

## Chapter 8

U.S. Department of the Interior, Bureau of Reclamation,  
and the California Department of Water Resources

Compliance with Applicable Laws, Policies,  
and Plans and Regulatory Framework

### **Water Operations Management Team, and Data Assessment Team, and Operations and Fisheries Forum**

The Water Operations Management Team (WOMT) is a group composed of executives from DWR, Reclamation, DFG, USFWS, and NOAA Fisheries. The group has the responsibility of making decisions about CVP and SWP operations for the following week based on proposed project operations. The WOMT has not historically ~~does not normally~~ included stakeholders, however they may be invited depending on the subject of the meeting. The Data Assessment Team (DAT) is an advisory group that is part of the CALFED Ops Group, and is composed of biologists and SWP and CVP operations staff. This group meets on an as needed basis to make agency recommendations to WOMT. The DAT identifies abundance and distribution of special-status species to determine if changes in operation and pumping would reduce take. This input is presented to the WOMT for consideration in making final decisions about operations of CVP and SWP facilities. Implementation of the SDIP would require decisions by the WOMT regarding operations of the gates. Additionally, as needed, the Operations and Fisheries Forum, a group made up of representatives from the member agencies and interested parties, convenes when information regarding take of listed species, or other factors or urgent issues need to be addressed.

### **Long-Term Solutions**

The third element of the Framework Agreement called for a joint state-federal process to develop long-term solutions to problems in the Bay-Delta Estuary related to fish and wildlife, water supply reliability, natural disasters, and water quality. The intent is to develop a comprehensive and balanced plan that addresses all of the resource problems. This effort is carried out under the policy direction of the CALFED agencies.

The public has a central role in the development of a long-term solution. A group of more than 30 citizen-advisors selected from California's agriculture, environmental, urban, business, fishing, and other interests with a stake in finding long-term solutions for the problems of the Bay-Delta Estuary was chartered under the Federal Advisory Committee Act as the Bay-Delta Advisory Council (BDAC). BDAC advised the CALFED agencies on its mission and objectives, the problems to be addressed, and proposed actions. BDAC also provided a forum for public participation and reviewed reports and other materials prepared by CALFED staff.

In 2000 the BDAC was terminated and was replaced by the Bay-Delta Public Advisory Committee (BDPAC) which was chartered in 2001. The purpose of this new committee is to provide recommendations to the Secretary of the Interior, the Governor of California, other participating federal agencies, and California Bay-Delta Authority (Authority) on the implementation of the

U.S. Department of the Interior, Bureau of Reclamation,  
and the California Department of Water Resources

Compliance with Applicable Laws, Policies,  
and Plans and Regulatory Framework

CWA Section 404(b) requires that the Corps process permits in compliance with guidelines developed by EPA. These guidelines (404(b)(1) Guidelines) require that there be an analysis of alternatives available to meet the project purpose and need including those that avoid and minimize discharges of dredged or fill materials in waters. Once this first test has been satisfied, the project that is permitted must be the least environmentally damaging practical alternative before the Corps may issue a permit for the proposed activity.

Actions typically subject to Section 404 requirements are those that would take place in wetlands or stream channels, including intermittent streams, even if they have been realigned. Within stream channels, a permit under Section 404 would be needed for any discharge activity below the ordinary high water mark, which is the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, or the presence of litter or debris.

The CALFED ROD for the Final Programmatic EIS/EIR includes a CWA Section 404 memorandum of understanding (MOU) signed by Reclamation, EPA, the Corps, and DWR. Under the terms of the MOU, when a project proponent applies for a Section 404 individual permit for CALFED projects, the proponent is not required to reexamine program alternatives already analyzed in the Programmatic EIS/EIR. The Corps and EPA will focus on project-level alternatives that are consistent with the PEIS/EIR when they select the least environmentally damaging practicable alternative at the time of a Section 404 permit decision.

A 404 (b)(1) Alternatives information package will be prepared for the SDIP and submitted to the Corps and EPA.

Note: Section 404 does not apply to authorities under the Rivers and Harbors Act of 1899 except that some of the same waters may be regulated under both statutes; the Corps typically combines the permit requirements of Section 10 and Section 404 into one permitting process.

## Section 401

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval [such as issuance of a Section 404 permit]) must also comply with CWA Section 401. In California, the authority to grant water quality certification has been delegated to the State Water Board, and applications for water quality certification under CWA Section 401 are typically processed by the RWQCB with local jurisdiction.

South Delta Improvements Program  
Draft Environmental Impact Statement/  
Environmental Impact Report

8-12

October 2005

J&S 02053.02

U.S. Department of the Interior, Bureau of Reclamation,  
and the California Department of Water Resources

Compliance with Applicable Laws, Policies,  
and Plans and Regulatory Framework

Water quality certification requires evaluation of potential impacts in light of water quality standards and CWA Section 404 criteria governing discharge of dredged and fill materials into waters of the United States.

For purposes of this project, Reclamation will obtain certification from the ~~Central Valley RWQCB~~ State Water Board under Section 401 of the CWA.

## River and Harbors Appropriation Act of 1899

The River and Harbors Appropriation Act of 1899 addresses activities that involve the construction of dams, bridges, dikes, etc., across any navigable water, or placing obstructions to navigation outside established federal lines and excavating from or depositing material in such waters, require permits from the Corps. Navigable waters are defined in section 329.4 as:

Those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination of navigability, once made, applies laterally over the entire surface of the waterbody, and is not extinguished by later actions or events which impede or destroy navigable capacity.

In the Corps Sacramento District, navigable waters of the U.S. in the project area that are subject to the requirements of the River and Harbors Appropriation Act include Middle River, San Joaquin River, Old River, and all waterways in the Sacramento-San Joaquin drainage basin affected by tidal action (U.S. Army Corps of Engineers 2003). Sections of the River and Harbors Act applicable to the SDIP are:

### Section 9

Section 9 (33 USC 401) prohibits the construction of any dam or dike across any navigable water of the United States in the absence of Congressional consent and approval of the plans by the Chief of Engineers and the Secretary of the Army. Where the navigable portions of the water body lie wholly within the limits of a single state, the structure may be built under authority of the legislature of that state, if the location and plans or any modification thereof are approved by the Chief of Engineers and by the Secretary of the Army.

### Section 10

Section 10 (33 USC 403) prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters, is unlawful unless the work has been authorized by the Chief of Engineers.

### Section 13

Section 13 (33 USC 407) provides that the Secretary of the Army, whenever the Chief of Engineers determines that anchorage and navigation will not be injured thereby, may permit the discharge of refuse into navigable waters. In the absence

U.S. Department of the Interior, Bureau of Reclamation,  
and the California Department of Water Resources

Compliance with Applicable Laws, Policies,  
and Plans and Regulatory Framework

obstructs the natural flow or changes the bed, channel, or bank of any river, stream, or lake, or uses material from a streambed must be previously authorized by DFG in a Lake or Streambed Alteration Agreement under Section 1602 of the Fish and Game Code. This requirement may in some cases apply to any work undertaken within the 100-year floodplain of a body of water or its tributaries, including intermittent streams and desert washes. As a general rule, however, it applies to any work done within the annual high-water mark of a wash, stream, or lake that contains or once contained fish and wildlife, or that supports or once supported riparian vegetation.

Activities associated with SDIP that require 1602 authorization and a Streambed Alteration Agreement include the modification and setting back of the existing levees, placement of fish and flow control gates, and conveyance improvements. These actions would result in the alteration of the flow within water bodies and occur within the annual high-water mark of water bodies that contain and wildlife, and support riparian vegetation.

The current temporary barriers program operates under DFG 1602 authorization. This EIS/EIR document will be used as the CEQA review document by DWR for either continued authorization of activities under the existing agreement, or for the issuance of a new Streambed Alteration Agreement (California Fish and Game Code 1600).

### **Porter-Cologne Water Quality Control Act of 1969**

In 1967, the Porter-Cologne Act established the State Water Board and nine RWQCBs as the primary state agencies with regulatory authority over California water quality and appropriative surface water rights allocations. Under this act (and the CWA), the state is required to adopt a water quality control policy and WDRs to be implemented by the State Water Board and nine RWQCBs. The State Water Board also establishes WQCPs) and statewide plans. The RWQCBs carry out State Water Board policies and procedures throughout the state.

WQCPs, also known as basin plans, designate beneficial uses for specific surface water and groundwater resources and establish water quality objectives to protect those uses. WQCPs and water resource management plans relevant to SDIP include the WQCP for the Sacramento and San Joaquin River Basins; San Francisco Bay Basin WQCP; WQCP for the Tulare Lake Basin; Inland Surface Waters Plan; the Enclosed Bays and Estuaries Plan; and the Delta Plan. Delta-specific beneficial uses protected through water quality objectives are municipal and domestic water supply, agricultural supply, industrial supply (process and service), recreation (water contact and non-contact), freshwater habitat (warm- and coldwater), fish migration (warm- and coldwater), fish spawning (warmwater fish), wildlife habitat, and navigation. The basin plans define surface water quality objectives for several parameters, including suspended material, turbidity, pH, DO, chlorides, flow, bacteria, temperature, salinity, toxicity, ammonia, and sulfides.

South Delta Improvements Program  
Draft Environmental Impact Statement/  
Environmental Impact Report

8-21

October 2005

J&S 02053.02

U.S. Department of the Interior, Bureau of Reclamation,  
and the California Department of Water Resources

Compliance with Applicable Laws, Policies,  
and Plans and Regulatory Framework

thorough implementation strategy describing 145 actions to protect the Bay-Delta Estuary. Ten program areas are identified in the CCMP. For each program area, the CCMP presents a problem statement, discusses existing management, identifies program area goals, recommends approaches, and states objectives and actions specific to the program. With regard to wetlands, the CCMP focuses on the restoration and ultimate enhancement of ecological productivity and habitat value. SFEP defines the estuary as the waters of San Francisco Bay, San Pablo Bay, Suisun Bay, and the Sacramento-San Joaquin River Delta. The proposed project boundaries include these waters, their watersheds, and lands in the Delta as delineated by Section 12220 of the State Water Code. Implementation of the SDIP would be consistent with this program as it would assist DWR and Reclamation in improving water quality within the south Delta.

### Area of Origin

During the years when the SWP and CVP were being developed, area of origin legislation was enacted to protect local northern California supplies from being depleted. County of origin statutes provide for the reservation of water supplies for counties in which the water originates when, in the judgment of the State Water Board, an application for the assignment or release from priority of a State water right filing would deprive the county of necessary water for present and future development. The proposed project will have ~~little~~ no effect on ~~water supplies for North of Delta users~~ are of origin water rights; therefore, this project is consistent with the area of origin legislation (see Section 5.1, Water Supply, for more detail).

### Delta Protection Act of 1959

The Delta Protection Act, enacted in 1959 (not to be confused with the Delta Protection Act of 1992, which relates to land use), declares that the maintenance of an adequate water supply in the Delta—to maintain and expand agriculture, industry, urban, and recreational development in the Delta area and provide a common source of fresh water for export to areas of water deficiency—is necessary for the peace, health, safety, and welfare of the people of the state, subject to the County of Origin and Watershed Protection laws. The act requires the SWP and the CVP to provide an adequate water supply for water users in the Delta through salinity control or through substitute supplies in lieu of salinity control. In 1984, additional area of origin protections were enacted to prohibit the export of groundwater from the Sacramento River and the Delta basins unless export is in compliance with local ground water plans. Water Code Section 1245 also holds municipalities liable for economic damages resulting from their diversion of water from a watershed. (Bulletin 160-93.) Implementation of the SDIP would improve water quality and quantity for south Delta users, while allowing a greater diversion and pumping capacity at SWP Banks for south of Delta water contractors.

South Delta Improvements Program  
Draft Environmental Impact Statement/  
Environmental Impact Report

8-24

October 2005

J&S 02053 02

## Chapter 9

U.S. Department of the Interior, Bureau of Reclamation,  
and the California Department of Water Resources

Growth-Inducing Impacts

Further uncertainty is created by the following:

- Some contractors such as Metropolitan, the San Diego County Water Authority, and the Santa Clara Valley Water District have multiple sources of water that provide varying amounts of water over time or with varying reliability, making it difficult to determine whether an increment of additional SWP or CVP water would remove a barrier to growth or rather be put to use offsetting existing groundwater pumping or other surface water supplies.
- Some local jurisdictions have sufficient supplies to serve all projected growth in their general plans, so additional supplies would not induce or accommodate additional growth.
- Growth in some jurisdictions may be limited by water supplies but also may be constrained by other factors, such as the availability of land, utilities (such as sewer service and electrical service), transportation facilities, schools, wastewater treatment facilities or local growth management ordinances. These other factors may continue to limit growth, even if water supply reliability increases.
- Jurisdictions where growth is limited by water supply can attempt to obtain water from new sources if additional SWP water is not provided through this project.
- Some retailers and jurisdictions have the ability to store water during years when supplies are plentiful and hold it over to be used in years when supplies are scarce. This makes it more difficult to assess the growth-related effects of additional supplies for local jurisdictions.
- Local jurisdictions, not water suppliers, have control over land use decisions, both how much and where growth will occur. It would be extremely difficult to determine specific lands that would be developed as a result of the additional increment of water provided by the SDIP, and what resources would be affected by that additional growth.
- Local jurisdictions ~~throughout in southern~~ California have typically based land-use planning on growth forecasts, which are usually based on factors such as demographic and economic forces, and not constrained by the availability of adequate water supplies (LSA Associates, Inc. 2003; EIP Associates 2004).

Some contractors, such as the Central Coast Water Authority, may rely solely on SWP supplies. The Santa Barbara/Goleta area and the area served by the Newhall County Water District are two examples of regions of California in which local governments have imposed limits on growth based on limits in their supply of water, and where additional water could lead to additional growth. While the Santa Barbara/Goleta area receives water from the SWP, the Monterey Peninsula area relies exclusively on local supplies. In areas that rely on the SWP or CVP and in which growth is limited by water supplies, providing additional water could lead to additional growth.

South Delta Improvements Program  
Draft Environmental Impact Statement/  
Environmental Impact Report

9-15

October 2005

J&S 02053.02

## Chapter 10

U.S. Department of the Interior, Bureau of Reclamation,  
and the California Department of Water Resources

Cumulative Impacts

feet in order to improve Bay Area water quality and water supply reliability. An expanded reservoir would require a new or expanded Delta intake, with a capacity of up to 1,750 cfs for the maximum reservoir size. Locations being considered for the new Delta intake include Old River and adjacent channels. Water from an expanded reservoir could be delivered to Bay Area water users through a connection to the South Bay Aqueduct.

The Los Vaqueros Reservoir expansion study is in the early planning stage. A Draft Planning Report, including an evaluation of the environmental impacts of an expanded Los Vaqueros Expansion alternative on the Delta, was released in May 2003 (California Bay-Delta Authority 2004). Studies conducted for the Draft Planning Report show that there would be no significant effect on water levels for current Delta water users, or on river velocities. An expanded Los Vaqueros could change the timing of diversions from the Delta. Passage of Measure N in March 2004 allows further environmental and engineering studies to continue, with planned environmental review public scoping meetings to be held in early 2005 and a tentative EIR/EIS schedule of 2007. Effects of a Los Vaqueros expansion are considered in the qualitative cumulative impact assessment below.

The Los Vaqueros Reservoir Expansion could contribute to cumulative effects on water supplies and associated resources. The project ~~would not result in~~ ~~could~~ ~~increase~~ water supplies available for export in those years when Los Vaqueros Reservoir otherwise would have spilled because Measure N included a condition that expansion would not result in exports to southern California. ~~However,~~ ~~this~~ project could also modify the timing and magnitude of upstream reservoir releases in wet years. Because this project is in its early environmental documentation stages, the cumulative analysis will be qualitative.

### Upper San Joaquin River Basin Storage Investigation

The Upper San Joaquin River Basin Storage Investigation is considering a range of approaches to increase water supplies through possible enlargement of Millerton Lake at Friant Dam. Reclamation and DWR are conducting the Upper San Joaquin River Basin Storage Investigation to consider a 700,000-acre-foot Millerton Lake expansion and other alternatives to providing surface storage in the upper San Joaquin River Basin. As stated in the CALFED ROD, the goal of the project is to "contribute to restoration of and improve water quality for the San Joaquin River and facilitate conjunctive water management and water exchanges that improve the quality of water deliveries to urban communities." The investigations are ongoing. The first of a series of reports analyzing alternatives was completed in 2003, with a second report, an "Initial Alternatives Information Report," due for completion in spring 2005. A final feasibility report and environmental review would be prepared at a later unscheduled date.

This project has the potential to improve fish conditions in the San Joaquin River and could increase flows into the Delta, depending on operation of Friant Dam

South Delta Improvements Program  
Draft Environmental Impact Statement/  
Environmental Impact Report

10-8

October 2005

J&S 02053.02

- expansion of Pacheco Reservoir.

The Low Point Improvement Project is currently in the planning stages. A NOP/NOI to prepare an EIS/EIR was released in August 2002, and the EIS/EIR is expected to be released in 2006, with possible implementation sometime during or after 2007. Implementation of this project would restore operational flexibility of the San Luis Reservoir and improve reliability of water deliveries to CVP contractors. This project is included in the qualitative cumulative analysis.

Stockton Deep Water Ship Channel DO Improvements

## CALFED Ecosystem Restoration Program

The goals of the CALFED ERP are to:

- recover 19 at-risk native species and contribute to the recovery of 25 additional species;
- rehabilitate natural processes related to hydrology, stream channels, sediment, floodplains and ecosystem water quality;
- maintain and enhance fish populations critical to commercial, sport and recreational fisheries;
- protect and restore functional habitats, including aquatic, upland and riparian, to allow species to thrive;
- reduce the negative impacts of invasive species and prevent additional introductions that compete with and destroy native species; and
- improve and maintain water and sediment quality to better support ecosystem health and allow species to flourish.

The ERP plan, which is divided into the Sacramento, San Joaquin, and Delta and Eastside Tributary regions, includes the following kinds of actions:

- develop and implement habitat management and restoration actions, including restoration of river corridors and floodplains, reconstruction of channel-floodplain interactions, and restoration of Delta aquatic habitats;
- restore habitat that would specifically benefit one or more at-risk species;
- implement fish passage programs and conduct passage studies;
- continue major fish screen projects and conduct studies to improve knowledge of their effects;
- restore geomorphic processes in stream and riparian corridors;
- implement actions to improve understanding of at-risk species;
- develop understanding and technologies to reduce the impacts of irrigation drainage on the San Joaquin River and reduce transport of contaminant (selenium) loads carried by the San Joaquin to the Delta and the Bay; and



- implement actions to prevent, control, and reduce impacts from nonnative invasive species.

ERP actions contribute to cumulative benefits on fish and wildlife species, habitats, and ecological processes and are considered in the qualitative analysis of cumulative effects.

### **Stockton Deep Water Ship Channel DO Improvements**

A CALFED ecosystem restoration action is a management plan to (improve) the low DO in the Stockton DWSC. One component of this action is the construction and demonstration of a dissolved oxygen aeration device in the Stockton DWSC. The DO demonstration project is being implemented by DWR and is in the final stages of construction. The demonstration aeration device uses liquid oxygen as the source of oxygen gas to inject small bubbles into two devices (200 feet deep wells) where the high hydrostatic pressure allows most of the oxygen gas to dissolve. Each device consists of two concentric tubes, with the water and gas bubble flowing down the center 20-inch diameter tube and then up the 30-inch diameter outer tube. Two screened pumps with a flow capacity of 25 cfs pump river water into the wells and then discharges the water back into the DWSC through a multi-port diffuser located at a depth of 15 feet. The device will be operational in the spring of 2007, and is designed to deliver 10,000 lbs/day of DO to the DWSC, which is enough to raise the DO by 1.0 mg/l within a 2-mile section of the DWSC each day of operation.

### **CALFED Levees Program**

The goal of the CALFED Levees Program is to uniformly improve Delta levees by modifying cross sections, raising levee height, widening levee crown, flattening levee slopes, or constructing stability berms. Estimates predict that there are 520 miles of levees in need of improvement and maintenance to meet the PL 84-99 standard for Delta levees. The levees program continues to implement levee improvements throughout the Delta, including the south Delta area. The program is included in the qualitative cumulative analysis.

City of Stockton Drinking Water Intake

### **Other CVP/SWP-Related Projects**

#### **Freeport Regional Water Project**

FRWP is a regional water supply project being developed on the Sacramento River near the town of Freeport by the Sacramento County Water Agency (SCWA) and EBMUD, in close coordination with the City of Sacramento and

Temperature objectives for the Trinity River are set forth in State Water Board Water Rights Order 90-5 (WR 90-5). Operationally, for the purposes of establishing the Trinity River flows, the water year type will be forecasted by Reclamation based on a 50% forecast on April 1. To avoid warming and to function most efficiently for temperature control, water is exported for the Trinity River Basin through Whiskeytown Reservoir and into the Sacramento River Basin during the late spring.

### **San Luis Drainage Reevaluation Project**

The Bureau of Reclamation San Luis Unit provides irrigation water and includes portions of Kings, Fresno, and Merced Counties on the west side of the San Joaquin Valley. Over time, irrigation of the land has caused shallow water tables to rise closer to the surface. By 1990 nearly 337,000 acres (nearly 47% of the land within the Unit) had water tables within 20 feet of the ground surface.

Methods exist for removing shallow groundwater from the root zone. The drainwater that is collected, however, contains concentrations of naturally occurring elements, such as salt, selenium, and boron that pose a threat to the environment and drinking water supplies. The San Luis Drainage Feature Re-Evaluation challenge is to remove, treat, and/or contain drainwater in a manner that protects the environment.

Reclamation has been developing potential drainage disposal options that will provide for the implementation of drainage service to the Unit. This analysis has resulted in a Draft Environmental Impact Statement that examines the alternatives and provides information about the potential environmental effects of providing drainage service.

Reclamation anticipates that the agency-preferred alternative will be one of the three In-Valley/Land Retirement Alternatives or some variation. Land retirement included in these alternatives range from 92,600 to 308,000 acres.

### **Delta Improvements Package**

The DIP is an outline for CALFED agencies to implement a series of projects, programs, and activities that will help meet the balanced implementation goal of the CALFED Program. Many of the activities identified in the DIP were also described in the CALFED ROD. However, some actions (listed below) were not, but are also reasonably foreseeable and are included in the cumulative impacts assessment:

- San Joaquin River Salinity Management Plan—DWR and Reclamation developed a plan to maintain compliance with all existing Delta water quality salinity objectives. The RWQCB adopted an amendment to the basin plan and forwarded it to the State Water Board for final action. The State Water Board adopted Resolution 2005-0087 on November 16, 2005, approving an

amendment to the Water Quality Control Plan for the Central Valley Region to incorporate a Total Maximum Daily Load for the control of salt and boron discharges into the lower San Joaquin River has not set a hearing date.

- Vernalis Flow Objectives—The San Joaquin Water Quality Management Group, an interagency working group, is currently looking at the salinity problem in the lower San Joaquin River and the DO problem in the Stockton DWSC. A report of findings and recommendations is in process.
- San Joaquin River Dissolved Oxygen—CALFED agencies would develop a plan to help improve water quality in the Stockton DWSC. This includes the demonstration of an aeration device in the DWSC.
- Franks Tract—State and federal agencies would evaluate and implement, if appropriate and authorized, a strategy to significantly reduce salinity levels in the south Delta and at the CCWD and SWP/CVP export facilities and improve water supply reliability by reconfiguring levees and/or Delta circulation patterns around Frank Tract while accommodating recreational interests.
- Relocation of M&I Intake—state and federal agencies will work with CCWD to relocate their intake to the lower part of Victoria Canal should the above actions not provide acceptable continuous improvements in Delta water quality.
- Delta Regional Ecosystem Restoration Implementation Plan (DRERIP)—This plan is intended to refine the existing planning foundation specific to the Delta, refine existing Delta-specific restoration actions, and provide guidance for Delta specific ERP tracking, performance evaluation, and adaptive management feedback.
- Science Actions and Commitments—several studies would be conducted, including a Focused Study on South Delta Hydrodynamics, Water Quality, and Fish; Focused Study on Delta Smelt and Fish Facilities; South Delta Fish Facilities; and Performance Evaluation and Monitoring Program.

## Water Transfers and Acquisition Programs

### CALFED Environmental Water Account

The EWA is designed to mitigate for water loss during times when CVP and SWP pumping is reduced in an effort to avoid harming fish as they migrate through the Delta. The EWA was created to address two problems: declining fish populations and unreliable water supplies. Its purpose is to better protect fish by making it possible to modify water project operations in the Bay-Delta and still meet the needs of water users. To do that, the EWA buys water from willing sellers or diverts surplus water when safe for fish, then banks, stores, transfers and releases it as needed to protect fish and compensate water users. The EWA has set a goal of acquiring up to 188,000 acre-feet of water each year through purchases. EWA expects to obtain some water through additional

U.S. Department of the Interior, Bureau of Reclamation,  
and the California Department of Water Resources

Cumulative Impacts

174-acre parcel of land approximately 1 mile west of the San Joaquin County line and 1 mile southeast of the Contra Costa County line. The actual footprint of the plant would be approximately 55 acres, with the remainder of the parcel available for agricultural leases. Water for cooling and other power plant processes would be provided by Byron Bethany Irrigation District. The plant is expected to have a 30 to 50 year operating life. Environmental documentation equivalent to an EIS/EIR (Revised Presiding Member's Proposed Decision) was completed in January 2003 and approval from the Energy Commission was granted in August 2003.

### **Water Facilities Expansion Project**

The City of Sacramento is in the process of expanding and replacing facilities at the E. A. Fairbairn Water Treatment Plant (WTP) and the Sacramento River WTP. The purpose of this project is to allow the City to reliably meet increasing water demands and to allow diversions to be shifted from the American River to the Sacramento River. The Fairbairn WTP is being expanded from approximately 90 mgd to 200 mgd. The Sacramento River WTP is being expanded from approximately 110 mgd to 160 mgd. Construction at both plants includes some new facilities as well as improvements to some of the existing facilities. It is expected that the Fairbairn WTP construction will be completed within approximately 32 months, while construction at the Sacramento River WTP is expected to be completed within approximately 34 months. Construction at both facilities may ultimately require up to 164,000 linear feet of transmission pipeline improvements. A final EIR was completed for this project in November of 2000, and construction of the project began in October of 2001.

### **Stockton Delta Water Supply Project**

The Stockton Delta Water Supply Project (DWSP) will develop a new supplemental water supply for the Stockton Metropolitan Area by taking in water from the Delta on the southwest tip of Empire Tract, and pumping that water through a ~~miles of~~ pipeline running along the north side of Eight Mile Road. From there, the water will be pumped to a surface water treatment plant. The DWSP will be constructed in phases with the initial phase to be completed in 2010. Initially, the DWSP will have the capacity to treat and deliver up to 30 mgd or 33,600 acre-feet per year of water. ~~Immediately, a~~ Approximately one third of Stockton's water needs will be met by this facility. Ultimately by about 2050, the water treatment plant would be expanded to treat 160 mgd or 125,900 acre-feet per year of water. The EIR for this project was certified on November 8, 2005 and a water right permit was issued on December 20, 3005.

South Delta Improvements Program  
Draft Environmental Impact Statement/  
Environmental Impact Report

10-21

October 2005

J&S 02053.02

Delta protections would continue in effect, and these future projects would be required to show how they are being met. Potential cumulative effects of storage and conveyance projects on south Delta level and flow conditions are considered less than significant.

### Other CALFED Programs

Other CALFED Program actions, including the Drinking Water and Reliability Program and the Levee Program actions, could result in some localized effects on Delta waterways (i.e., intake and levee improvements), but none would be expected to significantly affect south Delta tidal hydraulic conditions because they would not affect water level and flow conditions. The CALFED ERP actions would not substantially affect cumulative Delta tidal level and flow conditions.

In addition to CALFED programs identified in the Programmatic ROD, a number of programs in the DIP, including Franks Tract improvements, Delta Cross Channel operations, and the Through-Delta Facility, could have generalized cumulative effects on water level and flow conditions in the Delta. The potential for cumulative, localized tidal hydraulic effects in the south Delta is believed to be unlikely because of the distance of these projects from SDIP improvements. Specific projects related to improving San Joaquin River salinity and DO conditions would have a positive effect on flow conditions.

### Other Local Development Projects

Other local transportation and development projects in the vicinity of SDIP improvements (i.e., SR 4 Bypass, Mountain House and River Islands developments) are not expected to adversely affect Delta tidal hydraulic conditions because these projects would not modify level or flow conditions in Delta channels and would not affect operation of the CVP or SWP. The River Islands development project proposes to widen the Paradise Cut channel south of Stewart Tract to improve flood conveyance capacity and provide habitat for fish and wildlife. This project would also result in creation of back-bays on Old River adjacent to Stewart Tract. These changes are not expected to significantly affect level or flows on Old River or Paradise Cut and are not currently known to have adverse effects on other south Delta channels in the vicinity of Stewart Tract.

Additionally, the EIR for the DWSP indicates that there are negligible changes in flow and stage downstream of the DWSP intake, and that cumulative effects of the DWSP (in which the SDIP was included) would be minimal, with changes in stage of approximately 0.01 feet and changes in flows of less than 1%. It is not expected that these minor changes in flow and stage combined with SDIP and other projects would result in a significant cumulative impact to tidal hydraulics.

## Water Quality

Cumulative future water quality impacts in the Delta can result from future changes in river inflow water quality, as well as future conditions of reduced Delta outflow. No other projects that are assumed in SDIP or OCAP CALSIM analyses are proposed in the vicinity of the SDIP permanent gates or CCF gates that could have a substantial effect on south Delta water quality. The quantifiable cumulative changes in south Delta water quality would be associated primarily with SDIP permanent gate operations and operation of the CCF gates.

There is a limit to the magnitude of the future salinity changes expected in the Delta channels. The D-1641 objectives for maximum EC are generally satisfied by CVP and SWP operations in the Delta. Delta outflow is therefore already regulated, and these minimum Delta outflows are included in the CALSIM simulations that are used for the DSM2 inputs. Water quality objectives for salinity at Vernalis are expected to maintain the future San Joaquin River EC values at about what they are simulated to be in the 2001 baseline and 2020 baseline conditions. Other potential future changes in inflow water quality, or increased discharges of treated wastewater, in the Delta are expected to be independent of the increased SWP Banks pumping anticipated with SDIP alternatives. These potential water quality changes are considered to be independent of the SDIP and will not be increased with the SDIP alternatives. These future changes in Delta water quality are expected to occur with or without the SDIP alternatives, and can be evaluated only generally.

Some future water transfers during the July–September period will be possible without the SDIP. As described above, the water quality effects from these additional exports are assumed to be compensated for by “carriage water” that will slightly increase Delta outflow during the transfer. No cumulative water quality impacts from any additional water transfers with SDIP are anticipated.

Some of the additional water quality actions and projects that are being considered and investigated by the CBDA Drinking Water Quality and CALFED Science Programs, such as described in the Delta Improvement Program, and the proposed San Luis Drainage Reevaluation Program may provide improvements in the south Delta salinity and DOC concentrations. These potential improvements would reduce the future baseline conditions, but would not likely reduce the SDIP water quality effects. However, the adaptive operations of the tidal gates will provide a substantial new tool for management of south Delta water quality. Incremental improvements, from whatever future baseline conditions develop, will be possible by careful monitoring of water quality and appropriate operations of the south Delta tidal gates.

No significant cumulative water quality impacts beyond those impacts identified for the SDIP alternatives would result from combining other past, present, or reasonably foreseeable projects.

Cumulative changes in DWSC DO concentrations would be considered less than significant during summer months because when the south Delta water level and

quality objectives have been met, the head of Old River gate would be operated to improve San Joaquin River DO conditions.

### Other Water Storage and Conveyance Projects

Other water storage and conveyance projects outlined above are not expected to significantly affect cumulative water quality conditions in the south Delta beyond those discussed for SDIP because operating these projects would require compliance with current Delta flow and water quality requirements. Operating SWP Banks facility at a future permitted pumping capacity of 10,300 cfs is not expected to significantly affect south Delta salinity, DOC and DO conditions because operations at this pumping capacity would be similar to operations described for SDIP at 8,500 cfs, and current Delta outflow and water quality criteria would be required at an increased level of SWP pumping. Future storage reservoirs or expansion of existing reservoirs would not result in substantial changes in south Delta water quality because operating storage reservoirs typically involves storing river flows during high flow periods when water quality conditions are not a concern in the Delta and releasing flows during high demand summer periods, when south Delta salinity and DO conditions are less desirable. All of the existing flow-related water quality requirements of D-1641 and other Delta protections would continue in effect, and these future projects would be required to show how they are being met. Potential cumulative effects of storage and conveyance projects on Delta water quality conditions are considered less than significant.

### Other CALFED Programs

Other CALFED Program actions, including the Drinking Water and Reliability Program, ~~and the Levee Program actions, and the Stockton DWSC DO Improvements~~, could result in some localized effects on Delta waterways (i.e., intake and levee improvements), but none would be expected to significantly affect south Delta water quality because current water quality protections would remain in place and these projects would not substantially affect Delta flow or water quality conditions. The CALFED ERP actions would not substantially affect cumulative Delta water quality conditions. The Stockton DWSC aeration device demonstration project is expected to substantially improve the low DO in the DWSC.

In addition to CALFED programs identified in the Programmatic ROD, a number of programs in the DIP, including Franks Tract improvements, San Joaquin River Salinity Management Plan, and Vernalis Flow Objectives, are proposed to improve salinity and DO conditions in the San Joaquin River and Delta. Overall, it is expected that these programs will have a beneficial effect on cumulative water quality conditions in the south Delta.

## Other Local Development Projects

Other local transportation and development projects in the vicinity of SDIP improvements (i.e., SR 4 Bypass, Mountain House and River Islands developments) are not expected to adversely affect Delta water quality conditions because these projects would result in only minor localized effects on Delta waterways and would employ standard construction methods to minimize erosion and turbidity effects. Cumulative construction-related water quality effects would be similar to the types identified for SDIP Alternative 2A and could be additive, but are considered less-than-significant impacts because impacts on water quality would be minor and temporary. No additional mitigation is required.

## Fish

The cumulative fisheries resource impacts of the SDIP Stage 1 and other past, present, and future projects include changes in Delta fish habitat and minor direct loss of fish during construction activities. The SDIP would result in the loss of vegetation that provides migration, rearing, and spawning habitat for fish species in the Delta. Other projects occurring in the Delta such as Mountain House and River Islands may result in a minor additional reduction of fish habitat. Projects occurring in the Delta and in the Sacramento and San Joaquin River systems to restore habitat are ongoing under the Environmental Restoration Project (ERP). Loss of fish habitat in the Delta from the SDIP and other projects would be mitigated. This mitigation, combined with the ERP will ensure that the overall cumulative effect on fish habitat is less than significant. Additionally, with the incorporation of mitigation measures identified in the Vegetation and Wetlands section, losses of fish habitat would be compensated and there would be no net loss of habitat. Therefore, the SDIP Stage 1 contribution to this cumulative impact is not considerable.

The cumulative fisheries resource impacts of the SDIP Stage 2 and other reasonably foreseeable projects have been addressed quantitatively during ESA consultation for the coordinated operations of the CVP and SWP and the OCAP (National Marine Fisheries Service 2004; U.S. Fish and Wildlife Service 2004a). The BOs provide a project description for formal and early consultation elements, including a description of conservation measures (e.g., Water Rights Decision 1641, VAMP, EWA, CVPIA b(2), and an adaptive management process that is primarily centered on use of the Delta Smelt Risk Assessment Matrix (DSRAM) (National Marine Fisheries Service 2004; U.S. Fish and Wildlife Service 2004a). Formal consultation covers the effects of proposed 2020 operations of the CVP and SWP, including:

- long-term EWA to provide targeted pumping reductions,
- continued (improved) operation of the Tracy Fish Collection Facility,
- operation of the DMC/California Aqueduct Intertie,
- continued (improved) operation of the Skinner Fish Facility,



Table 10-1. Continued

Project	Criterion 1: Is the action under active consideration?	Criterion 2: Does the action have recently completed environmental documentation or are environmental documents in some stage of active development?	Criterion 3: Would the action be completed or operational within the timeframe being considered for the SDIP (assumed to be 2020)?	Criterion 4: Does the action, in combination with the SDIP alternatives, have the potential to affect the same resources?	Role in Cumulative Assessment		Notes
					Quantitative	Qualitative	
<b>Other CVP/SWP-Related Projects</b>							
Freeport Regional Water Project	Y	Y	Y	Y	X		
Trinity River Mainstream Fishery Restoration Program	Y	Y	Y	Y	X		
Sacramento Valley Water Management Agreement (Phase 8)	Y	YN	Y	Y		X	Most of the project components involve only the cooperation of northern California water users to increase water use efficiency. This will likely be accomplished by 2020.
San Luis Drainage Reevaluation Project	Y	Y	Y	Y	X	X	The potential actions undertaken by the San Luis Drainage Reevaluation Project are not included in CALSIM II. Therefore, these potential actions are evaluated qualitatively.
Delta Improvements Package	Y	Y	Y	Y	X	X	The potential actions undertaken by the Delta Improvements Program not included in CALSIM II. Therefore, these potential actions are evaluated qualitatively.
<b>Water Transfer and Acquisition Programs</b>							
CALFED Environmental Water Account	Y	Y	Y	Y	X		It is quantitative because 190,000 acre-feet were purchased and an additional 190,000 acre-feet will be gained each year through modification of pumping procedures
CALFED Environmental Water Program	Y	N	Y	Y		X	The program has not been implemented because of funding constraints, but should be by year 2020.
Delta Improvements Package	Y	Y	Y	Y		X	The Delta Improvements Package will be implemented in phases and includes actions that have already been implemented.
<b>Local Projects</b>							
State Route 4 Bypass Project	Y	Y	Y	Y		X	The first phase of this project is complete and the next phases are scheduled for 2004-10, depending on available funding.
Mountain House	Y	Y	Y	Y		X	
River Islands	Y	Y	Y	Y		X	

## Chapter 12

### Chapter 12 List of Preparers

Following is a list of persons who contributed to preparation of this EIS/EIR. This list is consistent with the requirements set forth in NEPA and CEQA (40 CFR 1502.17 and Section 15129 of the State CEQA Guidelines).

#### Department of Water Resources

Paul Marshall	Project Manager
Kathy Kelly	Bay-Delta Office Chief
Bijaya Shrestha	Water Resources Engineer
Erik Reyes	Water Resources Engineer
<u>Ajay Dev</u>	<u>Water Resources Engineer</u>
<u>Felix Ko</u>	<u>Water Resources Engineer</u>
Bob Pedlar	Senior Engineer
Gordon Enas	Senior Engineer
Scott Woodland	Senior Engineer
<u>Andy Chu</u>	<u>Senior Engineer</u>
Mike Ford	Principal Engineer
<u>Jamie Anderson</u>	<u>Operation Research Specialist</u>

#### Bureau of Reclamation

Michelle Light	Delta and Integrated Resource Planning Branch Chief
Dan Meier	Project Manager
Sharon McHale	Project Manager

## Chapter 13

U.S. Department of the Interior, Bureau of Reclamation,  
and the California Department of Water Resources

References

- Budd, H. 1926. Map of San Joaquin County, California. Budd & Widdows, Civil Engineers, Stockton, CA. On file at California History Room, California State Library, Sacramento, CA.
- Bureau of Reclamation. See U.S. Department of the Interior, Bureau of Reclamation.
- CALFED Bay-Delta Program. 1996. Affected environment technical report, cultural resources in the Delta region. Draft. September. Sacramento, CA
- . 2000a. Programmatic record of decision. August. Sacramento, CA.
- . 2000b. Final programmatic environmental impact statement/environmental impact report, CALFED Bay-Delta program. Prepared for the U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Environmental Protection Agency, Natural Resources Conservation Service, U.S. Army Corps of Engineers, and California Resources Agency. July. Sacramento, CA.
- . 2000c. Levee system integrity program plan, final programmatic EIS/EIR technical appendix. July. Sacramento, CA.
- . 2000d. Ecosystem restoration program plan, strategic plan for ecosystem restoration. Programmatic environmental impact statement/environmental impact report technical appendix. Prepared for the United States Bureau of Reclamation, United States Fish and Wildlife Service, National Marine Fisheries Service, United States Environmental Protection Agency, Natural Resources Conservation Service, United States Army Corps of Engineers, and California Resources Agency. California Air Resources Board. 2002. Mobile Source Emissions Inventory Program. Available: <<http://www.arb.ca.gov/msei/msei.htm>>.
- . 2000e. Multi-species conservation strategy for the CALFED Bay-Delta program. July. Sacramento, CA. Prepared by Jones & Stokes. Sacramento, CA.
- CALFED Ops Group. 2006. Description of CALFED Ops. Available at: <<http://www.wco.water.ca.gov/calfedops/desc.html>>. Accessed: May 11, 2006.
- California Air Resources Board. 2002. Mobile source emissions inventory program. Available: <<http://www.arb.ca.gov/msei/msei.htm>>.
- California Bay-Delta Authority. 2001. Guide to regulatory compliance for implementing CALFED actions, volume 2: Environmental regulatory processes. June. Sacramento, CA.

South Delta Improvements Program  
Draft Environmental Impact Statement/  
Environmental Impact Report

13-4

October 2005

J&S 02053.02

U.S. Department of the Interior, Bureau of Reclamation,  
and the California Department of Water Resources

References

- County of Sacramento and U.S. Bureau of Reclamation. 1997. Draft environmental impact report/environmental impact statement. Central Valley Project Water Supply Contracts under Public Law 101-514 (Section 206).
- Cramer, S. P. 1996. *The status of late-fall and spring Chinook salmon in the Sacramento River Basin in regards to the Endangered Species Act*. S. P. Cramer & Associates. 39 pp. (Available from S. P. Cramer & Associates, Inc., 300 S.E. Arrow Creek Lane, Gresham, OR 97080.)
- Daniels, R. A., and P. B. Moyle. 1983. Life history of the splittail (Cyprinidae: *Pogonichthys macrolepidotus*) in the Sacramento-San Joaquin Estuary. *Fish Bulletin* 84:105-117.
- DeHaven, R. W., F. T. Crase, and P. D. Woronecki. 1975. Movements of tricolored blackbirds banded in the Central Valley of California. *Bird Banding* 46:220-229.
- Delta Protection Commission. 1995. Land use and resource management plan for the primary zone of the Delta. Adopted February 23, 1995. Available: <<http://www.delta.ca.gov/plan.html>>.
- . 1997. Summary of the "Sacramento-San Joaquin Delta Recreation Survey, prepared by the Department of Parks and Recreation for the Delta Protection Commission and the Department of Boating and Waterways." Available at: <[http://www.delta.ca.gov/recsur.html#\\_chapI](http://www.delta.ca.gov/recsur.html#_chapI)>. Accessed September 30, 2002.
- EDAW and Surface Water Resources. 1999. *Draft environmental impact report for the water forum proposal*. City of Sacramento and County of Sacramento, Office of Metropolitan Water Planning. January.
- EIP Associates. 2004. Water front. August. Available: <[http://www.eipassociates.com/EIP\\_Water\\_Group\\_Website/index.htm#](http://www.eipassociates.com/EIP_Water_Group_Website/index.htm#)>. Accessed: 2004
- Emmett, R. L., S. A. Hinton, S. L. Stone and M.E. Monaco. 1991. Distribution and abundance of fishes and invertebrates in west coast estuaries, Volume II: species life history summaries. ELMR Rep. No. 8, NOAA/NOS Strategic Environmental Assessments Division, Rockville, MD, pp. 136-144.
- Enrix and Resource Insights. 1996. Draft environmental impact report/environmental impact statement (EIR/EIS), Interim South Delta Program (ISDP), Volume I. July. Prepared by Enrix, Inc., Sacramento, CA, and Resource Insights, Sacramento, CA. Prepared for Department of Water Resources, Sacramento, CA, and Bureau of Reclamation, Folsom, CA.

South Delta Improvements Program  
Draft Environmental Impact Statement/  
Environmental Impact Report

13-13

October 2005

J&S 02053.02

U.S. Department of the Interior, Bureau of Reclamation,  
and the California Department of Water Resources

References

———. 1997c. *Addendum report for an archaeological assessment within Reclamation Districts 2058 & 2095 in San Joaquin County, California: part of the cultural resources inventory and evaluation for U.S. Army Corps of Engineers, Sacramento District, PL 84-99 levee rehabilitation on the Feather, Bear, Sacramento and San Joaquin Rivers system COE water basin system designation SJ 08*. Prepared by Pacific Legacy, Inc., Woodland, CA. On file at Central California Information Center, California State University, Stanislaus (Study CCIC-3156). Turlock, CA.

Shirvell, C. S. 1990. Role of instream rootwads as juvenile coho salmon (*Oncorhynchus kisutch*) and steelhead trout (*Oncorhynchus mykiss*) cover habitat under varying stream flows. *Canadian Journal of Fisheries and Aquatic Sciences* 47:852–861.

Shlemon, R. J., and E. L. Begg. 1975. Late Quaternary evolution of the Sacramento–San Joaquin Delta, California, pp. 259–266 in Suggate, R. P., and M. M. Cresswell (eds.), *Quaternary Studies*. Wellington, New Zealand: The Royal Society of New Zealand.

Silverstein, M. 1978. Yokuts: Introduction, pp. 446–447 in R. F. Heizer (ed.), *California. Handbook of North American Indians*, volume 8, W. C. Sturtevant (gen. ed.). Washington, D.C.: Smithsonian Institution.

Smardon, R. C., J. F. Palmer, and J. P. Felleman. 1986. *Foundations for visual project analysis*. New York, NY: John Wiley & Sons Inc.

Society of Vertebrate Paleontology. 2005. Assessment and mitigation of adverse impacts to nonrenewable paleontologic resources: standard guidelines. Available: [http://www.vertpaleo.org/policy/policy\\_statement\\_conformable\\_Impact.htm](http://www.vertpaleo.org/policy/policy_statement_conformable_Impact.htm). Accessed May 23, 2006.

Sommer, T., R. Baxter, and B. Herbold. 1997. Resilience of splittail in the Sacramento–San Joaquin Estuary. *Transactions of the American Fisheries Society* 126:961–976.

Sommer, T., B. Harrell, M. Nobriga, R. Brown, P. Moyle, W. Kimmerer, and L. Schemel. 2001. California's Yolo Bypass: Evidence that flood control can be compatible with fisheries, wetlands, wildlife, and agriculture. *Fisheries* 26(8):6-16.

Sommer, T. R., M. L. Nobriga, W. C. Harrell, W. Batham, and W. J. Kimmerer. 2001. Floodplain rearing of juvenile Chinook salmon: Evidence of enhanced growth and survival. *Canadian Journal of Fisheries and Aquatic Sciences* 58(2):325–333.

Sommer, T., L. Conrad, G. O'Leary, F. Feyrer, and W. C. Harrell. 2002. Spawning and rearing of splittail in a model floodplain wetland. *Transactions of the American Fisheries Society* 131:966–974.

South Delta Improvements Program  
Draft Environmental Impact Statement/  
Environmental Impact Report

13-26

October 2005

J&S 02053 02

## Appendix J

U.S. Department of the Interior, Bureau of Reclamation,  
and the California Department of Water Resources

Methods for Assessment of Fish Entrainment in  
State Water Project and Central Valley Project Exports

water diversions are located at Antioch and Pittsburg, but the entrainment in cooling water intakes is not expected to change with the SDIP. The potential entrainment of particles (and fish) in cooling water intakes has not been included in this particle-tracking analysis.

### Particle Tracking Model—Simulated Entrainment of Fish Behaving as Passive Particles

The basis for this entrainment assessment is hypothesis 2, that the number of fish entrained is related to the interaction between Delta channel tidal hydraulics and fish distribution. Key elements of the assessment method include the assumed distribution and abundance of fish in the Delta channels, the effects of diversion on channel flows, and subsequent effects of channel flows on the distribution and movement of fish and exposure to diversion intakes. Fish are assumed to behave and move as passive particles within the water column. The movement and entrainment of particles are described for two separate study periods: (1) the full range of CVP and SWP pumping with Delta outflows of 5,000 cfs, 7,000 cfs, or 12,000 cfs; and (2) the full range of VAMP conditions during spring.

The full range of possible CVP and SWP pumping, from 0 cfs to ~~14,900~~14,900 cfs (CVP 4,600 cfs and SWP 10,300 cfs), was simulated for August 1997 tidal and flow conditions. The simulation of the full range of SWP and CVP pumping illustrates entrainment and distribution in the Delta channels over a 30-day period for the following Delta conditions:

- the head of Old River barrier was open;
- there were no temporary barriers in the south Delta channels;
- the Delta Cross Channel gates were open;
- historical tides for August 1977 were used;
- San Joaquin River inflow was 1,500 cfs;
- CVP pumping was 0 cfs or 4,600 cfs;
- SWP pumping was 0 cfs, 3,340 cfs, 6,680 cfs, 8,500 cfs, or 10,300 cfs;
- Contra Costa Water District (CCWD) diversion was 207 cfs, North Bay diversion was 104 cfs;
- agricultural diversions throughout the Delta were 2,871 cfs;
- seepage totaled 974 cfs but did not entrain particles;
- agricultural drainage was 1,329 cfs and so net channel depletion was 2,516 cfs;
- net Delta outflow was held at 5,000 cfs, 7,000 cfs, or 12,000 cfs; and
- Sacramento River inflow was variable to support the specified pumping and outflow.

South Delta Improvements Program  
Appendices to the Draft Environmental Impact  
Statement/Environmental Impact Report

J-18

October 2005

J&S 02053.02