

5C.1 Appendix Overview

This appendix presents the following information that is discussed in Chapter 5, *Surface Water*.

- The surface water assessment methodology used to evaluate changes in river flows in the Sacramento River Basin.
- The simulated long-term average of monthly flows by month for the period of October 1921 through September 2015 simulated in CalSim 3.
- The simulated average monthly flows by month and water year type for the period of October 1921 through September 2015 simulated in CalSim 3.

5C.2 Assessment Methodology

Modeling tools were used to identify these potential changes to use as the basis for impact assessment in subsequent resource chapters. While no changes are being proposed in operational rules and water supply allocation procedures for the State Water Project (SWP)/Central Valley Project (CVP) system, operation of the proposed north Delta intakes as part of a dynamic system could result in changes in simulated river flows and reservoir storage levels. CalSim 3 is a monthly reservoir-river basin planning model developed by the California Department of Water Resources and Bureau of Reclamation to simulate the operation of the SWP and CVP over a range of different hydrologic conditions. Inputs to CalSim 3 include water demands (including the pertinent terms and conditions of associated water rights), stream accretions and depletions, reservoir inflows, irrigation efficiencies, and parameters to calculate return flows, nonrecoverable losses, and groundwater hydrology. Model outputs include river flows, reservoir storage, Delta outflow, and diversions including Delta exports. CalSim 3 uses the Sacramento Valley and tributary rim basin hydrology with an adjusted historical sequence of monthly stream flows over a 94-year period (1922–2015).

CalSim 3 was used to simulate SWP/CVP operations—providing information about the surface water flows and reservoir storage associated with each project alternative. It should be noted that CalSim 3 results are not indicative of daily real-time operations decisions, especially for extreme conditions. Instead, model results are an approximation of operational conditions and should always be evaluated on a comparative basis. A brief overview of the model is provided in Chapter 4, *Framework for the Environmental Analysis*. A more detailed description of the model is included in Appendix 5A, *Modeling Technical Appendix*.

Changes to Sacramento River Basin flows at several key locations that can depict the SWP/CVP system operation were examined, including the Trinity River downstream of Lewiston Dam, Sacramento River downstream of Keswick Reservoir, Sacramento River at Bend Bridge, Yolo Bypass at Fremont Weir, Sacramento River at Freeport (i.e., upstream of the proposed north Delta intakes), Sacramento River just south of Hood (i.e., near the proposed north Delta intakes), Feather River

downstream of Thermalito Afterbay, and American River at Watt Avenue Bridge. For comparative analyses, the simulated monthly flows from CalSim 3 are summarized on a long-term average basis and are also averaged by water year type (i.e., wet, above normal, below normal, dry, critical, and dry/critical years) for existing conditions, the No Project Alternative, and all project alternatives (Tables 5C-1 through 5C-56).

The project is not expected to affect the operations of reservoirs south of the Delta, on the tributaries of the San Joaquin River (e.g., Millerton Lake on the San Joaquin River and the New Melones Reservoir on the Stanislaus River); therefore, locations on the San Joaquin River were not evaluated further. Appendix 5A includes surface flows for additional locations within the project area (that are not relevant to the discussion in Chapter 5).

5C.3 Sacramento River Basin Flows

5C.3.1 Trinity River Downstream of Lewiston Dam

5C.3.1.1 Existing Conditions

Table 5C-1. Trinity River Downstream of Lewiston Dam, Mean Monthly Flow under Existing Conditions

Statistic	Trinity River below Lewiston Dam, Mean Monthly Flow (cfs)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	375	396	690	768	708	765	647	3,814	1,911	905	843	834
Water Year Types ^b												
Wet Years	381	562	1,443	1,538	1,242	1,359	837	4,734	2,978	1,289	786	786
Above Normal Years	373	300	498	799	991	894	672	4,387	2,245	1,048	870	870
Below Normal Years	373	352	300	338	384	520	513	3,638	1,531	806	870	870
Dry Years	373	300	300	300	300	300	529	3,194	1,059	572	870	870
Critical Years	369	300	300	300	300	300	564	2,339	908	497	870	805
Dry/Critical Years	371	300	300	300	300	300	546	2,795	988	537	870	840

CalSim 3 output variable: C_TRN111.

cfs = cubic feet per second.

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

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

5C.3.1.2 No Project Alternative

Table 5C-2. No Project Alternative, Percent Change from Existing Conditions for Trinity River Downstream Lewiston Dam, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-1%	-10%	20%	42%	56%	20%	21%	-1%	5%	-7%	-3%	-2%
Water Year Types												
Wet Years	-2%	-16%	22%	43%	69%	36%	49%	-2%	10%	-15%	-9%	-9%
Above Normal Years	0%	0%	55%	86%	56%	-4%	1%	2%	3%	0%	0%	0%
Below Normal Years	0%	-15%	0%	27%	57%	-3%	-1%	1%	2%	0%	0%	0%
Dry Years	0%	0%	0%	0%	0%	0%	1%	-6%	0%	0%	0%	0%
Critical Years	1%	0%	0%	0%	0%	0%	1%	-5%	-14%	-9%	0%	8%
Dry/Critical Years ^b	0%	0%	0%	0%	0%	0%	1%	-6%	-6%	-4%	0%	4%

CalSim 3 output variable: C_TRN111.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.1.3 Alternatives 2b and 4b

Table 5C-3. Alternatives 2b and 4b, Percent Change from Existing Conditions for Trinity River Downstream of Lewiston Dam, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	1%
Water Year Types												
Wet Years	0%	0%	0%	-1%	0%	0%	1%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	0%	-4%	1%	4%	0%	0%	0%	0%	0%	0%
Below Normal Years	0%	0%	0%	7%	0%	2%	0%	0%	0%	0%	0%	0%
Dry Years	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical Years	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	8%
Dry/Critical Years ^b	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%

CalSim 3 output variable: C_TRN111.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.1.4 Alternatives 2c and 4c

Table 5C-4. Alternatives 2c and 4c, Percent Change from Existing Conditions for Trinity River Downstream of Lewiston Dam, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	1%
Water Year Types												
Wet Years	0%	0%	0%	-1%	0%	0%	4%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	-1%	-2%	1%	3%	0%	0%	0%	0%	0%	0%
Below Normal Years	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%
Dry Years	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical Years	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	8%
Dry/Critical Years ^b	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%

CalSim 3 output variable: C_TRN111.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.1.5 Alternatives 1 and 3

Table 5C-5. Alternatives 1 and 3, Percent Change from Existing Conditions for Trinity River Downstream of Lewiston Dam, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	1%
Water Year Types												
Wet Years	0%	0%	0%	-2%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	-2%	3%	1%	4%	0%	0%	0%	0%	0%	0%
Below Normal Years	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%
Dry Years	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical Years	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	8%
Dry/Critical Years ^b	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%

CalSim 3 output variable: C_TRN111.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.1.6 Alternatives 2a and 4a

Table 5C-6. Alternatives 2a and 4a, Percent Change from Existing Conditions for Trinity River Downstream of Lewiston Dam, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	-3%	-1%	-1%	0%	1%	0%	0%	0%	0%	0%	1%
Water Year Types												
Wet Years	0%	0%	-2%	-2%	-1%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	-2%	-4%	0%	4%	0%	0%	0%	0%	0%	0%
Below Normal Years	0%	-15%	0%	7%	0%	2%	0%	0%	0%	0%	0%	0%
Dry Years	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical Years	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	8%
Dry/Critical Years ^b	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%

CalSim 3 output variable: C_TRN111.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.1.7 Alternative 5

Table 5C-7. Alternative 5, Percent Change from Existing Conditions for Trinity River Downstream of Lewiston Dam, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	1%
Water Year Types												
Wet Years	0%	0%	0%	-2%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	-2%	6%	1%	4%	0%	0%	0%	0%	0%	0%
Below Normal Years	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%
Dry Years	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Critical Years	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	8%
Dry/Critical Years ^b	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%

CalSim 3 output variable C_TRN111.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.2 Sacramento River Downstream of Keswick Reservoir

5C.3.2.1 Existing Conditions

Table 5C-8. Sacramento River Downstream of Keswick Reservoir, Mean Monthly Flow under Existing Conditions

Statistic	Sacramento River at Keswick, Mean Monthly Flow (cfs)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	5,879	6,365	7,640	8,098	10,693	8,668	6,229	8,134	10,038	13,138	9,789	7,197
Water Year Types												
Wet Years	6,396	7,175	12,736	14,791	20,993	15,647	9,632	8,668	9,127	13,496	10,837	9,586
Above Normal Years	5,912	6,180	5,965	9,366	10,442	9,035	5,150	9,002	9,397	13,582	10,146	8,275
Below Normal Years	5,997	6,026	6,025	4,538	6,299	5,248	4,315	8,019	10,578	13,966	10,207	6,495
Dry Years	5,685	6,187	4,090	3,383	3,837	4,085	4,725	7,694	11,623	13,387	9,141	5,100
Critical Years	4,779	5,521	4,754	3,655	3,579	4,010	4,590	6,932	9,879	10,402	7,318	4,656
Dry/Critical Years ^b	5,262	5,876	4,400	3,510	3,717	4,050	4,662	7,339	10,809	11,994	8,290	4,893

CalSim 3 output variable: C_KSWCK.

cfs = cubic feet per second.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.2.2 No Project Alternative

Table 5C-9. No Project Alternative, Percent Change from Existing Conditions for Sacramento River Downstream of Keswick Reservoir, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-2%	-11%	6%	21%	15%	11%	11%	-3%	-2%	-4%	-4%	-9%
Water Year Types												
Wet Years	-6%	-5%	9%	27%	14%	9%	-3%	-17%	-4%	-1%	-2%	-9%
Above Normal Years	-4%	-8%	13%	23%	11%	8%	4%	-1%	1%	-1%	-10%	-6%
Below Normal Years	0%	-19%	10%	16%	23%	9%	38%	5%	-3%	-9%	-12%	-17%
Dry Years	-2%	-16%	-11%	-2%	12%	41%	33%	7%	-7%	-11%	-4%	-6%
Critical Years	10%	-11%	-17%	2%	18%	-7%	19%	6%	12%	5%	16%	1%
Dry/Critical Years ^b	3%	-14%	-14%	0%	15%	19%	27%	7%	1%	-5%	4%	-3%

CalSim 3 output variable: C_KSWCK.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.2.3 Alternatives 2b and 4b

Table 5C-10. Alternatives 2b and 4b, Percent Change from Existing Conditions for Sacramento River Downstream of Keswick Reservoir, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	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%	-1%	1%	-1%
Water Year Types												
Wet Years	1%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	-1%	1%	1%	0%	3%	-2%	0%	0%	-1%	-2%	-1%	0%
Below Normal Years	0%	0%	0%	-1%	1%	0%	2%	-1%	0%	-3%	3%	-6%
Dry Years	1%	-1%	-1%	11%	-1%	4%	0%	0%	0%	0%	0%	-1%
Critical Years	0%	0%	-3%	-2%	4%	0%	2%	1%	0%	0%	1%	2%
Dry/Critical Years ^b	0%	-1%	-2%	5%	1%	2%	1%	0%	0%	0%	0%	1%

CalSim 3 output variable: C_KSWCK.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.2.4 Alternatives 2c and 4c

Table 5C-11. Alternatives 2c and 4c, Percent Change from Existing Conditions for Sacramento River Downstream of Keswick Reservoir, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	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%	-1%	0%	-1%
Water Year Types												
Wet Years	1%	-1%	1%	0%	0%	0%	0%	1%	0%	-1%	0%	0%
Above Normal Years	-2%	5%	-2%	0%	2%	-3%	0%	0%	-1%	-1%	-2%	0%
Below Normal Years	-1%	0%	0%	-2%	-1%	2%	2%	-1%	0%	-3%	2%	-5%
Dry Years	1%	0%	2%	7%	0%	4%	1%	0%	0%	0%	0%	0%
Critical Years	1%	-1%	-1%	-1%	4%	0%	2%	1%	0%	1%	1%	2%
Dry/Critical Years ^b	1%	-1%	0%	3%	2%	2%	2%	0%	0%	1%	0%	1%

CalSim 3 output variable: C_KSWCK.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.2.5 Alternatives 1 and 3

Table 5C-12. Alternatives 1 and 3, Percent Change from Existing Conditions for Sacramento River Downstream of Keswick Reservoir, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	1%	0%	1%	0%	0%	-1%	0%	-1%
Water Year Types												
Wet Years	1%	-1%	1%	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Above Normal Years	-2%	5%	-1%	0%	2%	-3%	0%	1%	0%	-1%	-1%	1%
Below Normal Years	-1%	0%	0%	-2%	0%	2%	2%	-1%	0%	-4%	2%	-6%
Dry Years	1%	0%	0%	7%	1%	4%	2%	0%	0%	0%	-1%	-1%
Critical Years	1%	-1%	1%	-1%	7%	-4%	1%	1%	0%	1%	1%	2%
Dry/Critical Years ^b	1%	0%	1%	3%	3%	1%	1%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_KSWCK.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.2.6 Alternatives 2a and 4a

Table 5C-13. Alternatives 2a and 4a, Percent Change from Existing Conditions for Sacramento River Downstream of Keswick Reservoir, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	1%	0%	0%	0%	1%	-1%	1%	0%	0%	-2%	0%	0%
Water Year Types												
Wet Years	2%	-2%	0%	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Above Normal Years	-2%	4%	-1%	0%	3%	-2%	0%	0%	0%	-3%	-1%	1%
Below Normal Years	1%	1%	1%	-2%	3%	-2%	3%	-1%	0%	-4%	2%	-4%
Dry Years	1%	1%	-2%	9%	0%	4%	2%	0%	-2%	-1%	-2%	2%
Critical Years	1%	0%	0%	-1%	7%	-5%	0%	1%	0%	1%	2%	2%
Dry/Critical Years ^b	1%	1%	-1%	4%	3%	0%	1%	1%	-1%	0%	-1%	2%

CalSim 3 output variable: C_KSWCK.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.2.7 Alternative 5

Table 5C-14. Alternative 5, Percent Change from Existing Conditions for Sacramento River Downstream of Keswick Reservoir, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	0%	0%	0%	1%	0%	1%	0%	0%	-1%	0%	-1%
Water Year Types												
Wet Years	1%	-1%	1%	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Above Normal Years	-2%	5%	-1%	0%	2%	-3%	0%	1%	0%	-1%	-1%	0%
Below Normal Years	-1%	0%	0%	-2%	0%	2%	2%	-1%	0%	-4%	2%	-5%
Dry Years	1%	0%	0%	7%	1%	4%	2%	0%	0%	0%	-1%	-1%
Critical Years	0%	-1%	1%	0%	4%	-3%	1%	1%	0%	1%	1%	2%
Dry/Critical Years ^b	1%	0%	0%	4%	2%	1%	1%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_KSWCK.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.3 Sacramento River at Bend Bridge

5C.3.3.1 Existing Conditions

Table 5C-15. Sacramento River at Bend Bridge, Mean Monthly Flow under Existing Conditions

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	6,763	8,096	11,951	14,153	17,823	14,336	9,936	10,212	11,203	13,538	10,187	7,733
Water Year Types												
Wet Years	6,830	7,736	10,635	17,116	18,618	15,445	9,149	11,971	10,985	14,090	10,707	8,880
Above Normal Years	6,873	7,744	9,112	8,482	11,018	9,539	7,398	9,649	11,489	14,290	10,575	7,065
Below Normal Years	6,481	7,456	6,015	5,822	9,431	7,972	6,759	8,980	12,279	13,510	9,421	5,549
Dry Years	5,468	6,387	7,212	5,953	6,316	6,322	5,802	7,818	10,409	10,623	7,546	5,033
Critical Years	6,008	6,957	6,574	5,883	7,977	7,202	6,312	8,438	11,406	12,163	8,546	5,308
Dry/Critical Years ^b	6,763	8,096	11,951	14,153	17,823	14,336	9,936	10,212	11,203	13,538	10,187	7,733

CalSim 3 output variable: C_SAC257.

cfs = cubic feet per second

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.3.2 No Project Alternative

Table 5C-16. No Project Alternative, Percent Change from Existing Conditions for Sacramento River at Bend Bridge, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-4%	-8%	10%	18%	12%	9%	6%	-7%	-4%	-5%	-4%	-8%
Water Year Types												
Wet Years	-6%	-5%	16%	19%	9%	7%	1%	-6%	-4%	-3%	-10%	-5%
Above Normal Years	-2%	-14%	13%	15%	18%	8%	20%	0%	-5%	-10%	-12%	-14%
Below Normal Years	-4%	-12%	-3%	7%	12%	25%	20%	3%	-7%	-12%	-4%	-6%
Dry Years	6%	-9%	-6%	8%	16%	-1%	14%	2%	9%	4%	15%	2%
Critical Years	0%	-11%	-4%	8%	13%	14%	17%	3%	0%	-5%	4%	-2%
Dry/Critical Years ^b	-4%	-8%	10%	18%	12%	9%	6%	-7%	-4%	-5%	-4%	-8%

CalSim 3 output variable: C_SAC257.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.3.3 Alternatives 2b and 4b

Table 5C-17. Alternatives 2b and 4b, Percent Change from Existing Conditions for Sacramento River at Bend Bridge, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	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%	1%	-1%
Water Year Types												
Wet Years	-1%	1%	0%	0%	1%	-1%	0%	0%	0%	-2%	-1%	0%
Above Normal Years	0%	0%	0%	-1%	1%	0%	1%	0%	0%	-3%	3%	-6%
Below Normal Years	1%	-1%	-1%	6%	0%	2%	0%	0%	0%	0%	0%	-1%
Dry Years	0%	0%	-2%	-1%	2%	0%	2%	1%	0%	0%	1%	2%
Critical Years	0%	0%	-1%	3%	1%	1%	1%	0%	0%	0%	0%	1%
Dry/Critical Years ^b	0%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	1%	-1%

CalSim 3 output variable: C_SAC257.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.3.4 Alternatives 2c and 4c

Table 5C-18. Alternatives 2c and 4c, Percent Change from Existing Conditions for Sacramento River at Bend Bridge, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	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%	-1%
Water Year Types												
Wet Years	-1%	4%	-1%	0%	1%	-1%	0%	0%	-1%	-1%	-2%	0%
Above Normal Years	-1%	0%	0%	-1%	-1%	1%	1%	-1%	0%	-3%	2%	-5%
Below Normal Years	1%	0%	1%	4%	0%	2%	1%	0%	0%	0%	0%	0%
Dry Years	1%	-1%	-1%	-1%	2%	0%	2%	1%	0%	1%	1%	2%
Critical Years	1%	-1%	0%	2%	1%	1%	1%	0%	0%	1%	0%	1%
Dry/Critical Years ^b	0%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	0%	-1%

CalSim 3 output variable: C_SAC257.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.3.5 Alternatives 1 and 3

Table 5C-19. Alternatives 1 and 3, Percent Change from Existing Conditions for Sacramento River at Bend Bridge, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	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%	-1%
Water Year Types												
Wet Years	-1%	4%	-1%	0%	1%	-2%	0%	0%	0%	-1%	-1%	1%
Above Normal Years	-1%	0%	0%	-1%	0%	1%	1%	-1%	0%	-3%	2%	-5%
Below Normal Years	1%	0%	0%	4%	0%	2%	1%	0%	0%	0%	-1%	-1%
Dry Years	1%	-1%	1%	0%	4%	-2%	1%	1%	0%	1%	1%	2%
Critical Years	1%	0%	0%	2%	2%	0%	1%	0%	0%	0%	0%	0%
Dry/Critical Years ^b	0%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	0%	-1%

CalSim 3 output variable: C_SAC257.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.3.6 Alternatives 2a and 4a

Table 5C-20. Alternatives 2a and 4a, Percent Change from Existing Conditions for Sacramento River at Bend Bridge, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	1%	0%	0%	0%	1%	0%	0%	0%	0%	-2%	0%	0%
Water Year Types												
Wet Years	-1%	3%	0%	0%	2%	-1%	0%	0%	0%	-2%	-1%	1%
Above Normal Years	1%	1%	0%	-1%	2%	-1%	2%	0%	0%	-4%	2%	-4%
Below Normal Years	1%	1%	-1%	5%	0%	2%	1%	0%	-1%	-1%	-2%	2%
Dry Years	1%	0%	0%	-1%	4%	-3%	0%	1%	0%	1%	1%	2%
Critical Years	1%	0%	-1%	2%	1%	0%	1%	0%	-1%	0%	-1%	2%
Dry/Critical Years ^b	1%	0%	0%	0%	1%	0%	0%	0%	0%	-2%	0%	0%

CalSim 3 output variable: C_SAC257.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.3.7 Alternative 5

Table 5C-21. Alternative 5, Percent Change from Existing Conditions for Sacramento River at Bend Bridge, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	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%	-1%
Water Year Types												
Wet Years	-1%	4%	-1%	0%	1%	-2%	0%	0%	0%	-1%	-1%	0%
Above Normal Years	-1%	0%	0%	-1%	0%	1%	1%	-1%	0%	-3%	2%	-5%
Below Normal Years	1%	0%	0%	4%	0%	2%	1%	0%	0%	0%	-1%	-1%
Dry Years	0%	-1%	1%	0%	2%	-2%	1%	1%	0%	1%	1%	2%
Critical Years	1%	0%	0%	2%	1%	0%	1%	0%	0%	0%	0%	0%
Dry/Critical Years ^b	0%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	0%	-1%

CalSim 3 output variable: C_SAC257.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.4 Yolo Bypass at Fremont Weir

5C.3.4.1 Existing Conditions

Table 5C-22. Mean Monthly Flow under Existing Conditions

Statistic	Yolo Bypass, Mean Monthly Flow (cfs)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	42	218	2,255	6,686	9,220	5,936	1,093	67	8	0	0	0
Water Year Types												
Wet Years	133	683	6,481	18,736	25,147	16,691	3,421	152	24	0	0	0
Above Normal Years	0	0	116	5,326	6,120	4,102	4	146	0	0	0	0
Below Normal Years	0	0	735	113	1,184	362	5	0	0	0	0	0
Dry Years	0	0	0	0	797	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	425	0	0	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 of October 1921 through 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.

5C.3.4.2 No Project Alternative

Table 5C-23. No Project Alternative, Percent Change from Existing Conditions for Yolo Bypass at Fremont Weir, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions and Mean Monthly Flows (cfs)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-44% (24)	23% (268)	106% (4,650)	70% (11,341)	48% (13,605)	66% (9,862)	131% (2,530)	-100% (0)	-100% (0)	0% (0)	0% (0)	0% (0)
Water Year Types												
Wet Years	-44% (74)	23% (840)	86% (12,062)	57% (29,441)	36% (34,233)	48% (24,674)	96% (6,710)	-100% (0)	-100% (0)	0% (0)	0% (0)	0% (0)
Above Normal Years	0% (0)	0% (0)	1,491% (1,845)	96% (10,439)	81% (11,066)	121% (9,069)	36,757% (1,479)	-100% (0)	0% (0)	0% (0)	0% (0)	0% (0)
Below Normal Years	0% (0)	0% (0)	192% (2,145)	1,579% (1,896)	181% (3,328)	488% (2,132)	15,881% (758)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
Dry Years	0% (0)	0% (0)	N/A (132)	N/A (536)	204% (2,424)	N/A (1,566)	N/A (122)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
Critical Years	0% (0)	0% (0)	N/A (274)	0% (518)	N/A (509)	N/A (430)	N/A (12)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
Dry/Critical Years ^b	0% (0)	0% (0)	N/A (198)	N/A (528)	260% (1,531)	N/A (1,036)	N/A (71)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)

CalSim 3 output variable: C_YBP037.

Note: Large percent changes in the table occur when flows under existing conditions are low for the particular month and water year type combination, so that even a relatively modest increase in flow can create a large percent change. Because of this, the mean monthly flows in cubic feet per second have been included in parentheses for ease of comparison.

Moreover, certain percent changes are listed as “not applicable” since the No Project Alternative includes some month and water year combinations that received mean monthly flows when the same month and water year combination under existing conditions did not. These percent changes are marked as “N/A” since the percent change is undefined when the starting quantity is zero.

cfs = cubic feet per second; N/A = not applicable.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.4.3 Alternatives 2b and 4b

Table 5C-24. Alternatives 2b and 4b, Percent Change from Existing Conditions for Yolo Bypass at Fremont Weir, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	7%	3%	0%	0%	0%	0%	0%	-1%	0%	0%	0%	0%
Water Year Types												
Wet Years	7%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	-2%	-1%	-1%	-3%	-61%	-3%	0%	0%	0%	0%
Below Normal Years	0%	0%	1%	0%	4%	1%	0%	0%	0%	0%	0%	0%
Dry Years	0%	0%	0%	0%	-1%	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%	-1%	0%	0%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_YBP037.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.4.4 Alternatives 2c and 4c

Table 5C-25. Alternatives 2c and 4c, Percent Change from Existing Conditions for Yolo Bypass at Fremont Weir, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	0%	3%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Water Year Types												
Wet Years	0%	3%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	-6%	-1%	-1%	-3%	-71%	4%	0%	0%	0%	0%
Below Normal Years	0%	0%	1%	0%	3%	9%	0%	0%	0%	0%	0%	0%
Dry Years	0%	0%	0%	0%	-1%	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%	-1%	0%	0%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_YBP037.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.4.5 Alternatives 1 and 3

Table 5C-26. Alternatives 1 and 3, Percent Change from Existing Conditions for Yolo Bypass at Fremont Weir, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	5%	4%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%
Water Year Types												
Wet Years	5%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	-6%	0%	-1%	-4%	-75%	7%	0%	0%	0%	0%
Below Normal Years	0%	0%	1%	0%	3%	9%	0%	0%	0%	0%	0%	0%
Dry Years	0%	0%	0%	0%	-1%	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%	-1%	0%	0%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_YBP037.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.4.6 Alternatives 2a and 4a

Table 5C-27. Alternatives 2a and 4a, Percent Change from Existing Conditions for Yolo Bypass at Fremont Weir, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	7%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Water Year Types												
Wet Years	7%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	-11%	1%	0%	-3%	-42%	-2%	0%	0%	0%	0%
Below Normal Years	0%	0%	2%	0%	4%	-8%	0%	0%	0%	0%	0%	0%
Dry Years	0%	0%	0%	0%	-1%	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%	-1%	0%	0%	0%	0%	0%	0%	0%

CalSim 3 output variable: C_YBP037.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.4.7 Alternative 5

Table 5C-28. Alternative 5, Percent Change from Existing Conditions for Yolo Bypass at Fremont Weir, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	4%	4%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%
Water Year Types												
Wet Years	4%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Above Normal Years	0%	0%	-6%	0%	-1%	-4%	-75%	6%	0%	0%	0%	0%
Below Normal Years	0%	0%	1%	0%	4%	9%	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_YBP037.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

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

5C.3.5.1 Existing Conditions

Table 5C-29. Sacramento River at Freeport (Upstream of Proposed North Delta Intakes), Mean Monthly Flow under Existing Conditions

Statistic	Sacramento River at Freeport (Upstream of North Delta Diversion), Mean Monthly Flow (cfs)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	11,293	13,562	22,637	30,220	36,637	32,330	22,617	20,606	16,907	18,089	14,716	14,303
Water Year Types												
Wet Years	13,378	18,176	37,641	50,377	59,125	51,372	39,498	32,887	23,421	20,108	17,047	18,866
Above Normal Years	11,365	12,709	20,152	38,521	43,056	39,245	22,527	25,489	19,074	20,498	18,210	17,974
Below Normal Years	10,937	12,928	17,577	20,647	26,152	23,879	15,614	15,189	13,581	20,093	16,491	13,670
Dry Years	10,372	11,128	12,133	14,212	23,221	19,660	12,265	11,656	13,497	16,859	11,327	9,365
Critical Years	8,374	8,182	12,573	13,251	14,757	13,356	9,359	8,847	10,214	9,951	7,809	8,019
Dry/Critical Years ^b	9,439	9,753	12,338	13,764	19,271	16,718	10,909	10,345	11,965	13,636	9,685	8,737

CalSim 3 output variable: C_SAC049.

cfs = cubic feet per second.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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 5C.3.5.2 No Project Alternative

2 **Table 5C-30. No Project Alternative, Percent Change from Existing Conditions for Sacramento River at**
 3 **Freeport (Upstream of Proposed North Delta Intakes), Mean Monthly Flow**

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-13%	-4%	5%	7%	4%	4%	1%	-23%	-21%	-17%	-15%	-15%
Water Year Types												
Wet Years	-15%	0%	6%	7%	4%	3%	-6%	-33%	-38%	-11%	-6%	-13%
Above Normal Years	-12%	-5%	8%	7%	5%	5%	0%	-23%	-22%	-14%	-18%	-20%
Below Normal Years	-11%	-11%	8%	6%	4%	3%	14%	-8%	-1%	-22%	-30%	-22%
Dry Years	-12%	-8%	2%	7%	4%	10%	18%	-8%	-7%	-30%	-22%	-10%
Critical Years	-14%	-4%	0%	7%	9%	4%	12%	-7%	1%	-8%	3%	-5%
Dry/Critical Years ^b	-13%	-6%	1%	7%	6%	8%	15%	-7%	-4%	-22%	-12%	-8%

4 CalSim 3 output variable: C_SAC049.

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

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

5C.3.5.3 Alternatives 2b and 4b

Table 5C-31. Alternatives 2b and 4b, Percent Change from Existing Conditions for Sacramento River at Freeport (Upstream of Proposed North Delta Intakes), Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	1%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	0%	-1%
Water Year Types												
Wet Years	1%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	-2%	0%
Above Normal Years	3%	2%	0%	0%	0%	0%	0%	0%	0%	-3%	-2%	-1%
Below Normal Years	0%	0%	0%	0%	0%	0%	1%	-1%	1%	-2%	0%	-3%
Dry Years	3%	1%	0%	2%	0%	1%	0%	0%	0%	-1%	3%	0%
Critical Years	0%	-1%	0%	0%	0%	0%	2%	0%	0%	-1%	1%	0%
Dry/Critical Years ^b	2%	0%	0%	1%	0%	1%	1%	0%	0%	-1%	2%	0%

CalSim 3 output variable: C_SAC049.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.5.4 Alternatives 2c and 4c

Table 5C-32. Alternatives 2c and 4c, Percent Change from Existing Conditions for Sacramento River at Freeport (Upstream of Proposed North Delta Intakes), Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	1%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	-1%	-1%
Water Year Types												
Wet Years	1%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	-1%	0%
Above Normal Years	3%	2%	-1%	0%	0%	0%	0%	0%	0%	-2%	-2%	-2%
Below Normal Years	1%	0%	-1%	0%	0%	0%	1%	0%	0%	-2%	-1%	-3%
Dry Years	3%	1%	0%	1%	0%	1%	1%	0%	0%	0%	3%	1%
Critical Years	1%	-2%	0%	0%	1%	0%	2%	0%	1%	0%	1%	0%
Dry/Critical Years ^b	2%	0%	0%	1%	0%	1%	1%	0%	0%	0%	2%	1%

CalSim 3 output variable: C_SAC049.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.5.5 Alternatives 1 and 3

Table 5C-33. Alternatives 1 and 3, Percent Change from Existing Conditions for Sacramento River at Freeport (Upstream of Proposed North Delta Intakes), Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	1%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	-1%	-1%
Water Year Types												
Wet Years	1%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	-1%	0%
Above Normal Years	3%	4%	0%	0%	0%	0%	0%	0%	0%	-2%	-2%	-1%
Below Normal Years	1%	0%	-1%	0%	-1%	0%	1%	0%	1%	-2%	-1%	-4%
Dry Years	3%	1%	0%	1%	0%	1%	1%	0%	0%	-1%	2%	0%
Critical Years	2%	-1%	1%	0%	1%	0%	2%	0%	0%	0%	2%	0%
Dry/Critical Years ^b	2%	0%	1%	1%	1%	1%	1%	0%	0%	0%	2%	0%

CalSim 3 output variable: C_SAC049.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.5.6 Alternatives 2a and 4a

Table 5C-34. Alternatives 2a and 4a, Percent Change from Existing Conditions for Sacramento River at Freeport (Upstream of Proposed North Delta Intakes), Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	2%	0%	0%	0%	0%	0%	0%	0%	0%	-2%	-1%	-1%
Water Year Types												
Wet Years	1%	-1%	0%	0%	0%	0%	0%	0%	0%	-1%	-1%	-1%
Above Normal Years	3%	3%	0%	0%	0%	0%	0%	0%	0%	-3%	-2%	-1%
Below Normal Years	1%	0%	0%	0%	0%	0%	1%	0%	0%	-3%	-1%	-3%
Dry Years	4%	1%	0%	2%	0%	1%	1%	0%	0%	-2%	0%	1%
Critical Years	2%	0%	1%	0%	1%	0%	1%	0%	0%	0%	2%	0%
Dry/Critical Years ^b	3%	1%	0%	1%	1%	1%	1%	0%	0%	-1%	1%	1%

CalSim 3 output variable: C_SAC049.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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 **5C.3.5.7 Alternative 5**

2 **Table 5C-35. Alternative 5, Percent Change from Existing Conditions for Sacramento River at Freeport** 3 **(Upstream of Proposed North Delta Intakes), Mean Monthly Flow**

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	1%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	-1%	-1%
Water Year Types												
Wet Years	1%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	-1%	0%
Above Normal Years	3%	4%	0%	0%	0%	0%	0%	0%	0%	-2%	-2%	-1%
Below Normal Years	0%	0%	-1%	0%	0%	0%	1%	0%	1%	-2%	-1%	-4%
Dry Years	3%	1%	0%	2%	0%	1%	1%	0%	0%	-1%	3%	0%
Critical Years	0%	-1%	1%	0%	1%	0%	2%	0%	0%	0%	2%	0%
Dry/Critical Years ^b	2%	0%	1%	1%	1%	1%	1%	0%	0%	0%	2%	0%

4 CalSim 3 output variable: C_SAC049.

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

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

5C.3.6 Sacramento River Just South of Hood, Downstream of the Proposed North Delta Intakes

5C.3.6.1 Existing Conditions

Table 5C-36. Sacramento River at Hood (Near the Proposed North Delta Intakes), Mean Monthly Flow under Existing Condition

Statistic	Sacramento River at Hood (Downstream of North Delta Diversion), Mean Monthly Flow (cfs)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	11,567	13,833	23,010	30,632	37,168	32,710	22,922	20,835	17,119	18,288	14,933	14,549
Water Year Types												
Wet Years	13,673	18,509	38,106	50,948	59,731	51,815	39,851	33,121	23,635	20,310	17,265	19,111
Above Normal Years	11,640	12,975	20,541	38,982	43,664	39,609	22,806	25,712	19,288	20,696	18,428	18,217
Below Normal Years	11,201	13,188	17,922	20,975	26,619	24,239	15,902	15,416	13,790	20,292	16,708	13,923
Dry Years	10,634	11,360	12,402	14,529	23,715	20,001	12,559	11,881	13,705	17,058	11,541	9,607
Critical Years	8,635	8,389	12,896	13,517	15,203	13,696	9,621	9,075	10,427	10,147	8,024	8,259
Dry/Critical Years ^b	9,701	9,973	12,632	14,057	19,743	17,059	11,188	10,572	12,175	13,833	9,900	8,978

CalSim 3 output variable: C_SAC041.

cfs = cubic feet per second.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.6.2 No Project Alternative

Table 5C-37. No Project Alternative, Percent Change from Existing Conditions for Sacramento River at Hood (Near the Proposed North Delta Intakes), Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-11%	-3%	6%	7%	5%	5%	2%	-22%	-19%	-16%	-14%	-14%
Water Year Types												
Wet Years	-13%	1%	6%	7%	4%	4%	-5%	-32%	-36%	-10%	-5%	-12%
Above Normal Years	-10%	-3%	9%	8%	6%	6%	1%	-22%	-21%	-13%	-16%	-19%
Below Normal Years	-10%	-9%	9%	7%	5%	4%	14%	-7%	0%	-21%	-28%	-21%
Dry Years	-10%	-6%	3%	8%	5%	11%	19%	-6%	-6%	-28%	-19%	-8%
Critical Years	-11%	-1%	2%	8%	10%	5%	14%	-5%	3%	-6%	5%	-2%
Dry/Critical Years ^b	-11%	-4%	3%	8%	7%	9%	17%	-6%	-2%	-21%	-10%	-5%

CalSim 3 output variable: C_SAC041.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.6.3 Alternatives 2b and 4b

Table 5C-38. Alternatives 2b and 4b, Percent Change from Existing Conditions for Sacramento River at Hood (Near the Proposed North Delta Intakes), Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-2%	-5%	-4%	-5%	-4%	-5%	-1%	-2%	-3%	-6%	-1%	-4%
Water Year Types												
Wet Years	-3%	-5%	-4%	-4%	-2%	-3%	-1%	-3%	-5%	-4%	-2%	-1%
Above Normal Years	1%	-6%	-5%	-6%	-6%	-6%	-2%	-4%	-7%	-9%	-3%	-1%
Below Normal Years	-3%	-6%	-5%	-7%	-6%	-9%	1%	-1%	-1%	-9%	-2%	-12%
Dry Years	2%	-4%	-4%	-5%	-6%	-5%	0%	0%	0%	-2%	2%	-4%
Critical Years	-3%	-2%	-3%	-6%	-4%	-3%	2%	0%	0%	-1%	1%	0%
Dry/Critical Years ^b	0%	-3%	-4%	-5%	-5%	-5%	1%	0%	0%	-1%	2%	-2%

CalSim 3 output variable: C_SAC041.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.6.4 Alternatives 2c and 4c

Table 5C-39. Alternatives 2c and 4c, Percent Change from Existing Conditions for Sacramento River at Hood (Near the Proposed North Delta Intakes), Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-1%	-6%	-5%	-6%	-5%	-6%	-1%	-2%	-4%	-6%	-2%	-4%
Water Year Types												
Wet Years	-3%	-6%	-5%	-5%	-3%	-3%	-2%	-3%	-6%	-5%	-2%	-1%
Above Normal Years	0%	-6%	-7%	-8%	-8%	-9%	-3%	-4%	-9%	-10%	-3%	-2%
Below Normal Years	-2%	-8%	-6%	-8%	-8%	-12%	1%	-1%	-1%	-11%	-3%	-13%
Dry Years	2%	-4%	-4%	-6%	-7%	-7%	1%	0%	0%	-1%	2%	-4%
Critical Years	-1%	-3%	-4%	-7%	-4%	-4%	2%	0%	1%	0%	1%	0%
Dry/Critical Years ^b	1%	-4%	-4%	-7%	-6%	-6%	1%	0%	0%	-1%	2%	-2%

CalSim 3 output variable: C_SAC041.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.6.5 Alternatives 1 and 3

Table 5C-40. Alternatives 1 and 3, Percent Change from Existing Conditions for Sacramento River at Hood (Near the Proposed North Delta Intakes), Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-1%	-6%	-6%	-7%	-6%	-6%	-1%	-2%	-4%	-6%	-2%	-5%
Water Year Types												
Wet Years	-3%	-6%	-7%	-6%	-4%	-3%	-2%	-3%	-5%	-5%	-2%	-2%
Above Normal Years	0%	-6%	-7%	-10%	-8%	-9%	-3%	-4%	-10%	-10%	-3%	-1%
Below Normal Years	-2%	-8%	-6%	-9%	-9%	-13%	1%	-1%	-1%	-11%	-3%	-14%
Dry Years	2%	-4%	-4%	-7%	-9%	-9%	1%	0%	0%	-1%	2%	-5%
Critical Years	-1%	-3%	-3%	-8%	-4%	-5%	2%	0%	0%	0%	2%	0%
Dry/Critical Years ^b	1%	-4%	-4%	-7%	-7%	-7%	1%	0%	0%	-1%	2%	-3%

CalSim 3 output variable: C_SAC041.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.6.6 Alternatives 2a and 4a

Table 5C-41. Alternatives 2a and 4a, Percent Change from Existing Conditions for Sacramento River at Hood (Near the Proposed North Delta Intakes), Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-1%	-6%	-7%	-8%	-6%	-7%	-1%	-3%	-4%	-6%	-2%	-4%
Water Year Types												
Wet Years	-3%	-6%	-7%	-7%	-4%	-3%	-2%	-3%	-5%	-5%	-2%	-2%
Above Normal Years	0%	-6%	-8%	-11%	-9%	-10%	-3%	-5%	-10%	-10%	-2%	-1%
Below Normal Years	-1%	-9%	-7%	-10%	-9%	-14%	1%	-1%	-1%	-11%	-2%	-13%
Dry Years	3%	-4%	-5%	-7%	-9%	-10%	1%	0%	0%	-2%	0%	-5%
Critical Years	-1%	-3%	-4%	-9%	-4%	-5%	1%	0%	0%	0%	2%	0%
Dry/Critical Years ^b	1%	-4%	-4%	-8%	-7%	-8%	1%	0%	0%	-2%	1%	-3%

CalSim 3 output variable: C_SAC041.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.6.7 Alternative 5

Table 5C-42. Alternative 5, Percent Change from Existing Conditions for Sacramento River at Hood (Near the Proposed North Delta Intakes), Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	-2%	-6%	-6%	-7%	-6%	-6%	-1%	-3%	-4%	-6%	-2%	-5%
Water Year Types												
Wet Years	-3%	-6%	-7%	-6%	-4%	-3%	-2%	-3%	-6%	-5%	-2%	-2%
Above Normal Years	0%	-6%	-7%	-10%	-9%	-9%	-3%	-4%	-10%	-10%	-3%	-1%
Below Normal Years	-2%	-9%	-6%	-9%	-9%	-13%	1%	-1%	-1%	-11%	-3%	-14%
Dry Years	2%	-5%	-4%	-7%	-8%	-9%	1%	0%	0%	-1%	2%	-5%
Critical Years	-2%	-3%	-4%	-8%	-4%	-5%	2%	0%	0%	0%	2%	0%
Dry/Critical Years ^b	0%	-4%	-4%	-7%	-7%	-7%	1%	0%	0%	-1%	2%	-3%

CalSim 3 output variable: C_SAC041.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.7 Feather River Downstream of Thermalito Afterbay

5C.3.7.1 Existing Conditions

Table 5C-43. Feather River Downstream of Thermalito Afterbay, Mean Monthly Flow under Existing Conditions

Statistic	Feather River downstream of Thermalito, Mean Monthly Flow (cfs)											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	2,219	1,815	2,855	4,197	5,508	5,891	3,555	4,015	3,952	7,061	5,089	2,942
Water Year Types												
Wet Years	2,533	2,523	5,765	9,259	12,130	12,571	7,624	7,446	5,042	6,495	4,698	4,464
Above Normal Years	2,061	1,720	2,004	3,454	4,648	6,137	2,929	5,282	3,861	8,638	7,386	5,199
Below Normal Years	2,342	1,516	1,564	1,813	2,853	2,934	1,066	2,104	2,869	8,664	7,200	2,478
Dry Years	2,186	1,397	1,319	1,289	1,280	1,368	1,592	1,843	4,006	7,478	3,420	898
Critical Years	1,528	1,331	1,136	1,060	1,059	1,183	1,529	1,061	3,334	3,924	2,547	809
Dry/Critical Years ^b	1,879	1,366	1,233	1,182	1,177	1,282	1,563	1,478	3,692	5,819	3,012	857

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 of October 1921 through 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.

5C.3.7.2 No Project Alternative

Table 5C-44. No Project Alternative, Percent Change from Existing Condition for Feather River Downstream of Thermalito Afterbay, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	2%	2%	5%	29%	29%	27%	11%	-33%	33%	-1%	-7%	-40%
Water Year Types												
Wet Years	-6%	-3%	10%	39%	37%	29%	0%	-58%	-6%	25%	30%	-35%
Above Normal Years	20%	8%	-25%	19%	50%	50%	3%	-39%	57%	1%	-11%	-52%
Below Normal Years	5%	4%	4%	-15%	-30%	-7%	50%	32%	107%	-9%	-35%	-55%
Dry Years	13%	6%	-2%	0%	0%	27%	69%	38%	42%	-30%	-18%	0%
Critical Years	-14%	7%	-5%	8%	27%	13%	35%	24%	20%	-8%	3%	-3%
Dry/Critical Years ^b	3%	7%	-3%	3%	11%	21%	54%	33%	33%	-23%	-10%	-1%

CalSim 3 output variable: C_FTR063+C_TAB000.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.7.3 Alternatives 2b and 4b

Table 5C-45. Alternatives 2b and 4b, Percent Change from Existing Condition for Feather River Downstream of Thermalito Afterbay, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	4%	0%	0%	0%	-1%	0%	0%	0%	1%	-1%	-1%	0%
Water Year Types												
Wet Years	2%	1%	0%	0%	-1%	0%	0%	0%	1%	-1%	-4%	0%
Above Normal Years	24%	1%	-2%	-2%	-4%	1%	-2%	-1%	0%	-5%	-2%	0%
Below Normal Years	-3%	-2%	-4%	4%	0%	1%	4%	-3%	2%	3%	-5%	2%
Dry Years	10%	4%	2%	0%	0%	3%	-1%	-1%	1%	-3%	14%	0%
Critical Years	-2%	-3%	9%	0%	0%	-1%	2%	1%	1%	-3%	3%	-3%
Dry/Critical Years ^b	5%	1%	5%	0%	0%	1%	0%	0%	1%	-3%	10%	-1%

CalSim 3 output variable: C_FTR063+C_TAB000.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.7.4 Alternatives 2c and 4c

Table 5C-46. Alternatives 2c and 4c, Percent Change from Existing Condition for Feather River Downstream of Thermalito Afterbay, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	6%	1%	0%	0%	0%	0%	0%	0%	1%	-1%	-1%	-2%
Water Year Types												
Wet Years	3%	1%	-1%	0%	0%	0%	0%	0%	1%	-1%	-3%	-3%
Above Normal Years	26%	0%	-1%	-2%	-5%	0%	-2%	-1%	0%	-4%	0%	-5%
Below Normal Years	3%	-2%	-4%	5%	0%	1%	4%	-2%	2%	2%	-7%	2%
Dry Years	10%	6%	2%	0%	0%	3%	2%	-1%	0%	-1%	15%	0%
Critical Years	1%	-2%	8%	0%	0%	-1%	1%	1%	2%	-3%	3%	-3%
Dry/Critical Years ^b	6%	2%	4%	0%	0%	1%	2%	0%	1%	-2%	10%	-1%

CalSim 3 output variable: C_FTR063+C_TAB000.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.7.5 Alternatives 1 and 3

Table 5C-47. Alternatives 1 and 3, Percent Change from Existing Condition for Feather River Downstream of Thermalito Afterbay, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	7%	0%	-1%	1%	0%	1%	0%	0%	1%	-1%	-2%	-3%
Water Year Types												
Wet Years	3%	1%	-1%	0%	0%	0%	0%	0%	1%	-2%	-4%	-3%
Above Normal Years	26%	0%	-1%	1%	-3%	1%	-2%	-1%	0%	-5%	-2%	-4%
Below Normal Years	3%	-2%	-7%	5%	0%	0%	5%	-2%	2%	2%	-6%	0%
Dry Years	10%	4%	2%	0%	0%	3%	4%	-1%	1%	-1%	12%	0%
Critical Years	5%	-2%	9%	0%	1%	6%	2%	0%	-2%	-2%	4%	-3%
Dry/Critical Years ^b	8%	1%	5%	0%	0%	5%	3%	0%	0%	-2%	9%	-1%

CalSim 3 output variable: C_FTR063+C_TAB000.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.7.6 Alternatives 2a and 4a

Table 5C-48. Alternatives 2a and 4a, Percent Change from Existing Condition for Feather River Downstream of Thermalito Afterbay, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	7%	1%	-1%	1%	0%	1%	1%	0%	1%	-1%	-2%	-3%
Water Year Types												
Wet Years	2%	2%	-1%	0%	0%	0%	0%	0%	1%	-1%	-4%	-5%
Above Normal Years	26%	1%	-1%	2%	-3%	1%	-1%	-1%	0%	-5%	-2%	-5%
Below Normal Years	3%	-2%	-7%	6%	2%	1%	7%	-2%	2%	2%	-5%	0%
Dry Years	12%	5%	2%	0%	0%	3%	6%	-1%	2%	-2%	10%	0%
Critical Years	5%	1%	9%	0%	2%	6%	2%	1%	-3%	-3%	4%	-3%
Dry/Critical Years ^b	9%	3%	5%	0%	1%	4%	4%	0%	0%	-2%	7%	-1%

CalSim 3 output variable: C_FTR063+C_TAB000.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.7.7 Alternative 5

Table 5C-49. Alternative 5, Percent Change from Existing Condition for Feather River Downstream of Thermalito Afterbay, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	6%	0%	-1%	1%	0%	1%	0%	0%	1%	-1%	-2%	-3%
Water Year Types												
Wet Years	3%	1%	-1%	0%	0%	0%	0%	0%	1%	-1%	-4%	-3%
Above Normal Years	26%	0%	-1%	1%	-3%	1%	-2%	-1%	0%	-6%	-2%	-2%
Below Normal Years	2%	-2%	-7%	5%	0%	0%	5%	-2%	2%	3%	-6%	-2%
Dry Years	9%	4%	2%	0%	0%	3%	4%	-1%	1%	-1%	13%	0%
Critical Years	4%	-3%	9%	0%	1%	6%	2%	0%	-2%	-2%	4%	-3%
Dry/Critical Years ^b	7%	1%	5%	0%	0%	5%	3%	0%	0%	-2%	9%	-1%

CalSim 3 output variable: C_FTR063+C_TAB000.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.8 American River at Watt Avenue

5C.3.8.1 Existing Conditions

Table 5C-50. American River at Watt Avenue, Mean Monthly Flow under Existing Conditions

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	1,413	2,539	3,105	4,060	4,770	3,225	3,144	4,909	4,848	3,634	2,621	1,828
Water Year Types												
Wet Years	1,576	3,371	5,748	8,383	8,834	5,757	5,682	8,311	7,082	4,156	3,381	2,262
Above Normal Years	1,504	2,300	2,075	4,491	5,180	3,626	2,932	6,063	5,841	4,030	2,988	2,247
Below Normal Years	1,348	2,693	2,453	1,842	3,097	1,955	2,020	3,743	4,257	4,406	2,474	1,744
Dry Years	1,255	2,025	1,569	1,337	1,918	1,685	1,644	2,175	3,280	3,034	2,179	1,472
Critical Years	1,267	1,307	1,102	1,024	1,596	1,208	1,370	1,582	1,929	1,651	1,413	1,076
Dry/Critical Years ^b	1,260	1,690	1,351	1,191	1,768	1,463	1,516	1,899	2,649	2,389	1,821	1,287

CalSim 3 output variable: C_AMR009.

cfs = cubic feet per second.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.8.2 No Project Alternative

Table 5C-51. No Project Alternative, Percent Change from Existing Conditions for American River at Watt Avenue, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	1%	-7%	28%	29%	24%	34%	20%	-30%	-44%	-34%	-25%	7%
Water Year Types												
Wet Years	7%	4%	39%	28%	20%	36%	14%	-32%	-52%	-31%	-27%	11%
Above Normal Years	-4%	-14%	9%	33%	33%	33%	25%	-27%	-50%	-32%	-25%	7%
Below Normal Years	0%	-24%	22%	30%	25%	33%	45%	-28%	-37%	-44%	-28%	0%
Dry Years	1%	-11%	2%	18%	30%	30%	12%	-32%	-31%	-38%	-23%	4%
Critical Years	-7%	5%	5%	38%	21%	24%	16%	-20%	-20%	-8%	-10%	7%
Dry/Critical Years ^b	-3%	-5%	3%	26%	26%	28%	13%	-27%	-27%	-28%	-18%	5%

CalSim 3 output variable: C_AMR009.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.8.3 Alternatives 2b and 4b

Table 5C-52. Alternatives 2b and 4b, Percent Change from Existing Conditions for American River at Watt Avenue, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	2%	1%	0%	0%	0%	0%	1%	0%	0%	-1%	-2%	0%
Water Year Types												
Wet Years	0%	0%	1%	0%	0%	0%	0%	0%	0%	-1%	-1%	0%
Above Normal Years	-2%	7%	0%	-3%	0%	0%	0%	0%	0%	2%	-6%	-2%
Below Normal Years	1%	0%	0%	0%	-1%	2%	1%	0%	0%	-3%	-2%	-1%
Dry Years	8%	3%	0%	1%	2%	1%	0%	1%	1%	-1%	-2%	0%
Critical Years	3%	0%	2%	3%	0%	2%	5%	-5%	3%	1%	-2%	-1%
Dry/Critical Years ^b	6%	2%	1%	2%	1%	1%	3%	-1%	2%	0%	-2%	0%

CalSim 3 output variable: C_AMR009.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.8.4 Alternatives 2c and 4c

Table 5C-53. Alternatives 2c and 4c, Percent Change from Existing Conditions for American River at Watt Avenue, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	3%	1%	0%	0%	0%	0%	0%	0%	0%	-1%	-2%	-1%
Water Year Types												
Wet Years	1%	1%	0%	0%	0%	0%	0%	0%	0%	-1%	0%	1%
Above Normal Years	-3%	1%	-1%	0%	0%	0%	0%	0%	0%	1%	-7%	-5%
Below Normal Years	5%	1%	0%	0%	-1%	1%	1%	0%	1%	-3%	-2%	-1%
Dry Years	9%	0%	0%	1%	1%	1%	0%	1%	1%	-1%	-1%	1%
Critical Years	4%	-2%	1%	4%	2%	2%	5%	-5%	3%	1%	-1%	-1%
Dry/Critical Years ^b	6%	0%	0%	2%	2%	1%	2%	-1%	2%	-1%	-1%	0%

CalSim 3 output variable: C_AMR009.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.8.5 Alternatives 1 and 3

Table 5C-54. Alternatives 1 and 3, Percent Change from Existing Conditions for American River at Watt Avenue, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	3%	2%	0%	0%	0%	0%	1%	0%	0%	-1%	-2%	-1%
Water Year Types												
Wet Years	1%	1%	0%	0%	0%	0%	0%	0%	0%	-1%	-1%	0%
Above Normal Years	-3%	10%	-1%	-3%	0%	0%	0%	0%	0%	1%	-6%	-4%
Below Normal Years	3%	2%	0%	0%	-1%	1%	1%	0%	1%	-4%	-3%	-1%
Dry Years	9%	1%	0%	0%	1%	1%	-1%	1%	1%	-1%	-1%	0%
Critical Years	4%	-2%	1%	0%	2%	1%	8%	-4%	2%	0%	-1%	-1%
Dry/Critical Years ^b	6%	0%	1%	0%	2%	1%	3%	-1%	1%	-1%	-1%	0%

CalSim 3 output variable: C_AMR009.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.8.6 Alternatives 2a and 4a

Table 5C-55. Alternatives 2a and 4a, Percent Change from Existing Conditions for American River at Watt Avenue, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	2%	1%	0%	0%	0%	0%	1%	0%	0%	-1%	-2%	0%
Water Year Types												
Wet Years	1%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	0%	1%
Above Normal Years	-3%	8%	-1%	-3%	0%	0%	0%	0%	0%	0%	-4%	0%
Below Normal Years	1%	1%	0%	0%	-1%	1%	2%	0%	0%	-3%	-1%	-1%
Dry Years	9%	1%	0%	0%	3%	1%	0%	1%	1%	-2%	-5%	0%
Critical Years	3%	0%	1%	3%	2%	2%	6%	-4%	3%	0%	-2%	-1%
Dry/Critical Years ^b	6%	1%	0%	1%	3%	1%	3%	-1%	2%	-1%	-3%	0%

CalSim 3 output variable: C_AMR009.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.

5C.3.8.7 Alternative 5

Table 5C-56. Alternative 5, Percent Change from Existing Conditions for American River at Watt Avenue, Mean Monthly Flow

Statistic	Percent Change from Existing Conditions											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average												
Long-Term Average ^a	2%	2%	0%	0%	0%	0%	1%	0%	0%	-1%	-2%	0%
Water Year Types												
Wet Years	1%	1%	0%	0%	0%	0%	0%	0%	0%	-1%	-1%	0%
Above Normal Years	-3%	10%	-1%	-3%	0%	0%	0%	0%	0%	2%	-6%	-2%
Below Normal Years	3%	0%	0%	0%	-1%	1%	1%	0%	1%	-4%	-3%	-1%
Dry Years	9%	1%	0%	0%	3%	1%	-1%	1%	1%	-1%	-1%	0%
Critical Years	1%	-2%	0%	0%	2%	1%	8%	-4%	2%	0%	-1%	-1%
Dry/Critical Years ^b	5%	0%	0%	0%	3%	1%	3%	-1%	1%	-1%	-1%	0%

CalSim 3 output variable: C_AMR009.

^a Long-Term Average is the average monthly flow for the period of October 1921 through 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.