

Appendix 5B

Surface Water 2040 Analysis

This appendix presents potential changes to surface water resources that could result from the Delta Conveyance Project (project) alternatives under 2040 conditions. As described in Chapter 5, *Surface Water*, changes to surface water were quantified under 2020 conditions to define baseline conditions, although the project would not be fully operational until 2040. This appendix describes whether any of the trends documented in Chapter 5 would differ since project alternatives are expected to change under a 2040 analysis scenario (that incorporates climate change and sea level rise). Similar to Chapter 5, a description of potential changes to surface water resources are presented in this appendix to provide a basis for understanding the potential impacts to other surface water-related resources in this Final Environmental Impact Report (EIR). The analysis in this appendix is provided for informational purposes to help decision makers and the public better understand whether any of the modeling results documented in Chapter 5 would change when considered under future conditions when construction is complete, and the project is fully operational. This analysis also supports the Draft Environmental Impact Statement prepared by the U.S. Army Corps of Engineers. This analysis is not required by the California Environmental Quality Act (CEQA) and is not used to support the CEQA conclusions provided in Chapters 7 through 32.

While the 2040 analysis scenario includes facilities and programs that are represented in the existing conditions model, water supplies differ from existing conditions in order to represent projected changes due to climate change and sea level rise. Within the Sacramento River Basin, precipitation is expected to change under warming conditions, resulting in more frequent rainfall events and less frequent snowfall events (He et al. 2019:11). Less snowpack accumulation during the cool season (i.e., late autumn through early spring) will reduce the availability of snowmelt to sustain runoff during the warm season (i.e., late spring through early autumn). Moreover, warming temperatures will likely shift the timing and volume of this reduced snowmelt to earlier in the spring. These warming temperatures also contribute to sea level rise—which is primarily caused by thermal expansion of warming ocean water and melting of land ice. Recent modeling indicates that sea level at San Francisco (Golden Gate) tide gage is expected to increase from 0.08 foot (Representative Concentration Pathway [RCP] 8.5 modeling scenario, likely range with low risk aversion) to 1.8 feet (H++ modeling scenario, which is an extreme modeling scenario resulting from loss of the West Antarctic ice sheet) by 2040, and by as much as 3.4 feet (RCP 8.5 modeling scenario, likely range with medium-high risk aversion) to 10.2 feet (H++ modeling scenario) by 2100 (California Natural Resources Agency and California Ocean Protection Council 2018:18). It is expected that more land in the study area will be subject to inundation by 2100 in comparison to current conditions.

A more detailed description of the model and projected climate change conditions are included in Appendix 5A, *Modeling Technical Appendix*, and Chapter 30, *Climate Change*.

5B.1 No Project Alternative

Under the No Project Alternative, the State Water Project (SWP) and Central Valley Project (CVP) operations are assumed to continue in a manner similar to the operation under existing conditions.

California Department of Water Resources (DWR) and the Bureau of Reclamation would continue to operate the SWP and CVP to divert, store, and convey water consistent with applicable laws and contractual obligations.

The No Project Alternative encompasses programs adopted during the early stages of development of this Final EIR, facilities that are permitted or under construction during the early stages of development of the Final EIR, projects that are permitted or are assumed to be constructed by 2040, and changes due to climate change and sea level rise. A detailed description of the effects of climate change and sea level rise on system operations is discussed in Chapter 4, *Framework for the Environmental Analysis*, and Appendix 5A, *Modeling Technical Appendix*. Similarly, a detailed description of the modeling assumptions associated with the No Project Alternative is included in Appendix 5A.

The No Project Alternative analysis considered the range of programs and projects in the study area that might change surface water resources independent of the project. The existing regulatory environment is assumed unchanged, and actions required by the 2019 U.S. Fish and Wildlife Service and National Marine Fisheries Service Biological Opinions (BiOps) and the 2020 California Department of Fish and Wildlife Incidental Take Permit are also included in the No Project Alternative. A detailed description of the No Project Alternative assumptions for implementing the BiOps can be found in Appendix 3C, *Defining Existing Conditions, No Project Alternative, and Cumulative Impact Conditions*. Detailed assumptions for the SWP and CVP operations are represented in hydrological analytical models, as described in Appendix 5A.

The No Project Alternative also takes into account projects, plans, and programs that would be reasonably expected to occur in the foreseeable future. A list and description of actions included as part of the No Project Alternative is provided in Chapter 3, *Description of the Proposed Project and Alternatives*, and Appendix 3C. As described in Chapter 4, the No Project Alternative analyses focuses on describing the potential environmental impacts of constructing additional water-supply projects if the Delta Conveyance Project does not occur. However, none of these projects are expected to draw upon existing surface water resources and as such would not change surface water resources within the areas in which these projects are located.

5B.2 Comparison of Project Alternatives with No Project Conditions

5B.2.1 Changes to Sacramento River Basin Flows

The effect of the project alternatives on SWP and CVP Sacramento River Basin flows under 2040 conditions would be generally similar to what is described in Chapter 5, *Surface Water*. However, some of the changes that occurred for 2020 conditions (see Chapter 5) do not occur under 2040 conditions, and some additional differences in 2040 are noted here. While the reasons for the changes are largely the same as those presented in Chapter 5, X2 outflow requirements (i.e., “the Roe trigger,” described below) do cause differences under 2040 conditions that did not occur under 2020 conditions.

Similar to 2020, there are consistent decreases in flows throughout the year on the Sacramento River north of Courtland (i.e., downstream of the proposed north Delta intakes) in 2040 resulting

1 from operation of the proposed north Delta intakes. Summer decreases in flows are less, however,
2 because of reduced carriage savings as a result of differing salinity conditions in 2040 (which are
3 related to sea level rise). The summer decreases are also less pronounced on upstream tributaries
4 (i.e., the Sacramento River downstream of Keswick Reservoir, the Sacramento River at Bend Bridge,
5 the Feather River downstream of Thermalito Afterbay, and the American River at Watt Avenue) for
6 the same reason.

7 Winter and spring flows on the four tributaries noted above, as well as on the Trinity River
8 downstream of Lewiston Dam, exhibit changes similar to 2020 in certain month and water year type
9 combinations. The reasons for these changes are identical to what is described in Chapter 5. The
10 same operational shifts also cause some scattered changes in summer and fall flows on the Feather
11 River downstream of Thermalito Afterbay and the American River at Watt Avenue under 2040
12 conditions. In October, the flow increases on the Feather River downstream of Thermalito Afterbay
13 that were present in 2020 also appear in 2040, for the same reasons as in 2020. The October and
14 November minor increases in flows noted on the American River at Watt Avenue Bridge for 2020
15 are no longer present in 2040.

16 There are additional flow effects of the project alternatives under 2040 conditions that do not occur
17 in 2020, due to the differences in outflow requirements for X2 associated with the “Roe trigger.” The
18 Roe trigger is a condition in the State Water Resources Control Board D-1641 whereby the X2
19 standard at Roe Island (64 kilometers [km] upstream from the Golden Gate Bridge) is required to be
20 met in months when the prior month’s X2 location was just west of Roe Island. The Roe trigger
21 occurs less frequently for the project alternatives when compared to the No Project Alternative
22 because operation of the proposed north Delta intakes cause the location of X2 to move eastward in
23 some months. This leads to a few months in the model simulations where the X2 location is west of
24 Roe for the No Project Alternative and east of Roe for some or all of the project alternatives. If the
25 Roe trigger is met for the No Project Alternative but not for the project alternatives, then the Delta
26 outflow requirement to meet X2 will be much lower for the project alternatives in those months
27 because in the No Project Alternative, the X2 standard will be at Roe Island (64 km) while for the
28 project alternatives it will be at Chipps Island (74 km). With a lower Delta outflow requirement,
29 there is less need to make reservoir releases to meet X2 standards under the project alternatives,
30 which lowers flows on certain rivers. These flow changes can also lead to operational differences in
31 subsequent months, which can cause additional flow changes in those months.

32 While the Roe trigger shift also occurs under 2020 conditions, it has a much larger effect under 2040
33 conditions for two reasons. First, sea level rise leads to a greater difference in the flow needed to
34 meet the X2 standard at Roe Island compared to the standard at Chipps Island. If the triggering of
35 the Roe standard changes between alternatives, the resulting change in the Delta outflow
36 requirement will be much greater under 2040 conditions than it was under 2020 conditions.
37 Second, the number of days that the Roe standard has to be met in each month is determined by the
38 prior month’s Eight River Index (i.e., the sum of unimpaired flow on eight major rivers in the
39 Sacramento and San Joaquin River Basins). Under 2040 conditions, the Eight River Index is higher in
40 the late winter and early spring due to shifts in the timing of river flows under climate change, which
41 in turn affects X2 standards in subsequent months.

42 The flow changes caused by the Roe trigger shift occur in only a few years during the simulation
43 period, but are large enough to cause noticeable changes in flows in certain month and water year
44 type combinations. The reduced outflow requirements can cause reductions in flow in the
45 February–April period in below normal, dry, and/or critical years on the Sacramento River

1 downstream of Keswick Reservoir, the Sacramento River at Bend Bridge, the Feather River
2 downstream of Thermalito Afterbay, and the American River at Watt Avenue. The American River at
3 Watt Avenue also shows some increases in flows in the May–June period in drier years, which are
4 due to additional releases from Folsom Lake; the additional releases are a result of higher storage
5 resulting from the flow decreases just described in the February–April period.

6 Changes to simulated flows for all project alternatives (under 2040 conditions) and all water year
7 types that occur in the Sacramento River Basin are shown in Section 5B.3, *Sacramento River Basin*
8 *Flow Tables*, starting in Section 5B.3.1.1, *No Project Alternative*, through Section 5B.3.8.6, *Alternative*
9 *5*.

10 **5B.2.2 Changes to SWP and CVP Reservoir Storage**

11 The effect of the project alternatives on SWP and CVP reservoir storages under 2040 conditions
12 would be similar to what is described in Chapter 5, *Surface Water*, although for some alternatives
13 increases would be of a greater magnitude. Storages at SWP and CVP north-of-Delta reservoirs
14 averaged for all years and for dry/critical water years under the project alternatives are similar to
15 the No Project Alternative for all time periods examined (i.e., end of May, end of June, end of August,
16 and end of September). There are, however, more pronounced increases in end-of-September
17 storages in dry/critical years than occurred under 2020 conditions for alternatives with larger north
18 Delta diversion capacities. For San Luis reservoir, the changes in storage under 2040 conditions are
19 similar to under 2020 conditions. While the mechanisms and operating assumptions for these
20 changes remain largely the same as the analysis in Chapter 5, X2 outflow requirements (i.e., the Roe
21 trigger previously discussed) play a larger role than they did under 2020 conditions. The primary
22 effect of the Roe trigger on storages is that because the north-of-Delta reservoirs can reduce releases
23 in some situations because of lower X2 outflow requirements, storage increases for some
24 alternatives are more pronounced.

25 Changes to simulated SWP and CVP reservoir storage for all project alternatives (under 2040
26 conditions) are shown in Tables 5B-1 through 5B-5. Changes to simulated flows for all project
27 alternatives (under 2040 conditions) and all water year types that occur in the Sacramento River
28 Basin are shown in Tables 5B-6 through 5B-53.

1 **Table 5B-1. Changes to Trinity Lake Storage under the Project Alternatives (2040 Conditions)**

	No Project Alternative	Alternatives 2b, 4b		Alternatives 2c, 4c		Alternatives 1, 3		Alternatives 2a, 4a		Alternative 5	
	Reservoir Storage (TAF)	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA
End of May											
Long-Term Average ^a	1,809	1,813	0.2%	1,812	0.2%	1,817	0.4%	1,820	0.6%	1,817	0.4%
Dry/Critical Years ^b	1,341	1,350	0.6%	1,349	0.5%	1,359	1.3%	1,366	1.8%	1,359	1.3%
End of June											
Long-Term Average ^a	1,707	1,711	0.2%	1,711	0.2%	1,716	0.5%	1,719	0.7%	1,716	0.5%
Dry/Critical Years ^b	1,240	1,247	0.6%	1,248	0.6%	1,261	1.7%	1,270	2.4%	1,261	1.7%
End of August											
Long-Term Average ^a	1,436	1,439	0.2%	1,438	0.2%	1,443	0.5%	1,446	0.7%	1,443	0.5%
Dry/Critical Years ^b	954	960	0.7%	961	0.8%	973	2.0%	981	2.9%	973	2.0%
End of September											
Long-Term Average ^a	1,321	1,324	0.2%	1,324	0.2%	1,329	0.6%	1,331	0.7%	1,329	0.6%
Dry/Critical Years ^b	860	866	0.7%	868	0.8%	879	2.1%	884	2.8%	879	2.1%

2 CalSim 3 output variable: S_TRNTY.

3 NPA = No Project Alternative; TAF = thousand acre-feet.

4 ^a Long-term average is the average annual storage for the period October 1921–September 2015 simulated in CalSim 3.5 ^b Water year types are State Water Resources Control Board Water Right Decision 1641 Sacramento Valley 40-30-30 water year types as computed in CalSim 3 for the
6 period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

1 **Table 5B-2. Changes to Shasta Lake Storage under the Project Alternatives (2040 Conditions)**

	No Project Alternative	Alternatives 2b, 4b		Alternatives 2c, 4c		Alternatives 1, 3		Alternatives 2a, 4a		Alternative 5	
	Reservoir Storage (TAF)	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA
End of May											
Long-Term Average ^a	3,939	3,946	0.2%	3,947	0.2%	3,961	0.6%	3,966	0.7%	3,961	0.6%
Dry/Critical Years ^b	3,131	3,152	0.6%	3,153	0.7%	3,190	1.9%	3,205	2.3%	3,190	1.9%
End of June											
Long-Term Average ^a	3,627	3,633	0.2%	3,634	0.2%	3,648	0.6%	3,652	0.7%	3,648	0.6%
Dry/Critical Years ^b	2,751	2,767	0.6%	2,770	0.7%	2,807	2.0%	2,819	2.4%	2,807	2.0%
End of August											
Long-Term Average ^a	2,838	2,843	0.2%	2,843	0.2%	2,860	0.8%	2,865	0.9%	2,860	0.8%
Dry/Critical Years ^b	2,072	2,091	0.9%	2,093	1.0%	2,142	3.4%	2,162	4.4%	2,142	3.4%
End of September											
Long-Term Average ^a	2,715	2,720	0.2%	2,721	0.2%	2,737	0.8%	2,743	1.0%	2,737	0.8%
Dry/Critical Years ^b	2,004	2,023	0.9%	2,025	1.0%	2,074	3.5%	2,096	4.6%	2,074	3.5%

2 CalSim 3 output variable: C_SHSTA.

3 NPA = No Project Alternative; TAF = thousand acre-feet.

4 ^a Long-term average is the average annual storage for the period October 1921–September 2015 simulated in CalSim 3.5 ^b Water year types are State Water Resources Control Board Water Right Decision 1641 Sacramento Valley 40-30-30 water year types as computed in CalSim 3 for the
6 period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

1 **Table 5B-3. Changes to Lake Oroville Storage under the Project Alternatives (2040 Conditions)**

	No Project Alternative	Alternatives 2b, 4b		Alternatives 2c, 4c		Alternatives 1, 3		Alternatives 2a, 4a		Alternative 5	
	Reservoir Storage (TAF)	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA
End of May											
Long-Term Average ^a	2,870	2,869	0.0%	2,868	-0.1%	2,874	0.2%	2,875	0.2%	2,874	0.2%
Dry/Critical Years ^b	1,995	2,002	0.3%	1,997	0.1%	2,023	1.4%	2,024	1.4%	2,023	1.4%
End of June											
Long-Term Average ^a	2,546	2,545	0.0%	2,544	-0.1%	2,552	0.2%	2,552	0.3%	2,552	0.2%
Dry/Critical Years ^b	1,623	1,648	1.5%	1,644	1.3%	1,671	2.9%	1,671	2.9%	1,671	2.9%
End of August											
Long-Term Average ^a	1,717	1,725	0.5%	1,725	0.5%	1,730	0.8%	1,730	0.8%	1,730	0.8%
Dry/Critical Years ^b	1,042	1,052	1.0%	1,046	0.4%	1,064	2.1%	1,065	2.2%	1,064	2.1%
End of September											
Long-Term Average ^a	1,673	1,681	0.5%	1,681	0.5%	1,686	0.8%	1,687	0.8%	1,686	0.8%
Dry/Critical Years ^b	1,031	1,041	0.9%	1,035	0.3%	1,052	2.0%	1,053	2.1%	1,052	2.0%

2 CalSim 3 output variable: S_OROVL.

3 NPA = No Project Alternative; TAF = thousand acre-feet.

4 ^a Long-term average is the average annual storage for the period October 1921–September 2015 simulated in CalSim 3.5 ^b Water year types are State Water Resources Control Board Water Right Decision 1641 Sacramento Valley 40-30-30 water year types as computed in CalSim 3 for the
6 period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

1 **Table 5B-4. Changes to Folsom Lake Storage under the Project Alternatives (2040 Conditions)**

	No Project Alternative	Alternatives 2b, 4b		Alternatives 2c, 4c		Alternatives 1, 3		Alternatives 2a, 4a		Alternative 5	
	Reservoir Storage (TAF)	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA
End of May											
Long-Term Average ^a	808	809	0.2%	809	0.2%	813	0.7%	813	0.7%	813	0.7%
Dry/Critical Years ^b	541	546	0.9%	545	0.9%	557	3.0%	558	3.1%	557	3.0%
End of June											
Long-Term Average ^a	746	748	0.3%	748	0.3%	751	0.6%	751	0.8%	751	0.6%
Dry/Critical Years ^b	483	488	1.2%	488	1.1%	494	2.3%	496	2.8%	494	2.3%
End of August											
Long-Term Average ^a	526	528	0.4%	528	0.4%	530	0.8%	531	0.9%	530	0.8%
Dry/Critical Years ^b	328	333	1.6%	334	1.8%	339	3.2%	341	4.0%	339	3.2%
End of September											
Long-Term Average ^a	484	486	0.4%	486	0.4%	488	0.8%	489	0.9%	488	0.8%
Dry/Critical Years ^b	309	313	1.2%	314	1.5%	318	2.9%	320	3.5%	318	2.9%

2 CalSim 3 output variable: S_FOLSM.

3 NPA = No Project Alternative; TAF = thousand acre-feet.

4 ^a Long-term average is the average annual storage for the period October 1921–September 2015 simulated in CalSim 3.5 ^b Water year types are State Water Resources Control Board Water Right Decision 1641 Sacramento Valley 40-30-30 water year types as computed in CalSim 3 for the
6 period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

1 **Table 5B-5. Changes to San Luis Reservoir Total Storage under the Project Alternatives (2040 Conditions)**

	No Project Alternative	Alternatives 2b, 4b		Alternatives 2c, 4c		Alternatives 1, 3		Alternatives 2a, 4a		Alternative 5	
	Reservoir Storage (TAF)	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA	Reservoir Storage (TAF)	Percent Change from NPA
End of May											
Long-Term Average ^a	1,286	1,429	11.1%	1,454	13.1%	1,475	14.7%	1,495	16.2%	1,475	14.7%
Dry/Critical Years ^b	987	1,111	12.6%	1,133	14.8%	1,169	18.5%	1,201	21.7%	1,168	18.4%
End of June											
Long-Term Average ^a	1,048	1,163	10.9%	1,182	12.7%	1,198	14.2%	1,212	15.6%	1,197	14.2%
Dry/Critical Years ^b	802	876	9.2%	891	11.1%	919	14.6%	950	18.4%	919	14.6%
End of August											
Long-Term Average ^a	647	683	5.7%	689	6.6%	693	7.2%	695	7.5%	693	7.2%
Dry/Critical Years ^b	343	359	4.6%	362	5.5%	371	8.1%	384	11.8%	371	8.0%
End of September											
Long-Term Average ^a	558	570	2.1%	570	2.2%	571	2.3%	572	2.5%	571	2.2%
Dry/Critical Years ^b	365	361	-1.2%	359	-1.5%	362	-0.9%	377	3.2%	362	-0.9%

2 CalSim 3 output variable: S_SLUIS.

3 NPA = No Project Alternative; TAF = thousand acre-feet.

4 ^a Long-term average is the average annual storage for the period October 1921–September 2015 simulated in CalSim 3.

5 ^b Water year types are State Water Resources Control Board Water Right Decision 1641 Sacramento Valley 40-30-30 water year types as computed in CalSim 3 for the
6 period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3 Sacramento River Basin Flow Tables

5B.3.1 Trinity River Downstream of Lewiston Dam

5B.3.1.1 No Project Alternative

Table 5B-6. Trinity River Downstream of Lewiston Dam, Mean Monthly Flow under the No Project Alternative

Statistic	Trinity River Downstream of Lewiston Dam, Mean Monthly Flow (cfs)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	373	355	828	1,089	1,102	915	781	3,757	2,007	838	821	821
Water Year Types												
Wet Years	373	457	1,699	2,255	1,820	1,698	1,202	4,647	3,214	1,102	730	730
Above Normal Years	373	300	685	1,055	2,358	1,098	661	4,453	2,287	1,030	870	870
Below Normal Years	373	300	300	410	557	475	513	3,617	1,498	776	870	870
Dry Years	373	300	300	300	300	300	542	2,901	974	543	870	870
Critical Years	373	300	300	300	300	300	575	2,092	783	450	870	870
Dry/Critical Years ^b	373	300	300	300	300	300	557	2,528	886	500	870	870

CalSim 3 output variable: C_TRN111.

cfs = cubic feet per second.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.1.2 Alternatives 2b and 4b

Table 5B-7. Alternatives 2b and 4b, Percent Change from No Project Alternative for Trinity River Downstream of Lewiston Dam, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	-1%	1%	0%	0%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal Years	0%	0%	0%	-2%	1%	0%	0%	0%	0%	0%	0%	0%
Dry Years	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical Years	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry/Critical Years ^b	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_TRN111.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.1.3 Alternatives 2c and 4c

Table 5B-8. Alternatives 2c and 4c, Percent Change from No Project Alternative for Trinity River Downstream of Lewiston Dam, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	-1%	1%	0%	0%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	0%	0%	0%	-1%	1%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal Years	0%	0%	0%	-2%	1%	0%	0%	0%	0%	0%	0%	0%
Dry Years	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical Years	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry/Critical Years ^b	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_TRN111.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.1.4 Alternatives 1 and 3

Table 5B-9. Alternatives 1 and 3, Percent Change from No Project Alternative for Trinity River Downstream of Lewiston Dam, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	0%	15%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal Years	0%	0%	0%	-2%	1%	0%	0%	0%	0%	0%	0%	0%
Dry Years	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical Years	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry/Critical Years ^b	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_TRN111.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

1 **5B.3.1.5 Alternatives 2a and 4a**

2 **Table 5B-10. Alternatives 2a and 4a, Percent Change from No Project Alternative for Trinity River**
 3 **Downstream of Lewiston Dam, Mean Monthly Flow**

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	1%	0%	1%	-1%	0%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	0%	0%	1%	0%	1%	-1%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal Years	0%	0%	0%	-3%	1%	0%	0%	0%	0%	0%	0%	0%
Dry Years	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical Years	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry/Critical Years ^b	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

4 CalSim 3 output variable: C_TRN111.

5 ^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

6 ^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as
 7 computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water
 8 year types combined.

5B.3.1.6 Alternative 5

Table 5B-11. Alternative 5, Percent Change from No Project Alternative for Trinity River Downstream of Lewiston Dam, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	0%	15%	0%	0%	0%	0%	0%	0%	0%	0%
Below Normal Years	0%	0%	0%	-2%	1%	0%	0%	0%	0%	0%	0%	0%
Dry Years	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical Years	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry/Critical Years ^b	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_TRN111.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.2 Sacramento River Downstream of Keswick Reservoir

5B.3.2.1 No Project Alternative

Table 5B-12. Sacramento River Downstream of Keswick Reservoir, Mean Monthly Flow under the No Project Alternative

Sacramento River Downstream of Keswick Reservoir, Mean Monthly Flow (cfs)												
Statistic	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	5,770	5,654	8,064	9,801	12,319	9,589	6,936	7,913	9,881	12,584	9,423	6,542
Water Year Types												
Wet Years	5,947	6,749	13,622	18,605	21,452	16,973	9,022	7,362	8,538	13,444	10,337	8,629
Above Normal Years	6,007	5,533	8,056	10,513	16,687	7,895	5,328	8,982	10,783	13,682	9,877	8,032
Below Normal Years	5,793	4,743	5,317	4,674	7,158	5,689	5,837	8,294	10,235	12,589	8,976	5,215
Dry Years	5,528	5,452	3,570	3,385	4,994	5,662	6,234	8,367	10,648	11,295	8,608	4,804
Critical Years	5,340	4,943	3,978	3,651	3,655	3,584	5,601	7,273	11,233	10,894	8,487	4,592
Dry/Critical Years ^b	5,441	5,217	3,758	3,508	4,376	4,703	5,942	7,862	10,918	11,110	8,552	4,706

CalSim 3 output variable: C_KSWCK.

cfs = cubic feet per second.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.2.2 Alternatives 2b and 4b

Table 5B-13. Alternatives 2b and 4b, Percent Change from No Project Alternative for Sacramento River Downstream of Keswick Reservoir, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	-1%	0%	0%	-1%	1%	-1%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	-1%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	-1%	-1%	1%	0%	0%	1%	-1%	0%	0%	1%	1%	0%
Below Normal Years	0%	-1%	2%	-1%	-1%	3%	-2%	0%	0%	0%	0%	0%
Dry Years	-1%	-1%	-1%	0%	-9%	1%	-1%	0%	0%	0%	0%	0%
Critical Years	1%	0%	-1%	4%	-4%	0%	1%	0%	0%	1%	0%	0%
Dry/Critical Years ^b	0%	-1%	-1%	2%	-7%	1%	0%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_KSWCK.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.2.3 Alternatives 2c and 4c

Table 5B-14. Alternatives 2c and 4c, Percent Change from No Project Alternative for Sacramento River Downstream of Keswick Reservoir, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	-1%	1%	0%	-1%	1%	-1%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	-1%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	-1%	1%	0%	0%	1%	-1%	0%	0%	1%	1%	-1%
Below Normal Years	0%	-1%	2%	-1%	0%	3%	-2%	0%	0%	1%	1%	0%
Dry Years	0%	0%	0%	3%	-11%	1%	-5%	2%	0%	-1%	1%	0%
Critical Years	1%	2%	0%	4%	-1%	-1%	1%	0%	0%	0%	0%	0%
Dry/Critical Years ^b	0%	1%	0%	3%	-7%	0%	-3%	1%	0%	0%	0%	0%

CalSim 3 output variable: C_KSWCK.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.2.4 Alternatives 1 and 3

Table 5B-15. Alternatives 1 and 3, Percent Change from No Project Alternative for Sacramento River Downstream of Keswick Reservoir, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	1%	0%	-1%	1%	-2%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	-1%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	-1%
Above Normal Years	2%	0%	1%	0%	0%	1%	-1%	0%	0%	1%	1%	-1%
Below Normal Years	-1%	-1%	2%	0%	0%	3%	-5%	0%	0%	1%	1%	0%
Dry Years	0%	0%	2%	3%	-11%	1%	-7%	2%	-1%	0%	0%	0%
Critical Years	1%	2%	-1%	4%	-7%	0%	0%	0%	-1%	-1%	-2%	0%
Dry/Critical Years ^b	0%	1%	0%	4%	-10%	1%	-4%	1%	-1%	-1%	-1%	0%

CalSim 3 output variable: C_KSWCK.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.2.5 Alternatives 2a and 4a

Table 5B-16. Alternatives 2a and 4a, Percent Change from No Project Alternative for Sacramento River Downstream of Keswick Reservoir, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	1%	1%	-1%	1%	-3%	1%	0%	0%	0%	0%
Water Year Types												
Wet Years	-2%	-1%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Above Normal Years	2%	1%	1%	0%	0%	1%	-3%	0%	0%	1%	2%	0%
Below Normal Years	0%	-1%	2%	1%	1%	4%	-7%	0%	0%	1%	1%	0%
Dry Years	0%	1%	2%	4%	-11%	-4%	-9%	4%	0%	0%	-2%	1%
Critical Years	1%	2%	-2%	5%	-7%	0%	0%	0%	-1%	-2%	-3%	0%
Dry/Critical Years ^b	0%	1%	0%	5%	-10%	-2%	-5%	2%	0%	-1%	-3%	1%

CalSim 3 output variable: C_KSWCK.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.2.6 Alternative 5

Table 5B-17. Alternative 5, Percent Change from No Project Alternative for Sacramento River Downstream of Keswick Reservoir, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	1%	0%	-1%	1%	-2%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	-1%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	-1%
Above Normal Years	2%	0%	1%	0%	0%	1%	-1%	0%	0%	1%	1%	-1%
Below Normal Years	-1%	-1%	2%	0%	0%	3%	-5%	0%	0%	1%	1%	0%
Dry Years	0%	0%	2%	3%	-11%	1%	-7%	2%	-1%	0%	0%	0%
Critical Years	1%	2%	-1%	4%	-7%	0%	0%	0%	-1%	-1%	-2%	0%
Dry/Critical Years ^b	0%	1%	0%	4%	-10%	1%	-4%	1%	-1%	-1%	-1%	0%

CalSim 3 output variable: C_KSWCK.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.3 Sacramento River at Bend Bridge

5B.3.3.1 No Project Alternative

Table 5B-18. Sacramento River at Bend Bridge, Mean Monthly Flow under the No Project Alternative

Statistic	Sacramento River at Bend Bridge, Mean Monthly Flow (cfs)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	6,507	7,482	13,131	16,733	19,966	15,637	10,488	9,488	10,701	12,851	9,758	7,119
Water Year Types												
Wet Years	6,756	9,232	22,165	30,811	32,604	26,122	14,932	9,791	9,833	13,888	10,724	9,229
Above Normal Years	6,834	7,577	13,661	17,535	25,990	14,756	8,571	10,774	11,497	13,856	10,305	8,663
Below Normal Years	6,546	6,548	8,317	9,052	13,171	10,022	8,730	9,552	10,890	12,809	9,329	5,876
Dry Years	6,138	6,446	6,324	6,645	10,102	9,873	7,719	9,231	11,153	11,402	8,835	5,188
Critical Years	5,920	5,836	6,258	5,826	6,922	6,351	6,743	7,851	11,552	11,030	8,700	5,102
Dry/Critical Years ^b	6,038	6,164	6,294	6,267	8,634	8,247	7,269	8,595	11,337	11,230	8,773	5,148

CalSim 3 output variable: C_SAC257.

cfs = cubic feet per second.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.3.2 Alternatives 2b and 4b

Table 5B-19. Alternatives 2b and 4b, Percent Change from No Project Alternative for Sacramento River at Bend Bridge, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	-1%	1%	0%	0%	0%	-1%	0%	0%	1%	1%	0%
Below Normal Years	0%	-1%	1%	0%	0%	2%	-1%	0%	0%	0%	0%	0%
Dry Years	-1%	-1%	-1%	0%	-4%	1%	-1%	0%	0%	0%	0%	0%
Critical Years	1%	0%	-1%	2%	-2%	0%	1%	0%	0%	1%	0%	0%
Dry/Critical Years ^b	0%	0%	-1%	1%	-3%	1%	0%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_SAC257.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.3.3 Alternatives 2c and 4c

Table 5B-20. Alternatives 2c and 4c, Percent Change from No Project Alternative for Sacramento River at Bend Bridge, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	0%	0%	-1%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	-1%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	-1%	1%	0%	0%	0%	-1%	0%	0%	1%	1%	-1%
Below Normal Years	0%	-1%	1%	0%	0%	2%	-1%	0%	0%	1%	1%	0%
Dry Years	0%	0%	0%	2%	-5%	1%	-4%	1%	0%	-1%	1%	0%
Critical Years	1%	2%	0%	2%	-1%	-1%	1%	0%	0%	0%	0%	0%
Dry/Critical Years ^b	0%	1%	0%	2%	-4%	0%	-2%	1%	0%	0%	0%	0%

CalSim 3 output variable: C_SAC257.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.3.4 Alternatives 1 and 3

Table 5B-21. Alternatives 1 and 3, Percent Change from No Project Alternative for Sacramento River at Bend Bridge, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	-1%	1%	-1%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-1%
Above Normal Years	1%	0%	1%	0%	0%	0%	-1%	0%	0%	1%	1%	-1%
Below Normal Years	-1%	-1%	1%	0%	0%	2%	-3%	0%	0%	1%	1%	0%
Dry Years	0%	0%	1%	2%	-5%	1%	-5%	2%	-1%	0%	0%	0%
Critical Years	1%	1%	-1%	2%	-4%	0%	0%	0%	-1%	-1%	-2%	0%
Dry/Critical Years ^b	0%	0%	0%	2%	-5%	1%	-3%	1%	-1%	-1%	-1%	0%

CalSim 3 output variable: C_SAC257.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.3.5 Alternatives 2a and 4a

Table 5B-22. Alternatives 2a and 4a, Percent Change from No Project Alternative for Sacramento River at Bend Bridge, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	-1%	1%	-2%	1%	0%	0%	0%	0%
Water Year Types												
Wet Years	-1%	-1%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Above Normal Years	2%	1%	0%	0%	0%	0%	-2%	0%	0%	1%	2%	0%
Below Normal Years	0%	0%	1%	1%	0%	2%	-5%	0%	0%	1%	1%	0%
Dry Years	0%	0%	1%	2%	-5%	-2%	-7%	3%	0%	0%	-2%	1%
Critical Years	1%	2%	-1%	3%	-4%	0%	0%	0%	-1%	-2%	-3%	0%
Dry/Critical Years ^b	0%	1%	0%	3%	-5%	-1%	-4%	2%	0%	-1%	-2%	1%

CalSim 3 output variable: C_SAC257.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.3.6 Alternative 5

Table 5B-23. Alternative 5, Percent Change from No Project Alternative for Sacramento River at Bend Bridge, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	-1%	1%	-1%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-1%
Above Normal Years	1%	0%	1%	0%	0%	0%	-1%	0%	0%	1%	1%	-1%
Below Normal Years	-1%	-1%	1%	0%	0%	2%	-3%	0%	0%	1%	1%	0%
Dry Years	0%	0%	1%	2%	-5%	1%	-5%	2%	-1%	0%	0%	0%
Critical Years	1%	1%	-1%	2%	-4%	0%	0%	0%	-1%	-1%	-2%	0%
Dry/Critical Years ^b	0%	0%	0%	2%	-5%	1%	-3%	1%	-1%	-1%	-1%	0%

CalSim 3 output variable: C_SAC257.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.4 Yolo Bypass at Fremont Weir

5B.3.4.1 No Project Alternative

Table 5B-24. Yolo Bypass at Fremont Weir, Mean Monthly Flow under the No Project Alternative

Statistic	Yolo Bypass at Fremont Weir, Mean Monthly Flow (cfs)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	24	268	4,650	11,341	13,605	9,862	2,530	0	0	0	0	0
Water Year Types												
Wet Years	67	764	11,379	28,525	30,477	23,149	6,361	0	0	0	0	0
Above Normal Years	0	0	3,153	7,502	16,541	9,259	983	0	0	0	0	0
Below Normal Years	0	0	1,096	1,682	3,708	1,998	681	0	0	0	0	0
Dry Years	0	0	124	852	1,591	1,558	89	0	0	0	0	0
Critical Years	0	0	253	129	467	501	13	0	0	0	0	0
Dry/Critical Years ^b	0	0	183	519	1,072	1,070	54	0	0	0	0	0

CalSim 3 output variable: C_YBP037.

cfs = cubic feet per second.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.4.2 Alternatives 2b and 4b

Table 5B-25. Alternatives 2b and 4b, Percent Change from No Project Alternative for Yolo Bypass at Fremont Weir, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-3%	1%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	-3%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	3%	0%	-1%	1%	0%	0%	0%	0%	0%	0%
Below Normal Years	0%	0%	-1%	-1%	0%	8%	-1%	0%	0%	0%	0%	0%
Dry Years	0%	0%	-3%	0%	-3%	0%	4%	0%	0%	0%	0%	0%
Critical Years	0%	0%	0%	0%	-1%	0%	12%	0%	0%	0%	0%	0%
Dry/Critical Years ^b	0%	0%	-1%	0%	-3%	0%	5%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_YBP037.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.4.3 Alternatives 2c and 4c

Table 5B-26. Alternatives 2c and 4c, Percent Change from No Project Alternative for Yolo Bypass at Fremont Weir, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-3%	1%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	-3%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	3%	-1%	0%	1%	1%	0%	0%	0%	0%	0%
Below Normal Years	0%	0%	-1%	-1%	1%	8%	-1%	0%	0%	0%	0%	0%
Dry Years	0%	0%	-3%	1%	-6%	0%	-3%	0%	0%	0%	0%	0%
Critical Years	0%	0%	2%	0%	0%	0%	15%	0%	0%	0%	0%	0%
Dry/Critical Years ^b	0%	0%	0%	1%	-5%	0%	-1%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_YBP037.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.4.4 Alternatives 1 and 3

Table 5B-27. Alternatives 1 and 3, Percent Change from No Project Alternative for Yolo Bypass at Fremont Weir, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-10%	1%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	-10%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	2%	-1%	-1%	1%	1%	0%	0%	0%	0%	0%
Below Normal Years	0%	0%	-1%	0%	1%	8%	-2%	0%	0%	0%	0%	0%
Dry Years	0%	0%	-3%	1%	-6%	0%	-3%	0%	0%	0%	0%	0%
Critical Years	0%	0%	0%	0%	-3%	0%	-58%	0%	0%	0%	0%	0%
Dry/Critical Years ^b	0%	0%	-1%	1%	-5%	0%	-9%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_YBP037.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.4.5 Alternatives 2a and 4a

Table 5B-28. Alternatives 2a and 4a, Percent Change from No Project Alternative for Yolo Bypass at Fremont Weir, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-9%	-1%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	-9%	-1%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	3%	-1%	0%	2%	0%	0%	0%	0%	0%	0%
Below Normal Years	0%	0%	-1%	2%	1%	10%	-3%	0%	0%	0%	0%	0%
Dry Years	0%	0%	-2%	2%	-6%	-1%	-11%	0%	0%	0%	0%	0%
Critical Years	0%	0%	0%	0%	-3%	0%	-55%	0%	0%	0%	0%	0%
Dry/Critical Years ^b	0%	0%	-1%	1%	-5%	-1%	-16%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_YBP037.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.4.6 Alternative 5

Table 5B-29. Alternative 5, Percent Change from No Project Alternative for Sacramento River at Yolo Bypass at Fremont Weir, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-10%	1%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	-10%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	2%	-1%	-1%	1%	1%	0%	0%	0%	0%	0%
Below Normal Years	0%	0%	-1%	0%	1%	8%	-2%	0%	0%	0%	0%	0%
Dry Years	0%	0%	-3%	1%	-6%	0%	-3%	0%	0%	0%	0%	0%
Critical Years	0%	0%	0%	0%	-3%	0%	-58%	0%	0%	0%	0%	0%
Dry/Critical Years ^b	0%	0%	-1%	1%	-5%	0%	-9%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_YBP037.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.5 Sacramento River at Freeport, Upstream of Proposed North Delta Intakes

5B.3.5.1 No Project Alternative

Table 5B-30. Sacramento River at Freeport, Mean Monthly Flow under the No Project Alternative

Statistic	Sacramento River at Freeport, Mean Monthly Flow (cfs)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	9,793	12,970	23,876	32,244	38,269	33,740	22,895	15,906	13,386	15,010	12,452	12,140
Water Year Types												
Wet Years	11,106	17,542	39,085	53,927	58,117	51,253	36,222	22,405	14,651	17,983	16,153	16,335
Above Normal Years	10,745	13,222	23,111	38,251	47,479	43,719	20,522	17,751	15,647	17,480	14,072	14,719
Below Normal Years	9,488	11,281	16,389	20,492	29,031	23,721	17,558	13,571	13,046	15,312	11,229	10,121
Dry Years	8,634	9,392	12,855	16,188	22,731	21,746	13,565	10,810	12,465	10,834	8,761	8,253
Critical Years	7,484	8,040	11,705	12,306	14,923	13,792	10,470	7,652	10,021	9,202	8,015	7,580
Dry/Critical Years ^b	8,103	8,768	12,324	14,396	19,127	18,075	12,136	9,353	11,337	10,081	8,416	7,943

CalSim 3 output variable: C_SAC049.

cfs = cubic feet per second.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.5.2 Alternatives 2b and 4b

Table 5B-31. Alternatives 2b and 4b, Percent Change from No Project Alternative for Sacramento River at Freeport, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Water Year Types												
Wet Years	-1%	0%	0%	0%	0%	0%	0%	0%	1%	-2%	-1%	0%
Above Normal Years	2%	0%	0%	0%	0%	0%	0%	0%	0%	-2%	3%	0%
Below Normal Years	1%	0%	1%	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Dry Years	-1%	1%	0%	0%	-3%	-2%	-1%	3%	-3%	1%	3%	0%
Critical Years	2%	1%	0%	1%	-1%	0%	1%	0%	-1%	0%	0%	0%
Dry/Critical Years ^b	0%	1%	0%	1%	-2%	-1%	0%	2%	-2%	0%	2%	0%

CalSim 3 output variable: C_SAC049.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.5.3 Alternatives 2c and 4c

Table 5B-32. Alternatives 2c and 4c, Percent Change from No Project Alternative for Sacramento River at Freeport, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	1%	0%	0%	0%	0%	0%	0%	1%	0%	-1%	0%	0%
Water Year Types												
Wet Years	0%	0%	0%	0%	0%	0%	0%	0%	1%	-2%	-2%	0%
Above Normal Years	3%	1%	0%	0%	0%	0%	0%	0%	0%	-2%	3%	0%
Below Normal Years	1%	0%	1%	0%	0%	0%	0%	0%	0%	-1%	1%	-1%
Dry Years	-1%	1%	0%	1%	-3%	-2%	-3%	5%	-3%	1%	3%	0%
Critical Years	2%	3%	1%	1%	0%	0%	1%	0%	-1%	0%	0%	0%
Dry/Critical Years ^b	0%	2%	1%	1%	-2%	-1%	-1%	3%	-2%	0%	2%	0%

CalSim 3 output variable: C_SAC049.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.5.4 Alternatives 1 and 3

Table 5B-33. Alternatives 1 and 3, Percent Change from No Project Alternative for Sacramento River at Freeport, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	1%	0%	0%	0%	0%	0%	-1%	1%	0%	-1%	0%	0%
Water Year Types												
Wet Years	0%	0%	0%	0%	0%	0%	0%	0%	1%	-2%	-1%	0%
Above Normal Years	4%	1%	1%	0%	0%	0%	0%	0%	0%	-2%	3%	0%
Below Normal Years	1%	0%	1%	0%	0%	0%	-2%	0%	0%	-1%	1%	0%
Dry Years	-1%	1%	1%	1%	-3%	-2%	-6%	4%	-3%	1%	4%	1%
Critical Years	2%	2%	0%	1%	-1%	0%	-3%	0%	-1%	-1%	-2%	0%
Dry/Critical Years ^b	0%	1%	1%	1%	-2%	-1%	-5%	3%	-2%	0%	2%	0%

CalSim 3 output variable: C_SAC049.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.5.5 Alternatives 2a and 4a

Table 5B-34. Alternatives 2a and 4a, Percent Change from No Project Alternative for Sacramento River at Freeport, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	1%	0%	0%	0%	0%	0%	-1%	1%	0%	-1%	0%	0%
Water Year Types												
Wet Years	-1%	-1%	0%	0%	0%	0%	0%	0%	1%	-2%	-1%	0%
Above Normal Years	4%	1%	1%	0%	0%	0%	-1%	0%	0%	-2%	3%	0%
Below Normal Years	1%	0%	1%	0%	0%	0%	-2%	0%	0%	-1%	1%	-1%
Dry Years	0%	1%	1%	1%	-3%	-3%	-6%	7%	-3%	1%	2%	1%
Critical Years	1%	3%	0%	2%	-1%	0%	-3%	0%	0%	-2%	-2%	0%
Dry/Critical Years ^b	0%	2%	0%	1%	-2%	-2%	-5%	4%	-2%	0%	0%	1%

CalSim 3 output variable: C_SAC049.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.5.6 Alternative 5

Table 5B-35. Alternative 5, Percent Change from No Project Alternative for Sacramento River at Freeport, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	1%	0%	0%	0%	0%	0%	-1%	1%	0%	-1%	0%	0%
Water Year Types												
Wet Years	0%	0%	0%	0%	0%	0%	0%	0%	1%	-2%	-1%	0%
Above Normal Years	4%	1%	1%	0%	0%	0%	0%	0%	0%	-2%	3%	0%
Below Normal Years	1%	0%	1%	0%	0%	0%	-2%	0%	0%	-1%	1%	0%
Dry Years	-1%	1%	1%	1%	-3%	-2%	-6%	4%	-3%	1%	4%	1%
Critical Years	2%	2%	0%	1%	-1%	0%	-3%	0%	-1%	-1%	-2%	0%
Dry/Critical Years ^b	0%	1%	1%	1%	-2%	-1%	-5%	3%	-2%	0%	2%	0%

CalSim 3 output variable: C_SAC049.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.6 Sacramento River North of Courtland, Downstream of the Proposed North Delta Intakes

5B.3.6.1 No Project Alternative

Table 5B-36. Sacramento River North of Courtland, Mean Monthly Flow under the No Project Alternative

Statistic	Sacramento River North of Courtland, Mean Monthly Flow (cfs)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	10,259	13,448	24,488	32,881	39,024	34,321	23,392	16,319	13,791	15,397	12,856	12,583
Water Year Types												
Wet Years	11,591	18,079	39,827	54,718	58,929	51,895	36,763	22,822	15,058	18,373	16,560	16,776
Above Normal Years	11,222	13,708	23,700	38,936	48,304	44,277	20,979	18,159	16,052	17,869	14,477	15,158
Below Normal Years	9,942	11,747	16,940	21,060	29,747	24,269	18,048	13,985	13,449	15,698	11,632	10,574
Dry Years	9,081	9,818	13,380	16,706	23,447	22,288	14,043	11,219	12,867	11,218	9,162	8,689
Critical Years	7,936	8,438	12,211	12,767	15,594	14,341	10,921	8,066	10,427	9,586	8,415	8,017
Dry/Critical Years ^b	8,553	9,181	12,840	14,888	19,823	18,620	12,602	9,764	11,741	10,465	8,817	8,379

CalSim 3 output variable: C_SAC041.

cfs = cubic feet per second.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.6.2 Alternatives 2b and 4b

Table 5B-37. Alternatives 2b and 4b, Percent Change from No Project Alternative for Sacramento River North of Courtland, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-3%	-6%	-4%	-5%	-4%	-4%	-1%	-1%	0%	-1%	0%	-2%
Water Year Types												
Wet Years	-4%	-6%	-4%	-4%	-2%	-2%	-1%	-2%	0%	-2%	-1%	0%
Above Normal Years	-5%	-7%	-6%	-5%	-4%	-5%	-1%	-1%	0%	-2%	3%	0%
Below Normal Years	0%	-7%	-4%	-7%	-5%	-7%	-1%	0%	0%	-1%	0%	-7%
Dry Years	-1%	-3%	-6%	-8%	-10%	-8%	0%	2%	-3%	0%	3%	0%
Critical Years	-3%	-1%	-4%	-4%	-5%	-4%	1%	0%	-1%	0%	0%	0%
Dry/Critical Years ^b	-2%	-2%	-5%	-6%	-9%	-6%	0%	1%	-2%	0%	2%	0%

CalSim 3 output variable: C_SAC041.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.6.3 Alternatives 2c and 4c

Table 5B-38. Alternatives 2c and 4c, Percent Change from No Project Alternative for Sacramento River North of Courtland, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-2%	-7%	-6%	-6%	-5%	-5%	-1%	-1%	0%	-1%	0%	-2%
Water Year Types												
Wet Years	-4%	-7%	-6%	-5%	-3%	-3%	-1%	-2%	0%	-2%	-2%	0%
Above Normal Years	-3%	-9%	-8%	-6%	-5%	-7%	-1%	-1%	0%	-2%	3%	0%
Below Normal Years	0%	-8%	-5%	-9%	-7%	-9%	-1%	0%	0%	-1%	1%	-8%
Dry Years	-1%	-3%	-6%	-9%	-12%	-9%	-3%	4%	-3%	1%	3%	0%
Critical Years	-3%	1%	-4%	-4%	-5%	-5%	1%	0%	-1%	0%	0%	0%
Dry/Critical Years ^b	-2%	-2%	-5%	-7%	-10%	-8%	-1%	3%	-2%	0%	2%	0%

CalSim 3 output variable: C_SAC041.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.6.4 Alternatives 1 and 3

Table 5B-39. Alternatives 1 and 3, Percent Change from No Project Alternative for Sacramento River North of Courtland, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-3%	-7%	-7%	-7%	-5%	-6%	-2%	-1%	-1%	-1%	0%	-2%
Water Year Types												
Wet Years	-5%	-7%	-7%	-6%	-3%	-3%	-1%	-2%	0%	-2%	-2%	0%
Above Normal Years	-3%	-10%	-8%	-7%	-6%	-8%	-1%	-1%	0%	-2%	3%	0%
Below Normal Years	0%	-9%	-6%	-10%	-8%	-11%	-3%	0%	0%	-1%	1%	-9%
Dry Years	-1%	-4%	-6%	-10%	-13%	-12%	-5%	4%	-3%	1%	4%	-1%
Critical Years	-3%	0%	-5%	-5%	-6%	-5%	-3%	0%	-1%	-1%	-2%	0%
Dry/Critical Years ^b	-2%	-2%	-5%	-8%	-11%	-10%	-4%	3%	-2%	0%	2%	0%

CalSim 3 output variable: C_SAC041.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.6.5 Alternatives 2a and 4a

Table 5B-40. Alternatives 2a and 4a, Percent Change from No Project Alternative for Sacramento River North of Courtland, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-3%	-7%	-7%	-8%	-6%	-7%	-2%	-1%	-1%	-1%	0%	-2%
Water Year Types												
Wet Years	-5%	-8%	-7%	-7%	-3%	-3%	-1%	-2%	0%	-2%	-2%	0%
Above Normal Years	-3%	-10%	-9%	-8%	-6%	-9%	-1%	0%	0%	-2%	3%	0%
Below Normal Years	0%	-9%	-7%	-10%	-9%	-12%	-3%	0%	0%	-1%	1%	-9%
Dry Years	-1%	-4%	-6%	-11%	-14%	-15%	-6%	6%	-3%	1%	2%	-1%
Critical Years	-3%	0%	-6%	-4%	-7%	-6%	-3%	0%	0%	-2%	-2%	0%
Dry/Critical Years ^b	-2%	-2%	-6%	-8%	-12%	-12%	-5%	4%	-2%	0%	0%	0%

CalSim 3 output variable: C_SAC041.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

1 5B.3.6.6 Alternative 5

2 **Table 5B-41. Alternative 5, Percent Change from No Project Alternative for Sacramento River North of**
 3 **Courtland, Mean Monthly Flow**

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-3%	-7%	-7%	-7%	-6%	-6%	-2%	-1%	-1%	-1%	0%	-2%
Water Year Types												
Wet Years	-5%	-8%	-7%	-6%	-3%	-3%	-1%	-2%	0%	-2%	-2%	-1%
Above Normal Years	-3%	-10%	-9%	-7%	-6%	-8%	-1%	0%	0%	-2%	3%	0%
Below Normal Years	0%	-9%	-6%	-10%	-9%	-11%	-3%	0%	0%	-1%	1%	-9%
Dry Years	-1%	-4%	-6%	-10%	-13%	-12%	-5%	4%	-3%	1%	4%	-1%
Critical Years	-3%	0%	-5%	-5%	-6%	-5%	-3%	0%	-1%	-1%	-2%	0%
Dry/Critical Years ^b	-2%	-2%	-5%	-8%	-11%	-10%	-4%	3%	-2%	0%	2%	0%

4 CalSim 3 output variable: C_SAC041.

5 ^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

6 ^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as
 7 computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water
 8 year types combined.

5B.3.7 Feather River Downstream of Thermalito Afterbay

5B.3.7.1 No Project Alternative

Table 5B-42. Feather River Downstream of Thermalito Afterbay, Mean Monthly Flow under the No Project Alternative

Statistic	Feather River Downstream of Thermalito Afterbay, Mean Monthly Flow (cfs)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	2,270	1,855	2,985	5,396	7,085	7,474	3,951	2,687	5,242	6,970	4,748	1,776
Water Year Types												
Wet Years	2,372	2,441	5,889	12,487	14,980	15,793	7,340	3,115	4,888	8,224	6,396	2,937
Above Normal Years	2,525	1,711	1,605	3,178	9,638	8,516	2,435	3,169	6,451	8,502	5,643	2,428
Below Normal Years	2,458	1,535	1,588	1,352	1,956	2,477	1,755	2,746	5,645	7,597	4,305	1,022
Dry Years	2,344	1,508	1,238	1,233	1,502	1,874	2,527	2,462	5,735	4,681	2,789	869
Critical Years	1,307	1,452	1,099	1,177	1,084	1,175	2,182	1,286	3,864	3,685	2,789	789
Dry/Critical Years ^b	1,865	1,482	1,174	1,207	1,309	1,551	2,368	1,919	4,872	4,222	2,789	832

CalSim 3 output variable: C_FTR063+C_TAB000.

cfs = cubic feet per second.

^a Long-Term Average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.7.2 Alternatives 2b and 4b

Table 5B-43. Alternatives 2b and 4b, Percent Change from No Project Alternative for Feather River Downstream of Thermalito Afterbay, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	3%	1%	3%	0%	-1%	0%	0%	1%	0%	-3%	1%	-1%
Water Year Types												
Wet Years	-1%	-1%	2%	0%	0%	0%	0%	1%	5%	-5%	-2%	1%
Above Normal Years	11%	0%	8%	-1%	-1%	1%	0%	0%	0%	-6%	9%	-1%
Below Normal Years	5%	2%	4%	0%	-2%	1%	0%	2%	0%	-2%	2%	-7%
Dry Years	0%	8%	5%	0%	-18%	-10%	1%	1%	-7%	3%	9%	0%
Critical Years	4%	-2%	0%	1%	0%	0%	4%	-2%	-3%	0%	1%	0%
Dry/Critical Years ^b	2%	3%	3%	0%	-11%	-6%	2%	0%	-5%	2%	5%	0%

CalSim 3 output variable: C_FTR063+C_TAB000.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.7.3 Alternatives 2c and 4c

Table 5B-44. Alternatives 2c and 4c, Percent Change from No Project Alternative for Feather River Downstream of Thermalito Afterbay, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	4%	1%	2%	-1%	-1%	0%	0%	1%	0%	-3%	1%	-1%
Water Year Types												
Wet Years	1%	-1%	2%	0%	0%	0%	0%	1%	5%	-5%	-4%	1%
Above Normal Years	17%	0%	8%	-5%	-1%	1%	1%	0%	0%	-6%	8%	-1%
Below Normal Years	6%	2%	3%	0%	-2%	1%	-1%	2%	0%	-2%	4%	-8%
Dry Years	-1%	8%	5%	0%	-18%	-10%	-5%	6%	-8%	4%	11%	0%
Critical Years	6%	4%	3%	1%	-2%	3%	4%	0%	-2%	-1%	0%	1%
Dry/Critical Years ^b	1%	6%	4%	0%	-12%	-5%	-1%	4%	-6%	2%	6%	1%

CalSim 3 output variable: C_FTR063+C_TAB000.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.7.4 Alternatives 1 and 3

Table 5B-45. Alternatives 1 and 3, Percent Change from No Project Alternative for Feather River Downstream of Thermalito Afterbay, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	4%	1%	2%	-1%	-1%	0%	-2%	2%	0%	-3%	2%	-1%
Water Year Types												
Wet Years	1%	-1%	2%	0%	0%	0%	0%	1%	4%	-5%	-3%	1%
Above Normal Years	18%	0%	6%	-4%	-1%	1%	1%	0%	0%	-6%	7%	-1%
Below Normal Years	6%	2%	3%	0%	-3%	-1%	-2%	4%	-1%	-3%	5%	-8%
Dry Years	0%	8%	5%	0%	-18%	-10%	-11%	6%	-8%	5%	17%	0%
Critical Years	6%	2%	0%	0%	-2%	0%	-7%	0%	-3%	-1%	1%	0%
Dry/Critical Years ^b	2%	5%	3%	0%	-12%	-7%	-9%	4%	-6%	3%	9%	0%

CalSim 3 output variable: C_FTR063+C_TAB000.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.7.5 Alternatives 2a and 4a

Table 5B-46. Alternatives 2a and 4a, Percent Change from No Project Alternative for Feather River Downstream of Thermalito Afterbay, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	5%	1%	2%	-1%	-1%	0%	-1%	3%	0%	-3%	2%	-1%
Water Year Types												
Wet Years	2%	-1%	2%	-1%	0%	0%	0%	1%	4%	-5%	-3%	1%
Above Normal Years	17%	0%	8%	-3%	-1%	1%	1%	0%	0%	-6%	6%	-1%
Below Normal Years	6%	2%	3%	0%	-3%	0%	-2%	4%	0%	-3%	3%	-8%
Dry Years	-1%	7%	5%	0%	-18%	-17%	-10%	11%	-8%	4%	17%	0%
Critical Years	4%	3%	0%	0%	-2%	0%	-6%	0%	-2%	-1%	1%	0%
Dry/Critical Years ^b	1%	5%	3%	0%	-12%	-11%	-8%	7%	-6%	2%	10%	0%

CalSim 3 output variable: C_FTR063+C_TAB000.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.7.6 Alternative 5

Table 5B-47. Alternative 5, Percent Change from No Project Alternative for Feather River Downstream of Thermalito Afterbay, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	4%	1%	2%	-1%	-1%	0%	-2%	2%	0%	-3%	2%	-1%
Water Year Types												
Wet Years	1%	-1%	2%	0%	0%	0%	0%	1%	4%	-5%	-3%	1%
Above Normal Years	18%	0%	6%	-4%	-1%	1%	1%	0%	0%	-6%	7%	-1%
Below Normal Years	6%	2%	4%	0%	-3%	-1%	-2%	4%	-1%	-4%	5%	-8%
Dry Years	0%	8%	5%	0%	-18%	-10%	-11%	6%	-8%	5%	17%	0%
Critical Years	6%	2%	0%	0%	-2%	0%	-7%	0%	-3%	-1%	1%	0%
Dry/Critical Years ^b	2%	5%	3%	0%	-12%	-7%	-9%	4%	-6%	3%	9%	0%

CalSim 3 output variable: C_FTR063+C_TAB000.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.8 American River at Watt Avenue

5B.3.8.1 No Project Alternative

Table 5B-48. American River at Watt Avenue, Mean Monthly Flow under the No Project Alternative

Statistic	American River at Watt Avenue, Mean Monthly Flow (cfs)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	1,432	2,361	3,983	5,222	5,894	4,319	3,759	3,443	2,699	2,381	1,965	1,949
Water Year Types												
Wet Years	1,646	3,369	7,433	10,348	9,902	7,428	6,166	5,726	3,360	2,818	2,425	2,500
Above Normal Years	1,536	2,162	3,377	5,912	7,185	5,221	3,619	3,625	3,033	2,737	2,166	2,504
Below Normal Years	1,302	1,904	2,393	2,213	4,387	2,612	2,868	2,622	2,675	2,467	1,861	1,703
Dry Years	1,238	1,695	1,530	1,776	2,315	2,281	1,657	1,447	2,215	1,792	1,619	1,507
Critical Years	1,273	1,506	1,254	1,147	1,346	1,165	1,630	1,138	1,245	1,409	1,178	1,068
Dry/Critical Years ^b	1,254	1,608	1,402	1,486	1,868	1,766	1,644	1,305	1,767	1,615	1,415	1,304

CalSim 3 output variable: C_AMR009.

cfs = cubic feet per second.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.8.2 Alternatives 2b and 4b

Table 5B-49. Alternatives 2b and 4b, Percent Change from No Project Alternative for American River at Watt Avenue, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	-1%	0%	0%	1%	0%	1%	-1%	0%
Water Year Types												
Wet Years	0%	0%	0%	0%	-1%	1%	0%	0%	-1%	2%	-1%	-1%
Above Normal Years	0%	4%	0%	0%	0%	0%	0%	0%	1%	2%	-1%	0%
Below Normal Years	1%	0%	0%	0%	0%	1%	0%	0%	0%	-1%	-2%	0%
Dry Years	1%	0%	0%	0%	-6%	-12%	2%	17%	0%	1%	-1%	1%
Critical Years	0%	2%	5%	0%	2%	0%	-1%	-1%	-1%	0%	0%	0%
Dry/Critical Years ^b	0%	1%	2%	0%	-3%	-8%	0%	9%	-1%	1%	0%	1%

CalSim 3 output variable: C_AMR009.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.8.3 Alternatives 2c and 4c

Table 5B-50. Alternatives 2c and 4c, Percent Change from No Project Alternative for American River at Watt Avenue, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	-1%	0%	0%	1%	0%	1%	-1%	0%
Water Year Types												
Wet Years	0%	0%	0%	0%	-1%	1%	0%	0%	-1%	2%	-1%	-1%
Above Normal Years	0%	4%	0%	0%	0%	0%	0%	0%	1%	2%	-1%	0%
Below Normal Years	2%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Dry Years	0%	-1%	0%	1%	-6%	-12%	0%	18%	-1%	1%	-1%	1%
Critical Years	0%	2%	5%	0%	2%	0%	1%	-2%	-1%	-2%	0%	0%
Dry/Critical Years ^b	0%	0%	2%	1%	-3%	-8%	0%	10%	-1%	0%	-1%	1%

CalSim 3 output variable: C_AMR009.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.8.4 Alternatives 1 and 3

Table 5B-51. Alternatives 1 and 3, Percent Change from No Project Alternative for American River at Watt Avenue, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	-1%	0%	-1%	1%	0%	1%	-1%	0%
Water Year Types												
Wet Years	-1%	0%	0%	0%	-1%	1%	0%	0%	-1%	2%	-1%	0%
Above Normal Years	0%	4%	2%	0%	0%	0%	0%	0%	1%	2%	-1%	0%
Below Normal Years	1%	0%	1%	0%	0%	1%	-1%	0%	0%	0%	0%	0%
Dry Years	0%	-1%	0%	4%	-5%	-12%	-7%	18%	2%	1%	-2%	1%
Critical Years	0%	2%	5%	1%	2%	0%	-14%	0%	10%	1%	1%	1%
Dry/Critical Years ^b	0%	0%	2%	3%	-2%	-8%	-10%	11%	5%	1%	-1%	1%

CalSim 3 output variable: C_AMR009.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.8.5 Alternatives 2a and 4a

Table 5B-52. Alternatives 2a and 4a, Percent Change from No Project Alternative for American River at Watt Avenue, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	-1%	0%	-2%	1%	0%	1%	-1%	0%
Water Year Types												
Wet Years	-1%	0%	0%	0%	-1%	1%	0%	0%	-1%	2%	-1%	0%
Above Normal Years	0%	2%	2%	0%	0%	0%	-1%	0%	1%	2%	1%	0%
Below Normal Years	1%	0%	0%	0%	0%	1%	-1%	0%	-1%	0%	0%	0%
Dry Years	1%	-1%	0%	3%	-4%	-12%	-7%	19%	0%	2%	-2%	1%
Critical Years	0%	2%	5%	0%	2%	0%	-14%	1%	10%	0%	1%	2%
Dry/Critical Years ^b	0%	0%	2%	2%	-2%	-8%	-10%	12%	3%	1%	-1%	2%

CalSim 3 output variable: C_AMR009.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.3.8.6 Alternative 5

Table 5B-53. Alternative 5, Percent Change from No Project Alternative for American River at Watt Avenue, Mean Monthly Flow

Statistic	Percent Change from No Project Alternative											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	-1%	0%	-1%	1%	0%	1%	-1%	0%
Water Year Types												
Wet Years	-1%	0%	0%	0%	-1%	1%	0%	0%	-1%	2%	-1%	-1%
Above Normal Years	0%	4%	2%	0%	0%	0%	0%	0%	1%	2%	-1%	0%
Below Normal Years	1%	0%	1%	0%	0%	1%	-1%	0%	0%	0%	0%	0%
Dry Years	0%	-1%	0%	4%	-5%	-12%	-7%	18%	2%	1%	-2%	1%
Critical Years	0%	2%	5%	1%	2%	0%	-14%	0%	10%	1%	1%	1%
Dry/Critical Years ^b	0%	0%	2%	3%	-2%	-8%	-10%	11%	5%	1%	-1%	1%

CalSim 3 output variable: C_AMR009.

^a Long-term average is the average monthly flow for the period October 1921–September 2015 simulated in CalSim 3.

^b Water year types are State Water Resources Control Board Water Right Decision 1641 40-30-30 water year types as computed in CalSim 3 for the period October 1921–September 2015. Dry/critical year averages are for those two water year types combined.

5B.4 References Cited

California Natural Resources Agency and California Ocean Protection Council. 2018. *State of California Sea-Level Rise Guidance: 2018 Update*. Available: [https://opc.ca.gov/webmaster/ftp/pdf/agenda_items/20180314/Item3 Exhibit-A OPC SLR Guidance-rd3.pdf](https://opc.ca.gov/webmaster/ftp/pdf/agenda_items/20180314/Item3%20Exhibit-A%20OPC%20SLR%20Guidance-rd3.pdf). Accessed: April 13, 2021.

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