US Army Corps
of Engineers
Los Angeles District

PRADO BASIN ECOSYSTEM RESTORATION AND WATER CONSERVATION STUDY

EXECUTIVE SUMMARY
DRAFT INTEGRATED FEASIBILITY REPORT
Environmental Impact Statement | Environmental Impact Report

Orange, Riverside, and San Bernardino Counties, California



FEBRUARY 2019

ABSTRACT

Pursuant to the National Environmental Policy Act (NEPA), the U.S. Army Corps of Engineers (Corps) has prepared this Draft Prado Basin Ecosystem Restoration and Water Conservation Integrated Feasibility Report (IFR). The Corps is the Lead Agency for the project under NEPA, and the Orange County Water District (OCWD) is the non-federal sponsor (NFS) and the Lead Agency for the California Environmental Quality Act (CEQA). The proposed project encompasses much of the Prado Basin covering approximately 4,500 acres immediately upstream of Prado Dam and extends along the Santa Ana River for 7 miles downstream of Prado Dam.

This Draft IFR, which also serves as a Draft Environmental Impact Statement and Environmental Impact Report (EIS/EIR) evaluates opportunities for restoring degraded habitats and ecosystem function within the project area. Ecosystem problems include loss and/or degradation of aquatic, riparian woodland and floodplain habitats through alteration of the hydrology of the Santa Ana River and tributaries in the upper and mid Santa Ana River basin. Development, flood damage reduction, agricultural practices and other land use changes have altered water-related environments of the study area to reduce the extent and function of native habitats, and invasive species have displaced and damaged riparian and aquatic habitats.

For Water Conservation, this report also evaluates permanent changes to the Water Control Plan for Prado Dam. Decreasing availability of imported water and increasing cost of municipal and industrial water supply sources to meet demand in the study area have resulted in the need for additional water conservation.

Three Action Alternatives were carried forward for preliminary analysis. The Tentatively Selected Plan (TSP) is Alternative 2 which includes both an Ecosystem Restoration Plan and a Water Conservation Plan. Restoration measures include sediment management to address sediment deposition upstream of Prado Dam and channel incision downstream of the dam which have impacted the hydrologic function, geomorphology and suitability of channel and riparian habitats. The TSP also includes measures to remove invasive plants and animal species that impact habitat functions in the proposed project area, as well as riparian and floodplain restoration and in-stream habitat features to benefit native fish. The proposed Water Conservation Plan includes re-operation of Prado Dam for increased retention and controlled release of water from Prado Dam for diversion and infiltration at OCWD's facilities located downstream of the dam on the Santa Ana River. The TSP (Alternative 2) has been identified as the NEPA Environmentally Preferred Alternative due to the long-term net ecosystem benefits. The official closing date for the receipt of comments is 45 days from the date on which the notice of availability of this IFR/DEIS/EIR appears in the Federal Register. During this 45-day review period, comments should be sent to:

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EXECUTIVE SUMMARY

INTRODUCTION

Pursuant to study resolution dated May 8, 1964 by the Committee on Public Works, U.S. House of Representatives, Section 401(a) of the Water Resources Development Act of 1986, and the National Environmental Policy Act (NEPA), the U.S. Army Corps of Engineers (Corps) prepared the Draft Prado Basin Ecosystem Restoration and Water Conservation Integrated Feasibility Report (IFR), which develops feasible alternatives and also assesses the potential environmental impacts associated with implementation of the proposed project alternatives (in accordance with the requirements of Code of Federal Regulations (CFR) Title 40, Chapter V: Council on Environmental Quality (CEQ), Section 1501.4(b)). The Corps is the Lead Agency for the project in cooperation with the Orange County Water District (OCWD), whom is the non-federal sponsor (NFS) and the Lead Agency for CEQA.

This project is the culmination of coordination and planning that has been ongoing since 2012. The original Feasibility Cost Sharing Agreement (FCSA) between the Corps and the OCWD committed both parties to share costs at a contribution of 50 percent each, with the OCWD's contribution to be provided up to the full amount required as work-in-kind, cash, or any combination. The original FCSA was amended on August 25, 2014 to include a provision for OCWD to contribute funds voluntarily for remaining costs to complete the study.

NEPA regulations allow for the preparation of combined documents that meet the requirements of NEPA, equivalent state requirements such as CEQA, and technical planning and decision-making processes of an agency. The specific requirements of NEPA and CEQA and the sections of this document that address each are provided in Appendix X. No cooperating agencies have been participants in the study as defined under NEPA, beyond the Corps as Lead Agency, and OCWD as the NFS and CEQA Lead Agency. All other coordination and consultation with agencies having jurisdictional interests in the study are identified in Sections 8.1 through 8.3 of the IFR.

The content for this IFR was conducted in compliance with USACE's new SMART Planning (3x3x3 policy) process and was established based on applicable laws, USACE regulations and guidelines, professional judgment regarding the nature of the project, Appendix G of the CEQA Guidelines, and USACE standard NEPA practices. Impacts are described under each of the environmental resource areas in Chapter 5.

BACKGROUND

The Santa Ana River is the largest river entirely within Southern California in the United States. The most upstream tributaries in the watershed originate in the San Bernardino Mountains and the Santa Ana River flows through San Bernardino and Riverside Counties before bisecting the northern Santa Ana Mountains and Chino Hills through Santa Ana Canyon and flows southwest through urban Orange County to discharge into the Pacific Ocean. The Santa Ana River is 96 miles in length, and its drainage basin is 2,650 square miles in area.

The partners in this study, the Corps' Civil Works Program and the Orange County Water District, have responsibilities for management of the Santa Ana River to address a variety of public objectives for water resource management. The Prado Dam and flood control basin were constructed in 1941 to provide flood risk management for developed areas of Orange County. This project addresses ecosystem restoration and water conservation problems within the Prado Basin and the Santa Ana River downstream of Prado Dam.

Problems to ecosystems in the project area include:

- Loss and/or degradation of aquatic, riparian woodland and floodplain habitats through alteration of the hydrology of the Santa Ana River and tributaries in the upper and mid Santa Ana River basin caused by construction of Prado Dam for flood control in the 1940's.
- Development, agricultural practices and other land use changes have altered water-related environments of the study area by increasing the intensity and decreasing the duration of runoff from storm events.
- Invasive species have displaced and damaged edge, riparian and aquatic habitats that have declined in the study area.

Problems to water conservation in the project area include:

- Decreasing availability of imported water and increasing cost of municipal and industrial water supply sources to meet demand in the study area.

Early in the study process, the project delivery team (PDT) along with key stakeholders and the internal USACE reviewers of the Agency Technical Review (ATR) team for the study identified target or focal areas for ecosystem restoration and water conservation measures. These include an area of approximately 200 acres at the north end of the study boundary along Chino Creek; an area of approximately 148 acres along Mill Creek to the west of the creek, adjacent and downstream from a City of Ontario wetlands project; and the entire Santa Ana River Mainstem (SARM) within Prado Basin and Reach 9 from Prado Dam to Weir Canyon Road (Figure ES-1). Due to frequent dry conditions with no stream flow, the reach of Temescal Creek located within Prado Basin is considered a possible location only for measures that include non-native plant removal and associated native plantings.

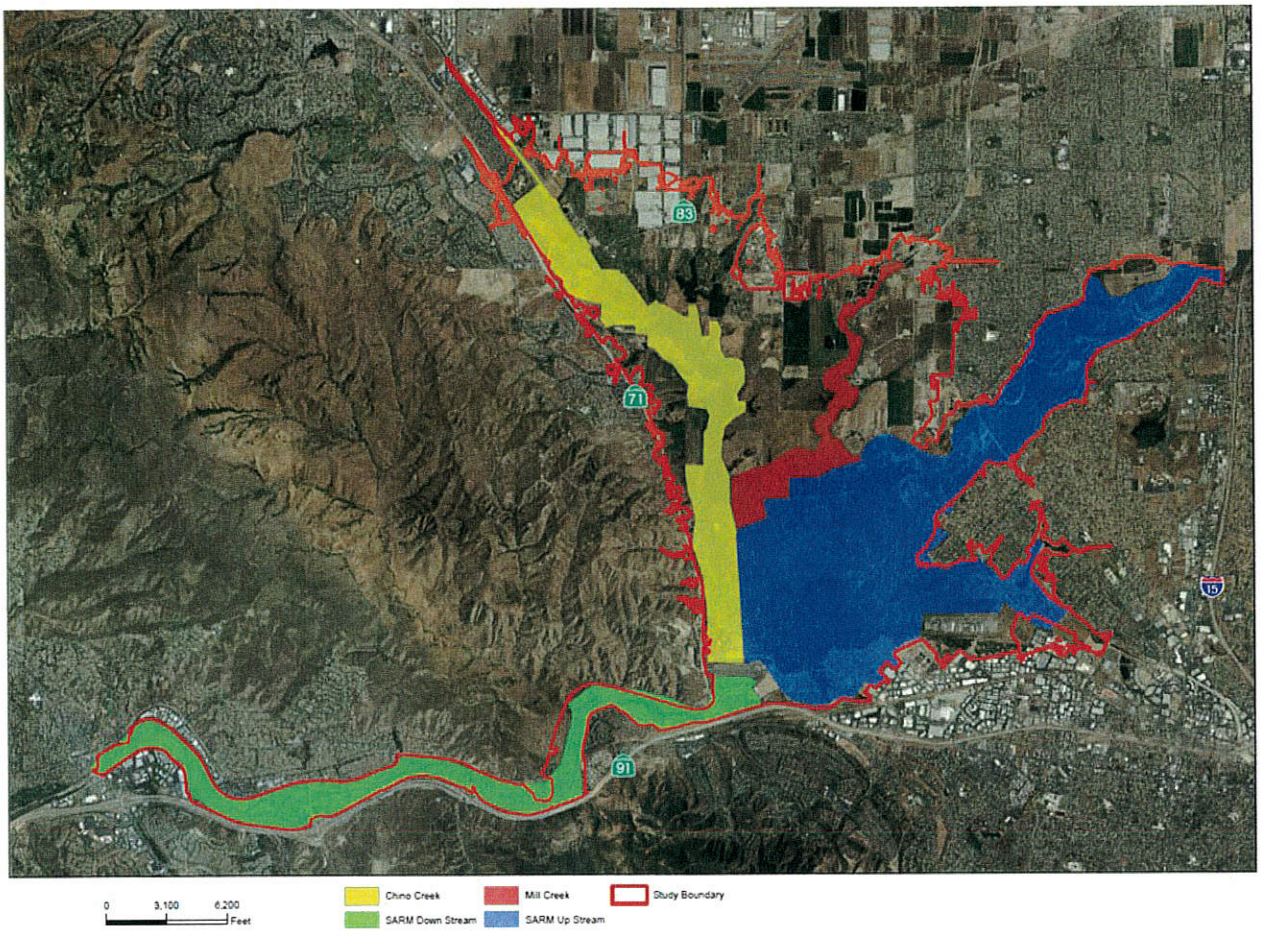


Figure ES-1 Focal Area Map for the Prado Project Area

PROJECT DESCRIPTION AND LOCATION

The project area for the IFR is located within the extent of the Santa Ana River Mainstem Project (SARM) and encompasses most of the Prado Basin covering approximately 4,500 acres of riparian habitat immediately upstream of Prado Dam and extends along Reach 9 of the Santa Ana River for 7 miles downstream of Prado Dam (Figure ES-2). Reach 9 of the Santa Ana River extends from Prado Dam downstream to Weir Canyon Road. All features for the project would be located within this area. The study also addresses any impacts of the project that would occur beyond proposed locations, including the Santa Ana River downstream to the Pacific Ocean.

The Prado Dam and flood control basin can be adapted and supplemented with additional measures to address two water resource management objectives: (1) ecosystem restoration and (2) water conservation. The study objective for ecosystem restoration is to restore aquatic and water-related habitats for native species, including threatened and endangered species with habitat in the study area that make use of the restoration opportunities provided by Prado Basin, the Santa Ana River and its tributaries. The study objective for water conservation is to operate Prado Dam for increased water conservation and cost savings for OCWD as a public water supplier for metropolitan Orange County.

Water conservation measures formulated for this study all rely on retention of water at Prado Dam for water conservation that is then released at a rate that allows additional volumes of water to be diverted to OCWD's existing recharge facilities located adjacent to the Santa Ana River downstream of Prado Dam. The existing water conservation provisions of the Prado Dam Water Control Plan allows retention of water to 498 feet water surface elevation (WSE) NGVD during flood season (October through February), and to 505 feet WSE NGVD during non-flood season (March through September) for controlled release for diversion and use by OCWD's recharge facilities.

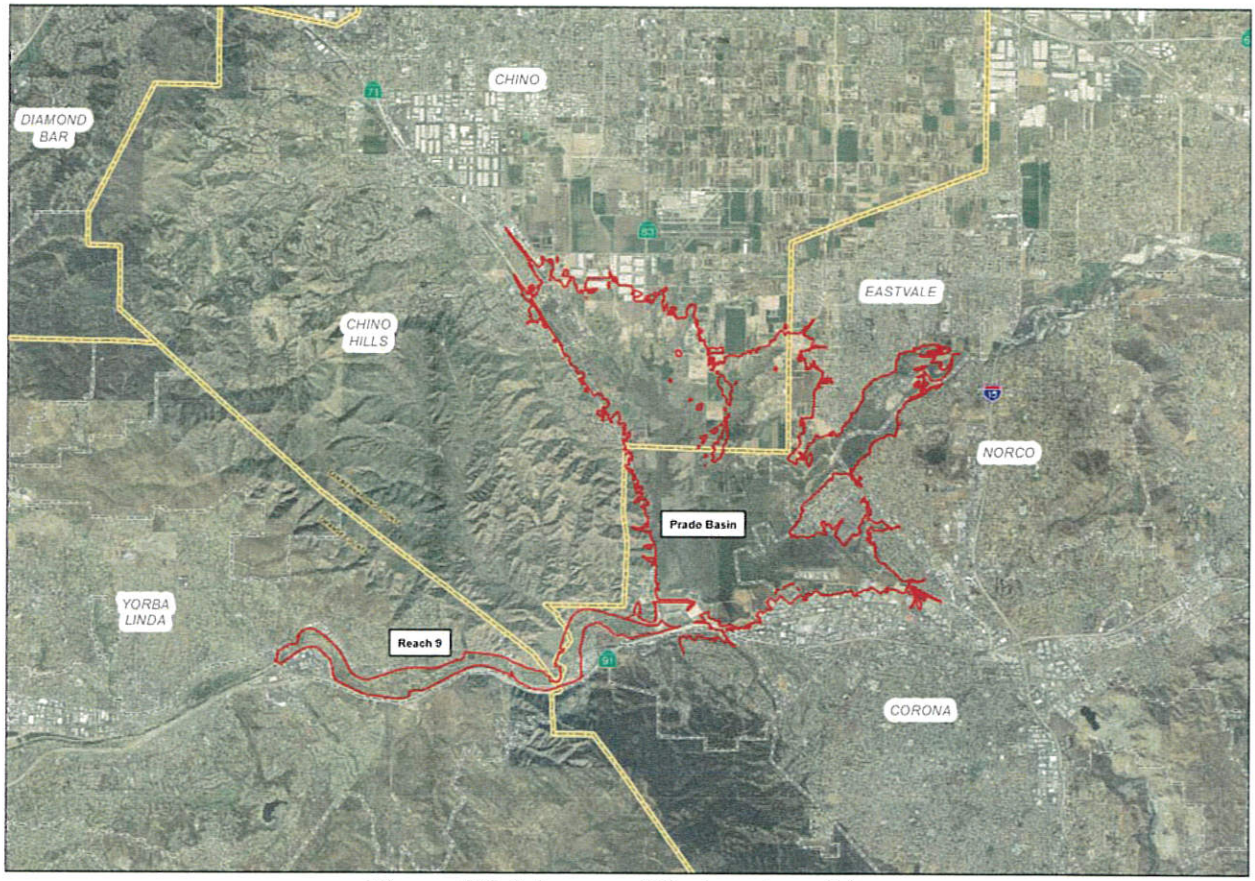


Figure ES-2 Proposed Project Area Map

PROJECT PURPOSE AND NEED

Planning goals for the study include restoration of aquatic and water-related habitats for native species, including threatened and endangered species with habitat in the study area that would make use of the restoration opportunities provided by Prado Basin, the Santa Ana River and its tributaries. There is a need to restore habitats and connectivity for wildlife in the project area. These aquatic and riparian habitats of the Santa Ana River and tributaries support aquatic species that depend on the flow and geomorphology of the largest flowing river in southern California, and thousands of acres of riparian forest that have been impacted by flood risk management activities, propagation of invasive plants and animals, and alteration of watershed hydrology through land development and agricultural practices. In addition, long-term growth and drought have stressed water supplies for the region, increasing demand for imported water has increased

energy use for water transfers, and raises reliability concerns for water supplies from distant sources.

The project purpose is stated in the form of planning objectives. The planning objectives developed for this study state the intended purpose of the planning process, identify what the USACE and OCWD partnership wants to achieve with the alternatives and accomplish with a plan.

The objectives for ecosystem restoration are:

- Improve hydraulic and fluvial geomorphic functions to promote habitat growth and wildlife connectivity to regionally significant core habitats at Prado Basin and associated main watercourses within the project area.
- Restore riparian and riparian associated habitats suitable to native species within the project area
- Reduce presence and effects of non-native wildlife on habitat suitability and function for native wildlife species.

The objective for water conservation is to:
Determine the feasibility of re-operating the Prado reservoir to provide additional water conservation storage. Conserved water would be used by OCWD and its member agencies.

PLAN FORMULATION FOR ECOSYSTEM RESTORATION

Initial plan formulation for Ecosystem Restoration was accomplished through Feasibility Kick-Off Workshops, PDT meetings and follow-on efforts by the Lead Planner in December 2012 and January 2013. Workshops included participation of the USACE PDT, the Agency Technical Review (ATR) Co-Leaders, a Water Resources Planner trained in the SMART planning process, the non-Federal sponsor (OCWD), U.S. Fish and Wildlife Service, California Department of Fish and Wildlife (formerly Fish and Game), the City of Ontario, the Regional Water Quality Control Board, the Santa Ana Watershed Authority and the Riverside-Corona Resource Conservation District.

Design workshops held by the PDT and stakeholders identified an inclusive list of measures to address the study objectives. Based on identified water resource problems and opportunities, many measures were enumerated by the group and have been developed to address the problems. Measures have been combined into alternative plans that could be implemented in the study area. Alternative plans can then be assessed and compared to determine the costs, effectiveness and impacts of the project alternatives.

After the Alternatives milestone, the preliminary array of reduced measures was developed into alternative design features. The design alternatives were developed to a sufficient level of detail to ensure technical feasibility, establish boundary footprints for construction activities, designate riparian habitat planting areas, determine avoidance requirements for existing and proposed infrastructure, and to provide a basis for detailed cost estimates. For the development of the initial array of alternatives, each of the measures developed were evaluated for their applicability

to each focal area and inherent aspects that determined or constrained the applicability and siting of measures.

After the initial set of restoration measures had been identified, a series of thematic plans were formulated for initial evaluation of restoration techniques at increasing scales of investment and intensity of alternation of existing environmental conditions. In increasing order of plan commitment and cost, the preliminary alternatives include:

- Basic Plan: restoration techniques that involve lower intensity alteration and level of investment, with two basic components: Water Conservation at 505' elevation year-round, and Invasive Vegetation Removal at upstream focal areas.
- Medium Chino Plan: added measures to address disrupted channel/aquatic environment geomorphology and hydrology (sediment removal, braided channel at Chino Creek, stabilize streambed of Santa Ana River mainstem)
- Widely Supported Plan: more extensive level of effort for restoration and wider range of habitat types provided (sediment removal for habitat, riparian edge habitats, invasive animal removal, wetlands creation at Mill Creek)
- All Inclusive Plan: a complete suite of available compatible measures for restoration (added floodplain widening and restoration upstream SAR and aquatic habitat features at Chino Creek)

PLAN FORMULATION FOR WATER CONSERVATION

During initial plan formulation, the PDT evaluated potential water conservation measures, including plan formulation efforts conducted for a 2005 draft water conservation feasibility report on Prado Basin. Based on the prior study efforts and the existing water conservation operations at Prado Dam, the PDT identified a range of measures to be considered for there are substantially greater costs and impacts of implementing water conservation to elevations higher than WSE 505 feet, including environmental impacts and flooding impacts within the basin. Water conservation retention at WSE between 498 feet and 505 feet, the project would incur similar operating costs as operating for water conservation at 505 feet but with proportionally lower yields. Based on these considerations, a decision was made at the Alternatives Milestone Conference, through coordination and agreement with the Corps South Pacific Division and Headquarters representatives, to carry forward water conservation at up to 505 feet WSE at any time during the year.

The PDT evaluated the previous operations under the Water Control Plan for Prado Dam and approved deviations and determined that the year round operation at 505 feet WSE maximized yield for the water conservation effort while ensuring that the flood risk management performance of the Santa Ana River Mainstem project, including Prado Dam, was not compromised.

Based on OCWD's experience with ongoing water conservation at Prado Dam, the PDT recognized that sediment removal could be included in the Water Conservation measure to address changes in sediment accumulation that might displace or degrade habitat. This feature would be included in the Water Conservation measure only if it is implemented in conjunction with an Ecosystem Restoration plan that does not include a sediment management measure for

Ecosystem Restoration. For final array plans that combine Water Conservation with a restoration plan that includes Sediment Management for Ecosystem Restoration, the Water Conservation measure would not require sediment removal. This is because the restoration Sediment Management Measure addresses sediment accumulation at much larger scale to address the geomorphologic and hydrologic conditions that provide restoration benefits related to sediment management on the Santa Ana River mainstem. The version of the Water Conservation measure without sediment removal would be compatible with Ecosystem Restoration Best Buy plans 11 and 14 in the final array.

COST EFFECTIVENESS/INCREMENTAL COST ANALYSIS

A Value Engineering workshop was completed in 2014. In addition to identifying some modification of individual measures to improve cost-effectiveness, the workshop recommended completion of a Cost Effectiveness/Incremental Cost Analysis (CEICA) to identify Best Buy Alternatives and ensure combinable measures were used to derive a range of alternatives that could be compared and evaluated for plan selection.

The initial CEICA analysis of refined restoration measures was performed in 2016. Outputs for cost effectiveness calculations are based on the habitat evaluation model identified by USACE as appropriate for this Feasibility Study. The model, Combined Habitat Assessment Protocol or CHAP results of the average annual habitat unites (AAHU) for each measure was included in the analysis. However, when the Abbreviated Cost Risk Analysis (ACRA) was performed for the proposed final array from the initial CEICA, costs for final array plans that included sediment management more than doubled because of the uncertainty associated with transport and placement of excess sediment removed from the basin. Revised contingency costs based on more detailed and updated designs were provided for the individual measures and the CEICA was rerun to ensure that more reliable costs were used as the basis for selecting the final array of alternatives.

To formulate the final array, each measure/focal area combination had been separately assessed for habitat output then assessed for combinability with other features, dependency on other features, and synergy from combining features. When two or more management measures are dependent, that relationship is considered in CEICA and retained in plan formulation. When management measures are not combinable, that relationship is specified in the IWR Plan software, which produces the CEICA. In this manner only mutually exclusive and independent alternatives are formulated, which is a requirement of plan formulation. These criteria were entered to establish all possible combinations of features and associated habitat outputs and costs. These combinations established by the criteria were entered into IWR Plan and became the alternative plans. Dependency, combinability, and synergy have been developed by the PDT based on consideration of function, requirements and location of the individual measures at the relevant focal areas.

The CEICA analysis was performed in a three-step process because the number of features, 20, exceeded the number of the computational capabilities of IWR Plan software. To get around this limitation CEICA analysis was first performed on the features located in SARM upstream and downstream. A CEICA model was then run for features within Chino and Mill Creek.

Chino/Mill Creek did not contain any measures with dependencies. This kept all measures with dependencies and the corresponding dependent measures within the SARM grouping. Non-combinable measure pairings also did not extend beyond either SARM or Chino/Mill Creek ensuring that all non-combinable measures are accounted for.

ALTERNATIVES ARRAY

Four of the Best Buy Plans (including the No Action Plan) were selected to carry forward into the Final Array of Ecosystem Restoration Plans. These plans include Best Buy Plans 1 (No Action), 9, 11, and 14. These Best Buy Plans represent the range of cost-effective combinations of measures that represent the range of possible alternatives that address Ecosystem Restoration objectives at different levels of output that are would provide sustainable benefits for the proposed project area. Table ES-1 below summarizes the features of the Final Array Ecosystem Restoration Plans and Table ES-2 summarizes and compares the outputs and costs of the Final Array Ecosystem Restoration Plans.

Table ES-1: Final Array Plan Features for Ecosystem Restoration

BB Plan	Adds Measure(s)	In Location
1	No Action	
9	Water Conservation at 505' Elevation Year-Round	All Locations
	Invasive Plant Mgt.	All Locations
	Native Plantings	SARM US, MC, CC
	Raise Invert/Cut New Channel	CC
	Cowbird Trapping*	All Locations
11 (adds to plan 9)	Non-native Aquatics Mgt.	SARM US
	Sediment Mgt. System	SARM US/DS
	Riparian Edge Mgt.	SARM US
	Instream Habitat Feature	SARM DS
14 (adds to Plan 11)	Non-Native Aquatics Mgt.	SARM DS
	Feral Pig Management	All Locations
	Instream Habitat Features	SARM US

Table ES-2: Ecosystem Restoration Array Plan Summary Outputs and Costs

	BB Plan 9	BB Plan 11	BB Plan 14
Construction	$23,709,898	$95,838,470	$101,481,812
PED/S&A	$2,699,920	$10,380,904	$10,925,144
Monitoring & Adaptive Mgt.	$260,000	$310,000	$310,000
LERRD	$0	$3,600,000	$3,600,000
Total First Cost	**$26,670,000**	**$110,129,000**	**$116,317,000**
IDC	$879,300	$6,564,500	$6,801,100
Investment Cost	$27,549,300	$116,693,500	$123,118,100
Annualized Investment Cost	$1,045,400	$4,428,300	$4,672,100
OMRR&R	$864,600	$5,745,000	$6,022,900
Total Annual Cost	**$1,910,000**	**$10,173,300**	**$10,695,000**
AAHU	38,795	60,594	61,246
AAC/AAHU	$49	$168	$175
Incremental AAC	$1,910,000	$8,263,300	$521,700
Incremental AAHU	38,795	21,799	652
Incremental AAC/AAHU	$49	$379	$800

Best Buy Plan 9 - This plan was the plan determined to minimally meet planning objectives. It provides 38,795 AAHUs. The total first cost is approximately $26.7 million, with an average annual cost of about $1.9 million. The incremental AAC/AAHU of Best Buy Plan 9 relative to Best Buy Plan 8 is $206, which represents a substantial increase over some smaller Best Buy Plans, but still low compared to larger scale plans. Relative to the No Action Plan, the incremental AAC/AAHU is about $49. This plan indirectly provides restoration of hydrologic processes by removing Arundo and reducing evapotranspiration, but it does not directly restore hydrologic processes and isolation of habitat caused by channel incision on the Santa Ana River upstream and downstream reaches.

Best Buy Plan 11 - This plan provides a substantial increase in output, generating 60,594 AAHUs. The total first cost is approximately $110.1 million, with an average annual cost of about $10.2 million. The incremental AAC/AAHU of this plan relative to Best Buy Plan 10 is $381, which is a 30% increase, but still low relative to larger scale best buy plans. Relative to Best Buy Plan 9, the incremental AAC/AAHU is about $379. This plan is the first to feature the sediment management system along the SARM, as well as in-stream habitat features in the SARM downstream area and riparian edge management features upstream, which are both dependent upon implementation of the sediment management system. This plan also adds non-native aquatics management in the SARM upstream area. These additional features raise the cost considerably – the first cost is about $83.5 million higher than Best Buy Plan 9, and average annual costs are approximately 5.3 times higher than the annual costs for Best Buy Plan 9. However, the increase in output of 21,799 AAHUs results in a low incremental cost per AAHU. The incremental AAC/AAHU for this best buy plan is substantially lower than larger scale best buy plans.

Best Buy Plan 14 - This is the largest plan carried forward to the Final Array, and is projected to generate 61,246 AAHUs. This represents an increase of 652 AAHUs relative to Best Buy Plan 11. The total first cost of Best Buy Plan 14 is approximately $116.3 million, with an average annual cost of about $10.7 million. The incremental first cost and annual cost of Best Buy Plan 14 relative to Best Buy Plan 11 are about $6.2 million and $522,000, respectively. This plan adds

non-native aquatics management in the SARM downstream area, in-stream habitat features in the SARM upstream area, and feral pig management throughout all focal areas. While the incremental AAC/AAHU for this final array plan is larger than smaller scale plans, it is still less than $900, which is substantially lower than larger scale best buy plans.

FINAL ARRAY OF COMBINED PLANS

The measures and plans formulated for each project purpose were formulated independently. The evaluation of conflicts and dependencies between plans for the different study purposes determined that the Water Conservation plan requires a component for additional sediment removal in combined plans only for alternatives where the Ecosystem Restoration Plan does not include the Sediment Management System Measure. The final array of combined plans is provided in Table ES-3.

Table ES-3: Final Array Combined Plans for Ecosystem Restoration and Water Conservation

Final Array Plan Number	1 (No Action)	2	3	4
Ecosystem Restoration Plan Component	None	Best Buy Plan 11	Best Buy Plan 9	Best Buy Plan 14
Water Conservation Plan Component	None	Water Conservation at WSE 505 (No Sediment Removal)	Water Conservation at WSE 505 With Sediment Removal	Water Conservation at WSE 505 (No Sediment Removal)

The environmental impacts of the alternatives are presented in Chapter 5, the comparison of plans by their outputs, impacts and costs is provided in Chapter 6, and the Tentatively Selected Plan (TSP) is identified in Chapter 7. USACE recommends implementation of Alternative 2, which combined Ecosystem Restoration Plan Best Buy 11 with Water Conservation at 505 feet WSE. Table ES-4 displays the comparison of impacts for the 4 final Alternatives and identifies unavoidable significant impacts in regards to air quality with respect to CEQA standards. The TSP is the combined plan for Ecosystem Restoration and Water Conservation purposes that meets the study objectives for each purpose while maximizing net economic benefits as the National Economic Development Plan for Water Conservation and also provides the most non-monetary benefits for Ecosystem Restoration relative to the monetary costs of the proposed plan to meet the national objective of National Ecosystem Restoration.

AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

At present there are no areas of major controversy that have been identified by the public. The Corps and OCWD have worked closely together and with the public and stakeholders to develop alternatives and a TSP that is responsive to potential concerns. The Corps and OCWD will continue to work together as public and agency comments are submitted on this Draft IFR. The key issue to be resolved is the final selection and any refinement to the choice among the

alternatives. While a TSP has been identified, the final selection remains an issue to be resolved, including potential refinements and the sequencing of the actions under the plan.

Table ES-4: Comparison of Potential Impacts

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
GEOLOGY, SEISMOLOGY, SOILS, AND MINERALS	***Construction Impacts*** None. ***Operation Impacts*** None.	***Construction Impacts*** Construction activities would not increase the risk or exposure of people or structures to significant adverse seismic ground rupture, seismic shaking impacts, or liquefaction impacts over the current condition. Soil, water and wind erosion resulting from construction would be controlled through BMPs and would be temporary. Impacts would be **less than significant**. ***Operation Impacts*** Impacts would not involve any activities that would increase the risks of ground rupture impacts, seismic ground shaking impacts, liquefaction or landslide impacts over the current condition. Adaptive management may include adjustments to cowbird control and fish removal methods, level of effort, and/or trap locations. As with other maintenance activities, potential impact would be **less than significant**.	***Construction Impacts*** Construction and long-term operation and maintenance activities would not increase the risk or exposure of people to significant adverse seismic ground rupture, seismic shaking impacts, or liquefaction impacts over the current condition. Potential impacted area decreases from Alternative 2 with less temporary and permanent grading impacts. Soil, water and wind erosion resulting from construction would be controlled through BMPs, and would be temporary resulting in **less than significant impacts.** ***Operation Impacts*** Same as Alternative 2 (Less than significant impact).	***Construction Impacts*** Potential impacted area is the same as Alternative 2. Soil, water, and wind erosion resulting from construction would be controlled through BMPs and would be temporary Impacts would **be less than significant.** ***Operation Impacts*** Same as Alternative 2 (Less than significant impact).
AIR QUALITY AND GREENHOUSE GASES	***Construction Impacts*** No adverse impacts There would be no construction air emissions that could	***Construction Impacts*** The construction and operational phases are expected to exceed the NOx threshold under CEQA resulting in **unavoidable impacts**. In regards to	***Construction Impacts*** Same as Alternative 2 (Less than significant).	***Construction Impacts*** Same as Alternative 2 (Less than significant impact).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	have the potential to exceed the Federal General Conformity Rule. ***Operation Impacts*** Emissions associated with existing operational practices and daily visitations to the project area would remain.	NEPA, construction activities would not result in Project-related emissions exceeding General Conformity de minimis levels as established in 40 CFR 93.153(b.), resulting in **less than significant impacts**. ***Operation Impacts*** Worse-case summer or winter daily regional annual criteria pollutants for operation/maintenance results show that combined direct and indirect emissions would be within the General Conformity de minimis levels. Therefore, preparation of a General Conformity Determination would not be required for the implementation of the Proposed Action. **Less than significant** impacts would occur.	***Operation Impacts*** Same as Alternative 2 (Less than significant impact).	***Operation Impacts*** Same as Alternative 2 (Less than significant impact).
LAND USE	***Construction Impacts*** None. ***Operation Impacts*** Water would continue to be stored at elevation 498 ft. during the flood season and at	***Construction Impacts*** With implementation of Environmental Commitments detailed in Chapter 5, construction activities would not result in adverse land use impacts or physically divide an established community resulting in **less than significant** impacts. Alternative 2 would not conflict with any	***Construction Impacts*** Compared to Alternative 2, sediment removal activities would be confined to a smaller area within the Prado Basin and would not impact any existing land uses With implementation of Environmental Commitments	***Construction Impacts*** Same as Alternative 2. (Less than significant impacts). ***Operation Impacts*** Same as Alternative 2. (Less than significant impacts).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	elevation 505 ft. during the non-flood season in accordance with the Water Control Plan for Prado Dam.	applicable land use plan, policies or regulations of an agency with jurisdiction over the project adopted for avoiding or mitigating an environmental effect. ***Operation Impacts*** Operation activities would be confined to specific areas for a short period of time. Potential operation, maintenance, and adaptive management impacts would not result in adverse land use impacts or physically divide an established community. Any land use **impacts would be less than significant.**	detailed in Chapter 5, the level of potential impacts to existing land uses and established community would be the same, resulting in impacts being **less than significant**. ***Operation Impacts*** Compared to Alternative 2, future operation and maintenance impacts would be the same and adverse impacts would **be less than significant.**	
WATER RESOURCES	***Construction Impacts*** No adverse impacts. There would be no construction or ecosystem restoration activities occurring in the study area and there would be no potential that water quality standards in the Basin Plan could be violated ***Operation Impacts*** The study area would continue to be subject to the water quality	***Construction Impacts*** With implementation of Environmental Commitments detailed in Chapter 5, construction activities would not violate any water quality standards or waste discharge standards, or otherwise degrade water quality making the impacts **less than significant**. Construction activities would not place structures within a 100-year floodplain which would impede or redirect flood flows or expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a	***Construction Impacts*** Same as Alternative 2, with less sediment excavation activities. While sediment management and related ecosystem restoration measures would not be implemented, the habitat benefits associated with Chino Creek restoration, invasive removal and native plantings would be consistent with Basin Plan objectives. None of the other restoration measures or the Water Conservation Plan would	***Construction Impacts*** Same as Alternative 2. (Less than significant impacts) and (Beneficial Impact). ***Operation Impacts*** (Less than significant impact) and (Beneficial Impact).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	standards established in the Basin Plan.	levee or dam. **Impacts would be less than significant**. ***Operation Impacts*** Water Conservation Measure would increase the level of pooling and days of inundation within the Prado Basin. Incoming waters into the Prado Basin that comply with the Basin Plan water quality objectives and beneficial uses would ensure that the additional stored water in the basin would not introduce new sources of pollution that would exceed water quality standards in the Basin Plan. Turbidity caused by high flow conditions during dam releases **is significant.** Although the sediment re-entrainment to the area downstream of the dam would not substantially increase the levels of turbidity, it is still significant and unavoidable. Moreover, water conservation would result in a **beneficial impact** by increasing the amount of water that is available for groundwater recharge.	worsen water quality or exceed thresholds identified in the Basin Plan. **Less than significant** impacts. ***Operation Impacts*** Same as Alternative 2 except there would not be unavoidable turbidity caused by high flow conditions during dam releases as described in Alternative 2. Thus, this Alternative would have less impacts compared to Alternative 2 in regard to turbidity.	
BIOLOGICAL RESOURCES	***Construction Impacts*** None. ***Operation Impacts*** None.	***Construction Impacts*** With implementation of Environmental Commitments detailed in Chapter 5, construction activities would not	***Construction Impacts*** With implementation of Environmental Commitments detailed in Chapter 5	***Construction Impacts*** Same as Alternative 2 (Less than Significant Impact).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		result in substantial adverse effects, either directly or through habitat modifications, on any species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. Indirect impacts were evaluated and are also not substantial, and therefore impacts would be **less than significant**. ***Operation Impacts*** Since the same actions would occur under long-term operation and maintenance as those that occurred under initial implementation, **impacts would be less than significant.**	Construction activities would not result in substantial adverse effects, either directly or through habitat modifications, on any species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. Indirect impacts were evaluated and are also not substantial, and therefore **less than significant**. ***Operation Impacts*** Since any long-term operation and maintenance efforts would utilized the same methods as the original implementation, the associated impacts would be the same as well. Therefore, impacts associated with long-term operation and maintenance would not result in substantial adverse effects to any sensitive or special status	***Operation Impacts*** Since any long-term operation and maintenance efforts would utilized the same methods as the original implementation, the associated impacts would be the same as well. Therefore, impacts associated with long-term operation and maintenance would not result in substantial adverse effects to any sensitive or special status plant of wildlife species and are therefore **less than significant.**

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
			plant of wildlife species and are therefore **less than significant.**	
CULTURAL RESOURCES	***Construction Impacts*** No adverse impacts. There would be no ground disturbances and no potential that buried pre-historic and/or historical cultural resources within the study area would be adversely affected. ***Operation Impacts*** None.	***Construction Impacts*** Alternative 2 would result in an adverse effect/substantial adverse change to at least one historic property/historic resource related to the construction of the sediment storage area. The impacts to the historic property/historic resource would not be substantial enough to exceed the significance criteria. Additional adverse effects/substantial adverse changes could occur if a historic property/historic resource is located within the footprint of the Chino Creek channel restoration measure or any of the features associated with the sediment trap and cannot be avoided. Due to the location and type of impacts associated with the Chino Creek channel or the sediment trap if there is an adverse effects/substantial adverse change the impact would likely be major enough to exceed the significance criteria. Alternative 2 would result in a known adverse effect/substantial adverse change that is **less than significant** under NEPA and CEQA;	***Construction Impacts*** Compared to the Alternative 2, Alternative 3 would have substantially less excavation activities, a smaller construction footprint and less likelihood to encounter unknown pre-historic and historic cultural resources. **Less than significant impacts** would occur. ***Operation Impacts*** Compared to the Alternative 2, Alternative 3 would have substantially less excavation activities, a smaller construction footprint and less likelihood to encounter unknown pre-historic and historic cultural resources. **Less than significant impacts** would occur.	***Construction Impacts*** Same as Alternative 2 (Less than significant impacts). ***Operation Impacts*** Same as Alternative 2 (Less than significant impacts).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		however, additional significant impacts could occur to as of unidentified cultural resources, but these impacts are unlikely. ***Operation Impacts*** The long-term operation and maintenance and adaptive management activities would involve regular inspection of the focal areas and the removal of non-native wildlife. Any future removal activities would be conducted in natural open space areas using existing maintenance roads and staging areas. Operation and maintenance would result in **less than significant** impacts under NEPA and CEQA.		
TRAFFIC AND CIRCULATION	***Construction Impacts*** None. ***Operation Impacts*** None.	***Construction Impacts*** Construction activities would occur over a period of 5 years. **Less than Significant impact** would occur. Construction activities would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness (Level of Service) for the performance of the circulation system, considering all modes of transportation including mass transit, and non-motorized travel and	***Construction Impacts*** Compared to the Alternative 2, Alternative 3 would have substantially less excavation activities, a smaller construction footprint and less traffic and circulation impacts. Daily construction is expected to be less than Alternative 2 after each of the following 3 years of construction.	***Construction Impacts*** Same as Alternative 2 (Less than significant impacts). ***Operation Impacts*** Same as Alternative 2 (Less than significant impacts).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		relevant components of the circulation system. Operation Impacts Daily trip contribution would be 0.30% to 0.60%. **Less than significant impact** would occur. Operation and maintenance activities would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness (Level of Service) for the performance of the circulation system, considering all modes of transportation including mass transit, and non-motorized travel and relevant components of the circulation system.	(2021,2022,2023). **Impacts will be less than significant.** Operation Impacts Daily trip contribution would be 0.20% to 0.30%, resulting in **less than significant** impacts.	
NOISE	***Construction Impacts*** None. ***Operation Impacts*** None.	***Construction Impacts*** All of the construction activity would occur during the hours of the day when construction noise would be exempt under the City of Norco Noise Ordinance, City of Eastvale Noise Ordinance and the County of Riverside Noise Ordinance. Construction activities associated with the non-native wildlife management would not result in an exposure of persons to or generation of noise levels in excess standards established in the local general plan	***Construction Impacts*** Compared to the Proposed Action, Alternative 3 would have substantially less excavation activities, a smaller construction footprint and, thus, less noise impacts resulting in impacts being **less than significant**. ***Operation Impacts*** Compared to the Proposed Action, Alternative 3 would have substantially less	***Construction Impacts*** Same as Alternative 2 (Less than significant impacts). ***Operation Impacts*** Same as Alternative 2 (Less than significant impacts).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		or noise ordinance, or applicable standards of other agencies. **Less than significant** impacts would occur. ***Operation Impacts*** No potential conflicts with local noise ordinances would occur during operations. **Less than significant** impacts would occur.	excavation activities, a smaller construction footprint and, thus, less noise impacts. **Less than significant** impacts would occur.	
AESTHETICS	***Construction Impacts*** No adverse impacts to existing scenic vistas would occur. Existing views surrounding the study area would not change. ***Operation Impacts*** None.	***Construction Impacts*** Construction activities would not have a substantial adverse effect on existing scenic vistas, site quality, or visual character of the Santa Ana River and the surrounding areas would return to their pre-construction condition and **would be less than significant.** ***Operation Impacts*** Same as above. Same as above.	***Construction Impacts*** Compared to the Alternative 2, no light and glare impacts would occur resulting in **less than significant impacts.** ***Operation Impacts*** Same as Alternative 2, but less construction and operation impact from sediment management. **Less than significant** impacts would occur.	***Construction Impacts*** Same as Alternative 2 (Less than significant impacts). ***Operation Impacts*** Same as Alternative 2 (Less than significant impacts).
PUBLIC HEALTH AND SAFETY, HAZARDOUS, TOXIC, RADIOACTIVE WASTE	***Construction Impacts*** Water would continue to be stored at elevation 498 feet during flood season and up to elevation	***Construction Impacts*** Implementation of the Non-Native Wildlife Management Measures would not involve the handling of any hazardous substances that could inadvertently be released into the	***Construction Impacts*** Same as Alternative 2, but less construction and operation impacts from sediment management. Less than	***Construction Impacts*** Same as Alternative 2 (Less than significant impacts).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	505 feet during the non-flood season in accordance with the Prado Dam Water Control Plan. In addition, no construction activity would occur as the Ecosystem Restoration Plan would not be implemented. Therefore, there would be no adverse impacts in creating a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. ***Operation Impacts*** Same as construction for Alternative 1.	environment. Therefore, **less than significant** impacts would occur that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. ***Operation Impacts*** Long-term operation and maintenance activities would involve regular inspection of the focal areas and the removal of non-native wildlife. These activities would be confined to specific areas for a short period of time. Additional adaptive management may include adjustments to cowbird control and fish and removal methods, level of effort, and/or trap locations. Therefore, long-term operation, maintenance, and adaptive management activities would not result in impacts that would create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.**(Less than significant).**	significant impacts would occur. ***Operation Impacts*** Same as Alternative 2, but less construction and operation impact from sediment management.	***Operation Impacts*** Same as Alternative 2 (Less than significant impacts).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE	***Construction Impacts*** No Adverse Impacts. Neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. ***Operation Impacts*** None.	***Construction Impacts*** Implementation of the ecosystem restoration measures would generate a limited amount of new employment opportunities within the study area. The majority of these employment opportunities would be expected to be filled by currently employed and unemployed labor force participants from the local and surrounding area and would not generate significant new increases in population levels or significantly increase housing demand within the study area. The proposed ecosystem restoration activities would be implemented within Riverside County, San Bernardino County and Orange County. This Alternative would not cause disproportionately adverse impacts to minority populations nor to low income households in these counties. Impacts would **be less than significant.** ***Operation Impacts*** Same impacts as that described in Construction Impacts **(less than significant)**	***Construction Impacts*** Compared to Alternative 2, there could be potentially fewer new employment opportunities and would not induce substantial population growth in an area within the study area resulting in **less than significant impacts**. ***Operation Impacts*** Compared to Alternative 2, there could be potentially fewer new employment opportunities and would not induce substantial population growth in an area within the study area resulting in **less than significant impacts**.	***Construction Impacts*** Same as Alternative 2 (Less than significant). ***Operation Impacts*** Same as Alternative 2 (Less than significant impacts).
CUMULATIVE IMPACTS	***Construction Impacts*** No Adverse Impacts.	Significant adverse long-term cumulative impacts have been	No significant adverse long-term cumulative impacts.	Same as Alternative 2 (Less than significant impacts).

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Neither the Water Conservation Plan nor the Ecosystem Restoration Plan would be implemented. **Operation Impacts** None.	identified for Water Resources and Water Quality. Significant adverse short-term and long-term cumulative impacts under CEQA have been identified for Air Quality.		