D • R • A • F • T December 2, 1999

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

DECISION ##

In the Matter of
Implementation of Water Quality Objectives for the
San Francisco Bay/Sacramento-San Joaquin Delta Estuary;
A Petition to Change Points of Diversion of the
Central Valley Project and the State Water Project in the Southern Delta, and
A Petition to Change Places of Use and Purposes of Use of the Central Valley Project.

Amending Permits and Licenses Listed in Table 1.

SOURCES: Sacramento and San Joaquin Rivers and their tributaries, and the Sacramento-San Joaquin Delta Estuary

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DECISION

- **IMPLEMENTING FLOW OBJECTIVES FOR THE BAY-DELTA ESTUARY;**
- **APPROVING A PETITION TO CHANGE POINTS OF DIVERSION OF THE CENTRAL VALLEY PROJECT AND THE STATE WATER PROJECT IN THE SOUTHERN DELTA, AND**
- **APPROVING A PETITION TO CHANGE PLACES OF USE AND PURPOSES OF USE OF THE CENTRAL VALLEY PROJECT**

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TO BE ADDED

LIST OF ACRONYMS

ACRONYMS	
BOD	Biochemical Oxygen Demand
CBOD	Cabonic Biochemical Oxygen Demand
CCR	California Code of Regulations
CCWD	Contra Costa Water District
CDWA	Central Delta Water Agency
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
cfs	cubic feet per second
COA	Coordinated Operations Agreement
COS	City of Stockton
CPOU	Consolidated Place Of Use
CUWA/AG	Calfornia Urban Water Agencies/Agricultural Exporters
CVCC	Cross Valley Canal Contractors
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CVRWQCB	Central Valley Regional Water Quality Control Board
CWT	Coded Wire Tagged
DEIR	Draft Environmental Impact Report
DFG	Department of Fish and Game
DO	Dissolved oxygen
DOI	Department of the Interior
DWR	Department of Water Resources
EBMUD	East Bay Municipal Utility District
EC	Electrical Conductivity
EDF	Environmental Defense Fund
EIR	Environmental Impact Report
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
ESA	Endangered Species Act
Exchange Contractors	San Joaquin River Exchange Contractors Water Authority
FEIR	Final Environmental Impact Report

ACRONYMS	
FERC	Federal Energy Regulatory Commission
ISDP	Interim South Delta Program
JPOD	Joint Points of Diversion
JSA	Joint Settlement Agreement
Merced ID	Merced Irrigation District
MID	Modesto Irrigation District
MOU	Memorandum of Understanding
MPWD	Maine Prairie Water District
NDWA	North Delta Water Agency
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NSJWCD	North San Joaquin Water Conservation District
OID	Oakdale Irrigation District
POU	Place Of Use
RCRC	Regional Council Rural Counties
RWQCB	Regional Water Quality Control Board
SCWA	Solano County Water Agency
SDWA	South Delta Water Agency
SEW	Suisun Marsh Ecological Workgroup
SEWD	Stockton East Water District
SJRA	San Joaquin River Agreement
SJREC	San Joaquin River Exchange Contractors
SJRECWA	San Joaquin River Exchange Contractor Water Authority
SJRGA	San Joaquin River Group Authority
SLDMWA	San Luis and Delta Mendota Water Authority
SMPA	Suisun Marsh Preservation Agreement
SMPA III	Suisun Marsh Preservation Agreement III
SMSCG	Suisun Marsh Salinity Control Gate
Solano	Solano County Water Agency
SRCD	Suisun Resource Conservation District
SSJID	South San Joaquin Irrigation District

ACRONYMS	
SWC	State Water Contractors
SWP	State Water Project
SWRCB	State Water Resources Control Board
taf	thousand acre-feet
TCCA	Tehema Colusa Canal Authority
TID	Turlock Irrigation District
TMDL	Total maximum daily load of pollutants
USBR	United States Bureau of Reclamation
USCOE	United States Corp of Engineers
USDI	United States Deparment of the Interior
USDOI	United States Deparment of the Interior
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VAMP	Vernalis Adaptive Management Plan
VSS	Volatile Suspended Solids
WID	Woodbridge Irrigation District
WWD	Westlands Water District
WWTP	Wastewater Treatment Plant
YCFC&WCD	Yolo County Flood Control and Water Conservation District
Yolo	Yolo County Flood Control and Water Conservation District
YOY	Young-of-Year

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- **APPROVING A PETITION TO CHANGE PLACES OF USE AND PURPOSES OF USE OF THE CENTRAL VALLEY PROJECT**

BY THE BOARD:

1.0 INTRODUCTION

In this decision, the State Water Resources Control Board (SWRCB) takes action on the following matters:

1. This decision accepts the contributions that certain parties, through their agreements, will make to meet the flow objectives in the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (1995 Bay-Delta Plan), and continues the interim responsibility of the Department of Water Resources (DWR) and the United States Bureau of Reclamation (USBR) for the remaining measures to meet the flow objectives. This decision also expands upon the responsibility of the DWR and the USBR, by including some objectives that were not included in two previous

limited term orders. The DWR and the USBR have been meeting almost all of the objectives[1] as part of their compliance with the state and federal Endangered Species Acts.

2. This decision approves, subject to terms and conditions, the joint petition of the DWR and the USBR to change[2] points of diversion of the Central Valley Project (CVP) and the State Water Project (SWP) in the southern Delta.

3. This decision approves, subject to terms and conditions, the petition of the USBR to change places of use and purposes of use of the CVP.

4. This decision recognizes the San Joaquin River Agreement (SJRA) and approves, for a period of eleven years, the conduct of the Vernalis Adaptive Management Plan (VAMP) under the SJRA instead of meeting the objectives in the 1995 Bay-Delta Plan. This decision approves, subject to terms and conditions, the petitioned water right changes needed to conduct the VAMP.

5. This decision recognizes the 1996 Memorandum of Understanding between East Bay Municipal Utility District (EBMUD) and the California Urban Water Agencies/Agricultural Exporters (CUWA/AG) with Respect to Bay-Delta Obligations from the lower Mokelumne River (1996 MOU). This decision approves the schedule of flows attached to the 1996 MOU as the limit of the responsibility of EBMUD, Woodbridge Irrigation District, and North San Joaquin Water Conservation District to meet the objectives in the 1995 Bay-Delta Plan.

6. This decision addresses the circumstances surrounding the proposed Suisun Marsh Preservation Agreement, Amendment Three, by relieving the DWR and the USBR of the responsibility to meet the objectives at two control stations in the western Suisun Marsh and by allowing variability in meeting the objectives.

7. This decision recognizes the contract between DWR and the North Delta Water Agency (NDWA) for the assurance of a dependable water supply of suitable quality, dated January 28, 1981, and the Memorandum of Understanding between the same parties dated May 26, 1998. This decision approves the proposal that DWR shall be responsible for providing any flows needed to meet any obligation of the NDWA to meet the objectives in the

[1] The DWR and the USBR have not been meeting the agricultural salinity objectives at the three stations in the interior of the southern Delta.

[2] The change entails adding points of diversion to the permits of both the DWR and the USBR.

1995 Bay-Delta Plan, so long as the 1981 and 1998 agreements remain in effect.

8. This decision recognizes the stipulation among the DWR, the State Water Contractors (SWC), and Yolo County Flood Control and Water Conservation District (Yolo), effective June 9, 1998. This decision approves the proposal that no requirement shall be placed upon Yolo to implement the objectives in the 1995 Bay-Delta Plan under its Cache Creek water rights, so long as the exercise of Yolo's Cache Creek water rights is in accordance with its existing water right permits.

9. This decision recognizes the stipulation among the DWR, the SWC, and Solano County Water Agency (Solano), effective August 18, 1998. This decision provides that no requirement is placed upon Solano to implement the objectives in the 1995 Bay-Delta Plan under any water rights it uses to obtain water from Putah Creek for the Solano Project, so long as the exercise of the Putah Creek water rights is in accordance with existing water rights.

This decision is the result of a public hearing conducted by the SWRCB commencing on July 1, 1998 and continuing for 80 days so far. The hearing is an adjudicative proceeding, and is governed by statutes and regulations as provided at Title 23, California Code of Regulations, section 648. The SWRCB issued a Notice of Public Hearing for this proceeding on December 2, 1997, and subsequently issued a Revised Notice of Public Hearing on May 6, 1998. The revised notice divided the hearing into phases, designated as Phases 1 through 8. Prior to the date of this decision, Phases 1 through 7 have been completed, including added Phases 2A and 2B. The SWRCB has received written closing briefs and reply briefs applicable to all completed phases. The SWRCB has considered all of the evidence and arguments in the hearing record for Phases 1 through 7. Table 1, below, lists the water rights affected by this decision.

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Table 1
Permits and Licenses Affected by This Decision

California Department of Water Resources

Application	Permit	License	Project
A005630	016478	----	Oroville Project
A014443	016479	----	Oroville Project
A014445A	016481	----	Banks Pumping Plant
A017512	016482	----	San Luis Reservoir
A017514A	016483	----	North Bay Aqueduct

U.S. Bureau of Reclamation

Application	Permit	License	Project
A000023	000273	001986	Friant Project
A000234	011885	----	Friant Project
A001465	011886	----	Friant Project
A005626	012721	----	Shasta Project
A005628	011967	----	Trinity Project
A005638	011887	----	Friant Project
A009363	012722	----	Shasta Project
A009364	012723	----	Shasta Project
A009366	012725	----	Contra Costa Canal
A009367	012726	----	Contra Costa Canal
A009368	012727	----	Tracy Pumping Plant
A013370	011315	----	Folsom Project
A013371	011316	----	Folsom Project
A014858A	016597	----	New Melones Project
A014858B	020245	----	New Melones Project
A015374	011968	----	Trinity Project
A015375	011969	----	Trinity Project
A015376	011970	----	Trinity Project
A015764	012860	----	San Luis Reservoir
A016767	011971	----	Trinity Project
A016768	011972	----	Trinity Project
A017374	011973	----	Trinity Project
A017376	012364	----	Whiskeytown Lake
A019304	016600	----	New Melones Project
A022316	015735	----	Contra Costa Canal

East Bay Municipal Utility District

Application	Permit	License	Project
A004228	002459	011109	Pardee Reservoir
A013156	010478	----	Camanche Reservoir

Woodbridge Irrigation District

Application	Permit	License
A005807	003890	005945
A010240	006931	008214
A012648	007277	008215

Merced Irrigation District

Application	Permit	License
A001221	000912	000990
A001222	000913	002684
A001224	000914	002685
A010572	006808	006047
A016186	012825	011395
A016187	012826	011396

Oakdale and South San Joaquin Irrigation Districts

Application	Permit	License
A010872	009360	007856
A013310	009366	007860

Turlock and Modesto Irrigation Districts

Application	Permit	License
A001233	001165	005417
A014127	009320	011058

The SWRCB makes the following findings of fact and conclusions of law.

2.0 BACKGROUND

2.1 Procedural History

The SWRCB has issued numerous orders and decisions regarding water quality and water right requirements for the Bay-Delta Estuary. The current water quality objectives are set forth in the 1995 Bay-Delta Plan, adopted May 22, 1995. The current water right requirements, applicable only to the water rights for the CVP and the SWP, are set forth in SWRCB Decision 1485 (D-1485) adopted in 1978, and in SWRCB Order WR 98-09 (Order WR 98-09), adopted on December 3, 1998.[3] The SWRCB adopted D-1485 to implement the objectives in the 1978 Delta Plan.[4] Order WR 98-09 supersedes SWRCB Order WR 95-6 (Order WR 95-6) and temporarily extends the actions taken in Order WR 95-6, which the SWRCB adopted in response to a petition filed by DWR and the USBR to change some of the requirements in D-1485.[5] These orders have temporarily removed conflicts between D-1485 and the objectives in the 1995 Bay-Delta Plan, but Order WR 98-09 will expire on December 31, 1999.

This decision is part of the SWRCB's implementation of the 1995 Bay-Delta Plan. Many of the objectives in the 1995 Bay-Delta Plan are best implemented by making changes in the flow of water or in the operation of facilities that move water. Accordingly, this decision amends certain water rights by assigning responsibilities to the persons or entities holding those rights to help meet the objectives.

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[3] The USBR has water right permits for much of the CVP appropriations pursuant to SWRCB Decision 990, adopted in February 1961. The USBR has permits to divert water from the Trinity River pursuant to SWRCB Permit Order 124. The USBR has permits to divert water from the Stanislaus River pursuant to SWRCB Decisions 1422 and 1616. The USBR has a permit to divert water in the Delta pursuant to SWRCB Decision 1020. The USBR has permits to divert water from the San Joaquin River pursuant to SWRCB Decision 935. The DWR has permits to divert water for the SWP appropriations from the Feather River and from the Delta pursuant to SWRCB Decision 1275, which was revised in SWRCB Decision 1291. D-1485 amended the SWP permits under Decision 1291 and the CVP permits under Permit Order 124 and under Decisions 990 and 1020.

[4] The full name of the 1978 Delta Plan is the Water Quality Control Plan for the Sacramento-San Joaquin Delta and Suisun Marsh. It was adopted in August 1978, pursuant to SWRCB Resolution No. 78-43.

[5] Some objectives in the 1995 Bay-Delta Plan were not included in Order WR 95-6, but the DWR and the USBR have made commitments to meet most of those objectives in connection with Biological Opinions under the state and federal Endangered Species Acts.

2.2 Physical Setting

The Bay-Delta Estuary includes the Sacramento-San Joaquin Delta, Suisun Marsh, and the embayments upstream of the Golden Gate. The Delta and Suisun Marsh are located where California's two major river systems, the Sacramento and San Joaquin rivers, converge to flow westward through San Francisco Bay. The watershed of the Bay-Delta Estuary is a source of water supplies for much of the state. The water is used for municipal, industrial, agricultural, and environmental purposes. The watershed is a source of drinking water for two-thirds of the state's population. The SWP, operated by the DWR, and the CVP, operated by the USBR, release previously-stored water into the Delta where they redivert the stored water and also divert natural flow. The water diverted by the two projects in the Delta is exported to areas south and west of the Delta through a system of water conveyance facilities.

The waterways of the Bay-Delta Estuary and its tributaries also are used by fish and wildlife and have other public trust values. Some of the fish that reside in the estuary or migrate through it are protected under the state or federal Endangered Species Act. Additionally, migratory birds and other animals use the marshlands of the estuary for food and habitat.

3.0 PROJECT DESCRIPTION

The project in this matter is to adopt a water right decision or decisions that will accomplish three goals. (1) Determine the interim and long-term responsibilities of water right holders listed in the Revised Notice of Public Hearing to help meet the objectives set forth in the 1995 Bay-Delta Plan. (2) Determine whether or not to approve, subject to terms and conditions, a joint petition of the DWR and the USBR to combine the points of diversion for the SWP and the CVP in the southern Delta. (3) Determine whether or not to approve, subject to terms and conditions, a petition of the USBR to change the places of use and purposes of use in its water right permits for operationally integrated parts of the CVP. These goals are the subjects of the Bay-Delta Water Rights Hearing.

4.0 ISSUES CONSIDERED IN THE HEARING

The Revised Notice of Public Hearing, issued on May 6, 1998, lists several Key Hearing Issues. Each of these issues is followed in the notice by an explanation of the issue, putting it into context. Two supplements to the Revised Notice of Public Hearing were issued, one for

Phase 2A and one for Phase 2B. The supplemental notices included specific hearing issues for the two hearing phases, but the issues specifically did not supersede the Key Issues in the Revised Notice of Public Hearing.

4.1 Issues Noticed

The Key Issues for the hearing are:

a. Should the SWRCB extend the effective period of Order WR 95-6? If yes, how long should it be extended, and what terms and conditions should it contain?

b. What requirements for implementing the flow-dependent objectives in the 1995 Bay-Delta Plan should be adopted in a water right decision?

c. Should the SWRCB approve the petitioned changes of point of diversion under the CVP and SWP permits?

d. Should the SWRCB approve the petitioned changes of place of use and purpose of use of water under the CVP permits?

e. With respect to the negotiated agreements that have been reached among some of the parties, should the SWRCB add water right terms and conditions to the water rights of the parties to the agreements or take other actions to implement the regulatory provisions of these agreements?

f. What evidence supports the SWRCB's exercising its jurisdiction and taking action regarding the water rights listed in Enclosure 2, for the purpose of ensuring that water originating within the watersheds of the Bay-Delta Estuary is diverted and used within the constraints of California Constitution, Article X, section 2 (the reasonable use doctrine) and the public trust doctrine?

The hearing issues noticed for Phase 2A were:

a. What requirements for implementing the flow-dependent objectives in the 1995 Bay-Delta Plan should be adopted in a water right decision applicable to the San Joaquin River watershed?

b. With respect to the SJRA, should the SWRCB add water right terms and conditions to the water rights of the parties to the agreements or take other actions consistent with the SJRA? Should an SWRCB action consistent with the SJRA establish or eliminate responsibility on the part of water right holders listed in Enclosure 2a of the May 6, 1998 Revised Notice of Public Hearing, who are not signatories to the SJRA? Should any SWRCB action consistent with the SJRA require that the DWR and the USBR take full responsibility for meeting the Bay-Delta flow objectives that otherwise might be allocated to other water right holders within the San Joaquin River watershed?

c. What evidence supports the SWRCB's exercising its jurisdiction and taking action regarding the water rights listed in Enclosure 2, for the purpose of ensuring that water originating within the watersheds of the Bay-Delta Estuary is diverted and used within the constraints of California Constitution, Article X, section 2 (the reasonable use doctrine) and the public trust doctrine?

The hearing issues noticed for Phase 2B were:

a. Would the petitioned changes unreasonably affect any legal user of water or result in substantial injury to any legal user of water?

b. Would the petitioned changes unreasonably affect fish, wildlife, or other instream beneficial uses of water?

c. Are the purposes of the petitioned changes to preserve or enhance wetlands habitat, fish and wildlife resources, or recreation in, or on, the water?

d. If the SWRCB approves the petitioned changes, what terms and conditions will best develop, conserve and utilize, in the public interest, the water proposed to be used as part of the change?

e. Would the petitioned changes increase the amount of water each of the petitioners is entitled to use?

f. Will the petitioned changes otherwise meet the requirements of Division 2 of the Water Code?

g. Would efforts to facilitate the petitioned changes or mitigate the water supply effects of the petitioned changes result in changes in ground water pumping rates and quantities, implementation of water conservation measures, operation of reservoirs, and deliveries of water? If so, what changes would occur?

h. What are the projected amounts of water to be transferred and times of transfer by each of the petitioners during each potential year type during the proposed long-term change?

4.2 Parties

The parties in the Bay-Delta Water Rights Hearing are the water right holders whose exercise of their water rights could be modified as a result of the proceeding[6] and the other interested persons and entities who stated an intent to present evidence. Each party who participated was required to file a Notice of Intent to Appear in the hearing.

[6] The water rights and water right holders whose exercise of their water rights could be modified as a result of the hearing are listed in Enclosure 2 of the Revised Notice of Public Hearing.

5.0 EFFECTS OF PROPOSED SOUTHERN DELTA CHANNEL BARRIERS

A common feature of several of the proposals before the SWRCB in the Bay-Delta Water Rights Hearing is the construction of one or more barriers in the southern Delta channels. A principal purpose of the head of Old River barrier is to reduce entrainment of emigrating juvenile San Joaquin fall-run chinook salmon in the southern Delta.[7] The purpose of other barriers is to improve water levels and circulation in the southern Delta channels. (DWR 37, pp. 4-6.) The decision to construct the permanent barriers will be made by the DWR and the USBR. The DWR and the USBR have prepared draft environmental documentation regarding the permanent barriers. (SWRCB 87.)

The alternatives in the DEIR to implement the southern Delta salinity objectives are (1) installation of the existing temporary barriers[8] or (2) installation and operation by the SWP and CVP of the permanent barriers proposed in the draft EIR for the Interim South Delta Program[9] (ISDP) as the preferred alternative.[10] Under the latter alternative, the permanent barriers would be operated to meet the water quality objectives at three stations in the southern Delta to the extent possible. The permanent barrier alternative in the SWRCB EIR does not include elements of the ISDP not necessary to support barrier operation, and the SWRCB alternative adds operation in September, which is not in the ISDP DEIR. (SWRCB 7.)

The permanent barriers will offer operational flexibility that the temporary barriers do not. The permanent barriers will include radial gates. The radial gates will be easily opened on the flood

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[7] The head of Old River barrier keeps emigrating San Joaquin River salmon smolts in the mainstem of the river and eliminates the Old River migratory corridor. Smolts are more susceptible to entrainment at the export pumps if they are diverted into Old River. The head of Old River barrier is also used in the fall to improve flows in the San Joaquin River near Stockton in order to improve low dissolved oxygen conditions. In the southern Delta salmon survival is lower than in other parts of the Delta due to increased predation and vulnerability to entrainment.

[8] The existing temporary barriers would be installed regularly under Southern Delta Salinity Alternatives 1 (D-1485 flow requirements) and 2 (1995 Bay-Delta Plan objectives).

[9] The ISDP includes the construction and operation of permanent barriers in the southern Delta and several other components.

[10] The permanent barriers alternative is Southern Delta Salinity Alternative 3.

portion of the tide and closed on the ebb tide. Consequently, the operators will be able to respond quickly to real-time monitoring results regarding fish, water levels, and water quality. The permanent barriers will not require annual installation. Lastly, the permanent barriers will be able to withstand higher flows than the temporary barriers. (DWR 37.)

Although this decision does not order that the barriers be constructed, the benefits of the barriers are integral to the implementation of several of the actions approved in this decision. The benefits of the barriers could be achieved by other means, such as increased flows through the southern Delta and export restrictions, but these measures could result in an unreasonable use of water and a significant reduction in water supplies south and west of the Delta. In addition to having benefits, the barriers will have some adverse effects, which are discussed below.

In Phase 5 of the hearing, the SWRCB received evidence on the effects of the South Delta Temporary Barrier Project and the ISDP on delta smelt and its critical habitat, and on Sacramento splittail.

A USFWS witness testified that the ISDP and temporary barrier programs may have significant adverse impacts on delta smelt and its critical habitat, and on Sacramento splittail. (USDI 16; R.T. pp. 5461-5465.) Much of the testimony, however, addressed impacts from components of the ISDP program other than the permanent barriers and impacts resulting from the annual construction of the temporary barriers. The USFWS identified the following potential impacts of the temporary barriers: increased entrainment at agricultural diversions and at the CVP/SWP facilities in the southern Delta, loss of shallow water habitat, blockage or interference with up and downstream migration, changes in fish distribution, changes in hydrology in the central and southern Delta, increases in water velocities in some channels, shifts in the position of X2,[11] degradation of water quality, and slight changes in temperature and dissolved oxygen in the vicinity of the barriers. (USDI 16, p.2.) Based on the USFWS responses to cross-examination,

[11] X2 is the location of the 2 parts per thousand salinity contour (isohaline), one meter off the bottom of the estuary, as measured in kilometers upstream from the Golden Gate Bridge. The abundance of several estuarine species has been correlated with X2. In the 1995 Bay-Delta Plan, an electrical conductivity value of 2.64 mmhos/cm is used to represent the X2 location. The SWRCB does not expect changes in the location of X2 as a result of the barriers.

however, some of the potential impacts identified above are not fully supported by the evidence. (R.T. pp. 5512-5674.) Nevertheless, the biological opinion issued by the USFWS for the temporary barriers project includes several measures to minimize the incidental take of delta smelt and Sacramento splittail. (USDI 16b, pp.18-21.) The DWR and the USBR will be responsible for developing appropriate measures to reduce or avoid impacts on these species from construction and operation of the permanent barriers.

The USFWS also presented testimony that construction of the permanent barriers could temporarily reduce physical habitat for spawning and rearing due to dredging and construction of additional levees. (USDI 16, pp.1-2; R.T. p. 5463.) Except for San Joaquin fall-run chinook salmon, construction and operation of the permanent barrier project would have potentially significant adverse impacts to fish, including Sacramento fall, late fall, winter, and spring-run chinook salmon, steelhead, striped bass, American shad, white and green sturgeon, delta smelt, longfin smelt, and Sacramento splittail. (USDI 16; R.T. pp. 5461-5465; SWRCB 87; 1A, pp. [IX-14]-[IX-17] and [IX-41]-[IX-45].) Because the permanent barriers will be operable at higher flows than the temporary barriers, they will be operable over a longer period each year. This should improve protection to San Joaquin fall-run chinook salmon, but could extend the period of potential impacts to other species.

CCWD argues that the flow barriers will degrade water quality at CCWD's intakes and adversely impact the Los Vaqueros Project. The water quality at CCWD's intakes can be affected by the difference in water quality of the Sacramento and San Joaquin rivers, the hydrology of the Delta,[12] and the design and operation of the barriers. The permanent barriers would reduce the percentage of high quality Sacramento River water at CCWD's intakes and increase the percentage of lower quality San Joaquin River water. (R.T. pp. 3918-3925; CCWD 2.) CCWD estimates that typical summer operation of the three agricultural barriers in dry years would add 3 ppm of chloride at CCWD's Rock Slough intake and 9 ppm at the Los Vaqueros intake. (R.T. pp. 4230-4231; CCWD 2, p. 9.) The estimates are based on modeling simulations

[12] Delta hydrology affecting CCWD's water quality is primarily controlled by the percentage of San Joaquin River flow at CCWD's pumps and SWP/CVP exports.

performed using the Fischer Delta Model for August 1988. (CCWD 2, pp. 6-7.) The expected reduction in water quality at Los Vaqueros may lead to a reduction in the water quality benefits of the project. CCWD argues that this is an injury that must be mitigated. CCWD proposes several measures it believes will mitigate for any reduction in water quality at its intakes, but provides no evidence regarding the appropriateness of the measures. This decision does not require that the measures be implemented since it does not require that the barriers be installed.

The DWR and USBR currently are modifying the ISDP into a new program for the southern Delta. Consultation is continuing among the DWR and USBR and the USFWS, NMFS, and DFG concerning the effects of the barriers and other components of the program on aquatic resources in the Delta. In the absence of a final EIR for the barriers, the SWRCB cannot order their installation. Also, due to the evolving program status and potential for significant adverse impacts, SWRCB action regarding the installation or operation of the temporary or permanent barriers in the southern Delta is not ripe at this time. The SWRCB does, however, encourage the parties developing the program to find ways to attain the benefits of the barriers while avoiding or mitigating the adverse effects. The benefits of the barriers appear to outweigh the potential impacts.

6.0 RESPONSIBILITY OF PARTIES PROPOSING THE SAN JOAQUIN RIVER AGREEMENT, AND ALTERNATIVES TO THE AGREEMENT

As provided above, the primary purpose of the Bay-Delta Water Rights Hearing is to determine the responsibilities of water right holders to implement the flow-dependent objectives in the 1995 Bay-Delta Plan. Ultimately, the process will result in water right changes that will supersede D-1485 and Order WR 98-09 as the regulatory mechanism for water rights implementation of the flow-dependent water quality objectives for the Bay-Delta Estuary.

As an alternative approach to deciding the responsibilities of the water right holders, the SWRCB gave the water right holders an opportunity to reach settlement agreements with other water right holders and interested parties proposing allocations of responsibility to meet the flow-dependent objectives in the 1995 Bay-Delta Plan. In the Revised Notice of Public Hearing,

the SWRCB notified the parties that it would receive evidence during the hearing on any agreements presented to it, and would consider adopting water right terms and conditions consistent with the agreements.[13] The SJRA was presented to the SWRCB as a settlement agreement proposing an allocation of responsibility for meeting the April-May objective for pulse flows from the San Joaquin River. (SJRGA 2) The SJRA also provides for some water for the October objective for salmon attraction flows and for additional water to be used as needed by the U.S. Department of Interior (USDI). The SJRA would not provide water for any other potential responsibilities of parties in the San Joaquin basin to meet the water quality objectives.

The SWRCB conducted three hearing phases to consider different aspects of the SJRA, including an overview, receipt of evidence adverse to the SJRA, and consideration of petitions for changes in water rights. In Phase 2, the SWRCB received evidence addressing the SJRA. In Phase 2, the cases in chief primarily supported the SJRA because the SWRCB had ruled that all parties could withhold their adversary evidence until a later phase of the hearing. The proponents of the SJRA coordinated their presentation of evidence. The Environmental Defense Fund (EDF) presented a case in chief opposing the SJRA. South Delta Water Agency (SDWA) presented rebuttal evidence. Twelve parties presented oral closing arguments. After concluding Phase 2, the hearing officers determined that the SJRA merited further consideration. Accordingly, the SWRCB issued a supplemental hearing notice for Phase 2A.

In Phase 2A, the SWRCB received evidence adverse to the SJRA including evidence to support alternatives to the SJRA, and also received additional evidence to support the SJRA.

On December 10, 1998, the water right holders who propose to supply water for instream flows in the San Joaquin River under the SJRA filed petitions for long-term changes in their water rights under Water Code sections 1707 and 1735 et seq. Under section 1707, the SWRCB can

[13] In the absence of an agreement, the SWRCB's approach to allocating responsibility would be to fashion an allocation that it believes mitigates the water right holders' impacts on salinity and flow related impacts on the Bay-Delta Estuary. Such an approach would include consideration of the factors discussed in California Constitution, Article X, section 2, the public trust doctrine, and applicable statutes, in addition to providing a reasonable method of calculating the responsibilities of the water right holders.

approve a change in water rights for the purpose of preserving or enhancing fish and wildlife resources in the San Joaquin River. Under section 1735, et seq., the SWRCB can approve a long-term change in water rights, i.e., for a period in excess of one year. The petitioners are Merced Irrigation District (Merced ID),[14] Turlock and Modesto Irrigation Districts (TID/MID),[15] and Oakdale and South San Joaquin Irrigation Districts (OID/SSJID).[16] The San Joaquin River Exchange Contractors Water Authority (Exchange Contractors) also filed a petition for changes, under section 1707, but later withdrew it because the operations the Exchange Contractors intend to use would not require a change in the Exchange Contractors' pre-1914 water rights.

Under the requested long-term changes, the petitioners would add to the places of use under their water right permits the reach of the lower San Joaquin River from their points of release to Vernalis and would add fish and wildlife enhancement as a purpose of use. The changes would commence in April 2000 and continue for eleven years, through 2010. On April 9, 1999, the Chief of the Division of Water Rights of the SWRCB approved temporary changes for 1999 that are similar to the changes requested under the long-term petitions for change. (Order Authorizing Temporary Changes in Place of Use and Purpose of Use in the San Joaquin River, dated April 9, 1999.)

Pursuant to the SJRA,[17] the petitioners along with the Exchange Contractors would provide up to 110 taf per year during a 31-day pulse flow period in April and May of each year, for instream flows in the lower San Joaquin River above Vernalis. (SJRGA 2, pp. 5-6; R.T. p. 825.) The petitioners and the Exchange Contractors would decide each year how to allocate the water required during the pulse flow period. The water for pulse flows would not be transferred to the USBR and the DWR, although they would pay for its release into the river. In addition to the pulse flow releases, Merced ID would release 12.5 taf of water in October to attract adult salmon returning to spawn. The only transfer of water would be from

[14] Licenses 2685, 6047, and 11395 for consumptive uses and licenses 990, 2684, and 11396 for power use, issued for Applications 1224, 10572, 16186, 1221, 1222, and 16187, respectively.

[15] Licenses 5417 and 11058, issued for Applications 1233 and 14127, respectively.

[16] Licenses 7856 and 7860, issued for Applications 10872 and 13310, respectively.

[17] The water to be provided under the SJRA is intended to contribute flows to conduct the VAMP.

OID, which would transfer to the USDI 15 taf of water, plus any unused portion of OID's contribution to the pulse flow.[18]

In order to receive evidence so that it could consider whether the petitions for change should be approved, the SWRCB on April 20, 1999, issued a supplemental hearing notice for Phase 2B. Phase 2B was focused on the statutory requirements for approval of water right change petitions.

6.1 Current Implementation of the Vernalis Flow Objectives by USBR and DWR

The hearing notices applicable to Phases 2 and 2A provide for the receipt of evidence and legal argument from parties opposing the proposal embodied by the SJRA and the VAMP, including evidence to support alternatives to the SJRA and the VAMP. The relevant alternatives are the alternatives applicable to the San Joaquin River for implementing the flow objectives in the 1995 Bay-Delta Plan.[19] The alternative of having the USBR and, to the extent feasible, the DWR, be responsible for meeting the flow objectives represents the current circumstances under Order WR 98-09 and the biological opinions issued to the projects under the state and federal Endangered Species Acts. It is designated as Flow Alternative 2 in the EIR. The analysis of Flow Alternative 2 assumes that the USBR will meet the flows using New Melones Reservoir. Nevertheless, the USBR could choose to meet the objectives by other means, such as recirculation, purchases from willing sellers such as the members of the SJRG, or releases from the Friant project. The notice for Phase 2A states that,

> "Evidence in Phase 2A should address the responsibilities of the parties who are jointly proposing the SJRA, the [DWR], and the [USBR], including any relevant adversarial evidence supporting alternatives to the SJRA applicable to the affected water right holders. Evidence in Phase 2A also should address whether or not any water right order implementing the regulatory portions of the SJRA should either establish or eliminate any responsibility for meeting 1995 Bay-Delta Plan objectives that might be allocated to water right holders in the San Joaquin River watershed who are not parties to the SJRA."

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[18] OID would supply up to 11 taf of water in April and May for the pulse flow.

[19] As provided in the Supplement to Revised Notice of Public Hearing for Phase 2A, the flow objectives in the 1995 Bay-Delta Plan include (1) the Delta outflow objectives, (2) salinity objectives in the Delta that occasionally control Delta outflow, (3) the flow objectives on the Sacramento River at Rio Vista, (4) the flow objectives on the San Joaquin River at Vernalis, and (5) the salinity objectives on the San Joaquin River at Vernalis.

Central Delta Water Agency (CDWA) and SDWA opposed the allocation of responsibility proposed under the SJRA, and instead recommended that no party other than the USBR and the DWR be allocated responsibility for meeting the flow objectives in the southern Delta.

6.2 Recirculation Proposal

SDWA proposed that the SWRCB implement the flow objectives in the southern Delta by requiring the DWR and the USBR to release water pumped from the Delta into the San Joaquin River. Flow Alternative 6 in the Bay-Delta EIR analyzes a variant of the SDWA proposal. As formulated and analyzed in the EIR, this alternative could (1) significantly reduce the amount of water available south and west of the Delta from exports (this effect is masked in the SWRCB's EIR because the alternative assumes there will be full use of the joint points of diversion in the southern Delta) and (2) adversely impact fish through entrainment and flow effects. A benefit of this alternative is that it would reduce demand on New Melones Reservoir, thereby providing needed water for local water users and for salinity control in the southern Delta.

SDWA's recirculation proposal calls for relaxing the export restrictions imposed under the biological opinion issued by the USFWS for delta smelt.[20] The purpose of the proposed relaxation is to avoid water supply impacts to contractors of exported water. The SWRCB, however, cannot change the biological opinion. The export restrictions in the biological opinion are more restrictive than the 1995 Bay-Delta Plan. SDWA suggested that if the export restrictions were not relaxed, the USBR should purchase water from its water contractors in the San Joaquin basin.

An expert witness for the USFWS testified that recirculation of exported water could result in adverse impacts on fishery resources in the Delta (R.T. pp. 10400-10408.) The witness identified potential impacts in the following areas:

[20] The delta smelt biological opinion effectively requires that the ratio of San Joaquin River flow to export rate be 2:1 during the April-May pulse flow. The 1995 Bay-Delta Plan requires a 1:1 ratio.

1. Recirculation could cause changes in the chemical composition of water in the San Joaquin River channel by importing water from the Sacramento River. This could interfere with the olfactory imprinting of juvenile salmonids produced in the basin and result in increased straying when they return from the ocean to spawn. Species of concern include fall-run chinook salmon and steelhead. (R.T. pp. 10401-10402.)

2. Recirculation could cause changes in the composition of water that reaches the Delta, thereby affecting habitat for Delta native fish. (R.T. pp. 10401-10402.)

3. Recirculation could cause increased entrainment of fish at the southern Delta export facilities, particularly during the spring pulse flow period, due to the increase in exports for recirculation. (R.T. pp. 10401, 10404.) Species of primary concern include salmon, steelhead, delta smelt, Sacramento splittail, and longfin smelt. (R.T. p. 10406.)

4. Increased exports due to recirculation might affect in-Delta hydrodynamics, which could affect the distribution of fish and their vulnerability to entrainment. (R.T. pp. 10404-10405.)

5. Recirculation under the proposal would move water through the Newman Wasteway, which might release contaminants that would impact fish. Pesticides, chlorides, etc. have been detected in the Wasteway. (R.T. pp. 10406-10407.)

Based on the above concerns, the USFWS witness testified that the proposal to recirculate exported water to meet flow objectives in the southern Delta requires substantially more scientific evaluation and information regarding potential impacts to fishery resources. (R.T. pp. 10407-10408.) The USFWS witness testified that the extent of the potential impact to salmonid imprinting was unclear. (R.T. p. 10402.) The SWRCB finds that a potential exists for the recirculation proposal to result in impacts on fishery resources, but further studies are needed to evaluate the degree of impact. No specific data are currently available to evaluate these impacts.

Recirculation potentially could help, under some circumstances, with meeting flow requirements from the San Joaquin River. Consequently, this decision requires that the USBR prepare a feasibility study to determine whether and under what circumstances recirculation could be used. In the study, the USBR will be required to evaluate potential and actual effects of: (1) changes in water composition on Delta native fish and on imprinting of juvenile fall-run chinook salmon and steelhead in the San Joaquin basin, (2) increased exports on in-Delta hydrodynamics and fish

entrainment at the SWP and CVP export facilities, (3) salt and contaminant loading in the San Joaquin basin due to recirculation of water through the Newman Wasteway, and (4) impacts on deliveries of water by the SWP and the CVP and, on San Luis Reservoir. This decision requires the USBR to develop a plan for the feasibility study in consultation with the NMFS, USFWS, DFG, and DWR and to submit it to the SWRCB for approval by June 30, 2000. This decision requires the USBR to initiate the study immediately following SWRCB approval and complete all study components within two years of approval. This decision requires that the release of CVP water by the Exchange Contractors in connection with the VAMP experiment be included as a study component.

6.3 Responsibility Consistent with the SJRA, the VAMP and the Change Petitions

6.3.1 The San Joaquin River Agreement

For a twelve-year period, the SJRA proposes to allocate responsibility for meeting the April-May pulse flow objectives in the 1995 Bay-Delta Plan to certain water right holders in the watershed of the San Joaquin River. (SJRGA 2, pp. 1, 5.) It also provides for supplemental flows at other times of the year. (SJRGA 2, pp. 10, 11.) The SJRA provides a mechanism for conducting the VAMP, an experiment to determine the relative impact of flow in the San Joaquin River and exports in the Delta on chinook salmon in the lower San Joaquin River.

The parties to the SJRA are: (1) the SJRGA,[21] consisting of the Exchange Contractors and water users receiving water from the San Joaquin River and its tributaries, (2) the United States Department of Interior parties,[22] (3) the California Resources Agency parties,[23] (4) the CVP/SWP Export Interests parties,[24] and (5) the Environmental Community parties.[25]

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[21] San Joaquin River Group Authority and its member agencies Modesto Irrigation District, Turlock Irrigation District, Merced Irrigation District, South San Joaquin Irrigation District; the San Joaquin River Exchange Contractors Water Authority and its member agencies Central California Irrigation District, San Luis Canal Company, Firebaugh Canal Water District and Columbia Canal Company; the Friant Water Users Authority on behalf of its member agencies; and the City and County of San Francisco.

[22] United States Bureau of Reclamation and United States Fish and Wildlife Service.

[23] California Department of Water Resources and California Department of Fish and Game.

[24] State Water Contractors, Kern County Water Agency, Tulare Lake Basin Water Storage District, Santa Clara Valley Water District, San Luis and Delta-Mendota Water Authority, Westlands Water District, and Metropolitan
[footnote continues on next page]

(SJRGA 2, p. 1.) The SJRA is an agreement among some, but not all, of the parties who have an interest in the allocation of responsibility to provide the San Joaquin River's share of water for meeting the Bay-Delta flow objectives. Some of the parties oppose the SJRA proposal.

Pursuant to the SJRA, some members of the SJRGA, listed in Part 6.0 above, would provide water for the VAMP experiment and for some other flows, including attraction flows for salmonids in October. (SJRGA 2, p. 11.) The members of the SJRGA who provide the water will receive $3 million per year from the USBR, to be paid from the Central Valley Project Improvement Act (CVPIA) Restoration Fund, and $1 million per year from the DWR. (SJRGA 2, p. 7.) The SJRA would assign responsibility to the DWR and the USBR to meet the flows it specifies during the pulse flow period in the southern Delta.26 (SJRGA 2, p.13.)

6.3.2 The VAMP Experiment

The VAMP experiment is designed to assess the effect of export pumping at various specific river flows, which range from 3,200 cfs to 7,000 cfs. (SJRGA 2, Appendix A, p. 3.) Under the VAMP experiment, the flows at Vernalis during the April-May pulse flow period could be lower than is required by the objectives in the 1995 Bay-Delta Plan, and the export pumping rates would be lower than the pumping rates allowed in the Plan. The parties to the SJRA have agreed, with certain limitations, to use the following pairs of operational constraints and export targets to conduct an experiment on the effects of Vernalis flows and export rates during a 31-day period between April 1 and May 31:

TABLE 2

Water District of Southern California. Of these parties, the San Luis and Delta-Mendota Water Authority and Westlands Water District did not sign the Statement of Support for the SJRA. (SJRGA 2, p.4.)

[25] The Environmental Community parties are the Natural Heritage Institute and The Bay Institute of San Francisco, but neither of these parties signed the Statement of Support for the SJRA. (SJRGA 2, p.5.)

[26] The DWR and the USBR have committed themselves to provide "backup" during the term of the SJRA for any responsibility that otherwise would be placed on the San Joaquin basin water right holders as a result of an allocation of responsibility in the Bay-Delta Water Rights Hearing. (R.T. pp. 9987-9995.) By doing this, the DWR and the USBR have made it possible for the SWRCB to approve the SJRA without needing to look to the non-signing water right holders in the San Joaquin Basin for the water that would not be provided under the SJRA to meet objectives other than the pulse flow objectives from April 15 through May 15.

SJRA OPERATIONAL STRUCTURE

	Vernalis Target Flows (cfs)				
Export limits	2,000	3,200	4,450	5,700	7,000
1,500	X	X	X		X
2,250				X	
3,000					X

(SJRGA 2, p. 8.)

The Vernalis Target Flows are to be provided as follows based on the "existing flow" at Vernalis as defined in the SJRA:

TABLE 3
SJRA VERNALIS TARGET FLOWS

Existing Flow (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

(SJRGA 2, p. 7.)

The target flows may be modified depending on forecasts of water year type, using the San Joaquin Valley "60-20-20" Water Year Hydrologic Classification.[27] Modifications are accomplished by giving each water year type a numeric indicator as follows:

[27] The calculation method for the 60-20-20 Water Year Hydrologic Classification is set forth in the Order for this decision at Figure 2.

TABLE 4
VAMP HYDROLOGIC CLASSIFICATION

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

(SJRGA 2, Appendix A, p. 4.)

The SJRA provides that the target flows may be modified based on current and recent hydrologic conditions. If the sum of the current year's indicator and the previous two years' indicators is four or less, the parties to the SJRGA will not provide flows above the existing flow. If the sum of the current year's indicator and the previous year's indicator is seven or greater, the target flow will be one level higher than the above tables provide (i.e., if the sum of the indicators is seven and the existing flow is 2050 cfs, the target flow is 4450 cfs). This is referred to as a "double step". (SJRGA 2, p. 7.)

There are differences in the flow targets between the VAMP and the SJRA. First, the SJRA provides flow targets of 2,000 cfs,[28] but the minimum flow targets under the VAMP are 3,200 cfs. (R.T. pp. 974-975.) Second, the obligation of the parties to the SJRA to provide water to meet the flow targets is limited to 110 taf annually. (SJRA 2, pp. 5-6; R.T. p. 825.) The SJRA calls for the USBR to purchase water, if possible, to meet the VAMP flow targets under these two circumstances. Finally, the SJRA contains an exemption from the export limitations in the VAMP that can be invoked in any year when the operations plan for the year is unacceptable

[28] SJRA flows can be lowered if the sum of the current year's indicator and the previous two years' indicator is four or less, as described above.

to the signers of the SJRA. (SJRGA 2, p. 9.) The exemption might be invoked if VAMP export limitations substantially reduce the amount of water available for export.[29]

The hearing record supports conduct of the VAMP experiment as set forth in Attachment A of the SJRA. (SJRGA 2.) The purpose of the VAMP is to gather scientific information on the relative effects on the survival and passage of salmon smolts through the Delta caused by (1) flows in the lower San Joaquin River and (2) CVP and SWP export pumping rates. (SJRGA 2, p. 3.) The study will be conducted during the April-May period when the 1995 Bay-Delta Plan calls for pulse flows in the San Joaquin River at Vernalis. Existing studies have not provided satisfactory results on the relative effects of flows and exports on smolt passage and survival. Additional studies are needed to clarify these effects (R.T. pp. 876, 883, 889.) The VAMP experiment is a unique opportunity for collecting data under controlled conditions because of the commitment of the DWR and USBR to control exports and releases from New Melones Reservoir, and operate the head of Old River barrier as needed for the experiment. As stated by the USDI, the VAMP provides a consistent framework for gathering this information. (USDI 1, p. 5)

The information from the VAMP experiment should provide the SWRCB with data that can be used to evaluate and modify, if necessary, the April-May pulse flow objectives in the 1995 Bay-Delta Plan. The pulse flow objectives adopted in the 1995 Bay-Delta Plan are based on limited information. Accordingly, the 1995 Bay-Delta Plan provides that the objectives will be reevaluated in a future review of the plan. (SWRCB 7e, p. 28.) Additionally, the SWRCB agreed, in a stipulation for dismissal of action filed September 25, 1996, in *San Joaquin Tributaries Assn., et al,* v. *State Water Resources Control Board, et al,* Sacramento County Superior Court No. 95CS01432, to review the Vernalis flow objectives as to timing and magnitude, under Water Code section 13240, during a future review of the 1995 Bay-Delta Plan.

[29] The export levels must, however, be consistent with the existing biological opinions under the state and federal Endangered Species Acts. (SJRGA 2, p. 9.)

As set forth in Attachment A of the SJRA, the VAMP contains no provisions for reductions in the amounts of water to be supplied, such as those provided in the SJRA, nor are there provisions for increases in the experimental export rates. Thus, the SJRA does not fully provide for conducting the experiment as designed. (SJRGA 2, p. 6.) Considering the value of the information to be obtained as a result of a fully completed VAMP experiment, the SWRCB urges the USBR to supplement the flows provided under the SJRA as needed to ensure that the experiment is completed. This decision also urges that the DWR and the USBR make it a priority to ensure that export rates during the VAMP experiment are held to the rates specified in the VAMP.

6.3.3 Terms of the SJRA

The SJRA is an agreement among its parties, and is evidence of a commitment on the part of its parties, to provide specific amounts of water and operational measures at designated times, for the purpose of conducting the VAMP experiment in most years. The DWR and the USBR have made a commitment, in the Bay-Delta Water Rights Hearing, to accept full, but temporary, responsibility to meet the affected objectives except when the VAMP calls for variations in the pulse flow for experimental purposes. (R.T. pp. 9987-9995; SJRGA 2, p. 15.)

The SJRGA requests that the SWRCB confirm that meeting the SJRA is the only responsibility of its members with respect to meeting Bay-Delta objectives. (SJRGA 2, p. 15.) Because of the backstops to be provided by the DWR and the USBR, the SWRCB can satisfy this request without setting additional requirements for either the SJRGA members or the other water right holders in the San Joaquin basin. The backstop provisions are discussed below.

Additionally, the SJRA is conditioned upon the adoption by the SWRCB of an order:

> "(1) Finding that the terms of this Agreement provide environmental protection at a level of protection equivalent to the Vernalis flow objectives of [the 1995 Bay-Delta Plan] during the Pulse Flow Period and implementation of the remaining San Joaquin River Portion of the [1995 Bay-Delta Plan] for the duration of this Agreement; (2) committing to expedited issuance of notice and timely completion of appropriate hearings if objection to the operations plan described in Paragraph 6.6 are unresolved after April 10, or this Agreement should terminate; (3) enforcing the obligations of the USBR and [DWR] under

> this Agreement; (4) committing to the enforcement of Water Code [s]ection 1707, through Water Code [s]ection 1725, 1435 or similar protection by prohibiting (a) unauthorized diversions of any portion of the flows provided by the SJRGA's members pursuant to this agreement until they pass Vernalis; and, (b) unauthorized diversions of any Existing Flow between SJRGA's members' last point of control and Vernalis; and, (5) adding appropriate changes to permits held by those [of] SJRGA's members that have an obligation to provide water as needed to permit them to comply with the obligations imposed by this Agreement."

(SJRGA 2, p. 10, § 7.0.)

Paragraph 10.3 of the SJRA provides that if the SWRCB's order is not consistent with the terms of the SJRA, the parties to the SJRA will work to negotiate a modification of the SJRA. The SWRCB's action herein recognizes the SJRA and its contribution to meeting the VAMP measures. Based on this action, the SWRCB believes that the parties to the SJRA can implement it as they have proposed, without changes. With respect to the requested actions, the SWRCB finds as follows:

6.3.3.1 SJRA CONDITION 1

Condition 1 is that the SWRCB make a finding of equivalent protection by the SJRA compared with the objectives. The intention of this condition apparently is to support a finding that the SWRCB's action will implement the objectives in the 1995 Bay-Delta Plan. Such a finding, however, cannot be made at this time, for the reasons set forth below. An alternative approach will, however, support the implementation of the SJRA.

A finding of equivalent protection would be premature at this time. The purpose of the SJRA and VAMP is to determine through experimentation alternative measures to protect the beneficial uses in the 1995 Bay-Delta Plan designated to be protected by the Vernalis pulse flow objectives. Until the experiment is complete, there will not be adequate information to know whether the measures provide equivalent protection.

Further, the Vernalis flow objectives in the 1995 Bay-Delta Plan do not contain a provision allowing a different set of objectives to be met if it is demonstrated that they provide equivalent protection for the beneficial uses protected by the objectives. In cases where equivalent protection can be provided, the objectives normally so state. Instead of providing for equivalent

protection, the 1995 Bay-Delta Plan provides that the Vernalis flow objectives will be reevaluated in a future review of the plan. (SWRCB 7e, p. 28.) The Plan provides that a reevaluation will be made because the objectives are based on limited information, and require more evidence. If the VAMP experiment results in equivalent or better protection of the beneficial uses, the objectives can be amended when the SWRCB reviews the 1995 Bay-Delta Plan. Under Water Code section 13242, an objective can be implemented in stages over a period of time. The VAMP experiment not only will provide a basis to reevaluate the objectives, but also will serve as a step toward implementation of the Vernalis pulse flow objectives. This decision provides for staged implementation of the Vernalis pulse flow objectives and establishes interim requirements for the affected parties who will conduct the VAMP experiment. This decision authorizes experimental operations in lieu of meeting the objectives during the interim period.

Finally, the SWRCB cannot predict, based on the existing record, that the SJRA will provide protection equivalent to the Vernalis flow objectives. The following factors prevent such a prediction.

1. New Melones Reservoir will be operated consistent with the USBR's Interim Plan of Operation at least through 1999 and possibly until the USBR develops a long-term plan of operation. (SJRGA 2, p. 6; USDI 4, pp. 3-4.) At this time the provisions of any long-term plan are unknown.

2. The SJRA calls for construction of a barrier at the head of Old River, to be operated in conjunction with the flows provided during the April-May pulse flow period. (SJRA 2, p. 9; R.T. pp. 906, 915, 939-940, 1049-1050.) The barrier would help protect San Joaquin River fall-run chinook salmon by ensuring that they stay on the mainstem of the San Joaquin River where they are less susceptible to entrainment at the export facilities. Construction and operation of this barrier, however, is not certain.

3. The maximum flows to be provided under the SJRA are lower than the flow targets in the VAMP. Failure to meet the VAMP flow targets may reduce the level of protection provided by the SJRA.

4. Paragraph 6.7 of the SJRA provides that if any party to the SJRA finds that the operations plan for the year is unacceptable, the export limits shown in Table 1, above, will not apply during that year. (SJRGA 2, p. 9.) Failure to meet the VAMP export limits could reduce the level of protection provided by the SJRA.[30]

The second part of Condition 1 appears to request a finding that the SJRA will satisfy all of the prospective obligations to meet Delta objectives held by parties diverting from the San Joaquin River. As discussed below regarding Condition 3, the DWR and the USBR have agreed to backstop the obligations of parties diverting from the San Joaquin River during the term of the VAMP experiment. Accordingly, the only obligations of the parties other than the DWR and the USBR during the term of the VAMP experiment are those specified in the SJRA and in this decision.

6.3.3.2 CONDITION 2 OF THE SJRA

Condition 2 is that the SWRCB commit to expedite noticing and holding a hearing if there is a dispute over operations under the SJRA during a given year, and the dispute continues on April 10, five days before the pulse flow is to start. (SJRGA 2, p. 9.) Condition 2 could be triggered by dissolution of the SJRA, in which case the DWR and the USBR have agreed to meet the flows for two years while the SWRCB conducts a hearing and deliberates. (SJRGA 2, p. 13.) In some cases Condition 2 calls for a hearing within five days. Five days is less than the minimum noticing period for a water right hearing. (See Wat. Code § 1340.) Notwithstanding that some of the actions contemplated under Condition 2 may not be possible within the time suggested, the SWRCB will retain continuing authority over the changes authorized in this decision and delegate authority to its staff to supervise the changes authorized to conduct the SJRA/VAMP. For actions triggered by dissolution of the SJRA, the SWRCB is committed to conducting necessary proceedings and taking any appropriate action.

[30] It should be recognized, however, that this provision might not result in lifting the VAMP export limits, since if listed fish were likely to be harmed, the Endangered Species Act requirements would control the export operations.

6.3.3.3 CONDITION 3 OF THE SJRA

Condition 3 is that the SWRCB commit to enforce the SJRA as it pertains to the DWR and USBR. The commitments of the DWR and the USBR include backstopping both the flow and salinity objectives at Vernalis and the San Joaquin basin's share of Delta outflow, paying money to the SJRGA, and varying project operations within the limits of the projects' permits. (SJRGA 2, pp. 7-9, 13.)

The SJRA specifies three different backstops to be provided by the DWR and the USBR. First, paragraphs 10.1.1 and 3.4 of the SJRA together provide that the USBR will assume responsibility for the agricultural and fish and wildlife objectives in the 1995 Bay-Delta Plan for salinity and flow at Vernalis. (SJRGA 2, pp. 12-13.) Second, paragraph 10.1.2 of the SJRA provides that the USBR and the DWR will assume responsibility for the San Joaquin River basin share of the Delta outflow objectives in the 1995 Bay-Delta Plan. (SJRGA 2, p. 13.) Third, paragraph 10 of the SJRA provides that if the SJRA is terminated, the USBR and the DWR will operate to provide the San Joaquin basin share of the Delta outflow for up to two years.[31] This is intended to allow adequate time for the SWRCB to establish alternative implementation of the San Joaquin portion of the objectives in the 1995 Bay-Delta Plan. (SJRGA 2, p. 13.) The DWR and the USBR have agreed to these backstops.

This decision requires that the parties who have agreed to provide water under the SJRA provide that water, so long as the SJRA remains in effect. This decision also requires the DWR and the USBR to provide backstops by ensuring, through water purchases or other measures, that the water and operations needed to conduct the VAMP experiment as modified pursuant to the SJRA are provided through the year 2010. However, the SWRCB is not the appropriate forum to enforce payments of money under the SJRA. This is a matter between the parties, and any enforcement of the payment provisions should be pursued in a court of law.

[31] The USBR might change its New Melones operations if it backstops the obligations of the parties to the SJRA. (R.T. pp. 1789-1790.) As a result, there could be less water available for other obligations of the New Melones Reservoir. (R.T. p. 1791.)

Considering that the SJRA limits the commitment of the SJRGA to a maximum contribution of 110 taf and caps the required contribution from water right holders in the San Joaquin basin at this amount, parties from other watersheds of the Delta, and some water contractors, question whether approval of the SJRA would result in the SWRCB assigning proportionately larger responsibilities to other river basins, to ensure that the objectives will be met. This concern applies principally to the outflow objective, as Sacramento River water has little or no effect on flows and water quality at Vernalis. (USDI 103, pp. 3-6; R.T. pp. 9994-10011.) Although making the USBR responsible for the Vernalis objectives (as a backstop) should have no impact on water users in the Sacramento basin, making the DWR and the USBR responsible for the Delta outflow objectives (as a backstop) could affect water users in the Sacramento basin. A potential exists for an effect on Sacramento basin water users because the DWR and the USBR might increase their flow contributions from the Sacramento River system to make up any shortfall of San Joaquin River contributions to Delta outflow, which could result in less water being available to current SWP and CVP contractors. (USDI 103, p. 3; R.T. pp. 9987-10167.)

The USBR analyzed the effect under Flow Alternative 3 of treating the San Joaquin basin contribution to Delta outflow as its contractual obligation, and presented evidence regarding the effect on other parties. Under these conditions, USBR operations to backstop the SJRA will not cause reductions in water diversions and supplies for water right holders in the Sacramento River basin. (R.T. pp. 9994-10000.) Nevertheless, the SJRA could result in CVP contractors in the Sacramento basin receiving less water than they would receive under Flow Alternative 3. (R.T. pp. 10113-10118.)

The USBR intends to operate New Melones Reservoir consistent with its Interim Operations Plan whether or not the SWRCB approves the SJRA. In general, implementation of the SJRA in conjunction with the Interim Operation Plan will have no impact on contractual allocations of CVP water from New Melones Reservoir. (USDI 4, p. 4.) New Melones contract allocations are specified in the Interim Operations Plan and are based on February end-of-month storage plus the March through September forecast of inflow to New Melones Reservoir. (USDI 4d. pp. 1-2.) However, modeling studies showed that, under certain hydrologic and operating scenarios, implementation of the SJRA in conjunction with the Interim Operations Plan formula could

cause February end-of-month storage to be lower than it would be without the SJRA resulting in lower allocations to CVP contractors of New Melones. (R.T. pp. 14042-14047, 15778, 15812.)

6.3.3.4 CONDITION 4 OF THE SJRA

This condition is that the SWRCB enforce the provisions of Water Code section 1707 with respect to the SJRA members' petitions for change of place of use and purpose of use in connection with implementing the VAMP. (SJRGA 2, p. 10.) The SJRGA members filed their long-term water right change petitions in December 1998, under Water Code sections 1707 and 1735. Water Code section 1707 allows the SWRCB to approve water right change petitions that seek, among other things, to use water held under existing water rights to preserve or enhance instream water uses. A change under section 1707 allows the water right holder to avoid legally abandoning the water when the water is released into the stream, and makes the water unavailable to other water users in the reach of the river where it is to be used for fish. This decision approves a change in the water right permits held by OID/SSJID, TID/MID, and Merced ID under sections 1707 and 1735. The SWRCB can enforce the protections provided to flows of water transferred to instream uses under Water Code section 1707, and will consider doing so if apparent violations are brought to its attention.

6.3.3.5 CONDITION 5 OF THE SJRA

This request is that the SWRCB make appropriate changes in the water right permits under the change petitions discussed in 4 above, to allow the SJRA to be implemented. This decision approves the change petitions, subject to terms and conditions. The change petitions are discussed below.

6.3.4 Findings Addressing the Petitions for Long-Term Changes

6.3.4.1 BACKGROUND

The petitions for long-term changes are described in Part 6.0 above. The notice for Phase 2B of the Bay-Delta Water Right Hearing, in which the SWRCB received evidence on the petitions, listed eight issues, which are discussed below. The issues are listed under Part 4.1 above.

Before the SWRCB can approve a petition for change filed under Water Code section 1707, it is required to make findings that the proposed change (1) will not increase the amount of water the water right holder is entitled to use; (2) will not unreasonably affect any legal user of water; and (3) otherwise meets the requirements of Division 2 of the Water Code. (Wat. Code § 1707(b).) Under Water Code section 1735, et seq., the SWRCB is required to make a finding that the change would not result in substantial injury to any legal user of water or unreasonably affects fish, wildlife or other instream beneficial uses of water.

In general, the agencies that petitioned for changes will not decrease consumptive use in their districts. Rather, the water provided under the proposed changes will come from conservation efforts, substitute groundwater pumping, stored water or reservoir reoperation. (SJRGA 103A, p. [2-6].)

CDWA and SDWA argued that the proposed changes would injure other legal users of water because the changes would result in poorer water quality at Vernalis during the summer irrigation season. Because the water to be supplied under the petitioned changes will not be from a reduction in consumptive use, they attempted to show that there would be adverse effects on downstream water right holders as a result of reduction or elimination of return flows, decreased groundwater accretions in the tributaries, and storage reductions in New Melones Reservoir (leading to a decreased supply of water to meet the Vernalis salinity objective).

Computer modeling of the hydrology in the San Joaquin River, however, showed that approval of the petitions would result in substantially similar, and in some cases improved, average monthly flow conditions at Vernalis in all year types. (SJRGA 103, pp. 23-25, 1a-1e.) The modeling showed that in some winter months of wet and above normal year types, the proposed changes resulted in lower flows at Vernalis than without the petitioned changes. (SJRGA 103, p. 9.) Considering the timing and the year type in which these reductions would occur, the model indicates that no downstream water user would be deprived of water by the winter reductions. (SJRGA 103, p. 9.) The modeling studies also indicate that approval of the petitions would result in improvement of overall water quality at Vernalis compared with current conditions. (SJRGA 103, p. 9.)

SDWA pointed out fifty-one instances in SJRGA's modeling studies in which SDWA argued that water quality at Vernalis would be impaired as a result of the petitioned changes. (SDWA 60C, pp. 4-5.) Forty-four of these instances, however, were attributable to rounding errors in the modeling studies. In these instances, the flows at Vernalis were the same with and without the petitioned changes. (R.T. pp. 14059-14061; SJRGA 103C.) The seven remaining instances corresponded to hydrological responses to the petitioned changes. In all seven instances, however, the Vernalis salinity objective was met. (R.T. pp. 14061-14062.) Accordingly, the modeling shows no injury to the southern Delta beneficial uses of water.

6.3.4.2 RIGHTS OF DOWNSTREAM WATER USERS CLAIMING INJURY

SDWA claims to represent all water right holders within the agency.[32] (R.T. p. 16030.) Its assumption is that the "mass bulk" of the land is riparian. (R.T. p. 16084.) SDWA exhibits 60A, 60B, 61 and 62 provide information on the rights of Alex Hildebrand and Jerry Robinson. Additionally, some individual appropriative water rights in the southern Delta are listed on Enclosure 2A. Banta Carbona ID and Westside ID are districts wholly contained within the boundaries of the SDWA with both pre-14 and post-14 appropriative rights. (R.T. pp. 16030, 16084.) Both districts also have contracts with the CVP for supplemental water. No district within the SDWA has formally requested representation by SDWA. (R.T. p. 16031.) Nevertheless, SDWA's arguments regarding effects on both riparian and appropriative rights in the Delta are discussed below.

6.3.4.2.1 Riparian Rights

Assuming that any water right holders downstream of the parties supplying water under the SJRA have senior riparian water rights, such water right holders could require the SJRA suppliers of water to bypass water from natural flow. They could require this with, or in the absence of, the petitioned changes. Riparian right holders cannot, however, require that water

[32] Such representation may be outside SDWA's authority and power. Neither SDWA nor CDWA has "authority or power to affect, bind, prejudice, impair, restrict, or limit water rights within the agency." (Wat. Code Appendix, §§ 116-4.5 and 117-4.2.) Both agencies were created for the purpose of reaching agreements with the United States and/or the State of California to protect the water supply of the lands within the agency against intrusion of ocean salinity, and to assure a dependable supply of water. (Wat. Code Appendix §§ 116-4.1 and 117-4.1.)

stored in another season be released for their benefit. Water stored in another season is not natural flow of the stream. Riparian rights attach only to the natural flow of a stream. *Lux* v. *Haggin* (1884) 69 Cal. 255 [4 P. 919]; *Bloss* v. *Rahilly* (1940) 16 Cal.2d 70 [104 P.2d 1049].) Further, riparian rights do not attach to water that has been stored upstream during an earlier period. (*Lindblom* v. *Round Valley Water Co*. (1918) 178 Cal. 450 [173 P. 994, 997].) Thus, if water previously stored in another season is flowing in the stream, that water is not available to riparian right holders. It follows that if previously stored water is not available to a riparian right holder, the riparian right holder cannot be injured if the water does not arrive at the riparian right holder's point of diversion due to a change in the use of the stored water. If an upstream diverter increases its use of natural flow or detains the water as a result of a change in its water right so that it does not reach the downstream riparian right holder at the natural time, however, and this change deprives the downstream riparian right holder of adequate water for beneficial uses, the downstream riparian right holder could be injured by the change. (*Scott* v. *Fruit Grower's Supply Co.* (1927) 202 Cal. 47 [258 P. 1095].)

The fundamental issue with respect to SDWA's claim that its members have riparian rights that could be impaired by the proposed changes, therefore, is whether there is sufficient natural flow to satisfy the diversion requirements of riparian right holders in the southern Delta. In this decision, the natural flow is estimated using DWR unimpaired flow data. (SCWA 18, p. 49.) Unimpaired flow is flow in rivers and streams that would have occurred in the absence of water storage and diversion projects. The unimpaired flow estimates provide a measure of total water supply available for all uses after removing the impacts of most upstream alterations. Channel improvements, levees, and flood bypasses are assumed to exist. (SCWA 18, p. 3.)

The southern Delta channel depletion requirements are specified in the hearing record. (SDWA 22; SWRCB 3j; R.T. p. 16004.) In general, SDWA presented evidence that water quality exceedances tend to occur in drier years. (R.T. pp. 8389, 15999.) Assuming that (1) all the lands in the southern Delta are riparian, and (2) there are no riparian right holders upstream

of Vernalis with whom the southern Delta riparian right holders must share water,[33] then the unimpaired flow at Vernalis is the amount of water available for the exclusive use of the southern Delta riparian right holders. Using these assumptions, the following table shows the differences between unimpaired flow and southern Delta diversion requirements using the 73-year hydrologic period.

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/ / /

[33] This is a very conservative assumption. Other water users upstream of Vernalis claim riparian rights.

TABLE 5

Southern Delta Water Availability Analysis

Southern Delta Diversion Requirement (cfs)

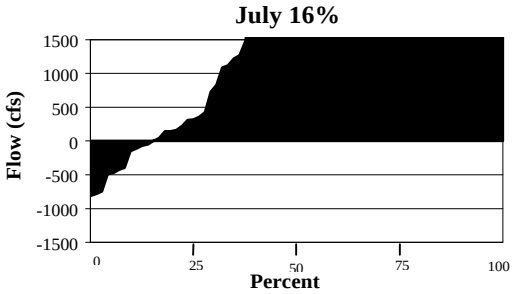
Jul	Aug	Sept	Oct
1,400	1,334	1,057	902

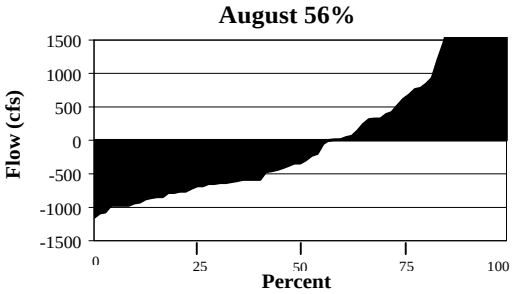
Natural Flow Minus Southern Delta Diversion Requirement (cfs)

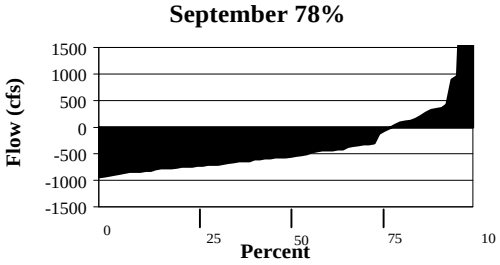
Year Type	Jul	Aug	Sept	Oct
W	12,685	2,274	634	601
AN	4,567	94	-476	26
BN	2,915	-410	-672	-373
D	488	-741	-406	-118
C	176	-804	-725	-402

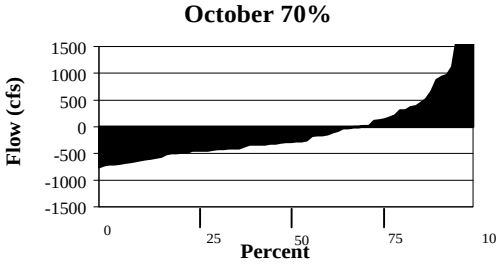
Based upon the 60-20-20 San Joaquin Valley Hyrdologic Classification System (See figure 2 of Order).

Percent of Years When There is Insufficient Water Available









In Summary:

1. On average, insufficient water is available to supply the southern Delta in Below Normal, Dry and Critical Dry years in August, September and October.

2. On average, sufficient water is available in September only in Wet Years.

3. Insufficient water is available in July during 16 percent of years, in August during 56 percent of years, in September during 78 percent of years, and in October during 70 percent of years.

To the extent that other instream water users are making riparian use of water, and to the extent that all southern Delta lands are not riparian, water is available to southern Delta water users less often than assumed herein.

Based on this analysis, riparian rights to the waters of the San Joaquin River are inadequate to meet the agricultural demands in the southern Delta in some months of many years. Because a riparian right holder's water right cannot exceed the natural flow, it follows that whenever there is inadequate natural flow to meet their demands, southern Delta riparian right holders cannot be injured if they are deprived of water that exceeds the natural flow. SWRCB Order WR 89-8 concludes that southern Delta riparian right holders have no right to water from the Sacramento River.

6.3.4.2.2 Appropriative Rights

An appropriative right holder can divert and use water on the place of use, for the purposes of use, at the point of diversion, up to the amount authorized in the permit or license. Appropriative water right holders can divert and use any unappropriated water that is flowing in the stream, including abandoned water. Thus, if an upstream appropriator abandons stored water after using it for hydropower generation during the summer, the water can be appropriated by a downstream appropriator.

Appropriative rights have limits, however, that are relevant in this decision. If the amount of unappropriated water in the source is inadequate to satisfy senior appropriative rights, a junior appropriator may not be able to divert any water. Even if there is enough water for senior water right holders, a junior appropriator may not be able to divert the maximum amount available

under the permit or license if there is not enough water left after the needs of senior water right holders are taken into account. Like riparians, downstream appropriators cannot require that the owner of an upstream reservoir release water appropriated during another season. (*Lindblom*, *supra*.) Further, a senior downstream appropriator can only demand that the reservoir operator bypass water during the season when the water is present in the stream and is being diverted. (*Lindblom*, *supra*.) Finally, an upstream appropriator is not required to continue to abandon stored water it has abandoned in the past, causing an artificial flow of water. (*Stevens* v. *Oakdale Irrigation District* (1939) 13 Cal.2d 343 [90 P.2d 58].)

SDWA presented evidence to show that Alex Hildebrand holds water right licenses 7143 and 7144 issued on Applications 17950 and 19194, for appropriation of up to 24 acre-feet per annum (afa) at the rate of 0.3 cfs from April 1 to November 1 of each year, and up to 40 afa at the rate of 0.5 cfs from May 1 to November 1 of each year. SDWA also provided evidence of water right license 3677, held by Mr. Robinson. (R.T. pp. 16013-16030.) The SWRCB has records of other permitted or licensed appropriative rights in the southern Delta.

If the SJRA water suppliers make water available under the petitioned changes by causing a reduction in return flows from direct diversions of water, and conserved water is held in storage in New Melones Reservoir, downstream appropriators could be injured. Injury would occur under this practice if inadequate water reaches the downstream right holders during the time period when natural flows occur. (*Scott* v. *Fruit Grower's Supply Co.* (1927) 202 Cal. 47, 258 P. 1095.) OID and SSJID possess direct diversion rights from May 1 through October 1, and they might use these rights to provide water under the SJRA. Accordingly, the issue is whether the petitioned changes would reduce flows when natural flows would occur under unimpaired circumstances.

The record is not entirely clear as to whether injury will occur to any downstream legal users of water as a result of the petitioned changes. Any legal injury will depend on relative seniority of the water rights involved and the presence of natural flow. It is unlikely, however, that either defacto or legal injury will occur, since the water provided for instream flows will be available to water right holders in the Delta after it passes Vernalis.

6.3.4.2.3 Effect of the Delta Protection Act

SDWA argues that the Delta Protection Act, at Water Code sections 12200 et seq., requires that the CVP and the SWP be operated to provide both salinity control in the Delta and an adequate water supply for in-Delta water users. Further, SDWA states that section 12204 mandates that only water that is surplus to Delta needs can be exported. The purposes of the Delta Protection Act are listed in section 12201, and include not only the maintenance of an adequate water supply in the Delta area, but also fresh water for export. Section 12202 provides that a function of the SWP, in coordination with the CVP, is to provide salinity control and an adequate water supply for the users of water in the Delta. Section 12202 further provides that if a substitute water supply is provided to the users of water in the Delta in lieu of providing salinity control, no added financial burden shall be placed on the Delta water users solely by virtue of the substitution. (Emphasis added.) The provision of substitute water, however, is subject to the provisions of the area of origin laws at Water Code sections 10505 and 11460 through 11463. Section 11462 is relevant in this context, because it provides that (1) sections 11460 et seq. do not create any new property rights other than against the DWR, and (2) these sections do not require DWR to furnish water to any person without adequate compensation for the water. As discussed elsewhere in this decision, section 11462 does not apply to the federal CVP, meaning that the CVP is not required to deliver water made available by the construction of its facilities.

No provision in the Delta Protection Act accords water users in the Delta water rights without either having existing riparian or appropriative water rights or obtaining new appropriative water rights through the procedures set forth in Division 2, Part 2 of the Water Code. Thus, if water users in the Delta do not have existing water rights adequate for their uses, the Delta Protection Act does not ensure the water users in the Delta a water supply unless they buy the water and provide adequate compensation to the DWR for the water, pursuant to Water Code section 11462.[34]

[34] As discussed below, this decision requires the SWP and the CVP to take salinity control actions to protect the beneficial uses of water in the Delta that may be affected by SWP and CVP actions. This requirement is included to help meet the salinity objectives in the 1995 Bay-Delta Plan.

6.3.4.2.4 Protection of Salinity in the Southern Delta

Notwithstanding the unavailability of water to satisfy existing water rights in the southern Delta during certain periods, the SWRCB has determined that protection of agriculture in the southern Delta is in the public interest. Water quality objectives have been set for this purpose, and the USBR is responsible for meeting the Vernalis salinity objective. The months in which the southern Delta water users' needs exceed their rights to water under riparian claims are the same months in which water quality violations tend to occur. Consequently, the southern Delta agricultural uses should not be deprived of water of useable quality as a result of this decision. However, the SWRCB urges the SDWA to seek water supply contracts to fill its water supply needs during water shortages. These shortages occur relatively frequently because of natural changes in the water supply.

6.3.4.3 EFFECTS OF REDUCTION OR ELIMINATION OF RETURN FLOWS DUE TO WATER CONSERVATION

SSJID has conserved water by lining canals and piping water to reduce percolation and evaporation losses, and by constructing structures, including canal control structures and a regulating reservoir, to control and measure water deliveries. (SJRGA 104, pp. 4-10; SJRGA 105, pp. 4-8.) OID has conserved water through improved efficiencies in delivery and water use. (SJRGA 106, pp. 1-2; R.T. pp. 16340-16341.) The conserved water is stored in New Melones Reservoir under OID's account. (R.T. p. 16279.) The conservation measures reduce the amount of water diverted and delivered to water users, but can also result in decreased return flows to surface streams and a decrease in deep percolation to underlying groundwater bodies.

In the service areas of OID and SSJID, irrigated lands overlie common groundwater basins and are linked by a network of surface streams and drains. Return flows from this area contribute to the supply of downstream users, to Delta outflow, and to deep percolation. Deep percolation from seepage and return flows is an important component of groundwater recharge in these service areas. The water that SSJID and OID will conserve in New Melones storage and apply to instream use could result in diminished return flow. Thus, downstream water users who are dependent on return flows could receive less water as a result of water conservation. As discussed above, however, the downstream water users can be injured only if they receive

inadequate water during times when natural flows would occur under unimpaired conditions. Any water in the OID conservation account would not be available to SDWA in the year of allocation. In subsequent years, SDWA would not have any right to the conserved water because it is stored water.

Under the proposed changes, once the water subject to the petitions for change flows past Vernalis, it will become available to water users in the CDWA and SDWA. Thus, the issue in the CDWA and SDWA service areas is one of timing of the flows. Some of the water will be released from mid-April through mid-May during the VAMP target flow period. This is probably earlier in the season than the pre-conservation return flows would have appeared in the stream system. The additional water provided by OID would be transferred to the USBR for instream beneficial uses, and the USDI would decide when to release it. (R.T. pp. 15811-15812.) If the USDI releases the water when it can be beneficially used by water right holders downstream of Vernalis, or releases it to meet the Vernalis salinity objective, the downstream water users would benefit from the transfer. However, under certain operating scenarios, this transfer of conserved water to storage in New Melones Reservoir could reduce the amount of water available in the southern Delta. (R.T. pp. 16005-16006.)

No modeling analysis in the hearing record shows the changes in return flow that could be caused by the petitioned changes. (R.T. pp. 13942-13944; R.T. pp. 13953-13955.) Changes in timing of return flows could deprive water users in the Delta of adequate flow for their beneficial uses, but, as discussed above, would not necessarily interfere with the exercise of valid water rights. This decision requires an annual report. The report should provide information adequate to determine the effects of the changes in return flow.

6.3.4.4 EFFECTS OF GROUNDWATER PUMPING ON DOWNSTREAM WATER USERS

Although MID and TID pump groundwater to help meet demand during drought conditions, they do not intend to increase their reliance on groundwater as a result of the petitioned changes, either in frequency or in volume. (R.T. pp. 14199-14203; SJRGA 107, p. 3.) They will meet the SJRA releases from stored water, and will incur reductions in carryover storage of surface water if necessary during a drought. Consequently, there will be no adverse effect on groundwater levels in the TID/MID service areas because of the petitioned changes.

Under hydrological conditions when Merced ID and OID lack enough water to meet their customers' demands and to supply water under the SJRA, however, Merced ID and OID intend to pump groundwater from the Merced, Modesto, and Eastern San Joaquin County groundwater basins. (SJRGA 103A, pp. [4-26]-[4-28].) The Merced ID indicated it would not need to pump groundwater to meet these demands during the next twelve years except in a significant drought. (SJRGA 103, p. 21.) All three of these basins are in a state of overdraft, although the severity of the overdraft is different in each basin. (SWRCB 65, Vol. 1, p.87.) A discussion of the overdrafts follows.

Regarding overdraft in the Merced Groundwater Basin, the SWRCB received contradictory evidence. Some testimony indicates that the groundwater basin is in relative balance and that groundwater levels in the basin have recovered to pre-1992 drought elevations. (SJRGA 109, pp. 3-4.) On the other hand, DWR Bulletin 160-93 and the Merced Groundwater Basin Groundwater Management Plan indicate that the overdraft is worsening. In Bulletin 160-93, the DWR reported that overdraft in the Merced Groundwater Basin was occurring at a rate of 28 taf per year based on 1990 demand level. (SWRCB 65, vol. I, pp. 87.) The 1997 final draft of the Merced Groundwater Basin Groundwater Management Plan states:

> "For years, the amount of pumping has exceeded the local recharge, creating a condition of local groundwater overdraft, although it is not considered significant at this time. According to the Groundwater Management Plan, the average annual overdraft…is estimated to be about 20 taf per year. In general, groundwater levels have been on a steady decline since 1983, with accelerated rates of decline during the 1987-1992 drought." (SJRGA 111C, p. 19.)

Testimony presented by SJRGA indicates that for a 1976-77 level drought, to meet demand and provide SJRA flows, Merced ID would need to pump an additional 74 taf of groundwater during the two-year period. (SJRGA 103, p. 15.) For a 1986-92 level drought, to meet demand and provide SJRA flows, an additional 59 taf of groundwater pumping would be needed over the six-year period. (SJRGA 103, p. 19.) The effect of pumping an extra 133 taf on overdraft attenuated over the 71-year hydrologic record amounts to an increase in overdraft of 2 taf per year. This value is a 7 to10 percent annual increase in the rate of overdraft depending on which estimate of

overdraft is used. The EIR/EIS for the SJRA identified this impact as potentially significant, but with mitigation, as less than significant. (SJRGA 103A, p. ES-7.)

The OID overlies both the Eastern San Joaquin County Groundwater Basin and the Modesto Groundwater Basin with the Stanislaus River separating the two basins. The overdraft in these basins is discussed above, in Part 6.3.4.3. Despite the overdraft, water levels suggest that the Stanislaus River is not a gaining stream in the OID service area. Groundwater gradients are relatively flat, and stream/aquifer interaction probably is controlled by the river stage rather than groundwater levels. (SJRGA 105K, App. D, p. 10.) Thus, pumping groundwater in the amount of the water supplied by OID under the SJRA should not affect the flow in the Stanislaus River. Consequently, OID's substitution of groundwater for surface water during a drought should not impact downstream water users.

If the SJRGA substitutes groundwater for surface water in an area such as the Merced area where the groundwater and surface water are interconnected, and groundwater affects stream flow, the use of the surface water elsewhere will in effect borrow local groundwater supplies against future stream flow and/or storage in the groundwater basin. In the Merced ID service area, the groundwater withdrawals could lessen groundwater accretions[35] to the surface streams, exacerbate overdraft, or both. If reductions in accretions reduce the flow in the San Joaquin River, downstream water users could receive less water. Additionally, as discussed below, continuing overdrafts of groundwater may not be in the public interest.

In most of the Merced Groundwater Basin, the groundwater basin contributes water to the Merced River. The rate of discharge of groundwater into the river is controlled by the hydraulic gradient from the aquifer to the river. As discussed above, an estimated 74 taf of additional groundwater pumping could occur during a 1976-77 level drought as a result of the petitioned changes. This represents a 13 percent increase in the average annual groundwater pumping from the groundwater basin. (SJRGA 109, p. 3; SJRGA 109B, p. 5-2.) Although no evidence was

[35] Groundwater accretions to surface streams contribute a portion of surface flow that is called "baseflow."

submitted to show how this additional pumping would affect the hydraulic gradient, there is a potential for this increase in groundwater pumping to reduce the flow in the Merced River.

Any immediate effects of additional groundwater pumping on flow in the Merced River could be minimized by pumping at a distance from the river, and, if possible, from geologic units in poor hydraulic connection with the river. However, it is possible that a decrease in Merced River flow due to groundwater pumping caused by the proposed change could occur at a time when surface flows are less than downstream demands and Delta requirements. Such a decrease could reduce downstream flows for other legal users of water during periods when flows otherwise would be adequate for downstream uses.

Potential impacts from groundwater pumping could be avoided through "in-lieu recharge" and conjunctive use programs whereby surface water in the amount needed to make up for the SJRA contributions is subsequently provided to water users whose normal supply is groundwater. Another approach would be direct recharge of surface water into the basin through spreading grounds or well injection. These actions could prevent any reductions in accretions to the Merced River due to groundwater pumping by stabilizing water levels in the basin, and thus, the hydraulic gradient toward the river.

Likewise, groundwater substitution in the Merced Groundwater Basin would not be in the public interest if the pumping exacerbates overdraft conditions in the basin. The use of groundwater to replace surface water supplies released under the SJRA would be appropriate if conducted with an in-lieu recharge or actual recharge program to balance the additional groundwater pumping. Alternatively, it would be reasonable if Merced ID has a groundwater management plan under Water Code section 10750, et seq. and/or a conjunctive use program. Accordingly, this decision requires that if groundwater substitution from the Merced Groundwater Basin is undertaken as a result of the petitioned changes, measures such as in-lieu recharge or actual recharge must be undertaken to prevent exacerbation of overdraft conditions.

6.3.4.5 EFFECTS ON DOWNSTREAM WATER USERS OF CHANGING RESERVOIR OPERATIONS

Merced ID, TID, and MID propose to release water from their reservoirs under the SJRA. If stored water is released or inflow is bypassed, the reservoir could be filled or refilled later in the

season, reducing downstream flows at a time of year when downstream users might be deprived of flow. (SJRGA 107, pp. 1-2; SJRGA 108, p. 1.) The petitioned changes potentially could affect the timing of return flows derived from direct diversions by changing the timing of releases of water that otherwise would be stored in upstream reservoirs and released for power generation in the late summer.

SDWA argues that shifting the timing of releases of water normally made in the summer for power purposes into the spring months injures the senior water rights of the Delta riparian right holders. (R.T. pp. 355, 15998.) SDWA further argues that upstream water right holders have a duty to operate their projects in a manner not detrimental to senior downstream rights. (R.T. p. 357.) When upstream parties move summer releases into the spring, less water is available at Vernalis to satisfy diversion requirements in the SDWA during the summer. As a result, southern Delta water users receive less water during the summer. (R.T. pp. 435, 8228, 16004.)

Limits in the water rights of Merced ID, TID and MID control the amount of water that these districts can divert and use, and could limit refill of their reservoirs after they make releases under the SJRA. Each of these districts holds water rights that allow diversion of water to storage during part of the summer. (SWRCB 1a, p. II-28.) By releasing stored water, however, these districts are taking a risk that reservoir storage levels will be reduced as a result of the petitioned changes. (R.T. pp. 14198-14199.) Merced ID's License 11395 (Application 16185) authorizes collection to storage of up to 605 taf per year. Merced ID's License 2685 (Application 1224) authorizes collection to storage of up to 266 taf per year. License 11395, however, limits the total withdrawal from storage for beneficial uses to 516.11 taf per year under Merced ID's licensed storage rights. TID and MID share a water right license on the Tuolumne River. (R.T. pp. 14150-14151.) TID/MID's License 11058 (Application 14127) authorizes collection to storage of up to 1,046.8 taf per year, with a maximum diversion of 1,371.8 taf per year. License 11058 sets the maximum withdrawal from storage for beneficial uses at 951.1 taf per year under Licenses 11058, 11057, 5420, and 5417. In consideration of the limits on these licenses, the petitioned changes will be conditioned upon these water right holders submission of an annual report to the SWRCB, Division of Water Rights, accounting for reservoir operations.

The SJRGA modeling shows benefits to instream flow and water quality under the SJRA, but actual operations could differ from those assumed in the model. CDWA requested that the changes be conditioned so that in all years when the February forecast for the San Joaquin River unimpaired runoff is below normal, dry or critical, the petitioners must bypass all inflow to their reservoirs during the period March through September. The SDWA requested a condition requiring the petitioners to pass through their reservoirs the natural flow of the rivers at all times that downstream channel depletion needs are not being met. (R.T. p. 16009.) To ensure that the actual conditions are as close as possible to the predicted instream flow and water quality, the petitioned changes will be conditioned to preclude reservoir refill diversions when New Melones Reservoir is releasing water to meet the Vernalis salinity objective or when the Vernalis salinity objective is not met. This will help ensure that downstream legal users of water are not harmed by refill operations resulting from the petitioned changes.

6.3.4.6 EFFECTS OF RELEASES FROM THE EXCHANGE CONTRACTORS

The member agencies of the San Joaquin River Exchange Contractors (SJREC) also will release water pursuant to the SJRA. Although the SJREC originally filed a change petition with the SWRCB, the petition was withdrawn because there are no changes to the water rights of the SJREC requiring approval of the SWRCB.

The SJREC will release water it receives under its exchange contract with the USBR. The maximum amount to be provided is 11 taf per year. (R.T. p. 14266.) The SJREC agencies do not plan to reduce consumptive use within their respective districts. The transfer water is available because of successful water conservation programs, including conjunctive use of surface and groundwater, adoption of a groundwater management plan, surface water transfers, tiered water pricing, a loan program to finance water system improvements, and a tailwater recovery program. (R.T. pp. 14236, 14238, 14243-14248, 14252-14253; SJREC 7; SJREC 7a; SJREC 7b.) The SJREC expects to save 20 taf per year under the CCID tailwater recovery program. This water would otherwise be lost to percolation into groundwater of unusable quality in the Grasslands Basin. (R.T. pp. 14251, 14307.)

6.3.4.7 PUBLIC INTEREST CONSIDERATIONS REGARDING SUBSTITUTION GROUNDWATER PUMPING

Notwithstanding that groundwater pumping under the SJRA is not likely to affect flows in the Stanislaus River, substitution of groundwater for surface water in OID's service area during a drought could result in adverse effects on groundwater overdraft. The Eastern San Joaquin County Groundwater Basin is experiencing overdraft at a rate of 70 taf per year. (SWRCB 65, vol. 1, p. 87) Saline water intrusion into the basin is one result of the overdraft. The OID Groundwater Management Plan indicates that opportunities for the development of additional conjunctive use in the Eastern San Joaquin County Groundwater Basin are limited. (SJRGA 106C, p. 18.) Nonetheless, OID plans to develop groundwater supplies from this basin to replace surface water transferred to SEWD pursuant to a proposed Water Transfer Project in addition to potentially substituting groundwater during a drought for the surface water supplied under the SJRA.

The draft EIR for this project indicates that impacts to groundwater conditions in the OID service area would be less than significant in the Eastern San Joaquin County Groundwater Basin. (SJRGA 105K, Appendix D, p. 16.) The cumulative impacts of the Water Transfer Project and the VAMP on groundwater conditions in the OID service area also were treated as being less than significant in the EIR. (SJRGA 105K, p. 5.1-3.) These findings appear to be based in part on the concept that the Water Transfer Project as a whole will benefit the Eastern San Joaquin County Groundwater Basin and that water level declines beneath OID will be less than one foot. Groundwater substitution for flows provided under the SJRA, however, will not benefit the groundwater basin. Further, this pumping would occur in a recharge area of the critically overdrafted basin. Because the basin is critically overdrafted, increased groundwater pumping, except as part of a conjunctive use or groundwater management program that prevents the pumping from contributing to long-term overdraft, could result in injury to legal users of groundwater. Accordingly, the SWRCB finds that a substitution of groundwater from the Eastern San Joaquin County Groundwater Basin to provide water for the SJRA is not in the public interest and should not be undertaken.

Adverse effects of any groundwater substitution by OID could be eliminated if the groundwater was pumped entirely from south of the Stanislaus River, rather than from the north side. |

Conditions of overdraft in the Modesto Basin do not appear to be a significant problem. The DWR estimated the amount of overdraft in the Modesto Basin at 15 taf per year. Other overdraft estimates reported in the OID Groundwater Management Plan are much lower. Hydrologic Consultants estimated an overdraft of 2 taf per year using a water balance method. A third estimate of overdraft using water levels is that the overdraft is 3 taf per year. The OID Groundwater Management Plan indicates that water conservation projects by the City of Modesto should bring the basin back into balance. (SJRGA 106C, App. A, pp. [3-34]-[3-46].) Groundwater pumping by OID from the Modesto Basin to facilitate the SJRA water transfer in critically dry years should not adversely impact overdraft conditions in the basin.

6.3.4.8 EFFECTS ON FISH, WILDLIFE, OR OTHER INSTREAM BENEFICIAL USES OF WATER

As discussed above, OID/SSJID, TID/MID, and Merced ID filed long-term change petitions under Water Code sections 1707 and 1735, et seq. These sections require specific findings by the SWRCB in connection with approval of a petition for change.

Under Water Code section 1707(a) a water right holder can petition the SWRCB under appropriate provisions of the Water Code for a change in the water right for purposes that include preserving or enhancing fish and wildlife resources. If the purpose of the change falls under section 1707, the water right holder can receive this section's benefits. A water right holder can protect water to be dedicated to fish and wildlife use by petitioning for a change of place of use and purpose of use before releasing the water. If the petition is approved, the water right holder does not abandon the water by releasing it, but continues to use the water as it flows in the stream. Such water is unavailable for appropriation in the stream reach between the release point and the end of the added place of use.

Under Water Code section 1735, et seq., the SWRCB can approve a petition for a long-term transfer if it makes specified findings, including a finding that the change of point of diversion, place of use, or purpose of use would not unreasonably affect fish, wildlife, or other instream beneficial uses.

The purpose of the petitioned changes is to contribute water for fish flows. Most of the water contributed would be released during April and May for the VAMP experiment. The releases

would supply water to conduct experiments on the relative effects of flow, exports, and the operation of the head of Old River barrier on survival of emigrating juvenile fall-run chinook salmon. (SJRGA 2, p. 3; R.T. p. 896.) It also would provide water for instream fish flows at other times of year. Accordingly, the SWRCB finds that the purpose of the petitioned changes falls within the scope of Water Code section 1707.

Under Water Code section 1735, et seq., the SWRCB must find that the proposed change would not unreasonably affect fish, wildlife, or other instream beneficial uses. Compared with the current water right requirements, which do not include a requirement that the Vernalis flow objective be met, the changes would benefit fish during periods when fish need additional flows. (SJRGA 103, p. 9.)

There are several ways in which implementation of the petitioned changes in connection with the SJRA could affect instream beneficial uses. These effects would result from changing: (1) the timing and magnitude of instream flows in the San Joaquin River and its tributaries, (2) export rates from the Delta, and (3) storage levels in the major reservoirs in the basin. These effects are discussed below.

6.3.4.8.1 Effects on Fish of Flow Changes in the San Joaquin River at Vernalis

During the hearing, the SWRCB heard numerous points regarding the equivalence or lack of equivalence of protection of beneficial uses under the SJRA, compared with the VAMP or the 1995 Bay-Delta Plan in the San Joaquin River at Vernalis. (R.T. pp. 431-933, 2083-2085; 2110-2112.)

As discussed in Part 6.3.3.1, it is premature for the SWRCB to make a finding of equivalent protection. Rather, the question before the SWRCB is whether the proposed change will unreasonably affect fish, wildlife or other instream beneficial uses. The projects currently operate under D-1485 as modified by Order WR 98-9. Under these conditions, there are no minimum flow objectives for the San Joaquin River at Vernalis. The SJRA would provide minimum flows in the San Joaquin River at Vernalis that are higher than D-1485 flows during the April-May pulse flow period. (SJRGA 2.) Modeling studies conducted by the SJRGA indicate that the SJRA would result in over a 50 percent increase in flow at Vernalis during the

April and May period in critical years and over a 70 percent increase in April-May flow in dry and below normal years compared to the regulatory requirements that were in place during the evaluation and development of the 1994 Principles Agreement. (SJRGA 11, p. 11.) Compared to current conditions in the San Joaquin basin, the SJRA results in additional flow during the pulse flow period and in October. (SJRGA 11, p. 11.) However, in critical years, the minimum flow targets under the SJRA (2000 cfs) are lower than those in the experimental design of the VAMP (3,200 cfs.). (R.T. pp. 974-975.) The SJRA provides that the USBR will assume responsibility, for the term of the Agreement, for the San Joaquin River portion of the 1995 Bay-Delta Plan objectives that can be reasonably met through flow measures. A USBR witness testified that it may not be possible or prudent to meet all of the standards under all conditions, but that they will make their best effort to do so.[36] (USDI 4, p. 4.)

Increased flows in the spring generally benefit salmon. Increased flows in the San Joaquin River at Vernalis during the spring months are correlated with increased numbers of adult fall-run chinook salmon spawners returning to the basin two and a half years later, implying that smolt survival improves with increased spring flows. (SWRCB 7e.) Data from recent USFWS smolt survival experiments indicate that there is a statistically significant relationship between flow at Stockton and absolute survival of smolts from Dos Reis or Mossdale to Jersey Point. (USDI 1, p. 5.) Within the manageable range of flows less than 8,000 cfs, additional San Joaquin River flow increases the survival of emigrating smolts. (USDI 1, p. 5.)

The April-May pulse flow under the SJRA coincides with the spawning season of a number of estuarine species, such as delta smelt, Sacramento splittail, and striped bass. Higher spring flows may improve spawning conditions for these species in the central and southern Delta and provide transport flows out of the central Delta. (SWRCB 7e.)

[36] The SWRCB expects that the USBR will make its best efforts to meet the VAMP target flows during the pulse flow period and to meet the objectives in the 1995 Bay-Delta Plan during other periods of the year.

Compared to existing conditions, therefore, increased spring flows under the SJRA are expected to result in increased survival of fall-run chinook salmon smolts emigrating from the basin, and may improve conditions for some estuarine fish species.[37]

6.3.4.8.2 Effects on Fish of Export Restrictions

The VAMP export targets are a goal of the SJRA but are not required by it.[38] (SJRGA 2.) The SWRCB urges the USBR and the DWR to meet the VAMP target objectives for Delta exports for the April/May period, because the target objectives would provide more information regarding fishery protection. Export objectives in the Plan restrict exports to a maximum rate of 1,500 cfs, or 100 percent of the 3-day running average of Vernalis flow, whichever is greater (a 1:1 ratio of flow to export). (SWRCB 7e.) The VAMP target objectives would always result in a flow to export ratio of at least 1:1 and would often result in a Vernalis inflow to total export ratio of 2:1 or greater. (SJRGA 2.)

The lower proportion of exports under the VAMP target objectives is expected to decrease both direct entrainment of chinook salmon at the project facilities in the south Delta and lessen net reverse flows in south Delta channels. (USDI 2, p. 8.) However, the effects of exports on San Joaquin basin smolt survival remain unclear. (USDI 1, p. 5.) Data gathered in the past on exports and smolt survival appear to be affected to some extent by flow. (USDI 1, p. 5.) The VAMP experimental design will provide a consistent framework to develop information on the effects of exports on smolt survival at various flow levels with the barrier in place. (USDI 1, p. 5.)

6.3.4.8.3 Effects on Fish of Changes in Flow and Water Temperature in San Joaquin River Tributaries

The CDWA raised questions regarding whether summer flows on the mainstem San Joaquin River and the lower Stanislaus, Tuolumne, and Merced rivers may be reduced under the SJRA,

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[37] In drier years, the VAMP would provide better conditions for these species than the SJRA, because of the higher minimum flow provisions in those years.

[38] The CVP and SWP are required, however, to meet the conditions in the biological opinion for delta smelt. (SWRCB 174.)

potentially impacting habitat for juvenile steelhead trout and chinook salmon rearing in these streams by increasing water temperatures. (R.T. pp. 14444, 14447-14449, 14455, 14470-14471.)

There is no evidence that implementation of the SJRA would cause summer flows to be significantly reduced, or summer water temperatures increased, in the San Joaquin River tributaries. Modeling studies show that summer flows in these streams are not significantly different under the SJRA compared to the base case. (SWRCB 1d, pp. [VI-40]-[VI-41], Tables [VI-23]-[VI-28].)

Results of water temperature modeling indicate that implementation of the SJRA will have no adverse effects on summer water temperatures in the lower Stanislaus River in any water year type. (SWRCB 196.) In a wet year, the SJRA may result in improved temperature conditions throughout the lower river for cold water species. Water temperatures would be higher in the winter and lower in the spring and summer months than under base case conditions. In other water year types (above normal, below normal, and critical years), water temperatures under all of the alternatives would be similar to or lower than temperatures under the base case.

Temperature modeling was not conducted for the lower Merced or Tuolumne rivers, but no significant temperature impacts are anticipated on these streams due to implementation of the SJRA. Changes in carryover storage in New Melones Reservoir, New Don Pedro Reservoir, and Lake McClure, which may affect the temperature of water releases to the San Joaquin River tributaries, were also evaluated for each of the flow alternatives. (SWRCB 1d, p. V-5, Tables V-3 and V-4.) Over the 73-year period of record, end of September carryover storage was predicted to be slightly lower in these reservoirs under the SJRA than in the base case condition, but by less than 10 percent in any reservoir. These slight reductions in carryover storage due to implementation of the SJRA are unlikely to result in significant temperature effects in the lower rivers.

No other significant impacts of implementation of the SJRA on fish and wildlife were identified in comparison to the D-1485 base case in the SWRCB analysis. (SWRCB 1d, pp. [VI-16]-[VI-35], [VI-43]-[VI-70].)

6.3.4.8.4 Value to Fisheries of the VAMP Experimental Data

The VAMP experiment is expected to provide valuable data to evaluate the relationship between the effects of San Joaquin River flows and export rates on survival of emigrating juvenile fall-run chinook salmon smolts during the April-May period.

Fishery experts expect the VAMP to provide protection for San Joaquin River fall-run chinook salmon equivalent to the 1995 Bay-Delta Plan. (DFG 13; USDI 1; USDI 2; SWC 12; (R.T. pp. 883-908).) Increased flows under the VAMP should provide quantifiable benefits to smolt survival. The VAMP provides a consistent framework for gathering valuable information on the role of exports on smolt survival (USDI 1, p. 5; R.T. pp. 865-877.) The VAMP has a sound technical foundation. (USDI 2, pp. 1, 6.) Successful implementation would be beneficial for the fish and wildlife resources of the state. (DFG 13, p. 1.)

6.3.4.8.5 Summary of Fish and Wildlife Effects

Based on the foregoing discussion, the SWRCB finds that implementation of the VAMP as supported by the SJRA will not unreasonably affect fish or wildlife resources and is consistent with the concept of real time best management practices which can be used to determine optimum solutions to resource problems. The SWRCB expects the SJRA/VAMP to have beneficial effects on San Joaquin River fall-run chinook salmon compared to existing or D-1485 base case conditions. The SWRCB expects the VAMP experiment, supported by implementation of the SJRA, to provide valuable fisheries data that will provide a basis to reevaluate the Vernalis flow objective.

6.3.5 Summary of Findings and Actions Regarding the SJRA

The SJRA is an agreement among a number of parties to the Bay-Delta Water Rights Hearing. Its purpose is to contribute a quantity of water toward conducting the VAMP experiment. The VAMP experiment is designed to determine the relative effects of San Joaquin River flow and export pumping rates in the southern Delta on chinook salmon. The VAMP experiment will test combinations of flows and exports. The parties providing water under the SJRA will contribute to the flows to conduct the VAMP experiment, but will not always provide all the water required. Meeting the flows specified in the VAMP will not meet the pulse flow objectives. Further, it is not certain that the VAMP will provide protection for the chinook salmon equivalent to that

provided by the objectives. Conducting the VAMP will, however, provide better information than is currently available on how large a pulse flow is needed to protect the salmon, and could provide a basis for changes in the objectives at a future review of the Bay-Delta Plan objectives.

This decision approves the SJRA for the purpose of conducting the VAMP experiment and authorizes a staged implementation of the Vernalis pulse flow objectives so that experimental operations can be conducted in lieu of meeting the objectives as the first stage of implementation. In years when the SJRA does not yield enough water to conduct the VAMP experiment, the USBR is urged to make up the difference in flow from other sources, to ensure that the experimental data is collected. Also to ensure that the data is collected, the USBR and the DWR are urged to comply with the applicable export pumping limits in the VAMP.

This decision accepts the commitments of the DWR and the USBR, for the term of the SJRA, to provide backstops adequate to allow the conduct of the VAMP pursuant to the provisions of the SJRA. Appropriate terms and conditions are included to encourage the completion of the VAMP experiment. This decision also approves the changes in purpose of use and place of use of water under water rights of OID/SSJID, TID/MID, and Merced ID, subject to terms and conditions. In approving the petitioned changes, the SWRCB finds that the changes, as conditioned, will not unreasonably affect or substantially injure any legal user of water, and will not unreasonably affect fish, wildlife, or other instream beneficial uses of water.

7.0 RESPONSIBILITY FOR MEETING THE SUISUN MARSH OBJECTIVES

7.1 Background

The 1995 Bay-Delta Plan contains water quality objectives (salinity objectives) for locations in Suisun Marsh for the protection of fish and wildlife beneficial uses.[39] The Plan lists numeric

[39] The Suisan Marsh salinity objectives were first adopted in the 1978 Delta Plan and were amended in the 1995 Bay-Delta Plan. The 1995 Bay-Delta Plan added deficiency period objectives and added the narrative objective. The stated purpose of the Suisun marsh salinity objectives is to… "provide water of sufficient quality to the managed wetlands to achieve soil water salinities capable of supporting the plants characteristic of a brackish marsh." (SWRCB 7, p.40.) The D-1485 objectives were based on research of Rollins and Mall (SWRCB 136; 119.) who investigated the salinity tolerance of alkali bullrush (*Scirpus maritimus*) and other important waterfowl food plants in the Suisun Marsh. The research identified maximum mean applied water salinity that would provide an
[footnote continues on next page]

salinity objectives at seven locations within the marsh and a narrative objective for the brackish tidal marsh areas. The numeric salinity objectives can be implemented either by ensuring that salinity does not exceed the numeric electrical conductivity values, or by providing equivalent or better protection for fish and wildlife at the locations of the compliance stations.[40] (SWRCB 7, p. 18.) The purpose of the marsh salinity objectives is to protect habitat for waterfowl in managed wetlands.[41]

In D-1485, the SWRCB assigned sole responsibility for meeting the salinity objectives to the DWR and the USBR (D-1485, Condition 7). The SWRCB temporarily changed the requirements regarding time of compliance by the DWR and the USBR to meet these objectives when it adopted Order WR 95-6. In Order WR 98-09, the SWRCB extended the temporary changes. DWR, in cooperation with the USBR, DFG, USFWS and the Suisun Resource Conservation District (SRCD) developed in 1984 a Plan of Protection for the marsh, including an EIR, to meet the D-1485 requirements. (SWRCB 1a, p. VII-4.) In 1987, the DWR, USBR, DFG and SRCD signed the Suisun Marsh Preservation Agreement (SMPA) as a contractual framework for implementing the Plan of Protection, including plans for physical facilities to control channel water salinity. The most important facility, the Suisun Marsh Salinity Control Gate (SMSCG) was constructed and began operation in 1988. (SWRCB 1a, pp. [VII-4] – [VII-8]; DWR 30, p.3.) The SMSCG has proven more effective for salinity control than originally

average of 90 percent of the maximum alkali bullrush seed production and a 60 percent seed germination rate. At that time, the D-1485 salinity objectives were thought to represent the most saline water that can be applied regularly to well-managed wetlands without loss of alkali bullrush seed production. (DWR 29, p. 3.)

[40] The salinity objectives at S-35 and S-97 have never been implemented. The SWRCB has extended the effective date of required compliance at these locations by orders dated October 30, 1997, August 14, 1998, April 30, 1999 and November 1, 1999.

[41] The managed wetlands are those areas isolated from the daily tidal flux by constructed dikes. The managed wetlands in Suisun Marsh were once brackish tidal marsh. Beginning in the late 1800's people tried to reclaim the marshland for agricultural purposes. This proved unsuccessful, and the land was managed for waterfowl to support numerous private duck hunting clubs. Currently, the managed wetlands constitute nearly 90 percent of the total land area in Suisun Marsh. (SWRCB 153, pp. [IV-2] – [IV-8]. SWRCB 1a, p. VII-1.) Typically, managed wetlands are flooded (using gravity flow) on high tides in early October to a depth of 12 inches. This level is maintained through the end of hunting season in January, after which the ponds are drained. Some landowners leave their property at this point and do nothing further until the following fall flooding. (R.T. p. 2203.) Others use a variety of leach cycles coupled with pond circulation, depending on the desired habitat. (DWR 30, Appendix B, p.10.)

expected. However, even with "full-bore" SMSCG operation, DWR and USBR cannot meet the objectives at the two western compliance stations, S-35 and S-97.

7.2 Implementation of the Numeric Objectives Using Equivalent Protection

The SMPA parties began work in 1990 on the Western Suisun Marsh Salinity Control Project, the purpose of which was to develop facilities or activities that would achieve compliance with the objectives in the western marsh. Work on the western marsh project was halted in 1995 because of changed conditions. Delta outflows required in the 1995 Bay-Delta Plan are generally higher during the Suisun Marsh salinity control season and therefore produce less saline conditions. This information, coupled with the greater than expected effectiveness of the SMSCG, convinced the SMPA parties to begin negotiations to amend the SMPA. These negotiations resulted in SMPA III. (DWR 29, pp. 4-5; DWR 30, Appendix A.)

The overall purpose of SMPA III is to provide equivalent protection to the managed wetlands without having to construct the large-scale facilities once thought necessary. The SMPA parties have determined that waterfowl habitat can be adequately protected under the current salinity regime through more efficient use of channel water and improved land management. Studies on properties in the eastern and western marsh have shown that consistently lower soil salinity can be achieved when the wetlands are actively managed. (DWR 30, Appendix B, pp.11-15.) Leaching cycles and pond recirculation are critical components of active water management. The parties have also recognized that there can be significant variation in salinity between high and low tides.

SMPA III proposes a combination of funding and management actions that the SMPA parties believe will protect the beneficial uses of the managed wetlands at a level that is equivalent to or better than the channel water salinity objectives at S-35 and S-97 and at other locations throughout the marsh.[42] The SMPA parties do not assert that SMPA III provides equivalent protection with respect to the brackish tidal marsh. (R.T., pp. 2226-2227, 2245.)

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[42] The SMPA III management actions are as follows: (1) Set channel water salinity standards consistent with the 1995 Bay-Delta Plan objectives. (2) Convert S-35 and S-97 from compliance to monitoring stations. (3) Set criteria
[footnote continues on next page]

The SMPA parties have agreed in principle to the SMPA III. (DWR 30, p.2.) However, full implementation requires completion of environmental documentation under CEQA and NEPA and consultation under the state and federal Endangered Species acts. A draft environmental document was circulated for public comment and a draft Biological Opinion has been prepared by DFG. (DWR 30; DFG 26.) The SMPA parties will not formally execute the SMPA III until the USBR completes consultation with the USFWS under section 7 of the federal Endangered Species Act. (16 U.S.C. э 1536.)[43] If there are new requirements in the biological opinion for SMPA III, the SMPA parties may revise SMPA III and/or its environmental documentation before executing the agreement. (DWR 29, p.1; USDI 7, pp.7-8; R.T. p. 2254.)

In the hearing, the USFWS witness testified that the historic focus in Suisun Marsh has been the management of wetlands for waterfowl production. The plant species thought to be important as waterfowl food are now known to grow abundantly in other more saline parts of the estuary, and animal matter has been determined to be a dominant component of waterfowl diet at certain times of the year. (USDI 7, p. 4; SWRCB 156; SWRCB 184.) In other words, the approach to Suisun Marsh protection has changed. The channel water salinity objectives in the 1995 Bay-Delta Plan do not provide adequate temporal and spatial variation throughout the marsh. Tidal marshes are inherently dynamic environments with no stable vegetation type. The dynamic character of tidal marshes is essential to the survival of the two resident federally listed plant species (soft bird's beak and Suisun thistle). Therefore, the dampening of long-term variability

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for September SMSCG operation to enable operators of managed wetlands to use lower salinity water during the fall flood-up. (4) Implement a water management program to help coordinate water management practices throughout the marsh. (5) Update individual ownership management plans. (6) Implement a joint-use facility program to encourage cooperative use of delivery systems. (7) Establish a managed wetland improvement fund. (8) Provide portable diversion pumps to provide landowners an opportunity to apply water of lower salinity at low tides. (9) Provide portable drainage pumps to improve drainage capability. (10) Realign and stabilize the Roaring River Distribution system turnout. (11) Establish a Drought Response Fund to mitigate landowner drought recovery activities. In addition to these eleven actions, the parties to the SMPA III plan to amend Article VI to broaden mitigation to include activities emphasizing management, restoration projects, and studies to mitigate for impacts to listed and sensitive species. The SMPA parties have agreed that the 3 million dollars of mitigation funds remaining from the original SMPA will be used for multi-species management and tidal marsh restoration. (DWR 29, p.12; R.T. p.2208.)

[43] A draft Biological Opinion on SMPA III is not expected before December 1999.

in salinity brought about by implementation of the salinity objectives may be detrimental to the species. (USDI 7, pp. 5-6; R.T. pp. 2287-2288.) The USFWS supported many of the individual actions in the SMPA III so long as the actions allow the owners of managed wetlands to produce the same quality of habitat with water of higher salinity. (USDI 7, p. 7.)

In consideration of its ongoing consultation and the above concerns, USDI recommended that the SWRCB not approve SMPA III at this time. (USDI 7, p.8; R.T. p. 2282.) USDI also recommends that the SWRCB postpone the effective implementation date for compliance at S-35 and S-97. (USDI 7, p. 8; R.T. p. 2282.)

Aside from USDI, the parties support all the actions proposed in SMPA III. The City of Vallejo and Solano Irrigation District conditioned their support on there not being an augmentation of flows in Green Valley Creek. (R.T. pp. 2149-2153.)

The SMPA parties' position is that the management actions provide equivalent protection to the managed wetlands. They argue that the actions described in SMPA III will make better use of available channel water and therefore adoption is in the public interest. They argue that conversion of S-35 and S-97 into monitoring stations can have no significant adverse effect on fish and wildlife, as the objectives have never been in effect at those locations. With the exception of USBR,[44] the SMPA parties request a finding that the provisions of SMPA III fulfill the SWP's and the CVP's share of meeting the Suisun Marsh objectives in the 1995 Bay-Delta Plan. (DWR 29, p. 14.) The parties recognize that the protection afforded by the agreement cannot be implemented until the agreement is signed, and the ESA consultation has been completed. (R.T. p. 2254.) DFG requested, in its closing brief, that the SWRCB adopt SMPA III by including appropriate provisions from the SMPA III in the water right permits of the SWP and the CVP.

[44] The USBR is a party to the SPMA III and fully supports the agreement. The USBR's position is that the SWRCB should not approve the agreement until ESA consultation is complete.

In general, the parties appeared to agree that in the absence of a fully executed version of SMPA III, the effective date for compliance at stations S-35 and S-97 should be deferred. (R.T., pp. 2282, 2289; USDI 7, p. 8.) They also agree that both waterfowl and threatened and endangered species need attention. (DFG 22, p.3. USDI 6, pp.3-4.) Finally, they support the provision of money and resources to facilitate management actions in the managed wetlands under SMPA III, regardless of salinity objectives. (USDI 7, p.7.)

7.3 Implementation of the Narrative Objective

In the 1995 Bay-Delta Plan, the SWRCB established a narrative objective for the protection of the brackish tidal marshes of Suisun Bay. (SWRCB 7, p.18.) The brackish tidal marsh provides critical habitat to a number of species listed under the state and federal Endangered Species acts.[45] (DFG 26, p.2; USDI 7, p.1.)

The narrative objective repeats verbatim a U.S Environmental Protection Agency (USEPA) water quality standard for the Bay-Delta. (40 C.F.R. ∋ 131.37(a)(iii)(C)(3)(i) [60 Fed. Reg. 4664, 4709 (January 24,1995)]; USDI 7d, p.23.) In informal consultation with USEPA regarding USEPA's approval of the 1995 Bay-Delta Plan, USFWS concluded that the 1995 Bay-Delta Plan would not cause jeopardy to endangered or threatened species in the Suisun Marsh. USFWS made this conclusion with the provision that "a quantitative water quality standard for protection of tidal marshes is developed and incorporated into the 1995 Bay-Delta Plan on or before the next triennial review" of the objectives. (USDI 7f.)

7.4 Conclusions Regarding Suisun Marsh

The purpose of SMPA III is to protect the beneficial uses in the managed wetlands of the Suisun Marsh at a level equivalent to the level of protection that would be provided by implementing the numeric objectives. If it is executed in its current form, substantial evidence in the record shows that SMPA III, currently in draft, will provide equivalent protection to the managed wetland

[45] The species pertinent to this discussion are: (1) The salt marsh harvest mouse (*Reithrodontomys raviventris*), (2) the California clapper rail (*Rallus longirostrus obsoletus*), (3) the Suisun thistle (*Circium hydrophilum* var *hydrophilum*), and (4) the soft birds beak (*Cordylanthus mollis* var *mollis*).

beneficial use. Consultation under the federal Endangered Species Act, however, is not yet complete, and SMPA III may be revised as a result of the consultation. After the biological opinion is released,[46] SMPA III will be either signed or renegotiated. In the absence of a signed SMPA III, the SWRCB has no assurance that equivalent protection will be provided and, more importantly, has no executed agreement before it.

Regarding the consultation under the federal Endangered Species Act, the key area of disagreement between the USFWS and the other parties appears to be whether the current objectives protect the full range of biological resources in the marsh, not whether the SMPA III would provide equivalent protection compared with the current objectives. This is an issue for the SWRCB's review during a periodic review of the 1995 Bay-Delta Plan, and is not a subject for consideration in this current SWRCB proceeding. However, this disagreement could result in a failure to execute SMPA III in its current form. The SWRCB urges the parties to resolve the disagreement and execute the SMPA III.

One aspect of the current version of SMPA III that all parties, including USFWS, agree on is that the two western compliance stations, S-35 and S-97, should not be implemented. The objectives at these two stations have not been implemented since the objectives were adopted. Consequently, removing the requirement that the DWR and USBR meet the objectives at these stations and instead requiring monitoring at these stations will have no adverse effect on the environment, and could be treated as being exempt from the California Environmental Quality Act (CEQA) (Pub. Resources Code § 21000 et seq.) in accordance with California Code of Regulations, title 14, section 15061(b)(3). Removing the requirement to meet the objectives at S-35 and S-97 also will cause no change in current salinity levels or fluctuations at these stations. No facilities have been installed to meet the objectives at these stations. Further, implementation of the objectives at these stations using fresh water would require an unreasonable amount of water and might freshen the western part of the Suisun Marsh more than is appropriate for certain species that require a brackish marsh. Accordingly, the SWRCB will delete the

[46] The biological opinion is expected to be released in mid-December, 1999.

requirement that the DWR and the USBR meet the objectives at S-35 and S-97, and will instead require the DWR and the USBR to conduct monitoring at these stations.

The salinity modeling predicts that the objectives at various locations in the Suisun Marsh occasionally will be exceeded. This would happen infrequently and in small amounts, even when the SWP and the CVP are operating the Salinity Control Gates to the maximum extent. Nevertheless, these occurrences would violate the current terms and conditions of the SWP and CVP water right permits. This decision amends the terms and conditions to allow some variability in meeting the objectives. Under the amendments, if the objectives are exceeded while the projects are operating the Salinity Control Gates to the maximum extent, the exceedances will not violate the permits of the SWP and CVP. |

The projects requested that the SWRCB find that implementation of SMPA III will fulfill their entire mitigation responsibility in the Suisun Marsh. While the record supports a finding that SMPA III will provide equivalent protection compared with the objectives, the evidence does not address the question of whether SMPA III fully mitigates for the impacts of the projects.

SMPA III does not address the narrative objectives for the unmanaged tidal marshlands. When the SWRCB adopted the 1995 Bay-Delta Plan it was unclear whether the narrative objective would be achieved through implementation of the Delta outflow objectives. To address this issue, the SWRCB directed DWR to convene a Suisun Marsh Ecological Workgroup (SEW). SEW's task was to identify specific measures to implement and evaluate the achievement of the narrative objective and to develop recommendations for numeric objectives to replace it. (SWRCB 7, pp.29, 40-41.) SEW submitted an interim report to the SWRCB. (SWRCB 153.) In the absence of a final report from the SEW, the evidence in the hearing record is inadequate to support measures that will effectively and reasonably implement the narrative objective. The USDI recommended that the SWRCB not take action on the narrative objective in this decision. (USDI 7, p. 7; R.T. p. 2296.) SEW should have completed its work by the time of the next periodic review of the 1995 Bay-Delta Plan. If information is available to review the narrative objective at that time, the SWRCB will review it.

8.0 RESPONSIBILITY OF PARTIES PROPOSING AGREEMENTS IN THE SACRAMENTO, MOKELUMNE, CALAVERAS, AND COSUMNES RIVER WATERSHEDS

As explained in Part 6.0 of this decision, the primary purpose of the Bay-Delta Water Rights Hearing is to determine the responsibilities of water right holders to implement the flow-dependent objectives in the 1995 Bay-Delta Plan. As an alternative to the SWRCB establishing the responsibilities of the water right holders to meet the flow-dependent objectives, the SWRCB gave the water right holders an opportunity to reach settlement agreements with other water right holders and interested parties, proposing allocations of responsibility. The four agreements discussed in this part of this decision were presented to the SWRCB during Phase 4 of the hearing. The subject of Phase 4 was the responsibilities of the parties who are jointly proposing agreements in the Sacramento, Mokelumne, Calaveras, and Cosumnes river watersheds, the DWR, and the USBR, to meet the flow-dependent objectives.

8.1 Mokelumne Agreement

EBMUD holds water rights on the Mokelumne River to divert and store water at Pardee and Camanche reservoirs. In the course of applying for a renewal of its power generation license from the Federal Energy Regulatory Commission (FERC), EBMUD entered into an agreement with the USFWS and the DFG. The purpose of the agreement, known as the Joint Settlement Agreement (JSA), is to establish FERC license conditions for the lower Mokelumne River Project that will protect fish and wildlife resources in the Mokelumne River system. The JSA includes both flow and non-flow measures, and replaces the 1961 agreement with DFG regarding flows in the lower Mokelumne River. (EBMUD 10, pp. 7.) (R.T. pp. 2491-2497.) The JSA was submitted to the FERC in March 1998 with a request to amend EBMUD's FERC license to include the schedule of flows specified in the JSA as the flow requirements for the project. FERC subsequently amended the license as requested. EBMUD currently releases the minimum fishery flows specified in the JSA.

After negotiating the JSA, EBMUD entered into an agreement with the California Urban Water Agencies export contractors and the agricultural export contractors (CUWA/AG) to propose to the SWRCB that the flows to be provided under the JSA will satisfy any responsibilities that the

SWRCB may find that EBMUD has to help meet the flow-dependent objectives in the 1995 Bay-Delta Plan. This agreement is called the 1996 Memorandum of Understanding (1996 MOU).

In Phase 4 of the Bay-Delta Water Right Hearing, EBMUD and CUWA/AG proposed that the flow releases to be provided under the JSA will satisfy any obligation of EBMUD toward meeting the Delta flow objectives in the 1995 Bay-Delta Plan. (EBMUD 10, pp. 1.) (R.T. pp. 2428.)

The analysis of the alternatives in the EIR prepared by the SWRCB for the Bay-Delta Water Rights Hearing includes modeling studies of the JSA flows for the Mokelumne River. Three of the flow alternatives under consideration by the SWRCB for implementation of the flow objectives of the 1995 Bay-Delta Plan (Flow Alternatives 3, 4 and 5) would require EBMUD to make higher flow releases to the Mokelumne River in summer months than are specified in the JSA.

8.1.1 Support for Finding that the MOU Satisfies Any Responsibility of EBMUD to Meet Bay-Delta Objectives

The DWR supports the MOU. In testimony at the hearing, the DWR agreed to provide a proportional share of any additional flows above those set forth in the MOU that otherwise would be assigned to EBMUD in the SWRCB decision. (R.T. pp. 2660; DWR 32, pp. 3-4.) The DWR did not specify the exact backstop amount it was offering since the amount could vary depending on the outcome of Phase 8 of the hearing. The State Water Contractors support the MOU provided that another party, such as the USBR, provides any additional flow assigned to EBMUD not backstopped by the DWR. Woodbridge Irrigation District (WID) supports adoption of the MOU and requests that its responsibility to meet Delta objectives be satisfied by bypassing water released by EBMUD to meet the “expected flows below Woodbridge” contained in the JSA. (WID 1, pp. 1-2.) (R.T. 2956 pp. 12-17.)

EBMUD argues that the JSA is preferable to Flow Alternatives 3, 4, and 5, which would require higher flow releases. The flows in the JSA were developed based on information gathered during extensive monitoring and research regarding anadromous fish in the lower Mokelumne River. (R.T. pp. 2436-2441.) EBMUD argues that additional flow releases from Camanche and Pardee

reservoirs would substantially deplete storage levels in some years, increasing the risk that water supply will become unavailable for instream uses and increasing the likelihood that the hypolimnion (cold water) portion of those reservoirs would be lost. In those years, water temperatures in the lower Mokelumne River may be higher than with the JSA flows, and could result in adverse impacts to habitat for chinook salmon and steelhead. (EBMUD 6, R.T. pp. 2443-2444, 2452-2466.) These impacts are relatively minor. Water temperatures resulting in unacceptable conditions for chinook salmon and steelhead are predicted to occur in only 5 percent of the years under Flow Alternative 3, 7 percent of the years under Flow Alternative 4, and 20 percent of the years under Alternative 5, compared to 3 percent of the years under the JSA. (EBMUD 6, p. 27; R.T. pp. 2456-2464.)

The JSA would provide additional flows to the Delta. EBMUD's estimates of additional flows in dry and critically dry years are 29 taf and 27 taf respectively. (EBMUD 10, pp. 9; R.T. pp. 2403.) EBMUD, however, analyzed the Delta inflow data in years defined as February 1 through January 31. Using a standard water-year format, the additional flows to the Delta resulting from the JSA compared to the 1961 Agreement increase to 36 taf for dry years and 29 taf for critically dry years. (EBMUD 10, pp. 9.) The following table shows the difference in total EBMUD releases between Flow Alternative 3 and the JSA (JSA releases minus Alternative 3 releases).

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TABLE 6

Total Camanche Reservoir Releases Comparison of Releases under the JSA to Releases under Alternative 3 (taf)													
Year Type	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**TOTAL**
Wet	0.5	1.2	4.0	1.9	2.5	0.0	0.0	1.9	-3.3	-0.8	1.1	1.1	**10.4**
Above Normal	0.2	0.2	0.2	3.5	10.0	2.4	0.9	4.4	-0.6	0.3	2.2	2.8	**26.3**
Below Normal	0.9	0.8	0.8	0.9	6.2	1.2	1.3	2.5	-12.3	-5.6	-4.5	1.1	**-6.7**
Dry	0.6	0.6	0.6	0.6	0.6	0.6	0.3	1.5	-21.9	-8.5	-9.4	0.6	**-33.7**
Critical	0.9	1.1	1.1	1.1	0.9	1.1	0.4	-0.3	-3.9	-7.8	-6.4	-0.1	**-12.1**

Note: Negative values indicate that Flow Alternative 3 generate greater flow than the JSA in a month.

Compared with Flow Alternatives 3 and 5 for the 73-year annual average inflow to the Delta (Table 7), over the long term, the JSA provides more inflow from September through February than any of the three flow alternatives. From March through July, however, Alternative 5 provides the most inflow. Alternative 3 provides more inflow to the Delta than the JSA in June, July and August. If Flow Alternative 3 were imposed, additional average flows to the Delta would be 71 taf for dry years and 41 taf for critically dry years compared to the 1961 Agreement.

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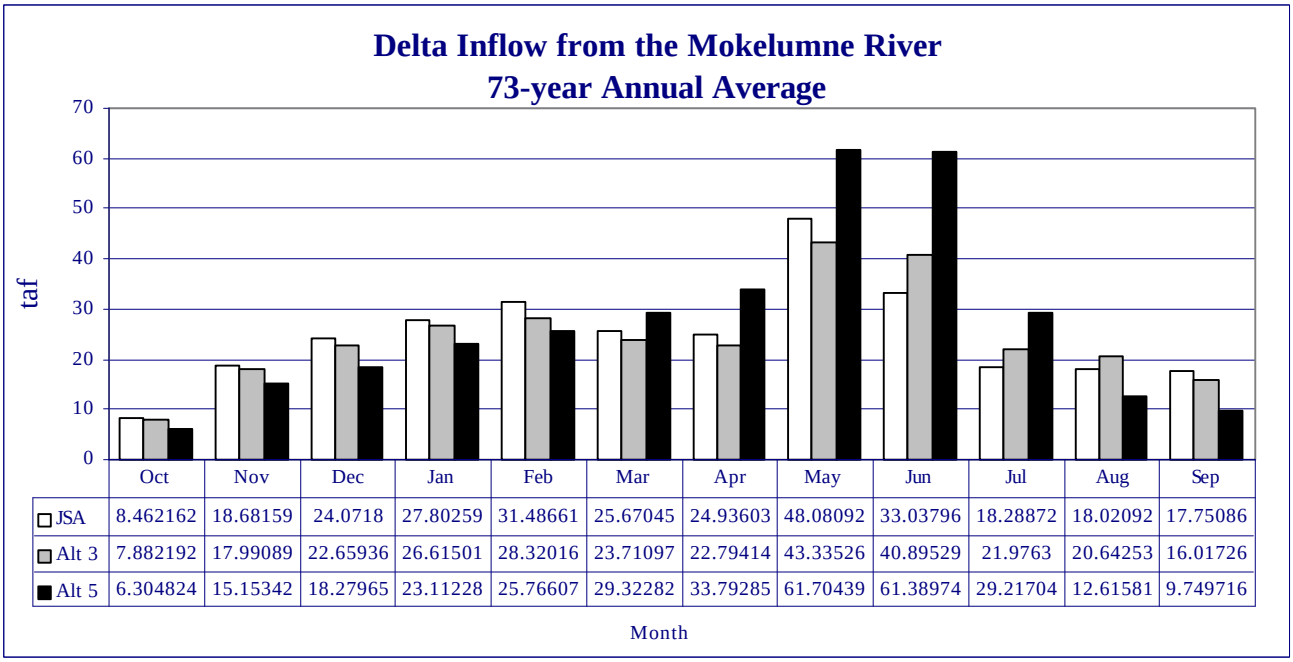
TABLE 7



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
JSA	8.462162	18.68159	24.0718	27.80259	31.48661	25.67045	24.93603	48.08092	33.03796	18.28872	18.02092	17.75086
Alt 3	7.882192	17.99089	22.65936	26.61501	28.32016	23.71097	22.79414	43.33526	40.89529	21.9763	20.64253	16.01726
Alt 5	6.304824	15.15342	18.27965	23.11228	25.76607	29.32282	33.79285	61.70439	61.38974	29.21704	12.61581	9.749716

8.1.2 Opposition to Establishing EBMUD's Responsibility in Accordance with the JSA Flows

Some parties opposed the 1996 MOU because it lacks a complete backstop. This opposition is based on the concern that in the absence of a complete backstop, the SWRCB will reallocate among other parties any remaining incremental responsibility that otherwise would be assigned to an agreeing party. It was suggested that if some parties did not enter into agreements, while other parties did reach agreements, the non-agreeing parties would be assigned a disproportionately larger responsibility than they would have if other parties had not reduced their responsibilities by agreement.

In this case, only one party (DWR) is willing to provide a share of the backstop. The final amount of the backstop depends on the result of Phase 8 of the Bay-Delta Water Rights Hearing. To evaluate the possible amount of a backstop, this decision uses Flow Alternative 3 as a base

for comparison. DWR is not likely to provide more than 25 percent[47] of the water needed for the backstop. The USBR opposes the agreement and has not offered to provide additional flow, if needed, to backstop the agreement. (R.T. pp. 3150 - 3157.)

The amount of water needed to backstop the agreement assuming adoption of Flow Alternative 3 is the difference in flow between the JSA and Flow Alternative 3 measured below Camanche Dam, EBMUD's last point of control. Negative values in the table showing Camanche releases, above, indicate the amount of the needed backstop. For below normal, dry and critically dry years, the amount of the backstop from June through August averages 22 taf, 40 taf, and 18 taf, respectively. In the single worst year, 1979, the amount of the backstop would have increased to 109 taf. The data also show that backstop flows are occasionally needed in the summer months of above normal and wet years.

A concern was raised that the JSA could affect endangered or threatened species such as the delta smelt. It does not appear from the record that the JSA would adversely affect delta smelt. However, the USFWS, which is responsible for protecting delta smelt under the federal Endangered Species Act, believes that Flow Alternative 5 is a better option. Regarding the JSA flows, USFWS issued a biological opinion under Section 7 of the Endangered Species Act on March 23, 1998. The biological opinion provides as follows.

> "After reviewing the current status of delta smelt, the environmental baseline, effects of the Settlement Agreement alternative and cumulative effects, it is the Service's biological opinion that the Settlement Agreement, as proposed, is not likely to jeopardize the continued existence of the delta smelt or result in destruction or adverse modification of critical habitat for delta smelt." (EBMUD 11.)

Nevertheless, the USFWS expressed reservations about delta smelt effects in its testimony during Phase 4 of the hearing. The USFWS supported Flow Alternative 5, and presented testimony to show that flows from the Mokelumne River under the SWRCB's Flow

[47] Under the Coordinated Operations Agreement between the DWR and the USBR, storage releases made for compliance with Delta objectives are shared on a 25/75 basis. Therefore, the DWR share of the backstop is likely to be considerably less than half of the water needed to fully backstop the agreement.

Alternative 5 would be significantly greater than under the JSA, especially in the spring of critically dry years. The USFWS did not, however, analyze the effects of these greater flow releases on delta smelt. (R.T. pp. 3179-3180.)

It was argued that the JSA should not be approved until the flow requirements for achieving the salmon doubling narrative objective are determined. Implementing the narrative objective for salmon protection requires a long-term process. A period of actual operation meeting the numerical objectives in the 1995 Bay-Delta Plan or the measures under the SJRA/VAMP, coupled with adequate monitoring, is required before the SWRCB can determine whether additional implementation measures are needed to meet this objective.

It was argued that the agreement should not be adopted until the flow requirements for meeting water quality objectives in the interior of the southern Delta are determined. Additional Mokelumne River flows, however, are unlikely to affect the salinity at these southern Delta stations.

The North San Joaquin Water Conservation District (NSJWCD) argued that its water supply should be protected from the effects of the MOU. (R.T. pp. 2988-2994.) When the SWRCB approved EBMUD's water right application (for export of water) in SWRCB Decision 858, it granted a junior permit to NSJWCD (an inbasin user) under a competing application. (NSJWCD 2, pp. 3.) NSJWCD contends that the area-of-origin statutes were violated when EBMUD was issued a permit. None of the area-of-origin statutes apply to EBMUD's water rights, however, because EBMUD's water right is not based on a state-filed application under Water Code section 10500 et seq., and EBMUD also is not subject to Water Code section 11460 et seq. The SWRCB granted a permit to EBMUD based on its municipal use being a higher beneficial use of water than NSJWCD's agricultural use, and found that there would be no unappropriated water available to NSJWCD after EBMUD had completed putting its water to beneficial use. The SWRCB issued a temporary permit to NSJWCD for water surplus to EBMUD's needs.

The NSJWCD also makes the area-of-origin argument regarding the SWRCB's grant of permits to the USBR for American River water, while denying a competing application of the NSJWCD.

(NSJWCD 2, p. 15.) In this case, both parties were exporters, so the area-of-origin statutes again did not apply.

A portion of the overdrafted groundwater basin in NSJWCD's service area is within the legal Delta. Thus, NSJWCD contends that this area is entitled to water, and should receive priority over the SWP and the CVP for Delta water under the Delta Protection Statutes. The Delta Protection Statutes, however, protect existing water rights in the Delta. The NSJWCD currently does not have water rights in the Delta. If the NSJWCD wishes to appropriate water from the Delta, it will have to first file an application.

NSJWCD has water right permits to divert up to 80 cfs by direct diversion and 20 taf by storage from the Mokelumne River between December 1 and July 1. The NSJWCD also contracts for 20 taf of surplus water from EBMUD to provide deliveries outside its diversion season.

The NSJWCD contends that it will bear the burden of EBMUD's increased fish flow releases under the 1996 MOU because it will receive less surplus water from EBMUD. NSJWCD further contends that EBMUD will suffer no water supply impacts as a result of the JSA. (NSJWCD 2, pp. 12-13.)

One party argued that DWR cannot backstop the agreement without violating the Monterey Agreement and the existing contracts. The Monterey Agreement is between the DWR and its water supply contractors. The Monterey Agreement is not binding on the SWRCB and does not limit the contents of a water right decision. Water supply contracts typically include provisions recognizing that delivery is not required when water is not available due to applicable regulatory requirements. (*O'Neil* v. *United States* (1995) 50 F. 3d 677.) Even assuming the Monterey Agreement could read as a guarantee by DWR to provide water notwithstanding limitations on its water rights, any remedy for violation of the agreement would be between DWR and the contractors.

WID has post-1914 water rights that are included in the Notice of Hearing for the Bay-Delta Water Rights Hearing. These are Licenses 5945, 8214, and 8215 (Applications 5807, 10240, and 12648, respectively). WID also claims pre-1914 water rights. WID has an agreement with

EBMUD under which WID diverts 60 taf under its water right licenses and additional water when available under its pre-1914 water rights. When inflow to Pardee Reservoir is less than 375 taf, WID's diversion is reduced to 39 taf. WID has passed a resolution stating that it will not divert the expected flows below Woodbridge, which are identified in the JSA, if the SWRCB finds that the JSA flows are an adequate contribution to the Delta for the Mokelumne basin as a whole. (WID 9; R.T. p. 2951.)

8.1.3 SWRCB Findings Regarding the Mokelumne Agreement

The flows under the JSA differ from the flows under Flow Alternatives 3 and 5. As USFWS argued, Alternative 5 might provide more benefit for Delta fish than the other alternatives, but it could result in more frequent consumptive use water shortages and more instances of elevated water temperatures affecting fish. The SWRCB finds that the fish should be protected, but consumptive uses nevertheless should be allowed to continue at a reasonable level. Excessive releases for fish at some times could result in releases of water that is too warm for fish at other times. The SWRCB finds that it would not be in the public interest to require more water from the Mokelumne River system than will be provided under the JSA. Additional releases could exacerbate the shortages experienced by NSJWCD. Further, any requirements imposed by the SWRCB could be added to the JSA flows when the JSA flows are lower, but flows may not be subtracted from the JSA when such flows are higher than the SWRCB alternatives. This could result in greater releases than either the JSA or the SWRCB alternatives would require alone. Accordingly, this decision establishes EBMUD's responsibility to help meet the Bay-Delta flow dependent objectives consistently with the JSA provisions. Additionally, consistent with WID's resolution, this decision establishes WID's responsibility by amending WID's water right licenses to require that WID bypass the expected flows below Woodbridge, as defined in the JSA. Unless it gives further notice, the SWRCB will not revisit the water rights on the Mokelumne River in future phases of the Bay-Delta Water Rights Hearing.

The DWR has agreed to backstop a part of any incremental responsibility to provide water from the Mokelumne River in excess of the JSA flows. Accordingly, this decision establishes a responsibility for the DWR to backstop a share of any additional Mokelumne River responsibility that the SWRCB determines after conducting further proceedings. The USBR declined during the hearing to provide a backstop for Mokelumne River flows. The USBR,

however, is responsible for meeting requirements under the federal Endangered Species Act for flows, export limits, and salinity in the Delta. Additionally, as discussed in Part 13 of this decision, the USBR will be required to meet certain objectives jointly with the DWR, including objectives for operation of the Delta Cross Channel Gates, export pumping, and Delta outflow. Thus, in practice the USBR will provide the flows to meet any obligation that might otherwise be allocated to Mokelumne River water right holders.

8.2 North Delta Agreement

The DWR and the North Delta Water Agency (NDWA) entered into an MOU on May 26, 1998. The MOU states that the DWR is responsible for any obligation imposed on NDWA to provide flows for the 1995 Bay-Delta Plan flow objectives as long as the 1981 contract is in effect. The MOU applies only to the areas within the NDWA's boundaries. The MOU does not apply to the section of the City of West Sacramento or Maine Prairie Water District that lie outside of the NDWA's boundaries. The issue considered herein is whether the SWRCB should find that the North Delta MOU fulfills NDWA's obligation to meet the 1995 Bay-Delta objectives.

The NDWA, formed in 1973, is located in the southern end of the Sacramento Valley southwest of the City of Sacramento. The NDWA represents Reclamation Districts 999, 2060 and 2068 as well as the Maine Prairie Water District. The Reclamation Districts are located entirely within the boundaries of the NDWA, as are portions of Maine Prairie Water District and the City of West Sacramento. (NDWA 3, pp. 1.) The majority of the land in NDWA is used for agriculture. The NDWA includes approximately 302,000 acres within the northern portion of the Delta of which approximately 72 percent are riparian, 16 percent have appropriative rights, 6 percent use groundwater and 7 percent are nonirrigable.

The NDWA and the City of West Sacramento presented evidence during Phase 4 of the Bay-Delta Water Rights Hearing in support of the MOU. The NDWA entered into a contract with the DWR in 1981, in which NDWA agreed to purchase water of specific quality and adequate quantity from the DWR. (NDWA 4, pp. 1-6.) The purpose of the 1981 contract was to assure that adequate water quality would be maintained at the respective water quality monitoring stations and to assure the right to use water from the Delta channels for present and future needs. (NDWA 1, pp. 3-4.) The NDWA, Reclamation Districts, MPWD and the City of

West Sacramento argue that they are safeguarded by the 1981 Contract and the MOU from providing flows to implement the water quality objectives of the 1995 Bay-Delta Plan. The quantity of water used per year by NDWA under its appropriative water rights is outlined in the table below. The EIR, under Flow Alternatives 3 and 4, divides the appropriative water right holders into eight priority groups, based on their water right priority dates. Under Priority Groups 1, 5 and 6 the maximum cumulative direct diversions for NDWA are 267 cfs, 441 cfs and 801 cfs respectively. The dates for the NDWA to divert water from the Delta include July and August, months when water rights would be curtailed under some of the flow alternatives in the SWRCB's EIR. Under the MOU, any responsibility assigned to the NDWA to implement the 1995 Bay-Delta objectives will be backstopped by the DWR. (DWR 33, pp. 1-2.)

Based on the agreement, the SWRCB finds that the DWR will provide the backstop for any water assigned to the parties within the NDWA as specified in the MOU. This decision assigns responsibility for any obligation of the NDWA to the DWR consistent with the MOU.

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TABLE 8
Appropriative Water Rights Within NDWA

Party	Priority Group	Application Number	Primary Diversion Dates	Secondary Diversion Dates	Maximum Direct Diversion (cfs)
Reclamation District 999	6	A001666	5/1 to 10/31	N/A	160
Reclamation District 999	5	A004099	5/1 to 10/31	N/A	4.82
Reclamation District 999	5	A004100	5/1 to 10/31	N/A	111.8
Reclamation District 999	5	A004101	5/1 to 10/31	N/A	12.8
Reclamation District 2060	5	A003769	3/1 to 11/1	N/A	45
Reclamation District 2068	6	A002318	3/1 to 10/31	N/A	200
Reclamation District 2068	1	A019229	11/1 to 3/1	N/A	42
Reclamation District 2068	1	A024961	3/1 to 10/31	N/A	55
Maine Prairie Water District	1	A017487	4/15 to 11/15	N/A	2
Maine Prairie Water District	1	A017488	4/1 to 10/31	N/A	2
Maine Prairie Water District	1	A017491	4/1 to 10/31	N/A	2
Maine Prairie Water District	1	A017493	4/1 to 11/30	N/A	2
Maine Prairie Water District	1	A017664	5/1 to 11/30	N/A	2
Maine Prairie Water District	1	A018527	5/1 to 11/1	N/A	2.11
Maine Prairie Water District	1	A020698	3/1 to 7/1	9/1 to 11/1	96
City of West Sacramento	1	A025616	1/1 to 6/30	9/1 to 12/31	62

Water under Priority 1, NDWA (cfs)	267.11
Water under Priority 5, NDWA (cfs)	441.53*
Water under Priority 6, NDWA (cfs)	801.53*

* Note: Priority Group totals are cumulative

8.3 Putah Creek Agreement

The Putah Creek Stipulation is an agreement among the Solano County Water Agency (SCWA), the DWR, and the State Water Contractors (SWC). (SCWA 1, pp. 1-3.) (R.T. pp. 3122-3123.) The Stipulation is an agreement as to the facts relating to hydrologic conditions in the Putah Creek watershed and does not provide a backstop for any water that may be required under some other alternative. The issue herein is whether the Stipulation satisfies any obligation that water

right holders in the Putah Creek watershed may have to help implement the flow objectives in the 1995 Bay-Delta Plan.

The Putah Creek Basin is located on the west side of Sacramento Valley and includes the southern part of Lake County, the northern half of Napa County and small portions of Yolo and Solano Counties. Prior to development, Putah Creek was an ephemeral stream. (R.T. p. 3126.) The runoff was characterized by high flows of 56 taf on average during winter months and low flows of 3 taf on average during the summer months. Putah Creek runs generally from west to east while the groundwater in the region flows from northwest to southeast. Putah Creek has both gaining and losing reaches. (SCWA 2, attached memo p. 3.) The gaining reach extends approximately five miles and is situated downstream of the Putah Diversion Dam between two losing reaches, which are also approximately five miles in length. The percolation rate for the losing reaches is in the range of 25-35 cfs per day. The gaining reach rate was not provided. (SCWA 2, attached memo p. 5.) Prior to the construction of the Solano Project, including Monticello Dam, in 1957 (Lake Berryessa), Putah Creek went dry in summer months of some years. Under current conditions, there is less flow in winter and more during the summer months than would have occurred prior to construction of the dam. (R.T. pp. 3126-3127.) The USBR holds the water rights for the Solano Project.

In SWRCB decision 1594, the SWRCB decided that Term 91 should not be included in a water right permit if, absent the permittee's diversion, there would be no hydraulic continuity between the permittee's point of diversion and the Delta. (SWRCB 5h, p. 30.) The Putah Creek watershed was identified in Order WR 81-15 as lacking hydraulic continuity. (SWRCB 5k, p. 10.) Water right holders in the Putah Creek watershed were, however, included in Flow Alternatives 3 and 4 (see Table II-5) in this proceeding. Under these alternatives, water right holders in the Putah Creek watershed would be directed to curtail diversions under their water rights under specified conditions.

SCWA argues that it should not have a responsibility to help meet the objectives in the 1995 Bay-Delta Plan because Putah Creek and its tributaries historically have had only infrequent hydraulic continuity with the Delta during periods when bypasses of water would be needed to meet the objectives. (SCWA 1, p. 1.)

In order for Putah Creek to have continuity with the Delta, the Putah Diversion Dam releases have to exceed the average percolation rate in the losing reach of 25 - 35 cfs or 1.5 to 2.1 taf/month. During the winter and spring, the percolation rate is approximately half of the average and in the summer and fall it nearly doubles. (SCWA 2, attached memo, p. 5.) Putah Diversion Dam releases into Putah Creek are not adequate to overcome the percolation rate and reach the Delta in most years. Even though continuity between Putah Creek and the Delta occurs during winter months, the frequency of continuity during the summer months is too low to warrant requiring Putah Creek flows to assist in meeting the 1995 Bay-Delta Plan objectives.

The SCWA argues that the release flows into Putah Creek from Putah Diversion Dam are greater than the estimated unimpaired flows during many months when flow releases would be required. (SCWA 2, p. 5; R.T. pp. 3129-3130.) This is true. The following figures show the average monthly difference between Putah Diversion Dam and unimpaired flows in Putah Creek under the five different year types. (Positive numbers indicate releases greater than unimpaired flow.) Average Putah Diversion Dam releases exceed unimpaired flows during the months of July and August in all year types except for wet years.

FIGURE 9

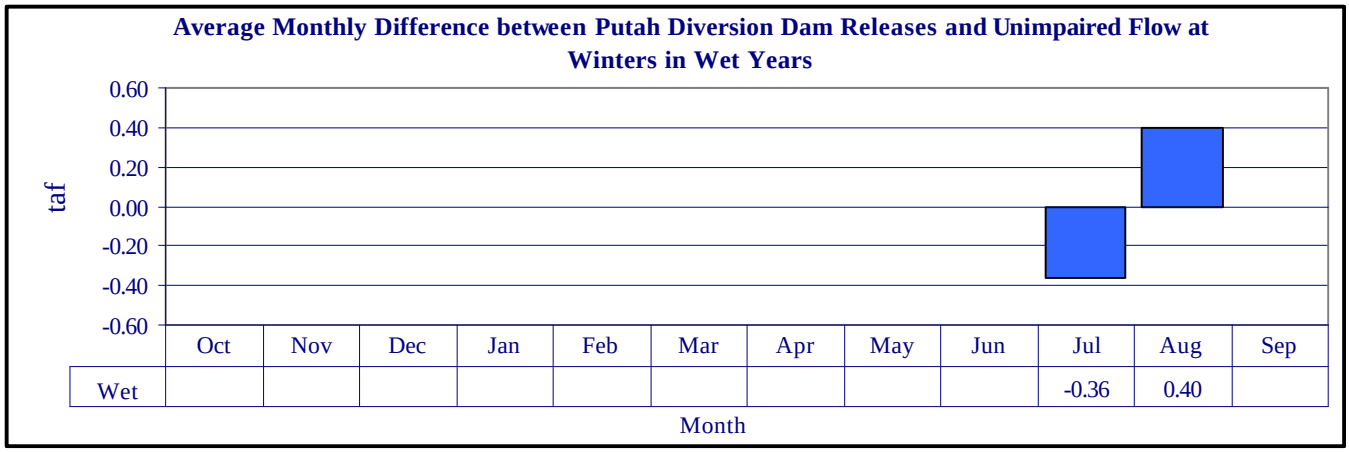

FIGURE 10

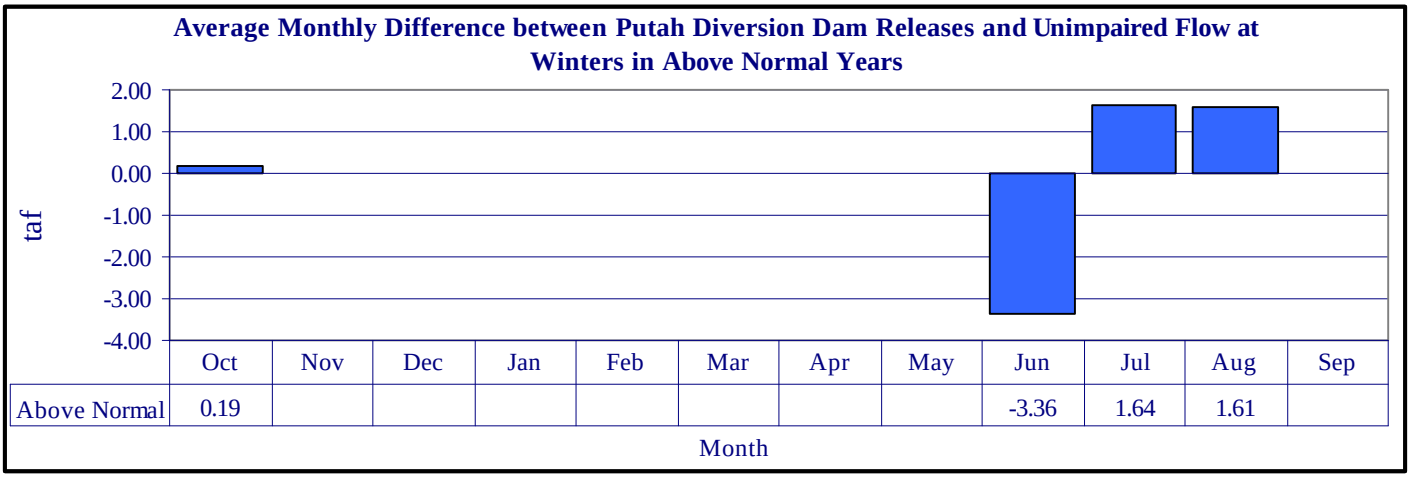

FIGURE 11

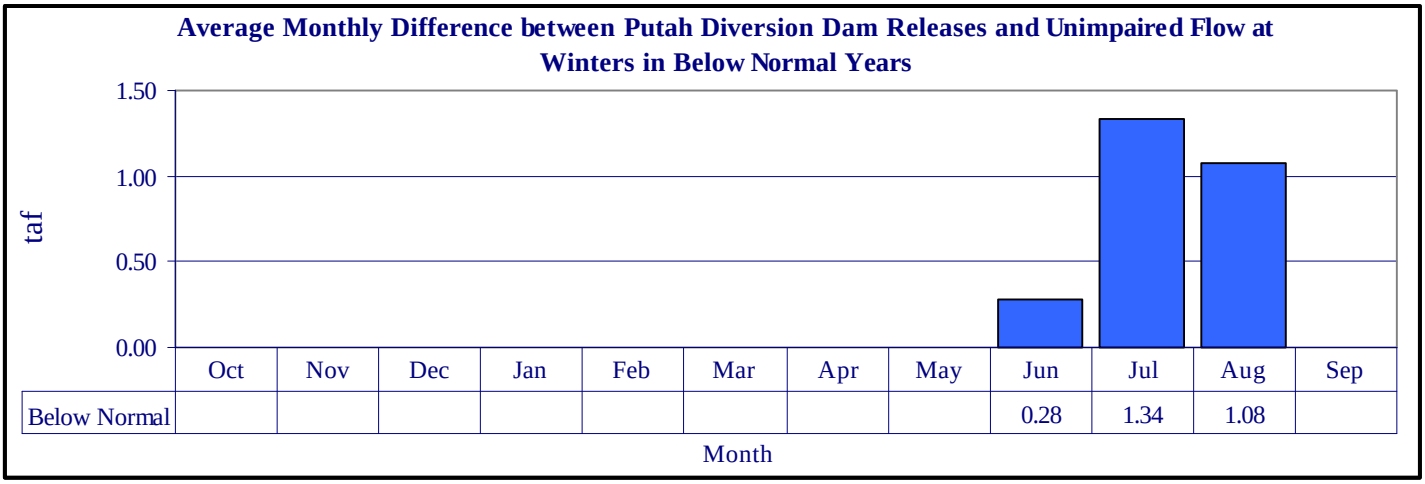

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FIGURE 12

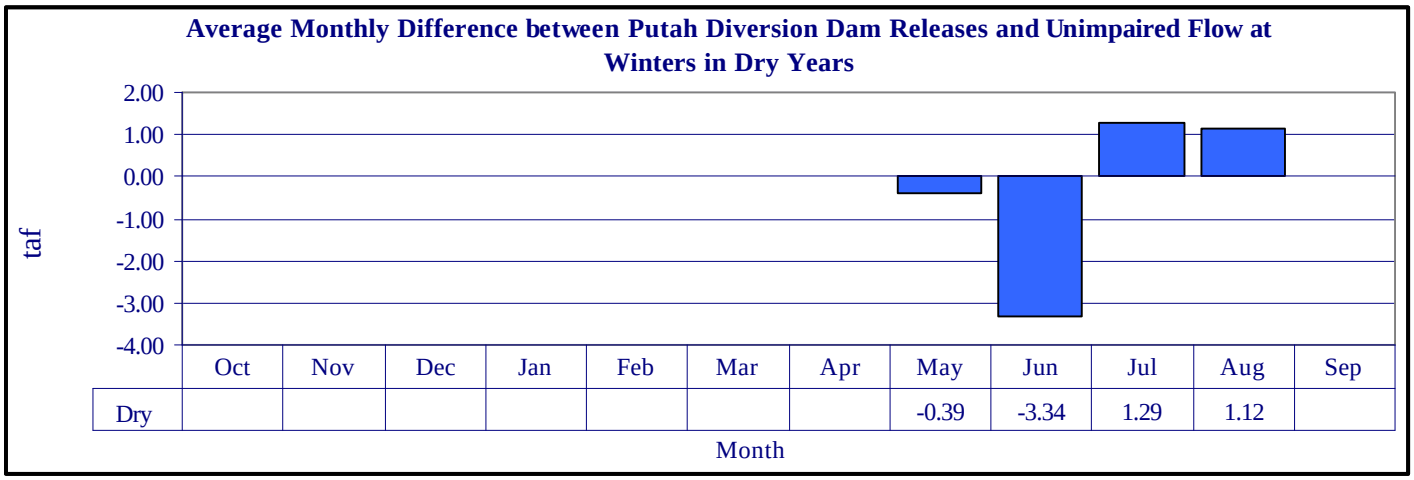
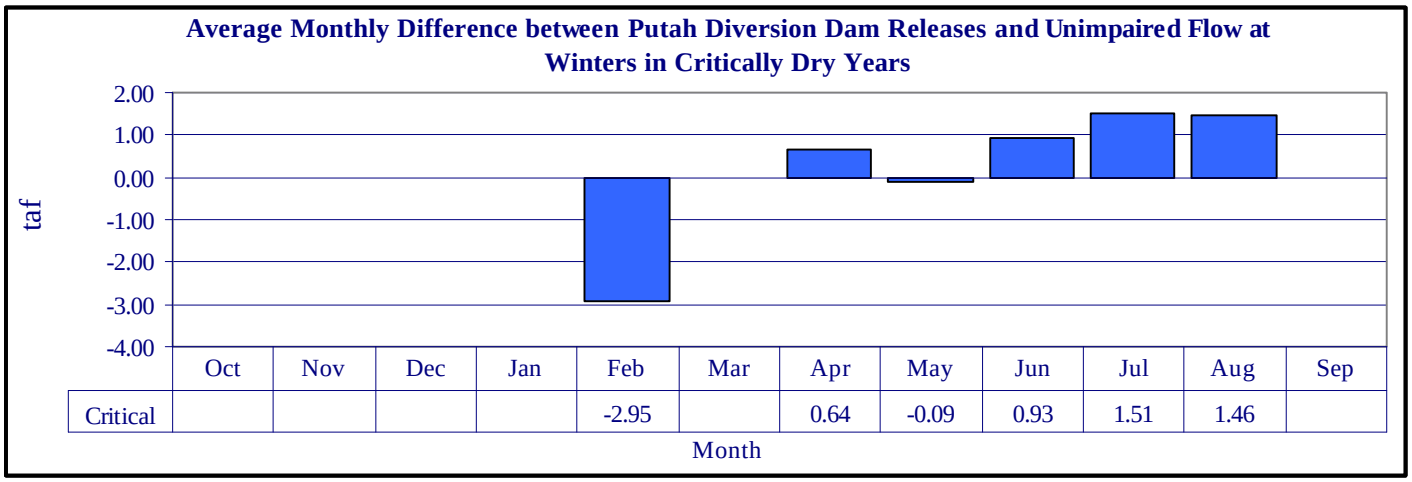


FIGURE 13



The SWRCB finds that for purposes of the Bay-Delta proceeding there is no hydraulic continuity between Putah Creek and the Delta. Accordingly, SCWA will not be required to provide water to help meet the Bay-Delta objectives as a result of the current proceeding.

8.4 Cache Creek Agreement

The Cache Creek Agreement is among Yolo County Flood Control and Water Conservation District's (YCFC&WCD), the DWR, and the SWC. (YCFC&WCD 1, pp. 1-3.) The Cache

Creek Basin, which encompasses 1,044 square miles, is located on the west side of Sacramento Valley and includes part of Yolo County and the southern portion of Lake County. The YCFC&WCD's service area includes the cities of Woodland, Davis and Winters as well as several unincorporated communities within the district's boundary. The entire population within the district is served by groundwater but irrigation uses are supplied with both surface water and groundwater. (YCFC&WCD 2, p. 1.) The issue herein is whether the SWRCB should exclude the YCFC&WCD's water rights from flow requirements to implement the 1995 Bay-Delta Plan.

The YCFC&WCD's water-supply system includes Clear Lake, Indian Valley Reservoir and Cache Creek. The peak runoff occurs earlier than the peak from the Sierra watersheds because the water supply originates mainly from precipitation and a minimal amount of snowfall. The summertime operation of Clear Lake, which impounds 320 taf, is limited to withdrawals not to exceed more than 150 taf by the Solano Decree dated April 21, 1978. (YCFC&WCD 2, p. 1.) The YCFC&WCD holds riparian, pre-1914 appropriative and permitted appropriative water rights on Cache Creek and its tributaries. The YCFC&WCD's Permits No. 12848 and 12849 for Indian Valley Reservoir allow for storage of 300 taf of water from the North Fork of Cache Creek and subsequent rediversion from Cache Creek for irrigation, flood control, recreation and domestic purposes. (YCFC&WCD 2, p. 2.) The YCFC&WCD also claims a pre-1914 right (S000609) to directly divert 938 cfs from Cache Creek. The appropriative water rights at Indian Valley Reservoir are the only ones affected by the Bay-Delta flow alternatives. Under the Cache Creek Stipulation, YCFC&WCD would not be required to curtail diversions under these water rights to implement the water quality objectives of the Bay-Delta Plan.

The only Bay-Delta flow alternatives that affect the Cache Creek watershed are Flow Alternatives 3 and 4. Under Flow Alternatives 3 and 4, water right holders would be obligated to curtail diversions during times when there is inadequate unimpaired flow to meet inbasin entitlements, including the objectives in the 1995 Bay-Delta Plan. At these times, Cache Creek has little or no hydraulic continuity with the Delta. The Cache Creek Stipulation would not require YCFC&WCD to contribute to the 1995 Bay-Delta Plan flow objectives. Further, the Cache Creek watershed, under Order WR 81-15, has been excluded from curtailing diversions under Term 91. (SWRCB 5k, p. 10.)

In order for Cache Creek to have hydraulic continuity with the Delta, water has to flow approximately 20 miles in Cache Creek from Capay Diversion Dam to the Yolo Bypass. Approximately 75 percent of this segment is a losing reach with a percolation rate of 200 cfs. The water then flows into the Settling Basin, across the Yolo Bypass and into the Tule Canal, which is connected to the Delta via the Toe Drain. (YCFCWCD 2, p. 4.) The USBR diverts 200 cfs of the water exiting the southern end of Settling Basin through two culverts controlled with slide gates. This water never reaches the Delta but rather flows down the west side of the Yolo Bypass. When the slide gates are closed or when the flow at the Settling Basin exceeds 200 cfs, the water may contact the Delta. (YCFC&WCD 2, p. 3.) The amount of water lost to percolation and evaporation between the Settling Basin and the Tule Canal also amounts to 200 cfs. Consequently, flow releases from Capay Diversion Dam of approximately 600 cfs are required to establish contact with the Delta. (YCFC&WCD 2, pp. 3-4.)

The estimated unimpaired flow in Cache Creek at Rumsey, obtained from DWR, confirms that in the water years 1922 through 1993, hydraulic continuity with the Delta is attained twice in months when bypass flows would be required. The inflow to Indian Valley Reservoir during the same time period is substantial enough to achieve hydraulic continuity with the Delta three times in months when bypass flows would be required. (YCFC&WCD 8, pp. 1-3.) However, the YCFC&WCD's holds a pre-1914 water right on Cache Creek for direct diversion of 938 cfs. Even if the inflow to Indian Valley Reservoir were bypassed and allowed to flow down Cache Creek, the resulting flows would not be sufficient to overcome the YCFC&WCD's direct diversion under this right. Consequently, the frequency of hydraulic continuity between Cache Creek and the Delta does not warrant including YCFC&WCD's appropriative water rights to assist in meeting the 1995 Bay-Delta Plan objectives.

Considering that the flows in Cache Creek are rarely sufficient to push through to the Delta, the Cache Creek Stipulation is approved. YCFC&WCD will not be required to provide water to help meet the 1995 Bay-Delta Plan objectives as a result of the current proceeding.

9.0 RESPONSIBILITY FOR MEETING DISSOLVED OXYGEN OBJECTIVES

One of the subjects in Phase 5 of the Bay-Delta Water Rights Hearing was the allocation of responsibility to implement the dissolved oxygen (DO) objective in the 1995 Bay-Delta Plan.

The issue regarding dissolved oxygen is what requirements should be adopted in a water right decision to implement the dissolved oxygen objectives for the San Joaquin River between Stockton and Turner Cut.

9.1 Background

DO is required for the respiration of aquatic organisms, including fish. The 1995 Bay-Delta Plan contains a DO objective of 6.0 mg/l from September through November in the lower San Joaquin River between Stockton and Turner Cut to protect fall-run chinook salmon. (R.T. p. 3667; SWRCB 7, pp. 18-28.) The Central Valley RWQCB Basin Plan contains a DO objective for the entire Delta region of 5.0 mg/l throughout the year. (SWRCB 7b, p. III-5.00.)

DO levels below 5.0 mg/l create an "oxygen block," which impedes upstream salmon migration. (SWRCB 99, p. 63.) DO levels as low as 1.5 mg/l have been recorded in the lower San Joaquin River, and levels as low as 0 mg/l have been recorded in the Stockton ship turning basin. (SWRCB 55, p. 3.) Water quality conditions in the San Joaquin River typically deteriorate in the late spring, summer, and fall when flow in the river is low, water diversion rates are high, water temperature is high, and wastewater discharges into the river from upstream sources combine to increase the biochemical oxygen demand (BOD). The DO objective typically is not met in the late summer and fall months. (SWRCB 1a, pp. X-1, [X-4]B[X-18]; SWRCB 40.)

Many factors contribute to low DO levels in the lower San Joaquin River. The most significant are channel geometry, flow, water temperature, and BOD loading. (R.T. pp. 4286-4288; COS 14, p. 7.) Channel geometry and, to a great extent, temperature are not controllable factors. The State and Regional Boards can partially control flow and discharges.

The principal factors affecting flow in the lower San Joaquin River are tides, exports, presence of the barrier at the head of Old River, the approximately 1800 diversions in the Delta, and upstream San Joaquin River flow. Tides can change the direction of the river several times a day during periods of low flow. Export operations of the SWP and the CVP also strongly influence flow in the San Joaquin River. (DWR 37; SWRCB 63.) The export pumping draws water from the San Joaquin River into Old River, which decreases the flow of water past Stockton.

(SWRCB 39, pp. 4-5.) The net effect at Stockton is poor circulation and a decreased assimilative capacity of the river. (SWRCB 1A, p. X-3.)

Under an agreement between fishery agencies and the projects, a temporary barrier is installed at the head of Old River in the fall in order to increase flow in the San Joaquin River past Stockton. (R.T. pp. 3678-3679.) When the barrier is absent, over half of the San Joaquin River flow measured at Vernalis flows down Old River. (R.T. pp. 862-864; SJRGA 6, Fig. 3.2.4.) When the barrier is in place, water flows downstream in the mainstem of the San Joaquin River rather than into Old River. Monitoring data show that installation of the barrier in the fall usually improves DO concentrations in the lower San Joaquin River, especially in years with relatively low San Joaquin River flows, although the rate of improvement has varied. (SWRCB 42.) The most pronounced beneficial effects of the barrier occur when its installation eliminates net negative flows on the San Joaquin River. There is no evidence in the record showing what flow is necessary to achieve the DO objectives in the absence of a barrier. Low DO levels have been recorded even when San Joaquin River flows were relatively high. (SWRCB 42.)

Sources of BOD loading to the San Joaquin River include (1) point source discharges, (2) nonpoint sources, and (3) dredging activities. BOD includes carbonaceous oxygen demand (CBOD) and nitrogenous oxygen demand (nitrification of ammonia, which consumes oxygen).

Point sources of BOD include municipal and industrial discharges to the river. Municipal and industrial discharges include the discharges at the Stockton wastewater treatment plant (WWTP) and upstream discharges at Modesto, Turlock and Newman. Although discharges from all of the treatment plants contribute to the DO problem, discharge from Stockton's WWTP is particularly important because of the low assimilative capacity of the river at the discharge point. (COS 58, p. 3.) Stockton holds an NPDES[48] permit issued by the Central Valley RWQCB. A revised permit was issued by the RWQCB in 1994 with more stringent effluent limitations for ammonia and CBOD than those in the previous permit. In response to a petition for review, the SWRCB

[48] NPDES stands for national pollutant discharge elimination system. NPDES permits are issued pursuant to 33 U.S.C. section 1342 and Water Code sections 13370, et seq.

remanded the permit to the RWQCB for review and revision. The SWRCB directed the RWQCB to reconsider the CBOD and ammonia effluent limitations in the permit, taking into account new river flow conditions that may be caused by implementation of the 1995 Bay-Delta Plan flow objectives. The SWRCB stayed the effluent limitations for ammonia and receiving water limitations for DO pending the RWQCB's review and revision. (SWRCB 5o.) The RWQCB and Stockton have agreed to postpone action until Stockton completes further modeling of both the WWTP's effects on the river and the effects of implementing the 1995 Bay-Delta Plan. (SWRCB 50.)

Nonpoint source discharges also are significant sources of BOD. The San Joaquin River carries substantial amounts of agricultural return water and urban runoff that together contribute nutrients, pesticides, salts, trace elements, sediments, oil and grease and various organic toxins that affect water quality. (SWRCB 39, p. 6.) Agricultural return water also contains nutrients which, combined with the shallow depths and low flows of the river, promote high algal production. Algal production can have considerable effects on DO in the San Joaquin River. When river flow transports algae to the deeper water of the San Joaquin River channel near Stockton, most of the algal biomass dies, settles to the dark riverbed, and decomposes. The decomposition of this algal biomass exerts a large DO demand. (R.T. p. 4292; COS 14, p. 3.)

Dredging in the ship channel causes further DO problems. In the short term, dredging re-suspends solids and constituents containing BOD into the water column. In the long term, channel deepening decreases DO by reducing velocities and reaeration of the water column, and increasing oxygen demand of dying phytoplankton. (SWRCB 39, p. 6.) Dredging the ship channel has reduced DO levels in the area of the Port of Stockton up to approximately 0.2 mg/l. (R.T. p. 4373; COS 14, p. 5.) This reduction can be significant because DO concentrations are often already low during the important fall period when salmon migration is occurring. (SWRCB 1, p. X-6.) To mitigate for reductions in DO concentrations that occur when the ship channel is dredged, the U.S. Army Corps of Engineers operates a jet aeration facility in the Stockton ship channel when DO levels at Stockton's monitoring stations drop below 5.2 mg/l during the fall chinook salmon run. (SWRCB 159, p. 3.) Modeling performed by Stockton suggests that the addition of 4,500 pounds per day of oxygen to the Ship Channel would result in

a 0.5 mg/l increase in DO at a net flow of 1,000 cfs. The current system is designed to deliver 2,000 pounds per day. (COS 14, p. 5.)

9.2 Ways to Meet the Dissolved Oxygen Objectives

Chapter X of the Bay-Delta EIR analyzes four alternatives for meeting the DO objective: (1) D-1485 flows with the Head of Old River temporary barrier installed in September through November; (2) 1995 Bay-Delta Plan flows with the head of Old River temporary barrier installed in September through November; (3) 1995 Bay-Delta Plan flows and operation of the head of Old River permanent barrier during September through November; and (4) 1995 Bay-Delta Plan flows, operation of the head of Old River permanent barrier during September through November, and enhanced treatment of the Stockton WWTP discharge to comply with BOD limits proposed by the Central Valley RWQCB.

The results of modeling studies show that the implementation of the 1995 Bay-Delta Plan flows (including the operation of the head of Old River temporary barrier during September to November) generally results in higher DO concentrations during the spring than under D-1485 flows and similar barrier operations. However, DO concentrations are generally reduced in summer months, particularly in August when DO concentrations are lowest. Modeling results also indicate that operation of the permanent barrier at the head of Old River significantly improves DO concentrations in the lower San Joaquin River when compared to operating the temporary barrier under the same 1995 Bay-Delta Plan hydrology. Implementation of the proposed Central Valley RWQCB permit conditions and the operation of a permanent barrier at the head of Old River typically result in the highest DO concentrations during the September to November period when the 6.0 mg/l DO objective is in place. (SWRCB 1e, pp. [X-20]-[X-31], Figures [X-5]-[X-29].)

In Phase 5 of the Bay-Delta Water Rights Hearing, the SWRCB received evidence on DO issues. Several parties recommended that the SWRCB support installation and operation of the head of Old River barrier to improve DO levels. Stockton presented the most extensive evidence on DO. Stockton makes the following recommendations: (1) The SWRCB should evaluate the appropriateness of the DO objective. Stockton argues that the 6.0 mg/l objective should apply only when salmon are present and temperature in the lower San Joaquin River is below 68°F.

(2) The SWRCB should await completion and implementation of a phased TMDL[49] by the RWQCB before taking additional action to improve DO levels. (3) Install a permanent operable gate at the head of Old River, and operate the head of Old River barrier on a real-time basis to control DO. (4) Continuously monitor flow, salinity, temperature, DO, and pH in the San Joaquin River as well as nutrients, volatile suspended solids (VSS), and chlorophyll to determine the sources and timing of high organic loads. (5) Implement effective methods to reduce nonpoint nutrient sources. (6) Determine the potential benefits of river aeration devices and implement feasible measures. (COS 10, pp. 9-11; R.T. pp. 4297-4298.)

Regarding Stockton's first recommendation, the scope of this water right proceeding does not include the revision of objectives. The SWRCB could, however, consider revising the DO objective during a periodic review of the 1995 Bay-Delta Plan.

No evidence was submitted during the Bay-Delta Water Rights Hearing that shows that operation of the aeration device is effective. Consultants are, however, conducting more detailed evaluations of the feasibility of aeration methods. (R.T. pp. 4372-4373; COS 14, p. 5.) The addition of more aeration devices may be an alternative way to meet the DO objectives, but the installation of more aeration devices may have associated impacts that might require environmental documentation.

9.2.1 Flow and Barriers

Flow moving past Stockton is the largest single controllable factor that affects DO. (R.T. p. 4295.) Although the 1995 Bay-Delta Plan contains flow objectives for the San Joaquin River at Vernalis, modeling shows that implementation of the 1995 Bay-Delta Plan flow objectives alone will not significantly improve DO concentrations at Stockton. (SWRCB 1a, pp. [X-16]-[X-27], Figures [X-4]-[X-28]; SWRCB 185.) A barrier[50] at the head of Old River can increase

[49] A TMDL is a process to determine the total maximum daily load of pollutants that can be received in a waterway while implementing the applicable water quality objectives. TMDLs are developed in accordance with section 303(d)(1)(A) of the federal Clean Water Act (33 U.S.C. § 1313(d)(1)(A).).

[50] As discussed in Part 5 of this decision, the presence of a barrier at the head of Old River adversely affects water levels in the southern Delta in the absence of tidal barriers and has the potential to adversely affect aquatic resources *[footnote continues on next page]*

flows in the San Joaquin River at Stockton by reducing the proportion of flow that enters Old River. If a head of Old River barrier is constructed and is operated in conjunction with implementing the 1995 Bay-Delta Plan flow objectives, DO should improve. (R.T. 4281.) Modeling shows that in September a barrier at the head of Old River can be effective in improving DO. (SWRCB 1a, pp. [X-16]-[X-27], Figures [X-4]-[X-28]; SWRCB 185.)

The benefit of the barriers to DO depends on their operation. The draft EIR for the ISDP assumes that the head of Old River barrier is operated principally for the purpose of improving conditions for San Joaquin River chinook salmon, and the tidal barriers are operated principally to improve water levels in the southern Delta. The ISDP DEIR does not include barrier operation in September -- when it would improve DO -- and does not evaluate the effect of barrier operations on DO. For reasons including the factors discussed above -- that the barriers are not planned for DO improvement, that they may adversely affect aquatic resources, that they require tidal barriers to protect water levels from the effects of the head of Old River barrier, and that they are not yet analyzed at the project level in a final EIR, this decision does not require the construction of permanent barriers in the southern Delta channels. Nevertheless, the SWRCB encourages the parties involved in constructing and regulating the barriers to consider the effects of the barriers on DO and to make their best efforts to achieve the benefits of the barriers to DO while avoiding or mitigating their adverse effects.

9.2.2 Establishment of a TMDL

Based on the recommendation of the Central Valley RWQCB, the SWRCB has given DO a high priority on the State's 1998 303(d) impaired water bodies list. (COS 36.) The Central Valley RWQCB has committed to a TMDL process. (COS 58; 59.) The City of Stockton indicated it will provide at least $500,000 to the TMDL process. (COS 60, pp. 7-8.) The TMDL process is an appropriate course for long-term planning and ultimate improvement in DO concentrations.

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in the Delta. (SDWA 39, p. 4; USDI 17.) These effects are described at a programmatic level in the SWRCB's EIR (SWRCB 1e) and are described at the project level in the draft EIR for the ISDP. (SWRCB 87.)

9.2.3 Stockton WWTP

Stockton argues that further regulation of its WWTP discharges is not cost effective and would not result in meeting the DO objective. (COS 11; 14, pp. 6-7.) To meet the more stringent effluent limitations Stockton would have to issue bonds for $78 million to upgrade its treatment plant. (COS 11, p. 2; R.T. p. 4271.) As stated previously, the RWQCB and Stockton have agreed to postpone action on implementation of more stringent WWTP effluent limitations until Stockton completes further modeling of the WWTP's effects on the river and the effects of implementation of the 1995 Bay-Delta Plan. Modeling shows that implementation of the Plan flows in the absence of other actions has little effect on DO levels at Stockton. (SWRCB 1, pp. [X-16]-[X-27], Figures [X-4]-[X-28]; SWRCB 40.)

9.3 Summary

Based on the foregoing, the SWRCB will not take any water right action to meet the DO objectives at this time. The RWQCB should determine effluent limits based on TMDL results. The SWRCB will wait until the RWQCB has established a TMDL and has implemented it before taking further action to achieve the DO objectives.

10.0 RESPONSIBILITY FOR MEETING SOUTHERN DELTA SALINITY OBJECTIVES

10.1 Background

A key issue of Phase 5 of the Bay-Delta Water Rights Hearing was how to allocate responsibility for meeting the southern Delta salinity objectives. The 1995 Bay-Delta Plan contains salinity objectives for the San Joaquin River at Vernalis and for three locations within the southern Delta (San Joaquin River at Brandt Bridge, Old River at Middle River and Old River at Tracy Road Bridge) to protect agricultural beneficial uses of water in the southern Delta. The objectives provide for a maximum 30-day running average of mean daily electrical conductivity of 0.7 mmhos/cm from April through August and of 1.0 mmhos/cm from September through March for all water year types. (SWRCB 7e, p. 17.) The objectives were developed following a study to determine the water quality needs of significant crops grown in the Delta. (SWRCB 7d.) The USBR currently is required, under its New Melones permits issued pursuant to D-1422 and D-1616, to meet the salinity objective at Vernalis. No regulatory requirement currently in place assigns responsibility to meet the objectives at the other three locations.

In D-1422, notwithstanding that the USBR estimated that no more than 70 taf would be needed for salinity control at Vernalis, the SWRCB required the USBR to meet the Vernalis objective, without setting a limit of 70 taf. (SWRCB 5f, pp. 11-13.) In some years, water quality releases from New Melones have exceeded the 70 taf estimate by twofold. (USDI 4h.)

The USBR historically has met its responsibility for salinity control in the Delta by releasing water from New Melones Reservoir as required under D-1422. D-1422 requires releases of stored water from New Melones Reservoir for water quality control purposes to maintain a mean monthly total dissolved solids concentration in the San Joaquin River at Vernalis of 500 parts per million or less. (SWRCB 5f, p. 31.) Currently, Order WR 98-09 requires the USBR to meet instead the Vernalis salinity objective in the 1995 Bay-Delta Plan. The SWRCB reserved jurisdiction over the permits for New Melones Reservoir for the purpose of revising the release requirements for water quality objectives. (SWRCB 5f; p. 6.)

A USBR witness testified that the USBR intends to operate New Melones in accordance with the New Melones Interim Operations Plan through water year 1999 and then decide whether to extend the Interim Operations Plan. (R.T. pp. 1821, 6518-6519.) Under the Interim Operations Plan, the USBR plans to allocate 70-250 taf to water quality purposes. (R.T. p. 6294; USDI 2.) However, the USBR acknowledged that on occasion salinity objectives at Vernalis will not be met under its plan. (R.T. p. 6554; USDI 4.)

10.2 Responsibility to Meet the Vernalis Salinity Objective

10.2.1 Causes of Salinity Concentrations at Vernalis

Salinity at Vernalis is affected by the salt load and quantity of flow in the lower San Joaquin River. High salt loads and low flows at Vernalis result from a combination of upstream water diversions, discharges of saline drainage water to the San Joaquin River and subsurface accretions to the river from groundwater.

10.2.1.1 EFFECTS OF UPSTREAM WATER DIVERSION AND USE

The largest diversions of water from the San Joaquin River and its tributaries are by (1) USBR at New Melones Reservoir and Millerton Lake; (2) MID and TID at New Don Pedro Reservoir; and

(3) Merced ID at Lake McClure. (SWRCB 6.) Additionally, the diversions into pipelines by the City and County of San Francisco from the Tuolumne River upstream of the Delta deplete Vernalis flows by 240 taf. (SWRCB 1e, p. IV-27.) Taken together, these diversions have significantly reduced the flows in the San Joaquin River. (SCWA 18; SDWA 34a; SDWA 48; SWRCB 56; SWRCB 75 a-q.) Because of CVP diversions, alone, the flow of the San Joaquin River at Vernalis has decreased by 550 taf per year on average with 345 taf of this decrease occurring from April through September. (SDWA 14.) The water diverted from the upstream tributaries to the lower San Joaquin River is of high quality. Thus, these diversions result in a substantial reduction in the assimilative capacity of the San Joaquin River.

Despite the reduction in the assimilative capacity of the San Joaquin River that results from upstream diversions, water users in the San Joaquin basin upstream of the Delta are not necessarily responsible for implementation of the southern Delta salinity objectives by virtue of their depletions. Water diverted by the upstream parties is put to beneficial use for purposes such as irrigation, hydropower generation, recreation, and fish and wildlife enhancement. (SWRCB 6.) These are reasonable and beneficial uses that contribute to ensuring that the State's water resources are put to beneficial use to the fullest extent of which they are capable. (See Cal. Const., art. X, § 2.) It has long been recognized that it is reasonable to expect that upstream development will eventually reduce the amounts of water available downstream. (*Town of Antioch* v. *Williams Irrig. Dist*. (1922) 188 Cal. 451 [205 P. 688].) In *Antioch*, the California Supreme Court held that it would not be reasonable for an appropriator to enjoin upstream diversions so that sufficient flow would remain to hold back salt water from the ocean. The current situation is similar to the *Antioch* case with respect to the depletion of water, since *Antioch* indicates that it may not be reasonable to require junior water right holders, solely because of their depletions, to release or bypass extra water to dilute downstream salinity. In appropriate circumstances, of course, the SWRCB has authority to restrict diversions or require releases to protect water quality from seawater intrusion or loss of assimilative capacity. (*United States* v. *State Water Resources Control Board* (1986) 182 Cal.App.3d 82, 117 [227 Cal.Rptr. 161, 179] ("Whatever final conclusion is to be drawn from *Antioch* regarding the nature and extent of common law . . . rights to salinity control, existing constitutional and legislative authorities encompass the [SWRCB's] obligation to protect the quality of Delta waters.") In this case, however, it is not necessary, and would not be reasonable, to require that depletions be

reduced, since the water quality objectives can and should be attained through regulation of other controllable factors.

In this case, the depletions in the tributaries and the water right holders incurring the depletions are not the primary cause of salinity problems. Return flow from upstream diversions of water does not contribute significantly to the salt loading in the San Joaquin River. (R.T. p. 4794.) From 1977 through 1997, return flows from the Merced, Tuolumne and Stanislaus rivers contributed four, nine, and six percent, respectively, of the annual salt load of the river. (SEWD 7a.) Return flows from the upstream segment of the San Joaquin River also contribute little to the salt in the lower river. As discussed below, other factors contribute far more to the salinity concentrations in the southern Delta.

10.2.1.2 THE EFFECT OF DISCHARGES IN THE CVP SERVICE AREA ON VERNALIS SALINITY

Although water quality problems on the San Joaquin River began with the reduction of flows due to upstream development and the advent of irrigated agriculture, they were exacerbated with construction of the CVP. (R.T. pp. 3988, 4781; SDWA 39; SWRCB 1a, pp. II-15, VIII-3.) The CVP consists of 18 federally operated reservoirs and four reservoirs operated jointly with the DWR. (SWRCB 1a, p. III-5.) The Delta-Mendota Canal and pumping plant first began operating in 1951. (SDWA 48, pp. 10-11.) The San Luis Dam and the California Aqueduct were completed in 1967. (SWRCB 167, Technical Appendix, pp. [II-11]-[II-13].) SDWA's witness testified that between 1930 and 1950 the average salt load at Vernalis was 750,000 tons per year. Between 1951 and 1997, the salt load has averaged more than 950,000 tons per year. Peak loads have exceeded 1.5 million tons per year following extended droughts. (SDWA 34A.) Central Valley RWQCB staff testified that from the 1960s onward there has been an increase in salt load and concentrations. (R.T. pp. 4835-4836.) The April through August salt load in the 1980s was 62 percent higher than the load in the 1960s and the corresponding annual load increase was 38 percent. (SWRCB 1a, pp. [VIII-10]-[VIII-11]; SWRCB 97.)

Central Valley RWQCB staff described geographic sources of salinity based on historical data from 1977 through 1997. (R.T. p. 4791.) The Central Valley RWQCB staff concluded that high salinity at Vernalis is caused by surface and subsurface discharges to the river of highly saline water. The sources of the discharges are agricultural lands and wetlands. (R.T. pp. 4857-4858;

SEWD 17, p. 5.) Approximately 35 percent of the salt load comes from the northwest side of the San Joaquin River, and approximately 37 percent of the salt load comes from the Grasslands area. (SEWD 7a.) These areas receive approximately 70 percent of their water supply from the CVP, 20 percent from precipitation and 10 percent from groundwater. (SWRCB 8, p. V-11.) The TDS concentration of agricultural drainage water from the Grasslands area that discharges to the river through Mud Slough is approximately 4,000 mg/l. (R.T. p. 4869; SWRCB 1a, p. VIII-27.) In some cases, drainage water is more than ten times the concentration of the Vernalis salinity standard. (R.T. pp. 7850-7851.)

The subsurface drainage problem is region-wide. The total acreage of lands impacted by rising water tables and increasing salinity is approximately 1 million acres. (SWRCB 147, p. 21.) The drainage problem may not be caused entirely by the farmer from whose lands the drainage water is discharged. In the western San Joaquin Valley, the salts originate from the application of irrigation water and from soil minerals, which dissolve as water flows through the soil. The salts are stored in groundwater. As more water is applied, hydraulic pressures increase, water moves downgradient, and salt-laden waters are discharged through existing drainage systems and directly to the river as groundwater accretion. (SJREC 5a.) Drainage found in a farmer's field may originate upslope and may not have risen into the tile drains on the downslope farmer's land but for the pressures caused by upslope irrigation. (SJREC 5a, pp. 27-29.)

Based on the above discussion, the SWRCB finds that the actions of the CVP are the principal cause of the salinity concentrations exceeding the objectives at Vernalis. The salinity problem at Vernalis is the result of saline discharges to the river, principally from irrigated agriculture, combined with low flows in the river due to upstream water development. The source of much of the saline discharge to the San Joaquin River is from lands on the west side of the San Joaquin Valley which are irrigated with water provided from the Delta by the CVP, primarily through the Delta-Mendota Canal and the San Luis Unit. The capacity of the lower San Joaquin River to assimilate the agricultural drainage has been significantly reduced through the diversion of high quality flows from the upper San Joaquin River by the CVP at Friant. The USBR, through its activities associated with operating the CVP in the San Joaquin River basin, is responsible for significant deterioration of water quality in the southern Delta.

10.2.2 Actions to Meet the Vernalis Salinity Objectives

The Vernalis salinity objectives can be achieved either by providing sufficient fresh water to dilute upstream discharges of saline water above Vernalis or by using measures to control the discharge of saline water to the river upstream of Vernalis. (R.T. p. 3731.)

Some parties in the hearing suggested that the USBR should consider potential sources of dilution water other than New Melones Reservoir. The USBR presented testimony that it has acquired water from other parties for the purpose of meeting flow objectives on the San Joaquin River at Vernalis, and has considered the use of water from the Delta-Mendota Canal to meet the water quality objectives. The USBR has not considered using water stored in Millerton Lake because it believes that conveyance losses due to percolation and uncontrolled diversions are in the order of 50 percent. Because other sources of water are available, the USBR has not made an effort to determine the actual conveyance losses that would occur if water is released from Friant for salinity control at Vernalis. (R.T. pp. 6545-6550.)

Westlands Water District (WWD) requested that the SWRCB not take any action that would affect its CVP water deliveries. If the SWRCB were to amend the CVP water right permits to require compliance with the southern Delta salinity objectives using only dilution water, there could be adverse effects on the water supply of CVP contractors south of the Delta, including WWD. Although releases of dilution water could help meet the southern Delta objectives, regional management of drainage water is the preferred method of meeting the objectives.

Short-term management measures should include both on-farm management activities to reduce subsurface drainage and real-time management to maximize the assimilative capacity of the river. On-farm management of drainage water has been effective in reducing the salt load of the San Joaquin River. (R.T. p. 4877.) The Grasslands Area farmers as part of the Grasslands Bypass Project[51] have established a tail water prohibition. The prohibition results in intensive

[51] The Grasslands Bypass Project transports selenium-laden agricultural subsurface drainage and tailwater, as well as stormwater, from 97 thousand acres in the Grassland Watershed. The project conveys drainage water to the San Joaquin River via the southern 28 miles of the San Luis Drain. The project will operate through September 2001.

drainage management. (R.T. p. 5098.) The purpose of the Grasslands Bypass Project is to reduce selenium discharges, but there has been a decrease in salt discharges between 1995 and 1997 of almost 100,000 tons per year. (R.T. p. 5102.) Grasslands area farmers manage discharges of tile water through sump management, the regulation of water levels in sumps by shutting sumps off at times. (R.T. p. 5098.) The farmers also recycle their tail and tile water onto their fields, although this requires careful management to avoid crop damage. (R.T. pp. 5108-5109; SLDMWA 10.) WWD has also implemented source control measures, and all farms in the WWD use on-farm tile and tailwater management. In WWD, the principal management tool is recycling of drainage water. (R.T. pp. 7528-7530.) Despite the lack of drainage, the farmers in WWD, for the time being, are able to continue irrigated agriculture through careful water management. (R.T. p. 7305.)

The EIR for implementation of the 1995 Bay-Delta Plan includes an alternative that would restrict the discharge of tile drainage principally to times when the assimilative capacity of the river is adequate. This approach would require that dischargers avoid releasing drainage at times. (SWRCB 1e, p. VIII-27.) The storage of drainage water in the ground and in the drains was discussed, but the methods discussed above may be more feasible. (R.T. p. 6007; SJREC 4a, p. 5; SJREC 5a, pp. 21-22.) Drainage can be delayed if it can be blended and discharged to the river during high flows. (SJREC 4a, p. 5; SJREC 4f.) This kind of real-time management of tile drainage could occur and has the potential to reduce salinity concentration in the San Joaquin River at Vernalis. (R.T. p. 6010; SJREC 5a, p. 29.)

Several parties argued that the Central Valley RWQCB should adopt water quality objectives for salinity for the San Joaquin River at locations upstream from Vernalis. In SWRCB Order WQ 85-1, the SWRCB directed the Central Valley RWQCB to initiate a process to develop specific water quality objectives for the San Joaquin River basin that will result in the adoption of appropriate basin plan amendments by the Regional Board and the development of a program to regulate agricultural drainage discharges. (SWRCB 5(l), p. 34.) The Central Valley RWQCB is currently in the process of setting salinity objectives for the San Joaquin River. (R.T. p. 4847.) As part of its implementation plan for the salinity objectives, the Central Valley RWQCB should evaluate a program to regulate the timing of agricultural discharges to the San Joaquin River.

Drainage problems in the San Joaquin Valley threaten water quality, agriculture, fish and wildlife, and public health. (SWRCB 7e.) Although current drainage programs will, in the short-term, assist in meeting the Vernalis salinity objective, a long-term solution for drainage management must be developed. The USBR should reevaluate alternatives for completing a drain to discharge salts from agricultural drainage outside of the San Joaquin Valley and pursue appropriate permits. The operations chief for the CVP identified the drain as a tool for meeting water quality at Vernalis. (R.T. p. 6924.) Other parties at the hearing supported long-term disposal outside the San Joaquin Valley. (R.T. pp. 3649, 3893, 7067, 7647.) Central Valley RQWCB staff testified regarding the need for a drain. (R.T. p. 4789.) The Water Quality Control Plan for the Central Valley Region states that a valley-wide drain will be the only feasible long-term solution to drainage problem. (R.T. p. 4851; SEWD 35; SWRCB 7b.) The drain has numerous benefits, including the maintenance of productivity and the export of salts. (R.T. p. 7563.)

Public Law 86-488 required assurance that the San Luis Drain would be constructed. (SJREC 4c.) In 1963 and 1967, the SJREC filed suit against the USBR. The USBR assured the judge that a drain would be constructed. (SJREC 4e.) Nevertheless, the USBR continues to delay making progress on an out-of-valley drain. (R.T. pp. 6452-6467.) A USBR witness testified that USBR has no specific plans to improve quality of the river upstream of Vernalis. (R.T. pp. 6466, 6554.) The USBR has been directed by the court to initiate activities to resolve the drainage problems in the San Joaquin Valley. It should proceed to do so promptly.

The USBR's actions have caused reduced water quality of the San Joaquin River at Vernalis. Therefore, this order amends the CVP permits under which the USBR delivers water to the San Joaquin basin to require that the USBR meet the 1995 Bay-Delta Plan salinity objectives at Vernalis. The USBR has wide latitude in developing a program to achieve this result. The USBR could consider sources of dilution water other than New Melones Reservoir and other means of reducing the salinity concentration in the southern Delta. This decision conforms Condition 5 of D-1422 to the southern Delta salinity objectives in the 1995 Bay-Delta Plan and to the current Basin Plan.

If, in five years, modeling and planning studies indicate that salinity objectives will not be consistently achieved, the USBR shall report to the Chief of the Division of Water Rights all activities that were taken in attempting to meet the objectives, including out-of-valley alternatives.

10.3 Responsibility for Southern Delta Salinity Objectives Downstream of Vernalis

10.3.1 Causes of Salinity Concentrations Downstream of Vernalis

Water quality in the southern Delta downstream of Vernalis is influenced by San Joaquin River inflow; tidal action; diversions of water by the SWP, CVP, and local water users; agricultural return flows; and channel capacity. (R.T. p. 3668; DWR 37, p. 8.) The salinity objectives for the interior southern Delta can by implemented by providing dilution flows, controlling in-Delta discharges of salts, or by using measures that affect circulation in the Delta.

Diversions in the Delta can cause hydrodynamic changes that affect water quality. During periods of high exports and peak irrigation, higher quality water is drawn into the southern Delta from the Delta cross-channel, the Mokelumne River, and Georgiana Slough. These waters mix with and improve the quality of San Joaquin flow. (DWR 37, p. 8.) However, export pumping by the SWP and the CVP and in-Delta diversions in the southern Delta also cause null zones, areas with little or no circulation. These zones have little assimilative capacity for locally discharged salts. The lack of circulation prevents better quality water that is otherwise available from the main channels from freshening the water in these channels. (R.T. pp. 3816-3818; DWR 37, p. 9; SDWA 48; SDWA 34A; SDWA 27; SDWA39; SDWA 51.)

Even when salinity objectives are met at Vernalis, the interior Delta objectives are sometimes exceeded. (SWRCB 1a, Figures [X-17]-[X-24].) Exceedance of the objectives in the interior Delta is in part due to water quality impacts within the Delta from in-Delta irrigation activities. (R.T. p. 7794.) SDWA argues that it does not add to the salt load; however, agricultural activity does increase the salinity of the water in the Delta channels. (R.T. pp. 3836-3847.) Irrigators within the Delta could implement water management measures as a means of controlling salt impacts within the Delta channels. (RT pp. 7869, 7870.)

10.3.2 Actions to Meet Interior Delta Salinity Objectives

Since 1985, DWR has been working to improve conditions in the southern Delta. In 1987, DWR and SDWA identified flow barriers that could be constructed in the southern Delta to enhance water levels and circulation. The DWR, the USBR and the SDWA have agreed that the salinity problems in the southern Delta can be mitigated using the barrier program. (R.T. pp. 3670, 6339; DWR 37, Attachment 1.) The barrier program is discussed in Part 5 of this decision. Since 1991, DWR has been installing and operating temporary barriers to assist SDWA diversions. Permanent barriers are proposed as components of the preferred alternative for the ISDP. (DWR 37.) Although the three agencies have reached an agreement regarding the barriers, the agreement has not been signed. (R.T. p. 3758.)

DWR, SDWA, Stockton, and the USDI presented evidence regarding the barriers. The main benefit of the barriers is improved water levels in the southern Delta. (SWRCB 87, p. S1.) The barriers also benefit water quality by improving circulation in the southern Delta. (R.T. p. 7525.) The barriers generally improve water quality in the southern Delta because salts otherwise trapped in the channels are transported out of the area due to the enhanced circulation. (DWR 37, pp. 12-13.) The barriers reduce the amount of salt imported by way of the Delta-Mendota Canal, which should result in some long-term improvement in the quality of the San Joaquin River. (R.T. p. 3905.) The improved quality of water delivered through the Delta-Mendota Canal should result in improvements to the salinity of drainage water that returns to the river. (R.T. p. 3731.)

The construction of permanent barriers alone is not expected to result in attainment of the water quality objectives. (R.T. pp. 3672, 3710, 3787-3788; DWR 37, p. 15; SWRCB 1d, pp. [IX 30]-[IX-41].) The objectives can be met consistently only by providing more dilution or by treatment. (R.T. p. 3737.) The modeling studies indicate that even when the barriers do not result in attainment of the standards, water quality generally improves as a result of the permanent barriers. The exception is at Brandt Bridge where water quality may worsen slightly at times due to barrier operation. (SWRCB 1a, Figures [IX-17]-[IX-24].) Barriers may result in slightly worse water quality in the mainstem of the San Joaquin River in the Delta, but the more saline water is quickly diluted. (DWR 37.) Modeling shows that construction and operation of

the temporary barriers should achieve water quality of 1.0 mmhos/cm at the interior stations under most hydrologic conditions.

The DWR and the USBR are partially responsible for salinity problems in the southern Delta because of hydrologic changes that are caused by export pumping. Therefore, this order amends the export permits of the DWR and of the USBR to require the projects to take actions that will achieve the benefits of the permanent barriers in the southern Delta to help meet the 1995 Bay-Delta Plan's interior Delta salinity objectives by April 1, 2005. Until then, the DWR and the USBR will be required to meet a salinity requirement of 1.0 mmhos/cm. If, after actions are taken to achieve the benefits of barriers, it is determined that it is not feasible to fully implement the objectives, the SWRCB will consider revising the interior Delta salinity objectives when it reviews the 1995 Bay-Delta Plan. The USBR and the DWR will be responsible to take any actions required by CEQA, NEPA, and the federal and State ESA prior to constructing the barriers.

10.4 Summary

The 1995 Bay-Delta Plan includes salinity objectives at Vernalis on the San Joaquin River and at three locations in the interior of the southern Delta. Currently, the USBR is the only water right holder with responsibility for meeting salinity objectives at Vernalis under its water rights. Prior to this decision, no water right holder has had responsibility under a water right permit for meeting the three interior southern Delta salinity objectives.

Salinity problems in the southern Delta result from low flows in the San Joaquin River and discharges of saline drainage water to the river. The actions of the CVP are the principal causes of the salinity concentrations exceeding the objectives at Vernalis. Downstream of Vernalis, salinity is influenced by San Joaquin River inflow, tidal action, diversions of water by the SWP, CVP, and local water users, agricultural return flows, and channel capacity. Measures that affect circulation in the Delta, such as barriers, can help improve the salinity concentrations.

This decision requires the USBR to meet the Vernalis objective using any measures available to it. This decision also requires the DWR and the USBR to meet a salinity requirement of 1.0 mmhos/cm at the interior southern Delta stations.

11.0 THE PETITION TO AUTHORIZE JOINT POINTS OF DIVERSION BY THE CVP AND THE SWP

11.1 Background

On February 28, 1995, the DWR and the USBR filed a petition requesting, among other things, that the water rights permits listed on Attachment x be amended to add the SWP's Harvey O. Banks Pumping Plant as a point of diversion and rediversion in the USBR's water rights and to add the CVP's Tracy Pumping Plant as a point of diversion and rediversion in the DWR's water rights.[52] (SWRCB 4c.) This use of one project's diversion facility by the other project is referred to as the Joint Points of Diversion (JPOD). On seven days during March 1999, the SWRCB conducted Phase 6 of the Bay-Delta Water Right Hearing to receive evidence regarding the petition.

In previous actions, the SWRCB has authorized limited use of JPOD. Under Condition 3 of D 1485, the SWRCB authorized the USBR to use SWP facilities to recoup reductions in exports caused by efforts to minimize diversion of striped bass from the Delta during May and June. The SWRCB also has occasionally issued temporary change orders allowing the SWP and the CVP to use JPOD. (DWR 35, Attachment 3.) After receiving the February 1995 petition, the SWRCB conducted an expedited hearing and on June 8, 1995 adopted Order WR 95-6, which included a temporary conditional approval of the petition. The expiration date of this approval was December 31, 1998. On December 3, 1998, the SWRCB adopted Order WR 98-09, extending the temporary approval of the JPOD until December 31, 1999. Order WR 98-09 retains the terms and conditions set forth in Order WR 95-6, and adds a requirement to maintain water levels in the southern Delta. (SWRCB 5n.)

The alternatives for taking action on the petitioned changes are set forth and analyzed in the SWRCB's DEIR and final EIR. The EIR analyzes the effects of approving the JPOD under

[52] Previously, on December 7, 1981, the DWR and the USBR filed a petition requesting approval of the JPOD. The USBR also requested use of the JPOD in its petition for consolidated place of use filed on September 24, 1985. (SWRCB 4a; USDOI 10, p.1.) The effect of this decision is to address the requests for a JPOD in all three petitions.

seven different operating assumptions, compared to two different baseline conditions. Under the first baseline (JPOD Alternative 1), the 1995 Bay-Delta Plan is not implemented, and D-1485 requirements are in effect. Under the second baseline (JPOD Alternative 2), the 1995 Bay-Delta Plan objectives are met by the DWR and the USBR. (SWRCB 1b.)

11.2 SWRCB Authority Regarding Petitions for Change

The DWR and USBR filed their petitions for change in point of diversion and rediversion under Water Code sections 1700 through 1705. These sections govern changes in appropriative water rights acquired under Division 2 of the Water Code. These sections require the permission of the SWRCB before a change can be made. Section 1702 provides that "[b]efore permission to make such a change is granted the petitioner shall establish, to the satisfaction of the board, and it shall find, that the change will not operate to the injury of any legal user of the water involved." Section 1702 codifies the common law "no injury" rule that an appropriator can make a change in its water right so long as the change is not injurious to other water right holders. (See *San Bernardino* v. *Riverside* (1921) 186 Cal. 7, 28 [198 P. 784]; Code Commission Notes to Water Code § 1700; SWRCB Order WR 98-1, p. 5; see generally Hutchins, The California Law of Water Rights (1956) pp. 176-177; Final Report, Governor's Commission to Review California Water Rights Law (1978), pp. 64-65.) This rule requires that the change cannot adversely affect the rights of any other water right holders, including junior appropriators. (*City of Lodi* v. *East Bay Mun. Utility Dist.* (1936) 7 Cal.2d 316, 340 [60 P.2d 439]; *Scott* v. *Fruit Growers Supply Co.* (1927) 202 Cal. 47 [258 P. 1095]; *Lester* v. *Doetsch* (1935) 7 Cal.App.2d 551 [46 P.2d 786]; *People's Ditch Co*. v. *Foothill Irrig. Dist.* (1931) 112 Cal. App. 273 [297 P. 71].)

This action is subject to CEQA. Accordingly, the significant environmental effects of this action are considered and mitigation is required as appropriate. The SWRCB also has an affirmative duty to take the public trust into account and to protect the public trust where feasible (*National Audubon Society* v. *Superior Court* (1983) 33 Cal.3d 419, 446 [189 Cal.Rptr. 346].) The SWRCB must also consider the public interest. (Wat. Code § 1243.5.)

Some of the parties in the Delta pointed out the protections afforded to Delta water users by the Delta Protection Act, set forth at Water Code sections 12200-12205. This decision protects the

water rights of water users in the Delta and includes terms and conditions requiring salinity control adequate to protect the beneficial uses of water in the Delta.

The petitioners and some other parties have recommended that the SWRCB approve full use of the JPOD, subject only to the development of an operations plan by CALFED. As discussed below, this decision approves the JPOD in three stages. Operations plans and other requirements will be imposed on changes in use of the JPOD from one stage to the next. The operations plan must be protective of fish and wildlife and of the rights of other legal users of the water. It will be subject to the approval of the Chief of the Division of Water Rights of the SWRCB. With these requirements, the JPOD will not cause injury to other legal users of the water, and will not have a significant adverse effect on the environment.

11.3 Positions of the Parties

In Phase 6, several parties made opening statements but did not present any evidence. The USDI, the DWR, the DFG, the SLDMWA, the WWD, the EDF, Trinity Co., and the Cross Valley Canal Contractors[53] (CVCC) presented evidence in cases in chief. The SJRECWA and SDWA presented evidence during cross-examination of other parties' witnesses. CCWD presented rebuttal evidence.

The DWR, the DFG, and the USDI, representing the USBR and the USFWS, presented a joint case in chief. In their opening statements, the agencies requested that the SWRCB approve the petition for JPOD, and allow it to be used up to the physical capacities of the Tracy and Banks Pumping Plants after an operations plan is developed by CALFED. In the interim, the agencies requested that the SWRCB authorize use of the JPOD subject to the conditions contained in Order WR 98-9, with the addition of diversions of water to be delivered to the USBR's CVCC, Musco Olive and the Veteran's cemetery. The USBR has dropped its original proposal to deliver water to the Tracy golf course. (R.T. pp. 10945-10946.) The CVCC supports the agencies'

[53] The Cross Valley Canal Contractors include Pixley Irrigation District, Lower Tule River Irrigation District, Tea Pot Dome Water District, Saucelito Irrigation District, Tri-Valley Water District, Rag Gulch Water District, and Kern-Tulare Water District.

proposal. In their closing briefs, the USDI and the DWR proposed terms and conditions to carry out their proposal. The terms in this decision addressing the JPOD are generally consistent with the USDI and DWR proposals.

In supporting the JPOD proposal, DFG requested that the SWRCB condition its approval of the JPOD. The condition would require completion of the operating plan before the JPOD could be used to export water at diversion rates up to the physical capacities of the export facilities. DFG explained that certain export facility operations, including unconditional use of joint points, could adversely impact Delta fisheries, including species protected under CESA, and that it expects the operating plan to protect fish and to meet other CALFED goals.

The SLDMWA and WWD jointly support approval of the JPOD as described by JPOD Alternative 5 in the FEIR. (SWRCB 1d; SWRCB 1e.) JPOD Alternative 5 would allow the use of the JPOD for any authorized beneficial use up to the permitted diversion rates of the projects and by Public Notice 5280-A, as amended.[54] SLDMWA and WWD argued that deferring approval of the petition until an operations plan is developed is unnecessary for fishery protection. (R.T. pp. 11460-11462, 11466.)

CCWD raised concerns regarding the impacts of expanded use of the JPOD. CCWD expressed concern that the use of the JPOD could impact water quality at CCWD's diversion points on Rock Slough and Old River. CCWD also expressed concern that approval of expanded use of the JPOD could adversely affect CCWD's ability to divert water under its Los Vaqueros permits by reducing the availability of surplus water and by changing the location of X2. CCWD requested that terms and conditions be included in the SWRCB's decision to protect its rights.

[54] Public Notice 5820-A Amended limits daily diversions into Clifton Court Forebay to 13,870 acre-feet and three day average diversions to 13,250 acre-feet per day. These amounts are based on the historical maximum diversion for the Delta Pumping Plant complex prior to the recent addition of four new pumps. Diversions may be increased by one-third of the San Joaquin River flow at Vernalis during the period from mid-December to mid-March when San Joaquin River flow exceeds 1000 cfs.

The EDF supports the use of the JPOD authorized by Order WR 98-9 but opposes any approval of expanded use of the JPOD until the environmental health of the Delta is restored. EDF requests that the SWRCB limit use of the JPOD. EDF proposes that additional exports be allowed only in connection with a comprehensive restoration program for fish in the Delta. EDF argues that the use of the JPOD to make up losses that result from complying with the CVPIA, the ESA, and other State and federal laws should not be authorized.

Trinity Co. opposes approval of the petition to authorize JPOD. Trinity Co. argues that the environmental documentation regarding the petition is inadequate. Trinity Co. argues that no water is available to divert through the JPOD, that the expanded use of the JPOD will place additional demands on the Trinity River, and that these additional demands can affect water levels in Trinity Reservoir and temperatures downstream in the river. Trinity Co. requests that the SWRCB amend the USBR's permit on the Trinity River to increase minimum stream flows, to require compliance with temperature objectives in the North Coast RWQCB's Basin Plan, and to require minimum carry over storage criteria for Trinity Reservoir. This request is for an action that is outside the noticed scope of the Bay-Delta Water Rights Hearing. Further, the requested action would not be mitigation for the JPOD, since the JPOD is not expected to affect flows and temperatures in the Trinity River.

SDWA opposes approval of the JPOD. SDWA argues that use of the JPOD diminishes flows in the mainstem San Joaquin River, lowers water levels in the southern Delta, and impacts salinity. SDWA argues that approval of the JPOD should be conditioned upon the protection of Delta water users because they hold riparian rights superior to the rights of the export projects. SDWA also argues that under the Delta Protection Act an adequate supply of water must be provided to Delta water users without charge. SDWA opposed delegation to CALFED of decision making to establish an operations plan for the JPOD.

The SWC submitted a reply brief for Phase 6, in which it supports approval of the JPOD petition as proposed by the State and federal agencies. The SWC argues that the evidence does not support a finding that exports of water by the projects cause entrainment of fish.

SJRGA did not oppose the JPOD and noted that approval of the JPOD is an integral part of the SJRA, but reserved the right to challenge the JPOD in Phase 8 if the SJRA is not approved by the SWRCB. (R.T. p. 10908.)

EBMUD expressed concern that approval of the JPOD may affect the recovery of salmon populations on tributaries to the Delta such as the Mokelumne River.

TCCA expressed concern that additional exports would result in less water being available for delivery to Sacramento Valley CVP contractors. TCCA asked that the SWRCB condition any approval of the JPOD to require the USBR to meet its area-of-origin obligations to existing Sacramento Valley contractors and to future water right applicants. TCCA also requested that the SWRCB retain jurisdiction as necessary to assure that the USBR complies with the requested conditions. The USBR is subject to Water Code sections 11460 and 11463, which are part of the area of origin laws, and if it violates those sections, the SWRCB has authority to require compliance.

RCRC opposes the petition. RCRC argues that there is not surplus water available to meet anticipated additional exports under the JPOD and that the draft EIR for the project is inadequate regarding impacts of the proposed change on the Trinity River. RCRC argued that approval of the JPOD would limit the transfer capacity of the projects, which would affect the ability of upstream water users to transfer water to users south of the Delta. Average transfer capacity declines in comparison to JPOD Alternative 2 for JPOD Alternatives 3, 4, 5, 6, and 9. Transfer capacity increases under alternatives 7 and 8, which allow use of the JPOD up to the physical capacities of the pumping plants. (SWRCB 1e, p. XIII-14, Figure XIII-10, Figure XIII-11.) RCRC's point does not support denying the petition. It merely means that the SWP and the CVP will be able to move more of their water, rather than moving another party's water. This is a matter of who gets paid for the water, not whether water can be transferred.

CDWA argues that increased exports in connection with the JPOD could impact water levels in the southern Delta, impact salinity of the San Joaquin River and the southern Delta, and impact fisheries as a result of entrainment or disruption of migration. CDWA argues that increased exports as a result of the JPOD should not be approved unless these issues are resolved. CDWA

argues that only water that is surplus to the needs of the areas of origin can be exported under JPOD.

11.4 Issues Raised In Opposition To JPOD Petition

Water users opposed to the JPOD alleged that approval of the petition would cause them injury. Parties in the southern and central Delta, the Sacramento River basin, and the Trinity River basin sought protection against several alleged adverse effects of increasing exports of water by the DWR and the USBR. Arguments raised by the parties opposing the petition are summarized as follows. (1) If the SWRCB approves the increased use of the JPOD subject only to CALFED development and authorization of an operations plan, the SWRCB will abdicate its authority. (2) If the JPOD is approved, it could result in CVP exports that exceed the permitted amounts and an increase in combined exports by the SWP and the CVP. (3) If the JPOD is approved, it could cause adverse impacts to the environment, particularly to threatened and endangered fish species. (4) The environmental documentation for the proposed project is inadequate. These issues are discussed below.

11.5 Effects of the JPOD on the SWP and the CVP

Historically, the USBR was able to meet most of its water supply demands. More recently, regulatory constraints have reduced the USBR's ability to meet these demands. (R.T. p. 10960.) The reliable water supply for agricultural uses south of the Delta has decreased by about 35 percent. (R.T. pp. 11773, 11784-11785.) These reductions are mainly the result of the biological opinions issued under the state and federal Endangered Species Acts, the Central Valley Project Improvement Act (Pub. L. No. 102-575, Title XXXIV.), and the outflow and export limitations established by the 1995 Bay-Delta Plan. (R.T. pp. 11773-11779.) Use of the JPOD could help the CVP contractors recover some of the lost supplies.

The DWR has experienced some of the same regulatory constraints that have affected the USBR. However, because not all of the constraints affect the SWP and because the SWP has available pumping capacity, it is not as severely affected as the USBR. Although the SWP could divert water at Tracy Pumping Plant under the JPOD, the SWP is expected to use the JPOD only when emergency repairs are required or when the constraints on the SWP's take of fish under the state or federal Endangered Species Act restrict operations. (SWRCB 1e, p. [XIII-7].)

Use of the JPOD will have water supply and environmental benefits in the export areas because water supply reliability for CVP contractors and wildlife refuges and wildlife management areas south of the Delta will recover from the reductions caused by the SWP and the CVP implementing the 1995 Bay-Delta Plan. Approval of the JPOD would allow for restoration of these water supplies. (R.T. pp. 10962-10963; USDOI 10c.) Water supply reliability will improve under the JPOD because the CVP will be able to fill San Luis Reservoir when there are high flows in the Delta. (R.T. p. 10983; DWR 35, pp. 1-2.) Also, water stored in upstream SWP and CVP reservoirs could be moved south of the Delta by using the JPOD during summer months. This would increase water supply reliability if San Luis Reservoir storage were low. (R.T. p. 10984; DWR 35, p. 3.) Lastly, the JPOD might help the projects continue to supply south of Delta demands during periods when pumping must be reduced in response to emergencies or facilities outages. (R.T. pp. 10985-10986; DWR 35, p. 5.)

Under the JPOD, the USBR proposes that CVP diversions of water could occur at rates up to 10,600 cfs for short periods of time. (USDI 10z.) This would exceed the physical limitation of 4600 cfs on current export diversions at Tracy by the USBR. (USDI 10, p.4.) It also would exceed the amount the USBR is authorized to divert in connection with use of the JPOD pursuant to Orders WR 95-6 and 98-09. Those orders limited diversions by the USBR at both the Banks and Tracy Pumping Plants to an average of 4600 cfs from the Delta and 4200 cfs to storage in San Luis Reservoir over a twelve-month period. The purpose of the diversion limitation in Orders WR 95-6 and 98-09 is to help prevent adverse effects on the environment, since no certified environmental document specifically addressed the petitioned use of the JPOD considered in those orders.

The USBR argues that the 4600/4200 cfs limit on diversions should not be required by the water right permits for the CVP. The 4600/4200 cfs limit is based on SWRCB Decision 1020 (D-1020), adopted on June 30, 1961. D-1020 approved a diversion of water by the USBR from

Old River, based on Application 15764 (Permit 12860).[55] D-1020 approves the diversion to storage of up to 1,000,000 afa, at a maximum rate of diversion of 4200 cfs, from November 1 of each year to April 30 of the succeeding year. It does not authorize the direct diversion portion of the application, which was for 1500 cfs. In the order, permit term 2 provides that, "The maximum rate of diversion through the Delta-Mendota Canal under this permit, together with other rights of permittee, shall not exceed 4600 cubic feet per second." (SWRCB 5c, p. 20.) This language is written as a limit on other permits held by the USBR, but it in fact is set forth only in Permit 12860. This limit has the potential to constrain the use of Permit 12860 and the JPOD at times.

Permit term 2 in D-1020 was based on a stipulated agreement between the USBR and other parties. The SWRCB found that the physical capacity of the Tracy Pumping Plant and the Delta-Mendota Canal is 4600 cfs and that more water could not be diverted through the facilities. The SWRCB included the limitation because of the stipulation. There is no other basis cited in D-1020 for the restriction. As part of the approval of the USBR's use of the Banks Pumping Plant under the JPOD, this decision deletes permit term 2 in D-1020.

The petition for JPOD does not propose to increase diversions through the Delta-Mendota Canal above 4600 cfs; however, the USBR's combined diversions through Tracy and Banks Pumping Plants will exceed 4600 cfs for any of the requested alternatives for approval of the JPOD. Under D-1485 conditions, the instantaneous rate of diversion reaches approximately 6000 cfs. (USDI 10g.) Use of the JPOD under the JPOD alternatives and under D-1485 to supply water to the CVCC results in a diversion rate above 4600 cfs a substantial amount of the time. (USDI 10z.)

JPOD diversions by the USBR at instantaneous combined rates above 4600 cfs have occurred regularly in the past. No evidence in the record indicates that combined diversions in excess of 4600 cfs necessarily cause adverse impacts to the environment or to legal water users.

[55] Application 15764 was filed on March 8, 1954 by the Westlands Water District, and was assigned to the United States on October 17, 1960.

Furthermore, the SWP and the CVP could, under their own rights at their own facilities, divert water at a combined rate of 14,900 cfs. If the USBR could not divert more than 4600 cfs at Tracy and Banks combined, the JPOD could not be used for any purpose. (R.T. p. 10967; USDI 10, p.4.)

Any adverse effect on the SWP of authorizing the JPOD at any level is expected to be minimal. (USDI 10, p.3; USDI 10d.) The projects propose that approval of the JPOD be subject to the approval of the owner of the facility that is being used for wheeling. DWR is the owner of the Banks Pumping Plant, where most of the JPOD use would occur, and it has the ability to decide whether and under what circumstances to make the facility available to another water right holder. It is reasonable to assume that if use of the JPOD adversely affected the SWP, DWR would not allow its use. (R.T. pp. 10963-10964.) Likewise, the USBR is not likely to allow the use of the Tracy Pumping Plant under the JPOD if it would adversely affect the CVP. This decision requires that use of the JPOD will be subject to the approval of the owner of the facility used for wheeling.

11.6 Effect of the Proposed Change on Other Legal Users of Water

Several parties argued that approval of the petition, especially if it results in increased exports, will injure legal users of water. The parties argue that injury will result because the JPOD will reduce the amount of water available to contractors in the Sacramento basin, reduce the availability of unappropriated water, cause a lowering of water levels in the Delta, or affect the quality of water diverted by other water users. The bases for these arguments are discussed below.

11.6.1 Effects on Sacramento River Water Users

Water users in the Sacramento River basin who contract with the CVP for water currently are not receiving as much water under their contracts with the CVP as they want. (R.T. pp. 12575, 12841, 12846; 12849, 12850; TCCA 6; TCCA 7; TCCA 8; TCCA 9.) TCCA, in particular, wants to contract with the CVP for additional water. TCCA presented evidence to show that Congress intended that its authorization of the CVP would ensure that the needs of area of origin users would be satisfied. (TCCA 1.) TCCA also argued that the CVP is required, under Water Code sections 11460, et seq., to supply water to meet the needs of water users in the Sacramento

Valley. TCCA requested that the SWRCB condition its approval of the JPOD to require that the CVP provide adequate water to meet the demands of the members of TCCA. In effect, TCCA is requesting the SWRCB's protection in two areas. The first is to maintain full deliveries under the existing CVP contracts, and the second is to obtain additional water delivery contracts.

TCCA's members hold water service contracts. (R.T. pp. 12894-12898.) TCCA argues that operation of CVP facilities, such as Shasta Reservoir, in conjunction with the JPOD and the petitioned changes in place of use of the CVP may increase the likelihood that deficiencies (reductions in water supply under the contracts) will be imposed on water service contractors causing them injury.[56] For the reasons discussed below, however, the SWRCB finds that the JPOD will not affect existing water service contractors in the Sacramento Valley.

The effect of the JPOD on Sacramento Valley water service contractors is dependent in part on how the USBR determines the deliveries to be made under the contracts. Except during water shortages, the CVP makes available to its contractors the amounts of water specified in the terms of its water rights and water service contracts. Amounts of water delivered to CVP water service contractors during water shortages are based on a combination of operational objectives, hydrologic conditions and reservoir storage conditions. The USBR allocates shortages[57] among water service contractors within the same service area based on the terms of individual contracts and based on CVP operational capabilities. (SWRCB 167, pp. [III-24]-[III-25].)

A USBR witness testified that operation of the JPOD will not deprive Sacramento Valley water users of water they otherwise would receive under existing contracts. (R.T. pp. 11069, 11073, 11075.)

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[56] Water service contractors, however, are not the water rights holders entitled to protection under Water Code section 1702. (See discussion in Part 12.4.3, below.)

[57] By imposing requirements on the CVP, the biological opinion for winter-run chinook salmon may create water shortages that affect annual allocations to water service contractors, including TCCA's members. The USBR makes its February 15 estimate of deliverable water based on estimates of precipitation and runoff at the 90 percent probability of exceedance. The biological opinion adds a requirement that the USBR maintain a minimum end-of–year carryover storage in Shasta Reservoir of 1.9 MAF. (SWRCB 127, p. 51.) Thus, the biological opinion may both protect carryover storage in Shasta, which benefits deliveries in the following year, and limit the CVP's ability to deliver water. The effects of the biological opinion, however, would exist whether or not the CVP uses the JPOD.

Even if additional water were available to the TCCA, its members may not be able to divert it. Even in years when CVP supplies are available, operating restrictions at Red Bluff Diversion Dam to improve salmon runs restrict the availability of water for diversion to contractors. (R.T. pp. 12845.) When the gates at the Red Bluff diversion dam are open, water must be pumped from the river into the Tehama-Colusa Canal, which serves TCCA. The pumps are not capable of pumping sufficient water into the canal to deliver TCCA's full supply. (R.T. 12915-12916.) Furthermore, it appears that the payment capacity of lands within TCCA is currently insufficient to pay off CVP obligations under the existing contracts.58 (R.T. pp. 12842, 12846-7, 12850; TCCA 19.) Based on the evidence, factors other than the JPOD will constrain TCCA from obtaining additional water supplies.

Assuming that TCCA's members could divert more water into their canals and could afford to pay for the water, the CVP could not be forced under state law to execute contracts to provide additional water service to TCCA or other Sacramento Valley water users. The part of the Watershed Protection Act that requires the execution of water service contracts with water users in the watershed of origin applies only to the DWR, and does not apply to the USBR's operation of the CVP. Water Code section 11128 provides:

> "The limitations prescribed in section 11460 <u>and</u> 11463 shall also apply to any agency of the state or federal government which shall undertake the construction or operation of the project, or any unit thereof, including, besides those specifically described, additional units which are consistent with and which may be constructed, maintained, and operated as a part of the project and in furtherance of the single object contemplated by this part." (Emphasis added.)

Neither section 11460 nor section 11463 imposes an obligation on the USBR to contract with water users in the watershed or area of origin. Section 11462 conditionally imposes such an obligation on the DWR, but section 11462 does not apply to the USBR.

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[58] A TCCA witness claimed that if TCCA had more water it could plant higher-value crops and increase the payment capacity of the land. This claim is, however, speculative, and was not supported by evidence showing that the land involved will support higher value crops.

TCCA points out that in approving the USBR's permits for Shasta Reservoir, the SWRCB included Term 23, which set a time schedule for the USBR to enter into contracts with existing and prospective water users in the Sacramento basin and in the Delta. The last time period expired on March 1, 1971, and has not been extended. The basis for Term 23 may have been protection of the public interest. It was not, however, compelled by Water Code section 11128 in combination with Water Code sections 11460 and 11463. TCCA has been advised in the past that the appropriate way to obtain additional surface water supplies under the Watershed Protection Act is to file applications to appropriate the additional water. (USDI 110.)

11.6.2 Water Supply Effects on Contra Costa Water District

CCWD raised concerns regarding the effect of the JPOD on the availability of water for diversion under its Los Vaqueros water right permits. (R.T. p. 12220.) The Los Vaqueros project was approved by the SWRCB subject to conditions in D-1629. D-1629 prohibits diversions by CCWD when the DWR and the USBR have declared the Delta to be in balanced conditions under the COA or when a diversion by CCWD under the permits would require the SWP or the CVP to release water from storage or reduce diversions or rediversions of water in order to provide flow to meet provisions of any state or federal law. (SWRCB 5j, p. 94.) In other words, CCWD can divert only when the Delta is in excess conditions. CCWD requested that the SWRCB condition the approval of the JPOD so that it will not affect the amount of water available for diversion by CCWD under its permits.

Under Water Code section 1702, before it can grant permission to make a change in point of diversion, the SWRCB must find that the change will not operate to the injury of any legal user of the water involved. The projects propose to use the JPOD to increase their diversions to storage in San Luis Reservoir during the winter when the Delta is in excess conditions. Operations under Order WR 95-6 (JPOD Alternative 4) result in diversions during periods of excess conditions of about 100 taf greater than they would be if the 1995 Bay-Delta Plan were implemented without JPOD approval (JPOD Alternative 2). (R.T. p. 10972.) JPOD diversions could increase under the petitioned changes, and would occur during the same period of time that CCWD is diverting water under Permits 20749 and 20750. CCWD is a legal user of the water involved. Use of the JPOD could result in the Delta being in balanced conditions at times when it would not have been in balanced conditions in the absence of the JPOD. Therefore, the JPOD

could impact the ability of CCWD to divert as much water as it could divert without the JPOD. (SWRCB 75 a, b, e-g.)

Because the JPOD is a change that could injure another legal user of the water, the increment of diversions of water under the JPOD that exceeds JPOD diversions under D-1485 will be junior in priority to CCWD's permits at times when the Delta otherwise would be in excess conditions. To avoid impacts to CCWD during use of the JPOD, the SWRCB will require the DWR and the USBR to determine when balanced conditions would have occurred in the absence of the JPOD. If the Delta would be in balanced conditions as a result of using the JPOD, and the Delta would not be in balanced conditions without the JPOD, then use of the JPOD by the DWR at Tracy or by the USBR at Banks will be junior to diversions by CCWD.

11.6.3 Effects on Uses of Water in the Delta

11.6.3.1 WATER LEVEL IMPACTS

SDWA claims that it is adversely affected by the existing and proposed use of JPOD. The claim is based on impacts to water levels and salinity in the southern Delta. First, SDWA contends that low water levels adversely affect its members. SDWA argues that approval of the petition will further reduce water levels within the channels of the SDWA. (R.T. pp. 3812, 3819-3820, 3826-3827.)

Water levels in the southern Delta are affected by diversions at project export facilities, but are affected by other factors as well. The other factors include: low river flows entering the southern Delta canals; local channel depletions by agricultural diversions; natural tidal variations, especially during periods of extreme low tides; fluctuations in atmospheric pressure, local wind direction and velocity; and limited channel capacities. (R.T. p. 3369.) Approval of the JPOD can affect diversions at project export facilities and flows entering southern Delta channels. Approval of the petition would not, however, affect other factors.

The USBR modeled the effect of the JPOD on water levels in the southern Delta using the same assumptions regarding barrier construction as in the EIR. (R.T. p. 11004; USDI 11.) At stations located downstream from the barriers, water levels basically remain the same or are slightly increased, as compared to D-1485 conditions. Reductions in water levels shown in the modeling

are usually associated with JPOD Alternatives 7 and 8, which assume that installation of permanent barriers would allow a 10,300 cfs pumping rate at Banks. (R.T. 11004; USDI 11, p.1.) When water level impacts occur, the impact usually is the result of implementing the plan, not as a result of the JPOD. (USDI 11b-11l.)

JPOD use consistent with SWRCB Order WR 95-6 (JPOD Alternative 4) can cause incremental impacts over those caused by implementation of the 1995 Bay-Delta Plan. These incremental impacts are shown on the following table.

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TABLE 14

WATER LEVEL CHANGES DUE TO JPOD ALTERNATIVE 4

Location	Month(s)	Approximate Decline in Water Levels (inches)
Middle River upstream of the barrier	June and July	1
Old River upstream of the barrier	May	2
Old River upstream of the barrier	June	3
Old River upstream of the barrier	July and August	2
Old River upstream of the barrier	September	3
Grant Line west of Tracy Road Bridge	June	<1
Grant Line east of Tracy Road Bridge	June	<1
Grant Line east of Tracy Road Bridge	September	2
Old River east of Tracy Road Bridge	May - September	2
Middle River near Undine Bridge	June	2
Old River upstream of the confluence with Middle River	January	2
Old River downstream of the confluence with the San Joaquin River	December	2

SDWA argued that the modeling impacts are unreliable because the results do not reflect historic conditions. Evidence suggests that the modeled water levels are slightly higher than actual conditions. (SDWA 57.) The value of the model output, however, is in its comparison of water levels among the alternatives rather than its comparison of the predicted water levels.

No testimony identifies either the magnitude of water level declines that cause injury to the southern Delta diverters or the months in which injury has occurred. Water users in the southern Delta testified that they have, in the past, experienced water level problems. Irrigation usually occurs in March through November. (R.T. pp. 324, 331, 334.) Irrigation can also occur in December, January and February (R.T. p. 331). Therefore, it can be assumed that water level changes during any month can potentially affect southern Delta diversions.

In Phase 1 of the hearing, farmers in the southern Delta testified that without the tidal barriers in place, Middle River goes dry. Also, Grant Line Canal water levels drop to low levels west of the barrier regardless of barrier operation. (R.T. pp. 325-336.) Based on this testimony, the SWRCB, in Order WR 98-9, conditioned the temporary approval of the JPOD upon the preparation of a response plan to demonstrate that water levels in the central and southern Delta are not lowered to elevations that cause impacts to pumping as a result of the use of the JPOD. This term limits export pumping at certain times, but the effect of the term is not known and the parties provided no additional evidence regarding this issue.

Modeling indicates that there is no significant difference in the impact to southern Delta users from approving the JPOD at the USCOE-authorized pumping level (JPOD Alternative 5) compared to approving it at the level authorized by Order WR 95-6 (JPOD Alternative 4). (USDI 11b-11l.) However, approval of the JPOD in combination with implementation of the SJRA (JPOD Alternative 9) has the potential to lower water levels beyond the levels existing under Order WR 95-6, especially in the months of September, October and November. (USDI 11b-11e.)

Unlimited JPOD pumping with the three permanent barriers in place could result in impacts to water levels at some locations in the southern Delta (JPOD Alternatives 7 and 8). This is particularly true during the summer months at locations between the barriers and the export pumps. (USDI 11b; 11d; 11f; 11h.) Water levels at these locations generally decline by less than five inches. At Grant Line west of Tracy Road Bridge water levels may decline over a foot. Evidence in the record shows that Mr. Robert Ferguson diverts water from the affected portion of Grant Line Canal. (R.T. pp. 334-336.) The Delta Atlas indicates other irrigation diversions also are located between the proposed barrier locations and the export pumps; however, the other diverters have not claimed injury and the impact to them is unknown. (SWRCB 63, p. 32.) Impacts on Grant Line canal could be reduced if the barrier was located farther to the west.

At most other locations, the effect of unlimited use of the JPOD (JPOD Alternatives 7 and 8) on water levels can be mitigated, and if the three permanent barriers are constructed, water level increases resulting from the permanent barriers are in the order of three to four feet. (USDI 11c; 11e; 11g; 11i, 11j; 11k; 11l.) Temporary barriers at Old and Middle rivers are less effective in

raising water levels in the southern Delta than the operation of permanent barriers at those locations and a permanent barrier on Grant Line Canal. (SWRCB Final EIR, Figures X-6 through X-15.) To protect water levels in the southern Delta, the SWRCB will limit the use of JPOD to the diversion rates specified by PN 5820-A Amended unless permanent barriers or equivalent measures are operated to maintain water levels for agricultural diversions.

Prior to using the JPOD, the DWR or the USBR will be required to consult[59] with SDWA and prepare and submit to the Chief of the Division of Water Rights a response plan specifying actions the DWR or the USBR will take to ensure that water levels in southern Delta Channels are not lowered to elevations inadequate for diversion of water for agricultural uses because of increased pumping resulting from the use of the JPOD. The DWR or the USBR will not be authorized to divert water using the JPOD until the response plan has been approved by the Chief of the Division of Water Rights. The DWR or the USBR will be required to implement the response plan.

11.6.3.2 DELTA SALINITY

CCWD, SDWA, and CDWA argued that approval of the JPOD petition could adversely affect salinity in the Delta to their detriment.

CCWD asserted that JPOD pumping could impact water quality at its Rock Slough intake and at the intake for the Los Vaqueros system on Old River, and that these impacts could occur when water is available for refilling Los Vaqueros Reservoir. CCWD also argued that CCWD's customers who have their own diversion points could suffer an impact in terms of water quality if joint point operations cause a change in the location of X2. No evidence was submitted regarding these customers or the potential for impact. Dr. David Briggs, on behalf of CCWD, testified that use of the JPOD could cause increased sea water intrusion, which would affect the quality of water available to CCWD, and could affect refill operations under CCWD's biological opinion under the ESA. (R.T. p. 12221.)

[59] Such consultation does not require the approval of SDWA before the response plan is submitted to the Chief of the Division of Water Rights.

The biological opinion restricts CCWD from refilling Los Vaqueros Reservoir during the months of February through May if a salinity level known as X2[60] is east of Chipps Island. In January, June, and August, CCWD is restricted from filling Los Vaqueros if X2 is east of Collinsville. Further restrictions apply in December if Delta smelt are present at the intake on Old River and X2 is east of Collinsville. (R.T. pp. 12222-12223.) On average, X2 is always to the west of those stations during those months. (SWRCB 1d, Table XIII-14.) Average conditions can mask effects, however. The following table indicates the months and years when X2 is expected to shift to the east due to use of the JPOD such that diversions by CCWD might be affected. All of the shifts indicated in the table below occur during excess conditions when CCWD is allowed to pump at Old River. Shifts in December will only affect CCWD if Delta smelt are present at the Los Vaqueros intake. X2 may shift to the east in other years during the months when the biological opinion affects CCWD's diversions, but either the pumping restrictions on CCWD also would occur under D-1485 conditions or the shift does not trigger a pumping restriction.

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[60] See Part 5, above, for an explanation of X2.

TABLE 15

SHIFTS IN X2 UNDER JPOD THAT AFFECT CCWD'S DIVERSION

Assumed JPOD Export Conditions	Month	Number of Occurrences (Water Years in which impact occurs)
JPOD to CVCC only (JPOD Alternative 3)	January	2 (1947, 1961)
SWRCB order WR 95-6 (JPOD Alternative 4)	December January February	3 (1954, 1959, 1981) 3 (1937, 1947, 1961) 2 (1947, 1976)
PN 5820-A and SJRA (JPOD Alternative 9)	December January February March	2 (1954, 1981) 1 (1947) 2 (1947, 1976) 1 (1964)
PN 5820-A Amended (JPOD Alternative 5)	December January February	3 (1954, 1959, 1981) 3 (1937, 1947, 1961) 1 (1947)
Physical Capacity of Pumping Plants (JPOD Alternative 7)	December January February March May August	8 (1922, 1927, 1928, 1947, 1954, 1964, 1981, 1994) 4 (1926, 1937, 1947, 1961) 1 (1988) 1 (1955) 1 (1945) 1 (1958)
Physical Capacity of Pumping Plants at 2020 demand level (JPOD Alternative 8)	December January February March May August	4 (1922, 1927, 1947, 1954) 5 (1926, 1937, 1947, 1961, 1990) 1 (1988) 1 (1955) 1 (1945) 1 (1958)

Unlimited approval of the JPOD petition is likely to affect the ability of CCWD to divert water at Old River to Los Vaqueros Reservoir because of restrictions under the biological opinion for Los Vaqueros Reservoir. Approval of the JPOD at the pumping rate currently authorized by the USCOE (JPOD Alternatives 5 and 9) would cause no additional injury to CCWD compared to the salinity impacts caused by operation under Order WR 95-6 (JPOD Alternative 4). This is because the biological opinion would restrict CCWD diversions in more months under JPOD

Alternative 4. Approval of the JPOD up to the physical capacity of the pumping plants (JPOD Alternatives 7 and 8) could result in additional impacts to CCWD. To prevent injury to CCWD as a result of these restrictions, this decision requires the DWR and the USBR to determine when X2 will shift solely as a result of use of the JPOD, preventing CCWD from diverting water at Old River. At those times, use of the JPOD will be junior to diversions by CCWD to Los Vaqueros Reservoir.

Approval of the JPOD petition is not expected to adversely affect water quality at either CCWD's Rock Slough intake or at its intake on Old River. At Rock Slough, water quality generally improves substantially during the summer months and worsens during the winter months as a result of implementing the 1995 Bay-Delta Plan. Use of the JPOD somewhat reduces the salinity improvements resulting from the Bay-Delta Plan. (SWRCB Final EIR, Figures XIII-12 through XIII-21) However, chloride levels at CCWD's intakes are less than the objective of 250 mg/l in every month. (SWRCB 75k-q.) The SWRCB's EIR shows that the municipal water quality objective at Rock Slough is exceeded in December. This is due, however, to differences between methods used to calculate salinity in the models used for the EIR's preparation. (SWRCB 1e, p. [VI-11]; R.T. p. 12249.) In actuality, the projects are operated to meet salinity objectives at Rock Slough as well as at the export pumps, and the objective should not be exceeded. Therefore, there should be no adverse effect on water quality at CCWD's Pumping Plants as a result of approving the petition.

Water users in the SDWA also asserted that approval of the JPOD would adversely impact them due to salinity increases. The evidence does not support this conclusion. Under average flow conditions, exceedances of the southern Delta salinity objective that occur as a result of the JPOD in June, July and August would also have occurred under D-1485 conditions. Furthermore, salinity generally is improved as a result of implementing the 1995 Bay-Delta Plan. Where conditions have worsened, they worsen due to implementation of the 1995 Bay-Delta Plan or due to restrictions on New Melones Reservoir releases for salinity control (JPOD Alternatives 6 and 9), not due to JPOD. (SWRCB 1e, Figures XIII-57 through XIII-72.) A minor exception occurs at Brandt Bridge. During above normal years in August at Brandt Bridge, salinity is slightly higher under SWRCB Order WR 95-6 conditions (JPOD Alternative 4). (SWRCB 1e, Figure XIII-62.) In July and August of dry years, salinity at Brandt

Bridge increases as a result of allowing exports to increase to the physical capacity of the pumping plant. However, the resulting exceedance of the objective is so slight as to be within modeling error. (SWRCB 1e, Figure XIII-32.)

Trinity Co. argues that approving the JPOD petition may exacerbate drainage and water quality problems in the western San Joaquin Valley. Trinity Co. alleges that increased deliveries to the San Luis Unit of the CVP, and particularly to WWD, result in increased discharges to the San Joaquin River of saline and contaminant-laden drainage water. However, exports are not expected to increase over the levels authorized under D-1485 as a result of the JPOD. (SWRCB 1d, Table XIII-1; USDI 10d.) Furthermore, a significant portion of the water delivered as a result of the JPOD is served to the CVCC. (USDI 10d.) Drainage resulting from the CVCC service area does not return to the San Joaquin River except under flood conditions. The remaining water will normally be delivered to the WWD. (WWD 7, p.4.) Lands within WWD's service area do not discharge drainage water, tailwater, or tile water outside the boundary of WWD. (R.T. p. 7232-7233, 7245, 7302-7305.)

11.7 Effects on Fish, Wildlife, and Other Instream Beneficial Uses of the Water

11.7.1 Effect on Refuges

The USDI argued that approval of the JPOD petition will benefit wildlife refuges in the San Joaquin Basin. A USBR witness testified that "[T]o the extent that we use Banks, we use it first to meet the Cross Valley Canal contract. The remaining use of the joint point of diversion in our studies was used to reduce whatever deficiencies there would be on our deliveries south of the Delta as a whole. And those deliveries are for water supply purposes and for environmental purposes on refuges in the San Joaquin Valley." (R.T. pp. 10970-10971.)

11.7.2 Effects on Aquatic Resources

The USDI, DWR, and DFG presented testimony that the JPOD will not have an unreasonable effect on the environment and may be used to benefit fish by adjusting pumping so that it occurs during seasons that avoid or reduce impacts. (R.T. pp. 10984, 11056-11059; DWR 35, pp. 3-4; DWR 36, pp. 2-4.) Shifting pumping from one point of diversion to the other can also benefit fish if the fish are not uniformly distributed or if predators are present at one facility and not the other. (R.T. pp. 10984, 11055, 11059-11061; DWR 35, p. 2; DWR 36, pp. 1-2, 4-6.) Lastly, the

JPOD can be used by the projects as a tool to avoid impacts to the fish screens that occur as a result of aquatic weeds or mitten crabs. (R.T. pp. 11378, 11061; DWR 36, pp. 6-7.)

The DFG, the USFWS, and the EDF raised concerns regarding the potential impacts of implementation of JPOD pumping on chinook salmon and other aquatic resources in the Delta and in upstream areas. The testimony and evidence submitted by the parties pertains mainly to the effect of increased exports on chinook salmon. Chapter XIII of the FEIR evaluates potential impacts of the JPOD on aquatic resources.

11.7.2.1 ENTRAINMENT EFFECTS ON CHINOOK SALMON IN THE DELTA

SWP and CVP export pumping from the Delta can adversely affect fish and wildlife resources in the Delta, including spring-run chinook salmon (listed as threatened under the CESA and ESA) and winter-run chinook salmon (listed as endangered under the CESA and ESA). Increased export pumping and changes in the timing of export pumping relative to the presence of certain fish species in the Delta from use of the JPOD may exacerbate those significant adverse effects. (DFG 27 (Revised); USDI 12 (Revised); USDI 17; SWRCB 7e, pp. 14-15, 19; SWRCB 5n, p. 30; SWRCB 1d, pp. [XIII-34]-[XIII-39].) Potential adverse impacts to fish from export pumping include decreases in salmon smolt survival during outmigration from changes in hydrologic patterns in the Delta (increases in net reverse flows), entrainment at the export pumps, and increased predation at the pumps. (R.T. pp. 12071-12080, 12089-12090, 12105-12106; DFG 27 (Revised), pp. 2-4.)

Based on recent studies using coded wire tagged (CWT) late fall-run chinook salmon smolts, there is greater mortality of CWT smolts released in Georgiana Slough, which migrate through the Central Delta, than for those released at Ryde, which migrate down the mainstem Sacramento River. (USDI 12a and 12b.) In addition, survival of CWT smolts released in Georgiana Slough generally decreases as exports increase, suggesting that, as more water is exported, fish diverted into the central Delta experience greater mortality. (USDI 12 (Revised).) WWD and SLDMWA, in cross examination, questioned the experimental design and significance of the relationship between export rates and smolt survival found in the USFWS studies. (R.T. pp. 12008-12062.) However, testimony by the USFWS and DFG indicates that, despite variability

in the data due to uncontrolled factors, there is an inverse relationship between Delta exports and smolt survival. (R.T. 12003-12007; DFG 27 (Revised); USDI 12 (Revised).)

Increases in exports from November through January associated with use of the JPOD, compared to implementation of the 1995 Bay-Delta Plan without the JPOD, have the greatest potential to adversely impact anadromous salmonids. (USDI 12 (Revised).) Yearling spring-run, late-fall and fall-run chinook salmon smolts, and winter-run chinook salmon fry may be present in the Delta in the November to January period and may have lower survival with the use of the JPOD. (USDI 12 (Revised).)

Spring-run salmon emigration through the Delta may occur anytime from October through June. (DFG 27 (Revised), p. 4.) For yearling spring run, migration may begin in October, typically peaks in November and December, and typically ends by February. Spring-run fry may appear in the Delta in January. (DFG 27 (Revised), p. 4.) Smolt emigration through the Delta occurs throughout the spring and is essentially completed by the end of June. (DFG 27 (Revised), p. 5.)

The USFWS and DFG testimony primarily addressed the potential for increased exports associated with use of the JPOD to impact fishery resources in the fall and winter months (November through January) compared to the Bay-Delta Plan condition. Compared to operation under the 1995 Bay-Delta Plan without the JPOD (JPOD Alternative 2), exports generally increase in the October through January period and decrease in February and March. (SWRCB 1e, Table XIII-12). However, compared to the D-1485 base case (JPOD Alternative 1), use of the JPOD would generally cause a decrease in average Delta exports in August, September, November and February, March, and April and an increase in exports in October, January, June and July. In December, exports will decrease if pumping is restricted by the USCOE pumping limit (JPOD Alternative 5), but will increase if pumping is allowed to occur up to the physical capacity of the pumps (JPOD Alternatives 7 and 8). In May, exports generally will decrease under Order WR 98-09 conditions, but will increase under other conditions.

Potential effects of the use of JPOD on the through-Delta survival of chinook salmon (Sacramento River fall-run, late fall-run, spring-run, and winter-run, and San Joaquin River

spring-run) were analyzed using survival models developed by the USFWS. (SWRCB 1e, pp. [XIII-64]-[XIII-68].) The model was developed based on studies conducted by the USFWS that showed that survival of smolts migrating through the Delta is inversely related to several factors, including SWP/CVP exports during the migration period. For all Sacramento River runs, smolt survival improved or did not change compared to operations under D-1485 for all levels of JPOD use, and there were no discernible differences between the JPOD alternatives and implementation of the 1995 Bay-Delta Plan alone. (SWRCB 1e, pp. [XIII-64]-[XIII-67].) For San Joaquin River fall-run, survival indices were generally lowest in the D-1485 base case (JPOD Alternative 1); with use of the JPOD, indices were slightly higher under Order 95-6 (JPOD Alternative 4) and SJRA requirements (JPOD Alternative 9). (SWRCB 1e, pp. [XIII-65], [XIII-67]-[XIII-68].)

Based on previous modeling of fall, late fall, and winter-run chinook smolt survival rates through the Delta (USDI 11N, SWRCB 1d, Figures [XIII-42]–[XIII-44].), there were only small differences among alternative levels of JPOD use on modeled survival of these runs. (R.T. p. 11456.) The USBR testified that modeled survival rates for these runs vary only slightly between use of the JPOD under Order 98-09 and use of the JPOD as restricted by the permitted pumping limits (JPOD Alternative 5). (R.T. pp. 11453-11455.)

In general, the impacts of increased exports in the fall and winter months would be offset by reduced exports in the spring months (February, March, and April) with the use of JPOD, compared to implementation of the 1995 Bay-Delta Plan alone or meeting D-1485 requirements. Reduced spring exports may reduce entrainment in the critical period for spawning, rearing, and outmigration of many aquatic species in the Delta. (SWRCB 1e, pp. [XIII-63], [XIII-73]; DWR 35; USDI 10.) Survival of juvenile steelhead during the peak emigration period from February through April will likely improve compared to operation under D-1485 as a result of implementing the 1995 Bay-Delta Plan, even with approval of the JPOD, because Delta exports will generally be lower in this period. (SWRCB 1e, pp. [XIII –68].)

In summary, increased export pumping from use of the JPOD may significantly impact survival of juvenile chinook salmon emigrating through the Delta, particularly in the November through January period. (DFG 27 (Revised); USDI 12 (Revised).) Although use of the JPOD would not

increase exports compared to operation under D-1485 in November, exports would increase compared to D-1485 in January and in December if pumping is allowed to occur up to the full physical capacity of the pumps. Compared to implementation of the 1995 Bay-Delta Plan alone, use of the JPOD would generally increase Delta exports from October through January. To reduce or avoid potential significant impacts to juvenile chinook salmon emigrating through the Delta, approval of the JPOD is conditioned upon the protection of chinook salmon from potential impacts of increased exports. The state and federal agencies will be required to submit an operations plan for this and other purposes.

11.7.2.2 ENTRAINMENT EFFECTS ON OTHER FISH SPECIES IN THE DELTA

Effects of use of the JPOD on young-of-the-year striped bass abundance were evaluated using a multiple regression relating total YOY abundance at 38 mm. to the mean April-July San Joaquin River flow past Jersey Point, net Delta outflow, and total Delta exports. (SWRCB 1e, pp. [XIII-68]-[XIII-69].) Compared to operation under D-1485, the YOY index improved under all proposed JPOD scenarios in dry and critical year types and declined in wet and above normal year types. In below normal year types, improvements occurred if pumping was limited to permitted pumping limits, but otherwise declines occurred. In all but critical year types, approval of the JPOD up to the physical capacities of the pumping plants (JPOD Alternatives 7 and 8) generally resulted in lower indices than when JPOD was restricted to USCOE regulatory levels (JPOD Alternative 5). Approval of JPOD consistent with SWRCB Order 95-6 (JPOD Alternative 4) or the SJRA (JPOD Alternative 9) resulted in slightly higher predicted indices of YOY striped bass abundance. The observed differences were due primarily to changes in Delta exports from April to July. (SWRCB 1e, p. [XIII-69].)

Implementation of the JPOD is not expected to have significant effects on delta smelt since Delta exports are generally reduced in the spring months and the mean monthly position of X2 is not significantly different from the position predicted for the 1995 Bay-Delta Plan with no use of the JPOD.

11.7.2.3 EFFECTS OF CHANGES IN DELTA OUTFLOW

Delta outflow is expected to change with the implementation of the JPOD alternatives but the effects are not expected to be as significant as entrainment effects. Delta outflow generally

decreases compared to operation under the D-1485 base case in October, December, and January and generally increases in all other months. (SWRCB 1e, pp. [XIII-64], [XIII-74].).

For longfin smelt, Sacramento splittail, starry flounder, and Crangon franciscorum, abundance indices show significant positive relationships with Delta outflow in the spring months. No significant differences were observed in the modeled abundance of these species between the JPOD alternatives and the D-1485 and 1995 Bay-Delta Plan alternatives. (SWRCB 1e, pp. [XIII-70]-[XIII-72].)

11.7.2.4 EFFECTS OF CHANGES IN WATER TEMPERATURE IN UPSTREAM AREAS

Under certain hydrologic conditions, use of the JPOD is predicted to result in higher water temperatures in the Sacramento, lower American, and lower Feather rivers than in the base cases without JPOD pumping. (SWRCB 196; USDI 10; SWRCB 1e, pp. [XIII-81], [XIII-84].) Athough these modeled temperature differences are unlikely to result in significant impacts to aquatic resources, this decision requires that the operations plan for the JPOD include measures to ensure that aquatic resources are not impacted by changes in water temperature in upstream areas as a result of the use of the JPOD.

11.7.2.5 SUMMARY OF FISHERY IMPACTS

The use of JPOD could cause potential significant impacts on aquatic resources. However, the use of JPOD pumping if appropriately conditioned, could benefit fishery resources by providing greater operational flexibility to avoid impacts during critical time periods.

For most aquatic species, implementation of JPOD at rates of diversion no higher than the pumping limits currently authorized by the USCOE permit (JPOD Alternatives 5 and 9) is predicted to have no significant effects compared to use of the JPOD consistent with Order WR 98-09 (JPOD Alternative 4). This level of implementation is recommended in the State and federal agencies' joint proposal. For San Joaquin fall-run chinook salmon, through-Delta survival is predicted to be slightly lower if JPOD is approved up to the currently permitted limits of the pumps. However, this slight difference is insignificant. In most water year types, predicted young-of-the-year striped bass abundance is also lower at this level of approval than under Order WR 98-09 (JPOD Alternative 4).

For most aquatic species, implementation of JPOD at the physical pumping capacity of the SWP and CVP is predicted to have no significant effects compared to approval of JPOD at regulatory capacities. Young-of-the-year striped bass abundance is predicted to be lower at the physical pumping capacities than at the permitted limits. This impact can be mitigated through additional stocking of striped bass.

11.8 Summary

The petition is approved in three stages up to the physical capacity of the pumping plants.

1. The first stage is use of the JPOD to serve CVCC contractors, Musco Olive and the Veteran's Cemetery; and to make up export reductions taken to benefit fish. Until an operations plan is submitted and approved by the Chief of the Division of Water Rights, use of the JPOD shall be limited to the first stage except for exemptions noted below. Make up operations in the first stage shall not cause an increase in annual exports above that which would have been exported without use of the JPOD. The SWRCB finds, based on the above discussion, that approval of the JPOD at this level with the response plan described in 11.6.3.1, will not injure any legal user of water and will not have a significant adverse effect on fish and wildlife.

2. The second stage is use of the JPOD for any authorized purpose under the permits, up to the limits specified in the current USCOE permit. Use of the JPOD at the second stage will be subject to the preparation and implementation of an operations plan acceptable to the Chief of the Division of Water Rights that provides adequate protection to aquatic resources and other legal users of water. DWR will be the state lead agency for any required environmental documentation under CEQA for the operations plan.

3. The third stage is use of the JPOD for any authorized purpose under the permits, up to the physical capacity of the pumping plants. Use of the JPOD at the third stage will be subject to the operation of barriers or other mechanisms to protect water levels in the southern Delta, an operations plan acceptable to the Chief of the Division of Water Rights that adequately protects aquatic resources and other legal users of water, and certification of a project-level EIR by the DWR for the ISDP or other barriers project.

The operations plans shall be prepared in consultation with the USFWS, NMFS, and DFG and shall include measures for the protection of aquatic resources and their habitat.

The Chief of the Division of Water Rights will be authorized to grant short-term exemptions to the limits in stages 1 and 2 before the barriers are constructed, for the purpose of (1) conducting a recirculation study as discussed in Part 6 of this decision, or (2) other purposes as the Chief of the Division of Water Rights deems appropriate.

12.0 THE PETITION TO CHANGE AND CONSOLIDATE PLACES OF USE AND PURPOSES OF USE OF WATER UNDER CERTAIN PERMITS OF THE CVP

12.1 Background

On September 24, 1985, the USBR filed a petition requesting, among other things, that the place of use and purposes of use of water under its CVP water right permits be changed. This petition is referred to as the consolidated place of use (CPOU) petition. Originally, the USBR sought to (1) consolidate the authorized places of use of CVP water so that all permits and licenses for the specified projects have the same place of use, (2) expand the authorized place of use, (3) conform the purposes of use, and (4) extend the time to complete full beneficial use of water under the permits.[61] The SWRCB gave notice of the petition on July 29, 1986, and thereafter received protests. The USBR then began preparing documentation for an EIR (CPOU EIR) on the proposed action, with the SWRCB serving as the lead agency under CEQA. On June 15, 1995, the USBR amended its petition to (1) exclude the permits on the Black Butte and New Melones projects from the petition and (2) reduce the requested expansion area from about 4 million acres to 851,513 acres that are located outside the authorized place of use but are eligible to receive CVP water under existing contracts with the USBR. The sixteen permits currently subject to the change petition are listed on page 2 of this decision.

On June 26, 1996, the USBR asked the SWRCB to consider the request for a time extension separately from the balance of the petition. Consequently, the time extension is not discussed in either this decision or the CPOU EIR.

[61] The petition filed September 24, 1985 included one of the USBR's requests for a change of point of diversion to allow CVP use of the DWR's Banks Pumping Plant in the southern Delta. The petition for change of point of diversion is considered in Part 11 of this decision.

The CPOU EIR contains both project level and programmatic analyses. It analyzes, at the project level, the petitioned consolidation of the places of use, conformance of the purposes of use, and expansion of the place of use to include all of the lands outside the authorized place of use where CVP service already has encroached (encroachment lands). This decision addresses the project level actions.[62]

By notices dated December 2, 1997 and May 6, 1998, the SWRCB gave notice that it would hear certain issues concerning the CPOU petition in the Bay-Delta Water Rights Hearing. On nine days in March and April 1999, the SWRCB conducted Phase 7 of the Bay-Delta Water Rights Hearing to receive evidence regarding the CPOU petition. The hearing notices stated that approval of the change petition would (1) consolidate the places of use of many of the CVP water right permits, (2) expand the places of use to include areas where CVP water is being used outside an authorized place of use, and (3) conform all of the purposes of use under the CVP permits that are subject to the CPOU petition. Recognizing the programmatic nature of the discussion of the expansion lands in the CPOU EIR, the hearing notices did not include consideration of adding the expansion lands to the place of use. The expansion lands can be considered in future proceedings when any required environmental documentation has been prepared. The SWRCB expects that environmental documentation for the expansion lands will be prepared by the local public agencies seeking to expand the place of use into previously unserved areas.

12.2 SWRCB Authority Regarding Petitions for Change

The USBR filed the CPOU petition under Water Code sections 1700 through 1705. These sections govern changes in appropriative water rights acquired under Division 2 of the Water Code. These sections require the permission of the SWRCB before a change can be made.

[62] The CPOU EIR also analyzes, at the programmatic level, the further expansion of the place of use to include the lands (expansion lands) outside the authorized place of use that have never received CVP water but are entitled to service under an existing CVP water service contract. The CPOU EIR discussion of the expansion lands is programmatic because future land and water uses in those areas cannot be readily determined, and would require speculation. More detailed site-specific environmental documents may be necessary before the SWRCB can authorize delivery of water to the expansion lands.

Section 1702 provides that "[b]efore permission to make such a change is granted the petitioner shall establish, to the satisfaction of the board, and it shall find, that the change will not operate to the injury of any legal user of the water involved." As discussed in Part 11 of this decision, section 1702 codifies the common law "no injury" rule prior to the Water Commission Act that an appropriator can make a change in its water right so long as the change is not injurious to other legal users of water. The issues regarding effects of the CPOU on other legal users of water are discussed below.

This action is subject to CEQA. Accordingly, the significant environmental effects of this action are considered and mitigation is required as appropriate. The SWRCB also has an affirmative duty to take the public trust into account and to protect the public trust where feasible (*National Audubon Society* v. *Superior Court* (1983) 33 Cal.3d 419, 446 [189 Cal.Rptr. 346].) The SWRCB must also consider the public interest. (Wat. Code § 1243.5.) The environmental effects of approving the petitioned changes considered in Phase 7 and the mitigation measures for the changes are discussed in Part 14 of this decision.

12.3 Current and Added Places of Use

A number of water users with lands outside the existing places of use depicted in the CPOU DEIR presented evidence to show that they had been using water in these areas for many years, often since the inception of the CVP. The primary concern of these parties was that they should not be outside the place of use at the conclusion of this proceeding. Further, they argued that they should not be required to provide mitigation for any increase in the place of use to encompass their lands.[63]

The parties receiving CVP water on land outside the identified place of use questioned the accuracy of the place of use boundaries. During Phase 7, it became apparent that the maps

[63] For purposes of distinguishing between lands outside the authorized place of use that are subject to the petitioned changes, this decision and the CPOU EIR use the term "encroachment lands" or "encroached lands" to denote the lands outside the authorized place of use that currently are receiving CVP water.

prepared by the USBR to depict the boundaries of the currently authorized places of use were not consistent with the official place of use maps in the files of the SWRCB.

Consequently, the SWRCB received in evidence the official place of use maps and based its technical analysis on a comparison of the official maps with the areas currently being served by the CVP. The results are depicted in the CPOU final EIR (CPOU FEIR). The analysis shows that seven of the twenty-six CVP contractors whose use of water was addressed in the CPOU DEIR as encroachment outside the place of use are entirely within the current place of use.[64] No further consideration is required herein regarding the service areas of these contractors.

Within the remaining nineteen CVP contractors' areas, the acreage of encroached lands is substantially less than was indicated in the CPOU DEIR. The total acreage encroached is 79,432 acres.

The following discussion addresses the finding required under Water Code section 1702.

12.4 Effects on Other Legal Users of Water

12.4.1 Effect of Consolidation of Places of Use

Currently, the authorized places of use in the USBR's water right permits do not all cover the same area. Because the USBR commingles its water from several large reservoirs and diversion works, and because separate permits for these facilities have different requirements, the USBR finds it impractical and infeasible to ensure that water appropriated under a specific permit is delivered only to lands within the place of use specified in the permit. Accordingly, the USBR's practice is to deliver water from any source to any location within its service area without ensuring that water appropriated under a specific permit is delivered only to places specified in the permit. (R.T. pp. 12425-12426.) To the extent that the USBR delivers water to places outside a permitted place of use, however, it is operating inconsistently with the terms and

[64] These contractors are Bella Vista Water District, Mountain Gate Community Services District, Shasta Community Services District, Shasta County Service Area No. 6 – Jones Valley, Shasta County Service Area No. 25 – Keswick, City of Shasta Lake, and Silverthorn Summer Homes, Inc.

conditions of the permit. Additionally, water used outside the place of use cannot be counted in determining the maximum amount of water that is used under a permit when the SWRCB issues a water right license. Thus, if this change were not made, a license granted to the USBR in the future might exclude some of the water diverted and used under a permit, because the water has not been used in the authorized place of use. The purpose of consolidating the places of use is to ensure that all water appropriated by the USBR under its permits is used within the authorized place of use. Thus, the USBR is requesting that the SWRCB expand the place of use of each of the sixteen water right permits listed in the petition for change so that all these permits have the same place of use.

Several parties, including Trinity Co., TCCA, CDWA, and SDWA objected to the consolidation of places of use because of concerns that this would increase the amount of water being delivered. Trinity County was concerned about increasing the amount of water diverted from the Trinity River. Trinity County also argued that the CVP permits should be amended to prevent further use of Trinity River water on the west side of the San Joaquin Valley because of salinity impacts in those areas.

TCCA particularly objected to increasing the place of use of Shasta project water through consolidation, because of a concern that reductions in deliveries of water under other permits could increase the amount of Shasta water exported from the watershed. TCCA invoked the watershed of origin protections under Water Code section 11460, et seq.

CDWA and SDWA were concerned about an increase in the amount of water exported from the Delta, which CDWA argued could cause impacts to water levels, salinity, and fish.

TCCA presented its arguments regarding the watershed of origin protections in Phase 7 of the Bay-Delta Water Rights Hearing, although TCCA specified that its arguments were applicable to both the petitioned JPOD considered in Phase 6 and to the changes of place of use considered in Phase 7. TCCA's arguments are discussed in Part 11 of this decision, at 11.6.1.

Although each of these parties expressed concern that the consolidation of the places of use will result in increased diversions and uses of water, no evidence is in the record that consolidation of

the places of use will have this effect.[65] Approving this petition will not increase the amount of water that can be diverted from the Delta. First, the USBR already operates its Tracy diversion facilities at full capacity, and this petition does not involve increases in exports. Second, the USBR has adequate water rights under its permits to satisfy more than all of the water uses in the export areas. (SWRCB 2, App. P. A-24.) Third, water allocations to CVP contractors are limited by the contracts. (R.T. pp. 12632-12634.) With these circumstances, the amount of water delivered to CVP contractors in export areas will not increase due to approval of the CPOU petition. Likewise, it is not likely to decrease if the petitioned consolidation is denied. Because the agricultural contractors south of the Delta receive less water from the CVP than their demands, they could use all of their contractual supplies within the current place of use. (WWD 14, p. 4; R.T. pp. 13026-13028, 13248.) As discussed above, the USBR's existing practice is consistent with consolidation of the places of use. The current situation is therefore a *de facto* consolidation, and approving it should have no effect on the USBR's operations.

The concerns expressed by Trinity Co., that additional water could be diverted from the Trinity River as a result of the consolidation of the places of use, is unfounded. The USBR's diversions from the Trinity River are restricted under federal law, and it is unlikely that the USBR could increase its diversions of Trinity River water. Further, as discussed above, the CVP deliveries will not increase as a result of approving the CPOU petition.

Based on the foregoing, the SWRCB finds that the consolidation of the places of use under the sixteen CVP permits will not cause injury to other legal users of water. Accordingly, the consolidation is approved.

12.4.2 Effects of Including the Encroachment Lands in the Place of Use

The current places of use of the USBR's sixteen permits subject to the petition do not include all of the places where the USBR currently delivers CVP water. The USBR seeks to have these additional places added to the overall place of use of all sixteen permits.

[65] The JPOD petition, not the CPOU petition, is related to export quantities. The potential for increases in water exports resulting from approval of the JPOD is discussed in Part 11 of this decision.

Three of the parties who opposed consolidating the place of use also opposed increasing the place of use to include the encroachment areas. These parties are Trinity Co., SDWA, and CDWA. The objections of these parties were the same as their objections regarding the consolidation of places of use. As is the case with consolidation of the places of use, there is no evidence in the record that shows there will be an increase in the diversion and use of water by the CVP as a result of including the encroachment areas in the place of use. These areas already are being served, and because of other constraints on the ability of the CVP to deliver water, deliveries are not expected to increase as a result of adding the encroachment areas to the place of use. Nor, as discussed above, will the diversions from the Trinity River be increased by this change.

The parties receiving water from the CVP generally supported increasing the place of use to include areas currently receiving CVP water. Some supported additional increases as well. As discussed above, however, the CPOU EIR analyzes the environmental effects of expansion at the programmatic level, which does not provide enough information to approve the expansion areas under CEQA.

For the same reasons that the consolidation of places of use will not cause injury to other legal users of water, adding the encroachment lands will not cause injury to other legal users of water. Therefore, this decision approves the addition of all of the encroached lands to the CVP place of use. As discussed in Part 14 of this decision, the USBR will be responsible for mitigating the environmental effects of this change unless USBR justifies an exemption from mitigation requirements. The figures attached to this decision depict the overall place of use of the sixteen CVP permits and the nineteen contractors' service areas where encroachment has occurred. The figures show the place of use with and without approval of the encroachment areas.

12.4.3 Effects of Changing the Purposes of Use

Currently, the purposes of use among the USBR's sixteen permits subject to the CPOU petition are not uniform. Among the sixteen permits, the existing purposes of use are irrigation (12 permits), domestic (12 permits), municipal (7 permits), industrial (7 permits), fish and wildlife enhancement (2 permits), salinity control (3 permits), water quality control (4 permits),

stock watering (3 permits), and recreation (8 permits). (SWRCB 2, Table 3-2, pp. [3-7]-[3-8].) Changing the purposes of use as petitioned would have the effect of making the permits consistent with the USBR's current operations, in which the USBR operates the CVP as an integrated project. It would allow the USBR to deliver water for irrigation, for example, under four permits to appropriate water from the American, Sacramento, and Trinity rivers, and from Rock Slough in the Delta. It would allow the USBR to deliver water for municipal use from these sources under nine of the sixteen permits subject to the change petition. It also would allow the USBR to maintain control over water it releases into a river for fish and wildlife enhancement, as in the case of the releases to be made for the VAMP experiment discussed in Part 6 of this decision. [66]

WWD objects to changing the purposes of use of the permits, arguing that this would cause injury to it and other CVP contractors. WWD argues that CVP contractors are legal users of water entitled to the protection of Water Code section 1702. WWD further argues that if the changes in purposes of use are approved the USBR will reduce the amount of water delivered to the contractors and will use the remaining water for other purposes. WWD argues that its water supply will be reduced because the USBR will use water that otherwise would be delivered to WWD for purposes of meeting requirements under the federal Endangered Species Act and under the 1992 Central Valley Project Improvement Act. In reply briefs, WWD was joined in its contentions by several of the other CVP contractors in the San Joaquin Valley. SDWA takes the position, without specifying any particular harm, that changing the purposes of use would allow the USBR meet new obligations under federal law instead of meeting existing obligations, and claims that this will occur at the expense of other parties. SDWA has not established that the change of purpose of use will injure any water rights it may have. Accordingly, this decision does not include further discussion of SDWA's position.

[66] Specifically, the releases of CVP water to be made by the Exchange Contractors under the SJRA and for the purpose of the recirculation study required by this decision will require that CVP water be released into the San Joaquin River for the purpose of fish and wildlife enhancement.

Before examining whether CVP contractors are legal users of water entitled to protection under Water Code section 1702, this decision examines whether the petitioned change in purposes of use would be the cause of the effects WWD asserts will occur. Whether or not the CVP contractors are entitled to protection under section 1702, the SWRCB has authority to apply public interest considerations to its decisions.

WWD's witness testified that WWD had received its full contractual allotment of 1,150,000[67] afa of CVP water in most years prior to enactment of the federal Central Valley Project Improvement Act (CVPIA) (Pub. L. 102-575, 106 Stat. 4600, ∋ 3402) in 1992. Since 1990, WWD has received full deliveries only in 1996 and in 1999. (WWD 14, p. 5; 10, p. 2.) WWD presented evidence to show that since enactment of the CVPIA, it expects reductions in its CVP supply even in wet years, averaging 25 to 35 percent. (WWD 7, p.2; 10, p. 5.) Federal Endangered Species Act requirements commencing in 1992 also caused reductions in the supply. (WWD 14, p.6; 10, p.2.) WWD blames the reductions in supply it has experienced since 1992 on USBR's use of water for fish and wildlife enhancement.

In response to WWD's assertions regarding the cause of reductions in CVP water supplies, USDI makes two points: (1) The SWRCB's approval of the petitioned change of purpose of use will not involve an actual change in the ongoing operation of the CVP, since it is impractical for the USBR to tie each purpose of use to a specific permit. (R.T. 12336.) (2) The CVP contractors, including WWD, are not entitled to a fixed supply of water in every year under their contracts. USDI pointed out that the contracts and the provisions of the *Barcellos* judgment expressly allow the USBR to reduce deliveries because of a shortage resulting from *any cause*. USDI interprets the contracts as allowing it to reduce water deliveries to its contractors when it is required to do so under federal laws.[68] The contractual requirements are a federal law matter between the

[67] WWD's contractual allotment is in two parts: a 1963 contract for 900 taf and a judgment in *Barcellos and Wolfson, Inc.* v. *Westlands Water District*, Civ. No. F-79-106 EDP (E.D. CA) that provides WWD an additional 250 taf.

[68] The water right permits held by the USBR pursuant to the water right decisions cited by WWD all recognize that deliveries of water by the USBR to public agencies are subject to the contractual provisions between the USBR and the public agencies. (SWRCB Decisions 893, at term 16; 990 at term 29, and 1020 at term 13.)

USBR and the contractor. We note, however, that a federal court has addressed this issue with respect to the delivery of water to Area I of WWD, and has held that the USBR is not liable for damages arising from shortages in water deliveries resulting from any cause. (*O'Neill* v. *United States* (1995) 50 F.3d 677.)

USDI argues that the USBR is subject to Congressional directives under both the CVPIA and the federal Endangered Species Act (16 U.S.C. § 1531, et seq.). These laws, and actions that have been taken under these laws, require the USBR to deliver certain quantities of water to wildlife refuges and wildlife management areas and to forego certain water diversions. USDI argues that the SWRCB should approve the petitioned changes so that in satisfying its obligations under federal law, the USBR operates consistently with its water right permits. In effect, USDI is saying that it is required by federal law to operate in a way that causes shortages of water deliveries to its contractors, and that it will continue to do so whether or not the SWRCB approves the petitioned changes in purpose of use. If the USBR is bound by federal law to operate in this manner, the SWRCB's approval of the changes cannot be the cause of the shortages. Considering the potential for federal preemption of state requirements, the SWRCB herein examines the state laws and permit requirements as well as federal requirements.

WWD argues that the CVPIA does not preempt Water Code section 1702. (WWD ignores, however, any preemptive effect of the federal Endangered Species Act, which has played a major role in USBR's increased use of water for fish and wildlife purposes.) In the absence of a federal preemption, USBR is required, by section 8 of the Reclamation Act of 1902 (43 U.S.C. § 383) to comply with the requirements of state law. (See *California* v. *United States* (1978) 438 U.S. 645, 674.) Section 3411 of the CVPIA provides:

> "Notwithstanding any other provision of this title, the Secretary shall, prior to the reallocation of water from any purpose of use or place of use specified within applicable Central Valley Project water rights permits and licenses to a purpose of use or place of use not specified within said permits or licenses, obtain a modification in those permits and licenses, in a manner consistent with the provisions of applicable state law, to allow such change in purpose of use or place of use." (CVPIA, Pub. L. 102-575, 106 Stat. 4600, § 3411(a).)

In effect, the USBR is seeking herein to satisfy this requirement.

Turning to the no-injury rule in section 1702, two questions arise. First, does the USBR require a change in purpose of use if it foregoes diversions or abandons water it has previously appropriated? If it does not require a change, then approving the change in purpose of use will not harm the CVP contractors. Second, are CVP contractors protected from changes in the amount of their contractual water supplies by Water Code section 1702?

Regarding the first question, in some circumstances the USBR would not need changes in its water right permits before it could release flows or change its operations to benefit fish and wildlife. A water right permit is an authorization to take and use water only to the extent and for the purpose allowed in the permit. (Wat. Code § 1381.) Water right permits establish limits on taking and using water through terms and conditions. Terms and conditions establish the maximum amount of water that can be taken and used, subject the permitted diversions to the rights of senior water right holders, specify where water can be diverted and used, specify the purposes for which it can be used, and establish other limits. A permit does not, however, require that a permittee take or use the water authorized under the permit.[69]

Thus, in the absence of a federal preemption of permit terms restricting the purpose of use, the USBR could, at least for a period of time, meet some of its federal obligations to protect fish and wildlife. For example, such obligations might include actions that involve releases of water into a river, where the USBR abandons the water and does not attempt to subsequently reclaim the water, or actions in which, through its operations, it foregoes diverting water that is available to it. The disadvantages of this approach are (1) the USBR could not object if a junior appropriator downstream of the point of abandonment took the water and used it, and (2) in the absence of a water right change that adds a purpose of use for fish and wildlife enhancement, the USBR could, over time, forfeit a portion of its water rights. (Wat. Code § 1241.)

[69] The remedies for not using a permit are that the SWRCB will either revoke the permit or find that the water right has reverted, making the water available for another water right applicant. (Wat. Code §§ 1241 and 1410 et seq.) A water right does not revert in less than five years, however, and the SWRCB's decision as to the existence of a reversion is discretionary. Likewise, the SWRCB's revocation of a permit is discretionary. In either case, the facts and circumstances would be considered in reaching a decision.

Regarding the second question, WWD argues that it is the water right holder, and that the USBR is merely a trustee. Trustee language appears in only one of the water right decisions cited by WWD, SWRCB Decision 893 (D-893). In D-893, both permits for the Folsom Project are granted to the United States as "trustee for the benefit of the public agencies of the State together with the landowners and water users within such public agencies as shall be supplied with the water appropriated under the permits." These are the only permits cited by WWD in which the United States is designated as a trustee, and the language in these permits indicates that the trust responsibility extends not just to the recipients of water, but to all the public agencies of the state.[70] WWD relates the trustee designation to statements in *Ivanhoe Irr. Dist*. v. *All Parties and Persons* (1957) 47 Cal.2d 597, 625-626 [306 P.2d 824] rev'd 357 U.S. 275 [78 S.Ct. 1174]. (*Ivanhoe* involved a contract dispute in which the USBR had made a contract but had not yet obtained a water right.) In *Ivanhoe*, the California Supreme Court stated in dicta that the state of California is a trustee for the benefit of the people of the state, all of whom are water users. The court went on to say that if the United States administers the trust by developing, conserving, and distributing water, it steps into the shoes of the state as a trustee. D-893 was adopted in the year following the California *Ivanhoe* decision. Thus, the trustee status accorded to the USBR in D-893 apparently is meant to place the USBR in the shoes of the State of California, which has statutory and common law public trust responsibilities. These responsibilities are not the trust responsibilities of a fiduciary acting for the benefit of another, but are governmental responsibilities that include the ability to choose among actions to carry out the greater public benefit. (*National Audubon Society* v. *Superior Court* (1983) 33 Cal.3d 419, cert. denied, 464 U.S. 977.) Accordingly, the trust language is of no help to WWD in claiming the USBR's water rights.

Title to the water rights under the permits is held by the USBR. The USBR obtained many but not all of the water right permits that are subject to the change petition pursuant to SWRCB

[70] These permits include a term that restricts the place of use, until 1968, to Placer, Sacramento, and San Joaquin counties, to give these counties an opportunity to execute contracts with the USBR before other areas are served on a permanent basis. WWD is not located in these areas, so it is arguable that WWD would not be the intended primary beneficiary of any trust responsibility.

Decisions 893, 990, and 1020. These decisions adopt numerous permit terms. WWD argues that terms common to these decisions provide that the right to use the water for irrigation shall be appurtenant to the land on which it is applied, and that because the right to use water for irrigation is appurtenant to the land where it is used, the contractors hold the water right. Except in the case of the two Folsom permits (Permits 11315 and 11316[71]), the permit terms cited by WWD accord this appurtenant aspect only to irrigation use and not to municipal, stock watering, domestic, industrial, or other uses. In each case, the permit terms that address appurtenance provide, "shall be appurtenant to the land on which said water shall be applied, subject to continued beneficial use and the right to change the point of diversion, place of use and purpose of use, as provided in Chapter 10 of Part 2 of Division 2 of the Water Code of the State of California, . . ."

An appurtenance is a right, privilege, or property that is incidental to the enjoyment of a more important right, such as land ownership. (American Heritage Dictionary, 2d College Ed.; Black's Law Dictionary, Rev'd 4th Ed.) In contrasting a riparian right with an appropriative right, the California Supreme Court has stated: "The right to the waters of a stream is real property, a part of the realty of the riparian lands originally, and a part of the realty as an appurtenance to any other lands to which it may be rightfully taken when the riparian rights have been divested in favor of the user on nonriparian land." (*Palmer* v. *Railroad Commission* (1914) 167 Calif. 163, 173 [138 P. 997, 1001].) It is apparent that the court believed that an appropriative right is not part and parcel of the land, while a riparian right is part and parcel of the land. Consistently, the law of appropriative rights does not require that an appropriator own the land on which water is used. (See, generally, Hutchins, The California Law of Water Rights (1956) pp. 70-71.) In particular, an appropriator can appropriate water that the appropriator does not use, but rather provides to another. (*Joerger* v. *Pacific Gas & Elec. Co.* (1929) 207 Cal. 8, 34, 276 Pac. 1017.) Thus, even if water use is appurtenant to the enjoyment of a particular property, that does not mean that the owner of that property is the water right holder.[72] Further,

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[71] Permit 11316 does not include irrigation as a purpose of use.

[72] In another context, the Court of Appeal recognized that the USBR is the water right holder. (*County of San Joaquin* v. *SWRCB* (1997) 54 Cal.App.4th 1144 [63 Cal.Rptr.2d 277].) The court observed: "appellants assert the
[footnote continues on next page]

the permit language does not dictate the quantity of water to be delivered to any end user. An appurtenance can remain appurtenant even if it is diminished. In effect making the water right appurtenant to land insofar as it is used for irrigation is a designation of a place of use of the water.

The phrase that follows the appurtenance language in each of the cited decisions is instructive. It provides that the right is "subject to continued beneficial use and the right to change the point of diversion, place of use, and purpose of use, as provided in Chapter 10 of Part 2 of Division 2 of the Water Code of the State of California . . . ." Under the terms of Water Code section 1700 et seq., only water right holders are able to change their use of water. In this context, the permit term clearly contemplates that the USBR will be able to change its use of water under state law. This is a further affirmation that the USBR is the water right holder.

Finally, federal law does not support WWD's argument. Under *Israel* v. *Morton* (9th Cir. 1977) 549 F.2d 128, 132, there can be no vesting of state law water rights by beneficial users of federally-provided water. In *Israel*, the court drew a distinction between appropriation of water from the natural watercourse and the receipt of developed water from the United States. The court stated that the terms upon which the water can be put to use, and the manner in which rights to continued use can be acquired are for the United States to fix. Finally, title to the water rights under the permits is held by the USBR, not by the contractors. (*Ivanhoe Irrigation Dist*. v. *McCracken* (1958) 357 U.S. 275, 290-291 [78 S.Ct. 1174, 1183]; *Ivanhoe Irrigation Dist*. v. *All Parties and Persons* (1960) 53 Cal.2d 692, 703-704, 715-716 [350 P.2d 69, 75, 82-83, 3 Cal.Rptr. 317, 323, 330-331].)

Taken to its logical end, WWD's argument that the end users of water are the water right holders would mean that instead of having a relatively few water purveyors subject to statewide

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Bureau 'holds only legal title to the water' and 'has no substantial interest in the water,' emphasizing the Bureau 'uses no water.' The argument is highly misleading: the fact the Bureau does not consume water is not synonymous with having no substantial interest in the water. The Bureau has appropriative water rights in the Central Valley Project. (*United States* v. *State Water Resources Control Bd.* (1986) 182 Cal.App.3d 82, 106, 227 Cal.Rptr. 161.) The Bureau owns the CVP facilities, has operational control and responsibilities relating to flood control, water supply, power generation, and fish and wildlife mitigation." (*Id*. at 1156 n. 12 [63 Cal.Rptr.2d at 285 n. 12].)

regulatory authority of the SWRCB, there would be millions of water right holders. Instead of regulating the purveyors of water, the SWRCB would regulate the use of water at the end of pipes and canals in individuals' homes, businesses, and farms.

In view of the foregoing discussion, the SWRCB finds that the water service contractors are not injured legal users of water within the meaning of Water Code section 1702, and consequently are not entitled to the protection of Water Code section 1702. The petitioned change of purpose of use will allow the USBR to operate efficiently without violating its water right permits. Accordingly, the petitioned change of purposes of use is approved.

13.0 RESPONSIBILITIES OF DWR AND USBR

The primary subject of the Bay-Delta Water Rights Hearing is the assignment of responsibility for meeting the objectives in the 1995 Bay-Delta Plan. Another subject is whether and under what conditions to extend the changes in the water rights of the DWR and the USBR under Order WR 95-6 (extended by Order WR 98-09). Order WR 98-09 will expire on December 31, 1999. The responsibilities of the DWR and the USBR were addressed throughout the seven phases of hearing conducted so far. Other parts of this decision address a number of responsibilities of the USBR and the DWR for meeting objectives in the 1995 Bay-Delta Plan. Nevertheless, the operational objectives and some of the flow-dependent objectives that were changed in the 1991 water quality control plan or in the 1995 Bay-Delta Plan are not directly addressed in other parts of this decision. Orders WR 95-6 and WR 98-09 temporarily replaced the requirements in D-1485 for striped bass spawning, Suisun Marsh, and operational constraints (export rates and Delta Cross Channel Operations) with objectives from the 1995 Bay-Delta Plan. The additional flow-dependent objectives for fish and wildlife currently are being met by the DWR and the USBR pursuant to their obligations under the state and federal Endangered Species Acts. The questions addressed in this part of this decision are (1) which of the otherwise unallocated objectives should be implemented permanently by the DWR and the USBR, and (2) should the DWR and the USBR be required, in the interim until the responsibilities to meet the flow-dependent objectives are permanently allocated, to implement all of the flow-dependent objectives that are not allocated to another party in this decision?

With the certification of a final EIR that addresses implementation of the changes the SWRCB made in these objectives when it adopted the 1995 Bay-Delta Plan, these revised objectives can now be made a permanent part of the water right permits of the DWR and the USBR. The objectives in the 1995 Bay-Delta Plan have been determined to ensure the reasonable protection of beneficial uses and the prevention of nuisance. (Wat. Code section 13241.) The flow-dependent objectives, including the objectives for operational constraints, in the 1995 Bay-Delta Plan are to be implemented through amendments to existing water rights.

The remaining phase of hearing, Phase 8, will address the responsibilities to provide water to meet the flow-dependent objectives in the Delta. The question for Phase 8 will be how to allocate that responsibility among the parties in the watersheds where this decision does not establish or eliminate either long-term or permanent responsibilities for all of the parties. Stated another way, what part of the flows, if any, currently being provided by the DWR and the USBR should instead be provided by other parties?

13.1 Responsibility for Meeting Objectives Requiring Operation of Facilities

Only the DWR and the USBR can implement the objectives for operational constraints in the 1995 Bay-Delta Plan. The objectives for export pumping rates are the responsibility of each of the two projects at their respective facilities. The objectives for Delta Cross Channel operation are the sole responsibility of its owner, the USBR. The DWR and the USBR have been operating in accordance with these objectives since the SWRCB adopted the 1995 Bay-Delta Plan.

The evidence in the record supports making these changes permanent. Accordingly, this decision amends the permits of the USBR that include diversion of water through the Delta Cross Channel and the permits of both the USBR and the DWR that include diversions of water in the southern Delta to require that the Delta Cross Channel objectives and the objectives for export pumping rates be met.

13.2 Responsibility for Meeting Flow Objectives

The DWR and the USBR currently have the responsibility to meet all the flow-dependent objectives adopted by the SWRCB in the 1978 water quality control plan for the Delta and for

Suisun Marsh. This responsibility is pursuant to D-1485 and, for the Vernalis salinity objective, D-1422. Interim SWRCB Order WR 95-6, followed by interim Order WR 98-09, requires the DWR and the USBR to meet some but not all of the changes in the flow-dependent objectives adopted by the SWRCB in the 1995 Bay-Delta Plan. As discussed above, the flow-dependent objectives are to be met through amendments to existing water rights. The DWR and the USBR are meeting the remaining objectives as part of their current obligation under the federal and state Endangered Species Acts. It is in the public interest that these objectives continue to be implemented while the SWRCB conducts further proceedings to reach a final determination as to the responsibilities of parties to help meet these objectives. Meeting these objectives protects fish and wildlife in the Bay-Delta Estuary, and ensures that water users such as CCWD who divert water from the Delta continue to receive water of adequate quality and quantity. For example, meeting the objectives ensures that water users whose authorization to divert water is dependent on the position of X2 are not prevented from diverting water because of a failure to implement the Delta outflow objective.

Therefore, on an interim basis, this decision requires that the DWR and the USBR meet all flow-dependent numeric objectives in the 1995 Bay-Delta Plan that are not assigned to other parties. This includes the Delta outflow objectives and the flow objectives at Rio Vista on the Sacramento River, and requires the USBR to meet the flow objectives at Vernalis except for the April/May pulse flows, which are addressed elsewhere in this decision. |

Shortly after this decision is adopted, the SWRCB intends to commence Phase 8 of the Bay-Delta Water Rights Hearing to determine the permanent allocations of responsibility with respect to the Sacramento River basin, the Cosumnes River, and the Calaveras River to meet the flow-dependent objectives. The SWRCB will consider a permanent allocation of responsibility with respect to the San Joaquin River basin after the SJRA has expired. The allocation of responsibility in this decision for the Mokelumne River is permanent and will not be revisited in the current proceeding.

14.0 COMPLIANCE WITH THE CALIFORNIA ENVIRONMENTAL QUALITY ACT.

14.1 Environmental Documentation for Responsibilities to Meet Objectives in the 1995 Bay-Delta Plan

Under the California Environmental Quality Act (CEQA), the SWRCB is the lead agency for preparation of environmental documentation for the actions taken in this decision. This decision conditionally approves the petitions for change of place of use and purpose of use of water appropriated by Merced ID, OID/SSJID, and TID/MID; conditionally approves the joint petition filed by the DWR and the USBR for combined points of diversion in the Delta; and conditionally approves the petition for change in place and purpose of use and extension of time filed by the USBR. This decision also continues the responsibility of the DWR and the USBR to meet the objectives in the 1995 Bay-Delta Plan. Two EIRs prepared by the SWRCB cover the actions taken in this decision. One EIR (referred to as EIR) addresses (1) alternatives for assigning responsibility to water right holders in the watershed of the Bay-Delta Estuary to meet the flow, operational, and water quality requirements in the 1995 Bay-Delta Plan and (2) the combined use of the CVP and the SWP points of diversion in the Delta. The other EIR prepared by the SWRCB addresses a petition to change the places and purposes of use of water right permits held by the USBR for the CVP (referred to as CPOU EIR).

Two environmental documents address the environmental effects of the proposed changes in place of use and purpose of use submitted by Merced, OID/SSJID, and TID/MID. These documents are a final Environmental Impact Report/Environmental Impact Statement (EIR/EIS) prepared by the proponents of the SJRA, which the SJRGA certified in early April 1999. (SJRGA 103A.) The second document is the EIR prepared by the SWRCB. (SWRCB 1.) Under the EIR/EIS, the USBR filed a record of decision for the project on April 12, 1999. On February 19, 1999, the SJRGA approved the project and made findings regarding the significant environmental impacts of the project pursuant to 14 Cal. Code Regs. Section 15092. (SJRA 112b.) The SJRGA filed a notice of determination with the State Clearinghouse on February 26, 1999. (SJRGA 112a.)

On July 27, 1995, the SWRCB distributed a Notice of Preparation of an EIR for the development of a water right decision to implement requirements for the 1995 Bay-Delta Plan and for the petition for JPOD. The SWRCB held public workshops on four days in August, September, and

November 1995. Based on comments received at these workshops, the SWRCB issued a revised NOP in December 1995. The SWRCB held additional workshops throughout 1996. The SWRCB released the DEIR for Implementation of the 1995 Bay-Delta Water Quality Control Plan, Volume I (Chapters I through XII) in November 1997. The SWRCB released Volumes II (Chapter XIII - Alternatives for Implementing the Joint Points of Diversion[73]) and III (Appendices) on December 15, 1997. The SWRCB circulated the DEIR to interested parties for a 45-day review commencing with the release of Volumes II and III, with comments due by January 30, 1998. The SWRCB subsequently extended the comment period on the DEIR to April 1, 1998. The SWRCB released Volume IV of the Draft EIR on May 26, 1998. Volume IV revises Chapters V, VI, and XIII of the earlier volumes. Comments on Volume IV were due by July 13, 1998. The SWRCB received 104 comment letters on the Draft EIR, on behalf of 125 parties. The SWRCB reviewed and prepared responses to all comments on the environmental effects of the proposed project, and on November 15, 1999, the SWRCB released a final EIR consisting of three volumes: (1) the final EIR, (2) technical appendices, and (3) responses to comments. The final EIR was certified immediately preceding adoption of this decision.

The County of Trinity and the RCRC argued that the DEIR is inadequate with respect to the JPOD because it does not address impacts of approving the petition on the Trinity River. In response, a USBR witness testified that the Trinity River is operated to meet the water quality objectives and the federal flow requirements for the Trinity River. (R.T. p. 12203.) All of the JPOD alternatives assume that minimum instream flow requirements in the Trinity River are 340 taf per year. (R.T. p. 12204; SWRCB 75a, b, k-q.) The operation of Trinity Reservoir affects the amount of water available to the Central Valley portion of the CVP. If the minimum instream flows of the Trinity River are increased, less water will be available to divert from the Trinity River to the Sacramento River and thus to CVP contractors through the JPOD. Therefore, the Trinity River flows are expected to have an effect on the JPOD, but the JPOD is not anticipated to have an effect on Trinity River flows. Furthermore, deliveries under the range of alternatives in the FEIR, with the exception of JPOD Alternative 8, are all less than the

[73] The USBR prepared the draft of Chapter 13 of the EIR, which addresses the JPOD.

deliveries authorized by D-1485. Therefore, no adverse impact to the Trinity River will occur. JPOD Alternative 8 assumes a year 2020 level of demand. (SWRCB 75.) The other JPOD studies assume a 1995 demand level (SWRCB 75.) Even with the additional demand, use of the JPOD is not expected to affect Trinity flows because the USBR operates Trinity Reservoir to meet the flow requirements.

DFG argued that the DEIR was inadequate because it did not evaluate impacts to temperature or to spring-run salmon. The FEIR includes the requested evaluation.

CDWA argues that the base case in the EIR should include export restrictions imposed by the USFWS service in its biological opinion for Delta smelt and water dedicated to the environment under the CVPIA. The base case does not include the export restrictions imposed by the USFWS because the restrictions could change at any time in response to changes in operations plans used by the USBR and the DWR. The rules for dedicating water to the environment under the CVPIA have changed during the course of the Bay-Delta Water Rights Hearing. The base case represents the permanent circumstances that would exist in the absence of the current temporary fixes.

EDF argued that the DEIR identified significant impacts of unrestricted use of the JPOD, and that restrictions should apply. The impacts to the environment of approving the JPOD are discussed in Part 10 of this decision. The USBR's position is that the environmental effects of approving the petition are adequately disclosed in the Draft EIR. (USDI 10, p. 3.) The USBR presented evidence to show that approval of the JPOD, by itself, will not result in an unreasonable effect on the environment. (USDI 10, pp. 5, 8; USDI 11, p. 2.) The SWRCB finds that the environmental effects of the JPOD are adequately disclosed in the EIR.

14.2 Environmental Documentation for Changes in Places and Purposes of Use of CVP Water Right Permits

On December 1, 1986, the SWRCB issued a Notice of Preparation of an EIR for a petition filed by the USBR to change the places and purposes of use of the CVP water right permits (CPOU EIR). On December 11, 1997, the SWRCB released a DEIR addressing the pending petition. The DEIR was circulated to interested parties with a 45-day comment period that ended on

January 30, 1998. The SWRCB received 54 comment letters. The SWRCB reviewed and prepared responses to all comments on the environmental effects of the proposed project. On November 15, 1999, the SWRCB released a final CPOU EIR that incorporated responses to comments on the DEIR. The final EIR was certified immediately preceding adoption of this decision.

In the Final CPOU EIR, corrections have been made to the authorized place of use boundary. (SWRCB 2A, pp. 2-1 to 2-51.) These corrections modify the acreage of land located outside the POU as presented in the DEIR. All values presented in the final EIR reflect the mapping corrections to the existing authorized POU boundary. While the encroachment acreages have decreased from the DEIR to FEIR due to the new GIS mapping, the CEQA findings regarding significant effects resulting from encroachment remain unchanged. (SWRCB 2A, pp. 2-53 to 2-55.) Unless the USBR establishes that some of the encroachments resulting from CVP deliveries are not subject to CEQA, the USBR will be required to mitigate for all the encroachment land that was first converted to irrigated agriculture due to CVP water deliveries.

The CPOU EIR is both a programmatic and project-specific environmental document. Two levels of analytical detail were used because of differing levels of information available to characterize impacts to the encroachment lands versus the expansion lands.

1. Impacts to encroachment lands were discussed at the project-specific level because they have occurred and the impacts can be readily identified and characterized.

2. Potential impacts to expansion lands were discussed at a programmatic level because the locations of future deliveries of CVP water cannot be readily determined at this time and would require speculation. Prior to SWRCB authorization to deliver CVP water to expansion lands, more detailed site-specific environmental documentation meeting CEQA requirements may be required of the water districts or local land-use authorities.

14.3 Significant Environmental Effects of This Decision

CEQA establishes a duty for public agencies to avoid or minimize environmental damage if feasible. (Cal. Code Regs., tit. 14, § 15092.) If a final EIR identifies one or more significant environmental impacts of a project, a public agency must make written findings for each significant impact and must explain each finding. (Cal. Code Regs., tit. 14, § 15091.) In deciding whether and how to approve the project, the SWRCB must consider the environmental effects of the project as disclosed in the final EIRs. The SWRCB is responsible for mitigating or avoiding only the environmental effects of the parts of the project it decides to approve. The SWRCB must make findings of overriding considerations for effects within its responsibility that it cannot avoid or mitigate. (Cal. Code Regs., tit. 14, § 15093.)

Public Resources Code section 21081.6(a) requires that if a public agency makes changes or alterations in a project to mitigate or avoid the significant adverse environmental effects of the project, it must adopt a monitoring or reporting program to ensure compliance with the changes or alterations. This decision contains terms and conditions to implement a mitigation and monitoring plan for identified significant environmental effects that are within the SWRCB's responsibility. Additionally this decision requires the DWR and the USBR to report to the Chief of the Division of Water Rights annually on their activities under the mitigation and monitoring plan and on the implementation of each mitigation measure. This decision also indicates which mitigation measures are not within the SWRCB's authority to implement. Finally, this decision identifies significant effects on the environment that are unavoidable but are acceptable due to overriding considerations.

The CPOU EIR analyzes and discloses the significant environmental effects of the USBR's petition to consolidate and conform 16 of its Central Valley Project (CVP) water rights permits. The final CPOU EIR: (1) identifies and considers the environmental consequences of implementing the pending petition and alternatives; (2) identifies measures to mitigate or avoid potential significant adverse effects on the environment and (3) identifies actions that require additional or subsequent environmental documentation associated with approving future site-specific changes to the place of use that are not known at this time to either the SWRCB or Reclamation.

The final EIR addresses the environmental effects of implementing the project. For the purposes of CEQA, the project is defined as the adoption by the SWRCB of a water right decision that (1) allocates responsibility to implement the objectives in the 1995 Bay-Delta Plan and (2) may authorize the combined use of the DWR and USBR points of diversion in the southern Delta. No new impacts were disclosed in the final EIR that were not disclosed in the draft EIR. The potential adverse environmental effects of the project are discussed below.

This decision discusses the benefits and the potential adverse environmental effects, of installing and operating barriers in the southern Delta. The discussion of barriers in the final EIR is programmatic. The SWRCB will not take action regarding the barriers in this decision. Additional environmental documentation for the barriers will be completed by the DWR and the USBR, or by some other agency. Actions that may be necessary to mitigate for construction and operation of the barriers are the responsibility of other parties.

This decision also discusses the Suisun Marsh Preservation Agreement Amendment III as a means of implementing the salinity objectives at compliance stations S-35 and S-97 in the Suisun Marsh. This decision establishes a new effective date for compliance at these locations. These objectives will not take effect until after the SWRCB has conducted a periodic review of the 1995 Bay-Delta Plan objectives. As these objectives have never been implemented, an extension of time for compliance will have no adverse effect on the environment.

14.3.1 Fish and Aquatic Resources

Export pumping by the SWP and the CVP adversely impacts fish and aquatic resources in the Delta, including species listed under the state and federal Endangered Species Acts. Meeting the flow objectives generally results in lower exports in the spring months than in the base case (D-1485). This should reduce entrainment at the project pumps and reduce the adverse effects of reverse flows in the critical period for spawning and rearing of many aquatic species in the Delta. However, in some months, the flow objectives result in higher Delta exports and greater reverse flows than in the base case, which may result in increased entrainment of aquatic organisms at the Delta export facilities.

The abundance of many Delta species shows a significant positive relationship with Delta outflow in the spring months. In the spring months, Delta outflow under the flow objectives is greater than in the base case, which may improve conditions for spawning and survival of aquatic resources. Delta outflow generally is lower under the flow objectives in October through January than in the base case, and thus may have an adverse impact.

Overall, implementation of the flow objectives is predicted to have beneficial effects on aquatic resources due to changes in Delta outflow and exports, when compared to the base case. Species that may be benefited include: chinook salmon, steelhead, longfin smelt, Sacramento splittail, starry flounder, *Crangon franciscorum*, and *Neomysis mercedis*.

Implementing the flow objectives may result in significant impacts to warm water reservoir fisheries at one or more upstream reservoirs, due to reduced or more widely fluctuating storage levels.

The JPOD may result in increased entrainment and other export-related effects in the Delta in the July to January period (except September) due to increased Delta exports compared to Bay-Delta Plan conditions without use of JPOD. Survival of yearling spring-run chinook salmon emigrating through the Delta may be reduced because their emigration period (fall and winter) coincides with the period of increased exports. However, exports would be reduced in the spring months under the JPOD compared to the base conditions, potentially reducing entrainment in the critical period for spawning, rearing, and outmigration of many aquatic species in the Delta.

The JPOD may also result in significant impacts to reservoir fisheries at one or more upstream reservoirs due to reduced, or more widely fluctuating, storage levels.

Mitigation: In general, impacts to reservoir fisheries are temporary and mitigable. If significant effects on reservoir fisheries are observed as a result of implementation of the flow objectives or the JPOD, mitigation could include: (1) additional fish planting, (2) habitat improvement through planting of shoreline vegetation, (3) addition of habitat structures, or (4) improved management of shoreline grazing practices. This decision requires that the DWR and the USBR

develop and implement an operations plan that will protect aquatic resources in upstream areas from impacts of the JPOD.

If operations under the JPOD result in increased entrainment, regulatory constraints could be applied to operations on a real-time basis to reduce or avoid impacts. This decision requires the DWR and the USBR to develop and implement an operations plan to protect aquatic resources from any significant impacts of increased exports. The plan shall include a description of the actions to be implemented to avoid, or minimize, the effects of JPOD operations if monitoring indicates that impacts to important species are occurring, or are likely to occur. Measures that can be used to reduce or avoid entrainment include: (1) switching diversions between SWP and CVP facilities if entrainment is high at one of the facilities, (2) modification of required export/inflow ratios, (3) re-operation of the Delta Cross Channel gates, (4) or reduction or termination of increased exports resulting from use of the JPOD.

14.3.2 Terrestrial Endangered Species

The conversion of 45,390 acres of native vegetation for agricultural purposes in the Central Valley was facilitated by the delivery of CVP water to certain water service contractors whose boundaries are partially outside the authorized CVP place of use. This land conversion has had adverse impacts on plant and animal species formerly inhabiting those lands.

Mitigation: As mitigation for delivery of CVP water to the encroachment lands, this decision requires the USBR to provide “in-kind” compensation for lost habitat with the exception of any lands that qualify for an exemption from CEQA. Specifically, the USBR must delineate existing habitats of the affected special status species and in consultation with the DFG and the USFWS develop a mitigation plan satisfactory to the SWRCB. This decision requires that the mitigation plan be developed and completed on a specified schedule. This decision also requires a mitigation monitoring and reporting program to ensure continued protection and enhancement of special status species.

14.3.3 Energy

Increased groundwater pumping to replace surface water supplies may result in increased pumping lifts and increases in energy consumption. Under the SJRA, water storage during peak

power producing months is reduced by up to 17 percent and Merced River flows are reduced in some months of above normal water years. Decreased storage at Lake McClure and reduced Merced River flows significantly reduce the potential for power production. Overall, the alteration of hydroelectric power generation schedules along with increased groundwater pumping may result in the increased consumption of fossil fuels, thereby increasing air pollution.

Mitigation: These impacts can be partially mitigated through off-peak pumping operations and use of alternative energy sources. Impacts to reservoir storage in general, and Lake McClure storage and Merced River flows in particular, are unavoidable and unmitigable. Feasible mitigation requires real-time operational decisions that are not susceptible to control by mitgation requirements. These decisions are the responsibility of the reservoir operators. It is not feasible for the SWRCB to require actions to mitigate those potential impacts to energy consumption and production.

14.3.4 Recreation

Implementation of the flow objectives could result in impacts to recreation in the Delta. Closure of the Delta Cross Channel gates impedes navigation between the Sacramento and Mokelumne rivers. This impact is unmitigable. Implementation of the flow objectives may improve the fish populations in the Delta, resulting in increased sport fishing opportunities.

Implementation of the flow objectives could result in adverse impacts to recreation at some reservoirs in the upstream area. Each flow alternative can have the effect of lowering water levels earlier in the season, for longer periods, or below the levels than would otherwise occur at certain reservoirs under the base case. Lowered reservoir elevations can substantially decrease opportunities for public recreational use by reducing water surface area and shoreline and by making access to the water more difficult. Use of the JPOD further reduces reservoir levels in Lake Oroville and Folsom Lake in the off-season during critically dry periods.

Extreme drawdowns can force the closure of marinas and boat launch ramps, resulting in a loss of access for boating and fishing. These conditions can reduce visitor use levels and attendant revenues.

Mitigation: Modification or relocation of facilities (such as boat ramps and marinas) to accommodate lower water levels would help to reduce or avoid significant impacts to recreation at reservoirs that are adversely impacted. Performance of mitigation activities is required of the reservoir owners.

14.3.5 Scenic Quality

Implementations of the flow alternatives may result in temporary degradation of the scenic quality at one or more reservoirs in the upstream area, as water levels may be lower for longer periods.

Mitigation: Any significant impacts to scenic quality are unavoidable and unmitigable during the temporary periods when they occur.

14.3.6. Cultural Resources

Implementation of the flow objectives has the potential to result in impacts to cultural resources at various reservoirs in the upstream areas. Most of the changes would occur at the CVP and SWP reservoirs. Cultural resource sites within the reservoir pools will continue to be subjected to the same types of impacts as they have been historically (i.e., inundation and exposure during drawdowns), but the frequency, extent, and duration of such drawdowns may increase significantly for some reservoirs as compared to the base case. Sites within the zone of seasonal fluctuation or drawdown suffer the greatest impacts, primarily in the form of erosion/scouring, deflation, hydrologic sorting, and artifact displacement, caused by waves and currents. There also is the possibility of impacts to cultural resources due to increased opportunities for off-highway-vehicle traffic and other forms of vandalism to occur when reservoir levels are low.

Mitigation: Inventory and evaluate cultural resources at affected reservoirs. Preserve and protect the resources in place where possible, or excavate and document the historic values and information. Implementation of these mitigation activities is required in connection with the JPOD, but is the responsibility of the reservoir owners with respect to other impacts.

14.3.7 Groundwater

Decreases in surface water deliveries due to implementation of the flow objectives and the SJRA are likely to result in increased groundwater use. Increased groundwater use can cause land subsidence, groundwater overdraft, groundwater quality degradation, and declines in agricultural productivity. Under some circumstances, subsidence can lead to irreversible loss of storage capacity in an aquifer. This loss of capacity is unmitigable after it occurs. In addition, approving the SJRA and the associated petitions could result in significant impacts to groundwater resources in the overdrafted Merced and Eastern San Joaquin County Groundwater Basins if groundwater is pumped to meet the target flows, or the water sales aspects, of the agreement.

Mitigation: Impacts to groundwater can be mitigated through conservation and water transfers. In addition, land subsidence impacts can be mitigated by limiting groundwater pumping and land retirement. Overdraft and groundwater quality deterioration impacts can be mitigated by adopting groundwater management plans, establishing a groundwater management agency by statute, and conjunctive use programs. Decreased agricultural productivity can be mitigated by blending groundwater supplies with surface water supplies, and shifting to salt tolerant crops. These mitigation measures are the responsibility of other parties.

To protect groundwater resources from impacts due to approving the SJRA and associated petitions, this decision includes a prohibition on pumping from the critically overdrafted Eastern San Joaquin County Groundwater Basin for the purpose of providing target flows or the sale of water to the USBR. To protect groundwater resources in the Merced Groundwater Basin, this decision prohibits the pumping of groundwater for the purpose of providing target flows, or the sale of water under the agreement, unless an equivalent amount of surface water is either recharged into the basin, or in-lieu recharge occurs, prior to providing flow or water sales pursuant to the SJRA.

14.3.8 Land Use Impacts

All of the Flow Alternatives result in significant water delivery reductions in the SWP and CVP service areas, when compared to the base case. Implementation of the SJRA could reduce deliveries to irrigation customers in the OID, SSJID, and Merced ID service areas. Water delivery reductions can cause, in turn, significant environmental impacts. Reduced surface

supplies could result in crop shifts and land fallowing within the SWP and the CVP service areas and within Merced ID, OID and SSJID.

Mitigation: A number of actions could be taken on a local level to reduce the effects of reduced deliveries from the Delta. Such actions include increased urban and agricultural conservation, increased groundwater management efforts, water recycling and water transfers. In addition, actions such as the JPOD, the ISDP and increased south of Delta offstream storage could increase the overall yield of the system. Exactly how local agencies will react to reduced water supplies is difficult to predict and is not under the control of the SWRCB. The SWRCB is not proposing to initiate the ISDP or additional offstream storage as part of implementing the 1995 Bay-Delta Plan. This decision requires mitigation for the effects of the JPOD.

14.4 Statement of Overriding Considerations

This decision requires that conditions be added to the water right permits or licenses of specific water right holders to mitigate the potential adverse effects of this decision. Nevertheless, some of the significant adverse environmental effects of this decision are either unavoidable, or other parties are responsible for carrying out potential mitigation measures. The following significant adverse environmental effects are unavoidable or are the responsibility of others:

- Potential impacts to land use in the export areas are only partially mitigable. Any significant impacts will be the result of the reactions of local agencies to interim implementation of the flow alternatives and the SJRA. Mitigation for local decisions is the responsibility of local agencies in the export areas.
- Potentially significant impacts to aquatic resources in affected reservoirs with implementation of the 1995 Bay-Delta Plan or use of the JPOD will be the result of operational choices made by the reservoir operators. This decision requires mitigation for the effects of the JPOD. To the extent that this mitigation does not fully mitigate the effects of the JPOD on aquatic resources in reservoirs, mitigation of the impacts is the responsibility of the DWR and USBR.
- Potentially significant impacts to energy generation and use will be in part the result of operational decisions by reservoir operators. Mitigation of any significant impacts is the primary responsibility of the operators, but to the extent the SWRCB is responsible, the SWRCB finds that the overriding considerations below require this action.

- The potentially significant impact to the usability of recreational facilities at affected reservoirs is in part dependent on operational decisions by the reservoir owners and operators, and mitigation for discretionary operations is the responsibility of the reservoir owners or operators. Mitigation measures for the JPOD are required in this decision.
- If significant impacts occur to scenic quality at affected reservoirs due to lower water levels, these impacts are unavoidable and unmitigable.
- The potentially significant impacts to cultural resources within reservoirs are dependent on operational decisions. Mitigation is required by this decision for effects caused by the JPOD, but mitigation for operational reactions to other requirements in this decision to implement the flow alternatives are the responsibility of the reservoir owners or operators.
- The potentially significant impacts resulting from increased groundwater use due to approving the change petitions for the SJRA can be mitigated in the areas where they occur, through appropriate management practices. This decision orders mitigation for some of the impacts, but mitigation of any impacts to agricultural productivity caused by operational decisions are the responsibility of the water districts and their members.

The SWRCB finds that the benefits to fish and wildlife in the Bay-Delta Estuary of implementing the 1995 Bay-Delta Plan are highly important to the protection of not only the fish and wildlife, but also the stability of the water supply of millions of California citizens in the areas that receive water from the Delta watershed. In the absence of implementation of the 1995 Bay-Delta Plan, fish and wildlife resources and water quality in the Delta could decline, and the measures to reverse the decline of fish and wildlife, particularly those that are threatened or endangered under the state or federal Endangered Species Act, could result in severe and unpredictable water shortages. To the extent that this decision does not fully mitigate the adverse effects of this actions, as discussed above, the SWRCB finds that overriding considerations of the greater public interest requires this action. Implementing the objectives is in the greater public interest. The environmental, economic, and social benefits of implementing the 1995 Bay-Delta Plan outweigh the potential adverse environmental effects that are not avoided or fully mitigated.

ORDER

IT IS HEREBY ORDERED that License 1986 (Application 23) and Permits 11315, 11316, 11885, 11886, 11887, 11967, 11968, 11969, 11970, 11971, 11972, 11973, 12364, 12721, 12722, 12723, 12725, 12726, 12727, 12860, 15735, 16597, 16600 and 20245 (Applications 13370, 13371, 234, 1465, 5638, 5628, 15374, 15375, 15376, 16767, 16768, 17374, 17376, 5626, 9363, 9364, 9366, 9367, 9368, 15764, 22316, 14858A, 19304, and 14858B, respectively) of the U.S. Bureau of Reclamation (USBR) and Permits 16478, 16479, 16481, 16482, and 16483 (Applications 5630, 14443, 14445A, 17512, and 17514A, respectively) of the California Department of Water Resources (DWR) shall be amended by adding the following terms and conditions.[❖] These Permits (CVP and SWP licenses and permits) are hereby ordered replaced with new updated and amended permits that will contain the terms and conditions specified herein and all current terms and conditions set forth in the original permits and subsequent decisions and orders.

1. Licensee/Permittee shall ensure that the water quality objectives for municipal and industrial beneficial uses and agricultural beneficial uses for the western Delta, interior Delta and export area as set forth in Tables 1 and 2, attached, are met.

2. Licensee/Permittee shall ensure that the water quality objectives for Delta outflow and for Sacramento River flow at Rio Vista for fish and wildlife beneficial uses as set forth in Table 3, attached, are met on an interim basis until the Board adopts a decision assigning permanent responsibility for meeting these objectives.

3. Licensee/Permittee shall implement the water quality compliance and baseline monitoring plan set forth in Table 5 on an interim basis, including construction, maintenance and operation of all necessary devices, until the Board adopts a decision assigning permanent responsibility for meeting the requirements in Table 5.

4. Licensee/Permittee shall:

    a. In consultation with the U.S. Fish and Wildlife Service (USFWS), Department of Fish and Game (DFG), San Joaquin River Group Authority (SJRGA), City and County of San Francisco (CCSF), and CVP/SWP Export Interests, prepare a fishery monitoring plan for the Vernalis Adaptive Management Plan (VAMP) experiment consistent with the SJRA and with the findings in this decision. The plan shall specify study objectives, sampling locations, methodology, and

[❖] Table 1 on page 4 of this decision lists the projects associated with these water rights.

sampling periods. The monitoring plan shall be submitted to the Chief, Division of Water Rights, for approval within 60 days after the date of this order.

b. Conduct the fishery monitoring studies according to the monitoring plan for the duration of the VAMP/SJRA study period, and submit results to the Chief, Division of Water Rights, on an annual basis. A monitoring report summarizing the study methodology and results from each year's experiment shall be submitted to the Chief, Division of Water Rights, by December 31 of each year. A final report shall be submitted to the Chief, Division of Water Rights, no later than eight months following completion of the VAMP experiment.

5. The continuing authority condition shall be updated to read as follows:

Pursuant to California Water Code Sections 100 and 275 and the common law public trust doctrine, all rights and privileges under this permit, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the Board in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to eliminating waste of water and to meeting the reasonable water requirements of permittee/licensee without unreasonable draft on the source. Permittee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to: (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to determine accurately water use as against reasonable water requirement for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the Board also may be exercised by imposing further limitations on the diversion and use of water by the permittee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Section 2; is consistent with the public interest; and is necessary to preserve or restore the uses protected by the public trust.

(0000012)

6. The water quality objectives condition shall be updated to read as follows:

The quantity of water diverted under this permit is subject to modification by the Board if, after notice to the permittee/licensee and an opportunity for hearing, the Board finds that such modification is necessary to meet water quality objectives in water quality control plans which have been or hereafter may be established or modified pursuant to Division 7 of the Water Code. No action will be taken pursuant to this paragraph unless the Board finds that: (1) adequate waste discharge requirements have been prescribed and are in effect with respect to all waste discharges which have any substantial effect upon water quality in the area involved, and (2) the water quality objectives cannot be achieved solely through the control of waste discharges.

(0000013)

7. Said permits/licenses are amended to include the following Endangered Species condition:

This permit does not authorize any act which results in the taking of a threatened or endangered species or any act which is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). If a "take" will result from any act authorized under this water right, the permittee/licensee shall obtain an incidental take permit prior to construction or operation of the project. Permittee/Licensee shall be responsible for meeting all requirements of the applicable Endangered Species Act for the project authorized under this permit/license.

(0000014)

8. SWRCB Decision 1485 (D-1485) ordered that certain terms and conditions in this license/permit be added or amended. Except as amended or deleted herein, the terms and conditions set forth in D-1485 remain in this license/permit. The terms and conditions in D-1485 numbered 2, 3, 4, 5, and 8 are rescinded.

9. Condition 6 of D-1485 is amended to read:

Upon request to and approval of the Chief, Division of Water Rights, variations in flow for experimental purposes for protection and enhancement of fish and wildlife may be allowed; provided that such variations in flow shall not cause violations of municipal, industrial and agricultural objectives in Tables 1 and 2.

10. Condition 7 of D-1485 is amended to read:

For the protection of Suisun Marsh, Licensee/Permittee shall report to the Board by September 30 of each year on progress toward implementation of mitigation facilities and on water quality conditions in the Suisun Marsh during the previous salinity control season.

11. To ensure compliance with the water quality objectives, to identify meaningful changes in any significant water quality parameters potentially related to operation of the SWP or the CVP, and to reveal trends in ecological changes potentially related to project

operations, Licensee/Permittee shall, independently or in cooperation with other agencies or individuals:

a. Perform the Water Quality and Baseline Monitoring program described in Table 5 and in Figure 4 of this Order.

b. Conduct ongoing and future monitoring surveys as recommended by the DFG, the USFWS or the National Marine Fisheries Service (NMFS), and acceptable to the Chief, Division of Water Rights, concerning food chain relationships, fisheries impacts, or impacts to brackish tidal marshes, as they are affected by operations of the SWP or the CVP in the Delta and Suisun Marsh.

c. Licensee/Permittee shall make available to the Board and others interested parties the results of the above monitoring as soon as practicable. Timely posting of this information on the Internet will satisfy this requirement. Licensee/Permittee shall submit to the Chief, Division of Water Rights, by December 1 of each year, annual reports summarizing the previous calendar year's findings and detailing future study plans.

d. If Licensee/Permittee anticipates violations of the water quality objectives or if such violations have occurred, Licensee/Permittee shall provide immediate written notification to the Chief, Division of Water Rights.

e. Licensee/Permittee shall evaluate the Water Quality Compliance and Baseline Monitoring once every three years to ensure that the goals of the monitoring program are attained. Licensee/Permittee shall report to the Chief, Division of Water Rights, the conclusions based upon this evaluation. Licensee/Permittee may propose appropriate modifications of the program for concurrence of the Chief, Division of Water Rights.

IT IS FURTHER ORDERED that Permits 11315, 11316, 11967, 11968, 11969, 11970, 11971, 11972, 11973, 12364, 12721, 12722, 12723, 12727, and 12860 (Applications 13370, 13371, 5628, 15374, 15375, 15376, 16767, 16768, 17374, 17376, 5626, 9363, 9364, 9368, and 15764, respectively)❖ of the USBR (CVP except New Melones and Friant) shall be amended by adding the following terms and conditions:

1. In addition to all other points of diversion and rediversion authorized by this permit, Permittee may divert or redivert water up to 10,350 cfs at the Harvey O. Banks Pumping Plant (Banks Pumping Plant), located within the NW ¼ of the SE ¼ of Projected Section 20, T1S, R3E, MDB&M and at Italian Slough, located within NW ¼ of the NE ¼ of Projected Section 24, T1S, R3E, MDB&M, subject to the permission of the Department of Water Resources. This authorization has three stages corresponding to export rates

and limitations on the purposes for which Permittee is authorized to divert or redivert water at the Banks Pumping Plant.

a. All stages of this authorization are subject to the following terms and conditions:

(1) Diversion by the USBR at Banks Pumping Plant is not authorized when the Delta is in excess conditions[74] and such diversion causes the location of X2[75] to shift upstream so far that:

(a) It is east of Chipps Island (75 river kilometers upstream of the Golden Gate Bridge) during the months of February through May, or

(b) It is east of Collinsville (81 kilometers upstream of the Golden Gate Bridge) during the months of January, June, August, and September, or

(c) During December it is east of Collinsville and Delta smelt are present at Contra Costa Water District's point of diversion under Permit 20749 (Application 20245).

(2) Any diversion by Permittee at the Banks Pumping Plant that causes the Delta to change from excess to balanced conditions[76] shall be junior in priority to Permit 20749 of the Contra Costa Water District.

(3) Permittee may divert or redivert water at Banks Pumping Plant only if a response plan to ensure that water levels in the southern Delta will not be lowered to the injury of water users in the southern Delta has been approved by the Chief, Division of Water Rights. Permittee shall prepare the response plan with input from the designated representative of the South Delta Water Agency.

(4) All other provisions of the above permits are met.

b. In Stage 1, Permittee is authorized to divert or redivert water at the Banks Pumping Plant to serve the Cross Valley Canal contractors, Musco Olive, and the

[74] Excess conditions exist when upstream reservoir releases plus unregulated natural flow exceed Sacramento Valley inbasin uses, plus exports.

[75] For the purposes of this term, X2 is the most downstream location of either the maximum daily average or the 14-day running average of the 2.64 mmhos/cm isohaline.

[76] Balanced conditions exist when it is agreed by the SWP and the CVP that releases from upstream reservoirs plus unregulated flow approximately equal the water supply needed to meet Sacramento Valley inbasin uses, plus exports.

Veteran's Cemetery; and to support a recirculation study.[77]

Permittee also is authorized to divert or redivert water at the Banks Pumping Plant to recover export reductions taken to benefit fish, if exports by the Permittee at the Tracy Pumping Plant are reduced below the applicable export limits set forth in Table 3, attached.

(1) The authorization to divert or redivert water at the Banks Pumping Plant under Stage 1 is subject to the following provisions:

(a) Recovery of export reductions shall not cause an increase in annual exports above that which would have been exported without use of the Banks Pumping Plant.

(b) Recovery of export reductions using the Banks Pumping Plant shall occur within twelve months of the time the exports are reduced.

(c) Before Permittee diverts or rediverts water at Banks Pumping Plant, Permittee shall consult with DFG, USFWS, and NMFS. Consultation with the CALFED Operations Group established under the Framework Agreement will satisfy this requirement. Permittee shall submit agreements on coordinated operations under this authorization to the Chief, Division of Water Rights for approval and shall also submit complete documentation showing that no additional water will be exported because of the use of the Banks Pumping Plant, including the method used to make this determination. Authority is delegated to the Chief, Division of Water Rights to act on the proposal if the conditions set forth above are met.

(2) The Chief, Division of Water Rights, is authorized to grant short-term exemptions to the export limits in Stage 1, for the purpose of (a) conducting the recirculation study discussed below, or (b) other purposes as the Chief, Division of Water Rights, deems appropriate, provided that such exemptions will not have a significant adverse effect on the environment and will not cause injury to other legal users of water.

c. In Stage 2, Permittee will be authorized to divert or redivert water at the Banks Pumping Plant for any purpose authorized under the above permits, subject to the following.

[77] The recirculation study is described in Term 2 below.

(1) Permittee shall develop in consultation with the DWR, the DFG, the USFWS and the NMFS an operations plan to protect fish and wildlife and other legal users of water. The operations plan shall be submitted to the Chief, Division of Water Rights, for approval at least 30 days prior to use by the USBR of Banks Pumping Plant. The plan shall include, but not be limited to, the following elements:

(a) The plan shall include specific measures to avoid or minimize the effects of the export operations at Banks Pumping Plant on entrainment and through-Delta survival of chinook salmon. The plan shall include monitoring of environmental conditions and fish abundance at upstream locations, as appropriate, to determine vulnerability of chinook salmon to entrainment at Banks Pumping Plant. The plan shall include monitoring of entrainment at Banks Pumping Plant. The plan shall include the frequency and method of data collection.

(b) The plan shall include minimum survival levels for chinook salmon. The minimum survival levels shall be used to trigger consultation with fishery agencies regarding data evaluation and decision making to minimize or avoid the impact of pumping at Banks Pumping Plant. The plan shall identify the consultation process that will be used including identifying the parties who will consult, how they will be notified, and a time schedule for decision making.

(c) The plan shall include specific measures at Trinity, Shasta, or Folsom Reservoirs when Permittee is using Banks Pumping Plant, to avoid or minimize adverse effects to chinook salmon if upstream or Delta monitoring indicates that such impacts are occurring. Measures may include the reoperation of the Delta Cross Channel Gates, increasing Delta outflow, or reducing exports at Banks Pumping Plant.

(d) The plan shall include operating criteria to ensure that use of the JPOD does not significantly impact aquatic resources in upstream areas due to changes in flow, water temperature, and reservoir water levels.

(e) The plan shall include specific measures to protect other legal users of water.

(f) The plan shall include specific measures to mitigate significant effects on recreational and cultural resources at affected reservoirs.

(2) Diversions or rediversions of water by the Permittee at Banks Pumping Plant shall not result in daily diversions into Clifton Court Forebay in excess of 13,870 acre-feet or three-day average diversion of 13,250

acre-feet/day, except during the period from mid-December to mid-March when San Joaquin River flow at Vernalis exceeds 1000 cubic feet per second (cfs), during which time diversions into Clifton Court Forebay may be increased by one-third of the San Joaquin River flow at Vernalis.

(3) The Chief, Division of Water Rights, is authorized to grant short-term exemptions to the export limits in Stage 2, for the purpose of (a) conducting the recirculation study discussed below, or (b) other purposes as the Chief of the Division of Water Rights deems appropriate, provided that such exemptions will not have a significant adverse effect on the environment and will not cause injury to other legal users of water.

d. In Stage 3, Permittee will be authorized to divert or redivert water at the Banks Pumping Plant for any authorized purpose under the above permits, up to the physical capacity of the Banks Pumping Plant, subject to completion of the following measures.

(1) Permittee shall prepare an operations plan acceptable to the Chief, Division of Water Rights, that will protect aquatic resources and their habitat and will protect other legal users of water. The operations plan shall include the same elements required for Stage 2. Permittee shall prepare the operations plan in consultation with the DWR, USFWS, NMFS, and DFG.

(2) Permittee shall protect water levels in the southern Delta through measures to maintain water levels at elevations adequate for diversion of water for agricultural uses. This requirement can be satisfied through construction and operation of three permanent tidal barriers in the southern Delta or through other measures that protect water levels at elevations adequate to maintain agricultural diversions. If construction and operation of tidal barriers is used as a basis for Stage 3 operation, such construction and operation shall be subject to certification of a project-level Environmental Impact Report by the DWR that discloses the impacts of the tidal barriers.

2. Permittee shall prepare a Plan of Action (POA) for a recirculation analysis alternative to evaluate the feasibility and impacts of recirculating water from the Delta Mendota Canal through the Newman Wasteway. The POA shall be submitted for approval by the Chief, Division of Water Rights by October 1, 2000. The purpose of the POA will be to develop a thorough workplan for determining the feasibility of use of recirculation as a method for meeting and/or augmenting the April-May Vernalis pulse flow requirements.

The POA shall include tasks for the evaluation of:

a. Potential impacts of changes in water composition on Delta native fish and on imprinting of juvenile fall-run chinook salmon and steelhead in the San Joaquin basin;

b. Potential effects of increased exports on in-Delta hydrodynamics and fish entrainment at the SWP and CVP export facilities;

c. Potential effects of salt and contaminant loading in the San Joaquin basin due to recirculation of water through the Newman Wasteway;

d. Impacts on water deliveries to exchange contractors and other contractors receiving water from the Delta Mendota Canal, the State Aqueduct, and San Luis Reservoir;

e. The capacity of the physical facilities to implement recirculation. A description of any needed structural/channel modifications, a cost estimate, and a determination of potential conserved water over other alternatives to meet Delta flow and VAMP requirements shall be provided; and

f. Potential for improvements in water quality in the San Joaquin River as a result of recirculation.

Permittee shall develop the POA in consultation with the DWR, SDWA, NMFS, USFWS, and DFG. It shall include a schedule for milestones and due dates for implementation, and identify a funding source(s) for the study. The POA study shall be completed within two years of approval of the POA. Permittee shall submit semi-annual reports to the Chief, Division of Water Rights on study progress and results. A final report summarizing analyses, results, and conclusions shall be submitted to the Chief, Division of Water Rights within six months after the recirculation analysis is completed.

3. Licensee/Permittee shall ensure that the San Joaquin River salinity; eastern Suisun Marsh salinity; western Suisun Marsh salinity at Chadbourne Slough, at Sunrise Duck Club (station S-21), and Suisun Slough near Volante Slough (station S-24); export limits; and Delta Cross Channel Gates closure objectives for fish and wildlife beneficial uses as set forth in Table 3, attached, are met.

   If any Suisun Marsh salinity objectives at the above locations are exceeded at a time when the Suisun Marsh Salinity Control Gates are being operated to the maximum extent, then such exceedances shall not be considered violations of this permit/license. A detailed operations report acceptable to the Chief, Division of Water Rights, regarding Suisun Marsh Salinity Control Gate operation and a certification from the parties that the gates were operated to the extent possible must be submitted to receive the benefit of this exception.

4. Permittee is jointly responsible with the DWR for providing Delta flows that otherwise might be allocated to Mokelumne River water right holders.

IT IS FURTHER ORDERED that Permits 16478, 16479, 16481, and 16482 (Applications 5630, 14443, 14445A, and 17512, respectively) ❖ of the DWR (SWP permits) are amended by adding the following terms and conditions:

1. In addition to all other points of diversion and rediversion authorized by this permit, Clifton Court Forebay, located within the NW ¼ of the SE ¼ of Projected Section 20, T1S, R4E, MDB&M is added as a point of diversion and point of rediversion.

2. In addition to all other points of diversion and rediversion authorized by this permit, Permittee may divert or redivert water up to 4,600 cfs at the Tracy Pumping Plant, located within the SW ¼ of the SW ¼ of Projected Section 31, T1S, R4E, MDB&M subject to the permission of the USBR. This authorization has three stages corresponding to export rates and limitations on the purposes for which Permittee is authorized to divert or redivert water at the Tracy Pumping Plant.

   a. All stages of this authorization are subject to the following terms and conditions:

      (1) Diversion by the DWR at Tracy Pumping Plant is not authorized when the Delta is in excess conditions[78] and such diversion causes the location of X2[79] to shift upstream so far that:

         (a) It is east of Chipps Island (75 river kilometers upstream of the Golden Gate Bridge) during the months of February through May, or

         (b) It is east of Collinsville (81 river kilometers upstream of the Golden Gate Bridge) during the months of January, June, August, and September, or

         (c) During December it is east of Collinsville and Delta smelt are present at CCWD's point of diversion under Permit 20749 (Application 20245).

      (2) Any diversion by Permittee at the Tracy Pumping Plant that causes the Delta to change from excess to balanced conditions[80] shall be junior in priority to Permit 20749 of the Contra Costa Water District.

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[78] Excess conditions exist when upstream reservoir releases plus unregulated natural flow exceed Sacramento Valley inbasin uses, plus exports.

[79] For the purposes of this term, X2 is the most downstream location of either the maximum daily average or the 14-day running average of the 2.64 mmhos/cm isohaline.

(3) Permittee may divert or redivert water at Tracy Pumping Plant only if a response plan to ensure that water levels in the southern Delta will not be lowered to the injury of water users in the southern Delta has been approved by the Chief, Division of Water Rights. Permittee shall prepare the response plan with input from in consultation with the designated representative of the SDWA.

(4) All other provisions of the above permits are met.

b. In Stage 1, Permittee is authorized to divert or redivert water at the Tracy Pumping Plant to recover export reductions taken to benefit fish, if exports by the Permittee at the Banks Pumping Plant are reduced below the applicable export limits set forth in Table 3, attached.

(1) The authorization to divert or redivert water at the Tracy Pumping Plant under Stage 1 is subject to the following provisions:

(a) Recovery of export reductions shall not cause an increase in annual exports above that which would have been exported without use of the Tracy Pumping Plant.

(b) Recovery of export reductions using the Tracy Pumping Plant shall occur within twelve months of the time the exports are reduced.

(c) Before Permittee diverts or rediverts water at Tracy Pumping Plant, Permittee shall consult with DFG, USFWS, and NMFS. Consultation with the CALFED Operations Group established under the Framework Agreement will satisfy this requirement. Permittee shall submit agreements on coordinated operations under this authorization to the Chief, Division of Water Rights for approval and shall also submit complete documentation showing that no additional water will be exported because of the use of the Tracy Pumping Plant, including the method used to make this determination. Authority is delegated to the Chief, Division of Water Rights to act on the proposal if the conditions set forth above are met.

(2) The Chief of the Division of Water Rights is authorized to grant short-term exemptions to the export limits in Stage 1, for purposes as the Chief of the Division of Water Rights deems appropriate, provided that such

[80] Balanced conditions exist when it is agreed by the SWP and the CVP that releases from upstream reservoirs plus unregulated flow approximately equal the water supply needed to meet Sacramento Valley inbasin uses, plus exports.

exemptions will not have a significant adverse effect on the environment and will not cause injury to other legal users of water.

c. In Stage 2, Permittee will be authorized to divert or redivert water at the Tracy Pumping Plant for any purpose authorized under the above permits, subject to the following.

(1) Permittee shall develop in consultation with the USBR, the DFG, the USFWS and the NMFS an operations plan to protect fish and wildlife and other legal users of water. The operations plan shall be submitted to the Chief, Division of Water Rights, for approval at least 30 days prior to use by the DWR of Tracy Pumping Plant. The plan shall include, but not be limited to, the following elements:

(a) The plan shall include specific measures to avoid or minimize the effects of the export operations at Tracy Pumping Plant on entrainment and through-Delta survival of chinook salmon. The plan shall include monitoring of environmental conditions and fish abundance at upstream locations, as appropriate, to determine vulnerability of chinook salmon to entrainment at Tracy Pumping Plant. The plan shall include monitoring of entrainment at Tracy Pumping Plant. The plan shall include the frequency and method of data collection.

(b) The plan shall include minimum survival levels of protection for chinook salmon. The minimum survival levels shall be used to trigger consultation with fishery agencies regarding data evaluation and decision making to minimize or avoid the impact of pumping at Tracy Pumping Plant. The plan shall identify the consultation process that will be used including identifying the parties who will consult, how they will be notified, and a time schedule for decision making.

(c) The plan shall include specific measures at Oroville Reservoir, to avoid or minimize any adverse effects to chinook salmon when Permittee is using Tracy Pumping Plant, if upstream or Delta monitoring indicates that such impacts are occurring. Measures may include the reoperation of the Delta Cross Channel Gates,

(d) increasing Delta outflow, or reducing exports at Tracy Pumping Plant.

(e) The plan shall include operating criteria to ensure that use of the JPOD does not significantly impact aquatic resources in upstream areas due to changes in flow, water temperature, and reservoir water levels.

(f) The plan shall include specific measures to protect other legal users of water.

(g) The Plan shall include specific measures to mitigate significant effects on recreation and cultural resources at affected reservoirs.

(2) The Chief, Division of Water Rights, is authorized to grant short-term exemptions to the export limits in Stage 2, for purposes as the Chief, Division of Water Rights, deems appropriate, provided that such exemptions will not have a significant adverse effect on the environment and will not cause injury to other legal users of water.

d. In Stage 3, Permittee will be authorized to divert or redivert water at the Tracy Pumping Plant for any authorized purpose under the above permits, up to the physical capacity of the Tracy Pumping Plant, subject to completion of the following measures.

(1) Permittee shall prepare an operations plan acceptable to the Chief, Division of Water Rights, that will protect aquatic resources and their habitat and will protect other legal users of water. The operations plan shall include the same elements required for Stage 2. Permittee shall prepare the operations plan in consultation with the USBR, USFWS, NMFS, and DFG.

(2) Permittee shall protect water levels in the southern Delta through measures to maintain water levels at elevations adequate for diversion of water for agricultural uses. This requirement can be satisfied through construction and operation of three permanent tidal barriers in the southern Delta or through other measures that protect water levels at elevations adequate to maintain agricultural diversions. If construction and operation of tidal barriers is used as a basis for Stage 3 operation, such construction and operation shall be subject to certification of a project-level Environmental Impact Report by Permittee that discloses the impacts of the tidal barriers.

(3) Licensee/Permittee shall ensure that the San Joaquin River salinity; eastern Suisun Marsh salinity; western Suisun Marsh salinity at Chadbourne Slough, at Sunrise Duck Club (station S-21), and Suisun Slough near Volante Slough (station S-24); and export limits for fish and wildlife beneficial uses as set forth in Table 3, attached, are met.

If any Suisun Marsh salinity objectives at the above locations are exceeded at a time when the Suisun Marsh Salinity Control Gates are being operated to the maximum extent, then such exceedances shall not be considered violations of this permit/license. A detailed operations report acceptable to the Chief, Division of Water Rights, regarding Suisun Marsh Salinity Control Gate operation and a certification from the parties that the gates were operated to the extent possible must be submitted to receive the benefit of this exception.

(4) Permittee is jointly responsible with the USBR for providing Delta flows that otherwise might be allocated to Mokelumne River water right holders.

(5) Permittee shall provide water to meet any responsibility of water right holders within the North Delta Water Agency to provide flows to help meet the 1995 Bay-Delta Water Quality Control Plan objectives as long as the 1981 contract between North Delta Water Agency and the DWR is in effect.

(6) This permit is conditioned upon implementation of the water quality objectives for agricultural beneficial uses in the southern Delta, as specified in Table 2, attached, at the following locations in the southern Delta:

a. San Joaquin River at Brandt Bridge (Interagency Station No. C-6);

b. Old River near Middle River (Interagency Station No. C-8; and

c. Old River at Tracy Road Bridge (Interagency Station No. P- 2).

Permittee has latitude in its method for implementing the water quality objectives at Stations C-6, C-8, and P-12, above; however, a barrier program in the southern Delta may help to ensure that the objectives are met at these locations.

IT IS FURTHER ORDERED that Permit 12860 (Application 15764)❖ of the USBR shall be amended by deleting Permit Term 2, which corresponds to Term 2 in SWRCB Decision 1020.

IT IS FURTHER ORDERED that License 1986 (Application 23) and Permits 11315, 11316, 11885, 11886, 11887, 11967, 11968, 11969, 11970, 11971, 11972, 11973, 12364, 12721, 12722, 12723, 12725, 12726, 12727, 12860, and 15735 (Applications 13370, 13371, 234, 1465, 5638, 5628, 15374, 15375, 15376, 16767, 16768, 17374, 17376, 5626, 9363, 9364, 9366, 9367, 9368, 15764, and 22316, respectively) of the USBR (CVP except New Melones) are amended by adding the following permit condition:

1. This permit is conditioned upon implementation of the water quality objectives for agricultural beneficial uses in the southern Delta, as specified in Table 2, attached, at the following locations in the southern Delta:

   a. San Joaquin River at Airport Way Bridge, Vernalis (Interagency Station No. C-10);

   b. San Joaquin River at Brandt Bridge (Interagency Station No. C-6);

   c. Old River near Middle River (Interagency Station No. C-8); and

   d. Old River at Tracy Road Bridge (Interagency Station No. P-12).

   Licensee/Permittee has latitude in its method for implementing the water quality objectives at Stations C-6, C-8, and P-12, above; however, a barrier program in the southern Delta may help to ensure that the objectives are met at these locations.

   If, within five years, Licensee/Permittee is unable to comply with the above requirement to meet the water quality objectives for agricultural beneficial uses at Vernalis, Licensee/Permittee shall report to the Chief, Division of Water Rights, all actions taken in attempting to meet the objectives, including out of valley alternatives. The Chief, Division of Water Rights, will evaluate the report and will decide whether further actions are necessary.

   Licensee/Permittee also shall report any expected noncompliance as soon as possible. The report of actions taken shall be submitted within three months following the period in which the requirements are not met.

IT IS FURTHER ORDERED that Permits 16597 and 16600 (Applications 14858A and 19304, respectively) ❖ of the USBR (New Melones storage) are amended as follows:

1. Term 19[81] of these permits is replaced with the following term:

   In conjunction with other measures to control salinity, Permittee shall release water from New Melones Reservoir to maintain the Vernalis agricultural salinity objective specified in Table 2, attached.

   Permittee shall release water from New Melones Reservoir for water quality purposes so as to maintain a dissolved oxygen concentration in the Stanislaus River as specified in the Water Quality Control Plan for the Sacramento and San Joaquin river basins.

[81] Term 19 in these permits corresponds to Condition 5 of Water Right Decision 1422.

If, within five years, Permittee is unable to comply with the above requirement to meet the water quality objectives for agricultural beneficial uses at Vernalis, Permittee shall report to the Chief, Division of Water Rights, all actions taken in attempting to meet the objectives, including out of valley alternatives. The Chief, Division of Water Rights, will evaluate the report and will decide whether further actions are necessary.

Permittee also shall report any expected noncompliance as soon as possible. The report of actions taken shall be submitted within three months following the period in which the requirements are not met.

In addition, Permittee shall ensure that the water quality objectives for agricultural beneficial uses in the southern Delta, as specified in Table 2, attached, are met at the following locations:

a. San Joaquin River at Brandt Bridge (Interagency Station No. C-6);

b. Old River near Middle River (Interagency Station No. C-8); and

c. Old River at Tracy Road Bridge (Interagency Station No. P-12).

Permittee has latitude in its method for implementing the water quality objectives at Stations C-6, C-8, and P-12, above; however, a barrier program in the southern Delta may help to ensure that the objectives are met at these locations.

2. Licensee/Permittee shall:

a. Ensure that the water quality objective for fish and wildlife beneficial uses for San Joaquin River flow at Airport Way Bridge, Vernalis set forth in Table 3 is met, with the exception that during the April-May pulse flow period while the SJRA is in effect, experimental target flows set forth in (b) below may be provided in lieu of meeting this objective.

b. During the April-May pulse flow period while the SJRA is in effect, maintain San Joaquin River flows at Airport Way Bridge, Vernalis, as follows, in lieu of meeting said river flow objective:

Existing Flow (cfs)	Target Flow (cfs)
0-1,999	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

During years when the sum of the current year's 60-20-20 indicator and the previous two years' 60-20-20 indicator is seven (7) or greater, target flows shall be one step higher than those required by the above table. The Licensee is not required to meet the target flow during years when the sum of the current year's 60-20-20 indicator and the previous two years' 60-20-20 indicator is four (4) or less, using the following table.

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

3. If the San Joaquin River Agreement (SJRA) is dissolved by the signatory parties before it expires, then Permittee shall meet the San Joaquin River flow objective set forth in Table 3 until the Board establishes alternative implementation of the San Joaquin River flow objective.

IT IS FURTHER ORDERED that Permit 20245 (Application 14858B) ❖ of the USBR (New Melones direct diversion) is amended by replacing Condition 21[82] of that permit as follows:

1. For the protection of water quality, no diversion is authorized for consumptive uses under this permit unless the San Joaquin River at Airport Way Bridge, Vernalis, salinity objective for agricultural beneficial uses, as specified in Table 2, attached, is met and the dissolved oxygen objectives in the Stanislaus River are met as specified in the Water Quality Control Plan for the Sacramento and San Joaquin River basins.

   If, within five years, Permittee is unable to comply with the above requirement to meet the water quality objectives for agricultural beneficial uses at Vernalis, Permittee shall report to the Chief, Division of Water Rights, all actions taken in attempting to meet the objectives, including out of valley alternatives. The Chief, Division of Water Rights, will evaluate the report and will decide whether further actions are necessary.

   Permittee also shall report any expected noncompliance as soon as possible. The report of actions taken shall be submitted within three months following the period in which the requirements are not met.

[82] Term 21 in this permit corresponds to Condition 12 of Water Right Decision 1616.

In addition, Permittee shall ensure that the water quality objectives for agricultural beneficial uses in the southern Delta, as specified in Table 2, attached, are met at the following locations:

a. San Joaquin River at Brandt Bridge (Interagency Station No. C-6);

b. Old River near Middle River (Interagency Station No. C-8); and

c. Old River at Tracy Road Bridge (Interagency Station No. P-12).

Permittee has latitude in its method for implementing the water quality objectives at Stations C-6, C-8, and P-12, above; however, a barrier program in the southern Delta may help to ensure that the objectives are met at these locations.

IT IS FURTHER ORDERED that Permits 12721, 11967, 12722, 12723, 12725, 12726, 12727, 11315, 11316, 11968, 11969, 11970, 11972, 12860, 11971, 11973, 12364, 15735, (Applications 5626, 5628, 9363, 9364, 9366, 9367, 9368, 13370, 13371, 15374, 15375, 15376, 16768, 15764, 16767, 17374, 17376, and 22316, respectively) of the USBR involved in the petitioned changes of place and purposes of use shall be amended as follows:

1. The purpose of use is identified as: Irrigation, Domestic, Municipal, Industrial, Fish and Wildlife Enhancement, Salinity Control, Water Quality Control, Stockwatering and Recreation.

2. The place of use is situated within portions of the following counties, as shown on USBR Map No. 214-208-12581 on file with the Board, and as further delineated in the GIS maps on file with the Board and attached to this Order.

Alameda	Madera	Santa Clara
Butte	Merced	Shasta
Colusa	Napa	Solano
Contra Costa	Placer	Stanislaus
El Dorado	Sacramento	Sutter
Fresno	San Benito	Tehama
Glenn	San Francisco	Trinity
Kern	San Joaquin	Tulare
Kings	San Mateo	Yolo

3. Permittee shall provide “in-kind” compensation and habitat values equivalent to those that were associated with lands that were converted (encroachment lands) as a result of application of CVP water, except to the extent that encroachment on such lands is exempt from the California Environmental Quality Act. The in-kind compensation shall be the

equivalent of the 45,390 acres converted and shall consist substantially of the following mix of habitats:

- 3 acres of valley-foothill hardwood-conifer
- 1 acre of mixed chaparral
- 4,278 acres of valley-foothill riparian/fresh emergent wetland
- 17,944 acres of annual grassland
- 23,165 acres of alkali scrub

Permittee shall define and delineate existing habitats of special status plant and animal species within these habitat types in consultation with DFG and the USFWS. Upon delineation of these habitats, an upland species Habitat Mitigation Plan (HMP) with specific mitigation measures, funding methods and schedules shall be developed in consultation with DFG and the USFWS. Suitable mitigation for the impacts to 45,390 acres of habitat could consist of several different programs to acquire, maintain, and restore the habitat values needed to support the listed species that were previously found on these lands. Measures to obtain these habitat values could include, but are not limited to:

a. Acquiring lands for habitat restoration for the listed species.

b. Implementing management programs to enhance existing habitat values for the listed species.

c. Acquiring development rights or easements to control land use activities to be consistent with target species needs and habitat requirements.

The HMP proposed by the Permittee shall be submitted to the Chief, Division of Water Rights for review and approval within 18 months from the date of this order. The funding of habitat and species mitigation measures identified in the HMP shall focus on and be consistent with existing or future Habitat Conservation Plans for special status terrestrial species and their habitats.

Changes in the HMP may be made through a process of adaptive management with the concurrence of the DFG and the USFWS and approval by the Chief, Division of Water Rights.

Permittee shall be responsible for compliance with federal and state environmental laws and any permits necessary to carry out specific mitigation measures in the HMP approved by the Board.

4. Permittee shall complete the mitigation identified in the HMP within ten years of the date of this order. An extension for the completion of any remaining mitigation at the end of the ten years may be granted by the Chief, Division of Water Rights after a showing of good cause. At the time of the request for an extension, the Permittee shall be required to provide to the Chief, Division of Water Rights, a revised HMP that identifies specific mitigation measures, funding methods and schedules developed in consultation with DFG and the USFWS. The revised HMP must demonstrate the ability of the permittee to

complete the mitigation obligation during the extension period. The extension period may not exceed an additional ten years.

5. Permittee, in consultation with DFG and the USFWS, shall develop and fund a Monitoring and Reporting Program (MRP) to ensure the continued protection, preservation or enhancement of special status species' habitats in the mitigation areas. The MRP shall be submitted to the Chief, Division of Water Rights, for review and approval within 18 months from the date of this order.

   Permittee shall provide annual reports to the Board, DFG and the USFWS that track the ongoing progress of the HMP. The annual reports are due on or before April 15 of each year. The MRP shall continue for a minimum of ten years following the completion of the last mitigation actions identified in the HMP.

   Permittee shall file with the Chief, Division of Water Rights a final MRP that demonstrates the Permittee has completed the HMP mitigation actions and has met its mitigation obligation pursuant to the approval of the petition to add the encroachment lands to the Place of Use.

IT IS FURTHER ORDERED that Licenses 990, 2684, 2685, 6047, 11395, and 11396 (Applications 1221, 1222, 1224, 10572, 16186, and 16187, respectively) of the Merced Irrigation District, Licenses 7856 and 7860 (Applications 10872 and 13310, respectively) of the Oakdale and South San Joaquin Irrigation Districts, and Licenses 5417 and 11058 (Applications 1233 and 14127, respectively)❖ of the Turlock and Modesto Irrigation Districts shall be amended by adding the following conditions which shall expire on December 31, 2010 or at such time as the San Joaquin River Agreement (SJRA) is terminated, whichever occurs first.

1. In addition to all other places of use authorized by this license, the reach of river between Licensee's point of diversion and Vernalis on the San Joaquin River is added as a place of use.

2. In addition to all other purposes of use authorized by this license, the purposes of use shall include Fish and Wildlife Enhancement.

3. The flows provided by Licensee pursuant to the SJRA will satisfy any responsibility of Licensee to meet the objectives in Tables 1, 2, and 3, attached. When the SJRA expires or is terminated, the Board will give notice and will commence a proceeding to determine the responsibility of Licensee to meet the objectives.

4. Except as provided below, while the SJRA is in effect, Licensee shall meet the following target flows for the protection of fish and wildlife beneficial uses on the San Joaquin River at

Airport Way Bridge, Vernalis during the 31-day pulse flow period in April and May[83] of each year while the SJRA is in effect. The target flow shall be based on the existing flow, as defined below.

Existing Flow[84] (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

The total amount of water provided under licenses 990, 2684, 2685, 6047, 11395, 11396, 7856, 7860, 5417, and 11058, together, to meet the target flows is not required to exceed 110,000 acre-feet annually. Water provided by the Licensee shall be measured at the Licensee's last point of control.

During years when the sum of the current year's 60-20-20[85] indicator and the previous two years' 60-20-20 indicator is seven (7) or greater, target flows shall be one step higher than those required by the above table. The Licensee is not required to meet the target flow during years when the sum of the current year's 60-20-20 indicator and the previous two years' 60-20-20 indicator is four (4) or less, using the following table.

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[83] The timing of the 31-day pulse flow is to be determined by the San Joaquin River Technical Committee (SJRTC). The SJRTC is composed of technical experts appointed by the parties to the SJRA to implement the VAMP experiment and other technical activities that its members deem appropriate to meet the goals of the SJRA.

[84] "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:

1. Tributary minimum instream flows pursuant to Davis-Grunsky, Federal Energy Regulatory Commission, or other regulatory agency orders existing on the date of this agreement;
2. Water quality or scheduled fishery releases from New Melones Reservoir;
3. 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;
4. Uncontrolled spills not otherwise recaptured pursuant to water right accretions (less natural depletions) to the system; and/or
5. Local runoff.

[85] The computation method for the 60-20-20 indicator is provided in Figure 2, attached.

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

5. Licensees shall determine the 60-20-20 indicator for each year while the SJRA is in effect, using the table below. The most current DWR forecast of the San Joaquin Valley water hydrologic classification will be used.

6. Licensees shall coordinate water release planning for the April-May pulse flow period with the DWR, the USBR, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the California Department of Fish and Game.

7. Licensees shall submit an annual operations report to the Chief, Division of Water Rights, by January 30 of each year. The report shall identify (a) the source and quantity of water released from storage, or storage and direct diversions foregone to meet the April-May pulse flow objective in the San Joaquin River at Airport Way Bridge in Vernalis; (b) the time period when this water was released from storage, or not diverted; (c) a monthly accounting of reservoir operations to refill reservoir storage; (d) the source and quantity of water transferred to the USBR pursuant to the terms of the SJRA; (e) the quantity, timing, and location of groundwater extractions made to maintain water supply deliveries due to the SJRA; (f) the time period in which water sold to the USBR was released from storage or not diverted; and (g) an analysis showing that all storage releases, storage and direct diversions foregone, and replenishment operations listed above were performed within the limits, terms and conditions of these licenses.

8. Licensees shall notify the Board immediately upon termination of the SJRA if such occurs in advance of December 31, 2010.

9. Pursuant to Water Code sections 100 and 275 and the common law public trust doctrine, all rights and privileges under this long term change order, including method of diversion, method of use, and quantity of water diverted or rediverted, are subject to the continuing authority of the Board in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

   The continuing authority of the Board also may be exercised by imposing specific requirements over and above those contained in this Order with a view to minimize waste of water and to meet reasonable water requirements without unreasonable draft on the source.

10. The Board reserves jurisdiction over the long-term changes authorized in this Order, to supervise the diversion, release, and use of water under this Order and to coordinate or modify terms and conditions, for the protection of other legal users of water, fish, wildlife, instream beneficial uses, and the public interest as future conditions may warrant. The Board delegates authority to the Chief, Division of Water Rights, to take actions under this reservation of jurisdiction when the action is consistent with this Order.

11. This Order does not authorize any act which results in the taking of a threatened or endangered species or any act which is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). If a "take" will result from any act authorized under this Order, the Licensee shall obtain an incidental take permit prior to construction or operation. Licensee shall be responsible for meeting all requirements of the applicable Endangered Species Act for the long-term changes authorized under this Order.

IT IS FURTHER ORDERED that Licenses 990, 2684, 2685, 6047, 11395, and 11396 (Applications 1221, 1222, 1224, 10572, 16186, and 16187, respectively) ❖ of the Merced Irrigation District be amended by adding the following conditions which shall expire on December 31, 2010:

1. Licensee is authorized to provide 12,500 acre-feet of water above the existing flow delivered at the last point of control for release to the Merced River during October of all years.

2. If groundwater substitution is used in response to meeting flow obligations of Licensee under the SJRA, and the result is exacerbation of groundwater overdraft in the Merced Groundwater Basin, Licensee shall take measures to recharge the incremental increase in the amount of groundwater pumped as a result of the authorized change. Prior to pumping groundwater as a result of the authorized change, Licensee shall provide to the Chief, Division of Water Rights, a recharge plan specifying the amount of groundwater to be pumped, the location of the pumping, and the location and method of recharge that will be undertaken to balance the groundwater pumping. The plan shall contain an analysis of how the recharge program will prevent overdraft or a decrease in flow in the Merced River due to the groundwater pumping. Upon approval of the plan by the Chief, Division of Water Rights, Licensee shall implement the plan.

3. At times when the USBR is releasing water from New Melones Reservoir for the purpose of meeting the Vernalis salinity objective, or when Standard Permit Term 93 is in effect, or when salinity objectives at Vernalis are not being met, Licensee shall not replenish (1) stored water or foregone diversions provided for the April-May pulse flow or the October target flow at Vernalis, or (2) water transferred to the USBR pursuant to the SJRA.

IT IS FURTHER ORDERED that Licenses 7856 and 7860 (Applications 10872 and 13310, respectively)❖ of the Oakdale and South San Joaquin Irrigation District shall be amended by adding the following conditions which shall expire on December 31, 2010:

1. While the SJRA is in effect, Licensee Oakdale Irrigation District is authorized to provide 15,000 acre-feet of water to the USBR annually. In addition, Licensee is authorized to provide the difference between the water released by the Licensee to meet its share of the San Joaquin River Flow objective and 11,000 acre-feet. Such water may be made available to the USBR at New Melones Reservoir for any authorized purpose of the New Melones Reservoir project while the SJRA is in effect.

2. Licensees shall not extract groundwater from the Eastern San Joaquin County Groundwater Basin to provide water for flow and water transfer obligations of the Oakdale Irrigation District under the SJRA. Also, extractions from this basin shall not be used to replace deliveries foregone due to these obligations.

IT IS FURTHER ORDERED that Licenses 5417 and 11058 (Applications 1233 and 14127, respectively) of the Modesto and Turlock Irrigation Districts shall be amended by adding the following condition which shall expire on December 31, 2010:

At times when the USBR is releasing water from New Melones Reservoir for the purpose of meeting the Vernalis salinity objective, or when Standard Permit Term 93 is in effect, or when salinity objectives at Vernalis are not being met, Licensees shall not replenish (1) stored water or foregone diversions provided for the April/May pulse flow or the October target flow at Vernalis, or (2) water transferred to the USBR pursuant to the San Joaquin River Agreement.

IT IS FURTHER ORDERED that License 11109 and Permit 10478 (Applications 4228 and 13156)❖ of the East Bay Municipal Utilities District shall be amended by adding the following conditions:

1. Permittee/Licensee shall provide the "Release from Camanche Dam" into the Mokelumne River in accordance with the schedule set forth below. The water year types are defined below.

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NORMAL & ABOVE NORMAL YEARS

Mokelumne River Minimum Flow Schedule (1)

FALL RUN CHINOOK SALMON LIFE STAGE	PERIOD	NOTE*	DAYS	RELEASE FROM CAMANCHE DAM (CFS)
Adult Immigration	10/1-10/15	(2)	15	325
Spawn/Incubation	10/16-10/31	(2)	16	325
	11/1-11/30	(3)	30	325
	12/1-12/31	(3)	31	325
Incubation/Alevin	1/1-1/31	(3)	31	325
	2/1-2/28	(3)	28	325
Fry Rearing	3/1-3/31	(3)	31	325
	4/1-4/15	(4),(5)	15	325
	4/16-4/30	(4),(5)	15	325
Fry Rearing/Juvenile Rearing	5/1-5/31	(5)	31	325
Outmigration	6/1-6/30	(5)	30	325
Oversummer	7/1-9/30		92	100

Notes*

(1) Due to changes in water conditions or to optimize fishery conditions, EBMUD may modify Flow Standards upon written concurrence of DFG and USFWS, provided the total quantity of water released for fishery purposes in Normal and Above year types is not less than the quantity provided by this flow schedule.

(2) During October, EBMUD will maintain minimum flows of 325 cfs below Camanche Dam and 100 cfs below WID's dam in Normal and Above year types.

(3) During the period when WID dam boards are pulled out and Lodi Lake is empty (approximately Nov. 1 through March 31), EBMUD shall make minimum releases of 325 cfs from Camanche Dam in Normal and Above year types. This release from Camanche dam is expected to provide at least 100 cfs below WID dam during this period. However, EBMUD shall not be obligated to increase releases above 325 cfs during this period in Normal and Above year types.

(4) During April, EBMUD will maintain minimum flows of 325 cfs below Camanche Dam and 150 cfs below WID's dam in Normal and Above year types.

(5) For the months of April, May, and June during Normal and Above year types, additional release of up to 200 cfs is required depending on combined Pardee and Camanche storage levels relative to the maximum allowable for the end of the prior month as follows:

Less than 10 TAF below maximum allowable storage (BMAS), additional release is 200 cfs for subsequent month.

10 TAF <= BMAS < 20 TAF, additional release is 150 cfs for subsequent month.

20 TAF <= BMAS < 30 TAF, additional release is 100 cfs for subsequent month.

30 TAF <= BMAS < 40 TAF, additional release is 50 cfs for subsequent month.

Below Normal Year
Mokelumne River Minimum Flow Schedule (1)

FALL RUN CHINOOK SALMON LIFE STAGE	PERIOD	NOTE*	DAYS	RELEASE FROM CAMANCHE DAM (CFS)
Adult Immigration	10/1-10/15	(2)	15	250
Spawn/Incubation	10/16-10/31	(2)	16	250
	11/1-11/30	(3)	30	250
	12/1-12/31	(3)	31	250
Incubation/Alevin	1/1-1/31	(3)	31	250
	2/1-2/28	(3)	28	250
Fry Rearing	3/1-3/31	(3)	31	250
	4/1-4/15	(4),(5)	15	250
	4/16-4/30	(4),(5)	15	250
Fry Rearing/Juvenile Rearing	5/1-5/31	(5)	31	250
Outmigration	6/1-6/30	(5)	30	250
Oversummer	7/1-9/30		92	100

Notes*

(1) Due to changes in water conditions or to optimize fishery conditions, EBMUD may modify Flow Standards upon written concurrence of DFG and USFWS, provided the total quantity of water released for fishery purposes in Below Normal year types is not less than the quantity provided by this flow schedule.

(2) During October, EBMUD will maintain minimum flows of 250 cfs below Camanche Dam and 100 cfs below WID's dam in Below Normal year types.

(3) During the period when WID dam boards are pulled out and Lodi Lake is empty (approximately Nov. 1 through March 31), EBMUD shall make minimum releases of 250 cfs from Camanche Dam in Below Normal year types. This release from Camanche dam is expected to provide at least 100 cfs below WID dam during this period. However, EBMUD shall not be obligated to increase releases above 250 cfs during this period in Below Normal year types.

(4) During April, EBMUD will maintain minimum flows of 250 cfs below Camanche Dam and 150 cfs below WID's dam in Below Normal year types.

(5) For the months of April, May, and June in Below Normal year types, additional release of up to 200 cfs is required depending on combined Pardee and Camanche storage levels relative to the maximum allowable for the end of the prior month as follows:

Less than 10 TAF below maximum allowable storage (BMAS), additional release is 200 cfs for subsequent month.

10 TAF <= BMAS < 20 TAF, additional release is 150 cfs for subsequent month.

20 TAF <= BMAS < 30 TAF, additional release is 100 cfs for subsequent month.

30 TAF <= BMAS < 40 TAF, additional release is 50 cfs for subsequent month.

Dry Year
Mokelumne River Minimum Flow Schedule (1)

FALL RUN CHINOOK SALMON LIFE STAGE	PERIOD	NOTE*	DAYS	RELEASE FROM CAMANCHE DAM (CFS)
Adult Immigration	10/1-10/15	(2)	15	220
Spawn/Incubation	10/16-10/31	(2)	16	220
	11/1-11/30	(3)	30	220
	12/1-12/31	(3)	31	220
Incubation/Alevin	1/1-1/31	(3)	31	220
	2/1-2/28	(3)	28	220
Fry Rearing	3/1-3/31	(3)	31	220
	4/1-4/15	(4)	15	220
	4/16-4/30	(4)	15	220
Fry Rearing/Juvenile Rearing	5/1-5/31		31	220
Outmigration	6/1-6/30	(5)	30	100
Oversummer	7/1-9/30		92	100

Notes*

(1) Due to changes in water conditions or to optimize fishery conditions, EBMUD may modify Flow Standards upon written concurrence of DFG and USFWS, provided the total quantity of water released for fishery purposes in Dry year types is not less than the quantity provided by this flow schedule.

(2) During October, EBMUD will maintain minimum flows of 220 cfs below Camanche Dam and 80 cfs below WID's dam in Dry year types.

(3) During the period when WID dam boards are pulled out and Lodi Lake is empty (approximately Nov. 1 through March 31), EBMUD shall make minimum releases of 220 cfs from Camanche Dam in Dry year types. This release from Camanche dam is expected to provide at least 80 cfs below WID dam during this period. However, EBMUD shall not be obligated to increase releases above 220 cfs during this period in Dry year types.

(4) During April, EBMUD will maintain minimum flows of 220 cfs below Camanche Dam and 150 cfs below WID's dam in Dry year types.

(5) During June, Outmigrating smolts will be trapped, tagged, and transported around the Delta in Dry year types.

Critically Dry Year
Mokelumne River Minimum Flow Schedule (1)

FALL RUN CHINOOK SALMON LIFE STAGE	PERIOD	NOTE*	DAYS	RELEASE FROM CAMANCHE DAM (CFS)
Adult Immigration	10/1-10/15	(2)	15	100
Spawn/Incubation	10/16-10/31	(2)	16	130
	11/1-11/30	(3)	30	130
	12/1-12/31	(3)	31	130
Incubation/Alevin	1/1-1/31	(3)	31	130
	2/1-2/28	(3)	28	130
Fry Rearing	3/1-3/31	(3)	31	130
	4/1-4/15	(4)	15	130
	4/16-4/30	(4)	15	130
Fry Rearing/Juvenile Rearing	5/1-5/31	(5)	31	100
Outmigration	6/1-6/30	(5)	30	100
Oversummer	7/1-9/30		92	100

Notes*

(1) Due to changes in water conditions or to optimize fishery conditions, EBMUD may modify Flow Standards upon written concurrence of DFG and USFWS, provided the total quantity of water released for fishery purposes in Critically-Dry year types is not less than the quantity provided by this flow schedule.

(2) During October, EBMUD will maintain minimum flows of 130 cfs below Camanche Dam and will maintain minimum flows of 15 cfs from Oct. 1-15 and 75 cfs from Oct. 16-31 below WID dam in Critically Dry year types.

(3) During the period when WID dam boards are pulled out and Lodi Lake is empty (approximately Nov. 1 through March 31), EBMUD shall make minimum releases of 130 cfs from Camanche Dam in Critically Dry year types. This release from Camanche dam is expected to provide at least 75 cfs below WID dam during this period. However, EBMUD shall not be obligated to increase releases above 130 cfs during this period in Critically-Dry year types.

(4) During April, EBMUD will maintain minimum flows of 130 cfs below Camanche Dam and 75 cfs below WID's dam in Critically-Dry year types.

(5) During May and June, outmigrating smolts will be trapped, tagged, and transported around the Delta in Critically-Dry year types.

Water Year Type Determination

Year Type	Normal/Above	Below Normal	Dry	Critically Dry
Oct. - Mar. (1) (Pardee/Camanche Storage)	Max Allowable (2)	Max Allowable to 400 TAF	399 TAF to 270 TAF	269 TAF or Less
Apr. - Sep. (3) (Unimpaired runoff)	890 TAF or More	889 TAF to 500 TAF	499 TAF to 300 TAF	299 TAF or Less (4)

(1) October through March minimum flows are determined by total Pardee and Camanche storage on November 5th.

(2) Maximum allowable storage on November 5th, shall be determined in accordance with the Army Corps of Engineer's Water Control Manual for Camanche Dam and Reservoir dated September 1981.

(3) April through September minimum flows are determined by the water year unimpaired runoff into Pardee Reservoir as forecasted by DWR in the April 1st Bulletin 120 Report except when combined Pardee/Camanche Nov. 5 storage is projected to be less than 200 TAF.

(4) April through September minimum flows shall be critically dry whenever Nov. 5 combined Pardee/Camanche storage is projected to be 200 TAF or less based on the runoff forecast in DWR Bulletin 120, beginning April 1st.

2. This permit/license does not authorize any act which results in the taking of a threatened or endangered species or any act which is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). If a “take” will result from any act authorized under this water right, the Permittee/Licensee shall obtain an incidental take permit prior to construction or operation. Permittee/Licensee shall be responsible for meeting all requirements of the applicable Endangered Species Act for the project authorized under this permit/license. (0000014)

3. The continuing authority condition shall be updated to read as follows:

   Pursuant to California Water Code Sections 100 and 275 and the common law public trust doctrine, all rights and privileges under this permit, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the Board in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

   The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to eliminating waste of water and to meeting the reasonable water requirements of Permittee/Licensee

without unreasonable draft on the source. Permittee/Licensee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to: (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to determine accurately water use as against reasonable water requirement for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the Board also may be exercised by imposing further limitations on the diversion and use of water by the permittee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Section 2; is consistent with the public interest; and is necessary to preserve or restore the uses protected by the public trust.

(0000012)

4. The water quality objectives condition shall be updated to read as follows:

The quantity of water diverted under this permit is subject to modification by the Board if, after notice to the Permittee/Licensee and an opportunity for hearing, the Board finds that such modification is necessary to meet water quality objectives in water quality control plans which have been or hereafter may be established or modified pursuant to Division 7 of the Water Code. No action will be taken pursuant to this paragraph unless the Board finds that: (1) adequate waste discharge requirements have been prescribed and are in effect with respect to all waste discharges which have any substantial effect upon water quality in the area involved, and (2) the water quality objectives cannot be achieved solely through the control of waste discharges.

(0000013)

5. Permittee/Licensee may reschedule or modify the specified flow releases required by this order, but the total quantity of water released in any year shall not be less than the quantity of water that would have been provided pursuant to the flow schedule specified in this order for the water year type in which the resheduling or modification occurs. Thirty days prior to rescheduling or modifying the specified flow releases, Permittee/Licensee shall submit to the Chief, Division of Water Rights, an operations plan acceptable to the Chief, Division of Water Rights, that specifies the release schedule for that year. Permittee/Licensee shall also submit a written concurrence to the operations plan signed by a representative of the DFG and the USFWS.

6. For the protection of fish, Permittee/Licensee shall:

(a) Make river flow changes gradually. During the October 16 through March 31 spawning and incubation period, flows shall not decrease by more than 50 cfs per day. During other periods, flows shall not decrease by more than 100 cfs per day. This requirement does not apply during emergency conditions or when flood control releases are being made.

(b) Use its best efforts to maintain a minimum of 28 taf of hypolymnetic volume in Camanche Reservoir through October whenever Pardee Reservoir volume exceeds 100 taf.

(c) Take action to maintain dissolved oxygen and to reduce hydrogen sulfide levels in the Camanche Reservoir hypolimnion during the period from May through October by using its Hypolimnetic Oxygenation System (HOS).

IT IS FURTHER ORDERED that the Licenses 5945, 8214, 8215 (Applications 5807, 10240 and 12648)❖ of the Woodbridge Irrigation District shall be amended by adding the following condition:

1. Licensee shall curtail its diversions at Woodbridge Dam adequately to ensure that the following flows are met below Woodbridge Diversion Dam. The minimum bypass will be reevaluated and possibly amended if the Joint Settlement Agreement is amended for the lower Mokelumne River.

Water Year Type Determination

Year Type	Normal/Above	Below Normal	Dry	Critically Dry
Oct. - Mar. (1) (Pardee/Camanche Storage)	Max Allowable (2)	Max Allowable to 400 TAF	399 TAF to 270 TAF	269 TAF or Less
Apr. - Sep. (3) (Unimpaired runoff)	890 TAF or More	889 TAF to 500 TAF	499 TAF to 300 TAF	299 TAF or Less (4)

(1) October through March minimum flows are determined by total Pardee and Camanche storage on November 5th.

(2) Maximum allowable storage on November 5th, shall be determined in accordance with the Army Corps of Engineer's Water Control Manual for Camanche Dam and Reservoir dated September 1981.

(3) April through September minimum flows are determined by the water year unimpaired runoff into Pardee Reservoir as forecasted by DWR in the April 1st Bulletin 120 Report except when combined Pardee/Camanche Nov. 5 storage is projected to be less than 200 TAF.

(4) April through September minimum flows shall be critically dry whenever Nov. 5 combined Pardee/Camanche storage is projected to be 200 TAF or less based on the runoff forecast in DWR Bulletin 120, beginning April 1st.

Required Flow Below Woodbridge Irrigation District Diversion Dam				
	Water Year Type			
Period	**Normal and Above**	**Below Normal**	**Dry**	**Critically Dry**
10/1-10/15	**100**	**100**	**80**	**15**
10/16-10/31	**100**	**100**	**80**	**75**
11/1-11/30	**100**	**100**	**80**	**75**
12/1-12/31	**100**	**100**	**80**	**75**
1/1-1/31	**100**	**100**	**80**	**75**
2/1-2/28	**100**	**100**	**80**	**75**
3/1-3/31	**100**	**100**	**80**	**75**
4/1-4/15	**150**	**150**	**150**	**75**
4/16-4/30	**150**	**150**	**150**	**75**
5/1-5/31	**300**	**200**	**150**	**15**
6/1-6/30	**300**	**200**	**20**	**15**
7/1-9/30	**25**	**20**	**20**	**15**

2. This license does not authorize any act which results in the taking of a threatened or endangered species or any act which is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). If a "take" will result from any act authorized under this water right, the licensee shall obtain an incidental take permit prior to construction or operation. Licensee shall be responsible for meeting all requirements of the applicable Endangered Species Act for the project authorized under this permit.

(0000014)

3. The continuing authority condition shall be updated to read as follows:

Pursuant to California Water Code Sections 100 and 275 and the common law public trust doctrine, all rights and privileges under this license, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the Board in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this license with a view to eliminating waste of water and to meeting the reasonable water requirements of Licensee without unreasonable draft on the source. Licensee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to: (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to determine accurately water use as against reasonable water requirement for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the Board also may be exercised by imposing further limitations on the diversion and use of water by the Licensee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Section 2; is consistent with the public interest; and is necessary to preserve or restore the uses protected by the public trust.

(0000012)

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4. The water quality objectives condition shall be updated to read as follows:

   The quantity of water diverted under this permit is subject to modification by the Board if, after notice to the Licensee and an opportunity for hearing, the Board finds that such modification is necessary to meet water quality objectives in water quality control plans which have been or hereafter may be established or modified pursuant to Division 7 of the Water Code. No action will be taken pursuant to this paragraph unless the Board finds that: (1) adequate waste discharge requirements have been prescribed and are in effect with respect to all waste discharges which have any substantial effect upon water quality in the area involved, and (2) the water quality objectives cannot be achieved solely through the control of waste discharges.

(0000013)

CERTIFICATION

The undersigned, Administrative Assistant to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a decision duly and regularly adopted at a meeting of the State Water Resources Control Board held on December 28, 1999.

AYE:

NO:

ABSENT:

ABSTAIN:

_____
Maureen Marché
Administrative Assistant to the Board

TABLE 1
WATER QUALITY OBJECTIVES FOR
MUNICIPAL AND INDUSTRIAL BENEFICIAL USES

COMPLIANCE LOCATION	INTERAGENCY STATION NUMBER (RKI [1])	PARAMETER	DESCRIPTION (UNIT)	WATER YEAR TYPE [2]	TIME PERIOD	VALUE
Contra Costa Canal at Pumping Plant #1	*C-5 (CHCCC06)*	*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^-*
-or-				*W*		*240 (66%)*
San Joaquin River at Antioch Water Works Intake	*D-12 (near) (RSAN007)*			*AN*		*190 (52%)*
				BN		*175 (48%)*
				D		*165 (45%*
				C		*155 (42%)*
Contra Costa Canal at Pumping Plant #1	*C-5 (CHCCC06)*	*Chloride (Cl^-)*	*Maximum mean daily (mg/l)*	*All*	*Oct-Sep*	*250*
-and-						
West Canal at mouth of Clifton Court Forebay	*C-9 (CHWST0)*					
-and-						
Delta-Mendota Canal at Tracy Pumping Plant	*DMC-1 (CHDMC004)*					
-and-						
Barker Slough at North Bay Aqueduct Intake	*---- (SLSAR3)*					
-and-						
Cache Slough at City of Vallejo Intake [3]	*C-19 (SLCCH16)*					

[1] River Kilometer Index station number.
[2] The Sacramento Valley 40-30-30 water year hydrologic classification index (see Figure 1) applies for determinations of water year type.
[3] The 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 LOCATION	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 April 1 to date shown*	*EC from date shown to Aug 15 [4]*
				W	*Aug 15*	*----*
				AN	*Jul 1*	*0.63*
				BN	*Jun 20*	*1.14*
				D	*Jun 15*	*1.67*
				C	*----*	*2.78*
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 April 1 to date shown*	*EC from date shown to Aug 15 [4]*
				W	*Aug 15*	*----*
				AN	*Aug 15*	*----*
				BN	*Jun 20*	*0.74*
				D	*Jun 15*	*1.35*
				C	*----*	*2.20*
INTERIOR DELTA						
South Fork Mokelumne River at Terminous	*C-13 (RSMKL08)*	*Electrical Conductivity (EC)*	*Maximum 14-day running average of mean daily EC (mmhos/cm)*		*0.45 EC April 1 to date shown*	*EC from date shown to Aug 15 [4]*
				W	*Aug 15*	*----*
				AN	*Aug 15*	*----*
				BN	*Aug 15*	*----*
				D	*Aug 15*	*----*
				C	*----*	*0.54*
San Joaquin River at San Andreas Landing	*C-4 (RSAN032)*	*Electrical Con-Ductivity (EC)*	*Maximum 14-day running average of mean daily EC (mmhos/cm)*		*0.45 EC April 1 to date shown*	*EC from date shown to Aug 15 [4]*
				W	*Aug 15*	*----*
				AN	*Aug 15*	*----*
				BN	*Aug 15*	*----*
				D	*Jun 25*	*0.58*
				C	*----*	*0.87*
SOUTHERN DELTA						
San Joaquin River at Airport Way Bridge, Vernalis ***-and-*** *San Joaquin River at Brandt Bridge site[5]* ***-and-*** *Old River near Middle River [5]* ***-and-*** *Old River at Tracy Road Bridge [5]*	*C-10 (RSAN112)* *C-6 (RSAN073)* *C-8 (ROLD69)* *P-12 (ROLD59)*	*Electrical Conductivity (EC)*	*Maximum 30-day running average of mean daily EC (mmhos/cm)*	*All*	*Apr-Aug* *Sep-Mar*	*0.7* *1.0*
EXPORT AREA						
West Canal at mouth of Clifton Court Forebay ***-and-*** *Delta-Mendota Canal at Tracy Pumping Plant*	*C-9 (CHWST0)* *DMC-1 (CHDMC004)*	*Electrical Conductivity (EC)*	*Maximum monthly average of mean daily EC (mmhos/cm)*	*All*	*Oct-Sep*	*1.0*

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 1) applies for determinations of water year type.

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

[5] The 0.7 EC objective becomes effective on April 1, 2005. The DWR and the USBR shall meet 1.0 EC at these stations year round until April 1, 2005. The 0.7 EC objective is replaced by the 1.0 EC objective from April through August after April 1, 2005 if permanent barriers are constructed, or equivalent measures are implemented, in the southern Delta and an operations plan that reasonably protects southern Delta agriculture is prepared by the DWR and the USBR and approved by the Chief of the Division of Water Rights. The SWRCB will review the salinity objectives for the southern Delta in the next review of the Bay-Delta objectives following construction of the barriers.

TABLE 3
WATER QUALITY OBJECTIVES FOR FISH AND WILDLIFE BENEFICIAL USES

COMPLIANCE LOCATION	INTERAGENCY STATION NUMBER (RKI [1])	PARAMETER	DESCRIPTION (UNIT) [2]	WATER YEAR TYPE [3]	TIME PERIOD	VALUE
SAN JOAQUIN RIVER SALINITY						
San Joaquin River at and between Jersey Point and Prisoners Point [4]	*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 [5]*
EASTERN SUISUN MARSH SALINITY						
Sacramento River at Collinsville ***-and-*** *Montezuma Slought at National Steel* ***-and-*** *Montezuma Slough near Beldon Landing*	*C-2 (RSAC081)* *S-64 (SLMZU25)* *S-49 (SLMZU11)*	*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* *Nov-Dec* *Jan* *Feb-Mar* *Apr-May*	*19.0* *15.5* *12.5* *8.0* *11.0*
WESTERN SUISUN MARSH SALINITY						
Chadbourne Slough at Sunrise Duck Club ***-and-*** *Suisun Slough, 300 feet south of Volanti Slough*	*S-21 (SLCBN1)* *S-42 (SLSUS12)*	*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 [6]* *Deficiency Period [6]*	*Oct* *Nov* *Dec* *Jan* *Feb-Mar* *Apr-May* *Oct* *Nov* *Dec-Mar* *Apr* *May*	*19.0* *16.5* *15.5* *12.5* *8.0* *11.0* *19.0* *16.5* *15.6* *14.0* *12.5*

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

COMPLIANCE LOCATION	INTERAGENCY STATION NUMBER(RKI 1[])	PARAMETER	DESCRIPTION (UNIT) [2]	WATER YEAR TYPE [3]	TIME PERIOD	VALUE
DELTA OUTFLOW						
		Net Delta Outflow Index (NDOI) [7]	*Minimum monthly average [8] NDOI (cfs)*	*All*	*Jan*	*4,500 [9]*
				All	*Feb-Jun*	*[10]*
				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 [11] flow rate (cfs)*	*All*	*Sep*	*3,000*
				W,AN,BN,D	*Oct*	*4,000*
				C		*3,000*
				W,AN,BN,D	*Nove-Dec*	*4,500*
				C		*3,500*
San Joaquin River at Airport Way Bridge, Vernalis	*C-10 (RSAN112)*	*Flow rate*	*Minimum monthly average [12] flow rate (cfs) [13]*	*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 [14]*	*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 [17]*
EXPORT LIMITS						
		Combined export rate [16]	*Maximum 3-day running average (cfs)*	*All*	*Apr 15- May 15 [17]*	*[18]*
				All	*Feb-Jun*	*35% Delta inflow [21]*
			Maximum percent of Delta inflow diverted [19] [20]	*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*	*[22]*
					Feb-May 20	*----*
					May 21- Jun 15	*[23]*

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 Figure 1) applies unless otherwise specified.

[4] Compliance will be determined at Jersey Point (station D15) and Prisoners Point (station D29).

[5] 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% exceedence 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] 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 5) was less than 11.35; or (3) a critical water year following a dry or critical water year.

[7] Net Delta Outflow Index (NDOI) is defined in Figure 3.

[8] 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.

[9] 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.]

[10] The minimum daily net 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 9) 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 Chief, Division of Water Rights, is delegated authority to decide whether this requirement 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 request of the DWR and the USBR, subject to the approval of the Chief, Division of water Rights. The standard does not apply in May and June if the best available May estimate of the Sacramento River Index (described in footnote 5) for the water year is less than 8.1 MAF at the 90% exceedence 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.

[11] The 7-day running average shall not be less than 1,000 cfs below the monthly objective.

[12] 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.

[13] The water year classification for the San Joaquin River flow objectives will be established using the best available estimate of the 60-20-20 San Joaquin Valley Water Year Hydrologic Classification (see Figure 2) at the 75% exceedence 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.

[14] 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.

[15] 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 DWR and the USBR in consultation with the USFWS, the NMFS and the DFG.

[16] 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.

[17] This time period may be varied based on real-time monitoring and will coincide with the San Joaquin River pulse flow described in footnote 18. The DWR and the USBR, in consultation with the USFWS, the NMFS and the DFG, will determine the time period for this 31-day export limit.

[18] Maximum export rate is 1,500 cfs or 100% of 3-day running average of San Joaquin River flow at Vernalis, whichever is greater. Variations to this maximum export rate may be authorized if agreed to by the USFWS, the NMFS 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. Any variations will be effective immediately upon notice to the Chief, Division of Water Rights. If the Chief, Division of Water Rights, does not object to the variations within 10 days, the variations will remain in effect. The Chief of the Division of Water Rights 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.

[19] Percent of Delta inflow diverted is defined in Figure 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.

[20] The percent Delta inflow diverted values can be varied either up or down. Variations are authorized subject to the process described in footnote 20.

[21] If the best available estimate of the Eight River Index (described in footnote 9) 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 within the range of 35% to 45%, after consultation with the USFWS, the NMFS and the DFG.

[22] For the November-January period, close Delta Cross Channel gates for a total of 45 days. The USBR will determine the timing and duration of the gate closure after consultation with the USFWS, the NMFS and the DFG.

[23] For the May 21-June 15 period, close 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 NMFS and the DFG.

Figure 1
Sacramento Valley
Water Year Hydrologic Classification

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

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

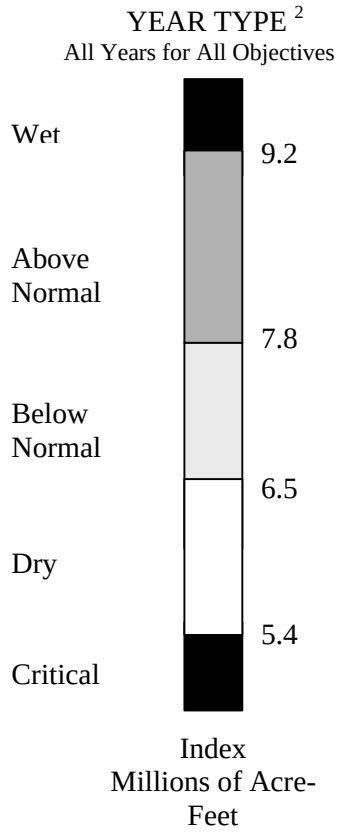
Where: X = Current year's April – July Sacramento Valley unimpaired runoff

Y = Current October – March Sacramento Valley unimpaired runoff

Z = Previous year's index[1]

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.

Classification	**Index Millions of Acre-Feet (MAF)**
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 2
San Joaquin Valley
Water Year Hydrologic Classification

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

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

Where: X = Current year's April – July San Joaquin Valley unimpaired runoff

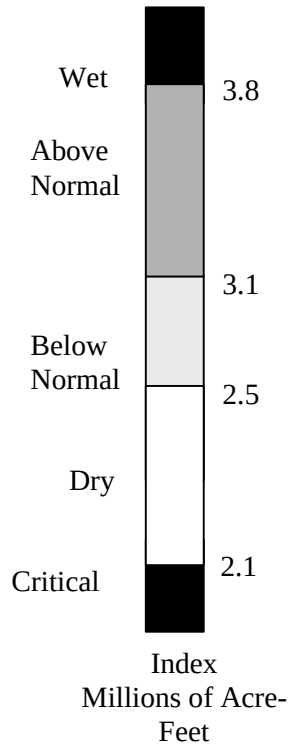
Y = Current October – March San Joaquin Valley unimpaired runoff

Z = Previous year's index[1]

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.

Classification	Index Millions of Acre-Feet (MAF)
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

YEAR TYPE [2]
All Years for All Objectives



[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 3
NDOI and PERCENT INFLOW DIVERTED [1]

The NDOI and the percent inflow diverted, as described in this footnote, 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) ¸ 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.

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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 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 Maximumu Daily Average Electrical Conductivity of 2.64 mmhos/cm Must Be Maintained at Specified Location [a]

PMI [b] (TAF)	Chipps Island (Chipps 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 electrical conductivity (EC) of 2.64 mmhos per centimeter (mmhos/cm) must be maintained at Chipps 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 9 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 Chipps 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

Table 5. Water Quality Compliance and Baseline Monitoring

Station Number	Station Description	Cont. Rec.[1]	Physical/ Chem-ical[2]	Multi-para-meter[3]	Phyto-plank-ton[4]	Zoo-plank-ton[4]	Ben-thos[4]
C2 ■	Sacramento River @ Collinsville	*					
C3 ⮝	Sacramento River @ Greens Landing		*	*	*		
C4 ■	San Joaquin River @ San Andreas Ldg.	*					
C5 ■	Contra Costa Canal @ Pumping Plant #1	*					
C6 ■	San Joaquin River @ Brandt Bridge site	*					
C7 ⮝	San Joaquin River @ Mossdale Bridge			*			
C8 ■	Old River near Middle River	*					
C9 •	West Canal at mouth of CCForebay Intake				*		*
C10 •	San Joaquin River near Vernalis		*		*		
C13 ■	Mokelumne River @ Terminous	*					
C14 ■	Sacramento River @ Port Chicago	*					
C19 ■	Cache Slough @ City of Vallejo Intake	*					
D4 ⮝	Sacramento River above Point Sacramento		*		*	*	*
D6 ⮝	Suisun Bay @ Bulls Head Pt. nr. Martinez		*	*	*	*	*
D7 ⮝	Grizzly Bay @ Dolphin nr. Suisun Slough		*		*	*	*
D8 ⮝	Suisun Bay off Middle Point near Nichols		*		*	*	
D10 •	Sacramento River @ Chipps Island			*		*	
D12 •	San Joaquin River @ Antioch Ship Canal			*		*	
D15 ■	San Joaquin River @ Jersey Point	*					
D16 ⮝	San Joaquin River @ Twitchell Island					*	*
D22 •	Sacramento River @ Emmaton					*	
D24 •	Sacramento River below Rio VistaBridge			*			*
D26 ⮝	San Joaquin River @ Potato Point		*		*	*	
D28A ⮝	Old River near Rancho Del Rio		*	*	*	*	*
D29 ■	San Joaquin River @ Prisoners Point	*					
D41 ⮝	San Pablo Bay near Pinole Point		*		*		*
D41A ⮝	San Pablo Bay nr. mouth of Petaluma R.						*
DMC1 •	Delta-Mendota Canal at Tracy Pump. Plt.			*			
P8 ⮝	San Joaquin River @ Buckley Cove		*	*	*	*	*
P12 ■	Old River @ Tracy Road Bridge	*					
MD10 ⮝	Disappointment Slough near Bishop Cut		*		*	*	
S21 ■	Chadbourne Slough @ Sunrise Duck Club	*					
S35 ⮝	Goodyear Sl. @ Morrow Is. Clubhouse	*					
S42 •	Suisun Slough 300' so. of Volanti Slough	*				*	
S49 ■	Montezuma Slough near Beldon Landing	*					
S64 ■	Montezuma Slough @ National Steel	*					
S97 ⮝	Cordelia Slough @ Ibis Club	*					
NZ032 ⮝	Montezuma Slough, 2nd bend from mouth					*	
NZ080 ⮝	San Joaquin River, 549 meters upstream of light 26					*	

(continued)

■ Compliance monitoring station ⮝ Baseline monitoring station • Compliance and baseline monitoring station

Table 5. Water Quality Compliance and Baseline Monitoring (continued)

Station Number	Station Description	Cont. Rec.[1]	Physical/ Chem-ical[2]	Multi-para-meter[3]	Phyto-plank-ton[4]	Zoo-plank-ton[4]	Ben-thos[4]
--- ■	Sacramento R. (I St. Bridge to Freeport) (RSAC155)	*					
--- ■	San Joaquin R. (Turner Cut to Stockton) (RSAN050-RSAN061)	*					
--- ■	Barker Sl. at No. Bay Aqueduct (SLBAR3)	*					
--- ■	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

1 Continuous 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.

2 Physical/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*.

3 Multi-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.

4 Sampling occurs monthly at discrete sites.

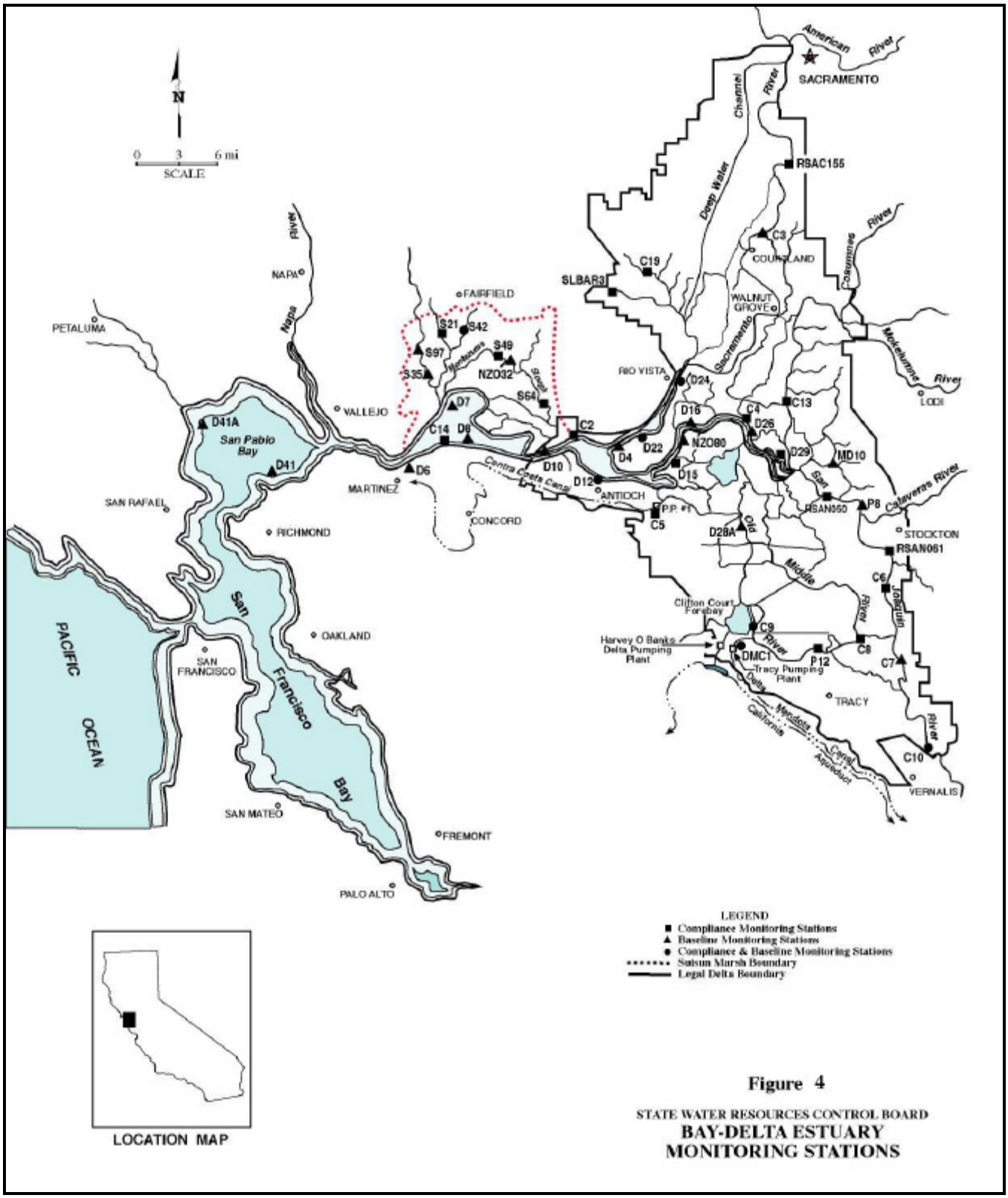
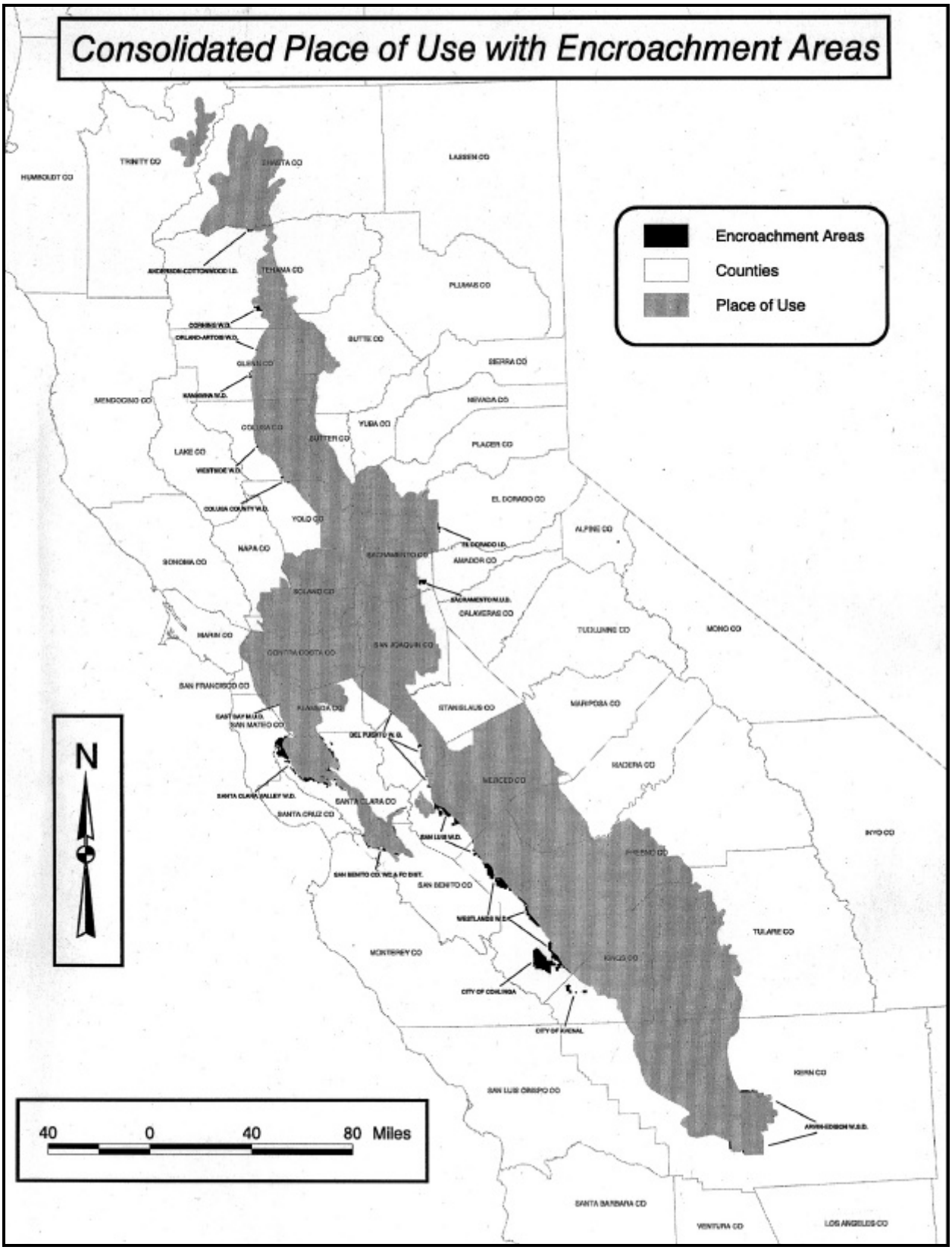
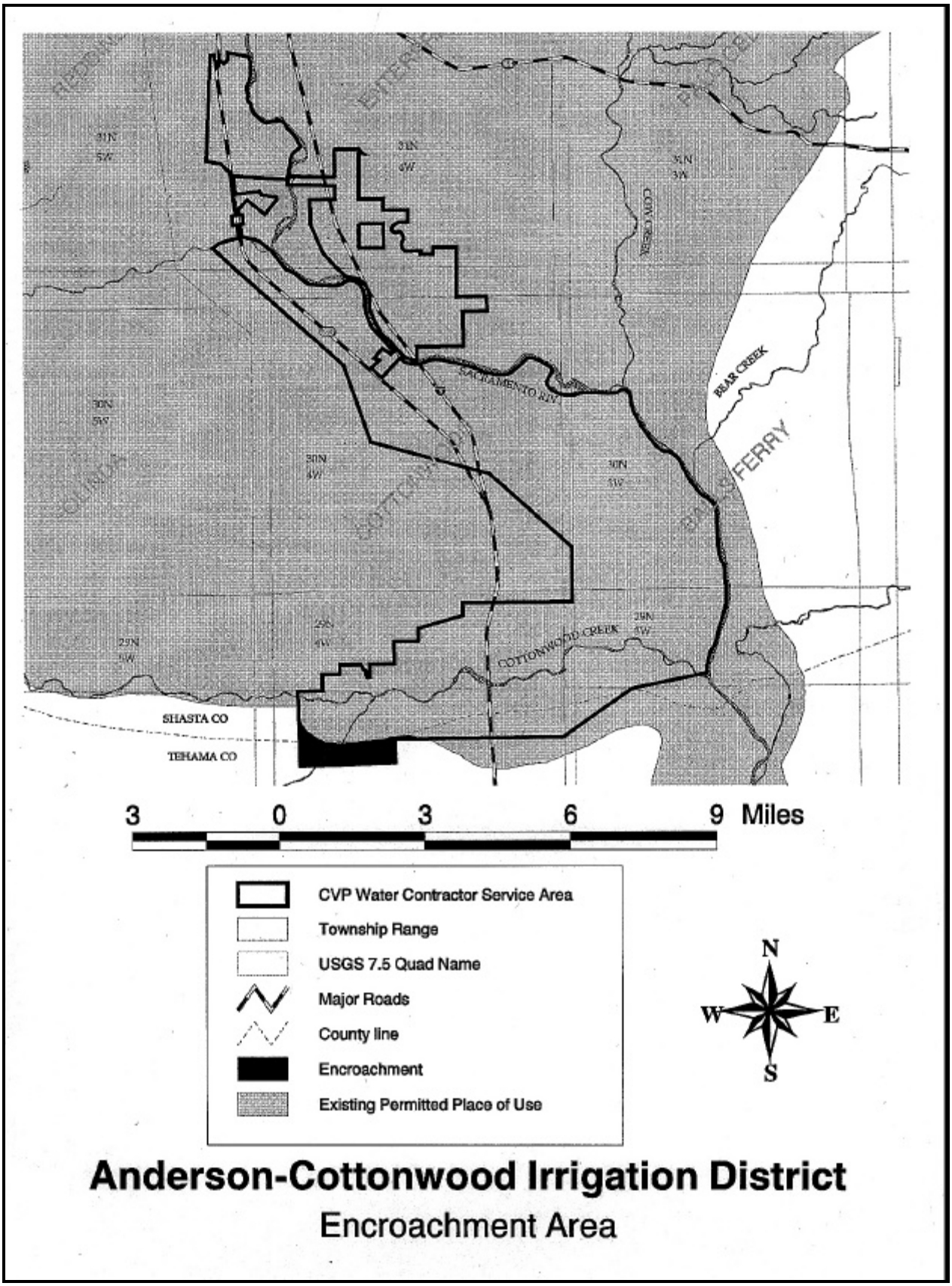
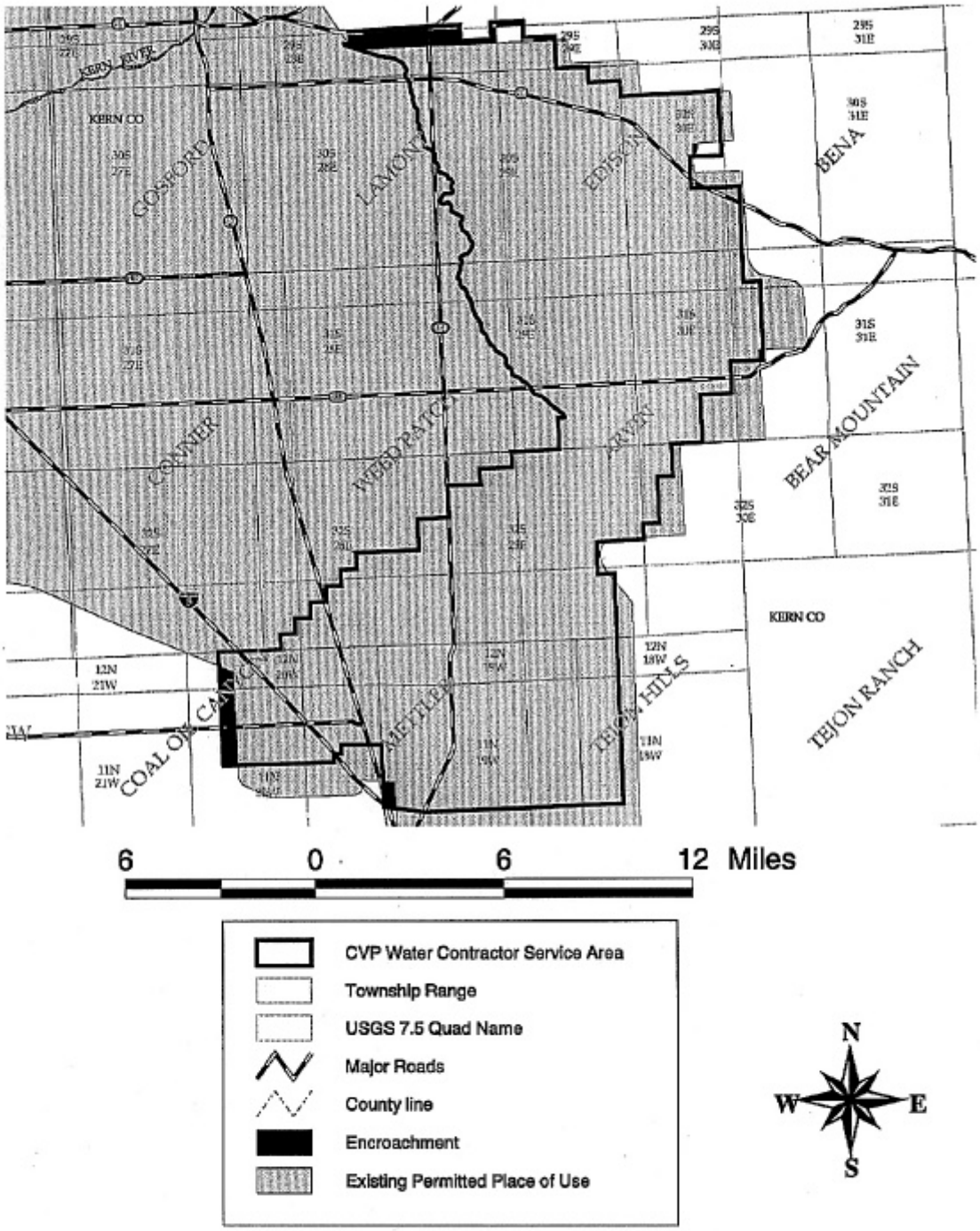


Figure 4

STATE WATER RESOURCES CONTROL BOARD
BAY-DELTA ESTUARY MONITORING STATIONS

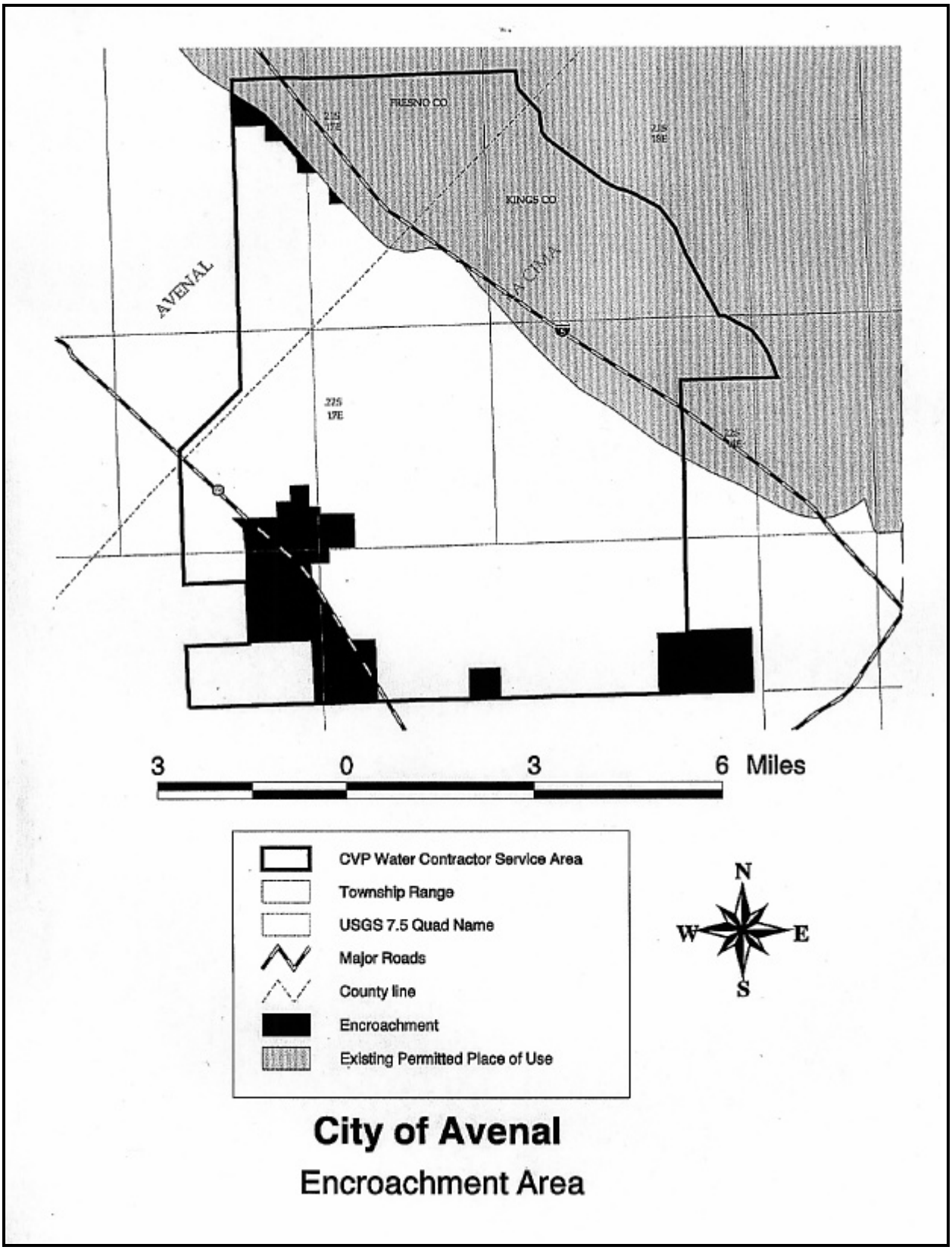

Consolidated Place of Use with Encroachment Areas
Encroachment Areas
Counties
Place of Use
TRINITY CO
HUMBOLDT CO
SHASTA CO
LASSEN CO
TEHAMA CO
PLUMAS CO
BUTTE CO
GLENN CO
SIERRA CO
MENDOCINO CO
NEVADA CO
YUBA CO
SUTTER CO
PLACER CO
LAKE CO
EL DORADO CO
YOLO CO
ALPINE CO
NAPA CO
SONOMA CO
AMADOR CO
SOLANO CO
CALAVERAS CO
TUOLUMNE CO
MONO CO
MARIN CO
CONTRA COSTA CO
SAN JOAQUIN CO
SAN FRANCISCO CO
STANISLAUS CO
MARIPOSA CO
MADERA CO
MERCED CO
SANTA CLARA CO
SANTA CRUZ CO
INYO CO
FRESNO CO
SAN BENITO CO
TULARE CO
MONTEREY CO
KINGS CO
KERN CO
SAN LUIS OBISPO CO
SANTA BARBARA CO
VENTURA CO
LOS ANGELES CO
N
40 0 40 80 Miles

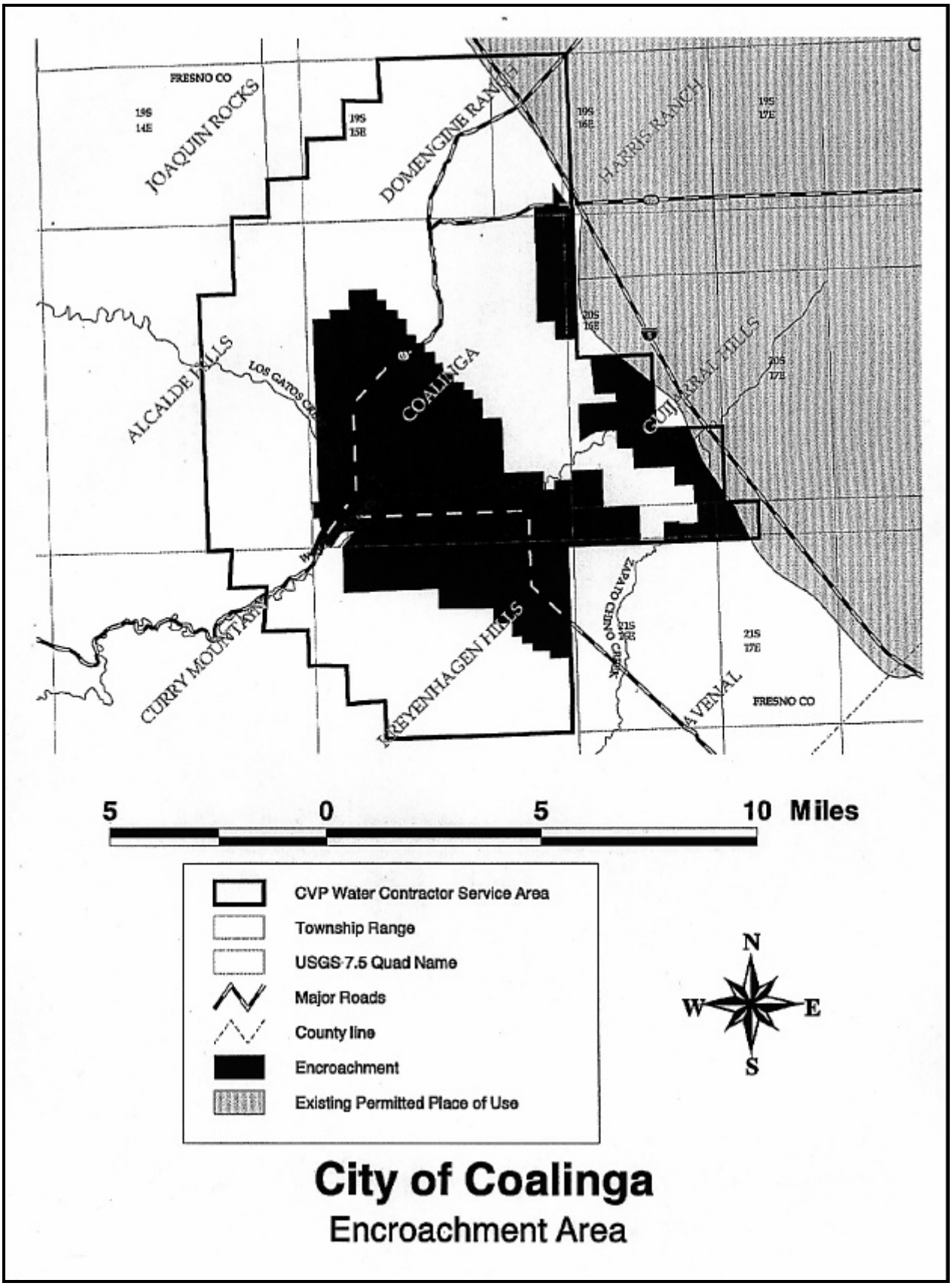

SHASTA CO
TEHAMA CO
SACRAMENTO RIV
COTTONWOOD CREEK
COW CREEK
BEAR CREEK
FERRY
3 0 3 6 9 Miles
CVP Water Contractor Service Area
Township Range
USGS 7.5 Quad Name
Major Roads
County line
Encroachment
Existing Permitted Place of Use
N
W
E
S
Anderson-Cottonwood Irrigation District
Encroachment Area

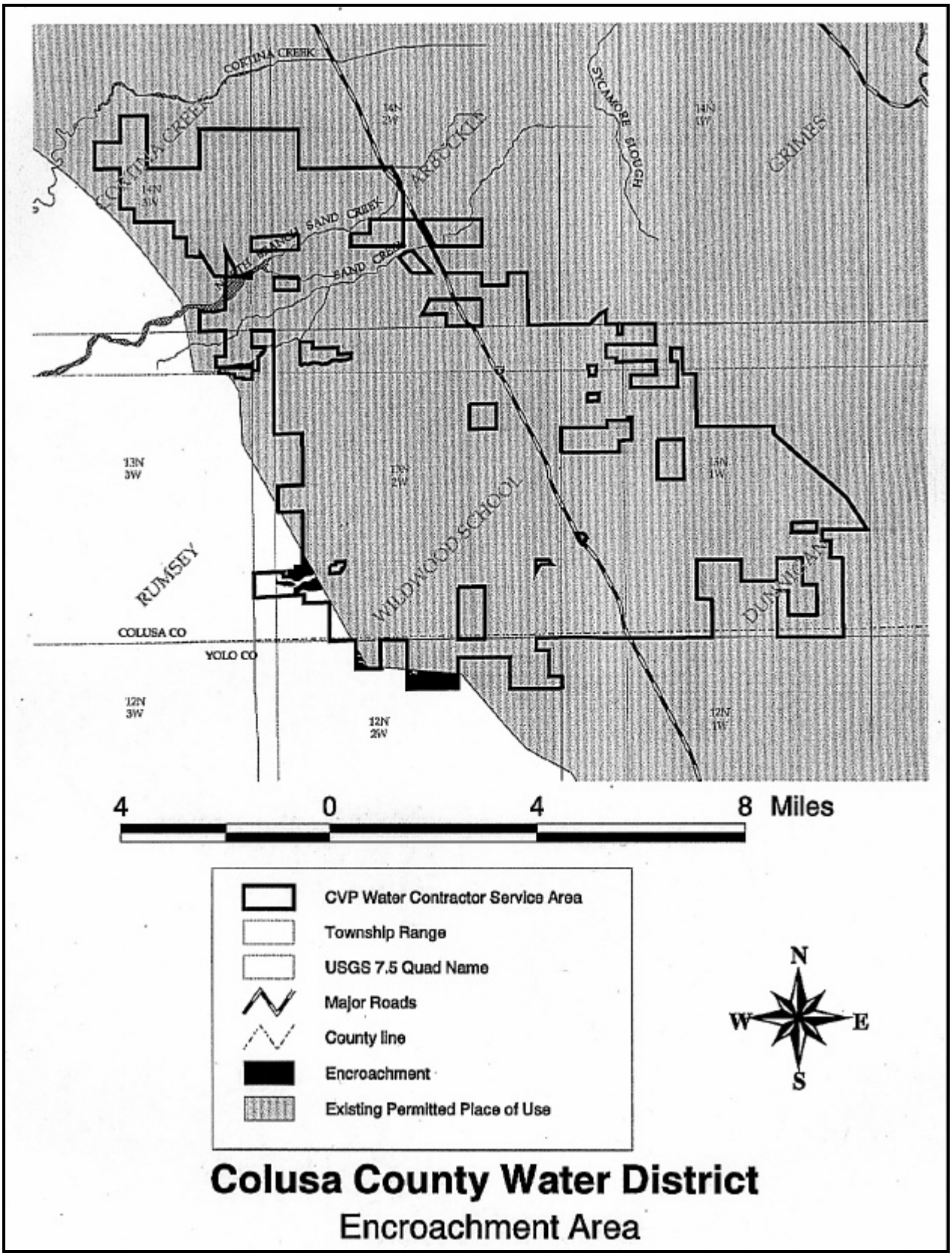


Arvin-Edison Water Storage District

Encroachment Area

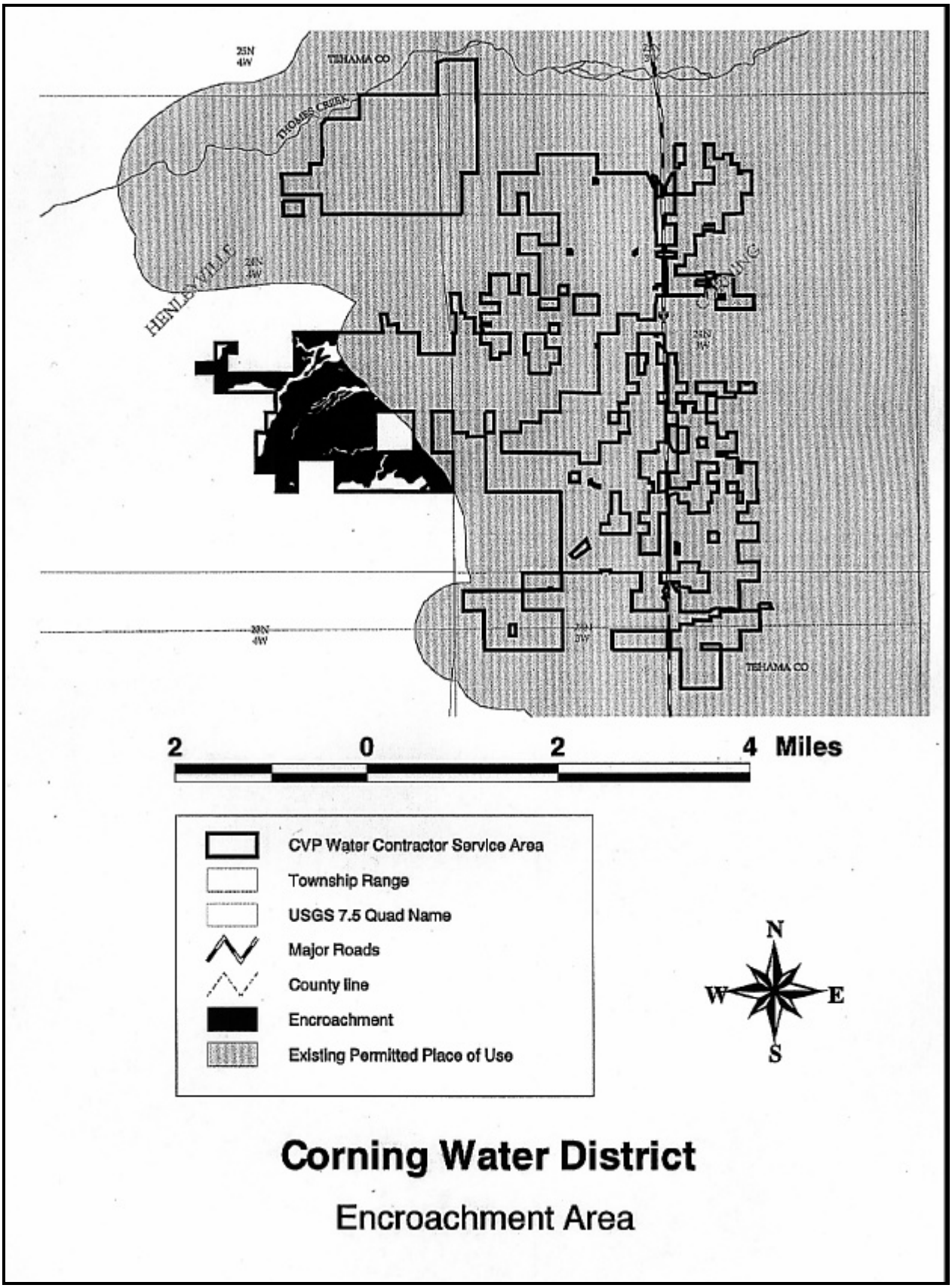

FRESNO CO
KINGS CO
AVENAL
ACIMA
21S 17E
21S 18E
22S 17E
22S 18E
3 0 3 6 Miles
CVP Water Contractor Service Area
Township Range
USGS 7.5 Quad Name
Major Roads
County line
Encroachment
Existing Permitted Place of Use
N
W
E
S
City of Avenal
Encroachment Area


FRESNO CO
JOAQUIN ROCKS
DOMENGINE RANCH
HARRIS RANCH
ALCALDE HILLS
LOS GATOS CREEK
COALINGA
GUIJARRAL HILLS
CURRY MOUNTAIN
KREYENHAGEN HILLS
AVENAL
FRESNO CO
5 0 5 10 Miles
CVP Water Contractor Service Area
Township Range
USGS 7.5 Quad Name
Major Roads
County line
Encroachment
Existing Permitted Place of Use
N
W
E
S
City of Coalinga
Encroachment Area



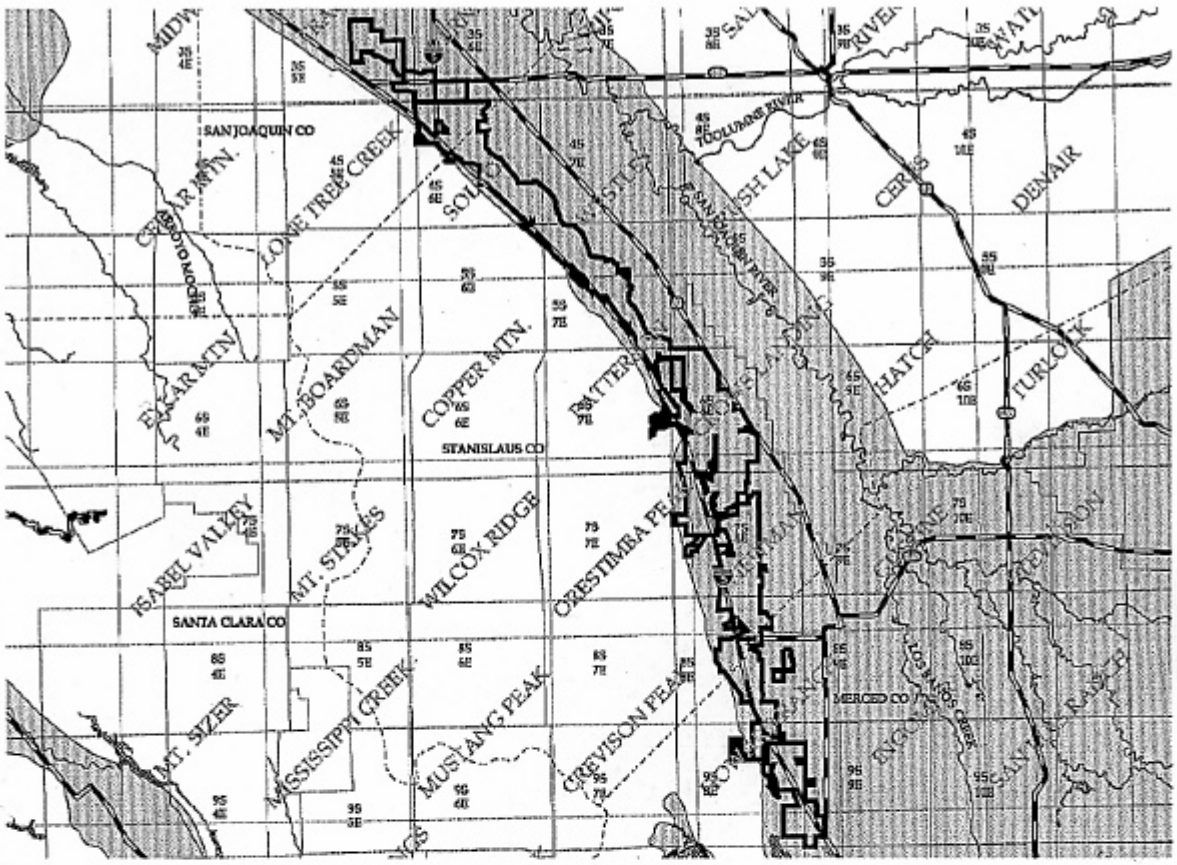
Colusa County Water District

Encroachment Area



Corning Water District

Encroachment Area



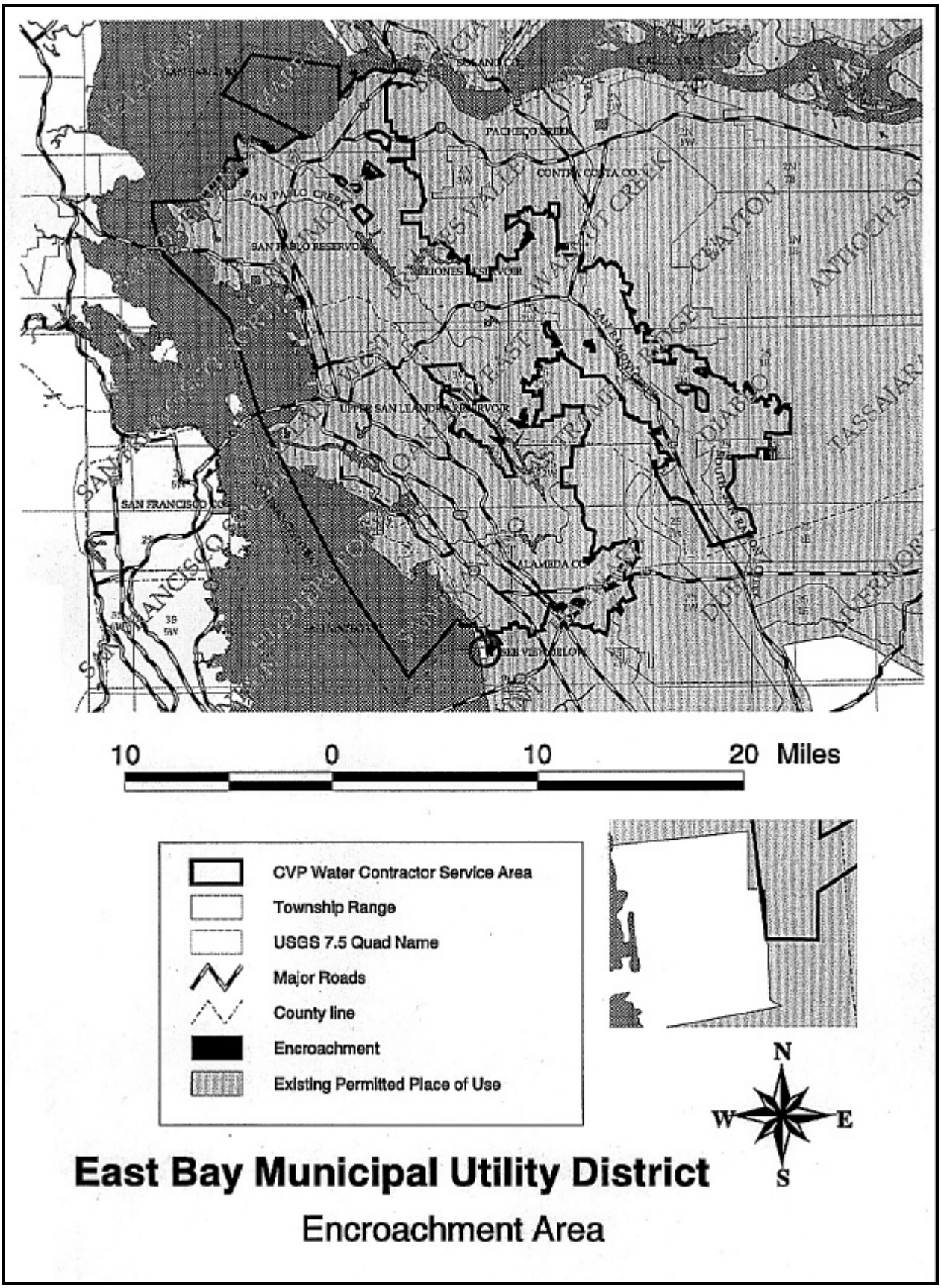
10 0 10 20 30 Miles

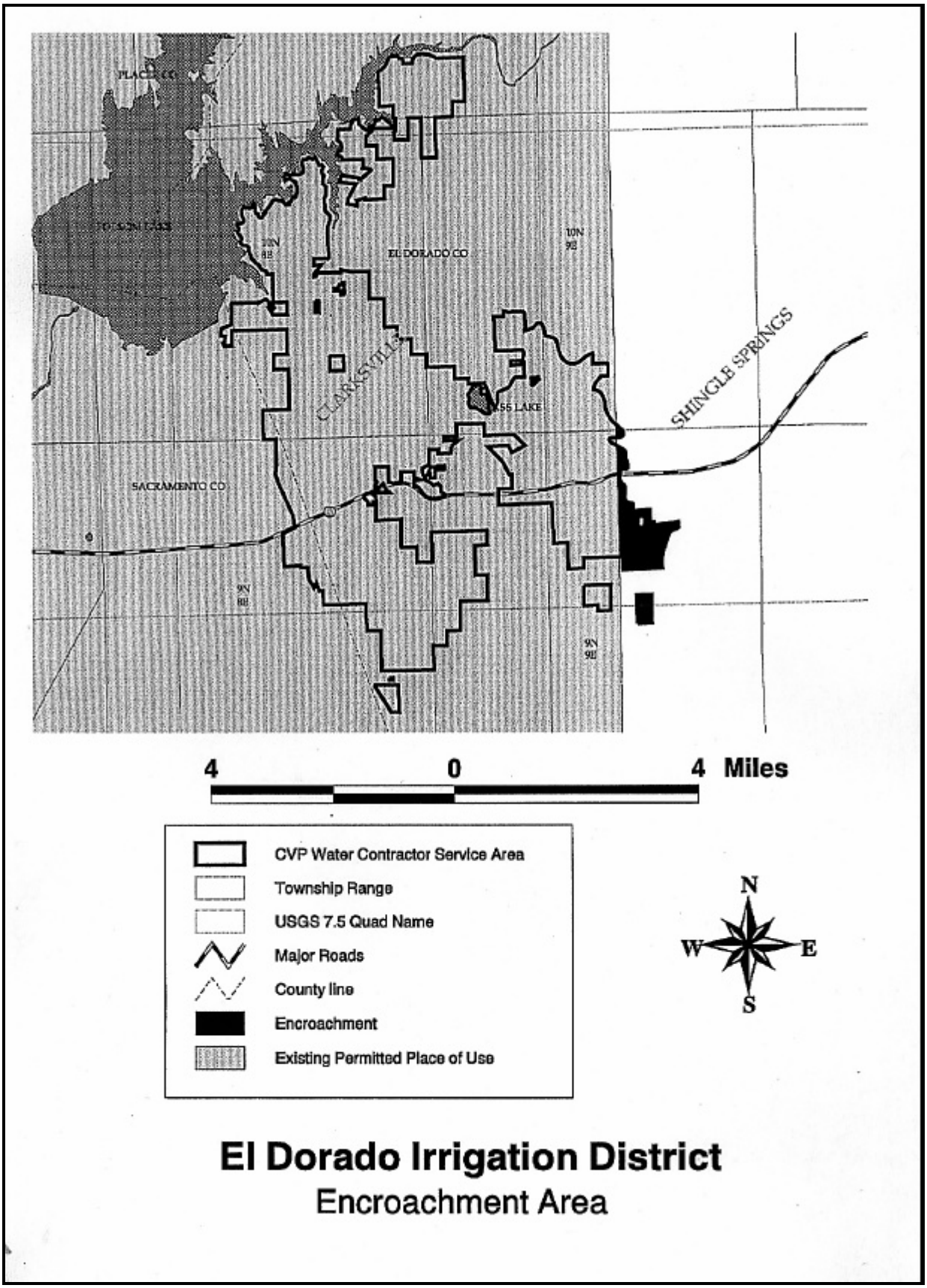
CVP Water Contractor Service Area
Township Range
USGS 7.5 Quad Name
Major Roads
County line
Encroachment
Existing Permitted Place of Use

N
W E
S

Del Puerto Water District

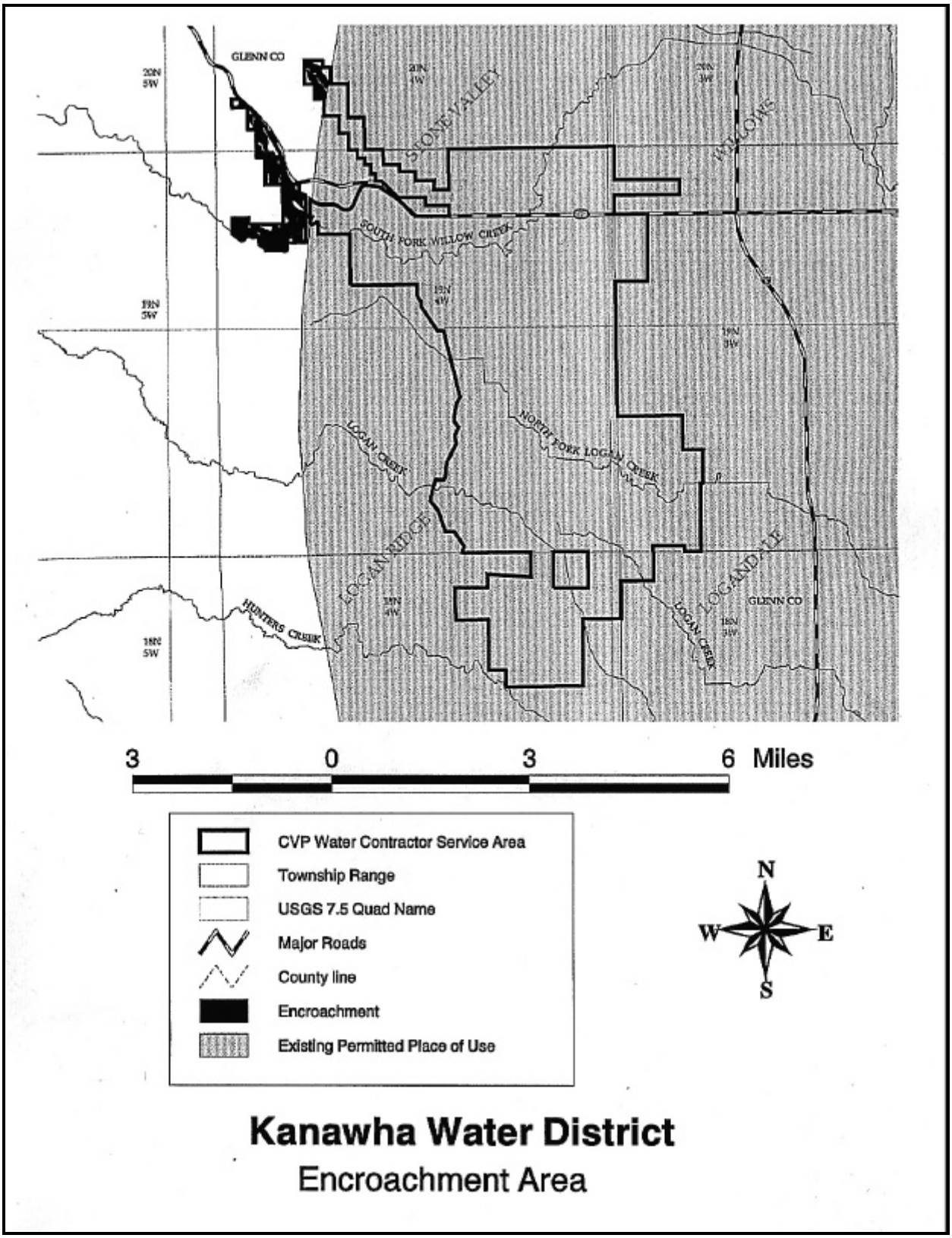
Encroachment Area


10
0
10
20 Miles
CVP Water Contractor Service Area
Township Range
USGS 7.5 Quad Name
Major Roads
County line
Encroachment
Existing Permitted Place of Use
N
W
E
S
East Bay Municipal Utility District
Encroachment Area



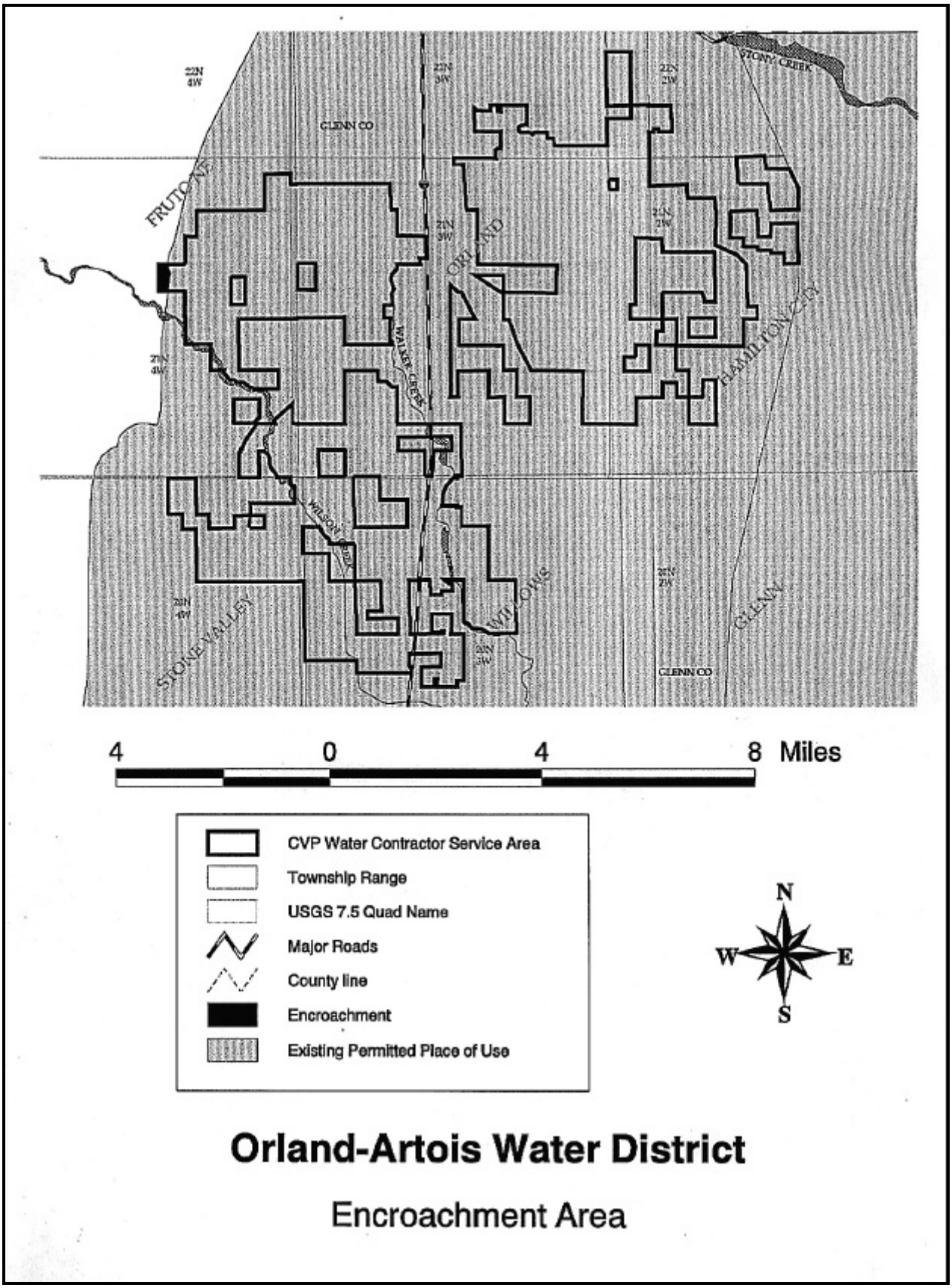
El Dorado Irrigation District

Encroachment Area



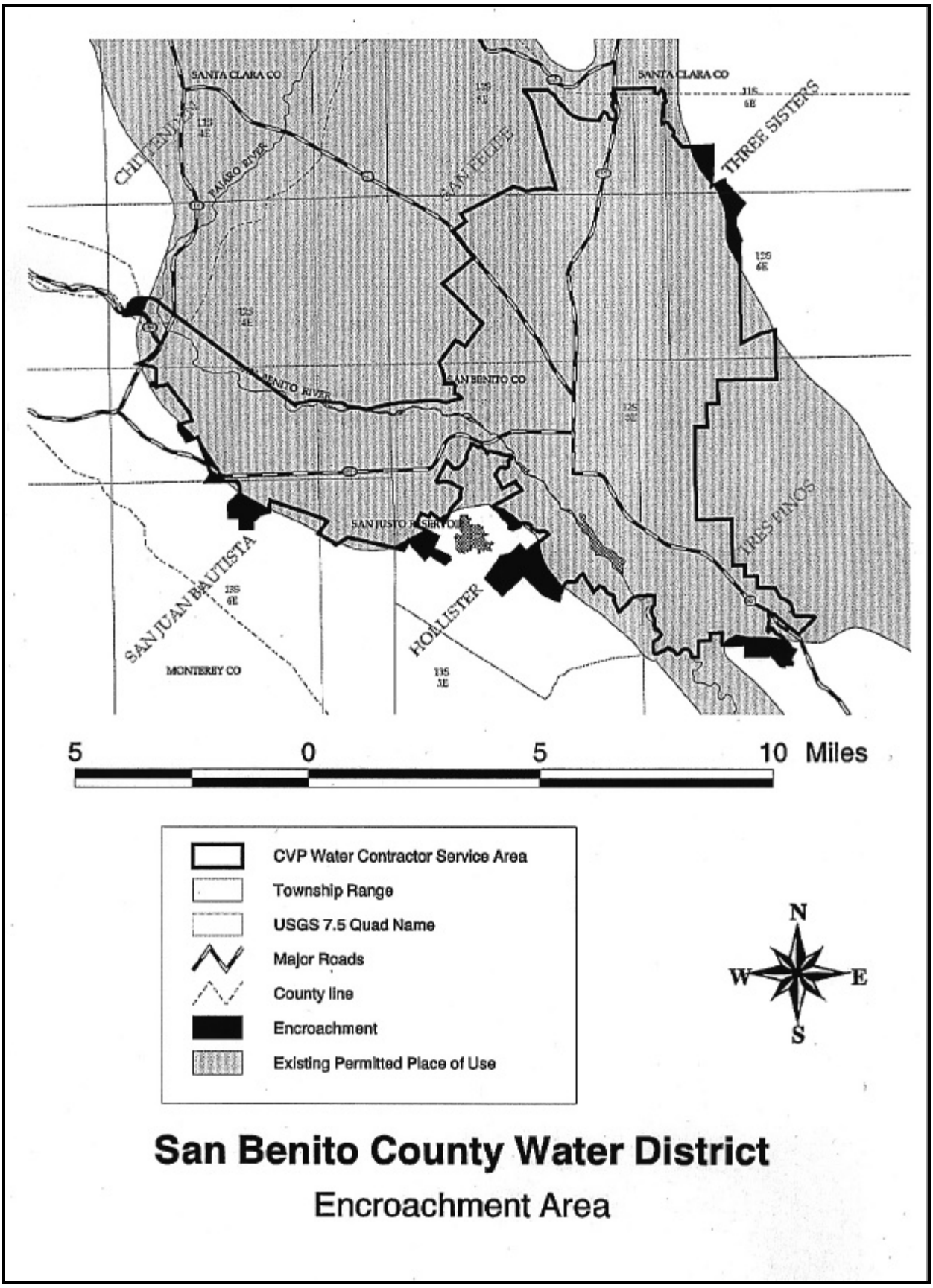
Kanawha Water District

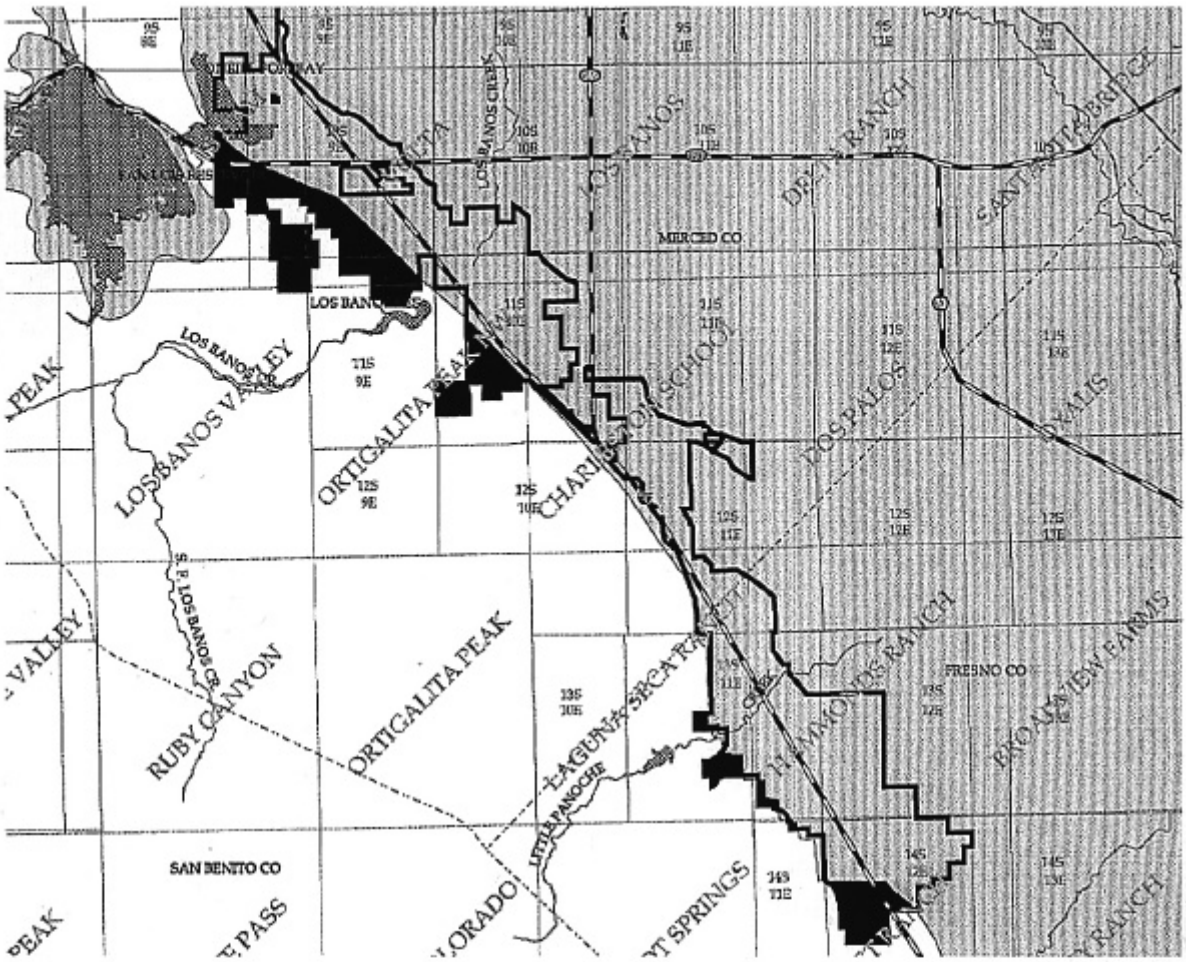
Encroachment Area



Orland-Artois Water District

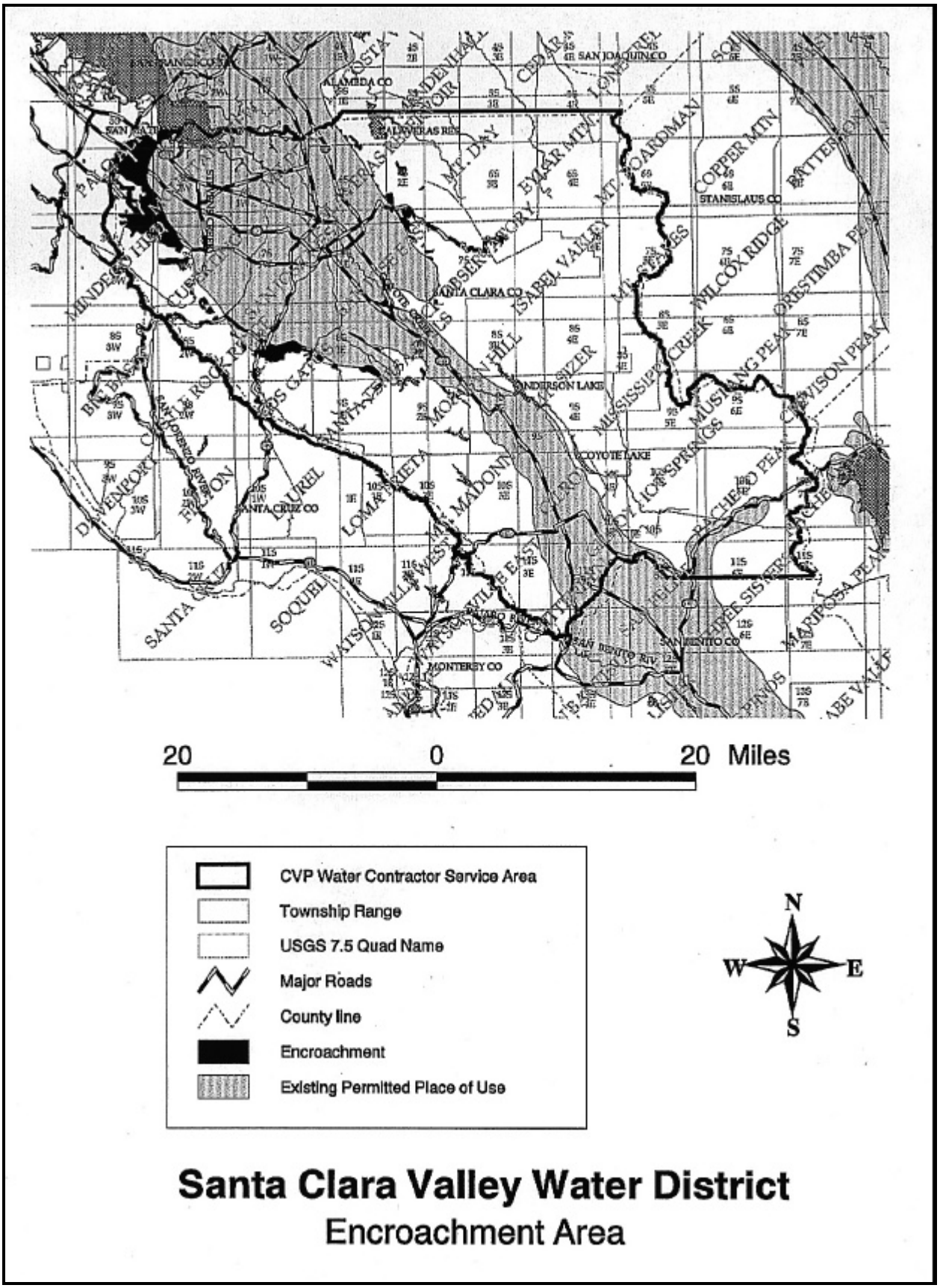
Encroachment Area


SANTA CLARA CO
SANTA CLARA CO
THREE SISTERS
CHITENDEN
PAJARO RIVER
SAN FELIPE
SAN BENITO CO
SAN JUAN BAUTISTA
HOLLISTER
TRES PINOS
MONTEREY CO
5
0
5
10 Miles
CVP Water Contractor Service Area
Township Range
USGS 7.5 Quad Name
Major Roads
County line
Encroachment
Existing Permitted Place of Use
N
W
E
S
San Benito County Water District
Encroachment Area



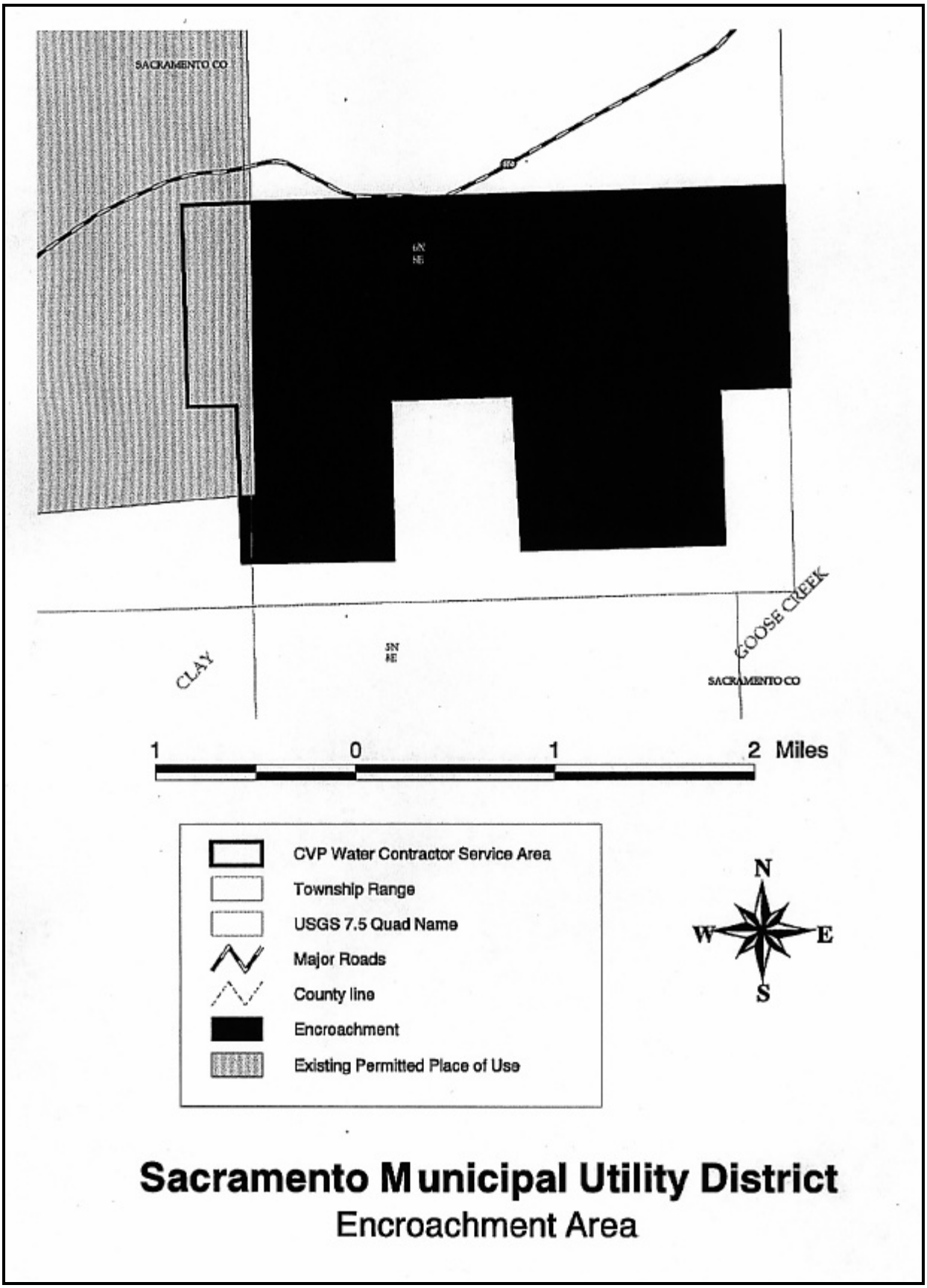
San Luis Water District

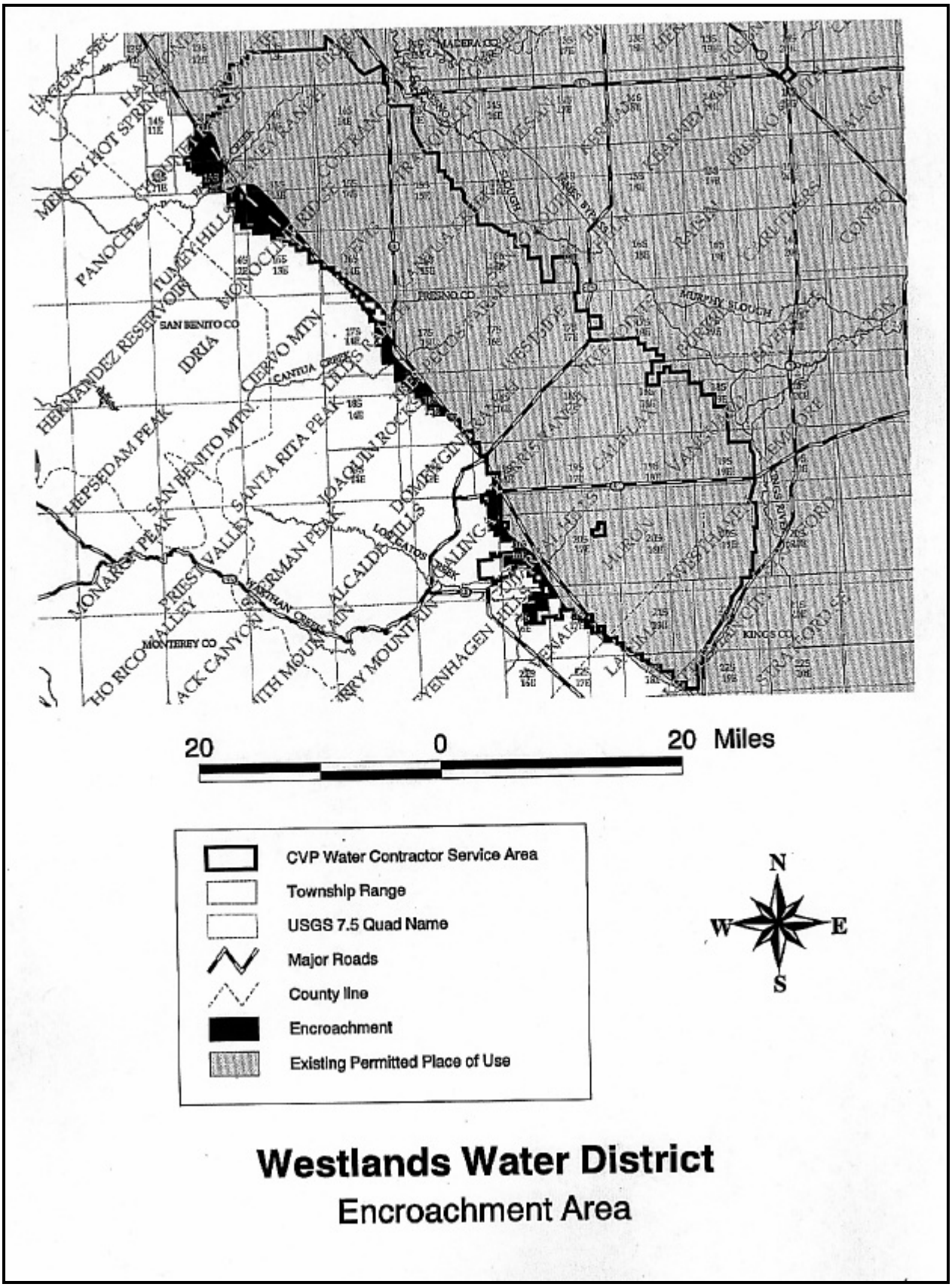
Encroachment Area



Santa Clara Valley Water District

Encroachment Area


SACRAMENTO CO
CLAY
GOOSE CREEK
SACRAMENTO CO
1
0
1
2 Miles
CVP Water Contractor Service Area
Township Range
USGS 7.5 Quad Name
Major Roads
County line
Encroachment
Existing Permitted Place of Use
N
W
E
S
Sacramento Municipal Utility District
Encroachment Area



Westlands Water District

Encroachment Area