

Plan Amendment Report, Appendix 1 to the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary

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CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

Division of Water Rights
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**PLAN AMENDMENT REPORT,
APPENDIX 1 TO THE
2006 WATER QUALITY CONTROL PLAN
FOR THE
SAN FRANCISCO BAY/
SACRAMENTO-SAN JOAQUIN
DELTA ESTUARY**

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TABLE OF CONTENTS

LIST OF FIGURES	ii
LIST OF TABLES.....	ii
ACRONYMS AND ABBREVIATIONS.....	iii
I. Introduction	5
II. Background.....	8
A. Relevant Statutory and Regulatory Provisions.....	8
B. Previous State Water Board Actions.....	9
C. 2004 Periodic Review	12
III. Plan Amendment Workshop	14
A. Plan Comparison (1995 Plan vs. 2006 Plan)	14
B. Revised Water Quality Objectives	16
C. Issue Analysis.....	28
1. Changes to Water Quality and Baseline Monitoring Program.....	28
2. Delta Cross Channel Gate Closure.....	33
3. Salmon Protection.....	35
4. Chloride Objectives.....	37
a. Calendar Year Calculation of Compliance with the 150 mg/L Chloride Objective	37
b. Chloride Objectives Compliance Location	38
c. Potential New Municipal and Industrial Objectives	41
5. Delta Outflow	44
6. Export Limits	46
7. River Flows: Sacramento River at Rio Vista	49
8. February-April 14 and May 16-June San Joaquin River Flow Objectives (Spring Flow Objectives)	50
9. 31-Day April 15-May 15 San Joaquin River Pulse Flow Objectives (Pulse Flow Objectives).....	59
10. Southern Delta Electrical Conductivity Objectives for the Protection of Agricultural Beneficial Uses	64
11. Additional issues regarding the 1995 Plan	73
a. Narrative Objective for Brackish Tidal Marshes of Suisun Bay.....	73
b. Dissolved Oxygen Objective (San Joaquin River between Turner Cut & Stockton).....	74
V. California Environmental Quality Act Review.....	77
A. Overview.....	77
B. Environmental Checklist Form	77
1. Project Title	77
2. Lead Agency Name and Address.....	77
3. Contact Person and Phone Number.....	77

4. Project Location.....	77
5. General Plan Designation.....	78
6. Zoning	78
7. Introduction.....	78
8. Environmental Setting	78
9. Project Description	78
10. Earlier Analyses.....	82
11. Other Public Agencies Whose Approval is Required.....	82
12. Environmental Factors Potentially Affected	83
13. Evaluation of Environmental Impacts	84

LIST OF FIGURES

Figure 1: Bay-Delta Estuary.....	6
Figure 2: Sacramento Valley Water Year Hydrologic Classification.....	24
Figure 3: San Joaquin Valley Water Year Hydrologic Classification.....	25
Figure 4: NDOI and Percent Inflow Diverted.....	26

LIST OF TABLES

Table 1: Water Quality Objectives for Municipal and Industrial Beneficial Uses.....	18
Table 2: Water Quality Objectives for Agricultural Beneficial Uses.....	19
Table 3: Water Quality Objectives for Wildlife and Beneficial Uses.....	20
Table 4: Number of Days When Maximum Daily Average Electrical Conductivity of 2.64 mmhos/cm must be Maintained at Specified Location.....	27
Table 5: Interim San Joaquin River Pulse Flows Objectives.....	63
Table 6: San Joaquin Valley 60-20-20 Water Year Hydrologic Classification Numeric Indicators.....	63
Table 7: Water Quality Compliance and Baseline Monitoring.....	30

ACRONYMS AND ABBREVIATIONS

AFRP	Anadromous Fish Restoration Program
AFS	American Fisheries Society
BI	Bay Institute
Board	State Water Resources Control Board
CALFED	aka California Bay Delta Authority
CCWD	Contra Costa Water District
CDWA	Central Delta Water Agency
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
D-1641	Water Rights Decision 1641
D/DBPR	Disinfectants/Disinfection Byproducts Rule
DCC	Delta Cross Channel
DBP	Disinfection by-product
Deltakeeper et. al.	Deltakeeper, California Sportfishing Protection Alliance, San Joaquin Audubon, and Committee to Save the Mokelumne
DFG	California Department of Fish and Game
DO	Dissolved Oxygen
DWR	California Department of Water Resources
DWSC	Deep Water Ship Channel
EC	electrical conductivity
ELPH	Equivalent level of public health
FFF	Northern California/Nevada Federation of Fly Fishers
IEP	Interagency Ecological Program
MAF	million acre-feet
MCL	Maximum contaminant level
mg/L	milligram(s) per liter
mmhos/cm	millimhos per centimeter
NCWA	Northern California Water Association
NDOI	Net Delta Outflow Index
NOAA Fisheries	National Marine Fisheries Service
POD	Pelagic Organism Decline
ppt	parts per thousand
Projects	The Department of Water Resources and the United States Bureau of Reclamation (when acting collectively)
Regional Water Board	Regional Water Quality Control Board
SDIP	South Delta Improvements Program
SDWA	South Delta Water Agency
SEWD	Stockton East Water District
SJEC	San Joaquin River Water Authority, Exchange Contractors
SJRA	San Joaquin River Agreement
SJRG	San Joaquin River Group Authority

SLDMWA	San Luis Delta-Mendota Water Authority
SWC	State Water Contractors
SWP	State Water Project
State Water Board	State Water Resources Control Board
TAF	thousand acre-feet
TMDL	Total Maximum Daily Load
TOC	total organic carbon
µg/l	microgram(s) per liter
USBR	United States Bureau of Reclamation
USCOE	United States Army Corps of Engineers
USDOI	United States Department of the Interior
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VAMP	Vernalis Adaptive Management Plan
WOMT	Water Operations Management Team

References within the text use the above acronyms and abbreviations.

Executive Summary

Following a review of the 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (1995 Plan) pursuant to California Water Code sections 13170 and 13240 and federal Clean Water Act section 303(c)(1) (33 USC § 1313(c)(1)) the State Water Resources Control Board (State Water Board) conducted a workshop to evaluate new information for consideration of new water quality objectives or changes to the objectives specified in the 1995 Plan. Based on the information provided in that workshop and other pertinent information, only minor changes should be made to the 1995 Plan. The changes to the 1995 Plan are contained in the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (2006 Plan). This report summarizes the information and recommendations received by the State Water Board during the review workshop for the 1995 Plan and describes the rationale behind the State Water Board's decision to adopt the 2006 Plan. In addition, this report includes an analysis of the potential environmental impacts of adopting the 2006 Plan, which meets the requirements of section 21080.5 of the California Environmental Quality Act.

The 2006 Plan makes only minor changes to the 1995 Plan. No changes have been made to the beneficial uses. Water quality objective footnotes containing implementation dates have been moved to the program of implementation or, if obsolete, have been deleted. Other water quality objective footnotes have been edited to be consistent with the footnotes in D-1641. Any new implementation dates in the 2006 Plan are specified in the program of implementation with reference to the affected objective. Due to deletions of some footnotes in the 1995 Plan, some of the footnotes in the 2006 Plan have been renumbered.

Because the State Water Board has already implemented the southern Delta electrical conductivity objectives by amending water right permits and licenses pursuant to Decision 1641 (D-1641), footnote 5 of Table 2 of the 1995 Plan (stating that the objectives will be implemented at certain locations by December 31, 1997) is deleted, and the note in Table 2 of the 1995 Plan addressing the southern Delta electrical conductivity objectives (stating that if certain parties have implemented a contract, the Board may revise the objectives) is deleted as well. Footnote 4 of Table 3 applying to the dissolved oxygen objective has been deleted, and the program of implementation has been revised to represent existing regulatory conditions. Additionally, the State Water Board has partially implemented the Western Suisun Marsh salinity objectives pursuant to D-1641. Footnote 7 of Table 3 (stating that the effective date for implementing the salinity objective at Station S-21 (Chadbourne Slough at Sunrise Duck Club) is October 1, 1995) is deleted because the objective has already been implemented at this site pursuant to D-1641. In addition, footnote 8 of Table 3 (stating that the effective date for implementing salinity objectives at Station S-42 (Suisun Slough, 300 feet south of Volanti Slough), Station S-97 (Cordelia Slough at Ibis Club), and Station S-35 (Goodyear Slough at Morrow Island Clubhouse) is also deleted. The salinity objective at Station S-42 has already been implemented pursuant to D-1641. The program of implementation for

the salinity objectives at Stations S-97 and S-35 is revised to allow additional time to investigate the appropriateness of the objectives prior to the objectives becoming effective.

Other changes to the program of implementation include changes to the implementation of the April 15 through May 15 San Joaquin River pulse flow objectives for the protection of fish and wildlife beneficial uses (pulse flow objectives) in Table 3 and changes to the Water Quality and Baseline Monitoring Program (Monitoring Program) in Table 4 of the 1995 Plan (Table 7 of the 2006 Plan). The changes to the implementation of the pulse flow objectives authorize a staged implementation of the objectives to allow for scientific experimentation by conducting the Vernalis Adaptive Management Plan (VAMP) experiment pursuant to the San Joaquin River Agreement to assess whether the pulse flow objectives or alternate objectives are more appropriate. These changes are consistent with the current implementation of the objectives per D-1641.

The changes to the Monitoring Program are changes proposed by the Department of Water Resources and U.S. Bureau of Reclamation to:

- (1) improve the scientific basis for the Monitoring Program and the usefulness of the resulting data by enhancing continuous, comprehensive, and shallow water monitoring , and reducing the spring-neap tidal bias;
- (2) improve Quality Assurance/Quality Control;
- (3) improve monitoring efficiency by consolidating neighboring stations; and
- (4) improve safety.

The changes to the Monitoring Program modify the existing program set forth in Table 4 of the 1995 Plan (Table 7 of the 2006 Plan) and Figure 2 of the 1995 Plan (Figure 7 of the 2006 Plan) to:

- (1) add, reestablish, or move baseline monitoring elements at one compliance monitoring station (D29), seven compliance and baseline stations (C9, C10, D10, D12, D22, D24, and S42), and six baseline monitoring stations (C3, D7, D9, D11, D19, and D41A);
- (2) remove one baseline station (NZ080);
- (3) modify station numbers and descriptions for four baseline monitoring stations (C3, D6, D28A, and P8);
- (4) modify sampling interval description in footnotes to Table 4 of the 1995 Plan (Table 7 of the 2006 Plan) to avoid the spring-neap tide sampling bias; and
- (5) modify the layout in Table 4 of the 1995 Plan (Table 7 of the 2006 Plan) to include geographic coordinates and rearrange table columns to group the continuous monitoring and discrete monitoring activities.

Additional changes to the program of implementation include: (1) a description of upcoming activities by the State Water Board; (2) direction to the Central Valley Regional Water Quality Control Board (Regional Water Board) to carry out certain activities; and (3) recommendations to other agencies regarding performing activities

to assist in achieving the objectives. Further changes include recommendations for studies and other activities to establish adequate scientific information in order to determine if future modifications should be made to the objectives to ensure the protection of the various beneficial uses, and/or to determine how to address certain water quality issues.

The following list summarizes these other changes to the 1995 Plan:

1. The State Water Board recommends additional measures that should be taken by the State Water Board, Central Valley Regional Water Board, and other agencies to assist in achieving the southern Delta salinity objectives. In addition, the State Water Board intends to convene a workshop to discuss undertaking an independent scientific investigation of irrigation salinity needs in the southern Delta (similar to the investigation on which the objectives are based) to provide a current foundation for supporting the objectives or making changes to the objectives in the future based on studies specific to the southern Delta.
2. The State Water Board directs the Central Valley Regional Water Board to continue implementation of the recently adopted *Total Maximum Daily Load for the Sacramento River and San Joaquin River Basins to Control Factors Contributing to Dissolved Oxygen Impairment in the Stockton Deep Water Ship Channel*. In addition, the State Water Board recommends (1) completion of various studies to better understand the sources of oxygen demanding substances and their precursors in the San Joaquin River and (2) completion of a proposed pilot aeration project to increase dissolved oxygen in the Stockton Deep Water Ship Channel.
3. The State Water Board recommends that various agencies continue efforts to meet the narrative salmon protection objective. In addition, the State Water Board will consider ongoing monitoring results to determine what existing and potential measures will achieve the objective and whether the objective should be replaced with a numeric objective in the future.
4. The State Water Board intends to review the Suisun Marsh soil and channel water salinity objectives and the narrative objective for brackish tidal marshes of Suisun Bay following completion of environmental documentation for the Suisun Marsh Plan.
5. The State Water Board recommends that various agencies complete investigations into the pelagic organism decline in the Delta. Following completion of these studies, the State Water Board intends to review any objectives that may be associated with this decline, including but not limited to: Delta outflow objectives, river flow objectives, export limits, and potential new objectives. Under Water Code section 13165, the State Water Board will require state and local agencies to investigate and report on technical factors affecting attainment of these objectives.
6. The State Water Board intends to conduct a workshop on the San Joaquin River spring flow and pulse flow objectives after revisions are made in response to peer review of modeling work by the Department of Fish and Game (DFG) regarding the flow objectives. At that time, the State Water

Board will receive additional scientific information concerning the flow needs on the San Joaquin River and implementation of the flow objectives. Based on that information, the State Water Board may make changes to the objectives, the program of implementation for the objectives, and/or water rights implementing the objectives. In order to provide information during the workshop and future proceedings, the State Water Board recommends that the fisheries agencies (including DFG, the U.S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NOAA Fisheries), in coordination with the Interagency Ecological Program and other interested parties, compile information and conduct studies to determine whether changes should be made to the February through April 14 and May 16 through June San Joaquin River flow objectives to ensure the protection of fish and wildlife beneficial uses. The State Water Board also recommends that the parties to the San Joaquin River Agreement conduct a peer review of the VAMP prior to the workshop discussed below to determine whether changes may be needed to the study design to protect fish and wildlife and to obtain necessary data points.

7. The State Water Board recommends that the CALFED Bay-Delta Program and the Interagency Ecological Program complete studies necessary to determine the appropriateness of re-operating the Delta Cross Channel gate. Once these studies are completed, the State Water Board may undertake proceedings to consider changes to the Delta Cross Channel gate closure objectives.
8. Numerous updates are made to the Recommendations to Improve Habitat Conditions in the program of implementation.

This report is prepared under a regulatory program that has been certified exempt from the requirement for preparing separate environmental documentation, pursuant to Public Resources Code section 21080.5. (See Cal. Code Regs., tit.14, § 15251(g).) This report contains environmental analysis and is a substitute for an Initial Study and Negative Declaration pursuant to the California Environmental Quality Act. This report concludes that none of the changes discussed above has the potential to significantly impact the environment.

I. Introduction

The San Francisco Bay/Sacramento-San Joaquin Delta Estuary and Suisun Marsh (hereinafter collectively referred to as “the Bay-Delta” or “the Delta”) (Figure 1) are located at the confluence of California’s two major river systems, the Sacramento River and San Joaquin River, and the San Francisco Bay. The Delta (as defined in Water Code section 12220) encompasses a combined total of approximately 851,000 acres (of which approximately 135,000 acres consist of waterway, marshland, or other water surfaces) and is one of the country’s largest and most important estuarine systems for fish and waterfowl production on the Pacific Coast. Additionally, the Delta is one of California’s most fertile and important agricultural regions, and its tributary watersheds provide water for about two-thirds of California’s municipal and industrial water users and for some of its most productive agricultural areas statewide.

The State Water Resources Control Board (State Water Board) is responsible for the regulation of activities and factors that may affect the quality of the waters of the State. (Wat. Code, §§13000, 13001.) Pursuant to this authority, on May 22, 1995, the State Water Board adopted the *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (1995 Plan). The State Water Board adopted the 1995 Plan to establish water quality control measures that contribute to the protection of beneficial uses in the Delta.

The California Water Code and the federal Clean Water Act require, respectively, a periodic and a triennial review of water quality objectives or standards under Water Code sections 13170 and 13240 and under section 303(c)(1) of the federal Clean Water Act (33 USC § 1313(c)(1)). In December of 2003 the State Water Board began a review of the objectives included in the 1995 Plan, and in September of 2004 the State Water Board adopted a staff report titled *2004 Staff Report Regarding Periodic Review of the 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (2004 Staff Report). The 2004 Staff Report described the review of the 1995 Plan and identified eleven issues the State Water Board intended to address during a multi-day workshop.

Between October of 2004 and August of 2005, the State Water Board held the multi-day workshop regarding the eleven issues identified in the 2004 Staff Report (Plan Workshop). The State Water Board received a large volume of comments, technical information, and recommendations during the Plan Workshop. Based on the comments, technical information and recommendations received and other available information, the State Water Board has prepared an amended water quality control plan for the Delta.

The amended water quality control plan is referred to as the *2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (2006 Plan). It makes only minor changes to some of the footnotes of the objectives in the 1995 Plan and moves some footnotes to the program of implementation. Please note that these changes resulted in renumbering of footnotes from those in

**FIGURE 1
BAY-DELTA ESTUARY**



the 1995 Plan, and making the footnotes consistent with D-1641, the Decision implementing the 1995 Plan. It also updates the program of implementation in the 1995 Plan, including adding direction and recommendations to other agencies regarding activities that the agencies should take to assist in achieving the objectives. During the Plan Workshop, it became clear that adequate scientific information is not currently available to determine whether changes should be made to the objectives in order to ensure the protection of the various beneficial uses, or to determine how to address certain water quality issues. Accordingly, the program of implementation for the 2006 Plan includes several commitments and recommendations for studies and other activities.

This report contains a brief summary of relevant background information regarding the water quality control planning process, a summary and analysis of the information and recommendations received by the State Water Board regarding each of the eleven issues identified in the 2004 Staff Report, and a description of the rationale behind the State Water Board's decision to adopt the 2006 Plan. The environmental effects of adopting the 2006 Plan are also addressed in this report.

II. Background

A. Relevant Statutory and Regulatory Provisions

The State Water Board is authorized, under Water Code section 13170, to adopt water quality control plans in accordance with the provisions of section 13240 et seq¹. The State Water Board's authority includes, but is not limited to, waters for which water quality standards are required by the federal Clean Water Act. (Wat. Code, § 13170.) Before adopting a water quality control plan pursuant to section 13170, the State Water Board must consider all relevant management agency agreements that are intended to protect a specific beneficial use of water. (Wat. Code, § 13170.1.)

Water quality control policies and plans relevant to the protection of beneficial uses of the Bay-Delta Estuary include: (1) Statement of Policy with Respect to Maintaining High Quality Waters in California (State Water Board Resolution No. 68-16); (2) State Policy for Water Quality Control (adopted by motion on July 6, 1972); (3) Water Quality Control Policy for Enclosed Bays and Estuaries (State Water Board Resolution No. 74-43); (4) Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (State Water Board Resolution No. 75-58); (5) Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (adopted by the State Water Board on September 18, 1975); (6) Policy with Respect to Water Reclamation in California (State Water Board Resolution No. 77-1); (7) Sources of Drinking Water Policy (State Water Board Resolution No. 88-63); (8) Pollutant Policy Document for the San Francisco Bay/Sacramento-San Joaquin Delta (State Water Board Resolution No. 90-67); (9) Water Quality Control Plan, San Francisco Bay Basin (including future changes to this plan as the changes take effect); and (10) Water Quality Control Plans, Central Valley Basin (including future changes to these plans as the changes take effect).

Fundamentally, a water quality control plan consists of establishment, for the waters within a specified area, of the beneficial uses to be protected, water quality objectives, and a program of implementation (Wat. Code § 13050(j)). Pursuant to Water Code section 13241, factors to be considered in establishing water quality objectives include (but are not limited to) all of the following:

- a) Past, present and future beneficial uses of water;
- b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto;
- c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors that affect water quality in the area;
- d) Economic considerations;
- e) The need for developing housing within the region; and
- f) The need to develop and use recycled water.

¹ The State Water Board also has authority to adopt State policy for water quality control under Water Code section 13140.

After a water quality control plan is adopted, the California Water Code and the federal Clean Water Act require, respectively, a periodic and a triennial review of water quality objectives or standards under Water Code sections 13170 and 13240 and under section 303(c)(1) of the federal Clean Water Act (33 USC § 1313(c)(1)). The Secretary for Resources has certified the State Water Board's process for adopting or amending water quality control plans as meeting the requirements of Public Resources Code section 21080.5. (Cal. Code Regs., tit. 14, § 15251(g).) Section 21080.5 authorizes State agencies acting under a certified program to assess the environmental effects of their actions within the decision-making document instead of in a separate environmental impact report or negative declaration. This report contains the information required by section 21080.5. The environmental effects of adopting the 2006 Plan are discussed in Chapter IV of this report.

B. Previous State Water Board Actions

In February 1961, the State Water Rights Board (predecessor to the State Water Board) adopted Water Right Decision 990, which approved water rights for much of the U.S. Bureau of Reclamation's (USBR) Central Valley Project (CVP). The State Water Board did not impose specific water quality requirements as terms and conditions of the CVP permits; however, it did reserve jurisdiction to impose such requirements in the future.

The State Water Board first established water quality requirements for the Delta in May 1967 by setting maximum agricultural salinity levels as terms and conditions in Water Right Decision 1275, which approved water rights for California Department of Water Resources' (DWR) State Water Project (SWP). In response to the concern by the Secretary of the Interior that existing protections for the Delta did not adequately protect municipal, industrial, agricultural, and fishery uses, the State Water Board (newly created by the amalgamation of the State Water Rights Board and the State Water Quality Control Board) adopted a water quality control policy for the Delta through Resolution 68-17 in 1968. This policy supplemented a water quality control policy for the Delta that had been developed by the Central Valley Regional Water Board and adopted by the State Water Board in June 1967. In accordance with a commitment made in Resolution 68-17 to supplement the salinity requirements, the State Water Board adopted Water Right Decision 1379 (D-1379) in July 1971. D-1379, which required the CVP and the SWP to meet standards for non-consumptive fish and wildlife uses in addition to agricultural, municipal, and industrial consumptive uses, was stayed by a court in October 1971 as a result of litigation challenging D-1379.

In 1971, the Regional Water Boards adopted, and the State Water Board approved, interim water quality control plans for the 16 planning basins in the State, including the Delta and Suisun Marsh. These regional water quality control plans marked the completion of the first phase of a comprehensive statewide planning effort. Subsequently, long-term standards for the Delta and Suisun Marsh were established in the regional plans for the Sacramento-San Joaquin Delta Basin and the

San Francisco Bay Basin, which the State Water Board approved in 1975 and 1976, respectively. Meanwhile, in April 1973 the State Water Board adopted a water quality control plan, through Resolution 73-16, which supplemented the State water quality control policies for the Delta.

In August 1978, the State Water Board exercised its reservation of jurisdiction over the water right permits for the CVP and the SWP by adopting Water Right Decision 1485 (D-1485). At the same time, the State Water Board adopted the 1978 Delta Plan. Together the 1978 Delta Plan and D-1485 revised existing standards for flow and salinity in the Delta's channels and ordered USBR and DWR to meet these standards by either reducing pumping, releasing water stored in upstream reservoirs, or both. To address the uncertainty associated with possible future project facilities and the need for additional information on the Bay-Delta Estuary's ecosystem, the State Water Board committed to review the Delta Plan in 10 years.

In 1987, the State Water Board began proceedings to reexamine water quality objectives for the Delta and consider how water right permits would be modified to meet the new objectives for salinity, dissolved oxygen (DO), and temperature. This proceeding ended with the State Water Board's withdrawal of an amended draft water quality control plan. The State Water Board then commenced a new proceeding to address only amendments to the water quality control plan and subsequently adopted the 1991 Plan and submitted it to the U.S. Environmental Protection Agency (USEPA) for approval. In September 1991, the USEPA approved all of the salinity objectives for municipal, industrial, and agricultural beneficial uses, and the DO objective for fish and wildlife beneficial uses. The USEPA disapproved the other fish and wildlife objectives because USEPA found that they would not adequately protect estuarine habitat and other fish and wildlife beneficial uses. As required under federal regulations (40 CFR 131.22), the USEPA initiated promulgation of water quality standards for the Bay-Delta Estuary. In January 1994, the USEPA published draft standards for the Estuary in the Federal Register.

In the summer of 1994, the State and federal agencies with responsibility for management of Bay-Delta resources signed a Framework Agreement to coordinate the parallel State and federal Bay-Delta resource management activities, the Governor's Water Policy Council of the State of California (Council) and the Federal Ecosystem Directorate (FED), comprised of State and federal resource agencies collectively referred to as CALFED². The purpose of the agreement was to establish a comprehensive program for coordination and communication between the Council and the FED regarding environmental protection and water supply dependability in the Bay-Delta Estuary and its watershed.

² In 2000 several State and federal agencies (referred to as the CALFED Agencies) entered into a memorandum of understanding to establish a cooperative mechanism for implementing the CALFED Bay-Delta Program as defined in the CALFED Record of Decision. The state agencies that are CALFED implementing agencies are the State Water Board, the California Environmental Protection Agency, the Resources Agency, DWR, the Department of Fish and Game, and the California Department of Food and Agriculture. The federal CALFED implementing agencies are the Department of Interior, the Department of Agriculture, USBR, the United States Fish and Wildlife Service, the United States Geological Service, the Bureau of Land Management, the National Marine Fisheries Service, the United States Environmental Protection Agency, the Army Corps of Engineers, the Natural Resources Conservation Service, the Forest Service, and the Western Area Power Administration.

In December of 1994, representatives of the State and federal governments and urban, agricultural, and environmental interests agreed on water quality control plan objectives that they would support before the State Water Board and agreed that DWR and USBR would carry out certain implementation measures. This agreement is set forth in the Principles for Agreement on Bay-Delta Standards between the State of California and the Federal Government (Principles Agreement). Because the State Water Board is the regulatory entity responsible for adopting both the water quality control plan and water right changes necessary to implement the water quality control plan, the State Water Board was not a signatory of the Principles Agreement.

Meanwhile, in March of 1994, the State Water Board announced a series of workshops to review the 1991 Plan. After conducting a hearing on February 23, 1995, the State Water Board adopted the 1995 Plan on May 22, 1995. The 1995 Plan is consistent with, but not exactly the same as the contents of the Principles Agreement. In response to a water right change petition filed by DWR and USBR, the State Water Board then adopted Water Right Order 95-6 and subsequently Water Right Order 98-09 that temporarily amended DWR's and USBR's water rights for the SWP and the CVP to be consistent with the 1995 Plan. These orders allowed DWR and USBR to operate the SWP and CVP in accordance with the 1995 Plan while the State Water Board conducted water right proceedings for a water right decision that would implement the 1995 Plan.

The USEPA published its final rule regarding water quality standards for the Bay-Delta Estuary in January of 1995. However, the USEPA agreed in the Principles Agreement that it would withdraw the rule if the State Water Board adopted approvable water quality objectives. In September 1995, the USEPA approved the 1995 Plan based on its determination that the 1995 Plan protects the beneficial uses of the Bay-Delta Estuary and complies with the requirements of the Clean Water Act. By approving the 1995 Plan, the USEPA supplanted its own water quality standards with the standards in the 1995 Plan. (*State Water Resources Control Board Cases* (2006) 136 Cal.App.4th 674,774-775 [39 Cal.Rptr.3d 189]; 33 U.S.C. § 1313(c)(2)(A), (c)(3).)

The State Water Board held a hearing extending over 80 days on the responsibilities of water right holders to implement the objectives in the 1995 Plan and on water right change petitions filed by DWR and USBR. During the period leading up to the hearing and during the hearing, DWR and USBR and their water supply contractors conducted negotiations with a number of parties regarding implementation of the 1995 Plan objectives. Based on the hearing record, the State Water Board adopted Decision 1641 (D-1641) in December of 1999 and subsequently revised D-1641 pursuant to Order WR 2000-02 in March of 2000. D-1641 accepts the contribution that certain parties, through their agreements, will make to meet the flow-dependent water quality objectives in the 1995 Plan, and continues the responsibility of DWR and USBR for the remaining measures to meet the flow-dependent objectives. The decision also expands upon the responsibility of DWR and USBR by requiring implementation of some objectives that were not addressed in orders 95-06 and

98-09. In addition, D-1641 recognizes the San Joaquin River Agreement (SJRA) and approves, for a period of twelve years, the conduct of the VAMP under the SJRA instead of meeting the pulse flow objectives in the 1995 Plan. The decision approves, subject to terms and conditions, the petitioned water right changes needed to conduct the VAMP. In addition, D-1641 acts on DWR's and USBR's change petitions. Since it adopted D-1641, the State Water Board has adopted three additional orders assigning responsibility for meeting the 1995 Plan objectives. These are Order WR 2000-10, assigning responsibility to Bear River water right holders, and Orders WR 2001-05 and 2002-0012, amending Conditions 1 and 2 on page 146 of D-1641, as revised, and staying and then dismissing Phase 8 of the Bay-Delta Hearing.

C. 2004 Periodic Review

The State Water Board began its periodic review of the 1995 Plan on December 10, 2003, by issuing a notice of a public workshop to receive comments from agencies and members of the public regarding any elements of the 1995 Plan that the State Water Board should consider amending. The notice included a list of potential issues prepared by staff. The State Water Board held the public workshop on January 8, 2004 and accepted written comments regarding potential amendments to the 1995 Plan through February 5, 2004.

In September of 2004, the State Water Board adopted the 2004 Staff Report describing the periodic review of the 1995 Plan. The 2004 Staff Report compiled the oral and written comments received during the periodic review into sixteen issues for potential change to the 1995 Plan. These sixteen issues identified potential changes to the objectives contained in Tables I, II, III, and IV and the program of implementation of the 1995 Plan. Of the sixteen issues initially identified, the following issues were found by the State Water Board to merit further review:

- Changes to the Water Quality Compliance and Baseline Monitoring Program
- Delta Cross Channel gates closure
- Salmon protection
- Chloride Objectives, Compliance Location at Contra Costa Canal at Pumping Plant #1, and Potential New Objectives
- Delta Outflow
- Export limits
- River Flows: Sacramento River at Rio Vista
- River Flows: San Joaquin River at Airport Way Bridge, Vernalis: February-April 14 and May 16-June
- San Joaquin River at Airport Way Bridge, Vernalis: 31 day Pulse Flow April 15 – May 15
- Southern Delta electrical conductivity

The 2004 Staff Report stated that the State Water Board would hold a multi-day workshop to receive additional information regarding the aforementioned issues and prepare draft plan amendments or a draft revised plan (as appropriate) for public review. A copy of the 2004 Staff Report is available on the Division of Water Rights' website at www.waterrights.ca.gov/baydelta/final-staff-report_9-30-04.pdf.

III. Plan Amendment Workshop

The State Water Board issued a revised public notice of the Plan Workshop (a multi-day workshop to receive additional information regarding the issues identified in the 2004 Staff Report) on September 17, 2004 and held the workshop between October 27, 2004 and August 31, 2005. Water quality control planning is a quasi-legislative function of the State Water Board, resulting in requirements that are in the nature of regulations. Information received by the State Water Board was posted on the Division of Water Rights' website during the Plan Workshop.

The information submitted in the Plan Workshop has been compiled and is included in the administrative record to the 2006 Plan. During the review of information submitted during the Plan Workshop, State Water Board staff identified additional materials relevant to the issues identified in the 2004 Staff Report. This additional information is also included in the administrative record of the 2006 Plan.

The State Water Board has reviewed the comments, technical information and recommendations received during the Plan Workshop and other available information, and has prepared an amended water quality control plan for the Bay-Delta. Provided below are the versions of Tables 1, 2, 3, and 4 (including footnotes) of the 2006 Plan with changes from the 1995 Plan shown on these tables in strikeout/underline format. Following the tables is an analysis of each of the issues identified for review in the 2004 Staff Report. The analysis of each issue includes a description of the objective associated with the subject issue, background information regarding the subject issue, a summary of the comments and recommendations received regarding the subject issue during the Plan Workshop, and the State Water Board's analysis of and conclusion(s) regarding the subject issue. For the convenience of the readers, rather than standard references, references are specific to the commenting parties' exhibits. These were submitted during the Plan Workshop and can be found at www.waterrights.ca.gov/baydelta/app2_refdocs.html. During the Plan Review, it became evident that certain objectives, other than those identified during the Periodic Review process, warranted updating at this time. The updates to those objectives are also shown in the Tables in strikeout/underline format.

A. Plan Comparison (1995 Plan vs. 2006 Plan)

The following summary is provided to help the reader see at a glance the changes that have been made to the 2006 Plan. The general reason for the change is also noted parenthetically. A number of changes were made for *readability* and to reduce the bulk of the document by moving historical background and detailed explanations to the supporting staff report. These readability changes include changes in numbering of footnotes and tables. *Consistency* changes were made to assure that sections reflect the current physical condition or current regulation.

Chapter I. Introduction

This chapter was revised, summarized, and reorganized. The background section has been streamlined by deleting detailed information from this section of the 1995 Plan and placing it into the amendment report (readability).

A new section D was added describing emerging water quality issues and what the State Water Board plans to do about them: Pelagic Organism Decline; Climate Change; Delta and Central Valley Salinity; and San Joaquin River Flows.

Chapter II. Beneficial Uses

There were no changes to the Beneficial Uses from the 1995 Plan to the 2006 Plan.

Chapter III. Water Quality Objectives

This chapter was edited to make minor changes to the Water Quality Objectives. There are no new water quality objectives to be adopted in the 2006 Plan. The following specific changes have been made:

- Applicability of water quality objectives to specific areas in the Delta has been clarified.
- Section C has been condensed by moving discussion of rationale and implementation of the objectives to the Program of Implementation chapter (readability).
- Table 2 - Footnote 5 and three-party contract notation have been deleted (consistency).
- Table 3 - Footnotes 4, 7, and 8 have been deleted. Footnote 10 (narrative) was moved into the body of Table 3. Footnote 6 was inserted. Most footnotes were renumbered due to the insertion and deletions (consistency and readability).
- Footnote 2 for Table 1 and Footnote 3 for Tables 2 and 3 were renamed as Figure 2 (readability).
- Footnote 17 for Table 3 was renamed as Figure 3 (readability).
- Footnotes 11 and 23 for Table 3 was renamed as Figure 4 (readability).
- Footnote 14 for Table 3 was renamed as Table 4 (readability).

Chapter IV. Program of Implementation

Information in this chapter was updated to make changes in implementation in the 2006 Plan, including but not limited to, implementation measures imposed in D-1641, and Board recommendations to other agencies for the protection of habitat.

Section A – Measures within State Water Board Authority

This section was expanded to include specific implementation measures for the water quality objectives established in the 2006 Plan over which the State Water

Board has direct authority. Many of these objectives are implemented through permit and license terms imposed through D-1641 (consistency).

Section B – Measures Requiring State Water Board Authorities and Actions by Other Agencies.

This section was revised to make current recommendations on other agency programs to reach water quality objectives. State Water Board authority to require that studies are conducted is cited (consistency).

Section C – Recommendations to Improve Habitat Conditions

This section was renamed Recommendations to Other Agencies. Most of the recommendations have been updated to discuss new developments since the release of the 1995 Plan. The sections regarding unscreened water diversions and fish survival at the SWP and CVP export facilities have been moved to the Narrative Objective for Salmon Protection. The section regarding the effectiveness of barriers as a means of improving fish survival in the Delta has been updated and moved to Section E, Other Studies, and can be found under the Delta Cross Channel gate heading. The recommendation regarding temperature control measures to reduce adverse impacts on salmon and steelhead has been deleted. Additional recommendations regarding the San Joaquin River spring flow objective and the San Joaquin River at Airport Way Bridge, Vernalis, River Flow Objective have been added. State Water Board authority to require that recommended studies are conducted is cited (consistency).

Section D – Monitoring and Special Studies Program

Table 4 in 1995 Plan was renamed as Table 7 (readability).

This section was updated to make changes to the Water Quality Compliance and Baseline Monitoring Program. Changes to Table 4 include the addition of GIS coordinates for each location, addition and deletion of stations, and any other changes as proposed by DWR (consistency).

Section E – Other Studies Conducted by Agencies That May Provide Information Relevant to Future Proceedings

This section is new to the Plan. It describes various programs by other agencies that are geared towards obtaining information that may be relevant to future Bay-Delta Water Quality proceedings.

B. Revised Water Quality Objectives

The revised plan clarifies the applicability of water quality objectives to specific areas in the Delta. Per section 13050(h) of the California Water Code, “water quality objectives means the limits or levels of water quality constituents or characteristics

which are established for the reasonable protection of water or the prevention of nuisance *within a specific area* (emphasis added).” Per section 13242, Basin Plans must contain a program of implementation for achieving these water quality objectives that includes, among other things, “a description of the surveillance to be undertaken to determine *compliance* (emphasis added) with objectives.”

Tables 1, 2, and 3 in the Plan provide the water quality objectives applicable to waters of the San Francisco Bay system and the legal Sacramento-San Joaquin Delta. Unless otherwise indicated, water quality objectives for a general area, such as the southern Delta, are applicable for all locations in that general area. The compliance locations indicated in the tables will be used to determine compliance with the objectives. Tables 1, 2, and 3 contain the water quality objectives for the protection of municipal and industrial, agricultural, and fish and wildlife beneficial uses, respectively. Changes to the water quality objectives in the 1995 Plan are shown in the following tables in strikeout/underline format.

Table 1
Water Quality Objectives For Municipal and Industrial Beneficial Uses

COMPLIANCE LOCATIONS	INTERAGENCY STATION NUMBER (RKI [1])	PARAMETER	DESCRIPTION (UNIT)	WATER YEAR TYPE [2]	TIME PERIOD	VALUE
Contra Costa Canal at Pumping Plant #1 -or- San Joaquin River at Antioch Water Works Intake	C-5 (CHCCC06) D12 (near) (RSAN007)	Chloride (Cl)	Maximum mean daily 150 mg/l Cl for at least the number of days shown during the calendar year. Must be provided in intervals of not less than two weeks duration. (Percentage of calendar year shown in parenthesis)			No. of days each calendar year ≤150 mg/l Cl
				W		240 (66%)
				AN		190 (52%)
				BN		175 (48%)
				D		165 (45%)
C		155 (42%)				
Contra Costa Canal at Pumping Plant #1 -and- West Canal at mouth of Clifton Court Forebay -and- Delta-Mendota Canal at Tracy Pumping Plant -and- Barker Slough at North Bay Aqueduct Intake -and- Cache Slough at City of Vallejo Intake [3]	C-5 (CHCCC06) C-9 (CHWST0) DMC-1 CHDMC004 --- (SLSAR3) C-19 (SLCCH16)	Chloride (Cl)	Maximum mean daily (mg/l)	All	Oct-Sep	250

Table 1 Footnotes:

- [1] River Kilometer Index station number.
- [2] The Sacramento Valley 40-30-30 water year hydrologic classification index (see [Figure 2 page 23](#)) applies for determinations of water year type.
- [3] Cache Slough objective to be effective only when water is being diverted from this location

Table 2
Water Quality Objectives For Agricultural Beneficial Uses

COMPLIANCE LOCATIONS	INTERAGENCY STATION NUMBER (RKI [1])	PARAMETER	DESCRIPTION (UNIT) [2]	WATER YEAR TYPE [3]	TIME PERIOD	VALUE
WESTERN DELTA						
Sacramento River at Emmaton	D-22 (RSAC092)	Electrical Conductivity (EC)	Maximum 14-day running average of mean daily EC (mmhos/cm)		0.45 EC	EC from date
					April 1 to date shown	shown to
					Aug 15	Aug 15 [4]
					---	---
					AN	0.63
San Joaquin River at Jersey Point	D-15 (RSAN018)	Electrical Conductivity (EC)	Maximum 14-day running average of mean daily EC (mmhos/cm)		0.45 EC	EC from date
					April 1 to date shown	shown to
					Aug 15	Aug 15 [4]
					---	---
					AN	0.63
San Joaquin River at Terminus	C-13 (RSMKL08)	Electrical Conductivity (EC)	Maximum 14-day running average of mean daily EC (mmhos/cm)		0.45 EC	EC from date
					April 1 to date shown	shown to
					Aug 15	Aug 15 [4]
					---	---
					AN	0.63
San Joaquin River at San Andreas Landing	C-4 (RSAN032)	Electrical Conductivity (EC)	Maximum 14-day running average of mean daily EC (mmhos/cm)		0.45 EC	EC from date
					April 1 to date shown	shown to
					Aug 15	Aug 15 [4]
					---	---
					AN	0.63
San Joaquin River at Airport Way Bridge, Vernalis	C-10 (RSAN112)	Electrical Conductivity (EC)	Maximum 30-day running average of mean daily EC (mmhos/cm)	All	Apr-Aug	0.7
					Sep-Mar	1.0
					-or-	
					-and-	
					-or-	
San Joaquin River at Brandt Bridge site	C-6 (RSAN073)	Electrical Conductivity (EC)	Maximum 30-day running average of mean daily EC (mmhos/cm)	All	Apr-Aug	0.7
					Sep-Mar	1.0
					-or-	
					-and-	
Old River near Middle River [5]	C-8 (ROLD69)	Electrical Conductivity (EC)	Maximum 30-day running average of mean daily EC (mmhos/cm)	All	Apr-Aug	0.7
					Sep-Mar	1.0
Old River at Tracy Road Bridge [5]	P-12 (ROLD59)	Electrical Conductivity (EC)	Maximum 30-day running average of mean daily EC (mmhos/cm)	All	Apr-Aug	0.7
					Sep-Mar	1.0
SOUTHERN DELTA						
West Canal at mouth of Clifton Court Forebay	C-9 (CHWST0)	Electrical Conductivity (EC)	Maximum monthly average of mean daily EC (mmhos/cm)	All	Oct-Sep	1.0
Delta-Mendota Canal at Tracy Pumping Plant	DMC-1 (CHDMC004)	Electrical Conductivity (EC)	Maximum monthly average of mean daily EC (mmhos/cm)	All	Oct-Sep	1.0

Table 2 Footnotes:

[1] River Kilometer Index station number.

[2] Determination of compliance with an objective expressed as a running average begins on the last day of the averaging period. The averaging period commences with the first day of the time period for the applicable objective. If the objective is not met on the last day of the averaging period, all days in the averaging period are considered out of compliance.

[3] The Sacramento Valley 40-30-30 water year hydrologic classification index (see Figure 2 page 23) applies for determinations of water year type.

[4] When no date is shown, EC limit continues from April 1.

[5] The EC objectives shall be implemented at this location by December 31, 1997.

Table 3
WATER QUALITY OBJECTIVES FOR FISH AND WILDLIFE BENEFICIAL USES

COMPLIANCE LOCATIONS	INTERAGENCY STATION NUMBER (RKI [1])	PARAMETER	DESCRIPTION (UNIT) [2]	WATER YEAR TYPE [3]	TIME PERIOD	VALUE	
DISSOLVED OXYGEN							
San Joaquin River between Turner Cut & Stockton	(RSAN050-RSAN061)	Dissolved Oxygen (DO)	Minimum DO (mg/l)	All	Sep-Nov	6.0 [4]	
SALMON PROTECTION							
			narrative			Water quality conditions shall be maintained, together with other measures in the watershed, sufficient to achieve a doubling of natural production of chinook salmon from the average production of 1967-1991, consistent with the provisions of State and federal law.	
SAN JOAQUIN RIVER							
SALINITY							
San Joaquin River at and between Jersey Point and Prisoners Point [45]	D-15 (RSAN018) -and- D-29 (RSAN038)	Electrical Conductivity (EC)	Maximum 14-day running average of mean daily EC (mmhos/cm)	W,AN,BN, D	Apr-May	0.44 [56]	
EASTERN SUISUN MARSH							
SALINITY [6]							
Sacramento River at Collinsville	C-2 (RSAC081)	Electrical Conductivity (EC)	Maximum monthly average of both daily high tide EC values (mmhos/cm), or demonstrate that equivalent or better protection will be provided at the location	All	Oct	19.0	
-and- Montezuma Slough at National Steel	S-64 (SLMZU25)				Nov-Dec	15.5	
-and- Montezuma Slough near Beldon Landing	S-49 (SLMZU11)				Jan	12.5	
					Feb-Mar	8.0	
					Apr-May	11.0	
WESTERN SUISUN MARSH							
SALINITY [6]							
Chadbourne Slough at Sunrise Duck Club	S-21 [7] (SLCBN1)	Electrical Conductivity (EC)	Maximum monthly average of both daily high tide EC values (mmhos/cm), or demonstrate that equivalent or better protection will be provided at the location	All but deficiency period	Oct	19.0	
-and- Suisun Slough, 300 feet south of Volanti Slough	S-42 [8] (SLSUS12)				Nov	16.5	
-and- Cordelia Slough at Ibis Club	S-97 [8] (SLCRD06)				Dec	15.5	
-and- Goodyear Slough at Morrow Island Clubhouse	S-35 [8] (SLGYR03)				Jan	12.5	
-and- Water supply intakes for waterfowl management areas on Van Sickle and Chipps islands	No locations specified				Feb-Mar	8.0	
					Apr-May	11.0	
					Deficiency period [79]	Oct	19.0
						Nov	16.5
						Dec-Mar	15.6
						Apr	14.0
				May	12.5		
BRACKISH TIDAL MARSHES OF SUISUN BAY							
			narrative			[40] Water quality conditions sufficient to support a natural gradient in species composition and wildlife habitat characteristic of a brackish marsh throughout all elevations of the tidal marshes bordering Suisun Bay shall be maintained. Water quality conditions shall be maintained so that none of the following occurs: (a) loss of diversity; (b) conversion of brackish marsh to salt marsh; (c) for animals, decreased population abundance of those species vulnerable to increased mortality and loss of habitat from increased water salinity; or (d) for plants, significant reduction in stature or percent cover from increased water or soil salinity or other water quality parameters.	

Table 3 (continued)
WATER QUALITY OBJECTIVES FOR FISH AND WILDLIFE BENEFICIAL USES

COMPLIANCE LOCATIONS	INTERAGENCY STATION NUMBER (RKI [1])	PARAMETER	DESCRIPTION (UNIT) [2]	WATER YEAR TYPE [3]	TIME PERIOD	VALUE
DELTA OUTFLOW						
		Net Delta Outflow Index (NDOI) [844]	Minimum monthly average [942] NDOI (cfs)	All	Jan	4,500 [1043]
				All	Feb-Jun	[1144]
				W,AN	Jul	8,000
				BN		6,500
				D		5,000
				C		4,000
				W,AN,BN	Aug	4,000
				D		3,500
				C		3,000
				All	Sep	3,000
				W,AN,BN,D	Oct	4,000
				C		3,000
				W,AN,BN,D	Nov-Dec	4,500
				C		3,500
RIVER FLOWS						
Sacramento River at Rio Vista	D-24 (RSAC101)	Flow rate	Minimum monthly average [1245] flow rate (cfs)	All	Sep	3,000
				W,AN,BN,D	Oct	4,000
				C		3,000
				W,AN,BN,D	Nov-Dec	4,500
				C		3,500
San Joaquin River at Airport Way Bridge, Vernalis	C-10 (RSAN112)	Flow rate	Minimum monthly average [1346] flow rate (cfs) [1447]	W,AN	Feb-Apr 14	2,130 or 3,420
				BN,D	and	1,420 or 2,280
				C	May 16-Jun	710 or 1,140
				W	Apr 15-	7,330 or 8,620
				AN	May 15 [1548]	5,730 or 7,020
				BN		4,620 or 5,480
				D		4,020 or 4,880
				C		3,110 or 3,540
				All	Oct	1,000 [1649]
EXPORT LIMITS						
		Combined export rate [1720]	Maximum 3-day running average (cfs)	All	Apr 15- May 15 [1824]	[1922]
			Maximum percent of Delta inflow diverted [2023] [2124]	All	Feb-Jun	35% Delta inflow [2225]
				All	Jul-Jan	65% Delta inflow
DELTA CROSS CHANNEL GATES CLOSURE						
Delta Cross Channel at Walnut Grove	—	Closure of gates	Closed gates	All	Nov-Jan Feb-May 20 May 21- Jun 15	[2326] ---- [2427]

Table 3 Footnotes:

- [1] River Kilometer Index station number.
- [2] Determination of compliance with an objective expressed as a running average begins on the last day of the averaging period. The averaging period commences with the first day of the time period of the applicable objective. If the objective is not met on the last day of the averaging period, all days in the averaging period are considered out of compliance.
- [3] The Sacramento Valley 40-30-30 Water Year Hydrologic Classification Index (see ~~page 23~~ Figure 2) applies unless otherwise specified.
- [4] ~~If it is infeasible for a waste discharger to meet this objective immediately, a time extension or schedule of compliance may be granted, but this objective must be met no later than September 1, 2005.~~
- [45] Compliance will be determined at Jersey Point (station D15) and Prisoners Point (station D29).

- [56] This standard does not apply in May when the best available May estimate of the Sacramento River Index for the water year is less than 8.1 MAF at the 90% exceedance level. [Note: The Sacramento River Index refers to the sum of the unimpaired runoff in the water year as published in the DWR Bulletin 120 for the following locations: Sacramento River above Bend Bridge, near Red Bluff; Feather River, total unimpaired inflow to Oroville Reservoir; Yuba River at Smartville; and American River, total unimpaired inflow to Folsom Reservoir.]
- [6] ~~An exceedance of any of these objectives at a time when it is established through certification by the entity operating the Suisun Marsh Salinity Control Gates that the Gates are being operated to the maximum extent shall not be considered a violation of the objective.~~
- [7] ~~The effective date for objectives for this station is October 1, 1995.~~
- [8] ~~The effective date for objectives for this station is October 1, 1997.~~
- [79] A deficiency period is: (1) the second consecutive dry water year following a critical year; (2) a dry water year following a year in which the Sacramento River Index (described in footnote 56) was less than 11.35; or (3) a critical water year following a dry or critical water year. The determination of a deficiency period is made using the prior year's final Water Year Type determination and a forecast of the current year's Water Year Type; and remains in effect until a subsequent water year is other than a Dry or Critical water year as announced on May 31 by DWR and USBR as the final water year determination.
- [10] ~~Water quality conditions sufficient to support a natural gradient in species composition and wildlife habitat characteristic of a brackish marsh throughout all elevations of the tidal marshes bordering Suisun Bay shall be maintained. Water quality conditions shall be maintained so that none of the following occurs: (a) loss of diversity; (b) conversion of brackish marsh to salt marsh; (c) for animals, decreased population abundance of those species vulnerable to increased mortality and loss of habitat from increased water salinity; or (d) for plants, significant reduction in stature or percent cover from increased water or soil salinity or other water quality parameters.~~
- [844] Net Delta Outflow Index (NDOI) is defined ~~on page 25 in Figure 4.~~
- [942] For the May-January objectives, if the value is less than or equal to 5,000 cfs, the 7-day running average shall not be less than 1,000 cfs below the value; if the value is greater than 5,000 cfs, the 7-day running average shall not be less than 80% of the value.
- [1043] The objective is increased to 6,000 cfs if the best available estimate of the Eight River Index for December is greater than 800 TAF. [Note: The Eight River Index refers to the sum of the unimpaired runoff as published in the DWR Bulletin 120 for the following locations: Sacramento River flow at Bend Bridge, near Red Bluff; Feather River, total inflow to Oroville Reservoir; Yuba River flow at Smartville; American River, total inflow to Folsom Reservoir; Stanislaus River, total inflow to New Melones Reservoir; Tuolumne River, total inflow to Don Pedro Reservoir; Merced River, total inflow to Exchequer Reservoir; and San Joaquin River, total inflow to Millerton Lake.]
- [1144] The minimum daily Delta outflow shall be 7,100 cfs for this period, calculated as a 3-day running average. This requirement is also met if either the daily average or 14-day running average EC at the confluence of the Sacramento and the San Joaquin rivers is less than or equal to 2.64 mmhos/cm (Collinsville station C2). If the best available estimate of the Eight River Index (described in footnote 1043) for January is more than 900 TAF, the daily average or 14-day running average EC at station C2 shall be less than or equal to 2.64 mmhos/cm for at least one day between February 1 and February 14; however, if the best available estimate of the Eight River Index for January is between 650 TAF and 900 TAF, ~~the operations group established under the Framework Agreement~~ Executive Director of the State Water Board shall decide whether this requirement will apply, with any disputes resolved by the CALFED policy group applies. If the best available estimate of the Eight River Index for February is less than 500 TAF, the standard may be further relaxed in March upon the ~~recommendation of the operations group established under the Framework Agreement, with any disputes resolved by the CALFED policy group request of the DWR and the USBR, subject to the approval of the Executive Director of the State Water Board.~~ The standard does not apply in May and June if the best available May estimate of the Sacramento River Index (described in footnote 56) for the water year is less than 8.1 MAF at the 90% exceedance level. Under this circumstance, a minimum 14-day running average flow of 4,000 cfs is required in May and June. Additional Delta outflow objectives are contained in Table ~~4-4.~~
- [1245] The 7-day running average shall not be less than 1,000 cfs below the monthly objective.
- [1346] Partial months are averaged for that period. For example, the flow rate for April 1-14 would be averaged over 14 days. The 7-day running average shall not be less than 20% below the flow rate objective, with the exception of the April 15-May 15 pulse flow period when this restriction does not apply.
- [1447] The water year classification will be established using the best available estimate of the 60-20-20 San Joaquin Valley Water Year Hydrologic Classification (see Figure 3 ~~4-2~~) at the 75% exceedance level. The higher flow objective applies when the 2-ppt isohaline (measured as 2.64 mmhos/cm surface salinity) is required to be at or west of Chipps Island.

- [1548] This time period may be varied based on real-time monitoring. One pulse, or two separate pulses of combined duration equal to the single pulse, should be scheduled to coincide with fish migration in San Joaquin River tributaries and the Delta. ~~The time period for this 31-day flow requirement will be determined by the operations group USBR will schedule the time period of the pulse or pulses in consultation with the USFWS, the NOAA Fisheries, and the DFG. Consultation with the CALFED Operations Group established under the Framework Agreement will satisfy the consultation requirement. The schedule is subject to the approval of the Executive Director of the State Water Board.~~
- [1649] Plus up to an additional 28 TAF pulse/attraction flow during all water year types. The amount of additional water will be limited to that amount necessary to provide a monthly average flow of 2,000 cfs. The additional 28 TAF is not required in a critical year following a critical year. The pulse flow will be scheduled by the ~~operations group established under the Framework Agreement.~~ DWR and the USBR in consultation with the USFWS, the NOAA Fisheries and the DFG. Consultation with the CALFED Operations Group established under the Framework Agreement will satisfy the consultation requirement.
- [1720] Combined export rate for this objective is defined as the Clifton Court Forebay inflow rate (minus actual Byron-Bethany Irrigation District diversions from Clifton Court Forebay) and the export rate of the Tracy pumping plant.
- [1824] This time period may be varied based on real-time monitoring and will coincide with the San Joaquin River pulse flow described in footnote 1518. ~~The operations group established under the Framework Agreement will determine the time period for this 31-day export limit. The DWR and the USBR, in consultation with the USFWS, the NOAA Fisheries and the DFG, will determine the time period for this 31-day export limit. Consultation with the CALFED Operations Group established under the Framework Agreement will satisfy the consultation requirement~~
- [1922] Maximum export rate is 1,500 cfs or 100% of ~~the~~ 3-day running average of San Joaquin River flow at Vernalis, whichever is greater. Variations to this maximum export rate ~~are may be~~ authorized if agreed to by the ~~operations group established under the Framework Agreement.~~ USFWS, the NOAA Fisheries and the DFG. This flexibility is intended to result in no net water supply cost annually within the limits of the water quality and operational requirements of this plan. Variations may result from recommendations of agencies for protection of fish resources, including actions taken pursuant to the State and federal Endangered Species Act. ~~Disputes within the operations group will be resolved by the CALFED policy group.~~ Any agreement on variations will be effective immediately and ~~will be presented upon notice~~ to the Executive Director of the State Water Board SWRCB. If the Executive Director does not object to the variations within 10 days, the variations will remain in effect. The Executive Director of the State Water Board is also authorized to grant short-term exemptions to export limits for the purpose of facilitating a study of the feasibility of recirculating export water into the San Joaquin River to meet flow objectives.
- [2023] Percent of Delta inflow diverted is defined in Figure 4-3. For the calculation of maximum percent Delta inflow diverted, the export rate is a 3-day running average and the Delta inflow is a 14-day running average, except when the CVP or the SWP is making storage withdrawals for export, in which case both the export rate and the Delta inflow are 3-day running averages.
- [2124] The percent Delta inflow diverted values can be varied either up or down. Variations are authorized subject to the process described in footnote 1922.
- [2225] If the best available estimate of the Eight River Index (described in footnote 1043) for January is less than or equal to 1.0 MAF, the export limit for February is 45% of Delta inflow. If the best available estimate of the Eight River Index for January is greater than 1.5 MAF, the February export limit is 35% of Delta inflow. If the best available estimate of the Eight River Index for January is between 1.0 MAF and 1.5 MAF, the ~~DWR and the USBR will set the export limit for February will be set by the operations group within the range of 35% to 45%, after consultation with the USFWS, the NOAA Fisheries and the DFG. Consultation with the CALFED Operations Group established under the Framework Agreement within the range of 35% to 45%. The CALFED policy group will resolve disputes within the operations group will satisfy the consultation requirement.~~
- [2326] For the November-January period, close Delta Cross Channel gates for a total of up to 45 days. The USBR will determine the timing and duration of the gate closure will be determined by the operations group after consultation with the USFWS, the NOAA Fisheries and the DFG. Consultation with the CALFED Operations Group established under the Framework Agreement will satisfy the consultation requirement.
- [2427] For the May 21-June 15 period, close ~~the~~ Delta Cross Channel gates for a total of 14 days. The USBR will determine the timing and duration of the gate closure after consultation with the USFWS, the NOAA Fisheries and the DFG. Consultation with the CALFED Operations Group established under the Framework Agreement will satisfy the consultation requirement. Gate closures shall be based on the need for the protection of fish and will be determined by the operations group established under the Framework Agreement. Variations in the number of days of gate closure are authorized if agreed to by the operations group established under the Framework Agreement. Variations shall result from recommendations from agencies for the protection of fish resources, including actions taken pursuant to the State and federal Endangered Species Acts. The process for approval of variations shall be similar to that described in footnote 1922.

FIGURE 2.

~~FOOTNOTE 2 FOR TABLE 1 AND FOOTNOTE 3 FOR TABLES 2 AND 3~~

Sacramento Valley Water Year Hydrologic Classification

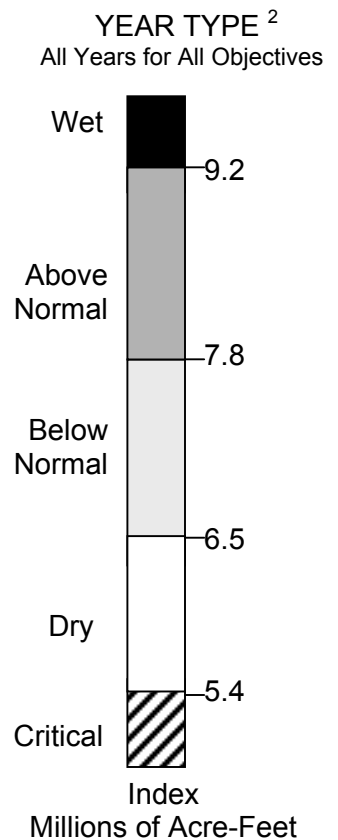
Year classification shall be determined by computation of the following equation:

$$\text{INDEX} = 0.4 * X + 0.3 * Y + 0.3 * Z$$

- Where:
- X = Current year's April – July Sacramento Valley unimpaired runoff
 - Y = Current October – March Sacramento Valley unimpaired runoff
 - Z = Previous year's index¹

The Sacramento Valley unimpaired runoff for the current water year (October 1 of the preceding calendar year through September 30 of the current calendar year), as published in California Department of Water Resources Bulletin 120, is a forecast of the sum of the following locations: Sacramento River above Bend Bridge, near Red Bluff; Feather River, total inflow to Oroville Reservoir; Yuba River at Smartville; American River, total inflow to Folsom Reservoir. Preliminary determinations of year classification shall be made in February, March, and April with final determination in May. These preliminary determinations shall be based on hydrologic conditions to date plus forecasts of future runoff assuming normal precipitation for the remainder of the water year.

<u>Classification</u>	<u>Index Millions of Acre-Feet (MAF)</u>
Wet	Equal to or greater than 9.2
Above Normal	Greater than 7.8 and less than 9.2
Below Normal	Equal to or less than 7.8 and greater than 6.5
Dry	Equal to or less than 6.5 and greater than 5.4
Critical	Equal to or less than 5.4



¹ A cap of 10.0 MAF is put on the previous year's index (Z) to account for required flood control reservoir releases during wet years.
² The year type for the preceding water year will remain in effect until the initial forecast of unimpaired runoff for the current water year is available.

FIGURE 3.

FOOTNOTE 17 FOR TABLE 3

San Joaquin Valley Water Year Hydrologic Classification

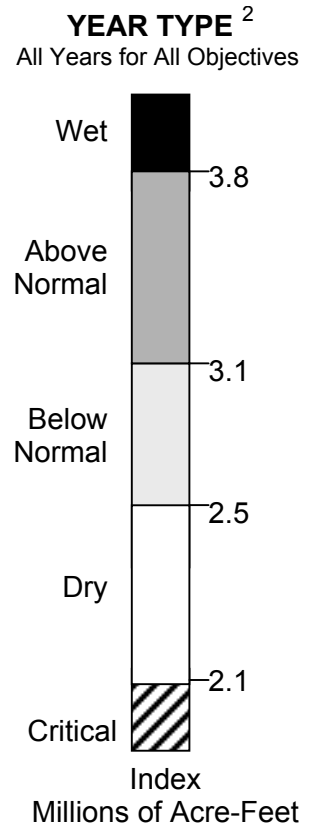
Year classification shall be determined by computation of the following equation:

$$\text{INDEX} = 0.6 * X + 0.2 * Y + 0.2 * Z$$

- Where: X = Current year's April – July
San Joaquin Valley unimpaired runoff
- Y = Current October – March
San Joaquin Valley unimpaired runoff
- Z = Previous year's index¹

The San Joaquin Valley unimpaired runoff for the current water year (October 1 of the preceding calendar year through September 30 of the current calendar year), as published in California Department of Water Resources Bulletin 120, is a forecast of the sum of the following locations: Stanislaus River, total flow to New Melones Reservoir; Tuolumne River, total inflow to Don Pedro Reservoir; Merced River, total flow to Exchequer Reservoir; San Joaquin River, total inflow to Millerton Lake. Preliminary determinations of year classification shall be made in February, March, and April with final determination in May. These preliminary determinations shall be based on hydrologic conditions to date plus forecasts of future runoff assuming normal precipitation for the remainder of the water year.

<u>Classification</u>	<u>Index Millions of Acre-Feet (MAF)</u>
Wet	Equal to or greater than 3.8
Above Normal	Greater than 3.1 and less than 3.8
Below Normal	Equal to or less than 3.1 and greater than 2.5
Dry	Equal to or less than 2.5 and greater than 2.1
Critical	Equal to or less than 2.1



¹ A cap of 4.5 MAF is put on the previous year's index (Z) to account for required flood control reservoir releases during wet years.

² The year type for the preceding water year will remain in effect until the initial forecast of unimpaired runoff for the current water year is available.

FIGURE 4.

FOOTNOTES 11 AND 23 FOR TABLE 3

NDOI and PERCENT INFLOW DIVERTED ¹

The NDOI and the percent inflow diverted, as described in this figure, shall be computed daily by the DWR and the USBR using the following formulas (all flows are in cfs):

$$NDOI = DELTA INFLOW - NET DELTA CONSUMPTIVE USE - DELTA EXPORTS$$

$$PERCENT INFLOW DIVERTED = (CCF + TPP) \div DELTA INFLOW$$

where $DELTA INFLOW = SAC + SRTP + YOLO + EAST + MISC + SJR$

- SAC** = Sacramento River at Freeport mean daily flow for the previous day; the 25-hour tidal cycle measurements from 12:00 midnight to 1:00 a.m. may be used instead.
- SRTP** = Sacramento Regional Treatment Plant average daily discharge for the previous week.
- YOLO** = Yolo Bypass mean daily flow for the previous day, which is equal to the flows from the Sacramento Weir, Fremont Weir, Cache Creek at Rumsey, and the South Fork of Putah Creek.
- EAST** = Eastside Streams mean daily flow for the previous day from the Mokelumne River at Woodbridge, Cosumnes River at Michigan Bar, and Calaveras River at Bellota.
- MISC** = Combined mean daily flow for the previous day of Bear Creek, Dry Creek, Stockton Diverting Canal, French Camp Slough, Marsh Creek, and Morrison Creek.
- SJR** = San Joaquin River flow at Vernalis, mean daily flow for the previous day.

where $NET DELTA CONSUMPTIVE USE = GDEPL - PREC$

- GDEPL** = Delta gross channel depletion for the previous day based on water year type using the DWR's latest Delta land use study.²
- PREC** = Real-time Delta precipitation runoff for the previous day estimated from stations within the Delta.

and where $DELTA EXPORTS$ ³ = $CCF + TPP + CCC + NBA$

- CCF** = Clifton Court Forebay inflow for the current day.⁴
- TPP** = Tracy Pumping Plant pumping for the current day.
- CCC** = Contra Costa Canal pumping for the current day.
- NBA** = North Bay Aqueduct pumping for the current day.

1 Not all of the Delta tributary streams are gaged and telemetered. When appropriate, other methods of estimating stream flows, such as correlations with precipitation or runoff from nearby streams, may be used instead.

2 ~~The DWR is currently developing new channel depletion estimates. If up to date channel depletion estimates are available they shall be used.~~ If these new estimates are not available, DAYFLOW channel depletion estimates shall be used.

3 The term "Delta Exports" is used only to calculate the NDOI. It is not intended to distinguish among the listed diversions with respect to eligibility for protection under the area of origin provisions of the California Water Code.

4 Actual Byron-Bethany Irrigation District withdrawals from Clifton Court Forebay shall be subtracted from Clifton Court Forebay inflow. (Byron-Bethany Irrigation District water use is incorporated into the GDEPL term.)

Table 4. Number of Days When Maximum Daily Average Electrical Conductivity of 2.64 mmhos/cm Must Be Maintained at Specified Location.

FOOTNOTE 14 FOR TABLE 3

TABLE A																	
Number of Days When Maximum Daily Average Electrical Conductivity of 2.64 mmhos/cm Must Be Maintained at Specified Location ^[a]																	
PMI^[b] (TAF)	Chippis Island (Chippis Island Station D10)					PMI^[b] (TAF)	Port Chicago (Port Chicago Station C14) ^[d]					PMI^[b] (TAF)	Port Chicago (Port Chicago Station C14) ^[d]				
	FEB	MAR	APR	MAY	JUN		FEB	MAR	APR	MAY	JUN		FEB	MAR	APR	MAY	JUN
≤ 500	0	0	0	0	0	0	0	0	0	0	0	5250	27	29	25	26	6
750	0	0	0	0	0	250	1	0	0	0	0	5500	27	29	26	28	9
1000	28 ^[c]	12	2	0	0	500	4	1	0	0	0	5750	27	29	27	28	13
1250	28	31	6	0	0	750	8	2	0	0	0	6000	27	29	27	29	16
1500	28	31	13	0	0	1000	12	4	0	0	0	6250	27	30	27	29	19
1750	28	31	20	0	0	1250	15	6	1	0	0	6500	27	30	28	30	22
2000	28	31	25	1	0	1500	18	9	1	0	0	6750	27	30	28	30	24
2250	28	31	27	3	0	1750	20	12	2	0	0	7000	27	30	28	30	26
2500	28	31	29	11	1	2000	21	15	4	0	0	7250	27	30	28	30	27
2750	28	31	29	20	2	2250	22	17	5	1	0	7500	27	30	29	30	28
3000	28	31	30	27	4	2500	23	19	8	1	0	7750	27	30	29	31	28
3250	28	31	30	29	8	2750	24	21	10	2	0	8000	27	30	29	31	29
3500	28	31	30	30	13	3000	25	23	12	4	0	8250	28	30	29	31	29
3750	28	31	30	31	18	3250	25	24	14	6	0	8500	28	30	29	31	29
4000	28	31	30	31	23	3500	25	25	16	9	0	8750	28	30	29	31	30
4250	28	31	30	31	25	3750	26	26	18	12	0	9000	28	30	29	31	30
4500	28	31	30	31	27	4000	26	27	20	15	0	9250	28	30	29	31	30
4750	28	31	30	31	28	4250	26	27	21	18	1	9500	28	31	29	31	30
5000	28	31	30	31	29	4500	26	28	23	21	2	9750	28	31	29	31	30
5250	28	31	30	31	29	4750	27	28	24	23	3	10000	28	31	30	31	30
≤ 5500	28	31	30	31	30	5000	27	28	25	25	4	>10000	28	31	30	31	30

- [a] The requirement for number of days the maximum daily average EC (EC) of 2.64 mmhos per centimeter (mmhos/cm) must be maintained at Chippis Island and Port Chicago can also be met with maximum 14-day running average EC of 2.64 mmhos/cm, or 3-day running average NDOIs of 11,400 cfs and 29,200 cfs, respectively. If salinity/flow objectives are met for a greater number of days than the requirements for any month, the excess days shall be applied to meeting the requirements for the following month. The number of days for values of the PMI between those specified in this table shall be determined by linear interpolation.
- [b] PMI is the best available estimate of the previous month's Eight River Index. (Refer to footnote 10 43 for Table 3 for a description of the Eight River Index.)
- [c] When the PMI is between 800 TAF and 1000 TAF, the number of days the maximum daily average EC of 2.64 mmhos/cm (or maximum 14-day running average EC of 2.64 mmhos/cm, or 3-day running average NDOI of 11,400 cfs) must be maintained at Chippis Island in February is determined by linear interpolation between 0 and 28 days.
- [d] This standard applies only in months when the average EC at Port Chicago during the 14 days immediately prior to the first day of the month is less than or equal to 2.64 mmhos/cm.

C. Issue Analysis

1. Changes to Water Quality and Baseline Monitoring Program

The 1995 Plan includes a Water Quality and Baseline Monitoring Program (also referred to as the Environmental Monitoring Program (EMP)), which is found in the program of implementation and is described in Table 4 of the 1995 Plan (Table 7 in the 2006 Plan). The program currently consists of 47 monitoring and baseline stations in the upper San Francisco Bay-Delta Estuary extending from the Sacramento River at Hood to the San Joaquin River at Vernalis and west to San Pablo Bay. The 1995 Plan states that this is a preliminary compliance program that may be modified by the Interagency Ecological Program (IEP) once the participating agencies and interested parties have fully assessed the new program requirements. Condition 11 (e) on page 149 of D-1641 required the DWR and the USBR to complete an assessment of the EMP every three years to evaluate whether the goals of the monitoring program were being attained. This review was completed in 2003, and based on that review, DWR and the USBR proposed amendments to the EMP due to address issues including safety, tidal bias of sampling, and better identification of monitoring station locations. These changes were considered to be functionally equivalent to the existing program.

Discussion

California Department of Fish and Game (DFG), IEP, and the State Water Contractors (SWC) supported the amendments to the EMP. The SWC stated they rely on the data and therefore it is important that it be as scientifically sound and efficient as possible. The SWC also recommended that the State Water Board approve and implement the proposed changes to Table 4 of the 1995 Plan separate from the rest of the 2006 Plan, and without comprehensive California Environmental Quality Act (CEQA) review. As discussed in this report, there will be no significant impact to the environment by making this change. Therefore, no further CEQA review is necessary for the proposed amendments to the EMP.

South Delta Water Agency (SDWA) did not comment on the proposed amendments to the Water Quality and Baseline Monitoring Program, but did recommend the addition of a compliance and monitoring station in the southern Delta to better protect agricultural beneficial uses in the area. SDWA stated that the additional station is necessary because the current stations provide no data for the area around the east end of Grant Line Canal at the intersection with Salmon Slough and Doughty Cut. The State Water Board may in the future consider adding the proposed station if SDWA submits documentation in support of the station.

At the Plan Workshop, DWR's representative stated that members of the public and various private, federal and State agencies, including the University of California Davis, have completed a comprehensive review of the proposed changes. The DWR stated the changes would benefit the EMP by improving the scientific basis of the information produced.

The proposed amendments will:

- 1.) Enhance continuous monitoring at key locations to better measure the temporal variability in the system,
- 2.) Enhance shallow water monitoring to better measure the spatial variability in the system,
- 3.) Reduce the tidal spring-neap bias that occurs in the current program,
- 4.) Improve the quality assurance and quality control of the program by providing continuous monitoring data that can be used as crosschecks against discrete or periodic sampling data, and
- 5.) Improve employee safety (DWR-03).

Conclusion

Based on the information, materials and comments submitted to the State Water Board during the Plan Workshop, the 2006 Plan makes changes to the Water Quality and Baseline Monitoring Program. Accordingly, Table 4 of the 1995 Plan is updated in the 2006 Plan as follows:

Table 7. Water Quality Compliance and Baseline Monitoring Program

Station Number ¹	Station Description ²	Latitude ³	Longitude ³	Cont. Rec. ^{4a}	Cont. Multi-parameter ^{4b}	Disc. Physical Chemical ^{4c}	Disc. Phytoplankton ^{4d}	Discr. Zooplankton ^{4e}	Discrete Ben-thos ^{4f}
C2 ■	Sacramento River @ Collinsville	<u>38.07395</u>	<u>-121.85010</u>	*					
C3 ▲	Sacramento River @ Hood								
C3A ▲	Sacramento River @ Hood	<u>38.36772</u>	<u>-121.52051</u>		*	*	*	*	
C4 ■	San Joaquin River @ San Andreas Ldg.	<u>38.10319</u>	<u>-121.59128</u>	*					
C5 ■	Contra Costa Canal @ Pumping #1	<u>37.99520</u>	<u>-121.70244</u>	*					
C6 ■	San Joaquin River @ Brandt Bridge site	<u>37.86454</u>	<u>-121.32270</u>	*					
C7 ▲	San Joaquin River @ Mossdale Bridge	<u>37.78604</u>	<u>-121.30666</u>		*				
C8 ■	Old River near Middle River	<u>37.82208</u>	<u>-121.37517</u>	*					
C9 ●	West Canal at mouth of CCForebay Intake	<u>37.8218</u>	<u>-121.55275</u>						*
		<u>37.83075</u>	<u>-121.55703</u>		*	*	*	*	
C10 ●	San Joaquin River near Vernalis	<u>37.67575</u>	<u>-121.26500</u>						
		<u>37.69734</u>	<u>-121.26472</u>		*	*	*	*	
C13 ■	Mokelumne River @ Terminous	<u>38.11691</u>	<u>-121.49888</u>	*					
C14 ■	Sacramento River @ Port Chicago	<u>38.05881</u>	<u>-122.02607</u>	*					
C19 ■	Cache Slough @ City of Vallejo Intake	<u>38.29687</u>	<u>-121.74784</u>	*					
D4 ▲	Sacramento River above Point Sacramento	<u>38.06214</u>	<u>-121.81792</u>			*	*	*	*
D6 ▲	Suisun Bay @ Bulls Head Pt. near Martinez	<u>38.04427</u>	<u>-122.11764</u>			*	*	*	*
D6A ▲	Suisun Bay @ Martinez	<u>38.02762</u>	<u>-122.14052</u>		-				
D7 ▲	Grizzly Bay @ Dolphin near Suisun Slough	<u>38.11708</u>	<u>-122.03972</u>	*		*	*	*	*
D8 ▲	Suisun Bay off Middle Point near Nichols	<u>38.05992</u>	<u>-121.98996</u>			*	*	*	
D9 ▲	Honker Bay near Wheeler Point	<u>38.07245</u>	<u>-121.93923</u>	-		-	-		
D10 ●	Sacramento River @ Chipps Island	<u>38.04288</u>	<u>-121.92011</u>		*	*			
		<u>38.04631</u>	<u>-121.91829</u>					*	
D11 ▲	Sherman Island near Antioch	<u>38.04228</u>	<u>-121.79951</u>	-		-	-		
D12 ●	San Joaquin River @ Antioch Ship Canal	<u>38.01770</u>	<u>-121.80273</u>		*	*			
		<u>38.02162</u>	<u>-121.80638</u>					*	
D15 ■	San Joaquin River @ Jersey Point	<u>38.05190</u>	<u>-121.68927</u>	*					
D16 ▲	San Joaquin River @ Twitchell Island	<u>38.09690</u>	<u>-121.66912</u>					*	*
D19 ▲	Frank's Tract near Russo's Landing	<u>38.04376</u>	<u>-121.61477</u>	-		-	-	-	
D22 ●	Sacramento River @ Emmaton	<u>38.08406</u>	<u>-121.73912</u>	*					
		<u>38.08453</u>	<u>-121.73914</u>					*	
D24 ●	Sacramento River below Rio Vista Bridge	<u>38.15891</u>	<u>-121.68721</u>		*	*			
		<u>38.15550</u>	<u>-121.68113</u>						*
D26 ▲	San Joaquin River @ Potato Point	<u>38.07667</u>	<u>-121.56696</u>			*	*	*	

D28A ▲	Old River near Rancho Del Rio	<u>37.97038</u>	<u>-121.57271</u>			*	*	*	*
		<u>37.96980</u>	<u>-121.57210</u>	*					
D29 ■	San Joaquin River @ Prisoners Point	<u>38.05793</u>	<u>-121.55736</u>	*					
..... ▲		<u>38.05793</u>	<u>-121.55736</u>		*	*	*		
D41 ▲	San Pablo Bay near Pinole Point	<u>38.03016</u>	<u>122.37287</u>			*	*	*	*
D41A ▲	San Pablo Bay near mouth of Petaluma R.	<u>38.08472</u>	<u>-122.39067</u>			*	*	*	*
DMC1 ●	Delta-Mendota Canal at Tracy Pump. Plt.	<u>37.78165</u>	<u>-121.59050</u>		*				
P8 ▲	San Joaquin River @ Buckley Cove	<u>37.97815</u>	<u>-121.38242</u>			*	*	*	*
P8A ▲	San Joaquin River @ Rough and Ready Island	<u>37.96277</u>	<u>-121.36587</u>		*				
P12 ■	Old River @ Tracy Road Bridge	<u>37.80493</u>	<u>-121.44929</u>	*					
MD10 ▲	Disappointment Slough near Bishop Cut	<u>38.04229</u>	<u>-121.41935</u>			*	*	*	
S21 ■	Chadbourne Slough @ Sunrise Duck Club	<u>38.18476</u>	<u>-122.08315</u>	*					
S35 ■▲	Goodyear Slough @Morrow Island Clubhouse	<u>38.1181</u>	<u>-112.09580</u>	*					
S42 ●	Suisun Slough 300' south of Volanti Slough	<u>38.18053</u>	<u>-122.04696</u>	*		*	*		
		<u>38.18027</u>	<u>-122.04779</u>					*	
S49 ■	Montezuma Slough near Beldon Landing	<u>38.18686</u>	<u>-121.97080</u>	*					
S64 ■	Montezuma Slough @ National Steel	<u>38.12223</u>	<u>-121.88800</u>	*					
S97 ■▲	Cordelia Slough @ Ibis Club	<u>38.15703</u>	<u>-122.11378</u>	*					
NZ032 ▲	Montezuma Slough, 2nd bend from mouth	<u>38.16990</u>	<u>-122.02112</u>					*	
NZ080 ▲	San Joaquin River, 549 meters upstream of light-26								
SLBAR3 ■	Barker Sl. at No. Bay Aqueduct (SLBAR3)	<u>38.27474</u>	<u>-121.79499</u>	*					
■	Sacramento R. (I St. Bridge to Freeport) (RSAC155)	<u>38.589 to 38.45585</u>	<u>-121.504 to -121.50302</u>	*					
- ■▲	San Joaquin R. (Turner Cut to Stockton) (RSAN050-RSAN061)	<u>37.99746 to 37.95242</u>	<u>-121.44435 to -121.31750</u>	*					
--- ■▲	Water supply intakes for waterfowl management areas on Van Sickle Island and Chipps Island			*					

■Compliance monitoring station

▲Baseline monitoring station

●Compliance and baseline monitoring station

Footnotes for Table 4.

¹Continuous recorder only (EC, dissolved oxygen, and or temperature) for purpose of compliance. For municipal and industrial intake chlorides objectives, EC can be monitored and converted to chlorides.

²Physical/chemical monitoring is conducted monthly at discrete sites and includes the following parameters: water column depth, secchi, nutrient series (inorganic and organic N-P), water temperature, dissolved oxygen, electrical conductivity, turbidity, and chlorophyll a. In addition, on board recording for vertical and horizontal profiles is conducted intermittently for the following parameters: water temperature, dissolved oxygen, electrical conductivity, turbidity, and chlorophyll a.

³Multi-parameter monitoring is conducted continuously and provides telemetered data on the following parameters: water temperature, pH, dissolved oxygen, electrical conductivity, turbidity, chlorophyll a, wind speed and direction, solar radiation, air temperature and tidal elevation.

⁴Sampling occurs at discrete sites.

¹ All stations with a compliance monitoring component are identified by historical "interagency" station numbers specified in SWRCB D-1641 (2000) and D-1485 (1978). Modified station ID numbers (e.g. C3A) identify baseline stations near historical stations.

² All stations with a compliance monitoring component retain their historical "interagency" station descriptions specified in SWRCB D-1641 (2000) and D-1485 (1978). Baseline stations with modified station ID numbers (e.g. C3A) have modified station descriptions.

³ Coordinates are geographic North American Datum 1983 and have been verified to be accurate for 1:24,000 scale mapping.

⁴ Continuous recording (every 15 minutes) of water temperature, electrical conductivity (EC), and/or dissolved oxygen. For municipal and industrial intake chloride objectives, EC can be monitored and converted to chloride concentration.

⁵ Continuous, multi-parameter monitoring (recording every 1 to 15 minutes with telemetry capabilities) includes the following variables: water temperature, EC, pH, dissolved oxygen, turbidity, chlorophyll a fluorescence, tidal elevation, and meteorological data (air temperature, wind speed and direction, solar radiation).

⁶ Discrete physical/chemical monitoring is conducted on a year-round, near-monthly basis that alternates between spring and neap tides and includes the following variables: macronutrients (inorganic forms of nitrogen, phosphorus and silicon), total suspended solids, total dissolved solids, total particulate and dissolved organic nitrogen and carbon, chlorophyll a, pH, dissolved oxygen (DO), EC (specific conductance), turbidity, secchi depth, and water temperature. In addition, on-board continuous recording is conducted intermittently for the following variables: water temperature, dissolved oxygen, electrical conductivity, turbidity, and chlorophyll a fluorescence.

⁷ Discrete sampling for phytoplankton enumeration or algal pigment analysis is conducted on a year-round, near-monthly basis that alternates between spring and neap tides.

⁸ Tow or pump sampling for zooplankton, mysids, and amphipods is conducted on a year-round, near-monthly basis that alternates between spring and neap tides.

⁹ In water years 2004 and 2005, replicated benthos and sediment grab samples were taken quarterly (every three months) and during special studies; more frequent monitoring sampling resumed in water year 2006.

2. Delta Cross Channel Gate Closure

The current objective states that the Delta Cross Channel (DCC) gate at Walnut Grove shall be closed November through January of the succeeding year, and May 21 through June 15 in all water year types. The objective is fully set forth in Table 3 of the Water Quality Objectives for Fish and Wildlife Beneficial Uses in the Plan. Interested parties proposed that the State Water Board amend the DCC gate closure objective based on new information concerning the effects of gate closure on fisheries.

There are several regulatory requirements governing DCC gate operations. The purpose of these requirements is to balance the needs for fresh water exports and the needs of salmon migrating through the Delta. In 2000, CALFED and the IEP began a three-year study of the benefits and impacts of various gate operations. The goal of the study was to determine the best operational scenario that benefits both fisheries and water quality. A summary of the incomplete work was released at the CALFED Science Conference in October 2004.

Discussion

Contra Costa Water District (CCWD) recommended not amending the current objective for the DCC gate if the amendment would result in degradation of water quality at the municipal intakes in the central and southern Delta. CCWD recommended closure of the DCC gate for fish and flood protection purposes only if there is clear evidence that migrating fish are present in the vicinity of the DCC gate. Additionally CCWD recommended that the State Water Board require any new DCC gate closures to be accompanied by other actions to prevent water quality degradation, and include additional conditions under which the DCC gate must be reopened or remain open to protect water quality. (CCWD-01)

CCWD recommended amending footnote 26 of the 1995 Plan to allow no more than 45 days of DCC gate closures during November through January, other than for flood control when Sacramento River flows reach and remain above 20,000 cfs. CCWD also recommended amending the 1995 Plan to state that the State Water Board's intent has always been to require that the DCC remain open at least 50% of the time to protect interior Delta water quality for drinking water and other beneficial uses. CCWD also recommended continuing to use the CALFED Operations Group (CALFED OPS), which includes the Water Operations Management Team³ (WOMT) and the Salmon Decision Process, when determining closure dates of the DCC gate. (CCWD-01)

DWR does not recommend changing the current DCC gate objective, as it would upset the balance established by the State Water Board whereby DCC gate operations provide reasonable protection for both water quality and fish. At the workshop, DWR presented evidence that it is not necessary to increase the number

³ The WOMT includes the Department of Water Resources, the U.S. Bureau of Reclamation, the Department of Fish and Game, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service.

of days the DCC gate be closed for fish protection. DWR argued that the Salmon Decision Process helps protect endangered salmon. DWR also stated that the CALFED and IEP studies addressing the re-operation of the DCC gate have been delayed due to lack of funding and staffing problems. Until the studies are completed, DWR recommends not making changes to the DCC gate closure objective. (DWR-04)

NOAA Fisheries stated that peer reviewed literature and several informal publications and professional presentations summarizing the preliminary findings of the CALFED and IEP studies begun in 2000 have been issued regarding the DCC gate. NOAA Fisheries staff participates in the Data Assessment Team (DAT), WOMT, and the CALFED OPS which applies the Salmon Decision Process as a means of determining DCC gate closures in accordance with the Long Term Central Valley Project and State Water Project Operations Criteria and Plan (OCAP). The staff finds the existing DCC gate closure objective to be an effective tool for protecting winter-run and spring-run chinook salmon and Central Valley steelhead. NOAA Fisheries, therefore, does not recommend changing the DCC gate closure objective and encourages the State Water Board to consider new science regarding listed fish in support of existing closure criteria. (NOAA-01)

The SWC and U.S. Department of the Interior (USDOI) both do not recommend changing the current DCC gate objectives as no credible information was provided during Periodic Review demonstrating that changes are necessary or reasonable. Further, USDOI recommends the current requirements should remain in effect while USDOI continues to work on information that will allow them to make future recommendations regarding long-term changes to DCC gate operations. (SWC-04, October 28, 2004 Workshop Transcripts, p. 90)

In combination with maintaining operational flexibility and real-time management of the DCC gate, Bay Institute (BI) recommended allowing up to 15 additional days of closure of the DCC gate between November 1 and January 31 in order to improve survival of winter-run chinook salmon and other juvenile fish in the Delta. BI recommended that, in most years in which Sacramento River flows are greater than 20,000 cfs, the DCC gate remain open some or all of the month of December. BI stated that given the 45-day limitation, closures are usually reserved for later in the season. The additional days will allow for more complete protection throughout December and January, when risks to juvenile fish are higher. (BAY-03)

The State Water Board did not receive adequate information during the technical workshop to support amending the current objective for the DCC gate. When completed, the State Water Board expects the CALFED Bay Delta Program multidisciplinary studies that were begun in 2000 to address the multi-purpose aspects of DCC gate operation (balancing the beneficial uses of fisheries, water quality, water supply and flood control), and provide information for future amendments to the Delta Cross Channel gate closure objective.

In addition, in 2005, scientists began investigating the declines in the populations of several Delta fish species and some of their important food sources. This phenomenon has been termed the Pelagic Organism Decline (POD). The reasons for the decline are unknown at this time. However, some of the suspected reasons include: toxics, competition from introduced species, and a shift in Delta pumping from spring to summer. Studies are ongoing to determine the possible causes of the decline, with results expected in 2007. In light of this decline in Delta species, the State Water Board will not change the DCC gate closure objective until the POD studies are completed or the Board receives other reliable technical information that warrants a change.

Conclusion

There is inadequate information to warrant a change. In the absence of better information as to the benefits and impacts of amending the DCC gate closure objective, including information regarding the causes of the critical declines in Delta fish and zooplankton species, the 2006 Plan does not amend the DCC gate closure objective. Additional information from the CALFED Bay Delta multidisciplinary studies is needed to provide adequate support for future amendments of this objective.

3. Salmon Protection

The State Water Board received information as to whether it should modify the value and/or description of the narrative salmon protection objective in the Water Quality Objectives for Fish and Wildlife Beneficial Uses described in Table 3 of the 1995 Plan. The 1995 Plan objective states “Water quality conditions shall be maintained, together with other measures in the watershed, sufficient to achieve a doubling of natural production of chinook salmon from the average production of 1967-1991, consistent with the provisions of State and federal law.”

The purpose of the narrative objective for salmon protection is to promote water quality conditions in the Delta that will contribute to the doubling of the natural production of Chinook salmon from average 1967-1991 levels in accordance with the goals set by the Central Valley Project Improvement Act (CVPIA). The Anadromous Fish Restoration Program (AFRP) was created under section 3406 (b)(1) of the CVPIA. This program is a statewide partnership of State, federal and local entities, whose focus is the restoration of anadromous fish and associated habitat.

Discussion

BI, American Fisheries Society (AFS), and NOAA Fisheries recommended the conversion of the current narrative objective into a fixed numeric value, the addition of a steelhead trout doubling goal and the expansion of the scope of the objective to include the watersheds and tributaries that feed into the Delta. Both BI and NOAA Fisheries argued that the effectiveness of any restoration efforts depends on the

scope of the project implementation, and that in the case of the salmon doubling it should be implemented at the watershed level. BI recommended the use of salmonid escapement data from each river and stream tributary to the Delta over a three-year running average to determine compliance with a predetermined numeric value based on AFRP targets. NOAA Fisheries suggested that the current salmon doubling narrative could be replaced with a numeric value based on the Viable Salmonid Population (VSP) Concept. (BAY-01, BAY-03, BAY-10, AFS-01, NOAA-14)

DFG recommended not changing the narrative objective to a numeric value. DFG did, however, recommend the addition of steelhead trout to the objective. (DFG-01, DFG-02)

Stockton East Water District (SEWD) recommended not changing the narrative objective to a numeric value, but recommended a change in the language of the objective so that, in accordance with Fish and Game Code section 6911, the "current" (as of 1988-1989) natural production level of salmon would be doubled. (SEWD-03)

USDOJ, DWR, Northern California Water Association (NCWA), San Luis Delta-Mendota Water Authority (SLDMWA), and SWC recommended not changing the salmon protection objective at this time, in order for current salmon doubling programs to be fully implemented. They argued that once the studies are completed, the resulting data will be analyzed and a determination can be made regarding the effectiveness of current doubling efforts. Three of these entities also submitted additional recommendations. The USDOJ recommended that the narrative objective be addressed through a multi-agency interactive and collaborative process. The DWR and NCWA both recommended that changes to the objective be discussed in a further proceeding. (DOI-22, DWR-12A, NCWA-01, SLDM-03, SWC-11)

The scope of the salmon narrative objective will not be expanded in the Plan to include the watersheds and tributaries that feed into the Delta. As stated in the 2004 Staff Report, the objectives of the 1995 Plan are limited to the waters of the Sacramento-San Joaquin Delta. This geographic limitation in the Plan does not preclude the Regional Water Boards from establishing objectives, as needed, to protect salmon in the upstream areas.

Some parties recommended expanding the objective to include steelhead trout. Insufficient information is available to establish minimum criteria for the doubling of steelhead trout at this time. Although years of historical data are available for the chinook salmon population, the record is comparatively incomplete for steelhead trout.

Likewise, there is not enough information available at this time to determine whether setting a numeric objective would add anything to current actions for the restoration of salmonid populations. In its Technical Memorandum NMFS-NWFSC-42, Viable

Salmonid Populations and the Recovery of Evolutionarily Significant Units (NOAA-12), NOAA Fisheries states that a main concern in translating the VSP guidelines into specific criteria will be the degree of uncertainty in much of the relevant information, and that applications of VSP should employ both a precautionary approach and adaptive management. As a result, the State Water Board is recommending as part of the program of implementation that NOAA Fisheries provide regular updates towards determining a numeric goal for salmon restoration.

Conclusion

There is insufficient information available at this time to support any changes to the narrative salmon protection objective. Therefore, the narrative salmon protection objective remains unchanged in the 2006 Plan. The program of implementation has been updated to express the State Water Board's intent to provide NOAA Fisheries and DFG an opportunity to give regular updates to the Board on the status of ongoing fishery studies, fishery improvements programs and any recommendations for the establishment of a specific numeric objective.

4. Chloride Objectives

Proposed changes to the Chloride Objectives were discussed as three different categories

a. Calendar Year Calculation of Compliance with the 150 mg/L Chloride Objective

The 150 mg/L chloride objective is set forth in Table 1 of the Water Quality Objectives for Municipal and Industrial Beneficial Uses in the Plan. The issue was raised whether the State Water Board should change the accounting method for determining compliance from the calendar year to the water year.

The Water Quality Objectives for Municipal and Industrial Beneficial Uses require that the chloride concentration at either the Contra Costa Canal at Pumping Plant #1 (PP#1) or the San Joaquin River at Antioch Water Works Intake (Antioch) be less than 150 mg/L for at least a specified number of days based on the water year type (hereinafter referred to as the 150mg/L chloride objective). The purpose of the 150 mg/L chloride objective is to maintain the water quality at CCWD's southern Delta diversion facilities at a level consistent with historical conditions. The objective requires that the chloride concentration at either PP#1 or Antioch be less than 150 mg/L for a minimum number of days each year, based on the water year type. The number of days varies from 240 days (66% of the year) for wet years to 155 days (42% of the year) for critical years. The current accounting method for calculating the number of days is based on a calendar year.

Discussion

CCWD provided general information regarding the 150mg/L objective and compared calendar year versus water year accounting over the period from 1979 through 2004. CCWD's information indicates that since 1979 (the year the objective first took effect), the 150mg/L chloride objective has been met in each year except for 1992 (the final year of a six-year dry cycle). With the exception of the 1987-1992 drought cycle, the DWR and the USBR have met the 150mg/L chloride objective for longer periods than required by the objective. In most years, they have met the 150mg/L chloride objective for more than 100 days in excess of the requirement, while in 1999, 2001, and 2002 they met it for 30 to 75 days more than the applicable requirement. CCWD's comparison of the two accounting methods concludes that there is little difference between the number of days less than 150 mg/L chloride calculated using either accounting method. CCWD concludes that, in most years, the accounting method does not influence whether the objective is met. Based on this information, CCWD concludes that there is no compelling reason to change the accounting method used to calculate compliance with the 150mg/L chloride objective. (CCWD-04) The City of Antioch submitted comments in support of CCWD's position and recommends no change to the 150mg/L chloride objective. (ANT-01)

A change in the accounting method for the 150mg/L chloride objective from calendar-year to water-year accounting would have little impact on whether the objective is met. No party recommended during the workshop that the objective be changed. Accordingly, the 2006 Plan does not change the accounting method for the 150 mg/L chloride objective.

Conclusion

The 2006 Plan does not amend the Water Quality Objectives for Municipal and Industrial beneficial uses set forth in Table 1.

b. Chloride Objectives Compliance Location

The Water Quality Objectives for Municipal and Industrial Beneficial Uses include a year-round requirement for the maximum chloride concentration at the locations of five Delta pumping facilities (including PP#1) of 250 mg/L. The Plan requires that the chloride concentration at either PP#1 or the Antioch Water Works Intake be less than 150 mg/L for a minimum number of days each year, based on the water year type. The number of days varies from 240 days (66% of the year) for wet years to 155 days (42% of the year) for critical years. In D-1641, the State Water Board assigned responsibility for implementation of the aforementioned chloride objectives to DWR and the USBR (also collectively referred to as the Projects).

PP#1 is located at the western terminus of the Contra Costa Canal, which extends generally east-west from PP#1 to Rock Slough (just south of Veale Tract) and thence the Old River. PP#1 is used by the CCWD to divert a portion of its water

supply. Though a majority of CCWD's customers receive water that is blended with water from other sources, some CCWD customers receive water directly from PP#1. (CCWD-07)

During periods of relatively high flow in the Contra Costa Canal, water quality at PP#1 can be correlated to water quality in the Old River, at the Holland Tract electrical conductivity (EC) monitoring station located north of the confluence of Rock Slough and Old River (Holland Tract). During these periods, a relatively predictable relationship exists between the chloride concentration at Holland Tract and PP#1, and relatively slight degradation of water quality occurs during conveyance of water through Rock Slough and the Contra Costa Canal. (CCWD-14, DWR-13)

However, during periods of relatively low flow in the Contra Costa Canal, significant water quality degradation occurs between the Old River and PP#1 due to local groundwater seepage to the Contra Costa Canal and surface water drainage to Rock Slough. This degradation limits the ability of the Projects to meet the 250 mg/L chloride objective at the PP#1 compliance location during periods of low pumping (typically, the 150 mg/L objective is met during the winter and spring months when flow in the Contra Costa Canal is relatively high). (CCWD-14, DWR-13) During such low-flow periods in December 1999, October 2001, and October 2002, water quality at PP#1 has exceeded the 250mg/L chloride objective. The State Water Board was notified of these water quality exceedances but did not take enforcement action. (CCWD-14)

CCWD has undertaken two water quality improvement projects to address local sources of water quality degradation within Rock Slough. The first project involves redirection of surface drainage from Veale Tract away from Rock Slough to eliminate the source of degradation within Rock Slough. The Veale Tract project was completed in February of 2006. The second project, intended for completion in 2007, involves lining the unlined portions of the Contra Costa Canal to address groundwater infiltration. This project is currently in the planning stages, and its completion will require continued funding. DWR, USBR, and CCWD indicated that the completion of these projects should address the issue of water quality degradation between Old River and PP#1 during periods of low pumping at PP#1. (CCWD-14)

Discussion

The Projects (the DWR and USBR when acting collectively) submitted joint comments and technical information regarding this issue. CCWD also submitted comments and technical information regarding this issue. The SWC and the SLDMWA (Export Water Users) submitted comments regarding this issue but did not include any additional technical information.

The Projects initially recommended the relocation of the compliance location at PP#1 to a point on the Old River at the Holland Tract EC monitoring station. The

export water users generally supported the Projects position on this issue. The Projects subsequently modified their position and recommended that the compliance location remain the same and that the State Water Board amend the Projects' water right permits to allow alternate compliance with the 250 mg/L chloride objective during periods of low flow in Rock Slough. (DWR-13) CCWD also recommended that the compliance location at PP#1 remain unchanged and that the State Water Board consider in a water right proceeding whether to allow alternate compliance with the 250 mg/L chloride objective. (CCWD-14) Both the Projects and CCWD state that the completion of the Veale Tract project and the projected completion of the Contra Costa Canal project should address the issue of water quality degradation between Old River and PP#1 during periods of low pumping at PP#1. (CCWD-14, DWR-13)

CCWD and the Projects agree that during periods of low flow in the Contra Costa Canal the Projects have limited ability to control the chloride concentration at PP#1. Both parties also agree that during these periods the Projects should be allowed to meet the existing chloride objective at PP#1 by maintaining an alternate chloride concentration at Holland Tract. The parties differ, however, on the specific flow magnitudes and alternate chloride concentrations that should be required.

Some CCWD customers receive water directly from the Contra Costa Canal. The 250 mg/L and the 150 mg/L components of the chloride objective measured at PP#1 are necessary for the protection of this beneficial use.

The State Water Board has not received adequate documentation, including documentation that would form the basis for an environmental analysis, to justify moving the objective to Holland Tract during certain periods. Any parties wishing to amend the objective or its implementation may submit adequate documentation, including environmental analysis, to support amending the Plan and request that the State Water Board amend the Plan to specify a different compliance point during certain periods or to specify alternative implementation measures.

The objective at PP#1 currently can be implemented by including terms and conditions in water right permits and licenses. At this time, only the Projects have terms and conditions in their water rights requiring them to meet the objective at PP #1. If the Projects wish to seek a change in their water right obligations without amending the objective or the program of implementation, they must file a petition to change their water right permits and also provide a basis for assigning some responsibility for the objective to another entity.

Conclusion

In the absence of adequate information to prepare an environmental analysis, the 2006 Plan does not amend the Water Quality Objectives for Municipal and Industrial beneficial uses by moving the compliance location away from C-5 at the Contra Costa Canal at PP#1.

c. Potential New Municipal and Industrial Objectives

CCWD proposed that the State Water Board add a new objective for constituents such as bromides and total organic carbons or other precursors to disinfection byproducts to the Water Quality Objectives for Municipal and Industrial beneficial uses in Table 1 of the 1995 Plan.

Surface water used for municipal purposes must be disinfected prior to delivery to control waterborne disease-causing microbes (e.g. *Cryptosporidium*, *Giardia*). Standard disinfection processes (chlorine, chloramine, ozone, and chlorine dioxide) have been found to react with naturally occurring organic substances (humic and fulvic acids) and inorganic substances (bromide ions) present in some surface waters to produce byproducts (referred to as disinfection byproducts or DBPs) identified as being potentially harmful to humans. These byproducts are suspected to be carcinogenic or to cause birth defects. Examples of DBPs are trihalomethanes, haloacetic acids, and bromates, however, over 500 DBPs have been identified. Since DBPs were first identified in 1974, less than half of the known DBPs have been chemically identified. Additionally, relatively little is known regarding the exact mechanisms responsible for DBP production and the relative rates of DBP production by known or suspected DBP precursors. (CCWD-05) Regulation of DBPs by the USEPA has been developed to balance the need for removal of disease-causing microbes (disinfection) from municipal water supplies with the need to control the formation of DBPs within these municipal water systems. Between 1992 and 1993 the USEPA developed recommendations for Maximum Contaminant Levels (MCLs) for DBPs utilizing a negotiated rulemaking process. These recommendations included requirements for information collection, interim requirements for disinfection (to ensure that attempts to control DBPs do not compromise disinfection needs), and a two-stage rule that included MCLs for several DBPs and resulted in the development of the current USEPA requirements for DBPs. (CCWD-05)

The information collection process resulted in the finalization in 1998 of the Stage 1 Disinfectants/Disinfection Byproducts Rule (Stage 1 D/DBPR). As of 2004, all public water systems that use chemical disinfectant for either primary or residual treatment are required to comply with the Stage 1 D/DBPR. The Stage 1 D/DBPR lowered existing requirements for trihalomethanes and established requirements for five haloacetic acids, bromate, and chlorite. Compliance with Stage 1 D/DBPR requirements is calculated using a running annual average of quarterly averages of all samples collected throughout the distribution system. The final Stage 2 Disinfectants/Disinfection Byproducts Rule (Stage 2 D/DBPR) was published in the Federal Register in January of 2006. The Stage 2 D/DBPR requires that compliance with annual running average maximums must be met at each compliance location. Municipal water systems will have until between 2012 and 2016 to initiate monitoring for the Stage 2 D/DBPR and will be required to comply with the Stage 2 D/DBPR requirements the next year. Information regarding the USEPA's Stage Two Disinfectant Rule is available at the following website:
www.epa.gov/safewater/disinfection/stage2/index.html

The two main DBP precursors of concern within Delta waters are bromide ions and organic carbons. Though numerous other DBP precursors are present within Delta waters, bromide ions and organic carbon (measured as total organic carbon or TOC) are generally agreed upon as the best indicators of the potential of Delta waters to create DBPs and also are the water quality parameters that are the most easily manipulated with water management tools. The majority of bromide ions within Delta waters come from the ocean. Groundwater accretions to the San Joaquin River have also been found to contain bromide ions. In general, the concentration of bromide ions in Delta water may be correlated to the chloride concentration. Additionally, as with chloride concentration, the mechanisms for controlling the bromide ion concentration in the Delta include upstream releases, export modifications, and Delta Cross Channel gate operations.

The State Water Board considered information regarding potential new objectives for DBP precursors during its preparation of the 1991 Water Quality Control Plan for Salinity (1991 Plan). At the time there was not sufficient scientific information to set new objectives. However, the 1991 Plan did provide that the 150mg/L chloride objective (initially intended for the protection of paper processing facilities within CCWD which were no longer present in 1991) be maintained because it provides benefits for other municipal and industrial uses in the absence of objectives for trihalomethanes and other DBPs. The State Water Board stated that if drinking water standards for DBPs are revised, it will consider modifying existing salinity requirements. The State Water Board did not however, amend the objectives for Municipal and Industrial beneficial uses in the 1995 Plan.

One of the four main goals of the CALFED program is to improve drinking water quality for municipal users of Delta waters. The CALFED Record of Decision, issued in 2000, identifies the following goals for the CALFED Water Quality Program:

- a. average concentrations at Clifton Court Forebay and other southern and central Delta drinking water intakes of 50 micrograms per liter ($\mu\text{g/L}$) bromide and 3.0 mg/L TOC, or
- b. an equivalent level of public health protection (ELPH) using a cost-effective combination of alternative source water, source control and treatment technologies

By including the ELPH option, the CALFED Record of Decision implicitly recognizes that given existing Delta facilities and operations, it may not be physically possible or economical to meet the water quality goal identified in a., above during all hydrologic conditions. Accordingly, the CALFED Water Quality Program is pursuing the ELPH approach and has initiated numerous studies to determine the most cost-effective combination of source control, water quality improvement, advanced treatment technologies, and alternative source water required to meet anticipated future drinking water standards. With the guidance and support of the Bay-Delta Public Advisory Committee's Drinking Water Subcommittee and the CALFED agencies, the Drinking Water Program has held numerous public workshops and working group sessions (including facilitated sessions) to develop an implementation strategy. The

major result of these efforts was the determination that an effective implementation strategy required a much better understanding of the options for the ELPH approach (the most cost-effective combination of source control, water quality improvement, advanced treatment technologies, and alternative source water) at local and regional levels. As of May 2006, the CALFED Water Quality Program had initiated development of a framework for regional ELPH plans to assist in informing major decisions about the future of the Delta. The Drinking Water Program has also, as of May 2006, initiated a process to synthesize the information available regarding salinity in the Delta. (SWRCB-17)

In a parallel effort the Central Valley Regional Water Board is sponsoring development of a Central Valley Drinking Water Policy. The Central Valley Drinking Water Policy Program is a technical and administrative process to establish either numeric or modified narrative objectives for drinking water constituents as elements of an overall drinking water policy for the Central Valley. The Central Valley Drinking Water Policy Workgroup has been defined in staff reports to the Central Valley Regional Water Board, and its task, goal, and milestones are documented in several workplans. Initial constituent prioritization efforts of the Central Valley Drinking Water Policy identified total dissolved solids, salinity, bromide, TOC, nutrients, and pathogens as constituents for further study; however, the Central Valley Drinking Water Policy Workgroup has concentrated its efforts on TOC, nutrients, and pathogens. The Central Valley Drinking Water Policy Workgroup is scheduled to complete its technical work and develop appropriate standards by 2009.

Discussion

CCWD initially recommended that the State Water Board adopt an objective that protects drinking water quality by, at a minimum, imposing a limitation of 50 micrograms/liter ($\mu\text{g/L}$) bromide and 3.0 mg/L TOC at all drinking water intakes in the southern and central Delta. CCWD's final comments include a recommendation that a 300 $\mu\text{g/L}$ bromide objective be added to the existing objectives for the protection of Municipal and Industrial beneficial uses.

Numerous parties including DWR, USDOJ, the California Department of Health Services, USEPA, the Central Valley Regional Water Board, the Bay-Delta Public Advisory Committee, California Bay Delta Authority, SLDMWA, and the SWC opposed establishing a new objective until completion of the CALFED Water Quality Program and the Central Valley Drinking Water Policy.

The complexity of the chemical reactions which form DBPs from the DBP precursors makes the correlation between source water quality standards and delivered water quality standards difficult. The rate of formation of bromide DBPs (typically bromate) from bromide ions is dependent on pH, temperature, and other factors in addition to the bromide ion concentration. Since the State Water Board is limited to creating objectives for the DBP precursors, further understanding of these chemical reactions and the effectiveness of available drinking water treatment and delivery methods is

required before water quality objectives for bromides, TOC, or other DBPs can be proposed, evaluated and established.

Conclusion

The Water Quality Objectives for Municipal and Industrial beneficial uses are not amended in the 2006 Plan at this time to adopt new water quality objectives for constituents such as bromides and TOCs or other precursors of DBPs.

The State Water Board recognizes that the development of information regarding drinking water within the State is of vital importance for municipal water systems to meet the Stage 2 D/DBPR. The State Water Board has determined that the preferred methods for developing this information are collaborative processes such as the CALFED Water Quality Program and the Central Valley Drinking Water Policy. The State Water Board will consider amending the 2006 Plan or taking other action when these processes are complete.

5. Delta Outflow

This objective is set forth in Table 3 of the Water Quality Objectives for Fish and Wildlife Beneficial Uses in the Plan. Delta Outflow is the calculated amount of fresh water that flows past the confluence of the Sacramento and San Joaquin Rivers into Suisun Bay. The Delta Outflow rate has major implications on water quality, migration/transport flows for estuarine species, and the location and the amount of low salinity habitat in the Estuary. The Net Delta Outflow Index (NDOI) is the basis for the Delta Outflow Objective and is calculated by measuring inflow, net Delta consumptive uses, and Delta exports. Alternatively, the Projects can comply with the NDOI by positioning the upstream edge of the fresh water/salt water interface where the salinity concentration is two parts per thousand one meter from the bottom of the channel. This location is referred to as the X2 location and has a specific conductance of 2.64 mmhos/cm (at 25°C) at the surface.

The ability to meet the Delta Outflow objective has been of particular concern during the months of February through June in all water year types, even though the 1995 Plan allows some flexibility in the requirement to meet the objective during the months of February and March.

Discussion

Originally, the WOMT and the export water users⁴ were in favor of adding flexibility to the objective under certain conditions. During an additional workshop, scheduled specifically to discuss this issue to receive information regarding proposed limits and guidelines for the implementation of any flexibility, and in subsequent comments, the WOMT withdrew its previous recommendation to add flexibility to the objective due to concerns regarding the Pelagic Organism Decline (POD). The WOMT agencies

⁴ State Water Contractors, San Luis and Delta Mendota Water Authority (SLDMWA), and Kern County Water Agency (KCWA)

now recommend postponing a flexibility proposal until the causes of the POD are better understood. The WOMT agencies also recommended adding a footnote to the objective and adding language to the program of implementation recognizing the potential for a future flexibility proposal. (DWR-27, DFG-11, NOAA-18)

SWC and SLDMWA both argued in favor of increasing the flexibility of the objective. SWC argued that the program of implementation of the objective could be modified to allow for real-time flexing of standards when conditions prevail that will enhance multiple beneficial uses. SLDMWA argued that flexible implementation of the objective is needed to more accurately represent real-time location of fish in the estuary, the effect of in-Delta actions on upstream fishery needs, and the balance between water resources expended and fishery benefits derived. Comments included proposed guidelines for the implementation of additional flexibility to the Delta Outflow Objective. The proposal of the export water users to modify the objective would prevent over-compliance and would add flexibility when certain conditions are met. Specifically, the export water users' proposal would modify the objective to allow for minor under-compliance in any month to be made up the following month. The export water users propose to allow the agencies to flex the objectives if all of the WOMT agencies agree to the flex, the Executive Director of the State Water Board does not veto the flex, and the flex meets specified thresholds for flows and exports. (SWC-11, SLDM-18)

BI, CCWD, Deltakeeper, California Sportfishing Protection Alliance, San Joaquin Audubon, and Committee to Save the Mokelumne (Deltakeeper et. al.), USEPA, the Water Forum and the Northern California/Nevada Council Federation of Fly Fishers all opposed making any changes to the current objective and argued that because the exact mechanism by which the Delta Outflow Objective provides protection is not fully understood, the objective should not be modified, especially given the declining status of pelagic species in the Delta. In addition, these parties contend that it would not be prudent to add flexibility to the objective for the protection of relatively healthy upstream fisheries at the expense of declining pelagic species in the Delta. The parties opposed to adding flexibility further argued that by taking advantage of the flexibility in the current objective, plus operational modifications, the SWP and CVP could meet the current objective and protect upstream fisheries without needing any changes. (BI-16, CCWD-23, CCWD-24, DK-19, FFF-01)

Before making changes to the Delta Outflow Objective the State Water Board will require the following information and analyses: (1) an analysis that meets the criteria in State Water Board Resolution No. 68-16 and demonstrates that the proposed revised objective will protect the beneficial uses as well as the current objective; (2) additional studies and modeling; and (3) an environmental analysis of the impacts of the change.

In addition, the reasons for the POD are still unknown, and water project operations are included in the conceptual model for many of the POD studies as a possible factor/cause for the decline. The study results are expected in 2007, and may have an impact on the Delta Outflow objective and its implementation. The study results

could help staff assess when the current Delta outflow objective must be met to protect the beneficial uses and whether the objective can be relaxed without causing an additional negative impact to sensitive species. In light of this, the State Water Board did not change this objective in the 2006 Plan. The State Water Board will not consider changing the Delta Outflow objective until the POD studies are completed or the Board receives other reliable technical information, warranting a change.

Conclusion

The 2006 Plan does not amend the numeric values established for the Delta Outflow Objective nor implement further flexibility in the value of, or application of the objective by modifying footnote 14 of Table 3 of the 1995 Plan (now footnote 11 of the 2006 Plan). The program of implementation in the 2006 Plan describes how, the State Water Board may add flexibility to the objective in the future. This result is consistent with the recommendation by the California Bay-Delta Authority's WOMT not to allow for flexibility at this time due to the decline of pelagic organisms in the Delta.

6. Export Limits

The export limits objective is intended to protect the habitat of estuarine-dependent species by reducing the entrainment of various life stages by the State and federal export pumps located in the southern Delta. The objective limits exports of water from the southern Delta (Delta exports) to a specific percentage (which varies by hydrologic conditions and time of year) of Delta inflow. Delta inflow is defined as the combined daily average flow in the Sacramento River at Freeport, the Sacramento Regional Wastewater Treatment Plant, the Yolo Bypass, the San Joaquin River at Vernalis, the eastside streams (the Mokelumne River, the Cosumnes River and the Calaveras River) and other miscellaneous streams that flow into the Delta. For the purposes of this objective only, Delta exports are defined as the sum of the daily inflow to Clifton Court Forebay (minus any withdrawals from Clifton Court Forebay by the Byron-Bethany Irrigation District), the daily amount of water pumped from the Tracy Pumping Plant, the daily pumping from the Contra Costa Canal, and the daily pumping from the North Bay Aqueduct. The export limits objective is set forth in Table 3 of the Water Quality Objectives for Fish and Wildlife Beneficial Uses in the Plan.

The "percentage of Delta Inflow diverted" is calculated by dividing Delta export by the Delta inflow. From July through January the maximum allowable percentage of Delta inflow diverted is 65 percent. From February through June (excluding the San Joaquin River April/May 31-day pulse flow period) the maximum allowable percentage of Delta inflow diverted is 35 percent. For the purposes of compliance with this objective, inflow and export rates are defined by running averages, with a 14-day running average used for uncontrolled inflow, and a 3-day running average used for exports. When hydrologic conditions are such that the Projects are releasing water from storage for export (i.e. controlled flow), the inflow rate parameter is calculated using a 3-day running average.

During the San Joaquin River April-May 31-day pulse flow period, exports are further limited to 1,500 cfs or 100% of the 3-day running average flow in the San Joaquin River. At the time the export limits objective was developed, no definitive studies or analyses had been completed to support the specific values required by the objective. The required percentage of Delta inflow diverted was developed to shift periods of high exports to less biologically sensitive times of the year. Accordingly, variations in any of the export limits are allowed if recommended by the California Bay-Delta Authority's Operations Group, approved by the WOMT, and approved by the Executive Director of the State Water Board. In D-1641, the State Water Board assigned responsibility for implementation of the export limits objective to DWR and USBR.

The Periodic Review of the 1995 Plan identified three specific potential modifications to the export limits objective: (1) change the manner in which in-Delta releases are accounted for by the export/ inflow accounting, (2) modify footnote 23 to increase the flexibility in selecting the accounting standard to follow when determining export/ inflow ratio, and (3) modify the San Joaquin River April-May 31-day pulse flow period export limits contained in footnote 22. Comments and information regarding each of these potential modifications was received during the Plan review.

Discussion

Delta Wetlands Properties (Delta Wetlands) requested that the manner in which the export limits objective is calculated pursuant to footnote 23 of the objective in the 1995 Plan be modified to address in-Delta releases. Delta Wetlands proposed that in-Delta releases be included in the calculation of Delta inflow. Specifically, Delta Wetlands proposed that the mean daily flow from the previous day's in-Delta releases would be included with the inflow components (described above) that are added together to calculate Delta inflow. (DW-01) NOAA Fisheries addresses this issue in its comments and recommends that footnote 23 of the export limits objective remain unchanged. NOAA Fisheries asserts that in-Delta releases are not equivalent to tributary inflow into the Delta for the protective purposes of this objective. NOAA Fisheries does not support including in-Delta releases as Delta inflow. (NOAA-16)

The Projects recommend that footnote 23 of Table 3 of the 1995 Plan be changed to accommodate project operations. Currently, the objective requires the State and federal water projects to switch from using a 14-day running average of inflow in export/inflow ratio calculations, to a 3-day running average when they begin releasing water from storage for export. The intent of the switch to a 3-day average is to allow the Projects to export storage releases immediately. However, when inflow to storage reservoirs drops below releases and the Projects start releasing water from storage to meet other obligations, the Projects are required to change to the 3-day running average even though the purpose of the storage withdrawals is not to export the stored water. Changing to the 3-day average could cause the Projects to curtail exports sooner than if they were operating to the 14-day objective.

In these situations, the Projects assert that it would benefit their operations to choose either the 14-day or the 3-day average, and result in no adverse impacts to Delta fishery resources. (DWR-17, DWR-18.)

DFG and NOAA Fisheries address the Projects' recommendation regarding footnote 23 and the flexibility proposed by the Projects. Both DFG and NOAA Fisheries oppose any change to footnote 23 of the 1995 Plan and state that the Projects' recommendation regarding additional flexibility in footnote 23 would result in adverse impacts to listed species. (NOAA-16, DFG-05.)

SDWA recommended that the third sentence in footnote 22 of Table 3 of the 1995 Plan be deleted. This sentence states that the flexibility incorporated into the export limits objective is intended to result in no net water supply cost annually within the limits of the water quality and operational requirements of the 1995 Plan. SDWA's proposed deletion was not accompanied by scientific evidence disclosing its impacts on other beneficial uses so no change is proposed. (SDWA-02.)

BI submitted comments regarding the export limits objective. BI states that the variation currently allowed in the export limits objective is sufficient to allow for variations in operations to protect water supply. BI also proposes the following modifications to the export limits objective for time periods between March 15 and April 15 and May 16 to June 15:

Time Period	Value
March 15-31	200% of Vernalis Flow
April 1-15	200% of Vernalis Flow
May 16 – May 31	100% of Vernalis Flow
June 1- June 15	200% of Vernalis Flow

(BAY-06, BAY-11)

The SWC state that that BI's recommendation will result in significant water supply impacts and the SWC do not support changing the Export Limits objective. The SLDMWA states that BI's recommendation is not supported by adequate information and the SLDMWA asserts that entrainment losses for salmon and Delta smelt at the export facilities are trivial when compared to other causes of mortality. The SLDMWA proposes that the Export Limits objective be made more flexible to avoid wasting water during times when relatively small changes to the Export Limits objective could be made with little or no change in the level of protection for fish and wildlife. (SWC-11) (SLDM-07)

During an additional workshop, scheduled to receive information regarding proposed flexibility of the Delta Outflow objective, the WOMET withdrew its previous recommendation to add flexibility to the Delta Outflow objective due to concerns regarding the POD. While the WOMET letter did not address the Export Limits objective specifically, the POD studies include estuarine-dependent species which the Export Limits objective intends to protect. Additionally, the POD studies are

considering the impacts of exports on these species and whether exports are playing a role in the POD. As stated above, the POD study results are expected in 2007 and could help staff assess what (if any) changes to the Export Limits objective may be appropriate. In light of this, the State Water Board did not change this objective in the 2006 Plan. (WOMT-01) (SWRCB-11)

Conclusion

The 2006 Plan does not amend the export limit objective. Upon completion of the POD studies in 2007 the State Water Board may consider amending the Export Limits objective.

7. River Flows: Sacramento River at Rio Vista

The Sacramento River at Rio Vista flow objective in Table 3 of the Plan is for the protection of Fish and Wildlife beneficial uses. This objective requires flows to protect estuarine habitat for anadromous fish and other estuarine-dependent species. This objective requires attraction and transport flows and suitable habitat for various life stages of aquatic organisms, including Delta smelt and chinook salmon.

The Sacramento River at Rio Vista flow objective requires minimum monthly average flows of: 3,000 cubic per second (cfs) during September of all year types, 4,000 cfs during October of all year types except critical years when flows of 3,000 cfs are required, and 4,500 cfs during November through December of all year types except critical years when flows of 3,500 cfs are required. The objective also requires that the 7-day running average flows are not less than 1,000 cfs below the monthly objective.

Discussion

The issue was raised whether the State Water Board should add flexibility to the flow objective for the Sacramento River at Rio Vista. BI, DFG, NOAA Fisheries, and SWC opposed increasing the flexibility of the objective. Additional information is necessary to determine if the species targeted for protection under the objective would be harmed or benefited by an increase of flexibility. BI emphasized that flexing the objective, especially when exports are near, at, or exceed the export/inflow ratio, could result in significant adverse impacts to fish and to habitat conditions in the Delta. DFG pointed out that the objective already included flexibility. (SWC-11, BAY-10, NOAA-16, DFG-06)

USDOJ recommended that more flexibility be added to the objective by implementing a real-time adaptive management approach. Claiming that the operation of upstream projects to meet flow objectives in the Delta is negatively impacting upstream fishery resources, USDOJ argued that flexibility is needed so real-time changes to address the competing needs for the water can be implemented and specific operational plans can be developed. The USDOJ argument for adding

flexibility to the objectives is based on the potential for avoiding certain impacts to fish due to USBR operations in upper tributary reaches. USDOl did not submit any information indicating that real-time management of the objectives would improve in-Delta conditions, or how and when the flexibility would be implemented. (DOI-25)

SLDMWA neither endorsed nor opposed adding flexibility to the values of the objectives but requested that the effects of added flexibility on water quality and beneficial uses be evaluated before allowing any variation in meeting the objectives. (SLDM-18)

Conclusion

There is not enough new scientific evidence at this time to support any changes to the current objective. In order to revise the river flow objectives, it is necessary to determine the impacts on Delta resources. However, there is insufficient information to determine whether adding flexibility in implementing the objectives might cause impacts to Delta fishery resources, and to determine whether upstream resources can be protected through operational modifications without changing the river flow objectives. Therefore the objective remains unchanged in the 2006 Plan.

8. February-April 14 and May 16-June San Joaquin River Flow Objectives (Spring Flow Objectives)

During the Plan Review, the State Water Board received information as to whether it should modify the San Joaquin River spring flow objectives for Fish and Wildlife Beneficial Uses set forth in Table 3 of the Plan.

The State Water Board established the spring flow objectives for the San Joaquin River at Vernalis in the 1995 Plan in response to poor habitat conditions in the lower San Joaquin River. Hydrologic modifications in the San Joaquin River watershed beginning in the late 1800s substantially reduced spring flows in the San Joaquin River and led to degraded water quality from agricultural return flows and other sources. The purpose of the spring flow objectives is to provide minimum net downstream fresh water flows to the San Joaquin River to address some of the habitat concerns from the reduced flows and water quality degradation. Specifically, the objectives are intended to benefit; juvenile fall-run chinook salmon; downstream migrating steelhead; and spawning, larval, and juvenile Delta smelt. The spring flows provide habitat, water quality, and temperature benefits to these and other aquatic and terrestrial species. In addition, the spring flow objectives also contribute a portion of the flows needed to meet the Delta outflow objectives and support the various habitat benefits of those objectives in the Delta.

The State Water Board based the spring flow objectives on the historical placement of the two parts per thousand isohaline (measured as 2.64 mmhos/cm surface salinity) and the historic relative proportion of flow provided by the San Joaquin River to Delta outflow (approximately 20 percent). Depending on water year type, the objectives are set at 10, 20, or 30 percent of the operative Delta outflow requirement

(7,100 cfs or 11,400 cfs). The objectives measured at Vernalis on the San Joaquin River range from 710 cfs to 3,420 cfs. The required flow objectives are determined both by water year type and by the required Delta outflow objective. The Plan designates the water year classification based on the best available estimate of the 60-20-20 San Joaquin Valley Water Year Hydrologic Classification at the 75% exceedance level. (Footnote 17 for Table 3 of 1995 Plan; Figure 3 of the 2006 Plan.) For each year type, the Plan includes two alternative spring flow objectives. The higher alternative flow is required during wetter year types. The higher of the two flow objectives applies when the 2 parts per thousand isohaline is required to be at or west of Chipps Island pursuant to the Delta outflow objective, with the lower flow objectives applying at all other times. The Plan designates the Delta outflow objectives based on the Eight River index, which is the calculated sum of the unimpaired runoff of the Sacramento, Feather, Yuba, American, Tuolumne, Stanislaus, Merced, and San Joaquin Rivers.

Although the water year type for the spring flow objectives is determined entirely by conditions in the San Joaquin River watershed, conditions within the Sacramento River watershed often dictate whether the higher or the lower flows for each year type apply. The Sacramento River and its tributaries contribute the majority of the flow comprising the Eight River index and as a result determine the required Delta outflow. Because the San Joaquin River watershed experiences snow-melt dominated runoff and the Sacramento River experiences both rain-fall and snow-melt runoff, and since the watersheds are situated in different geographical regions, the two watersheds may produce very different hydrological conditions. As a result, the higher spring flow objectives may be triggered by wetter conditions in the Sacramento River watershed even when conditions in the San Joaquin River watershed are much drier, and vice versa.

The State Water Board implemented the spring flow objectives in D-1641 and required USBR to meet the objectives. USBR has not consistently met the objectives from 2002 through 2004, with violations primarily occurring during February. USBR has stated that the reason for noncompliance has been a need to maintain water in storage in New Melones Reservoir so that it is available to meet other water quality and water supply needs of the project. USBR is not required by its water right permits to use New Melones Reservoir to meet the spring flow objectives, but USBR has not attempted to use other methods for meeting the objectives. Even if other methods were employed, however, water supplies in the San Joaquin River watershed are limited during drier hydrological conditions and are subject to a number of competing needs.

Discussion

During the Plan Review, several parties submitted recommendations regarding the spring flow objectives. Different parties made various recommendations including: reducing or eliminating the objectives; increasing the objectives at certain times to increase the pulse flow window; and increasing the objectives throughout the period. Other parties recommended that no changes be made to the objectives at this time.

Certain parties also recommended flexibility in the implementation of the objectives and others recommended that flexibility not be allowed.

The San Joaquin River Group Authority (SJRGA) recommended that the State Water Board eliminate the spring flow objectives. The SJRGA argued that the objectives are not based on sound science and are not necessary for the protection of salmon or endangered species. The SJRGA stated that the spring flow objectives were based on an agreement rather than science and are not based on hydrological conditions in the San Joaquin River watershed. The SJRGA argued that there is little correlation between flows at Vernalis and factors affecting salmon survival due to tidal effects. The SJRGA also argued that the objectives are unreasonable because when the objectives were adopted they could not be met with the tools available at the time.

The SJRGA commented that if the State Water Board decides to retain the spring flow objectives it should not consider increasing the objectives and should eliminate the objectives in February and from May 16 through June. The SJRGA stated that increasing the objectives would lead to termination of the SJRA and the VAMP⁵ if water right holders on upstream tributaries subsequently were required to meet any portion of the objectives. The SJRGA argued that the May 16 through June flow objectives are not needed at that time of year to protect outmigrating salmon smolts or other aquatic species in the Delta. The SJRGA stated that higher water temperatures at this time of year cannot be lowered by reservoir releases except at a tremendous cost in water supplies. In addition, the SJRGA provided information indicating that most salmon smolts have left the system by late May. The SJRGA also stated that the flow objectives are not needed after May 15 to transport Delta smelt larvae into Suisun Bay because most of the smelt have already moved out of the southern Delta by this time. (SJRGA-19.)

The SJRGA recommended the following flows, developed with the new CALSIM II model and based on the existing New Melones Index and San Joaquin River Basin Index, to replace the current objectives during February through June:

San Joaquin River Basin Index	Vernalis Flow Objective (cfs)	
	NM Index <2,500 TAF	NM Index >2,500TAF
1-W	2,000	2,500
2-AN	2,000	2,500
3-BN	1,250	1,750
4-D	1,250	1,750
5-C	700	1,000

(SJRGA-19.)

⁵ In D-1641, the State Water Board approved conducting the VAMP experiment proposed in the SJRA in lieu of meeting the 1995 Plan objectives for the April-May 31-day pulse flow on an interim basis. The VAMP is a 12 year study designed to protect juvenile Chinook salmon and to evaluate the relationship between San Joaquin River flow and State Water Project and Central Valley Project water exports with the Head of Old River Barrier installed, on the survival of marked juvenile Chinook salmon migrating through the Sacramento-San Joaquin Delta.

The SJRGA also presented testimony and exhibits in opposition to recommendations made by DFG, BI, NOAA Fisheries, and the USFWS. The SJRGA submitted analyses of DFG's and BI's flow recommendations that indicate that the recommendations may not be scientifically or technically sound for various reasons. Instead of increasing flows as recommended by DFG and BI, or leaving the objectives as they are, as recommended by NOAA Fisheries and the USFWS, the SJRGA proposed that the State Water Board instead focus on the Delta. The SJRGA recommended that the State Water Board require parties to conduct studies focused on the Delta to determine the flow and non-flow components affecting salmon smolt survival. Regardless of what the flow objectives are, the SJRGA recommended institution of real time monitoring, an operable Head of Old River Barrier, export reductions whenever fish of concern are likely to be unreasonably impacted, and short-duration pulse flows designed to maximize the effects of group migration, tidal cycles, and pumping restrictions. (SJRGA-23.)

SEWD commented that the spring flow objectives should be eliminated because they have no scientific basis. SEWD argued that at the least the higher flow objectives required when the 2 parts per thousand isohaline is at or west of Chippis Island should be eliminated because this objective is largely determined by hydrologic conditions in the Sacramento River watershed. SEWD stated that if additional flow is needed to meet the Delta outflow objectives it should be provided from the Sacramento River watershed. SEWD stated that if the State Water Board is going to continue to require spring flow objectives, it should change the objectives to the flows contained in the USFWS's February 4, 2004 Biological Opinion for Delta Smelt (2,000 cfs in wet and above normal years, 1,500 cfs in below normal years, 1,200 cfs in dry years, and 800 cfs in critical years). SEWD stated that these flows have the most scientific basis. Alternatively, SEWD recommended elimination of the higher of the two San Joaquin River flow objectives (with an objective of 2,130 cfs in wet and above normal years, 1,420 cfs in below normal and dry years, and 710 cfs in critically dry years). (SEWD-01.)

SEWD further commented that the State Water Board must take Public Law 108-361 into consideration in the program of implementation for the spring flow objectives. Public Law 108-361 requires the Secretary of Interior to develop and initiate implementation of a program to meet all existing water quality standards and objectives for which the CVP has responsibility. The program is to include the acquisition of water to provide water quality flows in the San Joaquin River and to reduce the reliance on New Melones Reservoir for meeting water quality and fishery flow objectives. (SEWD-03.)

USDOJ recommended that the State Water Board sponsor a cooperative evaluation of the spring flow objectives by federal and State agencies and interested parties to determine the appropriate flow objectives and how to achieve them. Pending completion of an evaluation, USDOJ recommended adding flexibility to the objectives to allow real-time responses to competing needs for water. (DOI-42.)

USBR presented its own comments during the workshop in addition to those presented by USDOl. USBR expressed concern about the link between the spring flow objectives and Delta outflow objectives. In addition, USBR asked the State Water Board to use the new CALSIM II model because USBR believes it better represents flow and water quality conditions in the San Joaquin River Basin. USBR also provided additional comments regarding implementation of the flow objectives in D-1641. USBR has typically relied on supplies from New Melones to meet the objectives. However, USBR stated that New Melones supplies are often insufficient to meet the flow objectives and the other obligations placed on New Melones due to a lack of supply. For example, USBR commented that there are potential fisheries management conflicts between upstream operations on the Stanislaus River and downstream management on the mainstem San Joaquin River where compliance is measured (e.g. flow fluctuations in the tributaries and reduced storage with subsequent temperature and flow impacts). (DOI-41 and R.T. March 21, 2005, p. 1342-1374.)

The USFWS provided written comments following the workshop to supplement USDOl's comments. The USFWS submitted information indicating that the Delta smelt population has experienced a significant decline in the last 20 years, and stated that Delta smelt are in danger of becoming extinct. The USFWS stated that the spring flow objectives provide an important source of fresh water to the ecosystem and provide important environmental cues that are essential to achieving species recovery. In addition, the USFWS indicated that higher late winter and spring flows provide: attractive conditions for adult Delta smelt moving upstream to spawn; favorable Delta smelt spawning and juvenile rearing conditions; increased dispersal of young; decreased loss of Delta smelt at the Delta pumping facilities; increased habitat availability; increased nutrients; and potentially increased food production. In addition, the USFWS stated that higher outflow conditions are associated with more turbid conditions and cooler temperatures that seem to favor native fishes over non-native species. The USFWS stated that while the spring flow objectives do not address all the needs of Delta smelt and San Joaquin River chinook salmon and steelhead, the objectives do provide a minimum flow level and some level of protection. Consequently, the USFWS does not recommend any weakening of the objectives. (DOI-43.)

DFG presented information indicating that chinook salmon populations in the tributaries to the San Joaquin River have been declining below levels established to measure salmon doubling pursuant to the AFRP doubling goals (based on average 1967-1991 population estimates). Based on these population declines, DFG expressed concern with whether the current San Joaquin River flow objectives for the entire February through June period (including the pulse flow period) are providing adequate protection for chinook salmon in the San Joaquin River. DFG recommended that the State Water Board make the flow objectives more protective in order to protect and reverse the trend in decreasing San Joaquin River chinook salmon populations. DFG's specific comments primarily concerned changes it recommends to the San Joaquin River pulse flow objectives and implementation of the objectives in D-1641 through the VAMP. DFG provided specific

recommendations for expanding the pulse flow period (up to 90 days) into the spring flow period and increasing the associated flows (up to 20,000 cfs) and frequency of higher flows to provide additional protection for migrating steelhead and salmon smolts. However, DFG did not provide any specific recommendations for periods outside of the proposed expanded pulse flow period. For additional information concerning DFG's recommendations, please see the section regarding the pulse flow objectives. (DFG-08 and 10.)

DFG provided information to show that expanding the pulse flow period by providing higher flows prior to April 15 and following May 15 (the current pulse flow period) would provide additional protection to both chinook salmon and steelhead trout and would help to address most of the San Joaquin River water quality issues, including temperature concerns. DFG stated that by increasing the magnitude and duration of the pulse flow and the frequency of flows above the minimum flow would likely result in compounding adult salmon production due to increased numbers of eggs, fry, and out-migrating smolts resulting from increased survival of out-migrating smolts and returning adults. DFG stated that these actions would also provide additional protection to steelhead, increasing the level of protection for all out-migrating steelhead. (DFG-08.)

Regarding whether the methodology for determining the applicable San Joaquin River flow (higher or lower) should be modified, DFG stated that spring flows appear to be inadequate to protect beneficial uses for salmon in the San Joaquin River, and that this is leading to declining abundance trends. DFG had no specific recommendations for modifying the present methodology for determining the required spring flow objectives aside from its recommendations for the pulse flow objectives. However, DFG recommended that any revised spring flow objective not be less than the current higher flow objectives for the San Joaquin River. (DFG-08.)

BI commented that the spring flow objectives should be made more protective. BI stated that flow conditions in the lower San Joaquin River during spring are directly related to salmon population abundance, population growth, and diversity. BI recommended modifying the pulse flow objectives by extending the pulse flow period into the spring flow period and ensuring that Vernalis flows exceed exports. BI stated that because salmonids migrate from April through July, that limiting the pulse flow period when flow conditions are acceptable for salmon emigration is limiting the phenotypic and genotypic diversity of the San Joaquin River salmon population by artificially promoting survival of the fish that migrate during the pulse flow window and limiting the survival of fish that emigrate before and after the pulse flow period. BI further argued that the ratio of Vernalis flow to exports is a limiting factor for salmon when the combined export rate at the Delta pumping facilities is greater than the flow at Vernalis. In addition, BI also submitted information indicating that low flows in the San Joaquin basin are a limiting factor for steelhead. (BAY-08.)

BI provided recommendations for changing the spring flow objectives for the San Joaquin River based on several criteria from the AFRP and the VAMP experimental design. BI based its flow recommendations on the following criteria: flows should

represent variation in annual and monthly hydrology in the upper watershed; San Joaquin River flows should contribute a minimum of 20 percent to Delta outflow during normal, dry, and critically dry water years and a minimum of 10 percent during all other year types (wet, above normal, and below normal); average flows of 5,000 cfs should be provided in a minimum of 2 to 3 consecutive months; flows during all months should be greater than or equal to 1,500 cfs to ensure adequate DO conditions in the Stockton Deep Water Ship Channel (DWSC); minimum flow levels in wet and above normal years should be limited to 7,000 cfs to allow for installation of the head of Old River barrier to protect outmigrating salmon; and flows should be linked to maximum Delta export rates to ensure that exports do not exceed Vernalis flows. Following are the flow objectives recommended by BI based on these criteria:

Month	Water Year Type				
	W	AN	BN	D	C
February	3,420	3,420	2,280	2,280	1,500
March	5,000	5,000	3,420	2,280	1,500
April 1-14	7,000	5,000	5,000	5,000	2,000
April 15-May 15	31-day flow objective as determined by VAMP experiment				
May 16-31	7,000	5,000	5,000	3,420	2,000
June	5,000	5,000	3,420	2,280	1,500

(BAY-08.)

BI submitted additional comments refuting comments made by the SJRGA and SEWD that the spring flow objectives should be eliminated because they were not based on sound science. BI stated that the objectives are based on science and represent a reasonable attempt to balance the scientific information available at the time with the needs of multiple beneficial uses of water in the area. BI stated that the conclusions reached by the SJRGA are based on incomplete studies and limited information. BI further argued that the alternative flows recommended by the SJRGA are not based on science and fail to consider the needs of fish and wildlife and their habitat. (BAY-10.)

At a minimum, NOAA Fisheries recommended that the spring flow objectives remain unchanged because San Joaquin River Basin chinook salmon and steelhead populations are not showing signs of improvement and continue to require the protection of the spring flow objectives. NOAA Fisheries did not recommend adding any flexibility to the objectives as recommended by USDOT. NOAA Fisheries stated that it is concerned that the current objectives are too low and recommended that the State Water Board consider increasing the objectives. NOAA Fisheries recommended that the State Water Board establish an independent scientific peer review panel to address potential changes to the objectives. (NOAA-17 and R.T. March 21, 2005, p. 1392-1399.)

Deltakeeper submitted general comments and information from proceedings on other matters indicating that increased flow is needed on the San Joaquin River to

address water quality concerns in the San Joaquin River and in the southern Delta. However, Deltakeeper did not provide any specific flow recommendations.

SLDMWA presented comments refuting comments made by DFG and BI. In addition, SLDMWA stated that the State Water Board should not consider linking maximum Delta export rates to flow levels at Vernalis because fish and wildlife will be reasonably protected without the link and that such a link could cause significant adverse impacts to other beneficial uses. (R.T. March 21, 2005, p. 1536-1541 and SLDM-7.)

The Central Valley Regional Water Board submitted comments relating to the effects of San Joaquin River flows on DO in the lower San Joaquin River (the Stockton DWSC). The Regional Water Board recommended that before the State Water Board makes any changes to the flow objectives, it first consider the potential impacts to DO in the DWSC. (RB5-02 and 03.)

SWC commented that the State Water Board should not require increased flows on the San Joaquin River to address the DO impairment in the Stockton DWSC. SWC argued that the problem is not caused by reduced flows, but by the artificially deepened ship channel and discharges to the river. (SWC-11.)

The AFS stated that recent population trends and habitat conditions indicate that current conditions within the San Joaquin River Basin are having significant impacts on fishery resources and their habitat. Accordingly, AFS recommended that the State Water Board consider options to increase protection for San Joaquin River fish and that the Board not consider adding any flexibility to the spring flow objectives. (AFS-02.)

Although the SJRGA and SEWD submitted information in support of eliminating or, at a minimum, reducing the San Joaquin River spring flow objectives based on the assertion that the objectives are not based on science, neither the SJRGA nor SEWD submitted adequate scientific information demonstrating that the objectives could be eliminated or reduced while reasonably protecting the fish and wildlife beneficial uses. Proponents for reducing or relaxing the spring flow objectives recommended the relaxation or reduction primarily for water supply reasons. While parties argued that adequate flows may not be available from New Melones reservoir to meet the flow objectives in all years in addition to other uses of water, USBR is not required to meet the flow objectives from New Melones Reservoir exclusively. In addition, this issue does not speak to whether the objectives are necessary for the protection of fish and wildlife beneficial uses. Given the declining status of various San Joaquin River Basin species and Delta species and the conclusions by the fisheries agencies (DFG, USFWS, and NOAA Fisheries) of the importance of minimum San Joaquin River flows in providing protection for these species, it is not appropriate to reduce or eliminate the objectives without more information. In addition, it is not appropriate to include flexibility in the objectives as recommended by USBR.

Adequate scientific information also does not exist to support the adoption of the higher flows recommend by BI or DFG without more information and scientific review. Further, additional information is needed to determine whether these flow recommendations are achievable and what the short-term and long-term water supply costs would be to all beneficial uses of water. DFG, the other fisheries agencies, and BI should coordinate to conduct additional studies to provide a scientific basis for any flow recommendations. Analyses should also be conducted to determine whether it is appropriate to revise the methodology for determining when the higher spring flow objectives apply to better represent hydrological conditions within the San Joaquin River Basin. In addition, modeling should be conducted to determine the water costs of the various proposals and the sustainability of such proposals given current water storage capacities and consumptive use needs within the San Joaquin River Basin. The above information should be presented to the State Water Board during its upcoming workshop on San Joaquin River flow issues and/or during future proceedings before the State Water Board.

Conclusion

The 2006 Plan makes no changes to the spring flow objectives. Currently, adequate scientific peer reviewed information does not exist on which to base either a reduction or an increase in the spring flow objectives as recommended by various parties. In addition, given the declining status of various San Joaquin River Basin and Delta fisheries, the State Water Board does not believe that adding flexibility to the objectives is warranted at this time. However, as indicated in the Emerging Issues section of Chapter 1 of the 2006 Plan, the State Water Board will hold a workshop after revisions are made in response to peer review of DFG's salmon escapement model (anticipated for summer of 2007) to receive additional scientific information concerning the San Joaquin River spring flow and pulse flow objectives. At that time, the State Water Board will hear any additional information that has been developed regarding the above recommendations and concerns. Following the workshop, the State Water Board may make changes to the objectives, the Program of Implementation, and/or water rights in response to information received during the workshop. In addition, the State Water Board may direct that additional scientific analyses be conducted to provide necessary scientific information concerning flow needs in the San Joaquin River basin.

In order to assure that the State Water Board has adequate scientific information on which to consider changes to the objectives at the workshop discussed above and in future proceedings, the State Water Board recommends that the fisheries agencies and other parties continue to develop information on flow needs in the San Joaquin River for the protection of fish and wildlife within the river and the Delta. Specifically, the State Water Board recommends an investigation of whether changes are justified in the objectives to better represent hydrological conditions in the San Joaquin River Basin, including what the potential effects of any change would be on the Delta outflow objectives.

9. 31-Day April 15-May 15 San Joaquin River Pulse Flow Objectives (Pulse Flow Objectives)

During the review of the Plan, the State Water Board received information as to whether it should modify the pulse flow objectives for Fish and Wildlife Beneficial Uses set forth in Table 3 of the 1995 Plan.

The pulse flow objectives in the 1995 Plan ranged from 3,110 to 8,620 cfs based on water year type and the required location of the 2 parts per thousand isohaline (X2). For each year type the objective included two flow objectives. The higher flow objective applies when X2 is required to be at or west of Chipps Island. The flow objective applies from April 15 to May 15. However, footnote 18 specifies that the time period may be modified based on real-time monitoring to coincide with fish migration. In addition, based on evidence that short-duration flow fluctuations, adequately separated in time, are effective in cueing smolts into outmigration, footnote 18 allows for one pulse, or two separate pulses of combined duration equal to the single pulse. The purpose of the pulse flow objectives is to aid in cueing chinook salmon smolt outmigration from the San Joaquin River. San Joaquin River fall-run chinook salmon principally migrate down the river in April and May, with some migration also occurring in June.

In D-1641, the State Water Board approved conducting the VAMP experiment proposed in the SJRA in lieu of meeting the 1995 Plan objectives for the April-May pulse flow, on an interim basis. Pursuant to the SJRA, signatories to the agreement agreed to provide flows for a period of 12 years. In return, USBR agreed to meet the San Joaquin River water quality objectives (including the flow objectives for the period outside of the pulse flow period and the salinity objectives). The VAMP experiment is designed to protect juvenile chinook salmon and to evaluate the relationship between San Joaquin River flow and SWP and CVP water exports with the Head of Old River Barrier⁶ installed, on the survival of marked juvenile chinook salmon migrating through the Sacramento-San Joaquin Delta. Experimental flows at Vernalis on the San Joaquin River range from 3,200 cfs to 7,000 cfs. The VAMP prescribes flows that are sometimes lower than the flow objectives in the 1995 Plan, while the export limits are equal or more restrictive than those in the 1995 Plan. However, the State Water Board did not impose the VAMP export limits on the water rights of DWR and USBR. Instead, the State Water Board urged DWR and USBR to comply with the export pumping limits in the VAMP. The State Water Board found that conducting the experiment would provide valuable information concerning the relationship between river flows and export rates and could provide the basis for future changes to the objectives during future review of the flow objectives.

In recent litigation over D-1641, the California Court of Appeal found that the State Water Board erred in allowing for a staged implementation of the pulse flow

⁶ The purpose of the head of Old River barrier is to reduce the downstream movement of juvenile San Joaquin River chinook salmon into the southern Delta via the head of Old River where fish mortality increases due to predation and higher levels of exposure to export facilities and agricultural diversions.

objectives in D-1641 because the 1995 Plan did not specifically provide for a staged implementation.

Discussion

During the Plan Review no parties specifically recommended changes in the pulse flow objectives. However, following the workshop DFG changed its position and recommended that the objectives be modified. Several parties commented that implementation of the pulse flow objectives through the SJRA and the VAMP should be investigated and changed. Other parties commented that no changes to the objectives should be made until the VAMP study is completed.

The USFWS, USDOJ, SJRGA, DWR, and SWC specifically recommended that no changes be made to the pulse flow objectives at this time. USDOJ commented that the objectives provide important protection for emigrating juvenile chinook salmon with concurrent benefits to federally listed Delta smelt. BI commented that it believes the pulse flow objectives are protective of fish and wildlife. However, BI also stated that it would support changing the objectives to the VAMP target flows if the State Water Board also changes the export limits to be consistent with the VAMP export limits. SDWA presented comments opposing substitution of the VAMP flows for the pulse flow objectives. Central Delta Water Agency (CDWA) commented that the pulse flow objectives should be based on science rather than agreements and should be designed to protect beneficial uses. However, CDWA did not comment on any specific changes it recommends to the pulse flow objectives or what those changes should be based on. (DOI-26; R.T. January 24, 2005, p. 1033-1034, 1049-1051, 1057-1061, 1061-1065; SJRG-13; DWR-20; and SWC-11.)

The USFWS and USDOJ stated that no changes should be made to the implementation of the objectives through the SJRA and the VAMP. (DOI-26; R.T. January 24, 2005, p. 1033-1034.) DFG, NOAA Fisheries, and Deltakeeper specifically recommended changes to the VAMP study design. DFG, Deltakeeper, and NOAA Fisheries recommended that the State Water Board direct and oversee an analytical peer review of the VAMP study design to ensure that adequate information is obtained from the study to establish new objectives and to protect fisheries in the San Joaquin River and its tributaries during the study. (DFG-07; R.T. January 24, 2005, p. 1052-1054; NOAA-17.) The SJRGA stated that the State Water Board should not be involved in any review of the VAMP study design since the State Water Board is not a signatory to the SJRA. (SJRG-13.) The SJRGA and DWR recommended only minor changes to the program of implementation to address the then-pending litigation regarding implementation of the objectives. (SJRG-13 and DWR-20.) CDWA and SDWA also made general comments about issues that should be considered in reviewing the VAMP study. (R.T. January 24, 2005, p. 1057-1061 and 1061-1065.)

Following the workshop, DFG modified its position and submitted specific recommendations for increasing and expanding the pulse flow objectives. DFG

recommends extending the pulse flow period up to 90 days (with May 1 being the center of the period) and modifying the pulse flow objectives as follows:

Water Year Type	Flow Level (daily average cfs)	Window Duration (days)
Wet	20,000	90
Above Normal	15,000	75
Below Normal	10,000	60
Dry	7,000	45
Critical	5,000	30

DFG stated that its flow recommendations remain preliminary subject to further internal and external review and are primarily intended to point out the seriousness and urgency of the problem with salmon protection on the San Joaquin River. DFG stated that it continues to support implementation of the pulse flow objectives through the VAMP only as long as the VAMP can be adapted (including target flows and exports) to improve protection of natural salmon and improve the scientific protocols and design of the VAMP to provide reliable results. Other parties submitted comments opposed to DFG's recommendations on the basis that the recommended changes are not scientifically sound or realistic.

No changes should be made to the pulse flow objectives at this time due to inadequate scientific information on which to base any changes to the objectives. While DFG submitted recommended changes to the pulse flow objectives, those recommendations are very preliminary. The objectives in the 1995 Plan were based on an agreement and not on adequate scientific information. While the 1995 Plan did not specifically allow staged implementation, D-1641 authorized the parties to conduct the VAMP experiment as part of a staged implementation of the objectives. The purpose of staging the implementation and conducting the VAMP in lieu of meeting the objectives is to provide additional scientific information concerning flow needs on the San Joaquin River during the pulse flow period before final implementation of the objectives. The 12-year study has not yet been completed, and in the first six years of the study all of the experimental data points have not yet occurred, and the experiment has not yet yielded conclusive results. Additional data points will likely yield more conclusive results. Prior to adopting D-1641, the State Water Board received a significant amount of testimony and evidence on the VAMP experiment and prepared an Environmental Impact Report which included an evaluation of both the flows contained in the 1995 Plan and the proposed VAMP flows. Based on this information the State Water Board determined that conducting the VAMP experiment will provide better information than is currently available on how large a pulse flow is needed to protect chinook salmon and could provide a basis for changes in the objectives at a future review of the 1995 Plan. Accordingly, the program of implementation has been modified in the 2006 Plan to provide for the completion of the VAMP experiment prior to the staged implementation of the pulse flow objectives or alternate objectives that the State Water Board may adopt based on the results of the VAMP experiment. The data from the experimental flows will help ensure the reasonable protection of beneficial uses by assisting the State

Water Board in determining the optimal flows necessary to promote the survival of San Joaquin River chinook salmon.

The State Water Board requests that the parties to the SJRA consider conducting a peer review of the VAMP study design to determine whether changes may be needed to the study design to obtain necessary data points and to ensure the protection of fish and wildlife. Following any peer review process to consider changes to the VAMP, the members of the SJRA could file a water right change petition if the water right conditions included in D-1641 need to be amended to implement the revised study flows. In response to continuing species declines in the San Joaquin River basin, the State Water Board will also hold a workshop on San Joaquin River flow issues after revisions are made in response to peer review of DFG's San Joaquin River salmon escapement model (anticipated for summer of 2007). At that time, the State Water Board will consider additional scientific information concerning flow needs during the February through June period, including the pulse flow period. The State Water Board requests that the SJRGA parties complete a peer review of the VAMP prior to that workshop in order to provide the State Water Board with its findings. Following the workshop, the State Water Board will determine whether adequate scientific information exists on which to base changes to the objectives or their implementation and may make appropriate changes to the objectives, the program of implementation, and/or water rights.

Conclusion

The 2006 Plan changes the program of implementation to allow for the ongoing staged implementation of the pulse flow objectives. In addition, the State Water Board commits to hold a workshop on San Joaquin River flow issues after revisions are made in response to DFG's salmon escapement model to determine if changes may be needed in San Joaquin River spring flow or pulse flow objectives and/or their implementation. The conclusion of the State Water Board is based on an analysis of the most recent comments and recommendations submitted by the interested parties.

Adequate scientific peer-reviewed information does not exist on which to base changes to the pulse flow objectives included in the 1995 Plan at this time and, therefore, these objectives remain unchanged in the 2006 Plan. The target flow should be based on the existing flow, as defined in table 5.

Table 5. Interim San Joaquin River Pulse Flow Objectives

Existing Flow ⁷ (cfs)	Target Flow (cfs)
0-1999	2,000
2,000-3,199	3,200
3,200-4,449	4,450
4,450-5,699	5,700
5,700-6,999	7,000
7,000 or greater	Existing Flow

Table 6 contains the numeric indicators for the San Joaquin Valley 60-20-20 Water Year Hydrologic Classification⁸. During years when the sum of the current year's 60-20-20 numeric indicator and the previous year's 60-20-20 numeric indicator is seven (7) or greater, target flows should be one step higher than those required in table 5. The licensee is not required to meet the target flow during years when the sum of the numeric indicators for the current year and the previous two years is four (4) or less.

Table 6. San Joaquin Valley 60-20-20 Water Year Hydrologic Classification Numeric Indicators

SJR Basin 60-20-20 Classification	60-20-20 Indicator
Wet	5
Above Normal	4
Below Normal	3
Dry	2
Critical	1

The VAMP study should be completed to determine whether any changes should be made to the pulse flow objectives. Accordingly, and to conform with the California Court of Appeals, the program of implementation has been modified to allow for a staged implementation of the objectives that will not result in full implementation until 2012. The process is as follows: (1) The VAMP study will be conducted until 2012 to provide additional scientific information concerning flow needs in the San Joaquin River during the pulse flow period. Water right holders in the San Joaquin River Basin should continue to provide the experimental flows as provided for in the SJRA and D-1641 until December 31, 2011, or until the SJRA is terminated; (2) Once the

⁷ "Existing flows" will be determined by the SJRTC. Existing flow is defined as the forecasted flows in the San Joaquin River at Vernalis during the pulse flow period that would exist absent the SJRA or water acquisitions, including but not limited to the following:

- Tributary minimum instream flows pursuant to Davis-Grunsky, Federal Energy Regulatory Commission, or other regulatory agency orders existing on the date of this agreement;
- Water quality or scheduled fishery releases from New Melones Reservoir;
- Flood control releases from any non-federal storage facility required to be made during the pulse flow period pursuant to its operating protocol with the U.S. Army Corps of Engineers in effect when the SJRA is executed;
- Uncontrolled spills not otherwise recaptured pursuant to water right accretions (less natural depletions) to the system; and/or
- Local runoff.

⁸ The classification method for the 60-20-20 San Joaquin Valley Water Year Classification Index is provided in Figure 3.

SJRA terminates or expires, the State Water Board may use the information gained from the VAMP study and other pertinent information to determine whether any changes are needed to the pulse flow objectives and to make changes to the Plan. The State Water Board may conduct a water right hearing to assign long-term responsibility for meeting the pulse flow objectives following the completion of any changes to the Plan.

The State Water Board requests that the parties to the SJRA convene a proceeding to review the VAMP study design. The State Water Board recommends that this peer review take place prior to the workshop the State Water Board intends to hold regarding San Joaquin River flow issues in order for this information to be presented during the workshop. Based on the finding of the peer review, the parties to the SJRA could file a petition to change their water rights regarding implementation of the VAMP if necessary.⁹ Alternatively, the State Water Board could undertake its own proceeding to make changes to the objectives, the program of implementation for the objectives, and/or water rights.

10. Southern Delta Electrical Conductivity Objectives for the Protection of Agricultural Beneficial Uses

During the Plan Review, the State Water Board received information as to whether it should modify the Southern Delta Electrical Conductivity Objectives for the Protection of Agricultural Beneficial Uses set forth in Table 2 of the Plan, and whether the program of implementation should be amended.

Elevated salinity (measured as EC) in the southern Delta is caused by a multitude of factors including: low flows; salts imported to the San Joaquin Basin in irrigation water; municipal discharges; subsurface accretions from groundwater; tidal actions; diversions of water by the SWP, CVP, and local water users; channel capacity; and local discharges of land-derived salts, primarily from agricultural drainage. Some of the factors listed above contribute to salinity at each of the four Southern Delta compliance locations to varying degrees depending on location, flow conditions, and other factors. The southern Delta EC objectives are intended to protect southern Delta agricultural uses from these effects.

The State Water Board established the current southern Delta EC objectives for the protection of agricultural beneficial uses in the 1978 Delta Plan. The approach used in developing the objectives involved an initial determination of the water quality needs of significant crops grown in the area, the predominant soil type, and irrigation practices in the area. In addition, the extent to which these water quality needs would be satisfied under “without project” (without the SWP and CVP) conditions was also considered. The State Water Board based the southern Delta EC objectives on the calculated maximum salinity of applied water which sustains 100 percent yields of two important salt sensitive crops grown in the southern Delta (beans and alfalfa) in conditions typical of the southern Delta (surface irrigation of

⁹ The State Water Board could then determine whether changes are needed to the 2006 Plan.

mineral soils) per the University of California Guidelines and Irrigation and Drainage Paper 29 of the Food and Agriculture Organization of the United Nations (page VI-16 – VI-19, 1978 Delta Plan). The State Water Board set an objective of 0.7 mmhos/cm EC during the summer irrigation season (April 1 through August 31) based on the salt sensitivity and growing season of beans and an objective of 1.0 mmhos/cm EC during the winter irrigation season (September 1 through March 31) based on the growing season and salt sensitivity of alfalfa during the seedling stage.

The State Water Board delayed implementation of the objectives pending negotiations by DWR, USBR, and SDWA concerning construction of physical facilities to protect agriculture in the southern Delta (permanent barriers or other devices). Because the negotiations were never completed, the 1991 Plan provided for a staged implementation of the objectives. The 1991 Plan called for implementation of the objectives at Vernalis and Brandt Bridge by 1994 and implementation of the objectives at the two Old River sites by 1996 unless a three-party agreement was reached between DWR, USBR, and SDWA. In the 1995 Plan, the State Water Board further delayed implementation of the EC objectives for the two Old River sites until December 31, 1997.

In D-1641, the State Water Board authorized a staged implementation of the southern Delta EC objectives. Pursuant to D-1641, USBR is required to meet the Vernalis EC objectives using any measures available to it. DWR and USBR also are required to meet an EC objective of 1.0 mmhos/cm at Brandt Bridge on the San Joaquin River, Old River near Middle River, and Old River at Tracy Road Bridge (the interior southern Delta stations) from March to September until April 1, 2005. As of April 1, 2005, D-1641 requires through their water right permits and license, that DWR and USBR meet an EC objective of 0.7 EC from April through August at the interior southern Delta stations.

In addition to the actions of the USBR and DWR to meet the southern Delta salinity objectives, additional actions required by the State and Regional Water Board have contributed to or are expected to contribute to attainment of the southern Delta salinity objectives. Releases from reservoirs on tributaries to the San Joaquin for fish and wildlife protection pursuant to the flow requirements on the San Joaquin River at Vernalis currently contribute to achieving the salinity objectives in the southern Delta. In addition, the State Water Board recently approved an amendment to the Water Quality Control Plan for the Central Valley Region to incorporate a Total Maximum Daily Load (TMDL) for the control of salt and boron discharges into the lower San Joaquin River to assist in ensuring compliance with the salinity objectives at Vernalis. Further, the Central Valley Regional Water Board is currently developing a proposed Basin Plan Amendment to establish new salinity and boron water quality objectives in the lower San Joaquin River upstream of Vernalis and a TMDL to implement the salinity and boron water quality objectives that when completed is expected to reduce saline discharges in the San Joaquin River. The Central Valley Regional Water Board also implemented its Conditional Waiver Program for Irrigated Lands in 2004 to reduce or eliminate discharges of pollutants to surface water bodies from Central Valley agricultural return flows and

stormwater runoff that currently contribute salt and other pollution to tributaries to the southern Delta.

The State Water Board provides funds through the State Revolving Fund Loan Program, the Agricultural Drainage Loan Program, the Agricultural Drainage Management Loan Program, Propositions 13, 40, and 50 grant funding through the Nonpoint Source Pollution Control Programs and Watershed Protection Programs that in part fund measures to reduce discharge of salt.

The Federal Water Pollution Control Act (Clean Water Act), as amended in 1987, provides for establishment of a State Revolving Fund loan program. The program is funded by federal grants and State bond funds. The purpose of the State Revolving Fund loan program is to implement the Clean Water Act and various State laws by providing financial assistance for the construction of facilities or implementation of measures necessary to address water quality problems and to prevent pollution of the waters of the State.

The State Revolving Fund Loan Program provides low-interest loan funding for construction of publicly-owned wastewater treatment facilities, local sewers, sewer interceptors, water reclamation facilities, as well as expanded use projects such as implementation of nonpoint source projects or programs, development and implementation of estuary Comprehensive Conservation and Management Plans, and stormwater treatment.

The Agricultural Drainage Loan Program was created by the Water Conservation and Water Quality Bond Act of 1986, to address treatment, storage, conveyance, or disposal of agricultural drainage water that threatens waters of the State. There is a funding cap of \$20 million for implementation projects and \$100,000 for feasibility studies. Loan repayments are for a period of up to 20 years.

The Agricultural Drainage Management Loan Program provides loan and grant funding for Drainage Water Management Units. Drainage Water Management Units are land and facilities for the treatment, storage, conveyance, reduction or disposal of agricultural drainage water that, if discharged untreated, would pollute or threaten to pollute the waters of the state. This program is available to any city, county, district, joint power authority, or other political subdivision of the state involved with water management.

The Prop. 13 Nonpoint Source Pollution Control Program provides grant funding for projects that protect the beneficial uses of water throughout the state through the control of nonpoint source pollution. Loans are available to local public agencies and nonprofit organizations formed by landowners to prepare and implement local nonpoint source plans. Sixty percent of the funds will be allocated to projects in the Counties of Los Angeles, Orange, Riverside, San Diego, San Bernardino, and Ventura. Forty percent of the funds are to be allocated to projects in the remaining counties.

Discussion

The State Water Board received information from several parties concerning the southern Delta agricultural salinity objectives. Some of that information concerned potential changes to the objectives or the program of implementation, while much of the information was related to other matters or proceedings outside of the scope of the review of the objectives. The SJRGA advocated increasing the salinity objectives at Vernalis to 1.0 mmhos/cm throughout the year and eliminating the objectives during August, September, and October of below normal, dry, and critically dry years. The San Joaquin River Water Authority Exchange Contractors (SJEC) also argued for increasing the 0.7 mmhos/cm southern Delta EC objectives to 1.0 mmhos/cm or higher. DWR and SWC did not recommend any specific changes to the salinity objectives; however, they did recommend that additional analyses be conducted to determine the appropriateness of the objectives. DWR also recommended various changes to the program of implementation to delay implementation of the 0.7 EC objective at the interior southern Delta sites until various actions occur. SWC also recommended a review of DWR's responsibility for implementing the objectives at Brandt Bridge. SDWA opposed increasing the salinity objectives and advocated increasing the effective period of the 0.7 EC objective from March 1 through September 30. CCWD, the Central Valley Regional Water Board, and the USEPA recommended that no changes be made to the southern Delta agricultural EC objectives.

The SJRGA provided a variety of scientific, economic, and policy testimony and exhibits in support of its recommendations to change the salinity objective at Vernalis.¹⁰ The SJRGA submitted evidence indicating that the current Vernalis water quality objective of 0.7 mmhos/cm EC during the irrigation season is not necessary to protect agricultural beneficial uses at Vernalis (including irrigation for beans, alfalfa, and corn). The SJRGA presented evidence that when considering rainfall, irrigation water salinities of 1.1 EC are adequate to provide 100 percent crop yields of beans and other crops grown in the southern Delta and thus a year round EC objective of 1.0 would conservatively protect all crops. The SJRGA pointed out that the original studies upon which the objectives were based, were conducted in pots without considering natural leaching by rainfall, using sub-irrigation of organic soils, which are rare in the southern Delta. The SJRGA argued that poor soil conditions, shallow water tables, and poor groundwater quality in the southern Delta along with other conditions affect crop yields in the southern Delta far more than the quality of the irrigation water supply within the ranges discussed (0.7 mmhos/cm-1.1 mmhos/cm). The SJRGA further stated that the current objectives are not applicable to southern Delta agriculture because there is no established economic link between southern Delta crop yields and Vernalis salinity, and there are very few salt sensitive crops (beans) grown in the area.

The SJRGA also argued, based on new CALSIM II Delta hydrodynamic modeling studies, that changing the Vernalis salinity objective would not substantially affect

¹⁰ The SJRGA did not comment specifically regarding the objectives at the other three southern Delta locations.

water quality due to the need to meet other regulatory requirements. The SJRGA stated that even if changes in salinity were to impact crop yields, the economic impacts would be minimal. The SJRGA further argued that there should be no salinity objectives at all at Vernalis during August, September, and October in below normal, dry, and critical years because few if any diverters have the right to divert high quality water at those times of year. (SJRGA-4, 5, 6, 7, 8, 34.)

The SJEC argued that the current 0.7 EC objective is detrimental to beneficial uses because it is unnecessarily low and thus prevents needed discharges to the San Joaquin River of higher salinity water. The SJEC argued that higher objectives are necessary to allow discharges to the San Joaquin River until a drainage solution is arrived at for discharging high salinity agricultural drainage water outside of the San Joaquin Valley in order to avoid salt accumulation in the San Joaquin Valley and the resulting destruction of productive farmland. The SJEC submitted evidence that 100 percent crop yields could be achieved for beans with irrigation water salinities as high as 2.0 mmhos/cm EC if the appropriate leaching fraction is used (the fraction of applied water that must deep percolate) and even higher salinity water if frequent irrigation occurs and rainfall is considered. In addition, the SJEC presented testimony that while the State Water Board based the 0.7 mmhos/cm EC objective on the salt sensitivity of beans, beans currently only represent about 5 percent of the crops grown downstream of Vernalis. (SJEC-1 and 2.)

DWR recommended that the State Water Board not change the salinity objectives at this time. DWR did request that the State Water Board modify footnote 5 of Table 2 (requiring implementation of the Old River objectives by December 31, 1997) to provide that the 0.7 EC objective at the interior southern Delta sites need not be implemented until the end of 2008. DWR also recommended that the State Water Board include a provision in the program of implementation that states that the 0.7 EC objective would not be required at the three interior Southern Delta stations until: (1) permanent operable barriers are constructed; and (2) more information is obtained to determine if the 0.7 EC objective is needed for crops in the southern Delta. DWR stated that the current installation of temporary rock barriers is not adequate to meet the 0.7 EC objective at the interior southern Delta sites during drier years. While modeling for the permanent operable barriers shows that operations of the permanent barriers will meet the interior southern Delta objectives under most conditions except at Brandt Bridge, modeling shows that the 0.7 EC objective will not be met at Brandt Bridge during the summer and when the EC at Vernalis is either at or above the objectives due to local degradation. As a result, DWR requested a delay in the effective date of the 0.7 EC objective in order to allow time to complete the environmental review and construction of the South Delta Barriers Project (part of the South Delta Improvements Program or SDIP). (DWR-21, 22, and 26.)

The SWC advocated a reexamination of the 0.7 southern Delta EC objective to determine if the objective is reasonable and necessary to protect crops. In addition, the SWC requested that the State Water Board specify in the program of implementation that the SWP is not responsible for meeting the Vernalis salinity

objectives because the SWP does not have any facilities or water users who impact water quality upstream of Vernalis. Further, the SWC stated that DWR should not be responsible for the objectives at Brandt Bridge and, instead, the objectives should be met by cleaning up the source of degradation. The SWC argued that there are discharges to the San Joaquin River downstream of Vernalis and upstream of Old River that result in degradation to water quality between 0.1 and 0.2 mmhos/cm EC that make it impossible to meet the objectives at Brandt Bridge if Vernalis water quality is near the objectives. The SWC further argued that because the majority of the water quality degradation occurs upstream of Old River, reducing the flow split into Old River by reducing pumping at DWR's Banks Pumping Plant or closing the Head of Old River Barrier provides minimal benefits because any increased flows would also violate the objectives. Accordingly, the SWC stated that Brandt Bridge should be considered a San Joaquin River station for which DWR is not responsible rather than a Delta station because there is no means by which either the SWP or barrier operations can alter water quality at the site. (SWC-11)

SDWA submitted testimony opposing any increase in the southern Delta EC objectives, and advocated increasing the effective period of the 0.7 EC objective from March 1 through September 30. In addition, SDWA stated that the State Water Board should add additional water quality compliance locations in the southern Delta after the range of barrier operations and circulation regimes has been determined for the SDIP. SDWA argued that the current objectives are necessary to protect crops grown in the southern Delta given the soil conditions in the area. SDWA stated that there are various mineral and other soil types (more than 70) in the southern Delta with different permeability rates that support the need for low salinity irrigation water. SDWA claimed that farmers in the southern Delta have experienced yield reductions related to salt accumulation in the soil. SDWA stated that the fact that USBR and DWR state that they cannot meet certain southern Delta water quality objectives is not a reason to change the objectives since USBR and DWR have not employed all available methods for meeting the objectives, including those recommended by SDWA that would not degrade water quality or reduce supplies for any other party. SDWA also submitted evidence and testimony to refute recommendations by the SJRGA and the SJEC. SDWA stated that there has been no long-term change in crop patterns or in irrigation methodology that affects crop tolerance to irrigation salinity. SDWA pointed out that the previous analyses on which the State Water Board based its objectives did not consider complicating factors such as variations in salinity tolerance at different stages of plant growth, cultural soil compaction, commercially necessary departures from "as needed" irrigation, variations in leach fraction with time during the crop season, root aeration problems which occur when soaking for high leach, soil variations within fields, or soil damage by precipitation. SDWA submitted evidence indicating that southern Delta soils have very low permeability and achieve low leach fractions. SDWA explained that there are numerous complicating factors associated with leaching salts from various crops including: harvesting practices that prevent irrigation or cause soil compaction on wet soils; limited precipitation during most of the growing season for many crops; seedling salinity sensitivity; difficulty in achieving leaching throughout the entire root

zone of deep rooted plants in Delta soils; weed and pest control activities that limit irrigation practices; and risk of drowning to tree crops from prolonged soaking.

SDWA specifically responded to the report submitted by the SJRGA and referenced by the SJEC titled *An Approach to Develop Site-Specific Criteria for Electrical Conductivity to Protect Agricultural Beneficial Uses that Accounts for Rainfall* authored by Isidoro-Ramirez, et. al., which concludes that an EC of 1.1 mmhos/cm is protective of beans (and consequently all other crops) in the Davis area where the analyses were conducted. SDWA pointed out that the report does not cite any new field tests or laboratory tests not previously reported, but instead relies on a mathematical relationship to develop a recommendation to avoid yield losses for beans. SDWA stated that the report was based on hypothetical conditions in the Davis area, and that various parameters would need to be revised in order to apply the report to southern Delta conditions. SDWA stated that the southern Delta area is substantially different than the Putah Creek area of Davis for which the report was prepared, including soil types, permeability of those soils, rainfall and climate, and the existence of high water tables in the southern Delta that cause upward movement of salts and prevent effective leaching. (SDWA-4, 5, 6, 7, 8, and 9A.)

CCWD stated that it strongly opposes changing, back to 1.0 EC, the April through August 0.7 EC objective that became effective April 1, 2005. CCWD asserted that the current drinking water quality objectives in the Delta are inadequate to protect drinking water supplies and that the current southern Delta agricultural EC objectives provide incidental protection for drinking water quality. CCWD argued that increasing the 0.7 EC objective would constitute backsliding in contradiction to the State Water Board's and the federal government's anti-degradation (backsliding) policies. CCWD asserted that such a change would result in direct adverse impacts to drinking water quality for CCWD and CVP and SWP customers. CCWD further argued that relaxing the existing objective would, at certain times, dramatically increase Delta salinity up to 85 mg/L chloride and increase the concentration of bromides at Delta drinking water intakes. (CCWD-20.)

The Central Valley Regional Water Board recommended that the State Water Board not make any changes to the southern Delta EC objectives at this time. The Central Valley Regional Water Board refuted the statement by the SJEC that an objective of as high as 2.5 mmhos/cm is reasonable within historic cropping patterns. The Central Valley Regional Water Board stated that southern Delta cropping patterns demonstrate that agricultural uses are likely impaired in the area due to high saline irrigation water. In response to the argument by various witnesses that higher levels of irrigation water salinity can be tolerated if additional water is applied to increase the leaching fraction, the Central Valley Regional Water Board stated that none of the information presented during the workshop adequately refutes the State Water Board's previous findings that an EC of 0.7 is protective of all crops on all soil types in the southern Delta. The Central Valley Regional Water Board stated that the conclusions reached by the various witnesses would require special cropping or water management, which would shift the costs from the dischargers to the water users. Regarding the paper titled *An Approach to Develop Site-Specific Criteria for*

Electrical Conductivity to Protect Agricultural Beneficial Uses that Accounts for Rainfall submitted by the SJRGA (SJRG-03), the Central Valley Regional Water Board pointed out that the study only covers soil, rainfall, and other conditions specific to the Davis area. The Central Valley Regional Water Board stated that there is no new science to justify changing the objectives or to discount the science on which the objectives were originally based. (RB5-02 and 03.)

The USEPA commented that they do not believe there is sufficient scientific or technical evidence at this time to support changes in the EC objectives because, in addition to other reasons, information from the crop studies is not specific to conditions in the Delta. (USEPA-04.)

While the SJRGA and the SJEC submitted evidence to indicate that a salinity objective of 0.7 EC is not necessary to protect southern Delta agriculture, that information was not specific to the southern Delta. Given the unique soil conditions in the southern Delta and other complicating factors discussed by SDWA, the scientific analyses of irrigation crop salinity needs presented by various parties cannot be correlated to conditions in the southern Delta without further field studies to verify such results. Further, other factors may also alter irrigation salinity needs such as irrigation practices and depth to water table that would need to be investigated before considering changes to the objectives. In addition, adequate information is not available to support expanding the effective period of the 0.7 mmhos/cm EC objectives to apply during March and September at this time. As a result, additional field analyses are needed to confirm any recommendations for changes in the salinity objectives before any modifications are made to the objectives. As discussed, the State Water Board recommends conducting an independent scientific investigation (similar to the investigation on which the objectives are based) to review the issues raised during this review in greater detail. While parties recommended changes to the objectives based on testimony and evidence from various sources, that evidence was not specific to conditions for crops grown in the southern Delta. However, the State Water Board may consider making changes to the southern Delta EC objectives in the future based on additional analyses concerning the irrigation water quality needs of crops grown in the southern Delta. The State Water Board will convene a series of workshops beginning in January 2007 to discuss, among other topics, undertaking an independent scientific investigation of irrigation salinity needs in the southern Delta (similar to the investigation on which the objectives are based). The purpose of the scientific investigation will be to review the issues raised during this review in greater detail and to provide a foundation for supporting the objectives or making changes to the objectives in the future based on studies specific to the southern Delta.

The State Water Board recognizes that permanent barriers (or operational gates) have not been installed in the southern Delta to assist in achieving the southern Delta EC objectives and that even when the barriers are installed, they may not always be adequate to fully meet the objectives at the Old River sites and will not assist in achieving the objectives at Brandt Bridge on the San Joaquin River. Accordingly, additional implementation measures may be needed to achieve full

implementation. The State Water Board considered these issues when it issued D-1641 and when it conditioned the water rights of DWR and USBR on implementation of the southern Delta EC objectives, the State Water Board established a procedure for the Executive Director of the State Water Board to evaluate any exceedance of the objectives at stations C-6, C-8, or P-12 before recommending whether enforcement action is appropriate or the exceedance is the result of actions beyond the reasonable control of DWR or USBR. If DWR or USBR believes that changes in its water rights are warranted it may petition to change its water rights or petition to add other responsible parties to share in the responsibility for implementing the objectives.

Central Valley Salinity

As a result of a joint State Water Board and Regional Water Board workshop on salinity issues in the Central Valley in January of 2006, the State Water Board directed creation of a joint panel of Regional and State Water Board staff to develop a plan to address salinity issues in the Central Valley. The panel is currently preparing a report for the State Water Board with its findings and recommendations.

Conclusion

The State Water Board does not have adequate evidence on which to base substantive changes to the southern Delta EC (salinity) objectives for the protection of agricultural beneficial uses at this time. Therefore, these objectives remain unchanged in the 2006 Plan. The State Water Board will receive additional information on the objectives and their implementation beginning in January 2007.

Footnote 5 of Table 2 of the 1995 Plan states that the 0.7 mmhos/cm EC objective will be implemented at the two Old River sites by December 31, 1997. The 2006 Plan deletes this footnote because it is obsolete. Currently, DWR and USBR are responsible for meeting both the 1.0 and the 0.7 EC objectives at these sites. The 2006 Plan also deletes the statement in Table 2 of the 1995 Plan regarding a three-party contract, since the objectives have already been implemented. As necessary, the State Water Board may review the southern Delta EC objectives or their implementation in the future as conditions warrant.

The State Water Board may consider additional measures for meeting the southern Delta salinity objectives through both its water rights and water quality authorities. The State Water Board will provide adequate notice and opportunity for hearing as appropriate before adopting additional measures. The Regional Water Board shall continue to implement the recently adopted TMDL for the control of salt and boron discharges into the lower San Joaquin River to assist in ensuring compliance with the salinity objectives at Vernalis. Further, the Regional Water Board shall continue to develop a proposed basin plan amendment to establish new salinity and boron water quality objectives in the lower San Joaquin River upstream of Vernalis and a TMDL to implement the salinity and boron water quality objectives. In addition, the Regional Water Board should use the Conditional Waiver Program for Irrigated

Lands adopted in 2004 to eliminate high salinity discharges to the southern Delta to the extent feasible. Other agencies also should act, as discussed in the program of implementation, to assist in achieving the southern Delta salinity objectives. In addition, any measures recommended by the joint State and Regional Water Board's recently convened panel on addressing salinity issues in the southern Delta should also be pursued as appropriate.

11. Additional issues regarding the 1995 Plan

The two following issues, though not considered during the periodic review, were addressed in the 1995 Plan: Narrative Objective for Brackish Tidal Marshes of Suisun Bay; and Dissolved Oxygen Objective for the San Joaquin River between Turner Cut & Stockton.

a. Narrative Objective for Brackish Tidal Marshes of Suisun Bay

The purpose of the narrative objective is to provide water quality conditions necessary to achieve a brackish marsh throughout all elevations of tidal marsh bordering Suisun Bay. The brackish tidal marsh provides critical habitat to a number of species listed under the State and federal Endangered Species acts.

Table 3 of the Plan states that the salinity objectives for the Suisun Marsh can be implemented either by ensuring that salinity does not exceed the numerical salinity values, or by providing equivalent or better protection for fish and wildlife at the locations of the compliance stations. The program of implementation of the 1995 Plan recommended the formation of a Suisun Marsh Ecological Workgroup (Workgroup) consisting of representatives of various State, federal, and private agencies as well as other interested parties. The 1995 Plan states that the Workgroup will conduct various tasks, including identifying specific measures to implement the narrative objective and making recommendations to the State Water Board regarding achievement of this objective and whether numeric objectives should replace it.

The Workgroup's study results were published in the November 2001 Suisun Ecological Workgroup Final Report to the State Water Board. Due to the varying salinity requirements of the different beneficial uses in the Suisun Marsh ecosystem, the Workgroup was unable to develop a single recommendation for a numeric objective.

In 2001 the Suisun Marsh Charter Group¹¹ was formed to resolve the issues of amending the SMPA and recover endangered species. The broader purpose of the Suisun Marsh Charter Group is to develop and agree on a long-term implementation plan. The Suisun Marsh Charter Group Principals¹² are currently preparing a

¹¹ The Suisun Marsh Charter Group member agencies include USFWS, USBR, DFG, DWR, State Water Board, CBDA and NOAA Fisheries.

¹² The Suisun Marsh Charter Group Principals agencies include Suisun Resource Conservation District, DFG, DWR, USBR, CBDA, NOAA Fisheries, and USFWS.

Programmatic Environmental Impact Statement/Environmental Impact Report (PEIS/EIR) for the Habitat Management, Preservation, and Restoration Plan for the Suisun Marsh (Suisun Marsh Plan). The proposed Suisun Marsh Plan would be consistent with the goals and objectives of the Bay-Delta Program, and would balance them with the SMPA, federal and State Endangered Species Acts and other management and restoration programs within the Suisun Marsh in a manner responsive to the concerns of all stakeholders and based upon voluntary participation of private landowners. In the preparation of the Suisun Marsh Plan, the Principal Suisun Marsh agencies are evaluating Plan alternatives with a tidal wetland habitat restoration component ranging from 3,000 to 36,000 acres.

State Water Board staff will use the results of the final PEIS/EIR and the resulting Suisun Marsh Plan to determine what, if any, changes need to be made in the numeric salinity objectives and time periods for meeting the objectives. The target date for meeting the objective shall be January 1, 2012. However, the objectives can be changed before that date as the result of the Suisun Marsh Plan being prepared by the Suisun Marsh Charter Group.

b. Dissolved Oxygen Objective (San Joaquin River between Turner Cut & Stockton)

The dissolved oxygen (DO) objective in Table 3 of the Plan requires a dissolved oxygen level of 6.0 mg/l from September through November in the San Joaquin River between Turner Cut and Stockton.

The purpose of the DO objective is to protect migrating fall-run chinook salmon in the San Joaquin River. Reduced DO levels can cause physiological stress and increased mortality to fish in addition to delaying or blocking upstream migration. Factors which contribute to low DO levels in the lower San Joaquin River include: the Stockton Wastewater Treatment Plant; upstream sources of biochemical oxygen demand (BOD); the deepened Stockton Deep Water Ship Channel (DWSC); the enlarged turning basin at the Port of Stockton; and low river flows in the fall.

The State Water Board initially adopted the current DO objective as part of the 1991 Plan. The objective was unchanged in the 1995 Plan except for the addition of footnote 4. Footnote 4 states, "If it is infeasible for a waste discharger to meet this objective immediately, a time extension or schedule of compliance may be granted, but this objective must be met no later than September 1, 2005." The program of implementation for the 1995 Plan identifies several feasible measures to implement the DO objective including: regulating the effluent discharged from the Stockton Wastewater Treatment Plan and other upstream discharges that contribute to the BOD load; providing adequate flows in the San Joaquin River; and installing barriers at locations (head of Old River) to increase flows in the river past Stockton. The program of implementation of the 1995 Plan states that the San Joaquin River flow objectives are expected to assist in meeting the DO objective and that additional flow-related measures will be considered by the State Water Board during a water rights proceeding.

In D-1641, the State Water Board directed the Central Valley Regional Water Board to establish a TMDL to address the DO impairment in the San Joaquin River. In November of 2005, the State Water Board approved the Amendment to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins to Control Factors Contributing to DO Impairment in the Stockton DWSC (DO basin plan amendment), which includes a TMDL. The DO basin plan amendment addresses both the 1995 Plan DO objective and the DO objective included in the Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin. The DO basin plan amendment identifies the following three main factors contributing to the DO impairment. First, upstream releases of oxygen-demanding substances react by various mechanisms in the Stockton DWSC to reduce DO concentrations. Second, the Stockton DWSC geometry intensifies the impact of these various reaction mechanisms such that net oxygen demand exerted in the Stockton DWSC is increased. Third, the reduced flow through the Stockton DWSC increases the residence time for these various reaction mechanisms, further increasing net oxygen demand exerted in the Stockton DWSC. The basin plan amendment assigns 100 percent responsibility to each of these factors and establishes a phased approach to corrective actions to address each factor.

To address sources of oxygen demanding substances and their precursors, the basin plan amendment requires completion of scientific studies needed to obtain information for more detailed allocation and eventual implementation of alternate measures by those responsible for the various sources and phased implementation of discharge requirements. The basin plan amendment prohibits the discharge of oxygen demanding substances or their precursors into waters tributary to the Stockton DWSC portion of the San Joaquin River after December 31, 2011, when flows in the Stockton DWSC portion of the San Joaquin River are less than 3,000 cfs, unless DO objectives are being met. The basin plan amendment also prohibits any increase in the discharge of oxygen demanding substances or their precursors into waters tributary to the Stockton DWSC portion of the San Joaquin River after the effective date of the basin plan amendment. The prohibitions do not apply however, if the discharge is regulated by a waiver of waste discharge requirement, or individual or general waste discharge requirements, or NPDES permits which implement the Control Program for Factors Contributing to the DO Impairment in the Stockton DWSC (or there is a finding that the discharge will not contribute to the DO impairment). The basin plan amendment requires parties responsible for point and non-point sources of oxygen demanding substances and their precursors to perform studies by December of 2008 to identify and quantify the sources, growth or degradation mechanisms, and impacts of oxygen demanding substances in the area of concern in order to determine allocation and implementation provisions.

To address DO impacts caused by the geometry of the Stockton DWSC, the basin plan amendment: requires future projects that increase the cross-sectional area of the Stockton DWSC geometry to evaluate and fully mitigate for potential impacts on DO; requires the U.S. Army Corps of Engineers (USCOE) to evaluate the impacts of the Stockton DWSC on DO concentrations; and recommends that the USCOE

mitigate for these impacts. To address the impacts of reduced flows on DO, the TMDL recommends: that the State Water Board consider amending current water right permits and conditioning future water right permits or transfers to mitigate for impacts of reduced flows on DO; and that agencies responsible for existing or future projects that may reduce flow through the Stockton DWSC mitigate impacts on DO. The basin plan amendment states that development of alternative measures to address non-load related factors will be required by December 31, 2011. (SWRCB-03)

In order to allow additional time for studies to be completed pursuant to the Central Valley Regional Water Board's basin plan and for various measures specified in the basin plan to be implemented, footnote 4, which requires the objective to be met by September 1, 2005, should be deleted. Currently, there is inadequate scientific understanding to support detailed load allocations to sources of oxygen demanding substances and their precursors. Instead of the footnote, the program of implementation in the 2006 Plan requires that the objective be met by January 1, 2012. However, if adequate progress on addressing the DO impairment is not being made, the State Water Board may require additional measures to ensure implementation of the objective. After the studies are completed in December of 2008, the State Water Board may also reevaluate this timeline.

The 2006 Plan makes several new recommendations to other agencies in the program of implementation. The other agencies should assist in implementing the measures in the basin plan amendment and other projects to help achieve the DO objective.

The DO objective was not identified as an issue upon which to receive evidence during the review workshop for the 1995 Plan. The 2006 Plan requires in the program of implementation that the objective be met by January 1, 2012.

V. California Environmental Quality Act Review

A. Overview

The Secretary for Resources has certified the basin planning process of the State Water Board under Water Code sections 13240 et seq., as meeting the requirements of Public Resources Code section 21080.5. Accordingly, documentation in the basin plan may be used in lieu of an environmental impact report or negative declaration. A substitute document under section 21080.5 must include either alternatives to the activity and mitigation measures to reduce any significant or potentially significant effect that the project may have on the environment or a statement that the project would not have a significant impact on the environment. A checklist or other documentation that shows the possible effects that were considered when reaching the decision must support this statement.

The following environmental checklist form was prepared in compliance with CEQA requirements and to assist in identifying potential impacts and outlining mitigation measures. The checklist is followed by discussion of each of the 17 categories of impact.

B. Environmental Checklist Form

1. Project Title

2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary

2. Lead Agency Name and Address

State Water Resources Control Board
Division of Water Rights
P.O. Box 2000
Sacramento, CA 95812

3. Contact Person and Phone Number

Gita Kapahi, Chief, Bay-Delta and Special Projects Unit
(916) 341-5289
gkapahi@waterboards.ca.gov

4. Project Location

San Francisco Bay/Sacramento-San Joaquin Delta Estuary, California

5. General Plan Designation

Not Applicable

6. Zoning

Not Applicable

7. Introduction

Following a review of the 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (1995 Plan) the State Water Board conducted a workshop to evaluate new information for consideration of new water quality objectives or changes to the objectives specified in the 1995 Plan. Based on that review, the State Water Board determined that only minor changes should be made to the 1995 Plan. The proposed changes to the 1995 Plan are incorporated in the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (2006 Plan) and discussed below.

8. Environmental Setting

The San Francisco Bay/Sacramento-San Joaquin Delta Estuary and Suisun Marsh (herein after collectively referred to as 'the Delta') are located at the confluence of California's two major river systems, the Sacramento River and San Joaquin River, and the San Francisco Bay. The Delta (as defined in Water Code section 12220) encompasses a combined total of approximately 851,000 acres (of which approximately 135,000 acres consist of waterway, marshland, or other water surfaces) and is one of the country's largest and most important estuarine systems for fish and waterfowl production on the Pacific Coast. Additionally, the Delta is one of California's most fertile and important agricultural regions, and its tributary watersheds provide water for about two-thirds of California's municipal, industrial, and agricultural water users. Land uses within and surrounding the Delta include agricultural, industrial, and municipal uses. For additional information regarding the environmental setting for this project, please see Chapter III of the November 1999 *Final Environmental Impact Report for Implementation of the 1995 Water Quality Control Plan*. (SWRCB-18)

9. Project Description

The proposed project is adoption of the 2006 Plan following a review of the 1995 Plan. The purpose of adopting the 2006 Plan is to update and make other changes to the measures in the 1995 Plan based on recent information. The 2006 Plan establishes water quality control measures that contribute to the protection of beneficial uses in the Bay-Delta Estuary. The plan consists of: (1) beneficial uses to be protected; (2) water quality objectives for the reasonable protection of beneficial

uses; and (3) a program of implementation for achieving the water quality objectives. Together, the beneficial uses and the water quality objectives established to protect them constitute water quality standards under the terminology of the federal Clean Water Act.

Where any inconsistencies exist, the 2006 Plan supersedes the 1995 Plan and all other preceding plans. The 2006 Plan makes only minor changes to the 1995 Plan, as described below. No changes have been made to the beneficial uses. Minor changes have been made to notes in Table 2 for the EC objectives for agricultural beneficial uses for the southern Delta (see Table 2) and in Table 3 for the Water Quality objectives for Fish and Wildlife Beneficial Uses for DO and western Suisun Marsh salinity (see Table 3). The footnotes for Table 3 have been changed to be consistent with the footnotes for Table 3 on pages 185-187 of D-1641. Likewise, other changes have been made for consistency with D-1641. These changes represent existing conditions. The environmental effects of these changes were analyzed in the Final Environmental Impact Report for Implementation of the 1995 Bay/Delta Water Quality Control Plan.

Because the State Water Board already has implemented the southern Delta EC objectives by amending water right permits and licenses pursuant to D-1641, footnote 5 of Table 2 of the 1995 Plan (stating that the objectives will be implemented at certain locations by December 31, 1997) is deleted, as is the note in Table 2 of the 1995 Plan addressing the southern Delta EC objectives (stating that if DWR, USBR, and SDWA have implemented a contract, the Board may respond by revising the objectives and compliance monitoring locations) is deleted. Similarly, footnote 7 of Table 3 (stating that the effective date for implementing salinity objectives at Chadbourne Slough at Sunrise Duck Club (Station S-21) is October 1, 1995) is deleted because the objectives already have been implemented at this site pursuant to D-1641.

Footnote 4 of Table 3 applying the dissolved oxygen objective in the 1995 Plan states that, "If it is infeasible for a waste discharger to meet this objective immediately, a time extension or schedule of compliance may be granted, but this objective must be met no later than September 1, 2005." The 1995 Plan program of implementation lists feasible measures to meet the objective and states that the State Water Board will consider additional flow related measures during the water rights proceeding. In D-1641, however, the State Water Board decided that it should not take any further action to implement the DO objective until the Central Valley Regional Board establishes a TMDL for the DO impairment on the San Joaquin River and implements it. In November of 2005, the State Water Board approved the Central Valley Regional Water Board's basin plan amendment and TMDL to address the DO impairment on the San Joaquin River.¹³ The DO basin plan amendment prohibits the discharge of oxygen demanding substances or their precursors into specified portions of the San Joaquin River after December 31, 2011. The TMDL also establishes interim requirements to establish additional information concerning

¹³ The DO basin plan amendment addresses both the 1995 Plan DO objective and the DO objective in the Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin.

the causes of the DO impairment and recommendations and requirements of other parties to ultimately meet the DO objectives. To make it consistent with the existing regulatory conditions concerning implementation of the DO objective, the 2006 Plan deletes the September 1, 2005 date in footnote 4 of the 1995 Plan for meeting the DO objective and substitutes a target date of January 1, 2012 in the program of implementation. The potential environmental effects of these changes are discussed in this section.

In addition, footnote 8 of Table 3 is deleted. The timeline for compliance with the objective is revised as it applies to Station S-97 (Cordelia Slough at Ibis Club) and Station S-35 (Goodyear Slough at Morrow Island Clubhouse) to allow additional time to investigate the appropriateness of the objectives. The Suisun Marsh Charter Group, consisting of private landowners and various state and federal agencies, has formulated a Restoration Plan that includes the regulation of the salinity in the channels of the Suisun Marsh. The Restoration Plan is currently being reviewed under the National Environmental Policy Act (NEPA) and CEQA in a report entitled *Programmatic Environmental Impact Statement/Environmental Impact Report (PEIS/EIR) for the Habitat Management, Preservation, and Restoration Plan for the Suisun Marsh*. When the environmental documentation is complete, the State Water Board will use the PEIS/EIR to determine whether changes should be made to the EC water quality objectives for the timeline for compliance with the EC objectives at stations S-35 and S-97 is amended in the 2006 Plan. Compliance with the EC objective at stations S-21 and S-42 is required as a condition of the water rights permits and licenses of the CVP and SWP.

The deletions update the plan to make it consistent with existing regulatory conditions and do not constitute substantive changes. In addition to the above changes to the footnotes in the objectives, the 2006 Plan makes several additional changes to the program of implementation in the 1995 Plan. Many of the changes result from updates to the information that was available for development of the 1995 Plan. Other changes add directions and recommendations to other agencies for activities that the other agencies should undertake to assist in achieving the objectives. The program of implementation for the 2006 Plan also contains several recommendations for studies and other activities. During the Plan Review workshop, it became clear that adequate scientific information is not currently available to determine whether changes should be made to the objectives in order to ensure the protection of the various beneficial uses, or to determine how to address certain water quality issues. Accordingly, the State Water Board makes several recommendations and plans for conducting proceedings to compile additional information on which to review various objectives in the future or to base implementation actions. As necessary, separate environmental documentation is being, or will be, carried out for these activities by the appropriate lead agencies.

More significantly, the program of implementation for the 2006 Plan makes changes to the implementation of the April 15 through May 15 San Joaquin River pulse flow objectives (pulse flow objectives) and changes to the Environmental Monitoring Program. These changes are the only changes to the program of implementation

from the 1995 Plan to the 2006 Plan that may have the potential to lead to a change in the environment. Accordingly, these issues and potential impacts are discussed in this section. Because these changes are consistent with current conditions, however, there will be no significant effects on the environment due to these changes.

The changes to the implementation of the pulse flow objectives authorize a staged implementation of the objectives to allow for scientific experimentation to determine whether the objectives are appropriate prior to final implementation. The first stage of implementation is to conduct the VAMP experiments through the SJRA until the end of 2011 in order to gather additional scientific information concerning flow needs under various conditions during the pulse flow period. The VAMP experiments will help to determine whether changes should be made to the pulse flow objectives. After 2011, the program of implementation specifies that the State Water Board should use the information obtained from the VAMP experiment to determine what if any changes to make to the pulse flow objectives. Following the determination of what if any changes should be made to the pulse flow objectives, the program of implementation specifies that the State Water Board will hold a water right hearing to assign long-term responsibility for meeting the flow objectives during the pulse flow period. These changes to the program of implementation for these objectives are consistent with the current implementation of the objectives in D-1641. Changes to the implementation of the pulse flow objectives are discussed in more detail in the program of implementation for the pulse flow objectives in the 2006 Plan and in the Issue Analysis in Part III of this report.

The 2006 Plan changes the Environmental Monitoring Program by modifying the existing program set forth in Table 4 of the 1995 Plan (Table 7 of the 2006 Plan) and Figure 2 of the 1995 Plan (Figure 5 of the 2006 Plan). The Environmental Monitoring Program specified in the 1995 Plan consists of 43 monitoring stations in the upper San Francisco Bay-Delta Estuary, extending from the Sacramento River at Hood to the San Joaquin River at Vernalis and west into San Pablo Bay. Of these, 20 stations are "Compliance Monitoring Stations", to measure compliance with the water quality objectives. Fifteen stations are "Baseline Monitoring Stations" operated to identify changes in the estuary. The remaining eight are "Compliance and Baseline Monitoring Stations", which perform both compliance and baseline monitoring functions.

The changes to the Environmental Monitoring Program in the 2006 Plan were proposed by USBR and DWR and have been reviewed by staff from various State and federal agencies, a science advisory group of independent scientists, and participants in three public meetings that included members of several consulting firms. The proposed amendments are as follows:

- (1) Add, reestablish, or move baseline monitoring elements at one compliance monitoring station (D29), seven compliance and baseline stations (C9, C10, D10, D12, D22, D24, and S42), and six baseline monitoring stations (C3, D7, D9, D11, D19, D41A);

- (2) Remove one baseline station (NZ080);
- (3) Modify station numbers and descriptions for four baseline monitoring stations (C3, D6, D28A, and P8);
- (4) Modify sampling interval description in footnotes to Table 4 of the 1995 Plan (Table 7 of the 2006 Plan) to avoid the spring-neap tide sampling bias; and
- (5) Modify the Table 4 of the 1995 Plan (Table 7 of the 2006 Plan) layout to include geographic coordinates and rearrange table columns to group the continuous monitoring and discrete monitoring activities.

USBR and DWR proposed the amendments to: (1) improve the scientific basis for the Environmental Monitoring Program and the usefulness of the resulting data by enhancing continuous, comprehensive, and shallow water monitoring reducing the spring-neap tidal bias; (2) improve Quality Assurance/Quality Control; (3) improve monitoring efficiency by consolidating neighboring stations; and (4) improve worker safety.

10. Earlier Analyses

Two environmental documents were previously prepared that address the proposed changes to the program of implementation for the pulse flow objectives through implementation of the VAMP by the SJRA. Those documents are the *Final Environmental Impact Report for Implementation of the 1995 Water Quality Control Plan* and the January 1999 *Final Environmental Impact Statement and Environmental Impact Report for Meeting Flow Objectives for the San Joaquin River Agreement 1999-2010* (SJRA EIS/EIR). Both of these documents are available for review at the State Water Resources Control Board, Division of Water Rights offices at 1001 I Street, Sacramento, CA 95812. In addition, the *Final Environmental Impact Report for Implementation of the 1995 Water Quality Control Plan* is available at <http://www.waterrights.ca.gov/baydelta/eir/> and the SJRA EIS/EIR is available at <http://www.sjrg.org/EIR/contents.htm>.

11. Other Public Agencies Whose Approval is Required

Water quality control plans and amendments to water quality control plans are regulatory and must be approved by the Office of Administrative Law before they are effective under California law. (Gov. Code, § 11353.) Additionally, newly adopted water quality standards and water quality standards that have been revised are subject to approval under the federal Clean Water Act and are to be submitted to the USEPA for approval.

12. Environmental Factors Potentially Affected

The environmental resource categories identified below are analyzed herein to determine whether the proposed project would result in adverse impacts to any of these resources. None of the categories below are checked because the proposed project is not expected to result in significant or potentially significant impacts to any of these resources. See the checklist on the following pages for more details.

- | | | | | | |
|--------------------------|----------------------|--------------------------|------------------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | Aesthetics | <input type="checkbox"/> | Agriculture Resources | <input type="checkbox"/> | Air Quality |
| <input type="checkbox"/> | Biological Resources | <input type="checkbox"/> | Cultural Resources | <input type="checkbox"/> | Geology/Soils |
| <input type="checkbox"/> | Hazards | <input type="checkbox"/> | Hydrology/ Water Quality | <input type="checkbox"/> | Land Use/ Planning |
| <input type="checkbox"/> | Mineral Resources | <input type="checkbox"/> | Noise | <input type="checkbox"/> | Population and Housing |
| <input type="checkbox"/> | Public Services | <input type="checkbox"/> | Recreation | <input type="checkbox"/> | Transportation |
| <input type="checkbox"/> | Utilities | <input type="checkbox"/> | Mandatory Findings of Significance | | |

On the basis of this initial evaluation

I find that the proposed project COULD NOT have a significant effect on the environment, and a FUNCTIONAL EQUIVALENT of a NEGATIVE DECLARATION will be prepared.

I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

I find that the proposed project MAY have a “potentially significant impact” or “potentially significant unless mitigated” impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

No potential significant impacts from this proposed action were identified

Reviewed By:

 Leslie F. Grober, Chief
 Hearings and Special Projects Section

 Date

13. Evaluation of Environmental Impacts

This Environmental Checklist has been prepared in compliance with the requirements of CEQA relating to certified regulatory programs.

1. AESTHETICS. Would the project:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The deletion of footnote 4 of Table 3 of the 1995 Plan and the addition of the revised date to the program of implementation of the 2006 Plan concerning the date by which the DO objective must be met are not expected to have any impacts on aesthetics. The objective has not yet been attained, and consequently the changes represent the current implementation of the objective and do not constitute a change in the environment. In addition, changing the date by which compliance with the DO objective is required does not involve any issues related to aesthetic resources.

The proposed change to move the substance of footnote 8 of Table 3 of the 1995 Plan to the program of implementation and extend the time for attainment of the EC objective is not expected to have any impacts on aesthetics. The objectives have not been attained. The State Water Board extended the date of required compliance at these locations by orders dated October 30, 1997, August 14, 1998, April 14, 1998, April 30, 1999 and November 1, 1999. Therefore, the proposed change does not constitute a change in the environment and does not involve any potential impacts related to aesthetic resources.

The proposed changes to the program of implementation for the pulse flow objectives are not expected to have any impacts on aesthetics. Pursuant to D-1641, the interim VAMP target flows have been implemented through the SJRA since 2000. D-1641 implements the pulse flow objectives upon expiration or termination of the SJRA. Since the changes to the program of implementation ratify the staged implementation of the objectives that has been in place since 2000, there will be no change in the environment due to the proposed changes to the program of implementation for the pulse flow objectives. Further, implementation of the VAMP target flows through the SJRA was previously adequately analyzed in the *Final Environmental Impact Report for Implementation of the 1995 Water Quality Control Plan* and in the SJRA EIS/EIR. In addition, both the range of flows included in the pulse flow objectives and the range of flows included in the VAMP are well within the historic range of flows experienced on the San Joaquin River. Accordingly, there is no potential for any significant impacts to visual resources.

The changes to the program of implementation for the Environmental Monitoring Program are not expected to have any effects on aesthetics. The changes already implemented by DWR and USBR include: movement of the baseline monitoring stations an insignificant distance from their original locations; changes in the sampling interval for discrete sampling; modification of station numbers; removal of one baseline station not mandated by D-1641; modification of Table 4 of the 1995 Plan (Table 7 of the 2006 Plan) to include geographic coordinates and rearrange table columns; and updates to Figure 2 of the 1995 Plan (Figure 5 of the 2006 Plan).

2. **AGRICULTURAL RESOURCES.** In determining whether impacts to agricultural resources are significant environmental impacts, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping & Monitoring Program of the California Resources Agency, to non-agricultural uses?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?

The deletion of footnote 4 of Table 3 of the 1995 Plan and the addition of the revised date to the program of implementation of the 2006 Plan concerning the date by which the DO objective must be met is not expected to have any impacts on agricultural resources. As discussed above, the change represents the current implementation of the objective and does not constitute a change in the environment. In addition, changing the effective date of the DO objective will not result in conversion of any farmland to non-agricultural uses.

The proposed change that moves footnote 8 of Table 3 of the 1995 Plan to the program of implementation is not expected to have any impacts on agricultural resources. As discussed above, the objectives have not been implemented, and therefore the delay in implementation does not constitute a change in the environment. In addition, changing the effective date of these EC objectives will not result in conversion of any farmland to non-agricultural uses.

There is no potential for the proposed changes to the program of implementation for the pulse flow objectives to significantly impact agriculture. As discussed above, the changes to the program of implementation for the pulse flow objectives represent current environmental conditions that have been previously adequately analyzed pursuant to CEQA. In addition, there is no potential for the proposed project to convert any farmland to non-agricultural uses or to conflict with existing zoning for agricultural use, or a Williamson Act contract. Further, the pulse flow objectives are intended to protect fish and wildlife beneficial uses. Additional implementation measures are included in the 2006 Plan for the protection of agricultural beneficial uses.

There is no potential for the proposed changes to the program of implementation for the Environmental Monitoring Program to significantly impact agriculture. As discussed above, these changes to the program of implementation will not affect the physical environment through the movement of baseline monitoring stations an insignificant distance. The other changes - the modification of the sampling interval and station numbers, the addition of GIS coordinates and the arrangement of table columns - are clerical in nature. Therefore, these changes will have no impact on agricultural resources.

3. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Create objectionable odors affecting a substantial number of people?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The deletion of footnote 4 of Table 3 of the 1995 Plan and the addition of the revised date to the program of implementation of the 2006 Plan concerning the date by which the DO objective must be met are not expected to have any impacts on air quality. As discussed above, the change represents the current implementation of the objective and does not constitute a change in the environment. In addition, changing the effective date of the DO objective does not involve any air quality issues.

The proposed change that moves footnote 8 of Table 3 of the 1995 Plan to the program of implementation is not expected to have any impacts on air quality. As discussed above, the change does not constitute a change in the environment. In addition, changing the effective date of these EC objectives does not involve any air quality issues.

There is no potential for the proposed changes to the program of implementation for the pulse flow objectives to significantly impact air quality. As discussed above, the changes to the program of implementation represent current environmental

conditions that have been previously adequately analyzed pursuant to CEQA. In addition, the proposed changes involve water flows on the San Joaquin River for fish and wildlife protection. Accordingly, the proposed changes do not have any air quality effects.

There is no potential for the proposed changes to the program of implementation for the Environmental Monitoring Program to significantly impact air quality. As discussed above, the changes to the program of implementation involve the movement of some baseline monitoring stations insignificant distances as well as additional clerical changes. Therefore, the proposed changes will not have any air quality effects.

4. BIOLOGICAL RESOURCES. Would the project:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the DFG or USFWS?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the DFG or USFWS?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Have a substantial adverse effect on federally-protected wetlands as defined by Section 404 of the federal Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption or other means?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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| d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory corridors, or impede the use of native wildlife nursery sites? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

The deletion of footnote 4 of Table 3 of the 1995 Plan and the addition of the revised date to the program of implementation of the 2006 Plan concerning the date by which the DO objective must be met are not expected to have any impacts on biological resources. As discussed above, the change represents the current implementation of the objective and does not constitute a change in the environment. Once the objective is implemented, the objective is expected to benefit biological resources. However, additional time is needed to develop information prior to full implementation of the objective.

The proposed change that moves footnote 8 of Table 3 of the 1995 Plan to the program of implementation is not expected to have any significant impact on biological resources. As discussed above, the change concerning the date by which the EC objective must be met at S-35 and S-97 does not constitute a change in the environment.

There is no potential for the proposed changes to the program of implementation for the pulse flow objectives to significantly impact biological resources. As discussed above, the changes to the program of implementation represent current environmental conditions. Accordingly, there is no change to the environment due to changing the program of implementation to describe those conditions. While the pulse flow objectives were included in the 1995 Plan, those objectives have not been implemented. Instead, in D-1641 the State Water Board implemented the VAMP study target flows through the SJRA on an interim basis. Pursuant to the SJRA, signatories to the agreement agreed to provide flows for a period of 12 years. The State Water Board also conditioned USBR's storage permits for New Melones Reservoir for the term of the SJRA to provide backstops adequate to allow the conduct of the VAMP pursuant to the provisions of the SJRA. The proposed changes to the program of implementation conform to the timeline for implementation of the objectives that was authorized in D-1641 and that has been

conducted since 2000. Accordingly, there is no change in the environment. In addition, as mentioned above, implementation of the VAMP study flows through the SJRA was previously adequately analyzed pursuant to CEQA. Further, completion of the VAMP study is expected to improve scientific understanding regarding flow needs on the San Joaquin River during the pulse flow period. As such, conduct of the VAMP will likely benefit biological resources, specifically fall-run chinook salmon in the San Joaquin River, by providing more conclusive information on which to base flow and export objectives during the pulse flow window.

There is no potential for the proposed changes to the program of implementation for the Environmental Monitoring Program to significantly impact biological resources. As discussed above, the changes to the program of implementation involve the movement of some baseline monitoring stations insignificant distances as well as additional clerical changes. Therefore, the proposed changes will not significantly impact biological resources.

5. CULTURAL RESOURCES. Would the project:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The deletion of footnote 4 of Table 3 of the 1995 Plan and the addition of the revised date to the program of implementation of the 2006 Plan concerning the date by which the DO objective must be met are not expected to have any impact on cultural resources. As discussed above, the change reflects the current implementation of the objective and does not constitute a change in the environment. In addition, changing the effective date of the DO objective does not involve any cultural resource issues.

The proposed change that moves footnote 8 of Table 3 of the 1995 Plan to the program of implementation is not expected to have any impact on cultural resources. As discussed above, the change does not constitute a change in the environment. In addition, changing the effective date of the EC objective does not involve any cultural resource issues.

There is no potential for the proposed changes to the program of implementation for the pulse flow objectives to significantly impact cultural resources. As discussed above, the changes to the program of implementation represent current environmental conditions that have existed since 2000 and have been previously adequately analyzed pursuant to CEQA. In addition, both the range of flows included in the pulse flow objectives and the range of flows included in the VAMP are well within the historic range of flows experienced on the San Joaquin River. Accordingly, there is no potential for changes in flows to either inundate or expose additional cultural resources, or otherwise impact cultural resources.

There is no potential for the proposed changes to the program of implementation for the Environmental Monitoring Program to significantly impact cultural resources. As discussed above, the changes to the program of implementation involve the movement of some baseline monitoring stations insignificant distances as well as additional clerical changes. Therefore, the proposed changes will not significantly impact cultural resources.

6. GEOLOGY and SOILS. Would the project:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
i) Rupture of a known earthquake fault, as delineated in the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines & Geology Special Publication 42.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) Strong seismic ground shaking?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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| iii) Seismic-related ground failure, including liquefaction? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| iv) Landslides? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b) Result in substantial soil erosion or the loss of topsoil? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| d) Be located on expansive soils, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| e) Have soils incapable of adequately supporting the use of septic tanks or alternate wastewater disposal systems where sewers are not available for the disposal of wastewater? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

The deletion of footnote 4 of Table 3 of the 1995 Plan and the addition of the revised date to the program of implementation of the 2006 Plan concerning the date by which the DO objective must be met are not expected to have any impact on geology and soils. As discussed above, the change reflects the current implementation of the objective and does not constitute a change in the environment. In addition, changing the effective date of the DO objective does not involve geology and soil issues.

The proposed change that moves footnote 8 of Table 4 of the 1995 Plan to the program of implementation is not expected to have any impacts on geology and soils. As discussed above, the proposed change does not constitute a change in the environment. In addition, changing the effective date of the EC objective does not involve geology and soil issues.

There is no potential for the proposed changes to the program of implementation for the pulse flow objectives to significantly impact geology and soils. As discussed above, the changes to the program of implementation represent current environmental conditions that have existed since 2000 and have been previously adequately analyzed pursuant to CEQA. In addition, both the range of flows included in the pulse flow objectives and the range of flows included in the VAMP are well within the historic range of flows experienced on the San Joaquin River. Accordingly, there is no potential for changes in flows to result in significant impacts to geology and soils.

There is no potential for the proposed changes to the program of implementation for the Environmental Monitoring Program to significantly impact geology and soils. As discussed above, the changes to the program of implementation involve the movement of some baseline monitoring stations insignificant distances as well as additional clerical changes. Therefore, the proposed changes will not significantly impact geology and soils.

7. HAZARDS and HAZARDOUS MATERIALS. Would the project:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within ¼ mile of an existing or proposed school?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would it create a significant hazard to the public or to the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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| f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

The proposed project does not involve any hazardous elements, including any of the hazards discussed above. Accordingly, there is no potential for significant impacts related to hazards. In addition, as discussed above, there is no change in the environment from existing conditions.

8. HYDROLOGY & WATER QUALITY. Would the project:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- c) Substantially alter the existing drainage pattern of the site, including through alteration of the course of a stream or river, or substantially increase the rate or volume of surface runoff in a manner that would:
- i) result in flooding on- or off-site
 - ii) create or contribute runoff water that would exceed the capacity of existing or planned stormwater discharge
 - iii) provide substantial additional sources of polluted runoff
 - iv) result in substantial erosion or siltation on-or off-site?
- d) Otherwise substantially degrade water quality?
- e) Place housing or other structures which would impede or re-direct flood flows within a 100-yr. flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?
- f) Expose people or structures to a significant risk of loss, injury, or death involving flooding:
- i) as a result of the failure of a dam or levee?
 - ii) from inundation by seiche, tsunami, or mudflow?
- g) Would the change in the water volume and/or the pattern of seasonal flows in the affected watercourse result in:
- i) a significant cumulative reduction in the water supply downstream of the diversion?

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| ii) a significant reduction in water supply, either on an annual or seasonal basis, to senior water right holders downstream of the diversion? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| iii) a significant reduction in the available aquatic habitat or riparian habitat for native species of plants and animals? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| iv) a significant change in seasonal water temperatures due to changes in the patterns of water flow in the stream? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| v) a substantial increase or threat from invasive, non-native plants and wildlife | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| j) Inundation by seiche, tsunami, or mudflow? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

The deletion of footnote 4 of Table 3 of the 1995 Plan and the addition of the revised date to the program of implementation of the 2006 Plan concerning the date by which the DO objective must be met are not expected to have any impacts on hydrology and water quality. As discussed above, the change reflects the current implementation of the objective and does not constitute a change in the environment. Once the objective is implemented, the objective is expected to benefit water quality. However, additional time is needed to develop information prior to full implementation of the objective.

As discussed in the program of implementation, the proposed change to the content of footnote 8 of Table 3 of the 1995 Plan, by changing the date by which the EC objective must be met at S-35 and S-97 and moving the substance of footnote 8 to the program of implementation, is not expected to have any impacts on hydrology and water quality. The change does not constitute a change in the environment.

There is no potential for the proposed changes to the program of implementation for the pulse flow objectives to significantly impact hydrology and water quality. As discussed above, the changes to the program of implementation represent current environmental conditions. Accordingly, there is no change to the environment from changing the program of implementation to reflect those conditions. In addition, as mentioned above, implementation of the VAMP study flows through the SJRA was previously adequately analyzed pursuant to CEQA. Further, both the range of flows included in the pulse flow objectives and the range of flows included in the VAMP are well within the historic range of flows experienced on the San Joaquin River and are well below levels of flood concern. Issues concerning changes in the water volume and/or the pattern of seasonal flows in the affected watercourse were adequately analyzed in the *Final Environmental Impact Report for Implementation of the 1995 Water Quality Control Plan* and the SJRA EIS/EIR.

There is no potential for the proposed changes to the program of implementation for the Environmental Monitoring Program to significantly impact hydrology and water quality. As discussed above, the changes to the program of implementation involve the movement of some baseline monitoring stations insignificant distances as well as additional clerical changes. Therefore, the proposed changes will not impact hydrology and water quality.

9. LAND USE AND PLANNING. Would the project:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Physically divide an established community?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The deletion of footnote 4 of Table 3 of the 1995 Plan and the addition of the revised date to the program of implementation of the 2006 Plan concerning the date by

which the DO objective must be met is not expected to have any impacts on land use and planning. As discussed above, the change represents the current implementation of the objective and does not constitute a change in the environment. In addition, changing the effective date of the DO objective does not involve any land use or planning issues.

As discussed in the program of implementation, the proposed change in the date of implementation of the EC objective at S-35 and S-97 addressed in footnote 8 of Table 3 of the 1995 Plan and moving the implementation date to the program of implementation, is not expected to have any impacts on land use and planning. The change does not constitute a change in the environment. In addition, changing the effective date of the EC objective does not involve any land use or planning issues.

There is no potential for the proposed changes to the program of implementation for the pulse flow objectives to significantly impact land use and planning. As discussed above, the changes to the program of implementation represent current environmental conditions. Accordingly, there is no change to the environment from changing the program of implementation to authorize those conditions. In addition, as mentioned above, implementation of the VAMP study flows through the SJRA was previously adequately analyzed pursuant to CEQA. Further, changes to the implementation of the pulse flow objectives do not involve any land use issues.

There is no potential for the proposed changes to the program of implementation for the Environmental Monitoring Program to significantly impact land use and planning. As discussed above, the changes to the program of implementation involve the movement of some baseline monitoring stations insignificant distances as well as additional clerical changes. Therefore, the proposed changes will not impact land use and planning.

10. MINERAL RESOURCES. Would the project:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of future value to the region and the residents of the State?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The proposed project does not involve mineral resources, including the issues discussed in a. and b. above. Accordingly, there is no potential for significant impacts to mineral resources. In addition, as discussed above, there is no change in the environment from existing conditions.

11. NOISE. Would the project result in:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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| d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing in or working in the project area to excessive noise levels? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| f) For a project within the vicinity of a private airstrip, would the project expose people residing in or working in the project area to excessive noise levels? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

The deletion of footnote 4 of Table 3 of the 1995 Plan and the addition of the revised date to the program of implementation of the 2006 Plan concerning the date by which the DO objective must be met are not expected to have any noise impacts. As discussed above, the change represents the current implementation of the objective and does not constitute a change in the environment. In addition, changing the timeline for meeting the DO objective does not involve the generation of any noise.

The proposed change of adding to the program of implementation and revising the implementation date that was in footnote 8 of Table 3 of the 1995 Plan is not expected to result in any noise impacts. As discussed above, the change does not constitute a change in the environment. In addition, changing the effective date of the EC objective does not involve the generation of any noise.

The proposed changes to the program of implementation for the pulse flow objectives will not result in any noise related impacts. In addition, as discussed above, there is no change in the environment from existing conditions.

There is no potential for the proposed changes to the program of implementation for the Environmental Monitoring Program to result in any noise related impacts. As discussed above, the changes to the program of implementation involve the movement of some baseline monitoring stations insignificant distances as well as additional clerical changes. Therefore, there will not be any noise related impacts as a result of the proposed changes.

12. POPULATION AND HOUSING. Would the project:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

There are no potentially significant impacts related to population and housing from the proposed project. The proposed project does not involve population or housing or any elements that could potentially affect these issues. In addition, as discussed above, there is no change in the environment from existing conditions.

13. PUBLIC SERVICES. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service rations, response times or other performance objectives for any of the public services:

a) Fire protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Police protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Schools?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Parks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Other public facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The proposed changes to the program of implementation do not have any bearing on fire protection, police protection, schools, parks, or other public facilities. Accordingly, there is no potential for the proposed project to result in potentially

significant impacts to public services. In addition, as discussed above, there is no change in the environment from existing conditions.

14. RECREATION. Would the project:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The deletion of footnote 4 of Table 3 of the 1995 Plan and the addition of the revised date to the program of implementation of the 2006 Plan concerning the date by which the DO objective must be met is not expected to have any impacts on recreation. As discussed above, the change represents the current implementation of the objective and does not constitute a change in the environment. In addition, changing the effective date of the DO objective does not involve any recreation issues.

The proposed change of adding to the program of implementation and revising the implementation date that was in footnote 8 of Table 3 of the 1995 Plan is not expected to have any impacts on recreation. As discussed above, the change does not constitute a change in the environment. In addition, changing the effective date of the EC objective does not involve any recreation issues.

The proposed changes to the program of implementation for the pulse flow objectives would not have any potentially significant impacts on recreation. As discussed above, there is no change in the environment from existing conditions. In addition, both the range of flows included in the pulse flow objectives and the range of flows included in the VAMP are well within the historic range of flows experienced on the San Joaquin River. Accordingly, there is no potential for changes in flows to result in significant impacts to recreational facilities, boating, fishing, and other recreational activities.

There is no potential for the proposed changes to the program of implementation for the Environmental Monitoring Program to significantly impact recreation. As discussed above, the changes to the program of implementation involve the movement of some baseline monitoring stations insignificant distances as well as additional clerical changes. Therefore, the proposed changes will not significantly impact recreational facilities, boating, fishing, or other recreational activities.

15. TRANSPORTATION / CIRCULATION. Would the project:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (<i>i.e.</i> , result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially increase hazards due to a design feature (<i>e.g.</i> , sharp curves or dangerous intersections) or incompatible uses (<i>e.g.</i> , farm equipment)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Result in inadequate emergency access?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in inadequate parking capacity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Exceed, either individually or cumulatively, a level-of-service standard established by the county congestion management agency for designated roads or highways?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Conflict with adopted policies supporting alternative transportation (<i>e.g.</i> , bus turnouts, bicycle racks)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

There are no potentially significant impacts related to transportation and circulation from the proposed project. The proposed project does not involve transportation or circulation or any elements that could potentially affect these issues. In addition, as discussed above, there is no change in the environment from existing conditions.

16. UTILITIES AND SERVICE SYSTEMS. Would the project:

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental impacts?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental impacts?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| g) Comply with federal, state, and local statutes and regulations related to solid waste? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

There are no potentially significant impacts related to utilities and service systems from the proposed project. The proposed project does not involve utilities or service systems or any elements that could potentially affect these issues. In addition, as discussed above, there is no change in the environment from existing conditions.

17. MANDATORY FINDINGS OF SIGNIFICANCE

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?

a) The proposed changes to the footnotes in Table 3 and changes to the program of implementation for the pulse flow objectives and the Environmental Monitoring Program do not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory. As discussed above, the changes to the footnotes in Table 3 represent existing regulatory conditions and allow additional time for information to be developed before final implementation of the DO and specified western Suisun Marsh salinity objectives.

The changes to the implementation of the pulse flow objectives represent existing conditions as they have existed since 2000 pursuant to the implementation of the pulse flow objectives in D-1641. Further, the changes to the Environmental Monitoring Program are unsubstantial and primarily clerical in nature.

Therefore, there is no significant change to current environmental conditions from making the proposed changes. The quality of the environment, habitat for fish and wildlife species, population and other effects on fish and wildlife species and the other factors discussed above will not change as a result of adopting the changes to the footnotes in Table 3, the program of implementation for the pulse flow objectives, or the Environmental Monitoring Program.

b) Changes to the footnotes in Table 3, the program of implementation for the pulse flow objectives, and the Environmental Monitoring Program do not have impacts that are individually limited, but cumulatively considerable. As discussed above, the proposed changes to the footnotes in Table 3 reflect existing regulatory conditions and allow additional time for information to be developed before final compliance with the DO and specified western Suisun Marsh salinity objectives are required. The proposed changes to the program of implementation for the pulse flow objectives conform to existing conditions pursuant to the implementation of the objectives in 2000 in D-1641. Further, the changes to the Environmental Monitoring Program are unsubstantial and primarily clerical in nature. Therefore, there are no additional cumulative impacts due to approval of the proposed changes. Cumulative impacts of the original implementation of the VAMP through the SJRA are discussed in section A of Chapter XII of the *Final Environmental Impact Report for*

Implementation of the 1995 Water Quality Control Plan and Chapter 4.12 of the SJRA EIS/EIR.

- c) Changes to the footnotes in Table 3, the program of implementation for the pulse flow objectives, and the Environmental Monitoring Program will not have environmental effects that will cause substantial adverse effects on human beings. Changes in the footnotes in Table 3, the implementation of the pulse flow objectives and the Environmental Monitoring Program, will not cause any change in the existing environment. In addition, both the VAMP flow objectives and the pulse flow objectives are well within historic flow patterns on the San Joaquin River and consequently will not lead to any associated impacts to people from increased or decreased flows.



Water Boards

STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

P.O. Box 100, Sacramento, CA 95812-0100 • www.waterboards.ca.gov
info@waterboards.ca.gov

Office of Public Affairs: (916) 341-5254
Office of Legislative Affairs: (916) 341-5251

Financial Assistance information: (916) 341-5700
Water Quality information: (916) 341-5455
Water Rights information: (916) 341-5300

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARDS

NORTH COAST REGION (1)

www.waterboards.ca.gov/northcoast
5550 Skylane Blvd., Suite A
Santa Rosa, CA 95403
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(707) 576-2220 TEL • (707) 523-0135 FAX

CENTRAL COAST REGION (3)

www.waterboards.ca.gov/centralcoast
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401
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(805) 549-3147 TEL • (805) 543-0397 FAX

LAHONTAN REGION (6)

www.waterboards.ca.gov/lahontan
2501 Lake Tahoe Blvd.
South Lake Tahoe, CA 96150
info6@waterboards.ca.gov
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SAN FRANCISCO BAY REGION (2)

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1515 Clay Street, Suite 1400
Oakland, CA 94612
info2@waterboards.ca.gov
(510) 622-2300 TEL • (510) 622-2460 FAX

LOS ANGELES REGION (4)

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320 W. 4th Street, Suite 200
Los Angeles, CA 90013
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Victorville branch office

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CENTRAL VALLEY REGION (5)

www.waterboards.ca.gov/centralvalley
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670
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COLORADO RIVER BASIN REGION (7)

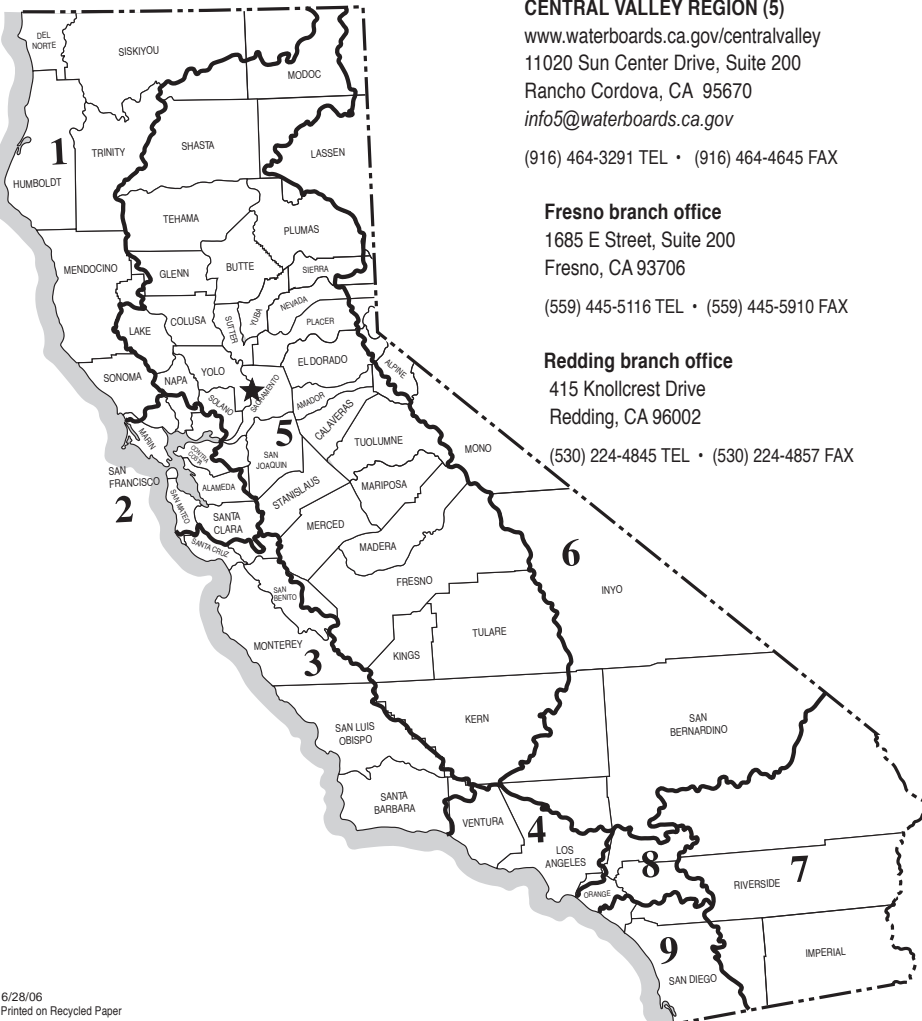
www.waterboards.ca.gov/coloradriver
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