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PUBLIC DRAFT

SUBSTITUTE ENVIRONMENTAL DOCUMENT IN SUPPORT OF POTENTIAL CHANGES TO THE WATER QUALITY CONTROL PLAN FOR THE SAN FRANCISCO BAY-SACRAMENTO/SAN JOAQUIN DELTA ESTUARY: SAN JOAQUIN RIVER FLOWS AND SOUTHERN DELTA WATER QUALITY

State Water Resources Control Board
California Environmental Protection Agency
P.O. Box 100
Sacramento, CA 95812-0100
Contact: Mark Gowdy
916.341.5432

WITH ASSISTANCE FROM:

ICF International
630 K Street, Suite 400
Sacramento, CA 95814
Contact: Nicole Williams
916.231.9614

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State of California
Governor Edmund G. Brown Jr.

California Environmental Protection Agency
Matthew Rodriquez, Secretary, Cal EPA

STATE WATER RESOURCES
CONTROL BOARD
P.O. Box 100
Sacramento, CA 95812-0100
(916) 341-5250
http://www.waterboards.ca.gov

Contents

Chapter 1
Introduction

1.1 Introduction

The State Water Resources Control Board (State Water Board) is considering amendments to the 2006 *Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta Estuary* (2006 Bay-Delta Plan). The amendments would establish new flow objectives on the Lower San Joaquin River (LSJR)[1] and its three eastside tributaries[2] for the protection of fish and wildlife beneficial uses, new water quality (salinity) objectives for the protection of agricultural beneficial uses in the southern portion of the Sacramento–San Joaquin Delta (Delta), and a program of implementation to achieve those objectives. The new LSJR flow objectives and southern Delta water quality (SDWQ) objectives and associated program of implementation would replace the existing San Joaquin River (SJR) flow and southern Delta water quality objectives and associated program of implementation in the 2006 Bay-Delta Plan.

The State Water Board is currently conducting a phased evaluation of the 2006 Bay-Delta Plan. Phase I consists of a review and update of the current LSJR flow and southern Delta salinity objectives and associated program of implementation. Phase II consists of review and potential modification to other parts of the 2006 Bay-Delta Plan, including Delta outflows, State Water Project (SWP) and Central Valley Project (CVP) export restrictions, and other requirements in the Bay-Delta to protect fish and wildlife beneficial uses. This substitute environmental document (SED) analyzes environmental impacts associated with Phase I. Environmental impacts associated with Phase II will be evaluated in a separate environmental document. Subsequent Phase III proceedings will consider and assign responsibility for implementing measures to achieve the water quality objectives established in Phase I and Phase II, including changes to water rights or other implementation actions. The State Water Board anticipates preparing an environmental impact report (EIR) to evaluate environmental effects of the changes to water rights that may be required as part of Phase III to implement the amendments to the 2006 Bay-Delta Plan (Phase I and Phase II).

The purpose of this report is to document the State Water Board's analysis of the need for, and effects of, potential changes to the 2006 Bay-Delta Plan to establish new LSJR flow and SDWQ objectives and a program of implementation for those objectives. In addition to other legal requirements, the State Water Board must comply with the requirements of the California Environmental Quality Act (CEQA)[3] when adopting water quality control plans (WQCP). CEQA

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[1] The LSJR is that portion of the San Joaquin River between its confluence with the Merced River and downstream to Vernalis, and its three eastside tributaries include the Stanislaus, Tuolumne, and Merced Rivers.

[2] In this document, the terms "three eastside tributaries", "eastside tributaries" and "major SJR tributaries" all refer to the Merced, Tuolumne, and Stanislaus Rivers.

[3] CEQA's basic purposes are to: 1) inform the decision makers and public about the potential significant environmental effects of a proposed project, 2) identify ways that environmental damage may be mitigated, 3) prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternative or mitigation measures when feasible, and 4) disclose to the public why an agency approved a project if significant effects are involved. (Cal. Code Regs., tit. 14, § 15002, subd. (a).) To fulfill these functions, a CEQA review

Chapter 5
Water Supply, Surface Hydrology, and Water Quality

5.1 Introduction

This chapter describes the environmental setting for water supply, surface hydrology, and water quality and the regulatory setting associated with these resource areas. It also evaluates the environmental impacts on water supply, surface hydrology, and water quality that could result from the Lower San Joaquin River (LSJR) alternatives and southern Delta water quality (SDWQ) alternatives, and, if applicable, offers mitigation measures that would reduce significant impacts.

The discussion and analysis of water supply, surface hydrology, and water quality is for the plan area, which includes: the LSJR, the three eastside tributaries of the LSJR (the Merced, Tuolumne, and Stanislaus Rivers), and the southern Delta. The LSJR and three eastside tributaries drain rainfall runoff and snowmelt from the western slopes of the Sierra Nevada. The operation of the three rim dams and associated major reservoirs on the eastside tributaries influences the flow and water quality in the rivers. These rim dams and reservoirs are New Exchequer Dam and Lake McClure Reservoir on the Merced River, New Don Pedro Dam and Reservoir on the Tuolumne River, and New Melones Dam and Reservoir on the Stanislaus River. This chapter also describes the surface hydrology and water quality of the Upper San Joaquin River (Upper SJR) (upstream of the Merced River confluence), since it flows into the LSJR, influencing flows at Vernalis. However, the Upper SJR is not considered part of the plan area for the purposes of evaluating the LSJR alternatives. Figure 1-1 depicts the San Joaquin River (SJR) Basin and Figure 1-2 depicts the plan area.

This chapter describes the baseline physical conditions and evaluates the expected changes in the baseline related to flows, salinity, temperature, and pollutant concentrations of the LSJR and the three eastside tributaries for the LSJR and SDWQ alternatives. Methodology descriptions and detailed results are presented in Appendix F.1, *Hydrologic and Water Quality Modeling*, and Appendix F.2, *Evaluation of Historical Flow and Salinity Measurements of the Lower San Joaquin River and Southern Delta*.[1] The hydrologic modeling calculated the likely changes in river flows, surface water supply diversions, and flood-control releases that would result from the LSJR alternatives. As presented below, the LSJR alternatives would change the three eastside tributary river flows and the LSJR flows February–June, and have the potential to affect temperatures and pollutant concentrations in the three eastside tributaries and the LSJR, surface water diversions and reservoir operations in these tributaries, and salinity in the LSJR and southern Delta. In addition, because inflow from the LSJR to the Delta would change under the LSJR alternatives, the LSJR alternatives have the potential to alter the Central Valley Project (CVP) and State Water Project (SWP) water exports. The SDWQ alternatives have the potential to result in changes to the number of times the salinity objectives would be violated (as measured at the interior south Delta water quality monitoring stations), and would potentially affect agricultural beneficial uses in the southern Delta

[1] The analyses in Appendix F.1, *Hydrologic and Water Quality Modeling*, and Appendix F.2, *Evaluation of Historical Flow and Salinity Measurements of the Lower San Joaquin River and Southern Delta*, measure salinity (EC) using microSiemens per centimeter (μS/cm). The text in this chapter primarily measures salinity using deciSiemens per meter (dS/m). However, tables may summarize results in μS/cm. The conversion is 1 dS/m = 1000 μS/cm.

5.2.4 Tuolumne River

Unimpaired and Historical Flow

The Tuolumne River flows into the SJR at RM 83, approximately 8 miles upstream of the Stanislaus River confluence and 35 miles downstream of the Merced River. The Tuolumne River is 155 miles long and drains a 1,870 square mile watershed from its headwaters in the Sierra Nevada mountains to its confluence with the SJR, approximately 10 miles west of Modesto. Approximately 52 miles of the river are downstream of La Grange Dam, the furthest downstream impediment to fish passage. Existing dams, water diversions, and downstream minimum flow agreements influence the hydrology of the Tuolumne River. Hetch Hetchy (360 TAF), Cherry Lake (270 TAF) and Lake Eleanor (27 TAF) in the upper Tuolumne River watershed provide hydropower and water supply for San Francisco and other Bay Area cities.

New Don Pedro is the major storage reservoir on the Tuolumne River. The 2.0 MAF reservoir stores water for irrigation, hydroelectric generation, fish and wildlife enhancement, recreation, and flood control (340 TAF for flood control). Water released from the New Don Pedro Dam is impounded and re-regulated by the LaGrange Dam and Reservoir. LaGrange Dam, located 2.5 miles downstream of New Don Pedro, is the diversion point for the Turlock Irrigation District (TID) and Modesto Irrigation District (MID) canals. The Fourth Agreement specifies the storage in New Don Pedro is shared between MID, TID, and CCSF (see Section 5.3.3 of this chapter). CCSF does not divert water directly from Don Pedro but owns the right to store up to 740 TAF in the reservoir, using part of Don Pedro as a water "bank." In the event CCSF needs water has and there is a balance in the water bank, CCSF is permitted by the districts to bypass a lesser flow than that entitled to the districts under the Raker Act (see Section 5.3.1 of this chapter).

The water rights on the Tuolumne River are shared. TID and MID have senior water rights and control more of the river flow in most years. The water right allocation is determined from the daily estimate of the unimpaired flow at La Grange Dam. All of the river flow less than 2,416 cfs belongs to the districts. During the 60-day period April 15–June 14 (peak snowmelt) the flow threshold for the districts is raised to 4,066 cfs (Environmental Defense 2004). In some dry years, very little of the Tuolumne's unimpaired flow belongs to CCSF, and CCSF would have to withdraw from its water bank to meet the Raker Act entitlements.

Figure 5-1 shows two examples of how water rights are divided (on a daily basis) between TID and MID and CCSF. During 1992, only 68 TAF (mostly in April) accrued for CCSF that year (68 TAF is equivalent to 1,143 cfs for 30 days). CCSF asked customers to conserve water and bought additional supplies from the Department of Water Resources' (DWR's) emergency drought water bank. Fortunately, rain and snow returned to the Sierra Nevada in 1993, allowing full water deliveries and replenishing surface storage in the Tuolumne River watershed (including water banked in New Don Pedro) and the Bay Area. The average calculated water rights for CCSF were about 750 TAF/y, about 40 percent of the Tuolumne River unimpaired flow of 1,853 TAF/y for the 1922–2003 period (Environmental Defense 2004). This is higher than the average aqueduct diversion of about 290 TAF/y, so much of this water is stored in New Don Pedro and eventually transferred or spilled during flood-control releases. The current CCSF demand for water is about 290 TAF. (Environmental Defense 2004). This CCSF diversion is therefore about 15 percent of the average unimpaired flow.

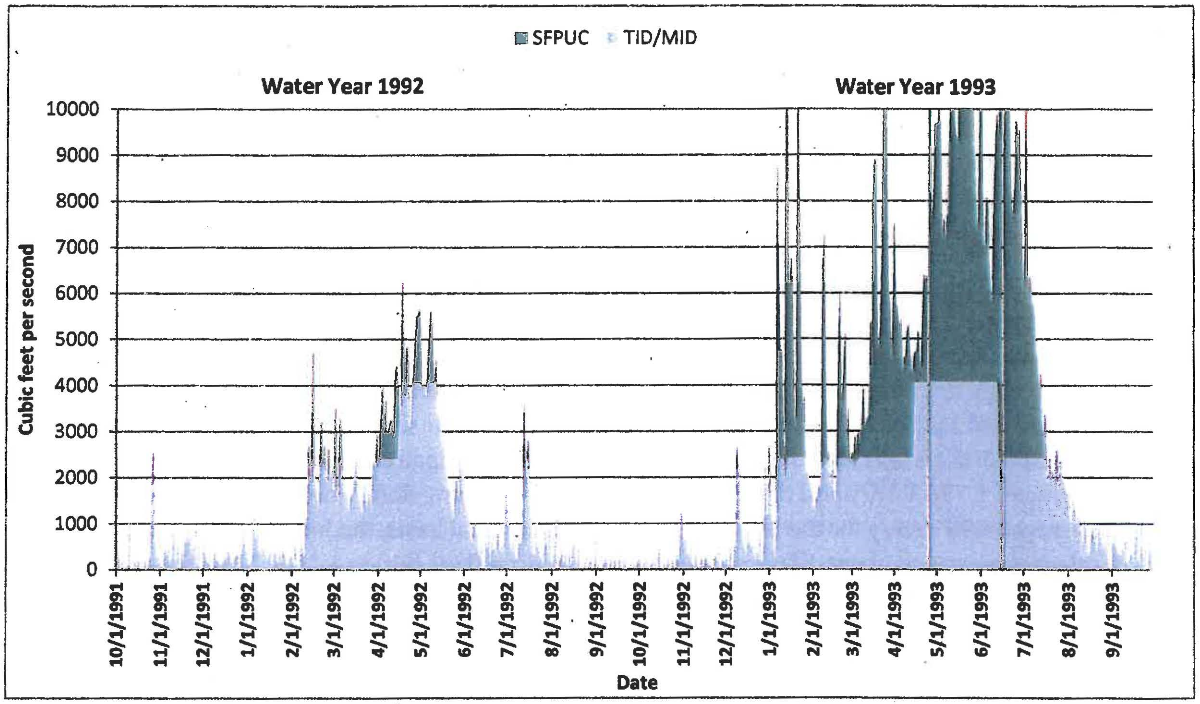

Figure 5-1. Division of Water Rights between Turlock and Modesto Irrigation Districts (TID/MID) and the City and County of San Francisco (CCSF) for 1992 and 1993 (Source: DWR).

The average diversion into TID's canal into Turlock Lake is 575 TAF/y and another 310 TAF/y are diverted to MID's canal into the Modesto Reservoir. These diversions (885 TAF/y) represent about 50 percent of the median unimpaired flow of 1,776 TAF. A total of 1,175 TAF/y are diverted from the Tuolumne River, representing about 65 percent of the average unimpaired runoff. The FERC license (Project Number 2299) for the New Don Pedro Project was amended in 1995 to establish higher release flows on the Tuolumne River below La Grange Dam. Higher flows are required when the runoff is greater. About 95 TAF are allocated on a monthly pattern in the driest years, with a maximum of about 300 TAF allocated in years with higher runoff. Pulse flows were specified for fish attraction to their spawning grounds in October and outmigration in April and May.

Table 5-9a gives the monthly cumulative distribution of Tuolumne River unimpaired flows for 1922–2003. Each month has a range of runoff depending on the rainfall and accumulated snowpack. The peak runoff for the Tuolumne River is observed in May and June, and relatively high runoff (median monthly runoff greater than 2,000 cfs) is observed February–June. The minimum flows are observed in August, September, and October. The median runoff for the February–June period was 2,085 cfs in February, 2,566 cfs in March, 4,498 cfs in April, 7,343 cfs in May, and 5,648 cfs in June. The average Tuolumne River runoff represents about 30 percent of the unimpaired flow at Vernalis. Because 290 TAF/y is diverted upstream of New Don Pedro Reservoir, the average inflow to New Don Pedro is about 1,563 TAF/y (85 percent of the Tuolumne River unimpaired flow).

Table 5-9b gives the monthly cumulative distribution of the historical flows for the Tuolumne River observed at Modesto for the recent period of 1985–2009. The average unimpaired flow for this 25-year period was 1,823 TAF (98 percent of the 1922–2003 average). The release flow requirements changed in 1995, as described above. The average monthly historical flows were about 500 cfs in the summer and fall (July–December), and were 1,000 cfs–2,000 cfs in the winter and spring (January–June). The median historical annual river flow was 361 TAF. The average annual historical flow was 811 TAF, more than 2.25 times the median, suggesting that the majority of the historical flow was the result of flood-control releases in wet years. The average historical flow was about 45 percent of the average unimpaired flow, but the majority of this historical flow was observed in the wet years with flood-control releases. New Don Pedro Reservoir allows considerable carryover storage from one year to the next.

Figure 2-7 shows the monthly unimpaired and the historical Tuolumne River flow at Modesto for the recent 10-year period of water years 2000–2009. The historical monthly flows at Modesto were generally lower than the unimpaired flows in the winter and spring months and were often slightly higher than the unimpaired flows in the late summer and fall months. The peak historical flow was in April and May of 2006 because New Don Pedro Reservoir was nearly full, and the high release flow of 8,000 cfs was for flood-control purposes. The unimpaired flow at New Don Pedro Dam averaged 1,738 TAF/y and the historical releases (including flood flows in 2000, 2005, and 2006) averaged 695 TAF/y for the 10-year period. On an annual basis, the historical La Grange Dam releases averaged about 40 percent of the unimpaired flow, but on a daily basis the releases were usually much less than 40 percent of the unimpaired flow, with flood-control releases providing the majority of the flow below LaGrange Dam.

Table 5-9a. Monthly Cumulative Distributions of Tuolumne River Unimpaired Flow (cfs) for 1922–2003

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Annual (TAF)
Minimum	-	21	55	81	142	379	1,326	1,724	283	166	-	-	383
10%	64	134	219	359	752	1,354	2,719	3,467	1,509	283	52	19	842
20%	87	150	332	529	1,046	1,881	3,136	4,730	2,280	364	104	42	1,055
30%	116	239	423	685	1,216	2,093	3,706	5,620	3,708	559	153	63	1,189
40%	149	284	550	887	1,514	2,358	4,144	6,162	4,850	919	212	85	1,414
50%	178	382	783	1,213	2,085	2,566	4,498	7,343	5,648	1,119	289	125	1,776
60%	193	564	920	1,715	2,496	2,870	4,927	8,071	6,722	1,781	359	165	2,024
70%	254	804	1,322	2,130	2,924	3,449	5,366	8,744	7,468	2,329	447	221	2,176
80%	329	1,153	1,774	2,818	4,034	4,163	5,809	9,355	8,923	3,114	563	294	2,516
90%	609	1,636	3,562	4,224	5,360	5,511	6,473	10,710	10,040	4,942	901	374	3,109
Maximum	2,486	8,765	10,565	16,806	10,718	9,411	11,097	15,617	17,077	10,598	3,337	1,745	4,631
Average	265	807	1,441	2,020	2,586	3,088	4,601	7,258	5,913	2,012	432	205	1,853

cfs = cubic feet per second
TAF = thousand acre-feet

Table 5-9b. Monthly Cumulative Distribution of Historical Tuolumne River Flow (cfs) at Modesto for 1985–2009

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Annual (TAF)
Minimum	135	162	176	154	166	239	271	144	104	97	97	111	134
10%	166	204	193	205	243	260	362	274	115	109	120	121	155
20%	233	227	237	287	266	288	389	412	143	134	142	167	202
30%	251	254	253	369	418	301	538	465	210	198	190	185	264
40%	337	294	314	462	458	353	683	604	248	241	241	222	303
50%	408	317	408	543	474	742	752	734	255	253	264	256	361
60%	579	445	429	643	1,373	1,113	1,006	871	386	330	357	422	550
70%	629	472	457	834	2,467	3,589	1,788	1,359	479	353	444	514	1,112
80%	728	494	745	1,396	3,163	4,746	3,402	2,943	981	503	556	689	1,440
90%	1,098	544	1,765	2,262	5,371	5,524	5,512	4,556	4,262	1,769	996	974	2,273
Maximum	1,794	1,212	4,996	15,498	8,782	6,182	8,264	7,964	5,481	3,291	1,437	2,365	2,399
Average	542	414	735	1,453	1,964	2,041	1,971	1,752	1,047	602	422	498	811

cfs = cubic feet per second
TAF = thousand acre-feet

Dams and Reservoirs

The hydroelectric power plant of New Don Pedro Dam has four units with a combined capacity of 203 MW and a maximum flow of 5,500 cfs (TID and MID 2011). Water released from the New Don Pedro Dam is regulated at La Grange Dam and Reservoir, also the diversion point for the MID and TID canals. A small hydroelectric power plant with a capacity of 4 MW and a maximum flow of 750 cfs is used to release water from the TID canal to the Tuolumne River. Because New Don Pedro turbine capacity is generally greater than the canal diversions and river releases, it is operated for only part of each day (peaking energy); daily fluctuations in flow and water elevation in La Grange Reservoir are normal.

Water Quality

Water quality is generally considered somewhat degraded below Don Pedro Reservoir as a result of agricultural irrigation return flow and some urban and agricultural runoff (CCSF 2008). Total dissolved solids content and turbidity generally increase in a downstream direction (CCSF 2008). The Tuolumne is identified on the 303(d) list for constituents associated with agricultural uses, such as pesticides (chlorpyrifos, diazinon, DDT), EC, and temperature (Table 5-4) (Central Valley Water Board 2009b).

Reservoir operations and changes in river flow attributable to water supply and hydropower generation activities affect some water quality characteristics in the Tuolumne River. Primary among them is water temperature, which may in turn affect DO content. Water temperature in flowing streams depends on the water source, air temperature, flow, surface area, and exposure to solar radiation. Reductions in stream flow when air temperature is high usually result in increases in water temperature. Storage of water in reservoirs may increase or decrease water temperatures. In the warmer months, water temperature increases in a downstream direction as the river leaves the foothills of the Sierra Nevada and flows to the floor of the San Joaquin Valley (CCSF 2008).

EC generally increases as water moves downstream in the Tuolumne River because of the relatively high EC in agricultural drainage and groundwater discharge to the river. The increase in EC is generally greater when the river flow is low. However, near the confluence with the SJR, the measured monthly EC in the Tuolumne River (at Modesto) is still generally low. The Tuolumne River EC values generally have been 0.050–0.300 dS/m (Appendix F.2, *Evaluation of Historical Flow and Salinity Measurements of the Lower San Joaquin River and Southern Delta*).

5.2.5 Stanislaus River

Unimpaired and Historical Flow

Stanislaus River joins the SJR about 3 miles upstream of Vernalis at RM 75 and 8 miles downstream of the Tuolumne River mouth. The Stanislaus River is 161 miles long and drains approximately 1,195 square miles of mountainous and valley terrain. New Melones Reservoir, which is located just downstream of the confluence of the three forks of the Stanislaus River, is the major storage reservoir on this river. It has a storage capacity of about 2.4 MAF. Tulloch Dam and power plant, located 6 miles downstream of New Melones Dam, is part of the Tri-Dam Project, which is a power generation project that includes Donnells and Beardsley Dams, located upstream of New Melones Reservoir. The water released from New Melones Dam (for peaking power) is re-regulated in Tulloch Reservoir. Goodwin Dam is located approximately 2 miles from Tulloch Reservoir, and approximately 59 miles of the Stanislaus River are downstream of Goodwin Dam to the confluence with the LSJR.

South San Joaquin Irrigation District (SSJID), Oakdale Irrigation District (OID), Stockton East Water District (SEWD), and Central San Joaquin Water Conservation District (CSJWCD) divert water from the Stanislaus River at Goodwin Dam. SSJID and OID jointly hold contract rights with USBR to divert 600 TAF when the projected unimpaired flow is greater than 600 TAF. OID and SSJID have an internal agreement to equally divide the available water, each receiving 300 TAF. USBR contracted with SEWD and CSJWCD for delivery of 155 TAF/y. The maximum diversion from the Stanislaus River is therefore 755 TAF/y. This represents about 67 percent of the average unimpaired Stanislaus River runoff of 1,120 TAF/y. The inflow to New Melones is seasonally shifted from the unimpaired flow by the upstream hydropower operations. The annual inflow to New Melones is about the same as the unimpaired runoff because there are no major upstream diversions.

Table 5-10a gives the monthly cumulative distribution of Stanislaus River unimpaired flows for 1922–2003. Each month has a range of runoff depending on the rainfall and accumulated snowpack. The peak runoff for the Stanislaus River is observed in May and June and relatively high runoff (median monthly runoff greater than 1,000 cfs) is observed February–June. The lowest median flows of about 150 cfs are observed in August, September, and October. The median runoff for the February–June period was 1,251 cfs in February, 1,704 cfs in March, 3,247 cfs in April, 4,657 cfs in May, and 2,757 cfs in June. The average Stanislaus River runoff represents about 18 percent of the average unimpaired flow at Vernalis.

Table 5-10b gives the monthly cumulative distribution (range) of the historical flows for the Stanislaus River observed at Ripon for the recent period of 1985–2009. The average unimpaired flow for this 25-year period was 1,081 TAF (97 percent of the 1922–2003 average). The Stanislaus release flow requirements have generally increased during this period. The average monthly historical flows were about 500–600 cfs in the summer and fall (July–December) and were about 850–1,250 cfs January–June. The average annual historical flow was 584 TAF, about 1. 5 times the

5.3 Regulatory Setting

5.3.1 Federal

Relevant federal programs, policies, plans, or regulations related to water supply, surface hydrology, and water quality are described below.

Clean Water Act

The federal CWA (33 U.S.C., § 1251 et seq.) places primary reliance for developing water quality standards on the states (e. g., water quality objectives). The CWA established the basic structure for regulating point and nonpoint discharges of pollutants into the waters of the United States and gave USEPA the authority to implement pollution control programs, such as setting wastewater standards for industry. The statute employs a variety of regulatory and nonregulatory tools to reduce pollutant discharges into waters of the United States, finance municipal wastewater treatment facilities, and manage polluted runoff. The CWA authorizes USEPA to authorize state governments to implement many permitting, administrative, and enforcement aspects of the law, although USEPA still retains oversight responsibilities in many instances. In California, USEPA has authorized the State Water Board to administer the CWA, which is done in conjunction with implementation of the Porter-Cologne Water Quality Control Act (Porter-Cologne Act) (Wat. Code, § 13000 et seq.). The State Water Board is updating the 2006 Bay-Delta Plan in accordance with the CWA.

Clean Water Act Section 303(d)

If the CWA's permit program fails to clean up a river or river segment, states, territories, and authorized tribes are required under CWA Section 303(d) to identify such "impaired waters" under their jurisdiction and list them in order of priority (see Table 5-4). The law requires that states determine TMDLs to monitor and improve water quality for these waters. TMDLs can affect the water quality standards in basin plans by leading to more stringent NPDES permits (CWA, § 402, discussed below). Relevant to the plan area (see Section 5.2.1), the State Water Board and USEPA have approved TMDLs for organic enrichment/low DO and methylmercury in the Delta and for salt and boron in the SJR at Vernalis. The 303(d) pollutant concentrations could be affected by the LSJR alternatives.

Clean Water Act Section 402

Under CWA Section 402, point-source discharges to surface waters are regulated through the NPDES program. In California, the State Water Board oversees the NPDES program, which is administered by the regional water boards. The NPDES program provides both general permits (those that cover a number of similar or related activities and/or for a specific geographic region) and individual permits. As the 2006 Bay Delta Plan is amended, future NPDES permits, established and enforced by the Central Valley Water Board, may be required to incorporate the latest Bay-Delta Plan standards.

Federal Antidegradation Policy

The federal antidegradation policy is designed to provide the level of water quality necessary to protect existing uses and provide protection for higher quality and national water resources. The federal policy directs states to adopt a statewide policy, which California did (see Chapter 19, *Antidegradation Analysis*).

Raker Act

Congress passed the Raker Act in 1913 to protected the water rights of TID and MID on the Tuolumne River. The act apportioned flows on the Tuolumne River and allowed CCSF to construct the O'Shaughnessy Dam. The act requires CCSF to bypass the district entitlements of the lesser of unimpaired flow as measured at La Grange Dam, or 2,416 cfs June 15–April 14 and 4,066 cfs April15–June 14. CCSF is therefore entitled to any remaining portion of the unimpaired flow greater than the district entitlements. The LSJR alternatives would establish flow requirements on the Tuolumne River.

5.3.2 State

Relevant state programs, policies, and regulations related to water supply, surface hydrology, and water quality are described below.

Porter-Cologne Water Quality Control Act of 1969

Under the Porter-Cologne Act, water quality objectives are limits or levels of water quality constituents or characteristics established for the purpose of protecting beneficial uses (e.g., agricultural beneficial uses or wildlife and fish beneficial uses). The act requires the State Water Board and regional water boards to formulate and adopt WQCPs that designate the beneficial uses of the water to be protected and establish water quality objectives and a program to meet the objectives. Water quality objectives under the act are defined as the limits or levels of water quality constituents or characteristics that are established for the reasonable protection of beneficial uses of water or the prevention of nuisance in a specific area. Therefore, the water quality objectives form the regulatory references for meeting state and federal requirements for water quality control.

A change in water quality is allowed only if the change is consistent with the maximum beneficial use of the waters of the state, would not unreasonably affect the present or anticipated beneficial uses, and would not result in water quality lower than that specified in applicable WQCPs (Central Valley Water Board 2009a).

The State Water Board is updating the 2006 Bay-Delta Plan in accordance with the Porter-Cologne Act.

San Francisco Bay/Sacramento–San Joaquin Delta Estuary WQCP (Bay-Delta Plan)

The current WQCP in effect in the Delta is the *2006 Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta Estuary* (2006 Bay-Delta Plan). The 2006 Bay-Delta Plan identifies beneficial uses of water in the Delta to be protected, water quality objectives for the reasonable protection of beneficial uses, and an implementation program to achieve the water quality objectives. For additional information on the 2006 Bay-Delta Plan, see Chapter 1, *Introduction*.

Sacramento River and SJR Basins WQCP (Basin Plan)

The Central Valley Water Board's *Water Quality Plan for the Sacramento and San Joaquin River Basins* (Basin Plan) covers the entire Sacramento and SJR Basins, including an area bound by the crests of the Sierra Nevada on the east and the Coast Range and Klamath Mountains on the west, and extending some 400 miles, from the California-Oregon border southward to the headwaters of the SJR.

The Basin Plan defines the beneficial uses, water quality objectives, implementation programs, and surveillance and monitoring programs. The Basin Plan contains specific numeric water quality objectives that are applicable to certain water bodies or portions of water bodies. Numerical objectives have been established for bacteria, DO, pH, pesticides, EC, total dissolved solids, temperature, turbidity, and trace metals. The Basin Plan also contains narrative water quality objectives for certain parameters that must be attained through pollutant control measures and watershed management. Narrative water quality objectives also serve as the basis for the development of detailed numerical objectives. The Central Valley Water Board would evaluate the update to the 2006 Bay-Delta Plan and incorporate any appropriate changes into the Basin Plan.

State Antidegradation Policy

The goal of State Water Board Resolution No. 68-16 (Statement of Policy with Respect to Maintaining High Quality Waters in California) is to maintain high quality waters where they exist in the state. The State Water Board has interpreted Resolution No. 68-16 to incorporate the federal antidegradation policy, which is applicable if a discharge that began after November 28, 1975, will lower existing surface water quality. (See Chapter 19, *Antidegradation Analysis*, for further discussion.)

Nonpoint Source Pollution Control Program (Water Code Section 13369[a][2][B])

In May 2004, the State Water Board adopted a new policy regulating nonpoint source pollution. The Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program fulfills the requirements of Water Code Section 13369(a)(2)(B). This policy affects landowners and operators throughout the state engaged in agricultural production, timber harvest operations, and other potential sources of nonpoint source pollution.

The policy generally expects nonpoint source dischargers to use management practices that do not impair surface water quality and charges each landowner a fee to cover increased regulatory oversight. Consequently, implementation programs for nonpoint source pollution control have expanded beyond waivers and now may be developed by a regional water board, the State Water Board, individual dischargers, or by a coalition of dischargers in cooperation with a third-party representative, organization, or government agency. The latter programs are collectively known as *third-party programs*, and the third-party role is restricted to entities that are not actual dischargers under regional water board/State Water Board nonpoint source discharge permitting and enforcement jurisdiction.

State Water Board Decision 1641

The Bay-Delta Plan (discussed previously) outlines current water quality objectives for the Delta. State Water Board D-1641 contains the current water right requirements, applicable to DWR and USBR's operations of the CVP and SWP facilities, respectively, to implement the Bay-Delta water quality objectives. D-1641 specifies that, February–June, the location of X2 must be west of Collinsville and must be west of Chipps Island or Port Chicago for a certain number of days each month, depending on the previous month's Eight River Index. D-1641 specifies that compliance with the X2 standard may occur in one of three ways: (1) the daily average EC at the compliance point is less than or equal to 2. 64 dS/m; (2) the 14-day average EC is less than or equal to 2. 64 dS/m; or (3) the 3-day average Delta outflow is greater than or equal to the corresponding minimum outflow. The State Water Board approved the conduct of VAMP for a period of 12 years in lieu of meeting the SJR pulse flow objectives identified in the Bay-Delta Plan and assigned responsibility to USBR for meeting the SJR flow objectives. The State Water Board also approved petitions for water right changes and established the condition for the water rights of various San Joaquin River Group Authority members to provide water for VAMP and the October pulse flow objective. Accordingly, the VAMP flows are considered baseline and are appropriately modeled.

CVP and SWP Coordinated Operations Agreement

CVP and SWP are relatively independent projects that use a common water supply. However, the CVP and SWP operations are linked by the requirement that they meet Delta flow and water quality standards and are linked by joint operations south of the Delta at the San Luis complex and the joint-use San Luis Canal. In 1986, Public Law 99-546 authorized the coordinated operations agreement (COA) between USBR and DWR, intended to define the rights and responsibilities of CVP and SWP with respect to use of that common water supply and provide an infrastructure to monitor those rights and responsibilities. Specifically, the COA defines the project facilities and their water supplies, sets forth procedures for coordination of operations, identifies formulas for sharing joint responsibilities for meeting Delta flow and water quality standards and other legal uses of water, identifies how unstored flow will be shared, sets up a framework for exchange of water and services between the projects, and provides for periodic review every 5 years.

Although implementation of the COA has changed since 1986 as modifications have occurred to the CVP and SWP systems and the operations of those systems have been altered, revisions to the 1986 COA have not been implemented to reflect changes in regulatory standards, operating conditions, and new project features, such as the Environmental Water Account (EWA).

The COA is considered as part of the baseline and is incorporated into the modeling appropriately.

5.3.3 Regional or Local

Relevant regional or local programs, policies, regulations, or agreements related to water supply, surface hydrology, and water quality are described below. Although local policies, plans, or regulations are not binding on the State of California, below is a description of relevant ones.

Fourth Agreement

The Fourth Agreement, between CCSF, TID, and MID (1966), sets forth conditions for CSSF to partially fund the construction of the New Don Pedro Reservoir. Under this agreement, if CCSF is able to bypass flows in excess of TID's and MID's Raker Act entitlements, and then the CCSF "banks" this amount of water, up to a seasonal high of 740 TAF, for later use. If CCSF bypasses less than the two districts Raker Act entitlements, then the CCSF would withdraw water from the water bank; a negative balance (CCSF bank depleted) would require prior agreement with the two irrigation districts. The Fourth Agreement also states that in the event any future changes to the New Don

Pedro FERC water release conditions negatively impact the two irrigation districts, CCSF, MID, and TID would apportion the burden prorated at 51.7121 percent to CCSF and 48.2879 percent to MID and TID. (CCSF/TID/MID 1966.)

5.4 Impact Analysis

This section lists the thresholds used to define impacts on water supply, surface hydrology, and water quality. It describes the methods of analysis and the approach to determine the significance of impacts on water supply, surface hydrology, and water quality. It also identifies impacts that are not evaluated further in the impact discussion. The impact discussion describes the changes to baseline resulting from the alternatives and incorporates the thresholds for determining whether those changes are significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the impact discussion, where appropriate.

5.4.1 Thresholds of Significance

The thresholds for determining the significance of impacts for this analysis are based on the State Water Board's Environmental Checklist in Appendix A of the Board's CEQA regulations (Cal. Code Regs, tit. 23, §§ 3720–3781) and the Environmental Checklist in Appendix G of the State CEQA Guidelines. The thresholds derived from the checklist(s) have been modified, as appropriate, to meet the circumstances of the alternatives. (Cal. Code Regs., tit. 23, § 3777, subd. (a)(2).) Hydrology and water quality impacts were determined to be potentially significant (see Appendix B, *State Water Boards Environmental Checklist* in this SED) and therefore are discussed in the analysis. Impacts would be significant if the LSJR or SDWQ alternatives result in the following conditions.

- Substantially reduce monthly river flow values relative to baseline.
- Substantially alter hydrology such that regulating reservoir operations would be limited.
- Substantially reduce surface water supply diversions caused by a change in river flows or reduce exports to CVP and SWP export service areas caused by a change in river flows.
- Violate water quality objectives for salinity by increasing in the number of months with EC above the water quality objectives for salinity at Vernalis or southern Delta compliance stations.
- Substantially degrade water quality by increasing Vernalis and/or southern Delta salinity (EC) such that agricultural beneficial uses are impaired Substantially increase temperature.
- Substantially degrade water quality by increasing water temperature caused by reduced river flows.
- Substantially degrade water quality by increasing contaminant concentrations caused by reduced river flows.