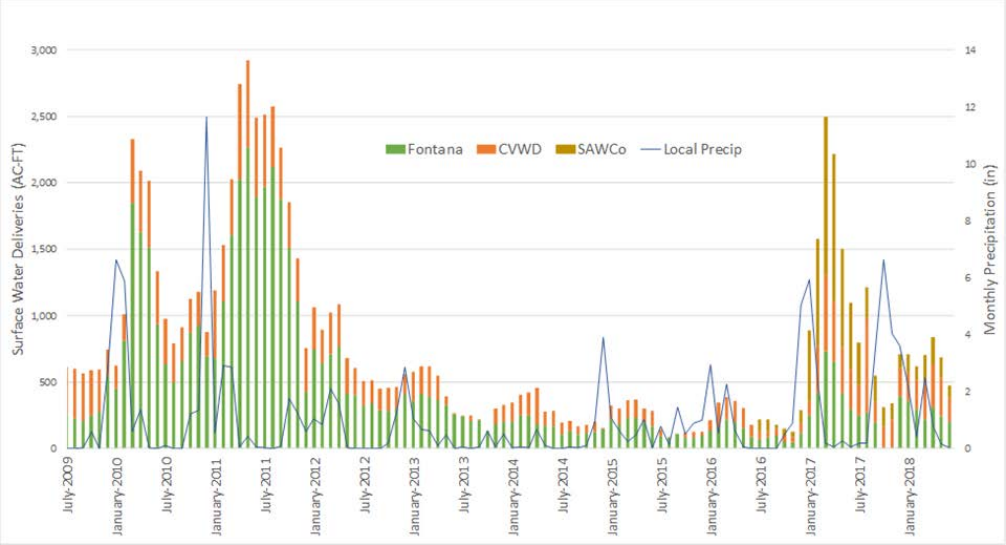
Three IEUA member agencies utilize local surface water supplies to meet demand, CVWD, Fontana Water Company, and SAWCo.

CVWD local surface water supplies come from streams, springs, and tunnels within canyons located in the northern area of the CVWD boundary. CVWD has rights to six sources of canyon water, three of which are currently utilized (Cucamonga Canyon, Day/East Canyon, and Deer Canyon). Based on historical data, CVWD estimates a reasonable available volume of 4,540 acre-feet per year (AFY) from local surface water supplies.

Fontana Water Company receives local surface water supplies from Lytle Creek, which is then treated at the Sandhill Plant. Lytle Creek supplies from 2011 to 2015 averaged 6,250 AFY. The Lytle Creek sum is augmented with water obtained from the Grapeland Tunnel. The Grapeland Tunnel has extensive collector lines in the Lytle Creek Canyon tributaries and a large line running below the streambed of Lytle Creek.

SAWCo has rights to surface flow from San Antonio Creek that are pre-1914 rights and over the years have been supported by Court Judgments per a confidential report entitled "Opinion Re Water Rights of San Antonio Water Company," dated June 1993. In 2011, a wet year, SAWCo diverted 8,800 AF from San Antonio Creek. The average diversion from 2012 to 2015 was 1,963 AFY.

Figure 6 compares the monthly local surface water deliveries for Fontana Water Company, CVWD, and SAWCo with monthly precipitation from a nearby weather station (CIMIS Station #78, Pomona). Local surface water supplies for each of these member agencies are highly reliant on local precipitation, and months of high local precipitation typically correspond with a greater volume of local surface water supply for the months to follow. Local precipitation provides a helpful predictor for local surface water availability and is a valuable indicator for the drought monitoring framework.



Note: Local precipitation was collected from CIMIS station in Pomona (#78). A Chino CIMIS station (#255) was added in March 2018 and could be used for future applications.

Figure 6. Historical Local Surface Water Supplies and Local Precipitation

3.2 Drought Monitoring

The supply types and portfolios within the IEUA service area are extremely diverse, and the relative availability of supply types can depend on many factors. The IEUA drought monitoring framework will rely largely on the knowledge and expertise of IEUA's member agencies to interpret real-time conditions and predict and define regional water shortages due to the disparate nature of the indicators of drought conditions throughout the region. There are four key cornerstones of the IEUA drought monitoring framework as described below and shown in Figure 7.

- **Indicator Data Collection and Distribution.** Key imported water availability indicators will be compiled and provided to the member agencies annually.
- **Member Agency Reporting**. Based on the provided indicator data and their own monitoring activities, participating member agencies will provide their annual projections for supplies and demands within their service area once a year.
- **Regional Supply-Demand Index Calculation**. The agency projections will be combined to formulate a regional supply-demand ratio (or index).
- **Shortage Classification.** The regional index will be used to classify the level of water shortage (if any).

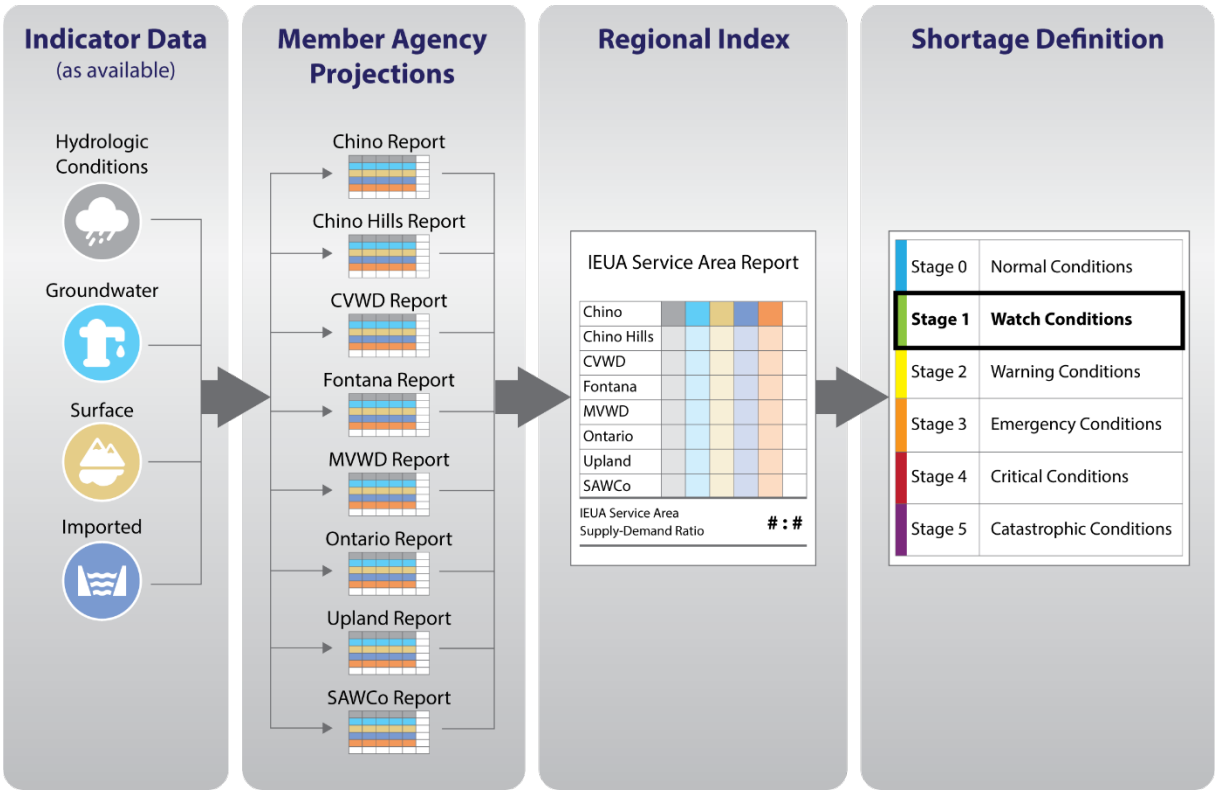


Figure 7. IEUA Regional Drought Monitoring Framework

3.2.1 Reporting Framework

The drought monitoring reporting will occur on an annual basis and will be a two-step process. First, key water supply indicators for imported water will be compiled into a standardized report and distributed to the water managers from each member agency. This will include projected deliveries of imported water from MWD in addition to any potential forecasts for shortages. IEUA will also provide estimated demand projections to the participating member agencies, as a reference or guide, based on a five-year historical average.

Second, each retail member agency will report their projected local supplies and demand for the coming year. Figure 8 below is the information obtained from each member agency that will be utilized to generate the supply-demand ratio.

Annual Supply Projections					
Agency	Local Groundwater	Surface Water	Imported Water	Annual Demand	Supply Shortage
Chino					
Chino Hills					
Fontana Water Company					
Ontario					
Upland					
Cucamonga valley Water District					
Monte Vista Water District					
San Antonio Water Company					

Figure 8. Sample Reporting Framework

This reporting time frame and structure was selected because it piggy-backs the annual reporting time frame conducted by IEUA, the retail member agencies and MWD.

As well, there is an additional review process. IEUA has an established monthly forum to provide and receive updates from the member agencies on water supply conditions. IEUA hosts member agency Water Manager meetings each month, where the managers review supply conditions, demand shifts and regulatory changes that may impact supply. If local circumstances or external drivers significantly shift, IEUA will request updated local supply data from respective member agencies. As with the annual reporting, this information will be used to determine if there is a regional water shortage due to these factors.

3.2.2 Supply and Demand Ratios

The supply and demand ratios for each year will be calculated based on the projections provided by the water managers. The data will be compiled into a singular supply-demand ratio for the IEUA service area. The regional supply-demand ratio will serve as the trigger to inform the regional water shortage.

Figure 9, on the following page, provides an example compilation of member agency projections and the calculation of the regional supply-demand ratio. There will be considerations for expected shortages for individual member agencies that may not be reflected in the regional ratio.

Between reporting periods, the participating member agencies will continue their individual monitoring activities. Each of the member agencies have developed their own approach to monitoring their supplies and have established unique definitions and responses for localized shortage conditions. *Appendix B:*

Summary of Member Agency Water Shortage Stages provides an overview of each agencies' shortage definitions and responses.

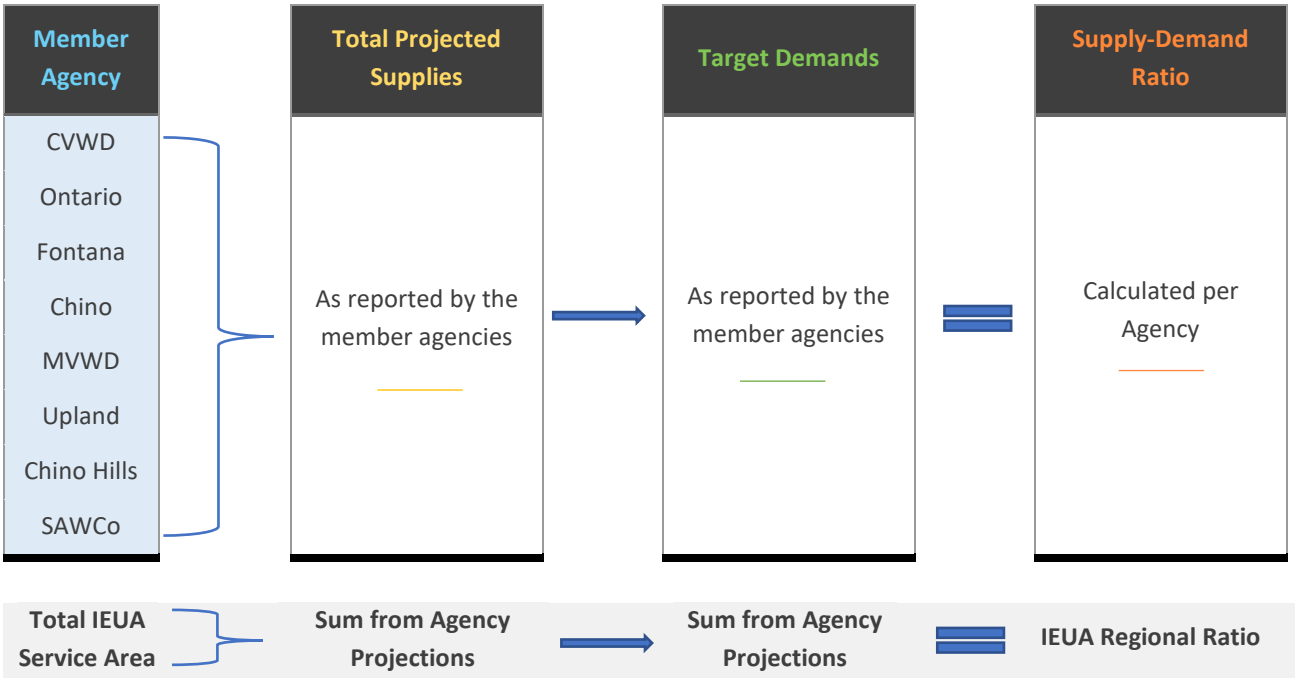


Figure 9. Annual Regional Supply and Demand Projects for IEUA Service Area

3.2.3 Water Shortage Stages

Stages will be defined based on the calculated supply-demand ratios for the IEUA service area. The water shortage stages and descriptions are shown in Table 5.

These stages will be used to help the Drought Response Taskforce identify the most appropriate regional responses for the anticipated shortages.

The stages are in compliance with the newly passed state legislation (SB 606 and AB 1668), which now requires drought plans to be standardized and include six stages of drought severity. These stages were developed in consultation with each of the member agency's own definitions for local drought or water shortage levels and can be viewed in *Appendix B: Summary of Member Agency Water Shortage Stages.*

It is important to understand that the stage is calculated and declared for the overall region, and at the time, a local retail agency may have a water supply level that varies from the regional stage due to the uniqueness of their water supply mix. When this occurs, the local agency may develop customer messaging that clarifies that their agency is not directly impacted to the same level as the region.

Water shortage stages and triggers for IEUA region are below:

Table 5. IEUA Regional Water Shortage Stages

Drought Stage:	Stage Descriptions:	Triggers:
Stage 0	Normal Conditions	No water shortages anticipated.
Stage 1	Watch Conditions	IEUA regional ratio is predicting shortages between 1% and 5%.
Stage 2	Warning Conditions	IEUA regional ratio is predicting shortages between 6% and 15%.
Stage 3	Emergency Conditions	IEUA regional ratio is predicting shortages between 16% and 25%.
Stage 4	Critical Conditions	IEUA regional ratio is predicting shortages between 26% and 50%.
Stage 5	Catastrophic Conditions	IEUA regional ratio is predicting shortages greater than 50%.

4 Vulnerability Assessment

In the western part of the United States, climate change is predicted to cause increased temperatures, less mountain snowpack, more severe and frequent droughts, changes in runoff patterns and overall negative impacts on regional water supplies.

Climate related factors may make it more challenging for water planners to manage demand needs. Add population growth into the mix and the picture becomes even more complicated.

A **vulnerability assessment** predictively identifies, quantifies, and prioritizes the potential susceptibilities of a region's complex and dynamic water supply sources. The assessment takes into consideration climate conditions, as well as other factors such as environmental and political policy, and population growth.

The desired outcome of the vulnerability assessment is to improve understanding of 1) the potential for, and 2) the characteristics of, future drought conditions.

This section is organized into four parts.

First, the regional water resources are reviewed and described.

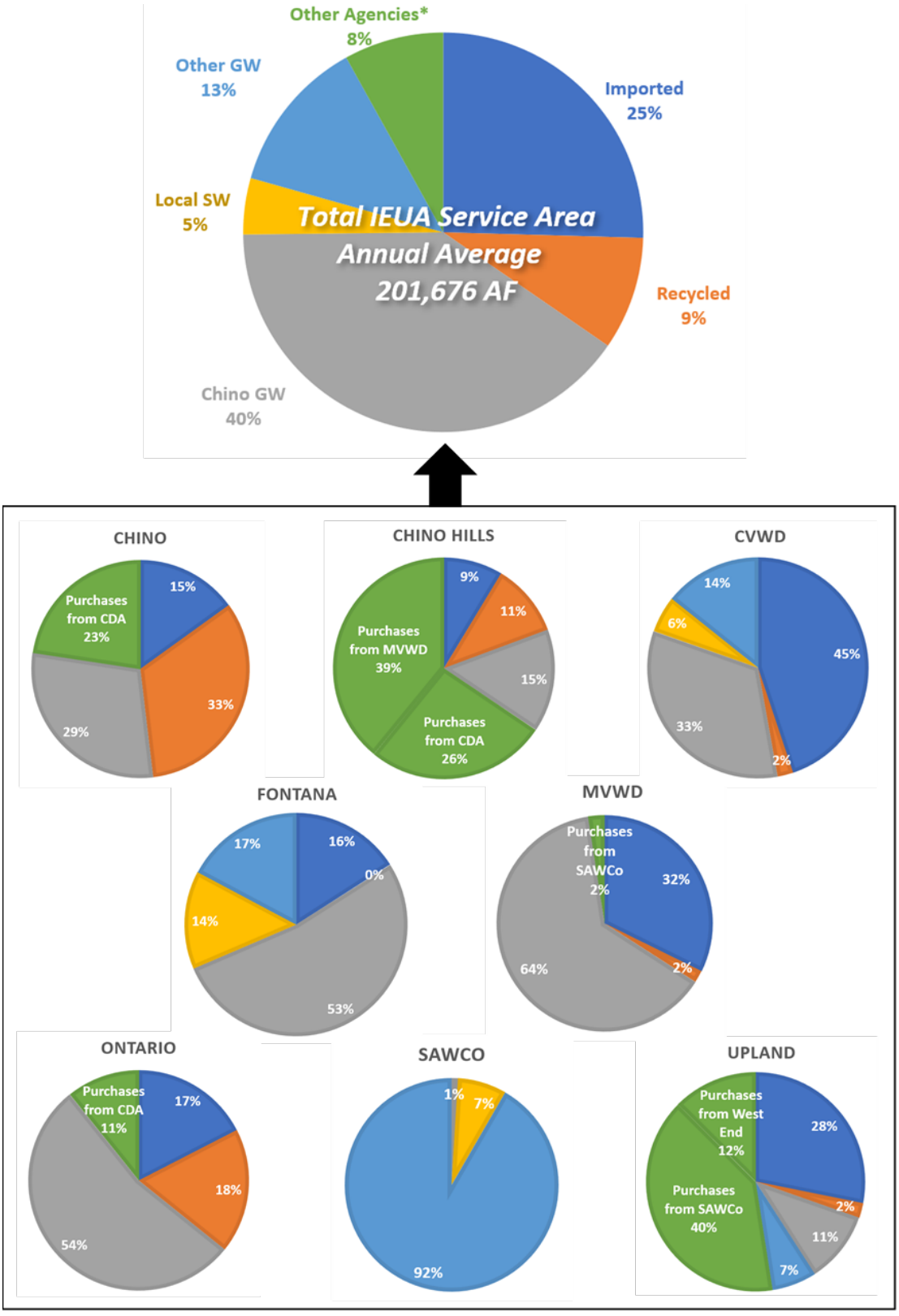
Then, potential future conditions are discussed related specifically to climate change and growth and how they may impact each of the regional water supply types.

Next, results from IEUA's Integrated Resource Plan modeling efforts, which explores the potential impacts to the regional water supplies based on simulated future scenarios, are presented.

Lastly, the key vulnerabilities are reviewed and discussed.

4.1 Regional Water Supplies

As described in previous sections, the region relies on imported water, groundwater from both the Chino and non-Chino groundwater basins, IEUA-supplied recycled water, exchanges and purchases from other agencies, and local surface water from local creeks and canyons to meet demands. The composition of the regional and member agency supply portfolios based on the average annual deliveries from 2009 to 2018 are shown in Figure 10. Chino Basin groundwater provides the largest portion of the annual regional supply at 40 percent and imported water accounts for about 30 percent. Each of the member agencies also has their own unique portfolio as shown in Figure 10.



Note: "Other Agencies" in the regional portfolio are reflective of purchases from non-member agencies. The member agencies' supply portfolios show all purchases (whether from member or non-member agencies).

Figure 10. Regional and Member Agency Supply Portfolios (2009-2018 Averages)

4.2 Future Conditions

This section addresses predictive impacts to regional water resources and imported supply resulting from growth, climate change, and other possible factors. To support this process, resource information was gleaned from the following sources:

- California's Fourth Climate Change Assessment (2018 CCCA)
  - Mean and Extreme Climate Change Impacts on the State Water Project [CCCA SWP]
  - Los Angeles Region Report [CCCA LA]
- IEUA's Integrated Water Resources Plan (2015 IRP)
- IEUA's Climate Change Action Plan (2018 CCAP)

The CCCA's Los Angeles Region Report was utilized because it encompasses Los Angeles, Ventura and Orange counties, and most importantly, urbanized portions of San Bernardino County.



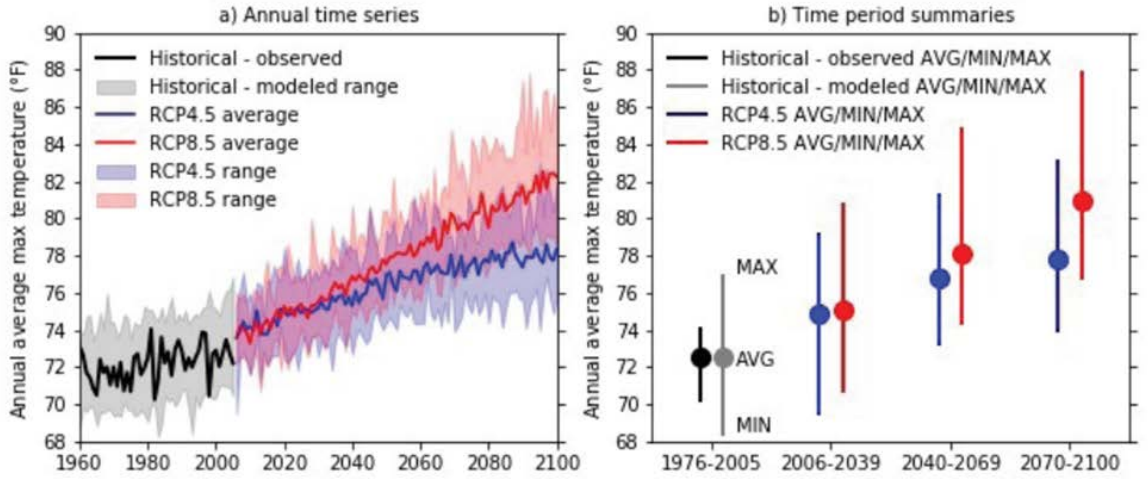
Los Angeles region topography and boundary definition as a solid red line, which encompasses Los Angeles, Ventura, and Orange Counties, and adjacent urbanized portions of San Bernardino and Riverside Counties.

Like the rest of the state, the Los Angeles region is expected to face a challenging combination of decreased water supply and increased water demand. The future reliability for IEUA's water resources are dependent upon climate conditions (both local and at the source of supplies), environmental and political drivers, and growth. Climate change-induced temperature increases, changes in runoff patterns, and drought are some of the key factors that will have a substantial impact on regional water supplies. Additionally, growth in the region will create new demand for potentially strained water supplies. The effects of climate change and growth are discussed in a general sense in Sections 4.2.1 and 4.2.2, respectively. Regional water supplies within the IEUA service are then summarized and analyzed through three lenses: climate change, growth, and other supply reliability factors.

4.2.1 General Effects of Climate Change

The effects of a changing climate are apparent throughout California, including increased temperatures, prolonged drought, rising sea levels, severe atmospheric river events, and extreme wildfires. Figure 11 shows the predicted trends for temperature in the Los Angeles area, as reported by the CCCA LA report, based on global climate models. In the figure, modeled scenarios are described as Representative

Concentration Pathways (RCP) 4.5 and 8.5. RCP4.5 represents a mitigation scenario where global CO_2 emissions peak by 2040, while RCP8.5 represents a "business-as-usual" scenario where CO_2 emissions continue to rise throughout the 21st century. Both scenarios show a predicted increase in average temperatures in the Los Angeles region. Though projections are similar during the early 21st century regardless of the emissions scenario, later in the 21st century the projections diverge as emissions continue to rise under RCP8.5 and they level off in the mid-century under RCP4.5. Based on the modeled results, average annual temperatures in the region could rise 4 to 5 degrees Fahrenheit by the mid-21st century, and 5 to 8 degrees Fahrenheit by the late 21st century.



Historical-observed (black), historical-modeled (grey), and projected future (RCP4.5 - blue, RCP8.5 - red) annual average maximum temperature over the LA region. (a) Annual time series of data (future projections begin in 2006), with solid lines representing model-averages and shading representing model spread. (b) Summary of model-average (circles) and spread (vertical lines) across four time periods: 1976-2005 (historical), 2006-2039 (early-21st century), 2040-2069 (mid-21st century), and 2070-2100 (late-21st century). Unit is °F.

Source: CCCA LA

Figure 11. Historical and Projected Temperatures for the Los Angeles Region

Annual precipitation in the Los Angeles/San Bernardino region is highly variable and a significant portion of the regional rainfall is concentrated in the winter months from November to April. Figure 2 (provided in Section 2) shows the annual precipitation from 1990 to 2018. As the figure shows, while the average annual precipitation is slightly more than 15 inches, there have been very few years that have reflected that average. There are typically years with much greater than average precipitation or much less. The climate science regarding the future magnitude and timing of precipitation in the region is still an active area of research, though the consensus is that dry and wet extremes are both expected to increase in the future (CCCA LA); meaning that, while the projected average annual precipitation may align with historical trends, the wet years will likely be wetter and the dry years drier, thus exacerbating an already highly variable water supply reliability factor.

The reliabilities of imported surface water, local groundwater, recycled water, and local surface water are all susceptible to the effects of climate change and are discussed in the following sections.

4.2.2 General Effects from Growth

Population growth within IEUA's service area creates new demand for water supplies, but regional planning efforts such as IEUA's 2015 IRP and 2018 CCAP provide a path forward that strives to decrease demands and optimize resource allocations. Through thoughtful planning and development, sustainable growth within IEUA is a probable outcome. In the 2015 IRP demand analysis, it was found that per capita water usage decreases as development trends shift toward higher density and smaller landscaped areas. Also, the public has shown a willingness to reduce total water usage in response to statewide calls for conservation. Both factors suggest that increases in population do not necessarily constitute substantial increase in water use.

4.2.3 Groundwater

Groundwater within the IEUA service area is, and will continue to be, crucial to the water supply portfolio. The Chino and non-Chino Basin groundwater supplies have accounted for 53 percent of the regional supply portfolio for the last decade. In addition, each of the member agencies rely, to some degree, on groundwater to meet their annual demands. Per the 2015 IRP, the baseline amount of groundwater production between 2020 and 2040 is assumed to be 91,300 AF for Chino Basin, and 22,000 AF for non-Chino basins.

Future conditions for Chino and non-Chino Basin groundwater are discussed below through the lenses of climate change, growth, and other reliability factors.

Climate Change Impacts

It is anticipated that the groundwater supply will likely be adversely impacted by climate change-induced temperature increases and drought. As discussed above, impacts of climate change for the Los Angeles/San Bernardino region are likely to include increased temperatures and more extreme precipitation events. Groundwater elevation and water quality within the region are both dependent upon rainfall and supplemental sources of recharge. Although the effect of climate change on precipitation in California is still unclear, more frequent occurrences of extreme events similar to the 2011 to 2017 drought could significantly decrease natural groundwater recharge. In addition, as other supplies become constrained in a drought situation, there is potential for less water availability for groundwater recharge purposes. Current supplies utilized for groundwater recharge include surface water, imported water, and recycled water. The 2015 IRP, which was informed by model simulations performed by Wildermuth Environment Inc., showed that natural groundwater recharge would decrease by 0.44 percent for each 1 percent decline in long-term precipitation. A key conclusion drawn from the simulations is that it is important to secure supplemental water when available to recharge the Chino Basin (through direct or in lieu practices) to enable increased groundwater production during droughts and emergencies (2015 IRP).

Groundwater quality is susceptible to climate change because as other sources become less available, groundwater will likely be more heavily relied upon, and if, in addition to those stresses, recharge is also reduced, the groundwater quality issues in the basin may be exacerbated.

Growth Impacts

The 2015 IRP assumed that baseline groundwater production between 2020 and 2040 to be 91,300 AFY, which is only 750 AFY more than the current baseline amount of groundwater production. This shows that groundwater pumping is not anticipated to ramp up to meet increased demand.

Future development patterns with increased hardscaping and more efficient irrigation practices (2015 IRP) also have the potential to impact the groundwater supply. Hardscaping and increased irrigation efficiency coupled with warmer surface air temperatures, will change urban landscapes. Lawns reliant on irrigation may be converted to low-water yards of mulch, rock, shrubs, and other ground cover (CCCA LA). These changes in urban landscapes have a dual effect – one lessens the demand and the other decreases the amount of recharge from deep percolation of applied water.

Other Reliability Factors

Other factors that will impact the future viability of local groundwater within IEUA include changes in stormwater volume and timing, as well as salinity, nitrogen, and other constituent build-up in the groundwater aquifer.

Stormwater caused by surface water runoff originating from both rain and snow in the San Gabriel Mountains and locally within the IEUA service area is an important source of groundwater recharge. Future conditions for stormwater are closely related to both climate change and growth as described above. As climactic events become more extreme, it is likely that there will often be times of minimal stormwater due to drought, and other times of far too much stormwater resulting from atmospheric rivers and other extreme storm events. Additionally, increased growth in the region will likely convert agricultural or non-developed land to hardscapes, which generate more surface runoff and, consequently, stormwater.

IEUA, the CBWM, the Chino Basin Water Conservation District (CBWCD), and San Bernardino Flood Control District will need to continue cooperative management of flood control channels to capture stormwater in adjacent detention basins. Runoff not captured during these large storm events will likely reach the Santa Ana River and the Pacific Ocean, resulting in a lost opportunity to recharge stormwater flows during large storm events. The CBWM Recharge Master Plan Update (RMPU) recommended projects to increase stormwater recharge increasing the recharge capacity by 6,400 AFY (2013 CBWM RMPU). Stormwater is an extremely valuable resource to the region because it is considered “free” once the necessary facilities to capture and use this water have been constructed. It is also a high-quality water source that can improve the quality of the groundwater supplies once it has infiltrated and become blended with the aquifer (2015 IRP).

Groundwater quality in the Chino Basin has historically been impacted by high salt, nitrate, and other constituent concentrations and water quality is therefore a crucial constraint on future groundwater production. Although much of the historical agricultural land within the IEUA service area has been urbanized, agricultural operations continue to use water supplies to irrigate crops and raise livestock. Reduced rainfall and increased groundwater withdrawal may lead to more salinity buildup in topsoil and increased concentrations within the aquifer posing problems for the region's salt-sensitive crops (CCCA LA), increasing the need to secure fresh water supplies for blending or to invest in advanced treatment technologies. In addition, the CDA is an important element of the long-term salinity management strategy for the basin.

4.2.4 Imported Water

The availability of imported water supplies is heavily dependent on the regional hydrology of the SWP as well as environmental regulations. This dependency can lead to high variability in the annual amount of water available to the Southern California region. For example, during the most recent California drought (December 2011 to March 2017), the California SWP was able to supply only five percent of its contract allocation in 2013-2014, which is a significant reduction from past allocations (2015 IRP).

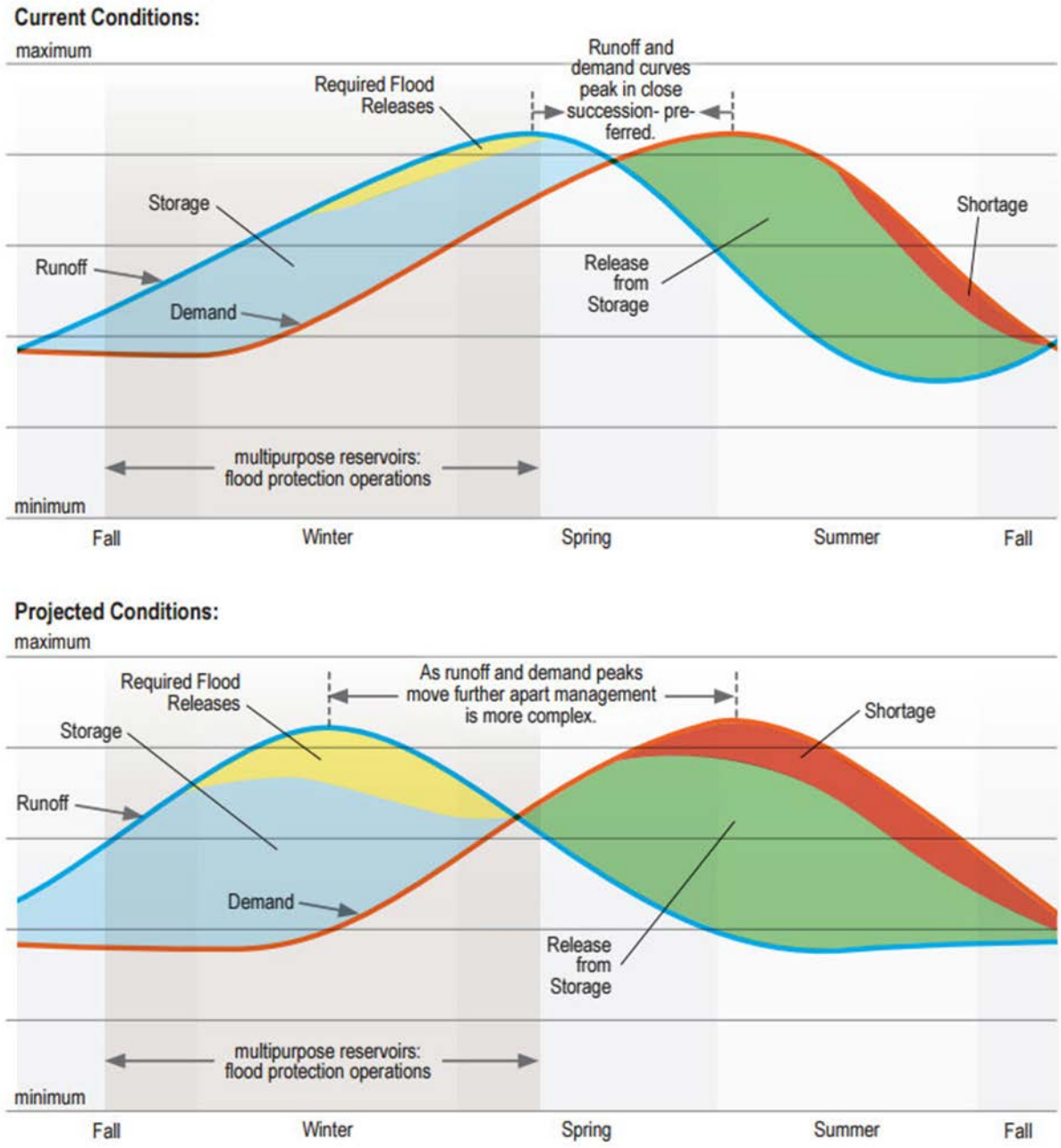
Imported water purchased from MWD is limited by a purchase order agreement. The agreement allows the region to purchase up to a total of 93,283 AFY at its lowest (Tier I untreated) rate. This limit is based on historical imported water purchases for municipal use by the member agencies and for regional groundwater recharge. The agreement includes an annual minimum purchase commitment of 39,835 AF, which is slightly less than the 40,000 AFY minimum needed to operate the region's water treatment facilities. The future of SWP supplies to MWD is uncertain, but it is projected that climate change and other factors will curtail allocations and ultimately increase the cost of water.

Future conditions for imported water are discussed below through the lenses of climate change, growth, and other reliability factors.

Climate Change Impacts

Climate change is expected to continue to significantly impact the timing and characteristics of snowpack, on which the SWP system depends. The SWP's infrastructure was designed to capture snowmelt from Sierra Nevada snowpack, and when snow melts during the warmer spring and summer months, a combination of reservoirs and conveyance facilities provides a steady water supply throughout the year. This system is particularly effective during the summer and fall seasons when water demands peak and the precipitation is limited. The reservoirs were sized based on the historical precipitation patterns, and as more precipitation falls as rain in the winter months, more water will be required to be released from the reservoirs. The challenge of the shifting snowmelt and resulting runoff patterns is illustrated in Figure 12. The reliability of imported SWP water has declined in recent years and climate change predictions appear to show further decreases in reliability.

The CCCA SWP reported that changing seasonal precipitation and flow patterns, combined with sea level rise, could result in an annual 500,000 AF reduction of Delta export as well as a roughly 25 percent decrease of north-of-Delta carryover storage by around 2060. The results also indicate that the extra runoff from early snow melting and higher percentage of rain in the winter and early spring is not conserved in reservoirs and thus cannot be used to meet the higher summer demand in the current SWP system. This extra water is released as flood water in the winter and early spring to become Delta outflow. Most climate models reviewed for the CCCA indicate that the south-of-Delta exports are anticipated to be reduced from 4 to 44 percent annually compared to historical deliveries (CCCA SWP).



Source: California Department of Water Resources

Figure 12. Changes in Runoff versus Demand for Reservoirs Dependent on Snowmelt

Growth Impacts

There are no specific challenges posed to imported supplies due to growth. The challenges associated with growth will be general in that the regional water demand increases as imported water supplies become less reliable.

Other Reliability Factors

The existing SWP infrastructure relies on the ability to pump water from the Sacramento-San Joaquin Delta where local water rights, environmental protections, and imported water conveyance are often in competition with one another. Because of these frequently competing interests and the factors described above, regulations and restrictions on Delta Exports could potentially increase in the future.

4.2.5 Recycled Water

IEUA owns and operates four water recycling plants. These facilities provide tertiary-treated wastewater, also known as recycled water. Recycled water supplies can be used for three different applications, direct non-potable uses, groundwater recharge for the Chino Basin, and other regional discharge obligations.

Recharge of recycled water is allowed by the Regional Water Quality Control Board (RWQCB) through the OBMP. In addition, the region secured several permits allowing for the direct use and groundwater recharge of recycled water. These permits define requirements for the use of non-potable recycled water, including, but not limited to, uses, water quality limits, and monitoring requirements.

The recycled water program is operated based on the following order of priorities for recycled water supply:

1. Regional discharge obligations (Santa Ana River Judgement, environmental, etc.)
2. Agency direct use demands
3. Regional groundwater recharge

Based on recent wastewater projections that were calculated as part of the Wastewater Facilities Master Plan (WFMP), treated flows are expected to increase to over 85,000 AFY by 2040. These flow estimates were based on current existing indoor water usage levels (to ensure that facilities and pipelines are adequately sized) and are consistent with the IEUA's upper demand forecast. However, indoor water use efficiency is increasing, and new plumbing code and appliance standards are being implemented. As a result, available wastewater flows by 2040 are expected to be lower than 80,000 AFY. These water flow trends are being carefully tracked by IEUA.

Because recycled water supplies, their uses, and additional source water needs are under development by IEUA and the Regional Contracting Agencies (RCAs), the DCP conservatively assumes these surplus recycled water supplies will generally be used for the purposes stated above and additional source water will be further defined by ongoing studies and reflected in IEUA's other planning efforts.

Future conditions for recycled water are discussed below through the lenses of climate change, growth, and other reliability factors.

Climate Change Impacts

The reliability of recycled water supplies is not negatively impacted by climate change. While the treatment and distribution of recycled water supplies for re-use is energy intensive, which does lead to climate change inducing greenhouse gasses, the treatment and distribution of recycled water is *less* energy intensive than imported water supplies, creating statewide reductions in greenhouse gas emissions (2015 IRP).

Growth Impacts

The volume of recycled water available to IEUA and its member agencies is dependent on indoor urban water use, which has historically steadily increased. Based on the 2015 IRP demand predictions, this trend is anticipated to continue and should provide IEUA with increased volumes of recycled water supply. However, trends in indoor water efficiency must be considered when projecting supply volume.

Current demands for recycled water include non-potable applications such as irrigation and groundwater recharge. Applications for recycled water face challenges in terms of changing wastewater quality and treatment requirements due to increases in indoor water use efficiency and outdoor water use efficiency standards and increasing regulatory and environmental requirements. Additionally, the use of recycled water is impacted by the groundwater quality of the Chino Groundwater Basin. Specifically, the applications for recycled water become constrained if the salinity in the basin rises beyond the Regional Water Board's specified limits. Maintaining and potentially expanding recycled water projects to manage these challenges will increase the resiliency of the regional water supplies. Therefore, the vulnerability of recycled water supplies diminishes with increased growth.

Other Reliability Factors

The ability to collect, treat, and reuse recycled supplies relies on infrastructure that is intertied with all the member agencies. The maintenance and continued expansion of collection pipelines, water treatment facilities, pumps, and distribution pipelines are necessary for the success of IEUA's recycled water efforts. In addition, for recycled water to be a reliable source of supply there must be a demand for the supply. Meaning that as regulations and public opinion evolves there is the potential for more, or less, demands for recycled water.

An additional factor related to recycled water use in the region is tied to the Chino Basin groundwater quality. Requirements from the Santa Ana Regional Water Quality Board and the State Water Resources Control Board necessitate ongoing implementation of regional salt management and reduction actions as a condition of the regional recycled water use permits for outdoor irrigation and groundwater recharge. The applications for recycled water become considerably constrained if it is expected that its use will exacerbate salinity issues within the Chino Basin.

4.2.6 Local Surface Water

Agencies located in the northern part of the IEUA service area have long-standing legal rights to divert and treat water from local creeks. The amount of water from these local surface supplies is variable depending on climate conditions, and currently accounts for approximately five percent of the regional water supply portfolio.

Local surface water is recognized as an important resource since the only cost to the member agencies is the operation of the facilities to capture, treat, and distribute this water. IEUA member agencies recognize the value of local surface water and are investing in the capture and treatment of these supplies.

Climate Change Impacts

Local surface supplies are dependent on precipitation and temperature, and each of these factors is predicted to be influenced by climate change, creating uncertainty from year-to-year. The predictions for precipitation in the Los Angeles/San Bernardino region, as discussed above, are still uncertain but it is expected that the extremes will be more severe, and temperatures are expected to increase.

Extreme precipitation events can result in short periods with high volumes of runoff that will be difficult to capture. Conversely, extended droughts and dry years will result in long periods without available local surface water supplies, which will increase demands on other supply types.

Higher temperatures also impact local surface water. Warmer temperatures cause more evaporation and transpiration, reducing the amount of soil moisture. This means that the soil may absorb and hold more water when rain occurs, and this can reduce the amount of water flowing into creeks and streams.

Growth Impacts

There are no specific challenges posed to local surface water supplies due to growth.

Other Reliability Factors

The ability to collect, treat, and use local surface water relies on infrastructure. The maintenance of collector pipelines, water treatment facilities, pumps, and distribution pipelines are necessary for the success of IEUA's local surface water use efforts.

4.2.7 Future Conditions Impacts by Sector

One of the major impacts to all sectors will be the new state legislation setting water use standards. On May 31, 2018, Gov. Jerry Brown signed into law two new bills that will require urban water providers throughout California to set new permanent water use targets for their service areas by 2022. Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman) provide a framework for setting water use targets, as well as implementing and enforcing the new water use requirements.

While many details for implementing the new water use requirements will be determined over the next several years, the overall framework includes:

- A standard for indoor residential water use of 55 gallons per person per day— dropping incrementally to 50 gallons beginning in 2030.
- A standard for outdoor water use (to be determined) based upon and the amount of irrigable landscaped area for a residential or dedicated irrigation commercial account and the community's climate.
- A standard for water loss due to leaks in water system pipes (to be determined).

These three standards will be calculated and added together to represent an overall water use target (in gallons) for the water provider. Although some IEUA member agencies base their rates on a water budget for each customer, the new state laws do not contain water use targets for individual residents or businesses. These laws outline an overall framework to guide urban water providers in setting water use targets, which must be approved by the State Water Resources Control Board. However, urban water providers will need to determine how their service area can best achieve the new water use target.

Impact to Residential Customer Base

The residential sector represents the largest number of customers within the IEUA service area. Future conditions indicate that shortages are likely to increase due to the combination of increased population growth and added strains on water supplies. The new state water use standards will require that customers use water more efficiently.

Newer high-density housing developments will likely include indoor water use appliances and fixtures with increased efficiencies. Residential properties with irrigated landscaping will likely be faced with more stringent restrictions on irrigation. In addition, increased average regional temperatures, and longer and drier droughts, may pose challenges with maintaining green spaces within residential neighborhoods. Lost urban greenery can further increase urban temperatures.

There will be costs associated with achieving increased efficiency both indoors and outdoors, and while there are rebates and other financial incentives offered to customers some of these costs will be placed on individual residents. Water rates may also increase as supplemental and alternative supply types and are implemented.

Impacts to Commercial, Industrial, and Institutional Customer Base

Commercial, industrial and institutional (CII) customer represent approximately 14% of water consumption in the IEUA service area. While the new laws do not set specific water use targets for CII customers, they do outline a framework for creating new water efficiency performance measures for businesses. As with residential customers, the CII customer base will be required to use water more

efficiently. Impacts of future shortages to the CII sectors may extend beyond the direct reductions in water supply.

Reduced water supply will impact industries which rely more heavily on water services such as food processing and other highly water dependent manufacturing. In addition, there may be increased costs for other materials and services due to water shortages and drought conditions (i.e. energy, agriculture). As with the residential sector, water rates may also increase as supplemental and alternative supply types are implemented.

Impacts for Irrigation at Schools, Parks and Other Large Landscape Properties

Dedicated irrigation meter accounts account for almost 14% of water consumption in the IEUA service area. The demands for irrigation are likely to increase in the future due to warmer temperatures and more variable precipitation. Meeting those demands with recycled water would offer a more drought resilient supply type. Additionally, other demands for recycled water may also increase (i.e. groundwater recharge, and regional discharge obligations) as supplies become more constrained. In the event of an extreme shortage, outdoor irrigation will become a lower priority to residential and commercial uses.

4.3 Vulnerability Assessment Modeling

Investigations performed as part of the regional IRP were used to inform this DCP vulnerability assessment. As part of the IRP efforts, the Chino Basin Regional Water Supply Infrastructure Model (Model) was developed to simulate existing and future conditions of the IEUA water supplies and infrastructure. The model incorporates existing regional and local potable water demands, supplies, key regional infrastructure, and interconnections allowing the movement of water from agency-to-agency within the IEUA service area.

In June 2019, the IRP team reported the modeling results for a 2020 baseline with five scenarios reflecting various future conditions. Two of the scenarios (Scenarios 2 and 3 referred to here as “DCP scenarios”) were developed in collaboration with the DCP team with the goal of bracketing potential future drought conditions from a moderate shortage condition with some consideration for climate change, and a more severe scenario beyond what has been experienced previously but which is possible based on current trends and research.

The two DCP scenarios that were modelled are described below and illustrate a range of potential drought severity conditions:

IRP Scenario 2	IRP Scenario 3
Imported Water Shortage (Level 9 WSAP)	***Import Water Shortage (Level 9 WSAP) & Local Supply Shortage***
An isolated water shortage condition for imported water while local supplies remain relatively unaffected.	A more widespread water shortage resulting from statewide drought conditions impacting both imported *and* local water supplies, including long-term groundwater impairment.

Recent California legislation requires urban water agencies to include considerations for a five-year drought in their water supply reliability planning efforts (SB 606 and AB 1668), and Scenario 3 is a helpful building block toward compliance. The following pages summarize the assumptions and results for each of the DCP scenarios. More information on the model and other results are provided in the Technical Memo "*DRAFT Integrated Water Resources Plan Regional Water Supply Infrastructure Model TM-2: 2020 Baseline and Evaluation of Water Supply Vulnerabilities for Scenarios 1 to 5,*" dated June 21, 2019, and will be provided in the forthcoming IRP update. It should also be noted that at this stage in the modeling efforts, the interconnections and the ability to transfer water between member agencies is not enabled. Later phases of the IRP modeling effort will explore opportunities for inter-agency transfers.

4.3.1 Scenario 2: Imported Water Shortage

Scenario 2 of the IRP modeling effort is intended to simulate potential reductions in imported water supply due to future drought and climate change conditions, while also considering that local conditions may *not* be impacted to the same degree as imported supplies. The assumptions for this scenario are based on historical deliveries for imported water, member agency projections, existing infrastructure, and recent research and climate models. Key assumptions and associated datasets are described below.

Scenario 2 Assumptions

Future Demands

The projected water demands for the year 2035 were used for Scenario 2. The projected demands from the 2015 IRP were used for each member agency, which assumed three ranges for future demands based on potential water use practices and ranged from low, medium, to high (Table 2). The medium demand forecast were used for the Scenario 2 simulation.

Imported Water Supplies

In the CCCA there are numerous predictions related to future conditions in the Los Angeles/San Bernardino region, specifically related to drought and the availability of imported water. Some predictions state that south-of-Delta exports by the SWP and the Central Valley Project could be reduced by 50 percent more than during historical droughts (Wang et al., 2018). Meaning that as drought intensity and frequency increases, strains on imported water supply will also intensify beyond what has been seen in the past. The reasons for the reductions are likely to be numerous, interconnected, and complicated, but the primary causes of the increased reductions are expected to be reduced carry-over storage in reservoirs as precipitation patterns shift and sea-level rise and the resulting increased salinity in Delta exports.

This prediction is corroborated by Delta supply water quality and MWD's SWP supply availability during the drought in water years 2015-17, which provides a benchmark for future drought conditions. During this time period, the IEUA region had the lowest three-year average of imported water deliveries. See Figure 13 for historical deliveries from MWD to IEUA. Due to a low SWP allocation of 0% which was increased to 5%, MWD implemented the WSAP, and deliveries to IEUA were reduced by 41% of the supplies delivered in 2008 (the highest year in the 2000-2017 record). As a result, Scenario 2 assumed a WSAP shortage level of 9 (67.5% reduction) as a representation for future drought conditions, reflecting the CCCA's predicted deeper reductions. See Table 6 for a summary of the ten WSAP levels.

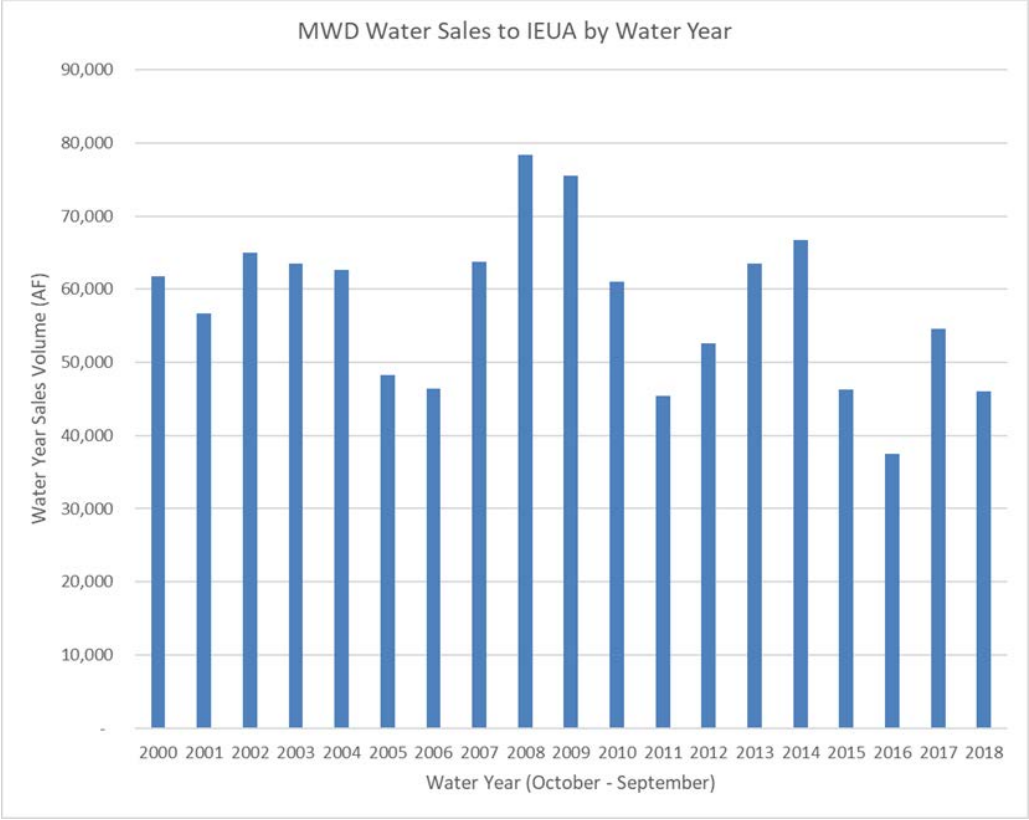


Figure 13. Historical MWD Deliveries to IEUA (Sum of Full Service and Interruptible Programs)

Table 6. MWD WSAP Shortage Allocation Index

Regional Shortage Level	Wholesale Minimum Percentage	Wholesale Reduction Percentage
1	92.5%	7.5%
2	85.0%	15.0%
3	77.5%	22.5%
4	70.0%	30.0%
5	62.5%	37.5%
6	55.0%	45.0%
7	47.5%	52.5%
8	40.0%	60.0%
9	32.5%	67.5%
10	25.0%	75.0%

Surface Water Supplies

Surface water supplies were simulated based on the 2035 projected availability as stated by each of the member agencies in their respective UWMPs. It is assumed that these supplies are unaffected by drought conditions in other areas of the State.

Groundwater Supplies

Local groundwater supplies were simulated at current available capacities and blending requirements. In addition, projected additional groundwater supplies for the year 2035 were included as reported in the member agencies' 2015 UWMPs. Details regarding how this information was collected and simulated are described in the August 2018 IEUA/INTERA Technical Memo titled *"IEUA Infrastructure Model and 2015 Baseline Scenario Results,"* and in a subsequent June 2019 Technical Memo (IEUA 2019).

4.3.2 Scenario 3: Five-Year Drought and Local Supply Shortage

Scenario 3 is intended to be representative of a severe five-year drought with a combination of shortages in imported supplies and local supplies. In a five-year drought condition, it is expected that imported water supplies would be drastically reduced as was simulated in Scenario 2 and the local surface and groundwater supplies would also be diminished. Key assumptions and associated datasets are described below.

Scenario 3 Assumptions

Future Demands

The 2035 demands from the IRP were used for Scenario 3 and are the same as for Scenario 2 (as described above).

Imported Water Supplies

The imported water supplies delivered by MWD to the IEUA service area for Scenario 3 are the same as for Scenario 2 and are set at WSAP Regional Shortage Level 9 (see Scenario 2 described above).

Local Surface Water

The local surface water supplies simulated for Scenario 3 were based on the projected supplies as reported by the member agencies in their respective 2015 UWMPs for a multiple dry year condition. In the UWMPs there was not an expected change in the projected surface water supplies from the single dry year or a multiple dry year. The multiple dry year surface water supplies were considered to be a reasonable source to represent a five-year drought condition.

Local Groundwater

In an extended five-year drought scenario, it is assumed that local groundwater supplies will be impaired due to quality as opposed to quantity. In the Chino Groundwater Basin there are trends of slowly rising TDS and nitrate levels, as well as new emerging constituents such as 1,2,3, - Trichloropropane (1,2,3 – TCP), PFOS, and PFOA, which could result in a future loss of available supply. In addition, in an extended drought scenario when other supplies like imported water are reduced, local groundwater will be relied on more heavily. Increased production from the basin could exacerbate water quality issues.

For Scenario 3, local groundwater was simulated based on current well capacities and the additional 2035 projected supplies as reported by the member agencies (as with Scenario 2). To simulate compromised groundwater quality, the wells with current blending requirements were removed from service. In addition, wells currently with noted impairment but without blending requirements, would have blending requirements of 50 percent.

4.3.3 Results

Scenario 2 Imported Water Shortage Results

The results of this modeling scenario indicate that under WSAP Shortage Level 9, three member agencies experience supply deficits ranging from 10 percent to 74 percent of 2035 demand with the current supply mix.

Other member agencies have surpluses and overall the region has a slight surplus of 2 percent of 2035 demand with current supplies, and a 10 percent surplus with 2035 projected new supplies.

The loss of imported water means that there is less water to blend, thus impacting groundwater quality. There are five agencies that use imported water for groundwater blending that would be impacted.

Scenario 3 Five-Year Drought and Local Supply Shortage Results

The results of this scenario indicate that under a severe, multi-year drought, six of the eight member agencies experience supply deficits ranging from 9 percent to 74 percent of 2035 demand with current supplies. Two member agencies have surpluses, but overall the region has a deficit of 13 percent of 2035 demand with current supplies, and 6 percent with projected 2035 supplies.

In this scenario, agencies with groundwater supplies that currently require blending lose that capacity and those with impaired supplies that do not currently require blending are impacted by a new 50 percent blending requirement.

4.4 Summary of Key Vulnerabilities

Based on the review of potential impacts to regional resources and the IRP modeling results, two key vulnerabilities are identified.

1. **Imported water will likely become less reliable in the future** and pose a considerable risk for overall regional water supply reliability. While within Scenario 2, the region showed an overall surplus, there are three agencies that currently depend more heavily on imported water and showed shortages in this situation. As Scenario 3 showed, while the region does not rely on imported water as heavily as it does local groundwater, there are ripple effects related to a loss of imported water. The loss of imported water could result in the increased reliance on local surface and groundwater sources, and increased groundwater production could cause groundwater quality issues to worsen in areas.

2. **Reductions, due to potential impairments to groundwater quality, pose the most significant water reliability risk to the IEUA service area**. All the member agencies, with the exception of SAWCo, rely on local groundwater to meet their annual demands. While groundwater has been a relatively reliable source of water in the past, conditions related to groundwater quality and reduced water available for blending may reduce the reliability of groundwater in the future. As the results from Scenario 3 illustrated, reduced groundwater quality combined with a loss of imported water could cause significant shortages for multiple agencies within the service area.

5 Mitigation Actions

Mitigation actions are projects, programs, and strategies implemented prior to a drought situation to lessen the risks and impacts of future water shortages.

IEUA and the retail member agencies developed and prioritized the list of mitigation actions through an inclusive and collaborative means as part of the IRP process. The mitigation projects were selected because they effectively address one or more of the key vulnerabilities; *future imported water supply reliability* and *ground water quality impairment*.

Both regional and local projects are included on the list. They include a combination of near- and long-term actions consisting of local supply and groundwater improvement, system interconnections, and capital improvement projects. A full list of the projects is included as an Appendix D to this document.

The timing and sequencing of project implementation is dependent on many factors. Although IEUA and member agencies will look to implementing the highest priority projects first, budget limitations and planning complexities will impact the actual timing. A lesser priority mitigation project may take precedence over a top priority one because, for example, there is outside funding available, resulting in expedited implementation.

The region is actively working on advancement of the mitigation actions included in this DCP. Through the 2015 IRP, IEUA and its member agencies explored and analyzed projects that resulted in the core recommendations discussed in this section.

This section provides an overview of the mitigation action planning efforts, strategy for mitigation action implementation, current regional planning efforts, and the context under which the actions will be advanced.

5.1 Planning Documents Utilized to Identify Mitigation Actions

Within the IEUA service area, there have been multiple planning efforts tasks initiated for the development of mitigation actions. In the early 2000s the region developed four foundational master planning documents. These historical documents illustrate how, for nearly the last 20 years, the region has recognized the increasingly uncertain future of imported water supply availability and the importance of local water supplies, particularly in changing climate conditions. As part of its response, the region has focused infrastructure investments on local water supply development strategies to reduce dependence on imported supplies and increase drought resiliency. These foundational documents are:

- Chino Basin Watermaster's Optimum Basin Management Program (2000)

- Chino Basin Organics Management Strategy (2001)
- Recycled Water System Feasibility Study (2002)
- Wastewater Facilities Master Plan (2002)

More recently, the 2015 IRP further evaluated the resiliency of the region's water resources under future climate conditions and identified strategies for ensuring that the region's future water needs through 2040 can be sustainably met.

The 2015 IRP was considered Phase I of the IRP process and provided an extensive list of potential supply projects (both local and regional) based on regional collaboration. At the time of this DCP effort, the 2020 IRP (Phase II) is currently underway. Phase II will provide a regional implementation strategy for long-term water resource management, strategically positioning the region for funding opportunities.

5.2 Mitigation Actions Strategy

Through the existing and ongoing regional plans there has been considerable effort and extensive stakeholder engagement aimed specifically at developing mitigation-type actions to improve regional water supply reliability.

The mitigation actions identified through the IRP fall into two core strategies:

1) Invest in Local Supplies

2) Enhance Groundwater Availability

5.2.1 Invest in Local Supplies

As the availability of imported water becomes less reliable in the future, it will be ever more important to continue to invest in all forms of local water supplies, including groundwater, surface water, and recycled water. Building the local water supply capacity decreases reliance on imported supplies and improves resiliency for the regional water supply portfolio. The 2015 IRP had two major mitigation recommendations for increased local water supply capacity:

- **"Implement water use efficiency measures to decrease demand and enhance water supply resiliency."**
  Water use efficiency is universally regarded as the most cost effective method to reduce water demand and ultimately creates an additional water supply source since the water conserved can be applied to other demands.

- **"Continue investment in recycled water projects to maximize the beneficial reuse."**
  Recycled water provides one the most reliable supply types for the region. Current demands for recycled water include non-potable applications such as irrigation and groundwater recharge.

Applications for recycled water face challenges in terms of changing wastewater quality and treatment requirements due to increases in indoor water use efficiency and outdoor water use efficiency standards and increasing regulatory and environmental requirements. Additionally, the use of recycled water is impacted by the groundwater quality of the Chino Groundwater Basin. Specifically, the applications for recycled water become constrained if the salinity in the basin rises beyond the Regional Water Board's specified limits. Maintaining and potentially expanding recycled water projects to manage these challenges will increase the resiliency of the regional water supplies.

5.2.2 Enhance Groundwater Availability

Groundwater is the most heavily relied on local water supply type. The Chino Groundwater Basin provided approximately 40 percent of the regional water supply portfolio over the last decade. The vulnerability assessment for the DCP illustrated how compromised groundwater quality poses a significant threat to local water supply reliability and can be compounded as other supplies currently used for blending, such as imported water, become less reliable. Enhancing groundwater treatment and groundwater recharge opportunities will be crucial as groundwater quality issues mount within the basin and dependence on groundwater potentially increases as other sources become less reliable. Groundwater recharge with good quality water sources provides the benefits of both groundwater quality management and increased groundwater storage. The 2015 had several recommendations related specifically to groundwater recharge:

- **"Strive to acquire low TDS supplemental water to enhance groundwater quality to sustain production and reduce salinity."**
  It is important that water used for recharge helps to support the salinity management measures within the Chino Basin. Identifying and securing low TDS water will help to increase the resiliency of the local groundwater supplies.

- **"Strategically maximize the purchase of supplemental water for recharge or in-lieu when available."**
  Periods of surplus supplies from imported water, exchanges, or other sources provide an excellent opportunity to acquire additional water supplies for groundwater recharge, or to offset the groundwater demands at the time. Positioning the region in terms of awareness, finances, and infrastructure to be able to maximize the purchases of those supplies creates greater resiliency for the region's water supply portfolio.

- **"Continue to maximize stormwater recharge projects, including rainwater capture and infiltration."**
  Local precipitation in the region is highly variable seasonally and annually, and it is expected that future rain events will become more intense in terms of magnitude and duration resulting in large volumes of stormwater. Improving the regional infrastructure to capture and utilize stormwater provides a low TDS water supply for groundwater recharge.

5.3 Mitigation Action Project Evaluation

A comprehensive list of potential mitigation actions was developed through the IRP process based on numerous planning efforts, including:

- 2015 Recycled Water Program Strategy
- 2015 Wastewater Facilities Master Plan Update
- 2013 Recharge Master Plan Update
- 2015 Water Use Efficiency Business Plan
- FY15/16 Ten Year Capital Improvement Plan (TYCIP)
- Santa Ana River Conservation and Conjunctive Use Program (SARCCUP)
- 2013 Upper Santa Ana River Habitat Conservation Plan

A full list of the projects can be found in *Appendix D: 2015 IRP Mitigation Actions*.

During the IRP planning process, the Technical Work Group crafted **five water resource strategies**. Each strategy had an underlying theme to address the region's water supply vulnerabilities. Below are the five strategies:

***Strategy 1**:* Maximize Chino Basin groundwater, including prior stored groundwater.

***Strategy 2**:* Recycled water program expansion.

Strategy 3: Recycled water & conservation program expansions.

***Strategy 4**:* Maximize supplemental water supplies and recycled water supplies.

***Strategy 5**:* Maximize imported water supplies with moderate conservation.

Each of the strategies required building a mix of projects that would best meet the supply needs under the respective strategy.

In order to determine the value of each specific project, as well as its means of water supply creation, every project underwent a series of evaluation steps. First, the anticipated acre-feet yield was calculated for each of the 100 projects and, next, a determination of the number of years that it will take to yield the water.

From this, a list of the desired project outcomes was developed. These outcomes were selected because they specifically address the region's major water supply vulnerabilities. Projects were then assessed and tagged *yes, no, or neutral* on its ability to impact desired project outcomes. For example, *does the project provide increased groundwater*? *Does the project reduce TDS in the groundwater?*

These are examples of desirable project outcomes because they provide a positive contribution to local water supply.

Table 7 provides a list of the desired outcomes used as metrics to evaluate each potential mitigation action project.

Table 7. Desired Mitigation Project Outcomes

Desired Mitigation Project Outcomes	
▪ Increases groundwater storage	▪ Provides emergency local supply redundancy
▪ Increases water level in critical groundwater management zones	▪ Decreases reliance on local surface water during dry years
▪ Increases stormwater capture/recharge	▪ Reduces TDS and/or nitrates in groundwater
▪ Increases permeability or natural infiltration	▪ Decrease net energy consumption
▪ Provides additional recycled water	▪ Increases capacity for wet water years
▪ Reduces dependence on imported water during dry years	▪ Eligible for grant funding
▪ Increases local water supply	▪ Technical feasibility/ease of implementation

Once the projects were evaluated against the desired outcomes, they were uploaded into a data visualization software tool. The tool then created and compared theoretical combinations of various projects. After analysis, the tool generated the mix of projects that delivered optimum results for each of the five resource strategies developed by the Technical Work Group during the IRP planning process.

The highest performing mix of projects were selected as prioritized mitigation actions for retail agency implementation.

Although the planning process resulted in the optimal choices, actual timing and sequencing of project implementation is dependent on many factors. IEUA and member agencies will look to implement the highest priority projects first, however budget limitations and planning complexities will impact the actual timing. A lesser priority mitigation project may take precedence over a top priority one because, for example, there is outside funding available, resulting in expedited implementation.

6 Response Actions

With growing populations and the inevitability of future drought cycles, IEUA's and its member agencies' overarching goal is to create a water efficient region that can successfully withstand future water shortages without hardship.

IEUA and its member agencies have been arduously working to re-shape customers' attitudes about water sustainability and their personal role in achieving water shortage resiliency. Through education, messaging, and programs IEUA and its member agencies have been driving change, however, customers still have a way to go to fully make the transition. A percentage of customers have made significant equipment and lifestyle changes at their properties, but most have not.

Regional water sustainability can be achieved only when:

1. Customers fully understand the value of water and the unique conditions of the Inland Empire.
2. Customers create drought sustainable properties prior to emergency conditions.
3. Customers experience no water deprivation hardship during a drought cycle due to the sustainable landscape design of their properties and their water-consuming equipment.

While striving for full water efficiency is the goal, IEUA understands we're not there yet. With this knowledge, IEUA recognizes that water savings, during droughts or other water shortages, will need to be driven through an escalation in marketing, increased programs service offers, and enhanced incentives that rise as drought stages advance.

Table 8 provides a rough estimate of overall acre-feet savings necessary to meet the requirements at each drought stage. The calculations are based on the 2020 projected demand as well as single dry year and multiple year projected demands. The Acre-feet savings are calculated by using the highest percentage savings number desired for each stage. The table illustrates the need for sharp increases in incremental water savings from Stage 1 through Stage 5 during a potential future drought cycle.

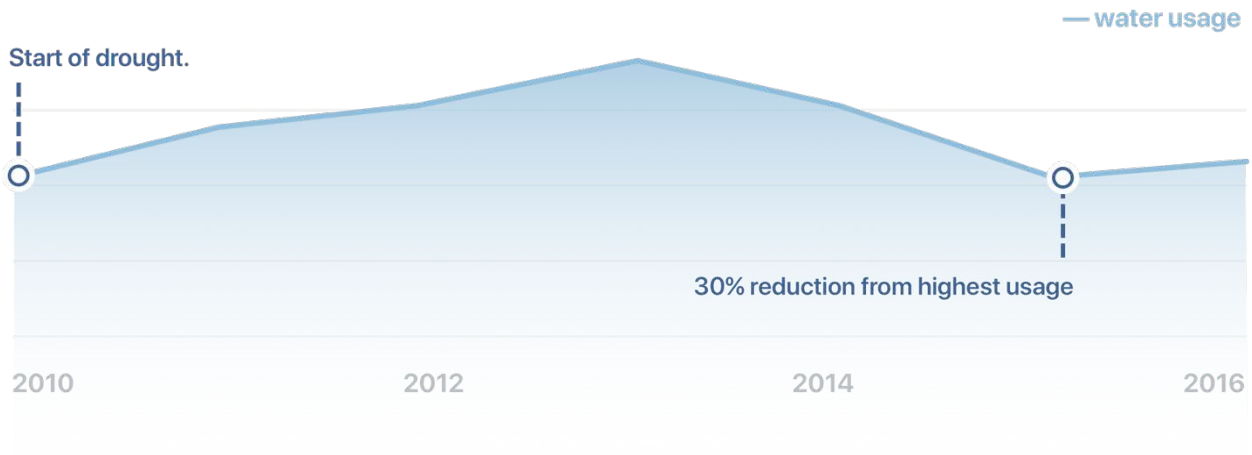
Table 8. Estimated Required Water Reduction per Drought Stage

	STAGE 1 **Est Savings (AF)** **5%** reduction	**STAGE 2** **Est Savings (AF)** **15%** reduction	**STAGE 3** **Est Savings (AF)** **25%** reduction	**STAGE 4** **Est Savings (AF)** **50%** reduction	**STAGE 5** **Est Savings (AF)** **50%+** reduction
Projected Demand	9,985	29,955	49,926	99,851	99,851+
Single Dry Year Projected Demand	10,529	31,588	52,647	105,294	105,294+
Multiple Dry Year Projected Demand	11,296	33,888	56,481	112,962	112,962+

6.1 Previous Droughts and Lessons Learned

Historical review is useful when conducting planning activities. By looking at the previous drought cycle, we see the quantity of water conserved over the course of the drought and customers' overall response time to reach reduction levels. This and other historical information were taken into account in the crafting of the Response Action Plan, as well as the Programs and Services.

The chart below provides a look-back at the annual total water usage for reporting years 2010-2016:



The take-aways that merit consideration in future planning include the following:

- Water use increased during the first couple of years of the drought.
- Customers' drought actions only reached an impactful level **late into the drought cycle,** in Year Four 2015-2016.
- Customers reacted when the situation became **extended and urgent**.
- The majority of **water savings were realized through mandatory restrictions** and water deprivation; not upgraded landscapes and efficiency equipment.
- During crisis times we need to **balance Carrots vs Sticks** in order to entice customers to make permanent changes**.**
- Today's **water usage has bounced back** to a volume above 2014 levels because the changes were not permanent.
- To drive **permanent savings** and **early response** it is desirable to have Messaging, Outreach and Programs that **Motivate vs Penalize.**

6.2 GOALS

The Response Action Plan described in the following sections, is modelled after the format of previous IEUA Water Use Efficiency Business Plans. The goals of the Response Plan are to:

- Increase the speed that drought response actions can be rolled out by pre-planning.
- Reduce workload for agencies by providing a blueprint for deployment of strategic actions as drought stages are declared.
- Provide recommendations on the optimal measures, activity levels, incentives, and services that will drive water savings according to need.
- Create an avenue for member agencies to provide input into a Regional drought response.
- Act as a starting point for creating a final plan of action during a drought event. The finalized plan may include adjustments from member agency input, new technologies, increased MWD Water District incentives, new grants, or other circumstances.

The plan is devised to balance *customer incentives and programs* with *prohibitions and penalties*. This balance between "carrot and stick" will give IEUA the flexibility to achieve quick-hit savings through restrictions, while enticing customers to move to long-term market transformation through program participation.

6.3 TYPES OF RESPONSE ACTIONS

There are a number of response actions available to IEUA agencies. These include escalation of customer messaging content and frequency, expanded outreach channels, enhanced water efficiency incentives and programs, and as necessary, water usage restrictions.

- **Messaging**
  Agencies can, and should, use creativity and attention-grabbing content to secure customers' attention and motivate them to take action.

- **Expanded Outreach**
  Customer attitudes and expectations have changed dramatically over the past decade, driven by consumers who have higher demands for expanded outreach vehicles. It's a customer-centric world and water agencies are competing for attention. This requires a modern approach to outreach including social media and influencer marketing.

- **Programs**
  Water efficiency programs provide customers with the means and guidance to lower their properties' water usage. Customer-friendly programs, substantial incentives, direct installation options and strong support services drive stronger response rates. The higher the services and incentives; the higher the customer response.

- **Restrictions**
  Watering restrictions further reduce water usage while reinforcing the message of community importance and "doing your part". They set an authoritarian tone, which can result in negative PR if the reasoning is not well communicated, however they are highly effective in securing immediate water savings and are a powerful tool for agencies.

6.4 DCP Response Process and Taskforce Operation

Once the drought monitoring framework indicates that the region has reached a specific stage of drought conditions, several actions will occur.

First, the Drought Response Taskforce will assemble.

The Drought Response Taskforce is the organizational group empowered to:

1) Create the Drought Response Plan blueprint.
2) During drought condition stages, assemble taskforce to finalize strategic response actions.
3) Work with their respective agency to implement response actions, according to plan.

The taskforce is comprised of representatives from each of the eight member agencies, and regional personnel from IEUA. The group works in a collaborative fashion to gain consensus on appropriate regional response actions.

The taskforce will make recommendations about the level of program and services, restrictions, and messaging to regional customers. These recommendations will be brought to each agency's respective management for approval.

It's important to note that, during a regional drought, an individual member agency may not be experiencing a drought condition due to their local supply mix. In this circumstance, the agency may elect in what capacity to participate in the taskforce and how to best communicate to their customers that locally there are no water supply issues, although the region is undergoing a drought stage.

Looking forwards, the taskforce will work to balance the effectiveness of regional messaging with the differing needs of individual member agencies. There are no pre-determined mandates regarding service offerings, restrictions, communications or budgets. The taskforce will collaborate on policies, while fully supporting flexibility for each agency.

The group will review the proposed actions set forth in the existing plan and make modifications as necessary. The plan was intended to be flexible and changeable. Modifications to the plan might include a change in incentive levels or program delivery mechanisms. There may also be a new water-saving technology that should be offered to customers. The taskforce might be able to secure additional grant funding, as well. Once the action plan is finalized and approved, the taskforce will implement the programs, penalties, and communications plan.

An overview of the drought response process is below:

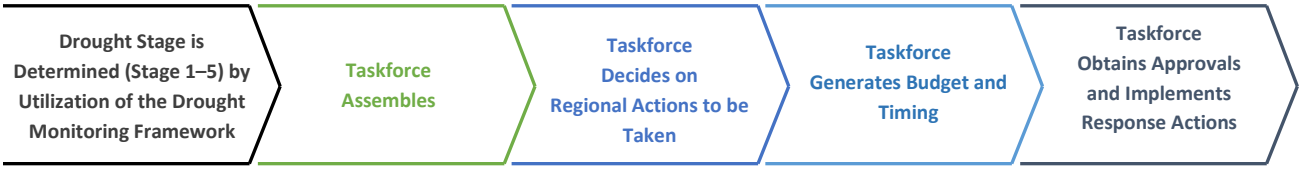


Figure 14. Drought Response Process

6.5 Response Action Plan Objectives

The objectives of the Response Plan are to integrate the drought response actions into a cohesive whole that improves the effectiveness of each component. The plan's objectives are to:

- Outline programs that are highly appealing to customers.
- Provide targeted marketing and communications for programs and restrictions.
- Guide escalation of response actions as drought stages increase.
- Allow for a consistent regional rollout that reduces customer confusion, raises response, and increases savings per household.
- Ensure communication, marketing, programs, and restrictions are interconnected and support each other in achieving water savings goals.

6.6 Response Plan Goals and Strategies

IEUA's overall goals are straightforward:



Agencies have long struggled to make significant water savings headway with high water users. To accomplish this goal, there are several strategies and tactics that must be successfully employed.

Provide Improved Target Marketing and Communications:

An essential portion of the Response Plan is deploying an effective customer marketing and outreach strategy. This is because the greatest contingency plan is worthless if the target audience is: 1) unaware of your offer, and 2) unresponsive. Retail water agency customers are widely diverse in their

characteristics, desires, and motivations. The combination of regional drought messaging paired with the member agencies' individual marketing will create a stronger more unified message.

Target audiences are single family households with high water user and large landscape customers. Reaching these customers is best accomplished by first profiling and micro-targeting customers and then employing a targeted and creative messaging and outreach campaign. It has been shown that customers have a strong, positive response to respected influencers and member agencies should utilize this strategy as a part of their marketing and outreach.

Create Programs That Are Highly Appealing to Customers:

Today's customers have little patience with processes that are time consuming and complicated. Programs must be customer-friendly and provide easy access to knowledgeable individuals that can answer customer questions and guide them through difficult processes.

As experienced in the previous drought cycle, customers are motivated by generous incentives or direct installation services that make it worthwhile to commit their valuable time and resources to a program.

Scalable programs allow customers to participate with relative ease, avoiding long processing times and capacity limitations for customer sign-ups.

Reach Higher Water Savings:

As drought stages escalate, there is an ever-increasing need to "dig deeper" and reach a higher level of water savings per site.

To accomplish this, tactics need to be escalated to higher levels. This includes the deployment of customer communications that contain a heightened level of urgency and at increased intervals. It also means that restrictions and penalties must be increased, as well.

6.7 Strategy Per Drought Stage

Tactics will expand as drought stages escalate. Agencies will increase staffing capability, add more customer support, and provide a higher level of program incentives and services as increased drought stages are declared.

At Stage Zero, a non-drought stage, programs and incentives will continue to be offered to customers at standard levels. During this time, the goal will be to encourage and incentivize customers to create drought sustainable properties in advance of an emergency. The focus will be on turf replacement programs and customer education offerings.

Once a drought enters a specific stage, the taskforce will assemble to finalize the Response Plan for that stage and begin the implementation process for customer targeting and increased outreach.

At **Stage 1 (1-5% decrease),** the plan is to profile customers and micro-target high potential customers, utilizing messaging that will best resonate with those customers.

The strategic focus for **Stage 2 (6-15% decrease)** is to expand activity for irrigation equipment direct installation programs and ramp up influencer marketing.

Tactics for **Stage 3 (16-25% decrease)** require incentive increases for landscape and irrigation measures and an expansion in outreach to customers.

Stage 4 (26-50% decrease) requires IEUA and its agencies to heighten the message of urgency and put forth a community call to action. Additionally, there will be an increase in penalties, implementation of emergency alerts and expanded news media coverage.

During **Stage 5 (water use for essential functions only),** only indoor plumbing and property leak detection programs will be offered. All landscape & irrigation programs will be suspended and IEUA will implement crisis messaging, announcing water for essential use only.

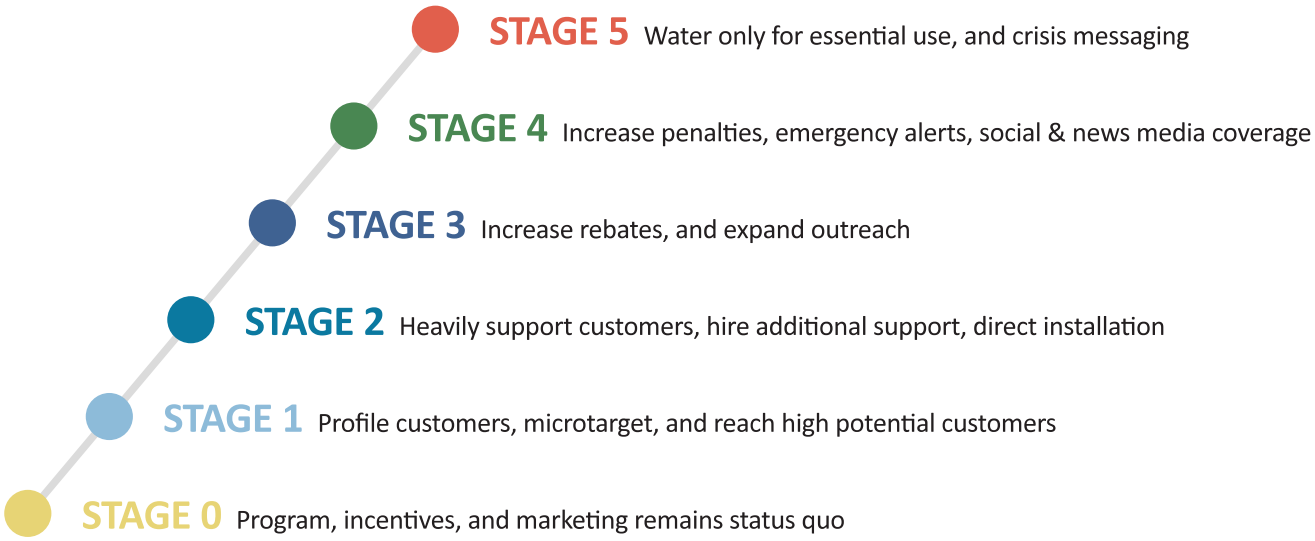


Figure 15. Drought Stage Strategy

6.8 Selected Programs and Services

There are numerous water-saving programs being offered to customers throughout the U.S. today. IEUA and its member agencies selected programs that best meet the needs of the Inland Empire during the next drought cycle.

These programs were selected because: *First*, they target the highest water savings opportunity which is outdoor water usage, and, *Second*, each program is fully scalable to meet escalating needs.

A scalable program Is designed to expand or contract *with ease* for the purpose of aligning with changing circumstances. This is particularly important during escalating drought stages where water agencies have an urgent need to drive increased participation and water savings.

A scalable program typically has mechanisms that can be ratcheted up or down without unbearable stress to the operating organization. Rebate programs are perhaps the most scalable incentive offering. Response can be driven up by increases in incentives and decreases in the complexities of program requirements. A scalable program has 1) market potential, 2) market readiness and 3) market momentum. Each of these has following characteristics:

Market Potential

- Large universe of potential customers
- A high potential for total water savings

Market Momentum

- Customers are interested
- Saturation is on the upswing

Market Readiness

- Sound technologies & solutions that are "tried and true"
- Technologies & solutions are readily available to customers

IEUA and the member agencies, through the plan development taskforce process, identified and selected seven programs and three support services as having the highest market potential, readiness and momentum.

The response programs are described below:

Table 9: Selected Programs

PROGRAMS	DESCRIPTION
Turf Replacement Incentives	$3 per sq. ft. incentive level for turf replacement.
Residential Irrigation Tune Up	Irrigation repairs, nozzle installations, and controller programming provided at no cost to the customer.
Residential Smart Irrigation Direct Installation	Customers receive installation of nozzles, controllers, and flow sensors.
School Smart Irrigation Direct Installation	Provide schools with installation of spray heads, nozzles, and controller programming.
FreeSprinklerNozzles.com	Online ordering and mail delivery of high efficiency nozzles.
Qualified Contractor Smart Irrigation Incentives	Provide approved contractors incentives for nozzles, controllers, drip, and flow sensors.
Home Leak Detection	Provide an incentive for a home leak detection device.

SUPPORT SERVICES	
Landscape Surveys	Provides homeowners with water savings recommendations and links to programs.
Landscape Workshops	Provides instruction on turf replacement & maintenance.
Landscape Design Services	Provides customers with help regarding irrigation system layout, plant selection, soil considerations, and overall design for their WE landscape upgrade project.

Recognizing that the future is unknowable, IEUA understands that unforeseen marketing and water savings opportunities may present themselves at some point during a drought cycle. For this reason, it is recommended to implement a mechanism to fund new, creative approaches or temporary resources.

This plan includes the creation of the WEFlex program which would offer IEUA's retail agencies funds for locally administered activities. The budget would be allocated to each agency based upon the water agencies size (or water sales). An agency could use the funds for local activities such as water waste enforcement and education or recycled water hook ups and permit fees. New technologies or other programs and services could be funded through WEFlex Fund, if approved by the drought response taskforce.

An agency will submit a description of the local activity, estimated costs and potential benefits or results. When accepted, the response taskforce will allocate the funds.

Program and Service Ranking by Drought Stage

Each of the selected programs was ranked by agency representatives to determine its viability during each advancing drought stage. The selection process for these programs and services was conducted by having agency representatives individually rank viable programs as a high (3 points), medium (2 points), or low (1 point) at each respective drought stage level.

This ranking criterion was based on the level of feasibility, appropriateness, and overall impact provided by that program/service at each drought stage. Budgets and program scalability were additional considerations factored into the ranking process. The group also assessed the effect and motivation that escalating drought stages would have on customers and how that, in turn, might drive customers' response for each program/service.

The results were totaled and averaged for each program at each drought stage. Higher numbers reflected a greater expected effectiveness for that program or service. Lower numbers indicated reduced support for the program or service and less likelihood for inclusion in the list of program offerings.

It's important to note that the ranking process provides general consensus and structure for planning, but program ranking is fluid and, as circumstances evolve in the future, the selections and priority levels may change.

Using the high, medium, or low point rubric program rankings were compiled and recorded as shown in the chart on the following page.

	STAGE 0	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
PROGRAMS						
Turf Replacement	1.71	1.86	2.14	2.43	2.71	2.71
Residential Irrigation Tune Up	2.00	2.14	2.43	2.29	2.43	2.43
FreeSprinklerNozzles.com	1.83	1.71	2.00	2.00	2.57	2.57
Qualified Contractor Smart Irrigation Incentives	1.67	1.67	1.67	1.86	2.29	2.29
Residential Smart Irrigation Direct Installation	1.57	1.86	2.14	2.43	2.57	2.57
School Smart Irrigation Direct Installation	1.80	2.20	2.17	2.43	2.57	2.71
Home Leak Detection	1.33	1.33	1.71	1.86	2.43	2.57
SERVICES						
Landscape Surveys	2.00	2.00	2.20	2.00	2.60	2.40
Landscape Workshops	2.00	2.00	2.14	2.43	2.57	2.57
Landscape Design Services	1.57	1.71	1.86	2.14	2.43	2.57

Figure 16. Program Evaluation per Stages

As is shown, generally, the higher the drought stage, the higher the level of program services to be provided by agencies. The reasoning for this is common-sense. Agencies need heightened customer response and they are much more likely to participate in a program when they are provided with free installation and low-cost product or, as with turf incentives, the rebate level is enticingly high.

At each drought stage, it is anticipated that the highest-ranking programs will be those most actively promoted, and those offering attractive customer enticements to participate.

As stages escalate, agencies are prepared to ramp up activity for all programs, but will rely most heavily on Turf Replacement, FreeSprinklerNozzles.com, and direct installation of landscape measures. The number of home surveys, workshops, and design services will also increase.

Home Leak Detection was ranked as the lowest priority program during Stage 0 and Stage 1, and only ramps up significantly in the later drought stages.

It's important to reinforce that the program and services rankings are not absolute and are a suggested template to be adjusted according to circumstances that exist at each actual drought stage.

Actual incentives, services, and roll out schedules will be determined by the taskforce, when the drought stage is declared, and the group is assembled.

6.8.1 Program Cut Sheets

IEUA and its member agencies collectively has selected seven customer programs to be offered during drought conditions. Each program is detailed in an individual write-up contained in Appendix E.

The components of each cut sheet are explained in the diagram on the following page. Following the guide is an example of a program cut sheet for the Turf Replacement Program.

PROGRAM CUT SHEET GUIDE

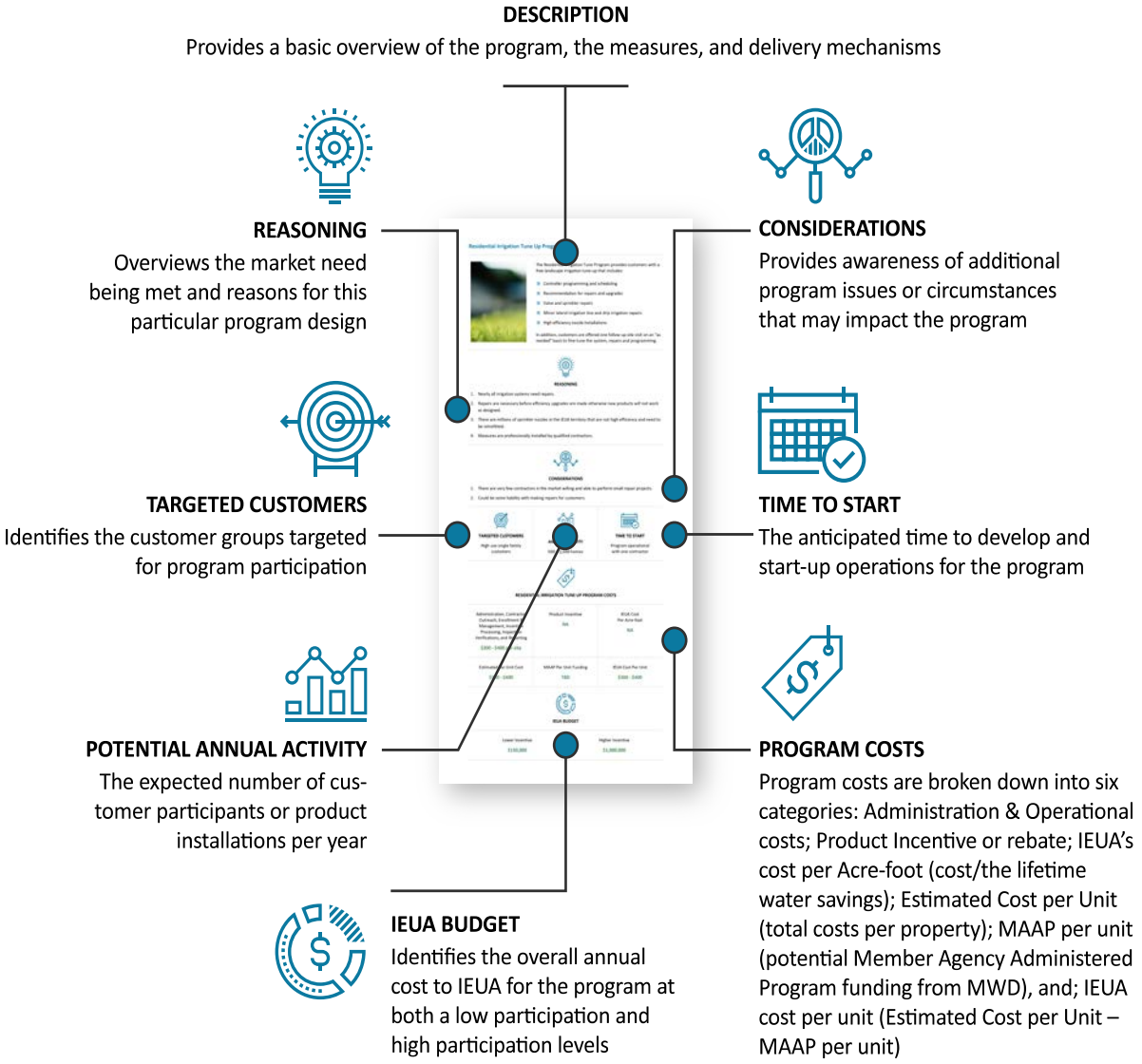


Figure 17: Program Cut Sheet Guide

Program Cut Sheet Example- Turf Replacement Program

Turf Replacement Program



The Turf Replacement Program encourages customers to remove high water-consuming turf and replace it with alternative solutions such as low water-using, regionally appropriate plants and surfaces that allow for ground water infiltration and elimination of runoff. Qualifying applicants are eligible to receive $3 per square foot of turf removed with a maximum incentive of 5,000 square feet for residential customers and 50,000 square feet for commercial customers. Eligible projects must have:

- Three plants per 100 square feet of area transformed
- No hardscape within the transformed area, except permeable hardscape
- A stormwater retention feature
- Replacement or modification of overhead spray sprinklers

For reference, the historical program activity of square feet removed is listed below.

	Residential	Commercial	Total
FY 14/15	119,130	1,136,334	1,255,464
FY 15/16	1,596,789	3,337,120	4,933,909
FY 16/17	255,091	637,916	893,007

REASONING

1. There are hundreds of thousands of square feet of irrigated turf in the IEUA territory.
1. Replacing turf with regionally appropriate plants aids in transforming the market. In a recent analysis done by Western MWD, for every customer replacing their turf, another customer did so without an incentive.
2. Provides long term savings- Current studies have shown that savings increase after the initial plant stabilization period and persist over 10 years or more.

CONSIDERATIONS

1. Turf replacement has an extremely high cost per acre-foot.
1. The market acceptance is low during non-drought times.
2. There are numerous customer barriers: costs, concerns about the new look, and lack of ability to execute projects.
3. Contractors are not interested in projects smaller than 1,000 sf.

TARGETED CUSTOMERS	POTENTIAL ANNUAL ACTIVITY	TIME TO START
All customers with live turf	500,000 – 5 Million SF	Currently operational

TURF REPLACEMENT PROGRAM COSTS

Administration, Contractor Outreach, Enrollment & Management, Incentive Processing, Inspection Verifications, and Reporting ***Covered by Metropolitan through regional vendor***	Product Incentive **$3 per square foot**	IEUA Cost Per Acre-foot **$769 ($ per sf)**
Estimated Per Unit Cost **$3 per sf**	MAAP Per Unit Funding **$2.00 (regional rebate)**	IEUA Cost Per Unit **$1 per sf**

BUDGET

Lower Incentive	Higher Incentive
$500,000	**$5,000,000**

Figure 18. Sample Cut Sheet – Turf Replacement Program

6.9 Messaging and Outreach

If you don't nail the messaging and outreach, the programs are meaningless.

Communication and outreach play a crucial a role in the delivery of water savings as the programs themselves. A strong plan will ensure that IEUA reaches the target audience, boosts awareness, and ultimately, delivers water savings.

For this reason, the Response Plan communications need to:

- Be heard by the right customers, understood, and favorably received.
- Clearly inform the customer of the current stage, tell them what action is desired, and motivate them to respond to the request.

Ultimately, all forms of communications and outreach need to work together throughout the region to raise response and increase water savings per household.

6.9.1 Requirements for An Effective Message and Campaign

The key principle of a successful outreach and communications campaign are:

1. Know Your Customer
2. Get the Message Right
3. Craft an Outreach Plan that Drives Customer Response

Know Your Customer

An organization needs to understand what each customer wants and then provide the I-can't-say-no-offer. Companies experience much higher response rates when they understand and effectively respond to customers' desires.

This requires data analysis, creation of customer personas, and micro-targeting to particular groups of customers. There are numerous analytics programs available today that will help agencies to identify distinct customer groups and personas. By knowing this, IEUA can target market services and program offers with intelligence and precision. Statistics show that micro-targeting greatly boosts customer response. For IEUA, this converts to higher water savings as well.

Get the Messaging Right

Marketing campaigns are most successful when they evoke emotion and resonate with a human need.

An emotional message strategy uses feeling to sell – and this is a much more powerful motivator than logic. An outreach vehicle using this tactic will make the target audience feel an emotional connection to the agency, program, water efficiency measure, and/or call-to-action.

IEUA will need to utilize the following messaging strategies to garner interest and participation from customers:

- *Emphasize the benefits* - What does this particular customer need? Present a solution to their problem.
- *Keep it simple.* - A confused mind says "no." People worry that deceit is hidden amongst the complexity.
- *Make it Fun* - Draw customers in by using fun and catchy messaging, stories, eye-catching visuals, and humor.
- *Use Authority*- Influencing others is easier if customers view the person making the pitch as an authority figure. We all like to listen to and follow an expert. We trust that they know what they're doing.

Two Types of Messaging Required

There are reasons for creating and driving mass audiences through broad messaging and other reasons for targeted action messaging directed to specific audiences. IEUA will need to provide both types effectively during drought conditions.

1. **Broad Messaging:** Broad messaging (delivered via news stories, radio/tv ads, billboards, etc.) gives the widest reach and allows IEUA to communicate overarching messages including:
    - Water Scarcity Issue
    - Urgency to Act
    - Commitment to continue to provide safe, reliable water supply
2. **Targeted Action Messaging:** Targeted action messaging is typically aimed at specific groups of customers, those most likely to respond to your request for program participation or water-use reduction. To promote action, IUEA and the member agencies will need to create messaging content and outreach such as below:
    - Design messaging to motivate landscape changes for single family customers
    - Post success stories – community members, people of prominence, business leaders
    - Promote stories from micro-influencers – Q&A blogs with customers, homeowner success stories, Did-You-Know educational snippets
    - Utilize 3rd party influencers – these individuals are more trusted than a company itself
    - Create a community call to action – "your community needs your help" messaging

Craft an Outreach Plan that Drives Customer Response

Successful outreach campaigns utilize the following strategies:

- Profile your customers to understand each customer's persona
- Micro-target to prospect the right customers for each offer
- Incorporate your strong messaging and influencer authority figures in all offers
- Add personalization
- Demonstrate value and generous offer
- Include a call to action
- Make it easy for customers to say YES
- Follow up and
- Track results
- As stages advance, increase frequency, urgency and intensity

IEUA and its agencies will need a creative and dynamic plan in order to increase customer response and water use reduction, especially during the higher stages.

It's important to note that most agencies still utilize antiquated marketing techniques, with little-to-no market research, standard messages and rudimentary outreach methods.

6.9.2 Successful Outreach Methods

There are major outreach mechanisms to be utilized for general categories of customers. Each outreach approach should be personalized to the group being targeted.

- Direct outreach to high users via personalized means (phone, letter, email, etc.)
- Regional outreach through broad media channels
- Earned media
- Social media
- Grassroots and community outreach

6.9.3 Importance of Influencers & Relationships

It's important to reiterate the essential need for influencers. Influencers are trusted individuals who have a large audience and can reach across media and social platforms. Because of their high level of trust-ability, they're often able to persuade (or "influence") readers and viewers to purchase products or endorse causes that they promote.

Influencer marketing is a highly effective way to reach interested customers and dramatically increase response. They act as a trusted and respected “friend” and customers trust third party influencers more than a company itself.

Who’s Prominent in the Inland Empire:

- Well known business owners/leaders
- Local sports or entertainment figures
- Respected church leaders
- Active PTA parents
- High profile community organizers

6.9.4 Drought Outreach Matrix

Communications and urgency increase as drought stages escalate. Since customers are the means to the water-savings solution, it’s imperative that they understand each drought stage and what’s required of them. Quality messaging will clearly communicate the current drought stage, define the condition, request a desired customer behavior, and direct them to solutions.

An overview of Drought Outreach per Stage is provided on the following pages.

Stages	0	1	2	3	4	5
Messaging	Overall preparedness and drought resiliency. Drought will be a regular occurrence.	What ***Watch*** Condition Means	What ***Warning*** Condition Means	What ***Emergency*** Condition Means	What ***Critical*** Condition Means	What ***Catastrophic*** Condition Means
Desired Behavior	Get customers to install drought resilient landscapes & smart irrigation prior to the next drought.	Minimum **1-5%** decrease in water use	Minimum **6-15%** decrease in water use	Minimum **16-25%** decrease in water use	Minimum **25-50%** decrease in water use	**Water used for only essential functions**
Outreach Strategies	Evaluate your specific community and the customers in your service territory to determine a compressive plan using a combination of the following strategies and tactics. Each approach should be personalized to the group you are targeting. ☐ Direct outreach to high users ☐ Regional outreach through broad media channels ☐ Social media outreach ☐ Grassroots and community outreach					
Tactics	☐ Social media toolkit for community influencers ☐ Grassroots training program for community groups, local organizers and high school students to share messages in their community (includes toolkit)					
	☐ Fact sheet describing each stage, the meaning and the impact to both current landscapes and drought resilient landscapes		☐ Fact sheet describing the stage level and how that impacts customers – one per stage with need action for each level ☐ Social media posts with messages and steps for how customers can respond to the appropriate stage ☐ "How to respond" fact sheet for each stage			
	☐ Case studies and feature pitches of successful landscape transformations (videos telling the stories, write-ups and photos) ☐ By-line articles by local influencers placed in local publications		☐ News release about stage and actions that need to be taken			

Stages	0	1	2	3	4	5
Tactics (con't)	☐ General informational flyers about drought resiliency and sustainable landscaping		☐ Website ☐ Bill inserts ☐ Social media reminders (some promoted posts)		☐ Wireless Emergency Alerts ☐ Personal Localized Alert Network ☐ Website ☐ Social Media	
Message Frequency	☐ Ongoing – worked into all regular organizational messages ☐ Plan for regular messaging		☐ Frequency escalates depending upon budget			

Figure 19. Drought Outreach Matrix

6.10 Voluntary and Mandatory Restrictions

Both voluntary and mandatory restrictions are coupled with public education campaigns to provide customers with information about the purpose for the restriction(s) and the call-to-action. Restrictions are typically highly publicized through local media, web pages, social media, mailings and water bills.

Mandatory restrictions are a more effective tool for drought coping than voluntary measures; however, mandatory restrictions can create heightened negativity directed at the customer's water provider.

Common restrictions include partial or total prohibitions against using hoses to wash paved areas, limits on car washing and filling or refilling swimming pools, and restrictions on watering times.

As drought stages are declared, each agency will implement voluntary and mandatory restrictions as dictated by their respective Water Waste Ordinance. It's important to note a couple details:

1. Each ordinance is unique to a specific water agency and the ordinances differ slightly from one another.
2. Ordinance stages are locally declared and therefore may not align with other agencies or a regionally-declared stage.

Table 10. Water Waste Ordinance by Agency

Agency	Ordinance/Code Title
City of Chino	Municipal Code Water Conservation 13.-5.010 – 13.05.120
City of Chino Hills	Ordinance 300u
Cucamonga Valley Water District	Ordinance 2019-5-1
Fontana Water Company	San Gabriel Valley Water Company Rule No. 14 & Schedule 14.1
Monte Vista Water District	Ordinance 22
City of Ontario	Municipal Code Water Conservation Plan Title 6, Section 8A
City of Upland	Municipal Code 13.16.020 & 13.16.05.050

Each agency is responsible for locally enforcing the ordinance, although enforcement is difficult to maintain. In order to accomplish this, agencies have to add field staffing, deal with administration of the water waste ordinance, and handle the increased level of customer phone calls.

Enforcement is critical to the integrity of the ordinance in the past and remains so for future water shortages. Without action and penalties, the ordinance has no teeth and customers soon recognize this thus nullifying the effectiveness of the initiative.

Typically, violations are reported by community members or visually seen by agency staff. Enforcement staff will then send letters, visit customer properties and educate customers on the importance of adherence for both the resident and the overall community.

The new WEFlex Fund (full description can be found in Appendix E. Response Action Program Cut Sheets) will be available to support agencies' enforcement costs. An agency will be required to present their plan and budget to the taskforce for approval of funds.

Below is a snapshot of each agency's water waste ordinance at respective stages as designated by that agency. As can be seen, not every restriction is required by every agency. Absence of a restriction is shown on the chart by a white square.

6.10.1 Restrictions by Agency

	Chino	Chino Hills	Ontario	Upland	CVWD	Fontana	MVWD
No irrigation run off	Stage 0	Stage 2	Stage 1	Stage 0	Stage 0	Stage 1	Stage 0 (BP)
No irrigation more than 10 minutes						Stage 1	

	Chino	Chino Hills	Ontario	Upland	CVWD	Fontana	MVWD
No irrigation more than 15 minutes	Stage 0	Stage 2					Stage 0 (BP)
No irrigation from 10am - 6pm				Stage 0			
No irrigation from 9am - 4pm					Stage 1		
No irrigation from 9am - 5pm						Stage 1	
No irrigation from 8am - 8pm							Stage 0 (BP)
No irrigation from 6am - 8pm	Stage 0		Stage 1 (6am-6pm)				
Irrigation only every other day	Stage 2			Stage 1 based upon address			
Irrigation only 2 days per week	Stage 1 4pm - 9am			Stage 2 based upon address			
Irrigation only one day per week				Stage 3 based upon address			Stage 2 Saturday only
Irrigation three days per week between 6pm - 6am; based upon address odd/even		Stage 2					
Irrigation two days per week between 6pm - 6am; based upon address odd/even		Stage 3					
Irrigation two days per week between 4pm - 9am; based upon address odd/even			Stage 2				
Irrigation only on Tuesday and Saturday							Stage 1
Irrigation only three days per week - Tues., Thurs., Sat.							Stage 1
Irrigation only 3 days per week depending upon street address						Stage 1	
Irrigation only 2 days per week depending upon street address						Stage 2	
Irrigation only 1 days per week depending upon street address						Stage 3	
No landscape irrigation		Stage 4	Stage 4			Stage 4	

	Chino	Chino Hills	Ontario	Upland	CVWD	Fontana	MVWD
Irrigation shall not exceed 75% of the amount of water used during the same billing period							Stage 1
Irrigation shall not exceed 50% of the amount of water used during the same billing period							Stage 1
Irrigation shall not exceed 33% of the amount of water used during the same billing period							Stage 2
Irrigation only every other day - May 1 - Sept 30	Stage 1						
No irrigation on rainy days	Stage 0	Stage 2 1/10" or more within a 48 hour period					Stage 0 (BP)
No irrigation during and for 48 hours after measurable precipitation		Stage 2			Stage 0	Stage 1	
No irrigation on turf areas public street medians					Stage 6	Stage 2	
No irrigation of landscapes outside newly constructed homes and buildings					Stage 6	Stage 2	
No washing down pavement	Stage 0	Stage 2	Stage 1	Stage 0 if runoff otherwise Stage 3	Stage 0 can use water broom	Stage 1	Stage 0 (BP) with waterbroom
No excess use - breaks and leaks	Stage 0	Stage 2 repair within 48 hours	Stage 1	Stage 0	Stage 0	Stage 1 repair within 48 hours Stage 2 repair within 24 hours Stage 4 repair immediately	Stage 0 (BP) within 7 days
No washing vehicles without bucket or shutoff nozzle	Stage 0	Stage 2	Stage 1	Stage 0	Stage 0	Stage 1	
Restaurants prohibited to serve water - except upon request	Stage 0	Stage 2	Stage 1	Stage 0	Stage 0	Stage 1	
Water fountain or feature without recirculated water prohibited	Stage 0	Stage 2	Stage 0		Stage 0	Stage 1	

	Chino	Chino Hills	Ontario	Upland	CVWD	Fontana	MVWD
Hotels/motels laundering sheets/towels everyday - except upon request	Stage 2	Stage 3		Stage 0	Stage 0	Stage 1	Stage 0 (BP)
No leaving water running while brushing teeth, shaving, soaping, shower or washing dishes						Stage 1	
Commercial car wash not using recirculated water	Stage 0		Stage 0	Stage 1 Also coin-op laundry			Stage 0 (BP)
Single-pass cooling systems	Stage 0		Stage 0				
New cooling towers, decorative fountain and car washes must have reuse system							Stage 0 (BP)
Industrial customer must evaluate their processes for ways to conserve water					Stage 0		
Restaurant using non-conserving spray valves	Stage 1						
Ornamental lakes/ponds filling or refilling - except to sustain aquatic life	Stage 1		Stage 1	Stage 1		Stage 3	
Filling or refilling pools only allowed from 4pm - 8am						Stage 1	
All decorative fountains and pools (non-swimming) shall be drained		Stage 4					
Irrigation of golf course fairways prohibited				Stage 1			
No use of water from fire hydrant other than fire fighting		Stage 2	Stage 1	Stage 1		Stage 1 allows utility maintenance	Stage 1
No vehicle washing except on designated outdoor water use days - Midnight - noon after sundown				Stage 1			
Only fill pool on allowed odd/even irrigation days		Stage 2	Stage 2				
Nurseries, golf courses and other water dependent industries only allowed to irrigate every other day			Stage 2				
No new meters - unless already permitted or to protect public health	Stage 3					Stage 4	

	Chino	Chino Hills	Ontario	Upland	CVWD	Fontana	MVWD
No commitments shall be made to provide water service as part of new land use entitlements		Stage 4					
Nurseries, golf courses and other water dependent industries only allowed to irrigate every third day			Stage 3				
No installation of new landscapes							Stage 2
No water used for construction and dust control		Stage 3 if recycled water is available			Stage 8		Stage 2
No vehicle washing				Stage 3			Stage 1
Nurseries, golf courses and other water dependent industries only allowed to irrigate with handheld			Stage 4				
No non-essential water use i.e. filling pools			Stage 4	Stage 1			Stage 1
				Stages are not numbered: Year round, Moderate shortage, High shortage	*Stages provide ability to mandate % reductions*		*Stages are not numbers: Best practices, Significant shortage, Critical, Emergency*

Figure 20. Water Waste Restrictions per Agency

6.11 Staging Strategy

As drought levels increase, more effort is required from agency customers.

This will happen only if IEUA and member agencies are effective in their mission to reach the right customers and provide the necessary incentive and support.

- Early profiling and micro-targeting of customers will provide great benefit in reaching the right customers, especially as drought stages escalate.
- Stage-by-stage increases in direct installation services, incentives, and penalties will drive higher water savings.
- Clear and frequent communications with customers is required at each stage to inform and motivate.

Below is a recap of the suggested strategic actions to be taken at each drought stage:

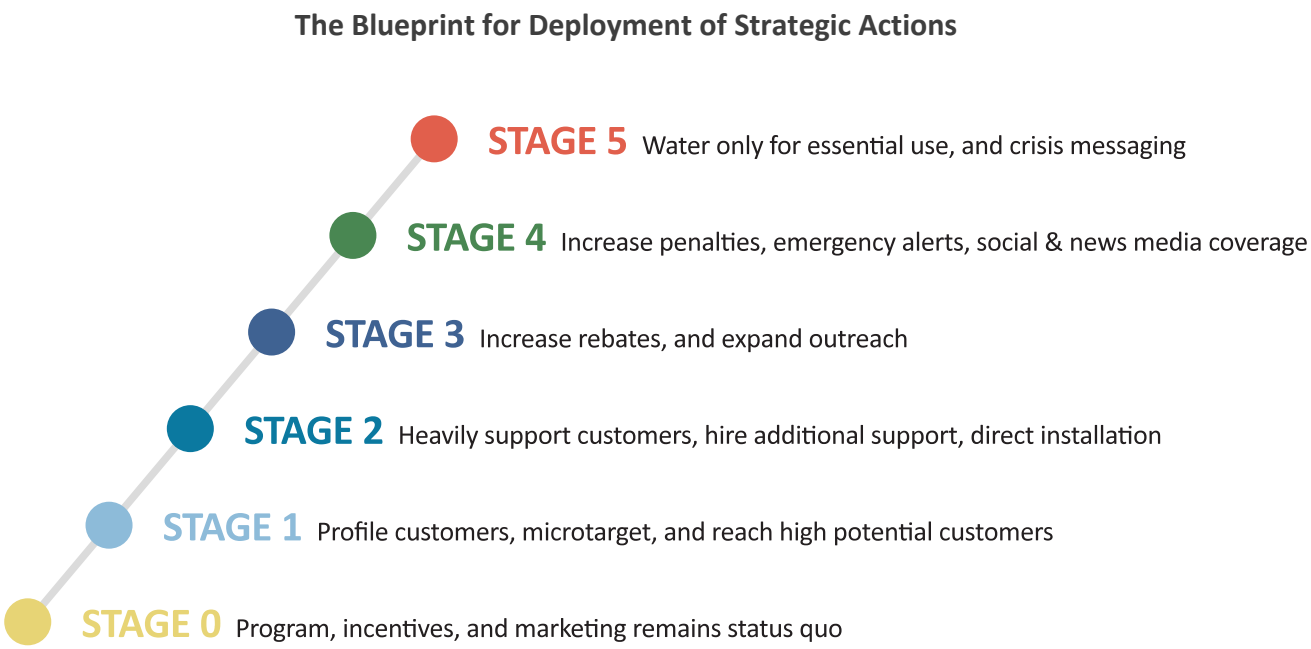


Figure 21. Blueprint for Deployment of Strategic Actions

On the following pages are snapshots of the programs, messaging, and activities for each drought stage:

STAGE 0

Goal: Customers to create drought sustainable properties prior to emergency conditions. Continue working towards goal with current strategies.

Programs:

- SoCal WaterSmart Residential and Commercial Rebates
- Turf Replacement Program
- Residential Irrigation Tune-up
- Home Surveys
- Landscape Workshops
- Design Services

Continue the success of the Residential Irrigation Tune Up Program. Work to increase response for the Turf Replacement Program through increased outreach and a higher level of linkage to support services. Implement the FreeSprinklerNozzles.com with online nozzle ordering and home delivery program. Implement the Leak Detection Pilot program.

Messaging: & Outreach: Reinforce the importance of creating/maintaining a water efficient property as preparedness for future water shortages.

Restrictions: Continue with current restrictions. Stage 0 restrictions vary agency-by-agency.

STAGE 1

Goal: Minimum 1 – 5% decrease in water use.

Programs: Programs remain the same.

Messaging & Outreach: Define ***Watch*** Condition and utilize in general customer messaging.

Begin profiling customers and micro-target high potential customers, utilizing messaging that will best resonate with those customers.

Restrictions: Consider escalation of local water waste prohibitions.

At this stage, agencies will communicate to their customers that there's a need to increase water efficiency levels and will ask everyone to do their part to save.

STAGE 2

Goal: Minimum 6 – 15% decrease in water use.

Programs: Implement direct installation programs including the Residential Smart Irrigation Direct Installation and the School Smart Irrigation Direct Installation. Hire additional landscape designers to expand Landscape Design services. Hold more frequent Landscape Workshops. Increase the volume of Home Surveys performed.

Messaging & Outreach: Define ***Warning*** Condition to use in general customer messaging.

IEUA continues profiling and micro-targeting of high potential customers. Introduce influencer marketing (role models and respected community members).

Restrictions: Prepare WEFlex proposals and plans for expanded customer communication and enforcement administration.

STAGE 3

Goal: Minimum 16 - 25% decrease in water use.

Programs: Continue base programs and increase incentive amounts for turf replacement, high efficiency nozzles, smart controllers, laminar flow restrictor and plumbing flow control valves. Continue smart irrigation direct installation programs.

Messaging & Outreach: Define ***Emergency*** Condition and utilize as general customer messaging.

IEUA expands profiling and micro-targeting to include mid-range water users as well as high-water use customers. Ramp up influencer marketing.

Restrictions: Hire additional local staff and set up operations for expanded customer communication and enforcement administration.

STAGE 4

Goal: Minimum 25 - 50% decrease in water use.

Programs: Continue increased incentives and smart irrigation direct installation programs.

Messaging & Outreach: Define ***Critical*** Condition and use as general customer messaging

IEUA and Agencies strengthen the message of urgency and the community call to action.

Restrictions: Increase penalties, implement emergency alerts and new media coverage.

STAGE 5

Goal: Minimum 50% decrease in water use.

Programs: Only offer indoor plumbing and property leak detection programs. Suspend all landscape & irrigation programs.

Messaging & Outreach: Define ***Catastrophic*** Condition and utilize as general customer messaging.

Implement crisis messaging, announcing essential use only.

Restrictions: Conduct stringent enforcement of restrictions.

7 Operational and Administrative Framework

The general process and respective agency roles for each major plan component are documented in their respective sections. Additionally, this section provides a summarization of tasks and responsibilities as well as the process for updating the plan. The major tasks are:

- Conduct drought monitoring
- Investigate mitigation actions and capital improvement programs (long-term)
- Initiate regional response actions (short-term)
- Update the Drought Contingency Plan

7.1 Roles and Responsibilities

IEUA: IEUA acts as the administrative facilitator of all components of the plan. IEUA is responsible for developing regional demand and supply projections, calculating supply/demand ratio, communicating outcomes, convening the Drought Response Taskforce, implementing response strategies and actions as determined by the Drought Response Taskforce, conducting vulnerability assessments, evaluating and implementing IEUA controlled mitigation actions, and updating the plan.

Member Agencies: Member agencies are responsible for providing demand and supply projections, implementing agency-selected local mitigation actions, participation in the Drought Taskforce, and implementation of response actions including of local programs water waste restrictions.

7.2 Drought Response Taskforce Process

Once the drought monitoring framework indicates that the region has reached a specific stage of drought conditions, several actions will occur.

First, the Drought Response Taskforce will assemble.

The Drought Response Taskforce is the organizational group empowered to:

1) Create the Drought Response Plan blueprint.
2) During drought condition stages, assemble taskforce to finalize strategic response actions.
3) Work with their respective agency to implement response actions, according to plan.

The taskforce is comprised of representatives from each of the eight member agencies, and regional personnel from IEUA. The group works in a collaborative fashion to gain consensus on appropriate regional response actions.

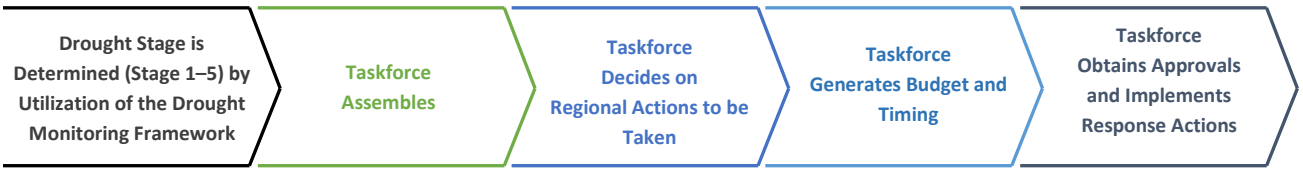
The taskforce will make decisions about the level of program and services, restrictions, and messaging to regional customers. Additionally, it's within the group's purview to determine the level of aggressiveness taken for each element of the plan.

It's important to note that, during a regional drought, an individual member agency may not be experiencing a drought condition due to their local supply mix. In this circumstance, the agency may elect in what capacity to participate in the taskforce and how to best communicate to their customers that locally there are no water supply issues, although the region is undergoing a drought stage.

Looking forwards, the taskforce will work to balance the effectiveness of regional messaging with the differing needs of individual member agencies. There are no pre-determined mandates regarding service offerings, restrictions, communications or budgets. The taskforce will collaborate on policies, while fully supporting flexibility for each agency.

The group will review the proposed actions set forth in the existing plan and make modifications as necessary. The plan was intended to be flexible and changeable. Modifications to the plan might include a change in incentive levels or program delivery mechanisms. There may also be a new water-saving technology that should be offered to customers. The taskforce might be able to secure additional grant funding, as well. Once the action plan is finalized, the taskforce will implement the programs, penalties, and communications plan, as agreed upon.

An overview of the drought response process is below:



7.3 Drought Contingency Plan Update

The Drought Contingency Plan is a working document and, as such, may be modified and updated as impactful changes occur such as another prolonged drought or increased legislative mandates. IEUA will regularly review the plan and make adjustments accordingly.

Changes and/or reviews of the plan should take place in line with the following conditions:

- Annually to assess the functionality and overall performance
- Updates to the Integrated Resource Plan
- Every 5 years to meet the Urban Water Management Plan report cycle
- As the State's Water Use Efficiency Framework policies are finalized

7.4 Operational and Administrative Summary

The table below overviews the activities, responsibilities, roles, for procedures for the operation and administration of the DCP.

Table 11. Operational and Administrative Framework

Activity	Responsibilities	Roles	Procedures
Monitoring	Collect and distribute indicator data	IEUA	Distribute identified data to member agencies via email, once a year.
	Develop annual demand projections	IEUA	Include demand projections with indicator data, annually.
	Report on projected annual supplies and demands	Member Agency Water Managers	Provide annual supply and demand projections, each year to IEUA via email.
	Review projection data and convene Taskforce (as needed)	IEUA	Determine the supply/demand ratio (regionally and for the individual member agencies) and if a regional shortage is predicted, convene the Taskforce within two weeks.
Mitigation Actions	Evaluate and prioritize mitigation projects	IEUA and Member Agencies	Continued support of regional planning efforts.
	Strategically pursue Implementation	IEUA and Member Agencies	Identify and secure funding for high-priority actions.
Response Actions	Review regional shortage conditions	Drought Response Taskforce	Once shortage is predicted, meet and review the regional conditions.
	Decide what regional actions to take	Drought Response Taskforce	Considering regional and agency-level shortage, formulate a strategy to achieve needed reductions based on consensus of the Taskforce.
	Generate budget and timing for implementation	Drought Response Taskforce	Based on consensus of the Taskforce.
	Obtain approval and implement actions	Drought Response Taskforce	Present proposed actions and budget to the IEUA Board and member agency Boards as appropriate.
Update DCP	Plan evaluation	IEUA	Annually conduct a review of the supply/demand projection reporting, identify data gaps and inefficiencies. Streamline and correct shortfalls. If response actions initiated, conduct review of results and modify plan.
	Updating the plan	IEUA and Member Agencies	Comprehensive review of DCP and updates to the framework as needed.

8 References

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Appendix A: Summary of Demand Projections Method and Rationale

IEUA Drought Contingency Plan

Demand Projections

There are numerous approaches available for projecting urban water demands. Both the 2015 IEUA Regional Urban Water Management Plan (UWMP) and the 2016 Integrated Water Resources Plan (IRP) applied elaborate data intensive methodologies to develop long-term projections within the service area for planning purposes. Included in these projections are varying levels of uncertainty as the time-horizon extends ten, fifteen, twenty, and out to thirty-five years into the future. Factors that influence demands include indoor and outdoor water use practices, urban development, annual precipitation, and population growth. Due to the nature of these uncertainties, the IRP provides ranges for future demands as low-, medium-, and high-projections.

For the purposes of the drought monitoring framework however, the demand projections are needed for very near-term planning and are intended to reflect the estimated water-use from one year to the next on a monthly time-step. Water demands are often strongly correlated from one year to the next as water practices are generally slow to shift to more or less efficient practices, and development is typically a gradual process. On the other hand, annual precipitation and other water restrictions can vary significantly from one year to the next.

The proposed approach for the IEUA drought monitoring framework demand projections would rely on the rolling average for the previous five years for each member agency. This approach is consistent with the timeframe used for wastewater projections which also relies on a five-year historical average. In addition, the five-year averages for the monthly demands were compared to the three-year averages for each of the member agencies and found to be relatively similar in most cases, though there were some variations. The member agency monthly averages for the previous three- and five-year periods are attached are on pages 3-5 of this Appendix.

For the drought monitoring framework, monthly demands for the five previous years would be averaged and used for the current year's monthly projections. These demand values would be provided as reference to the water managers when they generate their four-month supply projections for the drought monitoring purposes. If there are local circumstances or external drivers that have significantly shifted the expected demands from the historical averages, the water managers could adjust the demands as they saw necessary. For reference, Table 1 provides the five-year averages for each member agency based on data from the Chino Basin Watermaster for the fiscal years 2013/2014 through 2017/2018. In addition,

Table 2 shows an example of the projected 4-month demands for the City of Chino starting at the end of July 2019.

Based on further feedback from the member agencies, this approach for generating demand projections will be incorporated into the Drought Monitoring TM, and eventually the Drought Contingency Plan.

TABLE 1. FIVE-YEAR MONTHLY AVERAGES FOR IEUA MEMBER AGENCIES (AC-FT)

	Chino	*Chino Hills*	*CVWD*	*Fontana*	*MVWD*	*Ontario*	*Upland*	*SAWCo*
July	1,503	1,526	5,183	4,121	1,721	3,428	2,181	1,156
August	1,516	1,505	5,227	4,050	1,645	3,436	2,207	955
September	1,390	1,393	4,622	3,669	1,602	3,165	1,937	921
October	1,292	1,246	4,159	3,417	1,400	2,921	1,764	864
November	1,119	1,046	3,416	2,860	1,136	2,476	1,399	813
December	933	810	2,846	2,539	988	2,173	1,152	770
January	886	793	2,730	2,477	936	2,084	1,103	734
February	859	759	2,583	2,381	1,022	1,964	1,091	770
March	973	870	2,945	2,699	915	2,229	1,259	857
April	1,197	1,064	3,778	3,132	1,195	2,645	1,498	1,005
May	1,281	1,207	4,076	3,374	1,395	2,842	1,634	975
June	1,383	1,327	4,642	3,706	1,483	3,118	1,885	1,075
Total	14,332	13,545	46,206	38,427	15,437	32,481	19,109	10,894

TABLE 2. CITY OF CHINO 4-MONTH PROJECTION EXAMPLE – END OF JULY

	Projected 2019			
Supplies	***Aug.***	***Sept.***	***Oct.***	***Nov.***
Chino Basin GW				
Other GW (CDA, desalted)				
Imported (IEUA, treated by WFA)				
Recycled[1]				
Shortage Verification	***Target (AC-FT)***			
Demand[2]	***1,516***	***1,390***	***1,292***	***1,119***
Supply/Demand Ratio				

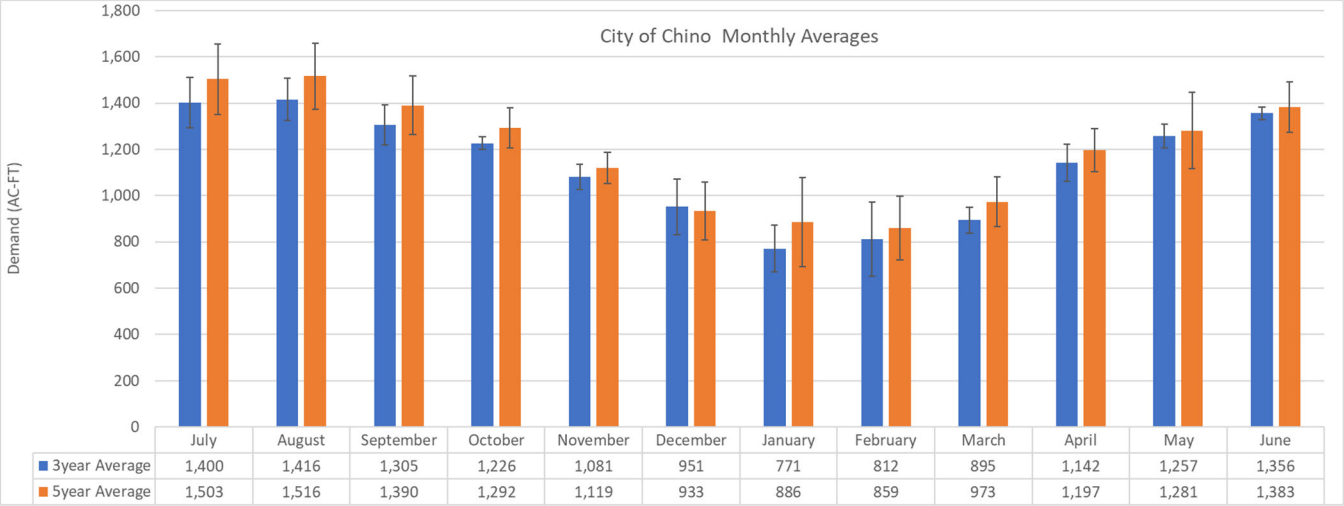
To be provided by the Member Agency

[1] For information only (not used in calculation of Supply/Demand Ratio)

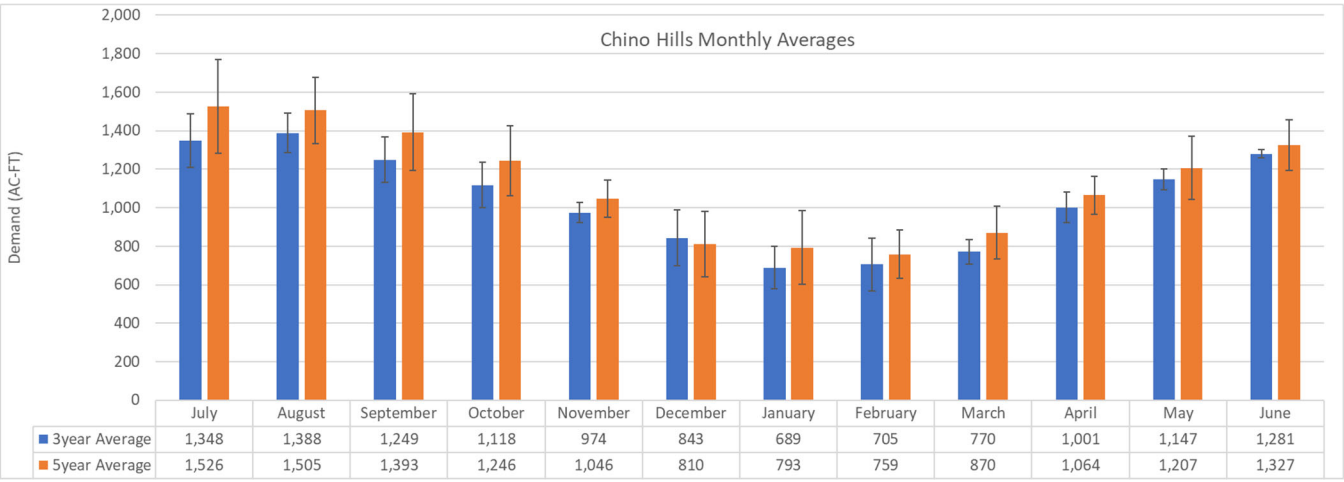
[2] Not including non-potable demands (i.e. purple pipe deliveries)

Monthly Demand Averages for IEUA Member Agencies

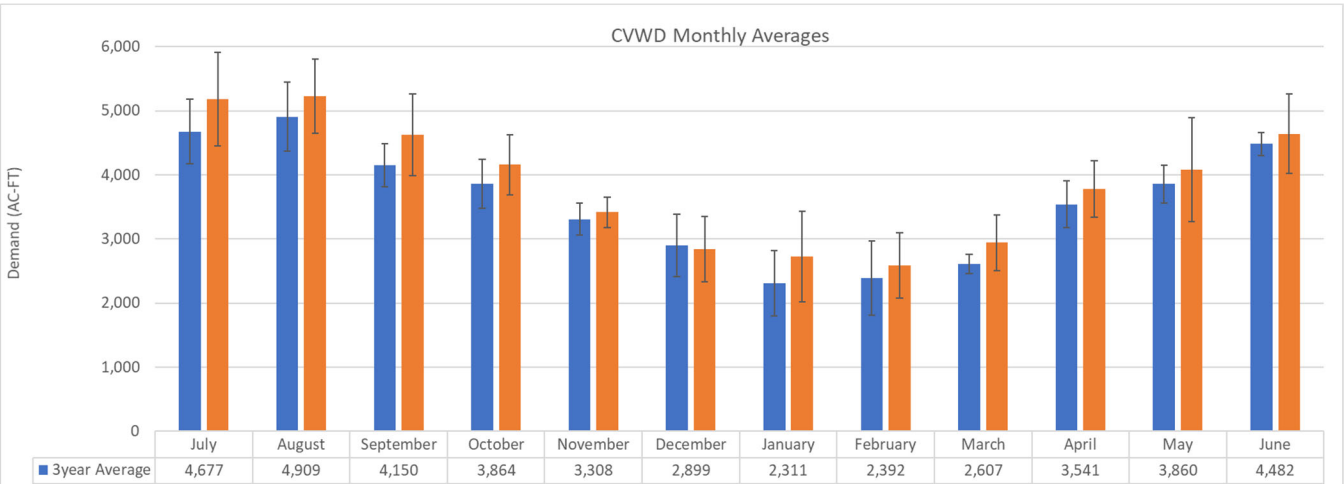
3-Year Average (FY15/16 -FY17/18) and 5-Year Average (FY13/14-FY17/18)



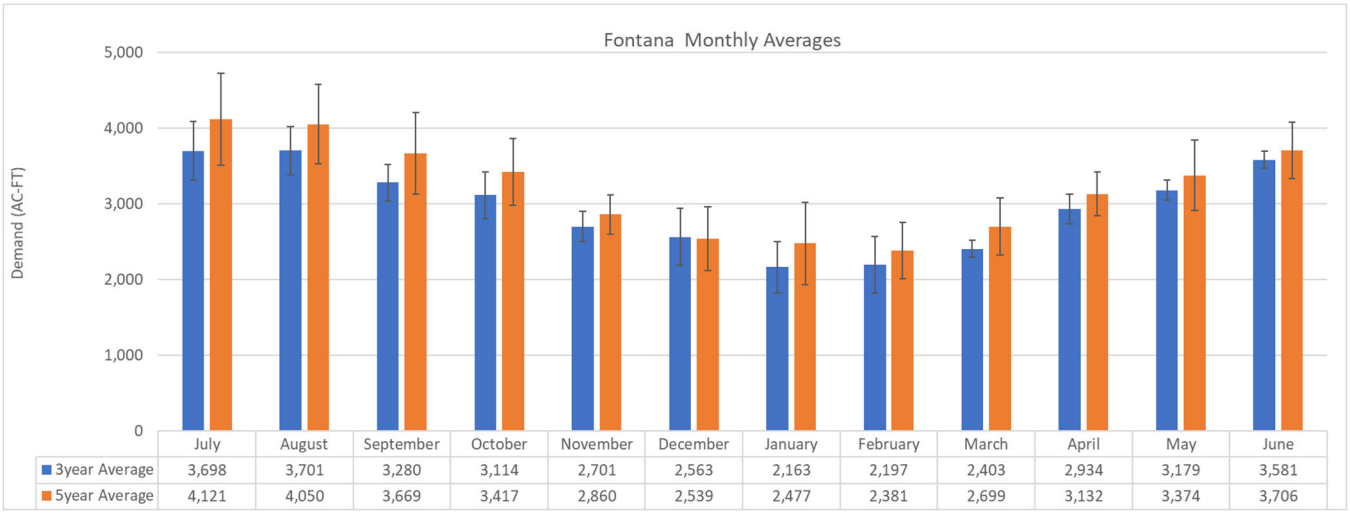
	July	August	September	October	November	December	January	February	March	April	May	June
3year Average	1,400	1,416	1,305	1,226	1,081	951	771	812	895	1,142	1,257	1,356
5year Average	1,503	1,516	1,390	1,292	1,119	933	886	859	973	1,197	1,281	1,383



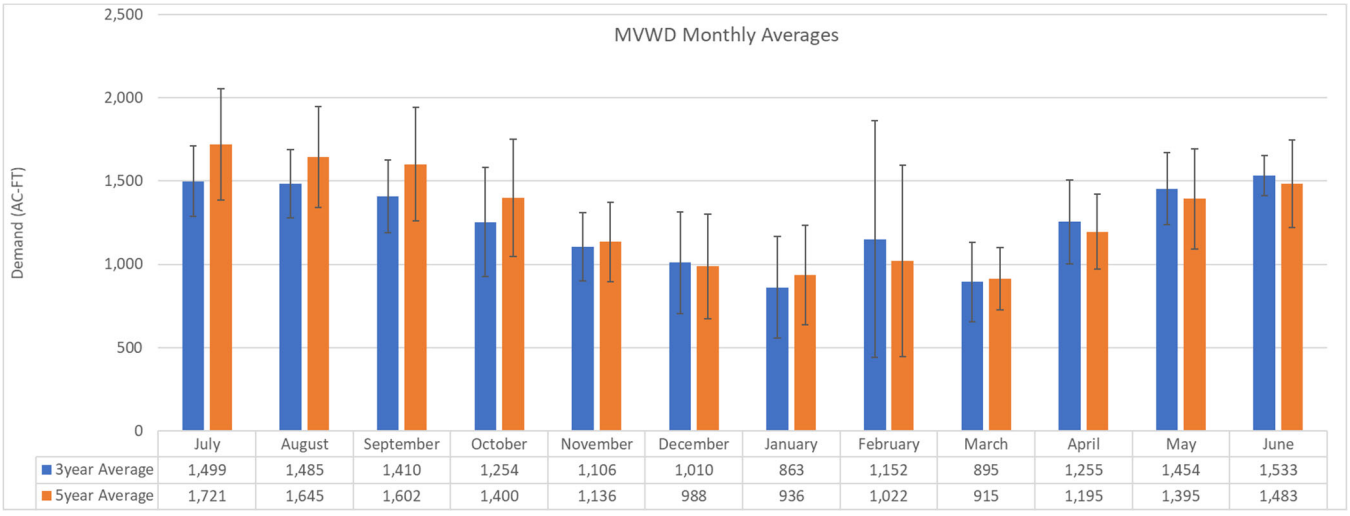
	July	August	September	October	November	December	January	February	March	April	May	June
3year Average	1,348	1,388	1,249	1,118	974	843	689	705	770	1,001	1,147	1,281
5year Average	1,526	1,505	1,393	1,246	1,046	810	793	759	870	1,064	1,207	1,327



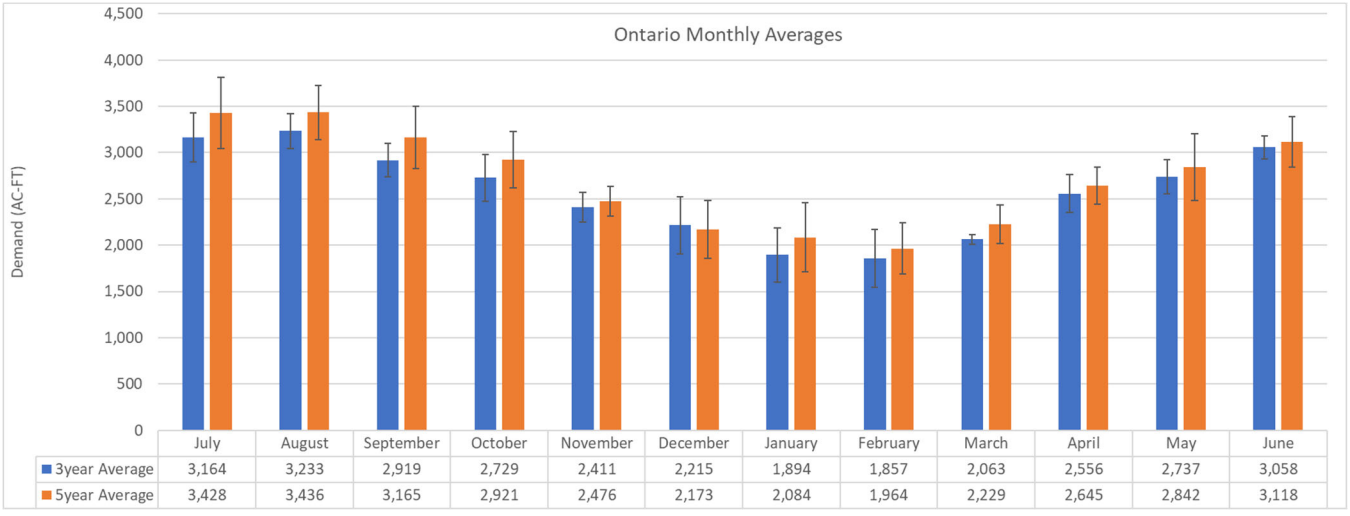
	July	August	September	October	November	December	January	February	March	April	May	June
3year Average	4,677	4,909	4,150	3,864	3,308	2,899	2,311	2,392	2,607	3,541	3,860	4,482
5year Average	5,183	5,227	4,622	4,159	3,416	2,846	2,730	2,583	2,945	3,778	4,076	4,642



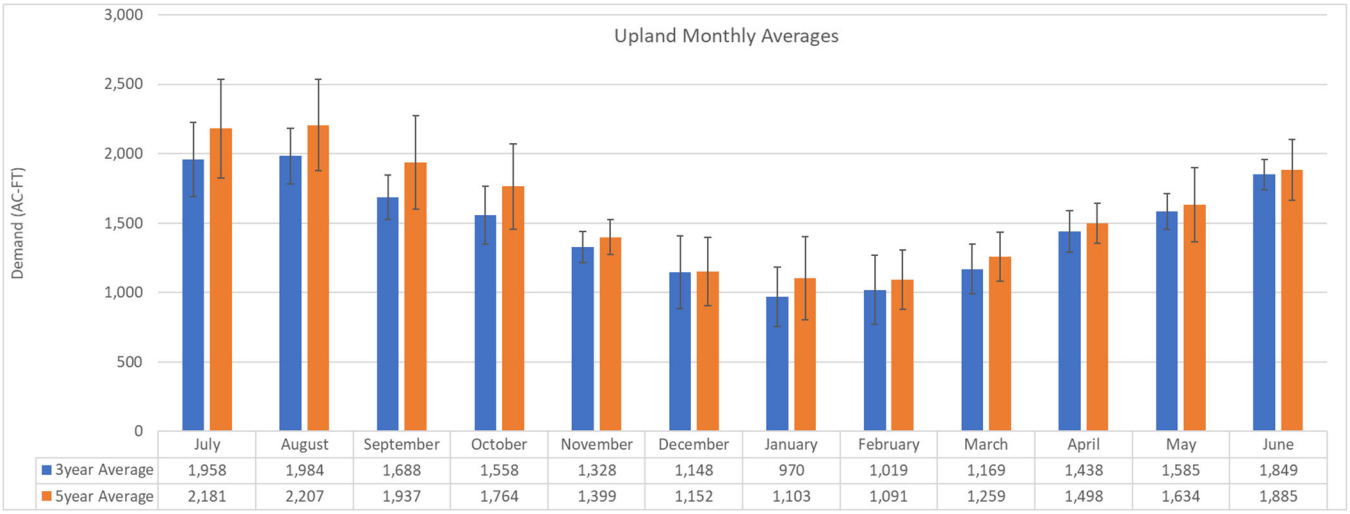
	July	August	September	October	November	December	January	February	March	April	May	June
3year Average	3,698	3,701	3,280	3,114	2,701	2,563	2,163	2,197	2,403	2,934	3,179	3,581
5year Average	4,121	4,050	3,669	3,417	2,860	2,539	2,477	2,381	2,699	3,132	3,374	3,706



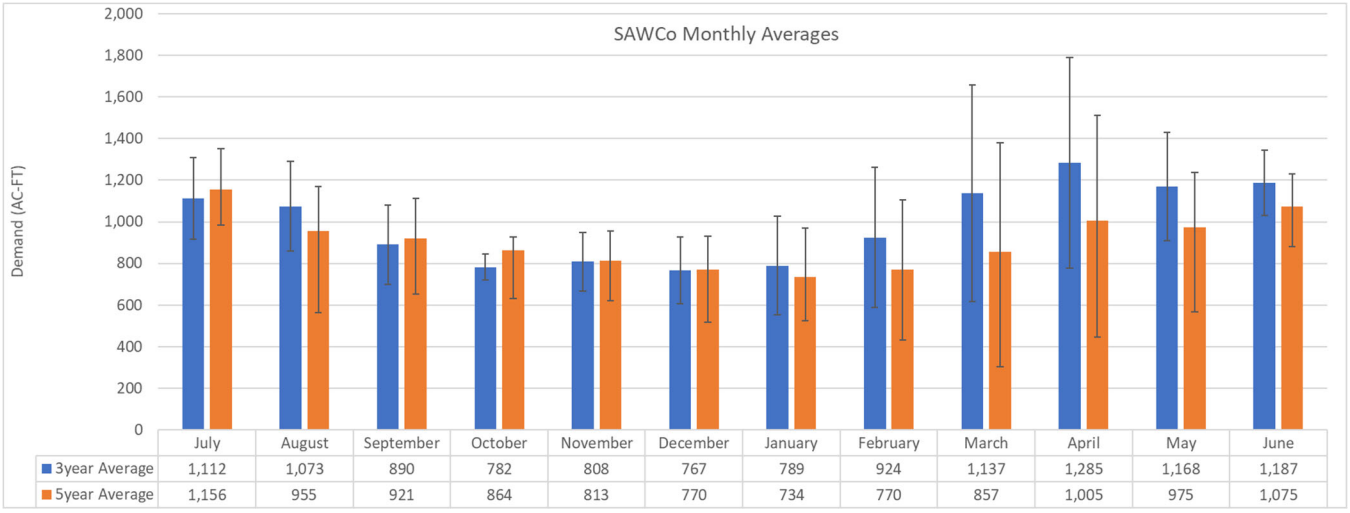
	July	August	September	October	November	December	January	February	March	April	May	June
3year Average	1,499	1,485	1,410	1,254	1,106	1,010	863	1,152	895	1,255	1,454	1,533
5year Average	1,721	1,645	1,602	1,400	1,136	988	936	1,022	915	1,195	1,395	1,483



	July	August	September	October	November	December	January	February	March	April	May	June
3year Average	3,164	3,233	2,919	2,729	2,411	2,215	1,894	1,857	2,063	2,556	2,737	3,058
5year Average	3,428	3,436	3,165	2,921	2,476	2,173	2,084	1,964	2,229	2,645	2,842	3,118



	July	August	September	October	November	December	January	February	March	April	May	June
3year Average	1,958	1,984	1,688	1,558	1,328	1,148	970	1,019	1,169	1,438	1,585	1,849
5year Average	2,181	2,207	1,937	1,764	1,399	1,152	1,103	1,091	1,259	1,498	1,634	1,885



	July	August	September	October	November	December	January	February	March	April	May	June
3year Average	1,112	1,073	890	782	808	767	789	924	1,137	1,285	1,168	1,187
5year Average	1,156	955	921	864	813	770	734	770	857	1,005	975	1,075

Appendix B: Summary of Member Agency Water Shortage Stages

IEUA Drought Contingency Plan

Cucamonga Valley Water District Existing Water Shortage Stages

Stage	Water Supply Condition*	Reduction (shortage imposed)	Response Action Type
1 - Encouraging Water Use Efficiency	Normal Supply	0%	Stage 1 = Mandatory Prohibited Water Practices.
2 - Water Watch	Supplies reduced by 10%	10%	In addition to Stage 1, reduce water usage by 10%, invoke outdoor watering conditions.
3 - Water Alert	Supplies reduced by 15%	15%	In addition to Stage 2, reduce water usage by 15%, invoke additional outdoor watering conditions.
4 - Critical Water Alert	Supplies reduced by 20%	20%	In addition to Stage 3, reduce water usage by 20%.
5 - Water Emergency	Supplies reduced by 25%	25%	In addition to Stage 4, reduce water usage by 25%.
6- Severe Water Emergency	Supplies reduced by 35%	35%	In addition to Stage 5, reduce water usage by 35% due to catastrophic event or severe drought, and additional end-user prohibitions.
7 - Water Crisis - Catastrophic	Supplies reduced by 50%	50%	In addition to Stage 6, reduce water usage by 50% due to catastrophic event or severe drought, and non-essential outdoor water may be prohibited and water for construction purposes curtailed.

* Supplies may be reduced below the planned levels due to such causes as extreme (worst case) drought conditions, unplanned outages of local and imported water supply facilities due to earthquakes or other major disasters, prolonged power outages, water contamination, or any other catastrophic loss of supply.

City of Ontario Existing Water Shortage Stages

Stage*	Water Supply Condition	Reduction (shortage imposed)	Response Action Type
0	Normal Supply	5%	Voluntary reductions for water use efficiency.
1	When water conservation goals not met through voluntary reduction or supplies reduced by 10%	Up to 10%	Stage 1 prohibitions implemented to reach 10% mandatory reduction (voluntary restrictions become mandatory).
2	Supplies reduced by 10% to 20%	> 15%	Stage 2 prohibitions implemented to reach at least 15% mandatory reduction.
3	Supplies reduced by more than 20%	> 20%	Stage 3 prohibitions implemented to reach greater than 20% mandatory reduction (includes no use of potable water for construction/grading).
4	Supplies reduced by more than 50%	Up to 50%	State 4 prohibitions implemented to reach up to 50% mandatory reduction (includes significant restrictions on landscape irrigation).

* Stage 0 prohibitions are entirely voluntary. Stages 1 to 4 prohibitions will be progressively implemented according to the severity of the water crisis.

City of Chino Existing Water Shortage Stages

Stage*	Water Supply Condition	Reduction (shortage imposed)	Response Action Type
0	Adequate Water Supply Conditions	0%	Permanent measures / restrictions to ensure water use efficiency.
1	When water conservation goals not met through voluntary reduction or supplies reduced by 10%	Up to 10%	Stage 1 restrictions implemented upon city council declaration of anticipated supply reduction of 10% or less (restricted outdoor irrigation and refill of lakes/ponds).
2	Supplies reduced by 10% to 20%	10% - 20%	Stage 2 restrictions implemented upon city council declaration of anticipated supply reduction of 10% to 20% (increased outdoor irrigation restrictions).
3	Supplies reduced by more than 20%	> 20%	Stage 3 restrictions implemented upon city council declaration of anticipated supply reduction of more than 20% (no water to new land development projects).

City of Chino Hills Existing Water Shortage Stages

Stage*	Water Supply Condition	Reduction (shortage imposed)	Response Action Type
1	Normal Supply	0%	Voluntary Water Conservation Alert: all elements of Stage 2-4 restrictions on voluntary basis.
2	Moderate Water Conservation Alert	Up to 10%	Stage 2 restrictions implemented upon city council declaration of anticipated supply reduction of 10% or less and voluntary conservation does not achieve the desired reduction (restrictions on outdoor irrigation and water features).
3	High Water Conservation Alert	10% - 25%	Stage 3 restrictions implemented upon city council declaration of anticipated supply reduction of 10% to 25% (no refilling of swimming pools or construction dust control).
4	Severe Water Conservation Alert	<25%	Stage 4 restrictions implemented upon city council declaration of anticipated supply reduction of more than 25% (no outdoor water use at any time).

* Stage 1 prohibitions are entirely voluntary. Stages 2 to 4 prohibitions will be progressively implemented according to the severity of the water crisis.

City of Upland Existing Water Shortage Stages

Stage*	Water Supply Condition	Reduction (shortage imposed)	Response Action Type
0	Adequate Water Supply Conditions	0%	Permanent measures / restrictions to ensure water use efficiency.
1	Significant Shortage	n/a	Stage 1 restrictions implemented upon city council declaration of anticipated supply not enough to meet demand (restrictions on outdoor irrigation).
2	High Shortage	n/a	Stage 1 restrictions implemented upon city council declaration of anticipated supply not enough to meet demand, despite Stage 1 restrictions (restrictions for washing vehicles and surfaces outdoors).

* percentages not associated with Stages 1-2

Fontana Water Company Water Shortage Stages

Stage*	Water Supply Condition	Reduction (shortage imposed)	Response Action Type
0	Adequate Water Supply Conditions	0%	Permanent measures / restrictions to ensure water use efficiency.
1	Water Alert	n/a	Stage 1 restrictions implemented if Commission, the utility, or authorized government agency determines that measures are needed to reduce water consumption (restrictions on timing and frequency of outdoor irrigation).
2	Water Shortage	n/a	Stage 2 restrictions implemented if Commission, the utility, or authorized government agency determines that measures are needed to reduce water consumption and further reduction is needed to provide utility service (increased irrigation restrictions).
3	Water Shortage - further demand reductions	n/a	Stage 2 restrictions implemented if Commission, the utility, or authorized government agency determines that measures are needed to reduce water consumption and further reduction is needed to respond to existing available water supply conditions (no dust control or filling of ponds / lakes).
4	"Emergency" Water Shortage	n/a	Stage 3 restrictions implemented upon Commission, the utility, or authorized government agency determines that measures are needed to reduce water consumption due to a critical water shortage emergency. Stage 1-3 are not sufficient to comply with demand reductions (no outdoor water use).

* percentages not associated with Stages 1-3

Monte Vista Water District Existing Water Shortage Stages

Stage*	Water Supply Condition	Reduction (shortage imposed)	Response Action Type
1	Adequate Water Supply Conditions	0%	Permanent measures / restrictions to ensure water use efficiency.
2	Significant Water Supply Shortage	10% - 25%	Stage 2 restrictions implemented if Board of Directors finds that current or near-term water supply conditions require a 10% to 25% reduction (outdoor irrigation restrictions).
3	Critical Water Supply Shortage	25% - 40%	Stage 3 restrictions implemented if Board of Directors finds that current or near-term water supply conditions require a 25% to 40% reduction (irrigation restrictions, no vehicle washing, no refilling of pools) .
4	Emergency Water Supply Shortage	> 40%	Stage 4 restrictions implemented if Board of Directors finds that current or near-term water supply conditions require greater than 40% reduction (no new landscaping, dust control for construction, or water to maintain pools and spas).

Appendix C:
2015 Integrated Water Resources Plan:
Water Supply & Climate Change Impacts 2015—2040
IEUA Drought Contingency Plan

2016

Integrated Water Resources Plan:

Water Supply & Climate Change Impacts 2015—2040



Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

“Our climate is rapidly changing, our population is growing and more extreme weather looms on the horizon. Now is not the time to shirk from responsibility. Storage or conveyance alone will not solve all of our problems. Recycling, groundwater management and conservation, individually, won't get us there either. It will take all of the above. *We must think differently and act boldly* -- and that's exactly what California is doing.”

—Governor Brown

Integrated Water Resources Plan:

Water Supply & Climate Change Impacts 2015—2040

Prepared by:
Inland Empire Utilities Agency

Technical Modeling by:
A&N Technical Services
RAND Corp.
Wildermuth Environmental Inc.

Technical Advisory Committee:
City of Chino
City of Chino Hills
City of Ontario
City of Upland
Chino Basin Water Master
Cucamonga Valley Water District
Fontana Water Company
Monte Vista Water District

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Acronyms

AF	Acre-Feet
AFY	Acre-Feet of water per Year
CBWM	Chino Basin Watermaster
CDA	Chino Desalter Authority
CUWCC	California Urban Water Conservation Council
CVWD	Cucamonga Valley Water District
DWR	Department of Water Resources
DYY	Dry Year Yield
EDU	Equivalent Dwelling Unit
ET	Evapotranspiration
GPD	Gallons per Day
IERCF	Inland Empire Regional Composting Facility
IEUA	Inland Empire Utilities Agency
IRP	Integrated Resource Plan
MGD	Million Gallons per Day
MG	Million Gallons
M&I	Municipal and Industrial
MVWD	Monte Vista Water District
MWD	Metropolitan Water District of Southern California
NPDES	National Pollutant Discharge Elimination System
NRW	Non-Reclaimable Wastewater
OBMP	Optimum Basin Management Plan
OSY	Operating Safe Yield
OWOW	One Water One Watershed

PEIR	Program Environmental Impact Report
RMPU	Recharge Master Plan Update
RTP	Regional Transportation Plan
SAWPA	Santa Ana Watershed Project Authority
SARCCUP	Santa Ana River Conservation and Conjunctive Use Project
SBCFCD	San Bernardino County Flood Control District
SCAG	Southern California Association of Governments
SFR	Single Family Residential
SRF	State Revolving Fund
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TYCIP	Ten-Year Capital Improvement Plan
USBR	United States Bureau of Reclamation
UWMP	Urban Water Management Plan
WEAP	Water Evaluation And Planning Model
WFMP	Wastewater Facilities Master Plan
WUE	Water Use Efficiency
WUEBP	Water Use Efficiency Business Plan



1. Overview & Purpose



Project Background

Climate Change

Phases of the IRP

IRP Development

Planning Process

Agricultural fields, in the City of Ontario.

I. Overview & Purpose

PROJECT BACKGROUND

The 2015 "Integrated Resources Plan: Water Supply & Climate Change Impacts 2015—2040" (IRP) is our region's blueprint for ensuring reliable, cost-effective, and environmentally responsible water supplies for the next 25 years. It takes into consideration availability of current and future water supplies and accounts for possible fluctuations in demand forecasts and climate change impacts. This is the first time that the region's planning has gone beyond a regional Urban Water Management Plan (UWMP) and the cities and water agencies (Agencies) have worked collaboratively to develop a comprehensive water resources plan. The sphere of influence for the 2015 IRP is the Inland Empire Utilities Agency's (IEUA) service area which is in southwestern San Bernardino County shown in Figure 1-1.

Two key goals of this IRP are to integrate and update water resource planning documents in a focused, holistic manner and to develop an implementation strategy that will improve near-term and long-term water resources management for the region. In addition, the IRP evaluates new growth, development, and water demand patterns within the service area and conducts an assessment of water needs and supply source vulnerabilities under climate change.

Although this is the first IRP that the region has developed, from 2000 to 2002 the region developed four foundational master planning documents which, together, functioned as an IRP. These historical documents illustrated how, since 2000, the region has recognized the increasingly uncertain future of imported water supply availability and the importance of local water supplies, particularly now with changing climate conditions. As part of its response, the region has focused infrastructure investments on local water supply development strategies to reduce dependence on imported supplies and increase drought resilient water sources (see Appendix 1 for a detailed description of foundational planning documents). These foundational documents are:

1. Chino Basin Water Master's Optimum Basin Management Plan (2000)
2. Chino Basin Organics Management Strategy (2001)
3. Recycled Water System Feasibility Study (2002)
4. Wastewater Facilities Master Plan (2002)

These documents were linked together in the 2002 IEUA Facilities Master Plan Programmatic Environmental Impact Report (EIR).

Water resources management strategies were further updated as part of the 2005 and 2010 UWMP. Individual programs were developed in reports such as the 2002 Salinity Management Plan, 2005 Recycled Water Implementation Plan, 2007 Recycled Water Three Year Business Plan, 2013 Recharge Master Plan Update, 2015 Recycled Water Program Strategy, 2015 Facilities Master

Plan Update, 2015 WUE Business Plan Update, and 2015 Energy Management Plan. The number and scope of regional planning documents that have been developed in the past 15 years illustrate both the commitment to local resource development and the emphasis on water resources sustainability.

An additional driver for the creation of the IRP was the need to strategically position the region for upcoming funding opportunities. By leveraging these funding opportunities for local projects, the region will be less vulnerable to the anticipated imported water rate increases of 4-5% annually through the next decade (MWD 2016 Forecast). The past success of the region to secure grant funding of over $258 million has made the expansion of the groundwater recharge, recycled water, and conservation programs possible. Over the next two years, more than a billion dollars of state and federal grants and loans will be available to support additional water supply development. The IRP will help position the region to pursue these funding opportunities by identifying regional water resources programs and ultimately project priorities.

CLIMATE CHANGE

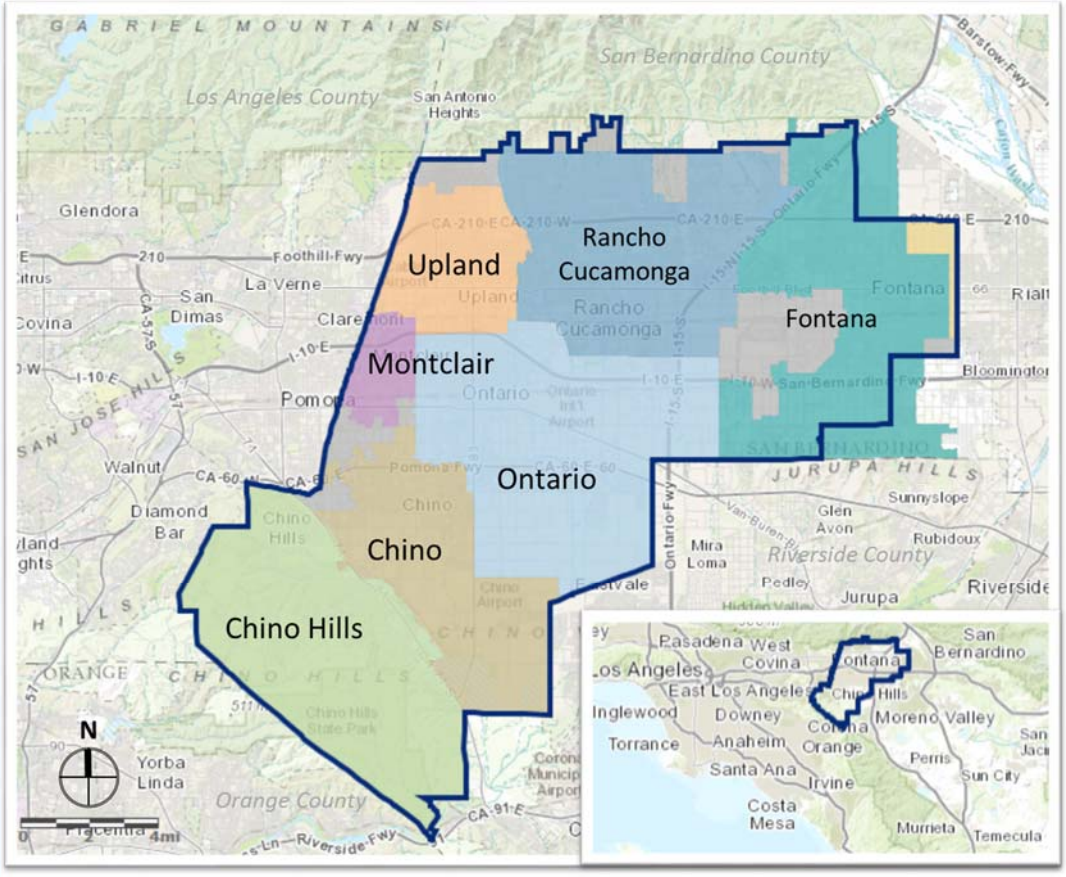
Climate change impacts have already started to create critical challenges for water resources management in Southern California. More intense storm events and the changing frequency and duration of drought years are becoming evident throughout the State and the West. This makes future water supplies available to the region more uncertain, particularly imported water resources that are uniquely vulnerable to changes in the state's snowpack.

General climate change trends projected for California are that temperatures will increase and precipitation will increasingly fall as rain rather than snow. These trends will impact water supplies in two ways: higher

The planning principal which guides the IRP is:

"… to plan for a deeply uncertain future and develop a robust strategy that can adapt and respond to a wide range of possible futures with changing conditions."

Figure 1-1: IRP Regional Planning Area Boundary



temperatures will cause increased water demands; however, infrastructure to capture rain runoff is limited as water infrastructure in California was designed to capture slow melting snowpack not rapid stormwater.

In addition, droughts are expected to occur more frequently, more intensely, and last longer. The Natural Resources Defenses Council (NRDC) estimates that if nothing is done to address the implications associated with climate change, between the years 2025 and 2100, the cost of providing water to the western United States will increase from $200 billion to $950 billion per year.

The IRP recognizes and incorporates an assessment of a range of impacts that climate change could have on water supplies for the State and region. This is done by using downscaled climate models from the Intergovernmental Panel on Climate Change (IPCC) Assessment. This IRP does not rely on historical hydrology to predict the future, but instead gathers data available from the latest climate models to project a wide range of possible future climate conditions. The information was used as a sensitivity analysis to help identify the most climate resilient water strategies and priorities for the region. This approach was selected to provide the region with a better understanding of how to effectively plan and prepare for how climate uncertainty affects our water supplies.

"Paleoclimate climate analysis has established that hydrology has the potential to vary far more widely than has been recorded in the observed record. This means that, given the scientific evidence supporting climate change, we need to look beyond historical observations to ensure that we have adequate water supplies."

"Strategies and Resources for Evaluating and Adapting to Climate Change Effects: Climate Change is Real –Now What?" Stanford Report. Fall 2014.

PHASES OF THE IRP

The development of the IRP is being done in two phases.

Phase 1 – Analysis and Recommendations: Phase 1 focuses on an extensive analysis of future projected water needs and water supply strategies under conditions of climate change and growth. Results from Phase 1 include summaries of the recommended regional water resource strategies; corresponding ranges of costs for the various supply categories; and a regionally developed, all-inclusive list of potential supply projects (local and regional). This information will be used to complete a Programmatic Environmental Impact Report (PEIR), which is needed to ensure that selected projects are grant eligible. The IRP report is the culmination of Phase 1.

Phase 2 – Implementation and Capital Improvement Program (CIP): Phase 2 will address additional detailed project level analysis including project scopes, costs, prioritization, and implementation scheduling. Phase 2 will also include the disaggregation of the regional demand and supply to the local retail level. Continued discussions will be facilitated through a Regional Water Forum. Phase 2 is anticipated to begin in Summer 2016.

IRP DEVELOPMENT

The IRP was developed from 2013-2015 by the IEUA Planning and Environmental Resources Department in conjunction with stakeholders including regional technical staff, water managers, and joint IEUA Board and Regional Policy Committee workshops.

IRP Technical Work Group: The IRP Technical Work Group consisted of IEUA member agencies, which includes the seven contracting sewerage agencies, and the retail water agencies within the IEUA service area. Meetings were held one to two times each month to discuss modeling assumptions, verify projections, establish project lists, and examine modeling results in detail. Modifications to methodology and clarifications were made with this group.

Water Managers Work Group: After technical items had been discussed and vetted, core findings and recommendations were presented at the monthly Water Managers Work Group meetings.

Joint Board and Policy Committee Workshops: The results from the IRP modeling and recommendations from the Technical and Water Managers Work Groups were presented to regional policy makers. These special joint workshops included members from IEUA's Board of Directors and the regional policy makers from the Regional Sewerage Policy Committee, as well as board members from the Monte Vista Water District (MVWD), and the General Manager from Fontana Water Company. These meetings served to update policy makers about the progress being made with the IRP as well as to receive policy direction.

Goals & Objectives: IRP Goals and Phase 1 objectives were developed by stakeholders during multiple workshops with the IRP Technical and Water Managers Work Groups, and joint IEUA Board and Regional Policy committee workshops. The overarching goals that guided the IRP process and analysis are:

- *Resilience* — Develop regional water management flexibility to adapt to climate change and economic growth and to any changes that limit, reduce, or make water supplies unavailable.
- *Water Efficiency* — Meet or exceed rules and regulations for reasonable water use.
- *Sustainability* — Provide environmental benefits, including energy efficiency, reduced greenhouse gas emissions, and water quality improvements, to meet the needs of the present without compromising the ability of future generations to meet their own needs.
- *Cost-Effectiveness* — Supply regional water in a cost effective manner and maximize outside funding.

Planning objectives for the 2015 IRP were also developed by the stakeholders. These objectives are:

- Identify key water resource supply vulnerabilities and evaluate different options that could reduce these vulnerabilities.
- Develop multiple water supply strategies to reduce future water supply imbalances.
- Evaluate strategies with different project combinations, or portfolios, to assess resiliency to climate change, including mega droughts and decadal drought impacts across future scenarios, and how the portfolios could improve regional supplies.
- Analyze portfolio results from the Water Evaluation and Planning (WEAP) model simulations to identify key tradeoffs among the portfolios.
- Develop a long-term grant application strategy for priority water resources projects.

PLANNING PROCESS

Phase 1 of the IRP was developed in three parts. The primary objective of Part I was to identity the water resource needs. Needs were developed based on an inventory of current and projected water supplies and demands. In Part 2, the IRP Technical Work Group discussed and developed regional water supply strategies that were then tested through modeling runs completed in Part 3. Individual Stages completed under each part are illustrated in Figure 1-2.

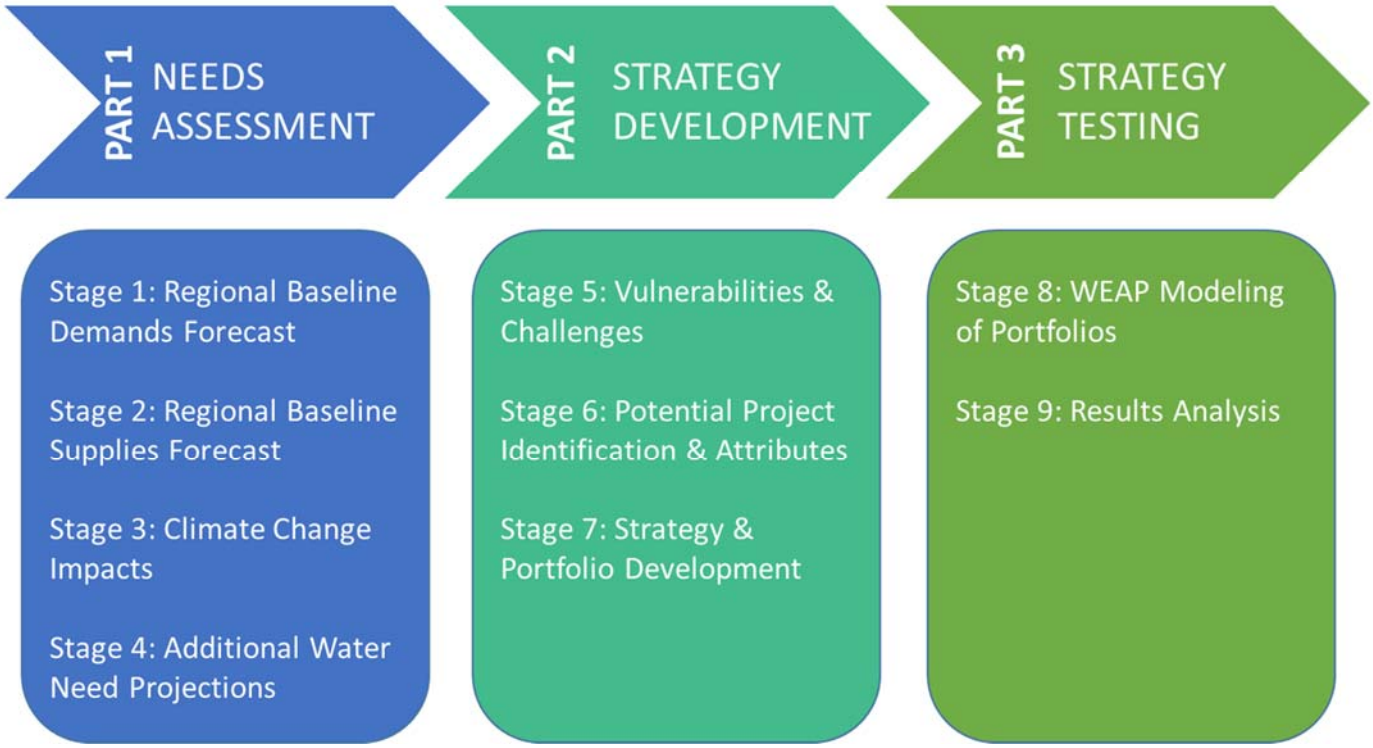
Part 1: Needs Assessment

Stage 1 - Regional Demand Forecast. Water demands for the region were projected from 2015 to 2040 using an econometric model that incorporated factors for economic conditions, growth, water efficiency, housing density, and conservation program investments approved in the FY15/16 Capital Improvement Program. Projected demands were displayed as a range to reflect trend uncertainties. The regional demand forecast is further described in Section 2 of the IRP. A complete technical description of the demand projection modeling by A&N Technical Services for this project is contained in Appendix 1.

Stage 2 - Regional Baseline Supply Forecast. Existing water resources utilized by the region were identified and analyzed to determine trends in water availability and usage through 2040. Water supplies from projects approved in the FY15/16 Ten Year Capital Improvement Program were included in this assessment. Together, these existing and new water supplies are defined as the baseline supplies through 2040.

Stage 3 - Climate Change Impacts. IEUA worked with the RAND Corporation to develop a water demand and supply model to evaluate the impact of climate change

Figure 1-2: IRP Phase 1 Planning Process Diagram



on the IEUA service area. The model, used as a baseline, tabular estimates of IEUA's supplies and demands. A set of 106 climate scenarios for the IEUA region were derived from downscaled general circulation model results used for the Intergovernmental Panel on Climate Change Assessment Reports 3 & 5. These data suggest that regional temperatures would likely increase between 0.5-3.5°F by 2040. Precipitation was highly variable and showed no clear trend across the ensemble of scenarios.

The climate scenarios and baseline water demands and supplies were then entered into a water management model developed in the Water Evaluation and Planning (WEAP) modeling system. The WEAP model used these inputs to estimate how water demands, supplies, runoff, flows, and storage would change under the 106 climate scenarios. This approach highlighted supplies that provided greater reliability and were resilient to climate change impacts. The WEAP model results are summarized in Section 3 of the IRP. A technical description of the modeling and climate assessment is presented in Appendix 3.

Stage 4 - Additional Water Need Projections. Based on the results from Stage 3, the IRP Technical Work Group evaluated the results of the climate modeling to identify the potential water supply shortfalls that the region would need to address to meet future demands. These potential shortfalls were used to develop regional water resources strategies and portfolios during Stage 7.

Part 2: Regional Strategy Development

Stage 5 - Vulnerabilities & Challenges. Key water resources vulnerabilities and challenges facing the region were identified and prioritized by the IRP Technical Work Group. Vulnerabilities and challenges for the region include:

- *Groundwater & Stormwater* — maintaining operational safe yield (OSY); preventing land subsidence; maintaining water quality; and preventing loss of natural infiltration
- *Recycled Water* — addressing increased total dissolved solids (TDS) as a result of indoor water use efficiency programs; regional interest in recycled water exceeding local supplies; competing uses of

existing supplies for direct use and for groundwater recharge; and energy intensity of additional treatment levels for direct potable.

- *Imported Water*— potential for catastrophic interruption; dependence on the MWD Rialto feeder pipeline; and constraints on supplies due to State Water Project (SWP) availability and Colorado River Basin over allocation and drought.
- *Other*— need for infrastructure redundancy; variability of surface water supplies; impact of new energy and water use efficiency standards; increasing salinity in source water; and avoiding stranded assets.

Stage 6 - Potential Project Identification and Attributes. A comprehensive list of potential water supply projects was developed based on previous and parallel planning efforts, including the Recycled Water Program Strategy, Wastewater Facilities Master Plan Update, 2013 Recharge Master Plan Update, Water Use Efficiency Business Plan (WUEBP), FY15/16 Ten Year Capital Improvement Plan (TYCIP), Santa Ana River Conservation and Conjunctive Use Program (SARCCUP), drought project list, and conceptual projects identified during the IRP process.

Individual projects were grouped into larger project categories. In some cases, categories were divided into multiple tiers which allowed the IRP Technical Work Group to either phase in similar projects over time or accelerate implementation by selected multiple tiers. Individual projects were also tagged according to their ability to address challenges and constraints facing the region.

Stage 7 - Strategy and Portfolio Development. Drawing upon information from Stages 3 and 4, the IRP Technical Work Group developed five water supply strategies to understand how combinations of projects could meet future water needs and address the challenges and constraints facing the region. A decision support tool, developed by the RAND Corporation and described in Appendix 3, supported this process. The five water supply strategies are:

- *Strategy 1:* Maximize Chino Basin groundwater, including prior stored groundwater
- *Strategy 2:* Recycled water program expansion
- *Strategy 3:* Recycled water & conservation program expansions
- *Strategy 4:* Maximize supplemental water supplies and recycled water supplies
- *Strategy 5:* Maximize imported water supplies with moderate conservation

A total of eight project portfolios were developed to test the five strategies under the WEAP model. Strategies and results are fully described in Section 4 of the IRP.

Part 3: Strategy Testing

Stage 8 - WEAP Modeling of Portfolios. Each portfolio was run through the WEAP model against the 106 climate scenarios. For comparison, a baseline portfolio that was limited to the baseline supplies identified in Stage 2, was also run through the WEAP model. WEAP model results were evaluated both in terms of the portfolio's ability to meet projected demands and whether surplus supplies were stored or used over time. Results are fully described in Section 4 of the IRP.

Stage 9 - Results Analysis. Portfolio performances were compared to the baseline portfolio results in order to determine the affect of the each portfolio on water supplies. Since there were 106 results per portfolio from the climate runs, it was beyond the scope of Phase 1 of the IRP to evaluate the nuances of the individual climate runs. Instead, the range of results that fell within 75% of the model runs were analyzed. The 75% criteria was chosen to eliminate outlier results which could have large cost implications.

Regional recommendations were developed based on: (a) the ability of a strategy to meet future demands and develop a surplus supply buffer and (b) input from the IRP Technical Work Group on the strategies that best met regional interests. Conclusions are discussed in Section 5 of the IRP. These recommendations will be used to target future grant applications. The development of future water resources projects will be done during Phase 2 of the IRP.



2. Water Demand Forecast



Introduction to Water Demands

Water Demand Setting

Methodology

Urban M&I Demand Projection Variables

Urban M&I Demand Forecast

Additional Water Needs Forecast

Total Regional Demand Forecast

View of single family residential homes in Chino Hills

II. Water Demand Forecast

INTRODUCTION TO WATER DEMANDS

Section 2 outlines the process used to identify water demands for the region through 2040. These water demands include urban, environmental, and regulatory needs. Urban demands, also known as retail municipal and industrial (M&I) demands, represent the full spectrum of urban water use within the service area including commercial, institutional, industrial uses, and residential service for approximately 844,000 people. In addition to urban demands, regional water demands also include environmental discharge obligations to the Santa Ana River and contractual water commitments.

WATER DEMAND SETTING

Since the 1990s, approximately 90% of the region's water demands have come from urban M&I users with the remaining 10% coming from agricultural users (source: 2010 IEUA UWMP). Overall urban water demand since 1995 has increased by approximately 20%, despite a regional growth of 30% (approximately 200,000 more residents). This is indicative of new water use behaviors, such as efficient irrigation and more efficient indoor fixtures, which prolong the availability of current regional water supplies into the future. The 2010 UWMP estimated total urban demand by the year 2015 to be approximately 272,000 acre-feet per year (AFY). However, actual demands have grown more slowly, increasing by only 3,000 acre-feet (AF) over the past four years from approximately 197,000 AFY in FY2010/11 to 200,000 AFY in FY2014/15 as shown in Figure 2-1. This is due in part to delayed growth as a result of the economic recession, as well as changes in plumbing code, implementation of water use efficiency programs, and responses to current water supply challenges such as the drought that California has been experiencing since 2012.

The impact of plumbing code changes and the implementation of water use efficiency programs was quantified in the recent 2015 WFMP flow monitoring. IEUA monitoring of new versus older residential developments showed that urban usage patterns have decreased from a regional indoor flow average of 55 gallons per capita per day (GPCD) down to 37 GPCD in new developments. This is consistent with new development trends throughout California (Codes and Standards Research Report: California's Residential Indoor Water Use. May 2015). This indicates that future developments will require less water, reducing the overall regional need for additional water supplies. This shift has significant implications for future wastewater and recycled water planning. Regional treatment plants may not need to be expanded for hydraulic capacity as quickly as previously thought (potentially saving regional capital); however, treatment plants will have to be expanded for treatment capacity for wastewater strength (because there will be greater concentrations of solids and TDS), and future available recycled water supplies may be lower than projected.

Outdoor water use provides the largest potential for improved water efficiency and additional water savings

in the region. As part of the IRP, A&N Technical Services conducted a study to estimate the amount of indoor and outdoor water use in the region. The study, which used data from the City of Ontario, found that outdoor irrigation accounts for approximately 60% of total urban demand. (Refer to Appendix 3 for the full technical memo.)

METHODOLOGY

This IRP uses an econometric model to forecast urban water demands. This water demand model incorporates various influences which impact urban water demand such as population, employment, economics, weather, and conservation activities.

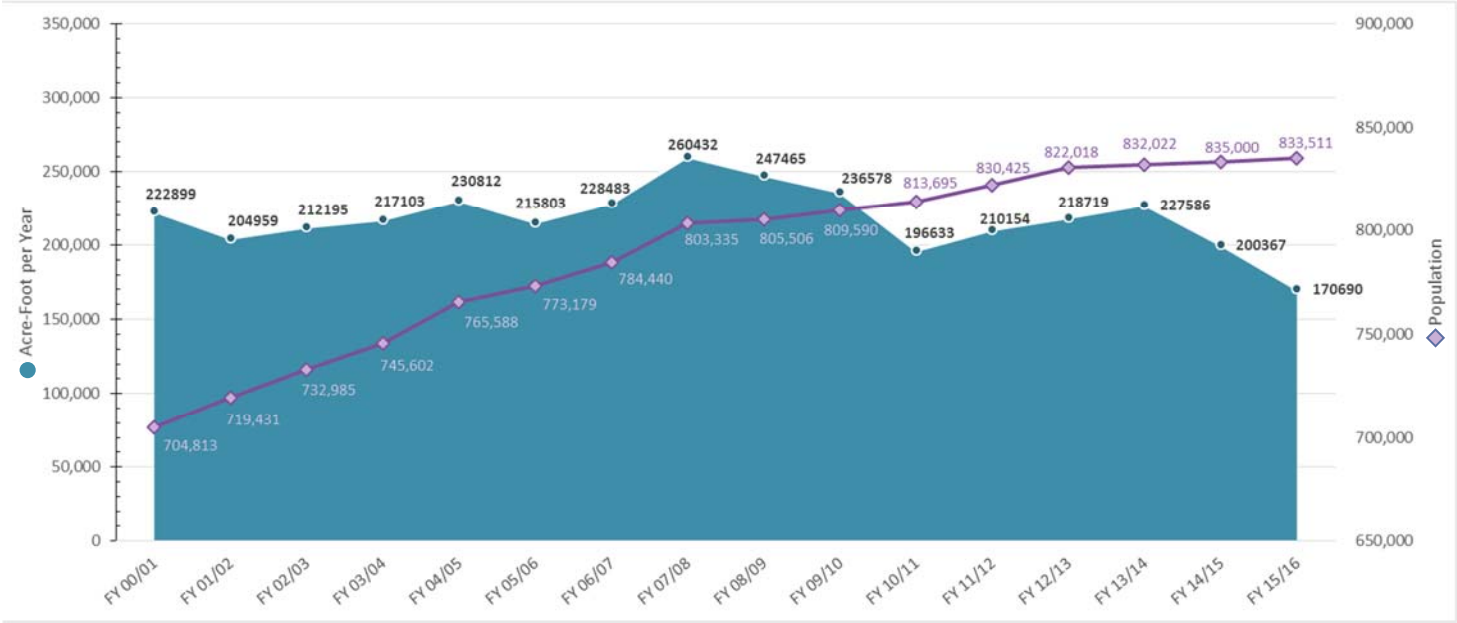
The IRP water demand model was developed by:

- Acquiring the latest regional demographic forecasts from the Southern California Association of Government "2012 Regional Transportation Plan".
- Inputting the demographic data into the econometric model equations to generate a base demand forecast.
- Calibrating the base demand forecast to identify corresponding water demand influences caused by factors including weather, employment, and economic cycles. For this IRP, a total of 12 factors were identified.
- Inputting the latest version of the Alliance for Water Efficiency (AWE) tracking tool for water savings that result from building codes and appliance standards (passive conservation) as well as regional programs that promote conservation (active conservation). Water savings are subtracted from water demand forecasts to ensure that water conservation is incorporated into the projections.
- Developing multiple water demand scenarios to plan for a range of possible futures.

URBAN M&I DEMAND PROJECTION FACTORS

To forecast urban M&I water demand through 2040, past and present urban water uses were assessed. This included an evaluation to determine which factors or influences impact demands and the corresponding

Figure 2-1: Regional Annual Water Use



Note: Annual water use includes imported water, surface water, groundwater, recycled and desalter production. FY 15/16 usage is projected based on 25% reduction from FY13/14

magnitude of their effect. A total of twelve water demand factors were identified along with their corresponding influence on water demand. Factors that influenced regional water demand were as follows:

1. Household size — single family residential (SFR), multi-family residential (MFR)
2. Land development and community density
3. Median household income
4. Customer response and water use behavior
5. Marginal water price
6. Active and passive conservation
7. Weather and climate change
8. Economic cycle
9. Short-term weather
10. Residential community mix of SFR and MFR
11. Weather and climate change
12. Conservation activities (demand management and water use efficiency)

Of the twelve factors, four were found to have a significant impact on regional urban M&I water demands and are described below. The remaining factors are described in Appendix 4. The four main factors were:

- ***Land Development and Community Density:*** regional development trends show that per capita water usage decreases with the shift towards higher density developments featuring smaller landscape areas.
- ***Weather and Climate Change:*** water use increases under hotter and drier conditions.
- ***Customer Response and Water Use Behavior:*** public increases conservation in response to statewide calls for conservation and permanent water use reductions.
- ***Economic Cycle:*** market conditions impact water usage, with recessions reducing water use and periods of growth increasing water use.

Land Development and Community Density

In the last decade, a relatively new type of housing development has emerged with higher housing densities. This is a national as well as a regional trend. These developments feature medium to large single family homes, usually built with minimal landscaping on small lots, also known as "zero-lot-line" housing. Irrigable landscaped areas in these developments are much smaller than traditional developments in the region have been. As a result, the higher density housing caused by these type of development trends lead to lower water use per housing unit because the reduced space for landscaping requires less irrigation.

For comparison purposes and to help anticipate a range of uncertain futures, Tables 2-1 and 2-2 summarize the sources of land use data and ranges of housing density incorporated into the demand forecast model. Land use data was sourced from the General Plans of the cities in the region, the Metropolitan Water District's (MWD) 2010 water demand model (2010 MWD_MAIN), and regional growth plans such as SCAG's 2012-2035 RTP/ Sustainable Communities Strategy (SCS) (2012 RTP/SCS).

Land use density is the variable that will have the largest impact on future demands. Comparing the demand forecast from the cities' General Plan data to the forecast presented in the 2010 Urban Water Management Plan (UWMP), there is a difference of at least 60,000 AF in total urban M&I demand by the year 2040.

This difference is further heightened when the UWMP urban M&I demand forecast is compared to the demands tied to higher housing density values described in recent General Plan EIR amendments throughout the region. These higher densities are also consistent with SCAG's 2012 SCS density levels. For example, when the 2010 UWMP demands are compared to the demand associated with high density presented in Tables 2-1 and 2-2, there is a difference in total urban M&I demand in the year 2040 of approximately 105,000 AF.

Weather and Climate Change

Weather has a large impact on the amount of water that customers need. Under hotter and drier conditions, water use increases at the same time that supplies may be constrained. With climate change, this trend is likely

Table 2-1: Single Family Housing Density Variability

Data Source	Low (Units per Acre)	Average (Units per Acre)	High (Units per Acre)
General Plans	1.2	2.7	4.2
2012 RTP/SCS	2.3	3.7	5.4
2010 MWD_MAIN	3.2	3.2	3.2

Table 2-2: Multi-Family Housing Density Variability

Data Source	Low (Units per Acre)	Average (Units per Acre)	High (Units per Acre)
General Plans	9.7	13.5	17.3
2012 RTP/SCS	8.4	13.5	17.0
2010 MWD_MAIN	10.9	10.9	10.9

Table 2-3: Climate and Weather Effect on Water Demands

By Year	Increase in Temp. (F)	Effect on Water Demand	Probability
2040	3.6 degrees	+4.3%	80th percentile
Multiple Dry Years		+5.98%	Varies by climate run

to be exacerbated in the near future.

In fact, climatologists have changed the way they view drought in years past and now recognize ongoing higher temperatures and longer drought conditions may be the "new normal" for California. A study conducted by scientists at Stanford University entitled "Anthropogenic Warming Has Increased Drought Risk in California" has linked climate change with "more frequent occurrences of high temperatures and low precipitation that will lead to increased severe drought conditions" (Stanford, 2015). In addition, over the past two decades, droughts have occurred more frequently than in the previous century, with 14 droughts occurring between 1896 and 1994, and six occurring between 1995 and 2014.

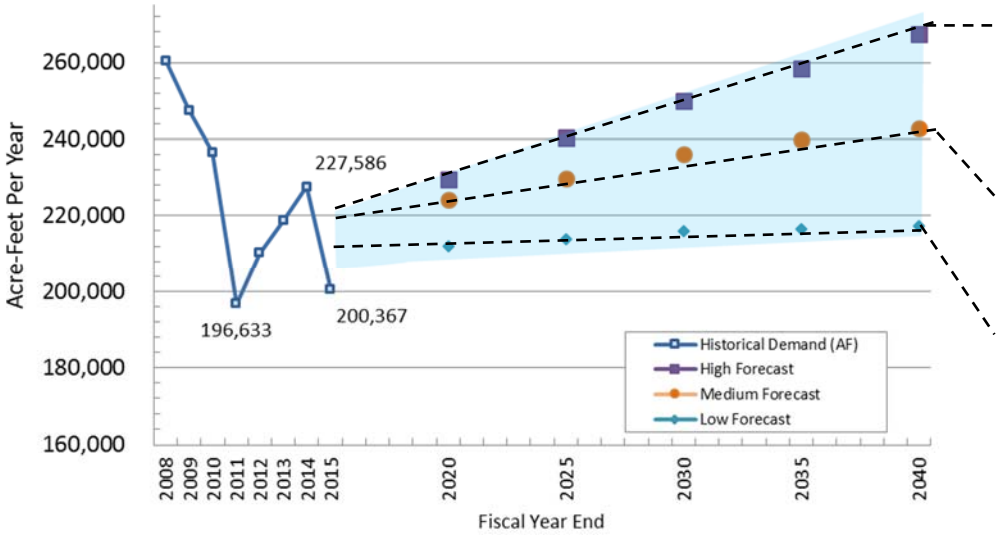
Weather-induced change in demands was accounted for in two ways. First, an adjustment was made for long term climate change based on the National Oceanic and Atmospheric Administration (NOAA) Technical Report, the National Environmental Satellite, Data, and Information Service (NESDIS) 142-5: Regional Climate Trends and Scenarios for U.S. National Climate Assessment. The report stated that increased atmospheric emissions have the potential to increase water use by as much as 4.3%.

As a result of these outlooks on future climate conditions and recent weather trends, the 2015 IRP demand forecast model includes outdoor water demand adjustments to account for climate change. IEUA performed a series of sensitivity analyses of urban outdoor demand and weather conditions. By 2040, IEUA estimates that one dry year would increase demand by 5.6%. Similarly, a one wet year would decrease outdoor demand by 5.6%. A longer period of dry weather (3-years) would increase demand by 8.9%. Separately IEUA estimates the long-term effect of warming on outdoor

Table 2-4: Urban M&I Forecast

Urban M&I Forecast	2015	2020	2040
High Forecast	225,000	230,000	267,000
Medium Demand Forecast	225,000	220,100	238,600
Low Demand Forecast	225,000	212,000	217,400

Figure 2-2: Regional Urban Water Demand Forecast



High Demand Forecast: traditional development and current usage patterns

Medium Demand Forecast: shift to higher density development and more efficient outdoor use

Low Demand Forecast: high density development, high outdoor efficiency

demand. It was found that for each degree temperature increase (in Celsius), outdoor demand would increase by 3%. Together these factors were applied to the climate scenarios to estimate how outdoor demand could change due to weather in the future.

Table 2-3 summarizes the climate and weather factors applied to urban outdoor demand used during WEAP modeling outlined in Section 4.

Customer Response and Water Use Behavior

Since 2012, Southern California has been challenged by drought conditions. This led to calls for voluntary and mandatory water use reductions from Governor Brown, numerous news articles about water supply conditions, and massive public outreach campaigns from water agencies across the State. Increased public awareness of water supply conditions resulted in measurable water savings across the State.

Regionally, these behavioral changes reduced urban M&I demands by 4.6% in FY14/15. Lifestyle changes in combination with the anticipated permanent state water restrictions are expected to keep demands suppressed.

For the purpose of the IRP demand forecast model, it is assumed that changes in water use behavior will continue into the future and will maintain a reduced demand by 4.6% through the year 2040.

Economic Cycle

The economy is also susceptible to change and it is likely to continue to change between strong and weak market conditions. During weak market conditions, urban M&I demands decrease by 7%; conversely, during strong market conditions, demands increase by 7%.

Although this is a significant impact, for the purpose of the 2015 IRP M&I demand forecast model it is assumed that the market conditions remain normal and so no adjustment was incorporated.

URBAN M&I DEMAND FORECAST

The IRP developed a range of demand possibilities to accommodate for future uncertainty caused by the various demand factors. To determine a range of urban demand possibilities, three water demand forecasts were created:

- *High Demand Forecast* – utilized housing densities from each city's General Plan and assumed that new development would use water consistent with current usage patterns—no change for outdoor, 55 GPCD indoor.
- *Medium Demand Forecast* — utilized 2012 SCAG RTP average housing density for occupied housing units and applied indoor and outdoor landscape efficiency standards established by Assembly Bill 1881 (also known as the Model Water Efficient Landscape Ordinance) for existing and future development. For the medium demand forecast, existing outdoor use is limited to 70% of evapotranspiration (ETo). Future outdoor use is limited to 60% ETo, and indoor water use is reduced from 55 GPCD in 2015 to 35 GPCD by 2040 for new development.
- *Low Demand Forecast* – utilized 2012 SCAG RTP high housing density and applied indoor and outdoor landscape efficiency standards established by AB 1881. For the low demand forecast, existing outdoor use is limited to 70% of ETo. Future outdoor use is limited to 60% ETo, and indoor water use is reduced from 55 GPCD in 2015 to 35 GPCD by 2040 for new development.

The range of urban water demand possibilities for the region through 2040 are shown in Table 2-4. When compared to historical demands, the region has experienced over 25,000 acre-feet (AF), or 12% reduction since FY2013/14 as shown in Figure 2-2. This is due in part to delayed growth as a result of the economic recession, but primarily from customer response from continued drought conditions and the State mandated water use restrictions. If demand continues to trend at FY2014/15 levels, the 2015 IRP demand model (which was created in 2014) will need to be updated to account for this regional shift in water use behavior. Additional technical data is provided in Appendix 1 which includes technical memorandums that detail the process used to develop the econometric water demand model.

To prepare the region for future uncertainty and to ensure sufficient water resources and adequate infrastructure capacity, the high urban water demand forecast was selected by the IRP Technical Work Group. This planning assumption was recognized to be a conservative forecast as recent residential developments within the region are currently more efficient (given that they use less water for indoors and outdoor landscaped areas) than presumed in the model.

The benefits of using this conservative forecast for the baseline demand are that it:

- Provides a sizeable water supply buffer which protects the region from future uncertainties.
- Allows conservation to be counted as a future water supply in the demand model.

Table 2-5: Additional Continuing Operational Water Needs Forecast

Additional Water Needs Forecast	2015	2020	2040
SAR Discharge Joint Obligation (Chino Basin share)	17,000	17,000	17,000
Management Zone 1 Supplemental Recharge	6,500	6,500	0
Chino Desalter Replenishment	1,145	2,290	11,035
Total Additional Demand	**24,645**	**25,790**	**28,035**

Figure 2-3: Total Regional Demand Forecast

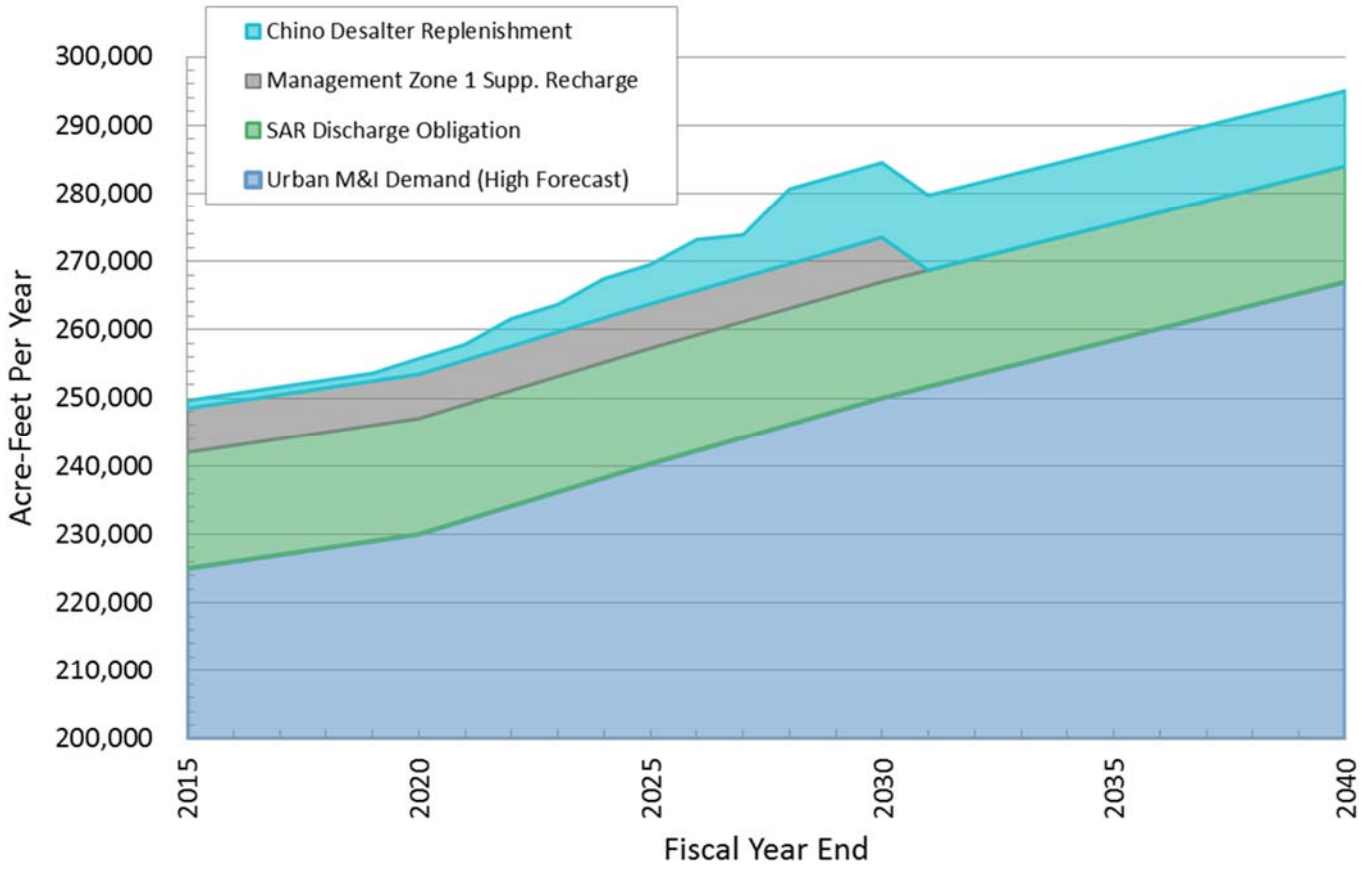


Table 2-6: Total Regional Demand Forecast

Total Regional Demand Forecast	2015	2020	2040
Urban M&I Demand (High Forecast)	225,000	230,000	267,000
Additional Continuing Operational Water Needs	24,645	25,790	28,035
Total Regional Demand	**249,645**	**255,790**	**295,035**

ADDITIONAL CONTINUING OPERATIONAL WATER NEEDS FORECAST

Current and future water demands include regional environmental and/or contractual stream flow obligations. These continuing operational water needs are not subject to the same variables as the urban M&I demands and instead are tied to standing contractual agreements and legal requirements. The water demand and supply models incorporate the following assumptions into the IRP forecasts:

- **Santa Ana River (SAR) Discharge Obligation** Santa Ana River (SAR) Discharge Obligation is a regional obligation that requires annual water discharges to the Santa Ana River above Prado dam. For the purposes of the IRP, 17,000 AFY is used as the Agency's requirement to fulfill the obligation through 2040. This is half of the 34,000 AFY minimum obligation shared with Western Municipal Water District. The region currently meets this

obligation by discharging treated wastewater to the Cucamonga and Chino Creeks.

- **Management Zone 1 Supplemental Recharge** pursuant to the Peace II Agreement, Section 8.4. For the purposes of the IRP 6,500 acre-foot per year will be used to fulfill the supplemental groundwater recharge obligation within Management Zone 1. The obligation is met by Chino Basin Watermaster through recycled water recharge and/or imported water recharge.
- **Chino Desalter Replenishment** pursuant to the Peace II Agreement, Section 6.2. For the purposes of the IRP, Exhibit C dated August 16, 2015 of the safe yield reset implementation plan will be used for the groundwater replenishment obligation.

TOTAL REGIONAL DEMAND FORECAST

Regional water demands for the 2015 IRP Phase 1 are the sum of the high urban M&I demand forecast and the total additional continuing operational water needs forecast. Total water needs for the 2015 IRP are shown in Table 2-6. By 2040 it is projected that 45,400 AFY of additional supply will be needed to accommodate regional growth and other environmental and/or legally obligated stream flows.



Low water use plants, including succulents, on display at a local garden center



3. Resources Inventory



Water Resource Setting

Potential Water Resource Projects

Chino Basin Groundwater

Stormwater

Recycled Water

Chino Basin Desalter

Local Surface Water

Non-Chino Groundwater

Imported Water

Conservation

A bio-swale slowly infiltrates stormwater runoff after a winter rain event in the City of Chino.

Resources Inventory

WATER RESOURCE SETTING

The region relies on imported and recycled water supplies provided by IEUA in addition to groundwater from both the Chino and non-Chino basins and local surface water from various creeks flowing through the service area which originate in the San Gabriel Mountains. As a response to the series of droughts that have impacted Southern California over the past 100 years, including the current drought that has lasted since 2012, the region has developed a sophisticated network of water supply facilities.

Climate change is one of the key factors that will have a substantial impact on water supplies. While recent droughts in California have been significant, climate change trends indicate a future of unprecedented "megadroughts" that have the potential to last multiple decades (Science Advances, 2015). To analyze the impact of potential climate change, RAND Corporation (a nonprofit research organization) evaluated IEUA's supply and demand balance under 106 climate scenarios that were selected from the IPCC Assessment Reports 3 & 5. Climate simulations were downscaled for the region and indicated that temperatures in the region would increase between 0.5-3.5°F. Indications for changes in precipitation varied greatly and had no clear trend.

Baseline water resource supplies were stress-tested across the 106 climate simulations to determine supply availability from 2015 to 2040 in order to establish annual expected resources. The simulations included water demand and supply inputs and calculated how demands, supplies, runoff, flows, and storage would function under each climate scenario. The individual sections of this section provide the results which illustrate the impact of climate change on future water supply. For a complete technical description of the climate simulation work by RAND, see Appendix 2.

This Resources Inventory section provides an overview of the water supplies that the region relies upon:

- Chino Basin Groundwater
- Stormwater
- Recycled Water
- Chino Basin Desalter
- Local Surface Water
- Non-Chino Basin Groundwater
- Imported Water
- Water Use Efficiency

Each supply section includes an overview of current supply use, management, and prioritization; baseline assumptions through 2040; supply challenges that may impact the future availability; additional potential water resource projects by supply type; and water management implications for the region.

POTENTIAL WATER RESOURCE PROJECTS

Future water resource projects were identified through the IRP Technical Work Group discussions. These projects are listed by category of supply. Many of these proposed projects were culled from existing planning documents, such as the Recharge Master Plan Update (RMPU) and the Recycled Water Program Strategy. The list includes conceptual projects as well as those that have been under development but have not yet been included in adopted regional Ten Year Capitol Improvement Plans (TYCIP). For the full project list compiled by the IRP Technical Work Group, see Appendix 2.

The proposed projects include capacity building and reliability investments, as well new sources of supply. Due to technical constraints, the Phase I RAND climate simulations focused on the water supply benefits of these projects and to what extent they meet water demands. This information was used to identify opportunities and build portfolio scenarios where new supplies were added to the baseline annual supplies to assess water supply resilience in 2040. These scenarios are described in Section 4.



California Buckwheat growing near San Antonio Dam

CHINO BASIN GROUNDWATER

Resource Overview

The Chino Basin is one of the largest groundwater basins in Southern California containing approximately 5,000,000 AF of water with an unused storage capacity of approximately 1,000,000 AF (source: CBWM website). Groundwater from the Chino Basin accounts for approximately 40% of regional water supplies.

San Bernardino County Superior Court created the Chino Basin Watermaster (CBWM) in 1978 as a solution to lawsuits over water rights. CBWM is responsible for management of the Chino Basin in accordance with the 1989 Judgement, 2000 Peace Agreement, 2007 Peace II Agreement, and the Chino Basin Optimum Basin Management Program (OBMP).

Water rights in the Chino Basin are held by representatives to three stakeholder groups, called Pools. The three Pools are:

- **Overlying Agricultural Pool**: representing dairymen, farmers, and the State of California
- **Overlying Non-Agricultural Pool**: representing area industries
- **Appropriative Pool**: representing local cities, public water districts, and private water companies

Although groundwater is an important local supply, the water quality in the lower Chino Basin area has been impacted by historical agricultural uses and now has high levels of nitrate and total dissolved solids (TDS). There are also some areas that exceed standards for perchlorate and volatile organic chemicals (VOCs). This lower quality water requires additional treatment, and/or blending with higher quality imported water. The Chino Basin Watermaster works in partnership with municipalities, IEUA, and the Santa Ana Regional Water Quality Control Board to address these water quality problems, including construction and operation of the Chino Basin Desalters.

The Chino Basin is subdivided into five groundwater zones, referred to as management zones. Each management zone has unique groundwater management issues. Management zones 1, 2, and 3 comprise the Chino North Management Zone. Management Zones 4 and 5 are outside of the IEUA service area. Throughout these management zones, there are 19 active spreading basins that are operated to capture stormwater, recycled water, and/or imported water for recharge into the Chino Basin.

Baseline Supply

The court judgment allocates groundwater rights by establishing an annual pumping "safe yield" for each Pool. The Operating Safe Yield (OSY) is the annual amount of groundwater that can be pumped from the basin by the Pool parties free of replenishment obligations. For planning purposes, controlled overdraft for the Appropriative Pool was not included in the IRP. Annual groundwater production in excess of the OSY is allowed by the adjudication, provided that the pumped water is replaced and recharged back into the groundwater basin.

The baseline amount for groundwater production between 2015 and 2020 is assumed to be 90,550 AFY, based on historical production of the appropriative pool parties within the IEUA service area. This amount of groundwater pumping includes recharge from natural rainfall, stormwater capture, and recharge. It does not include recharge from recycled water.

Baseline groundwater production between 2020 and 2040 is assumed to be 91,300 AFY, which is the Agencies' share of the forecasted OSY for this period and increased stormwater (SW) recharge from the Chino Basin Facilities Improvement Project. The Baseline does not include stormwater recharge from the proposed 2013 RMPU projects or recharged recycled water.

Climate

Chino Basin groundwater is dependent on rainfall and supplemental sources for recharge. Groundwater supply is impacted by climate change given that warmer temperatures and droughts increase the dryness of soil which results in less absorption when precipitation occurs and with predicted more intense periods of rainfall, water runoff will increase instead of percolating into the soil. Simulations by Wildermuth Environment Inc. showed that natural groundwater recharge (GWR) would decrease by 0.44% for each 1% decline in long-term precipitation. Groundwater supply is also impacted by development patterns (increased hardscaping) and

Table 3-1: Chino Basin Groundwater Supplies & Projects

Baseline Chino Groundwater			
Project Name	**Description**		**AF**
Baseline Chino Basin Groundwater -2015 – 2020	Baseline groundwater production through 2020 is assumed to be 90,550 AFY, based on historical groundwater production by the Agencies from 2009-2014. Includes replenishment from natural rainfall, SW capture, and recharge.		90,550
Baseline Chino Basin Groundwater	Baseline groundwater production from 2020 through 2040 is assumed to be 91,300 AFY: Includes Agencies' share of OSY (71.9%) of 127,000 AFY. Does not include SW from the 2013 CBWM RMPU or recycled water recharge as these are accounted for separately and in addition to the baseline Chino groundwater.		91,300

Chino Basin Groundwater Projects			
Project Name	**Description**	**ID**	**AF**
Groundwater Treatment (Rehab)-Increment 1, 2	This project category will rehabilitate existing groundwater production wells decommissioned due to water quality concerns. It is assumed that additional pumping would be limited by the volume of recharge occurring (over OSY). Increased well operation could supplement annual demands or help offset losses in another water supply. Increment 1 will provide up to 5,000 AFY of production. Increment 1 & 2 will provide up to 10,000 AF.	1	5,000
		2	5,000
Groundwater Treatment (new)-Increment 1, 2	This project category will construct a new groundwater production well and treatment facility to address water quality concerns. It is assumed that additional pumping would be limited by the volume of recharge occurring (over OSY). Increased well operation could supplement annual demands or help offset losses in another water supply. Each increment will provide 5,000 AF. If all increments are selected, there is a potential of up to 10,000 AFY of production.	3	5,000
		4	5,000
Production Wells-Increment 1, 2, 3, 4	With increasing groundwater recharge to the Chino Basin, new production wells may need to be constructed to recover the additional groundwater. It is assumed that additional pumping would be limited by the volume of recharge occurring (over OSY). Well operation could supplement annual demands or intermittent to help offset losses in another water supply. Each increment will provide 5,000 AF. If all increments are selected, there is a potential of up to 20,000 AFY of production.	5	5,000
		6	5,000
		7	5,000
		8	5,000
Desalter Recovery Improvement	The existing Chino Basin I Desalter (CD-1) recovers approximately 75 percent of water. Improvements could be done to increase recovery to approximately 90 percent. This water would be conveyed through the existing potable water system.	18	1,500
Six Basin Water Transfer	This project would explore the idea of developing a water transfer agreement with Six Basins. One concept is to purchase imported water for recharge into Six Basins and get in return equal volume of groundwater underflow plus agreed amount of stormwater. For example, 10,000 AF of imported water could be purchased in exchange for 10,000 AF of groundwater plus 7,000 AF of stormwater. Assume benefit 1 in 5 years.	38	17,000
Cucamonga Basin Improvements	This project category will identify projects that would result in additional groundwater production benefits coming into the IEUA service area from the Cucamonga Basin. Includes recharge facilities, treatment and production facilities to maximize supply coming into the Chino Basin.	62	2,500
Prior Stored Chino Groundwater	This category will allow supply to be taken from groundwater stored in the Chino Basin, pre 2014. It is estimated that approximately 400,000 AF of stored groundwater is available, of which 280,000 AF is made available for Agencies. This supply category will be managed on a case by case basis as selected into the Regional supply portfolios. The supply will be limited, but can be used annually or intermittent as needed.	87	8,400
Watershed Wide Water Transfers	This category of projects will construct or arrange other water transfers external to the Chino Basin. For example, dry weather flow exchange of recycled water to Orange County Water District for an equivalent amount of purchased imported water. For the purposes of the IRP, it is assumed that this category of projects will not increase supply, but increases reliability and/or quality. To occur annually or intermittent. Resiliency and flexibility benefit only.	98	5,000
Chino Basin Water Transfers	This category of projects will construct or arrange other water transfers within the Chino Basin. Projects to also include inter-agency interties for increased reliability. For the purposes of the IRP, it is assumed that this category of projects will not increase supply, but increases reliability. To occur annually or intermittent.	99	5,000
Reliability Production Wells	This project category will construct new production wells needed to replace lost production or under-performing facilities. These projects will maintain current annual groundwater production deliveries and are intended to increase operational flexibility and reliability. Increment 1 varies in capacity and will be determined on a case by case basis as selected into each of the regional supply portfolios.	100	5,000

more efficient irrigation practices.

A key conclusion drawn from the simulations is that it is important to secure supplemental water when available to recharge the Chino Basin (through direct or in lieu practices) to enable sustained or allow increased groundwater production during droughts and emergencies.

Supply Challenges
Supply challenges facing the Chino Groundwater Basin include the need to address:

- Sustainability or increased OSY for the Chino Basin.
- Loss of natural infiltration caused by higher density development, reduced outdoor landscaping, and irrigation efficiency measures.
- Targeting of groundwater recharge or limiting localized groundwater production in specific areas to help mitigate and/or prevent land subsidence.
- Recognition that different management practices may be required for groundwater recharge in each of the five management zones.
- Identification of additional supply sources for groundwater recharge to help meet Chino Basin recharge goals.
- Slowly rising levels total dissolved solids and nitrate levels in groundwater basin and corresponding potential future loss of available supply caused by this long term trend.
- Consideration of possible additional treatment infrastructure for groundwater.
- Containment of existing groundwater contamination plumes.

Supply Opportunities
The IRP process identified the potential projects listed in Table 3-1. Potential projects range from conceptual to well-developed proposals. Each project has the ability to increase the amount of supply available for groundwater recharge and/or increased groundwater production.

Implications
Groundwater stored in the Chino basin increases regional water supply reliability and resilience with minimal impacts from climate. It is important that the region account for diminished natural recharge resulting from climate and/or development impacts and take action to minimize these losses and to secure replacement sources. Otherwise future groundwater production will exceed sustainable levels. In addition, water quality is a key future constraint on groundwater production. The region will need to evaluate water quality improvement actions including the identification of potential blending water sources for recharge to attain long term salinity management and reliability goals.

Key implications for the Chino Basin groundwater supplies:

- Are not impacted by climate once water is stored in the groundwater basin.
- Are slightly impacted by receiving reduced natural recharge within the basin resulting from climate and/or development impacts.
- Can be sustained or increased through use of supplemental water for groundwater recharge (through in lieu or direct recharge) when these resources are available.
- Are a vital local emergency resource to help mitigate abnormal or catastrophic events through additional groundwater production.
- Are a climate flexible supply that can be tapped to offset either short- or long-term water supply needs.
- Provide a means for sustainable regional water management by enabling exchanges and transfers among agencies within the watershed.
- Are generated locally and are the region's least energy intensive water supply and have minimal greenhouse gas emissions relative to imported water.
- Are cost effective relative to imported water supplies.
- Are critical to improving the region's water self-reliance and reducing dependence on climate variable supplies such as imported water.

STORMWATER

Resource Overview

Stormwater is water that originates during rainfall and snow melt. In the region, stormwater comes primarily from surface water runoff from rain and snow starting in the San Gabriel Mountains and moving down through the Santa Ana watershed. In undeveloped areas, the soil absorbs some of the runoff and helps replenish the groundwater basin. However, developed areas with a significant amount of hardscape tend to concentrate and accumulate stormwater runoff in large quantities in a relatively short amount of time. Stormwater also runs off roofs, through streets, and into stormdrains, where these flows are largely diverted into the region's flood control channels.

The Chino Basin has 6 main flood control channels spread throughout the region. These channels collect and manage the stormwater generated within the watershed. Major flood control channels that convey stormwater within IEUA's service area include:

- San Sevaine Creek
- Day Creek
- Deer Creek
- Cucamonga and West Cucamonga Creek
- San Antonio Creek

Located on and adjacent to the channels are detention basins that are operated under a multiple-use agreement for both flood control and groundwater recharge operations. IEUA, Chino Basin Watermaster, and other agencies work closely with the San Bernardino Flood Control District to maximize the amount of stormwater that can be captured and recharged into the Chino groundwater basin. These channels also carry dry weather runoff from excessive outdoor irrigation.

Runoff that is not captured by these detention basins ultimately flows to the Santa Ana River. While there are efforts by agencies further downstream to capture these storm flows, large amounts of water can discharge to the ocean during large storm events.

Baseline Supply

The baseline amount of water that is available for stormwater recharge from existing projects is already included in the groundwater supply, described under the Chino Basin Groundwater resource sub-section. To ensure there is no double-counting in the IRP simulations, this part of the supply is not counted in the stormwater baseline.

The stormwater supply projection through 2040 includes additional water captured as the result of the construction of projects listed in the 2013. As a result, the baseline stormwater supply assumed to be available between 2020 and 2040 is 6,400 AFY as in the 2013 RMPU.

Climate

Stormwater supplies may also be impacted by temperature. Warmer temperatures cause soils to dry out through evaporation. This can lead to two competing effects. Because it is more difficult for water to penetrate dry soil, water runoff could increase. However, once the water is in the soil column, the ground retains this moisture until the soil is saturated which helps to replenish groundwater supplies. This outcome is also consistent with other larger basin studies performed by the Bureau of Reclamation and the Colorado River District. During dry conditions, IEUA has documented reductions in the expected amount of runoff from rain events into the groundwater recharge basins.

In absence of more detailed information on how future stormwater would vary with respect to precipitation, a regression formula was applied to develop baseline supplies as well as any additional supply that was selected as part of a water management strategy (see Section 4). Based on the results of the climate simulations, the 6,410 AFY baseline stormwater supply could vary from 2015 and 2020 between 900 AFY to 7,400 AFY.

Supply Challenges

Supply challenges facing stormwater supplies include the need to address:

- Dependence of these supplies on annual rainfall and snow melt.

Table 3-2: Stormwater Supplies & Projects

Stormwater Baseline		
Project Name	**Description**	**AF**
Baseline Stormwater 2015-2020	0 AF through 2020: Estimated completion of 2013 RMPU is 2020, therefore no new stormwater supply will be available until after 2020.	0
Baseline Stormwater 2021-2040	6,410 AFY for 2020 thru 2040: New stormwater supply generated from additional stormwater recharge from the recommended projects included in the 2013 CBWM RMPU.	6,400

Stormwater Projects			
Project Name	**Description**	**ID**	**AF**
Day Creek SW Capture	Modify existing basins along Day Creek to increase stormwater capture beyond the 2013 RMPU. Increase facilities to better accommodate the "big gulp" concept of approximately 2,500 AF. Assume benefit 1 in 5 years.	54	2,500
San Sevaine Creek SW Capture	Modify existing basins along San Sevaine Creek to increase stormwater capture beyond the 2013 RMPU. Increase facilities to better accommodate the "big gulp" concept of approximately 2,500 AF. Assume benefit 1 in 5 years.	55	2500
Regional LID-Increments 1, 2	Construct or modify urban development to better manage and infiltrate rainfall at the source. Projects could include bioswales and or pervious concrete installation in parking lots, street drainages. Each increment could provide up to 5,000 AFY of recharge for a total of up to 10,000 AFY recharge.	58 59	5000 5000

- Supply variability such as storm frequency, intensity, seasonality of rainfall events which are exacerbated by climate change.
- Reductions in natural infiltration into the groundwater basin caused by channelization, new development, hardscape, increased outdoor water efficiency, and open space conversion.
- Construction of additional stormwater recharge facilities in a highly urbanized area where available land may not be available or not available in the right places to capture and recharge significant volumes of water.
- Compliance with Municipal Separate Storm Sewer System (MS4) Permit low impact development (LID) stormwater retention/recharge requirements for new and existing development and quantification of corresponding water supply benefits.

Supply Opportunities

The IRP process utilized the list of potential stormwater projects shown in Table 3-2. Potential projects range from conceptual to well-developed proposals. Each project has the ability to increase the amount of supply available from stormwater by improving diversions to existing basins, constructing new basins and pumping facilities, and through on-site MS4 low impact development improvements.

Implications

Stormwater is an extremely valuable resource to the region because it is considered a "free" once the necessary facilities to capture and use this water have been constructed and maintained. It is also a high quality water source that can improves the quality of the groundwater supplies once it has infiltrated and become blended within the aquifer. Stormwater has and will likely continue to be an important element of the region's water resources as it can be stored and subsequently used. To capture large storm events additional infrastructure should be constructed. In addition, to help offset lost infiltration from increased urbanization and more efficient outdoor landscaping, increasing regional investment in MS4-compliant low impact development projects will be necessary.

Key implications for stormwater supplies:

- Are generated locally, are the least energy intensive water supply and have minimal greenhouse gas emissions relative to imported water.
- Are cost effective relative to imported water supplies.
- Are highly dependent on weather and impacted by climate.
- Will be significantly reduced during droughts when below average precipitation and drier conditions

exist.

- Require well-designed facilities that can operate under a wide range of flows.
- Are a high quality water supply and provide a supplemental source of water to blend with and improve groundwater quality.

RECYCLED WATER

Resource Overview

IEUA owns and operates four water reclamation plants: Regional Plant No. 1 (RP-1), Regional Plant No. 2 (RP-2), Regional Plant No. 4 (RP-4), Regional Plant No. 5 (RP-5), and the Carbon Canyon Water Reclamation Facility (CCWRF). These facilities provide tertiary-treated wastewater, also known as recycled water. Recycled water supplies can be used for direct non-potable uses, groundwater recharge for the Chino Basin, and for other regional discharge obligations.

Recharge of recycled water is allowed by the Regional Water Quality Control Board (RWQCB) through the OBMP, and currently provides approximately 17% of the region's urban water supply. The region secured a number of permits allowing for the direct use and groundwater recharge of recycled water. These permits define requirements for the use of recycled water (both direct use and recharge), including, but not limited to, uses, water quality limits, and monitoring requirements.

The recycled water program makes up approximately 15% of the regional water portfolio and is operated based on the following order of priorities for recycled water supply:

- Regional discharge obligations (Santa Ana River Judgement, environmental, etc.)
- Agency direct use demands
- Regional groundwater recharge

Although recycled water is an important component of the groundwater recharge program, not all of the recharge basins are able to use recycled water. Currently, 10 of the region's 16 groundwater recharge basins are permitted to receive recycled water.

During FY2014-15, the 4 regional water reclamation plants produced approximately 62,000 AF of recycled water. Based on recent wastewater projections that were calculated as part of the Wastewater Facilities Master Plan (WFMP), treated flows are expected to increase to over 85,000 AFY by 2040 as shown in Table 3-4. It is important to note that these flow estimates were based on current existing indoor water usage levels in order to ensure that facilities and pipelines are adequately sized, and are consistent with the IRP's upper demand forecast (see Section 2). However, indoor water use efficiency is increasing and new plumbing code and appliance standards are being implemented. As a result, available wastewater flows by 2040 are expected to be lower than 80,000 AFY. These water flow trends are being carefully tracked by IEUA.

Baseline Supply

As part of the 2015 Recycled Water Program Strategy (RWPS), regional direct use demand forecasts were developed. Direct use for recycled water is defined in the RWPS as the amount of water needed for landscaping, agricultural, and industrial processes. The forecasts indicate that by 2025 direct use demands will increase by 5,000 AFY. The projects required to achieve the direct use demand forecast by 2025 are included in IEUA's FY2015-16 Ten Year Capital Improvement Plan (TYCIP).

The TYCIP includes recycled water projects that will allow the region to increase both direct use and groundwater recharge deliveries. These projects will provide 30,640 AFY of direct use (including approximately 1,700 AF agriculture use) and 18,700 AFY of groundwater recharge supply by 2025. Because the TYCIP includes recycled water projects with prior commitments from the region, the corresponding amount of recycled water supply from those projects is considered baseline recycled water supply for the IRP.

In summary, the baseline recycled water supply for direct use demands is assumed to be:

- Near Term (2015 to 2020) = 25,000 AFY by 2020
- Mid Term (2020 to 2030) = 28,960 AFY by 2025
- Long Term (2030 to 2040) = 28,960 AFY by 2025

Recycled water deliveries for groundwater recharge were also updated as part of the 2015 RWPS. Similar to

Table 3-3: Wastewater Projection

	2015	2020	2030	2040
Regional Recycled Water Supply	63,900 AF	66,300 AF	77,500 AF	85,500 AF

direct use deliveries, projects required to contribute 18,700 AFY to the groundwater recharge program by 2025 are included in the TYCIP.

Therefore, baseline recycled water supply for groundwater recharge is assumed to be:

- Near Term (2015 to 2020) = 16,900 AFY by 2020
- Mid Term (2020 to 2030) = 18,700 AFY by 2025
- Long Term (2030 to 2040) = 18,700 AFY by 2025

Table 3-4 summarizes the baseline assumptions compared to the total available recycled water supply produced by the four water reclamation plants. Beyond 2025, there is a significant amount of recycled water supply that can be delivered for beneficial reuse. Additional projects will need to be constructed to increase the baseline amount of recycled water beneficially used to help meet the urban water demand for the region. Additional projects for increasing recycled water reuse are outlined below.

Climate

Under the climate simulations, wastewater flows were not impacted by climate. As a result, recycled water is the most climate resilient water supply available to the region.

Supply Challenges

Supply challenges facing recycled water supplies include the need to address:

- Projected available wastewater supply is not adequate to fulfill future demands for recycled water.
- Changes in the future amount of available wastewater as well as increases in wastewater strength (total dissolved solids and nitrate levels) and changes in treatment resulting from trend towards more efficient indoor water use.
- The efficient use of recycled water for outdoor irrigation (both urban and agriculture) and whether this use should be consistent with existing state efficiency standards.
- Increased energy needs for treatment and delivery of recycled water.
- Increasing regulatory and environmental issues for construction and operation of recycled water systems, in particular surface recharge of recycled water.

Supply Opportunities

The IRP process identified the following list of potential projects. Potential projects range from conceptual to well-developed proposals. Each project has the ability to increase the amount of supply available for recycled water direct use and groundwater recharge.

Implications

Due to its reliability and climate resilience, recycled water is one of the most valuable water supplies for the

Table 3-4: Recycled Water Supply & Baseline Demands

	2015	2020	2025	2030	2040
Recycled Water Supply[(1)]	60,200	64,300	69,700	75,100	82,900
SAR Discharge Obligation[(2)]	17,000	17,000	17,000	17,000	17,000
Direct Use Demands[(3,4)]	24,700	28,800	30,700	30,700	30,700
Groundwater Recharge [(3)]	14,500	16,900	18,700	18,700	18,700
Remaining Recycled Water Supply	***4,000***	***1,600***	***3,300***	***8,700***	***16,500***

Notes:
(1) Regional supply per Wastewater Facilities Master Plan, includes 3% loss due to treatment waste streams.
(2) Minimum discharge required by SAR Obligation is 16,850 AFY. For planning purposes, assume 17,000 AFY
(3) Per 2015 Recycled Water Program Strategy and Agency FY2015/16 TYCIP.
(4) Includes agricultural demands.

Table 3-5: Recycled Water Supplies & Projects

Recycled Water Baseline		
Project Name	**Description**	**AF**
Baseline Recycled Water for Groundwater Recharge 2015-2020	14,500 AFY by 2015 based on 5-year historical average from 2009-2014	14,500
Baseline Recycled Water Direct Use 2015-2020	16,100 AFY by 2015 based on 5-year historical average from 2009-2014	16,100
Baseline Recycled Water for Groundwater Recharge 2021-2025	2,400 AFY of additional Recycled water by 2020 for groundwater recharge per IEUA FY15-16 TYCIP	2,400
Baseline Recycled Water Direct Use 2021-2025	8,900 AFY of additional Recycled water direct use by 2020 per IEUA FY15-16 TYCIP	8,900
Baseline Recycled Water for Groundwater Recharge 2026-2040	1,800 AFY of additional Recycled water for groundwater recharge by 2025 per IEUA FY15-16 TYCIP	1,800
Baseline Recycled Water Direct Use 2026-2040	4,000 AFY of additional Recycled water for direct use by 2025 per IEUA FY15-16 TYCIP	4,000

Recycled Water Projects			
Project Name	**Description**	**ID**	**AF**
WRCRWA Recyled Water Intertie	The Western Riverside County Regional Wastewater Authority (WRCRWA) Plant intertie would allow for the delivery of recycled water from the WRCRWA Plant to be used in the IEUA southern service area. This would also allow additional recycled water to be delivered into the northern service area groundwater recharge basins by reducing the demand from the RP-1 930 pressure zone pump station. Intertie would occur within the 800/930 Pressure Zones.	9	4,500
Rialto Recycled Water Intertie	The Rialto intertie project would allow for delivery of recycled water from the Rialto Wastewater Treatment Plant (WWTP) to be used in the IEUA service area. The intertie could occur near the RP-3 groundwater recharge basins. This concept could involve the Inland Valley Pipeline, LLC to convey water between Rialto WWTP and IEUA's recycled water distribution system. Supply could be used for direct, groundwater recharge, or other reuse strategy.	10	4,500
Pomona Recycled Water Exchange/Transfer	The City of Pomona does not currently use all of the treated effluent from the Pomona Water Reclamation Plant. One concept would involve partnering to develop and expand their recycled water facilities in exchange for an agreed amount of their Chino Basin groundwater right. Could include other supply transfer agreement such as reclaimable waste and/or groundwater.	11	2,500
RP-1 Recycled Water Injection-Increment 1, 2, 3	This project would construct an advanced water filtration (e.g. process treatment that combines micro or ultrafiltration) facility at RP-1 to further treat tertiary effluent to allow the water to be injected directly into Chino Basin. The sizing of the facility and the volume to be produced will be determined as part of the portfolio development process. Increments 1-3 facility would be sized for 7,500 AFY.	12 13 14	2,500 2,500 2,500
Satellite Recycled Water Injection-Increment 1, 2, 3	This project category would construct a satellite (outside of RP-1) wastewater treatment plant with advanced water filtration (e.g. process treatment that combines micro or ultrafiltration) to allow the water to be injected directly into Chino Basin. The location, sizing, and volume to be produced will be determined as part of the portfolio development process. Increments 1-3 facility or facilities would have a capacity of 7,500 AFY.	15 16 17	2,500 2,500 2,500
Recycled Water Direct Use Expansion-Increment 1, 2, 3, 4	IEUA developed a new Recycled Water Program Strategy concurrent with the IRP. This project category will be used to determine the potential interest in expanding the direct use system beyond IEUA's Ten Year CIP. Includes the reuse of regional wastewater supply, approximately 83,000 AFY by 2035, and potential recycled water interties. Each increment would increase direct use beyond baseline supply by 5,000 AFY. Increment 1-4 facilities would increase direct use beyond baseline supply by 20,000 AFY.	19 20 21 22	5,000 5,000 5,000 5,000
Existing Groundwater Recharge Basin Improvements beyond RMPU-Increment 1, 2, 3, 4	The 2013 Chino Basin RMPU recommended a set of preferred projects to improve recharge at the existing groundwater spreading basins. This project category represents the next increment of additional groundwater recharge (imported water and/or recycled water) capable at the existing facilities. Increment 1-4 facilities would increase recharge at existing basins within the Chino Basin by an additional 15,000 AF.	23 24 25 26	2,500 2,500 5,000 5,000

Table 3-6: Recycled Water Projects Continued

Recycled Water Projects (*continued*)			
Project Name	**Description**	**ID**	**AF**
Construct New Groundwater Recharge Basins-Increment 1, 2, 3, 4	Purchase land to construct new groundwater recharge basins in the service area to capture additional stormwater, recycled water, and/or imported water for groundwater recharge. Increment 1-4 would provide up to an additional 9,800 AFY of recharge capacity, which is approximately 4 new basins at 350 AF per month for 7 months of operation.	27 28 29 30	2,450 2,450 2,450 2,450
Direct Potable Reuse-Increment 1, 2	This project would construct an advanced water filtration and treatment (e.g. process treatment that combines micro or ultrafiltration) facility at a Regional Plant. The treatment process would allow the recycled water to be introduced into the potable water system. Increment 1+2 facility would have a capacity of 10,000 AFY.	60 61	5,000 5,000
RP-1 NRWS Treatment	The north Non-Reclaimable Wastewater System (NRWS) discharges approximately 3.5 MGD of brine to Los Angeles County annually. The project would construct a treatment facility to allow the Region to reuse this supply into the recycled water system. Requires plant expansion and partial reverse osmosis for blending.	65	3,920
Watershed Wide Water Transfers	This category of projects will construct or arrange other water transfers external to the Chino Basin. For example, dry weather flow exchange of recycled water to Orange County Water District for an equivalent amount of purchased imported water. For the purposes of the IRP, it is assumed that this category of projects will not increase supply, but will increase reliability and/or quality. To occur annually or intermittently. Resiliency and flexibility benefit only.	98	5,000 AF
Chino Basin Water Transfers	This category of projects will construct or arrange other water transfers within the Chino Basin. Projects to also include inter-agency interties for increased reliability. For the purposes of the IRP, it is assumed that this category of projects will not increase supply, but will increase reliability. To occur annually or intermittently.	99	5,000 AF

region and is a high priority for additional investment. The region needs to account for the trend towards increased indoor water efficiency and evaluate opportunities to bring in supplemental wastewater flows through construction of collection systems in non-sewered areas and collaboration with neighboring jurisdictions to optimize regional infrastructure. Further, the region needs to improve efficiency of direct recycled water use to maximize its availability to all Agencies. This is particularly important for outdoor irrigation as improved efficiency can help make more recycled water available during the summer and fall when demands for recycled water are at their highest.

Implications for recycled water supplies:

- Are not impacted by climate making recycled water the region's most climate resilient water supply.
- Are needed to maximize supplemental water for groundwater recharge.
- Are generated locally and can be beneficially used by all Agencies.
- Are critical to improving the region's water self-reliance and reducing dependence on climate variable supplies such as imported water.
- Are being impacted by indoor water efficiency trends so the region must anticipate the amount of supply that is likely to be available in the future and the changes in treatment that may be required to maintain the water quality of these supplies.
- Are a supplemental water source for the entire region with infrastructure that can be intertied with that of neighboring agencies to optimize availability and use of recycled water.
- Generally require a higher level of energy than other water supplies for treatment and distribution, but are less energy intensive than imported water supplies and use of this water can contribute to statewide reductions in greenhouse gas emissions.

CHINO BASIN DESALTER

Resource Overview

The Chino Basin Desalter Authority (CDA) was formed to manage the production, treatment, and distribution of highly-treated potable water to cities and water agencies throughout the southern Chino Basin. A Joint

Powers Agency, the CDA was formed by the Jurupa Community Services District; Santa Ana River Water Company; Western Municipal Water District; the Cities of Chino, Chino Hills, Norco, and Ontario; and the Inland Empire Utilities Agency to treat saline groundwater extracted from the southern portion of the Chino Basin. Saline water is water that has more salt (about 1000 ppm of total dissolved solids) than fresh water, but not as high as seawater (about 3000 ppm of total dissolved solids).

The CDA operates two desalters: Chino I Desalter which began operation in 2001 and Chino II Desalter which began operation in 2006. The treatment processes at the Chino I and Chino II Desalters include Reverse Osmosis (RO) and Ion-Exchange (IX) for removal of nitrate and total dissolved solids (TDS). The Chino I Desalter also includes air stripping for removal of volatile organic chemicals (VOC).

These facilities serve three purposes. First, they convert unusable groundwater into a reliable potable water supply for the region and are part of a long-term pollution cleanup strategy for the Chino Basin. Second, they provide hydraulic control over the lower Chino Basin, which prevents the migration of poor quality water into the Santa Ana River as well as downstream impacts on groundwater basins in Orange County. Third, they maintain and enhance groundwater yield for the Chino Basin.

The Desalters are a critical component of a long-term salinity management strategy that enables the region to use recycled water in the Chino Basin. The Peace Agreement, OBMP, and Maximum Benefit Plan approved by the Santa Ana Regional Water Quality Board and the State Water Resources Control Board require ongoing implementation of regional salt management and reduction actions as a condition of the regional recycled water use permits for outdoor irrigation as well as for groundwater recharge. CDA accounts for approximately 5% of the regional water supply portfolio.

Baseline Supply

Chino I Desalter and Chino II Desalter currently produce 25,000 AFY of treated groundwater. These facilities are being expanded and will have the capacity to treat 35,200 AFY by 2017. The amount of water received by member agencies within IEUA's service area is approximately 50% of the total production from these facilities. The remaining water is sent to agencies within the Western Municipal Water District service area.

Member agencies that receive water from the Desalter facilities within IEUA's service area are:

- City of Chino
- City of Chino Hills
- City of Ontario

Based on information from the CDA, the baseline Chino Desalter supply for the Agency's service area is assumed to be 17,300 AFY through 2040.

Climate

The effect of climate on water supply produced from the Chino Desalter facilities was not modeled as part of the IRP. Climate impacts were considered to be negligible as the quantity of water produced is dependent upon the capacity of the desalter facility and is not supply limited.

Supply Challenges

Supply challenges facing the Chino Desalters include the need to address:

The outstanding groundwater replenishment obligation to the Chino Basin of 152,900 AF through the duration of the Peace Agreement that must be fulfilled by the region.

Increased energy needs and costs for the expanded treatment of saline water and brine disposal

The location of Desalter production wells near existing contamination plumes in the groundwater basin, including potential costly impacts on Desalter treatment processes as well as opportunities to use the Desalters as part of a groundwater clean-up strategy.

Supply Opportunities

The IRP process identified of potential projects that are listed in Table 3-7. Each project has the ability to increase the amount of supply available, treated, or produced by the Desalter facilities.

Implications

The Chino Desalters provide a new source of potable water supplies for the region by treating currently unusable groundwater, as well as providing hydraulic control of the southern Chino Groundwater Basin. This infrastructure is critical to the continued use of recycled water in the region as well as improving groundwater quality and yield in the Chino Basin.

Key implications for the Chino Desalter water supplies:

- Are not impacted by climate.
- Are critical to improving the region's water self-reliance and reducing dependence on climate variable supplies such as imported water.
- Generally require a higher level of energy than other water supplies for treatment and distribution.
- Are an essential component of the regional commitment to remove salt and nitrates in the Chino Basin.
- Are critical to the continued use of recycled water in the region for groundwater recharge.
- Provide hydraulic control for the Chino Basin which prevents poor quality water from migrating into the Santa Ana River and downstream groundwater basins.
- Are managed under the Peace Agreement and the Optimum Basin Management Plan, which require fulfillment of a groundwater replenishment obligation of 152,900 AF.
- Are limited on the amount of water that can be produced based on the capacity and performance of the Desalter facilities.

LOCAL SURFACE WATER

Resource Overview

Agencies located in the northern part of the region have long standing legal rights to divert and treat water from local creeks in the Santa Ana River watershed, including San Antonio Canyon, Cucamonga Canyon, Day Creek, Deer Creek, Lytle Creek, and other small surface creeks and tunnels. The amount of water from these local surface supplies is variable, depending on climate conditions, and currently accounts for approximately 5% of the regional water supply portfolio.

The quality of local surface water is typically quite high as the creeks are filled by rainfall and snowmelt from the San Gabriel Mountains. However, the surface water must receive treatment to comply with state and federal drinking water quality standards before it can be served for public use. Large storm events can cause sedimentation levels to rise to levels that impact the water treatment plants. During these times, water is bypassed downstream where it may be available for groundwater recharge.

Baseline Supply

The most recent local surface water production data received from Agencies was used to forecast the baseline water supply. The amount of local surface water supply was established using a 5-year average of production during the period of FY2009-10 through

Table 3-7: Chino Basin Desalter Baseline & Projects

Baseline Chino Desalter Projects		
Project Name	**Description**	**AF**
Baseline Chino Desalter	Phase 2 Chino Basin Desalter production for IEUA service area	15,000 AF
Baseline Chino Desalter	Phase 3 Chino Basin Desalter production for IEUA service area	2,730 AF

Chino Desalter Projects			
Project Name	**Description**	**ID**	**AF**
Desalter Recovery Improvement	The existing Chino Basin I Desalter (CD-1) recovers approximately 75 percent of water. Improvements could be done to increase recovery to approximately 90 percent. This water would be conveyed through the existing potable water system.	18	1,500 AF

FY2013-14. This period of time includes 3 consecutive years of below average precipitation and 2 years of normal or above normal precipitation, providing a conservative projection. Baseline local surface water before considering climate modeling effects is therefore assumed to be 11,700 AFY through year 2040.

Climate
Local surface supplies are highly impacted by climate. Due to their dependence on precipitation and snow melt, the amount of water that can be obtained from local surface sources is highly variable from year to year.

Historical variability in local surface supplies is highly correlated with precipitation but also temperature. Annual surface water supplies are highly dependent on the weather and susceptible to changes in climate and were modeled under climate influences. Based on the results of the climate simulations, the projected baseline local surface water supplies available between 2015 and 2020 ranges from 2,000 to 12,600 AFY.

Local surface supplies may also be impacted by temperature. Higher temperatures cause more evaporation, reducing the amount of soil moisture. This means that the soil is more likely to absorb and hold water when rain occurs and this can reduce the amount of water flowing into creeks and streams.

Records indicate that local surface flows have declined and projections indicate that flows will decline in the near future from at least 2021 to 2040 (Seager 2012).

Supply Challenges
Supply challenges facing local surface water supplies include the need to address:

- High variability due to their dependence on rainfall and snow melt .

Supply Opportunities
The IRP process identified potential projects listed in Table 3-8. Each project has the ability to increase the amount of supply available from local surface water by either diversion and/or treatment improvements.

Implications
Local surface water, when available, is an extremely valuable resource because it is considered relatively "free", with the cost to the Agencies being the operation of the necessary facilities to capture and use this water. Where possible, use of local surface water should be maximized.

Key implications for local surface water supplies:

- Are generated locally and are the region's least energy intensive water supply and have minimal greenhouse gas emissions relative to imported water .
- Are cost effective relative to imported water supplies.
- Are highly dependent on weather and driven by climate.
- Will be significantly reduced during droughts when below average precipitation and drier conditions exist.
- Are a high quality water supply and provide a supplemental source of water to blend with and improve groundwater quality.
- Are highly variable and require facilities to operate under a wide range of flows .

NON-CHINO BASIN GROUNDWATER

Resource Overview
Member agencies pump groundwater from basins adjacent to the Chino Basin. These basins include Cucamonga, Rialto, Lytle Creek, Colton, and the Six Basins groundwater basins. The Six Basins are comprised of the Ganesha, Live Oak, Pomona, Lower Claremont Heights, Upper Claremont Heights and Canyon Basin. These basins currently provide approximately 10% of the regional water supply portfolio.

There are four agencies within the IEUA service area that include non-Chino groundwater as a water supply source. These agencies are the City of Upland, Cucamonga Valley Water District, Fontana Water Company, and San Antonio Water Company.

Baseline Supply
The most recent water production data was used to forecast the baseline water supply. The amount of non-

Chino Basin groundwater supply was based on a five-year production average from FY2009-10 to FY2013-14. Baseline non-Chino groundwater supply is assumed to be 22,000 AFY through 2040.

Climate
Climate effect on non-Chino Basin groundwater was not evaluated as part of the IRP. However, it is expected that climate will have a slight impact on these groundwater supplies based on the climate simulations performed on the Chino Basin. The non-Chino Basin groundwater baseline supply is assumed to remain constant at 22,100 through 2040.

Supply Challenges
These groundwater basins face similar supply challenges to those identified for the Chino Basin. Challenges include reduced natural infiltration, safe yield operating constraints, and water quality issues.

Supply Opportunities
The IRP process identified the following list of potential projects. Each project has the ability to increase the amount of supply available for groundwater recharge and/or increased groundwater production.

Implications
Groundwater basins outside of the Chino Basin face similar implementation hurdles as the Chino Basin.

Key implications for non-Chino Basin groundwater supplies:

- Are not impacted by climate once water is stored in the groundwater basin.
- Are slightly impacted by receiving reduced natural recharge within the basin resulting from climate and/or development impacts.
- Can be sustained or increased through use of supplemental water for groundwater recharge (through in lieu or direct recharge) when these resources are available.
- Are a vital local emergency resource to help mitigate abnormal or catastrophic events through additional groundwater production.
- Provide a means for sustainable regional water management by enabling exchanges and transfers among agencies within the watershed.
- Are generated locally and are the region's least energy intensive water supply and have minimal greenhouse gas emissions relative to imported water.
- Are cost effective relative to imported water supplies.
- Are critical to improving the region's water self-reliance and reducing dependence on climate variable supplies such as imported water.
- Reduce the water resource needs in the Chino Basin.

IMPORTED WATER

Overview
IEUA was originally formed in 1950 as a municipal wholesale water district for the purpose of providing municipalities in the Chino Basin with supplemental

Table 3-8: Local Surface Water Baseline & Projects

Baseline Local Surface		
Project Name	**Description**	**AF**
Baseline Local Surface	11,700 AF based on 5-year historical average from 2009-2014.	11,700 AF

Local Surface Projects			
Project Name	**Description**	**ID**	**AF**
Dry Weather Flow Diversions	Capture and treat urban dry weather flow from Chino, Cucamonga and San Sevaine Creek into the Regional Plants. For the purposes of the IRP, a volume of 3,500 AFY was assumed as total available dry weather flow.	48	3,500 AF
Maximize Local Surface Water	This category of projects will construct facilities needed to capture additional local surface water. Projects to be defined by IEUA's Agencies. For example, increase surface flows off Lytle Creek in wet years. Assume benefit 3 in 5 years.	88	1,000 AF

imported water purchased from the Metropolitan Water District of Southern California (MWD).

MWD is a contractor to both the State Water Project (SWP), which imports water from northern California, and Colorado River Aqueduct (CRA) systems. The availability of imported water supplies is heavily dependent on hydrology and environmental regulations. This dependency can lead to high variability in the annual amount of water available to the Southern California region. For example, in the midst of the great drought, the California State Water Project was able to supply only 5 percent of its contract allocation in 2013-2014, which is a significant reduction from past allocations.

Due to salinity management concerns in the Chino Basin, the region can only use imported water from the State Water Project. Imported purchases from MWD in recent decades have averaged about 70,000 AFY, providing about 30% of the water supply for the service area.

Imported water purchased from the MWD is limited by a purchase order agreement. The agreement allows the region to purchase up to a total of 93,283 AF per year at its lowest (Tier I) rate. This limit is based on historical imported water purchases for municipal use by the member agencies and for regional groundwater recharge. The agreement includes an annual minimum purchase commitment of 39,835 AF. Note that this amount is slightly less than the 40,000 AFY minimum needed for the operation of the region's water treatment facilities.

There are four water treatment plants that treat imported water purchased from the MWD. These treatment facilities include:

- Water Facilities Authority's Agua de Lejos Treatment Plant (81 mgd capacity)
- Fontana Water Company's Sandhill Surface Water Treatment Plant (29 mgd capacity)
- CVWD's Lloyd W. Michael Water Treatment Plant (60 mgd capacity)
- CVWD's Royer-Nesbit Water Treatment Plant (11 mgd capacity)

Each agency is allocated an annual portion of MWD's available Tier 1 water supply (shown below). The allocations do not confer a contractual right to MWD imported water but are used to determine the price paid for the water. Purchases in excess of the Tier 1 allocation are assessed by MWD at a higher Tier 2 rate.

- Water Facilities Authority - 31,384 AFY
- Cucamonga Valley Water District - 28,368 AFY
- Fontana Water Company - 10,000 AFY
- Inland Empire Utilities Agency/Chino Basin Watermaster – 23,531 AFY

Imported water currently accounts for approximately 25% of the regional water supply portfolio. The amount available to IEUA and/or the Chino Basin Watermaster is used only for groundwater recharge.

Baseline Supply

The baseline supplies for imported water are based on IEUA Resolution 2014-12-1. Supplies were set as follows:

- Current imported purchases by Agencies are assumed to be 65,000 AFY (consistent with FY2014/15 purchases).
- Imported water purchases between 2020 and 2040 are assumed to be 69,752 AFY.
- Minimum imported purchases are assumed to be 40,000 AFY to meet retail agency water treatment operational requirements .

Climate

The State Water Project's infrastructure was designed to capture snowmelt from snowpack in the Sierra Nevada Mountains. When the snow melts during the warmer spring months, this combination of reservoirs and conveyance facilities provides a steady water supply throughout the year but especially during the summer and fall when water demands peak and precipitation is limited.

However, climate change is expected to continue to significantly impact the timing and characteristics of snowpack on which the SWP system depends. Predicting MWD's ability to supply specific amounts of imported water to IEUA were beyond the scope of climate simulation. Instead, the IRP considered a wide range of potential changes in imported supply availability,

Table 3-9: Non-Chino Basin Groundwater Supplies & Projects

Non Chino Basin Groundwater Baseline		
Project Name	**Description**	**AF**
Baseline Non-Chino Groundwater	22,100 AF Amount of water produced by an Agency from outside the Chino basin	22,100 AF

Non Chino Basin Groundwater Projects			
Project Name	**Description**	**ID**	**AF**
Maximize Other Groundwater	This project category will identify Agency projects that would result in additional groundwater production benefits coming into the IEUA service area outside of the Chino Basin. Such projects may have the potential of an additional 5,000 AF.	63	5,000 AF

including assumptions in which SWP supplies decline by 2040. To explore a range of possible climate effects of MWD supplies, the analysis varied the amount of reduction of the Tier 1 water above the minimum purchase level. Two levels were selected—a 40% reduction and an 80% reduction. This corresponds to a range of reduction of 17% to 34% in total MWD Tier 1 supplies.

An interesting finding from the climate modeling was the identification of times, particularly in the next ten years, when imported MWD water may not be needed to meet regional demand. This water, if purchased, could be placed into the Chino Basin for storage and made available during future droughts, or catastrophic events (see Figure 3-11). The modeling also shows that beyond the first ten years there are periods when there is shortage in the MWD supply, and available water is lower than the baseline assumption.

Supply Challenges

Supply challenges facing imported water supplies from MWD and the SWP include the need to address:

- Catastrophic interruption—for example, an earthquake affecting the Delta or Tehachapis, or a break along the Delta levee, MWD feeder, or pump station.
- Maintenance interruptions—for example, Rialto line repairs.
- Operational constraints without improvements to the Bay Delta conveyance, such as the Delta Fix proposed by the Department of Water Resources.
- Colorado River over-allocation and the status of Lake Mead, including the potential impact on availability of MWD supplies which could constrain distribution of water from the State Water Project.
- Cost of MWD supplies that are expected to increase 4-5% annually during the next decade.
- Vulnerability to climate change conditions, such as warmer temperatures, reduced snowpack, and more frequent droughts that will reduce supplies available from CRA and SWP given that both infrastructure projects are designed to capture slow melting snowpack.

Supply Opportunities

Additional opportunities for increasing supplemental water supplies from imported sources, both through MWD and from other locations, were identified during the IRP process and are summarized in Table 3-10.

Implications

Climate conditions, conveyance reliability, and the need to improve SWP infrastructure all affect the future availability of imported water to the region. Due to its high quality, including having low TDS, SWP water should be purchased when it is available to enhance groundwater recharge and to leverage other water supply programs that benefit the region.

Key implications for imported water supplies:

- Are less reliable now than they have been in the past and may further decrease in reliability with climate change and continued uncertainty about infrastructure improvements.
- Are not fully reliable, and it will be important to develop alternative supplies so that the region has the flexibility to withstand reduced SWP supply caused by extended years of limited/reduced snowpack.
- Are not fully reliable, and so additional investments may need to be made to meet water quality restrictions if low-salinity imported water is not available, such as considerations to include CRA supply.
- Should be leveraged, when available in the near-term, by the region for storage, groundwater recharge, exchanges, transfers, or in-lieu.
- Will be more expensive. The cost of supplies is expected to increase 4-5% annually during the next decade .

CONSERVATION

Overview

Unlike traditional water supplies, efficient use of water reduces demand in ways that are quantified indirectly. Demand is reduced through changes in consumer behavior and savings from water-efficient fixtures like toilets and showerheads. These water savings come from both "active" and passive "code-based" conservation efforts. "Active" efforts are Agency funded programs such as rebates, installations, and education. "Code-based" conservation consists of demand reductions attributable to more water-efficient plumbing codes and appliance standards and from customer response to higher water costs and rates that encourage water efficiency.

Over the past 24 years, since signing the 1991 California Urban Water Conservation Council's (CUWCC) memorandum of understanding (MOU) regarding Urban Water Conservation, the region has been committed to developing and implementing conservation programs that serve as a key component in the overall water resource management portfolio for the region. Such active conservation programs have traditionally included rebates for water saving devices such as ultra-low-flow toilets and high efficiency clothes washers, which are primarily administered through MWD's "Save Water-Save A Buck" program for commercial, residential, and multi-family properties. Other programs include educational programs such as the award-winning

Figure 3-11: Potential Climate Change Impact on SWP Supplies



Table 3-10: Imported Water Baseline & Projects

Baseline Imported Water		
Project Name	**Description**	**AF**
Baseline Imported Water	Agencies can purchase up to 69,750 AFY per the Member Agency Tier 1 purchase limit per Resolution 2014-12-1	69,750 AF

Imported Water Projects			
Project Name	**Description**	**ID**	**AF**
Existing Groundwater Recharge Basin Improvements beyond RMPU-Increment 1 ,2, 3, 4	The 2013 Chino Basin RMPU recommended a set of preferred projects to improve recharge at the existing groundwater spreading basins. This project category represents the next increment of additional groundwater recharge (imported water and/or recycled water) capable at the existing facilities. Increment 1 and 2 would increase recharge at existing basins within the Chino Basin by 2,500 AFY each. Increments 3 and 4 are 5,000 AF each. If all increments are selected there is a potential of up to 15,000 AFY of production.	23 24 25 26	2,500 AF 2,500 AF 5,000 AF 5,000 AF
Construct New Groundwater Recharge Basins-Increment 1, 2, 3, 4	Purchase land to construct new groundwater recharge basins in the service area to capture additional stormwater, recycled water and/or imported water for groundwater recharge. Each increment would provide up to an additional 2,450 AFY of recharge capacity, which is approximately one new basin at 350 AF per month for 7 months of operation. If all increments are selected, there is a potential production of 9,800 AFY.	27 28 29 30	2,450 AF 2,450 AF 2,450 AF 2,450 AF
ASR wells MZ1 and MZ2	Construct aquifer storage and recovery (ASR) wells to increase imported water groundwater recharge within management zone 1 and 2. Reference projects were taken from the 2010 RMPU, Sections 6.7.2.1 and 3 for CVWD and the City of Ontario.	31	11,500 AF
ASR wells MZ3	Construct ASR wells to increase imported water groundwater recharge within management zone 3. Reference projects were taken from the 2010 RMPU, Sections 6.7.2.2 for JCSD.	32	3,500 AF
Maximize ASR wells	Construct other ASR wells to increase imported water recharge by 3,500 AFY within the Chino Basin during wet and dry years. Assume benefit 40% of the time (2 in 5 years). Storage to be dependent on supplemental water availability in wet years.	33	3,500 AF
Cadiz IW Transfer	The Cadiz project would allow for the import of unused groundwater from the remote Fenner Valley near Cadiz, California. For the purposes of the IRP, a 5,000 AFY increment of water is assumed. The Cadiz supply would be transferred and taken as SWP water into the Chino Basin.	34	5,000 AF
Secure SWP IW transfer outside MWD	Imported water supply is solely from MWD via the SWP and is limited by the Agency's purchase order. Other permanent, temporary or seasonally available imported water supplies could be purchased and wheeled into the Chino Basin. The volume of water available varies depending on the source of water and timing. Supplies could be purchased from various Irrigation Districts or secured via Ag Transfer. Assume benefit 1 in 10 years.	35	5,000 AF
SBVMWD IW Transfer	As a SWP contractor, San Bernardino Valley MWD (SBVMWD) has a Table A allocation. This option would involve constructing an intertie between SBVMWD's imported water system. The supply would be temporary or seasonally available and could be purchased and wheeled into the Chino Basin. Assume benefit 1 in 5 years.	36	5,000 AF
Ocean Desalination Exchange	This project category would involve a partnership with another water agency pursuing ocean water desalination; through in-lieu exchange, the Chino basin would obtain an agreed amount of imported water. For the purposes of the IRP, a volume of 5,000 AFY was chosen. Opportunity to invest in upcoming ocean desalination plants includes Huntington Beach, Carlsbad and West Basin.	37	5,000 AF
Water Banking Facility	This project category would invest into the Semitropic Groundwater Storage Bank in Kern County or similar program. The Chino Basin could bank additional purchases of wet year water when these supplies are available and Chino Basin facilities are capacity limited.	56	5,000 AF

Table 3-10: Imported Water Baseline & Projects *(continued)*

Imported Water Projects (*continued*)			
Project Name	**Description**	**ID**	**AF**
Max Tier 1 MWD Imported Water-Increment 1, 2, 3	Maximize imported water from MWD at Tier 1 rate. Total available supply at Tier 1 rate is 93,283 AFY or cumulative purchase order maximum of 932,830 AF through December 31, 2024. Supply can be taken directly, in-lieu or for supplemental recharge. Each increment would allow for the purchase of an additional 7,850 AFY. If all increments are selected up to 23,550 AFY could be purchased purchased annually or intermittently.	89	7,850 AF
		90	7,850 AF
		91	7,850 AF
Max Tier 2 MWD Imported Water-Increment 1, 2, 3	Maximize imported water from MWD at Tier 2 rate. Could be taken annually or intermittent, availability pending MWD supply. Supply can be taken directly, in-lieu or for supplemental recharge. Each increment would allow for the purchase of an additional 5,000 AFY . If all increments are selected up to 15,000 AFY could be purchased annually or intermitently.	92	5,000 AF
		93	5,000 AF
		94	5,000 AF
MWD Replenishment or discount wet year water-Increment 1, 2, 3	Maximize replenishment or discount wet year imported water from MWD. Availability pending MWD supply and pricing. Supply can be taken in-lieu or for supplemental recharge. Each increment would allow for the purchase of an additional 10,000 AFY. If all increments are selected up to 30,000 AFY could be purchased annually or intermittently. Assumes benefits after 2 consecutive wet years (approx. 1 in 15 years)	95	10,000 AF
		96	10,000 AF
		97	10,000 AF
Watershed Wide Water Transfers	This category of projects will construct or arrange other water transfers external to the Chino Basin. For example, dry weather flow exchange of recycled water to Orange County Water District for an equivalent amount of purchased imported water. For the purposes of the IRP, it is assumed that this category of projects will not increase supply, but increases reliability and/or quality. To occur annually or intermittent. Resiliency and flexibility benefit only	98	5,000 AF
Chino Basin Water Transfers	This category of projects will construct or arrange other water transfers within the Chino Basin. Projects to also include inter-agency interties for increased reliability. For the purposes of the IRP, it is assumed that this category of projects will not increase supply, but increases reliability. To occur annually or intermittent.	99	5,000 AF

Garden in Every School Program, National Theatre for Children, monthly water conservation tips, landscape audits, and turf-grass removal programs.

Water conservation, also called water use efficiency strategies, have changed dramatically over the past few years as a result of state and local policies that require increased conservation and improved efficiency, technological improvements that increase water savings potential, and advancements in methods of communication that provide new opportunities to engage and educate the public. To address the shift, regional efforts include securing funding for technology-based software and supporting the development of sustainable water rate structures. Both technology-based software and sustainable rate structures establish an efficiency standard for each individual customer based on their existing indoor and outdoor water use profile. These programs also have the added benefit of targeting outdoor water use, which accounts for approximately 60% of urban M&I demands.

Baseline Supply

Conservation baseline supplies are water savings from existing conservation programs' active and passive savings. Baseline conservation savings are embedded in the demands forecast, based on current annual savings (see Table 3-11). These programs are expected to continue through 2040.

Climate

Climate does not appear to impact water supply savings from conservation.

Supply Challenges

Supply challenges facing conservation programs include the need to address:

- Existing development will need incentives such as conservation rebates to meet state regulations.
- Existing development will also need targeted messaging based on state established efficiency standards to meet responsible water use and establish a new water use practices.



"And it never failed that during the dry years the people forgot about the rich years, and during the wet years they lost all memory of the dry years. It was always that way."

—John Steinbeck

East of Eden

- Current efficiency standards do not include recycled water use.

Supply Opportunities

The IRP process identified potential projects that are listed in Table 3-11. Efficiency savings beyond baseline are shown as new water supplies because they offset water demands. Conservation project savings are tied to the IRP's upper demand forecast; therefore if actual demands are lower, there will be a corresponding reduction in projected water savings.

Implications

This is a key climate resistant water supply that has the best potential to augment and extend current available supplies. Since outdoor irrigation makes up 60% of urban M&I demands, this supply category has the largest potential impact for the region. The region will need to evaluate how to achieve targeted efficiency goals.

Key implications for water conservation programs:

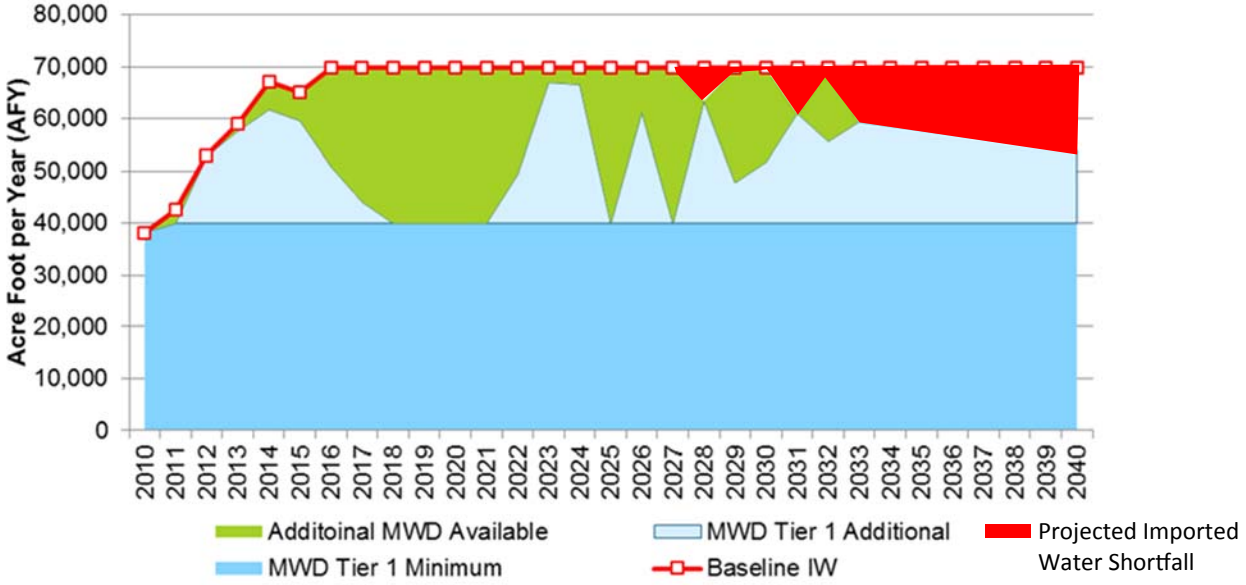
- Are cost effective relative to imported water supplies.
- Extend other water supplies and delay the need for additional system expansion because it is a demand offset.
- Are instrumental for the region to reduce dependence on climate variable supplies such as imported water.
- Are not impacted by climate change or water quality concerns.

Table 3-11: Water Use Efficiency Baseline & Projects

Water Use Efficiency Baseline		
Project Name	**Description**	**AF**
Baseline Conservation	1,000 AF per year from existing conservation programs' active and passive savings.	1,000 AF

Water Use Effiency Projects			
Project Name	**Description**	**ID**	**AF**
Expand WUE Devices	Implement additional targeted device related savings to reduce demand beyond current annual water use efficiency (WUE) savings. Provide incentives and pilot programs to roll out extremely high efficient indoor fixtures and toilets. To be verified with Water Use Efficiency Business Plan (WUEBP).	39	5,000 AF
WUE - Turf Removal-Increment 1, 2, 3	Implement turf removal and landscape transformational programs to reduce outdoor demand. To be verified with WUEBP. Each increment would provide up to 5,000 AFY of savings. If all are selected, they can result in up to 15,000 AFY savings	40 41 42	5,000 AF 5,000 AF 5,000 AF
WUE - Budget Rates-Increment 1, 2, 3	Implement water budget based rates for 2 Agencies (assuming 15% total savings per Agency after 3 years). To be verified with WUEBP. Each increment would provide up to 13,350 AFY of savings. If all increments are selected, they can result in up to 40,050 AFY savings.	43 44 45	13,350 AF 13,350 AF 13,350 AF
WUE- Recycled Water Demand Management-Increment 1, 2	Implement demand management devices and programs for direct recycled water customers. Does not generate additional supply, aids in managing the supply during peak demand. Each increment would provide 2,500 AFY of demand management. If both are selected they could provide 5,000 AFY additional recycled water. This supply could be used for increasing direct use demands, groundwater recharge or other reuse strategy	46 47	2,500 AF 2,500 AF
WUE - Advanced Metering Technologies	Install advanced metering infrastructure (AMI) between retail meters and a utility provider. Will provide real-time data about consumption and allow customers to make informed choices about usage.	66	5,000 AF

Figure 3-12: Sample Model Run of Climate Impacts on Imported Water Supply Availability





4. Supply Portfolio Themes



Baseline Assessment

Single Variable Tests

Water Resource Strategies

The desert globemallow, which requires very little water, grows in a low water use landscape.

Supply Portfolio Themes

Section 4 presents the different water resource strategies developed through the IRP Technical Work Group. The purpose of each water resource strategy is to increase future water supplies, including water efficiency as a source of supply, to reduce the region's vulnerability to climate change and to ensure that future water needs for the region are met.

First, a baseline assessment was conducted to evaluate the ability of the baseline water supplies, established in Section 3, to meet projected baseline water demands. To do this, a water management mass balance model was developed by IEUA's technical consultants (see Appendix 2) to compare projections of water demand and supply under historical and future climate change conditions. Three demand scenarios were then evaluated across 106 different projections of future climate derived from two archives of downscaled global circulation models simulations. The results were reviewed to assess the extent to which baseline water supplies could NOT fulfill demands (described as supply shortfalls) under each future. This baseline assessment provided the foundation for the Work Group to identify the additional water resources needed to meet future demands.

Next, single variable tests were conducted to determine how well specific types of new water supplies could help the region meet projected demands under climate change. Single variable tests added individual supplies to the baseline to determine how well that single change performed under each of the 106 climate scenarios in the model.

Based on the outcomes of the single variable tests, the IRP Technical Work Group crafted 5 water resource strategies for further evaluation. Each strategy had an underlying theme, such as maximizing the use of recycled water or securing additional supplemental water supplies for groundwater replenishment. These 5 strategies were turned into project portfolios by selecting representative projects from proposed lists of future projects (see Section 3) that could be implemented to increase future water supplies above the baseline projections.

Finally, the performance of each water resource strategy was compared to the baseline assessment. The evaluation focused on two IRP criteria: (1) the ability of the scenario to generate sufficient water to meet future regional water demands under climate change conditions and (2) the amount of surplus water produced, defined as water not needed to meet demand, and placed into long-term groundwater storage.

BASELINE ASSESSMENT

The regional baseline supplies and demand projections were developed in the first part of the IRP planning process. To establish how this baseline could be impacted by climate change, these projections were modeled and stress-tested under 106 separate climate scenarios, as referenced above and included in Appendix 2.

As a reminder, each of the 106 climate scenarios yields an independent model result and is depicted with a

separate colored line in the figures below. Note that no one run is "more accurate" than another. However, some of the runs stand out as "outlying" results that are either higher or lower than the majority of the runs. These results are not included in the scenario evaluations. For the purposes of the IRP, the analysis focused on the range of results for the majority (75%) of the climate scenarios.

Figure 4-1 shows the amount of unmet demand through 2040 under the baseline assessment with climate change. For the purposes of the IRP, unmet demands are defined as those times when demands exceed available water supplies. For the baseline conditions with climate change, the range of unmet demand is 0 AFY to 60,000 AFY . Note that the amount of unmet demand is smaller in the near term (about 20,000 AFY by 2030) and increases to 60,000 AFY by 2040. It is also important to note that without additional water supply development the region would struggle to meet future

Figure 4-1: Baseline Unmet Demands

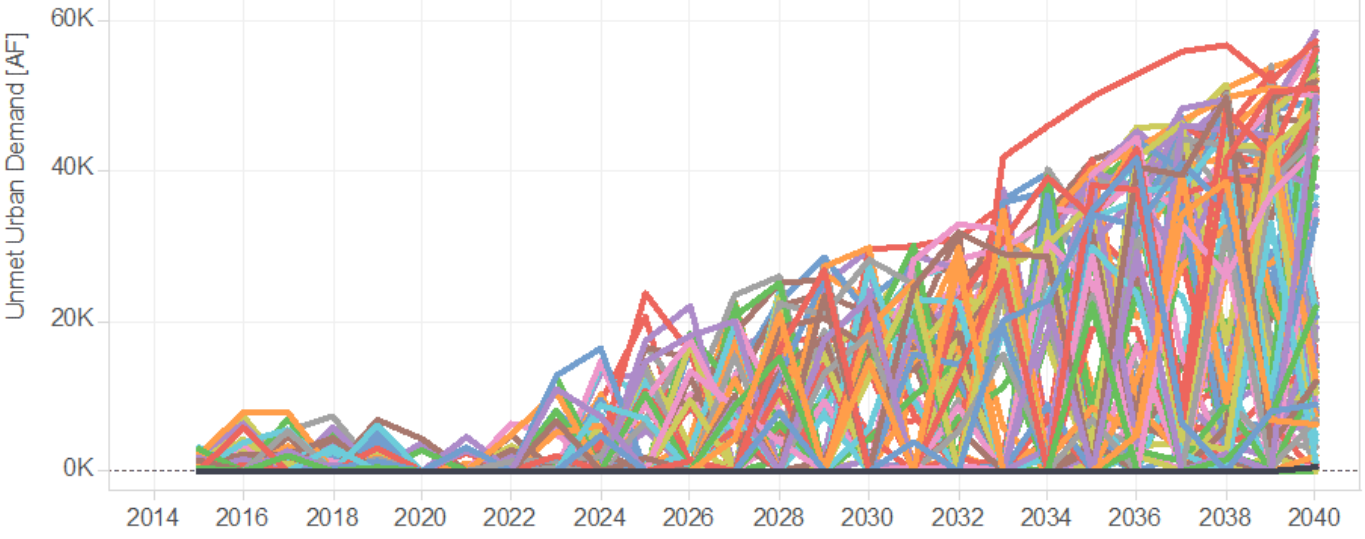
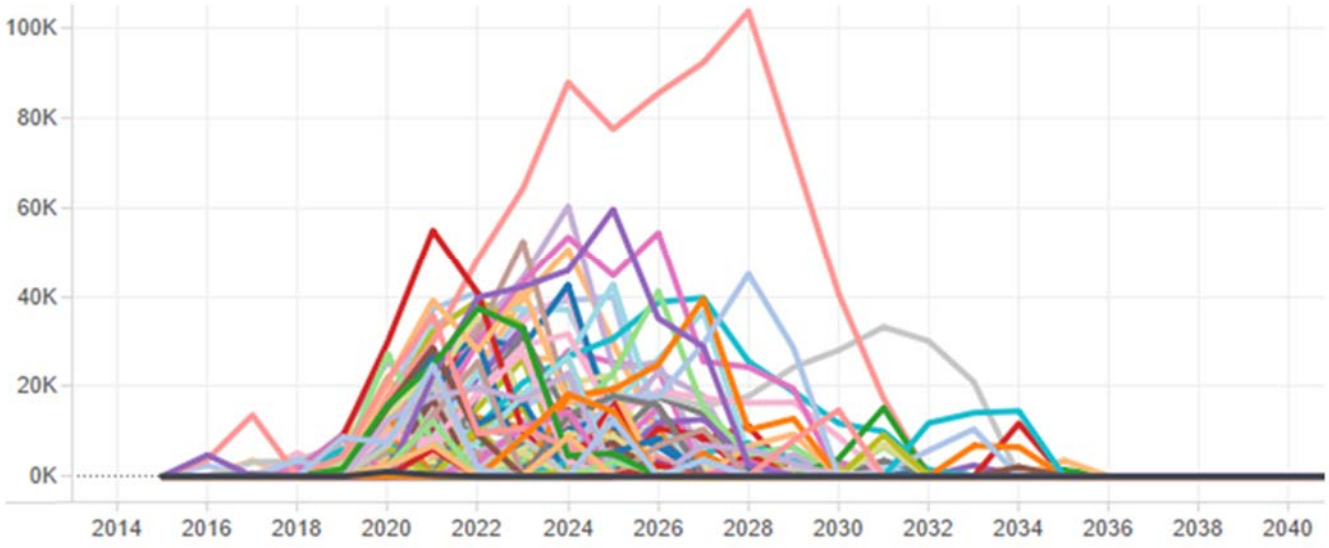


Figure 4-2: Baseline Stored Water Balance



water demands under climate change conditions.

In each climate run, there may be periods when water supplies exceed demands, creating surplus water supplies. The WEAP model tracks these surplus supplies by allocating the water to a groundwater storage account.

The IRP uses the 2014 groundwater storage level as the baseline for tracking the addition of surplus water to groundwater storage. Similarly, during periods when demands exceed supplies, the model deducts water from groundwater storage tracking account but cannot lower the groundwater below its 2014 level.

Figure 4-2 illustrates how stored water accumulates under each climate scenario through 2040. A positive or upward slope on the graphic indicates water surplus conditions and the excess water is added to the storage tracking account. A negative, or downward slope, indicates that demand is exceeding supplies, and water is pulled out of storage to meet, in whole or in part, the excess demands. As a result, the stored water creates a buffer supply that can be used offset future shortfalls. The model shows "unmet demands" only when demands exceed supplies AND no water remains in the storage tracking account created by the model.

For comparison, the thick black line in Figure 4-2 represents baseline assessment conditions without climate change. Note there is no accumulation of surplus supplies and therefore all available water supplies are needed to meet the regional demand, and no water is stored for future use.

Results of the baseline assessment with climate change indicate that the following is likely to be experienced by the region:

- 79% of the regional water demands are met by 2040.
- Water supply shortages, or unmet demand, will be more intense and frequent under climate change.
- Climate will drive unmet demand to 25,000 AFY by 2030 and up to 60,000 AFY by 2040.
- Significant water supply shortfalls could occur as soon as 2022.
- A "do nothing" approach is not sustainable, as projected demands exceed supplies under all scenarios.
- It may be possible to accumulate additional groundwater under baseline conditions, but the amount would depend on future climate scenarios (e.g., more rainfall, less variability, cooler temperatures) than currently predicted.

SINGLE VARIABLE TESTS

To evaluate how the addition of a new water supply could enhance the region's current, or baseline water supplies under climate change, a series of four single variable tests were evaluated. These tests were used to determine the potential improvement of implementing an isolated or single water supply source to help improve baseline conditions impacted by climate change.

The four single variable tests are:

1. Maximizing the Use of Prior Stored Chino Basin Groundwater
2. Maximizing the Purchase of MWD Imported Water
3. Maximizing Recycled Water Supply for Groundwater Recharge
4. Reducing Urban Water Demand by Increased Conservation and Water Use Efficiency

Conclusions from comparing the tests to the baseline assessment are summarized below.

1 — Maximizing the use of prior stored Chino Basin groundwater.

Test 1, Maximizing the Use of Prior Stored Chino Basin Groundwater does not produce new water supplies because it relies only on prior (pre-2013) stored groundwater. It is assumed that up to 8,400 AFY of groundwater can be pumped above baseline levels, and that the total amount of additional groundwater pumping cannot exceed 280,000 AF.

Results of this test are illustrated in Figure 4-3. If the region only relies upon the addition of prior stored Chino Basin groundwater to meet future water resource

needs:

- 91% of regional demands are met by 2040.
- Water supply shortages, or unmet demands, will be moderately improved by 2040 over baseline conditions.
- Unmet demand would be reduced to approximately 18,000 AFY by 2030 and 40,000 AFY by 2040.
- Significant water supply shortfalls could occur as early as 2024.
- The approach is not sustainable given that a significant amount of prior stored groundwater is needed to meet regional demands through 2040. The median of the climate scenarios shows a reduction in this storage from 280,000 AFY to approximately 130,000 AFY by 2040, with scenarios dropping as low as 80,000 AF.
- It may be possible to accumulate more stored water under this strategy, but the amount would depend on more benign future climate scenarios (e.g., more rainfall, less variability, cooler temperatures) than currently predicted.

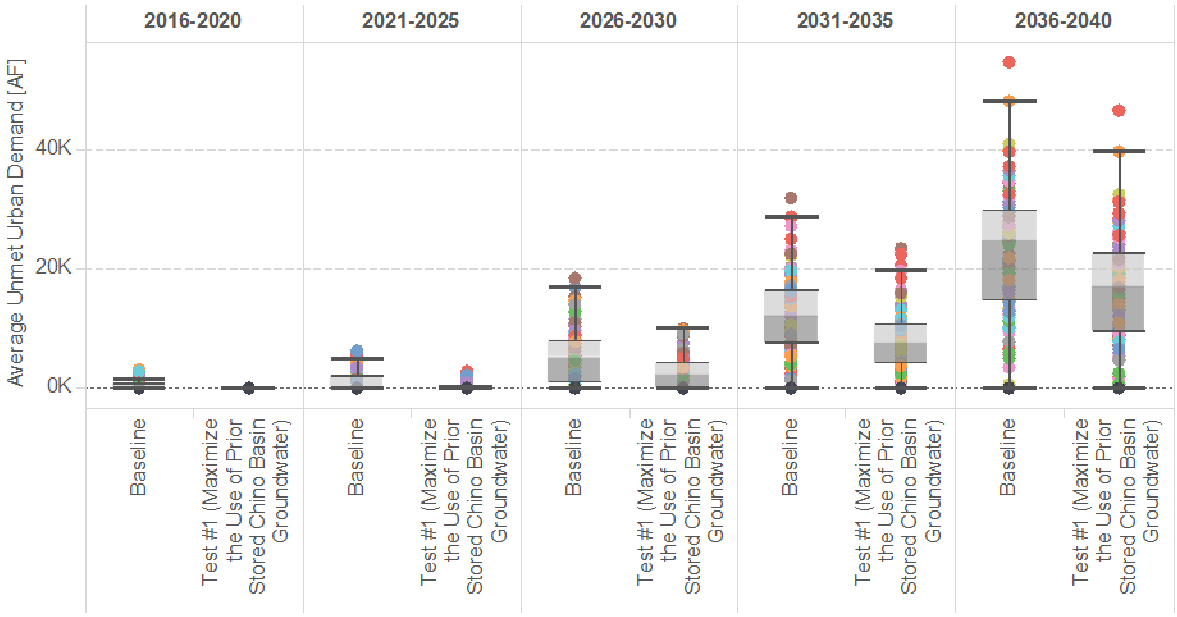
2 – Maximizing the Purchase of Metropolitan Water District (MWD) Imported Water

IEUA member agencies (agencies) have the ability to purchase up to 70,000 AFY of imported water from the MWD. As discussed in Section 3, the baseline modeling assumption for imported water is that member Agencies could purchase up to 69,752 AFY (consistent with Resolution 2014-12-1), with a minimum total purchase of 40,000 AFY.

Due to the cost of imported water, agencies typically only purchase the amount of water needed to meet their operational requirements or fulfill water demands that cannot be met through local supplies. This means there may be times when agencies don't need the imported water but could decide to purchase this water and place it into storage for future use.

The approach of Maximizing the Purchase of MWD imported water does not add new imported water supplies to the baseline supply. However, the region's agencies will purchase all of the water available, up to 70,000 AFY. This purchase would occur even if water supplies exceed demand. In years where agencies make these purchases, the additional water would be put into storage via groundwater recharge or in-lieu of

Figure 4-3: Baseline vs Test 1 Unmet Demand Comparison



groundwater pumping. The quantity of supply would be dependent on imported water availability.

Results of this test are illustrated in Figure 4-4. If the region relies only upon maximizing imported water purchases to meet future needs:

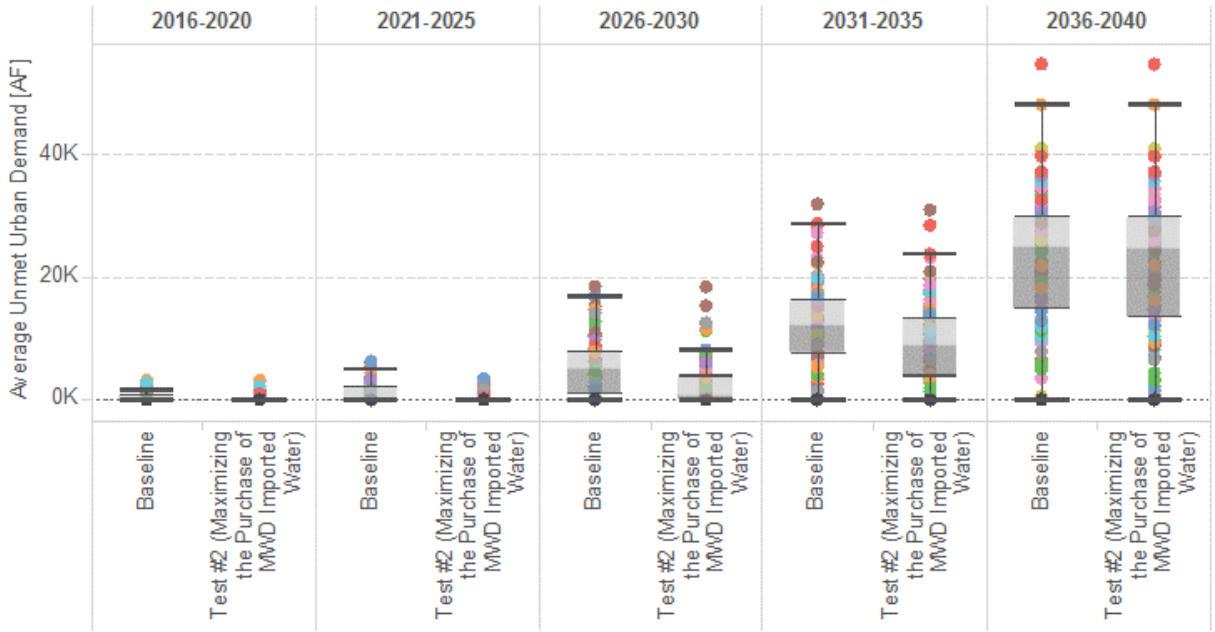
- 85% of regional demands are met by 2040.
- Water supply shortages, or unmet demands, will be slightly improved by 2040 over baseline conditions because imported water availability is adversely impacted by climate change.
- Unmet demand would be reduced to 22,000 AFY by 2030 and 55,000 AFY by 2040.
- Significant water supply shortfalls could occur as soon as 2024.
- This approach is not sustainable as a stand-alone approach and must be combined with other water resources to improve water supply conditions for the region.
- It may be possible to accumulate more stored water under this strategy, but the amount would depend on more benign future climate scenarios (e.g. more rainfall, less variability, cooler temperatures) than currently predicted.
- This approach could increase the region's dependence on imported water supplies, which could make the region more vulnerable to climate change.

3 – Maximizing Recycled Water Supply for Groundwater Recharge

The region has developed a successful regional Recycled Water Program for both direct use (landscaping, agricultural irrigation and industrial processing uses) and indirect use (groundwater recharge). In 2000, the region identified recycled water as a critical resource needed for drought-proofing the region and maintaining its economic growth.

The approach of Maximizing Recycled Water Supply for Groundwater Recharge builds on the successful regional Recycled Water Program. As discussed in Section 3, the baseline assumption for available recycled water is 47,700 AFY by 2025. As the region continues to grow, new communities will be sewered and additional recycled water supplies will be generated. It is estimated that there will be approximately 85,500 AFY of recycled water supply from regional development by 2040.

Figure 4-4: Baseline vs Test 2 Unmet Demand Comparison



Therefore, this will deliver 37,800 AFY of additional recycled water to the groundwater recharge program.

Results of this test are illustrated in Figure 4-5. If the region relies only upon maximizing recycled water supply for groundwater recharge for future water needs:

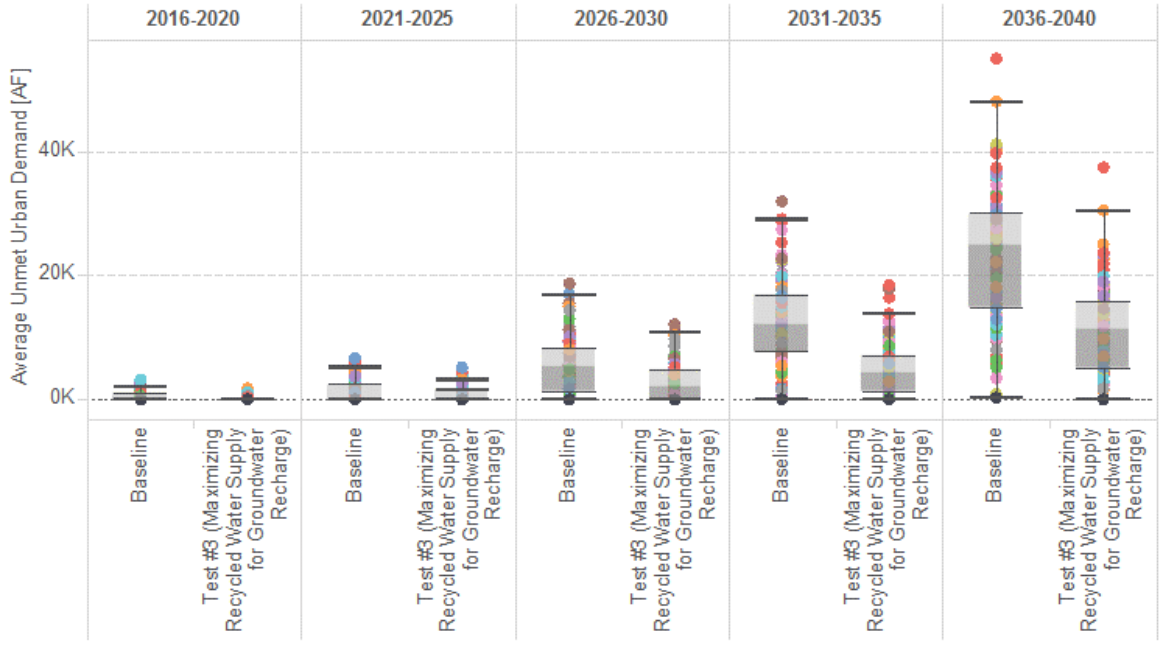
- 95% of the regional demands are met by 2040.
- Water supply shortages, or unmet demand, will be greatly improved by 2040 over baseline conditions.
- Unmet demand would be reduced to 10,000 AFY by 2030 and 17,000 AFY by 2040.
- Although water supply shortfalls are reduced, they could occur as early as 2024.
- Maximizing recycled water for groundwater recharge is sustainable as a stand-alone strategy, but would provide greater benefits if combined with other programs to enhance water supply conditions for the region.
- Provides flexibility by maximizing the amount of water stored in the Chino groundwater basin for future use.
- Recycled water is the most climate resilient water supply available to the region.
- It may is possible to accumulate more stored water under this strategy, but the amount depends on more benign future climate scenarios (e.g. more rainfall, less variability, cooler temperatures) than currently predicted.
- The volume of future recycled water supply is impacted by the amount and timing of new development in the region and indoor water efficiency trends. Additional tracking of wastewater flows is needed to accurately anticipate the amount of recycled water that will be available by 2040.

4 – Reducing Urban Water Demand by Increased Outdoor Water Use Efficiency and Conservation

Approximately 60% of the region's urban water use is for outdoor irrigation, particularly lawns. The IRP Technical Work Group requested a scenario to evaluate the implications of an increased outdoor efficiency and conservation program.

The approach of Reducing Urban Demand by Increasing Water Use Efficiency assumes that the region achieves a level of water savings that will reduce residential outdoor water usage to levels consistent with the requirements of the Department of Water Resources State Model Water Efficiency Landscape Ordinance (AB

Figure 4-5: Baseline vs Test 3 Unmet Demand Comparison



1881). This could be achieved by programs such as budget-based rates and continuation of active conservation programs. The region currently has one water agency on budget based rates.

This test assumed that four retail agencies would implement budget based rates structures by 2020. The savings are estimated to be 27,000 AFY from the rate structure changes and 11,000 AFY from active potable and recycled water conservation programs. Combined these measures are assumed to reduce urban demands by approximately 17% from 2013-14.

Results of this test are illustrated in Figure 4-6. If the region relies upon only reducing urban water demand by Increased Outdoor Water Use Efficiency and Conservation to meet future water needs:

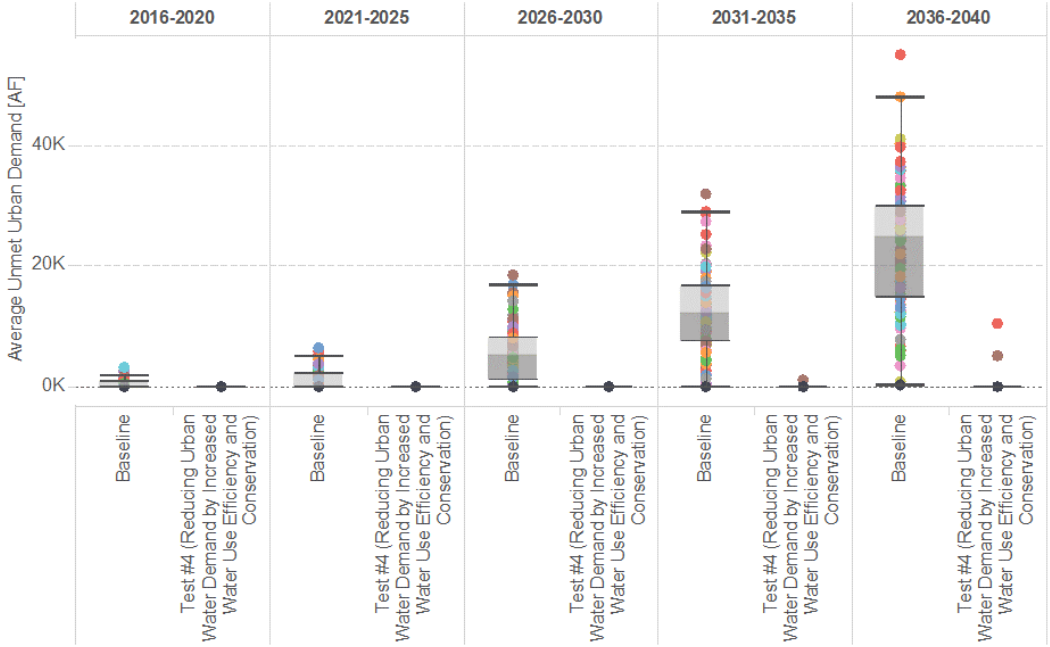
- 100% of the regional demands are met by 2040.
- Water supply shortages, or unmet demand, would be eliminated by 2040.
- Water supply shortfalls are delayed beyond 2040.
- Accumulation of stored water is very likely to occur, with more than 50% of the climate scenarios producing over 200,000 AFY of stored water by 2040.
- Regional recycled water supplies would not be impacted because this approach targets outdoor conservation.
- Reduces dependence on climate dependent supplies and reduces the volume of additional water supplies needed to meet future demand.
- Requires expansion of water efficiency programs to support transition to budget based rate structure to achieve outdoor efficiency standards.

Single Variable Test Conclusions

Results from the four single variable tests show that all of the strategies helped to reduce and delay water supply shortages when compared to baseline conditions under climate change. Notably, water efficiency/ conservation is the only water supply approach that could eliminate water supply shortages through 2040 as a "stand-alone" approach. However, the expansion of local supplies such as recycled water and storm water ensures that the region is insulated from unforeseen or cataclysmic conditions.

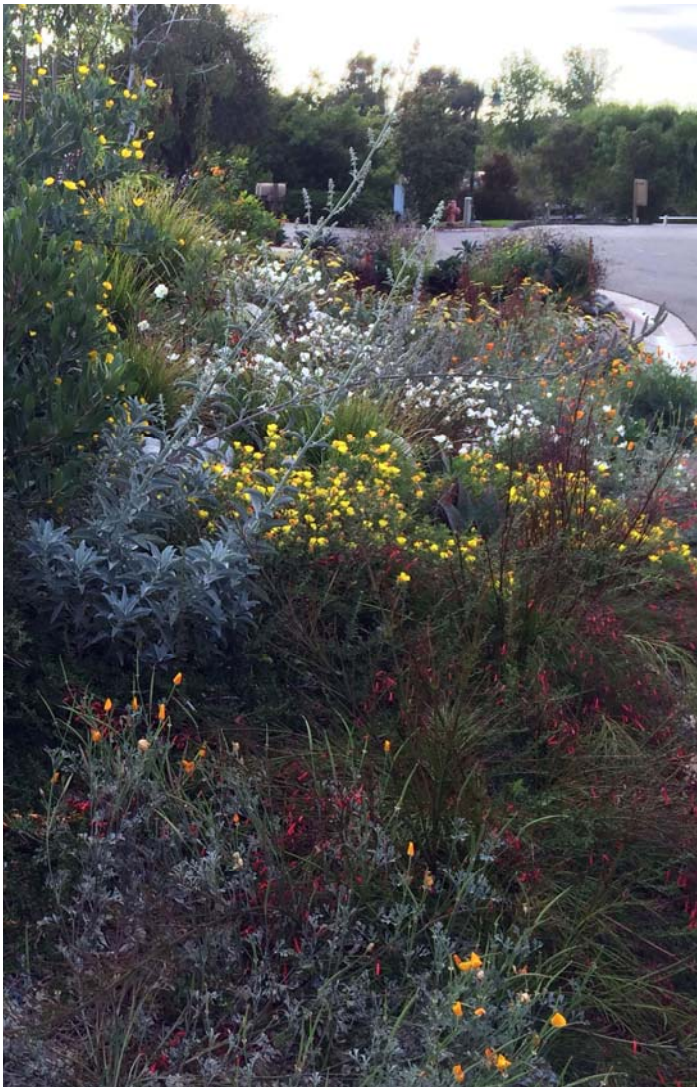
The recommended approach in the IRP is to diversify the region's water supplies. The following conclusions were

Figure 4-6: Baseline vs Test 4 Unmet Demand Comparison



used as the basis for developing the next step in the IRP, the creation of water strategies:

- Water use efficiency and conservation provides the region with the greatest level of water supply reliability and resiliency.
- Diversification of region's water supplies minimizes the potential for water shortages under climate change and from catastrophic events.
- Increasing water supplies for Chino groundwater recharge increases storage and provides a supply buffer, enhancing the region's water supply flexibility and resilience.
- Implementing outdoor water use efficiency and conservation minimizes climate change impacts on urban water demand.



WATER RESOURCE STRATEGIES

Each water resource strategy is a combination of water supply and conservation projects or opportunities that the region could pursue to achieve the goals of the IRP. Five water resource strategies were developed during the course of the IRP workshops, with a total of eight project portfolios. Each portfolio was modeled to determine performance and resiliency across the 106 climate scenarios. These strategies and portfolios are as follows:

Strategy A – Increase Chino Basin Groundwater Production

- ***Portfolio 1****:* Maximize the Use of Prior Stored Groundwater

Strategy B– Recycled Water Program Expansion

- ***Portfolio 2****:* Maximize Recycled Water (Including External Supplies) and Local Supply Projects and Implement Minimal Water Efficiency
- ***Portfolio 3****:* Portfolio 2 Plus Secure Supplemental Imported Water from MWD and Non-MWD Sources

Strategy C– Recycled Water & Water Efficiency Program Expansions

- ***Portfolio 4****:* Maximize Recycled Water (Including External Supplies) and Implement Moderate Water Efficiency
- ***Portfolio 5****:* Portfolio 4 Plus Implement High Water Efficiency

Strategy D– Increase Groundwater Recharge Supplies

- ***Portfolio 6*****:** Maximize Supplemental Water Supplies and Recycled Water Supplies

Strategy E – Maximize Imported Water Supplies with Moderate Water Efficiency

- ***Portfolio 7***: Maximize the Purchase of Imported Water from MWD and Implement Minimal-Moderate Level of Water Efficiency
- ***Portfolio 8***: Portfolio 7 Plus Maximize Recycled Water

Table 4-1: Supply Totals for Portfolio 1

Supply Type	Baseline	Portfolio 1
Chino Groundwater	91,300	8,400
Stormwater	6,400	-
Recycled Water		-
Locally Developed[(1)]	64,700	-
External Supplies		-
Chino Desalter	17,700	-
Local Surface	22,100	-
Non-Chino Groundwater	11,600	-
Imported Water		-
MWD	69,750	-
Other		-
WUE [(2)]	1,000	-
add'l supplies subtotal		*8,400*
Total Water Supply	**283,550**	**291,950**

Notes:

(1) Baseline Supply of 18,700 GWR + 29,000 Direct + 17,000 SAR, or total of 64,700 AFY, based on Agency TYCIP and not total available wastewater supply. Estimated total available local RW supply by 2040 to be 85,550 AFY based on 2015 WWFMPU flow monitoring.

(2) Baseline WUE of 1,000 AFY already included in the Urdan Demand forecast. Therefore, not included in Supply Table to avoid double counting. Only new WUE in addition to Baseline to be counted in Total Supply.

Strategy A – Increase Chino Basin Groundwater Production (Portfolio 1)

Under Strategy A, the IRP Technical Work Group explored the implications of expanding groundwater production without bringing in additional water resources. Strategy A is similar to Single Variable Test 1 – Maximizing the Use of Prior Stored Chino Basin Groundwater. It includes capacity building projects, the use groundwater that was previously stored in the Chino Basin, and the implementation of water efficiency programs for direct recycled water customers. Although strategy this does not generate additional recycled water supply, it allows for additional recycled water to be used for groundwater recharge. One water supply portfolio, Portfolio 1, was developed for Strategy A, with additional supply amounts shown in Table 4-1.

Portfolio 1 assumes that an additional 8,400 AFY of groundwater supply would be pumped from the Chino Basin, with a 2040 "not-to-exceed" limit of 280,000 AF. Since new supplies in Portfolio 1 are limited to 8,400 AFY from stored Chino Basin groundwater the results are identical to the first test strategy. Implicit in this scenario, when there are periods where the portfolio's water supplies exceed demands, the resulting surplus water supplies is assumed to be recharged into the groundwater basin. When this occurs, the stored water can be used at a later time.

Figure 4-7 shows unmet demands for Portfolio 1 in comparison to the baseline model run. Potential shortfalls begin to appear around 2022, which is the same as the baseline. In the majority (75%) of model runs, Portfolio 1 reduces unmet demands by 2040 from up to 27,900 AFY to 12,500 AF.

Stored water balances are shown in Figure 4-8. As illustrated, groundwater balances begin to accumulate in Portfolio 1 by 2020 with storage peaking around 2025. Stored groundwater starts to be used to meet demands by 2028 and continue to be drawn down through 2040.

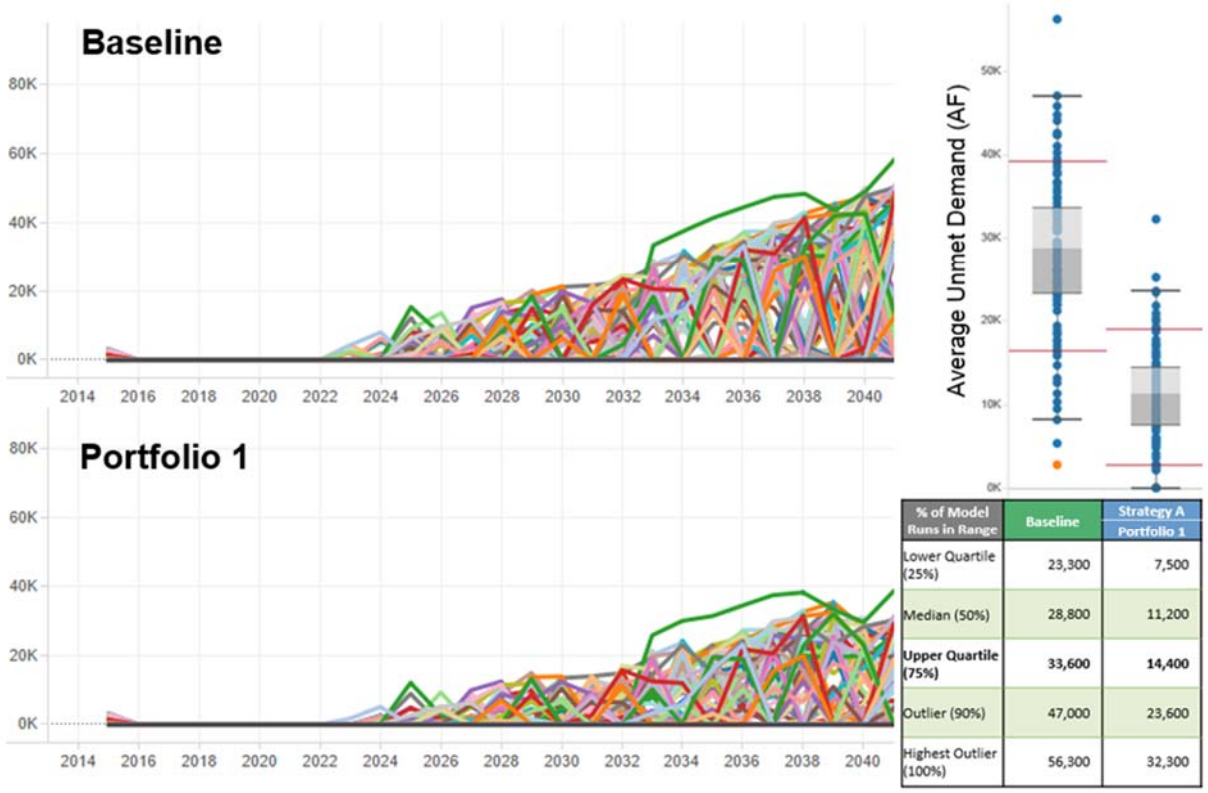
In summary, Portfolio 1

- Provides 95% of the demands under majority of climate scenarios
- Shows a 5% improvement over baseline conditions by utilizing existing stored groundwater on an annual basis
- However, the groundwater pulled from storage is a finite resource and due to the continued drawdown, this strategy is not sustainable without additional projects to replenish the storage or reduce demands.

Strategy B– Recycled Water Program Expansion (Portfolios 2 & 3)

Under Strategy B, the IRP Technical Work Group explores the continued expansion of the recycled water program. Strategy B focuses on how achieving a 40% increase in recycled water supply over the baseline condition would benefit the region. The strategy accomplishes this goal by using an additional 17,000 AFY of locally generated recycled water. As mentioned in Section 3, these additional recycled water supplies will be available as growth occurs in the service area. In addition, this strategy secures 10,500 AFY of external recycle water supply from neighboring jurisdictions by

Figure 4-7: Unmet Demands of Portfolio 1 Compared to Baseline



% of Model Runs in Range	Baseline	Strategy A Portfolio 1
Lower Quartile (25%)	23,300	7,500
Median (50%)	28,800	11,200
Upper Quartile (75%)	**33,600**	**14,400**
Outlier (90%)	47,000	23,600
Highest Outlier (100%)	56,300	32,300

Figure 4-8: Stored Groundwater Balance of Portfolio 1

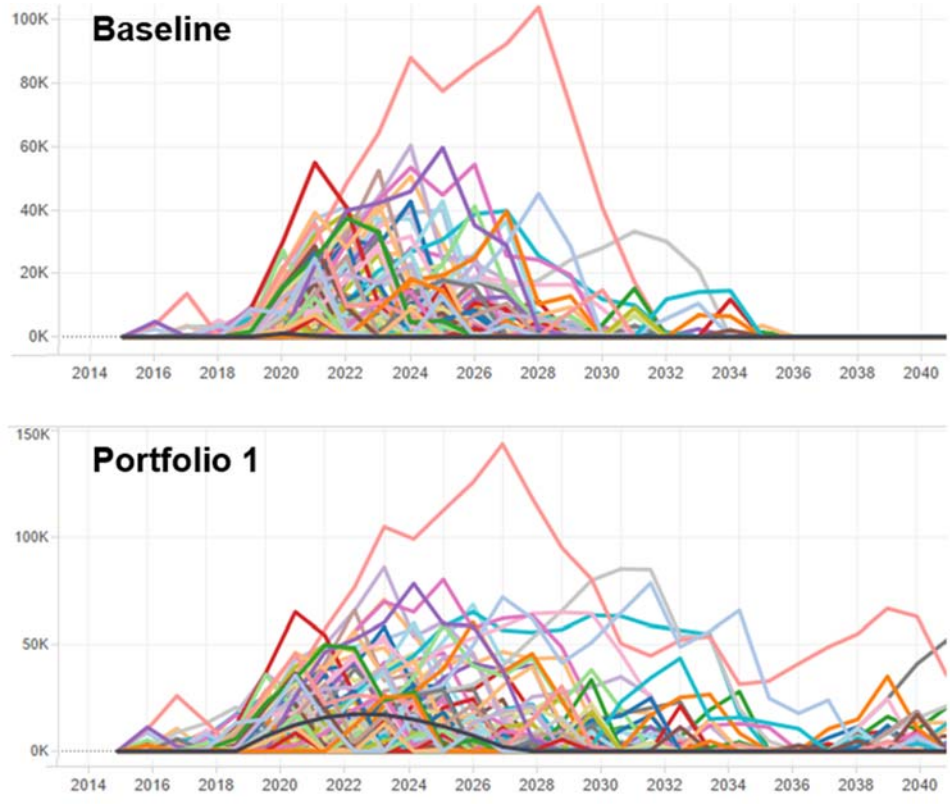


Table 4-2: Supply Totals for Portfolio 2 & 3

Supply Type	Baseline	Portfolio 2	Portfolio 3
Chino Groundwater	91,300	-	-
Stormwater	6,400	-	-
Recycled Water		-	-
Locally Developed[(1)]	64,700	17,000	17,000
External Supplies		10,500	10,500
Chino Desalter	17,700	-	-
Local Surface	22,100	-	-
Non-Chino Groundwater	11,600	-	-
Imported Water		-	-
MWD	69,750	-	7,850
Other		-	4,900
WUE [(2)]	1,000	5,000	5,000
add'l supplies subtotal		*32,500*	*45,250*
Total Water Supply	**283,550**	**316,050**	**328,800**

Notes:

(1) Baseline Supply of 18,700 GWR + 29,000 Direct + 17,000 SAR, or total of 64,700 AFY, based on Agency TYCIP and not total available wastewater supply. Estimated total available local RW supply by 2040 to be 85,550 AFY based on 2015 WWFMPU flow monitoring.

(2) Baseline WUE of 1,000 AFY already included in the Urdan Demand forecast. Therefore, not included in Supply Table to avoid double counting. Only new WUE in addition to Baseline to be counted in Total Supply.

2040. Strategy B also includes 5,000 AFY of additional device based conservation savings.

Two water supply portfolios were developed for Strategy B. The first, Portfolio 2, models the additional water supplies as described above. The second, Portfolio 3 includes all of Portfolio 2 supplies plus additional imported water as shown in Table 4-2. Imported water supplies include MWD Tier 1 and/or wet year purchases of supplemental water for groundwater replenishment. A complete list of projects in Portfolios 2 and 3 can be found in Appendix 6.

Figure 4-10 shows unmet demands for Portfolio 2 in comparison to the baseline model run. Potential shortfalls for Portfolio 2 begin to appear around 2024, which is two years later than baseline conditions. In the majority of model runs, Portfolio 2 reduces unmet demands by 2040 from to 27,900 AFY to 9,000 AF.

Stored groundwater balances for Portfolio 2 are illustrated in Figure 4-10. Groundwater balances begin to accumulate by 2018 with the majority of the model runs building around 25,000 AFY or less of stored water. By 2040 the quantity of stored water is depleted in approximately 90% of the climate runs.

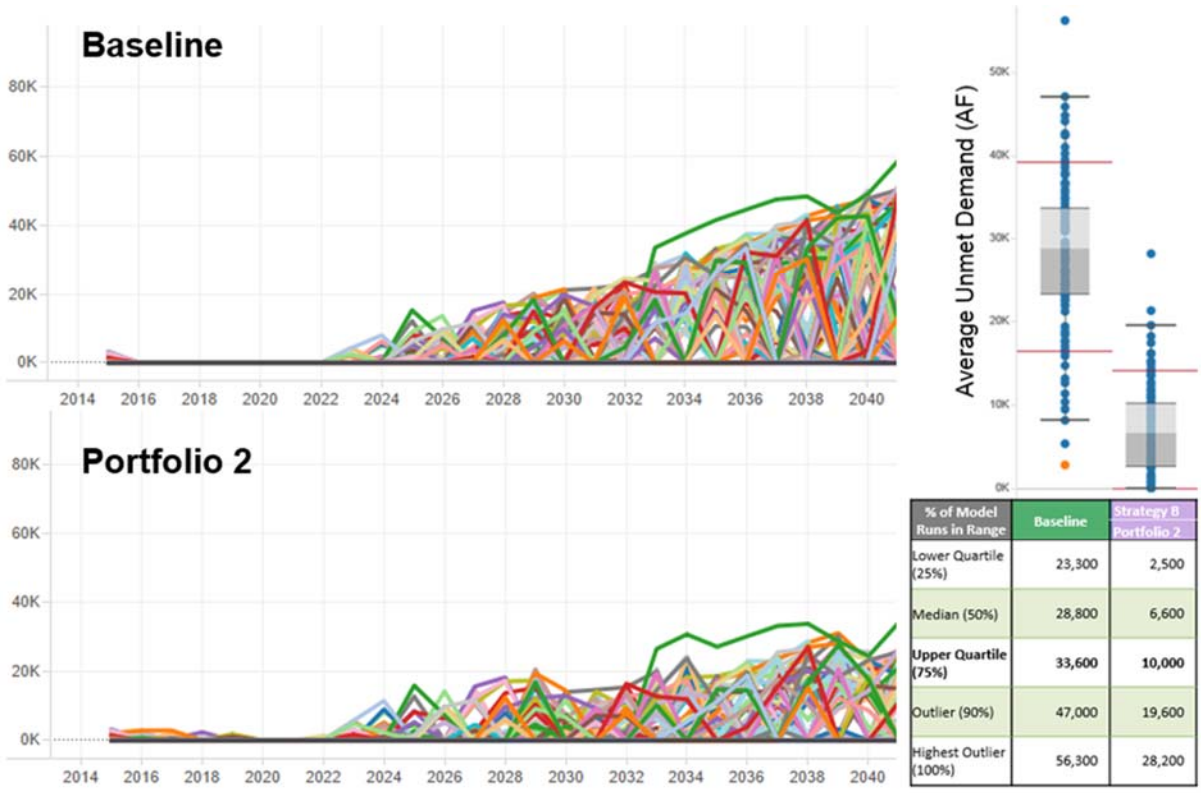
Unmet demands for Portfolio 3 in comparison to the baseline model run are shown in Figure 4-11. Potential shortfalls for Portfolio 3 begin to appear after 2035, 13 years after the baseline condition. In the majority of model runs, Portfolio 3 reduces unmet demands in 2040 from 27,900 AFY to 9,000 AF.

Stored water balances for Portfolio 3 are illustrated in Figure 4-12. Portfolio 3 behaves in a similar fashion to Portfolio 2, however there is a much greater probability of accumulating stored water. Approximately 70% of the runs in Portfolio 3 have water in storage by 2040. The range of stored water falls between 0 AFY and 280,000 AF.

In summary, Portfolios 2 and 3 under 75% of the climate scenarios:

- Provide 90% supply reliability under majority of climate conditions.
- Show a 5% improvement over baseline conditions by utilizing existing stored groundwater on an annual basis
- Water supply shortfalls are delayed by two years as compared to baseline conditions.
- Extend the ability to produce water stored water, with the majority of climate runs having the ability to build and maintain stored supplies through 2040

Figure 4-9: Unmet Demands of Portfolio 2 Compared to Baseline



% of Model Runs in Range	Baseline	Strategy B Portfolio 2
Lower Quartile (25%)	23,300	2,500
Median (50%)	28,800	6,600
Upper Quartile (75%)	**33,600**	**10,000**
Outlier (90%)	47,000	19,600
Highest Outlier (100%)	56,300	28,200

Figure 4-10: Stored Groundwater Balance of Portfolio 2

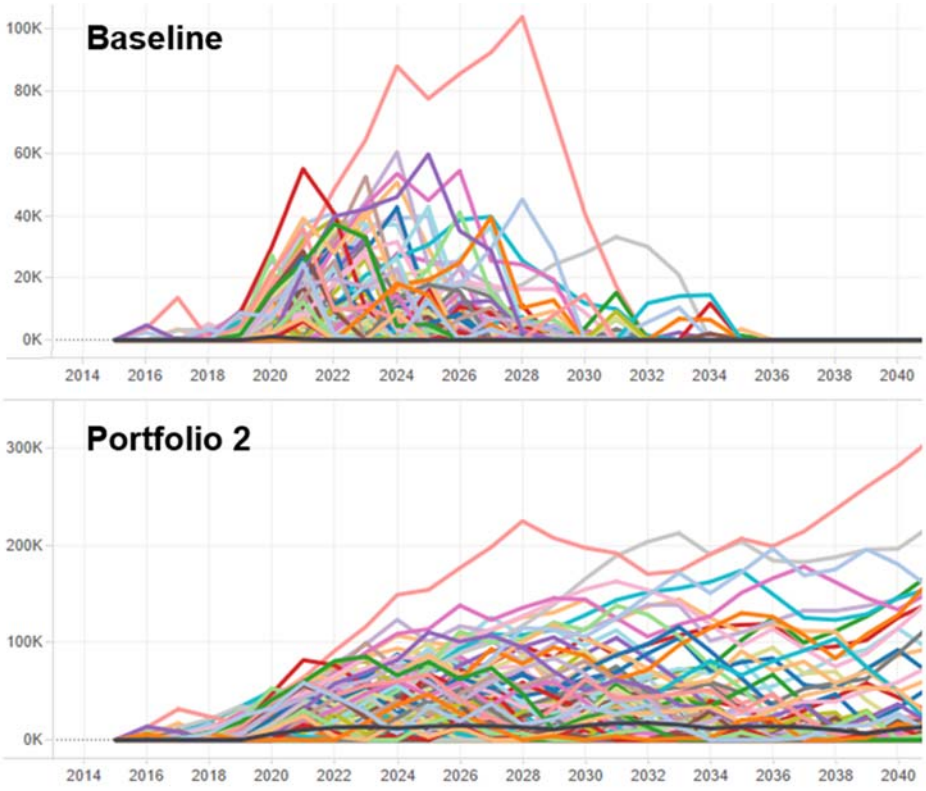
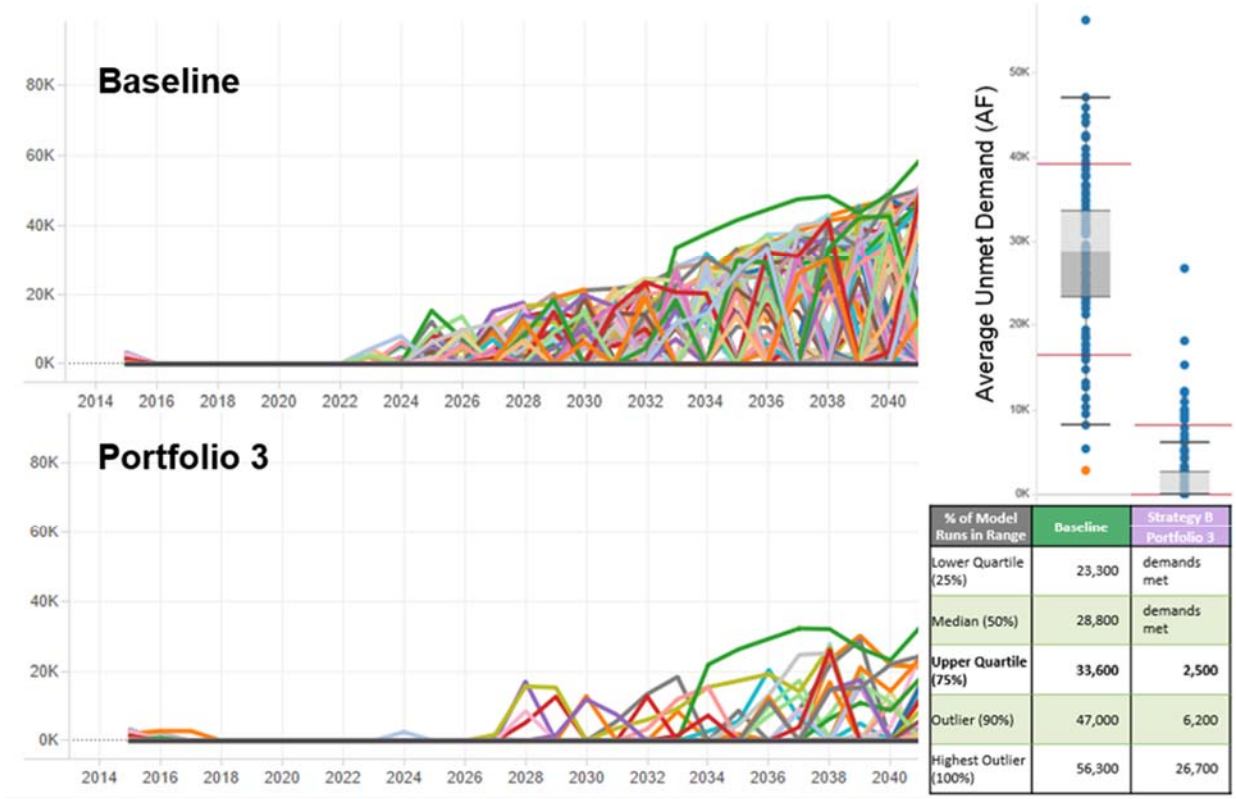
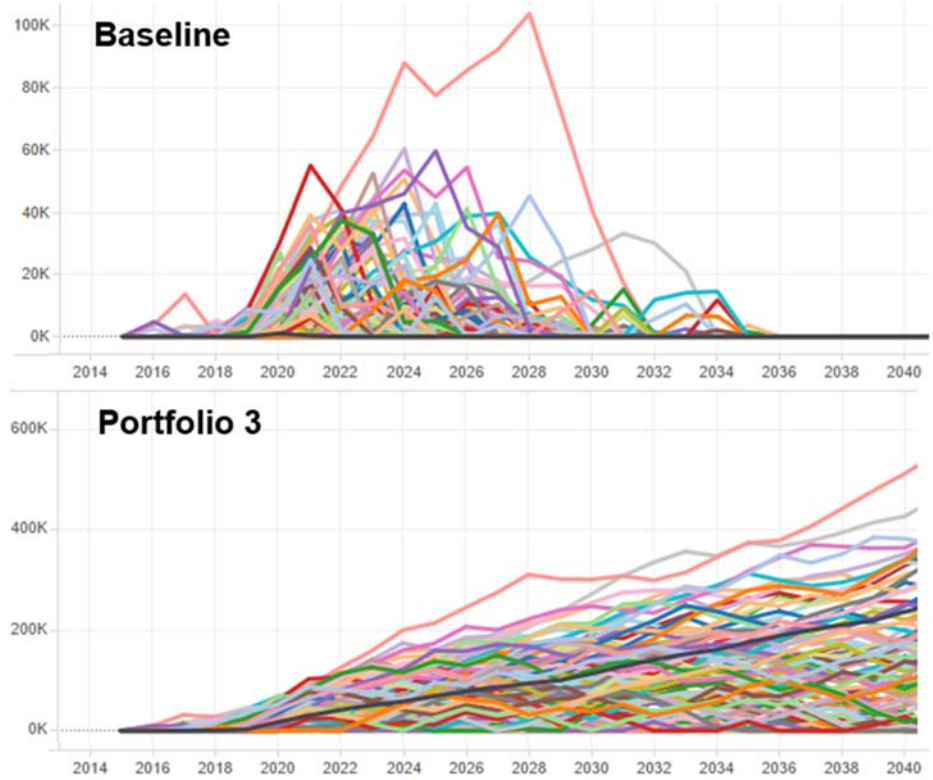


Figure 4-11: Unmet Demands of Portfolio 3 Compared to Baseline



% of Model Runs in Range	Baseline	Strategy B Portfolio 3
Lower Quartile (25%)	23,300	demands met
Median (50%)	28,800	demands met
Upper Quartile (75%)	**33,600**	**2,500**
Outlier (90%)	47,000	6,200
Highest Outlier (100%)	56,300	26,700

Figure 4-12: Stored Groundwater Balance of Portfolio 3



Strategy C – Recycled Water & Water Efficiency/ Conservation Program Expansions (Portfolios 4 & 5)

Under Strategy C, the IRP Technical Work Group evaluated how increased recycled water and water efficiency/conservation programming could benefit the region. With the focus on outdoor irrigation efficiency, there is a signification amount of water savings that could be achieved in both existing and future developments when compared with baseline conditions.

Strategy C assumes that a minimum of four agencies within IEUA's service area are implementing budget-based rates and increasing device-based conservation programming by 2020. This strategy also increases recycled water supply by utilizing an additional 17,000 AFY of locally generated recycled water, securing 10,500 AFY of an external recycle water supply by 2040, and implementing recycled water use efficiency programs to extend supplies.

Two water supply portfolios were developed for Strategy C. The first, Portfolio 4, models the additional water supplies as described above. The second, Portfolio 5, includes all of Portfolio 4 supplies plus the addition of two additional agencies adopting budget-based rates by 2020 and the addition of supplemental imported water as shown in Table 4-3. Imported water supplies include MWD Tier 1 and/or wet year purchases of supplemental water for groundwater replenishment. A complete list of projects in the portfolios can be found in Appendix 6.

Unmet demands for Portfolio 4 are shown in comparison to the baseline conditions in Figure 4-13. Portfolio 4 meets projected demands through 2040 100% of the time.

Stored water balances are illustrated in Figure 4-14 As illustrated, groundwater balances begin to accumulate in Portfolio 4 by 2022 with the majority of model runs continuing to build stored water through 2040. By 2040, 105 of the 106 model runs accumulated a minimum of 200,000 AFY of stored water.

Unmet demands for Portfolio 5 are shown in comparison to the baseline model run in Figure 4-15. Portfolio 5 meets projected demands through 2040 100% of the time.

Table 4-3: Supply Totals for Portfolio 4 & 5

Supply Type	Baseline	Portfolio 4	Portfolio 5
Chino Groundwater	91,300	-	-
Stormwater	6,400	-	-
Recycled Water		-	-
Locally Developed[(1)]	64,700	17,000	17,000
External Supplies		10,500	10,500
Chino Desalter	17,700	-	-
Local Surface	22,100	-	-
Non-Chino Groundwater	11,600	-	-
Imported Water		-	-
MWD	69,750	667	667
Other		-	4,900
WUE [(2)]	1,000	36,700	55,050
add'l supplies subtotal		*64,867*	*88,117*
Total Water Supply	**283,550**	**348,417**	**371,667**

Notes:

(1) Baseline Supply of 18,700 GWR + 29,000 Direct + 17,000 SAR, or total of 64,700 AFY, based on Agency TYCIP and not total available wastewater supply. Estimated total available local RW supply by 2040 to be 85,550 AFY based on 2015 WWFMPU flow monitoring.

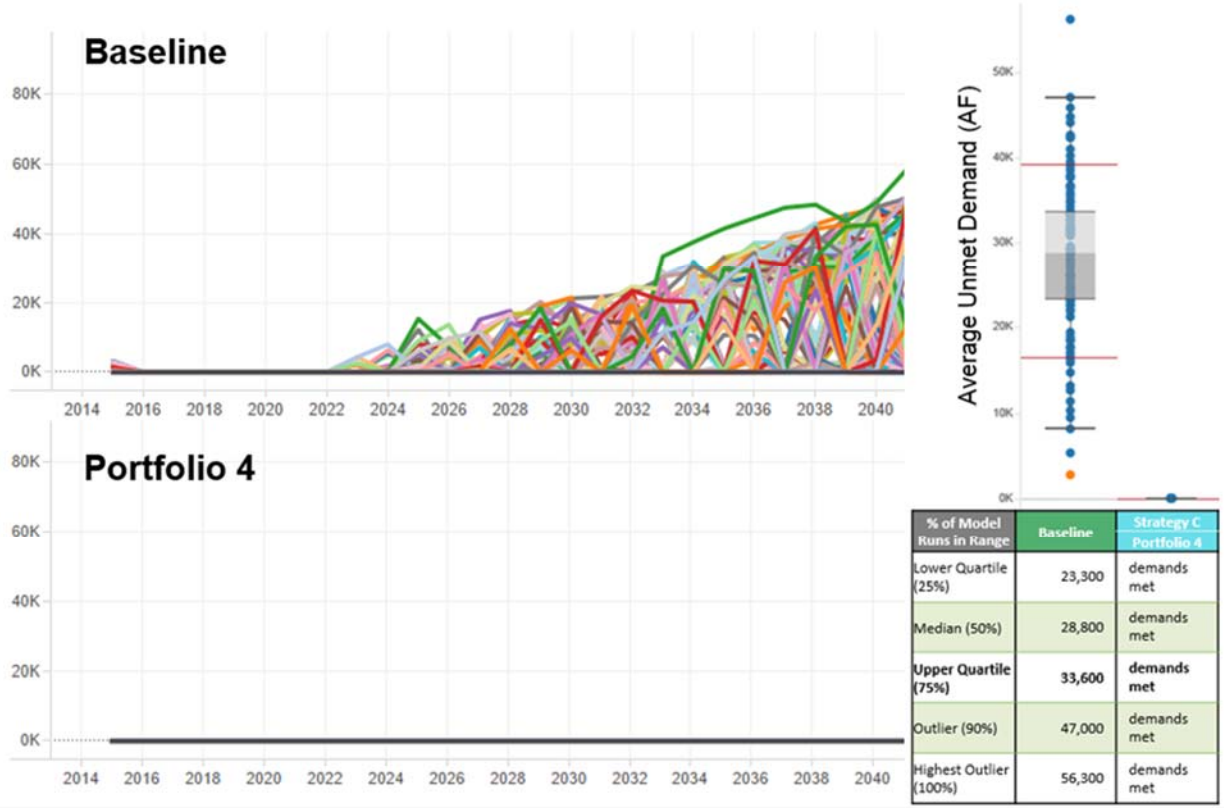
(2) Baseline WUE of 1,000 AFY already included in the Urdan Demand forecast. Therefore, not included in Supply Table to avoid double counting. Only new WUE in addition to Baseline to be counted in Total Supply.

Stored water balances for Portfolio 5 are illustrated in Figure 4-16. As illustrated, groundwater balances begin to accumulate in Portfolio 3B by 2020 with majority of model runs continuing to build stored water through 2040. By 2040, 105 of the 106 model runs accumulated a minimum of 500,000 AFY of stored water.

In summary, Portfolios 4 and 5 perform under 75% of the climate scenarios:

- Have no unmet demands across all climate scenarios due to reduced need for water
- Build water in storage consistently across climate scenarios, which could create an opportunity to sell surplus water
- Portfolio 4 has the potential for stored groundwater to build to over 200,000 AFY by 2040
- Portfolio 5 has the potential for stored groundwater to build to over 500,000 AFY by 2040

Figure 4-13: Unmet Demands of Portfolio 4 Compared to Baseline



% of Model Runs in Range	Baseline	Strategy C Portfolio 4
Lower Quartile (25%)	23,300	demands met
Median (50%)	28,800	demands met
Upper Quartile (75%)	**33,600**	**demands met**
Outlier (90%)	47,000	demands met
Highest Outlier (100%)	56,300	demands met

Figure 4-14: Stored Groundwater Balance of Portfolio 4

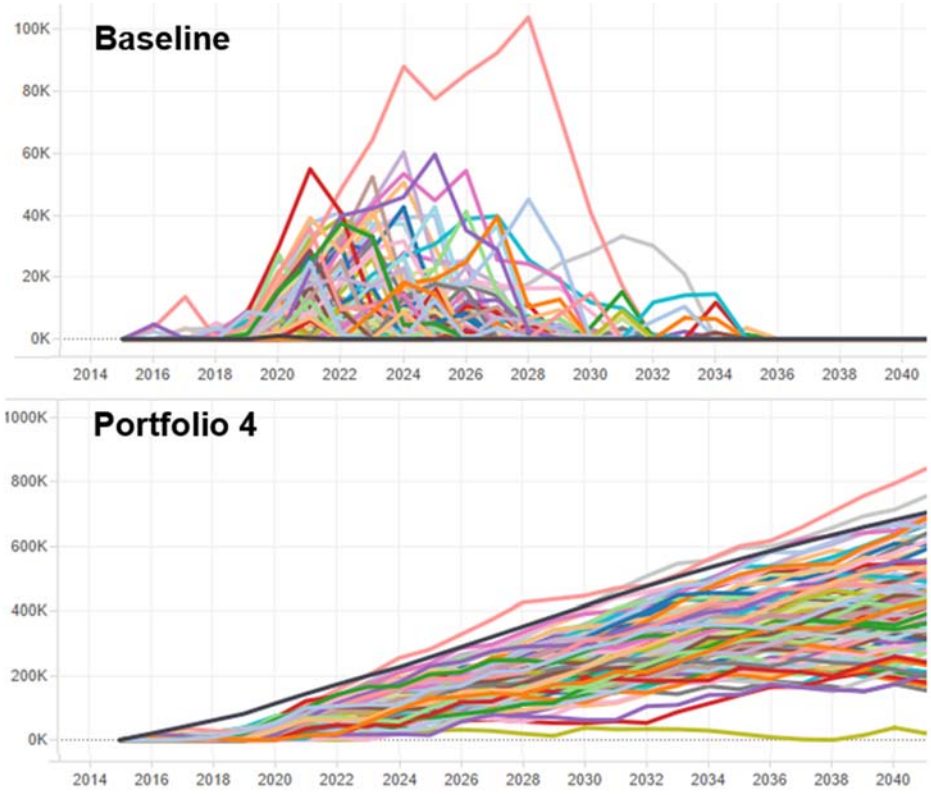
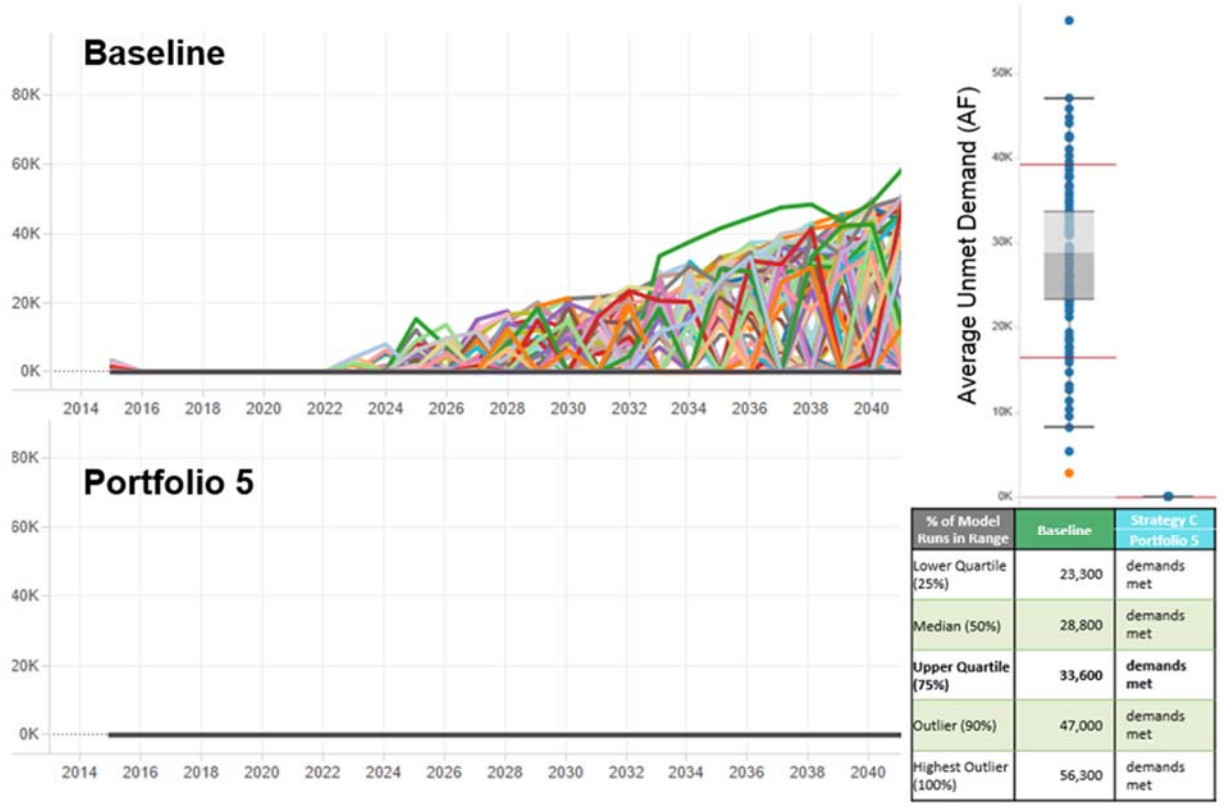


Figure 4-15: Unmet Demands of Portfolio 5 Compared to Baseline



% of Model Runs in Range	Baseline	Strategy C Portfolio 5
Lower Quartile (25%)	23,300	demands met
Median (50%)	28,800	demands met
Upper Quartile (75%)	**33,600**	**demands met**
Outlier (90%)	47,000	demands met
Highest Outlier (100%)	56,300	demands met

Figure 4-16: Stored Groundwater Balance of Portfolio 5

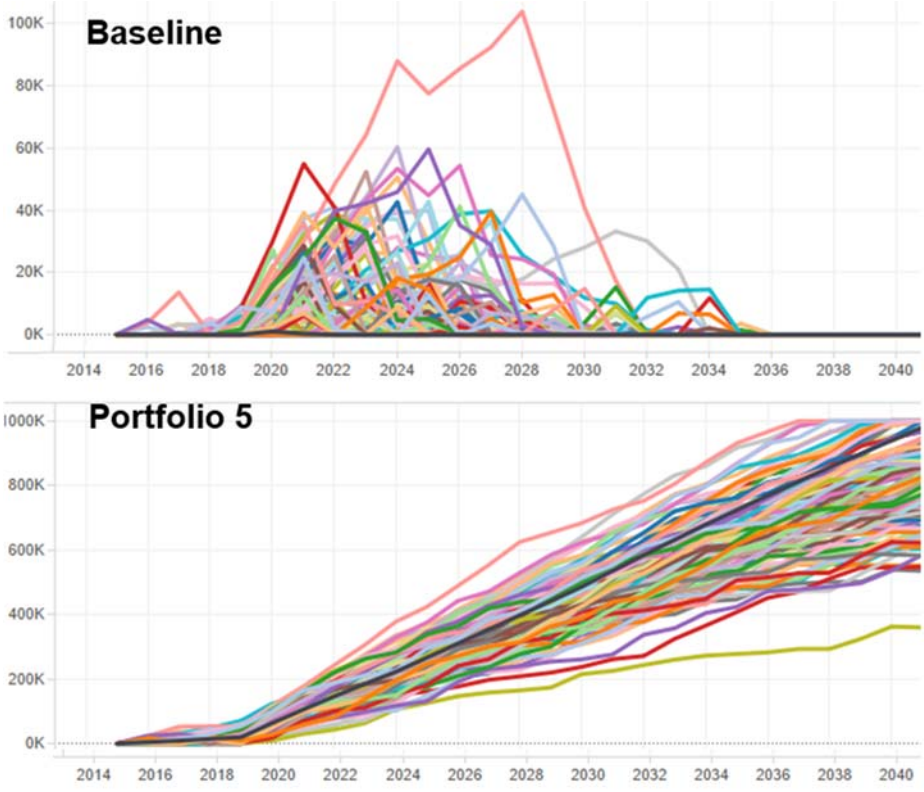


Table 4-4: Supply Totals for Portfolio 6

Supply Type	Baseline	Portfolio 6
Chino Groundwater	91,300	8,400
Stormwater	6,400	-
Recycled Water		-
Locally Developed[(1)]	64,700	20,800
External Supplies		9,000
Chino Desalter	17,700	-
Local Surface	22,100	-
Non-Chino Groundwater	11,600	2,500
Imported Water		-
MWD	69,750	667
Other		6,400
WUE [(2)]	1,000	13,500
add'l supplies subtotal		*61,267*
Total Water Supply	**283,550**	**344,817**

Notes:

(1) Baseline Supply of 18,700 GWR + 29,000 Direct + 17,000 SAR, or total of 64,700 AFY, based on Agency TYCIP and not total available wastewater supply. Estimated total available local RW supply by 2040 to be 85,550 AFY based on 2015 WWFMPU flow monitoring.

(2) Baseline WUE of 1,000 AFY already included in the Urdan Demand forecast. Therefore, not included in Supply Table to avoid double counting. Only new WUE in addition to Baseline to be counted in Total Supply.

Strategy D– Increase Groundwater Recharge Supplies

Under Strategy D, the IRP Technical Work Group focused on developing water supply interties with neighboring agencies in the watershed. Intermediate levels of water use efficiency/conservation are implemented in the form of two agencies adopting budget-based rates by 2020. In addition, all potential locally produced recycled water would be utilized in this strategy. One water supply portfolio, Portfolio 6, was developed for Strategy 6, with water supplies shown in Table 4-4. A complete list of projects in Portfolio 6 can be found in Appendix 6.

Unmet demands for Portfolio 6 in comparison to the baseline conditions are shown in Figure 4-17. Portfolio 6 meets projected demands through 2040 95% of the time.

Stored water balances are shown in Figure 4-18. As illustrated, groundwater balances begin to accumulate in Portfolio 6 by 2020. Due to variability in wet year supplemental supplies, stored water balances become highly variable and it is unclear whether stored water continues to build or draw down through 2040.

In summary, 75% of the time Portfolio 6:

- Eliminates unmet demand through 2040 due to reduced outdoor water demands from increased water use efficiency/conservation programming
- Has the potential to build stored groundwater through 2040, but the amount varies with climate conditions
- Takes advantage of climate resistant supplies by maximizing recycled water and water use efficiency

Strategy E – Maximize Imported Water Supplies with Moderate Conservation

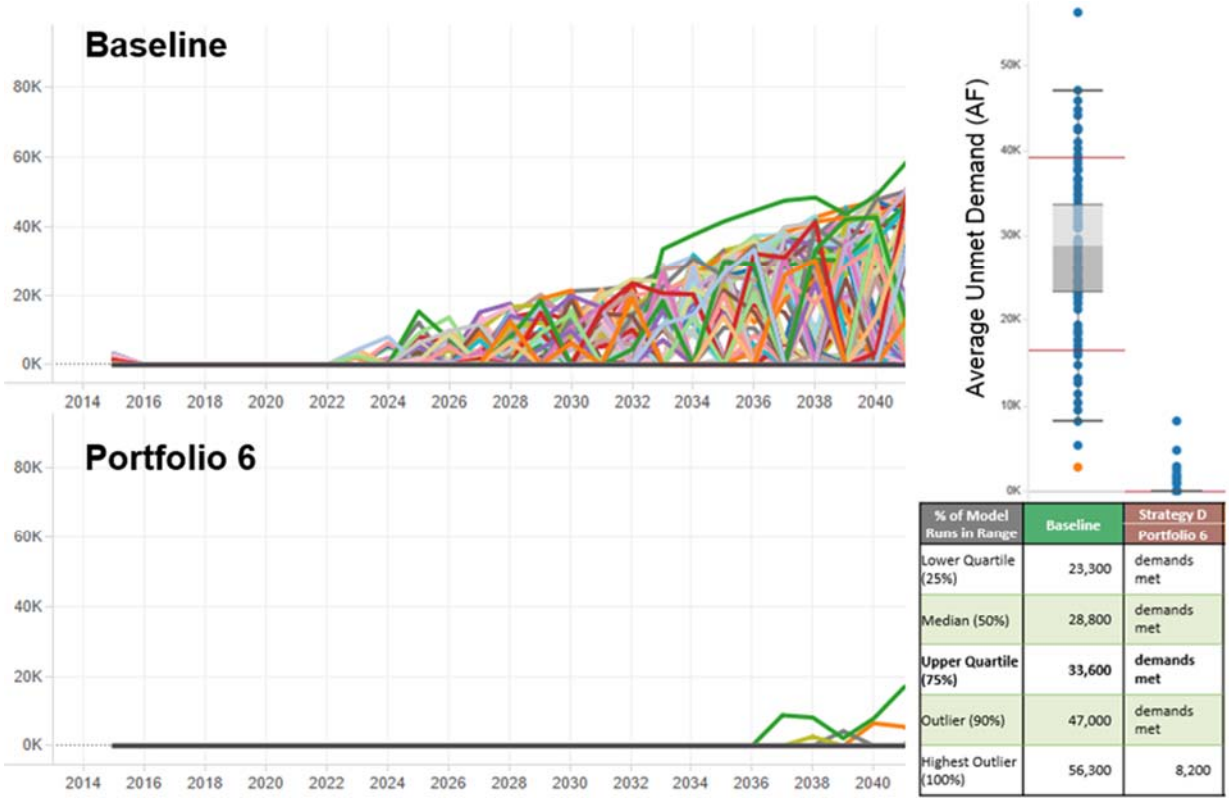
Under Strategy E, the IRP Technical Work Group evaluated how maximizing the purchase of imported water could alleviate pressure on and extend the availability of local water resources. This strategy allows for the purchase of up to 93,300 AFY of imported water to meet urban demand or to be used for groundwater replenishment. In addition, the strategy includes an intermediate level of water use efficiency/conservation in the form of two agencies adopting budget-based rates by 2020.

Two water supply portfolios were developed for Strategy E. The first, Portfolio 7, models the additional water supplies as described above. The second, Portfolio 8, includes all of the supplies of Portfolio 7 plus the addition of maximizing all locally produced recycled water as shown in Table 4-5. A complete list of projects in Portfolios 7 and 8 can be found in Appendix 6.

Unmet demands for Portfolio 7 in comparison to the baseline conditions are shown in Figure 4-19. Portfolio 7 meets projected demands through 2040 across 25% of the model runs.

Stored water balances are illustrated in Figure 4-20. As shown, groundwater balances begin to accumulate in Portfolio 7 by 2020 with the majority of model runs continuing to build stored water through 2040. Due to variability in wet year supplemental supplies, stored water balances become highly variable and unclear

Figure 4-17: Unmet Demands of Portfolio 6 Compared to Baseline



% of Model Runs in Range	Baseline	Strategy D Portfolio 6
Lower Quartile (25%)	23,300	demands met
Median (50%)	28,800	demands met
Upper Quartile (75%)	**33,600**	**demands met**
Outlier (90%)	47,000	demands met
Highest Outlier (100%)	56,300	8,200

Figure 4-18: Stored Groundwater Balance of Portfolio 6

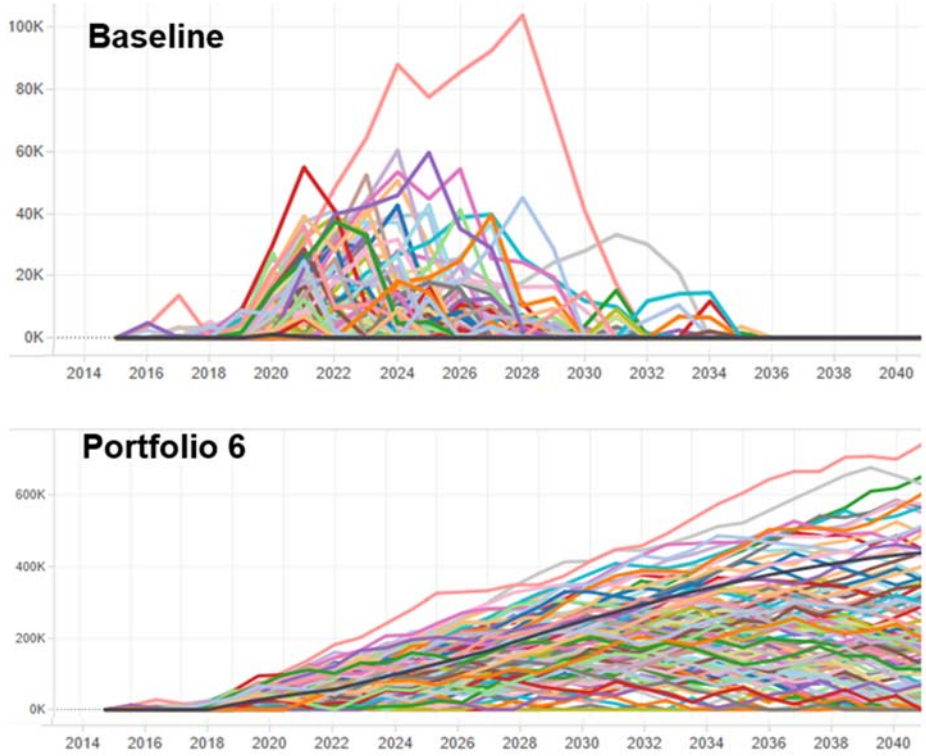
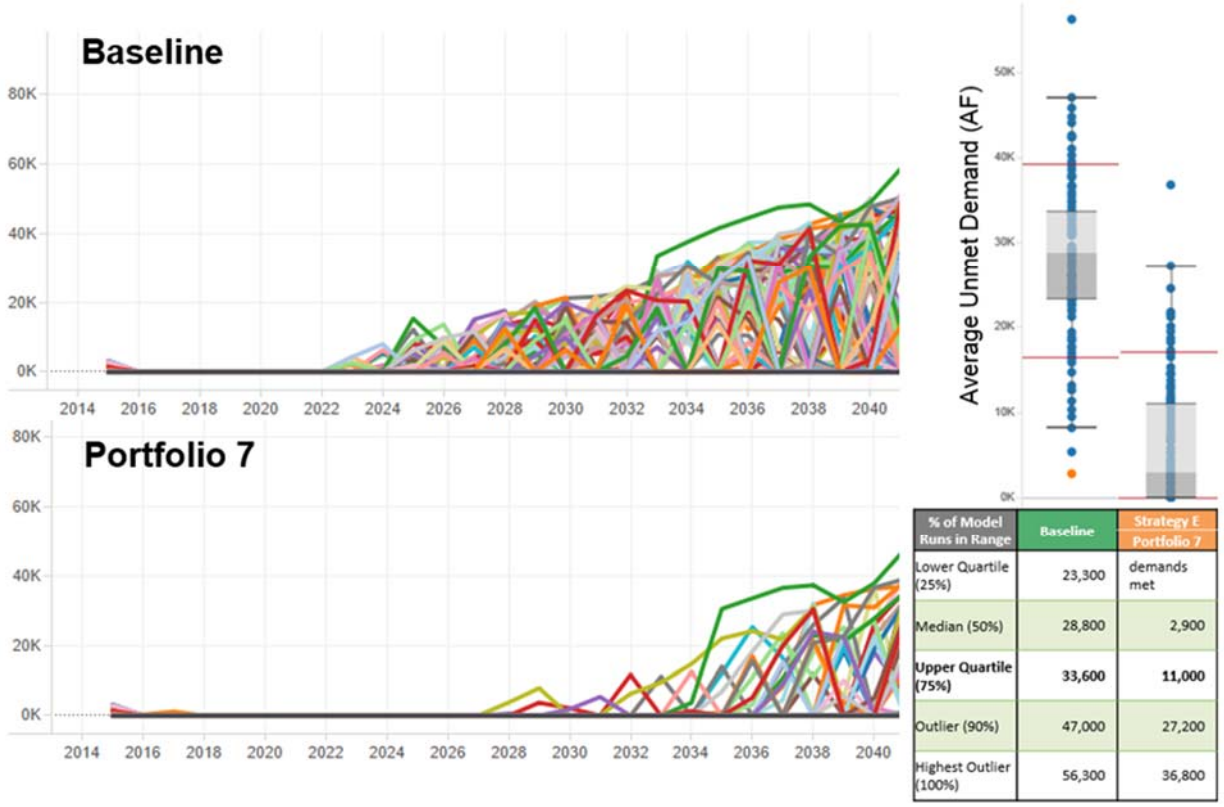
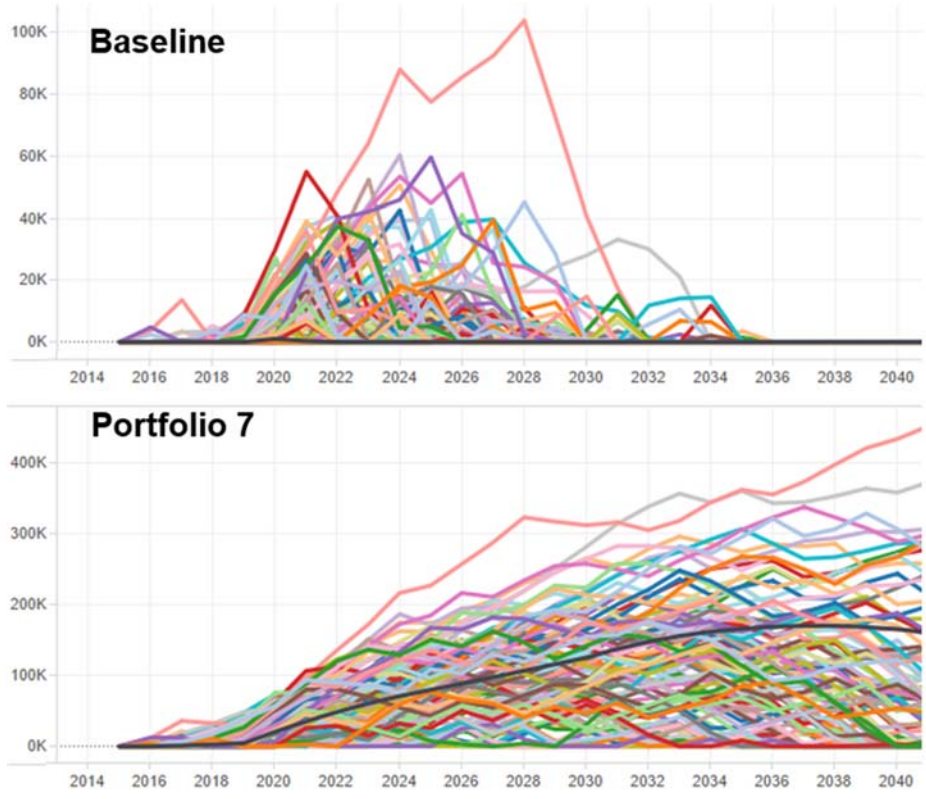


Figure 4-19: Unmet Demands of Portfolio 7 Compared to Baseline



% of Model Runs in Range	Baseline	Strategy E Portfolio 7
Lower Quartile (25%)	23,300	demands met
Median (50%)	28,800	2,900
Upper Quartile (75%)	**33,600**	**11,000**
Outlier (90%)	47,000	27,200
Highest Outlier (100%)	56,300	36,800

Figure 4-20: Stored Groundwater Balance of Portfolio 7



whether stored water continues to build or drawn down through 2040.

Unmet demands for Portfolio 8 in comparison to the baseline model run are shown in Figure 4-21. Portfolio 8 meets projected demands through 2040 100% of the time.

Stored water balances are illustrated in Figure 4-22. As shown, groundwater balances begin to accumulate in Portfolio 8 by 2020 with majority of model runs continuing to build stored water through 2040. Due to variability in wet year supplemental supplies, stored water balances become highly variable and unclear whether stored water continues to build or drawn down through 2040.

In summary, Portfolio 7 and 8:

- Portfolio 7 has a supply shortfall of up to 11,000 AFY under 75% of the climate scenarios
- Portfolio 8 meets demand under 100% of the climate scenarios, this increase in performance is due to the addition of recycled water.
- Both portfolios have the potential to build stored groundwater through 2040, but the amount in storage varies by climate conditions
- After 2030, Portfolio 8 builds stored groundwater under majority of climate scenarios due to the addition of recycled water.

Table 4-5: Supply Totals for Portfolio 7 & 8

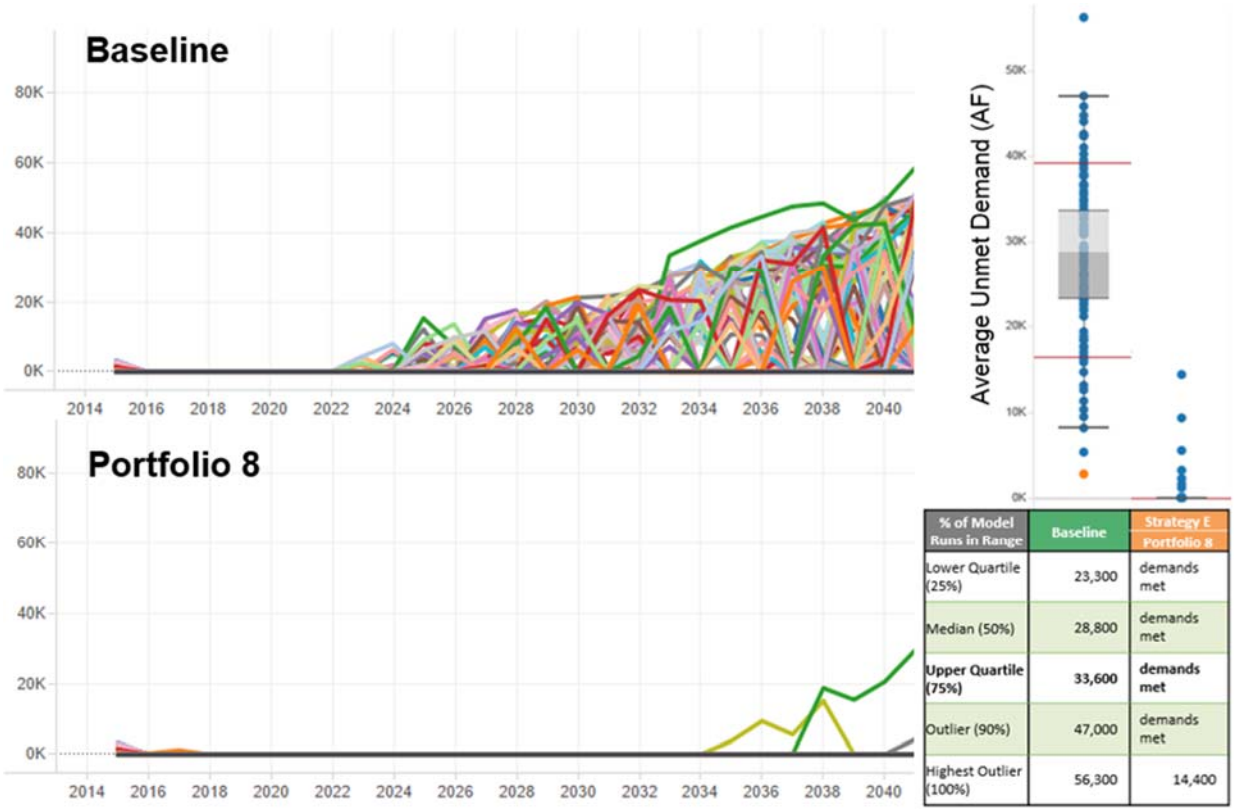
Supply Type	Baseline	Portfolio 7	Portfolio 8
Chino Groundwater	91,300	-	-
Stormwater	6,400	-	-
Recycled Water		-	-
Locally Developed[(1)]	64,700	-	20,800
External Supplies		-	7,000
Chino Desalter	17,700	-	-
Local Surface	22,100	-	-
Non-Chino Groundwater	11,600	-	-
Imported Water		-	-
MWD	69,750	23,550	23,550
Other		1,000	1,000
WUE [(2)]	1,000	18,500	18,500
add'l supplies subtotal		*43,050*	*70,850*
Total Water Supply	**283,550**	**326,600**	**354,400**

Notes:

(1) Baseline Supply of 18,700 GWR + 29,000 Direct + 17,000 SAR, or total of 64,700 AFY, based on Agency TYCIP and not total available wastewater supply. Estimated total available local RW supply by 2040 to be 85,550 AFY based on 2015 WWFMPU flow monitoring.

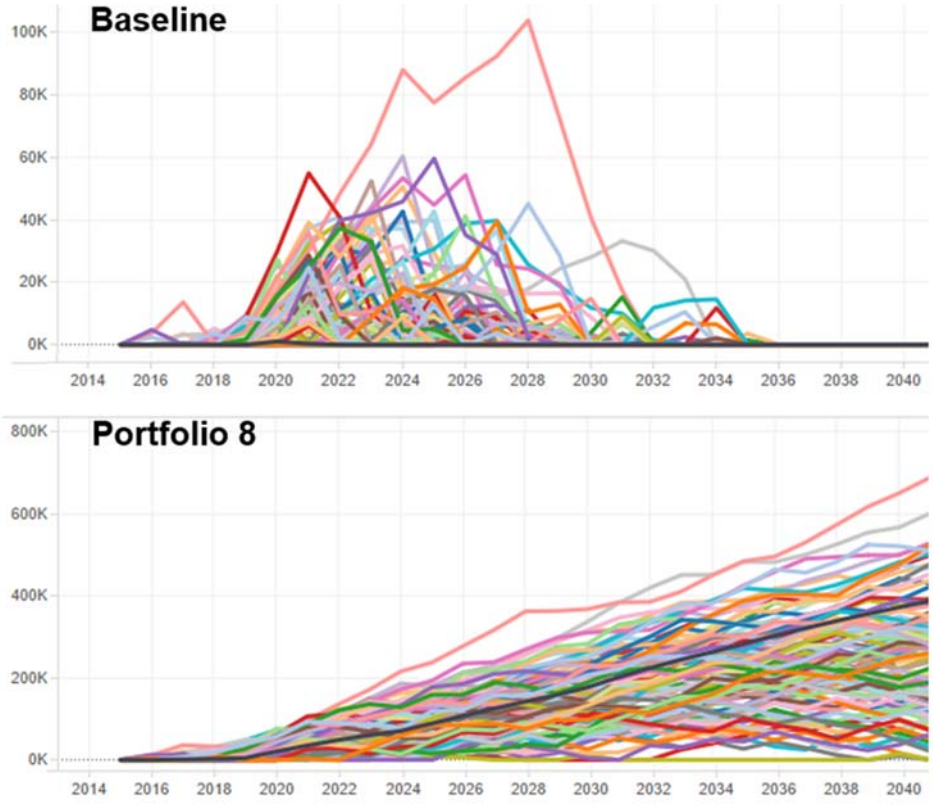
(2) Baseline WUE of 1,000 AFY already included in the Urdan Demand forecast. Therefore, not included in Supply Table to avoid double counting. Only new WUE in addition to Baseline to be counted in Total Supply.

Figure 4-19: Unmet Demands of Portfolio 7 Compared to Baseline



% of Model Runs in Range	Baseline	Strategy E Portfolio 8
Lower Quartile (25%)	23,300	demands met
Median (50%)	28,800	demands met
Upper Quartile (75%)	**33,600**	**demands met**
Outlier (90%)	47,000	demands met
Highest Outlier (100%)	56,300	14,400

Figure 4-20: Stored Groundwater Balance of Portfolio 7





Low water-use California native plants in a garden setting


OPEN

5. Conclusions & Next Steps



Core Findings of the 2015 IRP

Lessons Learned from the Climate Simulations

Final IRP Recommendations and Next Steps

Strawberry fields near a new development in Ontario.

Conclusions & Next Steps

With the adoption of the Chino Basin OBMP in 2000, the region embarked on a new era of water management. Over the past 15 years, more than $500 million was invested in the development of local water supplies. This resulted in the expansion of the regional recycled water program as well as in the development of significant groundwater capture, treatment, and storage programs.

As a result, when the record-breaking drought of 2012 began, the region was prepared. The region has had sufficient water supplies available to meet water needs during the drought of the last 4 years without constraining new development or economic growth. These local water resource programs form the foundation for the region's future water resiliency.

Climate change is now creating uncertain conditions and new water management challenges for the region's future. The purpose of the 2015 IRP is to evaluate the resiliency of the region's water resources under climate change and to identify the best strategies for ensuring that the region's future water needs through 2040 can be sustainably met. With the information from the IRP, the region has a roadmap to guide the next 25 years of regional investments in water supply development and management programs.

CORE FINDINGS

The region adopted goals for the 2015 IRP. In looking to the future, the region wanted a water development and management plan that would accomplish the following:

Resilience — Regional water management flexibility to adapt to climate change, economic growth, and any changes that limit, reduce, or make water supplies unavailable.

Water Efficiency — Meet or exceed rules and regulations for reasonable water use.

Sustainability — Provide environmental benefits, including energy efficiency, reduced green house gas emissions, and water quality improvements to meet the needs of the present without compromising the ability of future generations to meet their own needs.

Cost Effectiveness — Supply regional water in a cost-effective manner and maximize outside funding.

To achieve these goals, the IRP evaluated projected water needs and available water supplies through 2040. Future climate change scenarios were then used to "stress-test" an array of water development actions that were organized into "portfolios".

These results form the basis for the IRP's final recommendations. The core findings are:

1. The region's past investments in local water supplies and the diversification of the available water resources have positioned the region well to deal with the future impacts of climate change. If no further actions were taken beyond the currently planned investments in regional supplies and water use efficiency, the region would be able to meet 80-

90% of its projected water needs by 2040 .

2. Portfolios that combined water supply and water efficiency actions yielded the most adaptive strategies for the region. Many portfolios were able to reduce the region's risk of not having sufficient water supplies to meet future needs. Several portfolios were able to dramatically increase the amount of water stored in the Chino Basin. The portfolios that performed the best under the climate change scenarios were:

    - 2B – Maximize recycled water (includes bringing in external recycled water supplies), implement modest water use efficiency, and access supplemental imported water
    - 3A – Maximize recycled water (includes bringing in external recycled water supplies) and implement moderate water use efficiency
    - 3B – Maximize recycled water (includes bringing in external recycled water supplies) and implement high water use efficiency
    - 4 – Maximize supplemental water supplies and recycled water (includes bringing in external recycled water supplies)
    - 5B – Maximize the purchase of MWD water supplies, use of recycled water (includes bringing in external recycled water), and implementation of modest water use efficiency

LESSONS LEARNED FROM THE CLIMATE SIMULATIONS

Value of Water Use Efficiency — The climate scenarios reveal that the addition of very modest levels of water use efficiency (such as 10% reduction in water use) improved the performance of all portfolios and yielded significant benefits the region. The regional benefit is demonstrated through Portfolio 3B in which the actions of two Agencies achieving the State's existing water use efficiency standards results in the region's capacity to increase supplies in groundwater storage while meeting water needs through 2040.

Value of Recycled Water — The climate scenarios confirmed that recycled water is the region's most climate resilient water supply because the amount of available water to the region is not impacted by dry years. The regional benefit of maximizing recycled water is demonstrated through the comparison of Strategy B and C in which the use of recycled water enables the region to increase supplies in groundwater storage, especially in combination with increased water use efficiency.

Value of Supplemental Water — The climate scenarios highlight the importance of securing supplemental water – surface, imported, and external recycled water supplies – when it is available to build a stronger supply buffer for dry years or when State Water Project availability is limited. The regional benefit of opportunistically securing these external water supplies is demonstrated through the comparison of Portfolios 4, 5, and 6 which enables the region to increase supplies in groundwater storage, especially in combination with increased water use efficiency.

Value of Increasing Groundwater Storage — The climate scenarios affirmed the importance of adequate groundwater reserves in addressing future climate uncertainties or catastrophic events, such as a major facility or pipeline break or a loss in supplies. A broader regional benefit is the role that these reserves can play when managed as a regional water bank to enhance water supply reliability within the Santa Ana Watershed and across Southern California. Portfolios 4, 5, 6 and 8 highlight the value to the region of the increased flexibility and resiliency resulting from increased groundwater storage.

RECOMMENDATIONS & NEXT STEPS

Plans to protect air and water, wilderness and wildlife are in fact plans to protect man.

-Stewart Udall



The region adopted the following core recommendations for the 2015 IRP:

- **Continue investment in recycled water** projects to maximize the beneficial reuse.
- **Acquire low TDS supplemental water to enhance groundwater quality** to sustain production and reduce salinity.
- **Implement water use efficiency measures** to reduce current urban demand by at least 10% to enhance water supply resiliency.
- **Strategically maximize the purchase of supplemental water** for recharge or in-lieu when available.
- **Include external supplies**, consisting of exchanges, storage, and water transfers, **strategically in combination with conservation** to augment groundwater recharge, recycled water, **and build storage reserves**. External supplies include surface, imported, and non-potable water.
- **Continue to maximize stormwater recharge projects**, including rainwater capture and infiltration.

These recommendations will be evaluated through a Programmatic Environmental Impact Report in mid-2016. As funding opportunities become available, specific project cost and environmental assessments will be conducted as needed, particularly in relation to the regional benefit of the proposed actions. Phase 2 of the IRP will address additional detailed project level analysis including project scopes, costs, prioritization, and implementation schedule.

Table 5-1: Summary of How Phase 1 Recommendations Meet the IRP Goals

Water Use Efficiency	
Water Efficiency	This would help meet rules and regulations for reasonable water use now and in the future.
Sustainability	Savings realized through the implementation of the program extends the groundwater production for future generations.
Resilience	When combined with other programs, such as recycled water, creates storage to accommodate for abnormal and catastrophic events.

Recycled Water	
Water Efficiency	This would help meet rules and regulations for reasonable water use now and in the future, especially meeting current state mandates.
Sustainability	As a climate resistant supply, the beneficial use of recycled water when combined with Water Use Efficiency builds reserves within the Chino Basin.
Resilience	When combined with other programs, such as Water Use Efficiency, creates storage to accommodate for abnormal and catastrophic events.

Supplemental Water	
Water Efficiency	This would help meet rules and regulations for reasonable water use now and in the future, especially meeting current state mandates.
Sustainability	This would help meet rules and regulations for reasonable water use now and in the future, especially meeting current state mandates.
Resilience	as a climate resistant supply, the beneficial use of recycled water when combined with Water Use Efficiency builds reserves within the Chino Basin.

Groundwater Storage	
Sustainability	Storage reserves reduce dependence on climate variable supplies and are not impacted by climate once the supplies are in storage. As a climate resistant supply, the reserves can be used responsibly by future generations without depleting the Chino Basin.
Resilience	When combined with other programs, such as Water Use Efficiency, Recycled Water and Supplemental Water, creates storage to accommodate for abnormal and catastrophic events.



Appendices



1. A&N Technical Services Demand Forecast

2. Draft RAND Memo: "Evaluating Options for Improving the Climate Resilience of the Inland Empire Utilities Agency in Southern California"

3. A&N Technical Services Indoor/Outdoor Demands

4. A&N Technical Services Demand Influencing Factors

5. Full IRP Technical Committee Identified Project List

6. Project Lists for Water Resource Strategy Portfolios 1-8

California native plant, *Heteromeles arbutifolia*, displays crimson berries during the winter in the Chino Creek Wetlands and Educational Park.

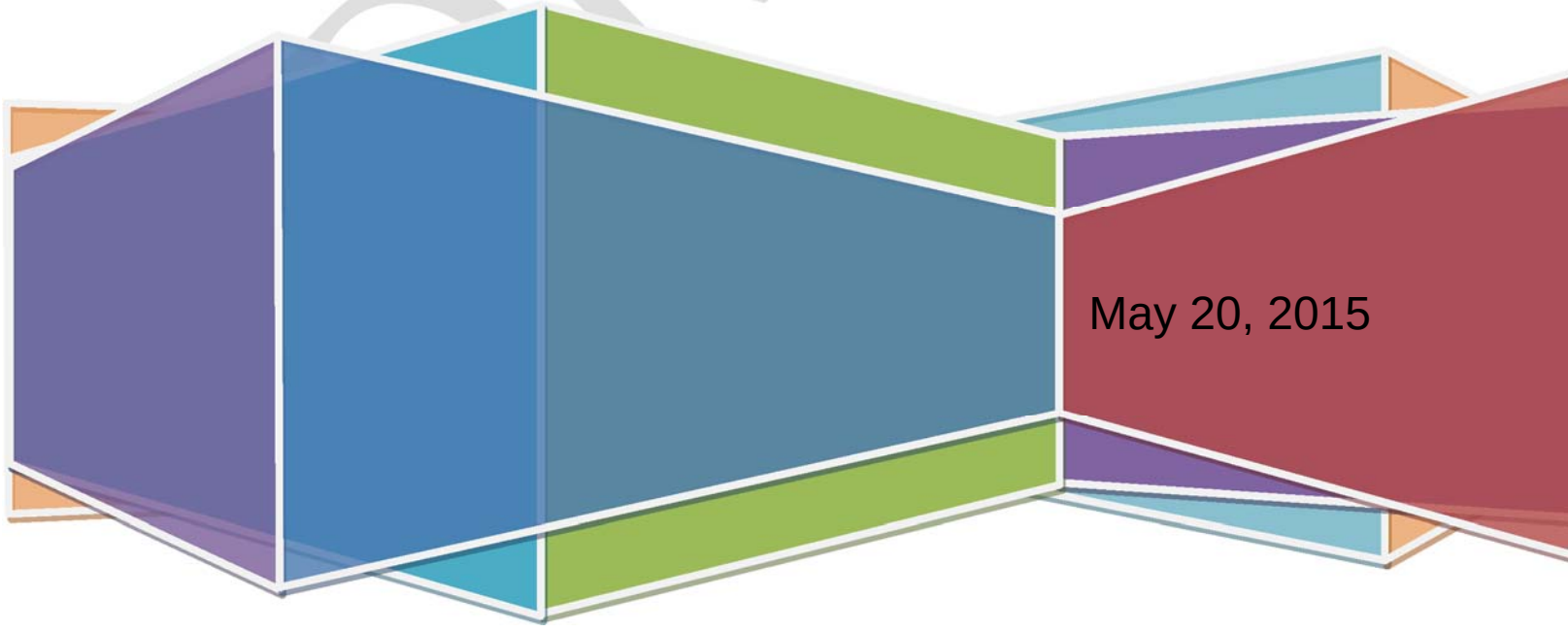
Appendix 1:
A&N Technical Services Demand Forecast

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

IEUA Long Term Demand Forecast Model User Guide

DRAFT

A & N Technical Services, Inc.



May 20, 2015

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Abbreviations List

AWE – Alliance for Water Efficiency
CDR – Center for Demographic Research
CII – Commercial-Industrial-Institutional
CVWD – Cucamonga Valley Water District
FIRE – Financial Activity & Real Estate
FWC – Fontana Water Company
GIS – Geographic Information Systems
IEUA – Inland Empire Utilities Agency
IRP – Integrated Resource Plane
MVWD – Monte Vista Water District
MWD – Metropolitan Water District of Southern California
NAICS – North American Industry Classification Systems
RMC – Raines Melton and Carella
RTP - Regional Transportation Plan
SCAG – Southern California Association of Governments
SCS – Sustainable Communities Strategy
SIC – Standard Industrial Classification
TAZ – Traffic Analysis Zone

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Introduction

This user guide documents the structure and use of the IEUA Long Term Demand Forecast Model.

Objectives

The model was constructed with the following objectives:

- Forecast demand and demand variability to 2040 in support of the IRP development process.
- Forecast demand as consumption, which we define as all of the consumption within IEUA service area boundaries.
- Base the demand forecast on the latest demographic forecast.
- Utilize a demand forecast method consistent with the MWD demand forecast methods.
- Utilize a conservation forecast method consistent with the AWE Tracking Tool that IEUA currently uses for conservation planning.
- Provide a way to assess the variability of future water demand forecasts to a wide range of scenarios that are built with a range of best-available data sources to accurately depict the effect of future uncertainties.

Approach

The approach in model development can be characterized as:

1. Acquiring the latest demographic forecast data from the SCAG 2012 RTP for all of the area within IEUA, for its retail water service areas, for its cities, and for its waste water tributary areas. (Enacted by the Center for Demographic Research.)
2. Inputting the demographic forecast into the demand forecast econometric equations to create a base forecast.
3. Calibrating the base forecast to normal demand (weather-normalized, employment-normalized). A separate statistical model of historical IEUA monthly water demand was estimated to develop empirical relationships between weather variation, the business cycle, and IEUA demand variability.
4. Inputting the quantified active and passive conservation forecast from the latest version of the AWE Tracking Tool that IEUA uses for conservation planning.

Discussion

Econometric Equations. MWD has cooperated with IEUA in the development of the demand forecast methods. Appendix A provides a review of the analytic structure of their long term water demand models.

Demand as Consumption. The base forecast has been calibrated to normalize demand –that is demand conditional on normal weather and normal economic activity. Note the caveat that some pumpers who are not accounted for by retailers may not be included.

Demographics 2035 to 2040. The SCAG 2012 RTP demographics only go out to the year 2035. We utilize a trend method similar to MWD for the years 2035 to 2040.

Section A: Index

The sections of this document correspond to the worksheets in the Long Term Demand Forecast Model. The following table provides the view of the first worksheet "Index". Clicking on any hyperlink will navigate to that section of the spreadsheet.



IEUA Long Term Demand Forecast Model

Index of Worksheets

Sheet Name	Description
Index	Index of worksheets for navigation
ControlPanel	Make scenario choices and see results.
Chart_Data	Arrays of data for charts
Model_Base	Base Case Scenario
Model_Scenario1	Scenario 1
Model_Scenario2	Scenario 2
Model_Scenario3	Scenario 3
WBBRS_Implementation	Inputs for water budget
WUE_Inputs	Inputs for water use efficiency plans

Section B: Control Panel

The *Control Panel* worksheet contains the "Scenario Manager" that allows the user to explore up to three different scenarios that use different combinations of future demand drivers. Demand drivers can include both short term drivers—such as one year weather swings--and long term drivers of future water demand such as population or employment growth. Water Use Efficiency drivers are broken out separately and include Water Budget Based Rate Structures and more traditional WUE/conservation programs. For more information on statistical analysis of Short Term IEUA Demand refer to Appendix E.

Each demand driver is discussed in sequence.

	Scenario Manager
Item	
	Scenario Name
Short Term Drivers	Drought Persistence
	Economic Cycle
	Short-Term Weather
Long Term Drivers	Sustainable Communities Housing
	Dwelling Units per Land Area
	Median Household Income Growth
	Long Term Climate Change
WUE Drivers	Water Budget Based Rate Structure (WBBRS)
	WUE Level

Short Term Drivers – 5 Years – 2015 to 2020

- **Drought Persistence** defines how much of recent demand reductions will persist into the future
    - amount of recent reduction that is permanent
        - 0 percent implies that everything will return to the baseline forecast
        - 4.6% percent implies that the 4.6% recent reduction is a permanent lifestyle change

The unexpressed bugbear is what is the "recent reduction"? It is reasonable to assume that one would want to know how much of a raw change in consumption is due to recession or weather. Fortunately IEUA has an empirical basis for such a determination in the short term IEUA demand model that is the source of the 4.6% recent reduction in demand (not attributable to recessionary effects.)

- **Economic Cycle** –The user can specify how much recession or boom could bump demand in a single year using the estimated annual standard deviation of business cycle effects from the short term IEUA demand model.
    - Recession year – demand minus 1 standard deviation from the IEUA short run water demand forecasting model
    - Baseline year—normal business cycle, no change
    - Growth year – demand plus 1 standard deviation from the IEUA short run water demand forecasting model

- **Short Term Weather** – Single wet, single dry, three consecutive dry years (required by UWMP). The effect of weather variation is defined using the estimated annual standard deviation of weather effects from the short term IEUA demand model.
    - Single wet year – demand minus 1 standard deviation from the IEUA short run water demand forecasting model
    - Single dry year – demand plus 1 standard deviation from the IEUA short run water demand forecasting model
    - Multiple dry year – demand plus 1.6 standard deviations from the IEUA short run water demand forecasting model

Long Term Drivers—2021 - 2050

- **Sustainable Communities Housing –** Derived scenarios explored in the SCAG Sustainable Communities Strategy, 2012 Regional Transportation Plan (p.114).
    - Baseline—future residential growth resembles the past, of which approximately 40% was high density multiple family.
    - More Sustainable—future residential growth resembles is approximately 71% high density multiple family.
    - Max Sustainable—future residential growth resembles is approximately 71% high density multiple family.

- **Dwelling Units per Land Area –**This driver allows another method of exploring effects of potential future densification.
    - Low Growth—future dwelling units per land area becomes less dense (minus one percent per year)
    - Baseline—future residential growth resembles past dwelling units per land area.
    - High Growth—future dwelling units per land area becomes more dense (plus one percent per year)
    - Very High Growth—future dwelling units per land area becomes more dense (plus two percent per year)

- **Median Household Income Growth –**3 alternative assumptions: low, baseline (2012 RTP), and high
    - Low Growth—median household income grows lower (minus one percent per year)
    - Baseline— median household income grows lower at predicted rate
    - High Growth— median household income grows faster than the baseline (plus one percent per year)

- **Long Term Climate Change –** Long term climate change is modeled by using recent GCC model predictions of potential increases in temperature with the short term IEUA demand model estimated temperature elasticity to depict this effect. (http://scenarios.globalchange.gov/report/regional-climate-trends-and-scenarios-us-national-climate-assessment-part-5-climate-southwest)
    - No Change— no long term climate change
    - P50 Median Expected Climate Change— 3.2% by 2040
    - P80 Median Expected Climate Change— 4.3% by 2040

WUE Drivers

- **Water Budget Based Rate Structure (WBBRS)** are depicted with alterative assumptions of how many agencies will adopt and roll out WBBRS over the next 5 years. These will be modeled as separate activities within the AWE Water Conservation Tracking Tool.
    - Low_Rollout_1 Agency—This results in approximately 10% of Single Family and Irrigation customers being affected within 5 years.
    - Mid_Rollout_2 Agencies--This results in approximately 30% of Single Family and Irrigation customers being affected.
    - High_Rollout_All Agencies-- This results in all Single Family and Irrigation customers being affected.

Note that the Baseline IEUA Demand Model allows a "pure price" effect—how customers would respond to an increase in the real average price of water

- **WUE Level –** the level of WUE Programs being implemented derives from separate account in the AWE Water Conservation Tracking Tool

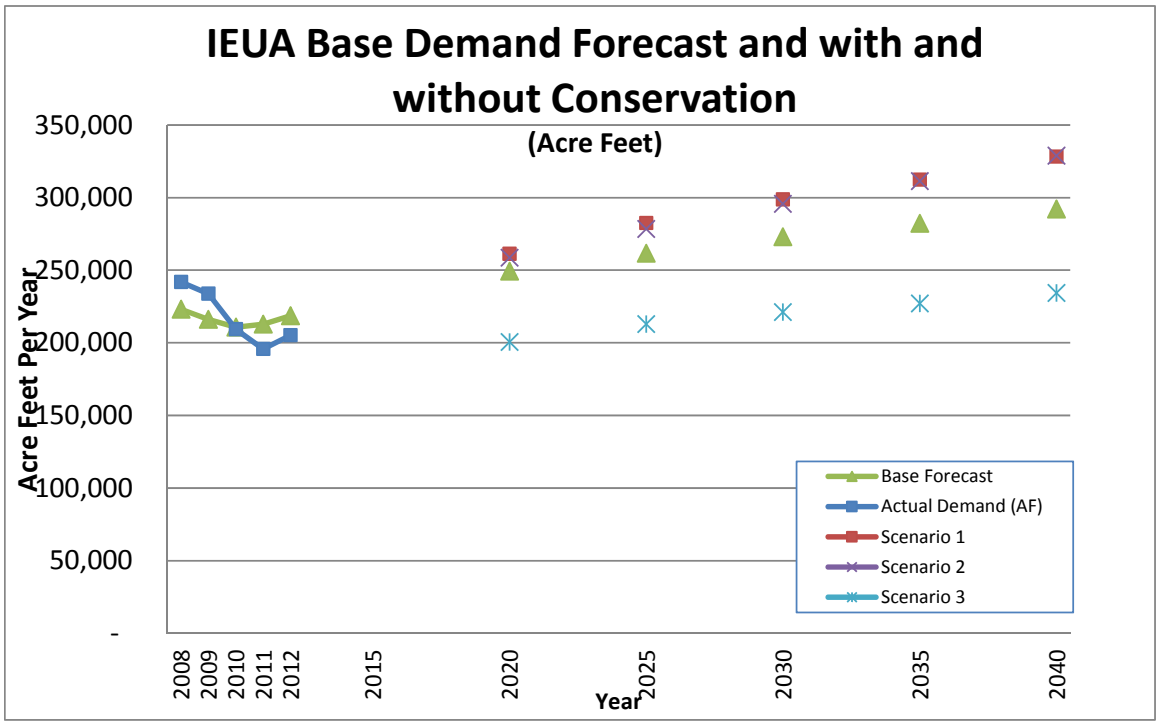
    - Programmatic (Device-driven) WUE Programs -- Tiers 1, 2, 3 developed as part of the WUE Business Plan.

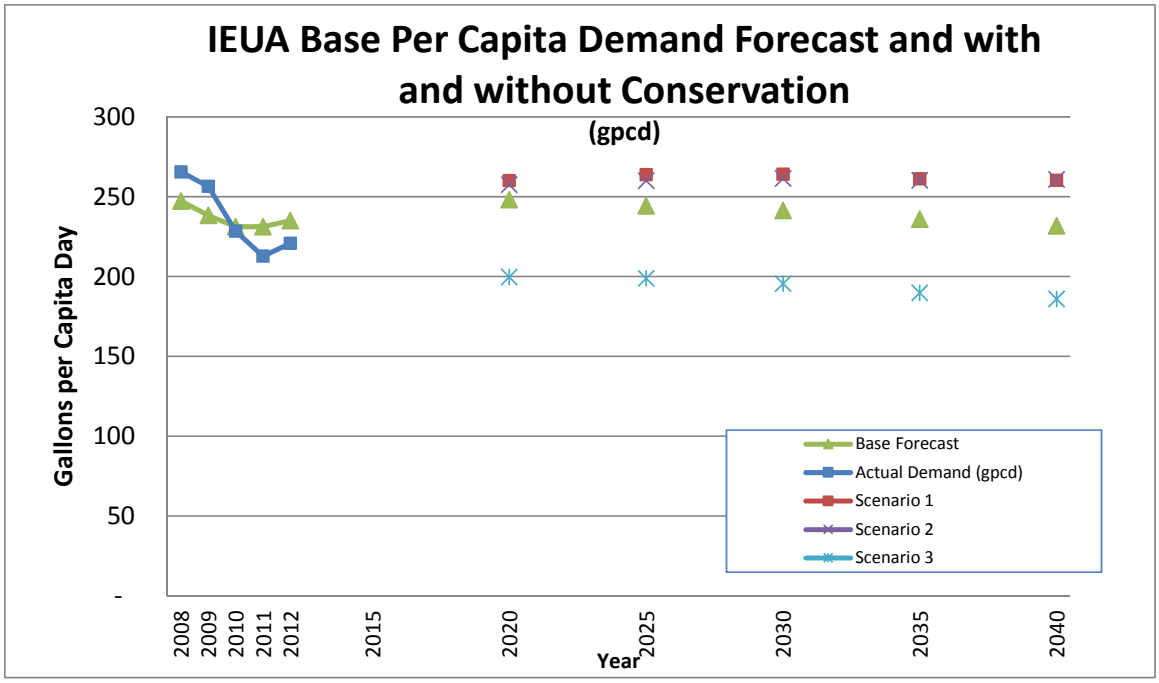
The Control Panel Worksheet contains drop down boxes to select values of demand drivers. A Collection of assumptions on demand drivers constitutes a demand forecasting scenario. Three scenarios are allowed. By allowing the user to define and control sources of forecast uncertainty in this control panel, one can more quickly develop a feel for which sources of uncertainty matter more than others using the visual feedback of dynamically changing plots of future water demand forecasts.

Each green box contains drop down boxes to choose values for each demand driver.

Scenario Manager		Use drop down box to enter values. Do not copy and paste unless you paste values only.		
Item		Scenario 1:	Scenario 2:	Scenario 3:
	Scenario Name	High	Intermediate	Low
Short Term	Drought Persistence	Drought_4.6%Permanent	Baseline	Drought_4.6%Permanent
Drivers	Economic Cycle	Growth Year	Baseline	Recession Year
	Short-Term Weather	Multi-Yr Dry	1-Yr Dry	1-Yr Wet
Long Term	Sustainable Communities Housing	Baseline (40% MF)	More Sustainable (71% MF)	Max Sustainable (96% MF)
Long Term	Dwelling Units per Land Area	Baseline	Baseline	Baseline
Drivers	Median Household Income Growth	Baseline	High Growth	Low Growth
	Long Term Climate Change	Change 4.3%_P80	Change 3.2%_P50	No Change
WUE	Water Budget Based Rate Structure (WBBRS)	None	Low_Rollout_10pctSF/Irr	High_Rollout_100All
Drivers	WUE Level	Level 3	Level 2	Level 3

The results can be readily observed in the forecast chart below the control panel.





Section C: Chart Data

This worksheet collects and arranges data needed to create charts on the Control Panel worksheet.

Section D: Model Base

The Model_Base worksheet contains the following:

- Base Model Parameters
  - Single Family
  - Multi-Family
  - Revised Non-Residential Models
  - Price effect
- Base Model Input - Region Dependent
- Base Model Output - Demand Forecast with Price-effect
- Demand Forecast Model

Base Model Parameters

The Base Model Parameters table contains the econometric parameter estimates that drive the base model forecast. The Base Model Parameters are revised only for major updates and revisions to the model. For everyday policy scenario runs, the Base Model Parameters are left alone, generally, except for possible sensitivity testing. The lag variables refer to statistical effect at different periods of time. For example, Lag 1 indicates the effect that weather in one year has on the subsequent year. The Base Model Parameters table starts in Row 5 of the Model_Base worksheet, and the values are reproduced in Appendix D:

Single Family Model. The single family model was estimated as a function of the following:

1. Weather variables that include the amount of rain, rainy days, and temperature— all of which also included lag variables of one period. Rain and temperature included additional lag 2 variables in the model.
2. Socioeconomic variables include marginal price, income, density (housing units per acre), and people (persons per household).
3. Conservation variables include one that indicates mandatory conservation, and another that indicates voluntary conservation.
4. Drought indicates drought during the period.
5. Month variables are used to estimate the effect of month on seasonal demand.

MODEL PARAMETERS							
Single Family Model							
	WEATHER	LAG 0	LAG 1	LAG 2			
	Rain	-0.0482	-0.0589	-0.0192			
	Rainy Days	-0.0088	-0.0047				
	Temperature	0.4647	0.3482	0.2942			
	SOCIOECONOMIC						
	Marginal Price	-0.1947					
	Income	0.2722		**MONTH**			
	Density	-0.6154		January	0.0233	July	0.5785
	People	0.5485		February		August	0.5603
				March	0.0659	September	0.4775
	CONSERVATION			April	0.2166	October	0.3361
	Voluntary	-0.0258		May	0.3799	November	0.1993
	Mandatory	-0.1033		June	0.5128	December	0.1056
	DROUGHT						
		-0.0503					

Multi-Family Model:

1. Weather variables include the amount of rain and temperature. Rain includes a variable with no lag, and also variables with 1 and 2 lag periods. Temperature includes one variable with 1 lag period.
2. Socioeconomic variables included are the same set as for the single family model.
3. Conservation variables include one that indicates mandatory conservation, and another that indicates voluntary conservation.
4. Month variables included are the same set as for the single family model.

Multi-Family Model							
	WEATHER	LAG 0	LAG 1	LAG 2	LAG 3		
	Rain	-0.0343	-0.0205	-0.0069			
	Temperature		0.1375				
	SOCIOECONOMIC						
	Marginal Price	-0.1626		**MONTH**			
	Income	0.3102		January	0.037	July	0.2255
	Density	-0.5262		February		August	0.2353
	People	0.4496		March	0.0009	September	0.1997
				April	0.0715	October	0.1414
	CONSERVATION			May	0.1405	November	0.1037
	Voluntary	-0.0452		June	0.1951	December	0.0858
	Mandatory	-0.1162					

Revised Non-Residential Model:

1. Weather variables include the amount of rain and cooling degree days, both with no lag, one period lag, and two periods lag.
2. Socioeconomic variables include one for the marginal price of water.
3. Conservation variables include one that indicates mandatory conservation, and another that indicates voluntary conservation.
4. Month variables included are the same set as for the single family model.
5. Employment variables included are Manufacture and Services as it is consistent with current MWD implementation. The model has the structure to accept, in addition, variables for Construction, Transportation, Wholesale, Retail, Finance, and Government employment.

Revised Non-Residential Model							
	WEATHER	LAG 0	LAG 1	LAG 2			
	Rain	-0.05817	-0.04906	-0.01905			
	Cooling degree Days	0.01037	0.01171	0.01200			
	SOCIOECONOMIC			**MONTH**			
	Marginal Price	-0.158920		January	0.0005	July	0.4163
				February		August	0.4308
	CONSERVATION			March	0.0425	September	0.3713
	Voluntary	-0.06655		April	0.1613	October	0.2561
	Mandatory	-0.13011		May	0.2980	November	0.1438
				June	0.3623	December	0.0658
EMPLOYMENT COEFFICIENTS							
Construction	Manufacture	Transportation	Wholesale	Retail	Finance	Services	Government
0.0000	**0.80297**	0.0000	0.0000	0.0000	0.0000	**0.55242**	0.0000

Price Effect

The price effect parameters reduce the effect of price on demand to account for increasing levels of conservation over time. Customers may have fewer opportunities to conserve if they already have conservation devices and behaviors.

The Constant Price parameter (Cell J79) toggles on and off the use of constant 1990 prices. When prices are constant, there are no price impacts on demand. This parameter could be used for sensitivity testing.

Price Effect

The price effect is reduced to account for the effects of price captured in the End-Use module. The original MWD model had one price effect across the forecast. This updated model allows for the effect to be reduced in phases, as End-Use conservation increases.	Year	Price Effect	Year	Price Effect
	2008	56%	2025	33%
	2009	54%	2030	33%
	2010	52%	2035	33%
	2011	50%	2040	33%
	2012	48%	2045	33%
	2015	42%	2050	33%
	2020	33%		

Constant Price (effects of 1990 price across all years) Toggle: 1 = use current rate, 0 use 1990 rates	1

Base Model Input

The Base Model Input tables start in Row 82 of the Model_Base worksheet. These tables contain the demographic input data and the equations to create the demand forecast. The Base Forecast is the forecast under the assumption of no new conservation savings.

Demographic Inputs

The latest demographic forecast for IEUA was acquired from the SCAG 2012 RTP data base. The Center for Demographic Research (CDR) at California State University, Fullerton utilized geographic information system (GIS) methods to extract data only for the area within IEUA service area boundaries. Detailed analysis of boundaries was conducted to assure that households, population, and employment were properly allocated. Appendix B contains detailed description of the GIS methods used to generate the demographic data set. Appendix D contains demographic input tables. The complete set of demographic inputs is as follows:

1. Population (Total Population, SCAG 2012 RTP data from CDR)
2. Occupied Housing Units (Households, SCAG 2012 RTP data from CDR)
3. Household size (Persons per Household, MWD)
4. Housing Density (Units per Acre, MWD)
5. Median Household Income (MWD)
6. Urban Employment by Sector (SCAG 2012 RTP data from CDR)
7. Marginal Water Price (MWD)

Demographics 2035 to 2040. The SCAG 2012 RTP demographics only go out to the year 2035. We utilize a trend method similar to MWD for the years 2035 to 2040, by applying the compounded average growth rate from 2008 to 2035.

The MWD employment categories are by grouped SIC codes and the SCAG 2012 RTP are grouped by NAICS codes. The following cross walk—developed by consulting SIC and NAICS definitions—was used to group SCAG NAICS into MWD SIC categories.

MWD (SIC)	SCAG (NAICS)
Construction	CONST
Manufacturing	MANU, AG
Utilities	TRANS, .5*INFO
Trade	WHOLE
Retail Trade	RET
Real Estate	FIRE
Service	PROF, EDU, ARTENT, OTHER, .5*INFO
Government	PUBADM

Source: Demographics_Compare_1.xlsx

Employment Productivity Factors by Year

1. Construction (MWD)
2. Manufacturing (MWD)
3. Transportation & Utility's Comm (MWD)
4. Wholesale Trade (MWD)
5. Retail Trade (MWD)
6. Finance, Insurance, and Real Estate (MWD)
7. Service (MWD)
8. Government (MWD)

Drought Restrictions

The table of drought restrictions contains the set of indicator variables that can be used to create forecast scenarios with conditions of drought and conservation restrictions.

1. Residential (Voluntary/Mandatory)
    a. Single Family
    b. Multi-Family
2. Employment (Voluntary/Mandatory)
3. Hot & Dry

Model Intercept and Calibration Inputs

The table labeled Model Intercept and Calibration Inputs contains the parameters to adjust the demand forecast to calibrate to the best estimate of normal weather demand. The table contains adjustments for the single family, multi family, and non-residential sectors. In addition the table below labeled Percentage Other can be used to adjust the other demand sector.

Model Intercept and Calibration Inputs			
Model Intercept Adjustments			
		Adjusted	Model Inter
	Single-Family	5.10	4.83
	Multi-Family	5.31	5.66
	Non-Residential	0.86	0.94
			med
	Model Calibration	0.96	
	SF Site Adjustment	0.5065	
	MF Site Adjustment	-0.1143	
	NR Site Adjustment	-0.0441	

All of the values in the table are sourced from MWD with the exception of Model Calibration. Since we are calibrating for one agency, we set the Model Calibration parameter by minimizing the difference between the modeled demand and normal demand.

Normal demand was estimated by methods described in the technical memo "Statistical Analysis of Short Term IEUA Demand: Empirical Estimates of Demand Trends." This memo documents the weather-normalization and employment-normalization of time series data provided by IEUA. Water demand was approximated as the sum of delivered supplies. The advantage of using this data source is that the modeling effort was based on consistent system-wide monthly data. And in addition, the monthly water production could be adjusted for changes in storage. Although these models may be described as "demand" models, the data on which the models are estimates would be better described as "supply" measures. To the extent that storage issues are accounted for, the difference between these two constructs should be made small.

We have also provided a second calibration that isolates differences between IEUA and MWD methods. The second calibration option takes actual demand history provided by MWD and then applies the weather and employment effects from our statistical analysis to yield normal demand based on MWD data. The model provides a toggle to switch between the two calibration methods for comparison purposes (Cell G161).

Minimize Delta to 2012 Normalized Demand by Adjusting Model Calibration in Cell E138					
Source of Actual Demand	**Normal Effects Estimation**	**2012 Demand**	**Delta**	**Model Calibration**	**Toggle 1=IEUA**
IEUA	A&N	218,614	(0)	0.956	1
MWD	A&N	243,922	25,308	0.983	

To run the calibration, run a Goal Seek in Excel that sets delta in Cell E161 (or E162) to zero by changing Cell E138. (In Excel, click on Data, What If, and then Goal Seek). This method calibrates the model to normal demand in the most recent year from the statistical analysis (2012).

Adjusted Normal Weather by Month

These values are from MWD and are calculated from tables labeled Actual Climate Data, which contain Median Rainfall, Median Rain Days, Normal Temperature, and Normal Cooling Degree Days.

Base Model Output

The Base Model Output table (Row 171) is the base forecast that includes the price effect, but it does not include new conservation savings. The following is an example of the Base Model Output table for single family multi-family and total acre feet demand (Non-Residential and Other are not shown separately, but they are included in Total demand).

ACRE-FEET

	Municipal and Industrial Water Demand - Base Forecast with Price Effect (Acre-Feet)								
				by Sector					
		TOTAL		Single-Family			Multi-Family		
YEAR	Annual	Summer	Winter	Annual	Summer	Winter	Annual	Summer	Winter
2008	223,185	147,008	76,177	103,644	69,914	33,730	25,879	15,963	9,916
2009	216,118	142,398	73,720	103,031	69,501	33,531	25,815	15,924	9,891
2010	210,826	138,957	71,869	103,262	69,656	33,606	25,979	16,025	9,954
2011	212,918	140,330	72,588	103,706	69,956	33,750	25,967	16,018	9,949
2012	218,614	144,088	74,526	106,581	71,895	34,686	26,645	16,436	10,209
2015	232,443	153,406	79,037	113,054	76,315	36,740	27,994	17,268	10,726
2020	249,390	164,505	84,885	120,523	81,356	39,167	31,667	19,533	12,133
2025	263,113	173,501	89,613	126,358	85,295	41,063	34,301	21,158	13,143

Demand Forecast Model

The Demand Forecast Model tables (starting in Row 225) contain the demand forecast equations for each forecast period.

Conservation Inputs

The Conservation Inputs tables (starting in Row 696) contain output from the AWE Tracking Tool that IEUA uses to plan conservation activities.

- Plumbing Code Savings by sector
- Historically Achieved (Retrospective) Active Savings by sector for peak and off-peak sectors

The demand forecast calls for Summer and Winter demand, so we apply the peak and off-peak conservation estimates from the AWE Tracking tool to Summer and Winter respectively.

The demand forecast also calls for the following sectors: Single Family, Multi Family, Non Residential, and Other. The AWE Tracking Tool has Commercial, Industrial, and Institutional separately categorized as well as an Irrigation category. We summed these into the Non-Residential sector on the Conservation_Inputs Worksheet.

Note that refined adjustments to the conservation forecast are possible in the AWE Tracking Tool that accompanies the demand forecast model. For example, past and future conservation activities can be added or updated. Past active conservation is entered on the Model_Base worksheet. The Base

Scenario on the Model_Base worksheet assumes there is not additional future active conservation. Scenarios 1 – 3 each have different plans for future active conservation that are linked to the active conservation input worksheets on Model_Scenario1, Model_Scenario2, and Model_Scenario3 respectively.

Note also that the Conservation_Inputs Worksheet takes the results from the AWE Tracking Tool and calculates the future addition to active and passive conservation beyond what is embedded in 2012. That is the latest year of the statistical normalization analysis based on actual demand (which by definition embodies all past active and passive conservation to date). The calculations for the future additions to active conservation accounts for the fact that active conservation has a defined savings life. Unless the conservation activity is replicated in the AWE Tracking Tool, the conservation effect will expire and result in an increment rather than a decrement to future demand. As a default conditions, the model assumes that future active conservation will be maintained at the same level as the present active savings level. This is a place holder until IEUA has developed the next phase of their conservation planning.

Conservation Forecast

The Conservation Forecast tables (Row 832) contains a forecast that is constructed by starting with the Base Forecast and subtracting out the added passive and active conservation forecast moving forward.

Note that since we have calibrated to a current estimate of normal demand, we subtract out only added future conservation above and beyond what is already embedded in the current estimates. The advantage of this approach is that it allows us to anchor the demand forecast to the best estimate of current measured demand data.

Cities Forecast

The Cities Forecast (Row 937) was created by disaggregating the IEUA forecast using the following method:

- Single Family was disaggregated by the share of single family housing units in the city
- Multi Family was disaggregated by the share of multi-family housing units in the city
- Non Residential was disaggregated by the share of employment in the city
- Other was disaggregated by the share of population in the city

When comparing a disaggregate forecast of base demand at a City level to recent realized water demand, analysts will need to recognize that realized demand does not reflect, in general, normal weather and normal business cycle conditions. When comparing alternative forecasts, analysts should begin by comparing the demand driver measures of population, housing stock, and employment.

Retail Service Areas Forecast

The Retail Service Areas Forecast (Row 1219) was created by disaggregating the IEUA forecast using the following method:

- Single Family was disaggregated by the share of single family housing units in the retail water service area

- Multi Family was disaggregated by the share of multi-family housing units in the retail water service area
- Non Residential was disaggregated by the share of employment in the retail water service area
- Other was disaggregated by the share of population in the retail water service area

When comparing a disaggregate forecast of base demand at a Retail Service Area level to recent realized water demand, analysts will need to recognize that realized demand does not reflect, in general, normal weather and normal business cycle conditions. When comparing alternative forecasts, analysts should begin by comparing the demand driver measures of population, housing stock, and employment.

Indoor/Outdoor Forecast

The Indoor/Outdoor Forecast tables break down total forecasted demand into indoor and outdoor components (Row 1560).

Please refer to Appendix C for documentation on the estimate of Indoor/Outdoor end uses in the IEUA service area.

Two methods were examined to estimate outdoor use across customer classes (See Appendix C). The minimum month method is common practice, yet it ignores outdoor use in climates where there is winter irrigation. The seasonal variation method applies the seasonal variation from dedicated irrigation meters to mixed meter customer classes. This method definitively establishes that the assumption of zero winter irrigation is untenable. The recommended seasonal variation method estimates that 62 percent of total water demand in the IEUA service area is outdoor water use. The model can provide additional estimates of how indoor and outdoor end uses are divided seasonally:

Summer (April to Oct.)		Winter (Nov. to March)	
Indoor	Outdoor	Indoor	Outdoor
33%	67%	49%	51%

Note that this split occurs in the model after the Base and Conservation Forecasts, and thus proportions of indoor and outdoor added active conservation savings will not be reflected. However, for the indoor outdoor analysis of passive conservation savings we performed to assist wastewater design team, we disaggregated passive conservation coming out of the AWE Tracking Tool into indoor and outdoor components. In addition, we disaggregated passive conservation into components derived from new construction and components derived from existing sites.

Section E: Model Scenarios (1-3)

There are three Model_Scenario worksheets that contain each of three scenarios controlled by the Control Panel. Each of these worksheets is based structurally on the Base_Model worksheet with differences in either data sources or assumptions that comprise the defined scenarios.

Section F: WBBRS Implementation

The WBBRS_Implementation worksheet contains the calculations and assumptions that underlie the alternative water budget based rate structures and their estimated water savings.

Section G: WUE Inputs

The WUE_Inputs worksheet contains the planned active conservation savings from the alternative water use efficiency scenarios.

Appendix A: Review of MWD Demand Model

Current econometric model specification

Metropolitan currently uses a customized version of the IWR-MAIN (Municipal and Industrial) sometimes referred to as MWD-MAIN. This demand model features a separate model for different customer sectors—Single Family Residential, Multifamily Residential, and Commercial, Industrial, and Institutional (CII). Table 1 depicts these key relationships in the MWD demand model. In the residential sector, the forecasts of water demand per dwelling unit are ultimately combined with the forecasts of dwelling units from the regional planning agencies to yield an estimate of total sector water demand. Similarly, in the nonresidential sector, water use per employee is combined with forecasts of employment to yield an estimate of total nonresidential water demand.

Table 1 MWD Demand Model Variables

Demand Sector	Projected Demographic	Dependent Variable	Explanatory Variables
Single Family Residential	Number of Single Family Households	Water use per household	Climate Household Size Income Price and Conservation Housing Density Service Area Location
Multifamily Residential	Number of Multifamily Households	Water use per household	Climate Household Size Income Price and Conservation Housing Density Service Area Location
Commercial, Industrial, Institutional (CII)	Total Urban Employment	Water use per employee	Climate Price and Conservation Industrial / Service Employment Share
System Loss / Unmetered Use			Percentage of total use

Each statistical model will be analytically described.

Specification of Single Family Residential Model

The systematic form of the single family residential model is:

Equation 1

$$\ln \frac{Use_{i,t}}{Unit_{i,t}} = \mu_i + \beta_M \cdot Month_t + \beta_W \cdot Weather_{i,t} + \beta_S \cdot SocioEconomic_{i,t} + \beta_D \cdot Drought_t$$

where $\frac{Use_{i,t}}{Unit_{i,t}}$ is the interpolated quantity of single family water use per occupied single family residence of retail agency *i* within month *t*,
the parameter μ_i represents a fixed intercept parameter for each agency *i*,
$Month_t$ is an indicator variable for the month,
$Weather_t$ is weather component,
$SocioEconomic_t$ is a set of socioeconomic measures, and
Drought, are indicator variables for the presence of drought response.

Taking a closer look at each component, the dependent variable is interpolated to reflect the fact that it is a measure taken from billed consumption data. (This type of "sales" data is required for the customer class specific models of MWDMAIN.) The interpolation was performed as follows:

$$\hat{Use}_t = 0.5 \cdot Use_t + 0.5 \cdot Use_{t-1}; monthly_data$$

or

$$\hat{Use}_t = 0.25 \cdot Use_t + 0.5 \cdot Use_{t-1} + 0.25 \cdot Use_{t-2}; bimonthly_data$$

The monthly seasonal component includes 11 binary indicator variables, one for each month:

$$Month_t = Jan + Mar + Apr + May + Jun + Jul + Aug + Sep + Oct + Nov + Dec$$

Since 12 monthly indicator variables are perfectly correlated with the intercept, one must be excluded. Identical predictions are generated no matter which month is excluded; only the interpretation of the monthly coefficients changes.

The weather component is comprised of weather measures (monthly rainfall, rainy days in the month, and air temperature) that are transformed logarithmically with their monthly average subtracted away. Contemporaneous values (rain in the same month as use) as well as lagged values are included.

$$Weather_{i,t} \equiv dlR_{i,t} + dlR_{i,t-1} + dlR_{i,t-2} + lRDays_{i,t} + lRDays_{i,t-1} + dlT_{i,t} + dlT_{i,t-1} + dlT_{i,t-2}$$

$$dlR_{i,t} \equiv \ln(Rain_{i,t} + 1) - \overline{\ln(Rain_{i,t} + 1)}$$

$$lRDays_{i,t} \equiv \ln(number_of_rainy_days_in_month + 1)$$

$$dlT_{i,t} \equiv \ln(Temp_{i,t}) - \overline{\ln(Temp_{i,t})}$$

The socioeconomic component for single family residential includes measures of water price, the number of occupied housing units per acre in 1990, the number of persons per household in 1990, and median household income in 1990.

$$Socioeconomic_{i,t} = \ln(real_marginal_price_{i,t}) + \ln(\frac{Units_{i,1990}}{Acres_{i,1990}}) + \ln(\frac{Persons_{i,1990}}{Units_{i,1990}}) + \ln(\frac{\overline{Income_{i,1990}}}{Unit_{i,1990}})$$

Because the estimation period included periods of drought, the model controlled for customer response to agency requested curtailments by using additional, agency-specific, binary indicators for voluntary or mandatory curtailments. An additional indicator for the severe drought period 1990-1992 was also included.

$$Drought_t = IndicatorforVoluntaryConservation_{i,t} + IndicatorforMandatoryConservation_{i,t} + IndicatorforDroughtPeriod(1990-1992)$$

The single family residential model was weighted by single family use/deliveries and estimated using ordinary least squares.

Multifamily Residential

The systematic form of the multifamily residential model is:

Equation 2

$$\ln\frac{Use_{i,t}}{Unit_{i,t}} = \mu_i + \beta_M \cdot Month_t + \beta_W \cdot Weather_{i,t} + \beta_S \cdot SocioEconomic_{i,t} + \beta_D \cdot Drought_t$$

where $\frac{Use_{i,t}}{Unit_{i,t}}$ is the interpolated quantity of water use per occupied multifamily residence of retail agency *i* within month *t*, as in the single family model.

The parameter μ_i represents a fixed intercept parameter for each agency *i*,
$Month_t$ is an indicator variable for eleven months,
$Weather_t$ is a somewhat simpler weather component,
$SocioEconomic_t$ is a set of socioeconomic measures, and
$Drought_t$ are indicator variables for the presence of drought response.

The components of the multifamily residential model are somewhat simpler.

$$Weather_{i,t} \equiv dlR_{i,t} + dlR_{i,t-1} + dlR_{i,t-2} + dlT_{i,t-1}$$
$$dlR_{i,t} \equiv \ln(Rain_{i,t}+1) - \overline{\ln(Rain_{i,t}+1)}$$
$$dlT_{i,t} \equiv \ln(Temp_{i,t}) - \overline{\ln(Temp_{i,t})}$$
$$Drought_t = IndicatorforVoluntaryConservation_{i,t} + IndicatorforMandatoryConservation_{i,t}$$

The multifamily residential model was weighted by multifamily use/deliveries and estimated using ordinary least squares.

Nonresidential—CII

For the nonresidential sector, the dependent variable is specified in terms of use per employee.

$$\ln\frac{Use_{i,t}}{Employee_{i,t}} = \mu_i + \beta_M \cdot Month_t + \beta_W \cdot Weather_{i,t} + \beta_S \cdot SocioEconomic_{i,t} + \beta_D \cdot Drought_t$$

In the documentation provided, the *Socioeconomic* component is formed by measures of eight major types of employment (the eight two digit SIC classifications of employment), that are adjusted for changes in productivity. A simpler form of this model is currently being used to generate nonresidential

projections; the working form of the nonresidential equation uses (unadjusted) measures of employment for the two largest employment groupings.

The nonresidential model was weighted by nonresidential use/deliveries and estimated using ordinary least squares.

Evaluation of current econometric model specification and estimation

Any water demand model can be described as deriving from a separation of the explanatory variable into systematic and nonsystematic portions: $Y=f(X) + \varepsilon$.

Dependent Variable: Y
This type of "smoothing" will reduce variation in the original measure and can attenuate the effect of explanatory variables that vary monthly (e.g., weather measures). This said, the use of estimated monthly data represents an improvement over the annual or semi-annual measures used in previous MAIN modeling exercises.

Functional Form of Model: f(X)
The only agency-specific parameter is the intercept. This implies that all slope parameters are restricted to be the same for each agency. Though this may not appear to be a very plausible assumption on the face of it, it does reflect some of the difficult choices between available data and the number of parameters that the modeler attempts to estimate. For example, the current model specification imposes the restriction that the seasonal shape is identical for each agency *i*. Thus, in the single family model, each agency will have January use that is 2 percent above its intercept. Further, the weather effect is identical for each agency. It is implausible that inland agencies would have the same response to weather variation that primarily coastal agencies would have.

The weather effect also imposes the restriction that the percentage response to changes in temperature or rainfall are identical throughout the year. It is implausible that rainfall in June would have the same response as rainfall in January. The specification of the climate effects constitutes an area of potential further refinement.

Estimation Method of Model: $\hat{f}$ and ε
It is well known that fixed effect models, such as those used in estimating equations for MWD-MAIN cannot directly yield slope estimates for explanatory variables that only vary cross-sectionally. Thus, the elasticity's attached to variables that do not vary with time—housing density, persons per household, and median household income—are the result of the weighting procedure and a very small amount of cross-sectionally varying agency data from 1990. The signs of the estimated coefficients are correct but I cannot attest to their validity. However, the magnitude and signs of the estimated parameters are within reasonable ranges, based on my professional experience with demand models in the literature and in use nationally. The model would be improved by the use of modern panel data estimators.

Summary
The current MWD-MAIN models represent an improvement over previous models. The evolutionary path of the MWD-MAIN has several promising alternatives for further improvement.

This review was based on documents, interviews, and data provided by Metropolitan. These included:

Development of Water Use Models for the Interim #5 Forecast: Memorandum Report, January 1995, Jack C. Kiefer, Jerzy W. Kocik, Eva M. Opitz, and Benedykt Dziegielewski of PMCL, A report for the Metropolitan Water District of Southern California.

Development of Water Use Models for the Interim #5 Forecast, ADDENDUM REPORT: MWDMOD Implementation and Calibration, May 1995, Jack C. Kiefer, Jerzy W. Kocik, Eva M. Opitz, and Benedykt Dziegielewski of PMCL, A report for the Metropolitan Water District of Southern California.

Development and Verification of Sectorial Water Demand Forecasting Models for the Metropolitan Water District of Southern California, Draft Report, Feb. 1997, Jack C. Kiefer, Jerzy W. Kocik of PMCL, A report for the Metropolitan Water District of Southern California.

Appendix B: Demographic Data Development

Summary Methodology for Socioeconomic Data Disaggregation to IEUA

In fall 2013, the Center for Demographic Research (CDR) at California State University, Fullerton was contracted to disaggregate regional socioeconomic data for a water demand model for the Inland Empire Utilities Agency (IEUA). The specific objectives of this project were to develop estimates and projections of the following variables for 2008 and 2010 through 2035 for the cities, Retail Water Service Agencies, and Wastewater Tributaries within IEUA:

1. Total Population
2. Resident/Household Population
3. Group Quarters Population
4. Households (Occupied Housing Units)
5. Single-Family Households
6. Multi-Family Households
7. Employment (Jobs) by sector:
    a. Agriculture & Mining
    b. Construction
    c. Manufacturing
    d. Wholesale
    e. Retail
    f. Transportation, Warehousing, & Utility
    g. Information
    h. Financial Activity & Real Estate (FIRE)
    i. Professional & Business Services
    j. Education & Health Services
    k. Leisure & Hospitality
    l. Other Services
    m. Public Administration

The projections database used is the Southern California Association of Governments (SCAG) 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (2012 RTP/SCS), which was allocated to the Traffic Analysis Zones (TAZ).

These were developed by first overlaying the city, water agency, and tributary boundaries on the TAZ boundaries using GIS software. Prior to overlaying the geographies, corrections and adjustments were made to the boundaries to minimize errors and differences.
First, a union of TAZ data to each of the three primary geographies (cities, Retail Service Water Agencies, and Wastewater Tributaries) was done using GIS software. TAZs wholly contained within a primary geography were assigned to that geography.
If a TAZ was split by a primary geography, the TAZ data was redistributed between two or more split polygons using a combination of GIS and Microsoft Excel. To distribute population and housing data, an area allocation method was used and then supplemented with a review of the 2010 aerial photo from ESRI. This was done by counting rooftops of single family detached homes. For multi-family housing,

Google Maps were used to find the property information, and then properties were contacted to obtain the number of housing units in the development.

Population was allocated based on the share of housing units in the split compared to the total number for the original TAZ data. For employment, employer point data from D&B was used which contained the address and number of employees by NAICS code. Each 2-digit NAICS code was assigned to one of the SCAG 13 employment sector categories. These were then subtotaled by the split TAZ geographies, and then controlled by sector to the original TAZ totals.

Summary Methodology for Socioeconomic Data Disaggregation to IEUA 2 of 2
Future growth after 2010 was allocated based on aerial review of open land by TAZ where splits occurred. After all population, housing, and employment data were allocated, the data were joined to each primary geography boundary file using GIS software. Each boundary file (shapefile) was quality-checked to verify the split TAZs correctly followed the source data for each geography type. Finally, the split TAZ data were dissolved on each of the primary geographies for cartographic representation. The outcomes were GIS shapefiles with spatially accurate, allocated population, housing, and employment data for three primary geographies: cities, Retail Water Service Agencies, and Wastewater Tributaries.

1. Total Population- Refers to all persons; sum of resident/household population and group quarters population.
2. Resident/Household Population- Resident population refers to the segment of the population that resides in non-institutionalized quarters, such as single and multiple family units, mobile homes, oats, recreational vehicles, and other miscellaneous types of residences. The resident population is synonymous with household population as defined by the California State Department of Finance.
3. Group Quarters Population- Group Quarters Population refers to the population residing in non-institutionalized group quarters, such as college dormitories, military barracks, convalescent hospitals, and shelters.
4. Total Households (Occupied Housing Units) - Occupied Total Dwelling Units and Households are synonymous. Households were calculated by summing Occupied Single-Family Households and Multi-Family Households.
5. Single-Family Households- Occupied single-family detached housing units.
6. Multi-Family Households- All other occupied housing units (includes single-family attached, multi-family, duplex, triplex, fourplex, mobile homes.
7. Employment: Total number of jobs, includes full time and part time jobs by sector
    a. Agriculture & Mining
    b. Construction
    c. Manufacturing
    d. Wholesale
    e. Retail
    f. Transportation, Warehousing, & Utility
    g. Information
    h. Financial Activity & Real Estate (FIRE)
    i. Professional & Business Services
    j. Education & Health Services
    k. Leisure & Hospitality
    l. Other Services
    m. Public Administration

Boundary Details Documentation

The IEUA official shape file was available for all IEUA-wide demographics.

To get the city boundaries, CDR utilized the RTP city files which are more accurate than the Census Tiger files.

To get the retail service area boundaries, CDR utilized the city files, and then overlaid the non-city water companies (MVWD, FWC, and CVWD).

Then special corrections were made for the following:

- West Valley Water District (northeastern IEUA area)
- Golden State Water Company (border of Upland and MVWD)
- Power Plant (Reliant Energy Etiwanda)
- IEUA facilities (adjacent to power plant)
- Yellowstone Circle (Chino Hills for water and Chino for wastewater)

To get the wastewater tributaries, RMC developed a boundary file in cooperation with IEUA.

Appendix C: Indoor/Outdoor End Uses

Introduction

This Appendix documents the estimation of indoor and outdoor water end uses for water demand in the IEUA service area. This estimation of indoor/outdoor end uses is conducted by customer class—single family residential, multi-family residential, and commercial-industrial-institutional (CII). Indoor end uses are of particular interest to planners tasked with designing wastewater systems and recycled water systems because it helps them establish capacity requirements. Both indoor and outdoor use is of great interest to planners tasked with designing Water Use Efficiency (conservation) programs. Although much has already been accomplished with indoor conservation, there is some level of remaining potential for water savings. WUE planners have particular interest in outdoor use because it is generally assumed to be a large share of total use with large remaining potential for savings.

Two methods were used to estimate outdoor use across customer classes. The first method is the minimum month method that has been historically used in the water industry—this method assumes that the minimum month of water demand is 100 percent indoor end uses. Though we believe that this is a counterfactual assumption in the IEUA service area (it assumes exactly zero outdoor irrigation in the winter) we provide estimates using the minimum month method to serve as a point of comparison. The second method develops an estimate of winter irrigation from dedicated irrigation meters and applies this nonzero assumption instead. Termed a "seasonal variation" method, it applies the seasonal variation from dedicated irrigation meters to mixed meter customer classes.

The seasonal variation method estimates outdoor end uses to compose 62 percent of overall water demand in the IEUA service area. (Presuming all water demand in the minimum month to be all indoor end use would estimate outdoor end uses to be 46 percent of total demand.) We recommend using the seasonal variation method because we know the minimum month method systematically underestimates outdoor water use in climates where there is winter irrigation such as IEUA.

Data

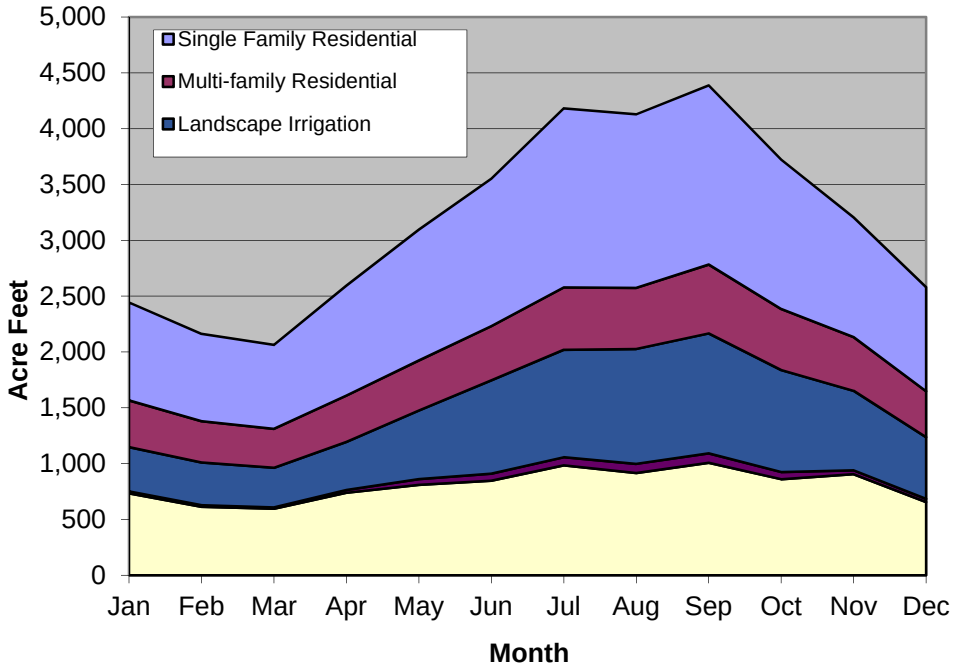
The data used are from the California Department of Water Resources, Public Water System Statistics filings for the City of Ontario for the years 1993 to 2012. These data are billing system summaries at the monthly level. Several other retailers provided monthly use summaries; however, these were generated with bimonthly billing cycles. Since different retailers can apportion bimonthly billing into calendar using different methods, we stick to the monthly data generated with monthly billing.

Table 1 shows the average use from 2008 to 2012 summed by customer class. Figure 1 shows the sum of water use by month. The strong seasonal pattern reflects irrigation needs during the characteristic hot and dry summers.

Table 1 – Average Use, 2008 to 2012, City of Ontario

Class	Use (AF)	Percent
Single Family Residential	13,993	36.7%
Multi-family Residential	5,647	14.8%
Commercial/Industrial/Institutional	9,666	25.4%
Landscape Irrigation	8,259	21.7%
Other	549	1.4%
Total	38,114	100.0%

Figure 1--Monthly Use by Class
Average of Monthly Use from 2008-2012, City of Ontario



Methods

Outdoor end uses are directly measured by dedicated irrigation meters. Many other types of water meters--single family, multi family, commercial, industrial, and institutional--can be measuring both indoor and outdoor end uses. If not measured or observed directly, planners are forced to rely on inference or judgment. For IEUA, we have conducted two methods to infer outdoor use for all sectors.

Minimum Month Method

The most common method employed to infer outdoor use is to assume the winter use is all indoors. (This assumption may be closer to the truth in wetter or colder climates.) For example, if we calculate winter minimum use times 12 months we have inferred total indoor use for the year. Total use for the year minus indoor use then equals outdoor use.

In Table 2 below, we find that outdoor use calculated with the "minimum winter use is indoor use" method is 46%. The method underestimates outdoor use because there is likely to be at least some winter irrigation in dry climates. Variations on this method include daily accounting and various ways

to define winter minimum. Note the results of this method will vary considerably from year to year; the reader is cautioned when using results from one year for planning
Purposes and we used for this analysis the monthly average over the five most recent years for which data were available (2008 to 2012).

Table 2 – Percent Outdoor Use

Class	Total	Minimum Month Method	Seasonal Variation Method
Single Family Residential	13,993	36%	58%
Multi-family Residential	5,647	26%	43%
Commercial/Industrial/Institutional	9,666	26%	42%
Landscape Irrigation	8,259	100%	100%
Other	549	75%	100%
Total	38,114	46%	62%

Seasonal Variation Method

The second method to infer outdoor use consists of employing the pattern of seasonal variation with dedicated irrigation meters and applying it to other sectors with mixed meters. The reasoning is that with dedicated irrigation meters we can measure winter irrigation. Thus, we can observe the relative water use in winter and summer irrigation seasons and calculate a parameter from variables that are observable in other sectors. For example, by calculating the ratio of winter minimum to the seasonal range we have a function of variables observable for sectors other than dedicated irrigation meters. This method will result in a higher estimate of outdoor water use than using minimum month. The method relies on the assumption that the seasonal variation of outdoor use is the same for sites with dedicated meters as for sites with mixed meters.
Due to the variability of landscape water use from year to year, we expect the calculated parameter to vary considerably from year to year. For this reason, we calculated the parameter (ratio of winter minimum to seasonal range) for each year for which we could collect data (1993 to 2012) and took the average. We applied this long term average to the monthly average of the most recent five years of consumption data (2008 to 2012) because of the changing distribution of water use by customer class as more dedicated irrigation meters are employed.

Figure 2 shows the use from irrigation-only meters, with winter irrigation illustrated in blue and the seasonal range in red for one example year (2011).

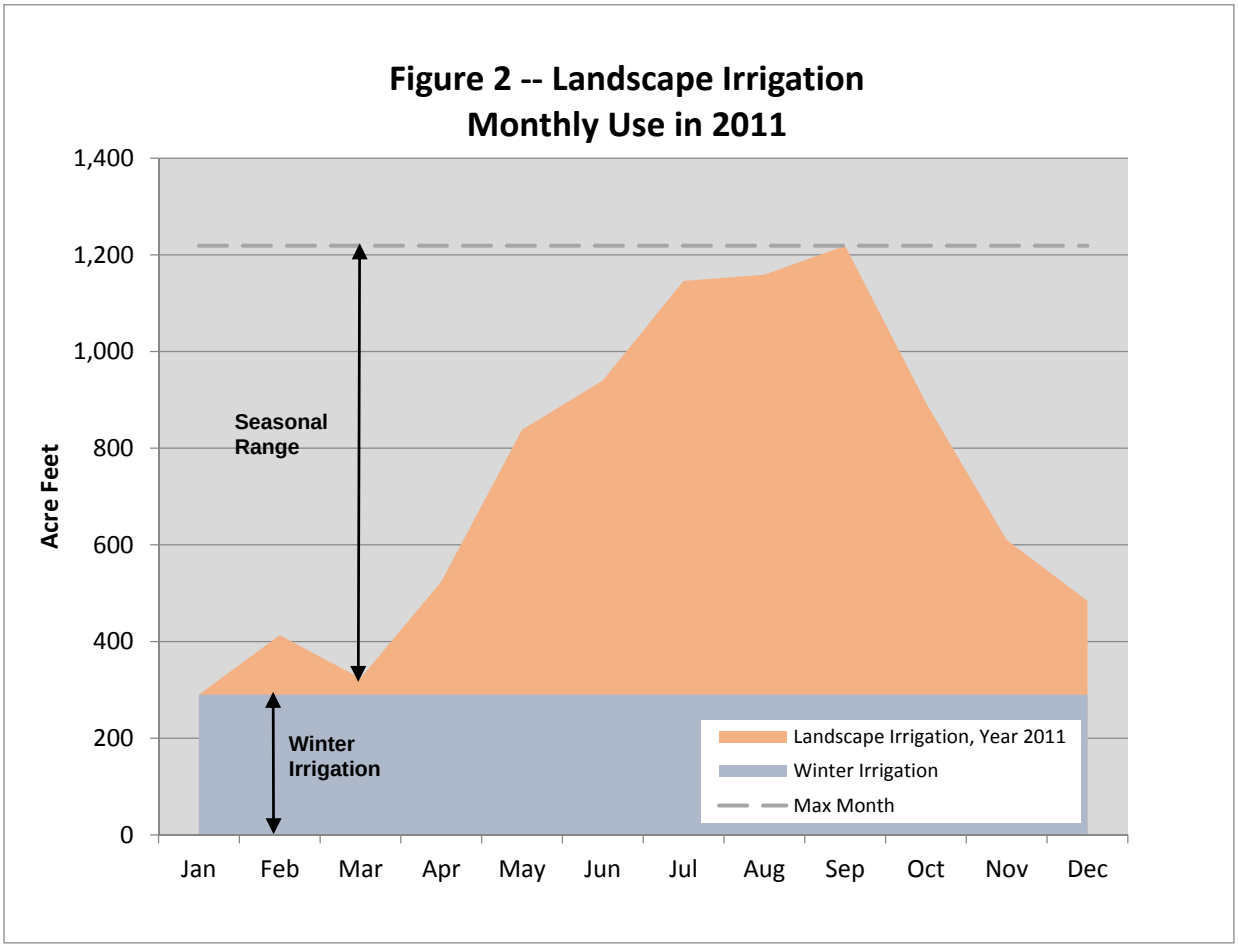
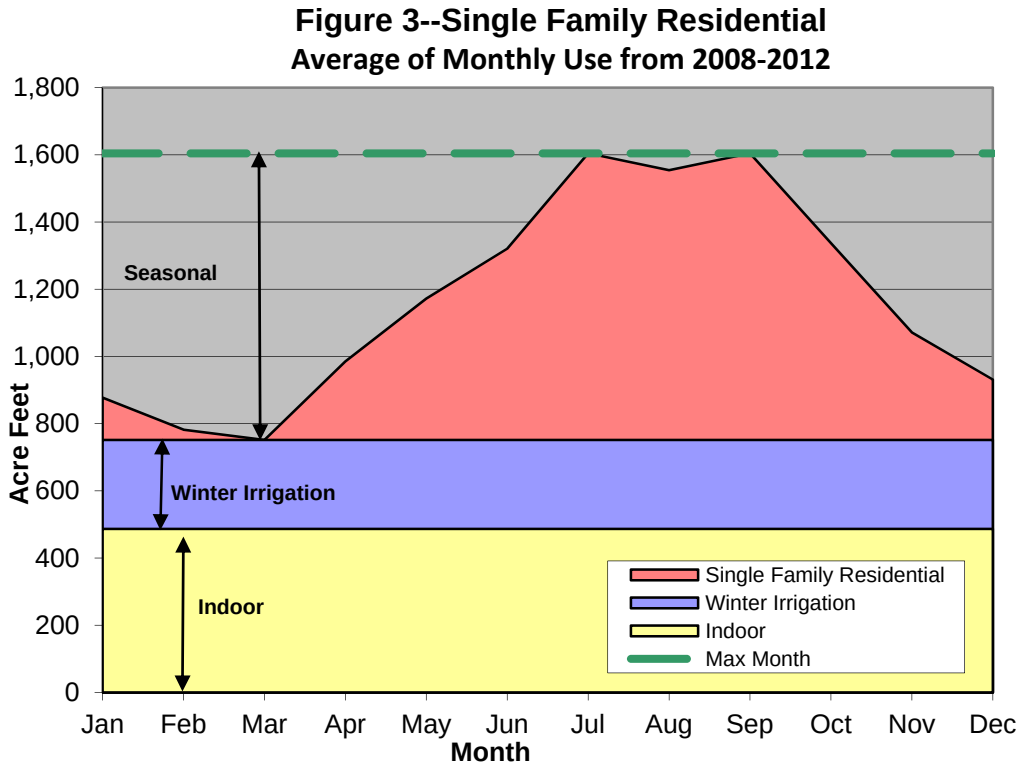


Figure 2 shows winter irrigation is 31% of seasonal range between summer and winter for dedicated irrigation accounts for the year 2011. We repeated this calculation for each year for which were able to collect data (1993 to 2012) and averaged the values to get the result we apply to customer sectors with mixed meters (31%).

Seasonal range and winter minimum are observable for non-irrigation classes. If we assume that winter irrigation is also 31% of seasonal range for the non-irrigation customer categories, we can infer their winter irrigation, and thus indoor and outdoor use.



For example, Figure 3 shows winter irrigation calculated as 31% of seasonal range for the single family residential sector. Total outdoor use (red+blue in this graph) is, thus, 58% of total use for the year (red+blue+yellow). In contrast, using the minimum month for the single family sector results in 36% outdoor use (red area only).

Recommendations

The minimum month method systematically underestimates outdoor use and overestimates indoor use. As such we do not recommend using it for planning water resource investments in the IEUA service area. Since it is a commonly used method, it may have comparison value. We can improve the reliability of the results by using a longer time series of data to see how the percent outdoor varies from year to year with changes in weather; however, the systematic estimation bias remains.

We recommend the seasonal variation method over the minimum month in this analysis for IEUA because the seasonal variation method does not contain the same source of systematic bias. We have reliable empirical measures using monthly-billed data from one of the larger retail water service areas.

Appendix D: Data Inputs

The following table is from the Parameters_Inputs Worksheet and it summarizes the econometrically estimated parameters that drive the demand equations. Section A defines these parameters in detail. These tables show the socioeconomic inputs from the Base_Forecast Worksheet as described in Section B:

MODEL PARAMETERS

Single Family Model

WEATHER	LAG 0	LAG 1	LAG 2				
Rain	-0.0482	-0.0589	-0.0192				
Rainy Days	-0.0088	-0.0047					
Temperature	0.4647	0.3482	0.2942				
SOCIOECONOMIC							
Marginal Price	-0.1947						
Income	0.2722			**MONTH**			
Density	-0.6154			January	0.0233	July	0.5785
People	0.5485			February		August	0.5603
				March	0.0659	September	0.4775
CONSERVATION				April	0.2166	October	0.3361
Voluntary	-0.0258			May	0.3799	November	0.1993
Mandatory	-0.1033			June	0.5128	December	0.1056
DROUGHT							
	-0.0503						

Multi-Family Model

WEATHER	LAG 0	LAG 1	LAG 2	LAG 3			
Rain	-0.0343	-0.0205	-0.0069				
Temperature		0.1375					
SOCIOECONOMIC							
Marginal Price	-0.1626			**MONTH**			
Income	0.3102			January	0.037	July	0.2255
Density	-0.5262			February		August	0.2353
People	0.4496			March	0.0009	September	0.1997
				April	0.0715	October	0.1414
CONSERVATION				May	0.1405	November	0.1037
Voluntary	-0.0452			June	0.1951	December	0.0858
Mandatory	-0.1162						

Revised Non-Residential Model

WEATHER	LAG 0	LAG 1	LAG 2				
Rain	-0.05817	-0.04906	-0.01905				
Cooling degree Days	0.01037	0.01171	0.01200				
SOCIOECONOMIC				**MONTH**			
Marginal Price	-0.158920			January	0.0005	July	0.4163
				February		August	0.4308
CONSERVATION				March	0.0425	September	0.3713
Voluntary	-0.06655			April	0.1613	October	0.2561
Mandatory	-0.13011			May	0.2980	November	0.1438
				June	0.3623	December	0.0658

EMPLOYMENT COEFFICIENTS

Construction	Manufacture	Transportation	Wholesale	Retail	Finance	Services	Government
0.0000	**0.80297**	0.0000	0.0000	0.0000	0.0000	**0.55242**	0.0000

Price Effect

The price effect is reduced to	**Year**	**Price Effect**		**Year**	**Price Effect**
account for the effects of price	2008	56%		2025	33%
captured in the End-Use module.	2009	54%		2030	33%
	2010	52%		2035	33%
The original MWD model had one	2011	50%		2040	33%
price effect accross the forecast.	2012	48%		2045	33%
This updated model allows for the	2015	42%		2050	33%
effect to be reduced in phases, as	2020	33%			
End-Use conservation increases.					

YEAR	Population		Occupied Housing Units			Household Size (persons / household)			Housing Density (units / acre		Median Household Income (1990 dollars)
				by Sector			by Sector		by Sector		
	TOTAL Population	Household Population	TOTAL	Single-Family	Multi-Family	AVERAGE	Single-Family	Multi-Family	Single-Family	Multi-Family	
2008	805,506	787,995	230,915	158,948	71,967	3.42	3.60	2.89	3.20	10.90	38.18
2009	809,590	792,072	232,091	159,548	72,542	3.41	3.59	2.87	3.20	10.90	37.38
2010	813,695	796,170	233,272	160,150	73,122	3.42	3.60	2.88	3.20	10.90	37.06
2011	822,018	804,344	235,913	162,158	73,754	3.43	3.61	2.90	3.20	10.90	35.82
2012	830,425	812,603	238,583	164,192	74,391	3.45	3.62	2.91	3.20	10.90	37.72
2015	856,168	837,890	246,777	170,447	76,337	3.40	3.58	2.87	3.20	10.90	41.70
2020	896,533	877,494	262,894	178,394	84,500	3.34	3.52	2.80	3.20	10.90	46.30
2025	955,569	935,762	279,209	187,488	91,721	3.35	3.54	2.82	3.20	10.90	46.05
2030	1,009,349	988,771	295,545	197,642	97,903	3.35	3.55	2.82	3.20	10.90	45.81
2035	1,067,946	1,046,605	311,860	207,794	104,066	3.36	3.56	2.83	3.20	10.90	45.59
2040	1,125,203	1,103,084	329,707	218,366	111,422	3.33	3.54	2.81	3.20	10.90	45.43
2045	1,185,530	1,162,611	348,575	229,475	119,298	3.33	3.53	2.81	3.20	10.90	45.23
2050	1,249,091	1,225,350	368,522	241,150	127,731	3.32	3.53	2.80	3.20	10.90	45.03

YEAR	Urban Employment by Sector (Major SIC Code)								
		by Sector							
	TOTAL	Construction	Manufacturing	Transportation and Public Utilities	Wholesale Trade	Retail Trade	Finance, Insurance, and Real Estate	Service	Government
2008	330,533	21,107	42,701	39,443	24,545	46,478	13,138	137,549	5,572
2009	315,381	17,722	38,572	38,242	22,820	44,094	12,236	132,535	8,168
2010	300,924	14,880	34,843	37,077	21,217	41,833	11,396	127,704	11,974
2011	310,237	16,141	35,615	38,214	21,663	42,684	11,653	132,151	11,984
2012	319,838	17,510	36,404	39,385	22,118	43,552	11,915	136,754	11,993
2015	350,461	22,351	38,878	43,121	23,542	46,265	12,738	151,545	12,022
2020	375,653	29,099	41,667	45,467	25,409	53,494	13,213	159,272	8,032
2025	422,424	33,652	42,577	50,597	27,167	57,670	14,636	184,170	11,956
2030	462,518	37,906	43,051	54,733	28,720	62,530	16,165	206,525	12,888
2035	488,928	41,547	42,659	57,937	29,258	65,765	17,118	222,942	11,702
2040	525,693	47,098	42,651	62,213	30,225	70,131	17,978	243,799	13,426
2045	565,222	53,391	42,643	66,804	31,225	74,787	18,881	266,607	15,403
2050	607,724	60,525	42,636	71,734	32,257	79,752	19,829	291,549	17,672

Appendix E: Statistical Analysis of Short Term IEUA Demand: Empirical Estimates of Demand Trends

Introduction

For purposes of quantifying trends in IEUA Demand, one must estimate how water demand responds to predictable variations. There are numerous forces that drive demand growth in the long-term. These include changes in land use patterns and household size, growth in personal income and employment, and price and conservation. Weather conditions tend to make water demand go up or down in any given year.

For use in the Integrated Resource Plan and for calibrating long term water demand forecasts, the IEUA needs depiction of the predictable forces that cause demand to vary in the short-term so as to clarify remaining long term trends. This memorandum describes an empirical model developed to predict daily demand fluctuations. By nature, these models cannot replace long-term predictive models of water demand. However, by providing a better understanding of short-term demand variations, these models can clarify the direction of long term trends. The explanatory variables in this short-term model include:

- Deterministic functions of calendar time, including
  - The seasonal shape of demand
- Weather conditions
  - measures of maximum daily temperature, contemporaneous and time of year
  - measures of rainfall, contemporaneous and time of year
- Measures to control for long-term growth in demand
  - Trend
  - Employment growth different than trend
  - Customer response to voluntary curtailment in 2013 and 2014

The model documented here is used to create high resolution depictions of how variations in weather and the business cycle affect water demand over a wide range of conditions. These model-estimated weather and employment effects can then be used to (1) normalize observed demand and (2) serve as the basis for defining near term variability of demand and any planning dependent upon the trajectory of long term demand.

Data and Methods

Data

Water demand in the IEUA service area is approximated in this analysis as the sum of delivered supplies. This modeling effort used consistent system-wide monthly data—that is monthly water production adjusted for changes in storage. The reader is urged to keep in mind that though these models maybe described as "demand" models, the data on which these models are estimated would be better described as "supply" measures. To the extent that storage issues can be accounted for, the difference between these two constructs should be made small. Nonetheless, the issue remains.

The second major issue with using production data is the level and magnitude of noise in the data. The data generating mechanism for recording production can change over time as flow meters age or are replaced. Constructing a consistent time series requires matching two different—and possibly inconsistent—time-series. The records of flow can also embed non-ignorable meter miss-measurement.

To keep data inconsistencies from corrupting statistical estimates of model parameters, this modeling effort employed a sophisticated range of outlier-detection methods and models.

Specification

A Model of Per Capita Water Demand

The model for IEUA per capita water demand seeks to separate several important driving forces. In the short run, changes in weather can make demand increase or decrease in a given year. In the long run, increased population can drive demand higher. Strong regional economic growth can increase water demand through additional commercial or industrial water use. In addition, a rising economic tide can broadly increase personal income levels and economic activity can encourage or discourage additional population growth. Changes in water rates will change the relative attractiveness of water conservation.

These models are estimated at an aggregate level and, as such, should be interpreted as a condensation of many types of relationships — meteorological, physical, behavioral, managerial, legal, and chronological. Nonetheless, these models depict key short-run and long-run relationships and should serve as a solid point of departure for improved quantification of these linkages.

Systematic Effects

This section specifies a water demand function that has several unique features. First, it models seasonal and climatic effects as continuous (as opposed to discrete monthly, semi-annual, or annual) function of time. Thus, the seasonal component in the water demand model can be specified on a continuous basis, then aggregated to a level comparable to measured water use (e.g. monthly). Second, the climatic component is specified in "difference" form as a similar continuous function of time. The climate measures are thereby made independent of the seasonal component. Third, the model permits interactions of the seasonal component and the climatic component. Thus, the season-specific response of water use can be specific to the season of the year.

The general form of the model is:

Equation 2

$$PerCapitaWaterUse_t[GPCD] = \frac{Use_t}{Pop_t} = f(S_t + C_t + T_t)$$

where ***Use*** is the volumetric quantity of retail water use within time *t*, $\boldsymbol{S_t}$ is a seasonal component, $\boldsymbol{C_t}$ is a climatic component, and $\boldsymbol{T_t}$ is the trend component of GPCD Demand. The function *f* is the functional form of the connection between per capita water use and its explanatory components. Each of these components is described below.

Seasonal Component: A monthly seasonal component could be formed using monthly dummy variables to represent a seasonal step function. Equivalently, one may form a combination of sine and cosine terms in a Fourier series to define the seasonal component as a continuous function of time.[1] The following harmonics are defined for a given day *T*, ignoring the slight complication of leap years:

[1] The use of a harmonic representation for a seasonal component in a regression context dates back to *Hannan* [1960]. *Jorgenson* [1964] extended these results to include least squares estimation of both trend and seasonal components.

Equation 3

$$S_t \equiv \sum_{1}^{6}\left[\beta_{i,j}\cdot\sin\left(\frac{2\pi\cdot jT}{365}\right)+\beta_{i,j}\cdot\cos\left(\frac{2\pi\cdot jT}{365}\right)\right]=Z\cdot\beta_S$$

where $T = (1,...365)$ and j represents the frequency of each harmonic. Because the lower frequencies tend to explain most of the seasonal fluctuation, the higher frequencies can often be omitted with little predictive loss.

The percentage effect of the seasonal component on normal demand is given by:

Equation 3

$$S_t\% = \left[\frac{\exp(\widehat{Y}_t - T_t) - \exp(\widehat{Y}_t - T_t - S_t)}{\exp(\widehat{Y}_t - T_t - S_t)}\right]$$

where $\widehat{Y}$ is the predicted demand.

Climatic Component: The model incorporates two types of climate measures into the climatic component–rainfall and maximum daily air temperature.[2] The measures of temperature and rainfall are then logarithmically transformed to yield:

Equation 4

$$R_t \equiv \ln\left[1+\sum_{t=T}^{T_d} Rain_t\right], T_t \equiv \ln\left[\sum_{t=T}^{T_d}\frac{T_t}{d}\right]$$

Though this model extends to monthly measures while for daily measures, d takes on the value of one. Because weather exhibits strong seasonal patterns, climatic measures are strongly correlated with the seasonal measures. In addition, the occurrence of rainfall can reduce expected temperature. To obtain valid estimates of a constant seasonal effect, the seasonal component is removed from the climatic measures by construction.

Specifically, climatic measures are constructed as a departure from their "normal" or expected value at a given time of the year. The expected value for rainfall during the year, for example, is derived from regression against the seasonal harmonics. The expected value of the climatic measures ($\hat{\boldsymbol{C}}=\boldsymbol{Z}\cdot\beta_C$) is subtracted from the original climatic measures:

Equation 5

$$C_t \equiv (R_t - \widehat{R}_t)\cdot\beta_R + (E_t - \widehat{E}_t)\cdot\beta_T$$

The climatic measures in this deviation-from-mean form are thereby separated from the constant seasonal effect.[3] Thus, the seasonal component of the model captures all constant seasonal effects, as it

[2] Specifically it uses the daily temperature and the total daily precipitation at the Ontario NOAA station summarized to a monthly level.

[3] The logarithmic transformation of the original climate variable implies that the seasonal mean climate effect is a geometric mean. Because the model is estimated on the logarithmic scale the departure-from-mean climatic effects would be more accurately termed departure-from-median. See *Goldberger* [1968].

should, even if these constant effects are due to normal climatic conditions. The remaining climate measures capture the effect of climate departing from its normal pattern.

The model can also specify a richer texture in the temporal effect of climate than the usual fixed contemporaneous effect. Seasonally-varying climatic effects can be created by interacting the climatic measures with the harmonic terms. In addition, the measures can be constructed to detect lagged effects of climate, such as the effect of rainfall a month ago on today's water demand.

The percentage effect of the climate on normal demand is given by:

Equation 6

$$C_t\% = \left[\frac{\exp(\hat{Y}_t - T_t) - \exp(\hat{Y}_t - T_t - C_t)}{\exp(\hat{Y}_t - T_t - C_t)} \right]$$

where $\hat{Y}$ is the predicted demand.

Trend Component : For the IEUA Demand model, a deterministic annual trend term was used as the primary determinant of trends in per capita water demand in the long term.

Equation 7

$$\mathbf{T}_t \equiv AnnualTrend_t \cdot \beta_T + (\ln EmpDetrended) \cdot \beta_E$$

Thus the annual long term trend in IEUA Demand from 2002-2012 on is captured by β_T while the effects of the business cycle are captured by the departure of employment from its long term trend.

Stochastic Effects

To complete the model, we must account for the fact that not every data point will lie on the plane defined by Equation **(1)**. This fundamental characteristic of all systematic models can impose large inferential costs if ignored. Misspecification of this "error component" can lead to inefficient estimation of the coefficients defining the systematic forces, incorrect estimates of coefficient standard errors, and an invalid basis for inference about forecast uncertainty. The specification of the error component involves defining what departures from pure randomness are allowed. What is the functional form of model error? Just as the model of systematic forces can be thought of as an estimate of a function for the "mean" or expected value, so too can a model be developed to explain departures from the mean—i.e., a "variance function" If the vertical distance from any observation to the plane defined by **(1)** is the quantity $\boldsymbol{\varepsilon}$, then the error component is added to Equation **(1)**:

Equation 8

$$\ln \frac{Use}{Pop} = \mathbf{f}(\mathbf{S}_t, \mathbf{C}_t, \mathbf{T}_t) + \varepsilon$$

In an Ordinary Least Squares (OLS) Regression, the error term is assumed to be distributed normally with a constant variance.

$$\varepsilon \sim N(\mu_\varepsilon, \sigma_\varepsilon)$$

In the estimated retail demand model below, the variance is allowed to be nonconstant and separately modeled as an empirical variance (or link) function.

$$\sigma_{\varepsilon} = g(\mathbf{S}_t, \mathbf{C}_t, \mathbf{T}_t)$$

A variance function was estimated using the methods of Carroll and Ruppert as a two stage weighted least squares regression[4]. Briefly described, the first stage uses an OLS regression of the mean function (Equation 7) to derive a consistent estimate of the estimated error. The absolute value of the estimated error is used to estimate the variance function. The inverse of the predicted variance is used to weight the regression of the mean function in the second stage.

Estimated Per Capita Demand Model for IEUA

Table C1 presents the estimation results for the model of mean monthly per capita demand in IEUA. The independent variables 1 to 8—made up of the sines and cosines of the Fourier series described in Equation 2—are used to depict the seasonal shape of daily retail water demand (that is, $Z \cdot \widehat{\beta}_S$); this is the shape of demand in a normal weather year. This seasonal shape is important in that it represents the point of departure for the estimated climate effects (expressed as departure from what is expected in an average month).

The estimated weather effect is specified in "departure-from-normal" form. Variable 9 is the departure of monthly precipitation from the average precipitation for that month in the season. (Average seasonal precipitation is derived from a regression of monthly precipitation on the seasonal harmonics—exactly equal to monthly precipitation averaged over all years in the record.) Temperature is treated in an analogous fashion (Variables 11). The contemporaneous weather effect is interacted with the harmonics (Variables 10, 12, and 13) to produce a seasonal shape to both the rainfall and the temperature elasticities. Thus, departures of temperature from normal produce the largest percentage effect in the spring. Similarly, departures from normal rainfall produce a larger effect upon daily demand in the summer than in the winter. The lagged effect of temperature can also be detected further in time than rainfall—a detectable effect one month long.

The departure of employment growth from trend (13) and the annual trend term (variable 14) and comprise the long term determinants of demand.[5] Indicators ("dummy") variables for the years 2013 and 2014 were used to detect any customer response to the drought-induced calls for voluntary demand curtailment. (These measure the annual change in demand that was surprising: not explainable due to weather variation, recession, or ongoing trends in demand.) The constant term (17) describes the intercept for this equation.

[4] See Carroll, R. J. and Ruppert, D. (1988). *Transformation and Weighting in Regression*. Chapman and Hall, London.

[5] A variation of the model was used to test for a detectable trend in the seasonal shape of demand by including an interaction of the trend term and the annual harmonic.

Table 1-- Estimated IEUA Per Capita Demand Model (Mean Function)

Estimated IEUA Demand Model (Mean Function) Ln IEUA Per Capita Use (Gl. Per Capita Per Day)		
Independent Variable	**Coefficient**	**Std. Error**
1. First Sine harmonic, 12 month (annual) frequency	-0.10278	0.00714
2. First Cosine harmonic, 12 month (annual) frequency	-0.37889	0.00642
3. Second Sine harmonic, 6 month (biannual) frequency	-0.00489	0.00688
4. Second Cosine harmonic, 6 month (biannual) frequency	-0.00438	0.00723
5. Third Sine harmonic, 4/12 frequency	-0.00510	0.00849
6. Third Cosine, 4/12 frequency	0.02987	0.00699
7. Fourth Sine harmonic, 3 month (quarterly) frequency	0.01300	0.00857
8. Fourth Cosine, 3 month (quarterly) frequency	0.02357	0.00820
9. Contemporaneous Rainfall Deviation [(ln (Rain+1)) – Monthly mean]	-0.13102	0.02219
10. Interaction of contemporaneous rain with annual cosine harmonic	-0.04787	0.02701
11. Contemporaneous deviation from mean ln (temperature) in the month	0.87760	0.12878
12. Interaction of contemporaneous temperature deviation with annual sine harmonic	0.14438	0.16733
13. Deviation of ln(Employment in San Bernardino County) from Trend	0.96640	0.09765
14. Overall Annual Trend 2003-2014	-0.00147	0.00207
15. Indicator for 2013	-0.02098	0.01367
16. Indicator for 2014	-0.04618	0.02613
17. Intercept	5.46346	0.01788
Obs	139	
R^2	0.9760	
Root Mean Squared Error	0.03816	
Time period (Fiscal Years)	2003-2014	

Figures 1 and 2 plot Actual IEUA Per Capita Demand against the model predictions ($\hat{Y}$) and reveals a very tight fit of predictions to actual.

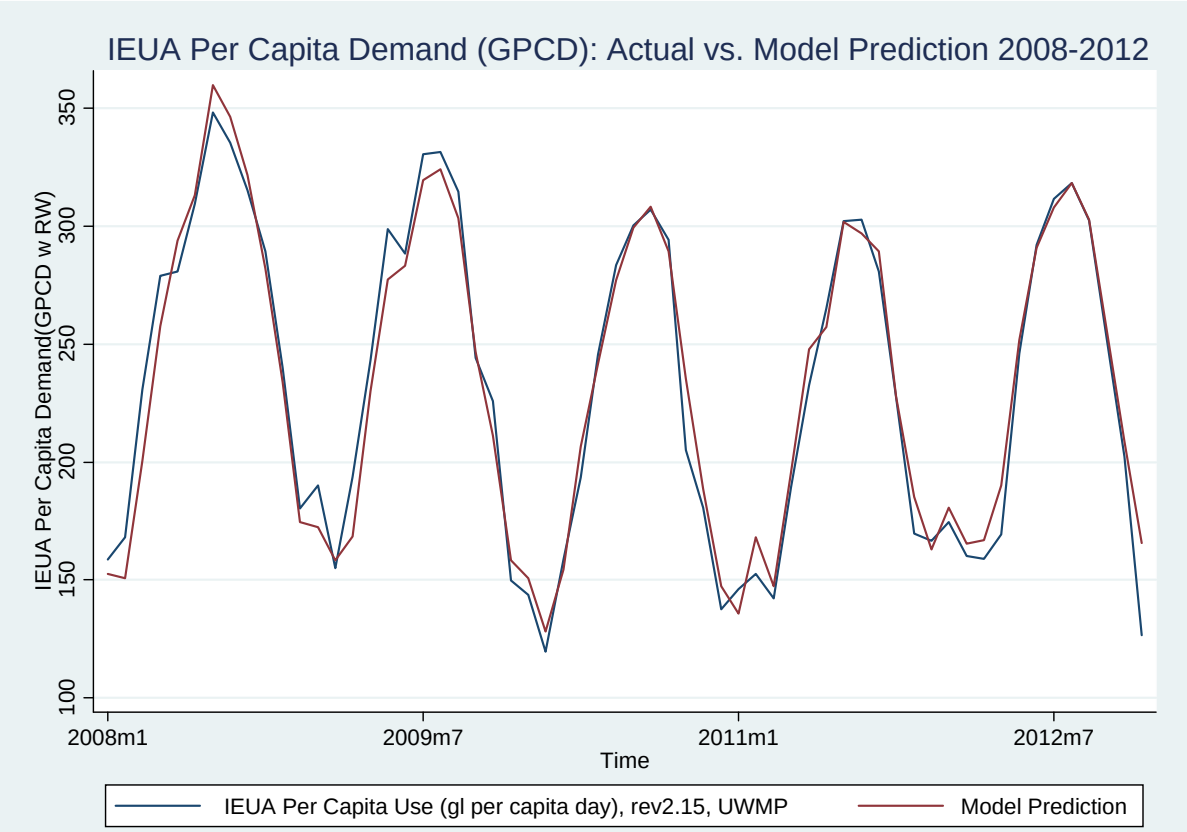


Figure 1-- IEUA Per Capita Demand (GPCD): Actual vs. Model Prediction , FY 2008-2012

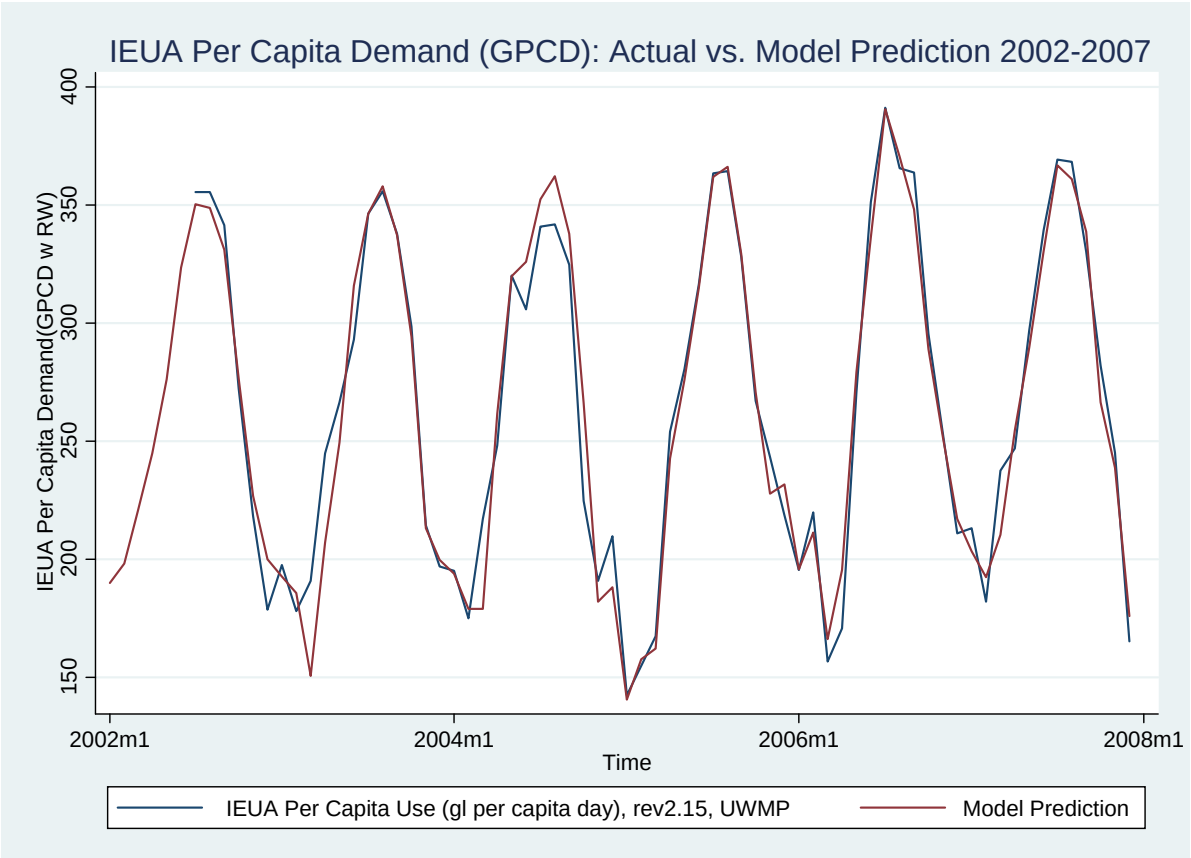


Figure 2-- IEUA Per Capita Demand (GPCD): Actual vs. Model Prediction , FY 2002-2007

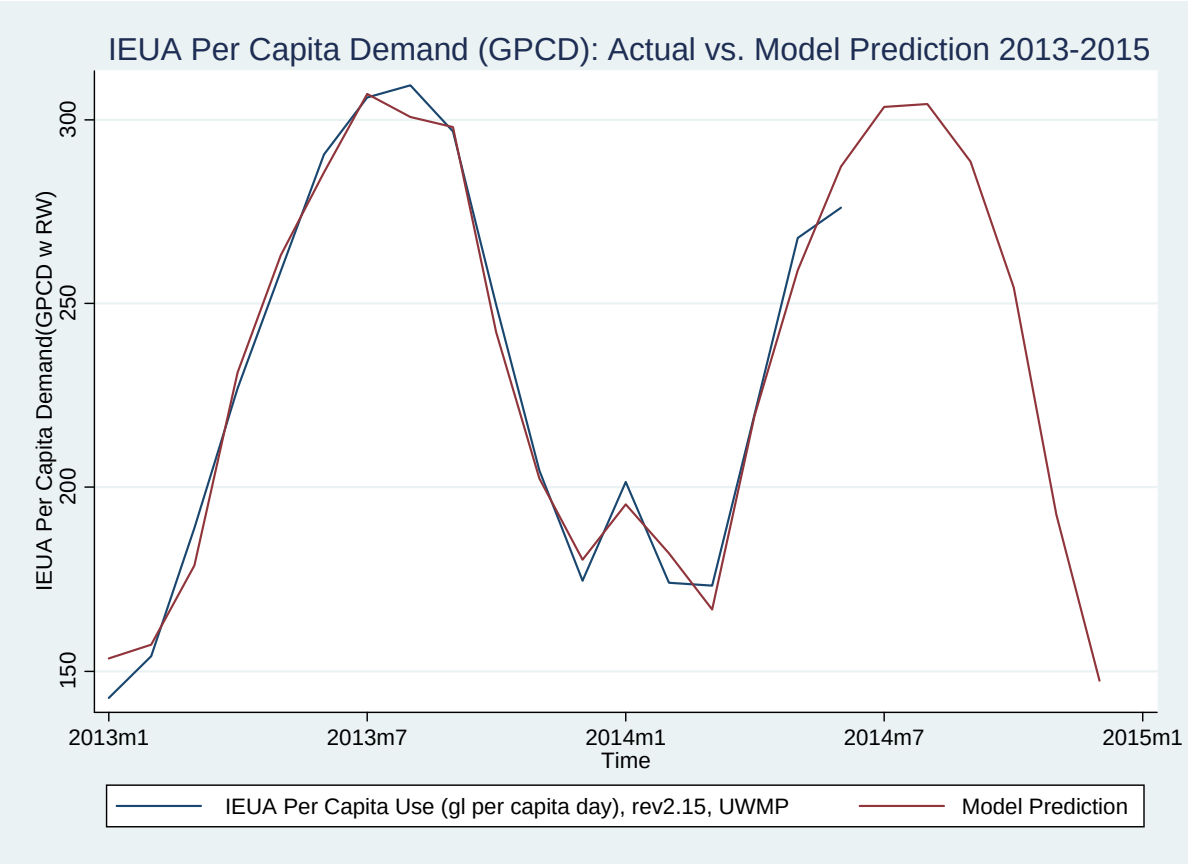


Figure 3-- IEUA Per Capita Demand (GPCD): Actual vs. Model Prediction, 2013-2014

Application to Demand Trends

From the statistically estimated model documented above, one can calculate the effect of weather on per capita water demand as the difference between two predictions: a prediction of demand conditional on actual weather and a prediction of demand "as if" weather were normal[6]. Equation 5 specifies this relationship in percentage terms. Table 2 presents the summation of the estimated effect of weather for each year.

[6] Normal weather is defined as the average values of each weather variable in each month over the period of record 1950-2012.

Table 2-- Effect of Weather on IEUA Per Capita Demand (GPCD)

IEUA Water Demand (GPCD)				
	IEUA Water Demand			
Year	Effect of Weather on Water Demand (Change in GPCD)	Effect of Weather on Water Demand (Percent)	Precipitation (inches)	Max Temperature (F)
2003	-22.85	-0.75%	16.71	77.15
2004	114.88	3.58%	8.66	79.71
2005	-170.88	-5.73%	28.20	76.19
2006	-10.02	-0.32%	12.78	78.15
2007	190.90	5.70%	3.73	79.78
2008	43.61	1.40%	11.75	78.58
2009	111.29	3.70%	9.40	79.50
2010	-15.18	-0.56%	15.34	77.95
2011	-75.60	-2.89%	16.45	76.47
2012	14.05	0.52%	9.12	78.14
2013	142.80	5.05%	5.54	80.35
2014	197.84	6.97%	4.38	81.13
Long Term Average	2003-2014		11.84	78.6
Weather Station	Ontario NOAA			

Finally, these estimated effects of non-normal weather and employment different from trend are next used to estimate what per capita water demand would have been if weather had been normal and if employment had not differed from its historical trend (that is, if the recession had not occurred.) Actual demand with weather and employment effects removed will be referred to as "normalized" per capita water demand. Figure 4 below plots the mean monthly employment for San Bernardino County and reveals the sharp effects of the recent recession.

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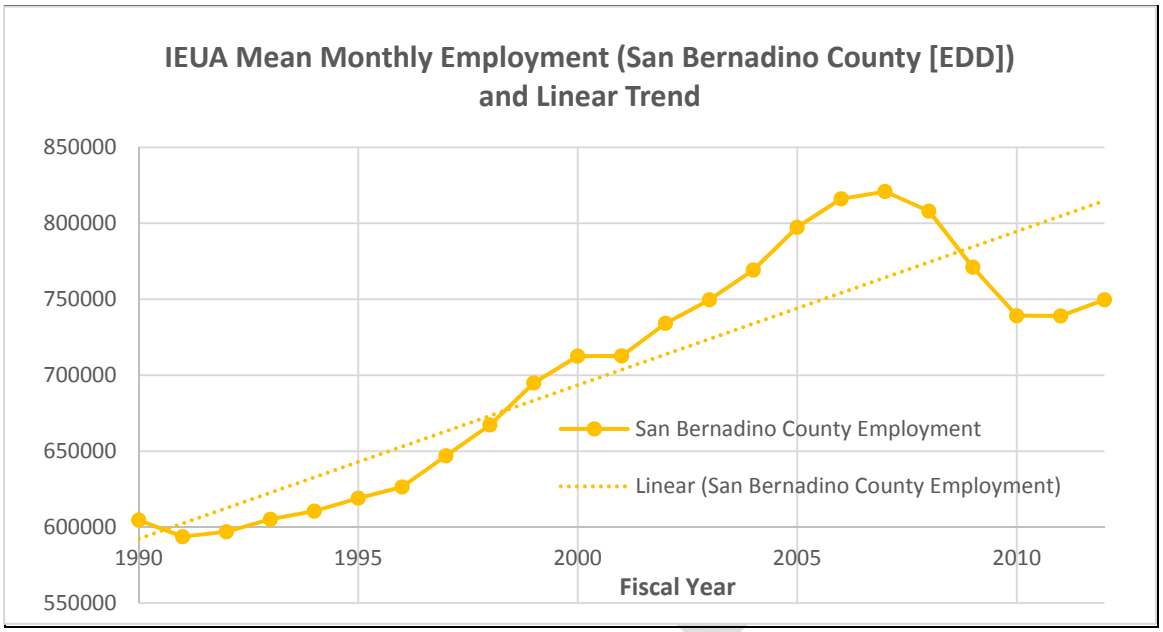


Figure 4-- IEUA Mean Monthly Employment (San Bernardino County [EDD]) and Linear Trend

Table 3 presents the derivation of normalized IEUA per capita water demand. The first column of raw demand data ("Actual Demand") is followed by demand normalized for weather. The estimated percentage effect of weather different from normal ("Effect of Weather on Water Demand (Percent)") explains how weather affected actual demand and is used to estimate the third column of retail demand ("Demand Normalized for Weather (GPCD)"). A similar estimate for the effect of employment different than trend is used to estimate the last column of retail demand ("Demand Normalized for Weather and Employment"). The assumptions implied by this "normalization" include that realized weather is exactly equal to average weather (monthly averages based on the period of record 1950-2012) and that employment continued along its long term trend (as depicted by the straight line in Figure 3).

Note that the variation of the percentage annual effect of weather and employment is summarized at the bottom of the table and is useful for risk analysis. Weather could knock per capita demand 7.3 percent either way in any year (90 percent confidence interval). The effect of the business cycle—as captured by the effect of employment swings—is very pronounced in recent years due to the Great Recession. Single year swings of 5 and a half percent occurred more than once with a very wide confidence interval required to contain 90 percent of expected annual variation due to employment variation (approximately 12.8 percent either way in any year).

The model also detects customer response in 2013 and 2014 to drought-induced calls for customers to voluntarily curtail water demand. These effects, though targeted mostly to residential customers, provide evidence of some customer response that cannot be

explained by the other forces in the model—weather variation, variation in employment, and long term trends in water demand.

Table 3-- IEUA Per Capita Use (GPCD): Actual and Normalized

	IEUA Water Demand				
Fiscal Year	Actual Demand (GPCD)	Effect of Weather on Water Demand (Percent)	Demand Normalized for Weather (GPCD)	Effect of Employment on Water Demand (Percent)	Demand Normalized for Weather and Employment (GPCD)
2003	257.77	-0.75%	259.7	4.54%	247.92
2004	267.63	3.58%	258.1	5.64%	243.51
2005	245.78	-5.73%	259.9	7.71%	239.83
2006	262.56	-0.32%	263.4	8.70%	240.47
2007	283.06	5.70%	266.9	8.11%	245.29
2008	265.58	1.40%	261.9	5.52%	247.43
2009	256.55	3.70%	247.1	0.10%	246.82
2010	228.42	-0.56%	229.7	-5.56%	242.47
2011	212.70	-2.89%	218.8	-7.04%	234.25
2012	220.83	0.52%	219.7	-7.08%	235.24
2013	231.40	5.05%	219.7	-6.06%	233.03
2014	237.75	6.97%	221.2	-5.25%	232.80
	Standard Deviation of % Effects	**+/- 3.74%**		**+/- 6.55%**	
	95% Confidence Interval	**+/- 7.3%**		**+/- 12.8%**	
Percentage Annual Trend, FY2003-2007	2.4%		0.7%		-0.3%
Percentage Annual Trend, 2007-2012	-2.7%		-3.8%		-0.8%

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Table 4 presents the same results as in Table 3, but in terms of acre feet rather than GPCD. Again, the first column of raw demand data ("Actual Demand") is followed by demand normalized for weather. The estimated percentage effect of weather different from normal ("Effect of Weather on Water Demand (Percent)") explains how weather affected actual demand and is used to estimate the third column of retail demand ("Demand Normalized for Weather (AF)"). A similar estimate for the effect of employment different than trend is used to estimate the last column of retail demand ("Demand Normalized for Weather and Employment").

Taken from "peak to trough," from 2007 to 2012, Table 4 also shows the decline in actual demand was an average of 4.3 percent per year, for a total of 19.6 percent decline over the five-year period. After normalizing for weather and employment, the decline was an average of 0.2 percent per year, or about a one percent decline over the five-year period.

The effect on the trend in per capita demand is easier to discern in Figures 4 and 5. Figure C5 plots actual and normalized demand in terms of GPCD. The near three percent annual decline (2.7 percent) in actual GPCD demand between fiscal years 2007 and 2012 is reduced in magnitude to less than one percent decline (0.8 percent) after normalizing for weather and employment. Figure 5 plots actual and normalized demand in terms of acre feet. The decline in actual demand (in acre feet per year) between fiscal years 2007 and 2012 was 4.3 percent per year on average. After normalizing for weather and employment, there was actually a slight decrease of 0.2 percent.

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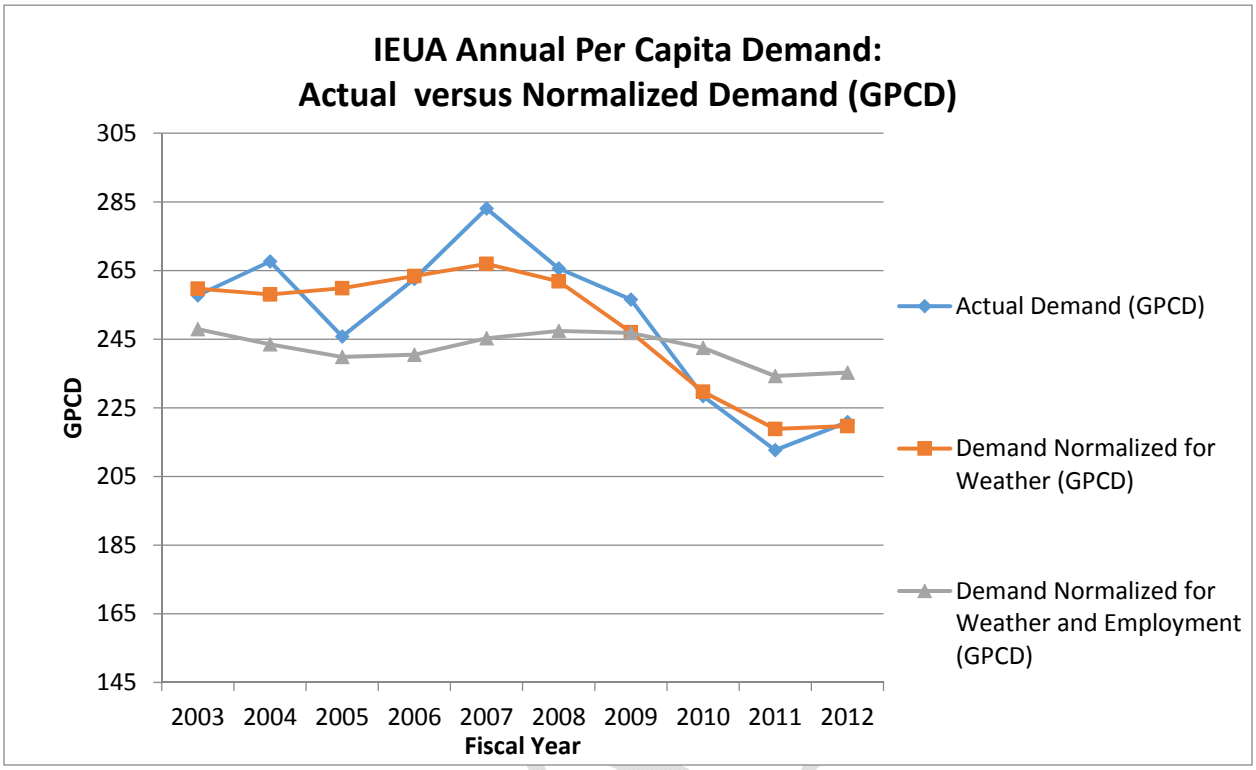


Figure 5-- IEUA Annual Per Capita Demand: Actual versus Normalized Demand (GPCD)

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Table 4-- IEUA Use (Acre Feet): Actual and Normalized

	IEUA Water Demand				
Fiscal Year	Actual Demand (AF)	Effect of Weather on Water Demand (Percent)	Demand Normalized for Weather (AF)	Effect of Employment on Water Demand (Percent)	Demand Normalized for Weather and Employment (AF)
2003	215685	-0.75%	217309.4	4.54%	207434.07
2004	230498	3.58%	222247.4	5.64%	209718.74
2005	213262	-5.73%	225476.5	7.71%	208098.51
2006	230911	-0.32%	231640.4	8.70%	211482.21
2007	255280	5.70%	240727.8	8.11%	221216.62
2008	241913	1.40%	238528.0	5.52%	225372.92
2009	233799	3.70%	225147.9	0.10%	224930.13
2010	209290	-0.56%	210457.9	-5.56%	222162.16
2011	195745	-2.89%	201392.7	-7.04%	215570.59
2012	205231	0.52%	204166.6	-7.08%	218614.07
2013	216004	5.05%	205103.5	-6.06%	217527.39
2014	223435	6.97%	207870.6	-5.25%	218784.24
	Standard Deviation of % Effects	**+/- 3.74%**		**+/- 6.55%**	
	95% Confidence Interval	**+/- 7.3%**		**+/- 12.8%**	
Percentage Annual Trend, FY2003-2007	4.3%		2.6%		1.6%
Percentage Annual Trend, 2007-2012	-4.3%		-3.2%		-0.2%

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Appendix 2:

RAND Memo "Evaluating Options for Improving Climate Resilience of the Inland Empire Utilities Agency in Southern California"

DRAFT. NOT CLEARED FOR OPEN PUBLICATION. DO NOT CIRCULATE OR QUOTE.

Project Report

Evaluating Options for Improving the Climate Resilience of the Inland Empire Utilities Agency in Southern California

Abbie H. Tingstad, David G. Groves, and James Syme (RAND Corporation)
Elizabeth Hurst and Jason Pivovaroff (Inland Empire Utilities Agency)

March 2016

Preface

The Inland Empire Utilities Agency (IEUA) and RAND worked together in 2003-2005 to demonstrate and evaluate how new approaches to decisionmaking under uncertainty could help a water utility evaluate the potential threats of climate change in their long-term planning. This work was performed outside IEUA's planning process and was documented in several RAND reports and scientific journal articles (Groves, Davis, *et al.*, 2008; Groves, Knopman, *et al.*, 2008; Groves, Lempert, *et al.*, 2008). In 2015, IEUA asked RAND to help it re-evaluate its water management system under a range of future conditions reflecting climate change and other drivers for its Integrated Resources Plan (IRP). This report documents the tools developed and analysis performed during 2015 for this effort. Questions or comments about this report should be sent to the project leaders, David Groves (groves@rand.org) and Abbie Tingstad (tingstad@rand.org).

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Abbreviations

BCSD	Bias-Corrected Statistically Downscaled
CMIP	Coupled Model Intercomparison Project
FWOA	Future Without Action
GCM	General Circulation Model
GHCND	Global Historical Climatology Network Database
IEUA	Inland Empire Utilities Agency
IRP	Integrated Resources Plan
MWD	Metropolitan Water District of Southern California
NOAA	National Oceanographic and Atmospheric Administration
PDT	Portfolio Development Tool
RDM	Robust Decision Making
SAR	Santa Ana River
SEI	Stockholm Environment Institute
UWMP	Urban Water Management Plan
WCRP	World Climate Research Programme
WEAP	Water Evaluation and Planning System
WEI	Wildermuth Environmental Inc.

Introduction

Water managers continue to face challenges related to climate non-stationarity (Milly *et al.*, 2008) in their long-term planning. Even when water supplies appear sufficient to meet present and short-term demand, uncertain future changes in temperature and precipitation make decisions about investments to ensure longer-term supply sufficiency difficult. In Southern California, the recent drought has refocused attention on water resources in this semi-arid, populous area. Although this drought appears to be consistent with long-term patterns of climate variability, its effects may be exacerbated by ongoing climate change, which is anticipated to have a strong effect on the region, including on its water supplies (e.g., with respect to the length and magnitude of droughts, timing of precipitation, and temperature-driven demand) (Diffenbaugh *et al.*, 2015; Mao *et al.*, 2015; Shukla *et al.*, 2015)

Adaptive management plans are designed to evolve over time in response to new information regarding future conditions. This type of flexible approach is becoming increasingly favored in the water management community as a mechanism for planning under uncertainty. Integrative approaches, which help facilitate adaptive plans, focus on combining a variety of management options, rather than a single type of solution.

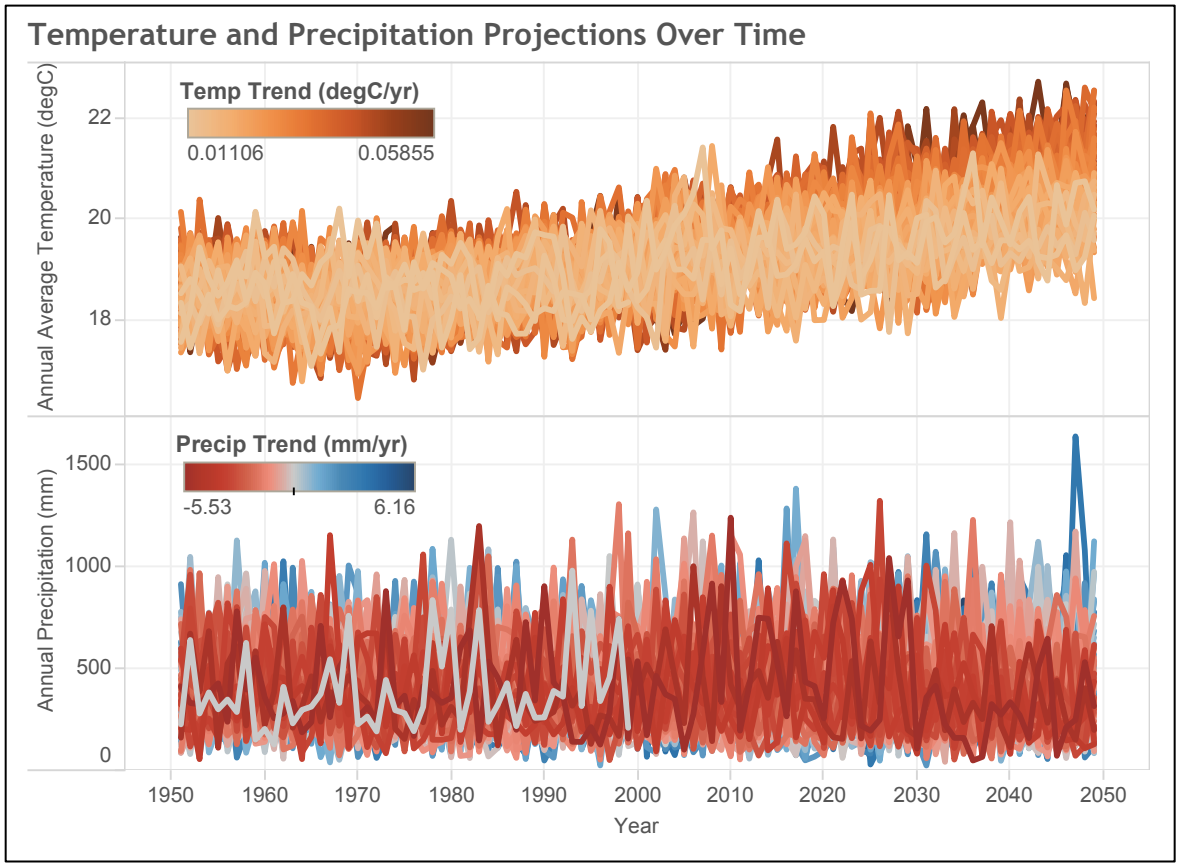
The Inland Empire Utilities Agency (IEUA), a water management agency in Southern California, recently partnered with the RAND Corporation, a multi-disciplinary, non-partisan research organization and educational institution headquartered in Santa Monica, California, to evaluate how adaptive, integrative water management options could improve IEUA's abilities to meet customer needs under a wide range of futures. This analysis was used to support the development of its Integrated Resources Plan (IRP). The purpose of the IRP is to evaluate the resiliency of water resources in the IEUA's service area over the next twenty-five years and to evaluate alternative management options for ensuring water deliveries to urban users. The IRP results will be used to recommend regional strategies and identify preferred water supply projects that, in turn, will help the IEUA and its member agencies to apply for grants and loans to implement new projects. RAND supported IEUA's IRP by developing a tool for constructing and visualizing different portfolios for water management investments and actions, and enabling an analysis of *status quo* and potential future water management activity success in meeting future urban water demand under different demand and climate change-impacted water supply conditions. This follows RAND's previous work supporting the IEUA's 2005 Urban Water Management Plan (UWMP) (Groves, Knopman, *et al.*, 2008; Groves, Lempert, *et al.*, 2008).

Current water demands in the IEUA service area are serviced by groundwater from the Chino Basin in addition to local surface supplies, recycled water, and imported water from Northern California via Metropolitan Water District of Southern California (MWD). In addition, IEUA implements water efficiency projects, such as low-flow toilet rebate programs. Depending on different estimates of future infrastructure water efficiency, this "baseline" supply (current and planned supplies from groundwater and other sources plus savings from water efficiency projects) is likely sufficient, or very nearly so, for meeting future demand assuming climatic conditions remain similar to those experienced in recent history. However, IEUA wanted to explore how shifts in stationarity assumptions through climate change, along with possible changes in demand, could impact its future water supplies and demands, and what water management projects could help meet future demand under uncertain future temperature and precipitation conditions.

A suite of global climate models suggests that temperatures over the IEUA service area will rise over the coming decades and that annual precipitation will continue to be highly variable, with no consensus on trends towards wetter or drier conditions. Figure 1 displays the annual average temperature and total precipitation estimates from 1950 to 2050 for the IEUA service area based on 106 downscaled projections of climate from a range of general circulation models (GCMs).[1] The temperature increases seen beginning around the 1980s and the uncertainty associated with local precipitation underscores the importance of carrying out an analysis of IEUA water management options to ensure that future demand can be met under a variety of different hydrologic circumstances against the backdrop of rising temperatures.

[1] Note that GCMs are not expected to simulate the precise interannual fluctuations of the historical period, because stochastic forces and sequences of events that are unresolvable by numerical models drive such historical variability. Instead, GCMs are validated based on their ability to characterize the statistical characteristics of historical climate, such as maximum and minimum temperatures or precipitation.

Figure 1: Estimates of historical and future annual average temperature and total precipitation for the IEUA service area



To support this analysis we developed (1) a simple mass balance water management model to estimate future supplies and demand across different future and (2) a decision support tool to help IEUA planners and stakeholders to compare attributes of different management options and develop portfolios for evaluation. We then performed a three-step analysis:

1. Evaluated the performance of the IEUA system under a wide range of futures to evaluate its vulnerability to climate and future demand
2. Constructed portfolios of water management projects that could help increase water management supplies in the future
3. Tested and compared how each proposed water management portfolio enhances the IEUA's ability to deliver urban water supplies in the future

In the next section we describe the methods and models used in each step. Due to the limited scope of this effort, we did not attempt to evaluate the cost-effectiveness or finer details (e.g., implementation potential at specific locations) of the different water management projects. We also did not conduct statistical analysis to determine the specific climatic conditions most

conducive to different portfolio success or failure in meeting urban water demand, nor did we consider uncertainties related to budget and/or other factors that could impact our results.

Methods

The overarching methodological framework for this project is Robust Decision Making (RDM) (Groves and Lempert, 2007; Lempert *et al.*, 2003). RDM is an approach that seeks to determine what plans reduce risk over a range of assumptions, thereby facilitating deliberation among stakeholders that may have differing values and expectations about the future (Lempert, 2013). It is a methodological process, involving iterative steps including stakeholder interactions, modeling, and statistical analysis, that facilitates interactions and aims to shape decision-maker discussions around which factors lead to plan success or failure and the identification of robust solutions – those that perform well under a range of futures—rather than a single "best" solution (Hallegatte *et al.*, 2012; Lempert *et al.*, 2006). The RDM approach runs models on tens to thousands of different sets of assumptions to describe how plans perform in a range of plausible futures. Analysts then use visualization and statistical analysis of the resulting large database of model runs to help decision-makers distinguish future conditions in which their plans will perform well from those in which they will perform poorly (Bryant and Lempert, 2010). RDM has been used in a range of contexts, to include water management, flood risk assessment, and sea level rise planning (Groves *et al.*, 2013, 2014; Herman *et al.*, 2015; Tingstad *et al.*, 2013).

Many RDM analyses are conceptually organized using a framework called "XLRM", where key uncertainties (X), policy levers or strategies (L), relationships or models (R), and metrics or outcome measures (M) are summarized in a quad chart. The principal considerations around which this project is organized are summarized in XLRM format below.

Table 1: Summary of uncertainties, projects, models, and outcome measures considered

Uncertainties (X)	Projects (L)
Climate conditions Demand	75 different projects in categories • Chino Basin projects (13) • Imported Water Direct, Imported Water Recharge (14) • Imported Water Recharge (3) • Imported Water Recharge / Recycled Water (4) • Local Surface (2) • Other Groundwater (1) • Recycled Water (16) • Stormwater (6) • Stormwater, Recharge, Imported Water Recharge, Recycled Water (4) • Water Use Efficiency (10) • Chino Basin Groundwater, Recycled Water, Imported Water (2)
Models (R)	**Performance Metrics (M)**
WEAP IEUA IEUA Portfolio Development Tool	Demand Sources of supply to meet demand Unmet demand

Water Management Mass Balance Model

RAND developed a water management model developed for the IEUA service area using a simulation platform called the Water Evaluation and Planning system (WEAP) (Yates *et al.*, 2005). The purpose of this model was to help address Step One of our analysis by creating a simulation model that could evaluate the performance of the IEUA system under a wide range of futures. In brief, WEAP enables integration of physical hydrologic processes with management of water demands and supplies using a link-and-node representation of a water management system, as constructed by a user. The WEAP model was used primarily to evaluate projected annual urban demands, sources of supply, and unmet demands.

RAND previously developed a WEAP model for the IEUA service area (Groves, Lempert, *et al.*, 2008) based on information available during the 2003-2005 time period. For the present study, RAND developed a new WEAP model based primarily on IEUA's latest spreadsheet-based information about current water supplies and demands, and annual projections of them through 2050. See Appendix 2 for more detail.

Absent available detailed analyses of how climate change could affect each element of IEUA's water supply portfolio, RAND worked with the best available data to develop some coarse approximations of how different supplies and demand would change under different assumptions and projections of climate conditions. These analyses were developed as a first step towards a more comprehensive assessment of IEUA resilience to climate change, and were vetted by IEUA water managers. For the purposes of this initial work, these coarse approximations provided sufficient insights into the potential impacts of climatic changes on supply and demand to facilitate deliberation over the usefulness of different types of water management projects.

Several "simple models" were developed to estimate the impacts of climatic changes on the following elements of the IEUA system (see Appendix 2 for details):

- *Local surface supplies, storm water, and replenishment supplies*: two regression models of historical annual local surface supplies and annual climate were used to estimate future local surface supplies based on projections of temperature and precipitation. These models were applied to estimate local surface supplies, available storm water supplies, and non-MWD replenishment supplies.
- *Groundwater safe yield*: Projections of future safe yield under different trends in climate conditions were developed by Wildermuth Environmental Inc. (WEI) and provided to IEUA and the study team. The current long-term sustainable yield of the groundwater basin was then modified for each climate projection based long-term precipitation trend perturbation factors derived from the WEI analysis.
- *Imported supplies via Metropolitan Water District*: A simple linear model of supply availability over time from Northern California via MWD was used to modify IEUA's contractually available supply from MWD. Two different climate response rates were

evaluated that effectively assumed a 17% and 34% reduction in imported available water by 2040.

- *Water demand*: Demand climate adjustment factors were developed using IEUA calculations of the sensitivity of demand to climate using MWD-MAIN. These factors were used together with the climate scenarios (annual average temperature and precipitation) to adjust the demand annually.

By imbedding these models into the WEAP model, we estimated future local surface water production, groundwater sustainable yield and replenishment, outdoor urban demand, and possible adjustments to water imports under changing climate. This WEAP model was used to both test baseline supply resiliency to climate change as well as determine expected benefits from new water management projects.

Portfolio Development Tool

With inputs from the IEUA and its member agencies, RAND created a Portfolio Development Tool (PDT) using the visualization software platform Tableau. The purpose of this activity was to support Step Two of our analysis by creating a user-friendly interface through which the IEUA and its member agencies could explore a variety of water management projects and develop portfolios that included one or more projects. The PDT enables users to review individual project attributes—both quantitative (i.e., how much water they produce) and qualitative (e.g., whether they contribute to different IEUA regional goals)—and determine how combinations of these projects together would increase future supplies, moderate demand, and meet qualitative, regional goals. IEUA and RAND used the PDT to support a series of meetings between the IEUA and member agencies and a workshop co-run with member agency representatives to create different adaptive, integrative options for increasing future water supplies. The final list of portfolios selected by the IEUA using the PDT is represented in the table below (Table 2), and the IEUA IRP includes more detailed description and rationale for these portfolios.

Table 2: Management portfolios developed using the Portfolio Development Tool

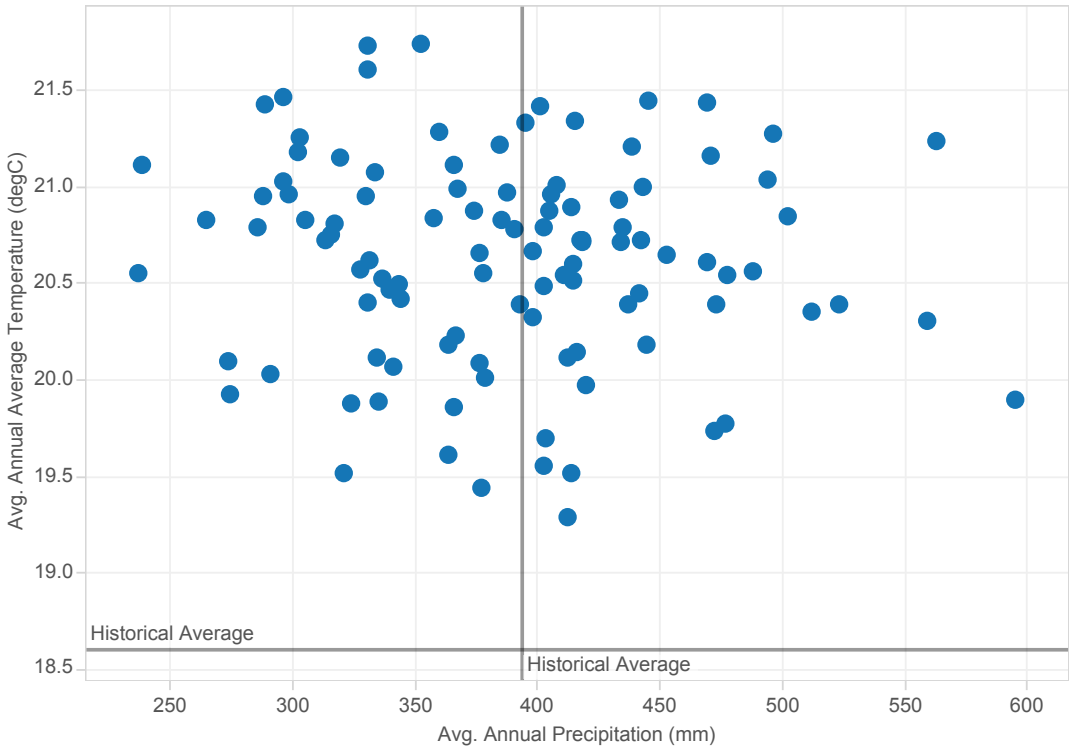
Portfolio Name	Portfolio Description
Portfolio #1	Maximize the Use of Prior Stored Groundwater
Portfolio #2A	Maximize Recycled Water (Including External Supplies) and Local Supply Projects and Implement Minimal Water Efficiency
Portfolio #2B	Portfolio 2A Plus Secure Supplemental Imported Water from MWD and Non-MWD Sources
Portfolio #3A	Maximize Recycled Water (Including External Supplies) and Implement Moderate Water Efficiency
Portfolio #3B	Portfolio 3A Plus Implement High Water Efficiency

Portfolio #4	Maximize Supplemental Water Supplies and Recycled Water Supplies
Portfolio #5A	Maximize the Purchase of Imported Water from MWD and Implement Minimal-Moderate Level of Water Efficiency
Portfolio #5B	Portfolio 5A Plus Maximize Recycled Water

Climate and Demand Futures

The WEAP model was then used to "stress test" the resiliency of the IEUA service area's baseline water supplies, and baseline supplies plus the different future water management project portfolios, under different conditions of climate change and demand. This is Step Three of our analysis. The study considered the 106 projections of future climate displayed in Figure 1. These were downloaded from an archive of downscaled global climate model simulations, described in Appendix 2. These 106 projections of future climate were integral to our ability to stress test the IEUA water management system in its ability to meet future demand. Each projection represents a plausible climate future in our analysis. Although we cannot know with certainty what type of climatic change the future holds, having a diverse set of projections enables development of management alternatives that could be robust in adapting to a range of different conditions. Figure 2 plots the average annual temperature and precipitation from 2040-2049 for this set of climate projections.

Figure 2: Average annual temperature and precipitation over the Inland Empire Utilities Agency service area from 106 climate projections (2040-2049)



All the climate projections show higher average annual temperatures from 2040 – 2049 than the historical average (1951-1999). This is consistent with observed and projected changes around the world (IPCC, 2014). About half of the climate projections show higher precipitation and half show lower precipitation. Specifically, annual average precipitation varies between 237 mm/year to 595 mm/year, or between 60% and 151% of the historical record. This uncertainty in precipitation trends reflects the difficulty in modeling the complex atmospheric and oceanic processes that govern precipitation patterns in the Southwest United States and the stochasticity of these processes (Peterson *et al.*, 2013). Although these projections do not indicate whether the climate will get drier or wetter in the coming decades in the IEUA service area, they do provide a useful test bed of plausible climate conditions for which to stress test water management plans. Dry conditions can challenge the ability of the system to meet user demand whereas wet conditions can render additional supply investments unnecessary expenditures.

Scientists have confidence that the projections in Figure 2 are suggestive of future climate conditions that are impacted by higher greenhouse gas concentrations in the atmosphere. One reason is that these climate models, when evaluated for historical periods of time (e.g. 1950-2000), estimate past variability that is similar to the observed historical values. To illustrate this, Figure 3 shows the historical, observed annual average temperature and annual total precipitation from 1951 – 1999 for the IEUA service area (blue line on the left), along side the maximum and

minimum projected annual average temperature from the 106 climate scenarios for the same time period (box charts on the right). The models, when "backcasting" the same historical time period, estimate a range of maximum and minimum temperatures that are inclusive of the historical observed maximum and minimum temperature. Figure 4 shows the same comparison for annual total precipitation. Once again, the future and historical maxima and minima appear to have some overlap.

Figure 3: Observed historical annual temperature record for the IEUA service area from 1951 – 1999 (left) compared to the distribution of predicted maximum and minimum temperatures across the 106 climate scenarios for the same historical time period (right)

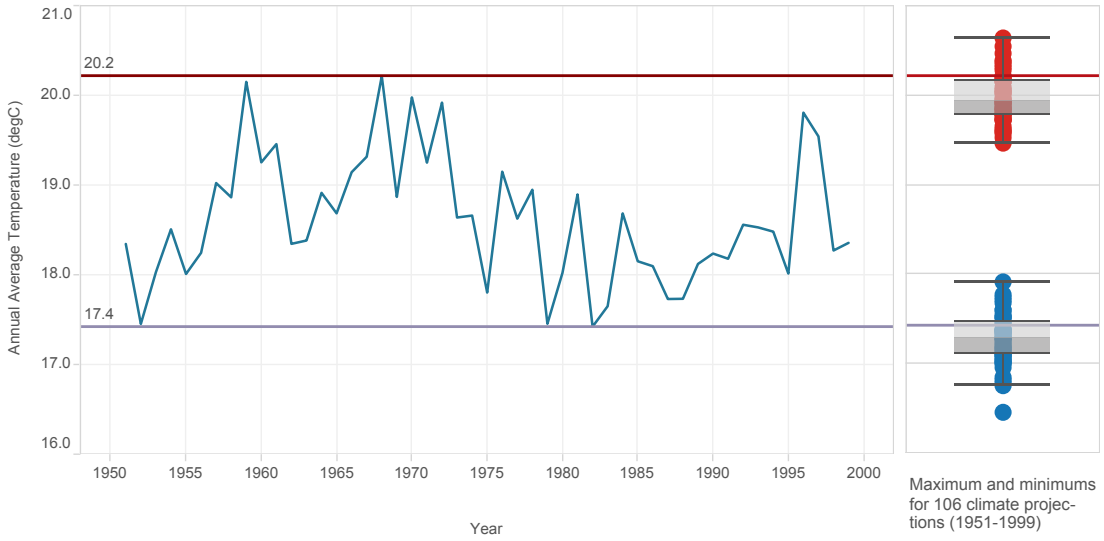
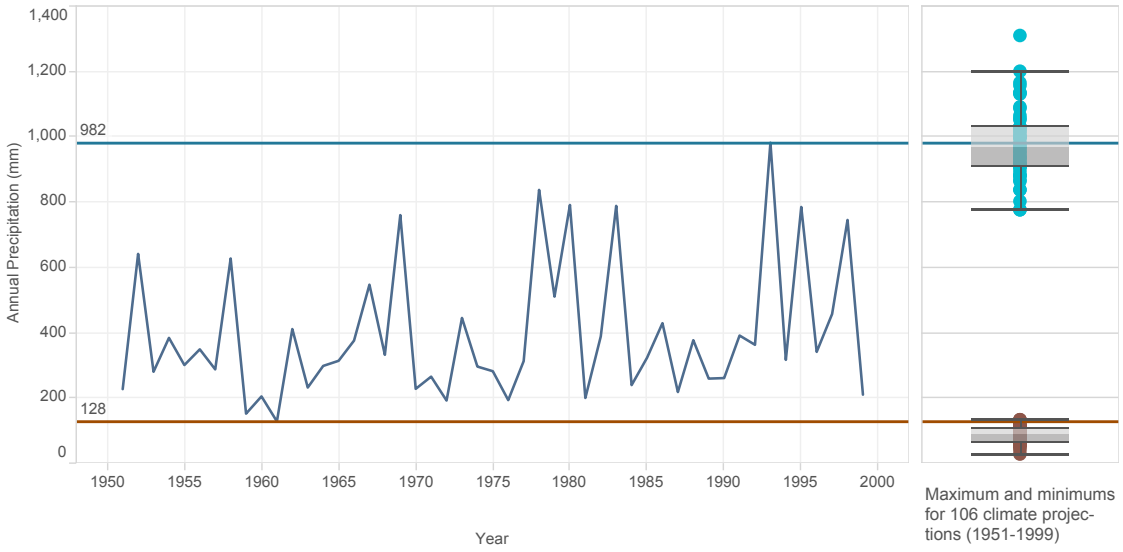
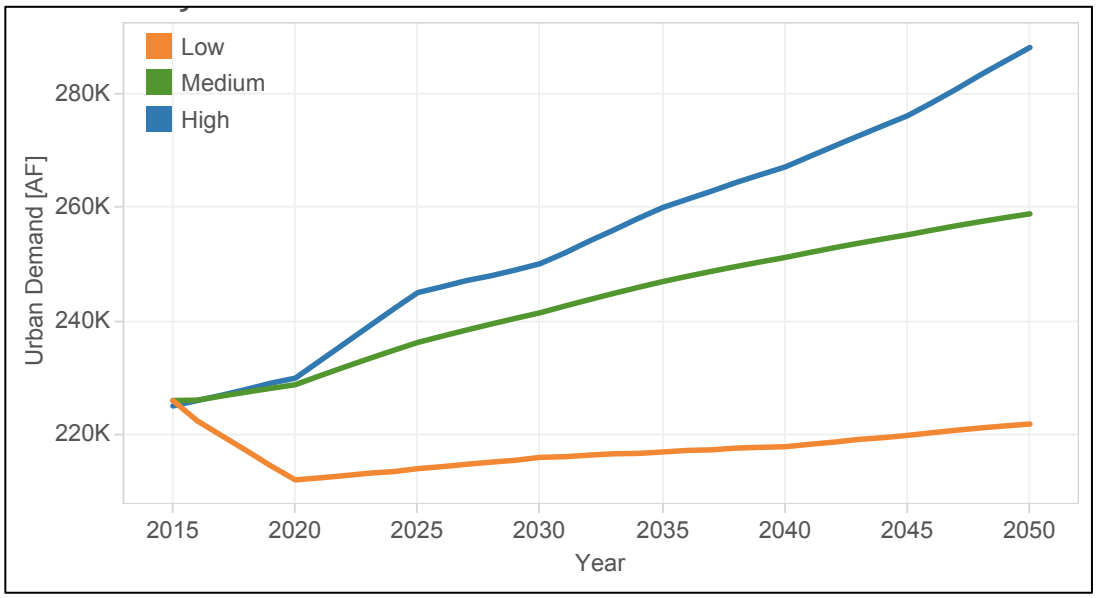


Figure 4: Observed historical annual total precipitation record for the IEUA service area from 1951 – 1999 (left) compared to the distribution of predicted maximum and minimum precipitation across the 106 climate scenarios for the same historical time period (right)



In addition to future climate, this work also examined impact of future demand. IEUA supplied two projections of future demand—a low and high demand estimate. A middle projection was then estimated within the water management model by specifying indoor and outdoor water use rates that were between those used for the high and low demand estimate. Figure 5 shows these three demand scenarios under conditions of no climate change. It also shows unmet demand under historical climate conditions.

Figure 5: IEUA demand scenarios under no climate change



Simulating future conditions

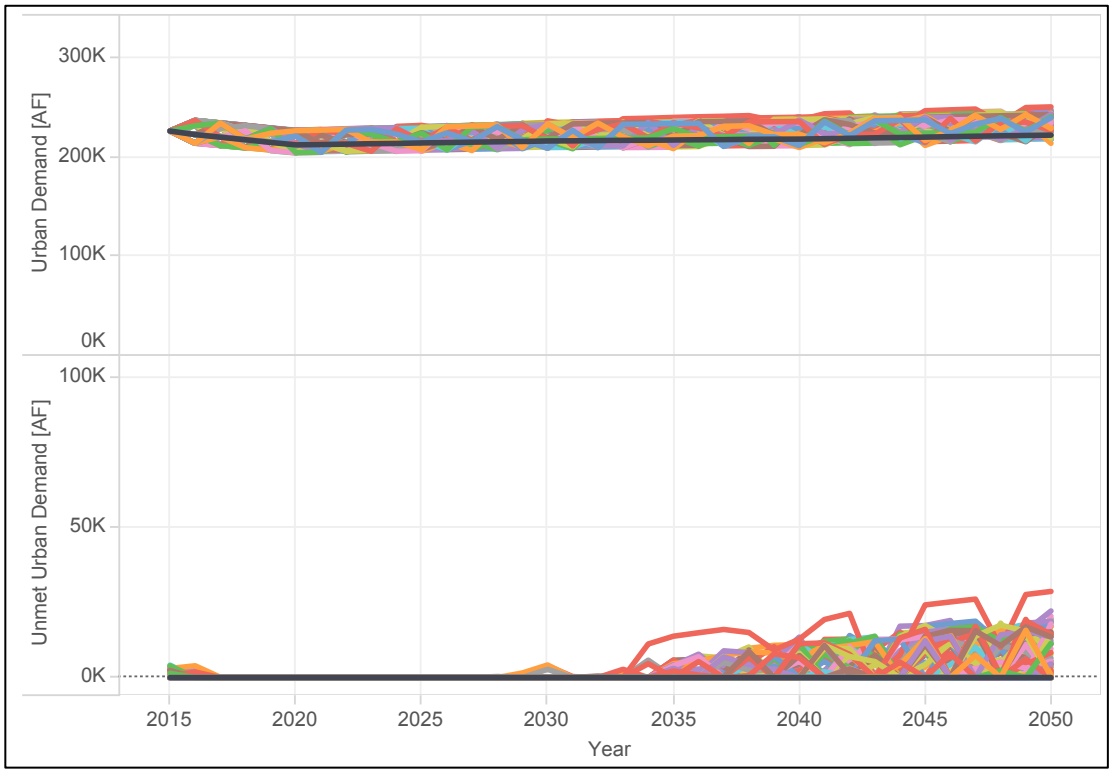
The study team used the WEAP IEUA model to stress test the IEUA's baseline supplies and proposed supply augmentation portfolios, and evaluated urban demand, supplies, and unmet demand from 2015 to 2050 for each of the 106 climate change projections as well as a projection that repeated historical climate conditions. Impacts of these 107 climate futures on IEUA's baseline supplies and proposed portfolios to augment supplies were examined in the context of the three future demand scenarios, as well as assumptions about the strength of climate change on imports, and the sensitivity of local supplies to temperature. In sum, IEUA's baseline supplies and each augmentation portfolio were tested against 1,284 futures (107 climate projections x 3 demand scenarios x 2 regressions to estimate climate impacts on local supplies x 2 levels of climate impact on water imports). The necessary computing capacity was obtained via Amazon Web Service, which enabled the WEAP model to be run hundreds of times simultaneously.

Results

IEUA baseline supplies may be insufficient to meet future demand

We found that, under the low demand scenario, supplies were sufficient under historical climate and mostly sufficient through mid-century with climate change (Figure 6). After 2035, some shortages begin to appear. The figure below shows results that assume the strongest effect of climate on imports, and that temperature changes affect local supplies. See Appendix 2 for more detail.

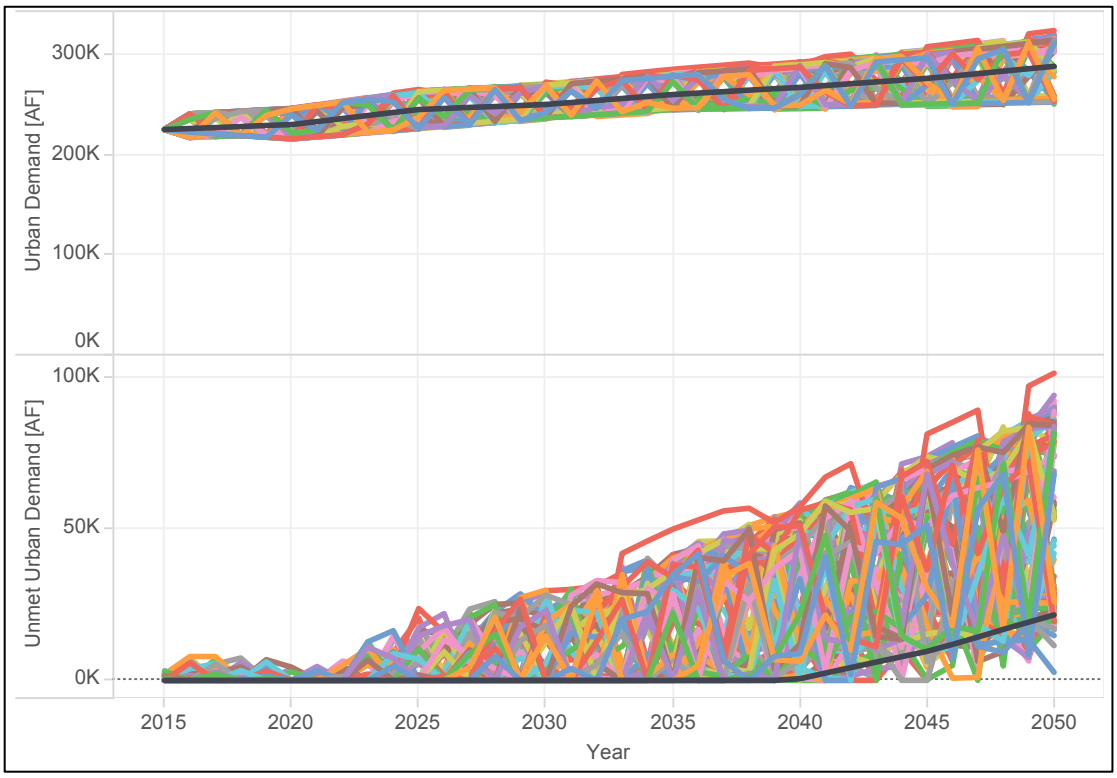
Figure 6: Unmet demand for IEUA service area by climate change scenario over time (low demand scenario)



Note: Colored lines correspond to the individual 106 climate scenarios. The black lines correspond to the historical climate scenario.

However, supplies do not appear sufficient to meet demand in the medium (not shown) and high demand scenarios as early as 2016, with the level of unmet demand ramping up significantly after 2020. Under the high demand scenario, unmet demand is nonzero even under historical climate conditions (Figure 7).

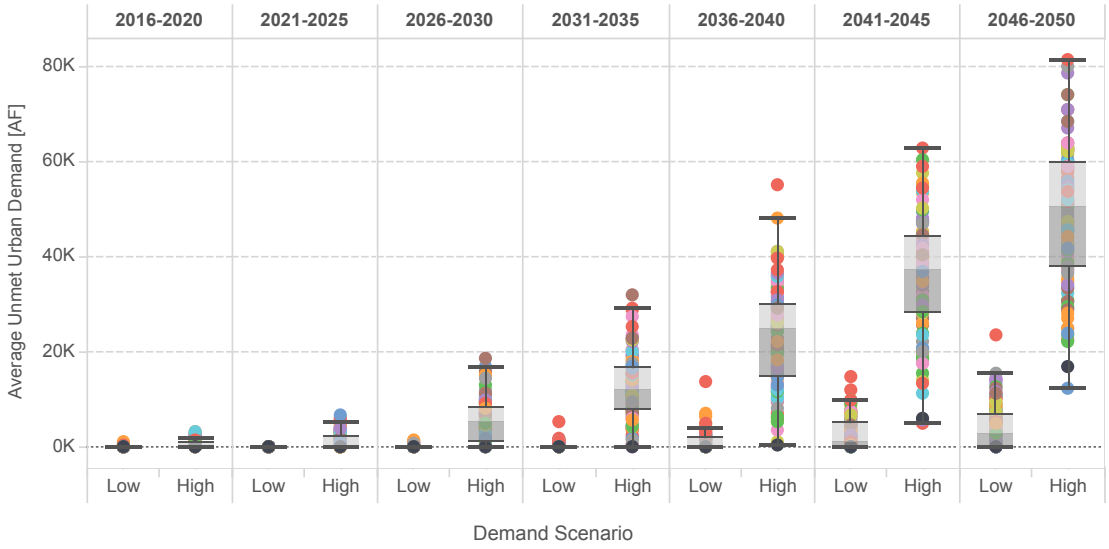
Figure 7: Unmet demand for IEUA service area by climate change scenario over time (high demand scenario)



Note: Colored lines correspond to the individual 106 climate scenarios. The black lines correspond to the historical climate scenario.

Figure 8 summarizes the results shown above by 5-year period. For the 2036-2040 period, which essentially reflects the end of IEUA's IRP timeframe, there is virtually no unmet demand for half of the 106 climate projections under the low demand scenario. In contrast, under the high demand scenario, the median result for unmet demand is about 25 TAF/year, and there is unmet demand in most of the future climates considered. Note that the IEUA IRP reports the 75th percentile unmet demand results as a characterization of the majority of plausible futures. The 75th percentile results are seen in the figure as the top of the shaded boxes.

Figure 8: Summaries of unmet demand across climate scenarios by demand scenario and 5-year period

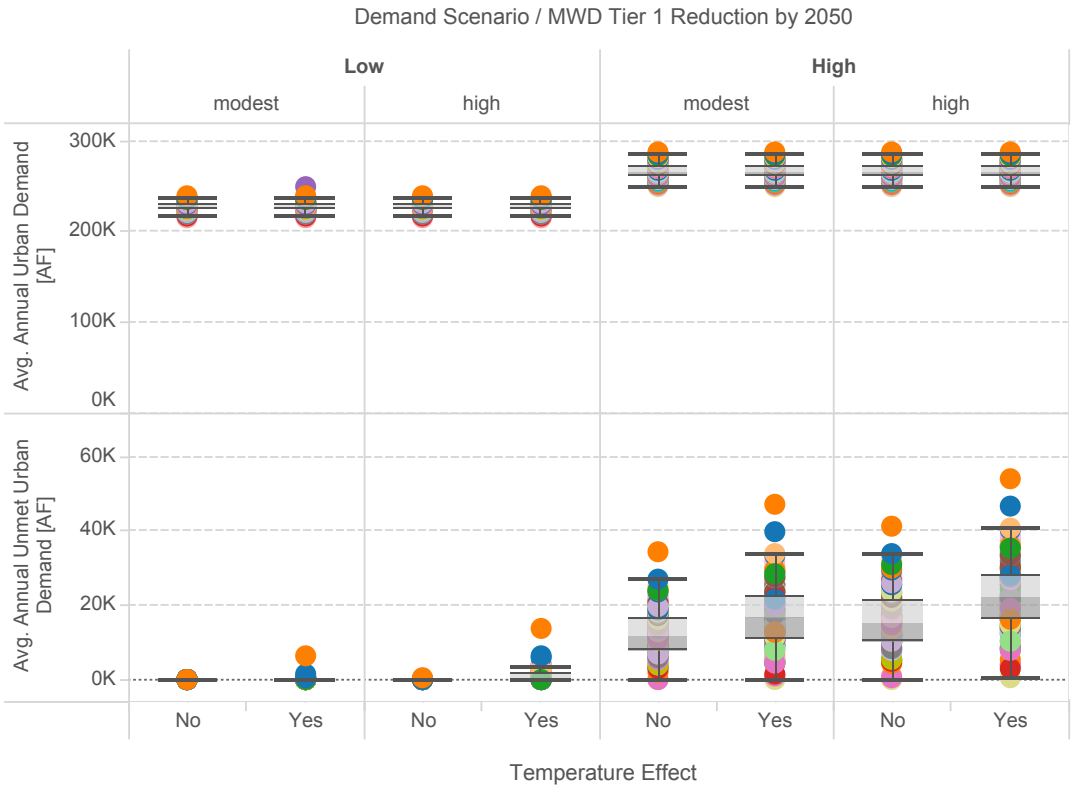


Note: Colored dots correspond to the individual 106 climate scenarios. The black dots correspond to the historical climate scenario. The boxes show the 25th, median, and 75th quartile results, with the vertical stems indicates 1.5 times the 25th-75th quartile range.

RAND also investigated how the results vary with different assumptions about how much MWD supplies might decline over time in response to climate change, and whether or not local supplies, stormwater, and non-MWD replenishment supplies will fluctuate due to temperature in addition to precipitation (see Appendix 2 for more detail). Figure 9 compares the range of unmet demands for the 2036-2040 period under different assumptions about temperature effects on local supplies and climate change on MWD supplies. For the low demand scenario, the assumptions appear to have little effect on the unmet demand results across the climate scenarios. For the high demand scenario, however, there are some modest changes. The effect of going from modest to high climate impact on MWD supplies is about equal to the effect of including the temperature impacts on local, stormwater, and replenishment water supplies. For both types of uncertainties, however, the effects on the results are modest, and are much smaller in scale than differences in results between demand scenarios.

For the IRP, IEUA selected the assumptions that (1) climate change would have a high impact on MWD supplies and that (2) there would be temperature effects on local, stormwater, and replenishment supplies in order to be able to plan for more stressing future situations. These assumptions were made to ensure that IEUA has sufficient resources and necessary infrastructure under a wide range of plausible futures.

Figure 9: Average urban demand and unmet demand (2036-2040) across climate scenarios (boxes), demand scenarios (Low, Wide), climate effects on MWD supplies (modest, high), and temperature effects on local, stormwater, and replenishment supplies (No, Yes)



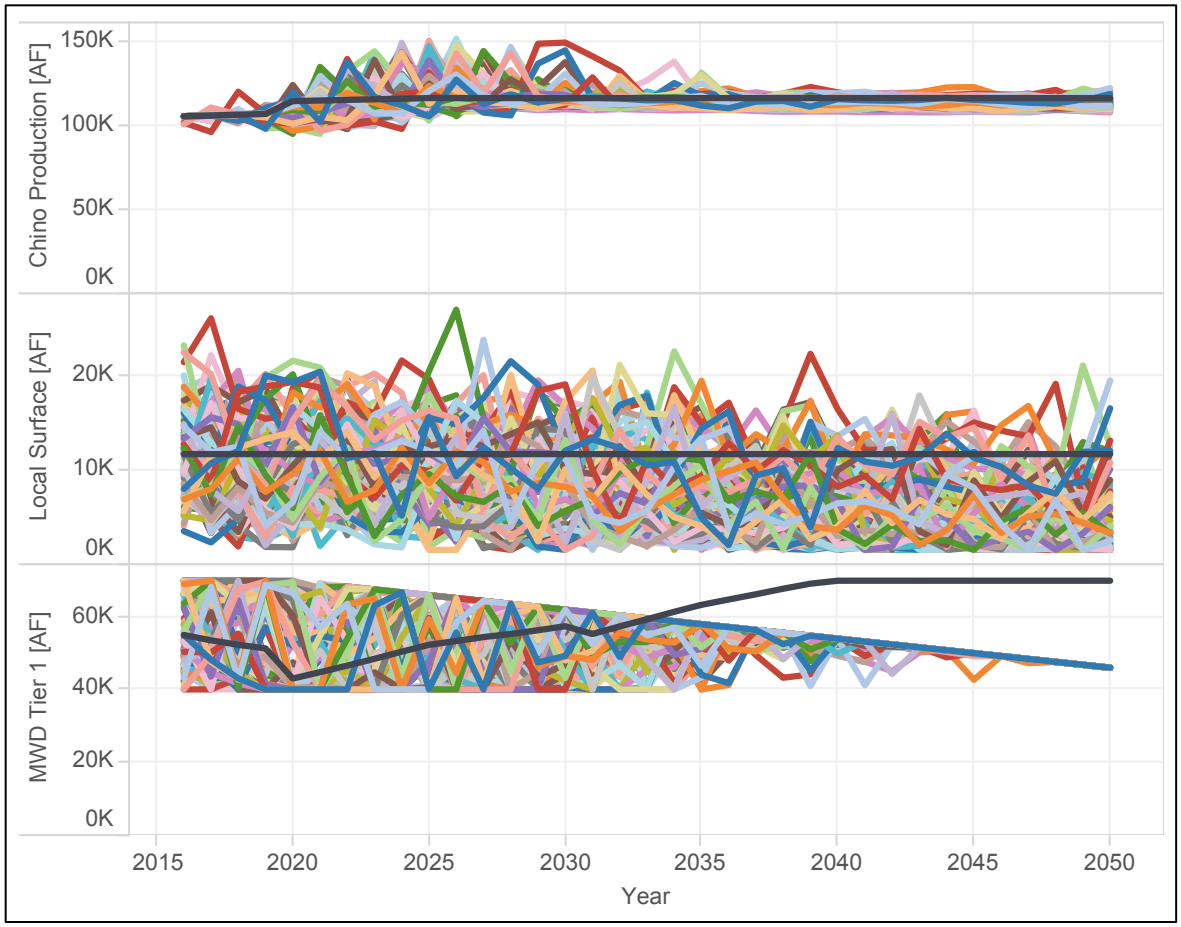
Note: Colored dots correspond to the individual 106 climate scenarios. The black dots correspond to the historical climate scenario. The boxes show the 25th, median, and 75th quartile results, with the vertical stems indicates 1.5 times the 25th-75th quartile range.

Figure 10 shows the major climate-dependent supplies used to meet demand over time for the 107 climate scenarios. The top panel shows these results for Chino Basin groundwater. The figure shows that during the next 15 years, when supplies generally exceed demand, there is a range of groundwater supply use, depending on the demand and availability of cheaper local surface supplies. The increased use during some years reflects deferred use of these supplies during wet years. Around 2030, increasing demand, coupled with declining surface supplies, groundwater supply becomes more stable at the maximum amount available. The slight range of use across the climate scenarios in the out years reflects the different climate effects on safe yield—which is small.

Local supply, some types of which are relatively low-cost (notably excluding recycled and desalted water), fluctuates due to its availability. Figure 10 shows significant variability as well as a tendency for declining amounts of supply, as compared to the typical IEUA assumption of stable supplies based on historical yields (the solid black line). These results reflect the projected warming conditions for all climate scenarios and variability in projected precipitation.

Lastly, the bottom panel of Figure 10 shows use of MWD Tier 1 water over time across the 107 climate scenarios. Future use under assumptions of historical climate declines initially as other supplies are developed. After 2020, however, IEUA increasingly relies on the assumed available MWD Tier 1 supply to meet growing demands. By 2040, all cheaper supplies are completely utilized and MWD Tier 1 supply is used at its maximum level. Note that 2040 is the year in which shortages are also shown to begin (see Figure 7). There is significant interannual variability in the use of MWD Tier 1 supplies across the futures, in response to variable demands and other supplies. In many years, Tier 1 use reaches the maximum available amount. Per the assumptions about climate's impact on available MWD supplies, the maximum amount available begins to decline in 2020. In those years and scenarios in which the MWD Tier 1 use is at this declining maximum level, there is also unmet demand as seen in Figure 7.

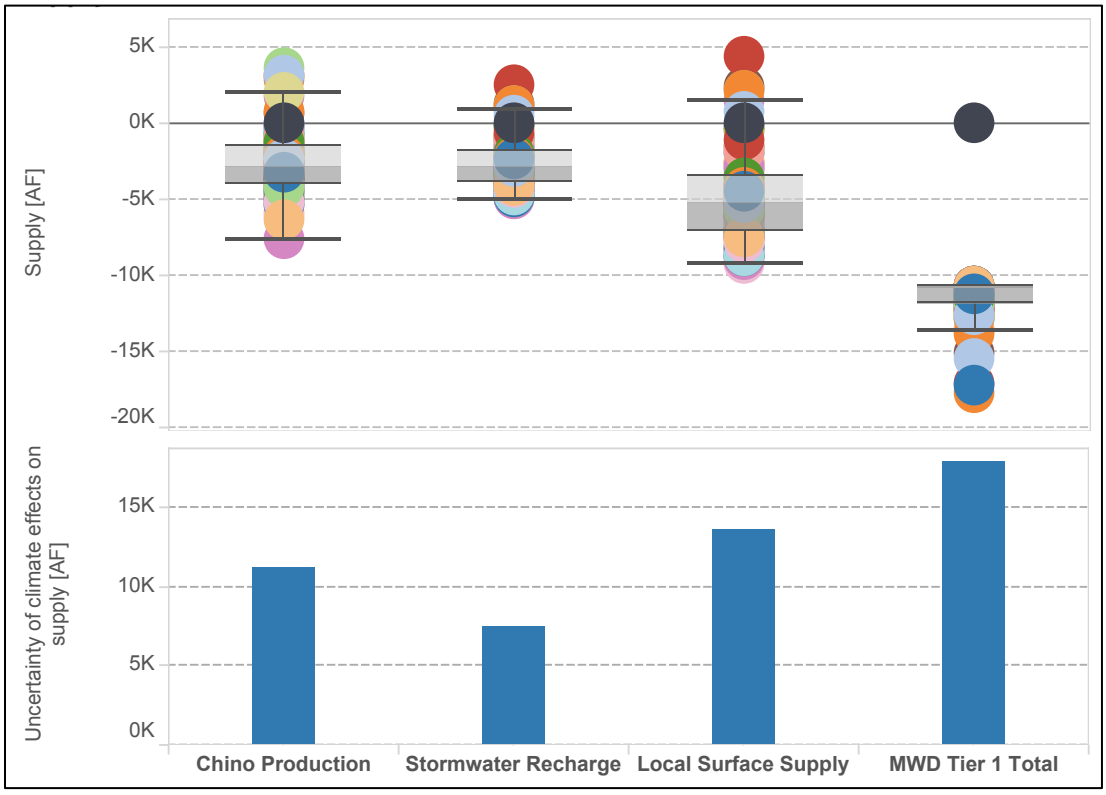
Figure 10: Baseline supply ability to meet IEUA service area in the high demand scenario by climate projection



While there is uncertainty over how climate change might affect IEUA's supplies, the climate scenarios used, combined with assumptions made in this analysis, show a tendency for supply reductions. The top panel of Figure 11 shows that for most scenarios, supplies are lower than they would be under historical climate conditions. The largest potential impact on supply is on MWD imported supply—with all climate scenarios showing a decline in accordance with the assumption that MWD supplies could experience a gradual decline in response to climate change. The second most impacted supply is on local surface supply, with a median decline of about 5 TAF/year. The overall effect on groundwater production is small, consistent with the assumptions about climate's effect on safe yield.

The bottom panel of Figure 11 shows the range in use of future supplies across the climate scenarios. For the resources that are utilized fully due to their lower cost, such as Chino groundwater and local surface supplies, the variability reflects the range of climate impacts on these supplies. For these, the larger range of uncertainty is seen in the local supplies. The range in uses of MWD Tier 1, however, reflects the range of availability of the less expensive supplies—not any assumptions of climate effects on MWD supplies. As described above, the only climate effect on MWD Tier 1 availability is specified through a steady decline in supply availability.

Figure 11: Impacts of climate on IEUA supplies across climate futures (colored dots) (2036-2040) (top) and uncertainty in the magnitude of climate impacts uncertainty (bottom)



Note: Colored dots correspond to the individual 106 climate scenarios. The black dots correspond to the historical climate scenario. The boxes show the 25th, median, and 75th quartile results, with the vertical stems indicates 1.5 times the 25th-75th quartile range. The blue bars indicate the range of supply outcomes across the climate scenarios (excluding the historical simulation shown by the black dot).

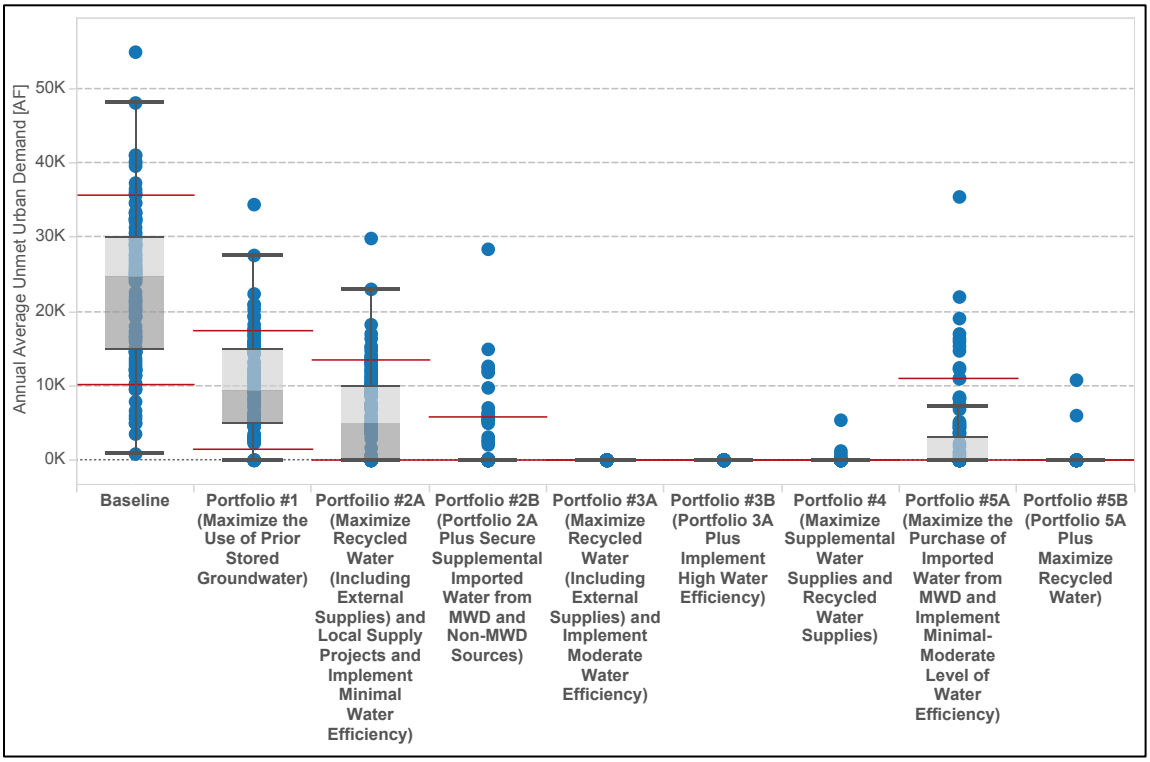
Management strategies that focus on efficiency and maximizing use of recycled and imported water help close future gaps between supply and demand

Through interactions with member agencies and other stakeholders, the IEUA developed the seven portfolios discussed above in Table 2, consisting of different water management actions aimed at closing the future gap between supply and demand, and meeting other qualitative regional goals.

Using the WEAP model and the same climate projections used to "stress test" the IEUA baseline water supplies, we evaluated how well each of the seven strategies would meet demand in the future. Figure 12 summarizes the performance of the baseline strategy and the seven portfolios in terms on unmet demand from 2036-2040. All portfolios lead to an improvement in

unmet demand over the baseline supply. Portfolio 1, which uses previously stored groundwater, reduces unmet demand by more than half for the median climate scenario. Portfolio #2A, which increases use of recycled water and external supplies as well as implements additional efficiency, eliminates unmet demand for more than 25% of scenarios and reduces the median unmet demand to below 10 TAF. Portfolio #2B improves upon portfolio #2A by adding additional imports—all but eliminating unmet demand. Portfolio #5A combines moderate efficiency with increased imports to eliminate unmet demand in more than half of the scenarios. Lastly, four portfolios—#3A, #3B, #4, and #5B—eliminate unmet demand in at least 90% of the scenarios. The first two do so by significantly increasing efficiency—effectively ensuring that demand follow the low growth demand trajectory. The other two (#3B and #5B) improve performance by maximizing recycled water use while also increasing imported water supplies.

Figure 12: Average unmet demand (2036-2040) across climates projections for high demand projection and different IEUA portfolios



Conclusion

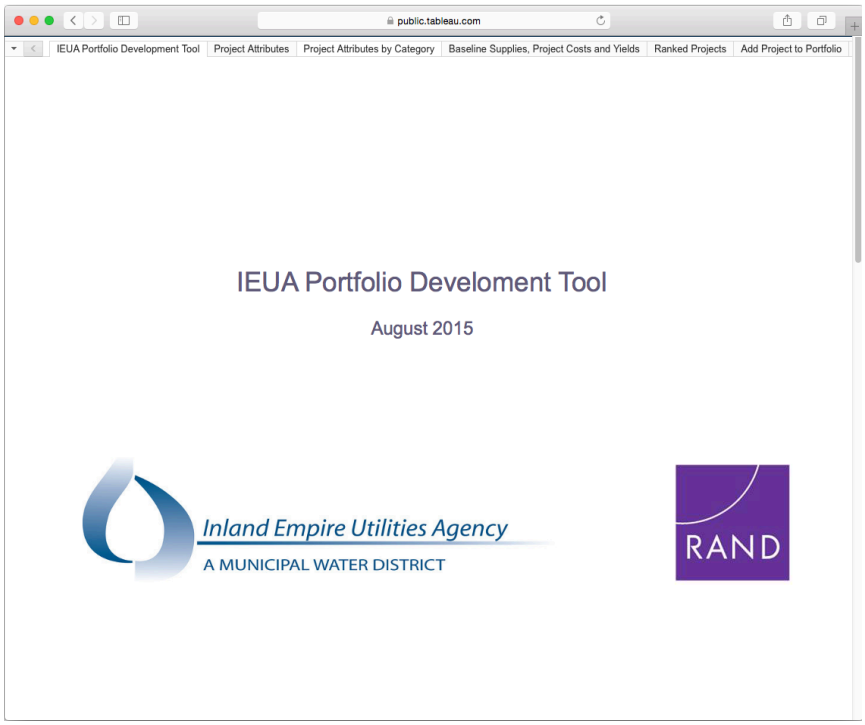
This is one of a growing number of water planning examples that highlights the benefits of examining the impacts of different climate change futures on meeting consumer demand. Here, assumptions about demand growth and climate future both had substantial impacts on ability to meet demand, and level of climate change impact on imported water as well as temperature impacts on local supplies also had some effect, especially in the most stressing demand future. Using these results, RAND and IEUA were able to identify types of management strategies focused on efficiency and maximizing available supplies that helped close the modeled future gaps between supply and demand. This work also demonstrates the value of visualization tools and water management simulations that can help facilitate discussion of alternatives for managing water resources in a very uncertain future.

For IEUA, participating in this process was not academic. As reported by IEUA management, it was a "game changer". This is because the analytic process described herein enabled understanding of how powerful water use efficiency and local supplies are in reducing the risk of future supply shortfalls in IEUA's service area, and also provided reassurance that their region is prepared for a future with uncertain shifts in climate. By engaging in this process, IEUA has not only identified how and when changes in temperature and precipitation could impact its water supplies, but also how demand influences the delicate balance between supply and demand. Both the timing of surges in unmet demand and the types of management actions that could help mitigate anticipated gaps in supply are helping to inform the construction of the IRP in a way that encourages adaptation and the use of integrative plans. Future work could investigate more specifically which assumptions related to future climate, demand, and supply lead to the greatest challenges in unmet demand, which could further help IEUA refine management practices and future plans.

Appendix 1 – Portfolio Development Tool

This appendix describes the IEUA Portfolio Development Tool (PDT) developed by RAND (Figure 13), with input from IEUA on its function, design, and input data. The PDT is a decision support tool designed to help IEUA and its member agencies assemble different portfolios of water management options that could help ensure the IEUA meets future water demands. IEUA used the PDT to develop a set of portfolios that were then evaluated across different climate and demand scenarios using a water management model described in Appendix 2. Although the information within and specific design of the PDT are specific to IEUA's needs, the visualization platform and methodological process could be used in the context of any water agency with similar needs for long-range planning under uncertain future conditions.

Figure 13: Title screen for the Portfolio Development Tool



The PDT was developed using Tableau—a business analytics and visualization software package. All the data used to develop the PDT were provided to RAND by IEUA, and the PDT was deployed via the Internet for IEUA and stakeholders. In the series of figures below, we walk through each of the PDT's visualizations. Once again, the design and data shown here are

specific to IEUA, but this type of tool could be configured to support decision-making within numerous types of organizations.

Overview of the Portfolio Development Tool

The PDT's main function is to help the user develop a portfolio of management options that meets specified near-term and long-term water supply and demand targets. To do this, the user first specifies the projects that he or she wishes to consider. Next, the user specifies the near-term and long-term targets. The PDT then identifies the projects that would best achieve the targets from the set of eligible projects using a cost effectiveness criterion. In this context cost effectiveness is expressed in terms of levelized cost—or average cost per unit of new supply or demand reduction. Lastly, the PDT summarizes the included projects, their overall attributes, their cumulative yields, and their cumulative costs.

Portfolio Development Tool Visualizations

Figure 14 shows one visualization used to concisely display qualitative information about the attributes of different water management projects. Here, each row pertains to a different project, organized by type, with each column indicating one of 16 qualitative attributes related to IEUA's future goals (e.g., increasing water levels in critical groundwater management zones, increasing stormwater capture and associated groundwater recharge). Filled circles indicate that projects help meet certain goals, half circles indicate that a projects have no impact on goals, and open circles indicate that projects detract from efforts to meet goals. This visualization provided a reference for IEUA and member agencies used this tab to contrast how well different types of and individual projects helped meet goals.

Figure 14: Summary of how a sample of IEUA potential projects would help meet qualitative goals

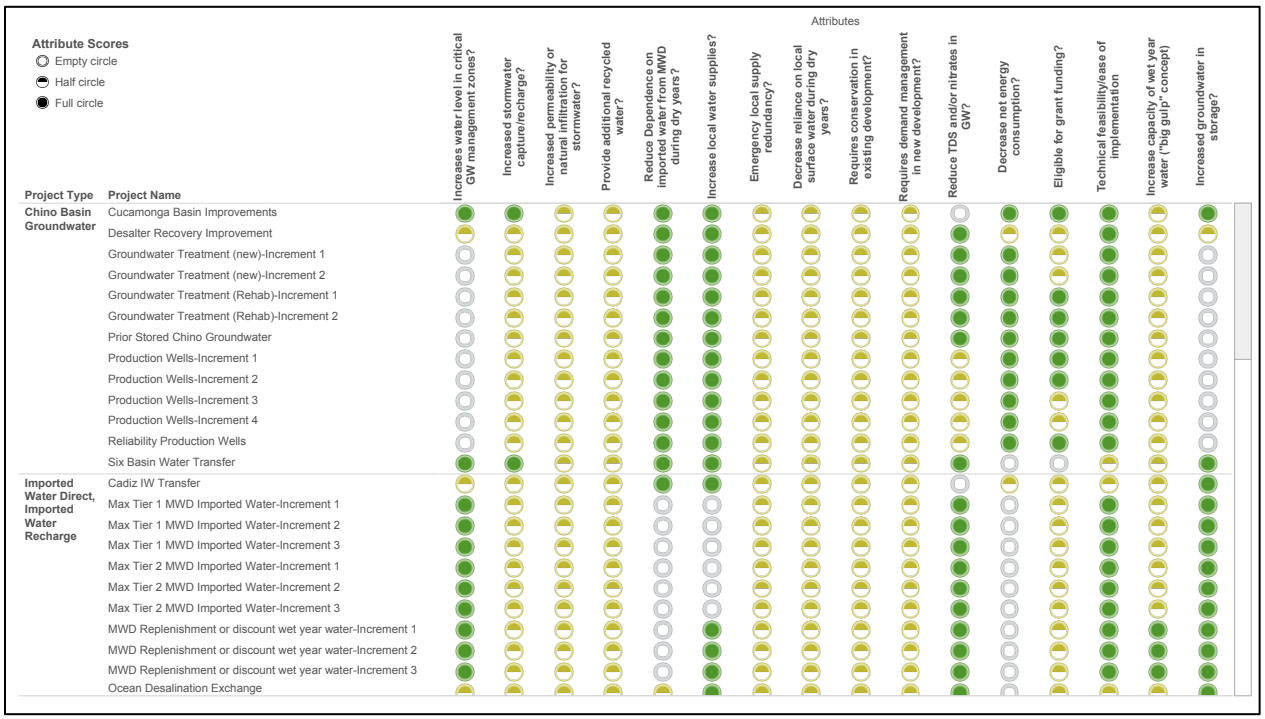
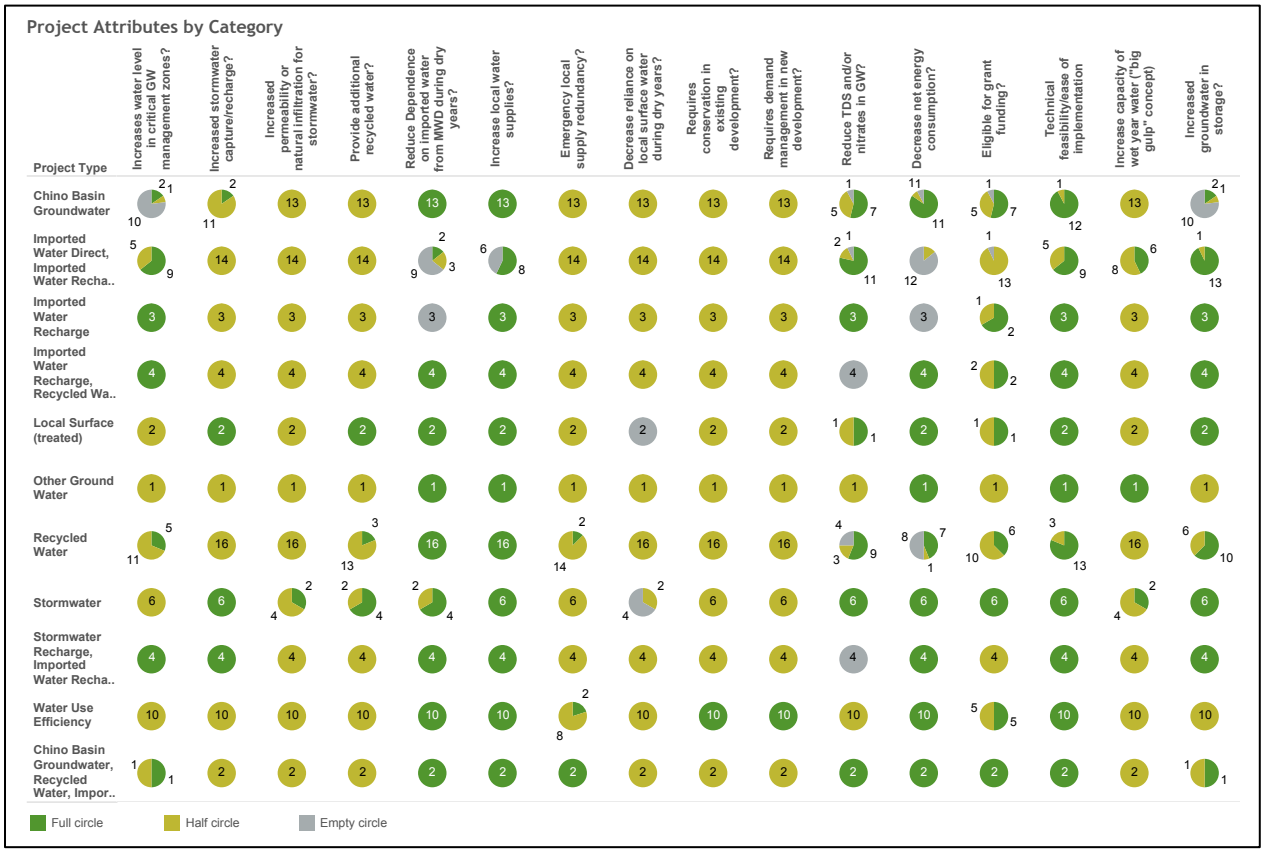


Figure 15 displays the same IEUA qualitative goals as in the previous screenshot (above), but summarizes their values within the different project categories. This shows, for example, how many projects within the more general category of "Chino Basin Groundwater" add to, detract from, or have neutral effects on different goals. This assists decision makers in identifying which categories have the most projects that might contribute to the achievement of particular goals.

Figure 15: Summary of how well projects in different categories meet various IEUA qualitative goals



IEUA has considerable supplies to meet current and future needs already. These are highlighted in the top panel of Figure 16, and include groundwater, recycled water, imported water, conservation measures, and other sources. The color bars indicate when these sources come online, and most are already available. (Note that those that come online in the future are already planned for implementation and are thus not considered in the portfolio options directly.) IEUA and member agencies requested this view of the baseline supplies because it serves as a useful perspective upon which to layer projects to bring additional future supplies. Below the baseline supply panel are the different potential projects, sorted by general categories, and with information about cost and amount of supply each is estimated to provide. Note that not all projects are visible in this screen shot.

Figure 16: Summary of baseline supplies, estimated new project supply amounts, and new project costs

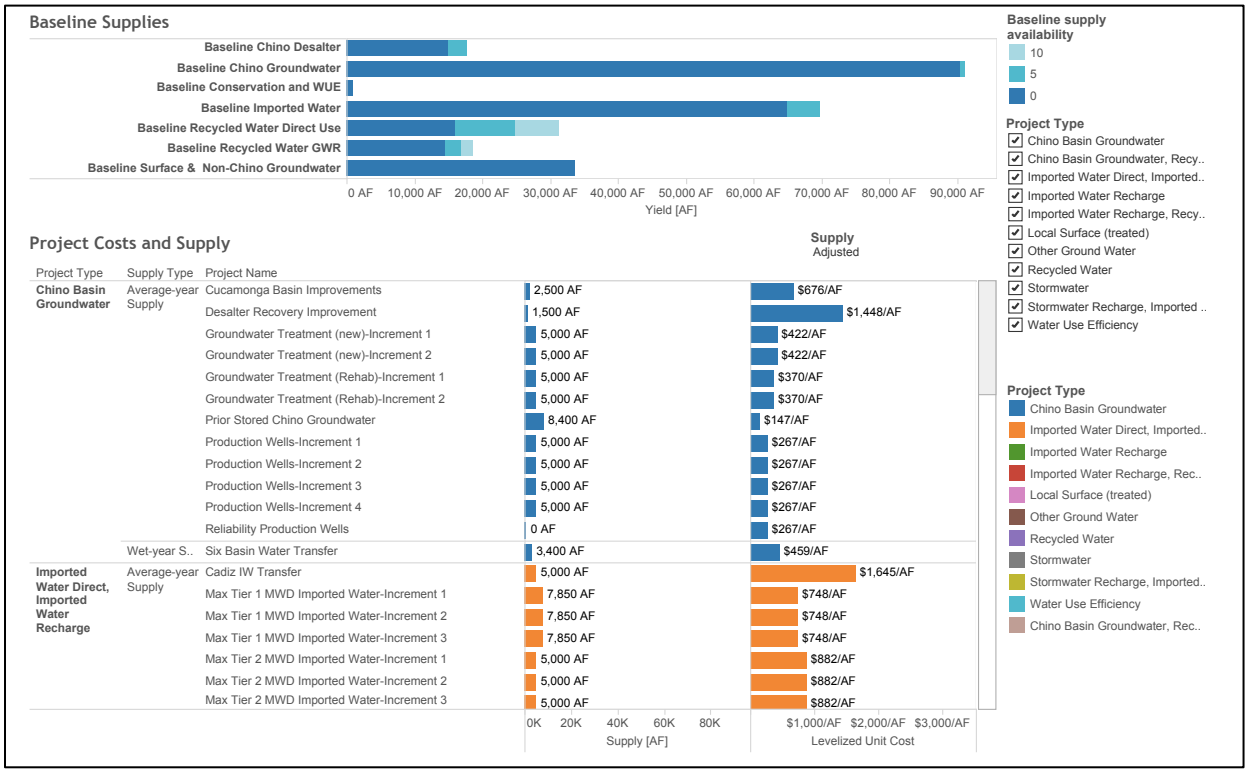
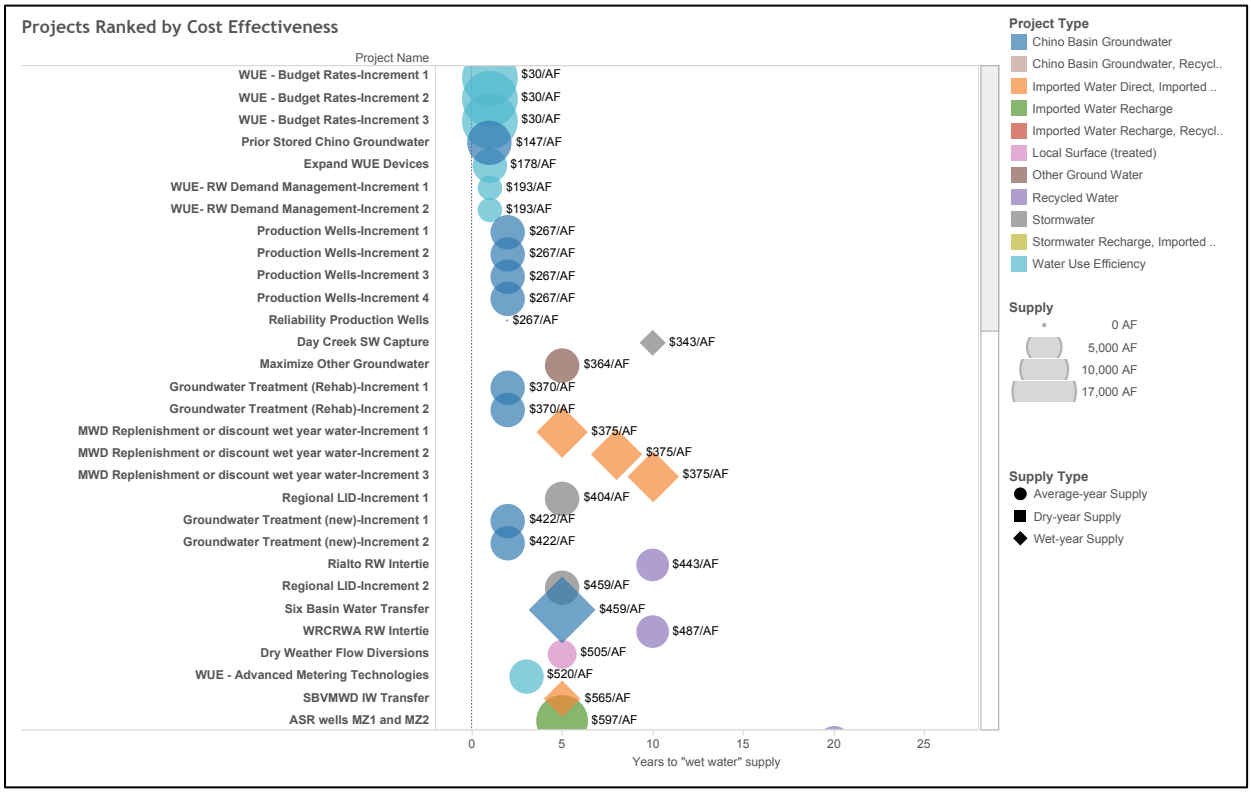


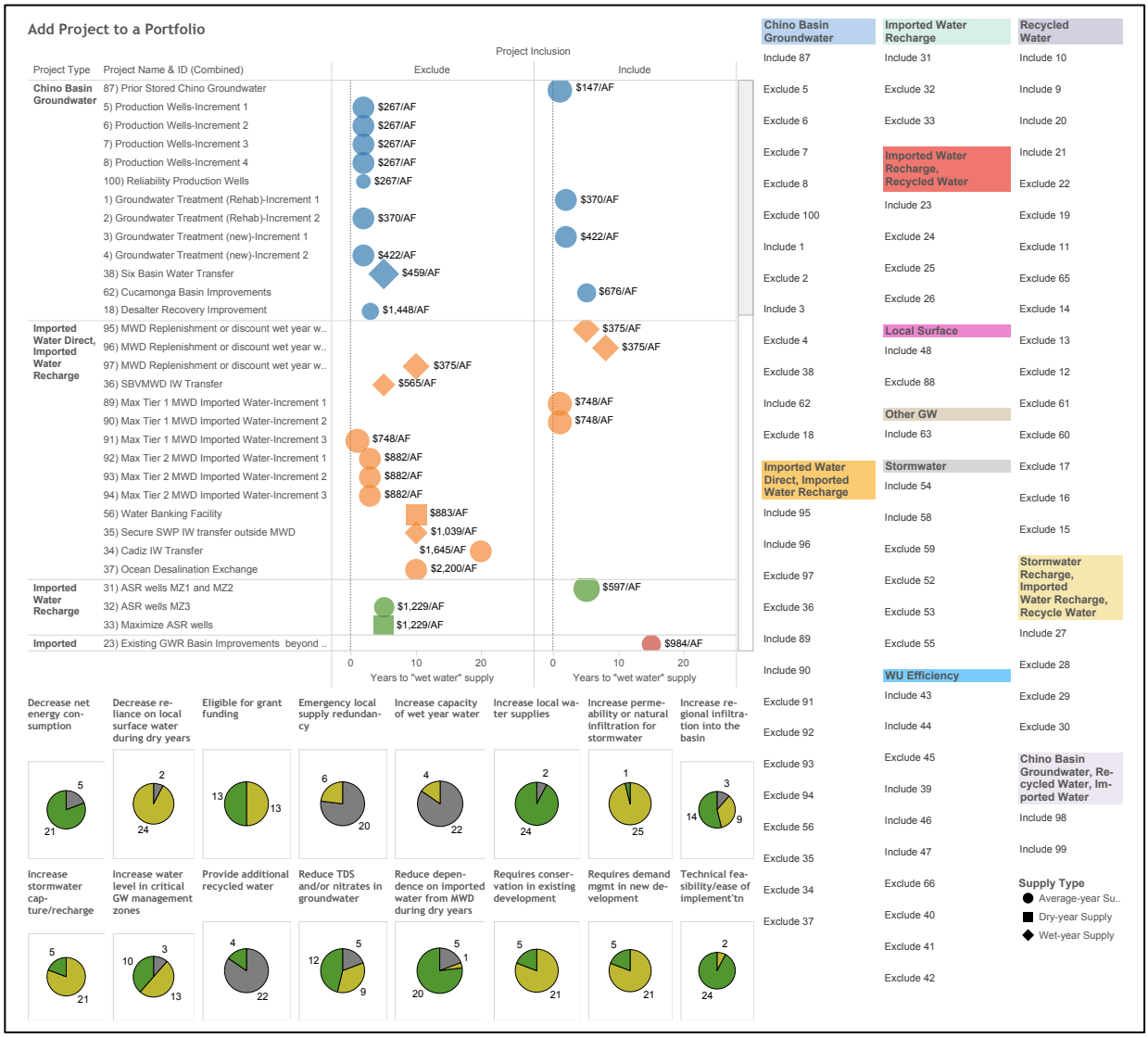
Figure 17 displays all the projects, sorted by preliminary estimates of per unit water cost (these have yet to be finalized). Symbol coloring indicates its category, size indicates its estimated volume; horizontal position indicates the number of years until which the project produces enough water to add to the supply IEUA distributes to stakeholders; the text label indicates its cost; and its symbol indicates whether the water is available during any given year or only under particularly wet or dry conditions. This view was useful for stakeholders to compare projects, and general categories of projects, by supply amount, timing, and cost.

Figure 17: Project cost per acre-foot, with information on project type, supply amount, supply type, and number of years to "wet water" supply



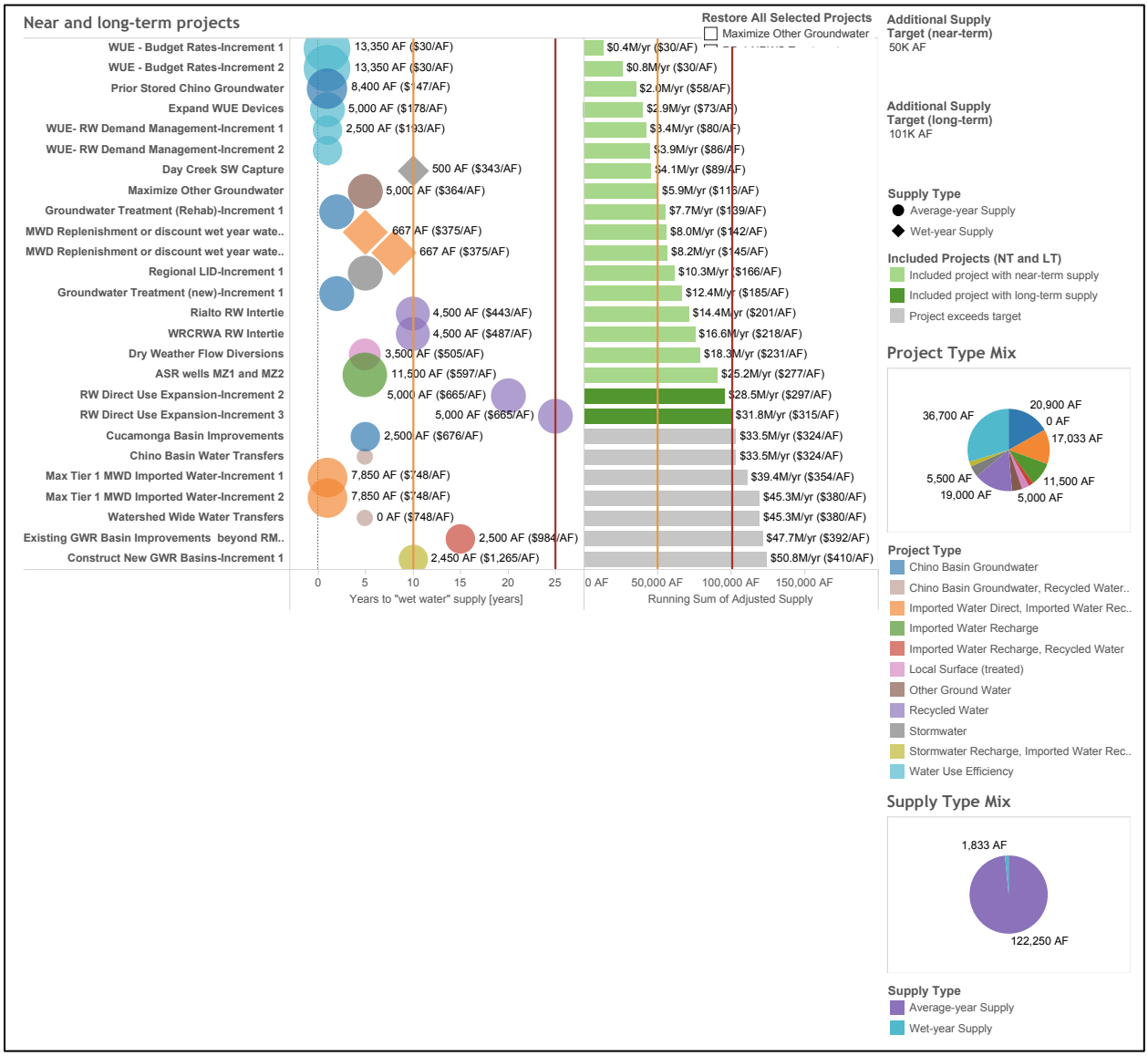
The next figures show how IEUA and member agencies were able to use the tool to create different potential portfolios of water management options. Figure 18 shows a tab in which the user is able to select individual projects to be considered in a portfolio. The user can exclude or include a project with a single click of the toggles on the right side of the screen shot. Projects' inclusion, category, cost, and years to wet water supply are tracked in real time on the left side of the screen. Aggregate summaries of the project attribute measures are shown as pie charts at the bottom of the screen. In this figure, a subset of projects is selected for inclusion, and only some projects are shown in the figure. In the tool, the user is able to scroll to see projects from all project categories.

Figure 18: Portfolio building tab enabling user to include and exclude specific projects in real time and visually track different project categories, costs, and years to "wet water" supply



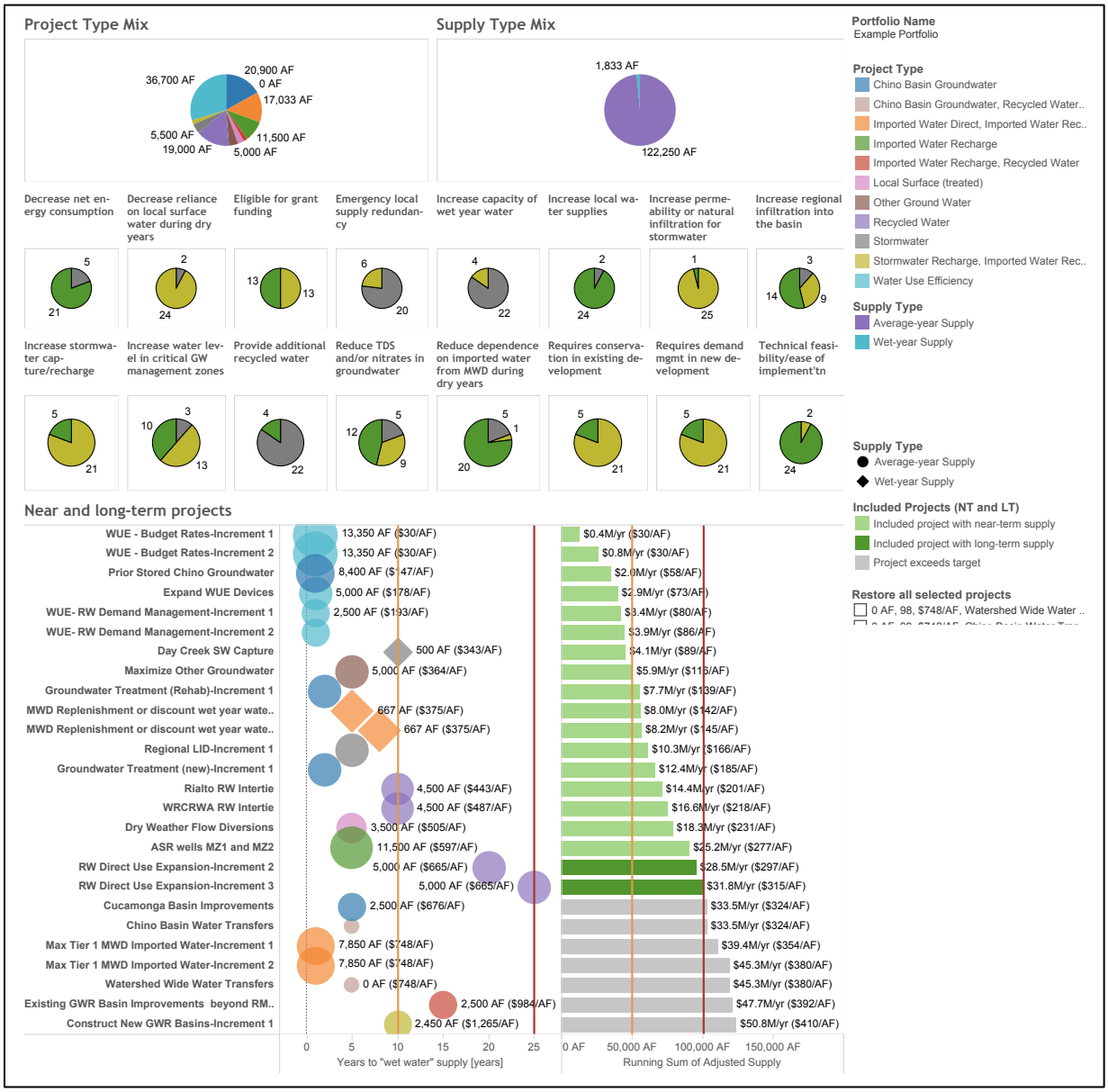
The next visualization (Figure 19) takes the options included in the previous screens and sorts them by cost effectiveness and availability to meet user-specified near-term (year 10) and long-term (year 25) targets. In this example, the near-term target is set to 50 TAF, whereas the long-term target is set to 101 TAF. On the left, projects are shown ordered by cost effectiveness. The bar chart to the right shows the cumulative new supply or demand reduction. Projects that meet the near-term or long-term targets are shaded green, indicating that they are included in the final portfolio. The project shaded dark green are only available to meet long-term demand. On the right, a pie chart summarizes the mixture of projects used to meet the supply targets and the type of projects with respect to availability (all year, wet year, or dry year).

Figure 19: Example portfolio with information on projects included therein, and how well projects meet supply goals



Lastly, Figure 20 provides another summary of the defined portfolio. This includes a summary of the supply and project category information in Figure 19, but also displays summaries of the project attributes—suggesting how well a particular portfolio meets different IEUA qualitative goals. IEUA and member agencies were able to use this display as a final summary chart for each portfolio they explored.

Figure 20: Example project portfolio summary, including how well projects meet IEUA qualitative goals



Appendix 2 – Water Management Model And Assumptions

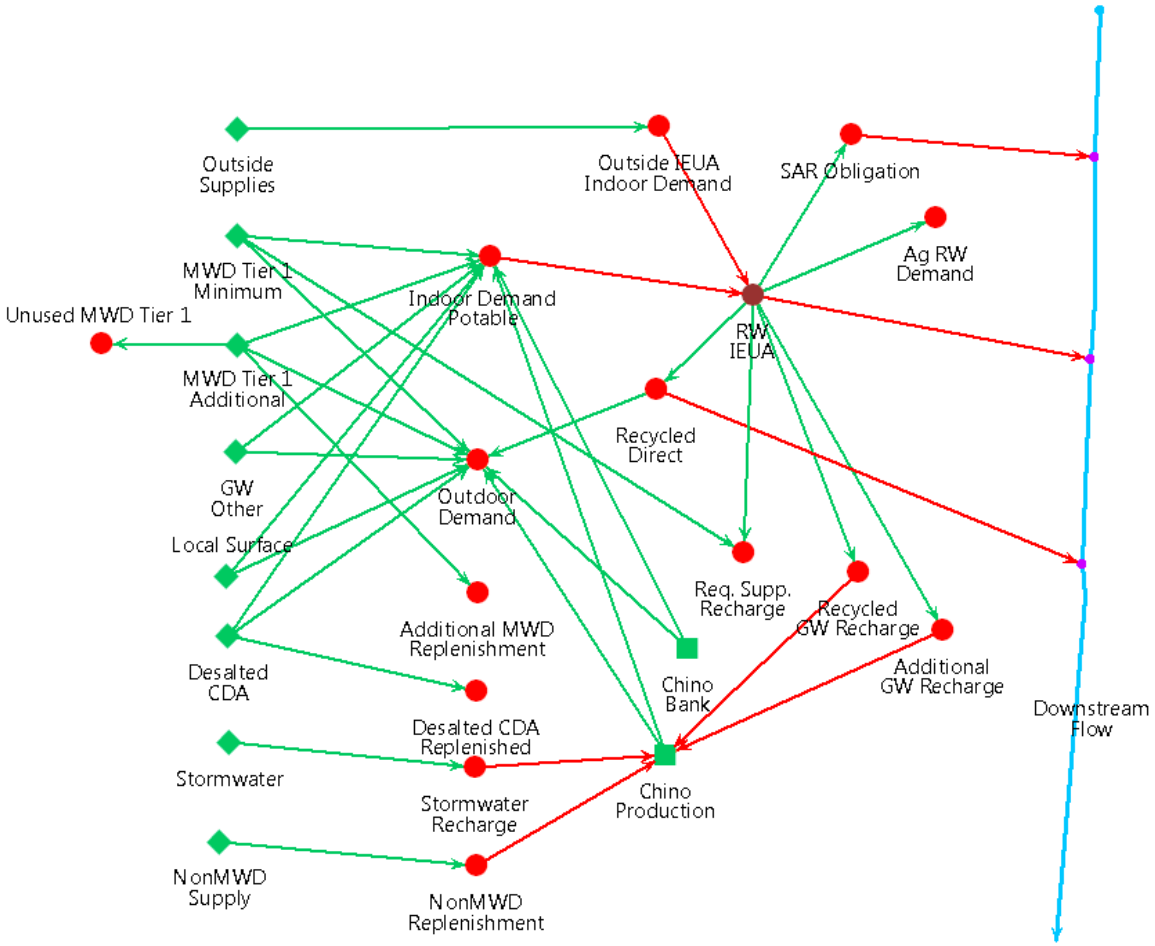
Model Overview

The study team built a model of the IEUA water management system, based on tabular monthly and annual information on historical and projected IEUA water supplies and demands provided by IEUA. The model includes simple relationships and data on estimated future climate conditions to evaluate water supply and demand balance conditions under alternative futures. Lastly, the model evaluates how different water management portfolios, developed using the Portfolio Development Tool (see Appendix 1), would improve performance over these futures.

The model is built in the Water Evaluation And Planning (WEAP) system, developed by the Stockholm Environment Institute (SEI) (Yates *et al.*, 2005). The WEAP IEUA water management model represents the IEUA system through a set of arcs and nodes. Nodes represent locations of water inflows, storage (surface or groundwater), outflows, or demand. Arcs represent conveyance, either natural or constructed, between different nodes.

The IEUA WEAP model calculates how water demand would be met by various supplies based on a system of supply preferences and priorities for each demand node. The model schematic shows the connectivity of water flows among the nodes via the arcs within the model (Figure 21). The schematic is not intended to represent the specific locations of IEUA system elements, but rather show their connectivity. Table 3 lists and describes the demand and supply nodes shown in the model schematic. More details on select demands and supplies are provided in the sections below.

Figure 21: Schematic of the WEAP model of the Inland Empire Utilities Agency service area



Note: RW = recycled water; Ag = agricultural; SAR = Santa Ana River; MWD = Metropolitan Water District of Southern California; CDA = Chino Desalter Authority; GW = Groundwater.

Table 3: IEUA WEAP model supply and demands

Node Name	Description
Demand	
Indoor Demand Potable	Indoor demand for potable (non recycled) water
Outdoor Demand	Outdoor demand for potable and recycled water
Recycled Direct	Total recycled water demand for outdoor use; met demand passes through to Outdoor Demand node or downstream flow if unneeded
Recycled GW Recharge	Demand for groundwater replenishment water; passes to Chino Production node
Additional GW Recharge	Demand for additional groundwater replenishment as specified by water management strategies; passes to Chino Production node
Outside IEUA Indoor Demand	Demand for water outside IEUA that is provided to IEUA for recycling via RW IEUA node

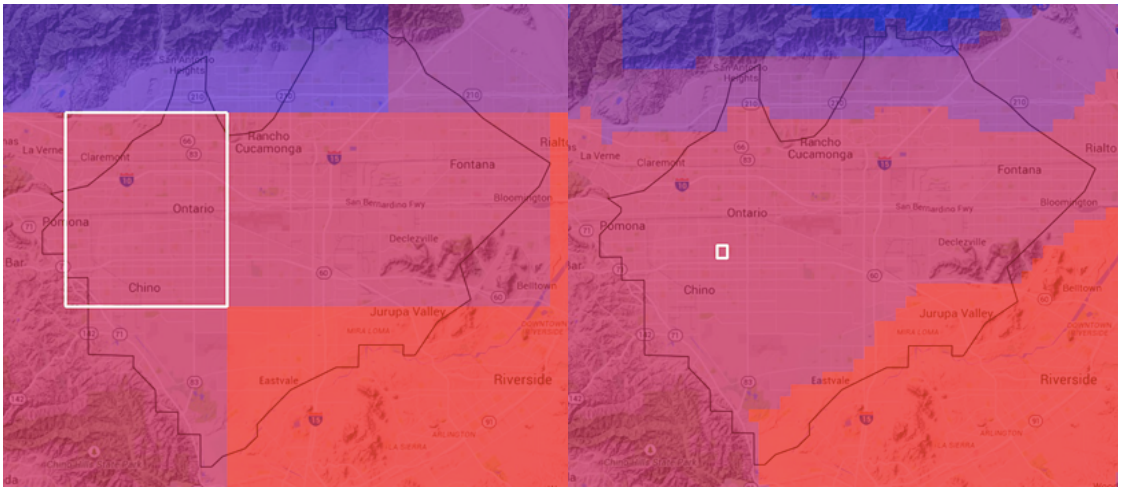
SAR Obligation	Santa Ana River flow obligation; met by recycled water
Ag RW Demand	Agricultural water demand in IEUA service area met with recycled water
Supplies	
MWD Tier 1 Minimum	Specified annual minimum Tier 1 MWD imports (about 40 TAF)
MWD Tier 1 Additional	Additional annual Tier 1 MWD imports, constrained by contract with MWD
Local Surface	Water supplies obtained from watersheds within the IEUA boundary
Desalted CDA	Desalted brackish groundwater from the Chino Desalter Authority facilities
Chino Production	Groundwater from the Chino Basins
GW Other	Groundwater from sources outside the Chino Basin
Stormwater	Additional runoff from storms captured and treated for use
NonMWD Supply	External sources of water used for groundwater replenishment

Climate Scenarios

The study uses downscaled climate data from general circulation models as the basis for a wide range of plausible future climate conditions. Historical and projected climate data from the World Climate Research Programme's (WCRP's) Coupled Model Intercomparison Project phase 3 (CMIP3) multi-model dataset were downloaded from the Downscaled CMIP3 and CMIP5 Climate and Hydrology Projections archive (Maurer *et al.*, 2007).[2] Climate data retrieved from this archive included bias-corrected statistically downscaled (BCSD) global climate model (GMD) monthly mean temperature and total precipitation observations and projections for 36 CMIP3 simulations and 70 CMIP5 model runs for years 1950-2050 (Brekke *et al.*, 2013). Note, however, that observed BCSD data were available only for years 1950-1999. These gridded climate data represented the gridded area bounded by latitudes 34.0N and 34.125N and longitudes 117.625W and 117.5W, roughly centered at Ontario International Airport (Figure 22).

[2] Data is available online at: http://gdo-dcp.ucllnl.org/downscaled_cmip_projections/.

Figure 22: Geographic scale of climate sources for CMIP-3 data (left) and CMIP-5 date (right)



Select Demands

Indoor Potable

Indoor potable demand is calculated as the population within the IEUA service area times an annual water use rate. IEUA, assisted by A&N Technical Services, specified the high and low demand scenario by varying annual water use rates. The middle demand scenario is user definable by setting the indoor and water use rates for 2050. Indoor potable demand does not vary by climate.

Table 4: Indoor potable demand parameters for historical data and scenario projections

Model Parameter	2010 (data)	2014 (data)	2020 (projection)	2050 (projection)
Population (people)	813,695	847,587	896,533	1,249,091 (all)
Water Use rates (gal/person/year)	26,061	23,981	24,090 (high) 22,959 (low)	24,017 (high) 17,082 (low)
Water Use/Demand (taf/year)	65.1	62.4	66.3 (high) 63.2 (low)	92.1 (high) 65.5 (low)

Outdoor

Outdoor demand is calculated as the population within the IEUA service area times an annual water use rate. IEUA, assisted by A&N Technical Services, specified the high and low demand scenario by varying annual water use rates. The middle demand scenario is user definable by setting the nominal outdoor and water use rates for 2050.

IEUA performed a series of sensitivity analyses of urban outdoor demand and weather conditions. By 2040, IEUA estimated that one dry year would increase demand by 5.6%. Similarly, a one wet year would decrease outdoor demand by 5.6%. A longer period of dry weather (3-years) would increase demand by 8.9%. Separately IEUA estimated the long-term effect of warming on outdoor demand. They found that for each degree temperature increase (in Celsius), outdoor demand would increase by 3%. Together these factors were applied to the climate scenarios to estimate how outdoor demand could change due to weather in the future.

Outdoor demand varies by three outdoor water demand factors that are applied depending up the projected precipitation difference from historical (or perturbation), as shown in Table 5. The outdoor water demand factors were derived from IEUA analysis.

Table 5: Climate effect factors on outdoor water demand

Precipitation Condition	Perturbation Threshold	Outdoor Water Demand Factor
Very dry	-5 cm/year	-0.089
Dry	0 cm/year	-0.056
Wet	+ 25 cm/year	+0.56

Agricultural recycled water demand

Agricultural recycled water demand is specified based on IEUA projections and does not vary by climate. This demand declines from about 10,000 AF in 2015 to 2,000 AF by 2025 and then remains constant through 2050. This is due to the transition of agricultural land to urban use.

SAR Obligations

IEUA's Santa Ana River (SAR) obligations are specified to be 17,000 AF/year per IEUA agreement.

Select Supplies

Local Surface supplies

Total monthly local surface supplies within the IEUA management boundary for water years (July through June) 2010 through 2015 were provided by IEUA member agencies and represent the amount of water that is diverted, not total stream flow. To estimate these total local surface water supplies under different climate scenarios, relationships between climate variables and surface supply were derived using historical data. These relationships were then used to estimate future supplies under each climate scenario included in the analysis. Several different regression models were evaluated, and two models were found to reasonably represent the relationship

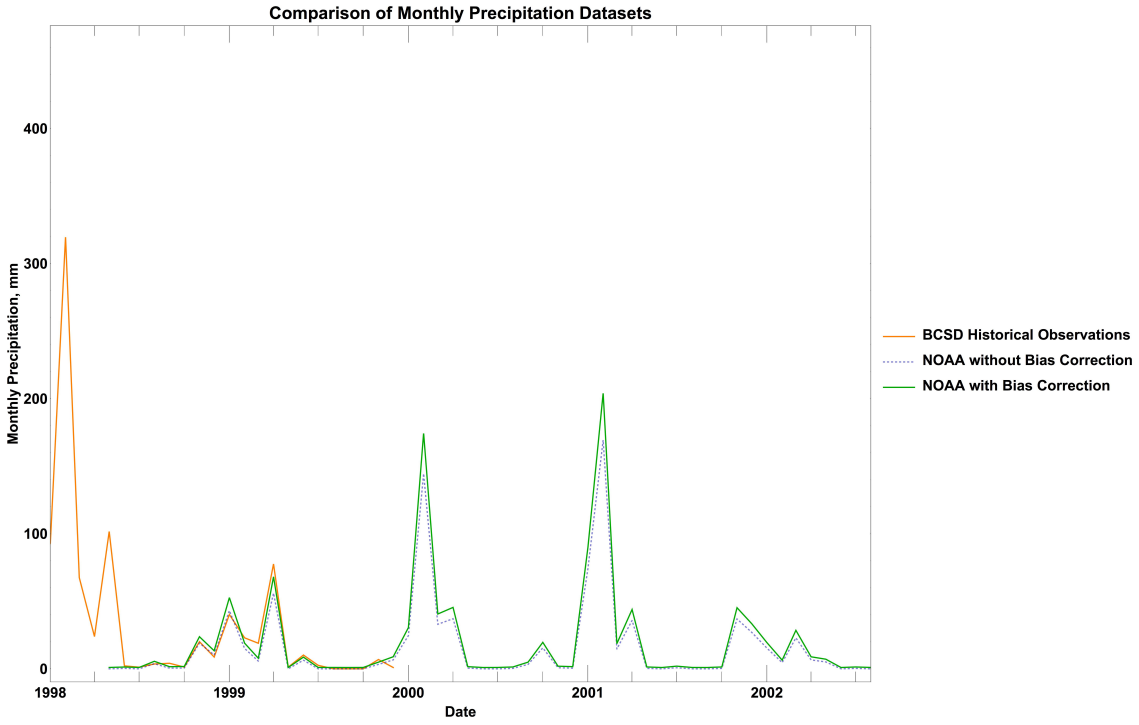
between historical climate and historical supplies. One included both temperature and precipitation variables and the other only precipitation.

At the time of the analysis, the gridded BCSD historical climate observations were available only between 1950 and 1999. Therefore, to compare climate observations to the surface supply results for 2010 to 2015 an additional proxy data set for the 2010 to 2015 period was developed. Specifically, we used weather station observation at Ontario International Airport[3] (coordinates 34.05N, 117.61667W) contained in the Global Historical Climatology Network Database (GHCND) (Menne *et al.*, 2012), maintained by the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center. The Ontario International Airport observation station reports monthly total precipitation and mean temperature observations from 1998 to present day.

We compared the monthly mean NOAA observed data to the monthly mean BCSD observed data for the overlapping period of May 1998 to June 2015. As expected we found very strong relationships for both monthly temperature and precipitation, although the NOAA observations were generally slightly drier than the BCSD data. We calculated a correction factor that we subsequently applied to the NOAA observed data to generate bias corrected datasets. Figure 23 shows a comparison of BCSD observed precipitation, NOAA observed monthly precipitation, and NOAA bias-corrected precipitation. This figure shows the strong relationship between the NOAA and BCSD datasets during the overlapping period of 1998 to 2000 and the very slight adjustment that was made to the NOAA data for months from 2000 and later.

[3] This station has Station ID GHCND:USW00003102 with latitude/longitude coordinates 34.05N, 117.61667W.

Figure 23: Comparison of BCSD, NOAA, and NOAA bias corrected monthly precipitation data on overlapping dates



NOAA bias corrected temperature and precipitation data, which were available until June 2015, were used to assess linear regressions relating monthly mean temperature and mean precipitation to total observed IEUA surface supplies. Additionally, given that a significant component of surface supply is due to melting snow pack, the potential of a delayed precipitation signal was evaluated. Four regressions were considered to estimate stream flow: (1) precipitation alone, (2) temperature alone, (3) precipitation and temperature, and (4) precipitation and a 12-month moving average of temperature. These regressions were analyzed with various lag times—applied to both temperature and precipitation—ranging from 0 to 6 months to search for a significant signal; a lag time of three months was found to have the lowest p-value among for all regressions and appeared to best reflect observed stream flow patterns. Note that the minimum p-value found with a lag time of 0 months was ≈ 0.429, while the p-values of the three best-fitting regression models at a lag time of three months were < 0.005. Shown below in Figure 24 is a comparison of each of the four regressions considered—each mapped over the NOAA bias corrected precipitation and/or temperature data—against observed surface flows. Figure 25 shows the same models aggregated to annual totals.

Figure 24: The four regression models versus observed flows

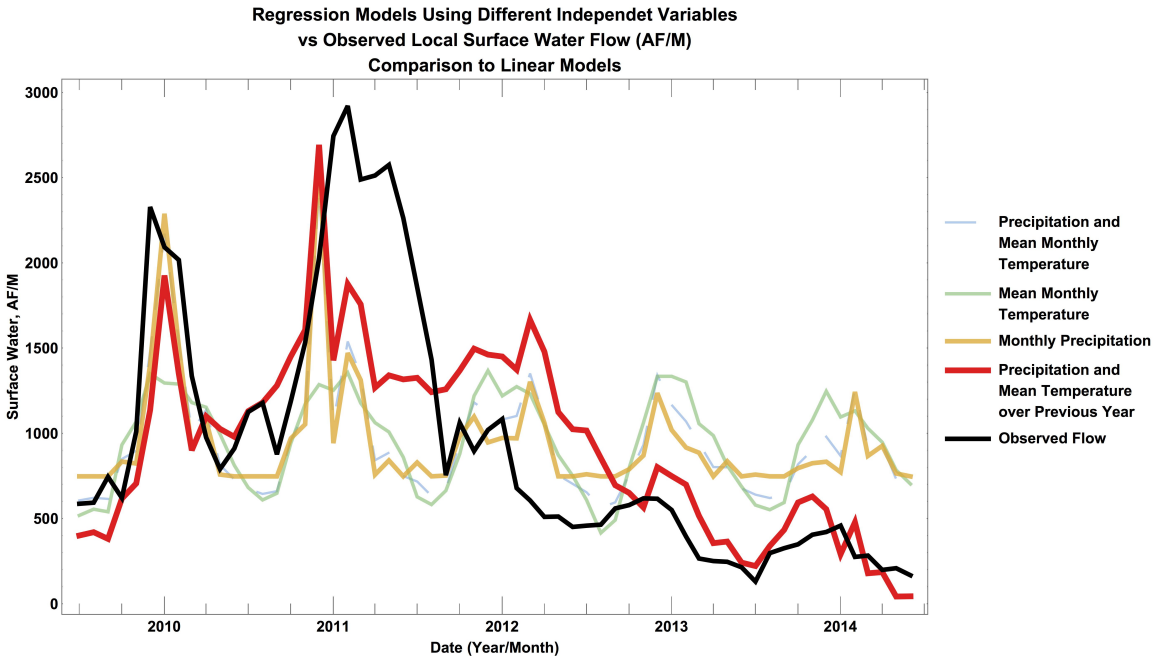
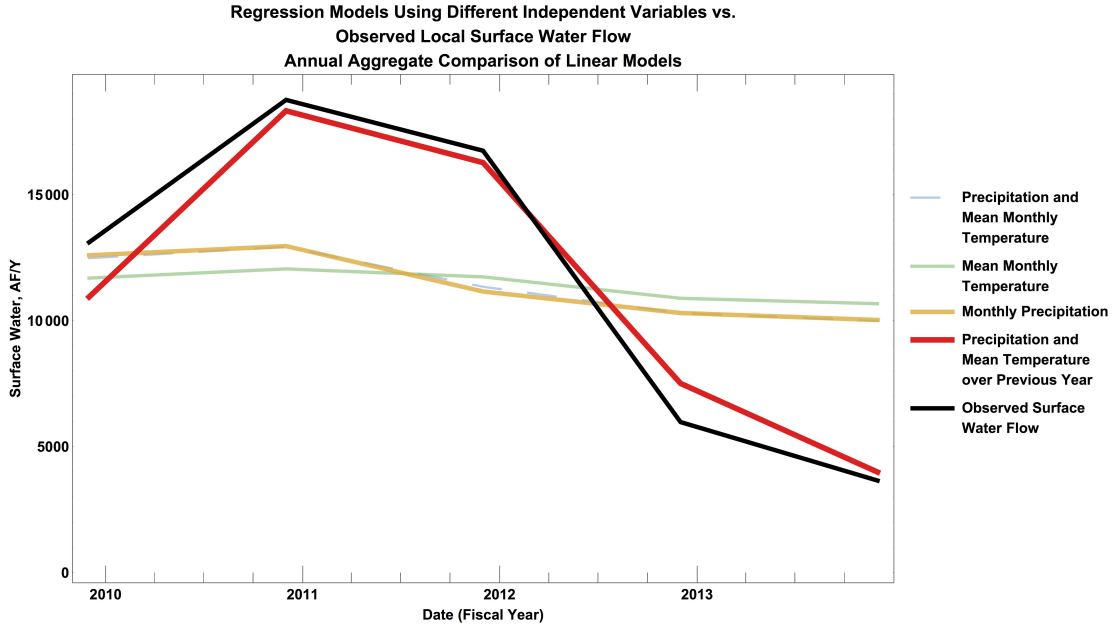


Figure 25: Four regression models averaged annually



The regression model using precipitation and the mean temperature of the previous year (a moving average of twelve months) appears to generally follow the downward trend, while the

precipitation only model, while accounting for much of the same variance, does not reflect the monthly downward trend in flow shown in Figure 24.

Estimated flows using both the precipitation and mean annual temperature under all 343 climate scenarios included, in addition to the mean estimated flow across all climate model outcomes, are shown in Figure 26. These same estimates generated using the precipitation only model are shown below in Figure 27.

Figure 26: Annual projected IEUA surface supplies using the Precipitation and Temperature regression model

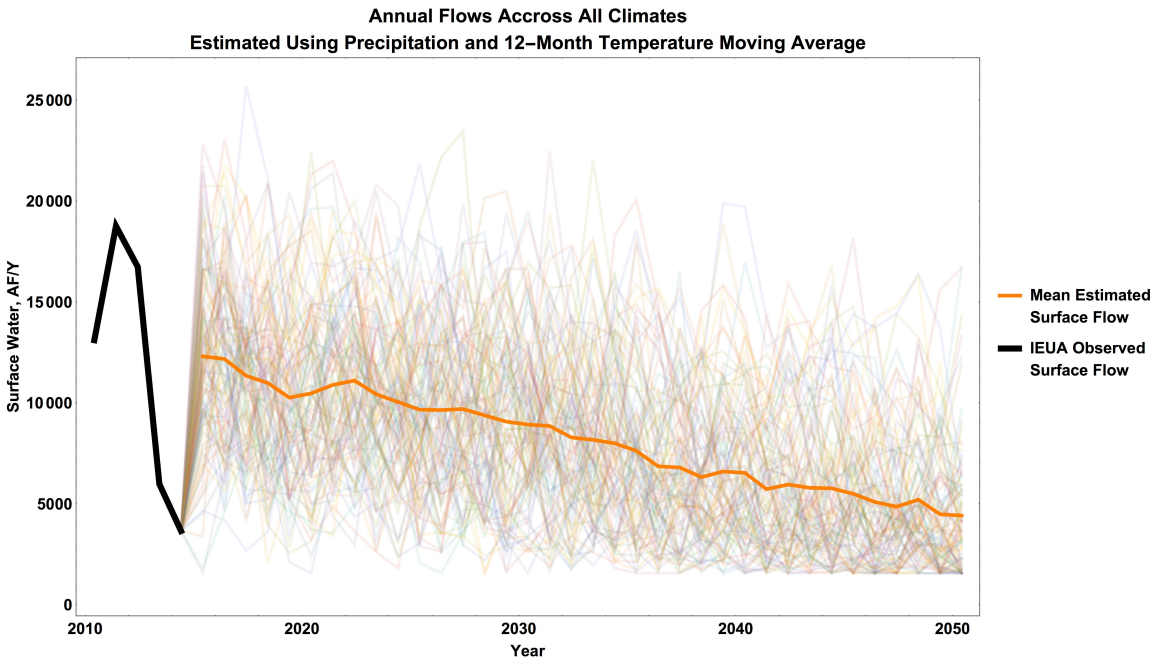
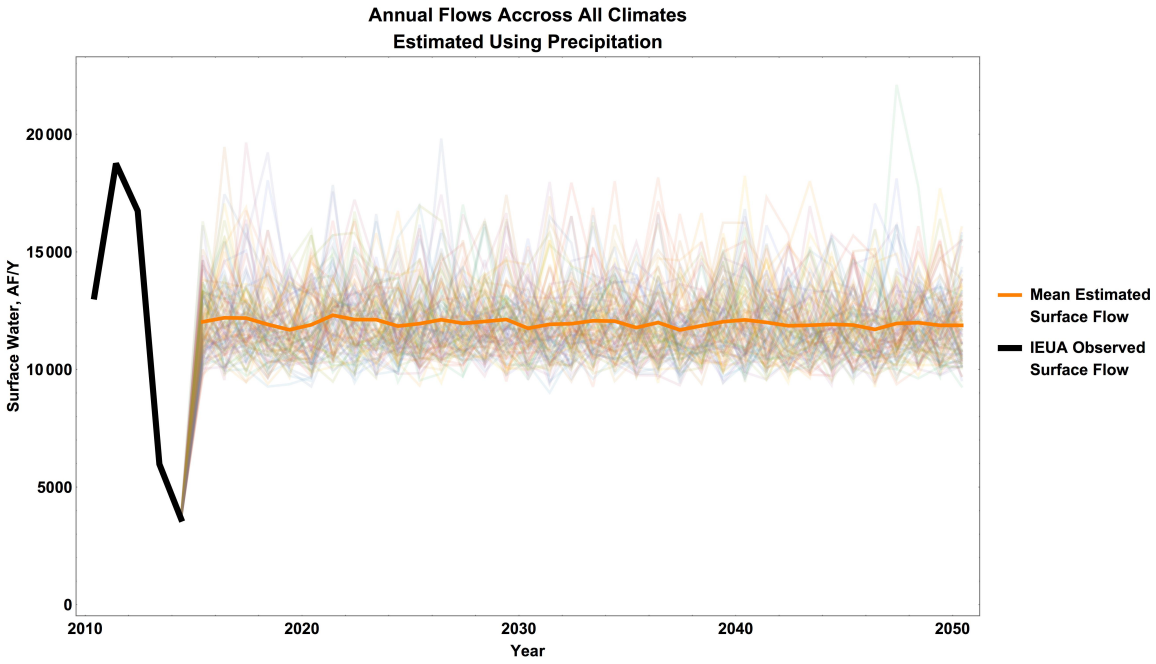


Figure 27: Annual projected IEUA surface supplies using the Precipitation regression model



Stormwater

Stormwater used for Chino Basin groundwater replenishment is projected to increase from effectively 0 to 6,400 AF by 2020. The historical stormwater recharge has been included in the Chino basin groundwater supply. Any "new" stormwater supply could be from projects constructued under the 2013 Recharge Master Plan Update prepared by the Chino Basin Water Master. In absence of more detailed information on how future stormwater would vary with respect to precipitation, we apply the same regression formula develop for surface water supply to the baseline supply as well as any additional supply specified as part of a water management strategy.

Imports via Metropolitan Water District

IEUA purchases water from MWD. Tier 1 water is generally used to meet urban indoor and outdoor demands. Per contract with MWD, IEUA must purchase at least 39,835 AF/year. Additional Tier 1 water, up to a total of 93,283 AF/year, is also typically made available to IEUA and is purchased when needed for direct use or groundwater replenishment. The baseline assumption for available additional Tier 1 water is 26,600 AF/year, for a total of just under 67,000 AF/year.

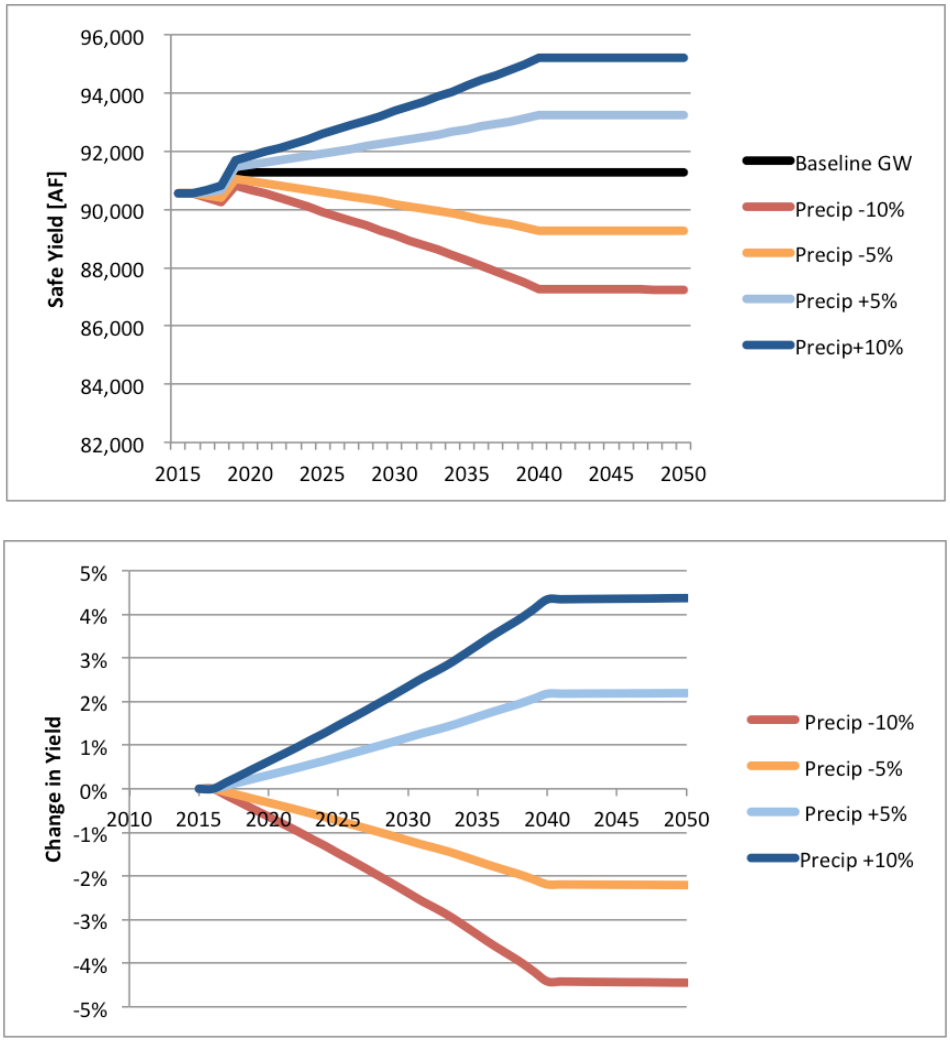
For this study we evaluate two possible levels of climate effect on additional Tier 1 water. In both cases, the total amount available declines beginning in 2021 through 2050. In one scenario, we assume additional Tier 1 water declines by 40%. In the other scenario, we assume declines of 80%. Note that these two level of water declines imply a total reduction in MWD Tier 1 water

from 62,600 AF in the without climate change condition to 51,960 (for the 40% decline in additional supplies) and to 41,320 (for the 80% decline in additional supplies).

Chino Groundwater Basin

IEUA's share of Chino Basin's sustainable groundwater yield is set through actions of the Chino Basin Water Master. Under current basin conditions, the amount of groundwater available to the appropriators within the IEUA service area is 91,266 AF. An analysis by Wildermuth Environmental Inc. determined the sensitivity of IEUA's allowable production as a function of long-term precipitation trends (Figure 28). These data show that across the four scenarios evaluated, the safe yield would decline 0.44% for each 1% decline in long-term precipitation.

Figure 28: Safe yield over time for the baseline and four trends in precipitation (top); change in safe yield (as compared to 2015 across four trends in precipitation (bottom)



We then modified the Chino Basin safe yield by the product of the long-term precipitation trend and the empirically derived scaling factor. For example, groundwater safe yield would be reduced 4.4% by 2040 for a climate scenario that exhibits a long-term precipitation trend of -10%.

Key Simulation Results

The WEAP IEUA model simulates annual water supply and demand from 2010 to 2015. For this analysis, the key outputs reviewed included:

- Urban indoor and outdoor demand
- Supplies used to meet urban demand
- Unmet urban demand
- Recycled water inflows and outflows
- Chino Basin inflows and outflows

This section shows results for these outputs from the WEAP IEUA model for a single simulation—high demand scenario and historical climate.

Figure 29 shows annual indoor potable demand and outdoor demand—both potable and recycled. Note that indoor demand gradually increases each year, whereas outdoor demand varies year-to-year. The outdoor demand variation is due to the historical climate used in this simulation.

Figure 29: Urban indoor and outdoor demand for high demand scenario and historical climate

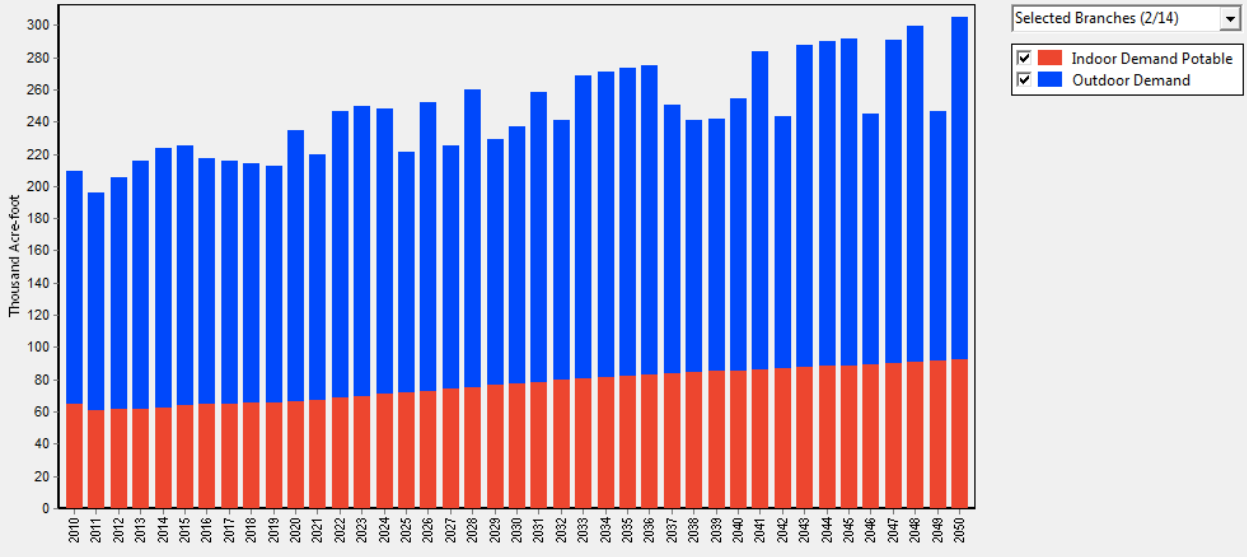


Figure 30 shows the mixture of supplies used to meet the demands in Figure 29. The largest source is Chino groundwater supplies. MWD Tier 1 supplies (minimum and additional) provide significant water. Lastly, recycled water provides about 20 percent of the supply.

Figure 30: Supplies used to meet demand for high demand scenario and historical climate

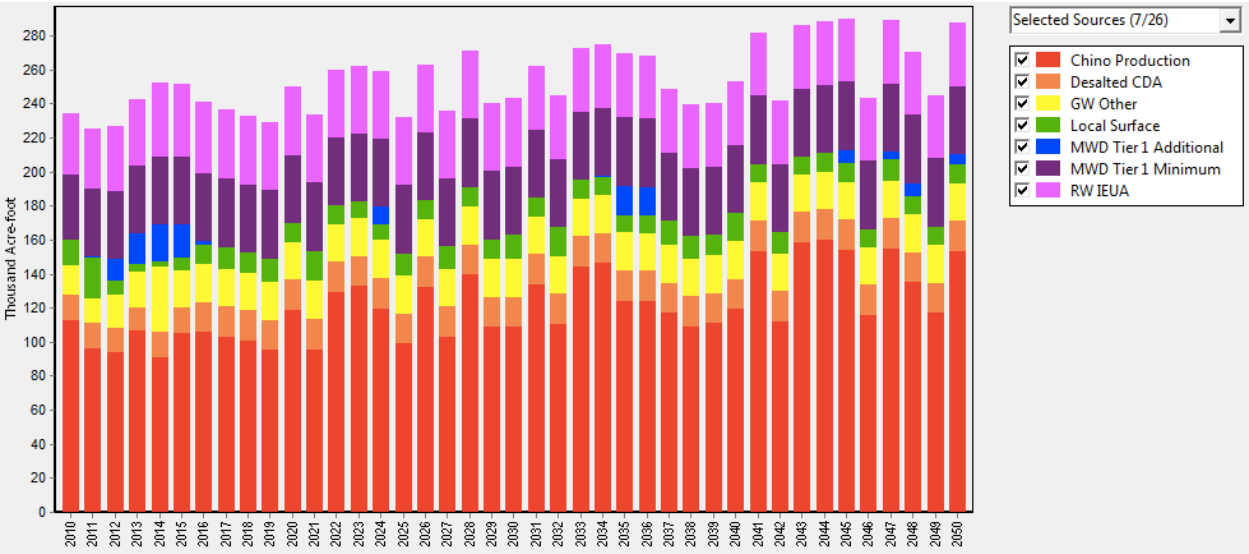


Figure 31 focuses on the recycled water portion of the IEUA system. The top bars show the inflows—return flow from IEUA indoor demand and some small amount of wastewater from outside the IEUA service area. The bottom bars show the destinations for the recycled water supply including: outdoor urban use (Recycled Direct), agricultural use (Ag RW Demand), the Santa Ana River (SAR Obligation and Downstream Flow), recharge to the Chino Basin (Req. Supp. Recharge and Recycled GW Recharge, Additional GW Recharge). Note that Downstream Flow represents more available recycled water than is needed to meet demand for recycled water. In simulations with low urban demand, there is no excess recycled water and instead shortages.

Figure 31: Sources of recycled water (top) and uses of recycled water (bottom) for high demand scenario and historical climate

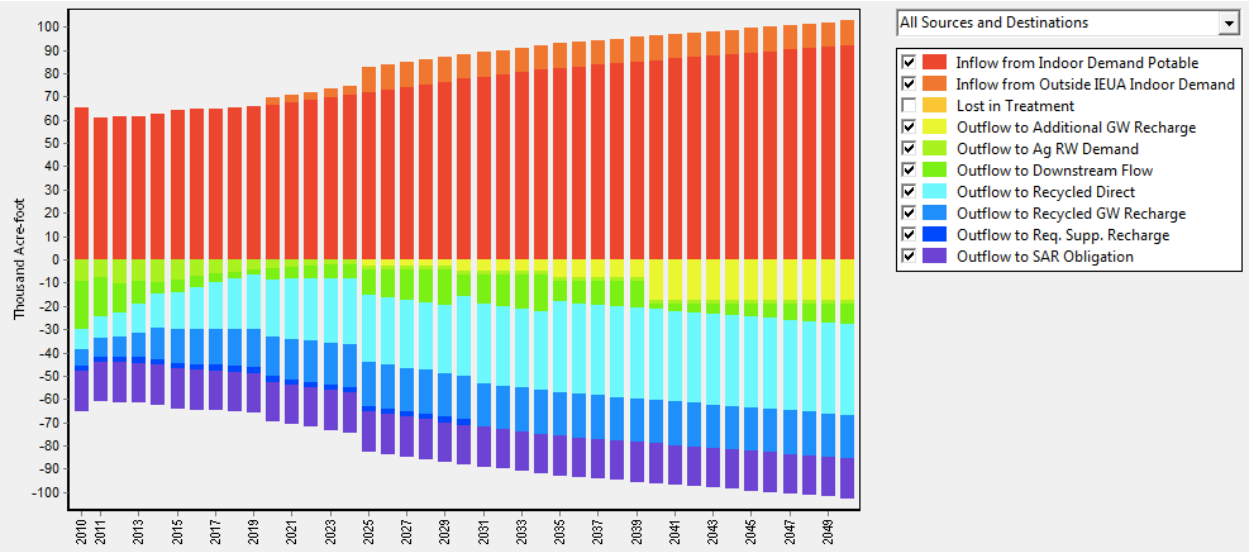
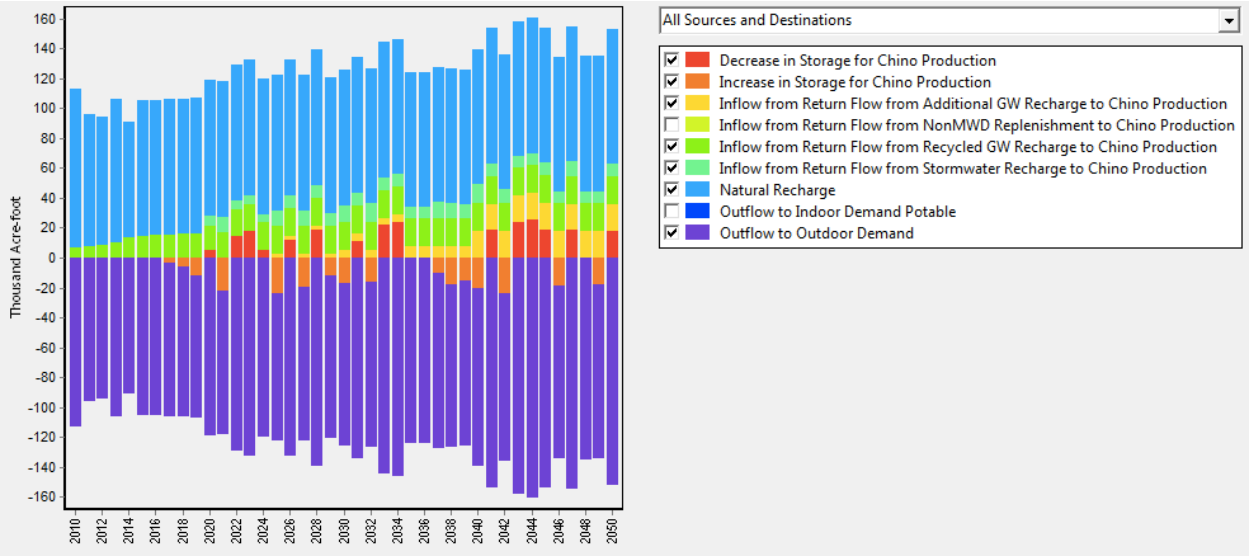


Figure 32 shows the inflows and outflows to the Chino Groundwater Basin. Natural Recharge is the largest source, but one can see how the different replenishment sources increase the inflows over time. The primary use of groundwater is to meet outdoor demands.[4] There is some modest increase and decrease in storage over the years.

[4] In reality, potable water for indoor and outdoor use are served using common water mains. The partitioning of supplies to indoor and outdoor potable use in the model reflects the priority structure used to ensure that shortages, if any, are experienced by outdoor uses first.

Figure 32: Inflows (top) and outflows (bottom) to the Chino Basin for high demand scenario and historical climate



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Appendix 3:

A&N Technical Services “Indoor and Outdoor Demands”

A & N Technical Services, Inc.

Memorandum

To: Jason Pivovaroff, IEUA

From: **David Pekelney and Thomas Chesnutt**

Date: January 24, 2014

Re: **Inferring Indoor and Outdoor Water End Uses in the IEUA Service Area**

Introduction

This memo documents the estimation of indoor and outdoor water end uses for water demand in the IEUA service area. This estimation of indoor/outdoor end uses is conducted by customer class—single family residential, multi-family residential, and commercial-industrial-institutional (CII). Indoor end uses are of particular interest to planners tasked with designing wastewater systems and recycled water systems because it helps them establish capacity requirements. Both indoor and outdoor use is of great interest to planners tasked with designing Water Use Efficiency (conservation) programs. Although much has already been accomplished with indoor conservation, there is some level of remaining potential for water savings. WUE planners have particular interest in outdoor use because it is generally assumed to be a large share of total use with large remaining potential for savings.

Two methods were used to estimate outdoor use across customer classes. The first method is the minimum month method that has been historically used in the water industry—this method assumes that the minimum month of water demand is 100 percent indoor end uses. Though we believe that this is a counterfactual assumption in the IEUA service area (it assumes exactly zero outdoor irrigation in the winter) we provide estimates using the minimum month method to serve as a point of comparison. The second method develops an estimate of winter irrigation from dedicated irrigation meters and applies this nonzero assumption instead. Termed a "seasonal variation" method, it applies the seasonal variation from dedicated irrigation meters to mixed meter customer classes.

Data

The data used are from the California Department of Water Resources, Public Water System Statistics filings for the City of Ontario for the years 1993 to 2012. These data are billing system summaries at the monthly level. Several other retailers provided monthly use summaries; however, these were generated with bimonthly billing cycles. Since different retailers can apportion bimonthly billing into calendar months using different methods, it is more consistent to stick to the monthly data generated with monthly billing. Although CVWD, Upland, and MVWD

839 Second Street, Suite 5 • Encinitas, CA 92024-4452 • Voice: 760.942.5149 • Fax: 760.942.6853
11808 Stanwood Dr. • Los Angeles, CA 90066 • Voice: 310.439.1883 • Fax: 310.439.1884

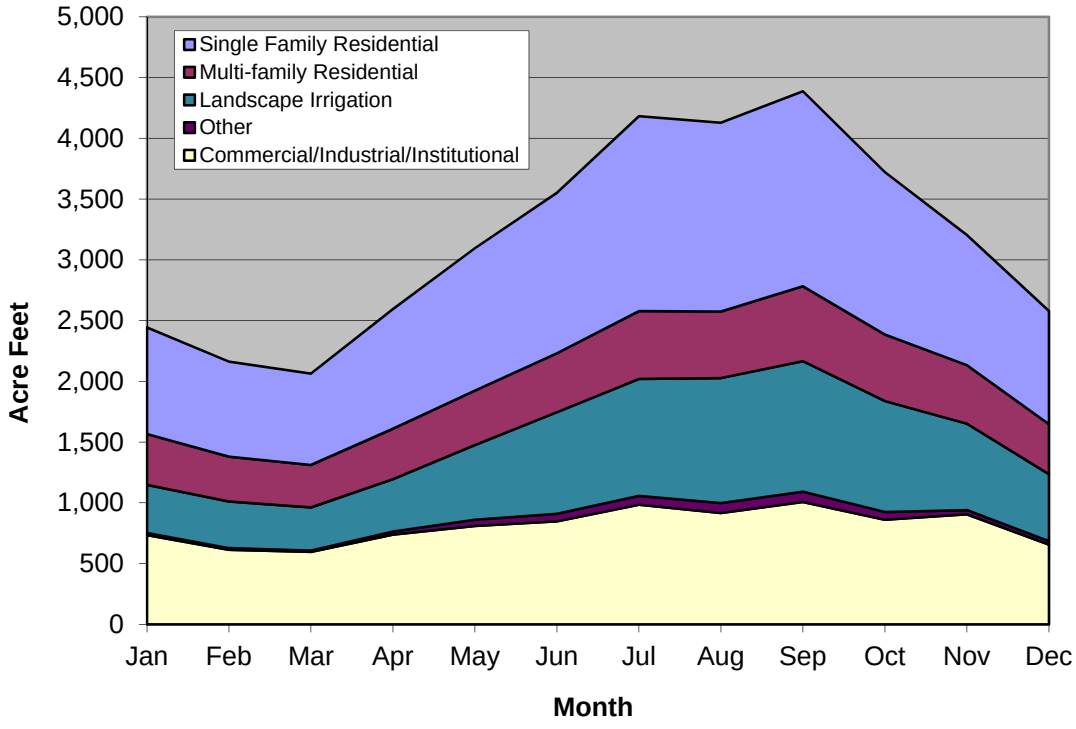
provided monthly data (based on bimonthly billing), we used the City of Ontario data for this analysis because it was the only retailer to provide monthly use data generated by monthly billing.

Table 1 shows the average use from 2008 to 2012 summed by customer class. Figure 1 shows the sum of water use by month. The strong seasonal pattern reflects irrigation needs during the characteristic hot and dry summers.

Table 1 – Average Use, 2008 to 2012, City of Ontario

Class	Use (AF)	Percent
Single Family Residential	13,993	36.7%
Multi-family Residential	5,647	14.8%
Commercial/Industrial/Institutional	9,666	25.4%
Landscape Irrigation	8,259	21.7%
Other	549	1.4%
Total	38,114	100.0%

Figure 1--Monthly Use by Class
Average of Monthly Use from 2008-2012, City of Ontario



Methods

Outdoor end uses are directly measured by dedicated irrigation meters. Many other types of water meters--single family, multi family, commercial, industrial, and institutional--can be measuring

both indoor and outdoor end uses. If not measured or observed directly, planners are forced to rely on inference or judgment. For IEUA, we have conducted two methods to infer outdoor use for all sectors.

Minimum Month Method

The most common method employed to infer outdoor use is to assume the winter use is all indoors. (This assumption may be closer to the truth in wetter or colder climates.) For example, if we calculate winter minimum use times 12 months we have inferred total indoor use for the year. Total use for the year minus indoor use then equals outdoor use.

In Table 2 below, we find that outdoor use calculated with the "minimum winter use is indoor use" method is 46%. The method underestimates outdoor use because there is likely to be at least some winter irrigation in dry climates. Variations on this method include daily accounting and various ways to define winter minimum. Note the results of this method will vary considerably from year to year; the reader is cautioned when using results from one year for planning purposes and we used for this analysis the monthly average over the five most recent years for which data were available (2008 to 2012).

Table 2 – Percent Outdoor Use

Class	Total	Minimum Month Method	Seasonal Variation Method
Single Family Residential	13,993	36%	58%
Multi-family Residential	5,647	26%	43%
Commercial/Industrial/Institutional	9,666	26%	42%
Landscape Irrigation	8,259	100%	100%
Other	549	75%	100%
Total	38,114	46%	62%

Seasonal Variation Method

The second method to infer outdoor use consists of employing the pattern of seasonal variation with dedicated irrigation meters and applying it to other sectors with mixed meters. The reasoning is that with dedicated irrigation meters we can measure winter irrigation. Thus, we can observe the relative water use in winter and summer irrigation seasons and calculate a parameter from variables that are observable in other sectors. For example, by calculating the ratio of winter minimum to the seasonal range we have a function of variables observable for sectors other than dedicated irrigation meters. This method will result in a higher estimate of outdoor water use than using minimum month. The method relies on the assumption that the seasonal variation of outdoor use is the same for sites with dedicated meters as for sites with mixed meters.

Due to the variability of landscape water use from year to year, we expect the calculated parameter to vary considerably from year to year. For this reason, we calculated the parameter (ratio of winter minimum to seasonal range) for each year for which we could collect data (1993 to 2012) and took the average. We applied this long term average to the monthly average of the most recent five years of consumption data (2008 to 2012) because of the changing distribution of water use by customer class as more dedicated irrigation meters are employed.

Figure 2 shows the use from irrigation-only meters, with winter irrigation illustrated in blue and the seasonal range in red for one example year (2011).

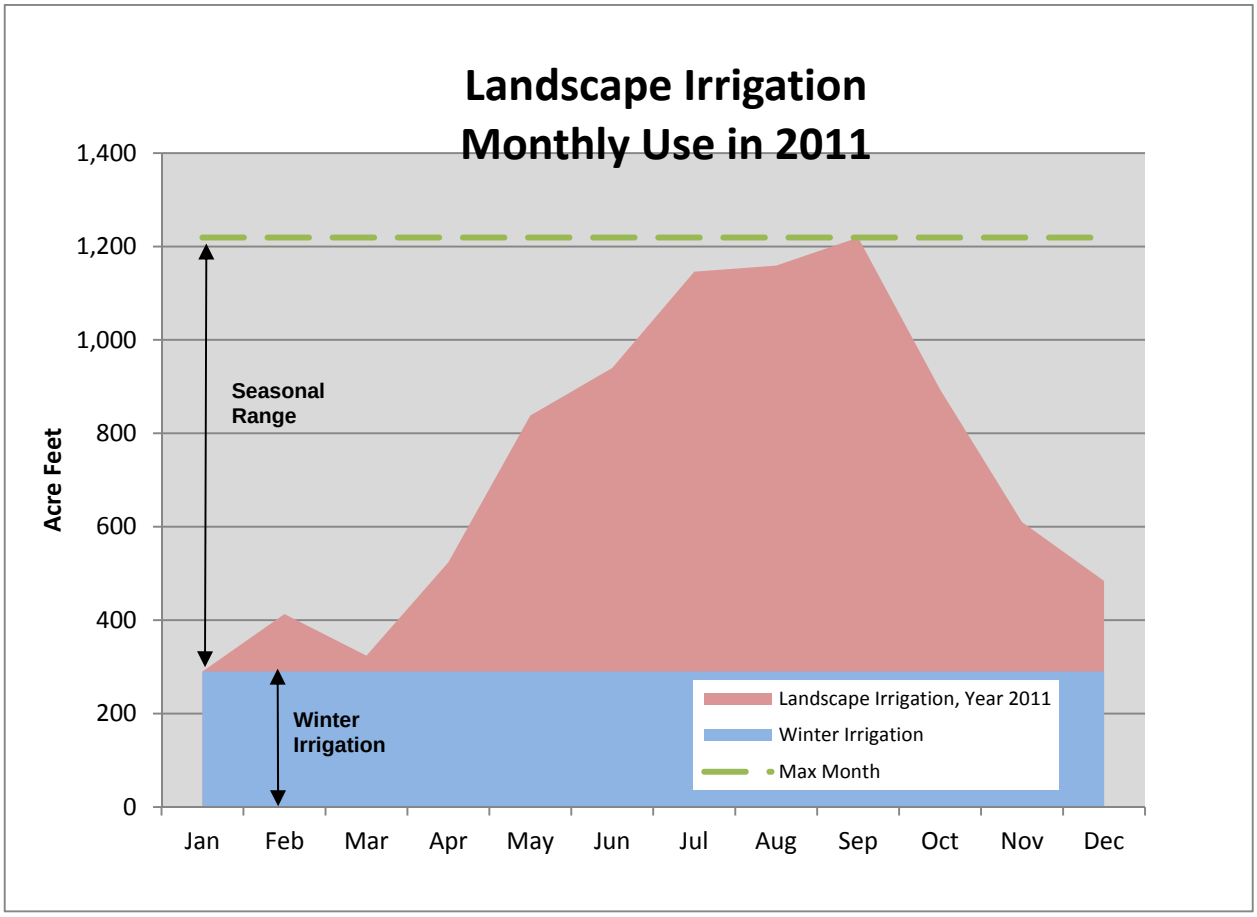
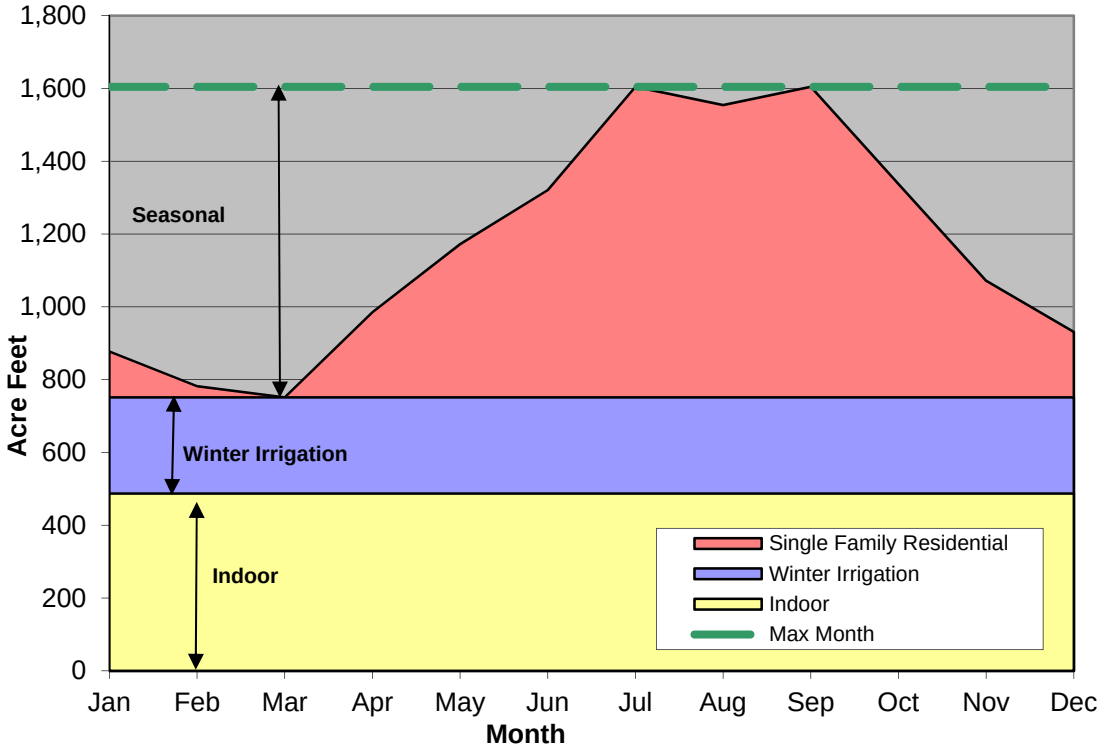


Figure 2 shows winter irrigation is 31% of seasonal range between summer and winter for dedicated irrigation accounts for the year 2011. We repeated this calculation for each year for which were able to collect data (1993 to 2012) and averaged the values to get the result we apply to customer sectors with mixed meters (31%).

Seasonal range and winter minimum are observable for non-irrigation classes. If we assume that winter irrigation is also 31% of seasonal range for the non-irrigation customer categories, we can infer their winter irrigation, and thus indoor and outdoor use.

Figure 3--Single Family Residential
Average of Monthly Use from 2008-2012



For example, Figure 3 shows winter irrigation calculated as 31% of seasonal range for the single family residential sector. Total outdoor use (red+blue in this graph) is, thus, 58% of total use for the year (red+blue+yellow). In contrast, using the minimum month for the single family sector results in 36% outdoor use (red area only).

Conclusions and Recommendations

The seasonal variation method estimates outdoor end uses to compose 62 percent of M&I water demand (across all customer sectors) in the IEUA service area. We recommend using the seasonal variation method because we know the minimum month method systematically underestimates outdoor water use in climates where there is winter irrigation such as IEUA.

Although the minimum month method systematically underestimates outdoor use and overestimates indoor use--and we do not recommend using it for planning water resource investments--it is a commonly used method that is simple to implement and, thus, it may have value as a comparison benchmark.

This analysis used empirical measures using monthly-billed data from one of the larger retail water service areas. We can improve the reliability of the results by expanding the data set to include other IEUA service areas that utilize monthly billing.

As stated in the Introduction, estimation of indoor/outdoor split is of particular interest because it aids with designing wastewater system and recycled water systems to establish capacity requirements. Indoor use is directly related to wastewater flows; however, that does not mean

they should be directly compared. Indoor use and wastewater flows are not commensurate without accounting for the following:

- The water volume used in the indoor/outdoor estimate derives from customer consumption measures. If a comparison to production measures is desired, one must account for factors that explain the differences between production and consumption measures: system loss, unaccounted for water, meter accuracy, and unmetered water. Additionally, if applying the estimate of indoor water use to total production, agricultural use needs to be separately accounted for because the estimates of indoor water use were constructed with M&I consumption data only.
- Some indoor use does not go down the drain because of cooking, consumption, cleaning, indoor plants, and other uses. These indoor water uses do not translate into wastewater flows.
- Parts of the unincorporated areas of IEUA are not hooked up to the sewer system—they still use septic systems—and their indoor use also does not translate to sewer flow.
- Any loss or gain in volume between the customer and the wastewater treatment plant would also need to be accounted for. For example, infiltration and inflows, wastewater system loss, and evaporation are potential effects on wastewater volume.
- It is easy to observe that water consumption data is inherently more variable than wastewater inflow measures due to outdoor use and weather variability. The estimate of indoor water use as a proportion of total M&I use in the City of Ontario is 38% over the years 1992-2012. If this proportion is calculated using the most recent five years from 2008 to 2012, the proportion of indoor water use is only 36%. This proportion should clearly not be thought of as a constant over time.

In sum, although most of indoor water use does indeed flow to the treatment plant, the estimates of wastewater flow and the indoor water use are not directly comparable without accounting for the above factors.

Appendix 4:

A&N Technical Services “Demand Influencing Factors”

Baseline Demand Influences

Table 1 summarizes the demand influences that were incorporated into the corresponding baseline demand forecast. The following sections define each level of influence, or adjustment that was applied to the normalized demand forecast.

Table 1: Baseline demand influences incorporated within each demand forecast

	Baseline Demand Influences					
	Economic Cycle	**Household Income**	**Housing Density**	**Weather**	**Climate Change**	**Customer Response**
Upper Forecast	Baseline	Baseline	City General Plan	Multiple Dry	High	Permanent
Lower Forecast	Baseline	Baseline	SCAG	Dry	Baseline	Permanent
Planning Forecast	NA	NA	DWR	NA	NA	NA

Notes: NA = Not Applicable

Economic Cycle

Ability to specify how strong and weak market conditions impact demand. The effect from market conditions was defined from historical demand data through the normalizing process.

- **Weak** – implies weak market conditions and demand is reduced by 6.55%.
- **Baseline** – implies that demand will not change and market conditions will remain normal/average.
- **Strong** – implies strong market conditions and demand will increase by 6.55%

Median Household Income

Ability to incorporate potential changes in demand related to household income. The following alternatives were based on the following assumptions.

- **Low** – median household income growth is below the baseline rate and reduces over time at minus 1% percent per year. Implies that demand will potentially be reduced.
- **Baseline**— median household income trends at the predicted rate per the 2012 SCAG RTP/SCS. Implies that demand will not change and will remain normal/average.
- **High** – median household income growth increases faster than the baseline rate and increases at plus 1% percent per year. Implies that demand will potentially be increased.

Housing Density

Ability to adjust the water use factor applied to each occupied housing unit based upon the expected density of future development. The density values below are aggregated regional values for the Agency's service area. In general, higher housing densification tends to have lower water use per unit caused by reduced landscape areas and more stringent water use efficiency standards.

- **City General Plan** – incorporates housing density reflective of the 2014 City General Plans.
    - Single family residential density range 1.2 – 4.2 units per acre
    - Multi-family residential density range 9.7 – 17.3 units per acre
- **Baseline** – implies that future residential development resembles past/traditional dwelling units per land area.
- **SCAG -** incorporates housing density reflective of the 2012 S.California Association of Governments Regional Transportation Plan/Sustainable Communities Strategy (2012 SCAG RTP/SCS).
    - Single family residential density range 2.3 – 5.4 units per acre
    - Multi-family residential density range 8.4 – 17.0 units per acre
- **DWR** – does not incorporate housing density, assumed a modified version of the current DWR State Model Water Efficient Landscape Ordinance. Assumed the following efficiency standards:
    - 70% relative evapotranspiration (Eto) for existing landscapes
    - 60% relative Eto for new landscapes
    - Indoor water use for future development of 55 gallons per capita day (GPCD) in 2015 to 35 GPCD by 2040.
    - Number of occupied housing units per SCAG RTP/SCS
    - Assumed 62% of total demand for residential use

Weather

Ability to specify how weather conditions impact demand from below and above average/normal conditions. The effect of weather variation was defined from historical demand data through the normalizing process.

- **Wet** – implies that demand will be decreased by 3.74% due to below normal temperature and increased wet periods.
- **Baseline** - implies that demand will not change and weather will remain normal/average conditions.
- **Dry** – implies that demand will increase by 3.74% due to above normal temperature and reduced wet periods.
- **Multiple Dry** – implies that demand will increase by 5.98% due to extended periods of above normal temperature and reduced wet periods.

Climate Change

Long term climate change is modeled by using recent Global Climate Change model predictions of potential increases in temperature and corresponding impact to demands. The Regional Climate Trends and Scenarios from the Southwest U.S. were referenced from the National Oceanic and Atmospheric Administration (NOAA) Technical Report NESDIS 142-5. (http://scenarios.globalchange.gov/report/regional-climate-trends-and-scenarios-us-nationalclimate-assessment-part-5-climate-southwest)

- **Baseline -** implies that demand will not change and climate will remain at normal/average conditions.
- **Median** (50^{th} percentile) – implies that expected temperature will increase by 2.7 degree Fahrenheit due to climate change. This would increase demands by 3.2% by 2040.
- **High** (80^{th} percentile) – implies that expected temperature will increase by 3.6 degree Fahrenheit due to climate change. This would increase demands by 4.3% by 2040.

Customer Response and Water Use Behavior

Defines how much of recent demand reductions will persist into the future that is permanent. The effect from recent customer response and water use behavior was defined from historical demand data through the normalizing process.

- **Baseline** – implies that demand will not change and everything will return to the normal, or bounce back to normal/average conditions.
- **Permanent** – implies that the 4.6% recent reduction is a permanent lifestyle change and continues to 2040.

Baseline Demand Comparison: Normalized vs. Adjusted

Figure A presents the Upper, Lower and Planning Forecasts under Baseline assumptions, therefore all demand influences are assumed to be normal or under average conditions, except for housing density. Housing density remained as indicated in Table 1. Figure B presents the same demand forecasts with the demand influences indicated in Table 1. As shown, there is a slight difference in the forecast envelope when you compare Figure A to B. The common attribute between the two Figures is housing density; therefore as shown, the other demand influences did not have as much impact to the demand forecasts as housing density did. To note, each demand influence adjusts the normalized water use factors that are applied regional growth projections for number of households and employees per sector.

Figure A: Baseline demand forecasts under normal or average conditions.

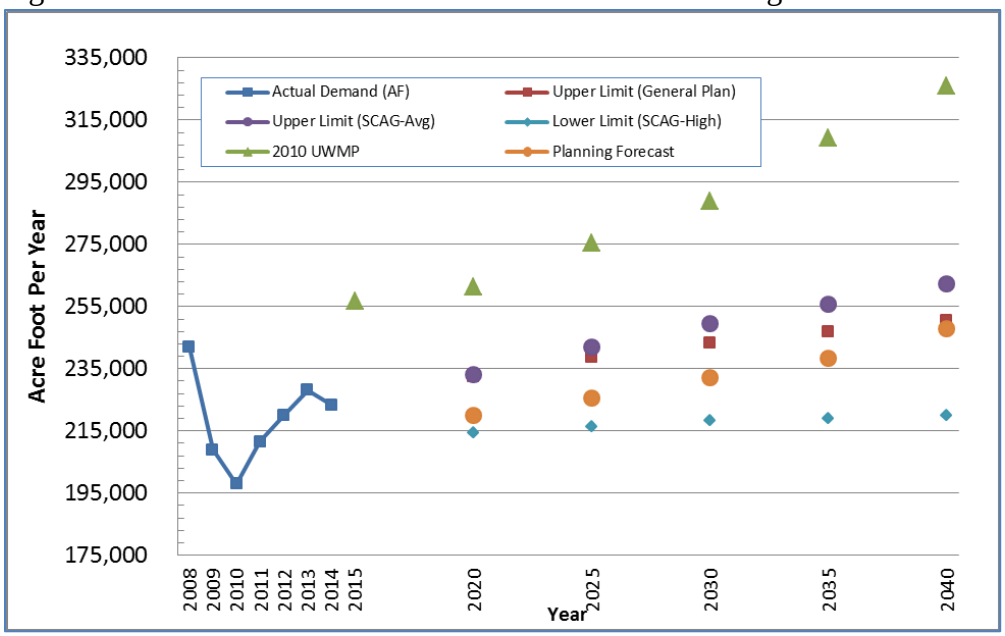
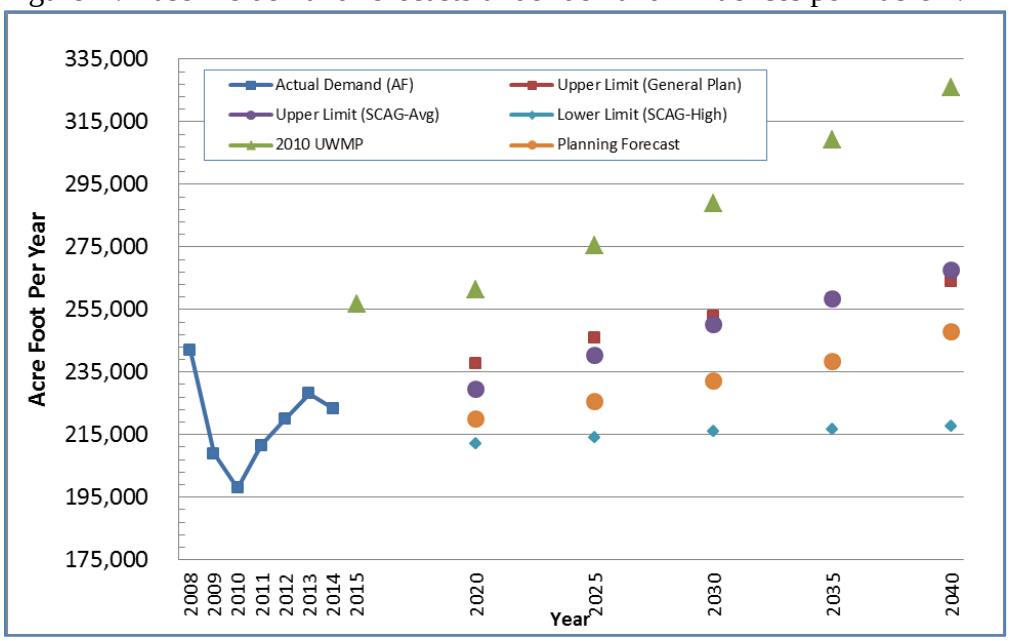


Figure B: Baseline demand forecasts under demand influences per Table 1.



Appendix 5:
Full IRP Technical Committee Identified Project List

ID	Project Name	Description	AF yield	Years to "wet water" yield	Increased groundwater in storage?	Increases water level in critical GW management zones?	Increased stormwater capture/recharge?	Increased permeability or natural infiltration for	Provide additional recycled water?	Reduce Dependence on imported water from MWD during dry	Increase local water supplies?	Emergency local supply redundancy?	Decrease reliance on local surface water during dry years?	Requires conservation in existing development?	Requires demand management in new development?	Reduce TDS and/or nitrates in GW?	Decrease net energy consumption?	Increase capacity of wet year water ("big	Eligible for grant funding?	Technical feasibility/ease of
1	Groundwater Treatment (Rehab)-Increment 1	This project category will rehabilitate an existing groundwater production wells decommissioned due to water quality concerns. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Increased well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1 will provide up to 5,000 AFY of production.	5,000	2	0	0	1	1	1	2	2	1	1	1	1	2	2	1	2	2
2	Groundwater Treatment (Rehab)-Increment 2	This project category will rehabilitate an existing groundwater production wells decommissioned due to water quality concerns. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Increased well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1 + 2 will provide up to 10,000 AFY of production.	5,000	2	0	0	1	1	1	2	2	1	1	1	1	2	2	1	2	2
3	Groundwater Treatment (new)-Increment 1	This project category will construct a new groundwater production well and treatment facility to address water quality concerns. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Increased well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1 will provide up to 5,000 AFY of production.	5,000	2	0	0	1	1	1	2	2	1	1	1	1	2	2	1	1	2
4	Groundwater Treatment (new)-Increment 2	This project category will construct a new groundwater production well and treatment facility to address water quality concerns. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Increased well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1 + 2 will provide up to 10,000 AFY of production.	5,000	2	0	0	1	1	1	2	2	1	1	1	1	2	2	1	1	2
5	Production Wells-Increment 1	With increasing groundwater recharge to the Chino Basin, new production wells may need to be constructed to recover the additional groundwater. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1 will provide up to 5,000 AFY of production	5,000	2	0	0	1	1	1	2	2	1	1	1	1	1	2	1	2	2
6	Production Wells-Increment 2	With increasing groundwater recharge to the Chino Basin, new production wells may need to be constructed to recover the additional groundwater. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1+2 will provide up to 10,000 AFY of production	5,000	2	0	0	1	1	1	2	2	1	1	1	1	1	2	1	2	2
7	Production Wells-Increment 3	With increasing groundwater recharge to the Chino Basin, new production wells may need to be constructed to recover the additional groundwater. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1-3 will provide up to 15,000 AFY of production	5,000	2	0	0	1	1	1	2	2	1	1	1	1	1	2	1	1	2
8	Production Wells-Increment 4	With increasing groundwater recharge to the Chino Basin, new production wells may need to be constructed to recover the additional groundwater. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1-4 will provide up to 20,000 AFY of production	5,000	2	0	0	1	1	1	2	2	1	1	1	1	1	2	1	1	2
9	WRCRWA RW Intertie	The Western Riverside County Regional Wastewater Authority (WRCRWA) Plant intertie would allow for the delivery of recycled water from the WRCRWA Plant to be used in the IEUA southern service area. This would also allow additional recycled water to be delivered into the northern service area groundwater recharge basins by reducing the demand from the RP-1 930 pressure zone pump station. Intertie would occur within the 800/930 Pressure Zones.	4,500	10	2	1	1	1	2	2	2	2	1	1	1	1	2	1	1	1
10	Rialto RW Intertie	The Rialto intertie project would allow for delivery of recycled water from the Rialto WWTP to be used in the IEUA service area. The intertie could occur near the RP-3 groundwater recharge basins. This concept could involve the Inland Valley Pipeline, LLC (IVP) to convey water between Rialto WWTP and IEUA's recycled water distribution system. Supply could be used for direct, GWR or other reuse strategy.	4,500	10	2	2	1	1	2	2	2	2	1	1	1	1	2	1	1	1
11	Pomona RW Exchange/Transfer	The City of Pomona does not currently use all of the treated effluent from the Pomona WRP. One concept would involve partnering to develop and expand their recycled water facilities in exchange for an agreed amount of their Chino Basin groundwater right. Could include other supply transfer agreement such as reclaimable waste and/or groundwater.	2,500	10	2	2	1	1	1	2	2	1	1	1	1	1	2	1	1	1
12	RP-1 RW Injection-Increment 1	This project would construct an advanced water filtration (e.g. process treatment that combines micro or ultrafiltration) facility at RP-1 to further treat tertiary effluent to allow the water to be injected directly into Chino Basin. The sizing of the facility and the volume to be produced will be determined as part of the portfolio development process. Increment 1 facility would be sized for 2,500 AFY.	2,500	9	2	1	1	1	1	2	2	1	1	1	1	2	0	1	2	2

13	RP-1 RW Injection-Increment 2	This project would construct an advanced water filtration (e.g. process treatment that combines micro or ultrafiltration) facility at RP-1 to further treat tertiary effluent to allow the water to be injected directly into Chino Basin. The sizing of the facility and the volume to be produced will be determined as part of the portfolio development process. Increment 1+2 facility would be sized for 5,000 AFY.	2,500	9	2	1	1	1	1	2	2	1	1	1	1	2	0	1	1	2
14	RP-1 RW Injection-Increment 3	This project would construct an advanced water filtration (e.g. process treatment that combines micro or ultrafiltration) facility at RP-1 to further treat tertiary effluent to allow the water to be injected directly into Chino Basin. The sizing of the facility and the volume to be produced will be determined as part of the portfolio development process. Increment 1-3 facility would be sized for 7,500 AFY.	2,500	9	2	1	1	1	1	2	2	1	1	1	1	2	0	1	1	2
15	Satellite RW Injection-Increment 1	This project category would construct a satellite (outside of RP-1) wastewater treatment plant with advanced water filtration (e.g. process treatment that combines micro or ultrafiltration) to allow the water to be injected directly into Chino Basin. The location, sizing and volume to be produced will be determined as part of the portfolio development process. Increment 1 facility, or facilities would have a capacity of 2,500 AFY.	2,500	5	2	2	1	1	1	2	2	1	1	1	1	2	0	1	2	2
16	Satellite RW Injection-Increment 2	This project category would construct a satellite (outside of RP-1) wastewater treatment plant with advanced water filtration (e.g. process treatment that combines micro or ultrafiltration) to allow the water to be injected directly into Chino Basin. The location, sizing and volume to be produced will be determined as part of the portfolio development process. Increment 1+2 facility, or facilities would have a capacity of 5,000 AFY.	2,500	5	2	2	1	1	1	2	2	1	1	1	1	2	0	1	1	2
17	Satellite RW Injection-Increment 3	This project category would construct a satellite (outside of RP-1) wastewater treatment plant with advanced water filtration (e.g. process treatment that combines micro or ultrafiltration) to allow the water to be injected directly into Chino Basin. The location, sizing and volume to be produced will be determined as part of the portfolio development process. Increment 1-3 facility, or facilities would have a capacity of 7,500 AFY.	2,500	5	2	2	1	1	1	2	2	1	1	1	1	2	0	1	1	2
18	Desalter Recovery Improvement	The existing Chino Basin I Desalter (CD-1) recovers approximately 75 percent of water. Improvements could be done to increase recovery to approximately 90 percent. This water would be conveyed through the existing potable water system.	1,500	3	1	1	1	1	1	2	2	1	1	1	1	2	1	1	1	2
19	RW Direct Use Expansion-Increment 1	IEUA developed a new Recycled Water Program Strategy concurrent with the IRP. This project category will be used to determine the potential interest in expanding the direct use system beyond the Agency's Ten Year CIP. Includes the reuse of regional wastewater supply, approximately 83,000 AFY by 2035 and potential recycled water interties. Increment 1 facilities would increase direct use beyond baseline supply by 5,000 AFY.	5,000	15	1	1	1	1	1	2	2	1	1	1	1	0	2	1	2	2
20	RW Direct Use Expansion-Increment 2	IEUA developed a new Recycled Water Program Strategy concurrent with the IRP. This project category will be used to determine the potential interest in expanding the direct use system beyond the Agency's Ten Year CIP. Includes the reuse of regional wastewater supply, approximately 83,000 AFY by 2035 and potential recycled water interties. Increment 1+2 facilities would increase direct use beyond baseline supply by 10,000 AFY.	5,000	20	1	1	1	1	1	2	2	1	1	1	1	0	2	1	1	2
21	RW Direct Use Expansion-Increment 3	IEUA developed a new Recycled Water Program Strategy concurrent with the IRP. This project category will be used to determine the potential interest in expanding the direct use system beyond the Agency's Ten Year CIP. Includes the reuse of regional wastewater supply, approximately 83,000 AFY by 2035 and potential recycled water interties. Increment 1-3 facilities would increase direct use beyond baseline supply by 15,000 AFY.	5,000	25	1	1	1	1	1	2	2	1	1	1	1	0	2	1	1	2
22	RW Direct Use Expansion-Increment 4	IEUA developed a new Recycled Water Program Strategy concurrent with the IRP. This project category will be used to determine the potential interest in expanding the direct use system beyond the Agency's Ten Year CIP. Includes the reuse of regional wastewater supply, approximately 83,000 AFY by 2035 and potential recycled water interties. Increment 1-4 facilities would increase direct use beyond baseline supply by 20,000 AFY.	5,000	25	1	1	1	1	1	2	2	1	1	1	1	0	2	1	1	2
23	Existing GWR Basin Improvements beyond RMPU-Increment 1	The 2013 Chino Basin RMPU recommended a set of preferred projects to improve recharge at the existing groundwater spreading basins. This project category represents the next increment of additional groundwater recharge (imported water and/or recycled water) capable at the existing facilities. Increment 1 facilities would increase recharge at existing basins within the Chino Basin by an additional 2,500 AFY.	2,500	15	2	2	1	1	1	2	2	1	1	1	1	0	2	1	2	2
24	Existing GWR Basin Improvements beyond RMPU-Increment 2	The 2013 Chino Basin RMPU recommended a set of preferred projects to improve recharge at the existing groundwater spreading basins. This project category represents the next increment of additional groundwater recharge (imported water and/or recycled water) capable at the existing facilities. Increment 1+2 facilities would increase recharge at existing basins within the Chino Basin by an additional 5,000 AFY.	2,500	20	2	2	1	1	1	2	2	1	1	1	1	0	2	1	2	2
25	Existing GWR Basin Improvements beyond RMPU-Increment 3	The 2013 Chino Basin RMPU recommended a set of preferred projects to improve recharge at the existing groundwater spreading basins. This project category represents the next increment of additional groundwater recharge (imported water and/or recycled water) capable at the existing facilities. Increment 1-3 facilities would increase recharge at existing basins within the Chino Basin by an additional 10,000 AFY.	5,000	25	2	2	1	1	1	2	2	1	1	1	1	0	2	1	1	2

26	Existing GWR Basin Improvements beyond RMPU-Increment 4	The 2013 Chino Basin RMPU recommended a set of preferred projects to improve recharge at the existing groundwater spreading basins. This project category represents the next increment of additional groundwater recharge (imported water and/or recycled water) capable at the existing facilities. Increment 1-4 facilities would increase recharge at existing basins within the Chino Basin by an additional 15,000 AFY.	5,000	25	2	2	1	1	1	2	2	1	1	1	1	0	2	1	1	2
27	Construct New GWR Basins-Increment 1	Purchase land to construct new groundwater recharge basins in the service area to capture additional stormwater, recycled water and/or imported water for groundwater recharge. Increment 1 would provide up to an additional 2,450 AFY of recharge capacity, which is approximately one new basin at 350 AF per month for 7 months of operation.	2,450	10	2	2	2	1	1	2	2	1	1	1	1	0	2	1	1	2
28	Construct New GWR Basins-Increment 2	Purchase land to construct new groundwater recharge basins in the service area to capture additional stormwater, recycled water and/or imported water for groundwater recharge. Increment 1+2 would provide up to an additional 4,900 AFY of recharge capacity, which is approximately 2 new basins at 350 AF per month for 7 months of operation.	2,450	15	2	2	2	1	1	2	2	1	1	1	1	0	2	1	1	2
29	Construct New GWR Basins-Increment 3	Purchase land to construct new groundwater recharge basins in the service area to capture additional stormwater, recycled water and/or imported water for groundwater recharge. Increment 1-3 would provide up to an additional 7,350 AFY of recharge capacity, which is approximately 3 new basins at 350 AF per month for 7 months of operation.	2,450	20	2	2	2	1	1	2	2	1	1	1	1	0	2	1	1	2
30	Construct New GWR Basins-Increment 4	Purchase land to construct new groundwater recharge basins in the service area to capture additional stormwater, recycled water and/or imported water for groundwater recharge. Increment 1-4 would provide up to an additional 9,800 AFY of recharge capacity, which is approximately 4 new basins at 350 AF per month for 7 months of operation.	2,450	20	2	2	2	1	1	2	2	1	1	1	1	0	2	1	1	2
31	ASR wells MZ1 and MZ2	Construct aquifer storage and recovery (ASR) wells to increase improted water groundwater recharge within management zone 1 and 2. Reference projects were taken from the 2010 RMPU, Sections 6.7.2.1 and 3 for CVWD and the City of Ontario.	11,500	5	2	2	1	1	1	0	2	1	1	1	1	2	0	1	2	2
32	ASR wells MZ3	Construct aquifer storage and recovery (ASR) wells to increase imported water groundwater recharge within management zone 3. Reference projects were taken from the 2010 RMPU, Sections 6.7.2.2 for JCSD.	3,500	5	2	2	1	1	1	0	2	1	1	1	1	2	0	1	2	2
33	Maximize ASR wells	Construct other aquifer storage and recovery (ASR) wells to increase imported water groundwater recharge by 3,500 AFY within the Chino Basin during wet and dry years. Assume benefit 40% of the time (2 in 5 years). Storage to be dependent on supplemental water availability in wet years	3,500	5	2	2	1	1	1	0	2	1	1	1	1	2	0	1	1	2
34	Cadiz IW Transfer	The Cadiz project would allow for the import of unused groundwater from the remote Fenner Valley near Cadiz, California. For the purposes of the IRP, a 5,000 AFY increment of water is assumed. The Cadiz supply would be transferred and taken as SWP water into the Chino Basin.	5,000	20	2	1	1	1	1	2	2	1	1	1	1	0	1	1	1	1
35	Secure SWP IW transfer outside MWD	Imported water supply is solely from MWD via the SWP and is limited by the Agency's purchase order. Other permanent, temporary or seasonally available imported water supplies could be purchased and wheeled into the Chino Basin. The volume of water available varies depending on the source of water and timing. Supplies could be purchased from various Irrigation Districts or secured via Ag Transfer. Assume benefit 1 in 10 years	5,000	10	2	1	1	1	1	1	2	1	1	1	1	1	0	2	1	1
36	SBVMWD IW Transfer	As a SWP contractor, San Bernardino Valley MWD (SBVMWD) has a Table A allocation. This option would involve constructing an intertie between SBVMWD's imported water system. The supply would be temporary or seasonally available and could be purchased and wheeled into the Chino Basin. Assume benefit 1 in 5 years.	5,000	5	2	1	1	1	1	1	2	1	1	1	1	2	0	2	1	1
37	Ocean Desalination Exchange	This project category would involve a partnership with another water agency pursuing ocean water desalination; through in-lieu exchange, the Chino basin would obtain an agreed amount of imported water. For the purposes of the IRP, a volume of 5,000 AFY was chosen. Opportunity to invest in upcoming ocean desalination plants includes Huntington Beach, Carlsbad and West Basin.	5,000	10	2	1	1	1	1	1	2	1	1	1	1	2	0	1	1	1
38	Six Basin Water Transfer	This project would explore the idea of developing a water transfer agreement with Six Basins. One concept is to purchase imported water for recharge into Six Basins and get in return equal volume of groundwater underflow plus agreed amount of stormwater. For example, could purchase 10,000 AF of IW for exchange of 10,000 AF of groundwater plus 7,000 AF of stormwater. Assume benefit 1 in 5 years.	17,000	5	2	2	2	1	1	2	2	1	1	1	1	2	0	1	0	1
39	Expand WUE Devices	Implement additional targeted device related savings to reduce demand beyond current annual water use efficiency savings. Provide incentives and pilot programs to roll out extremely high efficient indoor fixtures and toilets. To be verified with WUEBP.	5,000	1	1	1	1	1	1	2	2	1	1	2	2	1	2	1	1	2
40	WUE - Turf Removal-Increment 1	Implement turf removal and landscape transformational programs to reduce outdoor demand. To be verified with WUEBP. Increment 1 would provide up to 5,000 AFY of savings.	5,000	1	1	1	1	1	1	2	2	1	1	2	2	1	2	1	1	2
41	WUE - Turf Removal-Increment 2	Implement turf removal and landscape transformational programs to reduce outdoor demand. To be verified with WUEBP. Increment 1+2 would provide up to 10,000 AFY of savings.	5,000	1	1	1	1	1	1	2	2	1	1	2	2	1	2	1	1	2
42	WUE - Turf Removal-Increment 3	Implement turf removal and landscape transformational programs to reduce outdoor demand. To be verified with WUEBP. Increment 1-3 would provide up to 15,000 AFY of savings.	5,000	1	1	1	1	1	1	2	2	1	1	2	2	1	2	1	1	2
43	WUE - Budget Rates-Increment 1	Implement water budget based rates for 2 member agencies (assuming 15% total savings per Agency after 3 years). To be verified with WUEBP. Increment 1 would provide up to 13,350 AFY of savings.	13,350	1	1	1	1	1	1	2	2	1	1	2	2	1	2	1	2	2

44	WUE - Budget Rates-Increment 2	Implement water budget based rates for 2 member agencies (assuming 15% total savings per Agency after 3 years). To be verified with WUEBP. Increment 1 would provide up to 26,700 AFY of savings.	13,350	1	1	1	1	1	1	2	2	1	1	2	2	1	2	1	2	2
45	WUE - Budget Rates-Increment 3	Implement water budget based rates for 2 member agencies (assuming 15% total savings per Agency after 3 years). To be verified with WUEBP. Increment 1 would provide up to 40,050 AFY of savings.	13,350	1	1	1	1	1	1	2	2	1	1	2	2	1	2	1	2	2
46	WUE- RW Demand Management-Increment 1	Implement demand management devices and programs for direct recycled water customers. Does not generate additional supply, aids in managing the supply during peak demand. Increment 1 would provide 2,500 AFY of demand management, this supply could be used for increasing direct use demands, groundwater recharge or other reuse strategy.	2,500	1	1	1	1	1	1	2	2	2	1	2	2	1	2	1	2	2
47	WUE- RW Demand Management-Increment 2	Implement demand management devices and programs for direct recycled water customers. Does not generate additional supply, aids in managing the supply during peak demand. Increment 1+2 would provide 5,000 AFY of demand management, this supply could be used for increasing direct use demands, groundwater recharge or other reuse strategy.	2,500	1	1	1	1	1	1	2	2	2	1	2	2	1	2	1	2	2
48	Dry Weather Flow Diversions	Capture and treat urban dry weather flow from Chino, Cucamonga and San Sevaine Creek into the Regional Plants. For the purposes of the IRP, a volume of 3,500 AFY was assumed as total available dry weather flow.	3,500	5	2	1	2	1	2	2	2	1	0	1	1	1	2	1	1	2
52	San Antonio Creek SW Capture	Modify existing basins along San Antonio Creek to increase stormwater capture beyond the 2013 RMPU. Increase facilities to better accommodate the “big gulp” concept. Assume benefit 1 in 5 years	1,000	10	2	1	2	1	2	2	2	1	0	1	1	2	2	1	2	2
53	Cucamonga Creek SW Capture	Modify existing basins along Cucamonga Creek to increase stormwater capture beyond the 2013 RMPU. Increase facilities to better accommodate the “big gulp” concept. Assume benefit 1 in 5 years.	2,500	10	2	1	2	1	2	2	2	1	0	1	1	2	2	1	2	2
54	Day Creek SW Capture	Modify existing basins along Day Creek to increase stormwater capture beyond the 2013 RMPU. Increase facilities to better accommodate the “big gulp” concept. Assume benefit 1 in 5 years.	2,500	10	2	1	2	1	2	2	2	1	0	1	1	2	2	1	2	2
55	San Sevaine Creek SW Capture	Modify existing basins along San Sevaine Creek to increase stormwater capture beyond the 2013 RMPU. Increase facilities to better accommodate the “big gulp” concept. Assume benefit 1 in 5 years.	2,500	10	2	1	2	1	2	2	2	1	0	1	1	2	2	1	2	2
56	Water Banking Facility	This project category would invest into the Semitropic Groundwater Storage Bank in Kern County or similar program. The Chino Basin could bank additional purchases of wet year water when these supplies are available and Chino Basin facilities are capacity limited.	5,000	10	1	1	1	1	1	2	2	1	1	1	1	1	1	2	0	1
58	Regional LID-Increment 1	Construct or modify urban development to better manage and infiltrate rainfall at the source. Projects could include bioswales and or pervious concrete installation in parking lots, street drainages. Increment 1 facilities could provide up to 5,000 AFY of recharge.	5,000	5	2	1	2	2	1	1	2	1	1	1	1	2	2	2	2	2
59	Regional LID-Increment 2	Construct or modify urban development to better manage and infiltrate rainfall at the source. Projects could include bioswales and or pervious concrete installation in parking lots, street drainages. Increment 1+2 facilities could provide up to 10,000 AFY of recharge.	5,000	5	2	1	2	2	1	1	2	1	1	1	1	2	2	2	2	2
60	Direct Potable Reuse-Increment 1	This project would construct an advanced water filtration and treatment (e.g. process treatment that combines micro or ultrafiltration) facility at a Regional Plant. The treatment process would allow the recycled water to be introduced into the potable water system. Increment 1 facility would have a capacity of 5,000 AFY.	5,000	10	1	1	1	1	1	2	2	1	1	1	1	2	0	1	2	2
61	Direct Potable Reuse-Increment 2	This project would construct an advanced water filtration and treatment (e.g. process treatment that combines micro or ultrafiltration) facility at a Regional Plant. The treatment process would allow the recycled water to be introduced into the potable water system. Increment 1+2 facility would have a capacity of 10,000 AFY.	5,000	10	1	1	1	1	1	2	2	1	1	1	1	2	0	1	2	2
62	Cucamonga Basin Improvements	This project category will identify projects that would result in additional groundwater production benefits coming into the IEUA service area from the Cucamonga Basin. Includes recharge facilities, treatment and production facilities to maximize supply coming into the Chino Basin.	2,500	5	2	2	2	1	1	2	2	1	1	1	1	0	2	1	2	2
63	Maximize Other Groundwater	This project category will identify local member agency projects that would result in additional groundwater production benefits coming into the IEUA service area outside of the Chino Basin.	5,000	5	1	1	1	1	1	2	2	1	1	1	1	1	2	2	1	2
65	RP-1 NRWS Treatment	The north Non Reclaimable Wastewater System (NRWS) discharges approx.. 3.5 MGD of brine to Los Angeles County annually. The project would construct a treatment facility to allow the Region to reuse this supply into the recycled water system. Requires plant expansion and partial reverse osmosis for blending.	3,920	9	2	1	1	1	2	2	2	1	1	1	1	2	1	1	2	2
66	WUE - Advanced Metering Technologies	Install advanced metering infrastructure (AMI) between retail meters and a utility provider. Will provide real-time data about consumption and allow customers to make informed choices about usage.	5,000	$ 3	1	1	1	1	1	2	2	1	1	2	2	1	2	1	1	2
87	Prior Stored Chino Groundwater	This category will allow supply to be taken from groundwater stored in the Chino Basin, pre 2014. It is estimated that approximately 400,000 AF of stored groundwater is available, of which 280,000 AF is made available for IEUA member agencies. This supply category will be managed on a case by case basis as selected into the Regional supply portfolios. The supply will be limited, but can be used annually or intermittent as needed.	8,400	1	0	0	1	1	1	2	2	1	1	1	1	2	2	1	2	2
88	Maximize Local Surface Water	This category of projects will construct facilities needed to capture additional local surface water. Projects to be defined by IEUA's member agencies. For example, increase surface flows off Lytle Creek in wet years. Assume benefit 3 in 5 years	1,000	1	2	1	2	1	2	2	2	1	0	1	1	2	2	1	2	2

89	Max Tier 1 MWD Imported Water-Increment 1	Maximize imported water from MWD at Tier 1 rate. Total available supply at Tier 1 rate is 93,283 AFY or cumulative purchase order maximum of 932,830 AF through December 31, 2024. Supply can be taken directly, in-lieu or for supplemental recharge. Increment 1 would allow for the purchase of an additional 7,850 AFY. Can be purchased annually or intermittently.	7,850	1	2	2	1	1	1	0	0	1	1	1	1	2	0	1	1	2
90	Max Tier 1 MWD Imported Water-Increment 2	Maximize imported water from MWD at Tier 1 rate. Total available supply at Tier 1 rate is 93,283 AFY or cumulative purchase order maximum of 932,830 AF through December 31, 2024. Supply can be taken directly, in-lieu or for supplemental recharge. Increment 1+2 would allow for the purchase of an additional 15,700 AFY. Can be purchased annually or intermittent.	7,850	1	2	2	1	1	1	0	0	1	1	1	1	2	0	1	1	2
91	Max Tier 1 MWD Imported Water-Increment 3	Maximize imported water from MWD at Tier 1 rate. Total available supply at Tier 1 rate is 93,283 AFY or cumulative purchase order maximum of 932,830 AF through December 31, 2024. Supply can be taken directly, in-lieu or for supplemental recharge. Increment 1-3 would allow for the purchase of an additional 23,550 AFY. Can be purchased annually or intermittent.	7,850	1	2	2	1	1	1	0	0	1	1	1	1	2	0	1	1	2
92	Max Tier 2 MWD Imported Water-Increment 1	Maximize imported water from MWD at Tier 2 rate. Could be taken annually or intermittent, availability pending MWD supply. Supply can be taken directly, in-lieu or for supplemental recharge. Increment 1 would allow for the purchase of an additional 5,000 AFY. Can be purchased annually or intermittent.	5,000	3	2	2	1	1	1	0	0	1	1	1	1	2	0	1	1	2
93	Max Tier 2 MWD Imported Water-Increment 2	Maximize imported water from MWD at Tier 2 rate. Could be taken annually or intermittent, availability pending MWD supply. Supply can be taken directly, in-lieu or for supplemental recharge. Increment 1+2 would allow for the purchase of an additional 10,000 AFY. Can be purchased annually or intermittent.	5,000	3	2	2	1	1	1	0	0	1	1	1	1	2	0	1	1	2
94	Max Tier 2 MWD Imported Water-Increment 3	Maximize imported water from MWD at Tier 2 rate. Could be taken annually or intermittent, availability pending MWD supply. Supply can be taken directly, in-lieu or for supplemental recharge. Increment 1-3 would allow for the purchase of an additional 15,000 AFY. Can be purchased annually or intermittently.	5,000	3	2	2	1	1	1	0	0	1	1	1	1	2	0	1	1	2
95	MWD Replenishment or discount wet year water-Increment 1	Maximize replenishment or discount wet year imported water from MWD. Availability pending MWD supply and pricing. Supply can be taken in-lieu or for supplemental recharge. Increment 1 would allow for the purchase of an additional 10,000 AFY. Can be purchased annually or intermittently. Assume benefit after 2 consecutive wet years (assume 1 in 15 years)	10,000	5	2	2	1	1	1	0	2	1	1	1	1	2	0	2	1	2
96	MWD Replenishment or discount wet year water-Increment 2	Maximize replenishment or discount wet year imported water from MWD. Availability pending MWD supply and pricing. Supply can be taken in-lieu or for supplemental recharge. Increment 1+2 would allow for the purchase of an additional 20,000 AFY. Can be purchased annually or intermittently. Assume benefit after 2 consecutive wet years (assume 1 in 15 years)	10,000	8	2	2	1	1	1	0	2	1	1	1	1	2	0	2	1	2
97	MWD Replenishment or discount wet year water-Increment 3	Maximize replenishment or discount wet year imported water from MWD. Availability pending MWD supply and pricing. Supply can be taken in-lieu or for supplemental recharge. Increment 1-3 would allow for the purchase of an additional 30,000 AFY. Can be purchased annually or intermittently. Assume benefit after 2 consecutive wet years (assume 1 in 15 years)	10,000	10	2	2	1	1	1	0	2	1	1	1	1	2	0	2	1	2
98	Watershed Wide Water Transfers	This category of projects will construct or arrange other water transfers external to the Chino Basin. For example, dry weather flow exchange of recycled water to Orange County Water District for an equivalent amount of purchased imported water. For the purposes of the IRP, it is assumed that this category of projects will not increase supply, but increases reliability and/or quality. To occur annually or intermittent. Resiliency and flexibility benefit only	-	5	1	1	1	1	1	2	2	2	1	1	1	2	2	1	2	2
99	Chino Basin Water Transfers	This category of projects will construct or arrange other water transfers within the Chino Basin. Projects to also include inter-agency interties for increased reliability. For the purposes of the IRP, it is assumed that this category of projects will not increase supply, but increases reliability. To occur annually or intermittent.	-	5	2	2	1	1	1	2	2	2	1	1	1	2	2	1	2	2
100	Reliability Production Wells	This project category will construct new production wells needed to replace lost production or under performing facilities. These projects will maintain current annual groundwater production deliveries and are intended to increase operational flexibility and reliability. Increment 1 varies in capacity and will be determined on a case by case basis as selected into each of the regional supply portfolios.	-	2	0	0	1	1	1	2	2	1	1	1	1	1	2	1	2	2

Appendix 6:

Project Lists for Water Resource Strategy Portfolios 1-8

Project List for Strategy A Portfolio 1

Strategy A		
Project ID #	Portfolio 1	Project Name
1	x	Groundwater Treatment (Rehab)-Increment 1
2	x	Groundwater Treatment (Rehab)-Increment 2
5	x	Production Wells-Increment 1
6	x	Production Wells-Increment 2
23	x	Existing GWR Basin Improvements beyond RMPU-Increment 1
24	x	Existing GWR Basin Improvements beyond RMPU-Increment 2
25	x	Existing GWR Basin Improvements beyond RMPU-Increment 3
26	x	Existing GWR Basin Improvements beyond RMPU-Increment 4
46	x	WUE- RW Demand Management-Increment 1
47	x	WUE- RW Demand Management-Increment 2
87	x	Prior Stored Chino Groundwater
88	x	Maximize Local Surface Water

Project List for Strategy B Portfolios 2 & 3

Strategy B			
Project ID #	Portfolio 2	Portfolio 3	Project Name
1	x	x	Groundwater Treatment (Rehab)-Increment 1
5	x	x	Production Wells-Increment 1
9	x	x	WRCRWA RW Intertie
11	x	x	Pomona RW Exchange/Transfer
12	x	x	RP-1 RW Injection-Increment 1
19	x	x	RW Direct Use Expansion-Increment 1
20	x	x	RW Direct Use Expansion-Increment 2
23	x	x	Existing GWR Basin Improvements beyond RMPU-Increment 1
24	x	x	Existing GWR Basin Improvements beyond RMPU-Increment 2
25	x	x	Existing GWR Basin Improvements beyond RMPU-Increment 3
26	x	x	Existing GWR Basin Improvements beyond RMPU-Increment 4
27	x	x	Construct New GWR Basins-Increment 1
35		x	Secure SWP IW transfer outside MWD from Irrigation Districts or Ag Transfers
36		x	SBVMWD IW Transfer
38		x	Six Basin Groundwater Transfer
39	x	x	Expand WUE Devices
48	x	x	Dry Weather Flow Diversions
89		x	Max Tier 1 MWD Imported Water-Increment 1

Project List for Strategy C Portfolios 4 & 5

Strategy C			
Project ID #	Portfolio 4	Portfolio 5	Project Name
12	x	x	RP-1 RW Injection-Increment 1
13	x	x	RP-1 RW Injection-Increment 2
14	x	x	RP-1 RW Injection-Increment 3
21	x	x	RW Direct Use Expansion-Increment 3
23	x	x	Existing GWR Basin Improvements beyond RMPU-Increment 1
24	x	x	Existing GWR Basin Improvements beyond RMPU-Increment 2
25	x	x	Existing GWR Basin Improvements beyond RMPU-Increment 3
33	x	x	Maximize ASR wells
35		x	Secure SWP IW transfer outside MWD
36		x	SBVMWD IW Transfer
38		x	Six Basin Water Transfer
39	x	x	Expand WUE Devices
40		x	WUE - Turf Removal-Increment 1
43	x	x	WUE - Budget Rates-Increment 1
44	x	x	WUE - Budget Rates-Increment 2
45		x	WUE - Budget Rates-Increment 3
46	x	x	WUE- RW Demand Management-Increment 1
47	x	x	WUE- RW Demand Management-Increment 2
66	x	x	WUE - Advanced Metering Technologies
88	x	x	Maximize Local Surface Water
95	x	x	MWD Replenishment or discount wet year water-Increment 1
96		x	MWD Replenishment or discount wet year water-Increment 2

Project List for Strategy D Portfolio 6

Strategy D		
Project ID #	Portfolio 6	Project Name
9	x	WRCRWA Intertie
10	x	Rialto Intertie
36	x	SBVMWD IW Transfer
38	x	Six Basin Groundwater Transfer
43	x	WUE - Budget Rates- Increment 1 (2 agencies, 15% savings per agency)
56	x	Water Banking Facility - Increment 1
62	x	Cucamonga Basin Upgrades
87	x	Prior Stored Chino Groundwater
95	x	MWD Replenishment or discount wet year water-Increment 1

Project List for Strategy E Portfolios 7 & 8

Strategy E			
Project ID #	Portfolio 7	Portfolio 8	Project Name
9		x	WRCRWA Intertie
11		x	Pomona RW Exchange/Transfer
12		x	RP-1 advanced treatment RW Injection - Increment 1
19		x	Recycled Water Direct Use System Expansion - Increment 1
20		x	Recycled Water Direct Use System Expansion- 5,000 AF increment 2
23		x	Existing GWR Basin Improvements beyond RMPU - Increment 1
24		x	Existing GWR Basin Improvements beyond RMPU- 2,500 AF increment 2
25		x	Existing GWR Basin Improvements beyond RMPU- 5,000 AF increment 3
26		x	Existing GWR Basin Improvements beyond RMPU- 5,000 AF increment 4
27		x	Purchase Land to Construct New GWR Basins - Increment 1
36	x	x	SBVMWD IW Transfer
43	x	x	WUE - Budget Rates- Increment 1 (2 agencies, 15% savings per agency)
66	x	x	Advanced Metering Technologies
89	x	x	Max Tier 1 MWD Imported Water-Increment 1
90	x	x	Max Tier 1 MWD Imported Water-Increment 2
91	x	x	Max Tier 1 MWD Imported Water-Increment 3

Baseline Supply Forecast to 2040

Acre-Foot per Year (AFY)

FY End	Total Regional Supply	Total Urban Supply	Total Potable Supply	Imported-MWD	GW-Chino	GW-Other	Local Surface	Total RW-Direct	RW-Direct Ag	StormWater	RW-Direct	RW-GWR	Desalted-CDA	Other	RW-SAR Obligation	Supp. Recharge
09-10	226,290.0	209,290.0	201,004.1	38,243.9	105,594.8	17,286.6	13,109.9	17,312.8	9,026.9	-	8,285.9	7,208.0	14,623.6	12,145.4	17,000.0	
11	212,744.8	195,744.8	186,762.4	42,730.2	88,366.5	14,459.1	18,761.3	16,655.9	7,673.5	-	8,982.4	8,028.0	14,440.8	8,004.6	17,000.0	
12	222,230.9	205,230.9	194,886.1	52,876.1	85,345.8	19,507.2	16,744.3	20,605.5	10,260.8	-	10,344.8	8,634.0	13,961.0	6,451.8	17,000.0	
13	233,004.3	216,004.3	203,379.7	59,013.0	95,955.5	21,145.4	5,980.2	21,840.0	9,215.4	-	12,624.6	10,479.0	13,671.4	7,614.2	17,000.0	
14	240,435.2	223,435.2	208,836.9	67,055.4	77,429.9	38,092.2	3,658.3	24,657.2	10,058.9	-	14,598.3	13,593.0	14,735.4	7,865.8	17,000.0	
15	251,837.3	234,837.3		65,000.0	90,538.5	22,098.1	11,650.8	24,600.0	8,550.0	-	16,050.0	14,500.0	15,000.0		17,000.0	
16	261,910.8	244,910.8		69,752.0	90,538.5	22,098.1	11,650.8	25,426.0	7,267.5	-	18,158.5	14,980.0	17,733.0	-	17,000.0	
17	264,306.9	247,306.9		69,752.0	90,538.5	22,098.1	11,650.8	26,252.0	6,177.4	-	20,074.6	15,460.0	17,733.0	-	17,000.0	
18	266,539.6	249,539.6		69,752.0	90,538.5	22,098.1	11,650.8	27,078.0	5,250.8	-	21,827.2	15,940.0	17,733.0	-	17,000.0	
19	268,633.2	251,633.2		69,752.0	90,538.5	22,098.1	11,650.8	27,904.0	4,463.2	-	23,440.8	16,420.0	17,733.0	-	17,000.0	
20	277,736.2	260,736.2		69,752.0	91,266.0	22,098.1	11,650.8	28,730.0	3,793.7	6,400	24,936.3	16,900.0	17,733.0	-	17,000.0	
21	279,047.2	262,047.2		69,752.0	91,266.0	22,098.1	11,650.8	29,112.0	3,224.6	6,400	25,887.4	17,260.0	17,733.0	-	17,000.0	
22	280,272.9	263,272.9		69,752.0	91,266.0	22,098.1	11,650.8	29,494.0	2,740.9	6,400	26,753.1	17,620.0	17,733.0	-	17,000.0	
23	281,426.1	264,426.1		69,752.0	91,266.0	22,098.1	11,650.8	29,876.0	2,329.8	6,400	27,546.2	17,980.0	17,733.0	-	17,000.0	
24	282,517.5	265,517.5		69,752.0	91,266.0	22,098.1	11,650.8	30,258.0	1,980.3	6,400	28,277.7	18,340.0	17,733.0	-	17,000.0	
25	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	
26	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	
27	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	
28	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	
29	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	
30	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	
31	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	-
32	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	-
33	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	-
34	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	-
35	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	-
36	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	-
37	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	-
38	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	-
39	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	-
40	283,556.6	266,556.6		69,752.0	91,266.0	22,098.1	11,650.8	30,640.0	1,683.3	6,400	28,956.7	18,700.0	17,733.0	-	17,000.0	-

Chino Basin Groundwater - Baseline Supply Calculation

Chino Groundwater baseline Supply Calculation Sheet

GW Pumping - Available to Appropriators	Year 2040	
Developed Yield	135,000	
SARUNY	-	50% of CDA Production
Operating Safe Yield	135,000	OSY = DY - SARUNY
Ag	5,000	at 2040
Non-Ag	3,000	at 2040
Operating Safe Yield Available to Appropriators	127,000	AFY
IEUA Member Share of OSY Available to Appropriators (%)	71.9%	See below
IEUA Member Share of OSY Available to Appropriators	91,266	AFY
IEUA Member Share of SARUNY Credit (%)	57%	Based upon FY2012-13 productions
IEUA Member Share of SARUNY Credit	-	AFY
Total IEUA Member Share of GW available to Appropriators	91,266	Included SY + SARUNY credit

APPROPRIATIVE RIGHTS
(AS OF JUNE 30, 2011)

Party	Appropriative Right (Acre-Feet)	Share of Initial Operating Safe Yield (Acre-Feet)	Share of Operating Safe Yield (Percent)
City of Chino [A]	5,794.25	4,033.857	7.356
City of Chino Hills [B]	3,032.86	2,111.422	3.851
City of Norco	289.50	201.545	0.368
City of Ontario	16,337.40	11,373.515	20.742
City of Pomona	15,110.50	11,215.852	20.454
City of Upland	4,007.20	2,882.401	5.202
Cucamonga Valley Water District [C]	5,199.00	3,619.454	6.601
Jurupa Community Services District [D]	2,900.50	2,061.115	3.759
Monte Vista Water District [E]	6,929.15	4,823.954	8.797
West Valley Water District [F]	926.50	644.817	1.175
Fontana Union Water Company [G]	9,161.12	6,391.736	11.657
Fontana Water Company [H]	1.44	1.000	0.002
Los Serranos County Club [I]	-	-	-
Marygold Mutual Water Company	941.30	655.317	1.195
Monte Vista Irrigation Company	972.10	676.759	1.234
Niagara Bottling, LLC [J]	-	-	-
Nicholson Trust [K]	5.75	4.000	0.007
San Antonio Water Company	2,164.50	1,506.888	2.748
Santa Ana River Water Company	1,860.30	1,301.374	2.373
Golden State Water Company [L]	591.05	411.475	0.750
West End Consolidated Water Company	1,361.30	947.714	1.728
San Bernardino County (Shooting Park) [M]	-	-	-
Arrowhead Mountain Springs Water Company [N]	-	-	-
City of Fontana [O]	-	-	-
Total	78,763.82	54,634.000	100.000

[A] In 1950, Chino received a portion of San Bernardino County Water Works #8 (WWW8) OSY (363.730 AF) as a result of a permanent transfer.
[B] City of Chino Hills incorporated in 1991 and assumed the responsibility for providing the public services formerly provided by WWW8. WWW8 acquired a portion of the rights of Park and Pomona Valley Water Companies in 1962.
[C] CCWD acquired the rights to Etiwanda Water Company (upon dissolution) in 1966. CCWD changed its name to CVWD in 2004.
[D] JCSD acquired the rights of Mira Loma Water Company in 1979 (775.940 AF OSY), Feldspar Gardens in 1986 (47.543AF OSY) and Mutual Water Company of Glen Avon Heights in 1997 (467.374 AF OSY).
[E] MVCWD changed its name to MVWD in 1980. In 1990, MVWD received 675.516 AF of WWW8 OSY as a result of a permanent transfer.
[F] WVBCWD changed its name to WVWD in 2003.
[G] In FY 01-02, 5,000 AF OSY was reassigned: 1,000 AF to FWC and 4,000 AF to the Nicholson Trust.
[H] FWC intervened in 1985 and was assigned 1.000 AF OSY as a result of a permanent transfer of water rights from FUWC.
[I] Los Serranos intervened into the Appropriative Pool in 1990 with 0.000 AF OSY, and it was later determined that they are not within the Basin.
[J] Niagara Bottling intervened in FY 02-03 with 0.000 AF OSY.
[K] Nicholson Trust intervened in FY 01-02 and was assigned 4.000 AF OSY as a result of a permanent transfer of water rights from FUWC.
[L] GSWC permanently transferred 823.500 AF OSY to Park Water Company in 1960. Park Water Co was acquired by WWW8 which was subsequently acquired by the City of Chino Hills. SGWC changed its name to GSWC in 2005.
[M] San Bernardino County Prado Tire (now known as Prado Shooting Park) was involuntarily reassigned to the Appropriative Pool from the Agricultural Pool in 1996.
[N] Arrowhead intervened in 1992 with 0.000 AF OSY.
[O] City of Fontana intervened in 1998 with 0.000 AF OSY.

Inland Empire Utilities Agency
6075 Kimball Avenue
Chino, CA 91708
Phone: (909) 993-1600
www.ieua.org

Appendix D:
2015 Integrated Water Resources Plan: Mitigation Actions
IEUA Drought Contingency Plan

Appendix 5:
Full IRP Technical Committee Identified Project List

ID	Project Name	Description	AF yield	Years to "wet water" yield	Increased groundwater in storage?	Increases water level in critical GW management zones?	Increased stormwater capture/recharge?	Increased permeability or natural infiltration for	Provide additional recycled water?	Reduce Dependence on imported water from MWD during dry	Increase local water supplies?	Emergency local supply redundancy?	Decrease reliance on local surface water during dry years?	Requires conservation in existing development?	Requires demand management in new development?	Reduce TDS and/or nitrates in GW?	Decrease net energy consumption?	Increase capacity of wet year water ("big	Eligible for grant funding?	Technical feasibility/ease of
1	Groundwater Treatment (Rehab)-Increment 1	This project category will rehabilitate an existing groundwater production wells decommissioned due to water quality concerns. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Increased well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1 will provide up to 5,000 AFY of production.	5,000	2	0	0	1	1	1	2	2	1	1	1	1	2	2	1	2	2
2	Groundwater Treatment (Rehab)-Increment 2	This project category will rehabilitate an existing groundwater production wells decommissioned due to water quality concerns. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Increased well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1 + 2 will provide up to 10,000 AFY of production.	5,000	2	0	0	1	1	1	2	2	1	1	1	1	2	2	1	2	2
3	Groundwater Treatment (new)-Increment 1	This project category will construct a new groundwater production well and treatment facility to address water quality concerns. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Increased well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1 will provide up to 5,000 AFY of production.	5,000	2	0	0	1	1	1	2	2	1	1	1	1	2	2	1	1	2
4	Groundwater Treatment (new)-Increment 2	This project category will construct a new groundwater production well and treatment facility to address water quality concerns. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Increased well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1 + 2 will provide up to 10,000 AFY of production.	5,000	2	0	0	1	1	1	2	2	1	1	1	1	2	2	1	1	2
5	Production Wells-Increment 1	With increasing groundwater recharge to the Chino Basin, new production wells may need to be constructed to recover the additional groundwater. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1 will provide up to 5,000 AFY of production	5,000	2	0	0	1	1	1	2	2	1	1	1	1	1	2	1	2	2
6	Production Wells-Increment 2	With increasing groundwater recharge to the Chino Basin, new production wells may need to be constructed to recover the additional groundwater. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1+2 will provide up to 10,000 AFY of production	5,000	2	0	0	1	1	1	2	2	1	1	1	1	1	2	1	2	2
7	Production Wells-Increment 3	With increasing groundwater recharge to the Chino Basin, new production wells may need to be constructed to recover the additional groundwater. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1-3 will provide up to 15,000 AFY of production	5,000	2	0	0	1	1	1	2	2	1	1	1	1	1	2	1	1	2
8	Production Wells-Increment 4	With increasing groundwater recharge to the Chino Basin, new production wells may need to be constructed to recover the additional groundwater. It is assumed that additional pumping would be limited by the volume of recharge occurring (over operating safe yield). Well operation could supplement annual demands or intermittent to help offset losses in another water supply. Increment 1-4 will provide up to 20,000 AFY of production	5,000	2	0	0	1	1	1	2	2	1	1	1	1	1	2	1	1	2
9	WRCRWA RW Intertie	The Western Riverside County Regional Wastewater Authority (WRCRWA) Plant intertie would allow for the delivery of recycled water from the WRCRWA Plant to be used in the IEUA southern service area. This would also allow additional recycled water to be delivered into the northern service area groundwater recharge basins by reducing the demand from the RP-1 930 pressure zone pump station. Intertie would occur within the 800/930 Pressure Zones.	4,500	10	2	1	1	1	2	2	2	2	1	1	1	1	2	1	1	1
10	Rialto RW Intertie	The Rialto intertie project would allow for delivery of recycled water from the Rialto WWTP to be used in the IEUA service area. The intertie could occur near the RP-3 groundwater recharge basins. This concept could involve the Inland Valley Pipeline, LLC (IVP) to convey water between Rialto WWTP and IEUA's recycled water distribution system. Supply could be used for direct, GWR or other reuse strategy.	4,500	10	2	2	1	1	2	2	2	2	1	1	1	1	2	1	1	1
11	Pomona RW Exchange/Transfer	The City of Pomona does not currently use all of the treated effluent from the Pomona WRP. One concept would involve partnering to develop and expand their recycled water facilities in exchange for an agreed amount of their Chino Basin groundwater right. Could include other supply transfer agreement such as reclaimable waste and/or groundwater.	2,500	10	2	2	1	1	1	2	2	1	1	1	1	1	2	1	1	1
12	RP-1 RW Injection-Increment 1	This project would construct an advanced water filtration (e.g. process treatment that combines micro or ultrafiltration) facility at RP-1 to further treat tertiary effluent to allow the water to be injected directly into Chino Basin. The sizing of the facility and the volume to be produced will be determined as part of the portfolio development process. Increment 1 facility would be sized for 2,500 AFY.	2,500	9	2	1	1	1	1	2	2	1	1	1	1	2	0	1	2	2

13	RP-1 RW Injection-Increment 2	This project would construct an advanced water filtration (e.g. process treatment that combines micro or ultrafiltration) facility at RP-1 to further treat tertiary effluent to allow the water to be injected directly into Chino Basin. The sizing of the facility and the volume to be produced will be determined as part of the portfolio development process. Increment 1+2 facility would be sized for 5,000 AFY.	2,500	9	2	1	1	1	1	2	2	1	1	1	1	2	0	1	1	2
14	RP-1 RW Injection-Increment 3	This project would construct an advanced water filtration (e.g. process treatment that combines micro or ultrafiltration) facility at RP-1 to further treat tertiary effluent to allow the water to be injected directly into Chino Basin. The sizing of the facility and the volume to be produced will be determined as part of the portfolio development process. Increment 1-3 facility would be sized for 7,500 AFY.	2,500	9	2	1	1	1	1	2	2	1	1	1	1	2	0	1	1	2
15	Satellite RW Injection-Increment 1	This project category would construct a satellite (outside of RP-1) wastewater treatment plant with advanced water filtration (e.g. process treatment that combines micro or ultrafiltration) to allow the water to be injected directly into Chino Basin. The location, sizing and volume to be produced will be determined as part of the portfolio development process. Increment 1 facility, or facilities would have a capacity of 2,500 AFY.	2,500	5	2	2	1	1	1	2	2	1	1	1	1	2	0	1	2	2
16	Satellite RW Injection-Increment 2	This project category would construct a satellite (outside of RP-1) wastewater treatment plant with advanced water filtration (e.g. process treatment that combines micro or ultrafiltration) to allow the water to be injected directly into Chino Basin. The location, sizing and volume to be produced will be determined as part of the portfolio development process. Increment 1+2 facility, or facilities would have a capacity of 5,000 AFY.	2,500	5	2	2	1	1	1	2	2	1	1	1	1	2	0	1	1	2
17	Satellite RW Injection-Increment 3	This project category would construct a satellite (outside of RP-1) wastewater treatment plant with advanced water filtration (e.g. process treatment that combines micro or ultrafiltration) to allow the water to be injected directly into Chino Basin. The location, sizing and volume to be produced will be determined as part of the portfolio development process. Increment 1-3 facility, or facilities would have a capacity of 7,500 AFY.	2,500	5	2	2	1	1	1	2	2	1	1	1	1	2	0	1	1	2
18	Desalter Recovery Improvement	The existing Chino Basin I Desalter (CD-1) recovers approximately 75 percent of water. Improvements could be done to increase recovery to approximately 90 percent. This water would be conveyed through the existing potable water system.	1,500	3	1	1	1	1	1	2	2	1	1	1	1	2	1	1	1	2
19	RW Direct Use Expansion-Increment 1	IEUA developed a new Recycled Water Program Strategy concurrent with the IRP. This project category will be used to determine the potential interest in expanding the direct use system beyond the Agency's Ten Year CIP. Includes the reuse of regional wastewater supply, approximately 83,000 AFY by 2035 and potential recycled water interties. Increment 1 facilities would increase direct use beyond baseline supply by 5,000 AFY.	5,000	15	1	1	1	1	1	2	2	1	1	1	1	0	2	1	2	2
20	RW Direct Use Expansion-Increment 2	IEUA developed a new Recycled Water Program Strategy concurrent with the IRP. This project category will be used to determine the potential interest in expanding the direct use system beyond the Agency's Ten Year CIP. Includes the reuse of regional wastewater supply, approximately 83,000 AFY by 2035 and potential recycled water interties. Increment 1+2 facilities would increase direct use beyond baseline supply by 10,000 AFY.	5,000	20	1	1	1	1	1	2	2	1	1	1	1	0	2	1	1	2
21	RW Direct Use Expansion-Increment 3	IEUA developed a new Recycled Water Program Strategy concurrent with the IRP. This project category will be used to determine the potential interest in expanding the direct use system beyond the Agency's Ten Year CIP. Includes the reuse of regional wastewater supply, approximately 83,000 AFY by 2035 and potential recycled water interties. Increment 1-3 facilities would increase direct use beyond baseline supply by 15,000 AFY.	5,000	25	1	1	1	1	1	2	2	1	1	1	1	0	2	1	1	2
22	RW Direct Use Expansion-Increment 4	IEUA developed a new Recycled Water Program Strategy concurrent with the IRP. This project category will be used to determine the potential interest in expanding the direct use system beyond the Agency's Ten Year CIP. Includes the reuse of regional wastewater supply, approximately 83,000 AFY by 2035 and potential recycled water interties. Increment 1-4 facilities would increase direct use beyond baseline supply by 20,000 AFY.	5,000	25	1	1	1	1	1	2	2	1	1	1	1	0	2	1	1	2
23	Existing GWR Basin Improvements beyond RMPU-Increment 1	The 2013 Chino Basin RMPU recommended a set of preferred projects to improve recharge at the existing groundwater spreading basins. This project category represents the next increment of additional groundwater recharge (imported water and/or recycled water) capable at the existing facilities. Increment 1 facilities would increase recharge at existing basins within the Chino Basin by an additional 2,500 AFY.	2,500	15	2	2	1	1	1	2	2	1	1	1	1	0	2	1	2	2
24	Existing GWR Basin Improvements beyond RMPU-Increment 2	The 2013 Chino Basin RMPU recommended a set of preferred projects to improve recharge at the existing groundwater spreading basins. This project category represents the next increment of additional groundwater recharge (imported water and/or recycled water) capable at the existing facilities. Increment 1+2 facilities would increase recharge at existing basins within the Chino Basin by an additional 5,000 AFY.	2,500	20	2	2	1	1	1	2	2	1	1	1	1	0	2	1	2	2
25	Existing GWR Basin Improvements beyond RMPU-Increment 3	The 2013 Chino Basin RMPU recommended a set of preferred projects to improve recharge at the existing groundwater spreading basins. This project category represents the next increment of additional groundwater recharge (imported water and/or recycled water) capable at the existing facilities. Increment 1-3 facilities would increase recharge at existing basins within the Chino Basin by an additional 10,000 AFY.	5,000	25	2	2	1	1	1	2	2	1	1	1	1	0	2	1	1	2

26	Existing GWR Basin Improvements beyond RMPU-Increment 4	The 2013 Chino Basin RMPU recommended a set of preferred projects to improve recharge at the existing groundwater spreading basins. This project category represents the next increment of additional groundwater recharge (imported water and/or recycled water) capable at the existing facilities. Increment 1-4 facilities would increase recharge at existing basins within the Chino Basin by an additional 15,000 AFY.	5,000	25	2	2	1	1	1	2	2	1	1	1	1	0	2	1	1	2
27	Construct New GWR Basins-Increment 1	Purchase land to construct new groundwater recharge basins in the service area to capture additional stormwater, recycled water and/or imported water for groundwater recharge. Increment 1 would provide up to an additional 2,450 AFY of recharge capacity, which is approximately one new basin at 350 AF per month for 7 months of operation.	2,450	10	2	2	2	1	1	2	2	1	1	1	1	0	2	1	1	2
28	Construct New GWR Basins-Increment 2	Purchase land to construct new groundwater recharge basins in the service area to capture additional stormwater, recycled water and/or imported water for groundwater recharge. Increment 1+2 would provide up to an additional 4,900 AFY of recharge capacity, which is approximately 2 new basins at 350 AF per month for 7 months of operation.	2,450	15	2	2	2	1	1	2	2	1	1	1	1	0	2	1	1	2
29	Construct New GWR Basins-Increment 3	Purchase land to construct new groundwater recharge basins in the service area to capture additional stormwater, recycled water and/or imported water for groundwater recharge. Increment 1-3 would provide up to an additional 7,350 AFY of recharge capacity, which is approximately 3 new basins at 350 AF per month for 7 months of operation.	2,450	20	2	2	2	1	1	2	2	1	1	1	1	0	2	1	1	2
30	Construct New GWR Basins-Increment 4	Purchase land to construct new groundwater recharge basins in the service area to capture additional stormwater, recycled water and/or imported water for groundwater recharge. Increment 1-4 would provide up to an additional 9,800 AFY of recharge capacity, which is approximately 4 new basins at 350 AF per month for 7 months of operation.	2,450	20	2	2	2	1	1	2	2	1	1	1	1	0	2	1	1	2
31	ASR wells MZ1 and MZ2	Construct aquifer storage and recovery (ASR) wells to increase improted water groundwater recharge within management zone 1 and 2. Reference projects were taken from the 2010 RMPU, Sections 6.7.2.1 and 3 for CVWD and the City of Ontario.	11,500	5	2	2	1	1	1	0	2	1	1	1	1	2	0	1	2	2
32	ASR wells MZ3	Construct aquifer storage and recovery (ASR) wells to increase imported water groundwater recharge within management zone 3. Reference projects were taken from the 2010 RMPU, Sections 6.7.2.2 for JCSD.	3,500	5	2	2	1	1	1	0	2	1	1	1	1	2	0	1	2	2
33	Maximize ASR wells	Construct other aquifer storage and recovery (ASR) wells to increase imported water groundwater recharge by 3,500 AFY within the Chino Basin during wet and dry years. Assume benefit 40% of the time (2 in 5 years). Storage to be dependent on supplemental water availability in wet years	3,500	5	2	2	1	1	1	0	2	1	1	1	1	2	0	1	1	2
34	Cadiz IW Transfer	The Cadiz project would allow for the import of unused groundwater from the remote Fenner Valley near Cadiz, California. For the purposes of the IRP, a 5,000 AFY increment of water is assumed. The Cadiz supply would be transferred and taken as SWP water into the Chino Basin.	5,000	20	2	1	1	1	1	2	2	1	1	1	1	0	1	1	1	1
35	Secure SWP IW transfer outside MWD	Imported water supply is solely from MWD via the SWP and is limited by the Agency's purchase order. Other permanent, temporary or seasonally available imported water supplies could be purchased and wheeled into the Chino Basin. The volume of water available varies depending on the source of water and timing. Supplies could be purchased from various Irrigation Districts or secured via Ag Transfer. Assume benefit 1 in 10 years	5,000	10	2	1	1	1	1	1	2	1	1	1	1	1	0	2	1	1
36	SBVMWD IW Transfer	As a SWP contractor, San Bernardino Valley MWD (SBVMWD) has a Table A allocation. This option would involve constructing an intertie between SBVMWD's imported water system. The supply would be temporary or seasonally available and could be purchased and wheeled into the Chino Basin. Assume benefit 1 in 5 years.	5,000	5	2	1	1	1	1	1	2	1	1	1	1	2	0	2	1	1
37	Ocean Desalination Exchange	This project category would involve a partnership with another water agency pursuing ocean water desalination; through in-lieu exchange, the Chino basin would obtain an agreed amount of imported water. For the purposes of the IRP, a volume of 5,000 AFY was chosen. Opportunity to invest in upcoming ocean desalination plants includes Huntington Beach, Carlsbad and West Basin.	5,000	10	2	1	1	1	1	1	2	1	1	1	1	2	0	1	1	1
38	Six Basin Water Transfer	This project would explore the idea of developing a water transfer agreement with Six Basins. One concept is to purchase imported water for recharge into Six Basins and get in return equal volume of groundwater underflow plus agreed amount of stormwater. For example, could purchase 10,000 AF of IW for exchange of 10,000 AF of groundwater plus 7,000 AF of stormwater. Assume benefit 1 in 5 years.	17,000	5	2	2	2	1	1	2	2	1	1	1	1	2	0	1	0	1
39	Expand WUE Devices	Implement additional targeted device related savings to reduce demand beyond current annual water use efficiency savings. Provide incentives and pilot programs to roll out extremely high efficient indoor fixtures and toilets. To be verified with WUEBP.	5,000	1	1	1	1	1	1	2	2	1	1	2	2	1	2	1	1	2
40	WUE - Turf Removal-Increment 1	Implement turf removal and landscape transformational programs to reduce outdoor demand. To be verified with WUEBP. Increment 1 would provide up to 5,000 AFY of savings.	5,000	1	1	1	1	1	1	2	2	1	1	2	2	1	2	1	1	2
41	WUE - Turf Removal-Increment 2	Implement turf removal and landscape transformational programs to reduce outdoor demand. To be verified with WUEBP. Increment 1+2 would provide up to 10,000 AFY of savings.	5,000	1	1	1	1	1	1	2	2	1	1	2	2	1	2	1	1	2
42	WUE - Turf Removal-Increment 3	Implement turf removal and landscape transformational programs to reduce outdoor demand. To be verified with WUEBP. Increment 1-3 would provide up to 15,000 AFY of savings.	5,000	1	1	1	1	1	1	2	2	1	1	2	2	1	2	1	1	2
43	WUE - Budget Rates-Increment 1	Implement water budget based rates for 2 member agencies (assuming 15% total savings per Agency after 3 years). To be verified with WUEBP. Increment 1 would provide up to 13,350 AFY of savings.	13,350	1	1	1	1	1	1	2	2	1	1	2	2	1	2	1	2	2

44	WUE - Budget Rates-Increment 2	Implement water budget based rates for 2 member agencies (assuming 15% total savings per Agency after 3 years). To be verified with WUEBP. Increment 1 would provide up to 26,700 AFY of savings.	13,350	1	1	1	1	1	1	2	2	1	1	2	2	1	2	1	2	2
45	WUE - Budget Rates-Increment 3	Implement water budget based rates for 2 member agencies (assuming 15% total savings per Agency after 3 years). To be verified with WUEBP. Increment 1 would provide up to 40,050 AFY of savings.	13,350	1	1	1	1	1	1	2	2	1	1	2	2	1	2	1	2	2
46	WUE- RW Demand Management-Increment 1	Implement demand management devices and programs for direct recycled water customers. Does not generate additional supply, aids in managing the supply during peak demand. Increment 1 would provide 2,500 AFY of demand management, this supply could be used for increasing direct use demands, groundwater recharge or other reuse strategy.	2,500	1	1	1	1	1	1	2	2	2	1	2	2	1	2	1	2	2
47	WUE- RW Demand Management-Increment 2	Implement demand management devices and programs for direct recycled water customers. Does not generate additional supply, aids in managing the supply during peak demand. Increment 1+2 would provide 5,000 AFY of demand management, this supply could be used for increasing direct use demands, groundwater recharge or other reuse strategy.	2,500	1	1	1	1	1	1	2	2	2	1	2	2	1	2	1	2	2
48	Dry Weather Flow Diversions	Capture and treat urban dry weather flow from Chino, Cucamonga and San Sevaine Creek into the Regional Plants. For the purposes of the IRP, a volume of 3,500 AFY was assumed as total available dry weather flow.	3,500	5	2	1	2	1	2	2	2	1	0	1	1	1	2	1	1	2
52	San Antonio Creek SW Capture	Modify existing basins along San Antonio Creek to increase stormwater capture beyond the 2013 RMPU. Increase facilities to better accommodate the “big gulp” concept. Assume benefit 1 in 5 years	1,000	10	2	1	2	1	2	2	2	1	0	1	1	2	2	1	2	2
53	Cucamonga Creek SW Capture	Modify existing basins along Cucamonga Creek to increase stormwater capture beyond the 2013 RMPU. Increase facilities to better accommodate the “big gulp” concept. Assume benefit 1 in 5 years.	2,500	10	2	1	2	1	2	2	2	1	0	1	1	2	2	1	2	2
54	Day Creek SW Capture	Modify existing basins along Day Creek to increase stormwater capture beyond the 2013 RMPU. Increase facilities to better accommodate the “big gulp” concept. Assume benefit 1 in 5 years.	2,500	10	2	1	2	1	2	2	2	1	0	1	1	2	2	1	2	2
55	San Sevaine Creek SW Capture	Modify existing basins along San Sevaine Creek to increase stormwater capture beyond the 2013 RMPU. Increase facilities to better accommodate the “big gulp” concept. Assume benefit 1 in 5 years.	2,500	10	2	1	2	1	2	2	2	1	0	1	1	2	2	1	2	2
56	Water Banking Facility	This project category would invest into the Semitropic Groundwater Storage Bank in Kern County or similar program. The Chino Basin could bank additional purchases of wet year water when these supplies are available and Chino Basin facilities are capacity limited.	5,000	10	1	1	1	1	1	2	2	1	1	1	1	1	1	2	0	1
58	Regional LID-Increment 1	Construct or modify urban development to better manage and infiltrate rainfall at the source. Projects could include bioswales and or pervious concrete installation in parking lots, street drainages. Increment 1 facilities could provide up to 5,000 AFY of recharge.	5,000	5	2	1	2	2	1	1	2	1	1	1	1	2	2	2	2	2
59	Regional LID-Increment 2	Construct or modify urban development to better manage and infiltrate rainfall at the source. Projects could include bioswales and or pervious concrete installation in parking lots, street drainages. Increment 1+2 facilities could provide up to 10,000 AFY of recharge.	5,000	5	2	1	2	2	1	1	2	1	1	1	1	2	2	2	2	2
60	Direct Potable Reuse-Increment 1	This project would construct an advanced water filtration and treatment (e.g. process treatment that combines micro or ultrafiltration) facility at a Regional Plant. The treatment process would allow the recycled water to be introduced into the potable water system. Increment 1 facility would have a capacity of 5,000 AFY.	5,000	10	1	1	1	1	1	2	2	1	1	1	1	2	0	1	2	2
61	Direct Potable Reuse-Increment 2	This project would construct an advanced water filtration and treatment (e.g. process treatment that combines micro or ultrafiltration) facility at a Regional Plant. The treatment process would allow the recycled water to be introduced into the potable water system. Increment 1+2 facility would have a capacity of 10,000 AFY.	5,000	10	1	1	1	1	1	2	2	1	1	1	1	2	0	1	2	2
62	Cucamonga Basin Improvements	This project category will identify projects that would result in additional groundwater production benefits coming into the IEUA service area from the Cucamonga Basin. Includes recharge facilities, treatment and production facilities to maximize supply coming into the Chino Basin.	2,500	5	2	2	2	1	1	2	2	1	1	1	1	0	2	1	2	2
63	Maximize Other Groundwater	This project category will identify local member agency projects that would result in additional groundwater production benefits coming into the IEUA service area outside of the Chino Basin.	5,000	5	1	1	1	1	1	2	2	1	1	1	1	1	2	2	1	2
65	RP-1 NRWS Treatment	The north Non Reclaimable Wastewater System (NRWS) discharges approx.. 3.5 MGD of brine to Los Angeles County annually. The project would construct a treatment facility to allow the Region to reuse this supply into the recycled water system. Requires plant expansion and partial reverse osmosis for blending.	3,920	9	2	1	1	1	2	2	2	1	1	1	1	2	1	1	2	2
66	WUE - Advanced Metering Technologies	Install advanced metering infrastructure (AMI) between retail meters and a utility provider. Will provide real-time data about consumption and allow customers to make informed choices about usage.	5,000	$ 3	1	1	1	1	1	2	2	1	1	2	2	1	2	1	1	2
87	Prior Stored Chino Groundwater	This category will allow supply to be taken from groundwater stored in the Chino Basin, pre 2014. It is estimated that approximately 400,000 AF of stored groundwater is available, of which 280,000 AF is made available for IEUA member agencies. This supply category will be managed on a case by case basis as selected into the Regional supply portfolios. The supply will be limited, but can be used annually or intermittent as needed.	8,400	1	0	0	1	1	1	2	2	1	1	1	1	2	2	1	2	2
88	Maximize Local Surface Water	This category of projects will construct facilities needed to capture additional local surface water. Projects to be defined by IEUA's member agencies. For example, increase surface flows off Lytle Creek in wet years. Assume benefit 3 in 5 years	1,000	1	2	1	2	1	2	2	2	1	0	1	1	2	2	1	2	2

89	Max Tier 1 MWD Imported Water-Increment 1	Maximize imported water from MWD at Tier 1 rate. Total available supply at Tier 1 rate is 93,283 AFY or cumulative purchase order maximum of 932,830 AF through December 31, 2024. Supply can be taken directly, in-lieu or for supplemental recharge. Increment 1 would allow for the purchase of an additional 7,850 AFY. Can be purchased annually or intermittently.	7,850	1	2	2	1	1	1	0	0	1	1	1	1	2	0	1	1	2
90	Max Tier 1 MWD Imported Water-Increment 2	Maximize imported water from MWD at Tier 1 rate. Total available supply at Tier 1 rate is 93,283 AFY or cumulative purchase order maximum of 932,830 AF through December 31, 2024. Supply can be taken directly, in-lieu or for supplemental recharge. Increment 1+2 would allow for the purchase of an additional 15,700 AFY. Can be purchased annually or intermittent.	7,850	1	2	2	1	1	1	0	0	1	1	1	1	2	0	1	1	2
91	Max Tier 1 MWD Imported Water-Increment 3	Maximize imported water from MWD at Tier 1 rate. Total available supply at Tier 1 rate is 93,283 AFY or cumulative purchase order maximum of 932,830 AF through December 31, 2024. Supply can be taken directly, in-lieu or for supplemental recharge. Increment 1-3 would allow for the purchase of an additional 23,550 AFY. Can be purchased annually or intermittent.	7,850	1	2	2	1	1	1	0	0	1	1	1	1	2	0	1	1	2
92	Max Tier 2 MWD Imported Water-Increment 1	Maximize imported water from MWD at Tier 2 rate. Could be taken annually or intermittent, availability pending MWD supply. Supply can be taken directly, in-lieu or for supplemental recharge. Increment 1 would allow for the purchase of an additional 5,000 AFY. Can be purchased annually or intermittent.	5,000	3	2	2	1	1	1	0	0	1	1	1	1	2	0	1	1	2
93	Max Tier 2 MWD Imported Water-Increment 2	Maximize imported water from MWD at Tier 2 rate. Could be taken annually or intermittent, availability pending MWD supply. Supply can be taken directly, in-lieu or for supplemental recharge. Increment 1+2 would allow for the purchase of an additional 10,000 AFY. Can be purchased annually or intermittent.	5,000	3	2	2	1	1	1	0	0	1	1	1	1	2	0	1	1	2
94	Max Tier 2 MWD Imported Water-Increment 3	Maximize imported water from MWD at Tier 2 rate. Could be taken annually or intermittent, availability pending MWD supply. Supply can be taken directly, in-lieu or for supplemental recharge. Increment 1-3 would allow for the purchase of an additional 15,000 AFY. Can be purchased annually or intermittently.	5,000	3	2	2	1	1	1	0	0	1	1	1	1	2	0	1	1	2
95	MWD Replenishment or discount wet year water-Increment 1	Maximize replenishment or discount wet year imported water from MWD. Availability pending MWD supply and pricing. Supply can be taken in-lieu or for supplemental recharge. Increment 1 would allow for the purchase of an additional 10,000 AFY. Can be purchased annually or intermittently. Assume benefit after 2 consecutive wet years (assume 1 in 15 years)	10,000	5	2	2	1	1	1	0	2	1	1	1	1	2	0	2	1	2
96	MWD Replenishment or discount wet year water-Increment 2	Maximize replenishment or discount wet year imported water from MWD. Availability pending MWD supply and pricing. Supply can be taken in-lieu or for supplemental recharge. Increment 1+2 would allow for the purchase of an additional 20,000 AFY. Can be purchased annually or intermittently. Assume benefit after 2 consecutive wet years (assume 1 in 15 years)	10,000	8	2	2	1	1	1	0	2	1	1	1	1	2	0	2	1	2
97	MWD Replenishment or discount wet year water-Increment 3	Maximize replenishment or discount wet year imported water from MWD. Availability pending MWD supply and pricing. Supply can be taken in-lieu or for supplemental recharge. Increment 1-3 would allow for the purchase of an additional 30,000 AFY. Can be purchased annually or intermittently. Assume benefit after 2 consecutive wet years (assume 1 in 15 years)	10,000	10	2	2	1	1	1	0	2	1	1	1	1	2	0	2	1	2
98	Watershed Wide Water Transfers	This category of projects will construct or arrange other water transfers external to the Chino Basin. For example, dry weather flow exchange of recycled water to Orange County Water District for an equivalent amount of purchased imported water. For the purposes of the IRP, it is assumed that this category of projects will not increase supply, but increases reliability and/or quality. To occur annually or intermittent. Resiliency and flexibility benefit only	-	5	1	1	1	1	1	2	2	2	1	1	1	2	2	1	2	2
99	Chino Basin Water Transfers	This category of projects will construct or arrange other water transfers within the Chino Basin. Projects to also include inter-agency interties for increased reliability. For the purposes of the IRP, it is assumed that this category of projects will not increase supply, but increases reliability. To occur annually or intermittent.	-	5	2	2	1	1	1	2	2	2	1	1	1	2	2	1	2	2
100	Reliability Production Wells	This project category will construct new production wells needed to replace lost production or under performing facilities. These projects will maintain current annual groundwater production deliveries and are intended to increase operational flexibility and reliability. Increment 1 varies in capacity and will be determined on a case by case basis as selected into each of the regional supply portfolios.	-	2	0	0	1	1	1	2	2	1	1	1	1	1	2	1	2	2

Appendix E: Response Action Program Cut Sheets

IEUA Drought Contingency Plan

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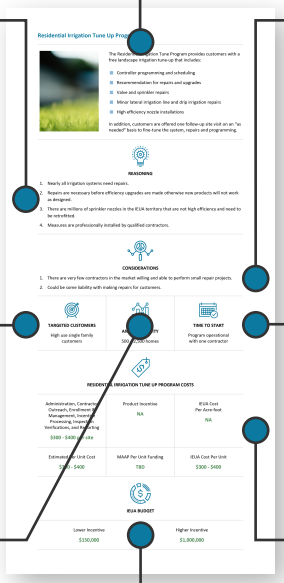
Guide to the Program Write-Ups

IEUA has selected seven customer programs to be offered during drought conditions. Each program is detailed in an individual write-up contained in this section.

The sections contained in each write-up are explained in the diagram below:

DESCRIPTION

Provides a basic overview of the program, the measures, and delivery mechanisms



REASONING

Overviews the market need being met and reasons for this particular program design

CONSIDERATIONS

Provides awareness of additional program issues or circumstances that may impact the program

TARGETED CUSTOMERS

Identifies the customer groups targeted for program participation

TIME TO START

The anticipated time to develop and start-up operations for the program

POTENTIAL ANNUAL ACTIVITY

The expected number of customer participants or product installations per year

PROGRAM COSTS

Program costs are broken down into six categories: Administration & Operational costs; Product Incentive or rebate; IEUA's cost per Acre-foot (cost/the lifetime water savings); Estimated Cost per Unit (total costs per property); MAAP per unit (potential Member Agency Administered Program funding from MWD), and; IEUA cost per unit (Estimated Cost per Unit – MAAP per unit)

IEUA BUDGET

Identifies the overall annual cost to IEUA for the program at both a low participation and high participation levels

Turf Replacement Program



The Turf Replacement Program encourages customers to remove high water-consuming turf and replace it with alternative solutions such as low water-using, regionally appropriate plants and surfaces that allow for ground water infiltration and elimination of runoff. Qualifying applicants are eligible to receive $3 per square foot of turf removed with a maximum incentive of 5,000 square feet for residential customers and 50,000 square feet for commercial customers. Eligible projects must have:

- Three plants per 100 square feet of area transformed
- No hardscape within the transformed area, except permeable hardscape
- A stormwater retention feature
- Replacement or modification of overhead spray sprinklers

For reference, the historical program activity of square feet removed is listed below.

	Residential	Commercial	Total
FY 14/15	119,130	1,136,334	1,255,464
FY 15/16	1,596,789	3,337,120	4,933,909
FY 16/17	255,091	637,916	893,007

REASONING

1. There are hundreds of thousands of square feet of irrigated turf in the IEUA territory.
1. Replacing turf with regionally appropriate plants aids in transforming the market. In a recent analysis done by Western MWD, for every customer replacing their turf, another customer did so without an incentive.
2. Provides long term savings- Current studies have shown that savings increase after the initial plant stabilization period and persist over 10 years or more.

CONSIDERATIONS

1. Turf replacement has an extremely high cost per acre-foot.
3. The market acceptance is low during non-drought times.
4. There are numerous customer barriers: costs, concerns about the new look, and lack of ability to execute projects.
5. Contractors are not interested in projects smaller than 1,000 sf.

TARGETED CUSTOMERS All customers with live turf	**POTENTIAL ANNUAL ACTIVITY** 500,000 – 5 Million SF	**TIME TO START** Currently operational

TURF REPLACEMENT PROGRAM COSTS

Administration, Contractor Outreach, Enrollment & Management, Incentive Processing, Inspection Verifications, and Reporting **Covered by Metropolitan through regional vendor**	Product Incentive **$3 per square foot**	IEUA Cost Per Acre-foot **$769 ($ per sf)**
Estimated Per Unit Cost **$3 per sf**	MAAP Per Unit Funding **$2.00 (regional rebate)**	IEUA Cost Per Unit **$1 per sf**



IEUA BUDGET

Lower Incentive	Higher Incentive
$500,000	**$5,000,000**

Residential Irrigation Tune Up Program



The Residential Irrigation Tune Program provides customers with a free landscape irrigation tune-up that includes:

- Controller programming and scheduling
- Recommendation for repairs and upgrades
- Valve and sprinkler repairs
- Minor lateral irrigation line and drip irrigation repairs
- High efficiency nozzle installations

In addition, customers are offered one follow-up site visit on an “as needed” basis to fine-tune the system, repairs and programming.

REASONING

1. Nearly all irrigation systems need repairs.
6. Repairs are necessary before efficiency upgrades are made otherwise new products will not work as designed.
7. There are millions of sprinkler nozzles in the IEUA territory that are not high efficiency and need to be retrofitted.
8. Measures are professionally installed by qualified contractors.

CONSIDERATIONS

1. There are very few contractors in the market willing and able to perform small repair projects.
9. Could be some liability with making repairs for customers.

TARGETED CUSTOMERS High use single family customers	**POTENTIAL ANNUAL ACTIVITY** 500 – 2,500 homes	**TIME TO START** Program operational with one contractor

RESIDENTIAL IRRIGATION TUNE UP PROGRAM COSTS

Administration, Contractor Outreach, Enrollment & Management, Incentive Processing, Inspection Verifications, and Reporting **$300 - $400 per site**	Product Incentive **NA**	IEUA Cost Per Acre-foot **NA**
Estimated Per Unit Cost **$300 - $400**	MAAP Per Unit Funding **TBD**	IEUA Cost Per Unit **$300 - $400**

IEUA BUDGET

Lower Incentive **$150,000**	Higher Incentive **$1,000,000**

Smart Irrigation Direct Installation



DESCRIPTION

The Smart Irrigation Direct Installation Program offers the installation of smart irrigation devices, potentially free to the customer. The Program could offer:

- Smart cloud-based controllers
- High efficiency sprinkler nozzles
- Wireless flow sensors

In order to maximize water savings, a qualification consideration could be that customers must have one acre or more of irrigated area or water usage of over 450,000 gallons per year per household. The Program could be designed with a customer co-pay, which would boost cost effectiveness. The inclusion of nozzle installations adds tremendous costs and could be eliminated if the budget does not allow it.

REASONING

1. Top water users and large landscape properties offer maximum water savings due to the expansive volume of acreage of irrigated lawns and gardens. In addition, over one-acre sites provide additional MAAP funding.
2. Single family properties with irrigated area have controllers and spray heads, but most do not have the latest smart irrigation technologies.
3. The smart irrigation package includes proven technologies that will be appealing to customers.
4. Addition of flow sensors will provide the ability to detect abnormal water use and alert property owners via text or email.
5. Measures will be professionally installed by contractors ensuring quality installations and programming.
6. Direct installation contractors typically meet installation goals on schedule due to proactive sales activities.



CONSIDERATIONS

1. High cost to provide direct installations.
2. Sometimes customers do not buy into new measures, specifically programming of the controller and they will override efficiency schedule.
3. Could be some liability with providing product and installation.

 **TARGETED CUSTOMERS** Single-family, multi-family, commercial 1 acre or larger	 **POTENTIAL ANNUAL ACTIVITY** 1,000 – 5,000 properties	 **TIME TO START** 6 – 8 months



SMART IRRIGATION DIRECT INSTALLATION PROGRAM COSTS

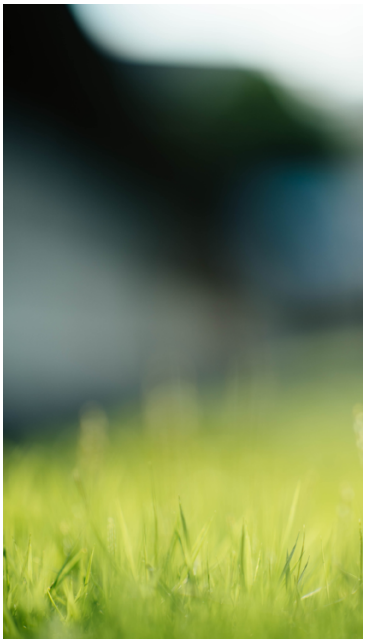
Administration, Contractor Outreach, Enrollment & Management, Incentive Processing, Inspection Verifications, and Reporting **$400**	Product Incentive **Free to customer**	IEUA Cost Per Acre-foot **$327**
Estimated Per Unit Cost **$1,550**	MAAP Per Unit Funding **$600**	IEUA Cost Per Unit **$950**



IEUA BUDGET

Lower Incentive	Higher Incentive
$950,000	**$4,750,000**

School Smart Irrigation Direct Installation



DESCRIPTION

Schools use a tremendous amount of water for irrigation, specifically for watering their lawn areas. These lawns are frequently used for student sports and recreation and therefore not candidates for turf replacement. The School Smart Irrigation Program would offer local schools free installation of smart irrigation devices. Measures to include:

- Pressure regulating spray heads
- High efficiency sprinkler nozzles
- Flow sensors and master valves (if practical)
- Smart cloud-based controllers (if practical)

If cost prohibitive flow sensors, master valves and smart controllers can be eliminated.

REASONING

1. Schools have large areas of functional lawn area, used for sports and recreation.

2. School properties typically have irrigation systems with old malfunctioning equipment. Much of the time the spray heads are broken, clogged, below grade or too high.

3. Most schools have limited budgets and resources to purchase and install irrigation equipment.

4. The program addition of flow sensors and master valves eliminates water waste due to leaks by shutting off the valve. In addition, the flow sensing data provides information on actual water usage.

5. Smart cloud-based controllers can provide and share water use information.

6. Improved irrigation efficiency in schools can significantly reduce their utility costs.

7. The program provides opportunity for schools to demonstrate leadership and educate students on water use efficiency.



CONSIDERATIONS

1. High cost to provide direct installations.
2. School personnel may override programming of the controller.
3. Could be some liability with providing product and installation.

 **TARGETED CUSTOMERS** Public schools	 **POTENTIAL ANNUAL ACTIVITY** Schools	 **TIME TO START** 6 – 8 months



SCHOOL SMART IRRIGATION DIRECT INSTALLATION PROGRAM COSTS

Administration, Contractor Outreach, Enrollment & Management, Incentive Processing, Inspection Verifications, and Reporting **$**	Product Incentive **Free to customer**	IEUA Cost Per Acre-foot **$**
Estimated Per Unit Cost **$**	MAAP Per Unit Funding **$**	IEUA Cost Per Unit **$**



IEUA BUDGET

Lower Incentive	Higher Incentive
$	$

Qualified Contractor Irrigation Incentive Program



DESCRIPTION

Program will allow customers to receive a comprehensive package of innovative and proven irrigation technologies from qualified contractors, for the following discounted prices:

- Smart controllers $35 - $50 per station
- High efficiency sprinkler nozzles **$6 - $10 per nozzle**
- Flow sensors with master valves **$60 - $100 per sensor**
- Drip irrigation **$0.40 - $0.60**

Eligible contractors would include: QWEL, CLCA and IA certified firms. Customers would be responsible for installation costs.

Targeted properties would include all customer segments (commercial, multi-family and residential) with one acre or more of irrigated area, with a program focus on commercial and HOA common areas.

REASONING

1. Large landscape properties offer maximum water savings due to the expansive acreage of irrigated lawns and gardens.
2. MF, CII and SF properties with irrigated area have irrigation controllers and spray heads, but most do not have the latest water-efficient smart irrigation technologies.
3. The smart irrigation package includes proven technologies that will be of interest to customers and their contractors.
4. Measures will be professionally installed by qualified contractors.

CONSIDERATIONS

1. In order to achieve activity goals, it will be necessary to offer the higher incentive making the program more costly.

2. Enlisting and managing contractors will take expert resources and add significant costs to the program.

TARGETED CUSTOMERS All customer segments with one acre or more of irrigated area	**POTENTIAL ANNUAL ACTIVITY** 250 – 1,000 homes	**TIME TO START** 6 months

QUALIFIED CONTRACTOR IRRIGATION INCENTIVE PROGRAM COSTS

Administration, Contractor Outreach, Enrollment & Management, Incentive Processing, Inspection Verifications, and Reporting **$300 per property**	Product Incentive (24-station controller, 150 nozzles, 46 sf of drip, 25 flow sensor/master valve) **Average of $1,809 per property** **(assumes full MAAP funding)**	IEUA Cost Per Acre-foot **$31 - $450**
Estimated Per Unit Cost **$2,109 - $3,227**	MAAP Per Unit Funding **$1,809**	IEUA Cost Per Unit **$300 - $1,418**



IEUA BUDGET

Lower Incentive	Higher Incentive
$75,000 - $300,000	**$354,500 - $1,418,000**

FreeSprinklerNozzles.com



The FreeSprinklerNozzles.com Program provides participating water agencies with a full-service approach to distribution of high efficiency sprinkler nozzles to their residential and commercial customers while requiring only minimal staffing. Nozzles are provided free to customers. Customer are responsible for installation.

With eight years of successful implementation, program management is looking to overhaul the FreeSprinklerNozzles.com program. The goal is for the new program to be a 100% online fulfilment program.

The new program would include an online application that would utilize aerial imagery to map a customer's landscaped area and irrigation system. The customer would use the tool to measure their irrigated area and note head locations. The system would automatically generate a nozzle inventory which would be sent to the irrigation equipment fulfilment center electronically. The nozzles would then be shipped to the customer.

REASONING

1. Nearly all properties in IEUA's territory with irrigated area have spray heads that can be retrofitted with efficient nozzles – there are literally millions of nozzles in this market available to be upgraded.
2. The product is easy to install and inexpensive.
3. The program offers a turnkey approach requiring minimal resources from IEUA or its member agencies.

CONSIDERATIONS

1. With a small device that many customers store in their garage until needed, a higher percentage of customers may not install the nozzles.

TARGETED CUSTOMERS All customers with irrigated area & spray heads	**POTENTIAL ANNUAL ACTIVITY** 50,000 – 200,000	**TIME TO START** Expected launch date of December 2019

FREESPRINKLERNOZZLES.COM PROGRAM COSTS

Administration, Contractor Outreach, Enrollment & Management, Incentive Processing, Inspection Verifications, and Reporting **Estimated $2 per nozzle**	Product Incentive **Free to customer**	IEUA Cost Per Acre-foot **$92 - $450**
Estimated Per Unit Cost **$5 - $6**	MAAP Per Unit Funding **$2 - $4**	IEUA Cost Per Unit **$2 - $4**

IEUA BUDGET

Lower Incentive **$100,000**	Higher Incentive **$800,000**

Leak Detection Incentive



DESCRIPTION

Household leaks can result in thousands of gallons of wasted water and potential property damage.

Smart leak detector devices can now monitor use, detect anomalies and alert homeowners of potential leaks. Some devices can even shut off use, mitigating water damage.

The Leak Detection Incentive would offer customers a rebate for purchase of an approved monitoring and leak detection device. There are currently five viable products on the market including Flume, Buoy, Flo, Phyn and Saya. Some devices require tapping into the existing plumbing system and may require a licensed plumber for installation, while others simply attach to the customer's water meter.

The water savings are unknown at the time and cost for product with installation ranges from $200 - $700+. The program could also offer free installation for customers with high use or could be an incentive offered to the manufacturer. The manufacturer would offer an incentive off the purchase price and bill IEUA for those properties.

REASONING

1. Many homes have leaks, currently industry estimates 10%.
2. Most leaks go undetected and customers are not aware for months until they get their bill and many times not even then.
3. Repairing water damage caused by leaks can cost thousands of dollars for a typical homeowner.
4. Providing customers with data on their water use gives them the necessary information and motivation to make efficiency changes.
5. Several water agencies have incentive and installation programs including: Southern Nevada Water Authority, Jurupa Community Services District, Contra Costa Water District, Rainbow Municipal Water District, and San Antonio Water System.



CONSIDERATIONS

1. Savings are unknown.
2. If water agency already has AMI, service is duplicative.
3. Program not applicable to all customers, must target customers with potential leaks and ones that value monitoring data.
4. Customer still has to fix leaks to secure savings.

 **TARGETED CUSTOMERS** Single-family homes, potentially in high pressure areas or with a significant increase in use	 **POTENTIAL ANNUAL ACTIVITY** 500 – 1,000 homes	 **TIME TO START** 4 months



LEAK DETECTION INCENTIVE PROGRAM COSTS

Administration, Contractor Outreach, Enrollment & Management, Incentive Processing, Inspection Verifications, and Reporting **$25 per home**	Product Incentive **$100 per home**	IEUA Cost Per Acre-foot **TBD**
Estimated Per Unit Cost **$125**	MAAP Per Unit Funding **TBD**	IEUA Cost Per Unit **$125**



IEUA BUDGET

Lower Incentive	Higher Incentive
$62,500	**$125,000**

WEFlex Fund



DESCRIPTION

Recognizing that the future is unknowable, IEUA understands that unforeseen marketing and water savings opportunities may present themselves at some point during a drought cycle. For this reason, the WEFlex Fund was created to allow IEUA to quickly respond and fund a new, creative approach.

The program will offer IEUA's retail agencies funds for locallyadministered activities. The budget will be allocated to each agency based upon the water agencies size (or water sales). An agency could use the funds for local activities such as water waste enforcement and education or recycled water hook up and permit fees. Other programs or services could be funded through WE Flex Fund, if approved by the drought response committee.

An agency will submit a description of the local activity, estimated costs and potential benefits or results. When accepted, IEUA will provide the funds.

REASONING

1. Should an effective new technology, marketing/promotional initiative, or delivery mechanism become available, IUEA does not want an agency to be limited to the pre-selected list of programs.
2. The program allows for retail agencies to choose a program or service that best serves their needs and those of their customers.
3. Typically, approval and funding of new initiatives take significant time to work their way through the management hierarchy. The WE Flex Fund will allow for an expedited process to implement new tactics.



CONSIDERATIONS

1. In order to achieve activity goals, it will be necessary to offer the higher incentive making the program more costly.
2. Enlisting and managing contractors will take expert resources and add significant costs to the program.

 **TARGETED CUSTOMERS** All customer segments	 **POTENTIAL ANNUAL ACTIVITY** NA	 **TIME TO START** Immediate



WEFLEX PROGRAM COSTS

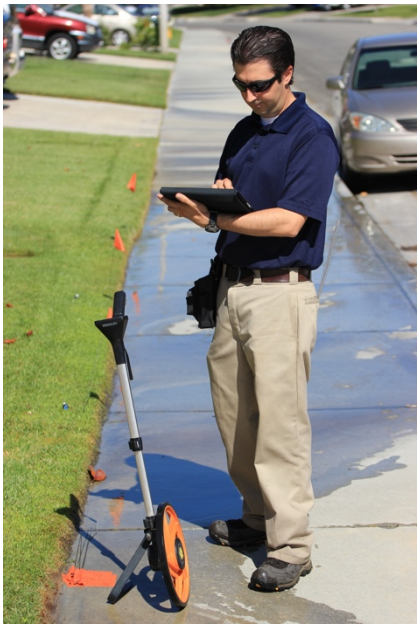
Administration, Contractor Outreach, Enrollment & Management, Incentive Processing, Inspection Verifications, and Reporting **TBD**	Product Incentive (24-station controller, 150 nozzles, 46 sf of drip, 25 flow sensor/master valve) **TBD**	IEUA Cost Per Acre-foot **TBD**
Estimated Per Unit Cost **TBD**	MAAP Per Unit Funding **TBD**	IEUA Cost Per Unit **TBD**

Services Offered

In addition to Programs, three Support Services are offered to provide customers with knowledge and information about water efficient landscaping. These Services are:

1. Landscape Surveys
2. Landscape Workshops
3. Landscape Design Services

Landscape Surveys



Administered by the Chino Basin Water Conservation District (CBWCD), in partnership with IEUA and the member agencies, the Landscape Survey Program offers customers a free evaluation of their landscape and irrigation system.

The survey includes:

- A complete evaluation of the customer's irrigation system
- Determination of the landscape's water needs
- Accurate profile of the property's water consumption
- Generation of a water budget based on the local evapotranspiration and irrigated landscape area

Customer's also receive:

- Water saving tips
- Recommendations on how to improve overall efficiency of your irrigation system
- Rebate opportunities

In order to ensure water savings, it is recommended that the surveys also include follow up to verify any recommendations have been implemented and assist customers in making the upgrades and receiving the incentives.

Landscape Workshops

The landscape classes offered through the IEUA service areas are FREE of charge. The descriptions below provide a basic overview of the topics covered.



Drought Tolerant Plants - This class provides information on a variety of water efficient plants that fit both our climate and landscape design. The instructor will discuss native and other California friendly plants, the benefits they provide to your landscape, and when and how to plant them.

Landscape Design - This class provides residents with the initial basics on how to develop a landscape that combines both beauty and environmental benefits to their home. Both preparation and design techniques will be discussed.

Water Efficient Irrigation Systems - This class teaches residents the importance of using water wisely and how an efficient irrigation system enables them to play their part in efficient water use. Overhead sprinklers, drip systems and irrigation controllers will be discussed.

Turf Removal - This class is specialized to instruct residents on the proper techniques to remove turf and replace it with a water efficient landscape.

Composting, Fertilizer, & Maintenance - This class teaches residents about compost, fertilizer and their correct usage to help plants flourish. Participants will also learn about the correct maintenance to ensure growth for their plants.

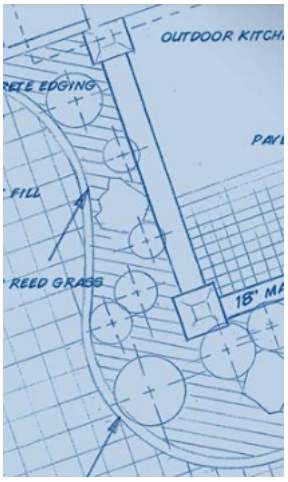
How the Drought Affects Your Water Timer - This class will help residents understand the watering restrictions and how to program their controller to align with their retail agency's outdoor watering restrictions.

Composting, Water Management, & Pest Control - This class provides instruction on composting, proper watering techniques, and integrated pest management. Participants will learn how often and how much to water plants, how to identify what can be used to compost, how to properly apply compost, and how to sustainably control pests.

Drought, El Nino, & What to do with Your Landscape - This class gives residents tips and tricks on how to maintain their landscape during transitioning seasons and weather changes.

Mini Class - Comprehensive four-hour class covering Landscape design basics, California friendly & native plants, landscape sprinkler systems, and planting and maintenance.

Landscape Design Services



Through a collaboration between CBWCD, IEUA and its member agencies, customers are offered landscape design services free of charge. This service has a market value of approximately $500.

Participants are required to attend a two-hour "What You Need to Know Before Your Landscape Transformation" class before they become eligible to register for the Landscape Design Assistance Program. The class is focused on providing all the information most people need to be successful with a turf replacement project, whether they are doing the work themselves or hiring a contractor.

Due to program demand, customers are provided design services for EITHER their front yard OR back yard. If a customer completes the first project, they can receive additional design services.

A CBMWD staff member consults with participants for approximately 1.5 - 2 hours in person at the Waterwise Community Center. At the appointment, customers discuss goals for their landscape area and then work with staff to create a computer-generated design for the landscape project.

After the consultation meeting, CBWCD staff finish the design, create a plant identification key and a custom plant list with the names and information about each plant selected for the designed landscape. Customers are also provided with a list of resources including sources of plants and other landscape materials.

WSCP Appendix B

November 2020 Notification Letter To
Encourage Public Involvement

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

6075 Kimball Avenue • Chino, CA 91708
P.O. Box 9020 • Chino Hills, CA 91709
TEL (909) 993-1600 • FAX (909) 993-1985
www.ieua.org

24 November 2020

GM Name
GM Title
Agency Name
Street Address
City, State, Zip

SUBJECT: 2020 Urban Water Management Plan Update

Dear Agency Representative:

The Inland Empire Utilities Agency (IEUA) is undertaking the review, update, and revision of its Urban Water Management Plan (UWMP). The Urban Water Management Planning Act requires every urban water supplier of a certain size to prepare and adopt an UWMP at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. IEUA is in the process of preparing the 2020 UWMP Update.

As an urban water supplier, the IEUA is required pursuant to Section 10620(d)(3) of the California Water Code to coordinate with water management agencies, relevant public agencies, and other water suppliers regarding the preparation of the UWMP. Pursuant to Section 10621(b) of the California Water Code, the IEUA will be reviewing the UWMP and will make amendments or changes, as appropriate. Based on the IEUA's current schedule, we expect to have a draft available for public review by April 2021, at which point your agency will receive notification that the draft UWMP is available for public review and comment.

The IEUA invites you to submit written comments in anticipation of the development of our 2020 UWMP Update within the next 30 days to IEUA. If your agency would like to learn more about the UWMP, please feel free to contact me at 909.993.1698 or jaguilar@ieua.org.

Sincerely,

Joshua Aguilar
Senior Engineer

Water Smart - Thinking in Terms of Tomorrow

Kati Parker, President | Jasmin A. Hall, Vice President | Steven J. Elie, Secretary/Treasurer | Michael E. Camacho, Director | Paul Hofer, Director | Shivaji Deshmukh, General Manager

WSCP Appendix C

April 2021 60-Day Notification Letter to City,
County and Others Within IEUA Service Area

NOTICE OF PUBLIC HEARING
BY THE BOARD OF DIRECTORS OF THE INLAND EMPIRE UTILITIES AGENCY*
TO ADOPT THE 2020 URBAN WATER MANAGEMENT PLAN (UWMP),
ADDENDUM OF APPENDIX G TO THE 2015 UWMP,
AND WATER SHORTAGE CONTINGENCY PLAN
SAN BERNARDINO COUNTY, STATE OF CALIFORNIA

NOTICE IS HEREBY GIVEN that the Board of Directors of the Inland Empire Utilities Agency intends to hold a public hearing for adoption of the 2020 Urban Water Management Plan (UWMP), Addendum of Appendix G to the 2015 UWMP, and Water Shortage Contingency Plan.

NOTICE IS FURTHER GIVEN that said public hearing will be held on the following date and time for the purpose of hearing any and all public testimony on the above-stated issue.

DATE: Wednesday, June 16, 2021 – 10:00 a.m.

The meeting will be accessible via teleconference at:
Phone Number: (415) 856-9169 / Conference ID: 811 284 110#

In the effort to prevent the spread of COVID-19, until further notice, the Inland Empire Utilities Agency will hold all Board and Committee meetings by video and audio conference. As of the posting/publication of this notice, it is anticipated that the public hearing will be conducted virtually by video and audio conference. (Please visit www.ieua.org for the most up-to-date information regarding meeting participation.) There will be no public location available to attend the meeting; all interested persons are invited to participate in the public hearing and provide comments regarding the proposed 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and Water Shortage Contingency Plan by calling into the number provided above. The public may also view the meeting live through the Agency's website at www.ieua.org. Oral statements will be heard, but for the accuracy of the record all important testimony should be submitted in writing. Written comments may be emailed to the Board Secretary/Office Manager Denise Garzaro at dgarzaro@ieua.org no later than 24 hours prior to the scheduled meeting time. Comments submitted in advance will be read into the record during the hearing.

NOTICE IS FURTHER GIVEN that the 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and Water Shortage Contingency Plan will be available on the Agency's website at www.ieua.org and via hard-copy upon request in Spring of 2021, no less than two weeks prior to the public hearing. All interested parties are noticed and invited to submit comments and consult with the Agency regarding its forthcoming 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and Water Shortage Contingency Plan to the Strategic Planning and Resources Department, attention Joshua Aguilar at jaguilar@ieua.org. For additional information regarding the 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and Water Shortage Contingency Plan, please contact Senior Engineer, Joshua Aguilar at (909) 993-1694.

*a municipal water district

WSCP Appendix D

Newspaper Notice of Public Hearing

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

6075 Kimball Avenue • Chino, CA 91708
P.O. Box 9020 • Chino Hills, CA 91709
TEL (909) 993-1600 • FAX (909) 993-1985
www.ieua.org

May 11th, 2021

Retail Agency
Contact Information
Placed Here

SUBJECT: Posting of the 2020 Urban Water Management Plan, Addendum of Appendix G to the 2015 UWMP, and 2020 Water Shortage Contingency Plan

Dear Agency Representative:

The Inland Empire Utilities Agency (IEUA) is inviting public review and comment on its Draft 2020 Urban Water Management Plan (UWMP). The Plan includes an updated Addendum of Appendix G to the 2015 UWMP and 2020 Water Shortage Contingency Plan (WSCP).

In compliance with California Water Code (§10610-10656, §10608 and §10632) the UWMP and WSCP are required to contain detailed evaluations of water supplies necessary to reliably meet demands of the California Water Code to coordinate with water management agencies, relevant public agencies, and other water suppliers regarding the preparation of the UWMP and other plans.

All plan documents are now available on IEUA's website here: https://www.ieua.org/read-our-reports/other-reports/.

Comments must be received no later than **5:00 p.m. Monday, May 24, 2021** and sent to the attention of Joshua Aguilar, 909.993.1698 or jaguilar@ieua.org.

If you or your agency would like more information on IEUA's UWMP, Addendum, or WSCP, please contact me.

Sincerely,

Joshua Aguilar
Senior Engineer

Jasmin A. Hall, President | Michael E. Camacho, Vice President | Steven J. Elie, Secretary/Treasurer | Paul Hofer, Director | Marco Tule, Director | Shivaji Deshmukh, General Manager

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Denise Garzaro
INLAND EMPIRE UTILITIES AGENCY
6075 KIMBALL AVE BUILDING A
CHINO, CA 91710

CNS 3471155

COPY OF NOTICE

Notice Type: HRG NOTICE OF HEARING

Ad Description: Urban Water Management Plan (UWMP)- 5/17 and 5/24

To the right is a copy of the notice you sent to us for publication in the INLAND VALLEY DAILY BULLETIN/ONTARIO. Please read this notice carefully and call us with any corrections. The Proof of Publication will be filed with the County Clerk, if required, and mailed to you after the last date below. Publication date(s) for this notice is (are):

05/17/2021 , 05/24/2021

The charge(s) for this order is as follows. An invoice will be sent after the last date of publication. If you prepaid this order in full, you will not receive an invoice.

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* A 0 0 0 0 0 5 7 1 8 2 7 3 *

NOTICE OF PUBLIC HEARING BY THE BOARD OF DIRECTORS OF THE INLAND EMPIRE UTILITIES AGENCY* TO ADOPT THE 2020 URBAN WATER MANAGEMENT PLAN (UWMP), ADDENDUM OF APPENDIX G TO THE 2015 UWMP, AND 2020 WATER SHORTAGE CONTINGENCY PLAN SAN BERNARDINO COUNTY, STATE OF CALIFORNIA

NOTICE IS HEREBY GIVEN that the Board of Directors of the Inland Empire Utilities Agency intends to hold a public hearing for adoption of the 2020 Urban Water Management Plan (UWMP), Addendum of Appendix G to the 2015 UWMP, and 2020 Water Shortage Contingency Plan.

NOTICE IS FURTHER GIVEN that said public hearing will be held on the following date and time for the purpose of hearing any and all public testimony on the above-stated issue.

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Phone Number: (415) 856-9169 / Conference ID: 811 284 110#

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submitted in advance will be read into the record during the hearing.

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5/17, 5/24/21
CNS-3471155#
INLAND VALLEY DAILY BULLETIN/ONTARIO

Inland Valley Daily Bulletin
(formerly The Daily Report)
9616 Archibald Avenue Suite 100
Rancho Cucamonga, CA 91730
909-987-6397
legals@inlandnewspapers.com

(Space below for use of County Clerk Only)

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LOS ANGELES, CA 90060

FILE NO. 3471155

PROOF OF PUBLICATION
(2015.5 C.C.P.)

STATE OF CALIFORNIA
County of San Bernardino

I am a citizen of the United States, I am over the age of eighteen years, and not a party to or interested in the above-entitled matter. I am the principal clerk of the printer of INLAND VALLEY DAILY BULLETIN, a newspaper of general circulation printed and published daily for the City of Ontario, County of San Bernardino, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of San Bernardino, State of California, on the date of August 24, 1951, Case Number 70663. The notice, of which the annexed is a true printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

05/17/2021, 05/24/2021

I declare under the penalty of perjury that the foregoing is true and correct.

Executed at Rancho Cucamonga, San Bernardino Co., California, on this 8th day of June, 2021.

Evangelina Almeida

Signature

NOTICE OF PUBLIC HEARING BY THE BOARD OF DIRECTORS OF THE INLAND EMPIRE UTILITIES AGENCY* TO ADOPT THE 2020 URBAN WATER MANAGEMENT PLAN (UWMP), ADDENDUM OF APPENDIX G TO THE 2015 UWMP, AND 2020 WATER SHORTAGE CONTINGENCY PLAN SAN BERNARDINO COUNTY, STATE OF CALIFORNIA

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and consult with the Agency regarding its forthcoming 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and 2020 Water Shortage Contingency Plan to the Strategic Planning and Resources Department, attention Joshua Aguilar at jaguilar@ieua.org. For additional information regarding the 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and 2020 Water Shortage Contingency Plan, please contact Senior Engineer, Joshua Aguilar at (909) 993-1694.
5/17, 5/24/21
CNS-3471155#
INLAND VALLEY DAILY BULLETIN/ONTARIO #11462691

WSCP Appendix E

Resolution of Adoption of UWMP, WSCP, and Addendum

RESOLUTION NO.2021-6-10

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE INLAND EMPIRE UTILITIES AGENCY (IEUA), SAN BERNARDINO COUNTY, CALIFORNIA, ADOPTING THE 2020 URBAN WATER MANAGEMENT PLAN, 2020 WATER SHORTAGE CONTINGENCY PLAN, AND APPENDIX G AS AN ADDENDUM TO THE 2015 URBAN WATER MANAGEMENT PLAN

Whereas, the California Legislature enacted Assembly Bill 797, (Water Code Section 10610 et seq., known as the Urban Water Management Planning Act) during the 1983-1984 Regular Session, and as amended subsequently, which mandates that every urban water supplier providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, prepare an Urban Water Management Plan at least once every five years; and

Whereas, the Urban Water Management Planning Act requires the preparation and adoption of a Water Shortage Contingency Plan, in accordance with prescribes requirements; and

Whereas, the Urban Water Management Planning Act specifies the requirements and procedures for amending and adopting such Urban Water Management Plans; and

Whereas, the Inland Empire Utilities Agency* is a wholesale supplier of water for 242-square miles in the western portion of San Bernardino; and

Whereas, pursuant to Section 10620 of the Urban Water Management Planning Act, the Inland Empire Utilities Agency has prepared the 2020 Urban Water Management Plan, 2020 Water Shortage Contingency Plan, and Appendix G as an addendum to the 2015 Urban Water Management Plan; and

Whereas, the Board of Directors of the Inland Empire Utilities Agency has duly reviewed, discussed, and considered the 2020 Urban Water Management Plan, 2020 Water Shortage Contingency Plan, and Appendix G as an addendum to the 2015 Urban Water Management Plan.

NOW, THEREFORE, BE IT RESOLVED, DETERMINED AND ORDERED BY THE INLAND EMPIRE UTILITIES AGENCY AS FOLLOWS:

Section 1. The 2020 Urban Water Management Plan is hereby adopted; and

Section 2. The 2020 Water Shortage Contingency Plan is hereby adopted; and

Section 3. The addendum of Appendix G to the 2015 Urban Water Management Plan is hereby adopted; and

Section 4. The General Manager is hereby authorized to file an electronic copy of the 2020 Urban Water Management Plan, 2020 Water Shortage Contingency Plan, and Appendix G to the 2015 Urban Water Management Plan with the State Department of Water Resources within 30

days following its adoption and no later than July 1, 2021.

Section 5. The General Manager is hereby authorized to file a CD or hardcopy of aforementioned plans with the California State Library no later than 30 days after its adoption.

Section 6. The General Manager is hereby authorized to submit an electronic copy or a CD or hardcopy of the adopted aforementioned plans to any city or county in which the suppliers provide water no later than 30 days after its adoption.

Section 7. The General Manager is hereby authorized and directed to implement the adopted aforementioned plans, including recommendations to the Board of Directors regarding necessary procedures, rules, and regulations in an effort to carry out effective and equitable water programs.

Section 8. The Resolution shall take effect upon adoption.

ADOPTED this 16th day of June 2021.

Jasmin A. Hall, President of the Inland Empire Utilities Agency* and the Board of Directors thereof

ATTEST:

Steven J. Elie, Secretary/Treasurer of the Inland Empire Utilities Agency* and of the Board of Directors thereof

The undersigned certifies that this is a true copy as on file in the permanent records of the Agency. This stamp must be in purple ink to constitute a certified copy.
Inland Empire Utilities Agency*
A Municipal Water Agency
By _____ Date 6/16/2021

STATE OF CALIFORNIA)
)SS
COUNTY OF)
SAN BERNARDINO

I, Steven J. Elie, Secretary of the Inland Empire Utilities Agency*, DO HEREBY CERTIFY that the foregoing Resolution being No. 2021-6-10, was adopted at a regular Board Meeting on June 16, 2021, of said Agency by the following vote:

AYES:	Camacho, Elie, Hall, Hofer, Tule
NOES:	None
ABSTAIN:	None
ABSENT:	None

Steven J. Elie, Secretary/Treasurer of the Inland Empire Utilities Agency* and of the Board of Directors thereof

(Seal)

*A Municipal Water District

2020 Water Shortage Contingency Plan

Project Lead

Joshua Aguilar, MsEM, P.E.
Senior Engineer

Prepared For

The Inland Empire Utilities Agency
6075 Kimball Avenue,
Chino, California 91708

Prepared By

Kennedy Jenks
300 N. Lake Ave, Suite 1020
Pasadena, CA 91101
Phone: 626-568-4300
Fax: 626-683-8938
Sachi Itagaki, P.E./QSD

Kennedy Jenks Reference

KJ 2044518*00

Kennedy Jenks

2020 Water Shortage Contingency Plan

Project Lead

Joshua Aguilar, MsEM, P.E.
Senior Engineer

Prepared For

The Inland Empire Utilities Agency
6075 Kimball Avenue,
Chino, California 91708

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Fax: 626-683-8938
Sachi Itagaki, P.E./QSD

Kennedy Jenks Reference

KJ 2044518*00

Kennedy Jenks

Appendix C

DWR Planning Tool and Standardized Tables

Submittal Table 2-2: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable* (select from drop down list)
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

Submittal Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
☑	Supplier is a wholesaler
☐	Supplier is a retailer
Fiscal or Calendar Year (select one)	
☐	UWMP Tables are in calendar years
☑	UWMP Tables are in fiscal years
If using fiscal years provide month and date that the fiscal year begins (mm/dd)	
7/1	
Units of measure used in UWMP * (select from drop down)	
Unit	AF
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES:	

Submittal Table 2-4 Wholesale: Water Supplier Information Exchange (select one)	
☑	Supplier has informed more than 10 other water suppliers of water supplies available in accordance with Water Code Section 10631. Completion of the table below is optional. If not completed, include a list of the water suppliers that were informed.
	Provide page number for location of the list.
☐	Supplier has informed 10 or fewer other water suppliers of water supplies available in accordance with Water Code Section 10631. **Complete the table below.**
Water Supplier Name	
Add additional rows as needed	
Chino Basin Water Master	
Chino Basin Desalter Authority	
City of Chino	
City of Chino Hills	
Cucamonga Valley Water District	
Fontana Water Company	
Local Agency Formation Commission for San Bernardino County	
City of Montclair	
Monte Vista Water District	
Metropolitan Water District	
City of Ontario	
City of Rancho Cucamonga	
Santa Ana Regional Water Quality Control Board	
San Antonio Water Company	
Santa Ana Watershed Project Authority	
San Bernardino County Planning Department	
Three Valleys Municipal Water District	
City of Upland	
Water Facilities Authority	
West Valley Water District	
NOTES:	

Submittal Table 3-1 Wholesale: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	906,046	945,849	987,401	1,031,771	1,074,773	1,119,568
NOTES: Population projections calculated using the 2020 Southern California Association of Government's population forecast.						

Submittal Table 4-1 Wholesale: Demands for Potable and Non-Potable Water - Actual			
Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only use types that will be recognized by the WUE data online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume*
Add additional rows as needed			
Sales to other agencies	MWD Imported Water	Raw Water	66,438
		TOTAL	66,438
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Volume values from IEUA Annual Water Use Database.			

Submittal Table 4-2 Wholesale: Use for Potable and Raw Water - Projected						
Use Type	Additional Description (as needed)	Projected Water Use * Report To the Extent that Records are Available				
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool.		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Sales to other agencies	Imported Water from MWD provided to Retail Agencies	77,416	79,630	81,974	84,021	84,065
	TOTAL	77,416	79,630	81,974	84,021	84,065
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES:						

Submittal Table 4-3 Wholesale: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045 (opt)
Potable and Raw Water From Tables 4-1W and 4-2W	66,438	77,416	79,630	81,974	84,021	84,065
Recycled Water Demand* From Table 6-4W	30,496	39,300	41,297	42,162	44,191	44,691
TOTAL WATER DEMAND	96,934	116,716	120,927	124,136	128,212	128,756
**Recycled water demand fields will be blank until Table 6-4 is complete.*						
NOTES: 2020 Values from FY 19/20 Recycled Water Annual Report and FY 19/20 Annual Water Use Report. Projected potable and raw water volumes is the sum of each retail agency's expected use of imported water from IEUA. Recycled water projections are the sum of direct use from member agencies and groundwater recharge projections from IEUA.						

Submittal Table 5-1 Baselines and Targets Summary
From SB X7-7 Verification Form
Retail Supplier or Regional Alliance Only

Baseline Period	Start Year *	End Year *	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	1995 - 1999	2004 - 2008	245	193
5 Year	2003 - 2005	2007 - 2009	227	

**All cells in this table should be populated manually from the supplier's SBX7-7 Verification Form and reported in Gallons per Capita per Day (GPCD)*

NOTES:

Submittal Table 5-2: 2020 Compliance **From** **SB X7-7 2020 Compliance Form** *Retail Supplier or Regional Alliance Only*				
2020 GPCD			2020 Confirmed Target GPCD*	Did Supplier Achieve Targeted Reduction for 2020? Y/N
Actual 2020 GPCD*	2020 TOTAL Adjustments*	Adjusted 2020 GPCD* *(Adjusted if applicable)*		
171	0	0	193	Yes
**All cells in this table should be populated manually from the supplier's SBX7-7 2020 Compliance Form and reported in Gallons per Capita per Day (GPCD)*				
NOTES:				

Submittal Table 6-1 Wholesale: Groundwater Volume Pumped						
☑	Supplier does not pump groundwater. The supplier will not complete the table below.					
☐	All or part of the groundwater described below is desalinated.					
Groundwater Type Drop Down List	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
Add additional rows as needed						
TOTAL		0	0	0	0	0
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES:						

Submittal Table 6-3 Wholesale: Wastewater Treatment and Discharge Within Service Area in 2020

☐ Wholesale Supplier neither distributes nor provides supplemental treatment to recycled water.
The Supplier will not complete the table below.

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)* [2]	Method of Disposal ***Drop down list***	Does This Plant Treat Wastewater Generated Outside the Service Area? ***Drop down list***	Treatment Level ***Drop down list***	2020 volumes [1]				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
Add additional rows as needed											
RP-1	DP-001	Prado Lake	8332818001	Lake outfall	Yes	Tertiary	26,932	25,889	30,495	0	0
	DP-002	Cucamonga Creek	8332818001	River or creek outfall	Yes	Tertiary				0	0
RP-4	DP-002	Cucamonga Creek	8332818001	River or creek outfall	Yes	Tertiary	10,718			0	0
RP-5	DP-003	Chino Creek	8332818001	River or creek outfall	Yes	Tertiary	9,699			0	0
CCWRF	DP-004	Chino Creek	8332818001	River or creek outfall	Yes	Tertiary	9,035			0	0
						Total	56,384	25,889	30,495	0	0

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.

[2] If the **Wastewater Discharge ID Number** is not available to the UWMP preparer, access the SWRCB CIWQS regulated facility website at https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility

NOTES:

Submittal Table 6-4 Wholesale: Current and Projected Retailers Provided Recycled Water Within Service Area							
☐	Recycled water is not directly treated or distributed by the Supplier. The Supplier will not complete the table below.						
Name of Receiving Supplier or Direct Use by Wholesaler	Level of Treatment *Drop down list*	2020*	2025*	2030*	2035*	2040*	2045* *(opt)*
Add additional rows as needed							
Direct Use	Tertiary	17,115	22,880	24,877	25,742	27,771	28,271
Groundwater Recharge	Tertiary	13,381	16,420	16,420	16,420	16,420	16,420
	Total	30,496	39,300	41,297	42,162	44,191	44,691
*** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.							
NOTES: 2020 value from FY 19/20 Recycled Water Annual Report. Direct use projected values from retail agencies. No projections were made for 2045, so the projected volume is set equal to 2040. Groundwater recharge projections from IEUA projections based on groundwater recharge annual report data.							

Submittal Table 6-5 Wholesale: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual		
☐	Recycled water was not used or distributed by the supplier in 2015, nor projected for use or distribution in 2020. The wholesale supplier will not complete the table below.	
Name of Receiving Supplier or Direct Use by Wholesaler	2015 Projection for 2020*	2020 Actual Use*
Add additional rows as needed		
Direct Use	30,757	17,115
Groundwater Recharge	13,977	13,381
Total	44,734	30,496
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*		
NOTES: From 2015 IEUA UWMP and FY 19/20 Recycled Water Annual Report.		

Submittal Table 6-7 Wholesale: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☐	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other suppliers?		Description *(if needed)*	Planned Implementation Year	Planned for Use in Year Type *Drop Down list*	Expected Increase in Water Supply to Supplier*
	Drop Down Menu	*If Yes, Supplier Name*				
Add additional rows as needed						
Recharge Basin Improvements	*Yes*	*Chino Basin Watermaster*	See Section 4.4.5	2021	All Year Types	11,852 AF
Water Use Efficiency Business Plan	*Yes*	*Retail Agencies, MWD, and other agencies detailed in Section 8*	See Section 4.4.1	2020/2025	All Year Types	9,008 AF
Recycled Water and Intertie	*Yes*	*Western Riverside County Regional Wastewater Authority*	See Section 4.4.3	To be determined	All Year Types	6,000 AFY
RP-5 Liquids Treatment Expansion	*No*		See Section 4.4.3	2020/2025	All Year Types	See Notes
RP-1 Liquids Capacity Recovery and Solids Treatment Expansion	*No*		See Section 4.4.3	2030/2035	All Year Types	See Notes
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: The projects and schedule detailed in this table are subject to change. Expected Increase in Water Supply is not compatible with some of these projects as they give IEUA the capacity to meet flows and don't provide water on their own. Recharge Basin improvements increase the amount of stormwater and recycled water that can be recharged to the Chino Basin.						

Submittal Table 6-8 Wholesale: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2020		
Drop down list May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool		Actual Volume*	Water Quality Drop Down List	Total Right or Safe Yield* (optional)
Add additional rows as needed				
Purchased or Imported Water	From MWD	66,438	Other Non-Potable Water	
Recycled Water	Direct Use and GWR	30,495	Recycled Water	
	Total	96,933		0
Units of measure (AF, CCF, MG) *must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES: GWR = Groundwater Recharge. Values from IEUA FY 19/20 Annual Water Use Report and FY19/20 Recycled Water Annual Report.				

OPTIONAL Table 6-8ds: Source Water Desalination

☐	Neither groundwater nor surface water are reduced in salinity prior to distribution.									
Plant Name or Well ID	Plant Capacity	Intake Type *Drop down list*	Source Water Type *Drop down list*	Influent TDS	Brine Discharge *Drop down list*	Volume of Water Desalinated				
						2016	2017	2018	2019	2020
Chino Desalter Authority	40,000	open-water intake (screened or unscreened)	groundwater	1,000 ppm	Brine Line	11,883	12,292	13,242	15,010	15,415
					Total	11883	12292	13242	15010	15415

**Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

Notes: Purchased by the cities of Chino, Chino Hills, and Ontario from Chino I Desalter. These three IEUA member agencies only purchase a portion of t

Submittal Table 6-9 Wholesale: Water Supplies — Projected											
Water Supply		Projected Water Supply* Report To the Extent Practicable									
		2025		2030		2035		2040		2045 (opt)	
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool	Additional Detail on Water Supply	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Add additional rows as needed											
Purchased or Imported Water	From MWD	93,283		93,283		93,283		93,283		93,283	
Recycled Water	Wastewater Plant Flows	60,073		63,207		64,142		66,836		66,836	
	Total	153,356	0	156,490	0	157,425	0	160,119	0	160,119	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*											
NOTES:											

Submittal Table 7-1 Wholesale: Basis of Water Year Data (Reliability Assessment)

Year Type	Base Year If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 1999-2000, use 2000	Available Supplies if Year Type Repeats	
		☐	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____
		☑	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available *	% of Average Supply
Average Year	FY 15/16 - FY 19/20	147,503	100%
Single-Dry Year	FY 15/16	147,477	100%
Consecutive Dry Years 1st Year	FY 15/16	147,477	100%
Consecutive Dry Years 2nd Year	FY 15/16	147,477	100%
Consecutive Dry Years 3rd Year	FY 15/16	147,477	100%
Consecutive Dry Years 4th Year	FY 15/16	147,477	100%
Consecutive Dry Years 5th Year	FY 15/16	147,477	100%

Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a supplier uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table. Suppliers may create an additional worksheet for the additional tables.

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Average year is the average of FY15/16 through FY19/20 wastewater plant flows plus the MWD contract amount from resolution 2014-12-1.

Submittal Table 7-2 Wholesale: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	153,356	156,490	157,425	160,119	160,119
Demand totals *(autofill fm Table 4-3)*	116,716	120,927	124,136	128,212	128,756
Difference	36,640	35,563	33,289	31,907	31,363
NOTES: Normal year based on the average of 2016-2020 conditions.					

Submittal Table 7-3 Wholesale: Single Dry Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 (Opt)
Supply totals*	153,329	156,462	157,397	160,091	160,091
Demand totals*	118,899	123,938	128,009	133,007	133,571
Difference	34,431	32,524	29,388	27,084	26,519
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					

NOTES:
IEUA considers FY15/16 to represent the single dry year hydrologic conditions. The expected supply is 100% of normal year supply. The IEUA IRP forecasts a regional demand increase of 3.74% by 2040 for a single dry year due to above normal temperature and reduced wet periods (IEUA IRP Appendix E, 2016). Demand increase for prior years are interpolated (from 0.62% in 2015 to 3.74% in 2040). The demand increases for 2045 is assumed to be the same as 2040.

Submittal Table 7-4 Wholesale: Multiple Dry Years Supply and Demand Comparison						
		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	153,329	156,462	157,397	160,091	160,091
	Demand totals	120,206	125,752	130,318	135,879	136,456
	Difference	33,124	30,710	27,079	24,212	23,635
Second year	Supply totals	153,329	156,462	157,397	160,091	160,091
	Demand totals	120,206	125,752	130,318	135,879	136,456
	Difference	33,124	30,710	27,079	24,212	23,635
Third year	Supply totals	153,329	156,462	157,397	160,091	160,091
	Demand totals	120,206	125,752	130,318	135,879	136,456
	Difference	33,124	30,710	27,079	24,212	23,635
Fourth year	Supply totals	153,329	156,462	157,397	160,091	160,091
	Demand totals	120,206	125,752	130,318	135,879	136,456
	Difference	33,124	30,710	27,079	24,212	23,635
Fifth year	Supply totals	153,329	156,462	157,397	160,091	160,091
	Demand totals	120,206	125,752	130,318	135,879	136,456
	Difference	33,124	30,710	27,079	24,212	23,635
Sixth year *(optional)*	Supply totals	153,329	156,462	157,397	160,091	160,091
	Demand totals	120,206	125,752	130,318	135,879	136,456
	Difference	33,124	30,710	27,079	24,212	23,635

***Units of measure (AF, CCF, MG) m** ust remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:
IEUA considers FY15/16 to represent each year of the multiple dry year hydrologic conditions. The expected supply is 100% of normal year supply. The IEUA IRP forecasts a regional demand increase of 5.98% by 2040 for a multi-dry year due to above normal temperature and reduced wet periods (IEUA IRP Appendix E, 2016). Demand increase for prior years are interpolated (from 1.00% in 2015 to 5.98% in 2040). The demand increases for 2045 is assumed to be the same as 2040. The supply and demand for each year of the multi-year drought is expected to be the same.

Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)

2021	Total
Total Water Use	100,497
Total Supplies	148,650
Surplus/Shortfall w/o WSCP Action	48,153
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	48,153
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use	105,098
Total Supplies	149,806
Surplus/Shortfall w/o WSCP Action	44,708
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	44,708
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use	109,911
Total Supplies	150,972
Surplus/Shortfall w/o WSCP Action	41,061
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	41,061
Resulting % Use Reduction from WSCP action	0%

2024	Total
Total Water Use	114,943
Total Supplies	152,146
Surplus/Shortfall w/o WSCP Action	37,203
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	37,203
Resulting % Use Reduction from WSCP action	0%

2025	Total
Total Water Use	120,206
Total Supplies	153,329
Surplus/Shortfall w/o WSCP Action	33,124
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	33,124
Resulting % Use Reduction from WSCP action	0%

Notes: Years 2021 through 2024 are interpolated between the 2020 actual supply and use values and the 2025 projected supply and use for multi-year drought (from Table 7-4). 2020 actual supply is the average year supply from Table 7-1.

Submittal Table 8-1
Water Shortage Contingency Plan Levels

Shortage Level	Percent Shortage Range	Shortage Response Actions (*Narrative description*)
1	Up to 10%	Watch (DCP Level 1: 1-5%)
2	Up to 20%	Warning (DCP Level 2: 6-15%)
3	Up to 30%	Emergency (DCP Level 3: 16-25%)
4	Up to 40%	Critical (DCP Level 4: 26-50%)
5	Up to 50%	
6	>50%	Catastrophic (DCP Level 5: >50%)

NOTES: IEUA's 2020 DCP defined five drought stage conditions noted in the Water Shortage Condition column above. The cross-reference between these shortage stages and the water shortage levels in this table is included in Table 4-1 in the WSCP.

Submittal Table 8-2: Demand Reduction Actions				
Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
Add additional rows as needed				
1	Expand Public Information Campaign	Minimum 1-5% of water use	Begin profiling high potential customers and develop messaging that will best resonate with those customers	
1	Provide Rebates on Plumbing Fixtures and Devices		SoCal WaterSmart Residential and Commercial Rebates	
1	Provide Rebates for Landscape Irrigation Efficiency		Residential Irrigation Tune-Up, Home Surveys, Landscape Workshops, and Design Services	
1	Provide Rebates for Turf Replacement		Turf Replacement Program	
2	Expand Public Information Campaign	Minimum 6-15% of water use	Introduce influencer marketing; continue targeting high potential customers	
2	Provide Rebates on Plumbing Fixtures and Devices		Implement direct installation programs	
2	Provide Rebates for Landscape Irrigation Efficiency		Expand Landscape Design Services; offer more frequent landscape workshops and home surveys	
2	Provide Rebates for Landscape Irrigation Efficiency		Continue Turf Replacement Program	
3	Expand Public Information Campaign	Minimum 16-25% of water use	Expand profiling and micro-targeting to include mid-range water users; increase influencer marketing	
3	Provide Rebates on Plumbing Fixtures and Devices		Continue base programs; Increase incentive amounts for certain programs; continue smart irrigation direct installation programs	

Submittal Table 8-2: Demand Reduction Actions				
Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
3	Provide Rebates for Landscape Irrigation Efficiency		Continue Stage 2 Actions	
3	Provide Rebates for Turf Replacement		Increase incentive amounts	
4, 5	Expand Public Information Campaign	Minimum 24-50% of water use	Strengthen message of urgency and community call to action	
4, 5	Provide Rebates on Plumbing Fixtures and Devices		Continue increase incentives and smart irrigation direct installation programs	
4, 5	Provide Rebates for Landscape Irrigation Efficiency		Continue Stage 2 Actions	
4, 5	Provide Rebates for Turf Replacement		Increase incentive amounts	
6	Expand Public Information Campaign	Minimum 50% of water use	Implement catastrophic messaging, announce essential use only	
6	Provide Rebates on Plumbing Fixtures and Devices		Only offer indoor plumbing and property leak detection programs.	
6	Provide Rebates for Landscape Irrigation Efficiency		Suspend all programs	
6	Provide Rebates for Turf Replacement		Suspend all programs	
NOTES: Each IEUA retail agency is responsible for enforcing local water waste ordinances; details of the restrictions by agency can be found in the 2020 DCP and each individual retail agency's 2020 WSCP. Additional details on drought response actions can be found in the IEUA's 2020 DCP and WSCP.				

Submittal Table 8-3: Supply Augmentation and Other Actions			
Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*
Add additional rows as needed			
1 through 6	Other Actions (describe)	Undetermined amount	IEUA is always looking for opportunities to explore additional recycled water connections to increase supply.
6	Other Purchases	Up to 93,283 AFY (MWD Contract Amount)	Purchase MWD Tier 2 Imported Water
NOTES: MWD Contract Amount from Resolution No. 2014-12-1			

Submittal Table 10-1 Wholesale: Notification to Cities and Counties (select one)		
☑	Supplier has notified more than 10 cities or counties in accordance with Water Code Sections 10621 (b) and 10642. **Completion of the table below is not required. Provide a separate list of the cities and counties that were notified.**	
Table 10-1	Provide the page or location of this list in the UWMP.	
☐	Supplier has notified 10 or fewer cities or counties. **Complete the table below.**	
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
City of Chino	Yes	Yes
City of Chino Hills	Yes	Yes
Cucamonga Valley Water	Yes	Yes
Fontana Water Company	Yes	Yes
Monte Vista Water District	Yes	Yes
City of Ontario	Yes	Yes
San Antonio Water Company	Yes	Yes
City of Upland	Yes	Yes
City of Rancho Cucamonga	Yes	Yes
City of Montclair	Yes	Yes
West Valley Water District	Yes	Yes
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
San Bernardino County	Yes	Yes

NOTES: In addition, the following agencies were also given a 60 Day Notice and Notice of Public Hearing: Chino Basin Water Master, Chino Basin Desalter Authority, Local Agency Formation Commission for San Bernardino County, Metropolitan Water District, Santa Ana Regional Water Quality Control Board, Santa Ana Watershed Project Authority, Three Valleys Municipal Water District, West Valley Water District, and the Water Facilities Authority.
Notification letters were sent out in November 2020, April 2021, and May 2021. Copies of these notification letters are included in Appendix E of the 2020 UWMP.

Appendix D

IEUA Resolution 2021-6-10 2020,
Adopting the UWMP, 2020 WSCP

RESOLUTION NO.2021-6-10

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE INLAND EMPIRE UTILITIES AGENCY (IEUA), SAN BERNARDINO COUNTY, CALIFORNIA, ADOPTING THE 2020 URBAN WATER MANAGEMENT PLAN, 2020 WATER SHORTAGE CONTINGENCY PLAN, AND APPENDIX G AS AN ADDENDUM TO THE 2015 URBAN WATER MANAGEMENT PLAN

Whereas, the California Legislature enacted Assembly Bill 797, (Water Code Section 10610 et seq., known as the Urban Water Management Planning Act) during the 1983-1984 Regular Session, and as amended subsequently, which mandates that every urban water supplier providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, prepare an Urban Water Management Plan at least once every five years; and

Whereas, the Urban Water Management Planning Act requires the preparation and adoption of a Water Shortage Contingency Plan, in accordance with prescribes requirements; and

Whereas, the Urban Water Management Planning Act specifies the requirements and procedures for amending and adopting such Urban Water Management Plans; and

Whereas, the Inland Empire Utilities Agency* is a wholesale supplier of water for 242-square miles in the western portion of San Bernardino; and

Whereas, pursuant to Section 10620 of the Urban Water Management Planning Act, the Inland Empire Utilities Agency has prepared the 2020 Urban Water Management Plan, 2020 Water Shortage Contingency Plan, and Appendix G as an addendum to the 2015 Urban Water Management Plan; and

Whereas, the Board of Directors of the Inland Empire Utilities Agency has duly reviewed, discussed, and considered the 2020 Urban Water Management Plan, 2020 Water Shortage Contingency Plan, and Appendix G as an addendum to the 2015 Urban Water Management Plan.

NOW, THEREFORE, BE IT RESOLVED, DETERMINED AND ORDERED BY THE INLAND EMPIRE UTILITIES AGENCY AS FOLLOWS:

Section 1. The 2020 Urban Water Management Plan is hereby adopted; and

Section 2. The 2020 Water Shortage Contingency Plan is hereby adopted; and

Section 3. The addendum of Appendix G to the 2015 Urban Water Management Plan is hereby adopted; and

Section 4. The General Manager is hereby authorized to file an electronic copy of the 2020 Urban Water Management Plan, 2020 Water Shortage Contingency Plan, and Appendix G to the 2015 Urban Water Management Plan with the State Department of Water Resources within 30

days following its adoption and no later than July 1, 2021.

Section 5. The General Manager is hereby authorized to file a CD or hardcopy of aforementioned plans with the California State Library no later than 30 days after its adoption.

Section 6. The General Manager is hereby authorized to submit an electronic copy or a CD or hardcopy of the adopted aforementioned plans to any city or county in which the suppliers provide water no later than 30 days after its adoption.

Section 7. The General Manager is hereby authorized and directed to implement the adopted aforementioned plans, including recommendations to the Board of Directors regarding necessary procedures, rules, and regulations in an effort to carry out effective and equitable water programs.

Section 8. The Resolution shall take effect upon adoption.

ADOPTED this 16th day of June 2021.

Jasmin A. Hall, President of the Inland Empire Utilities Agency* and the Board of Directors thereof

ATTEST:

Steven J. Elie, Secretary/Treasurer of the Inland Empire Utilities Agency* and of the Board of Directors thereof

The undersigned certifies that this is a true copy as on file in the permanent records of the Agency. This stamp must be in purple ink to constitute a certified copy.
Inland Empire Utilities Agency*
A Municipal Water Agency
By _____ Date 6/16/2021

STATE OF CALIFORNIA)
)SS
COUNTY OF)
SAN BERNARDINO

I, Steven J. Elie, Secretary of the Inland Empire Utilities Agency*, DO HEREBY CERTIFY that the foregoing Resolution being No. 2021-6-10, was adopted at a regular Board Meeting on June 16, 2021, of said Agency by the following vote:

AYES:	Camacho, Elie, Hall, Hofer, Tule
NOES:	None
ABSTAIN:	None
ABSENT:	None

Steven J. Elie, Secretary/Treasurer of the Inland Empire Utilities Agency* and of the Board of Directors thereof

(Seal)

*A Municipal Water District

Appendix E

Outreach Materials

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

6075 Kimball Avenue • Chino, CA 91708
P.O. Box 9020 • Chino Hills, CA 91709
TEL (909) 993-1600 • FAX (909) 993-1985
www.ieua.org

24 November 2020

GM Name
GM Title
Agency Name
Street Address
City, State, Zip

SUBJECT: 2020 Urban Water Management Plan Update

Dear Agency Representative:

The Inland Empire Utilities Agency (IEUA) is undertaking the review, update, and revision of its Urban Water Management Plan (UWMP). The Urban Water Management Planning Act requires every urban water supplier of a certain size to prepare and adopt an UWMP at least once every five years. The UWMP is a planning document in which water suppliers evaluate and compare their water supply and reliability to their existing and projected demands. IEUA is in the process of preparing the 2020 UWMP Update.

As an urban water supplier, the IEUA is required pursuant to Section 10620(d)(3) of the California Water Code to coordinate with water management agencies, relevant public agencies, and other water suppliers regarding the preparation of the UWMP. Pursuant to Section 10621(b) of the California Water Code, the IEUA will be reviewing the UWMP and will make amendments or changes, as appropriate. Based on the IEUA's current schedule, we expect to have a draft available for public review by April 2021, at which point your agency will receive notification that the draft UWMP is available for public review and comment.

The IEUA invites you to submit written comments in anticipation of the development of our 2020 UWMP Update within the next 30 days to IEUA. If your agency would like to learn more about the UWMP, please feel free to contact me at 909.993.1698 or jaguilar@ieua.org.

Sincerely,

Joshua Aguilar
Senior Engineer

Water Smart - Thinking in Terms of Tomorrow

Kati Parker, President | Jasmin A. Hall, Vice President | Steven J. Elie, Secretary/Treasurer | Michael E. Camacho, Director | Paul Hofer, Director | Shivaji Deshmukh, General Manager

NOTICE OF PUBLIC HEARING
BY THE BOARD OF DIRECTORS OF THE INLAND EMPIRE UTILITIES AGENCY*
TO ADOPT THE 2020 URBAN WATER MANAGEMENT PLAN (UWMP),
ADDENDUM OF APPENDIX G TO THE 2015 UWMP,
AND WATER SHORTAGE CONTINGENCY PLAN
SAN BERNARDINO COUNTY, STATE OF CALIFORNIA

NOTICE IS HEREBY GIVEN that the Board of Directors of the Inland Empire Utilities Agency intends to hold a public hearing for adoption of the 2020 Urban Water Management Plan (UWMP), Addendum of Appendix G to the 2015 UWMP, and Water Shortage Contingency Plan.

NOTICE IS FURTHER GIVEN that said public hearing will be held on the following date and time for the purpose of hearing any and all public testimony on the above-stated issue.

DATE: Wednesday, June 16, 2021 – 10:00 a.m.

The meeting will be accessible via teleconference at:
Phone Number: (415) 856-9169 / Conference ID: 811 284 110#

In the effort to prevent the spread of COVID-19, until further notice, the Inland Empire Utilities Agency will hold all Board and Committee meetings by video and audio conference. As of the posting/publication of this notice, it is anticipated that the public hearing will be conducted virtually by video and audio conference. (Please visit www.ieua.org for the most up-to-date information regarding meeting participation.) There will be no public location available to attend the meeting; all interested persons are invited to participate in the public hearing and provide comments regarding the proposed 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and Water Shortage Contingency Plan by calling into the number provided above. The public may also view the meeting live through the Agency's website at www.ieua.org. Oral statements will be heard, but for the accuracy of the record all important testimony should be submitted in writing. Written comments may be emailed to the Board Secretary/Office Manager Denise Garzaro at dgarzaro@ieua.org no later than 24 hours prior to the scheduled meeting time. Comments submitted in advance will be read into the record during the hearing.

NOTICE IS FURTHER GIVEN that the 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and Water Shortage Contingency Plan will be available on the Agency's website at www.ieua.org and via hard-copy upon request in Spring of 2021, no less than two weeks prior to the public hearing. All interested parties are noticed and invited to submit comments and consult with the Agency regarding its forthcoming 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and Water Shortage Contingency Plan to the Strategic Planning and Resources Department, attention Joshua Aguilar at jaguilar@ieua.org. For additional information regarding the 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and Water Shortage Contingency Plan, please contact Senior Engineer, Joshua Aguilar at (909) 993-1694.

*a municipal water district

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Denise Garzaro
INLAND EMPIRE UTILITIES AGENCY
6075 KIMBALL AVE BUILDING A
CHINO, CA 91710

CNS 3471155

COPY OF NOTICE

Notice Type: HRG NOTICE OF HEARING

Ad Description: Urban Water Management Plan (UWMP)- 5/17 and 5/24

To the right is a copy of the notice you sent to us for publication in the INLAND VALLEY DAILY BULLETIN/ONTARIO. Please read this notice carefully and call us with any corrections. The Proof of Publication will be filed with the County Clerk, if required, and mailed to you after the last date below. Publication date(s) for this notice is (are):

05/17/2021 , 05/24/2021

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NOTICE OF PUBLIC HEARING BY THE BOARD OF DIRECTORS OF THE INLAND EMPIRE UTILITIES AGENCY* TO ADOPT THE 2020 URBAN WATER MANAGEMENT PLAN (UWMP), ADDENDUM OF APPENDIX G TO THE 2015 UWMP, AND 2020 WATER SHORTAGE CONTINGENCY PLAN SAN BERNARDINO COUNTY, STATE OF CALIFORNIA

NOTICE IS HEREBY GIVEN that the Board of Directors of the Inland Empire Utilities Agency intends to hold a public hearing for adoption of the 2020 Urban Water Management Plan (UWMP), Addendum of Appendix G to the 2015 UWMP, and 2020 Water Shortage Contingency Plan.

NOTICE IS FURTHER GIVEN that said public hearing will be held on the following date and time for the purpose of hearing any and all public testimony on the above-stated issue.

DATE: Wednesday, June 16, 2021 – 10:00 a.m.

The meeting will be accessible via teleconference at:
Phone Number: (415) 856-9169 / Conference ID: 811 284 110#

In the effort to prevent the spread of COVID-19, until further notice, the Inland Empire Utilities Agency will hold all Board and Committee meetings by video and audio conference. As of the posting/publication of this notice, it is anticipated that the public hearing will be conducted virtually by video and audio conference. (Please visit www.ieua.org for the most up-to-date information regarding meeting participation.) There will be no public location available to attend the meeting; all interested persons are invited to participate in the public hearing and provide comments regarding the proposed 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and 2020 Water Shortage Contingency Plan by calling into the number provided above. The public may also view the meeting live through the Agency's website at www.ieua.org. Oral statements will be heard, but for the accuracy of the record all important testimony should be submitted in writing. Written comments may be emailed to the Board Secretary/Office Manager Denise Garzaro at dgarzaro@ieua.org no later than 24 hours prior to the scheduled meeting time. Comments

submitted in advance will be read into the record during the hearing.

NOTICE IS FURTHER GIVEN that the 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and 2020 Water Shortage Contingency Plan will be available on the Agency's website at www.ieua.org and via hard-copy upon request in Spring of 2021, no less than two weeks prior to the public hearing. All interested parties are noticed and invited to submit comments and consult with the Agency regarding its forthcoming 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and 2020 Water Shortage Contingency Plan to the Strategic Planning and Resources Department, attention Joshua Aguilar at jaguilar@ieua.org. For additional information regarding the 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and 2020 Water Shortage Contingency Plan, please contact Senior Engineer, Joshua Aguilar at (909) 993-1694.
5/17, 5/24/21
CNS-3471155#
INLAND VALLEY DAILY BULLETIN/ONTARIO

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

6075 Kimball Avenue • Chino, CA 91708
P.O. Box 9020 • Chino Hills, CA 91709
TEL (909) 993-1600 • FAX (909) 993-1985
www.ieua.org

May 11th, 2021

Retail Agency
Contact Information
Placed Here

SUBJECT: Posting of the 2020 Urban Water Management Plan, Addendum of Appendix G to the 2015 UWMP, and 2020 Water Shortage Contingency Plan

Dear Agency Representative:

The Inland Empire Utilities Agency (IEUA) is inviting public review and comment on its Draft 2020 Urban Water Management Plan (UWMP). The Plan includes an updated Addendum of Appendix G to the 2015 UWMP and 2020 Water Shortage Contingency Plan (WSCP).

In compliance with California Water Code (§10610-10656, §10608 and §10632) the UWMP and WSCP are required to contain detailed evaluations of water supplies necessary to reliably meet demands of the California Water Code to coordinate with water management agencies, relevant public agencies, and other water suppliers regarding the preparation of the UWMP and other plans.

All plan documents are now available on IEUA's website here: https://www.ieua.org/read-our-reports/other-reports/.

Comments must be received no later than **5:00 p.m. Monday, May 24, 2021** and sent to the attention of Joshua Aguilar, 909.993.1698 or jaguilar@ieua.org.

If you or your agency would like more information on IEUA's UWMP, Addendum, or WSCP, please contact me.

Sincerely,

Joshua Aguilar
Senior Engineer

Jasmin A. Hall, President | Michael E. Camacho, Vice President | Steven J. Elie, Secretary/Treasurer | Paul Hofer, Director | Marco Tule, Director | Shivaji Deshmukh, General Manager

Inland Valley Daily Bulletin
(formerly The Daily Report)
9616 Archibald Avenue Suite 100
Rancho Cucamonga, CA 91730
909-987-6397
legals@inlandnewspapers.com

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(2015.5 C.C.P.)

STATE OF CALIFORNIA
County of San Bernardino

I am a citizen of the United States, I am over the age of eighteen years, and not a party to or interested in the above-entitled matter. I am the principal clerk of the printer of INLAND VALLEY DAILY BULLETIN, a newspaper of general circulation printed and published daily for the City of Ontario, County of San Bernardino, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of San Bernardino, State of California, on the date of August 24, 1951, Case Number 70663. The notice, of which the annexed is a true printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

05/17/2021, 05/24/2021

I declare under the penalty of perjury that the foregoing is true and correct.

Executed at Rancho Cucamonga, San Bernardino Co., California, on this 8th day of June, 2021.

Evangelina Almeida

Signature

NOTICE OF PUBLIC HEARING BY THE BOARD OF DIRECTORS OF THE INLAND EMPIRE UTILITIES AGENCY* TO ADOPT THE 2020 URBAN WATER MANAGEMENT PLAN (UWMP), ADDENDUM OF APPENDIX G TO THE 2015 UWMP, AND 2020 WATER SHORTAGE CONTINGENCY PLAN SAN BERNARDINO COUNTY, STATE OF CALIFORNIA

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Phone Number: (415) 856-9169 / Conference ID: 811 284 110#

In the effort to prevent the spread of COVID-19, until further notice, the Inland Empire Utilities Agency will hold all Board and Committee meetings by video and audio conference. As of the posting/publication of this notice, it is anticipated that the public hearing will be conducted virtually by video and audio conference. (Please visit www.ieua.org for the most up-to-date information regarding meeting participation.) There will be no public location available to attend the meeting; all interested persons are invited to participate in the public hearing and provide comments regarding the proposed 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and 2020 Water Shortage Contingency Plan by calling into the number provided above. The public may also view the meeting live through the Agency's website at www.ieua.org. Oral statements will be heard, but for the accuracy of the record all important testimony should be submitted in writing. Written comments may be emailed to the Board Secretary/Office Manager Denise Garzaro at dgarzaro@ieua.org no later than 24 hours prior to the scheduled meeting time. Comments submitted in advance will be read into the record during the hearing.

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and consult with the Agency regarding its forthcoming 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and 2020 Water Shortage Contingency Plan to the Strategic Planning and Resources Department, attention Joshua Aguilar at jaguilar@ieua.org. For additional information regarding the 2020 UWMP, Addendum of Appendix G to the 2015 UWMP, and 2020 Water Shortage Contingency Plan, please contact Senior Engineer, Joshua Aguilar at (909) 993-1694.
5/17, 5/24/21
CNS-3471155#
INLAND VALLEY DAILY BULLETIN/ONTARIO #11462691

Appendix F

SBX7-7 Verification Tables and DWR Population Tool Output

City of Chino

SB X7-7 Table 0: Units of Measure Used in 2020 UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent throughout the UWMP, as reported in Submittal Table 2-3.*
NOTES:

City of Chino

SB X7-7 Table 2: Method for 2020 Population Estimate	
Method Used to Determine 2020 Population (may check more than one)	
☑	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☑	**4. Other** DWR recommends pre-review
NOTES: Data from the Department of Finance and the City of Chino's Water Master Plan was used to estimate the 2020 population.	

City of Chino

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	80,808
NOTES:	

City of Chino

SB X7-7 Table 4: 2020 Gross Water Use							
Compliance Year 2020	**2020 Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**2020 Deductions**					**2020 Gross Water Use**
		Exported Water *	**Change in Dist. System Storage*** (+/-)	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use***	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	
	15,273			-		-	**15,273**

*** Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.

NOTES:

City of Chino

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Chino Basin Groundwater
This water source is *(check one)* **:**	
☑	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	5,149	-	5,149

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

City of Chino

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s) Meter Error Adjustment

Complete one table for each source.

Name of Source	Water Facilities Authority
This water source is *(check one)* **:**	
☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	5,756		5,756

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES: 694 AF of water from City of Ontario was wheeled through WFA in 2020.

City of Chino

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Chino Basin Desalter Authority
This water source is *(check one)* **:**	
☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	4,368		4,368

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

City of Chino

SB X7-7 Table 4-B: 2020 Indirect Recycled Water Use Deduction *(For use only by agencies that are deducting indirect recycled water)*

2020 Compliance Year	2020 Surface Reservoir Augmentation					2020 Groundwater Recharge			Total Deductible Volume of Indirect Recycled Water Entering the Distribution System
	Volume Discharged from Reservoir for Distribution System Delivery[1]	Percent Recycled Water	Recycled Water Delivered to Treatment Plant	Transmission/ Treatment Loss[1]	Recycled Volume Entering Distribution System from Surface Reservoir Augmentation	Recycled Water Pumped by Utility[1,2]	Transmission/ Treatment Losses[1]	Recycled Volume Entering Distribution System from Groundwater Recharge	
			-		-			-	-

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] *Suppliers will provide supplemental sheets to document the calculation for their input into "Recycled Water Pumped by Utility". The volume reported in this cell must be less than total groundwater pumped - See Methodology 1, Step 8, section 2.c.*

NOTES:

City of Chino

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C: 2020 Process Water Deduction Eligibility (For use only by agencies that are deducting process water) Choose Only One	
☐	**Criteria 1**- Industrial water use is equal to or greater than 12% of gross water use. Complete SB X7-7 Table 4-C.1
☐	**Criteria 2** - Industrial water use is equal to or greater than 15 GPCD. Complete SB X7-7 Table 4-C.2
☐	**Criteria 3** - Non-industrial use is equal to or less than 120 GPCD. Complete SB X7-7 Table 4-C.3
☐	**Criteria 4** - Disadvantaged Community. Complete SB x7-7 Table 4-C.4
NOTES:	

City of Chino

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Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.1: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 1)*

Criteria 1
Industrial water use is equal to or greater than 12% of gross water use

2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction	2020 Industrial Water Use	Percent Industrial Water	**Eligible for Exclusion Y/N**
	15,273		0%	NO

NOTES:

City of Chino

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SB X7-7 Table 4-C.2: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 2)*

Criteria 2
Industrial water use is equal to or greater than 15 GPCD

2020 Compliance Year	2020 Industrial Water Use	2020 Population	2020 Industrial GPCD	**Eligible for Exclusion Y/N**
		80,808	-	NO

NOTES:

City of Chino

Data from this table will not be entered into WUEdata.
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SB X7-7 Table 4-C.3: 2020 Process Water Deduction Eligibility *(For use only*
by agencies that are deducting process water using Criteria 3)

Criteria 3
Non-industrial use is equal to or less than 120 GPCD

2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction *Fm SB X7-7 Table 4*	2020 Industrial Water Use	2020 Non-industrial Water Use	2020 Population *Fm SB X7-7 Table 3*	Non-Industrial GPCD	**Eligible for Exclusion Y/N**
	15,273		15,273	80,808	169	NO

NOTES:

City of Chino

Data from this table will not be entered into WUEdata.
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SB X7-7 Table 4-C.4: 2020 Process Water Deduction Eligibility ***(For** use only by agencies that are deducting process water using Criteria 4)*

Criteria 4

Disadvantaged Community. A "Disadvantaged Community" (DAC) is a community with a median household income less than 80 percent of the statewide average.

SELECT ONE

"Disadvantaged Community" status was determined using one of the methods listed below:

1. IRWM DAC Mapping tool https://gis.water.ca.gov/app/dacs/

☐	If using the IRWM DAC Mapping Tool, include a screen shot from the tool showing that the service area is considered a DAC.

2. 2020 Median Income

	California Median Household Income*		Service Area Median Household Income	Percentage of Statewide Average	**Eligible for Exclusion? Y/N**
☐	**2020**	**$75,235**		0%	YES

*California median household income 2015 -2019 as reported in US Census Bureau QuickFacts.

NOTES

City of Chino

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water *Fm SB X7-7 Table 4*	**2020 Population** *Fm SB X7-7 Table 3*	**2020 GPCD**
15,273	80,808	**169**
NOTES:		

City of Chino

SB X7-7 Table 9: 2020 Compliance

Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD (Enter "0" if Adjustment Not Used)			TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
	Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]				
169	-	-	-	-	169	189	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

City of Chino Hills

SB X7-7 Table 0: Units of Measure Used in 2020 UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent throughout the UWMP, as reported in Submittal Table 2-3.*
NOTES:

City of Chino Hills

SB X7-7 Table 2: Method for 2020 Population Estimate	
Method Used to Determine 2020 Population (may check more than one)	
☑	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☐	**4. Other** DWR recommends pre-review
NOTES:	

City of Chino Hills

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	82,409
NOTES:	

City of Chino Hills

SB X7-7 Table 4: 2020 Gross Water Use							
		2020 Deductions					
Compliance Year 2020	**2020 Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**Exported Water** *	**Change in Dist. System Storage*** (+/-)	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use***	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	**2020 Gross Water Use**
	14,493	-	-	-	-	-	**14,493**

*** Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.

NOTES:

City of Chino Hills

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	WFA
This water source is *(check one)* **:**	
☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	1,700	-	1,700

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s) Meter Error Adjustment

Complete one table for each source.

Name of Source	MVWD
This water source is *(check one)* **:**	
☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	7,707		7,707

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

City of Chino Hills

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Chino Hills Wells
This water source is *(check one)* **:**	
☑	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	-		0

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	CDA
This water source is *(check one)* **:**	
☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	3,669		3,669

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

City of Chino Hills

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	IEUA (Recycled)
This water source is *(check one)* **:**	
☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	1,417		1,417

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

City of Chino Hills

SB X7-7 Table 4-B: 2020 Indirect Recycled Water Use Deduction *(For use only by agencies that are deducting indirect recycled water)*

2020 Compliance Year	2020 Surface Reservoir Augmentation					2020 Groundwater Recharge			Total Deductible Volume of Indirect Recycled Water Entering the Distribution System
	Volume Discharged from Reservoir for Distribution System Delivery[1]	Percent Recycled Water	Recycled Water Delivered to Treatment Plant	Transmission/ Treatment Loss[1]	Recycled Volume Entering Distribution System from Surface Reservoir Augmentation	Recycled Water Pumped by Utility[1,2]	Transmission/ Treatment Losses[1]	Recycled Volume Entering Distribution System from Groundwater Recharge	
			-		-			-	-

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] *Suppliers will provide supplemental sheets to document the calculation for their input into "Recycled Water Pumped by Utility". The volume reported in this cell must be less than total groundwater pumped - See Methodology 1, Step 8, section 2.c.*

City of Chino Hills

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SB X7-7 Table 4-C: 2020 Process Water Deduction Eligibility (For use only by agencies that are deducting process water) Choose Only One	
☐	**Criteria 1**- Industrial water use is equal to or greater than 12% of gross water use. Complete SB X7-7 Table 4-C.1
☐	**Criteria 2** - Industrial water use is equal to or greater than 15 GPCD. Complete SB X7-7 Table 4-C.2
☐	**Criteria 3** - Non-industrial use is equal to or less than 120 GPCD. Complete SB X7-7 Table 4-C.3
☐	**Criteria 4** - Disadvantaged Community. Complete SB x7-7 Table 4-C.4
NOTES: No Deductions	

City of Chino Hills

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SB X7-7 Table 4-C.1: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 1)*

Criteria 1
Industrial water use is equal to or greater than 12% of gross water use

2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction	2020 Industrial Water Use	Percent Industrial Water	**Eligible for Exclusion Y/N**
	14,493		0%	NO

NOTES:

City of Chino Hills

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SB X7-7 Table 4-C.2: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 2)*

Criteria 2
Industrial water use is equal to or greater than 15 GPCD

2020 Compliance Year	2020 Industrial Water Use	2020 Population	2020 Industrial GPCD	**Eligible for Exclusion Y/N**
		82,409	-	NO

NOTES:

City of Chino Hills

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SB X7-7 Table 4-C.3: 2020 Process Water Deduction Eligibility *(For use only*
by agencies that are deducting process water using Criteria 3)

Criteria 3
Non-industrial use is equal to or less than 120 GPCD

2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction *Fm SB X7-7 Table 4*	2020 Industrial Water Use	2020 Non-industrial Water Use	2020 Population *Fm SB X7-7 Table 3*	Non-Industrial GPCD	**Eligible for Exclusion Y/N**
	14,493		14,493	82,409	157	NO

NOTES:

City of Chino Hills

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SB X7-7 Table 4-C.4: 2020 Process Water Deduction Eligibility ***(For** use only by agencies that are deducting process water using Criteria 4)*

Criteria 4

Disadvantaged Community. A "Disadvantaged Community" (DAC) is a community with a median household income less than 80 percent of the statewide average.

SELECT ONE

"Disadvantaged Community" status was determined using one of the methods listed below:

1. IRWM DAC Mapping tool https://gis.water.ca.gov/app/dacs/

☐	If using the IRWM DAC Mapping Tool, include a screen shot from the tool showing that the service area is considered a DAC.

2. 2020 Median Income

	California Median Household Income*		Service Area Median Household Income	Percentage of Statewide Average	**Eligible for Exclusion? Y/N**
☐	**2020**	**$75,235**	$102,746	137%	NO

*California median household income 2015 -2019 as reported in US Census Bureau QuickFacts.

NOTES

City of Chino Hills

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water *Fm SB X7-7 Table 4*	**2020 Population** *Fm SB X7-7 Table 3*	**2020 GPCD**
14,493	82,409	**157**
NOTES:		

City of Chino Hills

SB X7-7 Table 9: 2020 Compliance							
Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD Enter "0" if Adjustment Not Used Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]	TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
157	-	-	-	-	157	173	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

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SB X7-7 Table 0: Units of Measure Used in UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent with Table 2-3*
NOTES:

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SB X7-7 Table-1: Baseline Period Ranges			
Baseline	**Parameter**	**Value**	**Units**
10- to 15-year baseline period	2008 total water deliveries	58,175	Acre Feet
	2008 total volume of delivered recycled water	635	Acre Feet
	2008 recycled water as a percent of total deliveries	1.09%	Percent
	Number of years in baseline period[1, 2]	10	Years
	Year beginning baseline period range	1995	
	Year ending baseline period range[3]	2004	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2004	
	Year ending baseline period range[4]	2008	

[1] *If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period.* [2] *The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.*

[3] *The ending year must be between December 31, 2004 and December 31, 2010.*

[4] *The ending year must be between December 31, 2007 and December 31, 2010.*

NOTES:

Cucamonga Valley Water District

SB X7-7 Table 2: Method for Population Estimates	
Method Used to Determine Population (may check more than one)	
☐	**1. Department of Finance** (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2010 - 2020) when available
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☑	**4. Other** DWR recommends pre-review
NOTES: Historical Population within the service area is estimated based on average person per connection, based on the total number of dwelling units in District's financial software. This is multiplied by the average number of people per household, and also considered the	

Cucamonga Valley Water District

SB X7-7 Table 3: Service Area Population		
Year		**Population**
10 to 15 Year Baseline Population		
Year 1	1995	132,882
Year 2	1996	135,001
Year 3	1997	136,874
Year 4	1998	139,556
Year 5	1999	143,175
Year 6	2000	148,159
Year 7	2001	152,221
Year 8	2002	161,267
Year 9	2003	166,359
Year 10	2004	170,784
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2004	170,784
Year 2	2005	179,523
Year 3	2006	182,035
Year 4	2007	184,369
Year 5	2008	184,669
2020 Compliance Year Population		
2020		198,979
NOTES:		

Cucamonga Valley Water District

SB X7-7 Table 4: Annual Gross Water Use *

Baseline Year *Fm SB X7-7 Table 3*		Volume Into Distribution System *This column will remain blank until SB X7-7 Table 4-A is completed.*	Deductions					Annual Gross Water Use
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water *This column will remain blank until SB X7-7 Table 4-B is completed.*	Water Delivered for Agricultural Use	Process Water *This column will remain blank until SB X7-7 Table 4-D is completed.*	
10 to 15 Year Baseline - Gross Water Use								
Year 1	1995	42,131	-		-	101	-	42,030
Year 2	1996	45,476	-		-	151	-	45,325
Year 3	1997	47,219	-		-	133	-	47,086
Year 4	1998	41,864	-		-	88	-	41,776
Year 5	1999	49,409	-		-	103	-	49,306
Year 6	2000	50,718	73		-	112	-	50,533
Year 7	2001	48,063	-		-	73	-	47,990
Year 8	2002	52,423	307		-	80	-	52,036
Year 9	2003	51,899	437		-	54	-	51,408
Year 10	2004	54,826	385		-	55	-	54,386
Year 11	0	-			-		-	-
Year 12	0	-			-		-	-
Year 13	0	-			-		-	-
Year 14	0	-			-		-	-
Year 15	0	-			-		-	-
10 - 15 year baseline average gross water use								**48,188**
5 Year Baseline - Gross Water Use								
Year 1	2004	54,826	385		-	55	-	54,386
Year 2	2005	55,978	437		-	18	-	55,523
Year 3	2006	57,977	165		-	18	-	57,794
Year 4	2007	61,034	165		-	22	-	60,847
Year 5	2008	57,541	-		-	16	-	57,525
5 year baseline average gross water use								**57,215**
2020 Compliance Year - Gross Water Use								
2020		46,021	-		-	**11**	-	**46,010**

* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3

NOTES:

Cucamonga Valley Water District

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)
Complete one table for each source.

Name of Source	Chino Basin Groundwater
This water source is:	
☑	The supplier's own water source
☐	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1995	6,297		6,297
Year 2	1996	7,311		7,311
Year 3	1997	7,764		7,764
Year 4	1998	5,101		5,101
Year 5	1999	7,737		7,737
Year 6	2000	6,195		6,195
Year 7	2001	6,899		6,899
Year 8	2002	10,580		10,580
Year 9	2003	10,020		10,020
Year 10	2004	12,582		12,582
Year 11	0			-
Year 12	0			-
Year 13	0			-
Year 14	0			-
Year 15	0			-
5 Year Baseline - Water into Distribution System				
Year 1	2004	12,582		12,582
Year 2	2005	13,328		13,328
Year 3	2006	16,814		16,814
Year 4	2007	16,781		16,781
Year 5	2008	19,232		19,232
2020 Compliance Year - Water into Distribution System				
2020		23,315		23,315

** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES: 17,394.77 AF of Chino Basin production is pumped as part of MWD's conjunctive-use program (in lieu of imported water).

SB X7-7 Table 4-A: Volume Entering the Distribution

Name of Source	Cucamonga Basin Groundwater
This water source is:	
☑	The supplier's own water source

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☐	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1995	14,200		14,200
Year 2	1996	15,319		15,319
Year 3	1997	14,180		14,180
Year 4	1998	9,764		9,764
Year 5	1999	13,661		13,661
Year 6	2000	10,642		10,642
Year 7	2001	6,604		6,604
Year 8	2002	6,719		6,719
Year 9	2003	5,051		5,051
Year 10	2004	6,714		6,714
Year 11	0			0
Year 12	0			0
Year 13	0			0
Year 14	0			0
Year 15	0			0
5 Year Baseline - Water into Distribution System				
Year 1	2004	6,714		6,714
Year 2	2005	7,518		7,518
Year 3	2006	6,497		6,497
Year 4	2007	5,019		5,019
Year 5	2008	4,450		4,450
2020 Compliance Year - Water into Distribution System				
2020		3,618		3,618

** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: Volume Entering the Distribution	
Name of Source	Imported Water (State Water Project)
This water source is:	
☐	The supplier's own water source
☑	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1995	12,412		12,412

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Year 2	1996	16,932		16,932
Year 3	1997	18,587		18,587
Year 4	1998	17,419		17,419
Year 5	1999	21,854		21,854
Year 6	2000	29,460		29,460
Year 7	2001	28,905		28,905
Year 8	2002	32,635		32,635
Year 9	2003	33,329		33,329
Year 10	2004	33,638		33,638
Year 11	0			0
Year 12	0			0
Year 13	0			0
Year 14	0			0
Year 15	0			0
5 Year Baseline - Water into Distribution System				
Year 1	2004	33,638		33,638
Year 2	2005	28,109		28,109
Year 3	2006	29,318		29,318
Year 4	2007	36,041		36,041
Year 5	2008	28,551		28,551
2020 Compliance Year - Water into Distribution System				
2020		14,343		14,343
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES:				

SB X7-7 Table 4-A: Volume Entering the Distribution	
Name of Source	Cucamonga Canyon Water
This water source is:	
☑	The supplier's own water source
☐	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*	Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System			
Year 1	1995	0		0
Year 2	1996	0		0
Year 3	1997	586		586
Year 4	1998	1,612		1,612
Year 5	1999	1,664		1,664
Year 6	2000	1,053		1,053
Year 7	2001	1,648		1,648
Year 8	2002	492		492
Year 9	2003	958		958

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Year 10	2004	410		410
Year 11	0			0
Year 12	0			0
Year 13	0			0
Year 14	0			0
Year 15	0			0
5 Year Baseline - Water into Distribution System				
Year 1	2004	410		410
Year 2	2005	0		0
Year 3	2006	0		0
Year 4	2007	141		141
Year 5	2008	1,700		1,700
2020 Compliance Year - Water into Distribution System				
2020		931		931
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES:				

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source	Deer Canyon Water			
This water source is:				
☑	The supplier's own water source			
☐	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1995	2,355		2,355
Year 2	1996	1,091		1,091
Year 3	1997	1,033		1,033
Year 4	1998	2,028		2,028
Year 5	1999	640		640
Year 6	2000	504		504
Year 7	2001	579		579
Year 8	2002	209		209
Year 9	2003	453		453
Year 10	2004	249		249
Year 11	0			0
Year 12	0			0
Year 13	0			0
Year 14	0			0
Year 15	0			0
5 Year Baseline - Water into Distribution System				
Year 1	2004	249		249

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Year 2	2005	603		603
Year 3	2006	187		187
Year 4	2007	73		73
Year 5	2008	78		78
2020 Compliance Year - Water into Distribution System				
2020		0		0
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES:				

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source	Day/East Canyon Water			
This water source is:				
☑	The supplier's own water source			
☐	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1995	6,867		6,867
Year 2	1996	4,823		4,823
Year 3	1997	5,069		5,069
Year 4	1998	5,940		5,940
Year 5	1999	3,853		3,853
Year 6	2000	2,864		2,864
Year 7	2001	3,428		3,428
Year 8	2002	1,775		1,775
Year 9	2003	2,088		2,088
Year 10	2004	1,233		1,233
Year 11	0			0
Year 12	0			0
Year 13	0			0
Year 14	0			0
Year 15	0			0
5 Year Baseline - Water into Distribution System				
Year 1	2004	1233		1,233
Year 2	2005	6374		6,374
Year 3	2006	5161		5,161
Year 4	2007	2979		2,979
Year 5	2008	3485		3,485
2020 Compliance Year - Water into Distribution System				
2020		3,813		3,813
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				

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NOTES:

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source	FWC Interconnection - Transfer from FWC			
This water source is:				
☐	The supplier's own water source			
☑	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1995	0		0
Year 2	1996	0		0
Year 3	1997	0		0
Year 4	1998	0		0
Year 5	1999	0		0
Year 6	2000	0		0
Year 7	2001	0		0
Year 8	2002	13		13
Year 9	2003	0		0
Year 10	2004	0		0
Year 11	0			0
Year 12	0			0
Year 13	0			0
Year 14	0			0
Year 15	0			0
5 Year Baseline - Water into Distribution System				
Year 1	2004	0		0
Year 2	2005	45.51		46
Year 3	2006	0.18		0
Year 4	2007	0		0
Year 5	2008	45		45
2020 Compliance Year - Water into Distribution System				
2020		0		0
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				

NOTES:

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SB X7-7 Table 4-B: Indirect Recycled Water Use Deduction *(For use only by agencies that are deducting indirect recycled water)*

Baseline Year *Fm SB X7-7 Table 3*		Surface Reservoir Augmentation					Groundwater Recharge			**Total Deductible Volume of Indirect Recycled Water Entering the Distribution System**
		Volume Discharged from Reservoir for Distribution System Delivery	Percent Recycled Water	Recycled Water Delivered to Treatment Plant	Transmission/ Treatment Loss	Recycled Volume Entering Distribution System from Surface Reservoir Augmentation	Recycled Water Pumped by Utility*	Transmission/ Treatment Losses	Recycled Volume Entering Distribution System from Groundwater Recharge	
10-15 Year Baseline - Indirect Recycled Water Use										
Year 1	1995			-		-			-	-
Year 2	1996			-		-			-	-
Year 3	1997			-		-			-	-
Year 4	1998			-		-			-	-
Year 5	1999			-		-			-	-
Year 6	2000			-		-			-	-
Year 7	2001			-		-			-	-
Year 8	2002			-		-			-	-
Year 9	2003			-		-			-	-
Year 10	2004			-		-			-	-
Year 11	0			-		-			-	-
Year 12	0			-		-			-	-
Year 13	0			-		-			-	-
Year 14	0			-		-			-	-
Year 15	0			-		-			-	-
5 Year Baseline - Indirect Recycled Water Use										
Year 1	2004			-		-			-	-
Year 2	2005			-		-			-	-
Year 3	2006			-		-			-	-
Year 4	2007			-		-			-	-
Year 5	2008			-		-			-	-
2020 Compliance - Indirect Recycled Water Use										
2020				-		-			-	-

**Suppliers will provide supplemental sheets to document the calculation for their input into "Recycled Water Pumped by Utility". The volume reported in this cell must be less than total groundwater pumped - See Methodology 1, Step 8, section 2.c.*

NOTES:

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SB X7-7 Table 4-C: Process Water Deduction Eligibility *(For use only by agencies that are deducting process water) Choose Only One*	
☐	**Criteria 1**- Industrial water use is equal to or greater than 12% of gross water use. Complete SB X7-7 Table 4-C.1
☐	**Criteria 2** - Industrial water use is equal to or greater than 15 GPCD. Complete SB X7-7 Table 4-C.2
☐	**Criteria 3** - Non-industrial use is equal to or less than 120 GPCD. Complete SB X7-7 Table 4-C.3
☐	**Criteria 4** - Disadvantaged Community. Complete SB x7-7 Table 4-C.4
NOTES:	

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SB X7-7 Table 4-C.1: Process Water Deduction Eligibility					
Criteria 1 Industrial water use is equal to or greater than 12% of gross water use					
Baseline Year *Fm SB X7-7 Table 3*		Gross Water Use Without Process Water Deduction	Industrial Water Use	Percent Industrial Water	**Eligible for Exclusion Y/N**
10 to 15 Year Baseline - Process Water Deduction Eligibility					
Year 1	1995	42,030	2,220	5%	NO
Year 2	1996	45,325	2,020	4%	NO
Year 3	1997	47,086	2,317	5%	NO
Year 4	1998	41,776	2,254	5%	NO
Year 5	1999	49,306	2,367	5%	NO
Year 6	2000	50,533	2,598	5%	NO
Year 7	2001	47,990	2,426	5%	NO
Year 8	2002	52,036	2,465	5%	NO
Year 9	2003	51,408	2,462	5%	NO
Year 10	2004	54,386	2,495	5%	NO
Year 11	0	-			NO
Year 12	0	-			NO
Year 13	0	-			NO
Year 14	0	-			NO
Year 15	0	-			NO
5 Year Baseline - Process Water Deduction Eligibility					
Year 1	2004	54,386	2,495	5%	NO
Year 2	2005	55,523	2,446	4%	NO
Year 3	2006	57,794	2,755	5%	NO
Year 4	2007	60,847	2,506	4%	NO
Year 5	2008	57,525	2,589	5%	NO
2020 Compliance Year - Process Water Deduction Eligiblity					
2020		46,010	2,097	5%	NO
NOTES:					

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SB X7-7 Table 4-C.2: Process Water Deduction Eligibility					
Criteria 2 Industrial water use is equal to or greater than 15 GPCD					
Baseline Year *Fm SB X7-7 Table 3*		Industrial Water Use	Population	Industrial GPCD	**Eligible for Exclusion Y/N**
10 to 15 Year Baseline - Process Water Deduction Eligibility					
Year 1	1995	2,220	132,882	15	NO
Year 2	1996	2,020	135,001	13	NO
Year 3	1997	2,317	136,874	15	YES
Year 4	1998	2,254	139,556	14	NO
Year 5	1999	2,367	143,175	15	NO
Year 6	2000	2,598	148,159	16	YES
Year 7	2001	2,426	152,221	14	NO
Year 8	2002	2,465	161,267	14	NO
Year 9	2003	2,462	166,359	13	NO
Year 10	2004	2,495	170,784	13	NO
Year 11	0		-		NO
Year 12	0		-		NO
Year 13	0		-		NO
Year 14	0		-		NO
Year 15	0		-		NO
5 Year Baseline - Process Water Deduction Eligibility					
Year 1	2004	2,495	170,784	13	NO
Year 2	2005	2,446	179,523	12	NO
Year 3	2006	2,755	182,035	14	NO
Year 4	2007	2,506	184,369	12	NO
Year 5	2008	2,589	184,669	13	NO
2020 Compliance Year - Process Water Deduction Eligibility					
2020		2,097	198,979	9	NO
NOTES:					

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SB X7-7 Table 4-C.3: Process Water Deduction Eligibility

Criteria 3

Non-industrial use is equal to or less than 120 GPCD

Baseline Year *Fm SB X7-7 Table 3*		Gross Water Use Without Process Water Deduction *Fm SB X7-7 Table 4*	Industrial Water Use	Non-industrial Water Use	Population *Fm SB X7-7 Table 3*	Non-Industrial GPCD	**Eligible for Exclusion Y/N**
10 to 15 Year Baseline - Process Water Deduction Eligibility							
Year 1	1995	42,030		42,030	132,882	282	NO
Year 2	1996	45,325		45,325	135,001	300	NO
Year 3	1997	47,086		47,086	136,874	307	NO
Year 4	1998	41,776		41,776	139,556	267	NO
Year 5	1999	49,306		49,306	143,175	307	NO
Year 6	2000	50,533		50,533	148,159	304	NO
Year 7	2001	47,990		47,990	152,221	281	NO
Year 8	2002	52,036		52,036	161,267	288	NO
Year 9	2003	51,408		51,408	166,359	276	NO
Year 10	2004	54,386		54,386	170,784	284	NO
Year 11	0	-		-	-		NO
Year 12	0	-		-	-		NO
Year 13	0	-		-	-		NO
Year 14	0	-		-	-		NO
Year 15	0	-		-	-		NO
5 Year Baseline - Process Water Deduction Eligibility							
Year 1	2004	54,386		54,386	170,784	284	NO
Year 2	2005	55,523		55,523	179,523	276	NO
Year 3	2006	57,794		57,794	182,035	283	NO
Year 4	2007	60,847		60,847	184,369	295	NO
Year 5	2008	57,525		57,525	184,669	278	NO
2020 Compliance Year - Process Water Deduction Eligiblity							
2020		46,010		46,010	198,979	206	NO

NOTES:

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SB X7-7 Table 4-C.4: Process Water Deduction Eligibility

Criteria 4

Disadvantaged Community. A "Disadvantaged Community" (DAC) is a community with a median household income less than 80 percent of the statewide average.

SELECT ONE

"Disadvantaged Community" status was determined using one of the methods listed below:

☐ **1. IRWM DAC Mapping tool https://gis.water.ca.gov/app/dacs/**

If using the IRWM DAC Mapping Tool, include a screen shot from the tool showing that the service area is considered a DAC.

☑ **2. 2020 Median Income**

	California Median Household Income	Service Area Median Household Income	Percentage of Statewide Average	**Eligible for Exclusion? Y/N**
2020 Compliance Year - Process Water Deduction Eligibility				
2020	$80,440	$92,773	115%	NO

NOTES: Data obtained from data.census.gov/cedsci (California Business and Economy, Financial Characteristics)

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SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1995	132,882	42,030	282
Year 2	1996	135,001	45,325	300
Year 3	1997	136,874	47,086	307
Year 4	1998	139,556	41,776	267
Year 5	1999	143,175	49,306	307
Year 6	2000	148,159	50,533	304
Year 7	2001	152,221	47,990	281
Year 8	2002	161,267	52,036	288
Year 9	2003	166,359	51,408	276
Year 10	2004	170,784	54,386	284
Year 11	0	-	-	
Year 12	0	-	-	
Year 13	0	-	-	
Year 14	0	-	-	
Year 15	0	-	-	
10-15 Year Average Baseline GPCD				**290**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use
Year 1	2004	170,784	54,386	284
Year 2	2005	179,523	55,523	276
Year 3	2006	182,035	57,794	283
Year 4	2007	184,369	60,847	295
Year 5	2008	184,669	57,525	278
5 Year Average Baseline GPCD				**283**
2020 Compliance Year GPCD				
2020		198,979	46,010	**206**
NOTES:				

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SB X7-7 Table 6: Gallons per Capita per Day *Summary From Table SB X7-7 Table 5*	
10-15 Year Baseline GPCD	290
5 Year Baseline GPCD	283
2020 Compliance Year GPCD	206
NOTES:	

Cucamonga Valley Water District

SB X7-7 Table 8: 2020 Compliance								
Actual 2020 GPCD	2020 Interim Target GPCD	Optional Adjustments *(in GPCD)* Enter "0" if Adjustment Not Used: Extraordinary Events	Weather Normalization	Economic Adjustment	TOTAL Adjustments	Adjusted 2020 GPCD	2020 GPCD *(Adjusted if applicable)*	**Did Supplier Achieve Targeted Reduction for 2020?**
206	261	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	-	206	206	**YES**
NOTES:								

Fontana Water Company

SB X7-7 Table 0: Units of Measure Used in 2020 UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent throughout the UWMP, as reported in Submittal Table 2-3.*
NOTES:

Fontana Water Company

SB X7-7 Table 2: Method for 2020 Population Estimate	
Method Used to Determine 2020 Population (may check more than one)	
☐	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☐	**2. Persons-per-Connection Method**
☑	**3. DWR Population Tool**
☐	**4. Other** DWR recommends pre-review
NOTES:	

Fontana Water Company

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	229,041
NOTES:	

Fontana Water Company

SB X7-7 Table 4: 2020 Gross Water Use							
		2020 Deductions					
Compliance Year 2020	**2020 Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**Exported Water ***	**Change in Dist. System Storage*** (+/-)	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use***	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	**2020 Gross Water Use**
	39,445			-		-	**39,445**
*** Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.							
NOTES:							

Fontana Water Company

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	GW + Local
This water source is *(check one)* **:**	
☑	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	29,418	-	29,418

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s) Meter Error Adjustment

Complete one table for each source.

Name of Source	IEUA + SBVMWD
This water source is *(check one)* **:**	
☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	10,027		10,027

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

Fontana Water Company

SB X7-7 Table 4-B: 2020 Indirect Recycled Water Use Deduction *(For use only by agencies that are deducting indirect recycled water)*

2020 Compliance Year	2020 Surface Reservoir Augmentation					2020 Groundwater Recharge			Total Deductible Volume of Indirect Recycled Water Entering the Distribution System
	Volume Discharged from Reservoir for Distribution System Delivery[1]	Percent Recycled Water	Recycled Water Delivered to Treatment Plant	Transmission/ Treatment Loss[1]	Recycled Volume Entering Distribution System from Surface Reservoir Augmentation	Recycled Water Pumped by Utility[1,2]	Transmission/ Treatment Losses[1]	Recycled Volume Entering Distribution System from Groundwater Recharge	
			-		-			-	-

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] *Suppliers will provide supplemental sheets to document the calculation for their input into "Recycled Water Pumped by Utility". The volume reported in this cell must be less than total groundwater pumped - See Methodology 1, Step 8, section 2.c.*

Fontana Water Company

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C: 2020 Process Water Deduction Eligibility (For use only by agencies that are deducting process water) Choose Only One	
☐	**Criteria 1**- Industrial water use is equal to or greater than 12% of gross water use. Complete SB X7-7 Table 4-C.1
☐	**Criteria 2** - Industrial water use is equal to or greater than 15 GPCD. Complete SB X7-7 Table 4-C.2
☐	**Criteria 3** - Non-industrial use is equal to or less than 120 GPCD. Complete SB X7-7 Table 4-C.3
☐	**Criteria 4** - Disadvantaged Community. Complete SB x7-7 Table 4-C.4
NOTES:	

Fontana Water Company

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.1: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 1)*

Criteria 1
Industrial water use is equal to or greater than 12% of gross water use

2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction	2020 Industrial Water Use	Percent Industrial Water	**Eligible for Exclusion Y/N**
	39,445		0%	NO

NOTES:

Fontana Water Company

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.2: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 2)*

Criteria 2
Industrial water use is equal to or greater than 15 GPCD

2020 Compliance Year	2020 Industrial Water Use	2020 Population	2020 Industrial GPCD	**Eligible for Exclusion Y/N**
		229,041	-	NO

NOTES:

Fontana Water Company

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.3: 2020 Process Water Deduction Eligibility *(For use only*
by agencies that are deducting process water using Criteria 3)

Criteria 3
Non-industrial use is equal to or less than 120 GPCD

2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction *Fm SB X7-7 Table 4*	2020 Industrial Water Use	2020 Non-industrial Water Use	2020 Population *Fm SB X7-7 Table 3*	Non-Industrial GPCD	**Eligible for Exclusion Y/N**
	39,445		39,445	229,041	154	NO

NOTES:

Fontana Water Company

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.4: 2020 Process Water Deduction Eligibility ***(For** use only by agencies that are deducting process water using Criteria 4)*

Criteria 4

Disadvantaged Community. A "Disadvantaged Community" (DAC) is a community with a median household income less than 80 percent of the statewide average.

SELECT ONE

"Disadvantaged Community" status was determined using one of the methods listed below:

1. IRWM DAC Mapping tool https://gis.water.ca.gov/app/dacs/

☐	If using the IRWM DAC Mapping Tool, include a screen shot from the tool showing that the service area is considered a DAC.

2. 2020 Median Income

	California Median Household Income*		Service Area Median Household Income	Percentage of Statewide Average	**Eligible for Exclusion? Y/N**
☐	**2020**	**$75,235**		0%	YES

*California median household income 2015 -2019 as reported in US Census Bureau QuickFacts.

NOTES

Fontana Water Company

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water *Fm SB X7-7 Table 4*	**2020 Population** *Fm SB X7-7 Table 3*	**2020 GPCD**
39,445	229,041	**154**
NOTES:		

Fontana Water Company

SB X7-7 Table 9: 2020 Compliance							
Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD Enter "0" if Adjustment Not Used Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]	TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
154	-	-	-	-	154	176	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

Monte Vista Water District

SB X7-7 Table 0: Units of Measure Used in 2020 UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent throughout the UWMP, as reported in Submittal Table 2-3.*
NOTES:

Monte Vista Water District

SB X7-7 Table 2: Method for 2020 Population Estimate	
Method Used to Determine 2020 Population (may check more than one)	
☐	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☑	**4. Other** DWR recommends pre-review
NOTES: Data from the Southern California Association of Governments was used to estimate 2020 population.	

Monte Vista Water District

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	57,787
NOTES:	

Monte Vista Water District

SB X7-7 Table 4: 2020 Gross Water Use							
Compliance Year 2020	**2020 Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**2020 Deductions**					**2020 Gross Water Use**
		Exported Water *	**Change in Dist. System Storage*** (+/-)	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use***	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	
	15,740	7,707		-		-	**8,033**

*** Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.

NOTES:

Monte Vista Water District

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Chino Basin Groundwater
This water source is *(check one)* **:**	
☑	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	8,197	-	8,197

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES: Includes deliveries to the City of Chino Hills.

Monte Vista Water District

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s) Meter Error Adjustment

Complete one table for each source.

Name of Source	Water Facilities Authority

This water source is *(check one)* **:**

☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	6,886		6,886

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES: Includes direct WFA deliveries to the City of Chino Hills. Excludes WFA deliveries for groundwater injection.

Monte Vista Water District

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	San Antonio Water Company
This water source is *(check one)* **:**	
☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	657		657

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

Monte Vista Water District

SB X7-7 Table 4-B: 2020 Indirect Recycled Water Use Deduction *(For use only by agencies that are deducting indirect recycled water)*

2020 Compliance Year	2020 Surface Reservoir Augmentation					2020 Groundwater Recharge			Total Deductible Volume of Indirect Recycled Water Entering the Distribution System
	Volume Discharged from Reservoir for Distribution System Delivery[1]	Percent Recycled Water	Recycled Water Delivered to Treatment Plant	Transmission/ Treatment Loss[1]	Recycled Volume Entering Distribution System from Surface Reservoir Augmentation	Recycled Water Pumped by Utility[1,2]	Transmission/ Treatment Losses[1]	Recycled Volume Entering Distribution System from Groundwater Recharge	
			-		-			-	-

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] *Suppliers will provide supplemental sheets to document the calculation for their input into "Recycled Water Pumped by Utility". The volume reported in this cell must be less than total groundwater pumped - See Methodology 1, Step 8, section 2.c.*

NOTES:

Monte Vista Water District

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C: 2020 Process Water Deduction Eligibility (For use only by agencies that are deducting process water) Choose Only One	
☐	**Criteria 1**- Industrial water use is equal to or greater than 12% of gross water use. Complete SB X7-7 Table 4-C.1
☐	**Criteria 2** - Industrial water use is equal to or greater than 15 GPCD. Complete SB X7-7 Table 4-C.2
☐	**Criteria 3** - Non-industrial use is equal to or less than 120 GPCD. Complete SB X7-7 Table 4-C.3
☐	**Criteria 4** - Disadvantaged Community. Complete SB x7-7 Table 4-C.4
NOTES:	

Monte Vista Water District

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.1: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 1)*

Criteria 1
Industrial water use is equal to or greater than 12% of gross water use

2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction	2020 Industrial Water Use	Percent Industrial Water	**Eligible for Exclusion Y/N**
	8,033		0%	NO

NOTES:

Monte Vista Water District

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.2: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 2)*

Criteria 2
Industrial water use is equal to or greater than 15 GPCD

2020 Compliance Year	2020 Industrial Water Use	2020 Population	2020 Industrial GPCD	**Eligible for Exclusion Y/N**
		57,787	-	NO

NOTES:

Monte Vista Water District

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.3: 2020 Process Water Deduction Eligibility *(For use only*
by agencies that are deducting process water using Criteria 3)

Criteria 3
Non-industrial use is equal to or less than 120 GPCD

2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction *Fm SB X7-7 Table 4*	2020 Industrial Water Use	2020 Non-industrial Water Use	2020 Population *Fm SB X7-7 Table 3*	Non-Industrial GPCD	**Eligible for Exclusion Y/N**
	8,033		8,033	57,787	124	NO

NOTES:

Monte Vista Water District

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.4: 2020 Process Water Deduction Eligibility ***(For** use only by agencies that are deducting process water using Criteria 4)*

Criteria 4

Disadvantaged Community. A "Disadvantaged Community" (DAC) is a community with a median household income less than 80 percent of the statewide average.

SELECT ONE

"Disadvantaged Community" status was determined using one of the methods listed below:

1. IRWM DAC Mapping tool https://gis.water.ca.gov/app/dacs/

☐	If using the IRWM DAC Mapping Tool, include a screen shot from the tool showing that the service area is considered a DAC.

2. 2020 Median Income

	California Median Household Income*		Service Area Median Household Income	Percentage of Statewide Average	**Eligible for Exclusion? Y/N**
☐	**2020**	**$75,235**		0%	YES

*California median household income 2015 -2019 as reported in US Census Bureau QuickFacts.

NOTES

Monte Vista Water District

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water *Fm SB X7-7 Table 4*	**2020 Population** *Fm SB X7-7 Table 3*	**2020 GPCD**
8,033	57,787	**124**
NOTES:		

Monte Vista Water District

SB X7-7 Table 9: 2020 Compliance

Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD (Enter "0" if Adjustment Not Used)			TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
	Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]				
124	-	-	-	-	124	167	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

City of Ontario

SB X7-7 Table 0: Units of Measure Used in 2020 UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent throughout the UWMP, as reported in Submittal Table 2-3.*
NOTES:

City of Ontario

SB X7-7 Table 2: Method for 2020 Population Estimate	
Method Used to Determine 2020 Population (may check more than one)	
☑	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☐	**4. Other** DWR recommends pre-review
NOTES: Used service area boundary to approximate population determined by the Department of Finance for the City of Ontario.	

City of Ontario

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	178,409
NOTES:	

City of Ontario

SB X7-7 Table 4: 2020 Gross Water Use							
Compliance Year 2020	**2020 Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**2020 Deductions**					**2020 Gross Water Use**
		Exported Water *	**Change in Dist. System Storage*** (+/-)	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use***	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	
	32,109			-		-	**32,109**

*** Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.

NOTES:

City of Ontario

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Chino Basin Groundwater
This water source is *(check one)* **:**	
☑	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	18,395	-	18,395

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES

City of Ontario

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s) Meter Error Adjustment

Complete one table for each source.

Name of Source	Water Facilities Authority
This water source is *(check one)* **:**	
☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	6,513		6,513

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

City of Ontario

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Chino Basin Desalter Authority
This water source is *(check one)* **:**	
☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	6,636		6,636

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

City of Ontario

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	San Antonio Water Company

This water source is *(check one)* **:**

☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	565		565

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

City of Ontario

SB X7-7 Table 4-B: 2020 Indirect Recycled Water Use Deduction *(For use only by agencies that are deducting indirect recycled water)*

2020 Compliance Year	2020 Surface Reservoir Augmentation					2020 Groundwater Recharge			Total Deductible Volume of Indirect Recycled Water Entering the Distribution System
	Volume Discharged from Reservoir for Distribution System Delivery[1]	Percent Recycled Water	Recycled Water Delivered to Treatment Plant	Transmission/ Treatment Loss[1]	Recycled Volume Entering Distribution System from Surface Reservoir Augmentation	Recycled Water Pumped by Utility[1,2]	Transmission/ Treatment Losses[1]	Recycled Volume Entering Distribution System from Groundwater Recharge	
			-		-			-	-

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] *Suppliers will provide supplemental sheets to document the calculation for their input into "Recycled Water Pumped by Utility". The volume reported in this cell must be less than total groundwater pumped - See Methodology 1, Step 8, section 2.c.*

City of Ontario

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C: 2020 Process Water Deduction Eligibility (For use only by agencies that are deducting process water) Choose Only One	
☐	**Criteria 1**- Industrial water use is equal to or greater than 12% of gross water use. Complete SB X7-7 Table 4-C.1
☐	**Criteria 2** - Industrial water use is equal to or greater than 15 GPCD. Complete SB X7-7 Table 4-C.2
☐	**Criteria 3** - Non-industrial use is equal to or less than 120 GPCD. Complete SB X7-7 Table 4-C.3
☐	**Criteria 4** - Disadvantaged Community. Complete SB x7-7 Table 4-C.4
NOTES:	

City of Ontario

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.1: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 1)*

Criteria 1
Industrial water use is equal to or greater than 12% of gross water use

2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction	2020 Industrial Water Use	Percent Industrial Water	**Eligible for Exclusion Y/N**
	32,109		0%	NO

NOTES:

City of Ontario

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.2: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 2)*

Criteria 2
Industrial water use is equal to or greater than 15 GPCD

2020 Compliance Year	2020 Industrial Water Use	2020 Population	2020 Industrial GPCD	**Eligible for Exclusion Y/N**
		178,409	-	NO

NOTES:

City of Ontario

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.3: 2020 Process Water Deduction Eligibility *(For use only*
by agencies that are deducting process water using Criteria 3)

Criteria 3
Non-industrial use is equal to or less than 120 GPCD

2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction *Fm SB X7-7 Table 4*	2020 Industrial Water Use	2020 Non-industrial Water Use	2020 Population *Fm SB X7-7 Table 3*	Non-Industrial GPCD	**Eligible for Exclusion Y/N**
	32,109		32,109	178,409	161	NO

NOTES:

City of Ontario

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.4: 2020 Process Water Deduction Eligibility ***(For** use only by agencies that are deducting process water using Criteria 4)*

Criteria 4

Disadvantaged Community. A "Disadvantaged Community" (DAC) is a community with a median household income less than 80 percent of the statewide average.

SELECT ONE

"Disadvantaged Community" status was determined using one of the methods listed below:

1. IRWM DAC Mapping tool https://gis.water.ca.gov/app/dacs/

☐	If using the IRWM DAC Mapping Tool, include a screen shot from the tool showing that the service area is considered a DAC.

2. 2020 Median Income

	California Median Household Income*		Service Area Median Household Income	Percentage of Statewide Average	**Eligible for Exclusion? Y/N**
☐	**2020**	**$75,235**		0%	YES

*California median household income 2015 -2019 as reported in US Census Bureau QuickFacts.

NOTES

City of Ontario

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water *Fm SB X7-7 Table 4*	**2020 Population** *Fm SB X7-7 Table 3*	**2020 GPCD**
32,109	178,409	**161**
NOTES:		

City of Ontario

SB X7-7 Table 9: 2020 Compliance

Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD (Enter "0" if Adjustment Not Used)			TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
	Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]				
161	-	-	-	-	161	196	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

City of Upland

SB X7-7 Table 0: Units of Measure Used in 2020 UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent throughout the UWMP, as reported in Submittal Table 2-3.*
NOTES:
Conversion Rate to Gallons:
325851
Conversion Rate to Gallons per Day:
892.7424658

City of Upland

SB X7-7 Table 2: Method for 2020 Population Estimate	
Method Used to Determine 2020 Population (may check more than one)	
☐	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☑	**4. Other** DWR recommends pre-review
NOTES: Data developed by SCAG and provided by IEUA. Similar data as DOF.	

City of Upland

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	78,383
NOTES:	

City of Upland

SB X7-7 Table 4: 2020 Gross Water Use							
		2020 Deductions					
Compliance Year 2020	**2020 Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**Exported Water** *	**Change in Dist. System Storage*** (+/-)	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use***	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	**2020 Gross Water Use**
	18,431			-		-	**18,431**
* **Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.							
NOTES:							

City of Upland

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Purchased or Imported Water
This water source is *(check one)* **:**	
☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	3,395	-	3,395

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s) Meter Error Adjustment

Complete one table for each source.

Name of Source	Local Surface Water
This water source is *(check one)* **:**	
☑	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	3,365		3,365

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

City of Upland

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Groundwater
This water source is *(check one)* **:**	
☑	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	6,120		6,120

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Purchased groundwater
This water source is *(check one)* **:**	
☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	5,551		5,551

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

City of Upland

SB X7-7 Table 4-B: 2020 Indirect Recycled Water Use Deduction *(For use only by agencies that are deducting indirect recycled water)*

2020 Compliance Year	2020 Surface Reservoir Augmentation					2020 Groundwater Recharge			Total Deductible Volume of Indirect Recycled Water Entering the Distribution System
	Volume Discharged from Reservoir for Distribution System Delivery[1]	Percent Recycled Water	Recycled Water Delivered to Treatment Plant	Transmission/ Treatment Loss[1]	Recycled Volume Entering Distribution System from Surface Reservoir Augmentation	Recycled Water Pumped by Utility[1,2]	Transmission/ Treatment Losses[1]	Recycled Volume Entering Distribution System from Groundwater Recharge	
			-		-			-	-

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] *Suppliers will provide supplemental sheets to document the calculation for their input into "Recycled Water Pumped by Utility". The volume reported in this cell must be less than total groundwater pumped - See Methodology 1, Step 8, section 2.c.*

Although indirect recycled water use was credited to Upland by IEUA, the amount was not needed to meet its target.

City of Upland

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C: 2020 Process Water Deduction Eligibility (For use only by agencies that are deducting process water) Choose Only One	
☐	**Criteria 1**- Industrial water use is equal to or greater than 12% of gross water use. Complete SB X7-7 Table 4-C.1
☐	**Criteria 2** - Industrial water use is equal to or greater than 15 GPCD. Complete SB X7-7 Table 4-C.2
☐	**Criteria 3** - Non-industrial use is equal to or less than 120 GPCD. Complete SB X7-7 Table 4-C.3
☐	**Criteria 4** - Disadvantaged Community. Complete SB x7-7 Table 4-C.4
NOTES:	

City of Upland

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.1: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 1)*

Criteria 1
Industrial water use is equal to or greater than 12% of gross water use

2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction	2020 Industrial Water Use	Percent Industrial Water	**Eligible for Exclusion Y/N**
	18,431		0%	NO

NOTES:

City of Upland

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.2: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 2)*

Criteria 2
Industrial water use is equal to or greater than 15 GPCD

2020 Compliance Year	2020 Industrial Water Use	2020 Population	2020 Industrial GPCD	**Eligible for Exclusion Y/N**
		78,383	-	NO

NOTES:

City of Upland

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.3: 2020 Process Water Deduction Eligibility *(For use only*
by agencies that are deducting process water using Criteria 3)

Criteria 3
Non-industrial use is equal to or less than 120 GPCD

2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction *Fm SB X7-7 Table 4*	2020 Industrial Water Use	2020 Non-industrial Water Use	2020 Population *Fm SB X7-7 Table 3*	Non-Industrial GPCD	**Eligible for Exclusion Y/N**
	18,431		18,431	78,383	210	NO

NOTES:

City of Upland

Data from this table will not be entered into WUEdata.
Instead, the entire table will be uploaded to WUEdata as a separate upload in Excel format.

SB X7-7 Table 4-C.4: 2020 Process Water Deduction Eligibility ***(For** use only by agencies that are deducting process water using Criteria 4)*

Criteria 4
Disadvantaged Community. A "Disadvantaged Community" (DAC) is a community with a median household income less than 80 percent of the statewide average.

SELECT ONE
"Disadvantaged Community" status was determined using one of the methods listed below:

1. IRWM DAC Mapping tool https://gis.water.ca.gov/app/dacs/

☐	If using the IRWM DAC Mapping Tool, include a screen shot from the tool showing that the service area is considered a DAC.

2. 2020 Median Income

	California Median Household Income*		Service Area Median Household Income	Percentage of Statewide Average	**Eligible for Exclusion? Y/N**
☐	**2020**	**$75,235**		0%	YES

*California median household income 2015 -2019 as reported in US Census Bureau QuickFacts.

NOTES

City of Upland

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water *Fm SB X7-7 Table 4*	**2020 Population** *Fm SB X7-7 Table 3*	**2020 GPCD**
18,431	78,383	**210**

City of Upland

SB X7-7 Table 9: 2020 Compliance							
Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD Enter "0" if Adjustment Not Used			TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
	Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]				
210	-	-	-	-	210	220	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

Appendix G

Addendum to the 2015 UWMP

Kennedy Jenks

ARCADIS Design & Consultancy for natural and built assets

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

ADDENDUM TO THE 2015 URBAN WATER MANAGEMENT PLAN

Addendum prepared by Kennedy Jenks Consultants

June 2021

2020 UWMP Appendix G
& 2015 UWMP Appendix P

Reduced Delta Reliance Reporting



6/29/2021

Inland Empire Utilities Agency Reduced Delta Reliance Reporting

G.1 Background

IEUA is an urban water supplier and a member agency of MWD. MWD provides IEUA with imported water supplies, which IEUA in turn distributes on a wholesale basis to its retail water purveyors. MWD is a contractor on the State Water Project (SWP) and, due to water quality considerations, all imported water supplies IEUA receives from MWD originate from the SWP system. The SWP system runs from Lake Oroville in Northern California to Southern California, crossing the Sacramento-San Joaquin Delta (Delta) along the way. MWD and its member agencies have made investments into water supply and demand management to regionally reduce impacts on the Delta. These investments bring regional reliability and reduced Delta reliance that make it infeasible for individual MWD member agencies to determine their individual Delta reliance.

As a recipient of imported water from the SWP delivered via MWD, IEUA may indirectly receive water through a proposed covered action, such as a multi-year water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Delta. Through this appendix, IEUA is providing information in its 2015 and 2020 UWMPs that may be used in the covered action process, to demonstrate consistency with Delta Plan Policy WR P1, *Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance* (WR P1) [California Code of Regulations (CCR), Title 23, § 5003].

The Delta Plan is a comprehensive, long-term resource management plan for the Sacramento-San Joaquin Delta (Delta) that was developed as part of the Delta Reform Act of 2009 (Water code section 85000 et seq) and includes both regulatory policies and recommendations, aimed at promoting a healthy Delta ecosystem. Delta Plan Policy WR P1 is one of 14 regulatory policies in the Delta Plan. WR P1 identifies UWMPs as the tool to demonstrate consistency with state policy to reduce reliance on the Delta for any Supplier that is participating in or carrying out a proposed covered action or receiving Delta water from a proposed covered action.

Within the supplier's UWMP, information should be provided that can be used to demonstrate consistency with this policy. Section (c)(1) of WR P1 states that suppliers that have (A) completed an urban water management plan, (B) implemented the efficiency measures in that plan, and (C) shown a measurable reduction in Delta reliance and improvement in regional self-reliance in the plan, are contributing to reduced reliance on the Delta and are therefore consistent with WR P1 [CCR, Title 23, § 5003(c)(1)].

The analysis and documentation provided below include all elements described in WR P1(c)(1) and are included in IEUA's 2015 and 2020 UWMP to support a certification of consistency in the case of a future covered action.

G.2 Demonstration of Reduced Reliance

The methodology used to determine IEUA's reduced Delta reliance and improved regional self-reliance is consistent with the approach detailed in DWR's UWMP Guidebook Appendix C, including the use of narrative justifications for the accounting of supplies and the documentation of specific data sources. Some of the key assumptions underlying IEUA's demonstration of reduced reliance includes:

- All data were obtained from the current 2020 UWMP or previously adopted UWMPs and represent average or normal water year conditions.

- All analyses were conducted at the IEUA service area level. Demands on IEUA are the total demands from all its retail agencies. Supplies are the total supplies IEUA manages, which are imported water from MWD and recycled water from its regional water recycling plants.

- No projects or programs that are described in the UWMPs as "Projects Under Development" were included in the accounting of supplies.

G.3 Summary of Expected Outcomes for Reduced Reliance on the Delta

As stated in WR P1(c)(1), the policy requires that, commencing in 2015, UWMPs include expected outcomes for measurable reduction in Delta reliance and improved regional self-reliance. WR P1 further states that those outcomes shall be reported in the UWMP as the reduction in the amount of water used, or in the percentage of water used, from the Delta.

It is important to note that MWD has prepared a detailed analysis that demonstrates the consistency with the Delta Plan Policy in its 2020 UWMP on a region-wide scale that includes its Member Agencies (MWD 2020 UWMP, Appendix 11). From its 2010 baseline, both long-term Regional Self-Reliance and Reduced Reliance on Supplies from the Delta are expected to increase over time. IEUA has adopted MWD's calculation of Reduced Reliance on Supplies from the Delta due to the infeasibility of separating out the delta supplies that IEUA receives from MWD (see Section G.6 and G.7 for details).

IEUA will report its own expected outcomes for Regional Self-Reliance in the following sections (G.4 and G.5). These expected outcomes use the approach and guidance described in Appendix C of DWR's Urban Water Management Plan Guidebook 2020 (Guidebook Appendix C), finalized on March 29, 2021.

The following provides a summary of the near-term (2025) and long-term (2045) expected outcomes for IEUA's regional self-reliance and MWD's regional reduction in reliance on Delta water supplies. The results show that IEUA is measurably improving regional self-reliance and MWD and its member agencies are reducing reliance on Delta supplies, both as an amount of water used and as a percentage of water used.

- Near-term (2025) – IEUA's normal water regional self-reliance is expected to increase by 25 thousand acre-feet (TAF) from the 2010 baseline; this represents an increase of about 10 percent of 2025 normal water year demands (Table G-2).

- Long-term (2045) – IEUA's normal water regional self-reliance is expected to increase by 50 TAF from the 2010 baseline; this represents an increase of about 17 percent of 2045 normal water year demands (Table G-2).

- Near-term (2025) – MWD's normal reliance on water supplies from the Delta Watershed is expected to decrease by 300 thousand acre-feet (TAF) from the 2010 baseline; this represents a decrease of about 3 percent of 2025 normal water year demands (Table G-3).

- Long-term (2045) – MWD's normal reliance on water supplies from the Delta Watershed is expected to decrease by 314 thousand acre-feet (TAF) from the 2010 baseline; this represents a decrease of about 5 percent of 2045 normal water year demands (Table G-3).

G.4 Baseline and Calculation of Service Area Water Demands

In order to calculate the expected outcomes for measurable reduction in Delta reliance and improved regional self-reliance, a baseline is needed to compare against. This analysis uses a normal water year representation of 2010 as the baseline, which is consistent with the approach described in the Guidebook Appendix C.

Table G-1 shows the total service area water demands for IEUA for 2010 through 2045. These water demands include recycled water and imported water demand on IEUA from its retail agencies. The table also shows reported water use efficiency and calculates the total service area water demands without water use efficiency.

The data sources for the values in this table and calculations are explained below.

Service Area Demands with Water Use Efficiency Accounted For:

- Baseline (2010) value: The sum of the imported water and recycled water demands, as reported in IEUA's 2010 UWMP, Tables 3-10 and 3-15.

- 2015 value: The sum of the imported water and recycled water demands on IEUA, as reported in IEUA's 2015 UWMP, Table 2-8: IEUA Total Water Demands.

- 2020-2045 values: The sum of imported water and recycled water demands, from IEUA's 2020 UWMP, Table 2-4: Total Water Use (Potable and Non-Potable).

Reported Water Use Efficiency:

- Baseline (2010) value: No water use efficiency value is estimated to establish a conservative baseline.

- 2015 value: From IEUA's 2015 UWMP, Table 3-1. Only the 2015 value for WUE was selected.

- 2020 value: The volume of savings over the lifetime of water use efficiency measures implemented during FY 19/20, as reported in IEUA's Annual UWE FY19/20 report and detailed in Section 8.8 of IEUA's 2020 UWMP.

- 2025-2045 values: Projected water use efficiency savings, from IEUA's 2020 UWMP, Table 7-2.

The Service Area Water Demands without Water Use Efficiency Accounted For is the sum of the two volumes above for each year.

G.5 Calculation of Supplies Contributing to Regional Self-Reliance

For a covered action to demonstrate consistency with the Delta Plan, WR P1(c)(1) states that water suppliers must report the expected outcomes for measurable improvement in regional self-reliance. Table G-2 shows expected outcomes for supplies contributing to regional self-reliance both in amount and as a percentage. The numbers shown in Table G-2 represent efforts to improve regional self-reliance for the IEUA service area, focused only on the supplies IEUA manages, which are water use efficiency and water recycling. Supporting narratives and documentation for the all the data shown in the table are provided below:

Water Use Efficiency

The water use efficiency information shown in Table G-2 is taken directly from Table G-1. It is now reflected as a supply contributing to regional self-reliance.

Water Recycling

The water recycling values shown in Table G-2 are the recycled water supplies to meet the recycled water portion of the projected "service area water demands with water use efficiency accounted for" shown in Table G-1. These values come from IEUA's 2010 UWMP Table 3-15, IEUA's 2015 UWMP Table 2-8, and IEUA's 2020 UWMP Table 2-4. A description on these water supplies can be found in Section 5.4 – Current Recycled Water Uses in IEUA's 2020 UWMP.

The results shown in Table G-2 demonstrate that IEUA is improving its regional self-reliance, since the volume of water supplies contributing to regional self-reliance are projected to increase over time. In the near term (2025), the expected outcome for normal water year regional self-reliance increases by over 25,000 AF from the 2010 baseline; this represents an increase of about 10 percent of 2025 normal water year demands. In the long term (2045), normal water year regional self-reliance is expected to increase by more than 50,000 AF from the 2010 baseline.

G.6 Calculation of Reliance on Water Supplies from the Delta Watershed

WR P1(c)(1) requires that water suppliers report the expected outcomes for measurable reductions in supplies from the Delta watershed either as an amount or as a percentage. This analysis provides both calculations.

Although IEUA is currently a SWP-exclusive MWD member agency, it is infeasible to individually account for the independent impact on the Delta. IEUA participates, through MWD, in various water supply investment and demand management programs that reduce reliance on the Delta. Reliance on water supplies from the Delta are taken from MWD's Reduced Delta Reliance assessment (MWD 2020 UWMP, Appendix 11).

Regional reliance on supplies from the Delta watershed are expected to decrease by 314 TAF over the 2010 baseline, a decrease of about 5.2% of 2045 demands. Increased regional self-reliance primarily comes from water use efficiency, conjunctive use projects, water recycling, and local/regional water supply and storage projects. The water supply accounting completed by MWD does not include any supplies from potential future covered actions.

G.7 Infeasibility of Accounting Supplies from the Delta Watershed for Metropolitan's Member Agencies and their Customers

Metropolitan's service area, as a whole, reduces reliance on the Delta through investments in non-Delta water supplies, local water supplies, and regional and local demand management measures. Metropolitan's member agencies coordinate reliance on the Delta through their membership in Metropolitan, a regional cooperative providing wholesale water service to its 26 member agencies. Accordingly, regional reliance on the Delta can only be measured regionally—not by individual Metropolitan member agencies and not by the customers of those member agencies.

Metropolitan's member agencies, and those agencies' customers, indirectly reduce reliance on the Delta through their collective efforts as a cooperative. Metropolitan's member agencies do not control the amount of Delta water they receive from Metropolitan. Metropolitan manages a statewide integrated conveyance system consisting of its participation in the State Water Project (SWP), its Colorado River Aqueduct (CRA) including Colorado River water resources, programs and water exchanges, and its regional storage portfolio. Along with the SWP, CRA, storage programs, and Metropolitan's conveyance and distribution facilities, demand management programs increase the future reliability of water resources for the region. In addition, demand management programs provide system-wide benefits by decreasing the demand for imported water, which helps to decrease the burden on Metropolitan's infrastructure and reduce system costs, and free up conveyance capacity to the benefit of all member agencies.

Metropolitan's costs are funded almost entirely from its service area, with the exception of grants and other assistance from government programs. Most of Metropolitan's revenues are collected directly from its member agencies. Properties within Metropolitan's service area pay a property tax that currently provides approximately 8 percent of the fiscal year 2021 annual budgeted revenues. The rest of Metropolitan's costs are funded through rates and charges paid by Metropolitan's member agencies for the wholesale services it provides to them. Thus, Metropolitan's member agencies fund nearly all operations Metropolitan undertakes to reduce reliance on the Delta, including Colorado River Programs, storage facilities, Local Resources Programs and Conservation Programs within Metropolitan's service area.

Because of the integrated nature of Metropolitan's systems and operations, and the collective nature of Metropolitan's regional efforts, it is infeasible to quantify each of Metropolitan member agencies' individual reliance on the Delta. It is infeasible to attempt to segregate an entity and a system that were designed to work as an integrated regional cooperative.

In addition to the member agencies funding Metropolitan's regional efforts, they also invest in their own local programs to reduce their reliance on any imported water. Moreover, the customers of those member agencies may also invest in their own local programs to reduce water demand. However, to the extent those efforts result in reduction of demands on Metropolitan, that reduction may not equate to a like reduction of reliance on the Delta. Demands on Metropolitan are not commensurate with demands on the Delta because most of Metropolitan member agencies receive blended resources from Metropolitan as determined by Metropolitan—not the individual member agency—and for most member agencies, the blend varies from month-to-month and year-to-year due to hydrology, operational constraints, use of storage and other factors.

The accounting of regional investments that contribute to reduced reliance on supplies from the Delta watershed is straightforward to calculate and report at the regional aggregate level. However, any similar accounting is infeasible for the individual member agencies or their customers. As described above, the region (through Metropolitan) makes significant investments in projects, programs and other resources that reduce reliance on the Delta. In fact, all of Metropolitan's investments in Colorado River supplies, groundwater and surface storage, local resources development and demand management measures that reduce reliance on the Delta are collectively funded by revenues generated from the member agencies through rates and charges.

Metropolitan's revenues cannot be matched to the demands or supply production history of an individual agency, or consistently across the agencies within the service area. Each project or program funded by the region has a different online date, useful life, incentive rate and structure, and production schedule. It is infeasible to account for all these things over the life of each project or program and provide a nexus to each member agency's contributions to Metropolitan's revenue stream over time. Accounting at the regional level allows for the incorporation of the local supplies and water use efficiency programs done by member agencies and their customers through both the regional programs and through their own specific local programs. As shown above, despite the infeasibility of accounting reduced Delta reliance below the regional level, Metropolitan's member agencies and their customers have together made substantial contributions to the region's reduced reliance.

Colorado River Programs

As a regional cooperative of member agencies, Metropolitan invests in programs to ensure the continued reliability and sustainability of Colorado River supplies. Metropolitan was established to obtain an allotment of Colorado River water, and its first mission was to construct and operate the CRA. The CRA consists of five pumping plants, 450 miles of high voltage power lines, one electric substation, four regulating reservoirs, and 242 miles of aqueducts, siphons, canals, conduits and pipelines terminating at Lake Mathews in Riverside County. Metropolitan owns, operates, and manages the CRA. Metropolitan is responsible for operating, maintaining, rehabilitating, and repairing the CRA, and is responsible for obtaining and scheduling energy resources adequate to power pumps at the CRA's five pumping stations.

Colorado River supplies include Metropolitan's basic Colorado River apportionment, along with supplies that result from existing and committed programs, including supplies from the Imperial Irrigation District (IID)-Metropolitan Conservation Program, the implementation of the Quantification Settlement Agreement (QSA) and related agreements, and the exchange agreement with San Diego County Water Authority (SDCWA). The QSA established the baseline water use for each of the agreement parties and facilitates the transfer of water from agricultural agencies to urban uses. Since the QSA, additional programs have been implemented to increase Metropolitan's CRA supplies. These include the PVID Land Management, Crop Rotation, and Water Supply Program, as well as the Lower Colorado River Water Supply Project. The 2007 Interim Guidelines provided for the coordinated operation of Lake Powell and Lake Mead, as well as the Intentionally Created Surplus (ICS) program that allows Metropolitan to store water in Lake Mead.

IEUA has emergency service connections to the MWD's Upper Feeder, which includes CRA supplies. However, these connections are not currently utilized due to water quality concerns.

Storage Investments/Facilities

Surface and groundwater storage are critical elements of Southern California's water resources strategy and help Metropolitan reduce its reliance on the Delta. Because California experiences dramatic swings in weather and hydrology, storage is important to regulate those swings and mitigate possible supply shortages. Surface and groundwater storage provide a means of storing water during normal and wet years for later use during dry years, when imported supplies are limited. The Metropolitan system, for purposes of meeting demands during times of shortage, regulating system flows, and ensuring system reliability in the event of a system outage, provides over 1,000,000 acre-feet of system storage capacity. Diamond Valley Lake provides 810,000 acre-feet of that storage capacity, effectively doubling Southern California's previous surface water storage capacity. Other existing imported water storage available to the region consists of Metropolitan's raw water reservoirs, a share of the SWP's raw water reservoirs in and near the service area, and the portion of the groundwater basins used for conjunctive-use storage.

Since the early twentieth century, DWR and Metropolitan have constructed surface water reservoirs to meet emergency, drought/seasonal, and regulatory water needs for Southern California. These reservoirs include Pyramid Lake, Castaic Lake, Elderberry Forebay, Silverwood Lake, Lake Perris, Lake Skinner, Lake Mathews, Live Oak Reservoir, Garvey Reservoir, Palos Verdes Reservoir, Orange County Reservoir, and Metropolitan's Diamond Valley Lake (DVL). Some reservoirs such as Live Oak Reservoir, Garvey Reservoir, Palos Verdes Reservoir, and Orange County Reservoir, which have a total combined capacity of about 3,500 AF, are used solely for regulating purposes. The total gross storage capacity for the larger remaining reservoirs is 1,757,600 AF. However, not all of the gross storage capacity is available to Metropolitan; dead storage and storage allocated to others reduce the amount of storage that is available to Metropolitan to 1,665,200 AF.

Conjunctive use of the aquifers offers another important source of dry year supplies. Unused storage in Southern California groundwater basins can be used to optimize imported water supplies, and the development of groundwater storage projects allows effective management and regulation of the region's major imported supplies from the Colorado River and SWP. Over the years, Metropolitan has implemented conjunctive use through various programs in the service area; the following table lists the groundwater conjunctive use programs that have been developed in the region.

MWD Table 1: Metropolitan Groundwater Conjunctive Use Programs

Program	Metropolitan Agreement Partners	Program Term	Max Storage AF	Dry-Year Yield AF/Yr
Long Beach Conjunctive Use Storage Project (Central Basin)	Long Beach	June 2002-2027	13,000	4,300
Foothill Area Groundwater Storage Program (Monkhill/ Raymond Basin)	Foothill MWD	February 2003-2028	9,000	3,000
Orange County Groundwater Conjunctive Use Program	MWDOC OCWD	June 2003-2028	66,000+	22,000
Chino Basin Conjunctive Use Programs	IEUA TVMWD Watermaster	June 2003-2028	100,000	33,000
Live Oak Basin Conjunctive Use Project (Six Basins)	TVMWD City of La Verne	October 2002-2027	3,000	1,000
City of Compton Conjunctive Use Project (Central Basin)	Compton	February 2005-2030	2,289	763
Long Beach Conjunctive Use Program Expansion in Lakewood (Central Basin)	Long Beach	July 2005-2030	3,600	1,200
Upper Claremont Basin Groundwater Storage Program (Six Basins)	TVMWD	Sept. 2005- 2030	3,000	1,000
Elsinore Basin Conjunctive Use Storage Program	Western MWD Elsinore Valley MWD	May 2008- 2033	12,000	4,000
TOTAL			**211,889**	**70,263**

Metropolitan Demand Management Programs

Demand management costs are Metropolitan's expenditures for funding local water resource development programs and water conservation programs. These Demand Management Programs incentivize the development of local water supplies and the conservation of water to reduce the need to import water to deliver to Metropolitan's member agencies. These programs are implemented below the delivery points between Metropolitan's and its member agencies' distribution systems and, as such, do not add any water to Metropolitan's supplies. Rather, the effect of these downstream programs is to produce a local supply of water for the local agencies and to reduce demands by member agencies for water imported through Metropolitan's system. The following discussions outline how Metropolitan funds local resources and conservation programs for the benefit of all of its member agencies and the entire Metropolitan service area. Notably, the history of demand management by Metropolitan's member agencies and the local agencies that purchase water from Metropolitan's members has spanned more than four decades. The significant history of the programs is another reason it would be difficult to attempt to assign a portion of such funding to any one individual member agency.

Section 1: Local Resources Programs

In 1982, Metropolitan began providing financial incentives to its member agencies to develop new local supplies to assist in meeting the region's water needs. Because of Metropolitan's regional distribution system, these programs benefit all member agencies regardless of project location because they help to increase regional water supply reliability, reduce demands for imported water supplies, decrease the burden on Metropolitan's infrastructure, reduce system costs and free up conveyance capacity to the benefit of all the agencies that rely on water from Metropolitan.

For example, the Groundwater Replenishment System (GWRS) operated by the Orange County Water District is the world's largest water purification system for indirect potable reuse. It was funded, in part, by Metropolitan's member agencies through the Local Resources Program. Annually, the GWRS produces approximately 103,000 acre-feet of reliable, locally controlled, drought-proof supply of high-quality water to recharge the Orange County Groundwater Basin and protect it from seawater intrusion. The GWRS is a premier example of a regional project that significantly reduced the need to utilize imported water for groundwater replenishment in Metropolitan's service area, increasing regional and local supply reliability and reducing the region's reliance on imported supplies, including supplies from the State Water Project.

Metropolitan's local resource programs have evolved through the years to better assist Metropolitan's member agencies in increasing local supply production. The following is a description and history of the local supply incentive programs.

Local Projects Program

In 1982, Metropolitan initiated the Local Projects Program (LPP), which provided funding to member agencies to facilitate the development of recycled water projects. Under this approach, Metropolitan contributed a negotiated up-front funding amount to help finance project capital costs. Participating member agencies were obligated to reimburse Metropolitan over time. In 1986, the LPP was revised, changing the up-front funding approach to an incentive-based approach. Metropolitan contributed an amount equal to the avoided State Water Project pumping costs for each acre-foot of recycled water delivered to end-use consumers. This funding incentive was based on the premise that local projects resulted in the reduction of water imported from the Delta and the associated pumping cost. The incentive amount varied from year to year depending on the actual variable power cost paid for State Water Project imports. In 1990, Metropolitan's Board increased the LPP contribution to a fixed rate of $154 per acre-foot, which was calculated based on Metropolitan's avoided capital and operational costs to convey, treat, and distribute water, and included considerations of reliability and service area demands.

Groundwater Recovery Program

The drought of the early 1990s sparked the need to develop additional local water resources, aside from recycled water, to meet regional demand and increase regional water supply reliability. In 1991, Metropolitan conducted the Brackish Groundwater Reclamation Study which determined that large amounts of degraded groundwater in the region were not being utilized. Subsequently, the Groundwater Recovery Program (GRP) was established to assist the recovery of otherwise unusable groundwater degraded by minerals and other contaminants,

provide access to the storage assets of the degraded groundwater, and maintain the quality of groundwater resources by reducing the spread of degraded plumes.

Local Resources Program

In 1995, Metropolitan's Board adopted the Local Resources Program (LRP), which combined the LPP and GRP into one program. The Board allowed for existing LPP agreements with a fixed incentive rate to convert to the sliding scale up to $250 per acre-foot, similar to GRP incentive terms. Those agreements that were converted to LRP are known as "LRP Conversions."

Competitive Local Projects Program

In 1998, the Competitive Local Resources Program (Competitive Program) was established. The Competitive Program encouraged the development of recycled water and recovered groundwater through a process that emphasized cost-efficiency to Metropolitan, timing new production according to regional need while minimizing program administration cost. Under the Competitive Program, agencies requested an incentive rate up to $250 per acre-foot of production over 25 years under a Request for Proposals (RFP) for the development of up to 53,000 acre-feet per year of new water recycling and groundwater recovery projects. In 2003, a second RFP was issued for the development of an additional 65,000 acre-feet of new recycled water and recovered groundwater projects through the LRP.

Seawater Desalination Program

Metropolitan established the Seawater Desalination Program (SDP) in 2001 to provide financial incentives to member agencies for the development of seawater desalination projects. In 2014, seawater desalination projects became eligible for funding under the LRP, and the SDP was ended.

2007 Local Resources Program

In 2006, a task force comprised of member agency representatives was formed to identify and recommend program improvements to the LRP. As a result of the task force process, the 2007 LRP was established with a goal of 174,000 acre-feet per year of additional local water resource development. The new program allowed for an open application process and eliminated the previous competitive process. This program offered sliding scale incentives of up to $250 per acre-foot, calculated annually based on a member agency's actual local resource project costs exceeding Metropolitan's prevailing water rate.

2014 Local Resources Program

A series of workgroup meetings with member agencies was held to identify the reasons why there was a lack of new LRP applications coming into the program. The main constraint identified by the member agencies was that the $250 per acre-foot was not providing enough of an incentive for developing new projects due to higher construction costs to meet water quality requirements and to develop the infrastructure to reach end-use consumers located further from treatment plants. As a result, in 2014, the Board authorized an increase in the maximum incentive amount, provided alternative payment structures, included onsite retrofit costs and reimbursable services as part of the LRP, and added eligibility for seawater desalination projects. The current LRP incentive payment options are structured as follows:

- Option 1 – Sliding scale incentive up to $340/AF for a 25-year agreement term
- Option 2 – Sliding scale incentive up to $475/AF for a 15-year agreement term
- Option 3 – Fixed incentive up to $305/AF for a 25-year agreement term

On-site Retrofit Programs

In 2014, Metropolitan's Board also approved the On-site Retrofit Pilot Program which provided financial incentives to public or private entities toward the cost of small-scale improvements to their existing irrigation and industrial systems to allow connection to existing recycled water pipelines. The On-site Retrofit Pilot Program helped reduce recycled water retrofit costs to the end-use consumer which is a key constraint that limited recycled water LRP projects from reaching full production capacity. The program incentive was equal to the actual eligible costs of the on-site retrofit, or $975 per acre-foot of up-front cost, which equates to $195 per acre-foot for an estimated five years of water savings ($195/AF x 5 years) multiplied by the average annual water use in previous three years, whichever is less. The Pilot Program lasted two years and was successful in meeting its goal of accelerating the use of recycled water.

In 2016, Metropolitan's Board authorized the On-site Retrofit Program (ORP), with an additional budget of $10 million. This program encompassed lessons learned from the Pilot Program and feedback from member agencies to make the program more streamlined and improve its efficiency. As of fiscal year 2019/20, the ORP has successfully converted 440 sites, increasing the use of recycled water by 12,691 acre-feet per year.

Stormwater Pilot Programs

In 2019, Metropolitan's Board authorized both the Stormwater for Direct Use Pilot Program and a Stormwater for Recharge Pilot Program to study the feasibility of reusing stormwater to help meet regional demands in Southern California. These pilot programs are intended to encourage the development, monitoring, and study of new and existing stormwater projects by providing financial incentives for their construction/retrofit and monitoring/reporting costs. These pilot programs will help evaluate the potential benefits delivered by stormwater capture projects and provide a basis for potential future funding approaches. Metropolitan's Board authorized a total of $12.5 million for the stormwater pilot programs ($5 million for the District Use Pilot and $7.5 million for the Recharge Pilot).

Current Status and Results of Metropolitan's Local Resource Programs

Today, nearly one-half of the total recycled water and groundwater recovery production in the region has been developed with an incentive from one or more of Metropolitan's local resource programs. During fiscal year 2020, Metropolitan provided about $13 million for production of 71,000 acre-feet of recycled water for non-potable and indirect potable uses. Metropolitan provided about $4 million to support projects that produced about 50,000 acre-feet of recovered groundwater for municipal use. Since 1982, Metropolitan has invested $680 million to fund 85 recycled water projects and 27 groundwater recovery projects that have produced a cumulative total of about 4 million acre-feet.

<u>Conservation Programs</u>

Metropolitan's regional conservation programs and approaches have a long history. Decades ago, Metropolitan recognized that demand management at the consumer level would be an

important part of balancing regional supplies and demands. Water conservation efforts were seen as a way to reduce the need for imported supplies and offset the need to transport or store additional water into or within the Metropolitan service area. The actual conservation of water takes place at the retail consumer level. Regional conservation approaches have proven to be effective at reaching retail consumers throughout Metropolitan's service area and successfully implementing water saving devices, programs and practices. Through the pooling of funding by Metropolitan's member agencies, Metropolitan is able to engage in regional campaigns with wide-reaching impact. Regional investments in demand management programs, of which conservation is a key part along with local supply programs, benefit all member agencies regardless of project location. These programs help to increase regional water supply reliability, reduce demands for imported water supplies, decrease the burden on Metropolitan's infrastructure, reduce system costs, and free up conveyance capacity to the benefit of all member agencies.

Incentive-Based Conservation Programs

Conservation Credits Program

In 1988, Metropolitan's Board approved the Water Conservation Credits Program (Credits Program). The Credits Program is similar in concept to the Local Projects Program (LPP). The purpose of the Credits Program is to encourage local water agencies to implement effective water conservation projects through the use of financial incentives. The Credits Program provides financial assistance for water conservation projects that reduce demands on Metropolitan's imported water supplies and require Metropolitan's assistance to be financially feasible.

Initially, the Credits Program provided 50 percent of a member agency's program cost, up to a maximum of $75 per acre-foot of estimated water savings. The $75 Base Conservation Rate was established based Metropolitan's avoided cost of pumping SWP supplies. The Base Conservation Rate has been revisited by Metropolitan's Board and revised twice since 1988, from $75 to $154 per acre-foot in 1990 and from $154 to $195 per acre-foot in 2005.

In fiscal year 2020 Metropolitan processed more than 30,400 rebate applications totaling $18.9 million.

Member Agency Administered Program

Some member agencies also have unique programs within their service areas that provide local rebates that may differ from Metropolitan's regional program. Metropolitan continues to support these local efforts through a member agency administered funding program that adheres to the same funding guidelines as the Credits Program. The Member Agency Administered Program allows member agencies to receive funding for local conservation efforts that supplement, but do not duplicate, the rebates offered through Metropolitan's regional rebate program.

Water Savings Incentive Program

There are numerous commercial entities and industries within Metropolitan's service area that pursue unique savings opportunities that do not fall within the general rebate programs that Metropolitan provides. In 2012, Metropolitan designed the Water Savings Incentive Program (WSIP) to target these unique commercial and industrial projects. In addition to rebates for devices, under this program, Metropolitan provides financial incentives to businesses and

industries that created their own custom water efficiency projects. Qualifying custom projects can receive funding for permanent water efficiency changes that result in reduced potable demand.

Non-Incentive Conservation Programs

In addition to its incentive-based conservation programs, Metropolitan also undertakes additional efforts throughout its service area that help achieve water savings without the use of rebates. Metropolitan's non-incentive conservation efforts include:

- residential and professional water efficient landscape training classes
- water audits for large landscapes
- research, development and studies of new water saving technologies
- advertising and outreach campaigns
- community outreach and education programs
- advocacy for legislation, codes, and standards that lead to increased water savings

Current Status and Results of Metropolitan's Conservation Programs

Since 1990, Metropolitan has invested $824 million in conservation rebates that have resulted in a cumulative savings of 3.27 million acre-feet of water. These investments include $450 million in turf removal and other rebates during the last drought which resulted in 175 million square feet of lawn turf removed. During fiscal year 2020, 1.06 million acre-feet of water is estimated to have been conserved. This annual total includes Metropolitan's Conservation Credits Program; code-based conservation achieved through Metropolitan-sponsored legislation; building plumbing codes and ordinances; reduced consumption resulting from changes in water pricing; and pre-1990 device retrofits.

Infeasibility of Accounting Regional Investments in Reduced Reliance Below the Regional Level

The accounting of regional investments that contribute to reduced reliance on supplies from the Delta watershed is straightforward to calculate and report at the regional aggregate level. However, any similar accounting is infeasible for the individual member agencies or their customers. As described above, the region (through Metropolitan) makes significant investments in projects, programs and other resources that reduce reliance on the Delta. In fact, all of Metropolitan's investments in Colorado River supplies, groundwater and surface storage, local resources development and demand management measures that reduce reliance on the Delta are collectively funded by revenues generated from the member agencies through rates and charges.

Metropolitan's revenues cannot be matched to the demands or supply production history of an individual agency, or consistently across the agencies within the service area. Each project or program funded by the region has a different online date, useful life, incentive rate and structure, and production schedule. It is infeasible to account for all these things over the life of each project or program and provide a nexus to each member agency's contributions to Metropolitan's revenue stream over time. Accounting at the regional level allows for the incorporation of the local supplies and water use efficiency programs done by member agencies

and their customers through both the regional programs and through their own specific local programs. As shown above, despite the infeasibility of accounting reduced Delta reliance below the regional level, Metropolitan's member agencies and their customers have together made substantial contributions to the region's reduced reliance.

G.8 2015 UWMP Appendix P

The information contained in this Appendix G is also intended to be a new Appendix P attached to IEUA's 2015 UWMP consistent with WR P1 subsection (c)(1)(C) (Cal. Code Regs. tit. 23, § 5003). IEUA provided notice of the availability of the draft 2020 UWMP (including this Appendix G which will also be a new Appendix P to its 2015 UWMP) and WSCP and the public hearing to consider adoption of both plans and the addendum to the 2015 UWMP in accordance with CWC Sections 10621(b) and 10642, and Government Code Section 6066, and Chapter 17.5 (starting with Section 7290) of Division 7 of Title 1 of the Government Code. The notice of availability of the documents was sent to IEUA's member agencies, as well as cities and counties in IEUA service area. In addition, a public notice advertising the public hearing in English was published in the Inland Valley Daily Bulletin. The notification in English language newspapers was published on 17 May and 24 May 2021. Copies of: (1) the notification letter sent to the member agencies, cities and counties in IEUA service area, and (2) the notice published in the newspapers are included in the 2020 UWMP Appendix E.

Thus, this Appendix G to IEUA's 2020 UWMP, which was adopted with IEUA's 2020 UWMP, will also be recognized and treated as Appendix P to IEUA's 2015 UWMP. IEUA held the public hearing for the draft 2020 UWMP, draft Appendix G as an addendum to the 2015 UWMP, and draft WSCP on June 16, 2021, at the Board of Directors meeting, held online due to COVID-19 concerns. On June 16, IEUA's Board determined that the 2020 UWMP and the WSCP accurately represent the water resources plan for IEUA's service area. IEUA's Board determined that Appendix G to the 2020 UWMP and Appendix P to the 2015 UWMP includes all of the elements described in Delta Plan Policy WR P1, Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance (Cal. Code Regs. tit. 23, § 5003), which need to be included in a water supplier's UWMP to support a certification of consistency for a future covered action. As stated in Resolution No. 2021-06-10, the Board adopted the 2020 UWMP, Appendix G as an addendum to the 2015 UWMP, and the WSCP and authorized their submittal to the State of California. Copies of Resolution No. 2021-06-10 is included in the 2020 UWMP Appendix D.

Table G-1: Calculation of IEUA Service Area Water Demands Without Water Use Efficiency

Total Service Area Water Demands (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Water Demands with Water Use Efficiency Accounted For*	79,440	92,325	96,934	113,280	117,752	121,438	126,072	126,664
Reported Water Use Efficiency or Estimated Water Use Efficiency Since Baseline	-	1,975	3,292	9,788	11,984	17,257	22,570	27,802
Service Area Water Demands without Water Use Efficiency Accounted For	79,440	94,300	100,226	123,068	129,736	138,695	148,642	154,466

*Demands include imported and recycled water, as found in 2020 UWMP Table 4-3W

Table G-2: Calculation of IEUA Supplies Contributing to Regional Self-Reliance

Water Supplies Contributing to Regional Self-Reliance (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Water Use Efficiency	-	1,975	3,292	9,788	11,984	17,257	22,570	27,802
Water Recycling	24,506	33,419	30,495	40,495	42,697	44,122	46,504	46,844
Stormwater Capture and Use	-	-	-	-	-	-	-	-
Advanced Water Technologies	-	-	-	-	-	-	-	-
Conjunctive Use Projects	-	-	-	-	-	-	-	-
Local and Regional Water Supply and Storage Projects	-	-	-	-	-	-	-	-
Other Programs and Projects the Contribute to Regional Self-Reliance	-	-	-	-	-	-	-	-
Water Supplies Contributing to Regional Self-Reliance	24,506	35,394	33,787	50,283	54,681	61,379	69,074	74,646

Service Area Water Demands without Water Use Efficiency (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Water Demands without Water Use Efficiency Accounted For	79,440	94,300	100,226	123,068	129,736	138,695	148,642	154,466

Change in Regional Self Reliance (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Water Supplies Contributing to Regional Self-Reliance	24,506	35,394	33,787	50,283	54,681	61,379	69,074	74,646
Change in Water Supplies Contributing to Regional Self-Reliance		10,888	9,281	25,777	30,175	36,873	44,568	50,140

Percent Change in Regional Self Reliance (As Percent of Demand w/out WUE)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Percent of Water Supplies Contributing to Regional Self-Reliance	30.8%	37.5%	33.7%	40.9%	42.1%	44.3%	46.5%	48.3%
Change in Percent of Water Supplies Contributing to Regional Self-Reliance		6.7%	2.9%	10.0%	11.3%	13.4%	15.6%	17.5%

Table G-3: Calculation of MWD Reliance on Water Supplies from the Delta Watershed

Water Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
CVP/SWP Contract Supplies	1,472,000	1,029,000	984,000	1,133,000	1,130,000	1,128,000	1,126,000	1,126,000
Delta/Delta Tributary Diversions								
Transfers and Exchanges	20,000	44,000	91,000	58,000	52,000	52,000	52,000	52,000
Other Water Supplies from the Delta Watershed								
Total Water Supplies from the Delta Watershed	1,492,000	1,073,000	1,075,000	1,191,000	1,182,000	1,180,000	1,178,000	1,178,000

Service Area Water Demands without Water Use Efficiency (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Water Demands without Water Use Efficiency Accounted For	5,493,000	5,499,000	5,219,000	4,925,000	5,032,000	5,156,000	5,261,000	5,374,000

Change in Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Water Supplies from the Delta Watershed	1,492,000	1,073,000	1,075,000	1,191,000	1,182,000	1,180,000	1,178,000	1,178,000
Change in Water Supplies from the Delta Watershed		(419,000)	(417,000)	(301,000)	(310,000)	(312,000)	(314,000)	(314,000)

Percent Change in Supplies from the Delta Watershed (As a Percent of Demand w/out WUE)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Percent of Water Supplies from the Delta Watershed	27.2%	19.5%	20.6%	24.2%	23.5%	22.9%	22.4%	21.9%
Change in Percent of Water Supplies from the Delta Watershed		-7.6%	-6.6%	-3.0%	-3.7%	-4.3%	-4.8%	-5.2%

2020 Urban Water Management Plan

Project Lead

Joshua Aguilar, MsEM, P.E.
Senior Engineer

Prepared For

The Inland Empire Utilities Agency
6075 Kimball Avenue,
Chino, California 91708

Lead Consultant

Sachi Itagaki, P.E./QSD
Principal Engineer

Prepared By

Kennedy Jenks
300 N. Lake Ave, Suite 1020
Pasadena, CA 91101
Phone: 626-568-4300
Fax: 626-683-8938
Sachi Itagaki, P.E./QSD

Kennedy Jenks Reference

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Kennedy Jenks