6. Surface Water Resources

6.1 Introduction

This chapter describes Existing Conditions (the environmental setting) and Project-related changes to surface water resources in the Extended, Secondary and Primary study areas. Detailed descriptions and maps of these three study areas are provided in Chapter 1 Introduction, and summarized descriptions are included in this chapter. Surface water resources generally include reservoirs, rivers, creeks, and human-made diversions, such as flood bypasses and canals.

The chapter also includes a description of the current and future operations and resulting surface water resources characteristics of California's major water systems that are relevant to the Project: the Central Valley Project (CVP), the State Water Project (SWP), and associated tributary rivers and streams. A schematic showing the layout of these two water systems, with the relative location of the proposed Project, is shown in Figure 6-1. A comparison of these characteristics has been made between Existing Conditions, the No Project/No Action Alternative, and the three action alternatives (Alternatives A, B, and C). Unless noted, all numbers shown related to storages, flows, exports, and deliveries in this chapter are generated from the CALSIM-II computer simulation model.

This chapter describes changes in the surface water resources associated with Existing Conditions, the No Project/No Action Alternative, and the three action alternatives, but does not assess impacts or evaluate the significance of surface water changes, except for evaluating changes in the surface water resources metrics (CVP and SWP deliveries) used to evaluate water supply reliability impacts and significance (refer to Section 6.5).

All other impact and significance determinations that rely on the surface water resources data that are presented in this chapter are described and evaluated in other resource chapters (e.g., changes in reservoir storage and river flows). Chapter 5 Guide to the Resources Analyses describes the relationship between this chapter and subsequent analyses included in other chapters. Appendixes 6A and 6B describe the assumptions and the analytical framework used, and presents maps showing the specific locations used for surface water and surface water quality analyses.

6.2 Environmental Setting/Affected Environment

6.2.1 Extended Study Area

The Extended Study Area includes San Luis Reservoir, which is jointly operated by both the CVP and SWP. The Extended Study Area also includes the service areas of the CVP (operated and maintained by the U.S. Bureau of Reclamation [Reclamation]) and the SWP (operated and maintained by the California Department of Water Resources [DWR]).

6.2.1.1 San Luis Reservoir

The San Luis Unit, which is part of the CVP and the SWP, was authorized in 1960. Reclamation and DWR constructed and operate this unit jointly. Some features of the San Luis Unit are "joint-use facilities" of the federal government and the State. The joint-use facilities are O'Neill Dam and Forebay, B.F. Sisk San Luis Dam, San Luis Reservoir, William R. Gianelli Pumping/Generating Plant, Dos

Amigos Pumping Plant, Los Banos and Little Panoche reservoirs, San Luis Canal from O'Neill Forebay to Kettleman City, and the associated switchyard facilities.

Completed in 1967 and dedicated on April 20 of that year, B. F. Sisk Dam (which created San Luis Reservoir) is a zoned earthfill structure 382 feet high with a crest length of 18,600 feet; it contains 77,656,000 cubic yards of material. The dam's crest is 30 feet thick; the maximum base width is 2,420 feet. The reservoir filled for the first time on May 31, 1969. San Luis Reservoir is one of the largest offstream reservoirs in the nation. The reservoir has a capacity of slightly more than 2 million acre-feet (MAF), and is used to store surplus water from the Sacramento-San Joaquin Delta. Reservoir fill and release cycles are similar to other large reservoirs in California, with storage peaking in March (approximately 1.5 MAF average) and at annual minimum levels in August (548,000 acre-feet average). Releases are made through the San Luis Pumping/Generating Plant.

The pumping/generating units lift water from O`Neill Forebay and discharge it into the main reservoir. When not pumping, these units generate electricity by reversing flow through the turbines. Water for irrigation is released into the San Luis Canal, and flows by gravity to Dos Amigos Pumping Plant, where it is lifted more than 100 feet to permit gravity flow to the end of the San Luis Canal at Kettleman City, from which the water continues to flow in the California Aqueduct to southern California. During irrigation months, water from the California Aqueduct flows through O`Neill Forebay into the San Luis Canal instead of being pumped into San Luis Reservoir. Two detention reservoirs, Los Banos and Little Panoche, control cross drainage along the San Luis Canal. The reservoirs also provide recreation and flood control benefits (Reclamation, 2011).

Table 6-1 shows Existing Conditions for average monthly San Luis Reservoir (CVP and SWP) storage over the long term and by water year type for Existing Conditions. Refer to Appendix 6B for San Luis Reservoir surface water elevation and surface area data tables.

Table 6-1
San Luis Reservoir End of Month Storage (TAF)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	697	840	1,175	1,338	1,469	1,553	1,324	1,001	682	603	548	617
Water Year Types[b]												
Wet (32%)	912	950	1,290	1,481	1,673	1,848	1,611	1,301	1,028	895	810	879
Above Normal (15%)	643	758	1,123	1,215	1,346	1,496	1,241	883	621	499	448	546
Below Normal (17%)	732	1,025	1,367	1,352	1,448	1,518	1,267	903	537	489	444	568
Dry (22%)	577	801	1,104	1,340	1,431	1,425	1,183	831	416	398	426	489
Critical (15%)	425	523	860	1,132	1,231	1,207	1,064	842	560	518	381	370

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:
TAF = thousand acre-feet

6.2.1.2 CVP and SWP Deliveries

The CVP provides water to a range of service contract types delivering Municipal and Industrial (M&I), Agricultural, Settlement, Exchange, and Wildlife Refuge water supplies throughout California's Central

Valley. Settlement and Exchange contractors have the highest degree of reliability due to water rights senior to the CVP. Water service contractors and wildlife refuges are subject to shortages according to water availability and their geographic location. Due to conveyance constraints, water service contractors and wildlife refuges south of the Delta have a lower degree of reliability than water service contractors and wildlife refuges north of the Delta.

California is divided into 10 hydrologic regions (Figure 6-2) that correspond to the State's major water drainage basins (DWR, 2005). Table 6-2 shows the Existing Conditions for CVP deliveries for the hydrologic regions within the Extended Study Area by water service type.

Table 6-2
Central Valley Project Annual Deliveries (TAF)
Existing Conditions
Long-Term Average and Average by Water Year Type by Hydrologic Region

	Sacramento River			San Joaquin River			San Francisco Bay		Tulare Lake
Analysis Period	Ag Service	M&I Service	Settlement	Ag Service	M&I Service	Exchange	Ag Service	M&I Service	Ag Service
Long-Term									
Full Simulation Period[a]	223	85	1,908	289	16	852	35	241	600
Water Year Types[b]									
Wet (32%)	316	93	1,900	460	18	875	57	245	956
Above Normal (15%)	310	92	1,913	344	17	875	42	240	712
Below Normal (17%)	221	86	1,949	230	15	875	28	236	482
Dry (22%)	153	80	1,944	197	14	864	24	244	410
Critical (15%)	49	66	1,821	74	11	741	8	234	152

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

TAF = thousand acre-feet
M&I = Municipal and Industrial
Ag = Agricultural

Existing Conditions CVP deliveries reflect the delivery capability of the CVP system, including existing facilities, regulatory requirements, and contractual commitments. Settlement and Exchange deliveries comprise the greatest portion of deliveries for the Sacramento River and San Joaquin River regions, respectively. Agricultural service comprises the majority of the deliveries in San Francisco Bay Region and all of the deliveries in the Tulare Lake Region. Generally, deliveries diminish as conditions get drier. Agricultural service contracts also incur the greatest change in deliveries based upon water year type. For example, Agricultural service deliveries in Critical Years within the Tulare Lake Region (152,000 acre-feet) are 16 percent of the deliveries in Wet years (956,000 acre-feet).

As part of the Central Valley Project Improvement Act (CVPIA), the CVP provides Firm Level 2 Supplies to State Wildlife Refuges, National Wildlife Refuges (NWR), and private wetlands in the Grassland Resource Conservation District (RCD) identified in the CVPIA.

In addition, pursuant to CVPIA, Reclamation is negotiating long-term water supply contracts/agreements for Level 4 Supplies with the California Department of Fish and Game, Grasslands Water District (representing the Grassland RCD), and memoranda of understanding (MOUs) with the U.S. Fish and Wildlife Service (USFWS).

These contracts/agreements and MOUs will provide long-term water supplies (up to 25 years) to specified State wildlife areas, private wetlands in the Grassland RCD, and the NWRs identified in the CVPIA. These Level 4 supplies are in addition to the Firm Level 2 Supplies provided by the CVP.

Table 6-3 shows Existing Conditions for total Wildlife Refuge Water Supply deliveries for the hydrologic regions within the Extended Study Area. These include CVP Contract and Acquisitions supplies.

Table 6-3
Annual Wildlife Refuge Water Supplies[a] (TAF)
Existing Conditions
Long-Term Average and Average by Water Year Type by Hydrologic Region

Analysis Period	Sacramento River		San Joaquin River		Tulare Lake	
	Refuge L2[b]	Refuge L4[c] - Acquisition	Refuge L2	Refuge L4 - Acquisition	Refuge L2	Refuge L4 - Acquisition
Long-Term						
Full Simulation[d] Period	129	10	281	62	15	12
Water Year Types[e]						
Wet (32%)	142	11	289	64	16	12
Above Normal (15%)	131	11	289	64	16	12
Below Normal (17%)	137	11	289	64	16	12
Dry (22%)	126	10	285	63	15	12
Critical (15%)	99	9	240	53	13	10

[a]Includes Contract and Acquisitions supplies.
[b]L2 = Level 2 refuge water supply - the firm water supply historically required for existing habitat management.
[c]L4 = Level 4 refuge water supply - the increased amount of water above Level 2 needed to achieve optimum waterfowl habitat management.
[d]Based on CALSIM-II modeling over an 82-year simulation period.
[e]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Note:
TAF = thousand acre-feet

The SWP provides water to a range of service contract types delivering M&I and agricultural water supplies to service areas in northern California, including the Feather River Service Area (FRSA), the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and southern California. FRSA contractors are located north of the Delta and hold pre-SWP priority senior delivery rights.

Table 6-4 shows Existing Conditions for SWP contract deliveries for the hydrologic regions within the Extended Study Area by water service type. Existing Conditions SWP deliveries reflect the delivery capability of the SWP system, including existing facilities, regulatory requirements, and contractual commitments. Total deliveries of the SWP system are dominated by Agricultural Service in the Tulare Lake Region and M&I Service in the South Coast Region. Deliveries are diminished as conditions become drier, based upon water year type. For example, South Coast M&I Service deliveries in Critical years (757,000 acre-feet) are 50 percent of those deliveries in Wet years (1,517,000 acre-feet).

Table 6-4
Annual State Water Project Deliveries (TAF)
Existing Conditions
Long-Term Average and Average by Water Year Type Hydrologic Region

	Sacramento River	San Joaquin River	San Francisco Bay	Central Coast	Tulare Lake		South Lahontan	South Coast	
Analysis Period	**M&I Service**	**Ag Service**	**M&I Service**	**M&I Service**	**Ag Service**	**M&I Service**	**M&I Service**	**Ag Service**	**M&I Service**
Long-Term									
Full Simulation Period[a]	24	4	190	45	695	87	261	9	1,305
Water Year Types[b]									
Wet (32%)	31	5	219	55	922	114	299	11	1,517
Above Normal (15%)	25	4	192	46	723	92	253	9	1,399
Below Normal (17%)	23	4	206	47	687	86	283	8	1,391
Dry (22%)	20	3	182	42	584	75	252	7	1,240
Critical (15%)	12	2	121	25	353	44	171	4	757

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:
TAF = thousand acre-feet
M&I = Municipal and Industrial
Ag = Agricultural

Table 6-5 shows the average annual SWP contract FRSA deliveries over the long term and by water year type for Existing Conditions.

Table 6-5
Annual State Water Project Feather River Service Area Deliveries (TAF)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Annual Delivery
Full Simulation Period[a]	948
Water Year Types[b]	
Wet (32%)	973
Above Normal (15%)	983
Below Normal (17%)	980
Dry (22%)	986
Critical (15%)	769

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Note:
TAF = thousand acre-feet

6.2.2 Secondary Study Area

The Secondary Study Area is defined as the CVP and SWP reservoirs, rivers, creeks, and associated floodplains that could be affected by Project operations, located in 22 counties.

The Secondary Study Area includes the following reservoirs, rivers, creeks, and floodplains: Trinity Lake, Lewiston Lake, Trinity River, Klamath River downstream of the Trinity River, Whiskeytown Lake, Spring Creek, Shasta Lake, Sacramento River, Keswick Reservoir, Clear Creek, Lake Oroville, Thermalito Complex (Thermalito Diversion Pool, Thermalito Forebay, and Thermalito Afterbay), Feather River, Sutter Bypass, Yolo Bypass, Folsom Lake, Lake Natoma, American River, Sacramento-San Joaquin Delta, Suisun Bay, San Pablo Bay, and San Francisco Bay. They are discussed below.

6.2.2.1 Trinity Lake

The Trinity River Division consists of Trinity Dam and Lake, Trinity Power Plant, Lewiston Dam and Lake, Lewiston Power Plant, Clear Creek Tunnel, Judge Francis Carr Powerhouse, Whiskeytown Dam and Lake, Spring Creek Tunnel and Power Plant, Spring Creek Debris Dam and Reservoir, as well as related pumping and distribution facilities.

The Trinity Dam and facilities transfer water from the Trinity River basin to the Sacramento River Basin. Water from the Trinity River Basin is stored, regulated, and diverted through a system of dams, reservoirs, tunnels, and power plants. The system diverts the water south into Clear Creek, the Sacramento River, and the Central Valley.

Trinity Dam regulates flows and stores water for various uses. Completed in 1962, Trinity Dam is an earthfill structure 538 feet high with a crest length of 2,450 feet. The dam forms Trinity Lake. Trinity Lake, located approximately 50 miles west of the City of Redding, has a capacity of approximately 2.4 MAF and is operated for a variety of purposes: irrigation water supply, flood control, improved Sacramento River navigation, domestic and industrial water supply, electric power generation, fish and wildlife conservation, creation of recreation opportunities, and water quality enhancement. Releases from Trinity Dam through the downstream Trinity Power Plant are regulated downstream at Lewiston Reservoir for downstream flow requirements and diversions through the Clear Creek Tunnel to Keswick Reservoir. The outflow from Trinity and Lewiston reservoirs also provides water to meet temperature objectives for special-status species in the Trinity and upper Sacramento rivers.

The minimum instream flow requirements downstream of Lewiston Dam on the Trinity River that were stipulated in the Trinity River Record of Decision (ROD) (Reclamation, 2000) affect storage within Trinity Lake.

Storage varies between approximately 1.3 MAF (October) and 1.8 MAF (April), based upon the long-term average end-of-month storage. The variation from average is most significant in Critical year types, where end-of-month storage is reduced by up to 55 percent in November; Critical Year November storage is approximately 590,000 acre-feet, and long-term average November storage is approximately 1.3 MAF (Reclamation, 2011).

Table 6-6 shows Existing Conditions for average monthly Trinity Lake storage over the long term and by water year type. Refer to Appendix 6B for Trinity Lake surface water elevation and area data tables.

Table 6-6
Trinity Lake End-of-Month Storage (TAF)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	1,306	1,314	1,366	1,427	1,537	1,659	1,807	1,803	1,767	1,631	1,494	1,373
Water Year Types[b]												
Wet (32%)	1,738	1,746	1,764	1,753	1,913	2,047	2,224	2,260	2,239	2,111	1,997	1,845
Above Normal (15%)	1,547	1,542	1,571	1,523	1,676	1,845	2,015	2,020	1,992	1,869	1,736	1,601
Below Normal (17%)	1,211	1,245	1,328	1,316	1,390	1,487	1,658	1,643	1,598	1,466	1,335	1,232
Dry (22%)	1,070	1,074	1,182	1,322	1,405	1,533	1,664	1,615	1,552	1,404	1,235	1,127
Critical (15%)	595	589	621	913	952	1,023	1,083	1,062	1,040	886	734	653

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Note:
TAF = thousand acre-feet

6.2.2.2 Lewiston Lake

Lewiston Dam was constructed by Reclamation from 1960 to 1963. Lewiston Lake is formed by Lewiston Dam on the Trinity River. It has a capacity of approximately 14,600 acre-feet. Lewiston Power Plant is located at the base of Lewiston Dam. It diverts water through the Clear Creek Tunnel to Whiskeytown Lake. The power plant began operating in 1964.

Although developed primarily for irrigation, this multiple-purpose project also provides flood control, improves Sacramento River navigation, supplies domestic and industrial water, generates electric power, conserves fish and wildlife, creates opportunities for recreation, and enhances water quality.

Lewiston maintains and regulates river releases and provides power to the adjacent Trinity River Fish Hatchery. Energy in excess of hatchery loads is sold to Pacific Gas and Electric Company (Reclamation, 2011).

6.2.2.3 Trinity River

The Trinity River, located in northwest California, is the largest tributary to the Klamath River. Water export and energy generation from the Trinity River were envisioned as early as 1931 when plans for diverting Trinity River water to the Sacramento River were included as part of the California State Water Plan.

The 2000 Trinity River ROD stipulated specific releases to the Trinity River downstream of Lewiston Dam to meet instream flow requirements. The total volume of water released to the Trinity River ranges from approximately 369,000 acre-feet to 815,000 acre-feet, depending on the annual water-year type (hydrology) determined as of April 1st (Reclamation, 2000). Table 6-7 shows the annual flow volumes, peak flows, and peak flow durations by water type[1].

[1] The water year types included in the Trinity ROD are probability-based and classified by ranges of annual Trinity River Basin water year runoff. This classification is different from the water year types presented in all other tables of this chapter, which are based on the historical record of WY1922 through WY2003 and defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 2000).

Table 6-7
Trinity River Record Of Decision
Annual Flow Volumes and Peak Flows

Water Year Type	Volume (AF)	Peak Flow (cfs)	Peak Flow Duration (days)
Extremely Wet	815,000	11,000	5
Wet	701,000	8,500	5
Normal	647,000	6,000	5
Dry	453,000	4,500	5
Critically Dry	369,000	1,500	36

Notes:
cfs = cubic feet per second
AF = acre-feet

Source: Reclamation, 2000.

The release schedules based on water year type have a minimum release of 450 cubic feet per second (cfs) between October 1st through October 15th, and 300 cfs from October 16th through April 21st. Release schedules are variable, based upon water year type between April 22nd and July 21st. Releases across all water year types are then fixed at a minimum of 450 cfs from July 22nd through September 30th (Reclamation, 2000).

Table 6-8 shows Existing Conditions for average monthly Trinity River flow downstream of Lewiston Lake over the long term and by water year type. Trinity River long-term average flows by month vary between 365 cfs in November and 3,779 cfs in May.

Table 6-8
Trinity River Monthly Flow Downstream of Lewiston Reservoir (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	368	365	523	662	644	617	583	3,779	2,108	923	450	450
Water Year Types[b]												
Wet (32%)	373	300	856	1,436	1,056	1,227	716	4,636	3,371	1,289	450	450
Above Normal (15%)	373	741	621	316	760	436	469	4,462	2,488	1,048	450	450
Below Normal (17%)	373	300	300	300	517	319	507	3,774	1,672	869	450	450
Dry (22%)	373	300	300	300	300	300	529	3,216	1,251	667	450	450
Critical (15%)	342	300	300	300	300	300	575	2,092	783	450	450	450

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).
Note:
cfs = cubic feet per second

The Trinity River ROD release schedules are clearly reflected in the monthly flows by water year type. For example, the 300 cfs minimum flow requirement is reflected in the Below Normal, Dry, and Critical water years during November through March. The 450 cfs minimum flow requirement during August and September is clearly reflected across all water years.

6.2.2.4 Klamath River Downstream of the Trinity River

The Klamath River begins in the southeastern part of Oregon and flows approximately 263 miles southwest through northern California, flowing through the southern Cascade Range to empty into the Pacific Ocean. The Trinity River is the largest tributary of the Klamath River. The Trinity River joins the Klamath River at Weitchpec approximately 44 miles upstream of the Pacific Ocean.

The Trinity River confluence also marks the point where Klamath River flows slow down dramatically. For the remainder of its course, it flows generally northwest through the Hoopa Valley and Yurok Indian reservations, passing the town of Klamath and flowing out to sea 16 miles south of Crescent City. The mouth of the Klamath River is located at the community of Requa.

6.2.2.5 Clear Creek

Since 1964, a portion of the flow from the Trinity River Basin has been exported to the Sacramento River Basin through CVP facilities. Water is diverted from the Trinity River at Lewiston Dam via the 11-mile-long Clear Creek Tunnel and passes through the Judge Francis Carr Powerhouse as it is discharged into Whiskeytown Lake on Clear Creek.

Table 6-9 shows Existing Conditions for average monthly Clear Creek Tunnel flow over the long term and by water year type. The long-term average monthly flow in the Clear Creek Tunnel ranges from 92 cfs (February) to 1,866 cfs (August). The relative timing of flow in the Clear Creek Tunnel is unnatural because higher flows occur in summer and lower flows occur in winter.

Table 6-9
Clear Creek Tunnel Monthly Flow (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	981	382	243	468	92	268	403	155	518	1,782	1,866	1,660
Water Year Types[b]												
Wet (32%)	1,556	494	497	428	81	313	403	259	344	1,760	1,566	2,192
Above Normal (15%)	904	416	283	269	58	317	585	0	163	1,417	1,771	1,917
Below Normal (17%)	464	157	79	286	80	387	342	50	615	1,573	1,743	1,342
Dry (22%)	769	438	94	561	115	152	339	209	956	1,933	2,329	1,417
Critical (15%)	734	283	67	826	131	152	389	125	479	2,212	2,058	987

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Note:
cfs = cubic feet per second

Table 6-10 shows Existing Conditions for average monthly Clear Creek flow downstream of Whiskeytown Lake over the long term and by water year type. The long-term average monthly flow in Clear Creek downstream of Whiskeytown Lake ranges from 85 cfs (July) to 194 cfs (February).

Table 6-10
Clear Creek Monthly Flow Downstream of Whiskeytown Reservoir (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	182	183	184	193	194	188	188	262	180	85	86	146
Water Year Types[b]												
Wet (32%)	200	200	200	221	220	200	200	277	200	85	85	150
Above Normal (15%)	200	200	200	192	196	196	196	277	200	85	85	150
Below Normal (17%)	193	193	193	189	189	189	189	263	181	85	85	150
Dry (22%)	181	182	182	184	184	184	187	264	180	85	85	144
Critical (15%)	117	118	125	155	155	155	155	211	115	85	94	133

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).
Note:
cfs = cubic feet per second

6.2.2.6 *Whiskeytown Lake*

Whiskeytown Dam was constructed in 1963 by Reclamation. Located approximately eight miles west of Redding, it was one of the first units of the Trinity River Diversion of the CVP to be constructed. The earthfill dam, located on Clear Creek, is 282 feet high and 4,000 feet long. Crest elevation is 1,228 feet. Whiskeytown Dam regulates Trinity River flows discharged from the Judge Francis Carr Powerhouse and regulates the runoff from the Clear Creek drainage area. Whiskeytown Lake has a capacity of approximately 241,000 acre-feet.

Whiskeytown Lake is normally operated to regulate inflows for power generation and recreation, support upper Sacramento River temperature objectives, and provide releases to Clear Creek, consistent with CVPIA Anadromous Fish Restoration Program (AFRP) objectives.

Historically (1964 to 1992), approximately 1.3 MAF of water has been diverted annually from Whiskeytown Lake to Keswick Reservoir. This represents approximately 17 percent of the flow measured in the Sacramento River at Keswick.

Operations at Whiskeytown Lake during flood conditions are complicated by its operational relationship with the Trinity River, Sacramento River, and Clear Creek. On occasion, imports of Trinity River water to Whiskeytown Lake may be suspended to avoid increasing flows under high flow conditions in the Sacramento basin. Heavy rainfall events occasionally result in spillway discharges to Clear Creek.

Water rights permits issued by SWRCB for diversion from Trinity River and Clear Creek specify minimum downstream releases from Lewiston and Whiskeytown dams, respectively (Reclamation, 2011).

6.2.2.7 *Spring Creek*

The Spring Creek Tunnel diverts water from Whiskeytown Lake on Clear Creek to the Spring Creek Power Plant. The tunnel is 18.5 feet in diameter and approximately 2.4 miles long, including the 0.6-mile-long 17-foot-diameter Rock Creek Siphon. The Spring Creek Power Plant (a peaking plant that has been operating since 1964) is located at the foot of the Spring Creek Debris Dam. Water from the plant is discharged to Keswick Reservoir.

Spring Creek also flows into the Sacramento River and enters at Keswick Reservoir. Flows on Spring Creek are partially regulated by the Spring Creek Debris Dam.

The Spring Creek Debris Dam, located on Spring Creek upstream of the Spring Creek Power Plant tailrace, is an earthfill structure that is 196 feet high with a crest length of 1,110 feet. Spring Creek Reservoir has a capacity of approximately 5,800 acre-feet. It controls debris that would otherwise enter the power plant tailrace, and provides important fishery and water quality benefits by controlling contaminated runoff resulting from old mine tailings on Spring Creek (Reclamation, 2011).

6.2.2.8 Shasta Lake

Shasta Dam was constructed in 1945 by Reclamation as an integral element of the CVP for six purposes: irrigation water supply, M&I water supply, flood control, hydropower generation, fish and wildlife conservation, and navigation. Shasta Dam is located on the upper Sacramento River approximately nine miles northwest of Redding. Shasta Lake has a storage capacity of approximately 4.5 MAF. Shasta Lake captures runoff from approximately 6,665 square miles. Shasta Power Plant, a peaking power plant, is located downstream of Shasta Dam on the Sacramento River. Pertinent data for Shasta Dam and Lake are shown in Table 6-11.

Table 6-11
Shasta Dam and Lake Pertinent Data

	Elevation (feet)	Area (acres)	Capacity (TAF)
Inactive Pool	840	6,700	587
Bottom Flood Control Pool[a]	1,019	24,000	3,252
Gross (Full) Pool[b]	1,067	29,500	4,552

[a]Maximum Controlled Release: 81,800 cfs
[b]Spillway Capacity: 186,000 cfs

Note:
TAF = thousand acre-feet

Source: Reclamation, 2011.

Shasta Lake has an average annual inflow of 5.9 MAF. The flood control storage space is 1.3 MAF. Inflows to the lake generally increase during November through March, with maximum storage occurring in April or May following the months of highest inflow. After the spring snowmelt has ended, typical June through October flow into the reservoir is less than 5,000 cfs. Seasonal storage and releases average approximately 1.5 MAF with year-to-year carryover averaging about 2.8 MAF.

The entire outflow from Shasta Lake flows into, and is regulated through, Keswick Reservoir, which is located approximately nine miles downstream of Shasta Dam. Releases from Shasta Reservoir are managed to meet minimum fish flows and temperature requirements, flood control requirements, salinity control, and water supply demands of CVP contractors (Reclamation, 2011).

Shasta Lake is the largest reservoir in California, and as such, is the foundation storage facility of the CVP system. The operation of Shasta Lake has greatly changed the natural flow conditions of the Sacramento River downstream of Keswick Reservoir. Flood peaks are reduced in the winter and spring, and discharges are increased during the summer and fall for irrigation, fish, and other uses.

A temperature control device (TCD) was installed at Shasta Dam between 1996 and 1998 to both minimize power losses and control the water temperature downstream of Shasta Lake to protect salmon.

The new TCD has allowed for warmer water withdrawals in the spring/early summer, resulting in conservation of the deep cold water pool for colder withdrawals in the late summer/early fall to meet downstream temperature requirements.

Table 6-12 shows Existing Conditions for average monthly Shasta Lake storage over the long term and by water year type. Over the long-term average, Shasta Lake end-of-month storage varies between 2,549,000 acre-feet in November and 3,939,000 acre-feet in May.

Table 6-12
Shasta Lake End-of-Month Storage (TAF)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	2,571	2,549	2,703	2,979	3,260	3,615	3,910	3,939	3,635	3,159	2,825	2,651
Water Year Types[b]												
Wet (32%)	3,073	2,958	3,097	3,414	3,638	3,863	4,318	4,471	4,290	3,882	3,528	3,170
Above Normal (15%)	2,996	2,914	3,081	3,145	3,425	3,962	4,402	4,478	4,128	3,563	3,229	3,085
Below Normal (17%)	2,859	2,929	2,998	2,928	3,305	3,693	4,061	4,090	3,756	3,263	2,938	2,882
Dry (22%)	2,331	2,390	2,632	2,823	3,187	3,667	3,816	3,729	3,353	2,844	2,504	2,423
Critical (15%)	1,084	1,091	1,233	2,160	2,331	2,560	2,498	2,390	2,007	1,539	1,246	1,165

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Note:
TAF = thousand acre-feet

Water in storage in Shasta Lake is reduced, especially in Critical water years, up to 58 percent in October (from 2,571,000 acre-feet long-term average to 1,084,000 acre-feet during Critical water years). Refer to Appendix 6B for Shasta Lake surface water elevation and area data tables.

6.2.2.9 Keswick Reservoir

Since 1964, flow from the Trinity River has been imported to Whiskeytown Lake and then to Keswick Reservoir. Keswick Dam and Reservoir is located approximately nine miles downstream from Shasta Dam and five miles west of the City of Redding. Keswick Power Plant is located at Keswick Dam. Keswick Reservoir has a storage capacity of approximately 24,000 acre-feet.

Keswick Reservoir receives inflows from Whiskeytown Lake on Clear Creek and regulates all outflows from Shasta Lake that flow into and through the reservoir. Keswick Dam controls runoff from 45 square miles of drainage area. Nearly all releases from Keswick Dam are made through its generating facilities. On occasion, however, outflows during flood operations are made through the flood control outlets and over the spillway. During these instances, the existing power plant is bypassed for much of the flood release.

Releases from Keswick Reservoir are managed to meet minimum fish flow and temperature requirements, flood control requirements, salinity control requirements, and water supply demands of CVP contractors (Reclamation, 2011).

6.2.2.10 Sacramento River

The Sacramento River is the largest river in California. Runoff from the upper Sacramento River and its tributaries are regulated by Shasta Dam and Lake, and then by Keswick Dam and Reservoir.

Downstream of Keswick Reservoir, the Sacramento River is also influenced by tributary stream runoff from precipitation and snowmelt; diversions for agricultural, municipal, and industrial purposes; agricultural and municipal discharges; and a flood damage reduction system that includes levees, floodplains (including the Yolo, Sutter, and Colusa bypasses), and weirs.

The Sacramento River flood channel capacity between Red Bluff and Chico Landing near the mouth of Stony Creek is approximately 260,000 cfs. The Sacramento River Flood Control Project levees begin near Ord Bend. From Ord Bend to below Butte City, the Sacramento River flood channel capacity is approximately 160,000 cfs. Floodwaters exceeding the channel capacity between Chico Landing and Colusa Weir overflow into the Butte Sink area and then to the Sutter Bypass. The capacity of the Sacramento River decreases to approximately 110,000 cfs downstream of Moulton Weir, and to approximately 48,000 cfs downstream of Colusa Weir (USACE, 1960).

Annual diversions from the Sacramento River upstream of the Feather River average approximately 1.7 MAF. Major diversions occur at the Red Bluff Diversion Dam (RBDD) into the Tehama-Colusa (T-C) and Corning canals, and at the Glenn-Colusa Irrigation District (GCID) Canal at Hamilton City. Surface water demands along the Sacramento River between Red Bluff and Colusa are more than 2.3 MAF annually, including water supplies for Sacramento Valley refuges, agricultural activities, and urban uses.

The Sacramento River channel downstream of Colusa is quite different than upstream of Colusa. Downstream of Colusa, the gradient of the river decreases, the channel becomes deeper and narrower, the capacity decreases, and the bed material is finer (SRAC, 1998). The river is also contained by levees with excess flow bypassed through spills at Tisdale, Fremont, and Sacramento weirs. The bypassed flow goes into the Sutter Bypass and the Yolo Bypass. The Feather River joins the Sacramento River at the community of Verona, and the American River joins at the City of Sacramento. The Sacramento River then flows south, joining with the San Joaquin River in the Delta, and out to the Pacific Ocean.

Numerous small and large streams flow into the Sacramento River. The major tributaries feeding into the Sacramento River are listed in Table 6-13.

Table 6-13
Major Tributaries of the Sacramento River Downstream of Shasta Dam

West Side	East Side
Clear Creek	Cow Creek and Bear Creek
Cottonwood Creek	Battle Creek
Elder Creek	Paynes Creek
Thomes Creek	Antelope Creek
Stony Creek	Mill Creek
Colusa Basin Drain	Deer Creek
Cache Creek	Big Chico Creek
Putah Creek	Butte Creek
	Feather River
	American River

Table 6-14 shows Existing Conditions for average monthly Sacramento River flow downstream of Keswick Reservoir over the long term and by water year type. Long-term average Sacramento River monthly streamflow downstream of Keswick Reservoir varies between 6,248 cfs in October and 10,154 cfs in February. Streamflow downstream of Keswick Reservoir varies by year type, similar to Shasta Lake storage. Critical water year streamflow is decreased by up to 65 percent in February (3,591 cfs), compared to long-term average flow (10,154 cfs). Wet water year streamflow is increased by up to 92 percent in January (15,878 cfs), compared to long-term average flow (8,252 cfs).

Table 6-14
Sacramento River Monthly Flow Downstream of Keswick Reservoir (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	6,248	6,621	6,866	8,252	10,154	8,553	6,998	7,881	10,711	13,036	10,467	7,909
Water Year Types[b]												
Wet (32%)	7,485	8,758	7,585	15,878	18,374	16,094	9,415	9,514	10,374	12,762	11,001	12,009
Above Normal (15%)	5,980	8,513	6,903	7,591	14,202	8,625	6,182	7,700	11,172	14,150	10,441	7,812
Below Normal (17%)	5,440	5,162	8,203	4,284	5,370	4,841	5,321	6,918	10,678	12,780	9,954	5,371
Dry (22%)	5,844	5,081	7,101	3,967	3,678	3,820	5,713	7,235	11,136	13,238	10,620	5,752
Critical (15%)	5,385	4,108	3,357	3,447	3,591	3,571	6,464	6,617	10,383	12,509	9,705	5,320

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).
Note:
cfs = cubic feet per second

Table 6-15 shows Existing Conditions for average monthly Sacramento River flow downstream of the RBDD over the long term and by water year type. The long-term average monthly flow in the Sacramento River downstream of RBDD ranges from 7,032 cfs (October) to 17,941 cfs (February). Flow at this location is slightly less than the upstream flow at Bend Bridge in a few months due to diversions.

Table 6-15
Sacramento River Monthly Flow Downstream of Red Bluff Diversion Dam (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	7,032	8,787	11,637	15,206	17,941	14,579	10,565	9,466	10,911	12,412	9,946	8,154
Water Year Types[b]												
Wet (32%)	8,281	11,194	12,240	27,681	30,270	25,051	15,105	11,949	10,894	12,072	10,333	12,262
Above Normal (15%)	6,884	10,747	11,818	16,243	23,485	16,211	10,353	9,416	11,011	13,079	9,679	8,013
Below Normal (17%)	6,452	7,417	13,282	9,283	11,483	8,999	8,451	8,103	10,722	12,058	9,413	5,588
Dry (22%)	6,538	7,247	12,902	7,144	9,009	8,355	7,747	8,285	11,203	12,768	10,303	6,047
Critical (15%)	5,895	5,520	6,332	6,144	6,618	6,102	7,634	7,501	10,632	12,364	9,462	5,551

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).
Note:
cfs = cubic feet per second

Table 6-16 shows Existing Conditions for average monthly Sacramento River flow downstream of Hamilton City over the long term and by water year type. The long-term average monthly flow in the Sacramento River downstream of Hamilton City ranges from 6,619 cfs (October) to 20,300 cfs (February). Again, tributary inflow increases flow in most months and diversion reduces flow in a few months, when compared to the upstream location.

Table 6-16
Sacramento River Monthly Flow Downstream of Hamilton City (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	6,619	9,075	12,936	17,250	20,300	16,660	10,162	8,718	8,620	9,888	8,073	7,785
Water Year Types[b]												
Wet (32%)	7,853	11,556	13,484	31,340	33,977	28,110	15,739	11,993	8,997	9,663	8,472	11,920
Above Normal (15%)	6,474	11,083	13,152	18,882	26,624	18,886	10,245	8,864	8,710	10,487	7,736	7,644
Below Normal (17%)	6,147	7,766	14,677	10,647	13,229	10,421	7,874	7,027	8,254	9,373	7,410	5,181
Dry (22%)	6,042	7,550	14,569	7,957	10,413	9,935	6,626	6,905	8,520	10,084	8,346	5,656
Critical (15%)	5,503	5,510	7,053	6,733	7,425	6,994	5,970	6,169	8,287	10,085	7,909	5,200

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Note:
cfs = cubic feet per second

Table 6-17 shows Existing Conditions for monthly Sacramento River flow downstream of the proposed Delevan Pipeline Intake for averages over the long term and by water year type. The long-term average monthly flow in the Sacramento River downstream of the proposed Delevan Pipeline Intake ranges from 6,306 cfs (October) to 25,420 cfs (February).

Table 6-17
Sacramento River Monthly Flow Downstream of the Proposed Delevan Pipeline Intake (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	6,306	9,052	14,656	21,192	25,420	19,912	11,635	8,443	7,819	8,727	7,319	7,972
Water Year Types[b]												
Wet (32%)	7,634	11,475	15,519	38,450	42,982	32,866	19,105	12,303	8,817	8,651	7,724	12,246
Above Normal (15%)	6,246	11,166	14,847	24,460	32,370	24,091	11,987	8,976	7,824	9,124	7,024	7,851
Below Normal (17%)	5,946	8,101	16,785	12,874	16,828	12,226	8,830	6,775	7,233	8,097	6,559	5,317
Dry (22%)	5,556	7,438	16,198	9,455	13,318	12,085	6,699	5,929	7,278	8,920	7,469	5,731
Critical (15%)	5,031	5,218	7,798	7,843	8,597	8,377	5,773	5,267	7,149	8,942	7,403	5,291

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Note:
cfs = cubic feet per second

6.2.2.11 Glenn-Colusa Irrigation District Canal

The GCID's Main Pump Station, located approximately five miles northwest of Hamilton City, diverts water into the existing GCID Canal for distribution to over 130,000 acres of irrigated lands within the GCID service area. The approximately 65-mile-long Canal terminates at the Colusa Basin Drain (CBD) near the town of Williams, California.

GCID's system has undergone significant infrastructure and operational changes; infrastructure changes have included a major expansion of the GCID Fish Screen (completed in 2001) and several improvements along the Canal to allow year-round water delivery operations. Two major operational changes included a shift to year-round water delivery to provide water in the fall and winter to the federal Sacramento National Wildlife Refuge complex, as well as to meet increased fall and winter season water demands for rice straw decomposition purposes.

The existing Canal is an unlined earthen channel with capacity varying from 3,000 cfs at the upstream end to 300 cfs at its terminus. Approximately 40 miles of the Canal, from the Main Pump Station south to the proposed Terminal Regulating Reservoir (TRR), would be used for conveying water to the proposed Sites Reservoir. The 40-mile section of the Canal has six main reaches. There are 40 major structures within this area, including bridges, siphons, and check structures.

Table 6-18 shows Existing Conditions for average monthly GCID Canal Intake flow over the long term and by water year type. Long-term average monthly GCID Canal flow ranges from 52 cfs (February) to 2,818 cfs (June).

Table 6-18
Glenn-Colusa Irrigation District Canal Intake Monthly Flow at Hamilton City (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	675	391	180	71	52	117	2,096	2,054	2818	2,668	1,916	528
Water Year Types[b]												
Wet (32%)	706	404	197	67	52	105	1,931	2,085	2,864	2,728	1,977	561
Above Normal (15%)	703	398	175	61	49	100	2,063	2,047	2,900	2,738	1,988	548
Below Normal (17%)	692	406	170	77	52	125	2,200	2,139	2,862	2,746	2,011	547
Dry (22%)	696	376	191	74	54	122	2,213	2,111	2,889	2715	1,944	526
Critical (15%)	533	362	145	77	53	145	2,188	1,810	2,479	2,306	1,560	418

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).
Note:
cfs = cubic feet per second

6.2.2.12 Tehama-Colusa Canal

Constructed in 1980 by Reclamation, the T-C Canal is a lined canal that is approximately 111 miles long. It extends from the RBDD in Tehama County to south of the community of Dunnigan in Yolo County. It is operated by the Tehama-Colusa Canal Authority (TCCA) through a Joint Powers Authority comprised of 17 water districts. TCCA delivers water to the 17 water districts' irrigation service areas in Tehama, Glenn, Colusa, and northern Yolo counties. Since the canal operation began, fall and winter diversions have increased due to increased water demands for rice straw decomposition purposes.

Water from the Sacramento River enters the T-C Canal Intake at the RBDD. Canal capacity is 2,530 cfs at the start and 1,700 cfs at the terminus. Canal flows enter Funks Reservoir approximately 66 canal miles downstream from the RBDD. The canal capacity at Funks Reservoir is 2,100 cfs.

Table 6-19 shows Existing Conditions for average monthly T-C Canal Intake flow over the long term and by water year type. Long-term average monthly T-C Canal Intake flow ranges from 0 cfs (December and January) to 830 cfs (July).

Table 6-19
Tehama Colusa Canal Intake Monthly Flow at Red Bluff Diversion Dam (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	109	11	0	0	3	20	155	435	725	830	666	175
Water Year Types[b]												
Wet (32%)	142	13	0	0	0	16	152	605	1,008	1,159	906	239
Above Normal (15%)	110	8	0	0	0	13	188	594	1,011	1,139	882	233
Below Normal (17%)	105	9	0	0	3	33	186	411	667	772	601	131
Dry (22%)	98	9	0	0	6	20	138	290	491	544	435	126
Critical (15%)	61	13	0	0	9	23	115	154	245	305	354	100

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Note:
cfs = cubic feet per second

6.2.2.13 Lake Oroville and the Thermalito Complex (Thermalito Diversion Pool, Thermalito Forebay, and Thermalito Afterbay)

The Oroville Facilities include Oroville Dam and Lake Oroville, three power plants (Hyatt Pumping-Generating Plant, Thermalito Diversion Dam Power Plant, and Thermalito Pumping-Generating Plant), Thermalito Diversion Dam, the Feather River Fish Hatchery and Fish Barrier Dam, Thermalito Power Canal, Oroville Wildlife Area, Thermalito Forebay and Forebay Dam, Thermalito Afterbay and Afterbay Dam, transmission lines, as well as several recreational facilities. The Oroville Facilities were developed as part of the SWP and are operated by DWR.

The mainstem of the Feather River is regulated by Oroville Dam. The dam and its two saddle dams were completed in 1968 and formed Lake Oroville, a 3.5-MAF capacity storage reservoir with a surface area of approximately 16,000 acres at its normal maximum operating level.

The Oroville hydroelectric facilities have a combined licensed generating capacity of approximately 762 megawatts (MW). The facilities consist of the Hyatt Pumping-Generating Plant, the Thermalito Diversion Dam Power Plant, and the Thermalito Pumping-Generating Plant.

The Thermalito Afterbay is used to release water into the Feather River downstream of the hydroelectric facilities. It helps regulate the power system, provides storage for pump-back power operations, and provides recreational opportunities. Several local irrigation districts receive water from the Afterbay during the May through August season.

Operation of the Oroville facilities varies depending upon hydrology and the objectives DWR is trying to meet. Lake Oroville stores winter and spring runoff for release to the Feather River, as necessary, for project purposes. Typically, releases to the Feather River are managed to conserve water while meeting a variety of water delivery requirements, including flow, temperature, fisheries, recreation, diversions, and water quality. Power production is scheduled within the boundaries specified by the water operations criteria.

During the wintertime, the Oroville Facilities are operated pursuant to flood control requirements specified by the U.S. Army Corps of Engineers (USACE). Pursuant to these requirements, Lake Oroville is operated to maintain up to 750,000 acre-feet of storage space to allow for the capture of significant inflows.

Annual operations are conducted for multi-year carryover. The current methodology is to retain half of the Lake Oroville storage above a specific level for subsequent years. Currently, that level has been established at 1 MAF; however, this does not limit drawdown of the reservoir below that level. If hydrology is drier than expected, or requirements greater than expected, additional water would be released from Lake Oroville. The operations plan is updated regularly to reflect changes in hydrology and downstream operations. Project operations are directly constrained by downstream operational constraints and flood management criteria.

An August 1983 agreement between DWR and DFG titled, "*Agreement Concerning the Operation of the Oroville Division of the State Water Project for Management of Fish & Wildlife*," sets criteria and objectives for flow and temperatures in the low-flow channel and the reach of the Feather River between Thermalito Afterbay and Verona where the Feather River joins the Sacramento River. This agreement: (1) establishes minimum flows between Thermalito Afterbay Outlet and Verona, which vary by water year type; (2) requires flow changes under 2,500 cfs to be reduced by no more than 200 cfs during any 24-hour period, except for situations such as flood management or failures; (3) requires flow stability during the peak of the fall-run Chinook spawning season; and (4) sets an objective of suitable temperature conditions during the fall months for salmon and during the later spring/summer for shad and striped bass. In addition, the 2006 Feather River Settlement Agreement established minimum flows of 800 cfs during October through March and 700 cfs during April through August across all water year types in the low-flow channel.

Table 6-20 shows Existing Conditions for average end-of-month Lake Oroville storage over the long term and by water year type. The long-term average end-of-month Lake Oroville storage ranges from 1,812,000 acre-feet (October) to 3,015,000 acre-feet (May). In Critical water years, storage in Lake Oroville is reduced by more than 50 percent in July (1,153,000 acre-feet), as compared to long-term average (2,426,000 acre-feet). Refer to Appendix 6B for Lake Oroville surface water elevation and area data tables.

Table 6-20
Lake Oroville End-of-Month Storage (TAF)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	1,812	1,868	2,006	2,203	2,405	2,606	2,879	3,015	2,908	2,426	2,135	1,883
Water Year Types[b]												
Wet (32%)	2,464	2,503	2,544	2,697	2,868	2,945	3,303	3,507	3,488	3,146	2,987	2,563
Above Normal (15%)	2,012	2,071	2,178	2,321	2,624	2,938	3,300	3,498	3,398	2,842	2,478	2,090
Below Normal (17%)	1,906	1,972	2,184	2,108	2,352	2,608	2,984	3,206	3,109	2,526	2,129	1,965
Dry (22%)	1,236	1,328	1,590	1,904	2,122	2,415	2,608	2,654	2,452	1,879	1,426	1,303
Critical (15%)	954	975	1,081	1,571	1,669	1,824	1,820	1,788	1,608	1,153	1,015	975

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Note:
TAF = thousand acre-feet

6.2.2.14 Feather River

Lower Feather River flows vary as water released at the Oroville Dam facilities travels down to the confluence with the Sacramento River at Verona. At the upper extent, the approximate eight-mile low flow section contains mainly riffles and runs. The low-flow section also has a series of remnant gravel pit pools/ponds that connect to the main channel. This stretch is fairly confined by levees as it flows through the City of Oroville. The 2006 Feather River Settlement Agreement established minimum flows of 800 cfs during October through March and 700 cfs during April through August across all water year types in the low-flow channel. From the downstream end of the low-flow section, the Feather River is fairly active and meanders its way south to Marysville. However, this stretch is bordered by active farmland, which confines the river into an incised channel in certain stretches.

Table 6-21 shows Existing Conditions for monthly Feather River flow downstream of the Thermalito Complex for averages over the long term and by water year type. The long-term average monthly flow in the Feather River downstream of the Thermalito Complex ranges from 2,282 cfs (November) to 6,079 cfs (March).

Table 6-21
Feather River Monthly Flow Downstream of the Thermalito Complex (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	2,935	2,282	3,523	4,739	5,651	6,079	3,076	3,645	3,625	7,632	4,837	4,626
Water Year Types[b]												
Wet (32%)	3,888	3,486	5,622	10,678	11,699	12,513	6,499	7,531	5,063	6,479	3,292	7,931
Above Normal (15%)	3,714	2,323	3,340	3,586	5,659	7,115	2,252	3,366	3,291	8,874	6,037	6,935
Below Normal (17%)	2,770	1,998	2,618	1,756	3,045	2,383	1,119	1,137	2,655	8,938	6,243	2,571
Dry (22%)	2,225	1,478	2,510	1,604	1,757	2,009	1,330	1,555	3,157	8,221	6,778	2,038
Critical (15%)	1,346	1,172	1,731	1,209	1,421	1,516	1,388	1,566	2,679	6,481	2,432	1,436

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Note:
cfs = cubic feet per second

Downstream from Wilkins Slough, the Feather River enters the Sacramento River upstream of Verona. Between Wilkins Slough and Verona, floodwater is diverted at two places: Tisdale Weir into the Tisdale Bypass, and Fremont Weir into the Yolo Bypass. The bypass system routes floodwater away from the Sacramento River mainstem to discharge into the Delta.

6.2.2.15 Sutter Bypass

The Sutter Bypass is a narrow floodwater bypass that conveys Sacramento River flood flows. The bypass is an expansive land area for agriculture in Sutter County. In times of high water, Sacramento River water enters the bypass through the Butte Slough outfall and the Tisdale Weir (when the stage exceeds 45.45 feet) and inundates the bypass with as much as 12 feet of water.

The Sutter Bypass receives water from natural runoff areas south of Chico, overflow and weir flow from the Sacramento River, and drainage from the east side of the bypass through Wadsworth Canal and pumping plants. The bypass meets the Feather River upstream of the confluence with the Sacramento River near the Fremont Weir. The Fremont Weir is a floodway; when the water level in the Sacramento

River reaches a high level, water flows over the Fremont Weir into the Yolo Bypass. The Feather River and Sutter Bypass flow in a joint channel to the Sacramento River.

Table 6-22 shows Existing Conditions for average monthly Tisdale Weir flow into the Sutter Bypass over the long term and by water year type. Over the long-term average, Tisdale Weir flow into the Sutter Bypass ranges from 0 cfs (July to September) to 3,232 cfs (February). Flows occur even in some Critical water years during December through March. Refer to Appendix 6C for detailed tables of weir flows into the Sutter Bypass.

Table 6-22
Tisdale Weir Monthly Flow into Sutter Bypass (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	9	151	1,017	2,245	3,232	2,127	899	89	47	0	0	0
Water Year Types[b]												
Wet (32%)	0	96	1,088	5,283	7,222	4,819	2,391	170	147	0	0	0
Above Normal (15%)	0	513	1,109	2,723	3,702	3,230	791	241	0	0	0	0
Below Normal (17%)	53	101	1,292	611	1,206	270	145	0	0	0	0	0
Dry (22%)	0	128	1,263	263	818	365	0	0	0	0	0	0
Critical (15%)	0	0	84	65	101	3	0	0	0	0	0	0

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).
Note:
cfs = cubic feet per second

Table 6-23 shows Existing Conditions for average monthly Colusa Weir flow into the Sutter Bypass over the long term and by water year type. Colusa Weir flow into the Sutter Bypass ranges from 0 cfs (July to September) to 5,705 cfs (February). Refer to Appendix 6C for detailed tables of weir flows into the Sutter Bypass.

Table 6-23
Colusa Weir Monthly Flow into Sutter Bypass (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	8	133	1,336	3912	5,705	3,538	1,179	68	20	0	0	0
Water Year Types[b]												
Wet (32%)	0	35	1,281	9,969	1,4078	8,592	3,191	128	63	0	0	0
Above Normal (15%)	0	613	1,258	3,949	5885	5,033	1,043	186	0	0	0	0
Below Normal (17%)	46	70	1,688	716	1,245	104	88	0	0	0	0	0
Dry (22%)	0	94	2,064	225	755	271	0	0	0	0	0	0
Critical (15%)	0	0	28	13	13	0	0	0	0	0	0	0

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).
Note:
cfs = cubic feet per second

Table 6-24 shows Existing Conditions for average monthly flow into the Sutter Bypass from the Moulton Weir over the long term and by water year type. Moulton Weir flow into the Sutter Bypass ranges from 0 cfs (May to November) to 464 cfs (February). Refer to Appendix 6C for detailed tables of weir flows into the Sutter Bypass.

Table 6-24
Moulton Weir Monthly Flow into Sutter Bypass (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	0	0	57	289	464	242	32	0	0	0	0	0
Water Year Types[b]												
Wet (32%)	0	0	46	847	1,360	694	82	0	0	0	0	0
Above Normal (15%)	0	0	7	136	226	148	38	0	0	0	0	0
Below Normal (17%)	0	0	98	1	0	0	0	0	0	0	0	0
Dry (22%)	0	0	113	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).
Note:
cfs = cubic feet per second

Table 6-25 shows Existing Conditions average monthly flows into the Sutter Bypass from Ord Ferry over the long term and by water year type. Ord Ferry flow into the Sutter Bypass ranges from 0 cfs (May to November) to 427 cfs (February). Refer to Appendix 6C for detailed tables of weir flows into the Sutter Bypass.

Table 6-25
Ord Ferry Monthly Flow into Sutter Bypass (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	0	0	60	262	427	189	13	0	0	0	0	0
Water Year Types[b]												
Wet (32%)	0	0	37	795	1,204	555	34	0	0	0	0	0
Above Normal (15%)	0	0	1	64	310	88	18	0	0	0	0	0
Below Normal (17%)	0	0	128	0	0	0	0	0	0	0	0	0
Dry (22%)	0	0	121	0	0	0	0	0	0	0	0	0
Critical (15%)	0	0	0	0	0	0	0	0	0	0	0	0

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).
Note:
cfs = cubic feet per second

6.2.2.16 Yolo Bypass

The Yolo Bypass is an approximately 59,000-acre land area that conveys Sacramento River flood waters around Sacramento during times of high runoff. Flow is diverted from the Sacramento River into the bypass when the stage exceeds 33.5 feet (corresponding to 56,000 cfs at Verona). Diversion of the majority of the Sacramento River, Sutter Bypass, and Feather River floodwaters to the Yolo Bypass controls Sacramento River flood stages at Verona. During large flood events, up to 80 percent of Sacramento River flows are diverted into the bypass. The Yolo Bypass parallels the lower Sacramento River reach to the west. Flows enter this river reach at various points. First, flows from the Natomas Cross Canal enter the Sacramento River approximately one mile downstream from the Feather River mouth. The American River flows into the Sacramento River in the City of Sacramento. When Sacramento River system flood flows are the highest, a portion of the flow is diverted into the Yolo Bypass at the Sacramento Weir, located approximately three miles upstream from the American River confluence in downtown Sacramento. At the downstream end, Yolo Bypass flows reenter the Sacramento River near Rio Vista. As the river enters the Delta, Georgiana Slough branches off from the mainstem of the Sacramento River, routing a portion of the flow into the central Delta.

Table 6-26 shows Existing Conditions for average monthly Yolo Bypass flow over the long term and by water year type. Flow in the Yolo Bypass is mostly related to weir spills from the Sacramento River, as described above. Some of the flow is from Westside streams, such as Cache Creek. Long-term average monthly flow in the Yolo Bypass ranges from a monthly low of 47 cfs (July) to 12,548 cfs (February). Refer to Appendix 6B for detailed tables of weir flows into the Yolo Bypass.

Table 6-26
Yolo Bypass Monthly Flow (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	145	404	3,317	9,687	12,548	8,298	2,428	267	120	47	102	82
Water Year Types[b]												
Wet (32%)	84	591	4,322	26,071	31,139	21,303	6,490	640	240	47	149	95
Above Normal (15%)	34	850	1,408	7,455	12,263	8,396	1,399	183	65	47	96	67
Below Normal (17%)	563	228	3,233	1,002	2,662	715	488	64	64	47	116	88
Dry (22%)	45	231	5,233	515	1,703	691	306	76	65	47	60	72
Critical (15%)	53	19	274	309	358	279	104	65	63	47	54	75

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).
Note:
cfs = cubic feet per second

6.2.2.17 Folsom Lake and Lake Natoma

The Folsom Facilities were developed as an integral part of the CVP. The facilities consist of Folsom Lake, which is formed by Folsom Dam, and Lake Natoma, which is formed by Nimbus Dam.

Construction of Folsom Dam was completed in 1956 and impounds Folsom Lake. Total Folsom Lake storage capacity is approximately 1 MAF.

Folsom Lake is a multiple-purpose facility. It is managed to provide flood control, recreation, hydroelectric power generation, M&I water supply, Delta water quality protection, and minimum fish protection flows in the American River and the Sacramento-San Joaquin Delta. It is located on the American River approximately 15 miles northeast of the City of Sacramento, near the City of Folsom, and approximately 30 miles upstream of the confluence of the Sacramento and American rivers.

Nimbus Dam is located seven miles downstream from Folsom Dam and impounds Lake Natoma. Lake Natoma reregulates the releases made through the Folsom Power Plant. Lake Natoma has a storage capacity of approximately 8,760 acre-feet (Reclamation, 2011).

Flood control requirements and regulating criteria are specified by USACE and described in the *Folsom Dam and Lake, American River, California Water Control Manual* (USACE, 1987).

Since 1996, Reclamation has operated the facilities according to modified flood control criteria, which reserve 400,000 to 670,000 acre-feet of flood control space in Folsom Lake and in a combination of three upstream reservoirs. This flood control plan, which provides additional protection for the lower American River, is implemented through an agreement between Reclamation and Sacramento Area Flood Control Agency (SAFCA). The terms of the agreement allow some of the empty reservoir space in Hell Hole, Union Valley, and French Meadows reservoirs to be treated as if it were available in Folsom Lake.

Table 6-27 shows Existing Conditions for average end-of-month Folsom Lake storage over the long term and by water year type. The long-term average end-of-month storage in Folsom Lake ranges from 445,000 acre-feet (November) to 844,000 acre-feet (May). In Critical water years, storage in Lake Oroville is reduced by up to 53 percent in July (1,153,000 acre-feet), as compared to long-term average (2,426,000 acre-feet). Critical water year storage in Folsom Lake is reduced up to 54 percent in October (227,000 acre-feet), as compared to long-term average (489,000 acre-feet). Refer to Appendix 6B for Folsom Lake surface water elevation and area data tables

Table 6-27
Folsom Lake End-of-Month Storage (TAF)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	489	445	456	471	488	592	721	844	817	682	599	509
Water Year Types[b]												
Wet (32%)	599	510	509	520	502	633	794	966	966	877	770	606
Above Normal (15%)	544	487	505	518	529	642	796	968	947	757	688	573
Below Normal (17%)	577	529	516	508	540	637	788	932	912	719	650	594
Dry (22%)	401	402	417	436	497	592	708	782	720	559	467	431
Critical (15%)	227	225	281	326	345	401	433	443	400	329	280	251

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Note:
TAF = thousand acre-feet

6.2.2.18 American River

Downstream of Folsom Lake, the river passes through an urbanized area that is buffered by a riparian park, known as the American River Parkway. The river flows approximately 31 miles from Folsom Lake to the river's confluence with the Sacramento River.

Table 6-28 shows Existing Conditions for average monthly American River flow downstream of Nimbus Dam over the long term and by water year type. The long-term average monthly flow in the American River downstream of Nimbus ranges from 1,601 cfs (October) to 5,173 cfs (February).

Table 6-28
American River Monthly Flow Downstream of Nimbus Dam (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	1,601	2,831	3,341	4,446	5,173	3,773	3,290	3,603	3,702	3,763	2,704	2,923
Water Year Types[b]												
Wet (32%)	1,689	4,010	3,687	8,765	9,244	6,089	5,300	6,157	6,003	4,102	3,530	4,518
Above Normal (15%)	1,581	2,854	2,950	4,718	6,355	5,426	3,547	3,885	3,431	4,606	2,645	3,448
Below Normal (17%)	1,907	3,365	4,164	2,313	4,291	2,423	3,113	2,936	2,861	4,588	2,521	2,403
Dry (22%)	1,531	1,867	4,056	1,686	1,879	2,210	1,774	1,807	2,460	3,454	2,581	1,869
Critical (15%)	1,177	1,077	946	1,445	1,140	1,021	1,160	1,263	1,830	1,686	1,368	1,130

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Note:
cfs = cubic feet per second

6.2.2.19 Sacramento-San Joaquin Delta

The Sacramento-San Joaquin Delta (Delta), located to the east of San Francisco Bay, is the point of confluence for the Sacramento and San Joaquin rivers. The Delta encompasses the legal limits of the Delta, as defined in California Water Code Section 12220. Water flows out of the Delta, into Suisun Bay, then San Pablo Bay, and finally San Francisco Bay before flowing to the Pacific Ocean. Salty ocean water and fresh river water commingle in the Delta, creating the largest estuary on the west coast of North America. Water from more than 40 percent of the State’s land area flows into the Delta (Reclamation, 2009).

Hundreds of miles of waterways divide the Delta into islands, some of which are below sea level. The Delta relies on more than 1,000 miles of levees to protect these islands.

The Delta supports several beneficial uses, including water supply to local and south of Delta municipalities and agricultural uses; ecological support for fisheries, including wetlands and important habitat; in-Delta agriculture; flood management; water quality management; and a major conveyance for transporting fresh water from northern to southern portions of the State (Delta Vision Blue Ribbon Task Force, 2008). The Delta is critical to California’s economy, supplying drinking water for two-thirds of Californians and irrigation water for more than seven million acres of the most highly productive agricultural land in the world, providing approximately 45 percent of the nation’s produce. However, many water projects, including export pumps for the SWP and CVP, diversions for Delta area and Bay area municipalities, and regional agricultural users, also divert Delta waters, and thereby influence Delta hydrology and water quality (Reclamation, 2009).

Operation of the CVP and SWP is coordinated according to their respective water right permits, and a series of other governing laws, regulations, and agreements that have been developed to ensure compliance with specific hydrology, water quality, and ecosystem requirements while meeting the water supply contract obligations. CVP and SWP operations are adjusted to meet Delta flow and water quality standards by increasing releases of stored water in project reservoirs, or altering export pumping, gate positions, and other Delta facility operations. Water Rights Decision 1641 and Order WR 2001-05 contain water right requirements for Reclamation and DWR to implement the Bay-Delta Water Quality Control Plan flow and water quality objectives. The Coordinated Operations Agreement defines how Reclamation and DWR share their joint responsibility to meet Delta water quality standards and meet the water demands of senior water right holders. Depending on specific conditions of the fisheries populations and presence in the Delta each year, CVP/SWP exports can be restricted on a seasonal basis pursuant to biological opinions issued by the National Marine Fisheries Services (NMFS) and USFWS.

Flows through the Delta are maintained to meet Bay-Delta water quality standards arising from DWR's water rights permits. These standards are designed to meet several water quality objectives, such as salinity, Delta outflow, river flows, and export limits. The purpose of these objectives is to attain the highest water quality, which is reasonable, considering all demands being made on the Bay-Delta waters. In particular, they protect a wide range of fish and wildlife, including Chinook salmon, delta smelt, striped bass, and the habitat of estuarine-dependent species.

The primary factors that affect Delta hydrology are: (1) twice-daily tidal cycles, which result in inflow and outflow through the Delta and San Francisco Bay; (2) freshwater inflow from the Sacramento and San Joaquin rivers; and (3) water management activities, including SWP and CVP reservoir storage and releases, as well as water exports from the south Delta. Additionally, winds and salinity/freshwater mixing behaviors generate several secondary currents. Although these currents are generally of low velocity, they are significant in terms of transporting contaminants and mixing different sources of water.

The CVP and SWP are the largest Delta water users and exporters. Water is exported via pumping and aqueduct facilities located at Clifton Court Forebay, the Banks Pumping Plant, the Jones Pumping Plant, and the North Bay Aqueduct. Local agencies, such as Contra Costa Water District (CCWD), municipalities, private entities, and agricultural users also operate their own diversion programs and infrastructure.

The Delta includes approximately 540,000 acres of agricultural land which, during the summer irrigation season, is supplied by Delta surface water. Water use in the Delta region averages approximately 1.7 MAF per year with the majority of that going to agricultural uses. Most of the agricultural water is diverted directly by farmers through unscreened diversions pursuant to riparian or pre-1914 water rights. Agricultural users operate their own diversions at more than 1,800 locations and divert a net rate (total diversions minus return flows) estimated at over 4,000 cfs, for a total of approximately 1.5 MAF of water consumed annually. Agricultural return flows are collected by canal systems and pumped back into Delta waterways. Given the agricultural return flows, actual diversions exceed the net water consumed by 50 percent or more. There is also a small amount of urban water use, including diversions by CCWD, the City of Antioch, and industries along the Pittsburg-Antioch shoreline.

Table 6-29 shows Existing Conditions for average monthly Sacramento-San Joaquin Delta outflow over the long term and by water year type. The long-term average monthly Delta outflow ranges from 6,015 cfs (October) to 51,555 cfs (February).

The Delta Cross Channel (DCC) is a gated diversion channel in the Sacramento River near Walnut Grove and Snodgrass Slough. Flows into the DCC from the Sacramento River are controlled by two 60-foot by 30-foot radial gates. When the gates are open, water flows from the Sacramento River through the DCC to channels of the lower Mokelumne and San Joaquin rivers toward the interior Delta. The DCC operation improves water quality in the interior Delta by improving circulation patterns of good quality water from the Sacramento River toward Delta diversion facilities. Reclamation operates the DCC in the open position to (1) improve the transfer of water from the Sacramento River to the export facilities at the Banks and Jones pumping plants, (2) improve water quality in the southern Delta, and (3) reduce salt water intrusion rates in the western Delta. During the late fall, winter, and spring, the gates are often periodically closed to protect out-migrating salmonids from entering the interior Delta. In addition, whenever flows in the Sacramento River at Sacramento reach 20,000 to 25,000 cfs on a sustained basis, the gates are closed to reduce potential scouring and flooding that might occur in the channels on the downstream side of the gates.

Table 6-29
Sacramento-San Joaquin Delta Monthly Flow (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	6,015	11,701	21,478	42,346	51,555	42,576	30,053	22,456	12,771	7,964	4,594	9,715
Water Year Types[b]												
Wet (32%)	8,619	18,566	25,599	84,561	95,616	78,190	54,405	41,030	23,448	11,450	5,315	19,675
Above Normal (15%)	5,987	13,440	19,292	47,769	60,267	53,235	31,967	24,235	11,822	9,555	4,000	11,797
Below Normal (17%)	5,993	9,661	26,644	21,818	35,261	22,901	21,757	16,044	8,050	7,081	4,000	3,456
Dry (22%)	4,088	6,895	22,691	14,543	20,879	19,756	14,036	10,412	6,622	5,040	4,744	3,284
Critical (15%)	3,318	4,677	6,886	11,113	12,402	11,937	9,076	5,978	5,316	4,233	4,093	3,000

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).
Note:
cfs = cubic feet per second

Table 6-30 shows Existing Conditions for average monthly DCC flow over the long term and by water year type. The long-term average monthly flow in the DCC ranges from 3,371 cfs (May) to 7,701 cfs (July).

Table 6-30
Delta Cross Channel Monthly Flow (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	4,723	4,031	4,492	4,999	5,691	5,148	3,904	3,371	5,669	7,701	6,529	5,727
Water Year Types[b]												
Wet (32%)	4,670	4,184	4,913	7,566	8,385	7,381	5,860	5,077	6,583	7,701	6,718	5,350
Above Normal (15%)	5,116	4,335	4,509	5,922	6,760	6,681	4,282	3,629	5,492	8,474	6,770	8,100
Below Normal (17%)	5,104	4,279	5,043	3,841	4,923	3,910	3,165	2,687	5,594	8,141	6,632	5,743
Dry (22%)	4,612	3,798	4,324	3,119	3,645	3,578	2,545	2,276	5,233	7,689	6,993	5,497
Critical (15%)	4,164	3,455	3,175	2,686	2,752	2,575	2,190	1,859	4,610	6,429	5,061	4,500

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).
Note:
cfs = cubic feet per second

Water management activities, especially export pumping, can affect the direction of flow in Delta channels. Net flow of Delta waters is naturally westward from the San Joaquin and Sacramento rivers across the Delta and toward San Francisco Bay. However, during certain tidal, river inflow, and south Delta export pumping conditions, the direction of net flow within specific western Delta channels may be eastward (creating a reverse flow).

The combined Old and Middle river flows are used as a measure of net reverse flow conditions (exclusive of tides) downstream of the Jones and Banks pumping plants within the south Delta. CVP and SWP export pumping causes reverse flows in the southward direction down Old and Middle rivers and other central and south Delta channels. A negative flow value indicates reverse flow conditions.

Table 6-31 shows Existing Conditions for average monthly Old and Middle river flows over the long term and by water year type. The long-term average monthly flow in Old and Middle rivers ranges from -9,589 cfs (July) to 840 cfs (April). Positive flow values are shown in April and May for the long-term average and over all water years except for Dry and Critical. All other months and water years show negative flow values, which indicate reverse flows.

Table 6-31
Old and Middle Rivers Monthly Flow (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	-6,178	-6,084	-6,640	-3,473	-3,279	-2,779	840	352	-3,773	-9,589	-9,250	-7,582
Water Year Types[b]												
Wet (32%)	-6,294	-5,523	-6,886	-1,965	-2,581	-1,851	2,431	1,648	-4,166	-8,954	-10,070	-8,041
Above Normal (15%)	-6,718	-6,149	-7,623	-3,547	-3,286	-4,070	1,058	500	-4,840	-10,022	-10,452	-8,345
Below Normal (17%)	-7,414	-8,152	-6,550	-4,240	-3,434	-3,968	688	273	-4,056	-10,659	-9,892	-8,598
Dry (22%)	-6,008	-6,823	-6,158	-4,619	-4,004	-2,923	-295	-643	-3,286	-10,756	-9,988	-7,658
Critical (15%)	-4,200	-3,713	-5,952	-4,057	-3,517	-1,897	-947	-1,017	-2,254	-7,537	-4,415	-4,528

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Note:
cfs = cubic feet per second

Table 6-32 shows Existing Conditions for average monthly Banks and Jones pumping plant export over the long term and by water year type. The long-term average monthly export at Banks and Jones pumping plants ranges from 2,083 cfs (April) to 10,510 cfs (July).

Table 6-32
Total Banks Pumping Plant (SWP) and Jones Pumping Plant (CVP) Monthly Export (cfs)
Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]	6,940	6,885	8,906	6,660	7,242	6,595	2,083	2,190	4,849	10,510	10,053	8,650
Water Year Types[b]												
Wet (32%)	7,323	6,603	10,095	7,856	9,480	9,319	2,847	3,298	7,398	11,371	11,478	9,539
Above Normal (15%)	7,566	6,896	9,652	6,442	7,241	7,721	1,819	1,675	6,156	10,777	11,289	9,445
Below Normal (17%)	8,258	9,017	8,887	6,291	6,885	6,753	1,736	1,666	4,204	10,977	10,594	9,676
Dry (22%)	6,612	7,510	7,816	6,247	5,802	4,333	1,750	1,759	2,890	10,913	10,580	8,551
Critical (15%)	4,437	4,060	7,241	5,338	4,970	2,779	1,594	1,560	1,709	7,230	4,307	4,880

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Note:
cfs = cubic feet per second

6.2.2.20 Suisun Bay, San Pablo Bay, and San Francisco Bay

San Francisco Bay is a shallow productive estuary through which water from the Sacramento and San Joaquin rivers enters the Pacific Ocean. Specifically, both rivers flow into Suisun Bay, which flows through the Carquinez Strait to meet with the Napa River at the entrance to San Pablo Bay. San Pablo Bay connects at its south end to San Francisco Bay. However, the entire group of interconnected bays is often referred to as the “San Francisco Bay”.

The outlet of San Francisco Bay at Golden Gate Bridge is located 74 km from Chipps Island, the interface between the Delta and Suisun Bay. The Suisun Marsh is located north of Suisun Bay and east of Carquinez Strait; it is an extensive mosaic of variably controlled tidal marshlands. Tributaries to San Pablo Bay include the Napa, Sonoma, and Petaluma rivers. Numerous lesser streams collectively drain the Bay Region.

San Francisco Bay has a surface area of approximately 400 square miles at mean tide level. Most of the Bay’s shoreline has a mild slope, which creates a relatively large intertidal zone. The volume of water in the Bay changes by approximately 21 percent from mean higher-high tide to mean lower-low tide. The overall average depth of the Bay is approximately 20 feet, with the Central Bay averaging 43 feet and the South Bay averaging 15 feet. San Francisco Bay is surrounded by approximately 130 square miles of tidal flats and marshes.

Average net Delta outflow into the Bay Region, as measured at Chipps Island, is approximately 20,400 cfs, or 15 MAF per year. Average natural freshwater inflow to the Delta varies by a factor of more than 10 between the highest month in winter or spring and the lowest month in fall. During summer months of Critically Dry water years, net Delta outflow can decrease to 3,000 cfs.

In addition to Delta outflow, San Francisco Bay receives freshwater inflow from the Napa, Petaluma, and Guadalupe rivers, and from Alameda, Coyote, Walnut, and Sonoma creeks, as well as several smaller streams. The total average annual inflow volume of these tributaries (excluding the Delta) is approximately 350,000 acre-feet. Stream flow is highly seasonal, with more than 90 percent of the annual runoff occurring during November through April.

Suisun Bay and the adjacent 80,000-acre Suisun Marsh are located near the downstream end of the Delta. Suisun Bay is the area where the effects of mixing fresh water and salt water are typically most pronounced.

Downstream of Carquinez Strait are the San Pablo and central San Francisco bays. Carquinez Strait separates these bays from Suisun Bay and the Delta, and allows tides to play a leading role in their salinity and circulation. These embayments can become fresh, especially at the surface, during extremely high freshwater flows. During these high flows, the entrapment zone can be temporarily relocated downstream to San Pablo Bay. During periods of low freshwater flows and high tides, these embayments are saline.

The South Bay is different from the other parts of the system. This area is not in the main path of Delta outflows. Thus, except during sustained high-outflow periods, water quality is not significantly affected by Delta outflow. During low Delta outflow periods, evaporation, combined with limited tidal flushing, can cause salinity levels to be higher in the South Bay than in the ocean outside of the Golden Gate.

The Bay Region receives unallocated and minimum required outflows from the Delta Region. These can range from the minimum required flow of less than four to nearly 60 MAF, depending on precipitation and diversions. This water is used in the Bay Region primarily for ecological and water quality maintenance purposes.

The location of the mixing zone between fresh water from the Delta and saline water from the Bay varies with the amount of Delta outflow, as well as tides. The mixing zone is pushed downstream during periods of high Delta outflow and can move upstream into the Delta if Delta outflow is low, or during spring neap tides.

To track and regulate this movement, a standard has been developed, called X2, which represents the mean distance in kilometers (km) from the Golden Gate Bridge where salinity concentration and electrical conductivity requirements are met. The X2 position approximates the location of the entrapment zone, which is an area of high biological productivity.

The Water Quality Control Plan (WQCP) for the San Francisco Bay/Sacramento-San Joaquin Delta defines requirements for maintaining X2 at Port Chicago and Chipps Island (SWRCB, 1999).

6.2.3 Primary Study Area

The Primary Study Area is considered to be the footprint of the Project facilities, the land immediately surrounding them that could be affected by construction and/or maintenance activities (construction disturbance area), and the land parcels surrounding those areas that would be purchased as a Project buffer.

The Primary Study Area is located entirely within Glenn and Colusa counties. The primary surface water resources in this study area are Funks Creek, Stone Corral Creek, Funks Reservoir, CBD, and other small tributaries. They are discussed below.

6.2.3.1 Funks Creek

Funks Creek headwaters begin in the foothills west of the town of Maxwell. Funks Creek flows into Funks Reservoir at the T-C Canal, both of which are operated by TCCA. The drainage area of Funks Creek at Funks Dam is 43 square miles. The last stream gage that was operated on Funks Creek washed out in 1985 and was not replaced due to the constantly degrading channel. Peak winter flows of approximately 2,000 cfs are common (Weathers, pers. comm., 2005). Because the topography and soil composition of the watershed are similar to those of Stone Corral Creek, where stream flow records are available, and given the comparable drainage areas of the two watersheds, it is reasonable to assume that the 100-year discharge on Funks Creek would be similar to that of Stone Corral Creek.

6.2.3.2 Stone Corral Creek

The drainage area of the Stone Corral Creek watershed is 38.2 square miles. The USGS collected 25 years of discharge measurements near the town of Sites from 1958 through 1985 with periodic interruptions. During that time, there were three years of zero flow: 1972, 1976, and 1977. The maximum mean daily flow of 2,230 cfs occurred on December 24, 1983. The instantaneous peak flow was 5,700 cfs on January 26, 1983. The 100-year discharge upstream of Sutton Road (aka Cemetery Road) is 3,560 cfs. A summary of the flow statistics is shown in Table 6-33 (FEMA, 2003).

Table 6-33
Stone Corral Creek Daily and Monthly Flows Near Sites, USGS 11390672
Period of Record 4/1/1958 – 9/30/1964 and 10/1/1965 – 9/30/1985
Drainage Area = 38.2 Square Miles

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Daily Flows for Period of Record (cfs)												
Min	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	74	2,230	1,910	2,150	1,980	619	45	9	1	0	0
Avg	0	1	11	32	39	21	8	1	0	0	0	0
Monthly Flows (Acre-Feet) for Period of Record												
Min	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	427	11,432	8,825	11,137	15,227	4,451	740	146	19	0	0
Avg	0	37	660	1,946	2,190	1,300	484	83	13	1	0	0

Note:
cfs = cubic feet per second

6.2.3.3 Funks Reservoir

Funks Reservoir is located on Funks Creek approximately seven miles northwest of the town of Maxwell, in Colusa County. Constructed in 1975 by Reclamation, Funks Reservoir has a designed storage capacity of approximately 2,200 acre-feet with a surface area of 232 acres. The T-C Canal connects to Funks Reservoir with an inlet at the northeast end adjacent to the dam spillway and an outlet to the southeast end. Both the inlet and outlet have a gated release. The Funks Reservoir spillway is designed to pass 25,000 cfs. Both Funks Reservoir and the T-C Canal are operated and maintained by TCCA (Reclamation, 2012).

The typical summer releases from Funks Reservoir to the lower portions of T-C Canal range from 500 cfs to 1,000 cfs. Total flows of 50 cfs to 200 cfs for off-peak limited agricultural releases are needed between November and February, and possibly into March, depending on the weather (DWR, 2003).

6.2.3.4 Colusa Basin Drain

Runoff from 11 stream systems draining the foothill and valley floor watersheds contribute flow to the CBD. The CBD flows southward through Glenn, Colusa, and Yolo counties and enters the Sacramento River at the town of Knights Landing. This natural historic drainage system for the Colusa Basin has been almost entirely cut off from receiving floodwaters from the Sacramento River by an extensive levee system (except when flood flows on the Sacramento River exceed 300,000 cfs near Ord Ferry). In general, the CBD conveys flood flows from November through March, and agricultural irrigation and drainage flows from April through October. The northern half of the CBD is unleveed. Beginning south of Colusa, left bank (looking downstream) levees extend southward to the CBD's confluence with the Sacramento River. A DWR gaging station located at State Route (SR) 20 near the City of Colusa has been operating since 1924. The drainage area at SR 20 is 973 square miles, and the average annual runoff is 497,000 acre-feet. A summary of the flow statistics is shown in Table 6-34.

Table 6-34
Colusa Basin Drain Daily and Monthly Flows at Highway 20
Period of Record 11/1/1944 - 9/30/1994
Drainage Area = 973 square miles

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean Daily Flows for Period of Record (cfs)												
Min	0	62	22	64	22	44	0	0	0	0	0	0
Max	2,352	2,680	11,300	10,800	23,900	15,300	3,260	2,390	2,620	1,560	2,230	7,287
Avg	289	434	554	894	1,016	606	425	820	578	624	896	942
Monthly Flows (TAF) for Period of Record												
Min	0	7	4	6	3	6	5	10	7	4	11	5
Max	37	77	223	192	387	326	96	81	65	81	97	88
Avg	18	26	34	55	57	37	25	50	34	38	55	56

Source: DWR, 2013.

6.2.3.5 Other Local Creeks

Numerous small tributaries exist within the Primary Study Area. Grapevine Creek starts on the west side of the proposed Sites Reservoir inundation area and flows north and into the reservoir area near Sites Lodoga Road. It also flows into Funks Creek approximately seven miles upstream of Funks Reservoir. Antelope Creek starts on the west side of the proposed reservoir inundation area, south of the headwaters of Grapevine Creek. Antelope Creek flows south, then east, and then north through the southern portion of the proposed reservoir inundation area, and joins with Stone Corral Creek near the town of Sites. North of the Sites Reservoir inundation area, Hunters Creek flows to the east. Southeast of Sites Reservoir, Lurline Creek flows to the east. Both Hunters and Lurline creeks flow into the CBD.

6.3 Evaluation of Changes to Surface Water Resources

6.3.1 Regulatory Setting

Surface water resources are regulated at the federal, State, and local levels through regulations that pertain to water quality, flood control, protection of fish and wildlife, power generation, the beneficial uses of water, water rights, and regulations that define the sharing of water between the CVP and SWP. Provided below is a list of the applicable regulations. These regulations are discussed in detail in Chapter 4 Environmental Compliance and Permit Summary of this EIR/EIS.

6.3.1.1 Federal Plans, Policies, and Regulations

- Central Valley Project Improvement Act
- Coordinated Operations Agreement
- 2009 National Marine Fisheries Service Biological Opinion
- Bay-Delta Water Quality Control Plan
- CALFED Bay-Delta Authorization Act
- CALFED Bay-Delta Implementation Act
- Trinity River Mainstem Fishery Restoration

- San Joaquin River Agreement and the Vernalis Adaptive Management Plan
- Clean Water Act

6.3.1.2 State Plans, Policies, and Regulations

- State Water Resources Control Board Water Rights and Water Quality Protection
  - Water Rights Protections for County of Origin and Upstream Watersheds
- Water Rights Decision 1422/Order 83-3 and Water Rights Decision 1275
- Water Quality Control Plans for the Sacramento/San Joaquin River Basins, the San Francisco Bay Basin, and Development of the 1978 Delta Plan and Water Rights Decision 1485
- Development of the 1995 and 2006 Water Quality Control Plans and Orders 98-09 and 95-9
- State Water Resources Control Board Decision 1641
- Porter-Cologne Water Quality Control Act
- The Burns-Porter Act
- Delta Protection Act of 1959
- Delta Protection Act of 1992
- Monterey Agreement
- Monterey Plus
- Suisun Marsh Protection Act and Plan (1974)
- Suisun Marsh Preservation Agreement (1987)
- California Water Plan

6.3.2 Assessment Assumptions and Methodology

The following assumptions and methods were used to describe the changes in surface water resources associated with implementation of the No Project/No Action Alternative and Alternatives A, B, and C.

6.3.2.1 Key Assumptions Associated with the No Project/No Action Alternative

Below is a summary of key assumptions included in the No Project/No Action Alternative, which directly influence the changes in surface water resource metrics between the No Project/No Action Alternative and Existing Conditions. A more detailed explanation of key assumptions between alternatives can be found in Appendix 6A.

- An increase in demands and build-out of facilities associated with CVP contracts of approximately 253,000 acre-feet per year north of the Delta at the future level of development. This is a result of an increase in CVP M&I service contracts related primarily to urban M&I use within the American River Basin (198,000 acre-feet), especially in the communities in El Dorado, Placer, and Sacramento counties. A summary of the CVP demands between the No Project/No Action Alternative and the Existing Conditions is shown in Table 6-35.

- An increase in demands associated with SWP contracts, up to full contract amounts, south of the Delta at the future level of development. SWP M&I demands, which with the existing level of development, vary on hydrologic conditions between 3.0 to 4.1 MAF per year, and with the future condition are at maximum contract amounts in all hydrologic conditions. This represents a potential 25 percent increase on average in south of the-Delta demands pursuant to SWP M&I contracts between existing and future levels of development. A summary of the SWP demands between the No Project/No Action Alternative and the Existing Conditions is shown in Table 6-35.
- An increase in non-Project water rights demand of 184,000 acre-feet in the American River Basin.
- New urban intake/Delta export facilities include:
  - Freeport Regional Water Project (FRWP)
  - City of Stockton Delta Water Supply Project, 30 mgd capacity
  - Delta-Mendota Canal – California Aqueduct Intertie
  - Contra Costa Water District's Middle River Intake and Pump Station (previously known as the Alternative Intake Project) and Los Vaqueros expanded storage capacity, 160,000 acre-feet
  - South Bay Aqueduct rehabilitation, to 430 cfs capacity, from junction with California Aqueduct to Alameda County FCWSD Zone 7
- An increase in supplies firm Level 2 for wildlife refuges of approximately 32,000 acre-feet per year north of the Delta and a decrease of approximately 24,000 acre-feet south of the Delta and an increase of Level 4 supplies of for wildlife refuges of approximately 50,000 acre-feet per year (17,000 acre-feet north of the Delta and 33,000 acre-feet south of the Delta) at the future level of development. However, Firm Level 2 supplies are met by CVP contract supply and Level 4 supplies are met through local water acquisitions in both existing and future levels of development.
- Both Existing Conditions and the No Project/No Action Alternative modeling assumptions reflect the best representation of the Reasonable and Prudent Actions (RPAs) in the 2008 U.S. Fish and Wildlife Service (USFWS) and 2009 NOAA National Marine Fisheries Service (NMFS) Biological Opinions (BiOps).
  - USFWS BiOp RPA actions considered include:
    - Action 1: Adult Delta smelt migration and entrainment (RPA Component 1, Action 1 – First Flush)
    - Action 2: Adult Delta smelt migration and entrainment (RPA Component 1, Action 2)
    - Action 3: Entrainment protection of larval and juvenile Delta smelt (RPA Component 2)
    - Action 4: Estuarine habitat during Fall (Fall X2 Action) (RPA Component 3)
    - Action 5: Temporary spring head of Old River barrier and the Temporary Barrier Project (RPA Component 2)
  - NMFS BiOp RPA actions considered include:
    - Action I.1.1: Clear Creek spring attraction flows
    - Action I.3.1: Operations after May 14, 2012: Operate RBDD with Gates Out

- Action I.4: Wilkins Slough operations
- Action II.1: Lower American River flow management
- Action III.1.3: Stanislaus River flows downstream of Goodwin Dam
- Action IV.1.2: Delta Cross Channel gate operations
- Action IV.2.1: San Joaquin River flow requirements at Vernalis and Delta export restrictions
- Action IV.2.3: Old and Middle River flow management

Table 6-35 shows a summary of CVP and SWP demands for Existing Conditions and the No Project/No Action Alternative grouped by north-of-the-Delta and south-of-the-Delta regions. Key differences in project demands are reflected in the changes seen between Existing Conditions and the No Project/No Action Alternative. For a general discussion of the CVP and SWP project contractors and demands, refer to Section 6.2.1.2.

Table 6-35
Summary of CVP and SWP Demands (TAF/Year)
No Project/No Action Alternative Compared to Existing Conditions

Project Contractor Type	Summary of SWP and CVP Demands under Existing Conditions		Summary of SWP and CVP Demands under No Project/No Action Alternative	
	North-of-the-Delta	South-of-the-Delta	North-of-the-Delta	South-of-the-Delta
CVP Contractors				
Settlement/Exchange	2,194	840	2,194	840
Water Service Contracts				
Agriculture (Ag)	378	1,937	378	1,937
Municipal and Industrial (M&I)	304	164	557 (+253)	164
Level 2 Refuge Supplies	157	305	189 (+32)	281 (-24)
SWP Contractors				
Feather River Service Area (FRSA)	983	0	983	0
Table A	108	4,056	114 (+6)	4,056
Agriculture (Ag)	0	1,048	0	1,032 (-16)
Municipal and Industrial (M&I)	108	3,008	114 (+6)	3,024 (+16)

Notes:
SWP = State Water Project
CVP = Central Valley Project
TAF = thousand acre-feet

6.3.2.2 Methodology

Analyses to support the description of changes to surface water resources associated with implementation of the alternatives were developed based upon CALSIM II operations simulations. CALSIM II is the DWR and Reclamation operations simulation model developed for the CVP and SWP water resources system. CALSIM II is described in Appendix 6B.

The use of CALSIM II allows Project planners to describe the comparative changes or effects to the CVP and SWP water resources system associated with adding a new surface storage reservoir located north of the Delta. For the simulation of Existing Conditions, all characteristics of the CVP and SWP remained the same. For the simulation of the No Project/No Action Alternative, reasonably foreseeable projects and changes (such as increasing demands) were added to the Existing Conditions baseline. Subsequently, simulations of the CVP and SWP were performed with the addition of Project action alternatives A, B, and C to facilitate a comparison of surface water resources with and without the proposed Project.

The metrics chosen to evaluate differences between Existing Conditions, the No Project/No Action Alternative, and Alternatives A, B, and C were for those locations at which a relative change could occur due to implementation of the alternatives. In addition, one metric was chosen to represent changes at each evaluation location discussed. For example, storage was chosen to represent changes at reservoirs, although reservoir surface water elevation and surface area changes were also modeled.

Detailed data of all surface water resources modeling locations and metrics are included in Appendix 6B. In addition, maps showing the specific locations used for surface water and surface water quality modeling are included in Appendix 6B.

6.3.3 Topics Eliminated from Further Analytical Consideration

Metrics at several modeled locations were omitted from discussion throughout this chapter where it would have been redundant to represent changes resulting from implementation of the alternatives, or where no change would be expected to occur from implementation of the alternatives.

6.3.4 Changes Associated with the No Project/No Action Alternative

This section describes changes between the No Project/No Action Alternative and Existing Conditions. Environmental effects associated with the changes described below are discussed in other resources chapters.

6.3.4.1 Extended Study Area – No Project/No Action Alternative

San Luis Reservoir

Table 6-36 shows the differences between the No Project/No Action Alternative and the Existing Conditions for monthly San Luis Reservoir storage. Table 6-36 presents data for averages over the long term and by water year types.

Over the long term, storage would be reduced in most months, when compared to Existing Conditions. Small increases would occur in February, March, and April. Larger reductions in storage would occur in May through January. The largest reduction in storage (6.6 percent) would occur in November. The greatest storage reductions would occur in Wet water years, and the greatest storage increases would occur in Critical water years with June through November, all increasing by more than 20 percent (roughly 100,000 acre-feet or more). The largest reduction (18.4 percent) would occur in August of Wet water years, and the largest increase by water year type (30.7 percent) would occur in September of Critical water years.

Table 6-36
San Luis Reservoir End-of-Month Storage (TAF)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	697	840	1,175	1,338	1,469	1,553	1,324	1,001	682	603	548	617
No Project/No Action Alternative	653	784	1,113	1,328	1,477	1,572	1,332	992	668	583	513	584
Difference	-44	-55	-62	-10	8	19	8	-9	-14	-20	-34	-34
Percent Difference (%)	-6.3	-6.6	-5.3	-0.7	0.5	1.2	0.6	-0.9	-2.1	-3.4	-6.3	-5.5
Water Year Types[b]												
Wet (32%)												
Existing Condition	912	950	1,290	1,481	1,673	1,848	1,611	1,301	1,028	895	810	879
No Project/No Action Alternative	766	797	1,124	1,407	1,600	1,772	1,510	1,168	893	743	661	741
Difference	-147	-153	-167	-74	-73	-76	-101	-133	-135	-152	-149	-138
Percent Difference (%)	-16.1	-16.1	-12.9	-5.0	-4.3	-4.1	-6.3	-10.2	-13.1	-17.0	-18.4	-15.7
Above Normal (15%)												
Existing Condition	643	758	1,123	1,215	1,346	1,496	1,241	883	621	499	448	546
No Project/No Action Alternative	616	701	1,052	1,265	1,400	1,544	1,265	874	587	463	433	528
Difference	-27	-57	-71	49	55	49	24	-8	-33	-35	-15	-18
Percent Difference (%)	-4.3	-7.5	-6.4	4.1	4.1	3.3	1.9	-0.9	-5.4	-7.1	-3.3	-3.4
Below Normal (17%)												
Existing Condition	732	1,025	1,367	1,352	1,448	1,518	1,267	903	537	489	444	568
No Project/No Action Alternative	651	932	1,265	1,329	1,459	1,541	1,278	894	519	464	417	517
Difference	-81	-93	-102	-23	11	24	11	-9	-18	-25	-27	-51
Percent Difference (%)	-11.1	-9.0	-7.4	-1.7	0.8	1.6	0.9	-1.0	-3.3	-5.1	-6.2	-9.0
Dry (22%)												
Existing Condition	577	801	1,104	1,340	1,431	1,425	1,183	831	416	398	426	489
No Project/No Action Alternative	587	792	1,088	1,358	1,487	1,508	1,269	916	507	492	455	511
Difference	10	-9	-16	18	56	83	86	85	92	95	29	22
Percent Difference (%)	1.8	-1.1	-1.4	1.4	3.9	5.8	7.2	10.2	22.1	23.8	6.8	4.5
Critical (15%)												
Existing Condition	425	523	860	1,132	1,231	1,207	1,064	842	560	518	381	370
No Project/No Action Alternative	548	654	1,010	1,177	1,291	1,300	1,169	959	673	631	472	484
Difference	123	131	150	46	61	93	105	117	113	113	91	114
Percent Difference (%)	29.0	25.1	17.4	4.0	4.9	7.7	9.9	13.9	20.2	21.9	23.9	30.7

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:
Percent Difference (%) = Relative Difference of the monthly average.
TAF = thousand acre-feet

CVP Deliveries

No Project/No Action Alternative vs. Existing Conditions

Table 6-37 shows the differences between the No Project/No Action Alternative and Existing Conditions for annual CVP deliveries within the Extended Study Area by hydrologic region and water service type. Table 6-37 presents data for the long-term averages and combined Dry and Critical water years average.

Table 6-37
Annual CVP Deliveries (TAF)[a]
No Project/No Action Alternative (NPA/NAA) Compared to Existing Conditions (EXC)
Long-Term Average and Combined Dry and Critical Years Average

Region and Delivery Type		Average (Annual)	NPA/NAA (TAF)	EXC (TAF)	NPA/NAA – EXC (TAF) (Percent Change)
Sacramento River Hydrologic Region					
CVP Settlement	Contract Delivery	Long-Term[b]	1,934	1,908	26 (1%)
		Dry and Critical[c]	1,918	1,895	23 (1%)
CVP Refuge Level 2	Contract Delivery	Long-Term	155	129	26 (20%)
		Dry and Critical	137	115	22 (19%)
Refuge Level 4	Supply from acquisitions	Long-Term	27	10	17 (170%)
		Dry and Critical	25	10	16 (165%)
CVP M&I	Contract Delivery	Long-Term	211	85	126 (149%)
		Dry and Critical	174	74	100 (135%)
CVP Ag	Contract Delivery (does not include Settlement contractors)	Long-Term	213	223	-10 (-5%)
		Dry and Critical	93	112	-19 (-17%)
San Joaquin River Hydrologic Region (not including Friant-Kern and Madera Canal water users)					
CVP Exchange	Contract Delivery	Long-Term	852	852	0 (0%)
		Dry and Critical	814	814	0 (0%)
CVP Refuge Level 2	Contract Delivery	Long-Term	261	281	-20 (-7%)
		Dry and Critical	249	267	-18 (-7%)
Refuge Level 4	Supply from acquisitions	Long-Term	86	62	24 (39%)
		Dry and Critical	82	59	23 (39%)
CVP M&I	Contract Delivery	Long-Term	16	16	0 (0%)
		Dry and Critical	13	13	0 (0%)
CVP Ag	Contract Delivery (does not include Exchange contractors)	Long-Term	290	289	1 (0%)
		Dry and Critical	137	148	-11 (-7%)
San Francisco Bay Hydrologic Region					
CVP M&I	Contract Delivery	Long-Term	290	225	65 (29%)
		Dry and Critical	318	224	94 (42%)
CVP Ag	Contract Delivery	Long-Term	36	35	1 (1%)
		Dry and Critical	17	18	-1 (-7%)
Tulare Lake Hydrologic Region (not including Friant-Kern Canal water users)					
CVP Refuge Level 2	Contract Delivery	Long-Term	12	15	-3 (-21%)
		Dry and Critical	11	14	-3 (-21%)
Refuge Level 4	Supply from acquisitions	Long-Term	20	12	8 (67%)
		Dry and Critical	20	11	9 (77%)
CVP Ag	Contract Delivery (includes Cross Valley Canal)	Long-Term	599	600	-1 (0%)
		Dry and Critical	283	307	-24 (-8%)
Total For All Regions					
Total CVP Supplies	Contract Delivery (Settlement, Ag, M&I and Refuges from CVP – does not include Refuge Level 4 supply from acquisitions)	Long-Term	4,868	4,659	209 (4%)
		Dry and Critical	4,164	4,001	163 (4%)

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Notes:

Ag = Agricultural
CVP = Central Valley Project
EXC = existing conditions
M&I = Municipal and Industrial
TAF = thousand acre-feet

The total deliveries for all regions over the long-term average show that an increase of 209,000 acre-feet (four percent) would occur. By hydrologic region, the long-term average shows that substantial M&I increases would occur in the Sacramento and San Francisco Bay regions. M&I deliveries in the Sacramento River hydrologic region would increase by 126,000 acre-feet (149 percent). This increase is due primarily to increase in urban M&I use within the American River Basin. To a lesser extent, M&I deliveries would also increase by 65,000 acre-feet (29 percent) in the San Francisco Bay Region. The only noticeable change in Ag deliveries would be a reduction (10,000 acre-feet [5 percent]) in the Sacramento Region. Wildlife Refuge Level 2 deliveries would also decrease in both the San Joaquin (20,000 acre-feet [7 percent]) and Tulare Lake (3,000 acre-feet [21 percent]) regions. Sacramento Hydrologic Region CVP settlement contractors' deliveries would increase by 23,000 acre-feet (one percent). San Joaquin River Exchange contractors' deliveries would remain the same.

The total deliveries throughout all hydrologic regions for the combined Dry and Critical water years average show that an increase of 163,000 acre-feet (four percent) would occur. Examining the Dry and Critical water years average by region indicates that substantial reliability improvements would occur with similar M&I delivery increases in the Sacramento (100,000 acre-feet [135 percent]) and San Francisco Bay (94,000 acre-feet [42 percent]) regions. Ag deliveries show that reductions would occur in all four regions, ranging from 7 percent (11,000 acre-feet) in the San Joaquin River and San Francisco Bay regions to 17 percent (19,000 acre-feet) in the Sacramento River region. Sacramento Hydrologic Region CVP settlement contractors' deliveries would increase by 26,000 acre-feet (one percent). San Joaquin River Exchange contractors' deliveries would remain the same.

SWP Deliveries

No Project/No Action Alternative vs. Existing Conditions

Table 6-38 shows the differences between the No Project/No Action Alternative and Existing Conditions for SWP deliveries by hydrologic region and water service type. Table 6-38 presents data for the long-term averages and combined Dry and Critical water years average.

The total deliveries for all regions over the long-term average show that an increase of 21,000 acre-feet (one percent) would occur. The long-term averages indicate that M&I delivery increases in the San Francisco Bay (9,000 acre-feet [four percent], South Coast (48,000 acre-feet [four percent]) and South Lahontan (6,000 acre-feet [two percent]) regions would occur, while all other M&I deliveries would decrease.

The total deliveries throughout all hydrologic regions for the combined Dry and Critical water years average shows that a reduction of 134,000 acre-feet (five percent) would occur. Dry and Critical water years averages show M&I reductions for all regions, with the largest reductions occurring in the South Coast (57,000 acre-feet [five percent]), San Francisco Bay (16,000 acre-feet [10 percent]) and South Lahontan (23,000 acre-feet [10 percent]) regions. Dry and Critical water years averages also show that Ag reductions would occur in the Tulare Lake (32,000 acre-feet [six percent]) region.

Table 6-38
Annual SWP Deliveries (TAF)[a]
No Project/No Action Alternative (NPA/NAA) Compared to Existing Conditions (EXC)
Long-Term Average and Combined Dry and Critical Years Average

Region and Delivery Type		Average (Annual)	NPA/NAA (TAF)	EXC (TAF)	NPA/NAA – EXC (TAF) (Percent Change)
Sacramento River Hydrologic Region					
SWP FRSA	Contract Delivery	Long-Term[b]	950	948	2 (0%)
		Dry and Critical[c]	901	899	2 (0%)
SWP M&I	Contract Delivery	Long-Term	23	24	-1 (-4%)
		Dry and Critical	16	17	-1 (-6%)
San Joaquin River Hydrologic Region (not including Friant-Kern and Madera Canal water users)					
SWP Ag	Contract Delivery (including Article 21)	Long-Term	4	4	0 (0%)
		Dry and Critical	3	3	0 (0%)
San Francisco Bay Hydrologic Region					
SWP M&I	Contract Delivery (including Article 21, includes transfers to SWP contractors)	Long-Term	199	190	9 (4%)
		Dry and Critical	142	158	-16 (-10%)
Central Coast Hydrologic Region					
SWP M&I	Contract Delivery	Long-Term	44	45	-1 (-3%)
		Dry and Critical	31	35	-4 (-11%)
Tulare Lake Hydrologic Region (not including Friant-Kern Canal water users)					
SWP M&I	Contract Delivery	Long-Term	84	87	-3 (-3%)
		Dry and Critical	60	62	-2 (-5%)
SWP Ag	Contract Delivery (including Article 21)	Long-Term	658	695	-37 (-5%)
		Dry and Critical	460	492	-32 (-6%)
South Lahontan Hydrologic Region					
SWP M&I	Contract Delivery (including Article 21)	Long-Term	267	261	6 (2%)
		Dry and Critical	197	220	-23 (-10%)
South Coast Hydrologic Region					
SWP M&I	Contract Delivery (including Article 21, includes transfers to SWP contractors)	Long-Term	1,353	1,305	48 (4%)
		Dry and Critical	990	1,047	-57 (-5%)
SWP Ag	Contract Delivery (including Article 21)	Long-Term	8	9	-1 (-3%)
		Dry and Critical	6	6	0 (0%)
Total For All Regions					
Total SWP Supplies	Contract Delivery (FRSA, Ag, and M&I from SWP)	Long-Term	3,589	3,568	21 (1%)
		Dry and Critical	2,804	2,938	-134 (-5%)

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Notes:

Ag = Agricultural
EXC = existing conditions
FRSA = Feather River Service Area
M&I = Municipal and Industrial
SWP = State Water Project
TAF = thousand acre-feet

6.3.4.2 Secondary Study Area – No Project/No Action Alternative

Trinity Lake

Table 6-39 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Trinity Lake storage. It presents data for averages over the long term and by water year types.

Table 6-39
Trinity Lake End-of-Month Storage (TAF)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	1,306	1,314	1,366	1,427	1,537	1,659	1,807	1,803	1,767	1,631	1,494	1,373
No Project/No Action Alternative	1,305	1,315	1,367	1,431	1,541	1,665	1,816	1,810	1,774	1,636	1,495	1,374
Difference	-1	1	1	4	4	6	9	8	7	5	1	1
Percent Difference (%)	-0.1	0.1	0.0	0.3	0.2	0.4	0.5	0.4	0.4	0.3	0.1	0.1
Water Year Types[b]												
Wet (32%)												
Existing Condition	1,738	1,746	1,764	1,753	1,913	2,047	2,224	2,260	2,239	2,111	1,997	1,845
No Project/No Action Alternative	1,736	1,745	1,761	1,749	1,911	2,051	2,229	2,264	2,241	2,114	1,994	1,845
Difference	-2	-2	-4	-3	-2	4	5	4	2	3	-3	0
Percent Difference (%)	-0.1	-0.1	-0.2	-0.2	-0.1	0.2	0.2	0.2	0.1	0.2	-0.2	0
Above Normal (15%)												
Existing Condition	1,547	1,542	1,571	1,523	1,676	1,845	2,015	2,020	1,992	1,869	1,736	1,601
No Project/No Action Alternative	1,535	1,530	1,557	1,518	1,667	1,837	2,007	2,012	1,984	1,860	1,722	1,584
Difference	-12	-12	-13	-5	-9	-8	-8	-8	-8	-8	-15	-17
Percent Difference (%)	-0.8	-0.8	-0.9	-0.3	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	-0.8	-1.1
Below Normal (17%)												
Existing Condition	1,211	1,245	1,328	1,316	1,390	1,487	1,658	1,643	1,598	1,466	1,335	1,232
No Project/No Action Alternative	1,222	1,254	1,338	1,325	1,399	1,496	1,672	1,656	1,609	1,479	1,344	1,241
Difference	11	9	10	9	9	9	14	13	11	13	9	8
Percent Difference (%)	0.9	0.7	0.7	0.7	0.7	0.6	0.8	0.8	0.7	0.9	0.7	0.7
Dry (22%)												
Existing Condition	1,070	1,074	1,182	1,322	1,405	1,533	1,664	1,615	1,552	1,404	1,235	1,127
No Project/No Action Alternative	1,068	1,078	1,186	1,334	1,414	1,542	1,680	1,630	1,571	1,411	1,243	1,132
Difference	-2	4	4	11	8	9	16	15	18	8	8	5
Percent Difference (%)	-0.2	0.4	0.3	0.9	0.6	0.6	1.0	0.9	1.2	0.6	0.7	0.5
Critical (15%)												
Existing Condition	595	589	621	913	952	1,023	1,083	1,062	1,040	886	734	653
No Project/No Action Alternative	595	596	629	924	966	1,039	1,099	1,076	1,050	893	741	658
Difference	0	7	8	11	15	16	16	15	10	8	7	5
Percent Difference (%)	0	1.3	1.2	1.2	1.6	1.5	1.5	1.4	0.9	0.9	0.9	0.8

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

Percent Difference (%) = Relative Difference of the monthly average.
TAF = thousand acre-feet

The long-term average shows that slight changes would occur, with the greatest change being an increase (0.5 percent) in April. By water year type, storage generally would increase during drier years, with a maximum increase (1.6 percent) occurring during February of Critical water years.

Lewiston Lake

For the purposes of evaluation, Lewiston Lake is assumed to continue to operate as it has historically (as a regulating reservoir). As a regulating reservoir, Lewiston Lake is operated to manage inflows that vary hourly for power generation needs and manage releases that vary daily for meeting downstream flow needs and diversions through the Clear Creek Tunnel to Whiskeytown Lake. Water levels in the reservoir vary over a day and over the span of a week. The regulating operations of Lewiston Lake or Whiskeytown Lake would not be significantly changed by the Project. The modeling performed considered only flow variations on a monthly basis.

Trinity River

Table 6-40 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Trinity River flow downstream of Lewiston Lake. It presents data for averages over the long term and by water year types.

Table 6-40
Trinity River Monthly Flow Downstream of Lewiston Lake (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	368	365	523	662	644	617	583	3,779	2,108	923	450	450
No Project/No Action Alternative	368	360	522	655	645	575	554	3,779	2,091	923	450	450
Difference	0	-4	-2	-8	1	-42	-28	0	-17	0	0	0
Percent Difference (%)	0	-1.1	-0.3	-1.1	0.1	-6.7	-4.8	0	-0.8	0	0	0
Water Year Types[b]												
Wet (32%)												
Existing Condition	373	300	856	1,436	1,056	1,227	716	4,636	3,371	1,289	450	450
No Project/No Action Alternative	373	300	852	1,412	1,026	1,096	627	4,636	3,318	1,289	450	450
Difference	0	0	-5	-24	-30	-131	-89	0	-53	0	0	0
Percent Difference (%)	0	0	-0.6	-1.6	-2.8	-10.7	-12.4	0	-1.6	0	0	0
Above Normal (15%)												
Existing Condition	373	741	621	316	760	436	469	4,462	2,488	1,048	450	450
No Project/No Action Alternative	373	713	621	316	831	436	469	4,462	2,488	1,048	450	450
Difference	0	-28	0	0	72	0	0	0	0	0	0	0
Percent Difference (%)	0	-3.7	0	0	9.4	0	0	0	0	0	0	0
Below Normal (17%)												
Existing Condition	373	300	300	300	517	319	507	3,774	1,672	869	450	450
No Project/No Action Alternative	373	300	300	300	517	319	507	3,774	1,672	869	450	450
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference (%)	0	0	0	0	0	0	0	0	0	0	0	0
Dry (22%)												
Existing Condition	373	300	300	300	300	300	529	3,216	1,251	667	450	450
No Project/No Action Alternative	373	300	300	300	300	300	529	3,216	1,251	667	450	450
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference (%)	0	0	0	0	0	0	0	0	0	0	0	0

Table 6-40
Trinity River Monthly Flow Downstream of Lewiston Lake (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Critical (15%)												
Existing Condition	342	300	300	300	300	300	575	2,092	783	450	450	450
No Project/No Action Alternative	342	300	300	300	300	300	575	2,092	783	450	450	450
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference (%)	0	0	0	0	0	0	0	0	0	0	0	0

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

In general, flow changes would be minimal for both the long term and by water year type. Over the long term, the greatest change would be a reduction (6.7 percent) in March. By water year type, the greatest change would be a reduction (12.4 percent) in April of Wet water years. There would be no change in flows in Below Normal, Dry, and Critical water years because flow would be controlled by minimum flow requirements.

Klamath River Downstream of the Trinity River

Changes to Klamath River flows downstream of the Trinity River were not modeled. The Klamath River is relatively far downstream of the Trinity River, and flow changes were modeled on the Trinity River downstream of Lewiston Reservoir.

Changes to the Trinity River downstream of Lewiston Lake would be limited to slight reductions in spring flood spills. Flow changes and associated impacts would be even smaller downstream given the other flows coming together in the lower part of the watershed.

Clear Creek Tunnel

Table 6-41 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Clear Creek Tunnel flow. It presents data for averages over the long term and by water year types.

Table 6-41
Clear Creek Tunnel Monthly Flow (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	981	382	243	468	92	268	403	155	518	1,782	1,866	1,660
No Project/No Action Alternative	1,033	344	257	420	95	269	389	168	551	1,812	1,926	1,666
Difference	52	-38	14	-48	2	2	-13	14	33	30	60	6
Percent Difference (%)	5.3	-10.0	5.7	-10.2	2.4	0.7	-3.3	8.8	6.4	1.7	3.2	0.4

Table 6-41
Clear Creek Tunnel Monthly Flow (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Water Year Types[b]												
Wet (32%)												
Existing Condition	1,556	494	497	428	81	313	403	259	344	1,760	1,566	2,192
No Project/No Action Alternative	1,593	481	536	430	81	344	483	278	421	1,742	1,678	2,135
Difference	37	-14	39	2	0	30	80	19	77	-18	112	-57
Percent Difference (%)	2.4	-2.8	7.8	0.5	0	9.6	19.9	7.3	22.3	-1.0	7.1	-2.6
Above Normal (15%)												
Existing Condition	904	416	283	269	58	317	585	0	163	1,417	1,771	1,917
No Project/No Action Alternative	964	437	304	269	58	302	588	0	167	1,417	1,875	1,958
Difference	60	22	21	0	0	-16	2	0	3	0	104	42
Percent Difference (%)	6.7	5.2	7.6	0	0	-4.9	0.4	0	2.1	0	5.9	2.2
Below Normal (17%)												
Existing Condition	464	157	79	286	80	387	342	50	615	1,573	1,743	1,342
No Project/No Action Alternative	429	186	65	295	80	384	265	61	660	1,538	1,796	1,361
Difference	-36	29	-14	9	0	-3	-77	11	44	-36	53	18
Percent Difference (%)	-7.7	18.2	-17.6	3.1	0	-0.7	-22.5	2.2	7.2	-2.3	3.0	1.4
Dry (22%)												
Existing Condition	769	438	94	561	115	152	339	209	956	1,933	2,329	1,417
No Project/No Action Alternative	884	333	100	408	166	141	222	221	905	2,100	2,322	1,468
Difference	116	-105	7	-153	51	-11	-116	12	-51	167	-7	51
Percent Difference (%)	15.1	-24.0	7.1	-27.3	44.4	-7.5	-34.3	5.7	-5.3	8.7	-0.3	3.6
Critical (15%)												
Existing Condition	734	283	67	826	131	152	389	125	479	2,212	2,058	987
No Project/No Action Alternative	818	156	62	715	70	135	385	147	561	2,245	2,075	1,012
Difference	84	-127	-5	-111	-62	-17	-4	22	81	33	16	25
Percent Difference (%)	11.5	-45.0	-7.4	-13.4	-46.9	-10.9	-1.0	17.3	17.0	1.5	0.8	2.5

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

Over the long term, flows show that both increases and decreases would occur, with a maximum reduction (10.2 percent) occurring during January and a maximum increase (8.8 percent) occurring during May.

Whiskeytown Lake

For the purposes of evaluation, Whiskeytown Lake is assumed to continue to operate as it has historically (as a regulating reservoir). As a regulating reservoir, Whiskeytown Lake is operated to manage inflows that vary hourly for power generation needs and manage releases that vary daily for meeting downstream flow needs. Water levels in the reservoir vary over a day and over the span of a week. The regulating operations of Whiskeytown Lake would not be significantly changed by the Project. The modeling performed considered only flow variations on a monthly basis.

Clear Creek Downstream of Whiskeytown Lake

Table 6-42 shows the differences between the No Project/No Action Alternative and the Existing Conditions for monthly Clear Creek flow downstream of Whiskeytown Lake. It presents data for averages over the long term and by water year types.

Table 6-42
Clear Creek Monthly Flow Downstream of Whiskeytown Lake (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	182	183	184	193	194	188	188	262	180	85	86	146
No Project/No Action Alternative	185	187	189	197	197	192	191	265	181	85	86	148
Difference	2	5	5	3	3	5	3	3	2	0	0	2
Percent Difference (%)	1.3	2.5	3.0	1.8	1.8	2.6	1.5	1.1	0.9	0	0	0.8
Water Year Types[b]												
Wet (32%)												
Existing Condition	200	200	200	221	220	200	200	277	200	85	85	150
No Project/No Action Alternative	200	200	200	220	220	200	200	277	200	85	85	150
Difference	0	0	0	-1	0	0	0	0	0	0	0	0
Percent Difference (%)	0	0	0	0.0	0	0	0	0	0	0	0	0
Above Normal (15%)												
Existing Condition	200	200	200	192	196	196	196	277	200	85	85	150
No Project/No Action Alternative	200	200	200	192	196	205	196	277	200	85	85	150
Difference	0	0	0	0	0	9	0	0	0	0	0	0
Percent Difference (%)	0	0	0	0	0	4.8	0	0	0	0	0	0
Below Normal (17%)												
Existing Condition	193	193	193	189	189	189	189	263	181	85	85	150
No Project/No Action Alternative	193	193	193	189	189	189	189	269	186	85	85	150
Difference	0	0	0	0	0	0	0	6	5	0	0	0
Percent Difference (%)	0	0	0	0	0	0	0	2.2	2.6	0	0	0
Dry (22%)												
Existing Condition	181	182	182	184	184	184	187	264	180	85	85	144
No Project/No Action Alternative	181	182	182	192	192	192	192	264	180	85	85	150
Difference	0	0	0	8	8	8	5	0	0	0	0	6
Percent Difference (%)	0	0	0	3.9	3.9	3.9	2.1	0	0	0	0	3.8
Critical (15%)												
Existing Condition	117	118	125	155	155	155	155	211	115	85	94	133
No Project/No Action Alternative	133	149	163	168	168	168	168	224	120	85	94	133
Difference	17	31	38	13	13	13	13	13	5	0	0	0
Percent Difference (%)	14.3	26.1	30.0	8.6	8.6	8.6	8.6	6.3	4.7	0	0	0

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes

cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

The long-term average shows that slight increases for most months would occur, with no reductions. Critical water years show that substantial increases would occur during October through December, with a maximum increase (three percent) occurring during December.

Spring Creek

For the purposes of this evaluation, the Spring Creek Detention Dam on Spring Creek was assumed to operate as it has historically as a debris dam. Flows between Whiskeytown, Shasta, and Keswick dams were not considered to be more adverse due to detention dam operations. Whiskeytown Lake and Keswick Reservoir are regulating reservoirs. These reservoirs are operated to manage inflows that vary hourly for power generation needs and manage releases that vary daily for meeting downstream flow needs. Water levels in these reservoirs vary over a day and over the span of a week. The regulating operations of Whiskeytown Lake and Keswick Reservoir would not be significantly changed by the Project. Therefore, Spring Creek Detention Dam flows would not be altered in response to the changes due to the Project. The modeling performed considered only flow variations on a monthly basis and did not include the Spring Creek Detention Dam.

Shasta Lake

Table 6-43 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Shasta Lake storage. It presents data for averages over the long term and by water year types.

Over the long term, there would be slight storage variations, with the largest change being a reduction (0.8 percent) in September. By water year type, the greatest increases (1.9 percent) would occur during September and October of Critical water years, and the largest reduction (1.6 percent) would occur during September of Above Normal water years. This type of change, where storage would generally decrease in wetter years and increase in drier years, is associated with greater deliveries in the No Project/No Action Alternative, when compared to Existing Conditions, and some reduced allocations in drier years.

Table 6-43
Shasta Lake End-of-Month Storage (TAF)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	2,571	2,549	2,703	2,979	3,260	3,615	3,910	3,939	3,635	3,159	2,825	2,651
No Project/No Action Alternative	2,557	2,547	2,712	2,983	3,261	3,616	3,913	3,944	3,634	3,148	2,813	2,630
Difference	-14	-2	9	4	1	1	3	5	-2	-10	-12	-21
Percent Difference (%)	-0.5	-0.1	0.3	0.1	0.0	0.0	0.1	0.1	0.0	-0.3	-0.4	-0.8
Water Year Types[b]												
Wet (32%)												
Existing Condition	3,073	2,958	3,097	3,414	3,638	3,863	4,318	4,471	4,290	3,882	3,528	3,170
No Project/No Action Alternative	3,052	2,943	3,098	3,416	3,641	3,860	4,316	4,473	4,288	3,866	3,519	3,136
Difference	-20	-15	1	2	3	-3	-2	2	-2	-15	-9	-34
Percent Difference (%)	-0.7	-0.5	0.0	0.1	0.1	-0.1	-0.1	0.0	0.0	-0.4	-0.3	-1.1

Table 6-43
Shasta Lake End-of-Month Storage (TAF)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Above Normal (15%)												
Existing Condition	2,996	2,914	3,081	3,145	3,425	3,962	4,402	4,478	4,128	3,563	3,229	3,085
No Project/No Action Alternative	2,952	2,886	3,058	3,124	3,406	3,955	4,400	4,477	4,118	3,544	3,200	3,036
Difference	-44	-29	-24	-22	-18	-7	-1	-1	-10	-19	-29	-49
Percent Difference (%)	-1.5	-1.0	-0.8	-0.7	-0.5	-0.2	0.0	0.0	-0.3	-0.5	-0.9	-1.6
Below Normal (17%)												
Existing Condition	2,859	2,929	2,998	2,928	3,305	3,693	4,061	4,090	3,756	3,263	2,938	2,882
No Project/No Action Alternative	2,846	2,924	3,010	2,945	3,303	3,697	4,069	4,096	3,762	3,253	2,918	2,861
Difference	-12	-5	12	17	-2	4	9	6	5	-10	-21	-21
Percent Difference (%)	-0.4	-0.2	0.4	0.6	0.0	0.1	0.2	0.2	0.1	-0.3	-0.7	-0.7
Dry (22%)												
Existing Condition	2,331	2,390	2,632	2,823	3,187	3,667	3,816	3,729	3,353	2,844	2,504	2,423
No Project/No Action Alternative	2,323	2,412	2,666	2,827	3,189	3,665	3,810	3,725	3,339	2,829	2,486	2,413
Difference	-9	22	34	5	2	-3	-6	-4	-13	-14	-19	-10
Percent Difference (%)	-0.4	0.9	1.3	0.2	0.1	-0.1	-0.2	-0.1	-0.4	-0.5	-0.7	-0.4
Critical (15%)												
Existing Condition	1,084	1,091	1,233	2,160	2,331	2,560	2,498	2,390	2,007	1,539	1,246	1,165
No Project/No Action Alternative	1,105	1,111	1,254	2,180	2,349	2,578	2,524	2,416	2,024	1,554	1,266	1,187
Difference	21	20	21	20	18	18	26	26	17	15	20	23
Percent Difference (%)	1.9	1.8	1.7	0.9	0.8	0.7	1.1	1.1	0.9	1.0	1.6	1.9

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

Percent Difference (%) = Relative Difference of the monthly average.
TAF = thousand acre-feet

Keswick Reservoir

For the purposes of evaluation, Keswick Reservoir is assumed to continue to operate as it has historically (as a regulating reservoir). As a regulating reservoir, Keswick Reservoir is operated to manage inflows that vary hourly for power generation needs and manage releases that vary daily for meeting downstream flow needs. Water levels in the reservoir vary over a day and over the span of a week. The regulating operations of Keswick Reservoir would not be significantly changed by the Project. The modeling performed considered only flow variations on a monthly basis.

Sacramento River

Table 6-44 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Sacramento River flow downstream of Keswick Reservoir. It presents data for averages over the long term and by water year types.

Table 6-44
Sacramento River Monthly Flow Downstream of Keswick Reservoir (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	6,248	6,621	6,866	8,252	10,154	8,553	6,998	7,881	10,711	13,036	10,467	7,909
No Project/No Action Alternative	6,191	6,373	6,696	8,274	10,211	8,555	6,942	7,866	10,846	13,210	10,550	8,069
Difference	-57	-247	-170	22	57	2	-57	-15	135	174	83	160
Percent Difference (%)	-0.9	-3.7	-2.5	0.3	0.6	0.0	-0.8	-0.2	1.3	1.3	0.8	2.0
Water Year Types[b]												
Wet (32%)												
Existing Condition	7,485	8,758	7,585	15,878	18,374	16,094	9,415	9,514	10,374	12,762	11,001	12,009
No Project/No Action Alternative	7,296	8,649	7,369	15,898	18,357	16,226	9,479	9,465	10,515	12,963	11,017	12,376
Difference	-190	-109	-216	20	-16	133	63	-50	141	201	15	367
Percent Difference (%)	-2.5	-1.2	-2.8	0.1	-0.1	0.8	0.7	-0.5	1.4	1.6	0.1	3.1
Above Normal (15%)												
Existing Condition	5,980	8,513	6,903	7,591	14,202	8,625	6,182	7,700	11,172	14,150	10,441	7,812
No Project/No Action Alternative	5,952	8,274	6,844	7,637	14,153	8,412	6,093	7,692	11,336	14,294	10,702	8,198
Difference	-28	-239	-59	46	-49	-213	-89	-8	164	144	260	386
Percent Difference (%)	-0.5	-2.8	-0.9	0.6	-0.3	-2.5	-1.4	-0.1	1.5	1.0	2.5	4.9
Below Normal (17%)												
Existing Condition	5,440	5,162	8,203	4,284	5,370	4,841	5,321	6,918	10,678	12,780	9,954	5,371
No Project/No Action Alternative	5,261	5,066	7,920	4,285	5,700	4,747	5,167	6,958	10,735	12,997	10,181	5,397
Difference	-178	-96	-284	2	330	-94	-154	40	57	217	226	26
Percent Difference (%)	-3.3	-1.9	-3.5	0.0	6.1	-1.9	-2.9	0.6	0.5	1.7	2.3	0.5
Dry (22%)												
Existing Condition	5,844	5,081	7,101	3,967	3,678	3,820	5,713	7,235	11,136	13,238	10,620	5,752
No Project/No Action Alternative	5,936	4,465	6,916	3,889	3,764	3,878	5,648	7,208	11,245	13,426	10,682	5,656
Difference	92	-617	-185	-78	86	58	-65	-28	109	188	62	-96
Percent Difference (%)	1.6	-12.1	-2.6	-2.0	2.3	1.5	-1.1	-0.4	1.0	1.4	0.6	-1.7
Critical (15%)												
Existing Condition	5,385	4,108	3,357	3,447	3,591	3,571	6,464	6,617	10,383	12,509	9,705	5,320
No Project/No Action Alternative	5,504	3,931	3,331	3,625	3,553	3,539	6,306	6,626	10,606	12,583	9,623	5,345
Difference	118	-176	-26	178	-38	-33	-158	9	223	74	-81	25
Percent Difference (%)	2.2	-4.3	-0.8	5.2	-1.1	-0.9	-2.5	0.1	2.2	0.6	-0.8	0.5

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

Over both the long term and by water year type, flows would decrease during October through December and increase during June through September, with relatively minor changes. The long-term average shows that a maximum reduction (3.7 percent) would occur during November and a maximum increase (two percent) would occur during September. By water year type, the largest flow reduction (12.1 percent) would occur in November of Dry water years, while flows show that a maximum increase (4.9 percent) would occur during September of Above Normal water years.

Table 6-45 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Sacramento River flow downstream of RBDD. It presents data for averages over the long term and by water year types.

Table 6-45
Sacramento River Monthly Flow Downstream of Red Bluff Diversion Dam (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	7,032	8,787	11,637	15,206	17,941	14,579	10,565	9,466	10,911	12,412	9,946	8,154
No Project/No Action Alternative	7,009	8,619	11,525	15,263	18,025	14,624	10,566	9,505	11,044	12,615	10,052	8,336
Difference	-24	-167	-112	57	83	45	1	38	132	203	106	182
Percent Difference (%)	-0.3	-1.9	-1.0	0.4	0.5	0.3	0.0	0.4	1.2	1.6	1.1	2.2
Water Year Types[b]												
Wet (32%)												
Existing Condition	8,281	11,194	12,240	27,681	30,270	25,051	15,105	11,949	10,894	12,072	10,333	12,262
No Project/No Action Alternative	8,110	11,165	12,073	27,709	30,272	25,221	15,212	11,926	10,975	12,224	10,305	12,617
Difference	-171	-29	-167	28	2	170	107	-23	82	152	-28	356
Percent Difference (%)	-2.1	-0.3	-1.4	0.1	0.0	0.7	0.7	-0.2	0.8	1.3	-0.3	2.9
Above Normal (15%)												
Existing Condition	6,884	10,747	11,818	16,243	23,485	16,211	10,353	9,416	11,011	13,079	9,679	8,013
No Project/No Action Alternative	6,889	10,585	11,813	16,316	23,461	16,046	10,312	9,441	11,141	13,240	9,956	8,419
Difference	5	-162	-4	73	-24	-165	-41	26	130	162	277	405
Percent Difference (%)	0.1	-1.5	0.0	0.5	-0.1	-1.0	-0.4	0.3	1.2	1.2	2.9	5.1
Below Normal (17%)												
Existing Condition	6,452	7,417	13,282	9,283	11,483	8,999	8,451	8,103	10,722	12,058	9,413	5,588
No Project/No Action Alternative	6,325	7,396	13,046	9,331	11,836	8,942	8,376	8,226	10,834	12,363	9,710	5,646
Difference	-126	-21	-236	47	352	-57	-75	123	112	305	297	58
Percent Difference (%)	-2.0	-0.3	-1.8	0.5	3.1	-0.6	-0.9	1.5	1.0	2.5	3.2	1.0
Dry (22%)												
Existing Condition	6,538	7,247	12,902	7,144	9,009	8,355	7,747	8,285	11,203	12,768	10,303	6,047
No Project/No Action Alternative	6,663	6,712	12,765	7,117	9,125	8,457	7,730	8,323	11,334	13,040	10,432	6,002
Difference	124	-535	-137	-27	115	102	-17	39	131	272	129	-45
Percent Difference (%)	1.9	-7.4	-1.1	-0.4	1.3	1.2	-0.2	0.5	1.2	2.1	1.2	-0.7
Critical (15%)												
Existing Condition	5,895	5,520	6,332	6,144	6,618	6,102	7,634	7,501	10,632	12,364	9,462	5,551
No Project/No Action Alternative	6,057	5,427	6,415	6,383	6,625	6,124	7,565	7,586	10,903	12,494	9,431	5,618
Difference	162	-92	83	239	7	21	-69	85	271	130	-31	67
Percent Difference (%)	2.8	-1.7	1.3	3.9	0.1	0.4	-0.9	1.1	2.5	1.1	-0.3	1.2

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

A comparison indicates slight changes in monthly flow overall. Flow changes over both the long term and by water year type would follow a pattern similar to those downstream of the Keswick Reservoir, although the changes would be relatively minor. Flows would decrease during October through December and increase during June through September. Over the long term, flows would show a maximum reduction (1.9 percent) during November and a maximum increase (2.2 percent) during September. By water year type, the largest flow decrease (7.4 percent) would occur in November of Dry water years, and flows show that a maximum increase (5.1 percent) would occur during September of Above Normal water years.

Table 6-46 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Sacramento River flow downstream of Hamilton City. It presents data for averages over the long term and by water year types.

Table 6-46
Sacramento River Monthly Flow Downstream of Hamilton City (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	6,619	9,075	12,936	17,250	20,300	16,660	10,162	8,718	8,620	9,888	8,073	7,785
No Project/No Action Alternative	6,532	8,851	12,793	17,292	20,370	16,703	10,163	8,656	8,665	9,944	8,041	7,880
Difference	-87	-224	-143	42	70	43	1	-62	46	56	-32	94
Percent Difference (%)	-1.3	-2.5	-1.1	0.2	0.3	0.3	0.0	-0.7	0.5	0.6	-0.4	1.2
Water Year Types[b]												
Wet (32%)												
Existing Condition	7,853	11,556	13,484	31,340	33,977	28,110	15,739	11,993	8,997	9,663	8,472	11,920
No Project/No Action Alternative	7,611	11,467	13,284	31,352	33,964	28,279	15,845	11,871	8,970	9,632	8,281	12,187
Difference	-242	-89	-200	13	-13	168	106	-121	-27	-31	-191	267
Percent Difference (%)	-3.1	-0.8	-1.5	0.0	0.0	0.6	0.7	-1.0	-0.3	-0.3	-2.3	2.2
Above Normal (15%)												
Existing Condition	6,474	11,083	13,152	18,882	26,624	18,886	10,245	8,864	8,710	10,487	7,736	7,644
No Project/No Action Alternative	6,419	10,862	13,115	18,941	26,586	18,718	10,201	8,790	8,755	10,463	7,853	7,957
Difference	-55	-220	-37	58	-37	-168	-43	-74	45	-24	118	314
Percent Difference (%)	-0.8	-2.0	-0.3	0.3	-0.1	-0.9	-0.4	-0.8	0.5	-0.2	1.5	4.1
Below Normal (17%)												
Existing Condition	6,147	7,766	14,677	10,647	13,229	10,421	7,874	7,027	8,254	9,373	7,410	5,181
No Project/No Action Alternative	5,948	7,687	14,413	10,679	13,568	10,361	7,793	7,038	8,268	9,528	7,580	5,154
Difference	-198	-79	-264	32	339	-59	-81	11	14	155	170	-28
Percent Difference (%)	-3.2	-1.0	-1.8	0.3	2.6	-0.6	-1.0	0.2	0.2	1.7	2.3	-0.5
Dry (22%)												
Existing Condition	6,042	7,550	14,569	7,957	10,413	9,935	6,626	6,905	8,520	10,084	8,346	5,656
No Project/No Action Alternative	6,095	6,958	14,399	7,915	10,515	10,034	6,604	6,833	8,582	10,236	8,344	5,525
Difference	53	-592	-170	-42	102	99	-22	-71	62	153	-3	-131
Percent Difference (%)	0.9	-7.8	-1.2	-0.5	1.0	1.0	-0.3	-1.0	0.7	1.5	0.0	-2.3
Critical (15%)												
Existing Condition	5,503	5,510	7,053	6,733	7,425	6,994	5,970	6,169	8,287	10,085	7,909	5,200
No Project/No Action Alternative	5,641	5,370	7,107	6,958	7,418	7,010	5,917	6,178	8,504	10,147	7,794	5,182
Difference	138	-141	55	225	-7	17	-53	9	217	62	-116	-18
Percent Difference (%)	2.5	-2.6	0.8	3.3	-0.1	0.2	-0.9	0.1	2.6	0.6	-1.5	-0.4

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:
cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

A comparison of the No Project/No Action Alternative and Existing Conditions indicates overall slight changes would occur in monthly flow downstream of Hamilton City. Over both the long term and by water year type, flow changes would follow a pattern similar to those upstream, and would be, therefore, relatively minor. Flows would decrease during October through December and increase during June through September. The long-term averages show that a maximum reduction of 2.5 percent would occur during November and a maximum increase of 1.2 percent would occur during September. By water year type, the largest flow reduction (7.8 percent) would occur during November of Dry water years, and flows would increase 4.1 percent during September of Above Normal water years.

Table 6-47 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Sacramento River flow downstream of the proposed Delevan Pipeline Intake. It presents data for averages over the long term and by water year types.

Table 6-47
Sacramento River Monthly Flow Downstream of the Proposed Delevan Pipeline Intake (cfs)
No Project / No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	6,306	9,052	14,656	21,192	25,420	19,912	11,635	8,443	7,819	8,727	7,319	7,972
No Project/No Action Alternative	6,234	8,862	14,547	21,245	25,498	19,959	11,661	8,385	7,862	8,770	7,277	8,066
Difference	-72	-190	-109	53	78	47	26	-58	43	43	-42	94
Percent Difference (%)	-1.1	-2.1	-0.7	0.3	0.3	0.2	0.2	-0.7	0.5	0.5	-0.6	1.2
Water Year Types[b]												
Wet (32%)												
Existing Condition	7,634	11,475	15,519	38,450	42,982	32,866	19,105	12,303	8,817	8,651	7,724	12,246
No Project/No Action Alternative	7,414	11,413	15,337	38,456	42,977	33,038	19,238	12,191	8,789	8,608	7,521	12,512
Difference	-220	-62	-182	7	-5	172	132	-111	-28	-42	-202	266
Percent Difference (%)	-2.9	-0.5	-1.2	0.0	0.0	0.5	0.7	-0.9	-0.3	-0.5	-2.6	2.2
Above Normal (15%)												
Existing Condition	6,246	11,166	14,847	24,460	32,370	24,091	11,987	8,976	7,824	9,124	7,024	7,851
No Project/No Action Alternative	6,212	11,019	14,836	24,491	32,399	23,921	11,972	8,904	7,864	9,087	7,132	8,159
Difference	-34	-147	-11	31	29	-170	-15	-72	40	-37	108	308
Percent Difference (%)	-0.5	-1.3	-0.1	0.1	0.1	-0.7	-0.1	-0.8	0.5	-0.4	1.5	3.9
Below Normal (17%)												
Existing Condition	5,946	8,101	16,785	12,874	16,828	12,226	8,830	6,775	7,233	8,097	6,559	5,317
No Project/No Action Alternative	5,761	8,082	16,579	12,964	17,158	12,172	8,782	6,787	7,244	8,240	6,717	5,287
Difference	-185	-19	-206	90	329	-54	-48	12	10	142	158	-30
Percent Difference (%)	-3.1	-0.2	-1.2	0.7	2.0	-0.4	-0.5	0.2	0.1	1.8	2.4	-0.6
Dry (22%)												
Existing Condition	5,556	7,438	16,198	9,455	13,318	12,085	6,699	5,929	7,278	8,920	7,469	5,731
No Project/No Action Alternative	5,620	6,869	16,082	9,443	13,412	12,190	6,698	5,860	7,336	9,060	7,454	5,603
Difference	64	-569	-116	-11	94	106	-1	-70	58	140	-14	-128
Percent Difference (%)	1.1	-7.6	-0.7	-0.1	0.7	0.9	0.0	-1.2	0.8	1.6	-0.2	-2.2
Critical (15%)												
Existing Condition	5,031	5,218	7,798	7,843	8,597	8,377	5,773	5,267	7,149	8,942	7,403	5,291
No Project/No Action Alternative	5,171	5,078	7,875	8,072	8,584	8,396	5,736	5,274	7,363	8,990	7,279	5,274
Difference	140	-140	78	228	-13	20	-37	7	214	49	-123	-17
Percent Difference (%)	2.8	-2.7	1.0	2.9	-0.2	0.2	-0.6	0.1	3.0	0.5	-1.7	-0.3

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

A comparison of the No Project/No Action Alternative and Existing Conditions indicates that overall slight changes in monthly flow would occur. Over both the long term and by water year type, flow changes would follow a pattern similar to those upstream. Flows would decrease during October through December, and would fluctuate between slight increases and decreases during the remainder of the year. The long-term averages show that a maximum reduction (2.1 percent) would occur during November and a maximum increase (1.2 percent) would occur during September. By water year type, the largest flow decrease (7.6 percent) would occur during November of Dry water years and the largest flow increase (3.9 percent) would occur during September of Above Normal water years.

GCID Canal Intake

Table 6-48 shows the differences between the No Project / No Action Alternative and Existing Conditions for monthly GCID Canal Intake flow at Hamilton City. It presents data for averages over the long term and by water year types.

Over both the long term and by water year type, the largest canal flows (by volume) would be made during April through August, which are relatively dry months when demands are high. Over the long term, flows would increase during November through February with a peak diversion increase (26.9 percent) in February. However, flows (by volume) are relatively small to begin with during these months.

Table 6-48
Glenn-Colusa Irrigation District Canal Intake Monthly Flow at Hamilton City (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	675	391	180	71	52	117	2,096	2,054	2,818	2,668	1,916	528
No Project/No Action Alternative	736	448	212	86	66	119	2,091	2,124	2,879	2,791	2,037	600
Difference	61	57	32	15	14	2	-5	70	61	123	121	72
Percent Difference (%)	9.0	14.5	17.5	21.1	26.9	1.7	-0.2	3.4	2.2	4.6	6.3	13.6
Water Year Types[b]												
Wet (32%)												
Existing Condition	706	404	197	67	52	105	1,931	2,085	2,864	2,728	1,977	561
No Project/No Action Alternative	775	464	230	83	65	107	1,933	2,155	2,945	2,865	2,105	632
Difference	69	59	33	16	13	2	2	70	81	136	128	71
Percent Difference (%)	9.7	14.7	16.9	23.9	25.0	1.9	0.1	3.4	2.8	5.0	6.5	12.7
Above Normal (15%)												
Existing Condition	703	398	175	61	49	100	2,063	2,047	2,900	2,738	1,988	548
No Project/No Action Alternative	761	456	209	76	63	103	2,063	2,118	2,958	2,880	2,119	623
Difference	58	58	33	15	13	3	0	71	58	142	131	74
Percent Difference (%)	8.3	14.6	18.9	24.6	26.5	3.0	0	3.5	2.0	5.2	6.6	13.6
Below Normal (17%)												
Existing Condition	692	406	170	77	52	125	2,200	2,139	2,862	2,746	2,011	547
No Project/No Action Alternative	761	464	198	92	66	126	2,199	2,218	2,932	2,877	2,129	616
Difference	70	58	28	15	14	2	-1	78	70	131	118	70
Percent Difference (%)	10.1	14.3	16.6	19.4	26.9	1.6	-0.1	3.7	2.4	4.8	5.9	12.7

Table 6-48
Glenn-Colusa Irrigation District Canal Intake Monthly Flow at Hamilton City (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Dry (22%)												
Existing Condition	696	376	191	74	54	122	2,213	2,111	2,889	2,715	1,944	526
No Project/No Action Alternative	764	433	223	89	67	124	2,212	2,187	2,934	2,834	2,075	598
Difference	68	57	33	15	13	2	-1	77	45	119	131	72
Percent Difference (%)	9.8	15.1	17.2	20.2	24.0	1.8	0.0	3.6	1.6	4.4	6.7	13.7
Critical (15%)												
Existing Condition	533	362	145	77	53	145	2,188	1,810	2,479	2,306	1,560	418
No Project/No Action Alternative	557	410	174	92	66	145	2,155	1,858	2,515	2,376	1,644	490
Difference	24	47	28	15	13	0	-33	48	35	70	84	72
Percent Difference (%)	4.5	13.1	19.4	19.4	24.5	0	-1.5	2.7	1.4	3.0	5.4	17.3

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:
cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

Tehama-Colusa Canal

Table 6-49 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly T-C Canal Intake flow at the Red Bluff Diversion Dam. It presents data for averages over the long term and by water year types.

Table 6-49
Tehama-Colusa Canal Intake Monthly Flow at Red Bluff Diversion Dam (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	109	11	0	0	3	20	155	435	725	830	666	175
No Project/No Action Alternative	106	10	0	0	2	16	136	413	742	809	648	165
Difference	-3	-1	0	0	-1	-4	-19	-22	17	-21	-18	-10
Percent Difference (%)	-3.2	-9.1	0	0	-33.3	-20.0	-12.1	-5.1	2.4	-2.5	-2.7	-5.5
Water Year Types[b]												
Wet (32%)												
Existing Condition	142	13	0	0	0	16	152	605	1,008	1,159	906	239
No Project/No Action Alternative	141	11	0	0	0	13	149	603	1,074	1,206	943	249
Difference	-1	-1	0	0	0	-3	-3	-2	66	47	37	10
Percent Difference (%)	-0.8	-7.7	0	0	0	-18.8	-2.1	-0.4	6.6	4.0	4.1	4.2
Above Normal (15%)												
Existing Condition	110	8	0	0	0	13	188	594	1,011	1,139	882	233
No Project/No Action Alternative	110	8	0	0	0	12	175	583	1,044	1,118	862	219
Difference	0	0	0	0	0	-1	-13	-10	33	-21	-20	-14
Percent Difference (%)	0	0	0	0	0	-7.7	-6.9	-1.8	3.3	-1.8	-2.2	-5.9

Table 6-49
Tehama-Colusa Canal Intake Monthly Flow at Red Bluff Diversion Dam (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Below Normal (17%)												
Existing Condition	105	9	0	0	3	33	186	411	667	772	601	131
No Project/No Action Alternative	99	8	0	0	2	26	148	363	641	702	545	118
Difference	-6	-1	0	0	-1	-7	-38	-48	-27	-70	-56	-13
Percent Difference (%)	-5.6	-11.1			-33.3	-21.0	-20.4	-11.8	-4.0	-9.1	-9.3	-9.9
Dry (22%)												
Existing Condition	98	9	0	0	6	20	138	290	491	544	435	126
No Project/No Action Alternative	91	9	0	0	4	14	126	255	486	476	379	102
Difference	-7	0	0	0	-2	-5	-13	-34	-5	-68	-56	-23
Percent Difference (%)	-6.8	0	0	0	-33.3	-27.8	-9.1	-11.8	-1.0	-12.5	-12.9	-18.6
Critical (15%)												
Existing Condition	61	13	0	0	9	23	115	154	245	305	354	100
No Project/No Action Alternative	56	13	0	0	6	15	70	127	226	265	321	76
Difference	-4	0	0	0	-3	-8	-45	-27	-20	-40	-33	-24
Percent Difference (%)	-6.8	0	0	0	-33.3	-34.3	-39.0	-17.8	-8.1	-13.2	-9.3	-24.1

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:
cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

Across both the long-term average and by water year type, T-C Canal Intake flows show relatively no change or small decreases, when compared to Existing Conditions, but with flows still peaking over the dry summer months of June and July.

Lake Oroville

Table 6-50 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Lake Oroville storage. It presents data for averages over the long term and by water year types.

Table 6-50
Lake Oroville End-of-Month Storage (TAF)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	1,812	1,868	2,006	2,203	2,405	2,606	2,879	3,015	2,908	2,426	2,135	1,883
No Project/No Action Alternative	1,767	1,826	1,968	2,170	2,381	2,591	2,864	3,002	2,885	2,399	2,098	1,831
Difference	-45	-42	-37	-32	-24	-15	-15	-14	-23	-27	-36	-52
Percent Difference (%)	-2.5	-2.2	-1.9	-1.5	-1.0	-0.6	-0.5	-0.5	-0.8	-1.1	-1.7	-2.8

Table 6-50
Lake Oroville End-of-Month Storage (TAF)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Water Year Types[b]												
Wet (32%)												
Existing Condition	2,464	2,503	2,544	2,697	2,868	2,945	3,303	3,507	3,488	3,146	2,987	2,563
No Project/No Action Alternative	2,377	2,423	2,485	2,679	2,860	2,945	3,304	3,508	3,483	3,125	2,927	2,473
Difference	-87	-80	-59	-18	-8	0	0	0	-5	-21	-60	-90
Percent Difference (%)	-3.5	-3.2	-2.3	-0.7	-0.3	0	0	0	-0.1	-0.7	-2.0	-3.5
Above Normal (15%)												
Existing Condition	2,012	2,071	2,178	2,321	2,624	2,938	3,300	3,498	3,398	2,842	2,478	2,090
No Project/No Action Alternative	1,965	2,024	2,128	2,296	2,610	2,930	3,292	3,498	3,393	2,821	2,434	2,039
Difference	-46	-47	-50	-25	-14	-9	-8	0	-6	-21	-44	-51
Percent Difference (%)	-2.3	-2.2	-2.3	-1.1	-0.5	-0.3	-0.3	0	-0.2	-0.7	-1.8	-2.4
Below Normal (17%)												
Existing Condition	1,906	1,972	2,184	2,108	2,352	2,608	2,984	3,206	3,109	2,526	2,129	1,965
No Project/No Action Alternative	1,867	1,939	2,150	2,078	2,334	2,593	2,969	3,191	3,082	2,490	2,081	1,911
Difference	-40	-33	-33	-30	-18	-15	-15	-15	-27	-35	-48	-54
Percent Difference (%)	-2.1	-1.7	-1.5	-1.4	-0.8	-0.6	-0.5	-0.5	-0.9	-1.4	-2.2	-2.7
Dry (22%)												
Existing Condition	1,236	1,328	1,590	1,904	2,122	2,415	2,608	2,654	2,452	1,879	1,426	1,303
No Project/No Action Alternative	1,242	1,331	1,579	1,842	2,069	2,386	2,578	2,621	2,403	1,827	1,422	1,297
Difference	5	3	-11	-62	-53	-29	-30	-33	-49	-51	-3	-7
Percent Difference (%)	0.4	0.2	-0.7	-3.2	-2.5	-1.2	-1.2	-1.2	-2.0	-2.7	-0.2	-0.5
Critical (15%)												
Existing Condition	954	975	1,081	1,571	1,669	1,824	1,820	1,788	1,608	1,153	1,015	975
No Project/No Action Alternative	921	947	1,060	1,542	1,636	1,792	1,790	1,760	1,573	1,154	1,000	941
Difference	-33	-29	-22	-29	-34	-31	-30	-28	-35	2	-15	-34
Percent Difference (%)	-3.5	-2.9	-2.0	-1.9	-2.0	-1.7	-1.6	-1.6	-2.2	0.1	-1.5	-3.5

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

Percent Difference (%) = Relative Difference of the monthly average.
TAF = thousand acre-feet

Storage would decrease for both the long term and all water year types. Over the long term, the maximum reduction (2.8 percent) would occur during September. By water year type, the maximum reduction (3.5 percent) would occur during September and October of both Wet and Critical water years.

Thermalito Complex (Thermalito Diversion Pool, Thermalito Forebay, and Thermalito Afterbay)

For the purposes of evaluation, the Thermalito Complex is assumed to continue to operate as it has historically (as a regulating reservoir complex). As a regulating reservoir, the Thermalito Complex is operated to manage inflows that vary hourly for power generation needs and manage releases that vary daily for meeting downstream flow needs and diversions into irrigation canals. Water levels in the reservoir vary over a day and over the span of a week. The regulating operations of the Thermalito Complex would not be significantly changed by the Project. The modeling performed considered only flow variations on a monthly basis.

Feather River

Table 6-51 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Feather River flow downstream of the Thermalito Complex. It presents data for averages over the long term and by water year types.

Table 6-51
Feather River Monthly Flow Downstream of the Thermalito Complex (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	2,935	2,282	3,523	4,739	5,651	6,079	3,076	3,645	3,625	7,632	4,837	4,626
No Project/No Action Alternative	2,815	2,230	3,453	4,661	5,498	5,941	3,079	3,640	3,783	7,723	4,992	4,831
Difference	-120	-52	-70	-78	-153	-137	3	-5	157	91	155	205
Percent Difference (%)	-4.1	-2.3	-2.0	-1.6	-2.7	-2.3	0.1	-0.1	4.3	1.2	3.2	4.4
Water Year Types[b]												
Wet (32%)												
Existing Condition	3,888	3,486	5,622	10,678	11,699	12,513	6,499	7,531	5,063	6,479	3,292	7,931
No Project/No Action Alternative	3,835	3,384	5,285	10,620	11,516	12,387	6,511	7,539	5,149	6,745	3,920	8,437
Difference	-54	-102	-338	-58	-183	-126	12	9	86	266	628	505
Percent Difference (%)	-1.4	-2.9	-6.0	-0.5	-1.6	-1.0	0.2	0.1	1.7	4.1	19.1	6.4
Above Normal (15%)												
Existing Condition	3,714	2,323	3,340	3,586	5,659	7,115	2,252	3,366	3,291	8,874	6,037	6,935
No Project/No Action Alternative	3,592	2,323	3,389	3,461	5,426	7,028	2,257	3,232	3,397	9,119	6,405	7,040
Difference	-122	0	49	-125	-233	-87	6	-133	106	245	368	105
Percent Difference (%)	-3.3		1.5	-3.5	-4.1	-1.2	0.3	-4.0	3.2	2.8	6.1	1.5
Below Normal (17%)												
Existing Condition	2,770	1,998	2,618	1,756	3,045	2,383	1,119	1,137	2,655	8,938	6,243	2,571
No Project/No Action Alternative	2,533	1,893	2,615	1,711	2,799	2,337	1,119	1,159	2,849	9,062	6,441	2,656
Difference	-236	-105	-3	-45	-245	-46	1	22	194	124	198	85
Percent Difference (%)	-8.5	-5.3	-0.1	-2.6	-8.1	-1.9	0.1	2.0	7.3	1.4	3.2	3.3
Dry (22%)												
Existing Condition	2,225	1,478	2,510	1,604	1,757	2,009	1,330	1,555	3,157	8,221	6,778	2,038
No Project/No Action Alternative	2,031	1,516	2,732	1,453	1,635	1,685	1,329	1,605	3,442	8,256	6,071	2,002
Difference	-193	38	222	-151	-122	-324	-1	50	285	35	-708	-36
Percent Difference (%)	-8.7	2.6	8.8	-9.4	-6.9	-16.1	-0.1	3.2	9.0	0.4	-10.4	-1.8
Critical (15%)												
Existing Condition	1,346	1,172	1,731	1,209	1,421	1,516	1,388	1,566	2,679	6,481	2,432	1,436
No Project/No Action Alternative	1,330	1,101	1,607	1,206	1,476	1,480	1,375	1,545	2,807	6,084	2,595	1,592
Difference	-17	-71	-124	-3	55	-37	-13	-21	129	-397	163	157
Percent Difference (%)	-1.2	-6.0	-7.2	-0.2	3.9	-2.4	-0.9	-1.3	4.8	-6.1	6.7	10.9

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

Across both the long term and water year type averages, flows would decrease during October through March and increase during the remainder of the year. Over the long-term average, a maximum increase (4.4 percent) would occur during September and a maximum decrease (4.1 percent) would occur during October. By water year type, a maximum increase (19.1 percent) would occur during August of Wet water years and a maximum reduction (16.1 percent) would occur during March of Dry water years.

Sutter Bypass

Table 6-52 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Tisdale Weir flow into the Sutter Bypass. It presents data for averages over the long term and by water year types.

Table 6-52
Tisdale Weir Monthly Flow into the Sutter Bypass (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	9	151	1,017	2,245	3,232	2,127	899	89	47	0	0	0
No Project/No Action Alternative	8	147	1,010	2,248	3,231	2,125	897	89	45	0	0	0
Difference	-1	-4	-7	3	-1	-2	-2	0	-2	0	0	0
Percent Difference (%)	-11.1	-2.6	-0.7	0.1	0.0	-0.1	-0.2	0	-4.3	0	0	0
Water Year Types[b]												
Wet (32%)												
Existing Condition	0	96	1,088	5,283	7,222	4,819	2,391	170	147	0	0	0
No Project/No Action Alternative	0	98	1,109	5,277	7,193	4,834	2,396	169	143	0	0	0
Difference	0	2	21	-6	-29	15	5	-1	-4	0	0	0
Percent Difference (%)	0	2.1	1.9	-0.1	-0.4	0.3	0.2	-0.6	-2.7	0	0	0
Above Normal (15%)												
Existing Condition	0	513	1,109	2,723	3,702	3,230	791	241	0	0	0	0
No Project/No Action Alternative	0	511	1,096	2,726	3,647	3,200	767	241	0	0	0	0
Difference	0	-2	-13	3	-55	-30	-24	0	0	0	0	0
Percent Difference (%)	0	-0.4	-1.2	0.1	-1.5	-0.9	-3.0	0	0	0	0	0
Below Normal (17%)												
Existing Condition	53	101	1,292	611	1,206	270	145	0	0	0	0	0
No Project/No Action Alternative	49	101	1,231	613	1,293	265	147	0	0	0	0	0
Difference	-4	0	-61	2	87	-5	2	0	0	0	0	0
Percent Difference (%)	-7.5	0	-4.7	0.3	7.2	-1.9	1.4	0	0	0	0	0
Dry (22%)												
Existing Condition	0	128	1,263	263	818	365	0	0	0	0	0	0
No Project/No Action Alternative	0	110	1,255	278	823	356	0	0	0	0	0	0
Difference	0	-18	-8	15	5	-9	0	0	0	0	0	0
Percent Difference (%)	0	-14.1	-0.6	5.7	0.6	-2.5	0	0	0	0	0	0
Critical (15%)												
Existing Condition	0	0	84	65	101	3	0	0	0	0	0	0
No Project/No Action Alternative	0	0	86	67	101	3	0	0	0	0	0	0
Difference	0	0	2	2	0	0	0	0	0	0	0	0
Percent Difference (%)	0	0	2.4	3.1	0	0	0	0	0	0	0	0

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:
cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

Over the long-term average, flows show that either no change or slight decreases would occur, with a maximum reduction (11.1 percent) occurring during October.

Table 6-53 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Colusa Weir flow into the Sutter Bypass. It presents data for averages over the long term and by water year types. Over the long-term average, flows show either no change or slight decreases, with a maximum decrease (-12.5 percent) in October.

Table 6-53
Colusa Weir Monthly Flow into the Sutter Bypass (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	8	133	1,336	3,912	5,705	3,538	1,179	68	20	0	0	0
No Project/No Action Alternative	7	126	1,329	3,917	5,723	3,523	1,174	68	19	0	0	0
Difference	-1	-7	-7	5	18	-15	-5	0	-1	0	0	0
Percent Difference (%)	-12.5	-5.3	-0.5	0.1	0.3	-0.4	-0.4	0	-5.0	0	0	0
Water Year Types[b]												
Wet (32%)												
Existing Condition	0	35	1,281	9,969	14,078	8,592	3,191	128	63	0	0	0
No Project/No Action Alternative	0	35	1,292	9,956	14,022	8,607	3,195	128	61	0	0	0
Difference	0	0	11	-13	-56	15	4	0	-2	0	0	0
Percent Difference (%)	0	0	0.9	-0.1	-0.4	0.2	0.1	0	-3.2	0	0	0
Above Normal (15%)												
Existing Condition	0	613	1,258	3,949	5,885	5,033	1,043	186	0	0	0	0
No Project/No Action Alternative	0	589	1,240	3,961	5,888	4,959	997	187	0	0	0	0
Difference	0	-24	-18	12	3	-74	-46	1	0	0	0	0
Percent Difference (%)	0	-3.9	-1.4	0.3	0.1	-1.5	-4.4	0.5	0	0	0	0
Below Normal (17%)												
Existing Condition	46	70	1,688	716	1,245	104	88	0	0	0	0	0
No Project/No Action Alternative	40	75	1,613	716	1,433	83	89	0	0	0	0	0
Difference	-6	5	-75	0	188	-21	1	0	0	0	0	0
Percent Difference (%)	-13.0	7.1	-4.4	0	15.1	-20.2	1.1	0	0	0	0	0
Dry (22%)												
Existing Condition	0	94	2,064	225	755	271	0	0	0	0	0	0
No Project/No Action Alternative	0	75	2,090	256	768	245	0	0	0	0	0	0
Difference	0	-19	26	31	13	-26	0	0	0	0	0	0
Percent Difference (%)	0	-20.2	1.3	13.8	1.7	-9.6	0	0	0	0	0	0
Critical (15%)												
Existing Condition	0	0	28	13	13	0	0	0	0	0	0	0
No Project/No Action Alternative	0	0	29	14	13	0	0	0	0	0	0	0
Difference	0	0	1	1	0	0	0	0	0	0	0	0
Percent Difference (%)	0	0	3.6	7.7	0	0	0	0	0	0	0	0

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

Table 6-54 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Moulton Weir flow into the Sutter Bypass. It presents data for averages over the long term and by water year types. Over the long term, flows show either no change or minor changes.

Table 6-54
Moulton Weir Monthly Flow into the Sutter Bypass (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	0	0	57	289	464	242	32	0	0	0	0	0
No Project/No Action Alternative	0	0	59	283	467	240	32	0	0	0	0	0
Difference	0	0	1	-5	3	-2	0	0	0	0	0	0
Percent Difference (%)	0	0	2.6	-1.8	0.6	-0.6	0	0	0	0	0	0
Water Year Types[b]												
Wet (32%)												
Existing Condition	0	0	46	847	1,360	694	82	0	0	0	0	0
No Project/No Action Alternative	0	0	42	829	1,367	690	83	0	0	0	0	0
Difference	0	0	-5	-18	7	-4	1	0	0	0	0	0
Percent Difference (%)	0	0	-9.8	-2.1	0.5	-0.6	0.6	0	0	0	0	0
Above Normal (15%)												
Existing Condition	0	0	7	136	226	148	38	0	0	0	0	0
No Project/No Action Alternative	0	0	7	139	229	147	38	0	0	0	0	0
Difference	0	0	0	3	2	-1	1	0	0	0	0	0
Percent Difference (%)	0	0	0	2.3	1.1	-0.5	1.5	0	0	0	0	0
Below Normal (17%)												
Existing Condition	0	0	98	1	0	0	0	0	0	0	0	0
No Project/No Action Alternative	0	0	94	1	0	0	0	0	0	0	0	0
Difference	0	0	-4	0	0	0	0	0	0	0	0	0
Percent Difference (%)	0	0	-4.3	0	0	0	0	0	0	0	0	0
Dry (22%)												
Existing Condition	0	0	113	0	0	0	0	0	0	0	0	0
No Project/No Action Alternative	0	0	130	0	0	0	0	0	0	0	0	0
Difference	0	0	17	0	0	0	0	0	0	0	0	0
Percent Difference (%)	0	0	14.7	0	0	0	0	0	0	0	0	0
Critical (15%)												
Existing Condition	0	0	0	0	0	0	0	0	0	0	0	0
No Project/No Action Alternative	0	0	0	0	0	0	0	0	0	0	0	0
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference (%)	0	0	0	0	0	0	0	0	0	0	0	0

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

Table 6-55 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Ord Ferry flow into the Sutter Bypass. It presents data for averages over the long term and by water year types. Over the long term, flows show either no change or minor changes.

Table 6-55
Ord Ferry Monthly Flow into the Sutter Bypass (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	0	0	60	262	427	189	13	0	0	0	0	0
No Project/No Action Alternative	0	0	63	257	431	189	14	0	0	0	0	0
Difference	0	0	3	-5	4	0	1	0	0	0	0	0
Percent Difference (%)	0	0	4.4	-1.8	0.9	0	0.9	0	0	0	0	0
Water Year Types[b]												
Wet (32%)												
Existing Condition	0	0	37	795	1,204	555	34	0	0	0	0	0
No Project/No Action Alternative	0	0	29	779	1,213	554	34	0	0	0	0	0
Difference	0	0	-7	-17	9	0	0	0	0	0	0	0
Percent Difference (%)	0	0	-19.7	-2.1	0.8	0	0	0	0	0	0	0
Above Normal (15%)												
Existing Condition	0	0	1	64	310	88	18	0	0	0	0	0
No Project/No Action Alternative	0	0	1	68	316	88	19	0	0	0	0	0
Difference	0	0	0	5	6	1	1	0	0	0	0	0
Percent Difference (%)	0	0	0	7.4	1.9	0.7	5.5	0	0	0	0	0
Below Normal (17%)												
Existing Condition	0	0	128	0	0	0	0	0	0	0	0	0
No Project/No Action Alternative	0	0	123	0	0	0	0	0	0	0	0	0
Difference	0	0	-5	0	0	0	0	0	0	0	0	0
Percent Difference (%)	0	0	-3.8	0	0	0	0	0	0	0	0	0
Dry (22%)												
Existing Condition	0	0	121	0	0	0	0	0	0	0	0	0
No Project/No Action Alternative	0	0	147	0	0	0	0	0	0	0	0	0
Difference	0	0	26	0	0	0	0	0	0	0	0	0
Percent Difference (%)	0	0	21.8	0	0	0	0	0	0	0	0	0
Critical (15%)												
Existing Condition	0	0	0	0	0	0	0	0	0	0	0	0
No Project/No Action Alternative	0	0	0	0	0	0	0	0	0	0	0	0
Difference	0	0	0	0	0	0	0	0	0	0	0	0
Percent Difference (%)	0	0	0	0	0	0	0	0	0	0	0	0

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

Yolo Bypass

Table 6-56 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Yolo Bypass flow. It presents data for averages over the long term and by water year types.

Table 6-56
Yolo Bypass Monthly Flow (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	145	404	3,317	9,687	12,548	8,298	2,428	267	120	47	102	82
No Project/No Action Alternative	100	413	3,334	9,711	12,487	8,325	2,476	265	126	48	100	83
Difference	-45	9	17	24	-61	27	48	-2	6	1	-2	1
Percent Difference (%)	-31.0	2.2	0.5	0.2	-0.5	0.3	2.0	-0.7	5.0	2.1	-2.0	1.2
Water Year Types[b]												
Wet (32%)												
Existing Condition	84	591	4,322	26,071	31,139	21,303	6,490	640	240	47	149	95
No Project/No Action Alternative	86	622	4,191	26,131	31,005	21,378	6,583	631	256	48	143	102
Difference	2	31	-131	60	-134	75	93	-9	16	1	-6	7
Percent Difference (%)	2.4	5.2	-3.0	0.2	-0.4	0.4	1.4	-1.4	6.7	2.1	-4.0	7.4
Above Normal (15%)												
Existing Condition	34	850	1,408	7,455	12,263	8,396	1,399	183	65	47	96	67
No Project/No Action Alternative	37	859	1,440	7,385	11,958	8,418	1,424	183	66	48	95	65
Difference	3	9	32	-70	-305	22	25	0	1	1	-1	-2
Percent Difference (%)	8.8	1.1	2.3	-0.9	-2.5	0.3	1.8	0	1.5	2.1	-1.0	-3.0
Below Normal (17%)												
Existing Condition	563	228	3,233	1,002	2,662	715	488	64	64	47	116	88
No Project/No Action Alternative	286	278	3,321	1,047	2,780	693	568	67	66	48	114	86
Difference	-277	50	88	45	118	-22	80	3	2	1	-2	-2
Percent Difference (%)	-49.2	21.9	2.7	4.5	4.4	-3.1	16.4	4.7	3.1	2.1	-1.7	-2.3
Dry (22%)												
Existing Condition	45	231	5,233	515	1,703	691	306	76	65	47	60	72
No Project/No Action Alternative	46	180	5,387	542	1,722	701	308	77	67	48	61	73
Difference	1	-51	154	27	19	10	2	1	2	1	1	1
Percent Difference (%)	2.2	-22.1	2.9	5.2	1.1	1.4	0.7	1.3	3.1	2.1	1.7	1.4
Critical (15%)												
Existing Condition	53	19	274	309	358	279	104	65	63	47	54	75
No Project/No Action Alternative	56	22	303	318	363	292	107	68	64	48	54	70
Difference	3	3	29	9	5	13	3	3	1	1	0	-5
Percent Difference (%)	5.7	15.8	10.6	2.9	1.4	4.7	2.9	4.6	1.6	2.1	0	-6.7

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

Over the long term and by water year type, flows show that increases and decreases would occur with variation occurring between months. The flows over the Sacramento and Freemont weirs would occur during high flow, flood conditions in the Sacramento River and could vary widely from day to day and through a month. The flows shown in Table 6-56 are averages for each month and water year type. For a change shown in the table, the increases and decreases in flows could have either occurred in many months or in few months depending on how high flow, flood conditions changed with the No Project/No Action Alternative. Appendix 6B and Appendix 6C include detailed modeling results for all of the weirs along the Sacramento River. These variations in flow conditions are evaluated in more detail in Chapter 12 Aquatic Biological Resources.

Folsom Lake

Table 6-57 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Folsom Lake storage. It presents data for averages over the long-term and by water year types.

Over both the long-term and by water year type, storage would decrease with a maximum long-term average reduction (2.9 percent) in August. The reductions between the No Project/No Action Alternative and Existing Conditions are due to the inclusion of new and increased diversions represented in the No Project/No Action Alternative modeling assumptions. More specifically, an increase in urban M&I use within the American River Basin is not included in Existing Conditions, but is included in the No Project/No Action Alternative and Alternatives A, B, and C.

Table 6-57
Folsom Lake End-of-Month Storage (TAF)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	489	445	456	471	488	592	721	844	817	682	599	509
No Project/No Action Alternative	477	435	448	466	487	594	719	840	810	666	582	496
Difference	-12	-10	-8	-5	-1	2	-3	-4	-7	-16	-18	-13
Percent Difference (%)	-2.6	-2.2	-1.8	-1.0	-0.1	0.4	-0.4	-0.4	-0.9	-2.3	-2.9	-2.6
Water Year Types[b]												
Wet (32%)												
Existing Condition	599	510	509	520	502	633	794	966	966	877	770	606
No Project/No Action Alternative	590	505	505	520	505	634	792	964	961	867	762	600
Difference	-8	-5	-3	0	3	1	-2	-3	-5	-9	-8	-6
Percent Difference (%)	-1.4	-1.0	-0.7	0	0.7	0.2	-0.2	-0.3	-0.5	-1.1	-1.1	-1.0
Above Normal (15%)												
Existing Condition	544	487	505	518	529	642	796	968	947	757	688	573
No Project/No Action Alternative	528	474	492	516	533	649	796	966	939	744	662	559
Difference	-17	-13	-13	-2	4	7	0	-2	-8	-13	-26	-14
Percent Difference (%)	-3.1	-2.7	-2.5	-0.4	0.8	1.1	0	-0.2	-0.8	-1.7	-3.8	-2.5
Below Normal (17%)												
Existing Condition	577	529	516	508	540	637	788	932	912	719	650	594
No Project/No Action Alternative	558	508	504	500	538	635	787	928	907	685	610	565
Difference	-19	-21	-12	-9	-2	-3	-1	-4	-5	-34	-40	-29
Percent Difference (%)	-3.3	-3.9	-2.3	-1.7	-0.4	-0.4	-0.1	-0.4	-0.5	-4.7	-6.2	-5.0

Table 6-57
Folsom Lake End-of-Month Storage (TAF)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Dry (22%)												
Existing Condition	401	402	417	436	497	592	708	782	720	559	467	431
No Project/No Action Alternative	390	396	410	430	495	601	704	777	708	541	451	420
Difference	-11	-7	-7	-6	-2	10	-4	-5	-12	-18	-15	-10
Percent Difference (%)	-2.7	-1.6	-1.7	-1.5	-0.3	1.7	-0.6	-0.6	-1.7	-3.3	-3.2	-2.4
Critical (15%)												
Existing Condition	227	225	281	326	345	401	433	443	400	329	280	251
No Project/No Action Alternative	215	215	269	316	334	396	425	437	391	321	274	239
Difference	-12	-10	-12	-10	-11	-5	-8	-6	-9	-9	-6	-12
Percent Difference (%)	-5.5	-4.5	-4.4	-3.1	-3.2	-1.1	-1.8	-1.3	-2.2	-2.7	-2.1	-4.7

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:
Percent Difference (%) = Relative Difference of the monthly average.
TAF = thousand acre-feet

Lake Natoma

For the purposes of evaluation, Lake Natoma is assumed to continue to operate as it has historically (as a regulating reservoir). As a regulating reservoir, Lake Natoma is operated to manage inflows that vary hourly for power generation needs and manage releases that vary daily for meeting downstream flow needs and diversions into the Folsom South Canal. Water levels in the reservoir vary over a day and over the span of a week. The regulating operations of Lake Natoma would not be significantly changed by the Project. The modeling performed considered only flow variations on a monthly basis.

American River

Table 6-58 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly American River flow downstream of Lake Natoma. It presents data for averages over the long term and by water year types.

Expected flow changes correspond with the trends seen in Folsom Lake storage upstream, with flows decreasing during nearly all months over both the long-term and by water year types. The expected reductions between the No Project/No Action Alternative and Existing Conditions are due to the inclusion of new diversions represented in the No Project/No Action Alternative modeling assumptions, as discussed for Folsom Lake, which draw off of both the American River and Sacramento River.

The long-term average shows a maximum reduction (8.4 percent) occurring during September. Comparing by water year types, flows would decrease more as years become drier. Maximum reductions would occur during August and September for all water year types, with a maximum reduction (18.3 percent) occurring in September of Critical water years.

Table 6-58
American River Monthly Flow Downstream of Lake Natoma (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	1,601	2,831	3,341	4,446	5,173	3,773	3,290	3,603	3,702	3,763	2,704	2,923
No Project/No Action Alternative	1,498	2,745	3,268	4,368	5,068	3,686	3,255	3,461	3,526	3,640	2,501	2,679
Difference	-103	-86	-73	-78	-105	-87	-36	-142	-176	-123	-203	-245
Percent Difference (%)	-6.4	-3.0	-2.2	-1.8	-2.0	-2.3	-1.1	-3.9	-4.8	-3.3	-7.5	-8.4
Water Year Types[b]												
Wet (32%)												
Existing Condition	1,689	4,010	3,687	8,765	9,244	6,089	5,300	6,157	6,003	4,102	3,530	4,518
No Project/No Action Alternative	1,634	3,901	3,618	8,626	9,123	6,055	5,197	5,968	5,780	3,898	3,267	4,293
Difference	-55	-109	-69	-139	-121	-34	-103	-189	-223	-203	-263	-225
Percent Difference (%)	-3.3	-2.7	-1.9	-1.6	-1.3	-0.6	-1.9	-3.1	-3.7	-5.0	-7.4	-5.0
Above Normal (15%)												
Existing Condition	1,581	2,854	2,950	4,718	6,355	5,426	3,547	3,885	3,431	4,606	2,645	3,448
No Project/No Action Alternative	1,525	2,743	2,900	4,521	6,203	5,332	3,454	3,649	3,255	4,415	2,632	3,088
Difference	-56	-111	-51	-197	-151	-94	-92	-236	-176	-191	-13	-361
Percent Difference (%)	-3.6	-3.9	-1.7	-4.2	-2.4	-1.7	-2.6	-6.1	-5.1	-4.2	-0.5	-10.5
Below Normal (17%)												
Existing Condition	1,907	3,365	4,164	2,313	4,291	2,423	3,113	2,936	2,861	4,588	2,521	2,403
No Project/No Action Alternative	1,649	3,356	3,983	2,273	4,139	2,387	2,972	2,799	2,637	4,835	2,397	2,060
Difference	-258	-9	-181	-40	-152	-36	-141	-137	-224	246	-124	-344
Percent Difference (%)	-13.5	-0.3	-4.3	-1.7	-3.6	-1.5	-4.5	-4.7	-7.8	5.4	-4.9	-14.3
Dry (22%)												
Existing Condition	1,531	1,867	4,056	1,686	1,879	2,210	1,774	1,807	2,460	3,454	2,581	1,869
No Project/No Action Alternative	1,439	1,771	4,027	1,709	1,773	2,010	1,907	1,715	2,372	3,254	2,308	1,593
Difference	-92	-96	-29	22	-106	-200	133	-92	-88	-200	-273	-276
Percent Difference (%)	-6.0	-5.2	-0.7	1.3	-5.7	-9.1	7.5	-5.1	-3.6	-5.8	-10.6	-14.8
Critical (15%)												
Existing Condition	1,177	1,077	946	1,445	1,140	1,021	1,160	1,263	1,830	1,686	1,368	1,130
No Project/No Action Alternative	1,089	990	906	1,423	1,175	939	1,197	1,234	1,679	1,493	1,118	1,123
Difference	-88	-87	-40	-23	35	-82	37	-28	-151	-193	-250	-8
Percent Difference (%)	-7.5	-8.1	-4.3	-1.6	3.1	-8.0	3.2	-2.3	-8.3	-11.4	-18.3	-0.7

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

Sacramento-San Joaquin Delta

Table 6-59 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Sacramento-San Joaquin Delta outflow. It presents data for averages over the long term and by water year types.

Table 6-59
Sacramento-San Joaquin Delta Monthly Outflow (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	6,015	11,701	21,478	42,346	51,555	42,576	30,053	22,456	12,771	7,964	4,594	9,715
No Project/No Action Alternative	5,927	11,674	21,446	42,528	51,653	42,537	29,887	22,080	12,750	8,048	4,593	9,663
Difference	-88	-27	-32	182	97	-39	-165	-375	-21	84	-1	-51
Percent Difference (%)	-1.5	-0.2	-0.1	0.4	0.2	-0.1	-0.5	-1.7	-0.2	1.1	0.0	-0.5
Water Year Types[b]												
Wet (32%)												
Existing Condition	8,619	18,566	25,599	84,561	95,616	78,190	54,405	41,030	23,448	11,450	5,315	19,675
No Project/No Action Alternative	8,387	18,519	25,088	84,405	95,517	78,395	54,269	40,411	23,163	11,329	5,031	19,685
Difference	-232	-47	-511	-157	-100	205	-136	-619	-285	-122	-284	10
Percent Difference (%)	-2.7	-0.3	-2.0	-0.2	-0.1	0.3	-0.2	-1.5	-1.2	-1.1	-5.3	0.0
Above Normal (15%)												
Existing Condition	5,987	13,440	19,292	47,769	60,267	53,235	31,967	24,235	11,822	9,555	4,000	11,797
No Project/No Action Alternative	5,945	13,441	19,382	47,552	60,411	52,963	31,605	23,647	11,872	9,611	4,000	11,732
Difference	-41	1	90	-217	144	-272	-362	-589	50	56	0	-65
Percent Difference (%)	-0.7	0.0	0.5	-0.5	0.2	-0.5	-1.1	-2.4	0.4	0.6	0	-0.6
Below Normal (17%)												
Existing Condition	5,993	9,661	26,644	21,818	35,261	22,901	21,757	16,044	8,050	7,081	4,000	3,456
No Project/No Action Alternative	5,694	9,690	26,481	22,181	35,426	22,962	21,469	15,813	8,200	7,446	4,011	3,330
Difference	-299	29	-164	363	166	61	-288	-231	150	365	11	-126
Percent Difference (%)	-5.0	0.3	-0.6	1.7	0.5	0.3	-1.3	-1.4	1.9	5.2	0.3	-3.6
Dry (22%)												
Existing Condition	4,088	6,895	22,691	14,543	20,879	19,756	14,036	10,412	6,622	5,040	4,744	3,284
No Project/No Action Alternative	4,164	6,822	23,161	14,784	20,810	19,584	14,060	10,203	6,788	5,221	4,879	3,172
Difference	76	-73	470	241	-69	-172	24	-209	166	182	135	-112
Percent Difference (%)	1.9	-1.1	2.1	1.7	-0.3	-0.9	0.2	-2.0	2.5	3.6	2.9	-3.4
Critical (15%)												
Existing Condition	3,318	4,677	6,886	11,113	12,402	11,937	9,076	5,978	5,316	4,233	4,093	3,000
No Project/No Action Alternative	3,497	4,672	7,170	12,128	13,050	11,686	8,904	5,927	5,318	4,316	4,489	3,008
Difference	179	-4	284	1,015	647	-251	-172	-51	3	83	395	8
Percent Difference (%)	5.4	-0.1	4.1	9.1	5.2	-2.1	-1.9	-0.8	0.1	2.0	9.7	0.3

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:
cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

Over the long-term average, outflow shows that little change would occur, with a maximum increase (1.1 percent) occurring in July and a maximum reduction (1.7 percent) occurring in May. During Wet and Above Normal water years, outflows would decrease during most months.

Table 6-60 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Delta Cross Channel flow. It presents data for averages over the long term and by water year types.

Table 6-60
Delta Cross Channel Monthly Flow (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	4,723	4,031	4,492	4,999	5,691	5,148	3,904	3,371	5,669	7,701	6,529	5,727
No Project/No Action Alternative	4,708	4,028	4,507	5,014	5,702	5,143	3,909	3,347	5,679	7,772	6,490	5,711
Difference	-14	-3	15	15	11	-4	5	-24	9	72	-39	-17
Percent Difference (%)	-0.3	-0.1	0.3	0.3	0.2	-0.1	0.1	-0.7	0.2	0.9	-0.6	-0.3
Water Year Types[b]												
Wet (32%)												
Existing Condition	4,670	4,184	4,913	7,566	8,385	7,381	5,860	5,077	6,583	7,701	6,718	5,350
No Project/No Action Alternative	4,734	4,204	4,923	7,555	8,380	7,401	5,875	5,047	6,554	7,922	6,759	5,434
Difference	64	20	9	-11	-5	21	15	-31	-29	222	42	84
Percent Difference (%)	1.4	0.5	0.2	-0.1	-0.1	0.3	0.3	-0.6	-0.4	2.9	0.6	1.6
Above Normal (15%)												
Existing Condition	5,116	4,335	4,509	5,922	6,760	6,681	4,282	3,629	5,492	8,474	6,770	8,100
No Project/No Action Alternative	5,081	4,373	4,548	5,929	6,776	6,663	4,281	3,580	5,499	8,492	6,908	8,115
Difference	-35	37	40	7	16	-18	-1	-49	6	17	138	14
Percent Difference (%)	-0.7	0.9	0.9	0.1	0.2	-0.3	0.0	-1.3	0.1	0.2	2.0	0.2
Below Normal (17%)												
Existing Condition	5,104	4,279	5,043	3,841	4,923	3,910	3,165	2,687	5,594	8,141	6,632	5,743
No Project/No Action Alternative	4,988	4,301	5,024	3,875	4,930	3,917	3,142	2,674	5,592	8,311	6,690	5,654
Difference	-116	23	-19	34	7	7	-23	-13	-2	170	58	-89
Percent Difference (%)	-2.3	0.5	-0.4	0.9	0.1	0.2	-0.7	-0.5	0.0	2.1	0.9	-1.5
Dry (22%)												
Existing Condition	4,612	3,798	4,324	3,119	3,645	3,578	2,545	2,276	5,233	7,689	6,993	5,497
No Project/No Action Alternative	4,541	3,747	4,345	3,130	3,655	3,540	2,570	2,259	5,293	7,668	6,693	5,361
Difference	-70	-51	21	11	10	-38	25	-17	60	-21	-301	-136
Percent Difference (%)	-1.5	-1.3	0.5	0.3	0.3	-1.1	1.0	-0.7	1.1	-0.3	-4.3	-2.5
Critical (15%)												
Existing Condition	4,164	3,455	3,175	2,686	2,752	2,575	2,190	1,859	4,610	6,429	5,061	4,500
No Project/No Action Alternative	4,205	3,402	3,206	2,746	2,797	2,566	2,183	1,850	4,641	6,257	4,952	4,497
Difference	41	-53	32	60	45	-9	-7	-8	31	-173	-109	-3
Percent Difference (%)	1.0	-1.5	1.0	2.2	1.6	-0.3	-0.3	-0.5	0.7	-2.7	-2.2	-0.1

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:
cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

Over both the long-term and by water year types, flows show that little change would occur, with a maximum increase (0.9 percent) occurring during July and a maximum decrease (0.7 percent) occurring during May.

Table 6-61 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Old and Middle river flows. It presents data for averages over the long term and by water year types. A negative flow value indicates reverse flow conditions.

Table 6-61
Old and Middle Rivers Monthly Flow (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	-6,178	-6,084	-6,640	-3,473	-3,279	-2,779	840	352	-3,773	-9,589	-9,250	-7,582
No Project/No Action Alternative	-6,024	-6,006	-6,736	-3,456	-3,185	-2,843	752	265	-3,714	-9,532	-9,171	-7,712
Difference	154	78	-96	17	94	-64	-87	-88	59	57	79	-130
Percent Difference (%)	-2.5	-1.3	1.4	-0.5	-2.9	2.3	-10.4	-24.9	-1.6	-0.6	-0.9	1.7
Water Year Types[b]												
Wet (32%)												
Existing Condition	-6,294	-5,523	-6,886	-1,965	-2,581	-1,851	2,431	1,648	-4,166	-8,954	-10,070	-8,041
No Project/No Action Alternative	-6,186	-5,518	-7,037	-2,094	-2,518	-1,900	2,264	1,385	-4,208	-8,917	-10,406	-8,540
Difference	108	5	-150	-129	63	-48	-167	-263	-41	37	-337	-499
Percent Difference (%)	-1.7	-.09	2.2	6.6	-2.4	2.6	-6.9	-16.0	1.0	-0.4	3.3	6.2
Above Normal (15%)												
Existing Condition	-6,718	-6,149	-7,623	-3,547	-3,286	-4,070	1,058	500	-4,840	-10,022	-10,452	-8,345
No Project/No Action Alternative	-6,596	-6,082	-7,821	-3,723	-2,947	-4,269	910	415	-4,707	-9,954	-10,873	-8,531
Difference	122	67	-198	-177	339	-199	-148	-84	133	68	-421	-186
Percent Difference (%)	-1.8	-1.1	2.6	4.9	-10.3	-4.9	-14.0	-16.8	-2.7	-.70	4.0	2.2
Below Normal (17%)												
Existing Condition	-7,414	-8,152	-6,550	-4,240	-3,434	-3,968	688	273	-4,056	-10,659	-9,892	-8,598
No Project/No Action Alternative	-7,108	-8,187	-6,606	-4,240	-3,389	-3,923	637	248	-3,812	-10,867	-10,124	-8,484
Difference	306	-35	-57	0	45	44	-51	-25	244	-208	-232	114
Percent Difference (%)	-4.1	0.4	0.9	0	-1.3	-1.1	-7.4	-9.2	-6.0	2.0	2.3	-1.3
Dry (22%)												
Existing Condition	-6,008	-6,823	-6,158	-4,619	-4,004	-2,923	-295	-643	-3,286	-10,756	-9,988	-7,658
No Project/No Action Alternative	-5,777	-6,519	-6,117	-4,527	-4,112	-2,884	-329	-671	-3,228	-10,750	-9,053	-7,376
Difference	232	304	40	92	-108	39	-33	-28	57	5	935	282
Percent Difference (%)	-3.8	-4.5	-.7	-2.0	2.7	-1.3	11.5	4.4	-1.8	-0.6	-9.4	-3.7
Critical (15%)												
Existing Condition	-4,200	-3,713	-5,952	-4,057	-3,517	-1,897	-947	-1,017	-2,254	-7,537	-4,415	-4,528
No Project/No Action Alternative	-4,206	-3,674	-6,076	-3,620	-3,241	-2,140	-925	-890	-2,266	-7,060	-3,856	-4,702
Difference	-6	39	-123	436	276	-243	22	127	-12	477	560	-174
Percent Difference (%)	0.1	-1.1	2.1	-10.8	-7.8	12.8	-2.3	-12.5	0.5	-6.3	-12.7	3.8

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

Changes over the long-term average would be relatively minor during all months. By water year type, Wet and Above Normal water years show that increases in reversed (negative) flow conditions would occur during several months.

Table 6-62 shows the differences between the No Project/No Action Alternative and Existing Conditions for monthly Banks and Jones pumping plant exports. It presents data for averages over the long term and by water year types.

Over the long-term average, changes in exports would be relatively minor and fluctuate between increases and reductions. By water year type, maximum reductions would occur in August of both Dry (10.7 percent) and Critical (15 percent) years.

Table 6-62
Total Banks Pumping Plant (SWP) and Jones Pumping Plant (CVP) Monthly Exports (cfs)
No Project/No Action Alternative Compared to Existing Conditions
Long-Term Average and Average by Water Year Type

Analysis Period	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Long-Term												
Full Simulation Period[a]												
Existing Condition	6,940	6,885	8,906	6,660	7,242	6,595	2,083	2,190	4,849	10,510	10,053	8,650
No Project/No Action Alternative	6,735	6,772	9,003	6,607	7,090	6,641	2,103	2,223	4,939	10,439	9,862	8,678
Difference	-205	-113	97	-53	-152	45	20	33	90	-71	-191	28
Percent Difference (%)	-3.0	-1.6	1.1	-0.8	-2.1	0.7	1.0	1.5	1.9	-0.7	-1.9	0.3
Water Year Types[b]												
Wet (32%)												
Existing Condition	7,323	6,603	10,095	7,856	9,480	9,319	2,847	3,298	7,398	11,371	11,478	9,539
No Project/No Action Alternative	7,183	6,578	10,254	7,946	9,341	9,359	2,920	3,449	7,640	11,445	11,719	9,931
Difference	-141	-25	159	90	-139	40	73	151	243	74	241	392
Percent Difference (%)	-1.9	-0.4	1.6	1.1	-1.5	0.4	2.6	4.6	3.3	0.6	2.1	4.1
Above Normal (15%)												
Existing Condition	7,566	6,896	9,652	6,442	7,241	7,721	1,819	1,675	6,156	10,777	11,289	9,445
No Project/No Action Alternative	7,375	6,792	9,859	6,599	6,900	7,872	1,809	1,674	6,108	10,671	11,642	9,471
Difference	-191	-104	207	157	-341	152	-10	-2	-47	-106	353	26
Percent Difference (%)	-2.5	-1.5	2.1	2.4	-4.7	2.0	-0.5	-0.1	-0.8	-1.0	3.1	0.3
Below Normal (17%)												
Existing Condition	8,258	9,017	8,887	6,291	6,885	6,753	1,736	1,666	4,204	10,977	10,594	9,676
No Project/No Action Alternative	7,868	9,015	8,928	6,246	6,778	6,701	1,733	1,669	4,085	11,150	10,734	9,450
Difference	-390	-2	41	-45	-107	-52	-4	3	-119	173	140	-226
Percent Difference (%)	-4.7	0.0	0.5	-0.7	-1.6	-0.8	-0.2	0.2	-2.8	1.6	1.3	-2.3
Dry (22%)												
Existing Condition	6,612	7,510	7,816	6,247	5,802	4,333	1,750	1,759	2,890	10,913	10,580	8,551
No Project/No Action Alternative	6,323	7,163	7,795	6,153	5,885	4,268	1,746	1,731	3,014	10,801	9,449	8,152
Difference	-289	-347	-22	-94	83	-65	-3	-28	123	-112	-1,130	-399
Percent Difference (%)	-4.4	-4.6	-0.3	-1.5	1.4	-1.5	-0.2	-1.6	4.3	-1.0	-10.7	-4.7
Critical (15%)												
Existing Condition	4,437	4,060	7,241	5,338	4,970	2,779	1,594	1,560	1,709	7,230	4,307	4,880
No Project/No Action Alternative	4,418	3,971	7,334	4,817	4,576	3,009	1,593	1,498	1,800	6,656	3,661	5,058
Difference	-19	-89	94	-521	-394	230	-1	-62	91	-573	-647	177
Percent Difference (%)	-0.4	-2.2	1.3	-9.8	-7.9	8.3	0.0	-4.0	5.3	-7.9	-15.0	3.6

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB, 1999).

Notes:

cfs = cubic feet per second
Percent Difference (%) = Relative Difference of the monthly average.

Suisun Bay, San Pablo Bay, and San Francisco Bay

For the Suisun Bay, San Pablo Bay, and San Francisco Bay region, detailed evaluation was limited to evaluating the changes in Delta outflow, as shown in Table 6-59. Further evaluation of changes in Delta outflow on Suisun Bay, San Pablo Bay, and San Francisco Bay is included Chapter 7 Surface Water Quality and Chapter 12 Aquatic Biological Resources.

6.3.4.3 Primary Study Area – No Project/No Action Alternative

Funks and Stone Corral Creeks

Funks and Stone Corral creeks were not modeled for the No Project/No Action Alternative because the No Project/No Action Alternative does not include any modifications to Existing Conditions that would substantially affect Funks and Stone Corral creek flows.

Funks Reservoir

Changes to Funks Reservoir were not modeled for the No Project/No Action Alternative because the No Project/No Action Alternative does not include any modifications to Existing Conditions that would affect Funks Reservoir. Funks Reservoir was assumed to operate as it has historically (regulating water levels between the canals).

Colusa Basin Drain

CBD flows were not modeled for the No Project/No Action Alternative because the No Project/No Action Alternative does not include any modifications to Existing Conditions that would substantially affect CBD flows.

Other Local Creeks

Grapevine, Antelope, Hunters, and Lurline creeks were not modeled for the No Project/No Action Alternative because the No Project/No Action Alternative does not include any modifications to Existing Conditions that would substantially affect these creek flows.

6.3.5 Changes Associated with Alternatives A, B, and C

This section describes the changes to surface water resources associated with implementation of Alternatives A, B, and C.

The alternatives would be significantly integrated with the CVP and SWP systems. Consequently, the alternatives would affect operations and resultant storage, flows, and diversions associated with the CVP and SWP systems and respective streams and waterways.

Major differences in operational effects between Alternatives A, B, and C would result primarily from differences in the storage capacity of Sites Reservoir (1.27 MAF for Alternative A and 1.81 MAF for Alternatives B and C) and differences in diversion capabilities (Alternatives A and C include a 2,000 cfs Delevan Pipeline diversion and release facility, and Alternative B includes a 1,500 cfs Delevan Pipeline release-only facility).

Changes in metrics are presented comparing the alternatives to Existing Conditions and the No Project/No Action Alternative. To simplify the comparisons between the alternatives, expected changes associated with implementation of Alternatives A, B, and C relative to Existing Conditions and the No Project/No

Action Alternative are presented in summary tables. The summary tables show the long-term average and the combined Dry and Critical water years' average. Detailed modeling results with data for all water year types are included in Appendix 6B.

6.3.5.1 Extended Study Area – Alternatives A, B, and C

Changes in CVP and SWP deliveries between Alternatives A, B, and C, when compared to the No Project/No Action Alternative, are addressed in Section 6.5. Changes in San Luis Reservoir storage from Alternatives A, B, and C, when compared to Existing Conditions and the No Project/No Action Alternative, are discussed below.

San Luis Reservoir

Alternatives A, B, and C Compared to Existing Conditions

Table 6-63 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly San Luis Reservoir storage. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-63
San Luis Reservoir End-of-Month Storage (TAF)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	Existing Conditions	Change from Existing Conditions (TAF)			Month	Existing Conditions	Change from Existing Conditions		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	697	-11 (-2%)	-11 (-2%)	-26 (-4%)	Oct	516	-27 (-5%)	-4 (-1%)	-54 (-11%)
Nov	840	14 (2%)	23 (3%)	11 (1%)	Nov	690	-2 (0%)	23 (3%)	-41 (-6%)
Dec	1,175	-2 (0%)	6 (1%)	-10 (-1%)	Dec	1,006	-38 (-4%)	-1 (0%)	-68 (-7%)
Jan	1,338	45 (3%)	52 (4%)	33 (2%)	Jan	1,257	70 (6%)	64 (5%)	23 (2%)
Feb	1,469	54 (4%)	59 (4%)	42 (3%)	Feb	1,351	104 (8%)	98 (7%)	58 (4%)
Mar	1,553	43 (3%)	48 (3%)	27 (2%)	Mar	1,337	95 (7%)	99 (7%)	56 (4%)
Apr	1,324	23 (2%)	28 (2%)	6 (0%)	Apr	1,135	83 (7%)	89 (8%)	41 (4%)
May	1,001	-7 (-1%)	-3 (0%)	-27 (-3%)	May	835	59 (7%)	66 (8%)	14 (2%)
Jun	682	-30 (-4%)	-31 (-5%)	-49 (-7%)	Jun	473	37 (8%)	34 (7%)	-1 (0%)
Jul	603	-49 (-8%)	-49 (-8%)	-65 (-11%)	Jul	446	1 (0%)	3 (1%)	-36 (-8%)
Aug	548	-58 (-11%)	-59 (-11%)	-69 (-13%)	Aug	408	-14 (-4%)	-13 (-3%)	-39 (-9%)
Sep	617	-27 (-4%)	-24 (-4%)	-41 (-7%)	Sep	442	2 (0%)	26 (6%)	-23 (-5%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.
Note:
TAF = thousand acre-feet

Operations and criteria that affect San Luis Reservoir storage include CVP and SWP allocations, storage over the normally wet winter season, and the rate of drawdown between March (usually the beginning of the delivery season) and August.

Over the long-term averages, Alternatives A, B, and C show that storage would increase during January through April and would decrease during May through October, with maximum reductions occurring during July and August. Alternative C would result in the largest reductions (11 to 13 percent) among alternatives.

Over the Dry and Critical water year averages, Alternative A shows that storage would increase during January through June (as much as 8 percent), and storage would decrease during July through December. Alternative B shows that storage would increase in January through July and September and November, and storage would decrease in August and October. Alternative C shows that storage would increase in January through May, and storage would decrease in June through December. Alternative C would result in the largest storage reductions among the three alternatives.

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-64 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly San Luis Reservoir storage. It presents data for averages over the long-term and combined Dry and Critical water years averages.

Table 6-64
San Luis Reservoir End-of-Month Storage (TAF)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative: Alternative A	Alternative B	Alternative C	Month	No Project/No Action Alternative	Change from No Project/No Action Alternative: Alternative A	Alternative B	Alternative C
Oct	653	33 (5%)	33 (5%)	18 (3%)	Oct	571	-83 (-14%)	-59 (-10%)	-110 (-19%)
Nov	784	69 (9%)	78 (10%)	66 (8%)	Nov	737	-49 (-7%)	-24 (-3%)	-88 (-12%)
Dec	1,113	60 (5%)	68 (6%)	52 (5%)	Dec	1,057	-89 (-8%)	-51 (-5%)	-118 (-11%)
Jan	1,328	55 (4%)	62 (5%)	42 (3%)	Jan	1,286	41 (3%)	35 (3%)	-6 (0%)
Feb	1,477	46 (3%)	51 (3%)	34 (2%)	Feb	1,409	46 (3%)	40 (3%)	0
Mar	1,572	24 (2%)	29 (2%)	8 (1%)	Mar	1,425	8 (1%)	12 (1%)	-31 (-2%)
Apr	1,332	16 (1%)	21 (2%)	-2 (0%)	Apr	1,229	-10 (-1%)	-4 (0%)	-52 (-4%)
May	992	2 (0%)	6 (1%)	-18 (-2%)	May	933	-39 (-4%)	-31 (-3%)	-84 (-9%)
Jun	668	-16 (-2%)	-17 (-3%)	-35 (-5%)	Jun	574	-63 (-11%)	-66 (-11%)	-101 (-18%)
Jul	583	-29 (-5%)	-29 (-5%)	-45 (-8%)	Jul	548	-101 (-19%)	-100 (-18%)	-139 (-25%)
Aug	513	-24 (-5%)	-25 (-5%)	-34 (-7%)	Aug	462	-68 (-15%)	-67 (-14%)	-92 (-20%)
Sep	584	7 (1%)	9 (2%)	-7 (-1%)	Sep	500	-57 (-11%)	-33 (-7%)	-81 (-16%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.
Note:
TAF = thousand acre-feet

Over the long-term averages, Alternatives A and B show that storage would increase during September through May, with maximum increases (up to 10 percent) occurring during November, and storage would decrease during June through August. Alternative C shows that storage would increase during October through March and decrease during April through September. Alternative C shows the greatest storage reductions among the alternatives.

Over the Dry and Critical water years averages, Alternatives A, B, and C generally show that storage decreases would occur during most months. The three alternatives show that substantial reductions would occur in June and July (as much as 25 percent), with Alternative C showing the greatest reductions among the alternatives.

6.3.5.2 Secondary Study Area – Alternatives A, B, and C

As described for the No Project/No Action Alternative, operations for the regulating reservoirs that are located within the Secondary Study Area (i.e., Lewiston Lake, Whiskeytown Lake, Keswick Reservoir, the Thermalito Complex, and Lake Natoma) were not modeled. These reservoirs are assumed to continue to operate as they have historically (as regulating reservoirs), and therefore, would not experience changes in operation. In addition, Spring Creek and Suisun, San Pablo, and San Francisco bays were not modeled. Spring Creek Detention Dam is assumed to continue to operate as it has historically as a debris dam, and any changes in inflow to the bays would not be discernible.

Changes in operations resulting from implementation of Alternatives A, B, and C at the remaining facilities within the Secondary Study Area, when compared to Existing Conditions and the No Project/No Action Alternative, are discussed below.

Trinity Lake

Alternatives A, B, and C Compared to Existing Conditions

Table 6-65 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Trinity Lake storage. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-65
Trinity Lake End-of-Month Storage (TAF)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	Existing Conditions	Change from Existing Conditions: Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Change from Existing Conditions: Alternative A	Alternative B	Alternative C
Oct	1,306	45 (3%)	46 (4%)	55 (4%)	Oct	880	69 (8%)	67 (8%)	90 (10%)
Nov	1,314	49 (4%)	51 (4%)	59 (4%)	Nov	880	77 (9%)	77 (9%)	99 (11%)
Dec	1,366	46 (3%)	48 (4%)	56 (4%)	Dec	958	74 (8%)	74 (8%)	97 (10%)
Jan	1,427	44 (3%)	48 (3%)	53 (4%)	Jan	1,159	56 (5%)	61 (5%)	64 (6%)
Feb	1,537	42 (3%)	45 (3%)	51 (3%)	Feb	1,224	55 (4%)	59 (5%)	62 (5%)
Mar	1,659	39 (2%)	42 (3%)	48 (3%)	Mar	1,329	49 (4%)	56 (4%)	58 (4%)
Apr	1,807	40 (2%)	43 (2%)	48 (3%)	Apr	1,432	52 (4%)	58 (4%)	60 (4%)
May	1,803	40 (2%)	43 (2%)	48 (3%)	May	1,394	54 (4%)	60 (4%)	61 (4%)
Jun	1,767	39 (2%)	43 (2%)	47 (3%)	Jun	1,347	53 (4%)	60 (4%)	62 (5%)
Jul	1,631	40 (2%)	44 (3%)	49 (3%)	Jul	1,196	56 (5%)	59 (5%)	66 (6%)
Aug	1,494	42 (3%)	48 (3%)	52 (3%)	Aug	1,034	70 (7%)	74 (7%)	81 (8%)
Sep	1,373	44 (3%)	43 (3%)	51 (4%)	Sep	937	68 (7%)	58 (6%)	78 (8%)

[a]Based on CALSIM II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

TAF = thousand acre-feet

Increased Trinity Lake coldwater pool storage is a Project objective. An increase in the coldwater pool at Trinity Lake is considered an improvement for salmonids downstream of the dam, especially during Dry and Critical water year types.

Over the long-term averages, Alternatives A, B, and C show that increases (two to four percent) in storage would occur during all months.

Over the Dry and Critical water years averages, the alternatives show that the greatest storage increases would occur (8 to 11 percent) in the early winter (October through December).

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-66 shows the differences between Alternatives A, B and C and the No Project/No Action Alternative for monthly Trinity Lake storage. It presents data for averages over the long term and combined Dry and Critical water years averages.

Over the long-term averages, Alternatives A, B, and C show that increases (two to four percent) in storage would occur during all months.

Over the Dry and Critical water years averages, the alternatives show that the greatest storage increases would occur (8 to 11 percent) in the early winter (October through December).

Table 6-66
Trinity Lake End-of-Month Storage (TAF)
Alternatives A, B, and C Compared to the No Project / No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	1,305	46 (4%)	47 (4%)	56 (4%)	Oct	879	70 (8%)	68 (8%)	91 (10%)
Nov	1,315	47 (4%)	50 (4%)	58 (4%)	Nov	885	71 (8%)	72 (8%)	94 (11%)
Dec	1,367	45 (3%)	48 (3%)	55 (4%)	Dec	963	69 (7%)	69 (7%)	91 (9%)
Jan	1,431	40 (3%)	44 (3%)	49 (3%)	Jan	1,170	45 (4%)	50 (4%)	53 (5%)
Feb	1,541	38 (2%)	41 (3%)	47 (3%)	Feb	1,235	44 (4%)	48 (4%)	51 (4%)
Mar	1,665	33 (2%)	35 (2%)	42 (2%)	Mar	1,341	37 (3%)	44 (3%)	46 (3%)
Apr	1,816	32 (2%)	35 (2%)	40 (2%)	Apr	1,448	36 (3%)	42 (3%)	44 (3%)
May	1,810	32 (2%)	36 (2%)	40 (2%)	May	1,409	39 (3%)	45 (3%)	46 (3%)
Jun	1,774	32 (2%)	37 (2%)	40 (2%)	Jun	1,362	38 (3%)	45 (3%)	47 (3%)
Jul	1,636	35 (2%)	40 (2%)	44 (3%)	Jul	1,204	48 (4%)	52 (4%)	58 (5%)
Aug	1,495	41 (3%)	47 (3%)	51 (3%)	Aug	1,042	62 (6%)	66 (6%)	74 (7%)
Sep	1,374	43 (3%)	42 (3%)	51 (4%)	Sep	943	63 (7%)	53 (6%)	73 (8%)

[a]Based on CALSIM II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

TAF = thousand acre-feet

Trinity River

Alternatives A, B, and C Compared to Existing Conditions

Table 6-67 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Trinity River flow downstream of Lewiston Reservoir. It presents data for averages over the long term and combined Dry and Critical water years averages.

Over the long-term averages, Alternatives A, B, and C show that almost no change or reductions in flows would occur, primarily during December through April. Trinity River ROD flow criteria are reflected in Existing Conditions minimum flows (450 cfs) during August and September.

Over the Dry and Critical water years averages, the alternatives show that mostly no change in flows would occur, when compared to Existing Conditions, for almost all months except that minor increases (up to five percent) would occur during October and December. Trinity River ROD flow criteria are reflected in the minimum flows for Dry and Critical water year types, with flows of 300 cfs during November through March and flows of 450 cfs during August and September.

Table 6-67
Trinity River Monthly Flow Downstream of Lewiston Lake (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
		Change from Existing Conditions					Change from Existing Conditions		
Month	Existing Conditions	Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Alternative A	Alternative B	Alternative C
Oct	368	5 (1%)	0	5 (1%)	Oct	361	12 (3%)	0	12 (3%)
Nov	365	5 (1%)	-4 (-1%)	3 (1%)	Nov	300	0	0	0
Dec	523	-22 (-4%)	-20 (-4%)	-18 (-4%)	Dec	300	4 (1%)	15 (5%)	13 (4%)
Jan	662	-6 (-1%)	-19 (-3%)	-13 (-2%)	Jan	300	0	0	0
Feb	644	-21 (-3%)	-38 (-6%)	-24 (-4%)	Feb	300	0	0	0
Mar	617	-38 (-6%)	-29 (-5%)	-23 (-4%)	Mar	300	0	0	0
Apr	583	-22 (-4%)	-22 (-4%)	-22 (-4%)	Apr	548	0	0	0
May	3,779	0	0	0	May	2,767	0	0	0
Jun	2,108	-17 (-1%)	-17 (-1%)	-17 (-1%)	Jun	1,064	0	0	0
Jul	923	0	0	0	Jul	580	0	0	0
Aug	450	0	0	0	Aug	450	0	0	0
Sep	450	0	-5 (-1%)	0	Sep	450	0	-15 (-3%)	0

[a]Based on CALSIM II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-68 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Trinity River flow downstream of Lewiston Lake. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-68
Trinity River Monthly Flow Downstream of Lewiston Lake (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	368	5 (1%)	0	5 (1%)	Oct	361	12 (3%)	0	12 (3%)
Nov	360	9 (2%)	0	7 (2%)	Nov	300	0	0	0
Dec	522	-20 (-4%)	-19 (-4%)	-17 (-3%)	Dec	300	4 (1%)	15 (5%)	13 (4%)
Jan	655	1 (0%)	-11 (-2%)	-6 (-1%)	Jan	300	0	0	0
Feb	645	-22 (-3%)	-39 (-6%)	-25 (-4%)	Feb	300	0	0	0
Mar	575	3 (1%)	13 (2%)	19 (3%)	Mar	300	0	0	0
Apr	554	6 (1%)	6 (1%)	6 (1%)	Apr	548	0	0	0
May	3,779	0	0	0	May	2,767	0	0	0
Jun	2,091	0	0	0	Jun	1,064	0	0	0
Jul	923	0	0	0	Jul	580	0	0	0
Aug	450	0	0	0	Aug	450	0	0	0
Sep	450	0	-5 (-1%)	0	Sep	450	0	-15 (-3%)	0

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

cfs = cubic feet per second

Over the long-term averages, Alternatives A, B, and C show that reductions in flows (up to four percent) would occur primarily during December through February, and remaining months show that either no change or slight increases would occur. Trinity River ROD flow criteria are reflected in Existing Conditions minimum flows (450 cfs) in August and September.

Over the Dry and Critical water years averages, the alternatives show that mostly no change would occur, when compared to Existing Conditions, for almost all months except that minor increases in flows (three to five percent) would occur during October and December. Trinity River ROD flow criteria are reflected in the minimum flows for Dry and Critical water year types, with flows of 300 cfs during November through March and flows of 450 cfs during August and September.

Klamath River Downstream of the Trinity River

Changes to Klamath River flows downstream of the Trinity River were not modeled. The Klamath River is relatively far downstream of the Trinity River, and flow changes were modeled on the Trinity River downstream of Lewiston Reservoir.

Changes to the Trinity River downstream of Lewiston Reservoir are limited to slight reductions in spring flood spills. Flow changes would be smaller downstream at its confluence with the Klamath River, and would not be discernible considering the other flows coming together in the lower part of the watershed.

Clear Creek Tunnel

Alternatives A, B, and C Compared to Existing Conditions

Table 6-69 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Clear Creek Tunnel flow. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-69
Clear Creek Tunnel Monthly Flow (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
		Change from Existing Conditions					Change from Existing Conditions		
Month	Existing Conditions	Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Alternative A	Alternative B	Alternative C
Oct	981	-17 (-2%)	-46 (-5%)	-61 (-6%)	Oct	755	-26 (-3%)	-143 (-19%)	-199 (-26%)
Nov	382	-75 (-20%)	-86 (-23%)	-72 (-19%)	Nov	376	-131 (-35%)	-178 (-47%)	-162 (-43%)
Dec	243	71 (29%)	73 (30%)	67 (28%)	Dec	83	38 (45%)	32 (38%)	29 (35%)
Jan	468	36 (8%)	22 (5%)	64 (14%)	Jan	667	42 (6%)	8 (1%)	126 (19%)
Feb	92	57 (62%)	97 (106%)	62 (67%)	Feb	121	33 (27%)	35 (29%)	36 (30%)
Mar	268	77 (29%)	76 (28%)	69 (26%)	Mar	152	88 (58%)	56 (37%)	67 (44%)
Apr	403	3 (1%)	-10 (-3%)	8 (2%)	Apr	359	-57 (-16%)	-40 (-11%)	-44 (-12%)
May	155	4 (3%)	-1 (0%)	6 (4%)	May	176	-26 (-15%)	-35 (-20%)	-17 (-10%)
Jun	518	34 (7%)	12 (2%)	35 (7%)	Jun	765	6 (1%)	-4 (-1%)	-14 (-2%)
Jul	1,782	-24 (-1%)	-19 (-1%)	-45 (-3%)	Jul	2,044	-53 (-3%)	4 (0%)	-78 (-4%)
Aug	1,866	-38 (-2%)	-57 (-3%)	-50 (-3%)	Aug	2,221	-227 (-10%)	-242 (-11%)	-252 (-11%)
Sep	1,660	-31 (-2%)	83 (5%)	7 (0%)	Sep	1,245	23 (2%)	277 (22%)	47 (4%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Over the long-term averages, Alternatives A, B, and C show that relatively large increases in flows (some 20 percent or more) would occur during December through March. During the remainder of the year, flows for the alternatives show that minor changes would occur, except that noticeable decreases would occur during November.

Over the Dry and Critical water years averages, the alternatives show that greater increases in flows would occur during December through March. The alternatives also show that noticeable flow reductions would occur during October and November.

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-70 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Clear Creek Tunnel flow. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-70
Clear Creek Tunnel Monthly Flow (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative: Alternative A	Alternative B	Alternative C	Month	No Project/No Action Alternative	Change from No Project/No Action Alternative: Alternative A	Alternative B	Alternative C
Oct	1,033	-70 (-7%)	-98 (-9%)	-114 (-11%)	Oct	858	-129 (-15%)	-246 (-29%)	-302 (-35%)
Nov	344	-37 (-11%)	-48 (-14%)	-34 (-10%)	Nov	262	-17 (-6%)	-63 (-24%)	-48 (-18%)
Dec	257	57 (22%)	59 (23%)	54 (21%)	Dec	85	36 (42%)	30 (35%)	27 (32%)
Jan	420	83 (20%)	69 (17%)	112 (27%)	Jan	531	179 (34%)	144 (27%)	262 (49%)
Feb	95	55 (58%)	95 (101%)	60 (63%)	Feb	127	27 (21%)	29 (23%)	30 (24%)
Mar	269	75 (28%)	74 (27%)	67 (25%)	Mar	139	101 (73%)	69 (50%)	81 (58%)
Apr	389	17 (4%)	3 (1%)	22 (6%)	Apr	287	15 (5%)	31 (11%)	27 (9%)
May	168	-9 (-6%)	-14 (-9%)	-8 (-5%)	May	192	-42 (-22%)	-51 (-26%)	-33 (-17%)
Jun	551	1 (0%)	-21 (-4%)	2 (0%)	Jun	767	5 (1%)	-6 (-1%)	-16 (-2%)
Jul	1,812	-54 (-3%)	-49 (-3%)	-75 (-4%)	Jul	2,158	-166 (-8%)	-110 (-5%)	-192 (-9%)
Aug	1,926	-98 (-5%)	-117 (-6%)	-110 (-6%)	Aug	2,223	-229 (-10%)	-244 (-11%)	-254 (-11%)
Sep	1,666	-37 (-2%)	77 (5%)	1 (0%)	Sep	1,286	-18 (-1%)	236 (18%)	6 (1%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Over the long-term averages, Alternatives A, B, and C show that relatively large increases in flows (some 20 percent or more) would occur during December through March. During the remainder of the year, flows for the alternatives show that minor changes would occur, except that noticeable decreases would occur during October and November.

Over the Dry and Critical water years averages, the alternatives show that greater increases in flows would occur during December through March. The alternatives also show that noticeable decreases would occur during October and November.

Clear Creek Downstream of Whiskeytown Lake

Alternatives A, B, and C Compared to Existing Conditions

Table 6-71 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Clear Creek flow downstream of Whiskeytown Lake. It presents data for averages over the long term and combined Dry and Critical water years averages.

Over the long-term averages, Alternatives A, B, and C show that minor increases in flows would occur during all months.

Over the Dry and Critical water years averages, the alternatives show that greater increases in flows would occur during most months, when compared to the long-term average.

Table 6-71
Clear Creek Monthly Flow Downstream of Whiskeytown Lake (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
		Change from Existing Conditions					Change from Existing Conditions		
Month	Existing Conditions	Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Alternative A	Alternative B	Alternative C
Oct	182	4 (2%)	4 (2%)	4 (2%)	Oct	155	12 (8%)	12 (8%)	12 (8%)
Nov	183	5 (2%)	5 (2%)	5 (2%)	Nov	156	12 (8%)	12 (8%)	12 (8%)
Dec	184	5 (3%)	5 (3%)	6 (3%)	Dec	159	15 (9%)	15 (9%)	15 (9%)
Jan	193	3 (2%)	3 (2%)	3 (2%)	Jan	173	10 (6%)	10 (6%)	10 (6%)
Feb	194	3 (2%)	3 (2%)	3 (2%)	Feb	173	10 (6%)	10 (6%)	10 (6%)
Mar	188	3 (2%)	3 (2%)	3 (2%)	Mar	173	10 (6%)	10 (6%)	10 (6%)
Apr	188	3 (2%)	3 (2%)	3 (2%)	Apr	174	8 (5%)	8 (5%)	8 (5%)
May	262	3 (1%)	3 (1%)	3 (1%)	May	243	5 (2%)	5 (2%)	5 (2%)
Jun	180	2 (1%)	2 (1%)	2 (1%)	Jun	154	2 (1%)	2 (1%)	2 (1%)
Jul	85	71[d] (84%)	22 (26%)	63 (74%)	Jul	85	53 (62%)	3 (3%)	32 (37%)
Aug	86	-1 (-2%)	-1 (-2%)	-1 (-2%)	Aug	89	-4 (-4%)	-4 (-4%)	-4 (-4%)
Sep	146	1 (1%)	1 (1%)	1 (1%)	Sep	140	3 (2%)	3 (2%)	3 (2%)

[a]Based on CALSIM II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

[d]These increased flows in July would not occur under the alternatives; these results are due to a poorly formulated constraint in CALSIM-II due to NODOS alternative operating criteria. These flows should have been directed down the Sacramento River at Keswick Dam. Correcting these flows would not result in material difference in any other analysis of the EIR/EIS. These higher flows should be disregarded in evaluating changes in Clear Creek flows.

Note:

cfs = cubic feet per second

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-72 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Clear Creek flow downstream of Whiskeytown Lake. It presents data for averages over the long term and combined Dry and Critical water years averages.

Over the long-term averages, Alternatives A, B, and C show that no noticeable change in flows would occur during most months.

Over Dry and Critical water years averages, the alternatives show that no change in flows would occur during most months.

Table 6-72
Clear Creek Monthly Flow Downstream of Whiskeytown Lake (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
		Change from No Project/No Action Alternative					Change from No Project/No Action Alternative		
Month	No Project/No Action Alternative	Alternative A	Alternative B	Alternative C	Month	No Project/No Action Alternative	Alternative A	Alternative B	Alternative C
Oct	185	2 (1%)	2 (1%)	2 (1%)	Oct	162	5 (3%)	5 (3%)	5 (3%)
Nov	187	0	0	0	Nov	169	0	0	0
Dec	189	0	0	0	Dec	174	0	0	0
Jan	197	0	0	0	Jan	182	0	0	0
Feb	197	0	0	0	Feb	182	0	0	0
Mar	192	-1 (-1%)	-1 (-1%)	-1 (-1%)	Mar	182	0	0	0
Apr	191	0	0	0	Apr	182	0	0	0
May	265	0	0	0	May	248	0	0	0
Jun	181	0	0	0	Jun	156	0	0	0
Jul	85	71[d] (84%)	22 (26%)	63 (74%)	Jul	85	53 (62%)	3 (3%)	32 (37%)
Aug	86	-1 (-2%)	-1 (-2%)	-1 (-2%)	Aug	89	-4 (-4%)	-4 (-4%)	-4 (-4%)
Sep	148	0	0	0	Sep	143	0	0	0

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.
[d]These increased flows in July would not occur under the alternatives; these results are due to a poorly formulated constraint in CALSIM-II due to NODOS alternative operating criteria. These flows should have been directed down the Sacramento River at Keswick Dam. Correcting these flows would not result in material difference in any other analysis of the EIR/EIS. These higher flows should be disregarded in evaluating changes in Clear Creek flows.

Note:
cfs = cubic feet per second

Shasta Lake

Alternatives A, B, and C Compared to Existing Conditions

Table 6-73 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Shasta Lake storage. It presents data for averages over the long term and combined Dry and Critical water years averages.

Improved coldwater pool storage in Shasta Lake is a Project operational objective. Storage improvements would provide a measure of improvement of the reliability of the coldwater pool, and storage improvements during relatively drier years are especially important.

Over the long-term averages, Alternatives A, B, and C show that slight increases in storage (maximum four percent) would occur during almost all months.

More important to the reliability of the coldwater pool are improvements in Dry and Critical water years. Over the Dry and Critical water years averages, the alternatives show that larger increases in storage would occur, when compared to Existing Conditions, than when comparing the long-term averages. The greatest relative storage increases for the alternatives (8 to 11 percent) would occur during October.

Table 6-73
Shasta Lake End of Month Storage (TAF)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	Existing Conditions	Change from Existing Conditions: Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Change from Existing Conditions: Alternative A	Alternative B	Alternative C
Oct	2,571	77 (3%)	84 (3%)	91 (4%)	Oct	1,833	154 (8%)	193 (11%)	201 (11%)
Nov	2,549	85 (3%)	80 (3%)	86 (3%)	Nov	1,871	156 (8%)	189 (10%)	210 (11%)
Dec	2,703	50 (2%)	49 (2%)	56 (2%)	Dec	2,072	136 (7%)	172 (8%)	190 (9%)
Jan	2,979	24 (1%)	27 (1%)	37 (1%)	Jan	2,558	53 (2%)	76 (3%)	85 (3%)
Feb	3,260	-4 (0%)	-5 (0%)	8 (0%)	Feb	2,845	21 (1%)	43 (2%)	56 (2%)
Mar	3,615	11 (0%)	14 (0%)	26 (1%)	Mar	3,225	40 (1%)	57 (2%)	72 (2%)
Apr	3,910	36 (1%)	48 (1%)	50 (1%)	Apr	3,289	105 (3%)	118 (4%)	136 (4%)
May	3,939	54 (1%)	74 (2%)	68 (2%)	May	3,193	150 (5%)	166 (5%)	183 (6%)
Jun	3,635	74 (2%)	93 (3%)	91 (3%)	Jun	2,814	176 (6%)	199 (7%)	220 (8%)
Jul	3,159	69 (2%)	86 (3%)	84 (3%)	Jul	2,322	160 (7%)	198 (9%)	214 (9%)
Aug	2,825	75 (3%)	86 (3%)	84 (3%)	Aug	2,001	136 (7%)	180 (9%)	173 (9%)
Sep	2,651	80 (3%)	85 (3%)	87 (3%)	Sep	1,920	142 (7%)	183 (10%)	178 (9%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
TAF = thousand acre-feet

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-74 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Shasta Lake storage. It presents data for averages over the long term and combined Dry and Critical water years averages. The long-term average shows that all three alternatives would have increases (a maximum of four percent) during all months.

Table 6-74
Shasta Lake End-of-Month Storage (TAF)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative)	Change from No Project/No Action Alternative: Alternative A	Alternative B	Alternative C	Month	No Project/No Action Alternative	Change from No Project/No Action Alternative: Alternative A	Alternative B	Alternative C
Oct	2,557	91 (4%)	98 (4%)	104 (4%)	Oct	1,836	150 (8%)	190 (10%)	198 (11%)
Nov	2,547	87 (3%)	82 (3%)	88 (3%)	Nov	1,892	135 (7%)	168 (9%)	189 (10%)
Dec	2,712	41 (2%)	40 (1%)	46 (2%)	Dec	2,101	108 (5%)	143 (7%)	162 (8%)
Jan	2,983	20 (1%)	22 (1%)	33 (1%)	Jan	2,569	42 (2%)	65 (3%)	74 (3%)
Feb	3,261	-5 (0%)	-6 (0%)	7 (0%)	Feb	2,853	12 (0%)	35 (1%)	47 (2%)
Mar	3,616	11 (0%)	14 (0%)	25 (1%)	Mar	3,230	35 (1%)	52 (2%)	67 (2%)
Apr	3,913	33 (1%)	45 (1%)	47 (1%)	Apr	3,296	98 (3%)	111 (3%)	129 (4%)
May	3,944	50 (1%)	70 (2%)	64 (2%)	May	3,201	141 (4%)	158 (5%)	175 (5%)
Jun	3,634	75 (2%)	94 (3%)	93 (3%)	Jun	2,813	177 (6%)	200 (7%)	221 (8%)
Jul	3,148	80 (3%)	96 (3%)	94 (3%)	Jul	2,319	163 (7%)	201 (9%)	216 (9%)
Aug	2,813	87 (3%)	98 (3%)	96 (3%)	Aug	1,998	140 (7%)	183 (9%)	176 (9%)
Sep	2,630	101 (4%)	106 (4%)	108 (4%)	Sep	1,923	139 (7%)	180 (9%)	175 (9%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
TAF = thousand acre-feet

More important to the reliability of the coldwater pool are improvements in Dry and Critical water years. The alternatives show that larger increases in storage for the Dry and Critical water years averages would occur, when compared to the No Project/No Action Alternative, than for the long-term averages. The greatest relative storage increases for all three alternatives (8 to 11 percent) would occur during October.

Sacramento River

Alternatives A, B, and C Compared to Existing Conditions

Table 6-75 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Sacramento River flow downstream of Keswick Reservoir. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-75
Sacramento River Monthly Flow Downstream of Keswick Reservoir (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	Existing Conditions	Change from Existing Conditions			Month	Existing Conditions	Change from Existing Conditions		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	6,248	18 (0%)	-13 (0%)	-134 (-2%)	Oct	5,660	-213 (-4%)	-270 (-5%)	-602 (-11%)
Nov	6,621	-213 (-3%)	-22 (0%)	4 (0%)	Nov	4,692	-158 (-3%)	-118 (-3%)	-308 (-7%)
Dec	6,866	656 (10%)	579 (8%)	576 (8%)	Dec	5,603	379 (7%)	315 (6%)	390 (7%)
Jan	8,252	460 (6%)	385 (5%)	364 (4%)	Jan	3,759	568 (15%)	617 (16%)	514 (14%)
Feb	10,154	552 (5%)	661 (7%)	589 (6%)	Feb	3,644	580 (16%)	606 (17%)	558 (15%)
Mar	8,553	-179 (-2%)	-245 (-3%)	-229 (-3%)	Mar	3,720	-256 (-7%)	-190 (-5%)	-234 (-6%)
Apr	6,998	-416 (-6%)	-589 (-8%)	-406 (-6%)	Apr	6,013	-1,158 (-19%)	-1,083 (-18%)	-1,126 (-19%)
May	7,881	-299 (-4%)	-426 (-5%)	-297 (-4%)	May	6,988	-762 (-11%)	-831 (-12%)	-789 (-11%)
Jun	10,711	-295 (-3%)	-307 (-3%)	-359 (-3%)	Jun	10,835	-450 (-4%)	-560 (-5%)	-649 (-6%)
Jul	13,036	-44 (0%)	58 (0%)	-8 (0%)	Jul	12,946	102 (1%)	-32 (0%)	-63 (0%)
Aug	10,467	-149 (-1%)	-72 (-1%)	-58 (-1%)	Aug	10,254	104 (1%)	24 (0%)	382 (4%)
Sep	7,909	-125 (-2%)	80 (1%)	-68 (-1%)	Sep	5,579	-85 (-2%)	188 (3%)	-88 (-2%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Sacramento River flows would be modified with implementation of the alternatives, when compared to Existing Conditions. Some changes would be directly related to Project operational objectives, such as increased coldwater pool releases from Shasta Lake for temperature improvements and stabilizing flows downstream of Keswick Reservoir to improve salmonid conditions. Other changes would be caused in a more indirect manner and are associated with other Project objectives, such as improved water supply reliability, improved Delta water quality, and other ecosystem enhancement objectives.

Over the long-term averages, Alternatives A, B, and C show that flows would increase from Existing Conditions during December through February. Flows would decrease for the alternatives during the remainder of the year.

Over the Dry and Critical water years averages, the alternatives show that noticeable increases would occur during January and February (14 to 17 percent). Flows would decrease for the three alternatives in April (18 to 19 percent) and May (11 to 12 percent).

Table 6-76 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Sacramento River flow downstream of the RBDD. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-76
Sacramento River Monthly Flow Downstream of Red Bluff Diversion Dam (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
		Change from Existing Conditions					Change from Existing Conditions		
Month	Existing Conditions	Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Alternative A	Alternative B	Alternative C
Oct	7,032	51 (1%)	24 (0%)	-104 (-1%)	Oct	6,281	-182 (-3%)	-228 (-4%)	-559 (-9%)
Nov	8,787	-237 (-3%)	-57 (-1%)	-21 (0%)	Nov	6,556	-150 (-2%)	-116 (-2%)	-301 (-5%)
Dec	11,637	11 (0%)	-121 (-1%)	-71 (-1%)	Dec	10,274	17 (0%)	-121 (-1%)	61 (1%)
Jan	15,206	-768 (-5%)	-958 (-6%)	-883 (-6%)	Jan	6,744	-165 (-2%)	-146 (-2%)	-218 (-3%)
Feb	17,941	-663 (-4%)	-842 (-5%)	-760 (-4%)	Feb	8,053	-580 (-7%)	-545 (-7%)	-593 (-7%)
Mar	14,579	-986 (-7%)	-1,670 (-11%)	-1,214 (-8%)	Mar	7,454	-1,233 (-17%)	-1,223 (-16%)	-1,247 (-17%)
Apr	10,565	-508 (-5%)	-976 (-9%)	-574 (-5%)	Apr	7,702	-1,161 (-15%)	-1,099 (-14%)	-1,137 (-15%)
May	9,466	-222 (-2%)	-589 (-6%)	-266 (-3%)	May	7,971	-651 (-8%)	-755 (-9%)	-669 (-8%)
Jun	10,911	57 (1%)	-244 (-2%)	-7 (0%)	Jun	10,975	-222 (-2%)	-447 (-4%)	-410 (-4%)
Jul	12,412	409 (3%)	251 (2%)	433 (3%)	Jul	12,606	378 (3%)	92 (1%)	201 (2%)
Aug	9,946	-91 (-1%)	-65 (-1%)	20 (0%)	Aug	9,967	148 (1%)	83 (1%)	455 (5%)
Sep	8,154	-59 (-1%)	159 (2%)	0 (0%)	Sep	5,849	-46 (-1%)	256 (4%)	-50 (-1%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Refer to the above discussion related to changes in Sacramento River flow downstream of Keswick Reservoir. The flow downstream of RBDD also reflects the effect of T-C Canal diversions to Project storage. These changes would continue downstream.

Over the long-term averages, the alternatives show that the most noticeable flow reductions would occur during January through April. Alternative B, which does not include the proposed Delevan Pipeline Intake Facilities, shows that the greatest relative decreases (11 percent) would occur in March, when compared to Alternatives A and C.

Over the Dry and Critical water years averages, the alternatives show that the most noticeable flow reductions would occur during January through April. All three alternatives show relatively similar flow reductions (14 to 17 percent) during March and April.

Table 6-77 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Sacramento River flow downstream of Hamilton City. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-77
Sacramento River Monthly Flow Downstream of Hamilton City (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
		Change from Existing Conditions					Change from Existing Conditions		
Month	Existing Conditions	Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Alternative A	Alternative B	Alternative C
Oct	6,619	28 (0%)	-21 (0%)	-95 (-1%)	Oct	5,827	-263 (-5%)	-286 (-5%)	-587 (-10%)
Nov	9,075	-282 (-3%)	-87 (-1%)	-53 (-1%)	Nov	6,734	-236 (-3%)	-182 (-3%)	-362 (-5%)
Dec	12,936	-382 (-3%)	-425 (-3%)	-462 (-4%)	Dec	11,562	-221 (-2%)	-288 (-2%)	-178 (-2%)
Jan	17,250	-937 (-5%)	-1,069 (-6%)	-1,057 (-6%)	Jan	7,467	-263 (-4%)	-215 (-3%)	-316 (-4%)
Feb	20,300	-882 (-4%)	-1,033 (-5%)	-1,009 (-5%)	Feb	9,218	-780 (-8%)	-656 (-7%)	-804 (-9%)
Mar	16,660	-1,404 (-8%)	-2,444 (-15%)	-1,748 (-10%)	Mar	8,758	-1,717 (-20%)	-1,718 (-20%)	-1,818 (-21%)
Apr	10,162	-516 (-5%)	-1,264 (-12%)	-622 (-6%)	Apr	6,364	-874 (-14%)	-1,034 (-16%)	-827 (-13%)
May	8,718	-234 (-3%)	-847 (-10%)	-296 (-3%)	May	6,610	-380 (-6%)	-715 (-11%)	-393 (-6%)
Jun	8,620	807 (9%)	-58 (-1%)	765 (9%)	Jun	8,427	831 (10%)	-134 (-2%)	679 (8%)
Jul	9,888	1,293 (13%)	530 (5%)	1,339 (14%)	Jul	10,084	1,195 (12%)	232 (2%)	1,049 (10%)
Aug	8,073	-126 (-2%)	-259 (-3%)	108 (1%)	Aug	8,171	141 (2%)	-18 (0%)	617 (8%)
Sep	7,785	-86 (-1%)	125 (2%)	-5 (0%)	Sep	5,474	-135 (-2%)	181 (3%)	-104 (-2%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

cfs = cubic feet per second

Refer to the above discussion related to changes in Sacramento River flow downstream of Keswick Reservoir. The flow downstream of Hamilton City also reflects the diversions to Project storage associated with the GCID Canal conveyance.

Over the long-term averages, flows would decrease for all three alternatives during January through April, with the greatest reductions occurring during March (8 to 15 percent). Alternative B, which does not include the proposed Delevan Pipeline Intake Facilities, shows that the greatest decrease in flows would occur during March, when compared to Alternatives A and C. Alternatives A and C show that the most noticeable increase would occur during July (13 to 14 percent), when compared to Alternative B.

Over the Dry and Critical water years averages, all three alternatives show that the greatest flow reductions would occur during March and April (20 to 21 percent in March). Alternatives A and C would show the most noticeable increase in July (10 to 12 percent), when compared to Alternative B.

Table 6-78 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Sacramento River flow downstream of the proposed Delevan Pipeline Intake. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-78
Sacramento River Monthly Flow Downstream of the Proposed Delevan Pipeline Intake (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	Existing Conditions	Change from Existing Conditions: Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Change from Existing Conditions: Alternative A	Alternative B	Alternative C
Oct	6,306	852 (14%)	707 (11%)	827 (13%)	Oct	5,346	503 (9%)	324 (6%)	402 (8%)
Nov	9,052	490 (5%)	730 (8%)	859 (9%)	Nov	6,550	191 (3%)	249 (4%)	329 (5%)
Dec	14,656	-598 (-4%)	-328 (-2%)	-616 (-4%)	Dec	12,838	-284 (-2%)	-175 (-1%)	-112 (-1%)
Jan	21,192	-1,611 (-8%)	-1,004 (-5%)	-1,768 (-8%)	Jan	8,810	-623 (-7%)	-196 (-2%)	-667 (-8%)
Feb	25,420	-1,474 (-6%)	-941 (-4%)	-1,634 (-6%)	Feb	11,430	-1,344 (-12%)	-581 (-5%)	-1,271 (-11%)
Mar	19,912	-1,599 (-8%)	-2,328 (-12%)	-2,033 (-10%)	Mar	10,601	-1,841 (-17%)	-1,522 (-14%)	-2,033 (-19%)
Apr	11,635	-236 (-2%)	-742 (-6%)	-356 (-3%)	Apr	6,328	-155 (-2%)	-186 (-3%)	-153 (-2%)
May	8,443	-2 (0%)	-298 (-4%)	-72 (-1%)	May	5,664	255 (5%)	216 (4%)	230 (4%)
Jun	7,819	417 (5%)	589 (8%)	431 (6%)	Jun	7,226	564 (8%)	951 (13%)	724 (10%)
Jul	8,727	1,587 (18%)	1,499 (17%)	1,615 (19%)	Jul	8,928	1,142 (13%)	1,401 (16%)	1,261 (14%)
Aug	7,319	669 (9%)	519 (7%)	1,028 (14%)	Aug	7,442	1,225 (16%)	1,010 (14%)	1,888 (25%)
Sep	7,972	943 (12%)	1,079 (14%)	1,090 (14%)	Sep	5,555	818 (15%)	974 (18%)	966 (17%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

The flow downstream of the proposed Delevan Pipeline Intake reflects the effect of diversions to Project storage.

Over the long-term averages, flows would decrease for all three alternatives during December through April, with the greatest decreases occurring during March (8 to 12 percent). All three alternatives show that noticeable flow increases would occur during July through October.

Over the Dry and Critical water years averages, all three alternatives show that a similar trend would occur, with reductions in flows during December through March. The greatest reductions would occur during March (14 to 19 percent). All three alternatives show that the greatest flow increases would occur during July through September.

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-79 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Sacramento River flow downstream of Keswick Reservoir. It presents data for averages over the long term and combined Dry and Critical water years averages.

Sacramento River flows would be modified with implementation of Alternatives A. B, and C, when compared to the No Project/No Action Alternative. Some changes would be directly related to Project operational objectives, such as increased temperature releases from Shasta Lake and stabilizing flows downstream of Keswick Reservoir to improve salmonid conditions. Other changes would be caused in a more indirect manner and would be associated with other Project objectives, such as improved water supply reliability, improved Delta water quality, and other ecosystem enhancement objectives.

Table 6-79
Sacramento River Monthly Flow Downstream of Keswick Reservoir (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	6,191	75 (1%)	44 (1%)	-76 (-1%)	Oct	5,763	-316 (-5%)	-373 (-6%)	-705 (-12%)
Nov	6,373	35 (1%)	225 (4%)	251 (4%)	Nov	4,251	282 (7%)	323 (8%)	133 (3%)
Dec	6,696	826 (12%)	749 (11%)	746 (11%)	Dec	5,482	500 (9%)	437 (8%)	512 (9%)
Jan	8,274	438 (5%)	362 (4%)	342 (4%)	Jan	3,783	543 (14%)	593 (16%)	490 (13%)
Feb	10,211	494 (5%)	603 (6%)	532 (5%)	Feb	3,680	543 (15%)	570 (15%)	522 (14%)
Mar	8,555	-182 (-2%)	-248 (-3%)	-232 (-3%)	Mar	3,742	-278 (-7%)	-211 (-6%)	-256 (-7%)
Apr	6,942	-360 (-5%)	-533 (-8%)	-350 (-5%)	Apr	5,911	-1,056 (-18%)	-980 (-17%)	-1,024 (-17%)
May	7,866	-284 (-4%)	-411 (-5%)	-283 (-4%)	May	6,975	-749 (-11%)	-818 (-12%)	-776 (-11%)
Jun	10,846	-429 (-4%)	-442 (-4%)	-494 (-5%)	Jun	10,989	-605 (-6%)	-714 (-7%)	-804 (-7%)
Jul	13,210	-218 (-2%)	-116 (-1%)	-182 (-1%)	Jul	13,089	-40	-174 (-1%)	-205 (-2%)
Aug	10,550	-233 (-2%)	-156 (-1%)	-142 (-1%)	Aug	10,258	99 (1%)	20	377 (4%)
Sep	8,069	-285 (-4%)	-80 (-1%)	-228 (-3%)	Sep	5,532	-38 (-1%)	235 (4%)	-40 (-1%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

cfs = cubic feet per second

Over the long-term averages, all three alternatives show that increased flows from the No Project/No Action Alternative would occur during November through February. Flows would decrease slightly for all three alternatives during the remainder of the year.

Over the Dry and Critical water years averages, all three alternatives show that noticeable increases would occur during January and February (14 to 17 percent), and there would be noticeable reductions in flows for all three alternatives during April (17 to 18 percent) and May (11 to 12 percent).

Table 6-80 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Sacramento River flow downstream of RBDD. It presents data for averages over the long term and combined Dry and Critical water years averages.

The flow downstream of RBDD reflects the effect of T-C Canal diversions to Project storage.

Over the long-term averages, the alternatives show that the most noticeable flow reductions would occur during January through April. Alternative B, which does not include the proposed Delevan Pipeline Intake Facilities, shows that the greatest relative reductions (12 percent) would occur during March, when compared to Alternatives A and C.

Over the Dry and Critical Years averages, the alternatives show that the most noticeable flow decreases would occur during January through April. All three alternatives show relatively similar flow decreases (14 to 17 percent) during March and April.

Table 6-80
Sacramento River Monthly Flow Downstream of Red Bluff Diversion Dam (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative: Alternative A	Alternative B	Alternative C	Month	No Project/No Action Alternative	Change from No Project/No Action Alternative: Alternative A	Alternative B	Alternative C
Oct	7,009	75 (1%)	48 (1%)	-80 (-1%)	Oct	6,421	-321 (-5%)	-367 (-6%)	-699 (-11%)
Nov	8,619	-70 (-1%)	110 (1%)	146 (2%)	Nov	6,198	208 (3%)	242 (4%)	57 (1%)
Dec	11,525	123 (1%)	-9 (0%)	41 (0%)	Dec	10,225	67 (1%)	-72 (-1%)	110 (1%)
Jan	15,263	-825 (-5%)	-1015 (-7%)	-940 (-6%)	Jan	6,823	-245 (-4%)	-225 (-3%)	-297 (-4%)
Feb	18,025	-746 (-4%)	-925 (-5%)	-843 (-5%)	Feb	8,125	-652 (-8%)	-617 (-8%)	-665 (-8%)
Mar	14,624	-1,031 (-7%)	-1,715 (-12%)	-1,260 (-9%)	Mar	7,524	-1,302 (-17%)	-1,293 (-17%)	-1,317 (-17%)
Apr	10,566	-510 (-5%)	-977 (-9%)	-575 (-5%)	Apr	7,664	-1,123 (-15%)	-1,061 (-14%)	-1,099 (-14%)
May	9,505	-261 (-3%)	-627 (-7%)	-304 (-3%)	May	8,028	-708 (-9%)	-812 (-10%)	-726 (-9%)
Jun	11,044	-76 (-1%)	-376 (-3%)	-139 (-1%)	Jun	11,162	-409 (-4%)	-634 (-6%)	-597 (-5%)
Jul	12,615	207 (2%)	48 (0%)	230 (2%)	Jul	12,822	163 (1%)	-123 (-1%)	-15 (0%)
Aug	10,052	-197 (-2%)	-172 (-2%)	-86 (-1%)	Aug	10,031	83 (1%)	19 (0%)	390 (4%)
Sep	8,336	-241 (-3%)	-23 (0%)	-182 (-2%)	Sep	5,849	-46 (-1%)	256 (4%)	-50 (-1%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

cfs = cubic feet per second

Table 6-81 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Sacramento River flow downstream of Hamilton City. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-81
Sacramento River Monthly Flow Downstream of Hamilton City (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative: Alternative A	Alternative B	Alternative C	Month	No Project/No Action Alternative	Change from No Project/No Action Alternative: Alternative A	Alternative B	Alternative C
Oct	6,532	115 (2%)	66 (1%)	-8 (0%)	Oct	5,914	-351 (-6%)	-373 (-6%)	-674 (-11%)
Nov	8,851	-57 (-1%)	137 (2%)	172 (2%)	Nov	6,323	176 (3%)	230 (4%)	49 (1%)
Dec	12,793	-238 (-2%)	-281 (-2%)	-319 (-2%)	Dec	11,482	-141 (-1%)	-208 (-2%)	-98 (-1%)
Jan	17,292	-979 (-6%)	-1,111 (-6%)	-1,099 (-6%)	Jan	7,532	-328 (-4%)	-280 (-4%)	-381 (-5%)
Feb	20,370	-952 (-5%)	-1,102 (-5%)	-1,079 (-5%)	Feb	9,276	-838 (-9%)	-715 (-8%)	-863 (-9%)
Mar	16,703	-1,447 (-9%)	-2,486 (-15%)	-1,790 (-11%)	Mar	8,824	-1,783 (-20%)	-1,784 (-20%)	-1,884 (-21%)
Apr	10,163	-516 (-5%)	-1,264 (-12%)	-622 (-6%)	Apr	6,329	-840 (-13%)	-999 (-16%)	-792 (-13%)
May	8,656	-172 (-2%)	-785 (-9%)	-234 (-3%)	May	6,571	-341 (-5%)	-676 (-10%)	-353 (-5%)
Jun	8,665	761 (9%)	-104 (-1%)	719 (8%)	Jun	8,551	707 (8%)	-258 (-3%)	555 (6%)
Jul	9,944	1,237 (12%)	474 (5%)	1,283 (13%)	Jul	10,201	1,079 (11%)	116 (1%)	932 (9%)
Aug	8,041	-94 (-1%)	-227 (-3%)	140 (2%)	Aug	8,124	188 (2%)	30	665 (8%)
Sep	7,880	-180 (-2%)	31 (0%)	-100 (-1%)	Sep	5,388	-49 (-1%)	267 (5%)	-18 (0%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

cfs = cubic feet per second

The flow downstream of Hamilton City also reflects the diversions to Project storage associated with the GCID Canal conveyance.

Over the long-term averages, flows would decrease for all three alternatives during January through April, with the greatest reductions occurring during March (9 to 15 percent). Alternative B, which does not include the proposed Delevan Pipeline Intake Facilities, shows the greatest reduction in flows during March, when compared to Alternatives A and C. Alternatives A and C show that the most noticeable increase would occur during July (12 to 13 percent), when compared to Alternative B.

Over the Dry and Critical water years averages, the alternatives show that the greatest flow reductions would occur during March and April (20 to 21 percent in March). Alternatives A and C show that the most noticeable increase would occur during July (9 to 11 percent), when compared to Alternative B.

Table 6-82 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Sacramento River flow downstream of the proposed Delevan Pipeline Intake Facilities. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-82
Sacramento River Monthly Flow Downstream of the Proposed Delevan Pipeline Intake (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative: Alternative A	Alternative B	Alternative C	Month	No Project/No Action Alternative	Change from No Project/No Action Alternative: Alternative A	Alternative B	Alternative C
Oct	6,234	923 (15%)	779 (12%)	899 (14%)	Oct	5,440	408 (8%)	230 (4%)	307 (6%)
Nov	8,862	680 (8%)	919 (10%)	1049 (12%)	Nov	6,153	588 (10%)	646 (11%)	726 (12%)
Dec	14,547	-489 (-3%)	-219 (-2%)	-507 (-3%)	Dec	12,799	-245 (-2%)	-137 (-1%)	-73 (-1%)
Jan	21,245	-1,664 (-8%)	-1,057 (-5%)	-1,821 (-9%)	Jan	8,895	-707 (-8%)	-281 (-3%)	-752 (-8%)
Feb	25,498	-1,552 (-6%)	-1,018 (-4%)	-1,712 (-7%)	Feb	11,481	-1,395 (-12%)	-633 (-6%)	-1,322 (-12%)
Mar	19,959	-1,646 (-8%)	-2,375 (-12%)	-2,080 (-10%)	Mar	10,673	-1,912 (-18%)	-1,593 (-15%)	-2,105 (-20%)
Apr	11,661	-262 (-2%)	-767 (-7%)	-382 (-3%)	Apr	6,313	-140 (-2%)	-171 (-3%)	-138 (-2%)
May	8,385	56 (1%)	-240 (-3%)	-14 (0%)	May	5,625	294 (5%)	255 (5%)	269 (5%)
Jun	7,862	374 (5%)	547 (7%)	388 (5%)	Jun	7,347	444 (6%)	831 (11%)	604 (8%)
Jul	8,770	1,544 (18%)	1,455 (17%)	1,572 (18%)	Jul	9,032	1,039 (12%)	1,297 (14%)	1,157 (13%)
Aug	7,277	711 (10%)	561 (8%)	1,070 (15%)	Aug	7,384	1,283 (17%)	1,068 (14%)	1,946 (26%)
Sep	8,066	849 (11%)	985 (12%)	996 (12%)	Sep	5,471	902 (16%)	1,057 (19%)	1,050 (19%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

cfs = cubic feet per second

Flows downstream of the proposed Delevan Intake Facilities reflect the effects of diversions to and from Project storage. Generally, flows would decrease during December through April, and would increase during the remainder of the year, which corresponds with diversions to and from Project storage.

Over the long-term averages, flows would decrease for all three alternatives during December through April, with March showing the greatest reductions (8 to 12 percent). All three alternatives show that noticeable flow increases would occur during July through October.

Over the Dry and Critical water years averages, the three alternatives show that a similar trend of reductions in flows during December through March. The greatest reductions would occur during March (15 to 20 percent). All three alternatives show that the greatest flow increases would occur during July through September.

T-C Canal Intake

Alternatives A, B, and C Compared to Existing Conditions

Table 6-83 shows the differences between Alternatives A, B, and C and Existing Conditions for the monthly T-C Canal Intake flow at RBDD. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-83
Tehama-Colusa Canal Intake Monthly Flow at Red Bluff Diversion Dam (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
		Change from Existing Conditions					Change from Existing Conditions		
Month	Existing Conditions	Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Alternative A	Alternative B	Alternative C
Oct	114	-3 (-3%)	-7 (-6%)	0	Oct	86	-1 (-1%)	-15 (-17%)	-13 (-15%)
Nov	7	103	113	104	Nov	8	77	83	81
Dec	0	702	755	703	Dec	0	430	505	399
Jan	0	1,257	1,372	1,276	Jan	0	782	811	781
Feb	3	1,238	1,526	1,373	Feb	7	1,190	1,181	1,182
Mar	17	843	1,460	1,021	Mar	18	1,016	1,073	1,053
Apr	152	133	429	209	Apr	130	45	59	52
May	436	-45 (-10%)	197 (45%)	0	May	234	-65 (-28%)	-29 (-12%)	-74 (-31%)
Jun	729	-334 (-46%)	-44 (-6%)	-335 (-46%)	Jun	396	-201 (-51%)	-84 (-21%)	-213 (-54%)
Jul	834	-379 (-45%)	-165 (-20%)	-374 (-45%)	Jul	448	-213 (-47%)	-108 (-24%)	-220 (-49%)
Aug	679	-58 (-9%)	-5 (-1%)	-79 (-12%)	Aug	412	-41 (-10%)	-53 (-13%)	-69 (-17%)
Sep	159	-56 (-35%)	-63 (-39%)	-58 (-37%)	Sep	106	-20 (-19%)	-34 (-33%)	-21 (-20%)

[a]Based on CALSIM II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Notes:

cfs = cubic feet per second

Percent changes are not shown for November through April because the T-C Canal diversions associated with Existing Conditions during this period are zero or very low, and diversions to fill the proposed Sites Reservoir for the alternatives would typically be highest during these months. The percent change in these months would be very large and meaningless.

Over the long-term averages, Alternatives A, B, and C show that the T-C Canal Intake flows would increase during the predominantly wet months November through April, reflecting the diversions needed to fill the proposed Sites Reservoir. In contrast, the intake flows generally would decrease during May through September with the highest reductions occurring in June and July. These reductions in T-C Canal Intake flows would be a result of one of the Project's ecosystem objectives of increasing flows in the

Sacramento River from spring through fall by reducing diversions at the T-C Canal and GCID Canal intakes and providing supplemental flows through releases from the proposed Delevan Pipeline.

Over the Dry and Critical water years averages, the alternatives show that a similar flow pattern of increases would occur during the normally wet months November through April and would decrease noticeably during June and July.

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-84 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for the monthly T-C Canal Intake flow at RBDD. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-84
Tehama-Colusa Canal Intake Monthly Flow at Red Bluff Diversion Dam (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
		Change from No Project/No Action Alternative					Change from No Project/No Action Alternative		
Month	No Project/No Action Alternative	Alternative A	Alternative B	Alternative C	Month	No Project/No Action Alternative	Alternative A	Alternative B	Alternative C
Oct	110	0	-4 (-4%)	4 (3%)	Oct	81	5 (6%)	-9 (-11%)	-7 (-9%)
Nov	7	103	113	105	Nov	8	77	83	81
Dec	0	702	755	703	Dec	0	430	505	399
Jan	0	1,257	1,372	1,276	Jan	0	782	811	781
Feb	2	1,239	1,527	1,374	Feb	5	1,192	1,183	1,184
Mar	13	847	1,464	1,025	Mar	12	1,022	1,079	1,059
Apr	133	152	448	228	Apr	105	71	85	78
May	413	-21 (-5%)	221 (54%)	24 (6%)	May	201	-32 (-16%)	4 (2%)	-41 (-20%)
Jun	749	-354 (-47%)	-64 (-9%)	-355 (-47%)	Jun	388	-193 (-50%)	-76 (-20%)	-205 (-53%)
Jul	811	-356 (-44%)	-143 (-18%)	-352 (-43%)	Jul	390	-154 (-39%)	-49 (-13%)	-161 (-41%)
Aug	661	-40 (-6%)	12 (2%)	-61 (-9%)	Aug	365	6 (2%)	-7 (-2%)	-22 (-6%)
Sep	149	-46 (-31%)	-53 (-35%)	-49 (-32%)	Sep	82	4 (4%)	-11 (-13%)	2 (3%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Notes:

cfs = cubic feet per second

Percent changes are not shown for November through April because the T-C diversions associated with the No Project/No Action Alternative during this period are zero or very low, and diversions to fill the proposed Sites Reservoir for the alternatives would typically be highest during these months. The percent change in these months would be very large and meaningless.

Over the long-term averages, Alternatives A, B, and C show that the T-C Canal Intake flows would increase during November through April, reflecting the diversions needed to fill the proposed Sites Reservoir. In contrast, the intake flows generally would decrease during May through September with the highest reductions occurring in June and July. These reductions in T-C Canal Intake flows would be a result of one of the Project's ecosystem objectives of increasing flows in the Sacramento River from spring through fall by reducing diversions at the T-C Canal and GCID Canal intakes and providing supplemental flows through releases from the proposed Delevan Pipeline.

Over the Dry and Critical water years averages, the alternatives show that a similar flow pattern of increases would occur during the normally wet months November through April and would decrease noticeably during June and July.

GCID Intake at Hamilton City

Alternatives A, B, and C Compared to Existing Conditions

Table 6-85 shows the differences between Alternatives A, B, and C and Existing Conditions for the monthly GCID Canal Intake flow at Hamilton City. It presents data for averages over the long term and combined Dry and Critical water years averages.

Over the long-term averages, Alternatives A, B, and C show that GCID Canal Intake flows would increase during December through March, reflecting the diversions needed to fill the proposed Sites Reservoir. In contrast, flows would generally decrease during May through July with the highest reductions occurring in June and July (34 to 35 percent in July for Alternatives A and C). These reductions in GCID Canal Intake flows would be a result of one of the Project's ecosystem objectives of increasing flows in the Sacramento River from spring through fall by reducing diversions at the T-C Canal and GCID Canal intakes and providing supplemental flows through releases from the proposed Delevan Pipeline.

Over the Dry and Critical water years averages, the alternatives show that a similar flow pattern of increases would occur during the predominantly wet months December through March. All three alternatives show that flows would noticeably decrease during June and July (39 to 41 percent in June).

Table 6-85
Glenn-Colusa Irrigation District Canal Intake Monthly Flow at Hamilton City (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
		Change from Existing Conditions					Change from Existing Conditions		
Month	Existing Conditions	Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Alternative A	Alternative B	Alternative C
Oct	693	21 (3%)	42 (6%)	-11 (-2%)	Oct	647	78 (12%)	55 (8%)	25 (4%)
Nov	388	45 (12%)	31 (8%)	32 (8%)	Nov	367	86 (23%)	67 (18%)	62 (17%)
Dec	179	393	304	391	Dec	171	238	166	238
Jan	69	169	111	174	Jan	73	98	69	98
Feb	54	220	191	250	Feb	55	200	111	211
Mar	38	418	774	533	Mar	49	483	493	569
Apr	2,198	-1 (0%)	279 (13%)	39 (2%)	Apr	2,313	-301 (-13%)	-79 (-3%)	-324 (-14%)
May	2,011	-15 (-1%)	232 (12%)	4 (0%)	May	1,941	-297 (-15%)	-66 (-3%)	-303 (-16%)
Jun	2,846	-780 (-27%)	-215 (-8%)	-801 (-28%)	Jun	2,755	-1,080 (-39%)	-340 (-12%)	-1,116 (-41%)
Jul	2,673	-905 (-34%)	-301 (-11%)	-928 (-35%)	Jul	2,557	-815 (-32%)	-138 (-5%)	-846 (-33%)
Aug	1,944	19 (1%)	177 (9%)	-104 (-5%)	Aug	1,815	8 (0%)	102 (6%)	-161 (-9%)
Sep	478	10 (2%)	17 (3%)	-11 (-2%)	Sep	436	75 (17%)	61 (14%)	40 (9%)

[a]Based on CALSIM II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Notes:

cfs = cubic feet per second

Percent changes are not shown for December through March because GCID Canal diversions associated with Existing Conditions during this period are low, and diversions to fill the proposed Sites Reservoir for the alternatives would typically be highest during these months. The percent change in these months would be very large and meaningless.

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-86 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for the monthly GCID Canal Intake flow at Hamilton City. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-86
Glenn-Colusa Irrigation District Canal Intake Monthly Flow at Hamilton City (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, b]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	753	-40 (-5%)	-18 (-2%)	-72 (-10%)	Oct	697	29 (4%)	6 (1%)	-25 (-4%)
Nov	445	-12 (-3%)	-27 (-6%)	-26 (-6%)	Nov	421	32 (8%)	12 (3%)	8 (2%)
Dec	210	361	272	360	Dec	202	207	136	208
Jan	83	154	96	159	Jan	88	84	55	84
Feb	68	206	177	236	Feb	69	186	98	197
Mar	40	416	771	531	Mar	51	480	491	567
Apr	2,190	7 (0%)	287 (13%)	47 (2%)	Apr	2,296	-284 (-12%)	-62 (-3%)	-307 (-13%)
May	2,085	-89 (-4%)	158 (8%)	-70 (-3%)	May	2,011	-367 (-18%)	-136 (-7%)	-373 (-19%)
Jun	2,903	-836 (-29%)	-272 (-9%)	-858 (-30%)	Jun	2,791	-1,116 (-40%)	-376 (-13%)	-1,152 (-41%)
Jul	2,798	-1,030 (-37%)	-426 (-15%)	-1,053 (-38%)	Jul	2,658	-916 (-34%)	-239 (-9%)	-947 (-36%)
Aug	2,066	-103 (-5%)	55 (3%)	-226 (-11%)	Aug	1,928	-105 (-5%)	-11 (-1%)	-275 (-14%)
Sep	548	-61 (-11%)	-54 (-10%)	-82 (-15%)	Sep	508	3 (1%)	-11 (-2%)	-32 (-6%)

[a]Based on CALSIM II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Notes:

cfs = cubic feet per second

Percent changes are not shown for December through March because GCID Canal diversions associated with the No Project/No Action Alternative during this period are low, and diversions to fill the proposed Sites Reservoir for the alternatives would typically be highest during these months. The percent change in these months would be very large and meaningless.

Over the long-term averages, Alternatives A, B, and C show that GCID Canal Intake flows would increase during December through March, reflecting the diversions needed to fill the proposed Sites Reservoir. In contrast, flows would generally decrease during May through November with the highest reductions occurring in June and July (37 to 38 percent in July for Alternatives A and C). These reductions in GCID Canal Intake flows would be a result of one of the Project's ecosystem objectives of increasing flows in the Sacramento River from spring through fall by reducing diversions at the T-C Canal and GCID Canal intakes and providing supplemental flows through releases from the proposed Delevan Pipeline.

Over the Dry and Critical water years averages, the alternatives show that a similar flow pattern of increases would occur during the predominantly wet months December through March. All three alternatives show that noticeable flow reductions would occur during June and July (40 to 41 percent in June).

Lake Oroville

Alternatives A, B, and C Compared to Existing Conditions

Table 6-87 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Lake Oroville storage. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-87
Lake Oroville End-of-Month Storage (TAF)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
		Change from Existing Conditions					Change from Existing Conditions		
Month	Existing Conditions	Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Alternative A	Alternative B	Alternative C
Oct	1,812	-16 (-1%)	-26 (-1%)	-24 (-1%)	Oct	1,123	36 (3%)	27 (2%)	31 (3%)
Nov	1,868	-12 (-1%)	-22 (-1%)	-19 (-1%)	Nov	1,187	34 (3%)	26 (2%)	29 (2%)
Dec	2,006	8 (0%)	-6 (0%)	4 (0%)	Dec	1,386	46 (3%)	22 (2%)	42 (3%)
Jan	2,203	11 (0%)	1 (0%)	10 (0%)	Jan	1,771	0	-4 (0%)	5 (0%)
Feb	2,405	17 (1%)	7 (0%)	9 (0%)	Feb	1,941	7 (0%)	5 (0%)	14 (1%)
Mar	2,606	17 (1%)	13 (0%)	14 (1%)	Mar	2,179	23 (1%)	17 (1%)	27 (1%)
Apr	2,879	21 (1%)	17 (1%)	18 (1%)	Apr	2,293	32 (1%)	27 (1%)	35 (2%)
May	3,015	26 (1%)	22 (1%)	23 (1%)	May	2,307	43 (2%)	41 (2%)	48 (2%)
Jun	2,908	9 (0%)	13 (0%)	5 (0%)	Jun	2,115	40 (2%)	51 (2%)	45 (2%)
Jul	2,426	3 (0%)	14 (1%)	1 (0%)	Jul	1,588	52 (3%)	77 (5%)	59 (4%)
Aug	2,135	-9 (0%)	-8 (0%)	-11 (-1%)	Aug	1,262	40 (3%)	57 (4%)	53 (4%)
Sep	1,883	-39 (-2%)	-42 (-2%)	-45 (-2%)	Sep	1,172	14 (1%)	15 (1%)	14 (1%)

[a]Based on CALSIM II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

TAF = thousand acre-feet

Over the long-term averages, Alternatives A, B, and C show that storage changes would be small, with increases occurring during December through July, and reductions occurring in the remaining months.

Over the Dry and Critical water years averages, the alternatives show that small, but positive, storage increases would occur during nearly all months, with the greatest increases occurring during July and August. Relative increases would be greater than those expected over only the long-term averages.

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-88 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Lake Oroville storage. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-88
Lake Oroville End-of-Month Storage (TAF)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	1,767	29 (2%)	19 (1%)	21 (1%)	Oct	1,113	46 (4%)	37 (3%)	42 (4%)
Nov	1,826	29 (2%)	20 (1%)	23 (1%)	Nov	1,177	43 (4%)	35 (3%)	39 (3%)
Dec	1,968	45 (2%)	31 (2%)	42 (2%)	Dec	1,371	62 (4%)	37 (3%)	57 (4%)
Jan	2,170	43 (2%)	33 (2%)	43 (2%)	Jan	1,722	49 (3%)	45 (3%)	54 (3%)
Feb	2,381	41 (2%)	32 (1%)	33 (1%)	Feb	1,896	52 (3%)	50 (3%)	59 (3%)
Mar	2,591	32 (1%)	28 (1%)	29 (1%)	Mar	2,148	53 (2%)	47 (2%)	57 (3%)
Apr	2,864	36 (1%)	32 (1%)	32 (1%)	Apr	2,263	62 (3%)	57 (3%)	65 (3%)
May	3,002	40 (1%)	36 (1%)	36 (1%)	May	2,276	74 (3%)	72 (3%)	79 (3%)
Jun	2,885	32 (1%)	36 (1%)	28 (1%)	Jun	2,071	84 (4%)	94 (5%)	88 (4%)
Jul	2,399	30 (1%)	41 (2%)	28 (1%)	Jul	1,558	82 (5%)	107 (7%)	90 (6%)
Aug	2,098	28 (1%)	28 (1%)	25 (1%)	Aug	1,253	49 (4%)	65 (5%)	61 (5%)
Sep	1,831	13 (1%)	9 (1%)	7 (0%)	Sep	1,154	32 (3%)	33 (3%)	32 (3%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of Oct 1921 - Sep 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of Oct 1921 - Sep 2003.

Note:

TAF = thousand acre-feet

Over the long-term averages, Alternatives A, B, and C show that small storage increases would occur during all months.

Over the Dry and Critical water years averages, the alternatives show that small storage increases would occur during nearly all months, with the greatest increases occurring during June and July. Relative increases would be greater than those expected over the long-term averages.

Feather River

Alternatives A, B, and C Compared to Existing Conditions

Table 6-89 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Feather River flow downstream of the Thermalito Complex. It presents data for averages over the long term and combined Dry and Critical water years averages.

During September, long-term averages for all three alternatives show that an increase in flows would occur (9 percent for Alternative A, 11 percent for Alternatives B and C), and in October, all three alternatives show that a decrease would occur (between 8 and 12 percent).

During Dry and Critical water years, the same is true; there would be an increase during September for the alternatives (between 16 and 31 percent) and then a reduction in October for all three alternatives (between 9 and 18 percent).

Table 6-89
Feather River Monthly Flow Downstream of the Thermalito Complex (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, b]				
Month	Existing Conditions	Change from Existing Conditions			Month	Existing Conditions	Change from Existing Conditions		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	2,935	-363 (-12%)	-236 (-8%)	-327 (-11%)	Oct	1,873	-345 (-18%)	-159 (-9%)	-263 (-14%)
Nov	2,282	-82 (-4%)	-98 (-4%)	-98 (-4%)	Nov	1,355	-15 (-1%)	-45 (-3%)	-26 (-2%)
Dec	3,523	-313 (-9%)	-261 (-7%)	-367 (-10%)	Dec	2,199	-177 (-8%)	-7 (0%)	-195 (-9%)
Jan	4,739	-59 (-1%)	-107 (-2%)	-113 (-2%)	Jan	1,446	-51 (-3%)	-126 (-9%)	-28 (-2%)
Feb	5,651	-108 (-2%)	-107 (-2%)	36 (1%)	Feb	1,623	-107 (-7%)	-118 (-7%)	-111 (-7%)
Mar	6,079	-6 (0%)	-107 (-2%)	-90 (-1%)	Mar	1,812	-254 (-14%)	-243 (-13%)	-220 (-12%)
Apr	3,076	-38 (-1%)	-46 (-1%)	-38 (-1%)	Apr	1,353	-120 (-9%)	-139 (-10%)	-122 (-9%)
May	3,645	-73 (-2%)	-74 (-2%)	-75 (-2%)	May	1,559	-196 (-13%)	-222 (-14%)	-198 (-13%)
Jun	3,625	288 (8%)	157 (4%)	303 (8%)	Jun	2,966	47 (2%)	-159 (-5%)	48 (2%)
Jul	7,632	121 (2%)	-8 (0%)	87 (1%)	Jul	7,525	-89 (-1%)	-372 (-5%)	-138 (-2%)
Aug	4,837	172 (4%)	358 (7%)	201 (4%)	Aug	5,040	116 (2%)	289 (6%)	90 (2%)
Sep	4,626	437 (9%)	509 (11%)	508 (11%)	Sep	1,797	285 (16%)	550 (31%)	530 (30%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-90 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Feather River flow downstream of the Thermalito Complex. It presents data for averages over the long term and combined Dry and Critical water years averages.

Over the long-term averages, Alternatives A, B, and C show that maximum flow increases would occur (five to six percent) during September, and maximum decreases (seven to nine percent) would occur during October and December.

Over the Dry and Critical water years averages, the alternatives show that noticeable decreases in flows (8 to 13 percent) would occur during October and December, and would also decrease (9 to 15 percent) during April and May. Flows would increase noticeably (27 to 28 percent) during August and September, when compared to the long-term average August and September flows.

Table 6-90
Feather River Monthly Flow Downstream of the Thermalito Complex (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	2,815	-243 (-9%)	-115 (-4%)	-207 (-7%)	Oct	1,751	-223 (-13%)	-37 (-2%)	-141 (-8%)
Nov	2,230	-30 (-1%)	-45 (-2%)	-46 (-2%)	Nov	1,350	-9 (-1%)	-40 (-3%)	-21 (-2%)
Dec	3,453	-243 (-7%)	-192 (-6%)	-298 (-9%)	Dec	2,282	-260 (-11%)	-91 (-4%)	-278 (-12%)
Jan	4,661	19 (0%)	-29 (-1%)	-35 (-1%)	Jan	1,354	41 (3%)	-34 (-3%)	64 (5%)
Feb	5,498	45 (1%)	46 (1%)	189 (3%)	Feb	1,571	-56 (-4%)	-67 (-4%)	-60 (-4%)
Mar	5,941	131 (2%)	30 (1%)	47 (1%)	Mar	1,603	-45 (-3%)	-34 (-2%)	-11 (-1%)
Apr	3,079	-40 (-1%)	-49 (-2%)	-41 (-1%)	Apr	1,347	-115 (-9%)	-133 (-10%)	-116 (-9%)
May	3,640	-68 (-2%)	-69 (-2%)	-70 (-2%)	May	1,581	-218 (-14%)	-244 (-15%)	-220 (-14%)
Jun	3,783	130 (3%)	-1 (0%)	145 (4%)	Jun	3,188	-176 (-6%)	-381 (-12%)	-174 (-5%)
Jul	7,723	30 (0%)	-99 (-1%)	-4 (0%)	Jul	7,387	49 (1%)	-234 (-3%)	0 (0%)
Aug	4,992	16 (0%)	202 (4%)	45 (1%)	Aug	4,680	475 (10%)	649 (14%)	449 (10%)
Sep	4,831	232 (5%)	304 (6%)	303 (6%)	Sep	1,838	244 (13%)	509 (28%)	490 (27%)

[a]Based on CALSIM II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Sutter Bypass

Alternatives A, B, and C Compared to Existing Conditions

Table 6-91 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Tisdale Weir flow into the Sutter Bypass. It presents data for averages over the long term and combined Dry and Critical water years averages.

Tisdale Weir flows show that reductions would occur during the wetter months (generally November through April), which reflect the Sacramento River diversions for the proposed Project.

Over the long-term averages, Alternatives A, B, and C show that flow reductions would occur during the wetter months (generally November through April), with maximum flow decreases occurring during November with implementation of Alternatives A and C.

Over the Dry and Critical water years averages, the alternatives show that flow reductions would occur during November through March.

Table 6-91
Tisdale Weir Monthly Flow (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	Existing Conditions	Change from Existing Conditions			Month	Existing Conditions	Change from Existing Conditions		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	9	2 (24%)	2 (23%)	1 (10%)	Oct	0	0	0	0
Nov	151	-19 (-13%)	-13 (-9%)	-18 (-12%)	Nov	77	-20 (-26%)	-17 (-22%)	-20 (-26%)
Dec	1,017	-34 (-3%)	-33 (-3%)	-56 (-6%)	Dec	791	-62 (-8%)	-23 (-3%)	-54 (-7%)
Jan	2,245	-83 (-4%)	-50 (-2%)	-111 (-5%)	Jan	184	-58 (-32%)	-43 (-23%)	-59 (-32%)
Feb	3,232	-174 (-5%)	-164 (-5%)	-225 (-7%)	Feb	531	-111 (-21%)	-81 (-15%)	-122 (-23%)
Mar	2,127	-158 (-7%)	-231 (-11%)	-171 (-8%)	Mar	220	-86 (-39%)	-103 (-47%)	-87 (-40%)
Apr	899	-26 (-3%)	-85 (-9%)	-28 (-3%)	Apr	0	0	0	0
May	89	-4 (-5%)	-18 (-21%)	-9 (-11%)	May	0	0	0	0
Jun	47	-2 (-4%)	-2 (-5%)	-2 (-4%)	Jun	0	0	0	0
Jul	0	0	0	0	Jul	0	0	0	0
Aug	0	0	0	0	Aug	0	0	0	0
Sep	0	0	0	0	Sep	0	0	0	0

[a]Based on CALSIM II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

cfs = cubic feet per second

Table 6-92 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Colusa Weir flow into the Sutter Bypass. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-92
Colusa Weir Monthly Flow (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	Existing Conditions	Change from Existing Conditions			Month	Existing Conditions	Change from Existing Conditions		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	8	2 (21%)	1 (19%)	1 (10%)	Oct	0	0	0	0
Nov	133	-6 (-5%)	-6 (-4%)	-6 (-5%)	Nov	56	-17 (-31%)	-18 (-31%)	-17 (-30%)
Dec	1,336	63 (5%)	98 (7%)	51 (4%)	Dec	1,250	47 (4%)	123 (10%)	78 (6%)
Jan	3,912	-122 (-3%)	-67 (-2%)	-172 (-4%)	Jan	140	-51 (-37%)	-41 (-29%)	-52 (-37%)
Feb	5,705	-248 (-4%)	-249 (-4%)	-357 (-6%)	Feb	458	-133 (-29%)	-95 (-21%)	-132 (-29%)
Mar	3,538	-211 (-6%)	-306 (-9%)	-218 (-6%)	Mar	163	-100 (-62%)	-98 (-60%)	-100 (-62%)
Apr	1,179	-2 (0%)	-99 (-8%)	-6 (0%)	Apr	0	0	0	0
May	68	-2 (-2%)	-13 (-20%)	-8 (-12%)	May	0	0	0	0
Jun	20	-2 (-11%)	-2 (-8%)	-2 (-12%)	Jun	0	0	0	0
Jul	0	0	0	0	Jul	0	0	0	0
Aug	0	0	0	0	Aug	0	0	0	0
Sep	0	0	0	0	Sep	0	0	0	0

[a]Based on CALSIM II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

cfs = cubic feet per second

Colusa Weir flows show that reductions would occur during the wetter months (generally November through April), which reflect the Sacramento River diversions for the proposed Project.

Over the long-term averages, Alternatives A, B, and C show that noticeable flow reductions would occur, primarily during January through March, and that flows would increase for the three alternatives during December.

Over the Dry and Critical water years averages, the alternatives show that noticeable flow reductions would occur primarily during January through March, and that flows would increase for the alternatives during December.

Table 6-93 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Moulton Weir flow into the Sutter Bypass. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-93
Moulton Weir Monthly Flow (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
		Change from Existing Conditions					Change from Existing Conditions		
Month	Existing Conditions	Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Alternative A	Alternative B	Alternative C
Oct	0	0	0	0	Oct	0	0	0	0
Nov	0	0	0	0	Nov	0	0	0	0
Dec	57	8 (14%)	10 (17%)	8 (14%)	Dec	68	16 (23%)	13 (18%)	20 (29%)
Jan	289	-20 (-7%)	-24 (-8%)	-19 (-7%)	Jan	0	0	0	0
Feb	464	-8 (-2%)	-25 (-5%)	-16 (-3%)	Feb	0	0	0	0
Mar	242	-17 (-7%)	-25 (-10%)	-20 (-8%)	Mar	0	0	0	0
Apr	32	-1 (-2%)	-4 (-14%)	-1 (-2%)	Apr	0	0	0	0
May	0	0	0	0	May	0	0	0	0
Jun	0	0	0	0	Jun	0	0	0	0
Jul	0	0	0	0	Jul	0	0	0	0
Aug	0	0	0	0	Aug	0	0	0	0
Sep	0	0	0	0	Sep	0	0	0	0

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Moulton Weir flows show that reductions would occur during the wetter months (generally November through April), which reflect the Sacramento River diversions to the proposed Project.

Over the long-term averages, Alternatives A, B, and C show that noticeable flow reductions would occur during January through March. Flows would increase for the three alternatives during December.

Over the Dry and Critical water years averages, the alternatives show that an increase in flows would occur during December.

Table 6-94 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Ord Ferry flow into the Sutter Bypass. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-94
Ord Ferry Monthly Flow (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
		Change from Existing Conditions					Change from Existing Conditions		
Month	Existing Conditions	Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Alternative A	Alternative B	Alternative C
Oct	0	0	0	0	Oct	0	0	0	0
Nov	0	0	0	0	Nov	0	0	0	0
Dec	60	4 (7%)	8 (13%)	3 (5%)	Dec	72	19 (26%)	8 (11%)	21 (29%)
Jan	262	-29 (-11%)	-30 (-11%)	-29 (-11%)	Jan	0	0	0	0
Feb	427	-9 (-2%)	-28 (-7%)	-17 (-4%)	Feb	0	0	0	0
Mar	189	-8 (-4%)	-15 (-8%)	-11 (-6%)	Mar	0	0	0	0
Apr	13	-1 (-4%)	-2 (-16%)	-1 (-4%)	Apr	0	0	0	0
May	0	0	0	0	May	0	0	0	0
Jun	0	0	0	0	Jun	0	0	0	0
Jul	0	0	0	0	Jul	0	0	0	0
Aug	0	0	0	0	Aug	0	0	0	0
Sep	0	0	0	0	Sep	0	0	0	0

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Ord Ferry flows show that reductions would occur during the wetter months (generally November through April), which reflect the Sacramento River diversions for the proposed Project.

Over the long-term averages, Alternatives A, B, and C show that noticeable flow reductions would occur during January through March, and that flows would increase for the three alternatives during December.

Over the Dry and Critical water years averages, the alternatives show that an increase in flows would occur during December.

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-95 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Tisdale Weir flow into the Sutter Bypass. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-95
Tisdale Weir Monthly Flow (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	8	3 (35%)	3 (34%)	2 (20%)	Oct	0	0	0	0
Nov	147	-15 (-10%)	-10 (-7%)	-15 (-10%)	Nov	66	-9 (-14%)	-6 (-9%)	-9 (-13%)
Dec	1,010	-27 (-3%)	-27 (-3%)	-50 (-5%)	Dec	787	-58 (-7%)	-19 (-2%)	-50 (-6%)
Jan	2,248	-85 (-4%)	-52 (-2%)	-113 (-5%)	Jan	194	-68 (-35%)	-53 (-27%)	-69 (-36%)
Feb	3,231	-173 (-5%)	-163 (-5%)	-224 (-7%)	Feb	534	-114 (-21%)	-84 (-16%)	-125 (-23%)
Mar	2,125	-156 (-7%)	-228 (-11%)	-169 (-8%)	Mar	214	-80 (-37%)	-97 (-45%)	-82 (-38%)
Apr	897	-25 (-3%)	-83 (-9%)	-26 (-3%)	Apr	0	0	0	0
May	89	-4 (-4%)	-18 (-20%)	-9 (-10%)	May	0	0	0	0
Jun	45	-1 (-2%)	-1 (-2%)	-1 (-2%)	Jun	0	0	0	0
Jul	0	0	0	0	Jul	0	0	0	0
Aug	0	0	0	0	Aug	0	0	0	0
Sep	0	0	0	0	Sep	0	0	0	0

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Tisdale Weir flows show that reductions would occur during the wetter months (generally November through April), which reflect the Sacramento River diversions for the proposed Project.

Over the long-term averages, Alternatives A, B, and C show that noticeable flow reductions would occur during November through March.

Over the Dry and Critical water years averages, the alternatives show that flow reductions would occur during November through March.

Table 6-96 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Colusa Weir flow into the Sutter Bypass. It presents data for averages over the long term and combined Dry and Critical water years averages.

Colusa Weir flows show that reductions would occur during the wetter months (generally November through April), which reflect the Sacramento River diversions for the Project.

Over the long-term averages, Alternatives A, B, and C show that noticeable flow reductions would occur during primarily January through March. Flows would increase for all three alternatives during December.

Over the Dry and Critical water years averages, the alternatives show that noticeable flow reductions would occur during primarily January through March, and that flows would increase for all three alternatives during December.

Table 6-96
Colusa Weir Monthly Flow (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	7	3 (39%)	3 (37%)	2 (28%)	Oct	0	0	0	0
Nov	126	1 (1%)	1 (1%)	1 (1%)	Nov	45	-5 (-12%)	-6 (-13%)	-5 (-12%)
Dec	1,329	70 (5%)	105 (8%)	58 (4%)	Dec	1,265	31 (2%)	107 (8%)	62 (5%)
Jan	3,917	-126 (-3%)	-72 (-2%)	-176 (-4%)	Jan	160	-71 (-44%)	-60 (-38%)	-71 (-45%)
Feb	5,723	-266 (-5%)	-267 (-5%)	-374 (-7%)	Feb	466	-141 (-30%)	-103 (-22%)	-140 (-30%)
Mar	3,523	-195 (-6%)	-290 (-8%)	-202 (-6%)	Mar	147	-84 (-57%)	-82 (-56%)	-85 (-58%)
Apr	1,174	3 (0%)	-94 (-8%)	-1 (0%)	Apr	0	0	0	0
May	68	-2 (-2%)	-14 (-20%)	-9 (-13%)	May	0	0	0	0
Jun	19	-2 (-8%)	-1 (-5%)	-2 (-9%)	Jun	0	0	0	0
Jul	0	0	0	0	Jul	0	0	0	0
Aug	0	0	0	0	Aug	0	0	0	0
Sep	0	0	0	0	Sep	0	0	0	0

[a]Based on CALSIM II 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

cfs = cubic feet per second

Table 6-97 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Moulton Weir flow into the Sutter Bypass. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-97
Moulton Weir Monthly Flow (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	0	0	0	0	Oct	0	0	0	0
Nov	0	0	0	0	Nov	0	0	0	0
Dec	59	6 (11%)	8 (14%)	7 (11%)	Dec	78	6 (7%)	3 (3%)	10 (12%)
Jan	283	-14 (-5%)	-19 (-7%)	-14 (-5%)	Jan	0	0	0	0
Feb	467	-10 (-2%)	-28 (-6%)	-19 (-4%)	Feb	0	0	0	0
Mar	240	-16 (-7%)	-24 (-10%)	-18 (-8%)	Mar	0	0	0	0
Apr	32	-1 (-3%)	-5 (-15%)	-1 (-3%)	Apr	0	0	0	0
May	0	0	0	0	May	0	0	0	0
Jun	0	0	0	0	Jun	0	0	0	0
Jul	0	0	0	0	Jul	0	0	0	0
Aug	0	0	0	0	Aug	0	0	0	0
Sep	0	0	0	0	Sep	0	0	0	0

[a]Based on CALSIM II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

cfs = cubic feet per second

Moulton Weir flows show that reductions would occur during the wetter months (generally November through April), which reflect the Sacramento River diversions for the proposed Project.

Over the long-term averages, Alternatives A, B, and C show that noticeable flow reductions would occur during January through March. Flows would increase for all three alternatives during December.

Over the Dry and Critical water years averages, the alternatives show that a slight increase in flows would occur during December.

Table 6-98 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Ord Ferry flow into the Sutter Bypass. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-98
Ord Ferry Monthly Flow (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	0	0	0	0	Oct	0	0	0	0
Nov	0	0	0	0	Nov	0	0	0	0
Dec	63	2 (2%)	5 (8%)	0	Dec	88	3 (4%)	-8 (-9%)	6 (6%)
Jan	257	-24 (-10%)	-25 (-10%)	-24 (-9%)	Jan	0	0	0	0
Feb	431	-12 (-3%)	-32 (-7%)	-21 (-5%)	Feb	0	0	0	0
Mar	189	-8 (-4%)	-15 (-8%)	-11 (-6%)	Mar	0	0	0	0
Apr	14	-1 (-5%)	-2 (-17%)	-1 (-5%)	Apr	0	0	0	0
May	0	0	0	0	May	0	0	0	0
Jun	0	0	0	0	Jun	0	0	0	0
Jul	0	0	0	0	Jul	0	0	0	0
Aug	0	0	0	0	Aug	0	0	0	0
Sep	0	0	0	0	Sep	0	0	0	0

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Ord Ferry flows show that reductions would occur during the wetter months (generally November through April), which reflect the Sacramento River diversions for the proposed Project.

Over the long-term averages, Alternatives A, B, and C show that noticeable flow reductions would occur during January through March. Flows would increase slightly for all three alternatives during December.

Over the Dry and Critical water years averages, the alternatives show that a slight increase in flows would occur during December.

Yolo Bypass

Alternatives A, B, and C Compared to Existing Conditions

Table 6-99 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Yolo Bypass flow. It presents data for averages over the long-term and combined Dry and Critical water years averages.

Over the long-term averages, Alternatives A, B, and C show that slight increases and generally reductions in flows would occur, with a maximum reduction (10 percent) occurring during November. During September, there would be an increase (28 percent) in flows for all three alternatives.

Over the Dry and Critical water years averages, the alternatives show that the largest reduction in flows would occur during March (31 percent).

Table 6-99
Yolo Bypass Monthly Flow (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	Existing Conditions	Change from Existing Conditions: Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Change from Existing Conditions: Alternative A	Alternative B	Alternative C
Oct	145	-7 (-5%)	-7 (-5%)	-13 (-9%)	Oct	48	-3 (-6%)	-1 (-3%)	-3 (-6%)
Nov	404	-42 (-10%)	-25 (-6%)	-40 (-10%)	Nov	146	-5 (-3%)	20 (14%)	4 (3%)
Dec	3,317	-193 (-6%)	-153 (-5%)	-257 (-8%)	Dec	3,249	-74 (-2%)	-74 (-2%)	-138 (-4%)
Jan	9,687	-618 (-6%)	-480 (-5%)	-691 (-7%)	Jan	432	-155 (-36%)	-79 (-18%)	-147 (-34%)
Feb	12,548	-469 (-4%)	-418 (-3%)	-552 (-4%)	Feb	1,165	-84 (-7%)	-43 (-4%)	-86 (-7%)
Mar	8,298	-348 (-4%)	-659 (-8%)	-460 (-6%)	Mar	527	-164 (-31%)	-161 (-31%)	-164 (-31%)
Apr	2,428	15 (1%)	-135 (-6%)	-9 (0%)	Apr	225	2 (1%)	2 (1%)	2 (1%)
May	267	-2 (-1%)	-26 (-10%)	-15 (-6%)	May	71	2 (3%)	2 (3%)	2 (3%)
Jun	120	5 (4%)	5 (4%)	5 (4%)	Jun	64	2 (2%)	2 (2%)	2 (2%)
Jul	47	1 (2%)	1 (2%)	1 (2%)	Jul	47	1 (2%)	1 (2%)	1 (2%)
Aug	102	-2 (-2%)	-2 (-2%)	-2 (-2%)	Aug	57	1 (2%)	1 (2%)	1 (2%)
Sep	82	23 (28%)	23 (28%)	23 (28%)	Sep	73	-1 (-1%)	-1 (-1%)	-1 (-1%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-100 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Yolo Bypass flow. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-100
Yolo Bypass Monthly Flow (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative: Alternative A	Alternative B	Alternative C	Month	No Project/No Action Alternative	Change from No Project/No Action Alternative: Alternative A	Alternative B	Alternative C
Oct	100	39 (39%)	39 (39%)	33 (33%)	Oct	50	-5 (-10%)	-3 (-6%)	-5 (-10%)
Nov	413	-51 (-12%)	-34 (-8%)	-49 (-12%)	Nov	117	24 (21%)	50 (42%)	34 (29%)
Dec	3,334	-210 (-6%)	-169 (-5%)	-274 (-8%)	Dec	3,353	-178 (-5%)	-178 (-5%)	-242 (-7%)
Jan	9,711	-642 (-7%)	-504 (-5%)	-715 (-7%)	Jan	453	-176 (-39%)	-99 (-22%)	-167 (-37%)
Feb	12,487	-408 (-3%)	-356 (-3%)	-490 (-4%)	Feb	1,179	-98 (-8%)	-57 (-5%)	-100 (-8%)
Mar	8,325	-375 (-5%)	-686 (-8%)	-487 (-6%)	Mar	538	-175 (-33%)	-172 (-32%)	-175 (-33%)
Apr	2,476	-33 (-1%)	-183 (-7%)	-57 (-2%)	Apr	227	0	0	0
May	265	-1 (0%)	-25 (-9%)	-13 (-5%)	May	73	0	0	0
Jun	126	-1 (-1%)	-1 (-1%)	-1 (-1%)	Jun	66	0	0	0
Jul	48	0	0	0	Jul	48	0	0	0
Aug	100	0	0	0	Aug	58	0	0	0
Sep	83	22 (27%)	22 (26%)	22 (27%)	Sep	72	0	0	0

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Over the long-term averages, Alternatives A, B, and C show that flows would generally decrease with a maximum reduction (12 percent) occurring during November. During September and October, there would be flow increases (26 and 39 percent, respectively).

Over the Dry and Critical water years averages, the alternatives generally show that flows would decrease in October (6 to 10 percent) and December through March (5 to 39 percent). There would be a maximum increase in flows in November (42 percent).

Folsom Lake

Alternatives A, B, and C Compared to Existing Conditions

Table 6-101 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Folsom Lake storage. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-101
Folsom Lake End-of-Month Storage (TAF)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
		Change from Existing Conditions					Change from Existing Conditions		
Month	Existing Conditions	Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Alternative A	Alternative B	Alternative C
Oct	489	6 (1%)	3 (1%)	6 (1%)	Oct	331	10 (3%)	15 (4%)	12 (4%)
Nov	445	9 (2%)	4 (1%)	5 (1%)	Nov	331	17 (5%)	17 (5%)	16 (5%)
Dec	456	5 (1%)	2 (0%)	2 (0%)	Dec	363	9 (3%)	9 (3%)	9 (2%)
Jan	471	6 (1%)	1 (0%)	4 (1%)	Jan	392	16 (4%)	9 (2%)	14 (4%)
Feb	488	9 (2%)	6 (1%)	9 (2%)	Feb	436	17 (4%)	10 (2%)	16 (4%)
Mar	592	10 (2%)	7 (1%)	10 (2%)	Mar	515	20 (4%)	14 (3%)	20 (4%)
Apr	721	2 (0%)	-1 (0%)	1 (0%)	Apr	598	9 (2%)	1 (0%)	6 (1%)
May	844	0	-4 (0%)	-1 (0%)	May	647	7 (1%)	-3 (0%)	5 (1%)
Jun	817	-1 (0%)	-4 (0%)	0	Jun	592	7 (1%)	2 (0%)	10 (2%)
Jul	682	16 (2%)	4 (1%)	10 (1%)	Jul	467	10 (2%)	13 (3%)	10 (2%)
Aug	599	6 (1%)	-2 (0%)	6 (1%)	Aug	392	10 (3%)	17 (4%)	14 (4%)
Sep	509	9 (2%)	9 (2%)	11 (2%)	Sep	359	9 (2%)	22 (6%)	14 (4%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

TAF = thousand acre-feet

Generally, minor positive and negative changes in storage would occur for the long-term average. The maximum increase (two percent) would occur during July, and the maximum reduction of four TAF would occur during June. Over the long-term averages, Alternatives A, B, and C show that a slight increase would occur during September (two percent).

Over Dry and Critical water year averages, Alternatives A and C show that Folsom Lake storage would increase by one to five percent in all months. Alternative B shows that storage generally increases in all months by up to five percent, except in May where there is a small reduction of three TAF.

Table 6-102 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Folsom Lake storage. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-102
Folsom Lake End-of-Month Storage (TAF)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	477	18 (4%)	16 (3%)	19 (4%)	Oct	320	21 (7%)	26 (8%)	23 (7%)
Nov	435	19 (4%)	14 (3%)	15 (3%)	Nov	323	25 (8%)	25 (8%)	24 (7%)
Dec	448	13 (3%)	10 (2%)	10 (2%)	Dec	354	19 (5%)	18 (5%)	18 (5%)
Jan	466	10 (2%)	6 (1%)	9 (2%)	Jan	384	24 (6%)	17 (4%)	22 (6%)
Feb	487	10 (2%)	7 (1%)	9 (2%)	Feb	431	22 (5%)	16 (4%)	21 (5%)
Mar	594	7 (1%)	4 (1%)	7 (1%)	Mar	519	16 (3%)	10 (2%)	16 (3%)
Apr	719	5 (1%)	2 (0%)	4 (1%)	Apr	592	15 (2%)	6 (1%)	11 (2%)
May	840	4 (0%)	0	3 (0%)	May	641	13 (2%)	2 (0%)	10 (2%)
Jun	810	6 (1%)	4 (0%)	7 (1%)	Jun	581	18 (3%)	13 (2%)	21 (4%)
Jul	666	32 (5%)	20 (3%)	26 (4%)	Jul	453	25 (6%)	28 (6%)	24 (5%)
Aug	582	23 (4%)	15 (3%)	23 (4%)	Aug	380	22 (6%)	29 (8%)	26 (7%)
Sep	496	22 (5%)	22 (4%)	24 (5%)	Sep	348	19 (6%)	32 (9%)	25 (7%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
TAF = thousand acre-feet

Generally, storage in Folsom Lake would increase in nearly every month for the long-term averages and Dry and Critical years average for Alternatives A, B, and C, when compared to the No Project/No Action Alternative. Storage changes would be positive during all months over the long-term average, with a maximum increase (five percent) occurring in July. Over the Dry and Critical water years averages, the alternatives show that similar increases in storage would occur in every month, with maximum increases of seven to nine percent.

American River

Alternatives A, B, and C Compared to Existing Conditions

Table 6-103 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly American River flow downstream of Lake Natoma. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-103
American River Monthly Flow Downstream of Lake Natoma (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	Existing Conditions	Change from Existing Conditions			Month	Existing Conditions	Change from Existing Conditions		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	1,601	-41 (-3%)	3 (0%)	-15 (-1%)	Oct	1,390	-117 (-8%)	4 (0%)	-67 (-5%)
Nov	2,831	-96 (-3%)	-59 (-2%)	-23 (-1%)	Nov	1,551	-151 (-10%)	-64 (-4%)	-115 (-7%)
Dec	3,341	21 (1%)	-5 (0%)	-6 (0%)	Dec	2,812	62 (2%)	69 (2%)	58 (2%)
Jan	4,446	-40 (-1%)	-17 (0%)	-56 (-1%)	Jan	1,590	-52 (-3%)	40 (3%)	-59 (-4%)
Feb	5,173	-102 (-2%)	-118 (-2%)	-119 (-2%)	Feb	1,584	-28 (-2%)	-22 (-1%)	-30 (-2%)
Mar	3,773	-42 (-1%)	-49 (-1%)	-52 (-1%)	Mar	1,734	-49 (-3%)	-56 (-3%)	-71 (-4%)
Apr	3,290	-7 (0%)	0	14 (0%)	Apr	1,529	111 (7%)	151 (10%)	168 (11%)
May	3,603	-123 (-3%)	-108 (-3%)	-126 (-3%)	May	1,589	-38 (-2%)	-1 (0%)	-46 (-3%)
Jun	3,702	-218 (-6%)	-241 (-7%)	-256 (-7%)	Jun	2,208	-200 (-9%)	-301 (-14%)	-302 (-14%)
Jul	3,763	-539 (-14%)	-387 (-10%)	-429 (-11%)	Jul	2,747	-310 (-11%)	-436 (-16%)	-260 (-9%)
Aug	2,704	-73 (-3%)	-130 (-5%)	-170 (-6%)	Aug	2,096	-216 (-10%)	-279 (-13%)	-290 (-14%)
Sep	2,923	-241 (-8%)	-364 (-12%)	-269 (-9%)	Sep	1,574	-145 (-9%)	-241 (-15%)	-168 (-11%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Generally, over the long-term average, flows in the American River downstream of Lake Natoma for Alternatives A, B, and C would decrease in all months and would correspond to the general increase in Folsom Lake storage. The maximum flow decrease (14 percent) would occur in July. For Dry and Critical water years, flows in the American River downstream of Lake Natoma for Alternatives A, B, and C would generally decrease in all months with maximum decreases occurring during June through September (9 to 16 percent).

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-104 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly American River flow downstream of Lake Natoma. It presents data for averages over the long term and combined Dry and Critical water years averages.

Over the long-term averages, flows in the American River downstream of Lake Natoma for Alternatives A, B, and C would decrease in June and July with a maximum reduction (11 percent) expected to occur in July. Flows in all other months would increase or decrease slightly.

For Dry and Critical water years, flows in the American River flow downstream of Lake Natoma for Alternatives A, B, and C would decrease in June and July with a maximum reduction (nine percent) expected to occur in July. Flows in all other months would increase or decrease slightly.

Table 6-104
American River Monthly Flow Downstream of Lake Natoma (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	1,498	62 (4%)	106 (7%)	88 (6%)	Oct	1,299	-26 (-2%)	94 (7%)	24 (2%)
Nov	2,745	-10 (0%)	27 (1%)	63 (2%)	Nov	1,459	-58 (-4%)	28 (2%)	-22 (-2%)
Dec	3,268	94 (3%)	67 (2%)	67 (2%)	Dec	2,779	96 (3%)	103 (4%)	92 (3%)
Jan	4,368	38 (1%)	61 (1%)	23 (1%)	Jan	1,594	-56 (-4%)	36 (2%)	-63 (-4%)
Feb	5,068	2 (0%)	-13 (0%)	-14 (0%)	Feb	1,534	21 (1%)	27 (2%)	20 (1%)
Mar	3,686	45 (1%)	38 (1%)	35 (1%)	Mar	1,581	104 (7%)	97 (6%)	82 (5%)
Apr	3,255	29 (1%)	36 (1%)	49 (2%)	Apr	1,623	17 (1%)	57 (4%)	73 (5%)
May	3,461	19 (1%)	34 (1%)	16 (0%)	May	1,523	28 (2%)	65 (4%)	20 (1%)
Jun	3,526	-42 (-1%)	-64 (-2%)	-80 (-2%)	Jun	2,095	-86 (-4%)	-187 (-9%)	-188 (-9%)
Jul	3,640	-416 (-11%)	-265 (-7%)	-307 (-8%)	Jul	2,549	-113 (-4%)	-239 (-9%)	-63 (-2%)
Aug	2,501	130 (5%)	73 (3%)	33 (1%)	Aug	1,832	48 (3%)	-15 (-1%)	-26 (-1%)
Sep	2,679	4 (0%)	-120 (-4%)	-25 (-1%)	Sep	1,405	23 (2%)	-72 (-5%)	1 (0%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Sacramento-San Joaquin Delta

Alternatives A, B, and C Compared to Existing Conditions

Table 6-105 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Sacramento-San Joaquin Delta outflow. It presents data for averages over the long term and combined Dry and Critical water years averages.

Over the long-term averages, Alternative A shows that very slight changes would occur during all months. Alternatives B and C (which include the 1.81-MAF Sites Reservoir) show that slight decreases in outflow would occur during November through May, and that outflow increases would occur during June through October. The increased Delta outflows during June through October would be due to supplemental releases from the proposed Sites Reservoir for Delta water quality improvements.

Over the Dry and Critical water years averages, Alternative A shows that a mix of slight changes would occur during all months. When compared to Existing Conditions, Alternatives B and C show that greater fluctuations between positive and negative outflow changes would occur (than for Alternative A), with noticeably more positive outflows occurring during July through October.

Table 6-105
Sacramento-San Joaquin Delta Monthly Outflow (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	Existing Conditions	Change from Existing Conditions: Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Change from Existing Conditions: Alternative A	Alternative B	Alternative C
Oct	6,015	-88 (-1%)	18 (0%)	36 (1%)	Oct	3,780	117 (3%)	337 (9%)	473 (12%)
Nov	11,701	-27 (0%)	-178 (-2%)	-136 (-1%)	Nov	6,008	-45 (-1%)	-371 (-6%)	-273 (-5%)
Dec	21,478	-32 (0%)	-628 (-3%)	-350 (-2%)	Dec	16,369	396 (2%)	343 (2%)	518 (3%)
Jan	42,346	182 (0%)	-1,675 (-4%)	-1,102 (-3%)	Jan	13,171	551 (4%)	-754 (-6%)	-261 (-2%)
Feb	51,555	97 (0%)	-1,460 (-3%)	-978 (-2%)	Feb	17,489	217 (1%)	-1,322 (-8%)	-634 (-4%)
Mar	42,576	-39 (0%)	-1,472 (-3%)	-2,353 (-6%)	Mar	16,629	-204 (-1%)	-1,834 (-11%)	-1,644 (-10%)
Apr	30,053	-165 (-1%)	-430 (-1%)	-929 (-3%)	Apr	12,052	-55 (0%)	-284 (-2%)	-297 (-2%)
May	22,456	-375 (-2%)	-387 (-2%)	-674 (-3%)	May	8,638	-146 (-2%)	-61 (-1%)	-78 (-1%)
Jun	12,771	-21 (0%)	455 (4%)	527 (4%)	Jun	6,099	101 (2%)	363 (6%)	504 (8%)
Jul	7,964	84 (1%)	1,100 (14%)	1,068 (13%)	Jul	4,717	142 (3%)	959 (20%)	864 (18%)
Aug	4,594	-1 (0%)	384 (8%)	457 (10%)	Aug	4,484	239 (5%)	646 (14%)	728 (16%)
Sep	9,715	-51 (-1%)	201 (2%)	188 (2%)	Sep	3,170	-64 (-2%)	299 (9%)	302 (10%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Table 6-106 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Delta Cross Channel flow. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-106
Delta Cross Channel Monthly Flow (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	Existing Conditions	Change from Existing Conditions: Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Change from Existing Conditions: Alternative A	Alternative B	Alternative C
Oct	4,723	-213 (-5%)	-176 (-4%)	-206 (-4%)	Oct	4,433	-5 (0%)	12 (0%)	-21 (0%)
Nov	4,031	-17 (0%)	-32 (-1%)	-36 (-1%)	Nov	3,661	136 (4%)	147 (4%)	157 (4%)
Dec	4,492	20 (0%)	52 (1%)	25 (1%)	Dec	3,864	44 (1%)	106 (3%)	78 (2%)
Jan	4,999	-118 (-2%)	-57 (-1%)	-138 (-3%)	Jan	2,946	-40 (-1%)	9 (0%)	-44 (-2%)
Feb	5,691	-131 (-2%)	-74 (-1%)	-129 (-2%)	Feb	3,288	-148 (-5%)	-54 (-2%)	-138 (-4%)
Mar	5,148	-150 (-3%)	-223 (-4%)	-205 (-4%)	Mar	3,177	-241 (-8%)	-203 (-6%)	-265 (-8%)
Apr	3,904	-23 (-1%)	-69 (-2%)	-32 (-1%)	Apr	2,403	-15 (-1%)	-16 (-1%)	-6 (0%)
May	3,371	-23 (-1%)	-57 (-2%)	-31 (-1%)	May	2,109	1 (0%)	-2 (0%)	-4 (0%)
Jun	5,669	75 (1%)	75 (1%)	66 (1%)	Jun	4,984	110 (2%)	119 (2%)	113 (2%)
Jul	7,701	-259 (-3%)	-411 (-5%)	-230 (-3%)	Jul	7,185	212 (3%)	165 (2%)	247 (3%)
Aug	6,529	203 (3%)	200 (3%)	288 (4%)	Aug	6,220	287 (5%)	267 (4%)	457 (7%)
Sep	5,727	188 (3%)	213 (4%)	308 (5%)	Sep	5,098	245 (5%)	355 (7%)	360 (7%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Over the long-term averages, Alternatives A, B, and C generally show that minor flow increases and minor flow reductions would occur, with increases (three to five percent) that would occur during August and September.

Over the Dry and Critical water years averages, the alternatives show that similar flow increases would occur during August and September (four to seven percent).

Table 6-107 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Old and Middle river flows. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-107
Old and Middle River Monthly Flow (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
		Change from Existing Conditions					Change from Existing Conditions		
Month	Existing Conditions	Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Alternative A	Alternative B	Alternative C
Oct	-6,178	-411	-422	-483	Oct	-5,285	222	217	169
Nov	-6,084	-658	-854	-940	Nov	-5,579	-623	-643	-527
Dec	-6,640	-83	-90	-104	Dec	-6,076	274	181	66
Jan	-3,473	-175	-192	-171	Jan	-4,394	-310	-267	-279
Feb	-3,279	31	29	20	Feb	-3,809	-79	-132	-169
Mar	-2,779	-26	-42	9	Mar	-2,512	79	-15	18
Apr	840	-99	-101	-102	Apr	-556	-35	-38	-39
May	352	-99	-99	-104	May	-793	16	21	8
Jun	-3,773	52	121	83	Jun	-2,873	66	167	63
Jul	-9,589	-29	12	-68	Jul	-9,468	23	86	-43
Aug	-9,250	-320	-250	-408	Aug	-7,759	-448	-311	-704
Sep	-7,582	-874	-985	-910	Sep	-6,406	-590	-936	-669

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Over the long-term averages, Alternatives A, B, and C show that minor negative changes in flows would occur (which indicates increased reverse flows), except for maximum increases in reverse flows during September and November.

Over the Dry and Critical water years averages, the alternatives show that a mix of flow changes would occur, with the only relatively large change being maximum increases in reverse flows during September and November.

Table 6-108 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly Banks and Jones pumping plant exports. It presents data for averages over the long term and combined Dry and Critical water years averages.

Over the long-term averages, Alternatives A, B, and C show that slight increases in exports would occur, with the greatest export increases occurring during September (10 to 11 percent) and November (10 to 14 percent).

Over the Dry and Critical water years averages, the alternatives show that a mix of changes in exports would occur, with the only noticeable changes being greater flow increases during September (8 to 13 percent) and November (9 to 11 percent).

Table 6-108
Total Banks Pumping Plant (SWP) and Jones Pumping Plant (CVP) Monthly Exports (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	Existing Conditions	Change from Existing Conditions			Month	Existing Conditions	Change from Existing Conditions		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	6,940	400 (6%)	413 (6%)	478 (7%)	Oct	5,742	-274 (-5%)	-267 (-5%)	-216 (-4%)
Nov	6,885	676 (10%)	887 (13%)	980 (14%)	Nov	6,130	636 (10%)	657 (11%)	533 (9%)
Dec	8,906	81 (1%)	86 (1%)	103 (1%)	Dec	7,586	-305 (-4%)	-204 (-3%)	-77 (-1%)
Jan	6,660	157 (2%)	172 (3%)	151 (2%)	Jan	5,883	327 (6%)	280 (5%)	294 (5%)
Feb	7,242	-85 (-1%)	-85 (-1%)	-75 (-1%)	Feb	5,469	29 (1%)	87 (2%)	131 (2%)
Mar	6,595	0	16 (0%)	-40 (-1%)	Mar	3,712	-116 (-3%)	-12 (0%)	-48 (-1%)
Apr	2,083	27 (1%)	28 (1%)	28 (1%)	Apr	1,687	23 (1%)	27 (2%)	29 (2%)
May	2,190	40 (2%)	37 (2%)	42 (2%)	May	1,679	-17 (-1%)	-24 (-1%)	-9 (-1%)
Jun	4,849	89 (2%)	12 (0%)	53 (1%)	Jun	2,418	71 (3%)	-38 (-2%)	74 (3%)
Jul	10,510	19 (0%)	-25 (0%)	61 (1%)	Jul	9,440	-112 (-1%)	-180 (-2%)	-40 (0%)
Aug	10,053	241 (2%)	166 (2%)	336 (3%)	Aug	8,071	396 (5%)	248 (3%)	674 (8%)
Sep	8,650	836 (10%)	957 (11%)	876 (10%)	Sep	7,083	580 (8%)	955 (13%)	666 (9%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-109 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Sacramento-San Joaquin Delta outflow. It presents data for averages over the long term and combined Dry and Critical water years averages.

Over the long-term averages, Delta outflows for Alternatives A, B, and C show that decreases would occur during the wetter winter months (November through March) and relatively substantial increases would occur during July and August.

Over the Dry and Critical water years averages, the outflows of the alternatives show that relatively substantial decreases would occur during January through March. The alternatives also show that increases would occur during July through September.

Table 6-109
Sacramento-San Joaquin Delta Monthly Outflow (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	5,927	106 (2%)	124 (2%)	70 (1%)	Oct	3,897	220 (6%)	355 (9%)	209 (5%)
Nov	11,674	-152 (-1%)	-109 (-1%)	-47 (0%)	Nov	5,962	-326 (-5%)	-228 (-4%)	-61 (-1%)
Dec	21,446	-596 (-3%)	-318 (-1%)	-728 (-3%)	Dec	16,765	-53 (0%)	122 (1%)	-151 (-1%)
Jan	42,528	-1,857 (-4%)	-1,284 (-3%)	-2,081 (-5%)	Jan	13,721	-1,305 (-10%)	-811 (-6%)	-1,295 (-9%)
Feb	51,653	-1,557 (-3%)	-1,076 (-2%)	-1,637 (-3%)	Feb	17,706	-1,539 (-9%)	-851 (-5%)	-1,568 (-9%)
Mar	42,537	-1,433 (-3%)	-2,315 (-5%)	-1,925 (-5%)	Mar	16,425	-1,630 (-10%)	-1,440 (-9%)	-1,885 (-11%)
Apr	29,887	-264 (-1%)	-764 (-3%)	-363 (-1%)	Apr	11,998	-229 (-2%)	-242 (-2%)	-172 (-1%)
May	22,080	-12 (0%)	-299 (-1%)	-99 (0%)	May	8,493	85 (1%)	68 (1%)	38 (0%)
Jun	12,750	476 (4%)	548 (4%)	474 (4%)	Jun	6,200	262 (4%)	403 (7%)	268 (4%)
Jul	8,048	1,016 (13%)	984 (12%)	1,071 (13%)	Jul	4,859	817 (17%)	722 (15%)	859 (18%)
Aug	4,593	384 (8%)	458 (10%)	582 (13%)	Aug	4,723	407 (9%)	489 (10%)	709 (15%)
Sep	9,663	252 (3%)	239 (2%)	406 (4%)	Sep	3,106	363 (12%)	366 (12%)	672 (22%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Table 6-110 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Delta Cross Channel flow. It presents data for averages over the long term and combined Dry and Critical water years averages.

Over the long-term averages, Alternatives A, B, and C generally show that no change or minor decreases in flows would occur, except for minor increases (four to six percent) during August and September.

Over the Dry and Critical water years averages, the alternatives show that similar flow increases would occur during August and September (7 to 11 percent).

Table 6-110
Delta Cross Channel Monthly Flow (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	4,708	-199 (-4%)	-162 (-3%)	-192 (-4%)	Oct	4,407	20	38 (1%)	5 (0%)
Nov	4,028	-14 (0%)	-28 (-1%)	-32 (-1%)	Nov	3,609	188 (5%)	199 (6%)	209 (6%)
Dec	4,507	5 (0%)	37 (1%)	10 (0%)	Dec	3,889	19 (0%)	81 (2%)	53 (1%)
Jan	5,014	-133 (-3%)	-72 (-1%)	-153 (-3%)	Jan	2,977	-71 (-2%)	-22 (-1%)	-75 (-3%)
Feb	5,702	-142 (-2%)	-84 (-1%)	-140 (-2%)	Feb	3,312	-172 (-5%)	-78 (-2%)	-162 (-5%)
Mar	5,143	-145 (-3%)	-219 (-4%)	-201 (-4%)	Mar	3,150	-214 (-7%)	-176 (-6%)	-239 (-8%)
Apr	3,909	-28 (-1%)	-74 (-2%)	-37 (-1%)	Apr	2,415	-27 (-1%)	-28 (-1%)	-18 (-1%)
May	3,347	1 (0%)	-33 (-1%)	-7 (0%)	May	2,096	14 (1%)	11 (1%)	9 (0%)
Jun	5,679	66 (1%)	66 (1%)	57 (1%)	Jun	5,032	61 (1%)	71 (1%)	64 (1%)
Jul	7,772	-331 (-4%)	-483 (-6%)	-302 (-4%)	Jul	7,104	294 (4%)	247 (3%)	328 (5%)
Aug	6,490	242 (4%)	239 (4%)	327 (5%)	Aug	5,996	511 (9%)	491 (8%)	681 (11%)
Sep	5,711	205 (4%)	230 (4%)	324 (6%)	Sep	5,015	328 (7%)	437 (9%)	443 (9%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Table 6-111 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Old and Middle river flows. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-111
Old and Middle River Monthly Flow (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	-6,024	-566	-576	-638	Oct	-5,148	86	80	32
Nov	-6,006	-736	-932	-1018	Nov	-5,381	-820	-841	-725
Dec	-6,736	12	6	-9	Dec	-6,101	299	206	91
Jan	-3,456	-192	-210	-188	Jan	-4,164	-539	-496	-509
Feb	-3,185	-63	-65	-74	Feb	-3,764	-125	-178	-215
Mar	-2,843	38	22	73	Mar	-2,586	153	59	92
Apr	752	-11	-13	-14	Apr	-567	-23	-27	-28
May	265	-11	-12	-17	May	-759	-18	-12	-26
Jun	-3,714	-7	63	25	Jun	-2,843	37	137	34
Jul	-9,532	-86	-45	-125	Jul	-9,274	-171	-108	-237
Aug	-9,171	-399	-329	-487	Aug	-6,974	-1,232	-1,095	-1,489
Sep	-7,712	-744	-855	-781	Sep	-6,306	-689	-1035	-769

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

Over the long-term averages, Alternatives A, B, and C show that minor negative changes in flows would occur (which indicates increased reverse flows), except that maximum increases in reverse flows would occur during September and November.

Over the Dry and Critical water years averages, the alternatives show a mix of flow changes, with the only relatively large change being maximum increases in reverse flows during August, September, and November.

Table 6-112 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly Banks and Jones pumping plant exports. It presents data for averages over the long term and combined Dry and Critical water years averages.

Over the long-term averages, Alternatives A, B, and C show that substantial pumping export increases (9 to 16 percent) would occur during September through November.

Over the Dry and Critical water years averages, the alternatives show that substantial pumping export increases would occur during August (17 to 23 percent), September (11 to 16 percent), and November (13 to 15 percent).

Table 6-112
Total Banks Pumping Plant (CVP and SWP) and Jones Pumping Plant (CVP) Monthly Exports (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	6,735	606 (9%)	619 (9%)	683 (10%)	Oct	5,561	-93 (-2%)	-86 (-2%)	-35 (-1%)
Nov	6,772	789 (12%)	1,000 (15%)	1,093 (16%)	Nov	5,886	880 (15%)	901 (15%)	777 (13%)
Dec	9,003	-16 (0%)	-10 (0)%	6 (0%)	Dec	7,611	-329 (-4%)	-228 (-3%)	-102 (-1%)
Jan	6,607	210 (3%)	225 (3%)	204 (3%)	Jan	5,619	592 (11%)	545 (10%)	558 (10%)
Feb	7,090	67 (1%)	66 (1%)	77 (1%)	Feb	5,361	137 (3%)	195 (4%)	239 (4%)
Mar	6,641	-46 (-1%)	-29 (0%)	-86 (-1%)	Mar	3,764	-168 (-4%)	-65 (-2%)	-101 (-3%)
Apr	2,103	7 (0%)	8 (0%)	8 (0%)	Apr	1,685	26 (2%)	29 (2%)	31 (2%)
May	2,223	7 (0%)	4 (0%)	10 (0%)	May	1,638	24 (1%)	18 (1%)	33 (2%)
Jun	4,939	-1 (0%)	-79 (-2%)	-37 (-1%)	Jun	2,528	-40 (-2%)	-148 (-6%)	-36 (-1%)
Jul	10,439	90 (1%)	46 (0%)	132 (1%)	Jul	9,143	185 (2%)	117 (1%)	256 (3%)
Aug	9,862	432 (4%)	356 (4%)	527 (5%)	Aug	7,134	1,333 (19%)	1,185 (17%)	1,611 (23%)
Sep	8,678	808 (9%)	929 (11%)	848 (10%)	Sep	6,914	749 (11%)	1,124 (16%)	835 (12%)

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
cfs = cubic feet per second

6.3.5.3 Primary Study Area – Alternatives A, B, and C

Funks Creek and Stone Corral Creek

With implementation of either Alternative A, B, or C, Sites and Golden Gate dams would impound Funks and Stone Corral creeks. After Project construction is complete, maintenance flows up to a maximum of 10 cfs would be maintained in both Funks and Stone Corral creeks downstream of Sites Reservoir (refer to Chapter 9 Flood Control and Management and Chapter 3 Description of the Proposed Project/Proposed Action and Alternatives for additional details).

Funks Reservoir

The existing Funks Reservoir is a reregulating reservoir that balances water level operations of the T-C Canal upstream and downstream of Funks Creek. With implementation of the Project, Funks Reservoir would be expanded to form Holthouse Reservoir by constructing a new dam (Holthouse Dam) and reservoir to the east of Funks Reservoir, and breaching the existing Funks Dam so that the new and existing reservoirs would act as one unit with an enlarged active storage capacity of approximately 6,500 acre-feet and a surface area of approximately 450 acres. Holthouse Reservoir would be required for the Project to facilitate balancing and regulating Sites Reservoir inflows and outflows through the Sites Pumping/Generating Plant, and to provide sufficient supplemental storage to allow simultaneous pump back power generation.

Colusa Basin Drain

The CBD conveys runoff and agricultural return flows from approximately one million acres of watershed in the Colusa Basin and discharges the flows to the Sacramento River at Knights Landing. The CBD also collects flood flows from the local creeks within the Primary Study Area. During high flows, flows in the CBD are diverted to Yolo Bypass through the Knights Landing Ridge Cut.

The operation of Sites Reservoir would reduce potential flood flow impacts primarily from Funks and Stone Corral creeks, as well as from Grapevine and Antelope creeks, which are located within the proposed Sites Reservoir Inundation Area. Flows from these creeks would be regulated by Sites and Golden Gate dams through releases of low maintenance flows. Hunters and Lurline creeks, which flow into the CBD, would not be affected by Sites Reservoir's operation.

The CBD would, therefore, change from an unregulated sporadic flow that is responsive to local storms to a regulated low maintenance flow resulting from the reduced drainage from Funks, Stone Corral, Grapevine and Antelope creeks once Sites Reservoir becomes operational.

Other Local Creeks

Many small tributaries exist within the Primary Study Area, including Grapevine Creek, Antelope Creek, Hunters Creek, and Lurline Creek.

Grapevine and Antelope creeks are located within the proposed Sites Reservoir Inundation Area; flows from both of these creeks would be reduced with operation of Sites Reservoir.

Hunters Creek (located north of Sites Reservoir) flows to the east. Lurline Creek (located southeast of Sites Reservoir) flows to the east. Hunters and Lurline creeks flow into the CBD. The operation of Sites Reservoir would not affect Hunters and Lurline creeks.

Sites Reservoir

Alternatives A, B, and C Compared to Existing Conditions

Table 6-113 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly storage at the proposed Sites Reservoir. It presents data for averages over the long term and combined Dry and Critical water years averages.

Table 6-113
Proposed Sites Reservoir End-of-Month Storage (TAF)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
		Change from Existing Conditions					Change from Existing Conditions		
Month	Existing Conditions	Alternative A	Alternative B	Alternative C	Month	Existing Conditions	Alternative A	Alternative B	Alternative C
Oct	0	633	902	1049	Oct	0	365	452	623
Nov	0	596	862	1004	Nov	0	348	433	591
Dec	0	679	924	1084	Dec	0	394	469	628
Jan	0	812	1013	1220	Jan	0	595	770	938
Feb	0	926	1106	1349	Feb	0	703	837	1041
Mar	0	1017	1237	1463	Mar	0	803	921	1154
Apr	0	1012	1253	1465	Apr	0	750	876	1103
May	0	985	1235	1441	May	0	682	805	1034
Jun	0	934	1171	1386	Jun	0	620	710	949
Jul	0	826	1068	1276	Jul	0	552	613	862
Aug	0	759	1014	1192	Aug	0	471	540	758
Sep	0	687	947	1114	Sep	0	412	491	688

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
TAF = thousand acre-feet

Across both the long-term averages and water year types, reservoir storage would decline to a minimum in November, increase during December through April to its maximum, and then decrease during May through October.

Although Alternatives B and C would both include the larger reservoir size (1.81-MAF), Alternative C would have more water in storage in Sites Reservoir than Alternative B. This increased storage would result from differences in diversion and conveyance capacities between the alternatives associated with the Delevan Pipeline Intake Facilities and the Delevan Pipeline Discharge facility.

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-114 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly storage at the proposed Sites Reservoir. It presents data for averages over the long term and combined Dry and Critical water years averages.

Across both the long-term averages and water year types, reservoir storage would decline to a minimum in November, increase during December through April to its maximum, and then decrease during May through October.

Although Alternatives B and C would both include the larger reservoir size (1.81-MAF), Alternative C's reservoir would have more water in storage in Sites Reservoir than Alternative B. This increased storage would result from differences in diversion and conveyance capacities between the alternatives associated with the Delevan Pipeline Intake Facilities and the Delevan Pipeline Discharge facility.

Table 6-114
Proposed Sites Reservoir End-of-Month Storage (TAF)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	0	633	902	1,049	Oct	0	365	452	623
Nov	0	596	862	1,004	Nov	0	348	433	591
Dec	0	679	924	1,084	Dec	0	394	469	628
Jan	0	812	1,013	1,220	Jan	0	595	770	938
Feb	0	926	1,106	1,349	Feb	0	703	837	1,041
Mar	0	1,017	1,237	1,463	Mar	0	803	921	1,154
Apr	0	1,012	1,253	1,465	Apr	0	750	876	1,103
May	0	985	1,235	1,441	May	0	682	805	1,034
Jun	0	934	1,171	1,386	Jun	0	620	710	949
Jul	0	826	1,068	1,276	Jul	0	552	613	862
Aug	0	759	1,014	1,192	Aug	0	471	540	758
Sep	0	687	947	1,114	Sep	0	412	491	688

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

TAF = thousand acre-feet

Delevan Pipeline Intake Facilities

Alternatives A, B, and C Compared to Existing Conditions

Table 6-115 shows the differences between Alternatives A, B, and C and Existing Conditions for monthly flow at the proposed Delevan Pipeline Intake. It presents data for averages over the long term and combined Dry and Critical water years averages.

Over the long-term averages, Alternatives A and C show that increases would occur during the late winter (December through March) and late summer (June and July). Over the Dry and Critical water years averages, Alternatives A and C show that an increase in diversions would occur during December through July. During June and July, upstream GCID and T-C canal flows would be supplemented by Delevan Pipeline flows.

Alternative B does not include the Delevan Pipeline Intake Facilities.

Table 6-115
Proposed Delevan Pipeline Intake Monthly Flow (cfs)
Alternatives A, B, and C Compared to Existing Conditions

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	Existing Conditions	Change from Existing Conditions: Alternative A	Change from Existing Conditions: Alternative B	Change from Existing Conditions: Alternative C	Month	Existing Conditions	Change from Existing Conditions: Alternative A	Change from Existing Conditions: Alternative B	Change from Existing Conditions: Alternative C
Oct	0	7	0	16	Oct	0	0	0	6
Nov	0	55	0	55	Nov	0	26	0	27
Dec	0	343	0	335	Dec	0	180	0	180
Jan	0	761	0	806	Jan	0	391	0	391
Feb	0	655	0	776	Feb	0	610	0	610
Mar	0	308	0	406	Mar	0	348	0	460
Apr	0	68	0	71	Apr	0	186	0	193
May	0	66	0	78	May	0	180	0	213
Jun	0	694	0	690	Jun	0	778	0	622
Jul	0	468	0	485	Jul	0	704	0	560
Aug	0	19	0	16	Aug	0	13	0	13
Sep	0	7	0	2	Sep	0	20	0	7

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

cfs = cubic feet per second

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-116 shows the differences between Alternatives A, B, and C and the No Project/No Action Alternative for monthly flow at the proposed Delevan Pipeline Intake. It presents data for averages over the long term and combined Dry and Critical water years averages.

Over the long-term averages and across all water year types with implementation of Alternatives A and C, flows would increase during the predominantly wet months of December through March, reflecting the withdrawals needed to fill the proposed Sites Reservoir. Pipeline releases would increase during the dry summer months of June and July. During June through August, upstream GCID and T-C canal flows would be supplemented by Delevan Pipeline flows.

In contrast, Alternative B does not include the Delevan Pipeline Intake Facility.

Table 6-116
Proposed Delevan Pipeline Intake Monthly Flow (cfs)
Alternatives A, B, and C Compared to the No Project/No Action Alternative

Long-Term Average[a, b]					Dry and Critical Water Years Average[a, c]				
Month	No Project/No Action Alternative	Change from No Project/No Action Alternative			Month	No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Oct	0	7	0	16	Oct	0	0	0	6
Nov	0	55	0	55	Nov	0	26	0	27
Dec	0	343	0	335	Dec	0	180	0	180
Jan	0	761	0	806	Jan	0	391	0	391
Feb	0	655	0	776	Feb	0	610	0	610
Mar	0	308	0	406	Mar	0	348	0	460
Apr	0	68	0	71	Apr	0	186	0	193
May	0	66	0	78	May	0	180	0	213
Jun	0	694	0	690	Jun	0	778	0	622
Jul	0	468	0	485	Jul	0	704	0	560
Aug	0	19	0	16	Aug	0	13	0	13
Sep	0	7	0	2	Sep	0	20	0	7

[a]Based on CALSIM II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:

cfs = cubic feet per second

6.4 Evaluation of Changes to Operational Flexibility

The existing State and federal water systems, SWP and CVP, respectively, have become relatively rigid in terms of timing, location, and quantity of stored and released water. This lack of flexibility creates difficulty in addressing many of the challenges facing California's water managers, including drought impacts, flood risk, declining ecosystems, impaired water quality, and climate change. As described in Chapter 1 Introduction, having more water in storage would improve the operational flexibility of California's major water systems and would give water managers the ability to develop more solutions to respond to California's water resources challenges.

Changes in CVP and SWP storage associated with implementation of Alternatives A, B, and C, when compared to Existing Conditions and the No Project/No Action Alternative, are discussed below.

6.4.1 Total North-of-the-Delta CVP and SWP Reservoir Storage

Table 6-117 shows the differences in total annual North-of-the-Delta storage between Alternatives A, B, and C, when compared to Existing Conditions and the No Project/No Action Alternative. It presents data for averages over the long term and combined Dry and Critical water years averages. Total North-of-the-Delta storage combines the Trinity Lake, Shasta Lake, Lake Oroville, Folsom Lake, and the proposed Sites Reservoir storages.

A comparison of the long-term averages and Dry and Critical water years averages of the total North-of-the-Delta storage for Alternatives A, B, and C with Existing Conditions and the No Project/No

Action Alternative indicates that there would be additional operational flexibility provided by the proposed Sites Reservoir.

Table 6-117
Total Annual North-of-the-Delta Storage[a] (TAF)

Long-Term Average[b, c]					Dry and Critical Water Years Average[b, d]				
	Existing Conditions	Change from Existing Conditions				Existing Conditions	Change from Existing Conditions		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Annual	7,628	927 (12%)	1,167 (15%)	1,373 (18%)	Annual	6,070	791 (13%)	953 (16%)	1,173 (19%)
	No Project/No Action Alternative	Change from No Project/No Action Alternative				No Project/No Action Alternative	Change from No Project/No Action Alternative		
		Alternative A	Alternative B	Alternative C			Alternative A	Alternative B	Alternative C
Annual	7,591	964 (13%)	1,205 (16%)	1,410 (19%)	Annual	6,040	821 (14%)	983 (16%)	1,203 (20%)

[a]For Existing Conditions and the No Project / No Action Alternative, total annual storage combines Trinity Lake, Shasta Lake, Lake Oroville, and Folsom Lake storage. For Alternatives A, B, and C, the storage for the same four reservoirs is combined with the proposed Sites Reservoir storage.
[b]Based on CALSIM II modeling over an 82-year simulation period.
[c]Long-Term is the average quantity for the period of October 1921 through September 2003.
[d]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Note:
TAF = thousand acre-feet

Alternatives A, B, and C show that substantial increases in total North-of-the-Delta storage would occur. Some of the increase in total North-of-the-Delta storage would be associated with increases at the existing reservoirs, and some would be associated with water in storage at the proposed Sites Reservoir. Over the long-term averages, total storage would increase, when comparing Alternatives A, B, and C, reflecting the differences in Sites Reservoir design capacity as well as differences in conveyance to the reservoir.

For example, over the long-term average, Alternative A includes the smaller Sites Reservoir (with a storage capacity of 1.27 MAF) and would result in the smallest total North-of-the-Delta storage increase of 927 TAF (12 percent), when compared to Existing Conditions, and 964 TAF (13 percent), when compared to the No Project/No Action Alternative.

Alternatives B and C both include the larger 1.81-MAF Sites Reservoir, and over the long-term average both show that larger total North-of-the-Delta storage increases would occur when compared to Existing Conditions (increases of 1,167 TAF [15 percent], and 1,373 TAF [18 percent], respectively) and the No Project/No Action Alternative (increases of 1,205 TAF [16 percent], and 1,410 TAF [19 percent], respectively).

Over the Dry and Critical water years average, Alternative A would result in a total North-of-the-Delta storage increase of 791 TAF (13 percent), when compared to the Existing Conditions, and 821 TAF (14 percent), when compared to the No Project/No Action Alternative. Alternative B would result in a total North-of-the-Delta storage increase of 953 TAF (16 percent), when compared to the Existing Conditions, and 983 TAF (16 percent), when compared to the No Project/No Action Alternative. Alternative C would result in a total North-of-the-Delta storage increase of 1,173 TAF (19 percent), when compared to the Existing Conditions, and 1,203 TAF (20 percent), when compared to the No Project/No Action Alternative.

Although Alternatives B and C would have the same reservoir storage size, the approximately 200 TAF storage difference between those alternatives reflects the difference in intake and conveyance capacity to Sites Reservoir between Alternative C and Alternative B. Alternative C includes the 2,000 cfs Delevan

Pipeline Intake Facilities; whereas, Alternative B has no diversion capability at the Delevan Pipeline (it instead has the Delevan Pipeline Discharge Facility).

6.5 Water Supply Impacts

6.5.1 Water Supply Reliability

Water supply reliability is defined as delivering a specific quantity of water with a determined frequency to a particular location at a particular time. Reliability indicates an acceptable level of dependability of water delivery to the users receiving it. Local, regional, California, and federal governments, and water suppliers, all have a role in water resource sustainability and improving water supply reliability for the existing and future population and the environment.

Water supply reliability is complicated by the need for consistent and efficient delivery of water to environmental, agricultural, and urban users. During prolonged droughts, water supplies are less reliable, which increases competition and can lead to conflict between water users.

Climate change threatens to further reduce water supply reliability throughout California. The potential effects of climate change, including the effects upon the alternatives, are discussed in Chapter 25 Climate Change and Greenhouse Gas Emissions.

The effects of implementation of Alternatives A, B, and C on water supply reliability are evaluated below.

6.5.2 Evaluation Criteria and Significance Thresholds

Significance criteria represent the thresholds that were used to identify whether an impact would be significant. For the purposes of this analysis, an alternative would result in a significant impact on water supply reliability if it would result in the following:

- A decrease in average annual CVP or SWP deliveries of greater than one percent with implementation of Alternatives A, B, and C, when compared to deliveries associated with the No Project/No Action Alternative.

A significance criterion value of one percent was selected to avoid consideration of minor fluctuations in model output due to simulation techniques.

No significance determination was made for the comparison of Alternatives A, B, and C CVP and SWP deliveries with Existing Conditions. Inherent in the differences in CVP and SWP deliveries between Alternatives A, B, and C and Existing Conditions are the differences in assumptions between the No Project/No Action Alternative and Existing Conditions. There are significant differences in key assumptions relating to increase in demands and build-out of facilities associated with CVP contracts (particularly M&I contract deliveries in the American River Basin), Level 2 supplies for wildlife refuges, increase in non-project water rights in the American River Basin, and new urban water intakes/Delta export facilities between the No Project/No Action Alternative and Existing Conditions, as described in Section 6.3.2.1. The differences in CVP and SWP deliveries between the No Project/No Action Alternative and Existing Conditions that are attributed to the differences in key assumptions are shown in Tables 6-37 and 6-38. Because the differences in CVP and SWP deliveries for Alternatives A, B, and C, when compared to Existing Conditions, are attributed to the differences in key assumptions between the

No Project/No Action Alternative and Existing Conditions and not the Project, it is not appropriate to make a significance determination for these comparisons.

6.5.2.1 Impact Assessment Methodology

CVP and SWP water supply allocations and the ability to divert from the south Delta intakes are determined in accordance with federal and State regulations. Factors that affect CVP and SWP water supply availability include CVP and SWP reservoir storage and Delta outflow requirements. CVP and SWP water supply allocations are calculated based upon current year hydrologic conditions and resultant reservoir storage. Overall, there are many factors that are considered in the determination of CVP and SWP deliveries and Delta exports.

For the purpose of this analysis, CVP and SWP water supply reliability was evaluated as a function of only CVP and SWP service area deliveries. The analysis of changes in CVP and SWP water service area deliveries compares simulated water supply conditions based upon CALSIM II results.

As discussed previously, there would be some changes between Existing Conditions and the No Project/No Action Alternative, such as a 2009 level of demand for Existing Conditions and a 2030 level of demand for the No Project/No Action Alternative. The level of demand change is one of several changes associated with implementation of the No Project/No Action Alternative. Refer to Section 6.3.2.1 for a more detailed discussion of key changes between Existing Conditions and the No Project/No Action Alternative, which are reflected in the modeling results.

Water supply reliability was evaluated based upon comparisons of CVP and SWP total annual water deliveries associated with Alternatives A, B, and C, when compared to the No Project/No Action Alternative, and is presented below. Water supply reliability is presented, but not evaluated, for Existing Conditions for total annual water deliveries and regional water deliveries. Regional water deliveries are also presented, but not evaluated, for the No Project/No Action Alternative.

6.5.2.2 Evaluation Results

<u>CVP Contract Deliveries</u>

Alternatives A, B, and C Compared to Existing Conditions

Table 6-118 shows the differences between Alternatives A, B, and C and Existing Conditions for annual CVP deliveries for the hydrologic regions within the Extended Study Area by water service type. It presents data for averages over the long-term and combined Dry and Critical water years averages.

Table 6-118
Annual CVP Deliveries (TAF)[a]
Alternatives A, B, and C Compared to Existing Conditions

Region and Delivery Type		Average (Annual)	EXC (TAF)	Change from Existing Conditions		
				Alternative A (TAF/%)	Alternative B (TAF/%)	Alternative C (TAF/%)
Sacramento River Hydrologic Region						
CVP Settlement	Contract Delivery	Long-Term[b]	1,908	35 (2%)	31 (2%)	34 (2%)
		Dry and Critical[c]	1,895	37 (2%)	28 (2%)	37 (2%)
CVP Refuge Level 2	Contract Delivery	Long-Term	129	30 (23%)	29 (22%)	32 (24%)
		Dry and Critical	115	26 (22%)	25 (21%)	27 (23%)
Refuge Level 4	Supply from acquisitions	Long-Term	10	16 (160%)	16 (160%)	15 (150%)

Table 6-118
Annual CVP Deliveries (TAF)[a]
Alternatives A, B, and C Compared to Existing Conditions

Region and Delivery Type		Average (Annual)	EXC (TAF)	Change from Existing Conditions: Alternative A (TAF/%)	Alternative B (TAF/%)	Alternative C (TAF/%)
		Dry and Critical	10	16 (165%)	15 (158%)	15 (158%)
	Supply from NODOS	Long-Term	0	1 (0%)	1 (0%)	2 (0%)
		Dry and Critical	0	0 (0%)	1 (0%)	1 (0%)
CVP M&I	Contract Delivery	Long-Term	85	127 (151%)	126 (149%)	128 (151%)
		Dry and Critical	74	101 (136%)	101 (135%)	102 (136%)
CVP Ag	Contract Delivery (does not include Settlement contractors)	Long-Term	223	-1 (0%)	-7 (-3%)	-1 (0%)
		Dry and Critical	112	-9 (-8%)	-14 (-13%)	-10 (-8%)
San Joaquin River Hydrologic Region (not including Friant-Kern and Madera Canal water users)						
CVP Exchange	Contract Delivery	Long-Term	852	0 (0%)	0 (0%)	0 (0%)
		Dry and Critical	814	0 (0%)	0 (0%)	0 (0%)
CVP Refuge Level 2	Contract Delivery	Long-Term	281	-20 (-7%)	-20 (-7%)	-20 (-7%)
		Dry and Critical	267	-18 (-7%)	-18 (-7%)	-18 (-7%)
Refuge Level 4	Supply from acquisitions	Long-Term	62	-10 (-16%)	-32 (-52%)	-34 (-55%)
		Dry and Critical	59	6 (10%)	-6 (-11%)	-6 (-11%)
	Supply from NODOS	Long-Term	0	35	56	58
		Dry and Critical	0	17	30	29
CVP M&I	Contract Delivery	Long-Term	16	0 (0%)	0 (0%)	0 (0%)
		Dry and Critical	13	0 (0%)	0 (0%)	0 (0%)
CVP Ag	Contract Delivery (does not include Exchange contractors)	Long-Term	289	7 (2%)	-1 (0%)	4 (1%)
		Dry and Critical	148	-1 (-1%)	-9 (-6%)	-5 (-3%)
San Francisco Bay Hydrologic Region						
CVP M&I	Contract Delivery	Long-Term	225	66 (29%)	65 (29%)	66 (29%)
		Dry and Critical	224	95 (43%)	94 (42%)	95 (42%)
CVP Ag	Contract Delivery	Long-Term	35	2 (3%)	1 (1%)	1 (2%)
		Dry and Critical	18	0 (2%)	-1 (-4%)	0 (0%)
Tulare Lake Hydrologic Region (not including Friant-Kern Canal water users)						
CVP Refuge Level 2	Contract Delivery	Long-Term	15	-3 (-21%)	-3 (-21%)	-3 (-21%)
		Dry and Critical	14	-3 (-21%)	-3 (-21%)	-3 (-21%)
Refuge Level 4	Supply from acquisitions	Long-Term	12	0 (0%)	-5 (-42%)	-6 (-50%)
		Dry and Critical	11	5 (41%)	1 (11%)	2 (16%)
	Supply from NODOS	Long-Term	0	8	14	14
		Dry and Critical	0	4	7	7
CVP Ag	Contract Delivery (includes Cross Valley Canal)	Long-Term	600	12 (2%)	-4 (-1%)	6 (1%)
		Dry and Critical	307	0 (0%)	-17 (-6%)	-8 (-3%)
Total For All Regions						
Total CVP Supplies	Contract Delivery (Settlement, Ag, M&I and Refuges from CVP and NODOS – does not include Refuge Level 4 supply from acquisitions)	Long-Term	4,659	298 (6%)	288 (6%)	319 (7%)
		Dry and Critical	4,001	251 (6%)	222 (6%)	255 (6%)

Table 6-118
Annual CVP Deliveries (TAF)[a]
Alternatives A, B, and C Compared to Existing Conditions

Region and Delivery Type	Average (Annual)	EXC (TAF)	Change from Existing Conditions		
			Alternative A (TAF/%)	Alternative B (TAF/%)	Alternative C (TAF/%)

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Notes:

Ag = Agricultural
CVP = Central Valley Project
EXC = Existing Conditions
M&I = Municipal and Industrial
TAF = thousand acre-feet

Annual Long-Term Averages

Over the long-term averages, the total annual average CVP deliveries for all hydrologic regions show that increases of 288,000 to 319,000 acre-feet (six to seven percent) would occur for the three alternatives, when compared to Existing Conditions.

Over the long-term averages, the three alternatives show that increases in annual CVP M&I Service deliveries would occur in the Sacramento River and San Francisco Bay hydrologic regions.

Over the long-term averages, CVP M&I Service deliveries would increase substantially in the Sacramento River (by more than 125,000 acre-feet or 150 percent on average) and San Francisco Bay hydrologic regions (by 65,000 acre-feet or 29 percent on average) for the three alternatives, when compared to Existing Conditions. Average annual deliveries for CVP settlement contractors in the Sacramento River Hydrologic Region would increase from 31,000 to 35,000 acre-feet for the three alternatives, when compared to Existing Conditions.

Over the long-term averages, annual CVP Ag Service deliveries show that both positive and negative changes would occur in the four hydrologic regions for the three alternatives, when compared to Existing Conditions. The average annual deliveries for the CVP Exchange Contractors in the San Joaquin River Hydrologic Region would remain the same for the three alternatives, when compared to Existing Conditions.

If Alternative B is implemented, annual CVP Ag Service deliveries would decrease in the Sacramento River Hydrologic Region (by 7,000 acre-feet or three percent), in the San Joaquin River Hydrologic Region (by 1,000 acre-feet or less than one percent) and in the Tulare Lake Hydrologic Region (by 4,000 acre-feet or one percent).

If Alternatives A and C are implemented, annual CVP Ag Service deliveries would decrease in the Sacramento River Hydrologic Region (by 1,000 acre-feet) and San Joaquin River Hydrologic Region (by 7,000 and 4,000 acre-feet, or two and one percent, respectively).

Over the long-term averages, Wildlife Refuge Level 2 deliveries would increase (by 29,000 to 32,000 acre-feet or more than 20 percent) in the Sacramento River Hydrologic Region. However, Wildlife Refuge Level 2 deliveries would decrease in the San Joaquin River Hydrologic Region (by

20,000 acre-feet or seven percent) and in the Tulare Lake Hydrologic Region (by 3,000 acre-feet or 21 percent).

Over the long-term averages, Wildlife Refuge Level 4 supplies for Alternatives A, B, and C would increase, when compared to Existing Conditions. The Project would provide up to 2,000 acre-feet in the Sacramento River Hydrologic Region, up to 58,000 acre-feet in the San Joaquin River Hydrologic Region, and up to 14,000 acre-feet in the Tulare Lake Hydrologic Region. Water acquisitions to meet the Wildlife Refuge Level 4 supply goals would be reduced as the substitute supply from the Project becomes available, but total Wildlife Refuge Level 4 supplies would increase.

Annual Dry and Critical Years Averages

Over the Dry and Critical water years averages, the total annual average CVP deliveries for all hydrologic regions show that increases of 222,000 to 255,000 acre-feet (six to seven percent) would occur for the three alternatives, when compared to Existing Conditions.

Over the Dry and Critical water years averages, the three alternatives show that increases in annual CVP M&I Service deliveries would occur in the Sacramento River and San Francisco Bay hydrologic regions.

Over the Dry and Critical water years averages, CVP M&I Service deliveries would increase substantially in the Sacramento River (by more than 100,000 acre-feet or 135 percent on average) and San Francisco Bay hydrologic regions (by approximately 95,000 acre-feet or 42 percent on average) for the three alternatives. Over the Dry and Critical water years averages, annual CVP Ag Service deliveries show that positive and negative changes would occur in the four hydrologic regions for the three alternatives. CVP settlement contractors' deliveries in the Sacramento River Hydrologic Region would increase from 28,000 to 37,000 acre-feet for the three alternatives, when compared to Existing Conditions.

If Alternative B is implemented, annual Dry and Critical water years averages for CVP Ag Service deliveries would decrease in the San Francisco Bay Hydrologic Region (by 1,000 acre-feet or four percent) and in the Tulare Lake Hydrologic Region (by 17,000 acre-feet or six percent).

If Alternatives A, B, and C are implemented, annual Dry and Critical water years averages for CVP Ag Service deliveries would decrease in the Sacramento River Hydrologic Region (by 9,000 to 14,000 acre-feet or 8 to 13 percent) and San Joaquin River Hydrologic Region (by 1,000 to 9,000 acre-feet or one to six percent). Deliveries for the CVP Exchange Contractors in the San Joaquin River Hydrologic Region would remain the same for the three alternatives, when compared to Existing Conditions.

If Alternative C is implemented, annual Dry and Critical water years averages for CVP Ag Service deliveries would decrease in the Tulare Lake Hydrologic Region (by 8,000 acre-feet or three percent).

Over the Dry and Critical water years averages, Wildlife Refuge Level 2 deliveries would increase noticeably (by 25,000 to 27,000 acre-feet or more than 20 percent) in the Sacramento River Hydrologic Region. However, Wildlife Refuge Level 2 deliveries would decrease in the San Joaquin River Hydrologic Region (by 18,000 acre-feet or seven percent) and in the Tulare Lake Hydrologic Region (by 3,000 acre-feet or 21 percent).

Over the Dry and Critical water years averages, Wildlife Refuge Level 4 supplies for the Alternatives A, B, and C would increase, when compared to Existing Conditions. The Project would provide up to 1,000 acre-feet in the Sacramento River Hydrologic Region, up to 30,000 acre-feet in the San Joaquin

River Hydrologic Region, and up to 7,000 acre-feet in the Tulare Lake Hydrologic Region. Water acquisitions to meet the Wildlife Refuge Level 4 supply goals would be reduced as the substitute supply from the Project becomes available.

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-119 shows total annual CVP deliveries for Alternatives A, B, and C, when compared to the No Project/No Action Alternative for averages over the long term as well as Dry and Critical water years averages.

Table 6-119
Annual CVP Deliveries (TAF)[a]
Alternatives A, B and C Compared to the No Project/No Action Alternative

Region and Delivery Type		Average (Annual)	NPA/NAA (TAF)	Change from No Project/No Action Alternative		
				Alternative A (TAF/%)	Alternative B (TAF/%)	Alternative C (TAF/%)
Sacramento River Hydrologic Region						
CVP Settlement	Contract Delivery	Long-Term[b]	1,934	9 (0%)	5 (0%)	8 (0%)
		Dry and Critical[c]	1,918	14 (1%)	5 (0%)	14 (1%)
CVP Refuge Level 2	Contract Delivery	Long-Term	155	4 (3%)	3 (2%)	6 (4%)
		Dry and Critical	137	4 (3%)	3 (2%)	5 (4%)
Refuge Level 4	Supply from acquisitions	Long-Term	27	-1 (-4%)	-1 (-4%)	-2 (-7%)
		Dry and Critical	25	0 (0%)	-1 (-2%)	-1 (-2%)
	Supply from NODOS	Long-Term	0	1 (0%)	1 (0%)	2 (0%)
		Dry and Critical	0	0 (0%)	1 (0%)	1 (0%)
CVP M&I	Contract Delivery	Long-Term	211	1 (1%)	0 (0%)	2 (1%)
		Dry and Critical	174	1 (0%)	1 (0%)	2 (1%)
CVP Ag	Contract Delivery (does not include Settlement contractors)	Long-Term	213	9 (5%)	3 (1%)	9 (5%)
		Dry and Critical	93	10 (11%)	5 (5%)	9 (10%)
San Joaquin River Hydrologic Region (not including Friant-Kern and Madera Canal water users)						
CVP Exchange	Contract Delivery	Long-Term	852	0 (0%)	0 (0%)	0 (0%)
		Dry and Critical	814	0 (0%)	0 (0%)	0 (0%)
CVP Refuge Level 2	Contract Delivery	Long-Term	261	0 (0%)	0 (0%)	0 (0%)
		Dry and Critical	249	0 (0%)	0 (0%)	0 (0%)
Refuge Level 4	Supply from acquisitions	Long-Term	86	-34 (-40%)	-56 (-65%)	-58 (-67%)
		Dry and Critical	82	-17 (-21%)	-29 (-36%)	-29 (-36%)
	Supply from NODOS	Long-Term	0	35	56	58
		Dry and Critical	0	17	30	29
CVP M&I	Contract Delivery	Long-Term	16	0	0	0
		Dry and Critical	13	0	0	0
CVP Ag	Contract Delivery (does not include Exchange contractors)	Long-Term	290	6 (2%)	-2 (-1%)	3 (1%)
		Dry and Critical	137	10 (7%)	2 (1%)	6 (4%)
San Francisco Bay Hydrologic Region						
CVP M&I	Contract Delivery	Long-Term	290	1 (0%)	0 (0%)	1 (0%)
		Dry and Critical	318	1 (0%)	0 (0%)	1 (0%)
CVP Ag	Contract Delivery	Long-Term	36	1 (2%)	0 (0%)	0 (1%)
		Dry and Critical	17	1 (10%)	0 (0%)	1 (7%)

Table 6-119
Annual CVP Deliveries (TAF)[a]
Alternatives A, B and C Compared to the No Project/No Action Alternative

Region and Delivery Type		Average (Annual)	NPA/ NAA (TAF)	Change from No Project/No Action Alternative		
				Alternative A (TAF/%)	Alternative B (TAF/%)	Alternative C (TAF/%)
Tulare Lake Hydrologic Region (not including Friant-Kern Canal water users)						
CVP Refuge Level 2	Contract Delivery	Long-Term	12	0 (0%)	0 (0%)	0 (0%)
		Dry and Critical	11	0 (0%)	0 (0%)	0 (0%)
Refuge Level 4	Supply from acquisitions	Long-Term	20	-8 (-40%)	-13 (-65%)	-14 (-70%)
		Dry and Critical	20	-4 (-20%)	-7 (-37%)	-7 (-34%)
	Supply from NODOS	Long-Term	0	8	14	14
		Dry and Critical	0	4	7	7
CVP Ag	Contract Delivery (includes Cross Valley Canal)	Long-Term	599	13 (2%)	-3 (-1%)	7 (1%)
		Dry and Critical	283	24 (9%)	7 (3%)	16 (6%)
Total For All Regions						
Total CVP Supplies	Contract Delivery (Settlement, Ag, M&I and Refuges from CVP and NODOS – does not include Refuge Level 4 supply from acquisitions)	Long-Term	4,868	89 (2%)	79 (2%)	110 (2%)
		Dry and Critical	4,164	88 (2%)	59 (1%)	92 (2%)

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Notes:

Ag = Agricultural
CVP = Central Valley Project
M&I = Municipal and Industrial
NPA/NAA = No Project/No Action Alternative
TAF = thousand acre-feet

Annual Long-Term Averages

Over the long-term averages, the total annual CVP deliveries for all hydrologic regions show that increases of 79,000 to 110,000 acre-feet (two percent) would occur for the three alternatives, when compared to the No Project/No Action Alternative. Thus, implementation of Alternative A, B or C would result in a **potentially beneficial effect** to total annual CVP deliveries, when compared to the No Project/No Action Alternative**.**

Over the long-term averages, annual CVP M&I Service deliveries show that either no change or minor increases (at most 1 percent) would occur in the four hydrologic regions, when compared to the No Project/No Action Alternative.

Over the long-term averages, annual CVP Ag Service deliveries show that positive and negative changes would occur in the four hydrologic regions for the three alternatives, when compared to the No Project/No Action Alternative. Annual deliveries for the CVP settlement contractors in the Sacramento River Hydrologic Region for the three alternatives would increase slightly from 5,000 to 9,000 acre-feet, and annual deliveries for the CVP Exchange Contractors in the San Joaquin River Hydrologic Region for the three alternatives would remain the same, when compared to the No Project/No Action Alternative.

Over the long-term averages, CVP Ag Service deliveries would increase in the Sacramento River Hydrologic Region (by 3,000 to 9,000 acre-feet or one to five percent) for the three alternatives.

If Alternative B is implemented, annual CVP Ag Service deliveries would decrease in the San Joaquin River Hydrologic Region (by 2,000 acre-feet or one percent) and in the Tulare Lake Hydrologic Region (by 3,000 acre-feet or one percent[2]).

If Alternatives A and C are implemented, annual CVP Ag Service deliveries would increase in San Joaquin River Hydrologic Region (by 3,000 to 6,000 acre-feet or one to two percent), San Francisco Bay Hydrologic Region (by 1,000 acre-feet or two percent), and the Tulare Lake Hydrologic Region (by 7,000 to 13,000 acre-feet or one to two percent).

Over the long-term averages, Wildlife Refuge Level 2 deliveries would increase in only the Sacramento River Hydrologic Region (by 3,000 to 6,000 acre-feet or two to four percent) for the three alternatives.

Over the long-term averages, Wildlife Refuge Level 4 supplies for the Alternatives A, B, and C would be the same, when compared to the No Project/No Action Alternative. The Project would provide up to 2,000 acre-feet in the Sacramento River Hydrologic Region, up to 58,000 acre-feet in the San Joaquin River Hydrologic Region, and up to 1,000 acre-feet in the Tulare Lake Hydrologic Region. Water acquisitions to meet the Wildlife Refuge Level 4 supply goals would be reduced as the substitute supply from the Project becomes available. The total Wildlife Refuge Level 4 supplies from both acquisitions and the Project would be the same as for the No Project/No Action Alternative.

Annual Dry and Critical Years Averages

Over the Dry and Critical water years averages, the total annual CVP deliveries for all hydrologic regions show that increases of 59,000 to 92,000 acre-feet (one to two percent) would occur for the three alternatives, when compared to the No Project/No Action Alternative. Thus, implementation of Alternative A, B, or C would result in a **potentially beneficial effect** to total annual CVP deliveries, when compared to the No Project/No Action Alternative.

Over the Dry and Critical water years averages, annual CVP M&I Service show either no change or minor increases (at most one percent) in the four hydrologic regions for the three alternatives, when compared to the No Project/No Action Alternative.

Over the Dry and Critical water years averages, annual CVP Ag Service deliveries show that either no change or noticeable increases would occur for the three alternatives, when compared to the No Project/No Action Alternative. Annual Dry and Critical water years averages for CVP settlement contractors deliveries in the Sacramento River Hydrologic Region for the three alternatives would increase slightly from 5,000 to 14,000 acre-feet, and annual Dry and Critical water years averages for the CVP Exchange Contractors deliveries in the San Joaquin River Hydrologic Region for the three alternatives would remain the same, when compared to the No Project/No Action Alternative.

If either Alternative A or C is implemented, annual Dry and Critical water years averages for CVP Ag Service deliveries would increase (by 45,000 acre-feet or nine percent for Alternative A and by 32,000 acre-feet or six percent for Alternative C) for the four hydrologic regions. If Alternative B is implemented, annual Ag Service deliveries would increase (by 14,000 acre-feet or three percent) in the Sacramento River, San Joaquin River, and Tulare Lake hydrologic regions.

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[2] Table 6-119 shows a decrease of one percent due to rounding.

Over the Dry and Critical water years averages, annual Wildlife Refuge Level 2 deliveries would increase in only the Sacramento River Hydrologic Region (by 3,000 to 5,000 acre-feet or two to four percent) for the three alternatives, when compared to the No Project/No Action Alternative.

Over the Dry and Critical water years averages, Wildlife Refuge Level 4 supplies for the Alternatives A, B, and C would be the same, when compared to No Project/No Action Alternative. The Project would provide up to 1,000 acre-feet in the Sacramento River Hydrologic Region, up to 30,000 acre-feet in the San Joaquin River Hydrologic Region, and up to 7,000 acre-feet in the Tulare Lake Hydrologic Region. Water acquisitions to meet the Wildlife Refuge Level 4 supply goals would be reduced as the substitute supply from the Project becomes available. The total Wildlife Refuge Level 4 supplies from both acquisitions and the Project would be the same as for the No Project/No Action Alternative.

SWP Contract Deliveries

Alternatives A, B, and C Compared to Existing Conditions

Table 6-120 shows total annual SWP deliveries for Alternatives A, B, and C and Existing Conditions for averages over the long term as well as Dry and Critical water years averages.

Table 6-120
Annual SWP Regional Deliveries (TAF)[a]
Alternatives A, B and C Compared to Existing Conditions

Region and Delivery Type		Average (Annual)	EXC (TAF)	Change from Existing Conditions		
				Alternative A (TAF/%)	Alternative B (TAF/%)	Alternative C (TAF/%)
Sacramento River Hydrologic Region						
SWP FRSA	Contract Delivery	Long-Term[b]	948	2 (0%)	2 (0%)	0 (0%)
		Dry and Critical[c]	899	2 (0%)	2 (0%)	-4 (0%)
SWP M&I	Contract Delivery	Long-Term	24	0 (0%)	0 (0%)	0 (0%)
		Dry and Critical	17	1 (9%)	1 (9%)	2 (12%)
San Joaquin River Hydrologic Region (not including Friant-Kern and Madera Canal water users)						
SWP Ag	Contract Delivery (including Article 21)	Long-Term	4	0 (0%)	0 (0%)	0 (0%)
		Dry and Critical	3	0 (0%)	0 (0%)	0 (0%)
San Francisco Bay Hydrologic Region						
SWP M&I	Contract Delivery (including Article 21, includes transfers to SWP contractors)	Long-Term	190	18 (9%)	19 (9%)	19 (10%)
Central Coast Hydrologic Region						
SWP M&I	Contract Delivery	Long-Term	45	1 (2%)	1 (2%)	1 (3%)
		Dry and Critical	35	1 (1%)	0 (0%)	1 (3%)
Tulare Lake Hydrologic Region (not including Friant-Kern Canal water users)						
SWP M&I	Contract Delivery	Long-Term	87	1 (1%)	1 (1%)	2 (2%)
		Dry and Critical	62	6 (9%)	6 (9%)	8 (11%)
SWP Ag	Contract Delivery (including Article 21)	Long-Term	695	-6 (-1%)	-4 (-1%)	-2 (0%)
		Dry and Critical	492	26 (5%)	23 (5%)	34 (7%)
South Lahontan Hydrologic Region						
SWP M&I	Contract Delivery (including Article 21)	Long-Term	261	19 (7%)	20 (8%)	20 (8%)
		Dry and Critical	220	7 (3%)	5 (2%)	10 (5%)

Table 6-120
Annual SWP Regional Deliveries (TAF)[a]
Alternatives A, B and C Compared to Existing Conditions

Region and Delivery Type		Average (Annual)	EXC (TAF)	Change from Existing Conditions		
				Alternative A (TAF/%)	Alternative B (TAF/%)	Alternative C (TAF/%)
South Coast Hydrologic Region						
SWP M&I	Contract Delivery (including Article 21, includes transfers to SWP contractors)	Long-Term	1,305	110 (8%)	114 (9%)	116 (9%)
		Dry and Critical	1,047	85 (8%)	74 (7%)	98 (9%)
SWP Ag	Contract Delivery (including Article 21)	Long-Term	9	0 (0%)	0 (0%)	0 (0%)
		Dry and Critical	6	1 (9%)	0 (0%)	1 (10%)
Total For All Regions						
Total SWP Supplies	Contract Delivery (FRSA, Ag, and M&I from SWP and NODOS)	Long-Term	3,568	144 (4%)	152 (4%)	156 (4%)
		Dry and Critical	2,938	131 (4%)	114 (4%)	155 (5%)

[a]Based on CALSIM-II modeling over an 82-year simulation period.
[b]Long-Term is the average quantity for the period of October 1921 through September 2003.
[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Notes:
Ag = Agricultural
EXC = Existing Conditions
FRSA = Feather River Service Area
M&I = Municipal and Industrial
SWP = State Water Project
TAF = thousand acre-feet

Annual Long-Term Averages

Over the long-term averages, total annual deliveries to all hydrologic regions show that an increase of 144,000 to 156,000 acre-feet (four to five percent) would occur, when compared to Existing Conditions for the three alternatives. Alternatives B and C, with the larger 1.81-MAF reservoir size, would show annual delivery increases that are larger than those for Alternative A.

Over the long-term averages, substantial annual M&I Service delivery increases would be in the San Francisco Bay (by 18,000 to 19,000 acre-feet or 9 to 10 percent), South Lahontan (by 19,000 to 20,000 acre-feet or seven to eight percent), and South Coast hydrologic regions (by 110,000 to 116,000 acre-feet or eight to nine percent), when compared to Existing Conditions for the three alternatives.

Over the long-term averages, annual Ag Service deliveries show that no change would occur, except for decreases in the Tulare Lake Hydrologic Region with implementation of Alternative A (by 6,000 acre-feet or one percent) and Alternative B (by 4,000 acre-feet or one percent).

Annual Dry and Critical Years Averages

Over the Dry and Critical water years averages, total deliveries for all hydrologic regions show that an increase of 114,000 to 155,000 acre-feet (four to five percent) would occur, when compared to Existing Conditions for the three alternatives. Both Alternative A and C, which include the Delevan Pipeline Intake Facilities (diversion and release conveyance), have larger total annual delivery increases despite the reservoir size difference, when compared to Alternative B, which includes the release-only Delevan Pipeline Discharge Facility.

Over the Dry and Critical water years averages, substantial annual M&I Service delivery increases would be in the South Coast (by 74,000 to 98,000 acre-feet or seven to nine percent), Tulare Lake (by 6,000 to 8,000 acre-feet or 9 to 11 percent), and South Lahontan (by 5,000 to 10,000 acre-feet or two to five percent) hydrologic regions.

Over the Dry and Critical water years averages, the Tulare Lake Hydrologic Region shows that a large change in Ag Service deliveries would occur (by 23,000 to 34,000 acre-feet or five to seven percent), where current Ag Service deliveries are fairly substantial (492,000 acre-feet per year for Existing Conditions) in that region.

Alternatives A, B, and C Compared to the No Project/No Action Alternative

Table 6-121 shows total annual SWP deliveries for Alternatives A, B, and C and the No Project/No Action Alternative for averages over the long-term as well as Dry and Critical water years averages.

Table 6-121
Annual SWP Regional Deliveries (TAF)[a]
Alternatives A, B and C Compared to the No Project/No Action Alternative

Region and Delivery Type		Average (Annual)	NPA/ NAA (TAF)	Change from No Project/No Action Alternative		
				Alternative A (TAF/%)	Alternative B (TAF/%)	Alternative C (TAF/%)
Sacramento River Hydrologic Region						
SWP FRSA	Contract Delivery	Long-Term[b]	950	0 (0%)	0 (0%)	-2 (0%)
		Dry and Critical[c]	901	0 (0%)	0 (0%)	-6 (-1%)
SWP M&I	Contract Delivery	Long-Term	23	1 (6%)	1 (6%)	1 (7%)
		Dry and Critical	16	2 (16%)	2 (15%)	3 (19%)
San Joaquin River Hydrologic Region (not including Friant-Kern and Madera Canal water users)						
SWP Ag	Contract Delivery (including Article 21)	Long-Term	4	0 (0%)	0 (0%)	0 (0%)
		Dry and Critical	3	0 (0%)	0 (0%)	0 (0%)
San Francisco Bay Hydrologic Region						
SWP M&I	Contract Delivery (including Article 21, includes transfers to SWP contractors)	Long-Term	199	9 (5%)	10 (5%)	10 (5%)
		Dry and Critical	142	18 (13%)	17 (12%)	21 (15%)
Central Coast Hydrologic Region						
SWP M&I	Contract Delivery	Long-Term	44	2 (5%)	2 (5%)	2 (5%)
		Dry and Critical	31	5 (14%)	4 (14%)	5 (17%)
Tulare Lake Hydrologic Region (not including Friant-Kern Canal water users)						
SWP M&I	Contract Delivery	Long-Term	84	4 (5%)	4 (5%)	5 (5%)
		Dry and Critical	60	8 (14%)	8 (14%)	10 (17%)
SWP Ag	Contract Delivery (including Article 21)	Long-Term	658	31 (5%)	33 (5%)	35 (5%)
		Dry and Critical	460	58 (13%)	55 (12%)	66 (14%)
South Lahontan Hydrologic Region						
SWP M&I	Contract Delivery (including Article 21)	Long-Term	267	13 (5%)	14 (5%)	14 (5%)
		Dry and Critical	197	30 (15%)	28 (14%)	33 (17%)
South Coast Hydrologic Region						
SWP M&I	Contract Delivery (including Article 21, includes transfers to	Long-Term	1,353	62 (5%)	66 (5%)	68 (5%)
		Dry and Critical	990	142 (14%)	131 (13%)	155 (16%)

Table 6-121
Annual SWP Regional Deliveries (TAF)[a]
Alternatives A, B and C Compared to the No Project/No Action Alternative

Region and Delivery Type		Average (Annual)	NPA/ NAA (TAF)	Change from No Project/No Action Alternative: Alternative A (TAF/%)	Alternative B (TAF/%)	Alternative C (TAF/%)
	SWP contractors)					
SWP Ag	Contract Delivery (including Article 21)	Long-Term	8	1 (5%)	1 (5%)	1 (5%)
		Dry and Critical	6	1 (13%)	0 (0%)	1 (14%)
Total For All Regions						
Total SWP Supplies	Contract Delivery (FRSA, Ag, and M&I from SWP and NODOS)	Long-Term	3,589	123 (3%)	131 (4%)	135 (4%)
		Dry and Critical	2,804	265 (9%)	248 (9%)	289 (10%)

[a]Based on CALSIM-II modeling over an 82-year simulation period.

[b]Long-Term is the average quantity for the period of October 1921 through September 2003.

[c]Dry and Critical Years Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003.

Notes:

Ag = Agricultural
FRSA = Feather River Service Area
M&I = Municipal and Industrial
NPA/NAA =No Project/ No Action Alternative
SWP = State Water Project
TAF = thousand acre-feet

Annual Long-Term Averages

Over the long-term averages, total annual SWP deliveries for all hydrologic regions show that an increase of 123,000 to 135,000 acre-feet (three to four percent) would occur, when compared to the No Project/No Action Alternative for the three alternatives. Because the three alternatives show that increases in total annual SWP deliveries over the long-term averages would occur, implementation of Alternative A, B, or C would result in a **potentially beneficial effect** to total annual SWP deliveries, when compared to the No Project/No Action Alternative.

Deliveries by hydrologic region show that uniform increases would occur, when compared to the No Project/No Action Alternative for the three alternatives.

Over the long-term averages, annual M&I Service deliveries would increase in the San Francisco Bay (by 9,000 to 10,000 acre-feet or five percent), South Lahontan (by 13,000 to 14,000 acre-feet or five percent), and South Coast hydrologic regions (by 62,000 to 68,000 acre-feet or five percent), for the three alternatives, when compared to the No Project/No Action Alternative.

Over the long-term averages, annual Ag Service deliveries show either no change or an increase would occur to all hydrologic regions for the three alternatives, when compared to the No Project/No Action Alternative. Tulare Lake Hydrologic Region shows the largest Ag Service increase (by 31,000 to 35,000 acre-feet or five percent).

Annual Dry and Critical Years Averages

Over the Dry and Critical water years averages, the total annual SWP deliveries to all hydrologic regions show that an increase of 248,000 to 289,000 acre-feet (9 to 10 percent) would occur, when compared to the No Project/No Action Alternative for the three alternatives.

Because the three alternatives show that increases in total annual SWP deliveries over the Dry and Critical water years averages would occur**,** implementation of Alternative A, B, or C would result in a **potentially beneficial effect** to total annual SWP deliveries, when compared to the No Project/No Action Alternative.

Over the Dry and Critical water years averages, annual deliveries by hydrologic region show that greater increases for M&I and Ag Service deliveries would occur, when compared to the No Project/No Action Alternative for the three alternatives.

Over the Dry and Critical water years averages, annual M&I Service deliveries would increase in all hydrologic regions, with an increase in the San Francisco Bay (by 17,000 to 21,000 acre-feet or 12 to 15 percent), South Lahontan (by 28,000 to 33,000 acre-feet or 14 to 17 percent), and South Coast hydrologic regions (by 131,000 to 155,000 acre-feet or 13 to 16 percent), when compared to the No Project/No Action Alternative for the three alternatives.

Over the Dry and Critical water years averages, annual Ag Service would increase, with the largest increase in the Tulare Lake Hydrologic Region (by 55,000 to 66,000 acre-feet or 12 to 14 percent), when compared to the No Project/No Action Alternative for the three alternatives.

If Alternative C is implemented, FRSA deliveries show that a 6,000 acre-feet decrease (one percent[3]) would occur.

6.6 References

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[3] Table 6-121 shows a decrease of one percent due to rounding.

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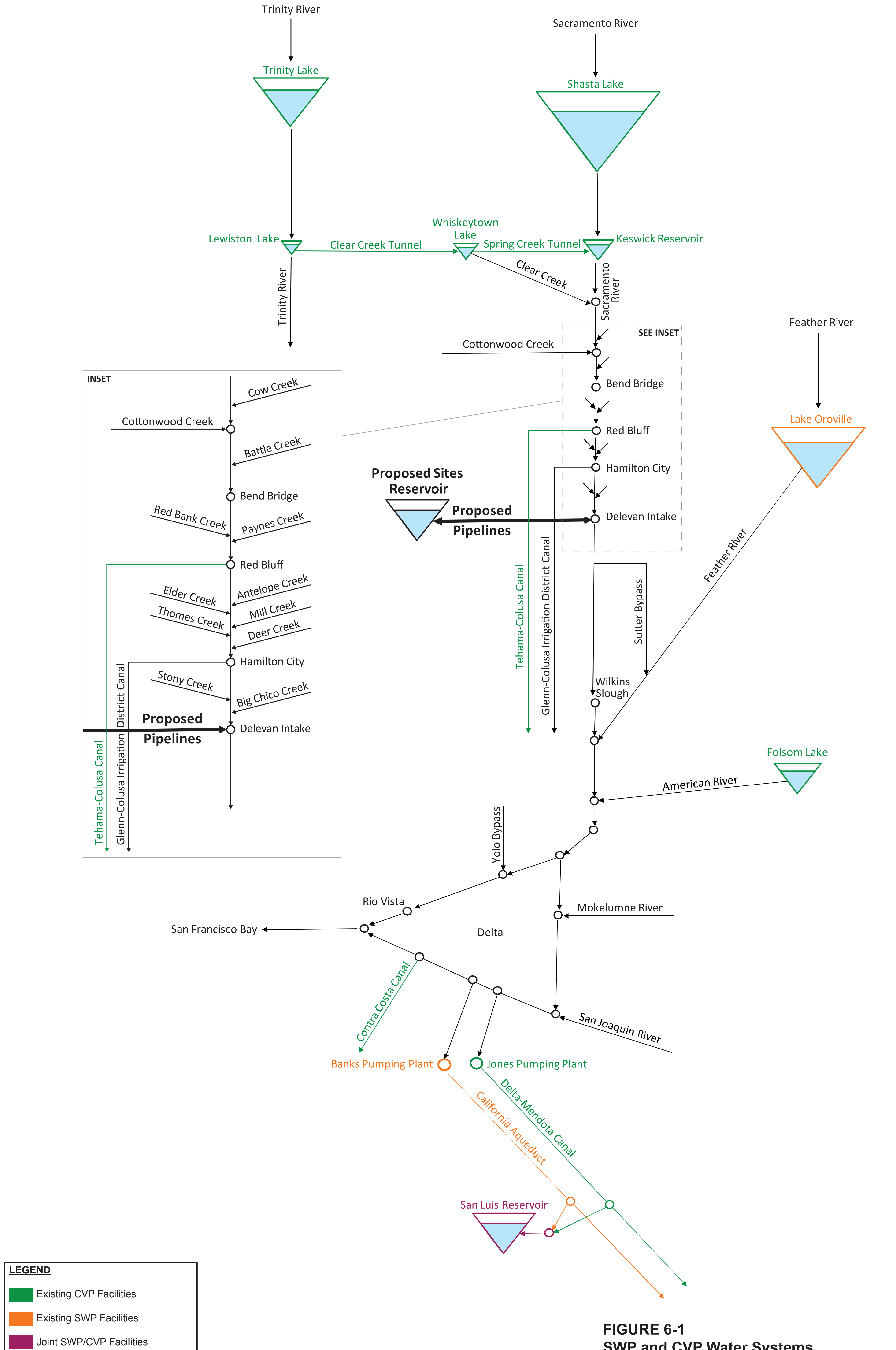
Figures



Note: Not To Scale

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FIGURE 6-1
SWP and CVP Water Systems in the Sacramento Valley
North-of-the-Delta Offstream Storage Project

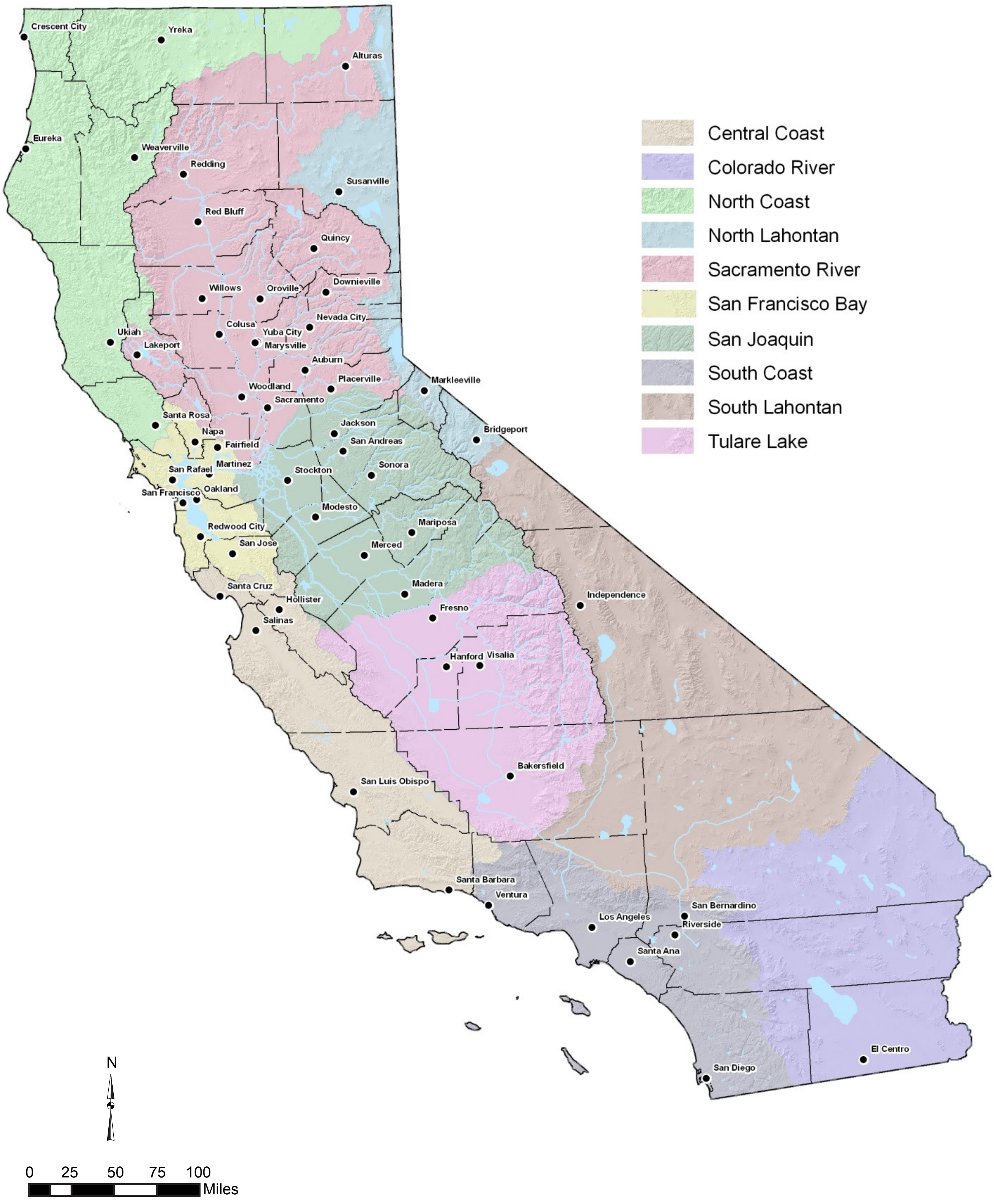

FIGURE 6-2
Hydrologic Regions in California
North-of-the-Delta Offstream Storage Project