Chapter 2
Project Description

Introduction

DWR and Reclamation have agreed to jointly pursue the development of the SDIP to address regional and local water supply needs as well as the needs of the aquatic environment. Overall, the SDIP alternatives are intended to meet the project purpose and objectives of reducing the downstream movement of San Joaquin River watershed Central Valley fall-/late fall–run juvenile Chinook salmon into the south Delta via the head of Old River; maintaining adequate water levels and, through improved circulation, water quality available for agricultural diverters in the south Delta downstream of the head of Old River; and when appropriate, increasing water deliveries and delivery reliability for SWP and CVP water contractors south of the Delta and providing opportunities to convey water for fish and wildlife purposes by increasing the maximum diversion through the existing intake gates at CCF to 8,500 cfs. Several regulations, as described in Chapter 1, are in place to protect water quality, fish, water levels, and other important resources. The proposed project would continue to operate in compliance with these regulations.

Project Components

The SDIP consists of a physical/structural component combined with an operational component designed to meet the purpose and objectives of the project. The following describes the basic actions related to the physical/structural component and the operational component of the SDIP.

Physical/Structural Component Potential Actions

- Construct and operate a fish control gate at the head of Old River to reduce the downstream movement of San Joaquin River watershed Central Valley fall-/late fall–run juvenile Chinook salmon into the south Delta via the head of Old River.
- Construct and operate up to three flow control structures (gates) to improve existing water level and circulation patterns for south Delta water users:

- Middle River (near the confluence of Middle River with Victoria Canal),
- Grant Line Canal (near the confluence of Grant Line Canal and Old River), and
- Old River (east of the DMC approximately 4,000 feet southeast of the intersection of the Alameda, Contra Costa, and San Joaquin County lines).

- Dredge various channels in the south Delta to improve conveyance and dredge areas surrounding agricultural diversions to improve their function.
- Extend up to 24 agricultural diversion intake facilities to improve their function.

Operational Component Potential Scenarios

- Modify operations to increase the monthly average diversion rate into CCF up to 8,500 cfs.
- Convey up to 100,000 acre-feet of CVP Level 2 Refuge water through CCF and SWP Banks by September 1, and provide a north-of-Delta supply up to 75,000 acre-feet from CVP storage facilities to reduce SWP's obligation to comply with Bay-Delta water quality and flow requirements.
- Implement an interim operations regime between December 15 and March 15 until the selected operational component is fully implemented to achieve the greater of:
  - maximum diversions under existing Corps authorization which is 6,680 cfs plus 1/3 the flow of the San Joaquin River when flows at Vernalis are greater than 1,000 cfs, or
  - maximum diversions of up to 8,500 cfs when (1) water quality standards (salinity at south Delta stations as defined by D-1641) are met and the dissolved oxygen (DO) in the San Joaquin River at Stockton is at or above the objective of 5 milligrams per liter (mg/l); (2) the south Delta water levels are at least 0.0 feet above mean sea level (feet msl) if needed for agricultural diversions; (3) there would be no unacceptable effects on special-status species; and (4) there would be no impact on EWA.

California Environmental Quality Act/ National Environmental Policy Act Requirements

CEQA and NEPA generally require consideration of a range of alternatives to a proposed project that would attain most of the basic project objectives while avoiding or substantially lessening project impacts and accomplish the project purpose and need. A range of reasonable alternatives is analyzed to sharply define the issues and provide a clear basis for choice among the options. The CEQA/NEPA analysis must also include an analysis of the no project or no action alternative.

CEQA requires that the lead agency consider alternatives that would avoid or reduce one or more of the significant impacts identified for the project in an EIR. The State CEQA Guidelines state that the range of alternatives required to be evaluated in an EIR is governed by the "rule of reason"; the EIR needs to describe and evaluate only those alternatives necessary to permit a reasonable choice and to foster informed decision-making and informed public participation (Section 15126.6[f]). Consideration of alternatives focuses on those that can either eliminate significant adverse environmental impacts or reduce them to less-than-significant levels; alternatives considered in this context may include those that are more costly and those that could impede to some degree the attainment of all the project objectives (Section 15126.6[b]). CEQA does not require the alternatives to be evaluated in the same level of detail as the proposed project.

Similarly, the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR 1502.14) require all reasonable alternatives to be objectively evaluated in an EIS, so that each alternative is evaluated at an equal level of detail. Alternatives that cannot reasonably meet the purpose and need do not require detailed analysis. An EIS must briefly describe alternatives to the proposed action where unresolved resource conflicts exist. NEPA does not require alternatives to offer some environmental benefit over the proposed action; however, neither does it discourage consideration of alternatives with lesser effects. NEPA requires that alternatives be evaluated at a comparable level of detail (40 CFR 1502.14[b]).

Identification of a Proposed Project/ Preferred Alternative

CEQA's directives are written with the premise that the lead agency is reacting to a proposal or request for a discretionary action and conducting an environmental review of a "proposed project" (see for example, CEQA Guidelines Sections 15124(a), (b); 15126(a); 15126.2(a); and 15126.6). Therefore, compliance with CEQA, in preparing an EIR, typically relates to analysis of the proposed project and alternatives (based on the proposed project's objectives). However, CEQA provides discretion for the lead agency to propose several alternatives for achieving certain objectives, without identifying one of the alternatives as the "proposed project" in the draft EIR, as long as the draft EIR contains sufficient level of detail of all the alternatives, as if any of them were the proposed project. The lead agency has the discretion to determine the alternative to be selected as the "proposed project" in the final EIR, after all environmental analysis has been completed, provided that the alternatives with the potential for being selected have been adequately analyzed in the EIR.

NEPA directs that the lead agency's environmental analysis in an EIS evaluate all reasonable alternatives (see 40 CFR 1502.14). NEPA also is written with the premise that there can be a "proposed action" if there is a non-federal applicant (see 40 CFR 1502.14(b)) but does not mandate that the lead agency's preferred alternative be identified as such at the draft EIS stage. If no preferred alternative is known at the draft EIS stage, it need not be identified until the final EIS on the basis of the draft EIS and the public and agency comments (see CEQ publication "Forty Most Asked Questions Concerning CEQ's NEPA Regulations," Question No. 4b, 5a).

DWR and Reclamation began developing this EIS/EIR in 2002. Early in this process, DWR and Reclamation, along with other stakeholders, developed alternatives meeting CEQA and NEPA requirements. Because there are both operational and physical objectives, each alternative contains two types of components: a physical/structural component and an operational component. The physical/structural component includes constructing and operating gate(s), conveyance dredging, spot dredging, and the extension of agricultural diversions. DWR and Reclamation propose the 4-gate configuration as the preferred physical/structural component due to its ability to best meet the project purpose and objectives. The operational component of each alternative is based on the timing and amount of diversions at CCF, as well as different priorities for end uses of the water. This document analyzes alternatives that include different numbers of gates combined with various operational scenarios. Consistent with the project objectives, DWR and Reclamation have chosen a range of operational scenarios paired with the 4-gate configuration, as this is the preferred physical/structural component.

During preliminary agency and public outreach related to the EIS/EIR, the lead agencies indicated that the draft would most likely identify a "proposed project/preferred alternative," based on the best available information, including regulations, policy, and scientific evidence. However, to allow additional scientific information to be developed regarding the population decline of pelagic fish in the Delta, this approach has been revised and is described below.

SDIP Decision Stages

DWR and Reclamation have identified a preferred physical/structural component of SDIP as gates at four locations in the south Delta. After the public comment period for the Draft EIS/EIR, a Final EIS/EIR will be prepared that includes responses to public and agency comments. After certification of the Final EIS/EIR for the SDIP, DWR will adopt a project and issue a Notice of Determination (NOD), and Reclamation will issue a Record of Decision (ROD) during each of two stages of the SDIP decision-making process. This process is illustrated in Figure 2-1.

Stage 1 will include making a decision involving the physical/structural component assuming the existing SWP and CVP operational rules, including the permitted limit for SWP diversions at CCF. In this stage, a decision to implement a physical/structural component or to continue installing temporary barriers will be made. The decision-making process for Stage 2 will begin after the Stage 1 decision has been documented in an NOD/ROD. The added flexibility and adaptability provided by the physical/structural component alone will achieve, to some extent, each of the SDIP objectives, regardless of the operational decision made during Stage 2. If the Stage 1 decision is to continue the installation of the temporary barriers, proceeding with Stage 2 and addressing both the physical/structural component and the operational component would be considered.

Assuming the Stage 1 decision is to implement a physical/structural component, Stage 2 would include the selection of the preferred operational component, based upon the operational scenarios presented in the Draft EIS/EIR and incorporating public input, and additional information collected on the condition of pelagic organisms in the Delta. During this stage, and prior to the selection of the preferred operational component, the public will again be provided the opportunity to comment on the preferred operational component.

CEQA and NEPA compliance for the decision made under Stage 2 will follow the preparation and circulation of supplemental information as directed by the CEQA Guidelines (see Article 11) and CEQ NEPA Regulations (40 CFR 1502.9(c)). DWR and Reclamation will issue the necessary supplemental document for CEQA and NEPA compliance explaining the preferred operational component, the rationale for its selection, and any additional environmental effects. This document would be available for public comment and review for a period of at least 45 days, consistent with CEQA and NEPA, and will provide opportunity for the public to submit additional comments on the environmental analysis of the operational component of the SDIP. A second Notice of Determination from DWR and an ROD from Reclamation regarding the selection of the preferred operational component will be filed to complete the environmental compliance requirements for Stage 2 of the SDIP.

Parties concerned about the operational component in Stage 2 should participate early in the EIS/EIR process and review and comment on this Draft EIS/EIR. With respect to the future decision for Stage 2 that relies upon the SDIP EIS/EIR certified at the time of the NOD for Stage 1, and any supplements to the EIS/EIR, a new CEQA challenge period will commence at the time of the Stage 2 decision for parties to request judicial review of DWR's decision based on any cause of action under CEQA related to the Stage 2 decision. In any decision for Stage 2, DWR will state in the Notice of Determination that DWR has relied in part upon the SDIP EIS/EIR certified in Stage 1 and intends that those aspects of the SDIP EIS/EIR relied upon in the Stage 2 decision will be subject to further judicial review.

Other permitting requirements may follow a similar staging process whereby a responsible or cooperating agency may issue a permit based on the Stage 1 decision and later amend the permit to include the Stage 2 decision. For example, DFG as a responsible agency may issue an NCCP permit on Stage 1 and later amend it to address Stage 2 (see Chapter 8).

Terminology Used in This Document

NEPA and CEQA are similar in that both laws require the preparation of an environmental study to evaluate the environmental effects of proposed governmental activities. However, there are several differences between the two regarding terminology, procedures, environmental document content, and substantive mandates to protect the environment. For this environmental evaluation of the Proposed Action, the more rigorous of the two laws was applied in cases in which NEPA and CEQA differ.

Many concepts are common to NEPA and CEQA; however, the laws sometimes use differing terminology for these common concepts. The chart below compares the terminology of CEQA and NEPA.

CEQA/NEPA Terminology

CEQA Term	Correlated NEPA Term
Lead Agency	Lead Agency
Responsible Agency	Cooperating Agency
Environmental Impact Report	Environmental Impact Statement
Findings	Record of Decision
Proposed Project	Proposed Action
Project Objectives	Project Purpose and Need
No-Project Alternative	No-Action Alternative
Environmental Setting	Affected Environment
Significant Impact	Impact
Mitigation	Environmental Commitments

Background on State Water Project and Central Valley Project Operations

Currently, DWR and Reclamation coordinate their operations to ensure that all regulatory standards required by their water right permits or other legal constraints in the Delta are met. Under all operational scenarios, DWR and Reclamation would continue coordinated operations to ensure that their Delta regulatory requirements would be met. Coordination involves joint planning of the SWP and CVP operations to achieve target levels of water quality and other standards to protect fish and benefit the environment. It also involves joint monitoring of project operations and Delta conditions to ensure that planned operations are adequate and that project operations are adjusted as necessary. These joint planning and monitoring procedures are typically implemented as described below. The information described below or in other chapters related to current and proposed operations will be used to prepare necessary permits, such as permits pursuant to ESA, CESA, and the NCCPA.

State Water Project Operations at Clifton Court Forebay and Harvey O. Banks Pumping Plant

The discussion below provides a background on the SWP and CVP operations, including a description of how the SWP's CCF and SWP Banks currently work, as well as annual, weekly, and daily operations, and information on DWR's Corps permit and joint point of diversion (JPOD).

Annual Operations Planning

DWR and Reclamation estimate the amount of water that will be provided to their respective contractors each year, existing and forecasted, based on rainfall, existing storage, available data export and conveyance capacity, and beginning snowpack measurements of each year. This amount is usually a percentage of the contractors' full contractual amount. As the year progresses and forecasted data is replaced with actual data, those allocations may be revised.

Weekly Operations Planning

To plan weekly project operations, Bay-Delta tides are estimated using the National Oceanic and Atmospheric Administration's (NOAA's) forecasted tides and regression relationships with flow and salinity at various Delta locations. Based on the best estimates of weather conditions and past experience, a target Delta outflow is determined that is expected to meet the controlling water quality standard as well as other standards. DWR and Reclamation coordinate reservoir releases to meet the target outflows (California Department of Water Resources and Bureau of Reclamation 1996a).

Daily Operations

During actual daily project operations, data are transmitted hourly to DWR and Reclamation hydrometeorological systems in their water management control centers in Sacramento. These data consist of river flows, tides, salinity, and wind speed/direction at various Delta locations. If the data indicate a significant deviation from the planned conditions, one or more of the three following operational changes can be implemented: (1) adjust project reservoir releases; (2) adjust Delta export levels; and (3) close or open the Delta Cross Channel gates. Reservoir releases are most effective for meeting Sacramento River salinity criteria (most frequently at Emmaton) or Delta outflow criteria. San

Joaquin River salinity criteria (most frequently at Jersey Point) are most effectively met by adjusting the amount of export pumping.

Rivers and Harbors Act

CCF and SWP Banks operate under a nationwide permit issued by the Corps under Section 10 of the Rivers and Harbors Act for construction and operation of facilities prior to 1968. Since 1968, four pumps were added to SWP Banks. DWR subsequently requested that the Corps provide a new permit under the Rivers and Harbors Act. In 1981, in Public Notice 5820A, Amended (Public Notice), dated October 13, 1981, the Corps determined that

> operation of the expanded facility such that future diversions into the forebay do not exceed the historical maximum one-day and three-day diversion rates would have no increased effect on navigable capacity of the Delta waterways. Therefore, no additional permit will be required under Section 10 of the River and Harbor Act of 1899 provided that the historical maximum diversion rates are not exceeded.

The Public Notice notes that those maximum diversion rates into CCF are 13,870 acre-feet (af) daily (and 13,250 acre-feet over a 3-day average). DWR also presented the Corps with plans to increase diversions by one-third of the San Joaquin River flow at Vernalis during the period from mid-December to mid-March, provided that flows at Vernalis exceed 1,000 cfs. The Corps' Public Notice states that

> analysis of this proposed operation indicated that there would be no additional reduction in water levels at Clifton Court Ferry because any increased drawdown would be off-set by higher stages caused by increased San Joaquin River flows.

The Corps concluded that "diverting one-third of the flow at Vernalis during the timeframe proposed would have no effect on navigable capacity, and no Section 10 permit is required for this operation." Under all the SDIP proposed operational scenarios, the maximum diversion capacity would be higher than the currently permitted 6,680 cfs. Therefore, increased diversions would require a new Rivers and Harbors Act Section 10 permit from the Corps.

Joint Point of Diversion

The CVP and SWP historically have shared Delta export pumping facilities to assist with project deliveries and to aid each project during times of facility outages. The sharing of these facilities is referred to as JPOD. In 1978, DWR agreed to, and the State Water Board permitted, the CVP to use the SWP Banks facility to export up to 195,000 acre-feet annually to replace pumping capacity lost at the CVP Tracy facility because of striped bass pumping restrictions in D-1485. In 1986, Reclamation and DWR formally agreed that "either party may make use of its facilities available to the other party for pumping and conveyance of water by written agreement" and that the SWP would pump CVP water to make up for striped bass protection measures (California Department of Water Resources 2003a). Per D-1641, use of JPOD is subject to an operations plan that protects fish and wildlife and other legal users of water. Thus, such joint point pumping essentially occurs only under conditions acceptable to NOAA Fisheries, DFG, USFWS, and the State Water Board, among other considerations. Although JPOD would continue to be implemented as it is currently, the operational scenarios under SDIP provide additional JPOD opportunities in the winter and summer periods. However, it could not be assumed that JPOD could provide the CVP with increased certainty and allow for increased water allocations to CVP contractors south of the Delta earlier in the year.

Project Alternatives

Alternatives Screening Process

To comply with the CEQA and NEPA regulations described above, an Alternatives Screening Report (Appendix A) was prepared describing the process by which a large number of alternatives have undergone screening as part of the identification of practicable alternatives for the project.

After passing the initial screen of meeting the project objectives/purpose and need, these alternatives were screened for feasibility based on existing technology and logistics, and their compatibility with each of the project objectives. Technological constraints involved substantial costs, implementation of untested or questionable technology, or unreasonable geotechnical assumptions. Logistical constraints included maintenance costs, access, reliability, unreasonable property acquisition, or operational constraints. An alternative's compatibility with all or most of the project objectives is evaluated to determine if implementation of any single-component/single-objective alternative would prohibit any of the project objectives from being met.

DWR worked with a broad coalition of stakeholders, including Reclamation, to discuss, debate, and develop alternative operational scenarios. This process, referred to as the 8,500 Stakeholders Process, included representatives of resource agencies, including Reclamation, water agencies and districts, and environmental groups. Facilitated meetings were held through most of 2002 producing four proposals for operational scenarios (described in Appendix A as Operational Scenarios B through E). Operational Scenario F was proposed in June 2003. In July 2003, Reclamation and DWR developed Operational Scenario A, which combined scenarios D and F. Operational Scenario E was subsequently dropped because it did not provide the CVP with a reliable capacity for exporting CVP supplies via CCF and SWP Banks. The remaining three operational scenarios (re-labeled A, B, and C) have been carried forward and are evaluated in this Draft EIS/EIR.

Four measures were determined to meet project objectives/purpose and need of maintaining adequate water quality and water levels and also meet other technological and logistical considerations. These measures were using the existing intake and enlarging West Canal (to improve conveyance capacity), permanent south Delta flow control structures (gates), localized dredging around agricultural diversions and siphons, and extending agricultural diversions that are too shallow.

DWR evaluated seven different measures to meet the objective of minimizing the loss of Central Valley fall-/late fall–run Chinook salmon in the San Joaquin River caused by the operation of the SWP and CVP export facilities. These measures ranged from screening the CCF intake to using acoustical fish gates and screening agricultural diversions. After these measures were evaluated against the project objective/purpose and need, each was evaluated for technological and logistical constraints. A permanent fish control gate at the head of Old River was determined to meet project objectives and other selection considerations.

Permanent flow control gates at Middle River, Grant Line Canal, and Old River at DMC would meet the south Delta water quality and water level objective/purpose and need, and a permanent fish control gate at the head of Old River would meet the fish protection objectives/purpose and need.

Alternatives

As described above, each alternative contains two types of components: a physical/structural component and an operational component. This document discloses the environmental impacts of different numbers of gates (physical/structural component) combined with various operational scenarios (operational component). DWR and Reclamation have evaluated a range of operational scenarios paired with the four-gate configuration, as this is the preferred physical/structural component. Consistent with the staged implementation approach described above, the environmental impacts resulting from the Stage 1 decision and the Stage 2 decision are disclosed separately for each alternative.

The selected combinations of operational component scenarios with physical/structural component actions yield a complete range of effects that are analyzed in this EIS/EIR. Each operational scenario explores differences in the timing and amount of diversions at CCF, as well as different priorities for end uses of the water (i.e., SWP, CVP, or EWA), while the difference in number of gates allows evaluation of a range of physical effects. However, not all possible combinations of physical and operational components were evaluated.

Table 2-1, below, shows various combinations of CVP and SWP operational scenarios with a range of gate configurations. Each of the alternatives is labeled with a combination of a letter and number. The gate configurations for the physical/structural component are shown as 2, 3, and 4. The scenarios for the operational component are shown as A, B, and C. The No Action Alternative, a combination of temporary barriers and current constraints of 6,680 cfs, is also evaluated.

Table 2-1. Range of Evaluated Alternatives

Temporary Barriers	Existing Conditions 6,680 cfs (D-1641)/ No Action Alternative	Operational Scenario A	Operational Scenario B	Operational Scenario C
Four Gates (preferred)	Stage 1	Alternative 2A (Stage 2)		
Four Gates (preferred)	Stage 1		Alternative 2B (Stage 2)	
Four Gates (preferred)	Stage 1			Alternative 2C (Stage 2)
Three Gates	Stage 1		Alternative 3B (Stage 2)	
One Gate	Stage 1		Alternative 4B (Stage 2)	

The evaluation of the four-gate configuration (with the greatest physical effect) combined with the current diversion limit of 6,680 cfs for the Stage 1 decision, and the evaluation of the four-gate configuration combined with three different operational scenarios for the Stage 2 decision discloses the range of potential effects of operation of four gates (Alternatives 2A–2C). Evaluation of the three-gate configuration and the one-gate configuration with Operational Scenario B further discloses possible effects that could result from implementation of permanent operable gates combined with increased diversions into CCF (Alternatives 3B and 4B). Table 2-2 shows the specific physical components of each alternative.

Table 2-2. Physical Components of Each Alternative

Alternative	Temporary Barriers	Head of Old River Fish Control Gate[1]	Flow Control Gates			Conveyance Dredging[2]	Spot Dredging[3]	Agricultural Diversions Extension
			Middle River	Old River at DMC	Grant Line Canal			
No Action	X							
2A		X	X	X	X	X	X	X
2B		X	X	X	X	X	X	X
2C		X	X	X	X	X	X	X
3B		X	X	X		X	X	X
4B		X				X	X	X

Notes:

1 Construction of head of Old River fish control gate is required by CVPIA.

2 in Middle River, West Canal, and Old River.

3 in Victoria, North, and Grant Line Canals, and in Old River and Middle River.

Alternative 1 (No Action)

A no action alternative is required pursuant to NEPA, and a no project alternative is required for CEQA. If the SDIP were not implemented, the project components described below, including fish control and flow control gates and an increase in diversion, would not occur. SWP would continue to operate under its currently permitted pumping capacity of 6,680 cfs. The current EWA program is assumed to be a component of the No Action Alternative. All of the temporary rock barriers (head of Old River fish control barrier, and Middle River, Grant Line Canal, and Old River flow control barriers) would continue to be installed and removed annually. Currently, the head of Old River barrier is installed and removed once in the spring and once in the fall. The Middle River, Grant Line Canal, and Old River temporary barriers would continue to be installed in the spring and removed in the fall. The effects of these continued operations on water supply and quality and growth inducement are discussed later in this EIS/EIR in the analysis of those specific resource areas.

Alternative 2A

Alternative 2A would be implemented in 2 stages. Stage 1 would involve the implementation of the physical/structural component including the construction and operation of the head of Old River fish control gate and Old River, Middle River, and Grant Line Canal flow control gates; channel dredging in Old River, Middle River, and West Canal; spot dredging in Victoria, North, and Grant Line Canals, and in Old River and Middle River; and extension of agricultural diversions. Stage 2 of Alternative 2A would involve implementation of Operational Scenario A for the operational component of SDIP. Specific timing and additional detail for Operational Scenario A are provided later under the discussion of Operational Scenarios.

Interim Operations

Alternative 2A also includes the implementation of Interim Operations, which would allow increased diversions prior to the full implementation of the operational component. Interim Operations would be used only between December 15 and March 15, as specified in the Corps Public Notice dated October 13, 1981. Interim Operations would include the greater of the maximum diversions of 6,680 cfs plus 1/3 the flow of the San Joaquin River when flows at Vernalis exceed 1,000 cfs (i.e., the existing limit); or maximum diversions of 8,500 cfs when (1) water quality standards (salinity at south Delta stations as defined by D-1641) are met and the DO in the San Joaquin River at Stockton is at or above the objective of 5 mg/l; (2) the south Delta water levels are at least 0.0 msl if needed for agricultural diversions; (3) there would be no unacceptable effects on special-status species; and (4) there would be no impact on EWA.

Alternative 2B

Alternative 2B would be implemented in 2 stages. Stage 1 would involve the implementation of the physical/structural component including the construction and operation of the head of Old River fish control gate and Old River, Middle River, and Grant Line Canal flow control gates; channel dredging in Old River, Middle River, and West Canal; spot dredging in Victoria, North, and Grant Line Canals, and in Old River and Middle River; and extension of agricultural diversions. Stage 2 of Alternative 2B would involve implementation of Operational Scenario B for the operational component of SDIP. Specific timing and additional detail for Operational Scenario B are provided later under the discussion of Operational Scenarios.

Alternative 2C

Alternative 2C would be implemented in 2 stages. Stage 1 would involve the implementation of the physical/structural component including the construction and operation of the head of Old River fish control gate and Old River, Middle River, and Grant Line Canal flow control gates; channel dredging in Old River, Middle River, and West Canal; spot dredging in Victoria, North, and Grant Line Canals, and in Old River and Middle River; and extension of agricultural diversions. Stage 2 of Alternative 2C would involve implementation of Operational Scenario C for the operational component of SDIP. Specific timing and additional detail for Operational Scenario C are provided later under the discussion of Operational Scenarios.

Alternative 3B

Alternative 3B would be implemented in 2 stages. Stage 1 would involve the implementation of the physical/structural component including the construction and operation of the head of Old River fish control gate and Old River and Middle River flow control gates; channel dredging in Old River, Middle River, and West Canal; spot dredging in Victoria, North, and Grant Line Canals, and in Old River and Middle River; extension of agricultural diversions; and Operational Scenario B. Specific timing and additional detail for Operational Scenario B are provided later under the discussion of Operational Scenarios. No flow control gate in Grant Line Canal is included in this alternative.

Alternative 4B

Alternative 4B would be implemented in 2 stages. Stage 1 would involve the implementation of the physical/structural component including the construction and operation of the head of Old River fish control gate; channel dredging in Old River, Middle River, and West Canal; spot dredging in Victoria, North, and Grant Line Canals, and in Old River and Middle River; and extension of agricultural diversions. Stage 2 would involve the implementation of Operational Scenario B. Specific timing and additional detail for Operational Scenario B are provided later under the discussion of Operational Scenarios. No flow control gates are included in this alternative.

Elements Common to All Action Alternatives

The following project elements are common to all Action Alternatives evaluated in this EIS/EIR:

- head of Old River fish control gate;
- conveyance dredging in Middle River, West Canal, and Old River;
- spot dredging in Victoria, North, and Grant Line Canals, and in Old River and Middle River; and
- extension of agricultural diversions.

Potential Secondary Accomplishments

NEPA and CEQA require that project proponents evaluate the effects of reasonably foreseeable consequences resulting from implementation of a project. In particular, NEPA only requires an evaluation of environmental impacts and effects having a reasonably close causal relationship to a change in the physical environment. The SDIP operational component would provide the capability for increased diversions to CCF and the accompanying additional pumping at Banks pumping plant that may result in an increase in the amount of water transferred in future years compared to the amount of water transfers that are allowed under current conditions. The increased diversions that would be permitted under each operational alternative could allow increased water transfers in the months of July, August, and September from north-of-Delta water users to south-of-Delta water users. The actual amount of water that would be transferred depends on supply and demand for the water, the availability of CVP and SWP pumping facilities, and regulatory requirements. Under the existing permitted level of diversion, there is unused SWP pumping capacity in some years that could be used for future water transfers. In addition to these transfers, additional future water transfers could occur as a result of the SDIP operational component. Figure 4-2 depicts both the existing transfer capacity and the potential transfer capacity that could occur with SDIP. This amount of currently unused capacity is considered to be a cumulative water supply effect compared to the 2001 and 2020 baseline conditions (See Chapter 10).

Section 5.1, Water Supply, provides a discussion of the changes in Delta exports that may result from these potential transfers. DWR and Reclamation will also jointly develop criteria to address any stage deficiencies at the Tracy Pumping Plant due to transfers through the SWP Banks Pumping Plant prior to the transfers occurring. Potential effects of transfers in areas upstream of the Delta on tributaries of the Sacramento and San Joaquin, and within areas receiving the transfers, are not addressed because of the speculative nature of the amount, timing, source, and use of transfers that occur in any particular water year. These effects would be evaluated as necessary by the transfer proponent. Potential increases in water transfers could result in indirect effects in the Delta, specifically on tidal hydraulics, water quality, fish and vegetation. These effects are evaluated in Sections 5.2, 5.3, 6.1, and 6.3, respectively.

NEPA Preferred Alternative

As stated previously, NEPA requires the lead agency to identify a “preferred alternative” if one has been identified at the draft EIS stage (see 40 CFR 1502.14(e)). However, NEPA allows that, if no preferred alternative is known at the draft EIS stage, it need not be identified until the final EIS on the basis of the draft EIS and the public and agency comments (see CEQ publication “Forty Most Asked Questions Concerning CEQ’s NEPA Regulations,” Question No. 4b, 5a). Therefore, because no preferred operational component exists at this time, Reclamation will identify this as part of the final EIS/EIR and ROD.

CEQA Environmentally Superior Alternative

According to Section 15126.6(e)(2) of the CEQA Guidelines, the lead agency should identify the environmentally superior alternative. Based on the analysis in the draft EIS/EIR, Alternative 4B is currently identified as the environmentally superior alternative. This alternative includes the lowest level of environmental impacts associated with construction, and the least environmental impacts associated with diversion of water into CCF. Environmental impacts associated with project elements common to all alternatives remain the same. Without flow control gates in south Delta channels, adequate water levels cannot be protected and therefore, the project objective of maintaining water levels and water quality in the south Delta could not be met. The low amount of additional diversions associated with this alternative creates only a small benefit for water supplies and, therefore, does not substantially meet the project objective of increasing water deliveries to water contractors.

Operational Component

Three separate operating scenarios (identified as Operational Scenarios A–C) would increase water diversions into CCF from the current permitted level of diversions to 8,500 cfs (monthly average) using the existing intake structure. Each operating scenario explores differences in the timing and amount of diversions at CCF, as well as different priorities for end uses of the water (i.e., SWP, CVP, or EWA).

SWP and CVP operations under Operational Scenarios A–C would continue to fall under the regulatory and legal framework governing operation of water projects and water management in California, including a combination of federal, state, and regional laws, policies, agency decisions, permit requirements, and agreements relating to water rights, biological resource protection, waterway modification, and water project management. These include but are not limited to the State Water Board WQCP and D-1641, COA, CVPIA, ESA and CWA. In addition, each scenario contains EWA–sponsored reductions in export levels to provide the same level of fish protection as is currently provided by the EWA. A new Corps Section 10 permit, issued under the Rivers and Harbors Act, would need to be obtained to increase the allowable diversion capacity to 8,500 cfs.

Priority of Use

The use of the additional pumping capacity achieved when CCF diversion is increased from 6,680 cfs to 8,500 cfs would vary throughout the year depending upon the type of water year (wet, above-normal, below-normal, dry and critically dry). During dry and critically dry years, the full pumping capacity may be limited to rare storm events. During wet, above-normal, and below-normal years, there would be more opportunities to use the maximum pumping capacity.

The provisions of D-1641, which incorporates the water quality and fish protection measures contained in the 1995 WQCP, regulate daily pumping at SWP Banks and CVP Tracy. Daily diversions into CCF are also constrained by the public notice issued by the Corps on October 13, 1981. This notice allows a 3-day average of 13,250 acre-feet per day, which is equivalent to 6,680 cfs. During the December 15 through March 15 period, pumping can be increased by an amount equal to 1/3 of the San Joaquin River flows at Vernalis when flows are above 1,000 cfs. Actual operations of the CCF gates are controlled by DWR to maintain sufficient water elevation within CCF to allow off-peak pumping at SWP Banks and preserve high tide conditions in the south Delta channels. (See Section 5.2 regarding Clifton Court Forebay Operations.)

The DWR and Reclamation joint planning model (CALSIM II) used to simulate the CVP and SWP reservoir and Delta operations uses a monthly timestep. The daily limits that may occur from the 3-day, 7-day, and 14-day averaging periods that are specified in D-1641 objectives cannot be directly simulated by CALSIM. Monthly average limits are simulated in CALSIM.

The SDIP alternatives differ in the monthly limits as well as the priority given to uses within the monthly allowable pumping limits. The priority for use of SWP pumping capacity is described in Table 2-3.

Details of the three different operational scenarios (A–C) are presented below.

Operational Scenario A

Operational Scenario A integrates each of the strengths of the CVP and SWP (storage and conveyance, respectively) to maximize water supplies for the benefit of both CVP and SWP contractors that rely on water delivered from the Bay-Delta in a manner that (1) would not impair in-Delta uses, and (2) would be consistent with fishery, water quality, and other flow and operational requirements imposed under CWA and ESA, CVPIA, D-1641, and consistent with goals and programs under the CALFED ROD. Similar to current operations, EWA would be used to alleviate water supply impacts while curtailing pumping for the protection of sensitive fish species.

Diversion and Use

Operational Scenario A increases the average monthly allowable rates of diversion to 8,500 cfs year-round. Under Operational Scenario A, the 3-day average diversion into CCF would not exceed 9,000 cfs, and the 7-day average diversion would not exceed 8,500 cfs between March 16 and December 14. From December 15 through March 15, diversions into CCF would not exceed the greater of 8,500 cfs over a 7-day average or 6,680 cfs plus one-third of the 7-day running average flow of the San Joaquin River at Vernalis when Vernalis flow exceeds 1,000 cfs. The year-round monthly average diversion rate would not exceed 8,500 cfs. Details regarding rates of diversion and priority of use during specific months are described below. To allow ease of comparison, details for Operational Scenarios A–C are also presented in Table 2-3.

October 1 through December 14

The average allowable rate of diversion into CCF would not exceed 9,000 cfs over a 3-day average, and 8,500 cfs over a 7-day average. The first priority use of capacity goes to SWP. Capacity not used by SWP would be split equally between EWA and CVP.

December 15 through March 15

The average allowable rate of diversion into CCF would not exceed the greater of 8,500 cfs over a 7-day average or 6,680 cfs plus one-third of the 7-day running average flow of the San Joaquin River at Vernalis when Vernalis flow exceeds 1,000 cfs. The first priority use of capacity goes to SWP. Capacity not used by SWP would be split equally between EWA and CVP.

March 16 through June 30

The average allowable rate of diversion into CCF would not exceed 9,000 cfs over a 3-day average, and 8,500 cfs over a 7-day average. The first priority use of capacity goes to SWP. Capacity not used by SWP would be split equally between EWA and CVP. During the VAMP period (April 15–May 15), pumping would be curtailed substantially at both SWP and CVP export facilities below the maximum capacities to meet the D-1641 limit of pumping less than the San Joaquin River inflow and to conduct the VAMP experiment.

July 1 through September 30

The average allowable rate of diversion into CCF would not exceed 9,000 cfs over a 3-day average, and 8,500 cfs over a 7-day average. Of that amount, up to 90 taf of export capacity is dedicated to the EWA in July, August, and September to export water acquired upstream and reduce any EWA water debt. The remaining export capacity, including unused capacity dedicated for EWA transfers, would first be used by the SWP, and if there is unused capacity, it may be used by EWA and CVP, each with equal priority.

Annual Commitments

Under this scenario, DWR would annually convey up to 100,000 acre-feet of CVP Level 2 Refuge water through CCF and SWP Banks by September 1, and Reclamation would provide SWP up to 75,000 acre-feet from CVP storage facilities north of the Delta to meet a portion of the SWP obligation to comply with Bay-Delta water quality and flow requirements. The Level 2 Refuge water would be pumped as part of SWP first priority to pumping capacity.

Operational Scenario B

Under Operational Scenario B, the rate of diversion would vary in different months of the year to allow DWR to use greater diversion capacity during less-sensitive time periods for fish, while ensuring all regulatory requirements, environmental interests, and local beneficial uses of water are met. Similar to Operational Scenario A, operations would be conducted in a manner that (1) will not impair in-Delta uses, and (2) will be consistent with fishery, water quality, and other flow and operational requirements imposed under CWA and ESA, the

Table 2-3. General Comparison of Timing, Amount of Water Diverted, and End User Priority under Operational Scenarios A, B, and C to Increase Diversions to Clifton Court Forebay to 8,500 cubic feet per second (cfs)

<table>
<tr><th>Month</th><th>Scenario A[a]</th><th>Scenario B</th><th>Scenario C</th></tr>
<tr><td>October</td><td rowspan="2"><u>October 1 to December 14</u>
Monthly average max of 8,500 cfs
1st priority: State Water Project (SWP)
2nd priority: Environmental Water Account (EWA)/Central Valley Project (CVP) (50-50)</td><td rowspan="2"><u>October 1 to November 30</u>
Monthly average max of 8,500 cfs
1st priority: SWP
2nd priority: EWA/CVP (50-50)</td><td rowspan="6"><u>October 1 to March 15</u>
Monthly average max of 8,500 cfs
1st priority: SWP
2nd priority: EWA/CVP (50-50)</td></tr>
<tr><td>November</td></tr>
<tr><td>December</td><td rowspan="4"><u>December 15 to March 15</u>
Monthly average max of 8,500 cfs by diverting the greater of:
▪ 8,500 cfs (7-day average); or
▪ 6,680 cfs plus ⅓ of the San Joaquin River flow at Vernalis when flow exceeds 1,000 cfs over a 7-day average.
1st priority: State Water Project (SWP)
2nd priority: EWA/CVP (50-50)</td><td rowspan="7"><u>December 1 to June 30</u>
Monthly average max of 6,680 cfs except when fish densities allow higher diversions. Monthly average max of 8,500 cfs

1st priority: SWP
2nd priority: EWA/CVP (50-50)</td></tr>
<tr><td>January</td></tr>
<tr><td>February</td></tr>
<tr><td>March</td></tr>
<tr><td>April</td><td rowspan="3"><u>March 15 to July 1</u>
Monthly Average max of 8,500 cfs
1st priority: State Water Project (SWP)
2nd priority: EWA/CVP (50-50)</td><td rowspan="3"><u>March 16 to June 30</u>
Monthly Average max of 6,680 cfs
1st priority: SWP
2nd priority: EWA/CVP (50-50)</td></tr>
<tr><td>May</td></tr>
<tr><td>June</td></tr>
<tr><td>July</td><td rowspan="3"><u>July 1 to September 30</u>
Monthly average max of 8,500 cfs
Up to 90 taf dedicated to EWA
Note: If EWA does not use the entire 90 taf, the remaining export capacity could be used by the SWP or CVP, or for transfers.
Remaining capacity:
1st priority: SWP
2nd priority: EWA/CVP (50-50)</td><td rowspan="3"><u>July 1 to September 30</u>
Monthly average max of 8,500 cfs
1,820 cfs dedicated to EWA
Note: If EWA does not use the entire 1,820 cfs, the remaining export capacity could be used by the SWP, CVP, or for transfers.
Remaining capacity:
1st priority: SWP
2nd priority: CVP/EWA (50-50)</td><td rowspan="3"><u>July 1 to September 30</u>
Monthly average max of 8,500 cfs
Up to 90 taf dedicated to EWA
Note: If EWA does not use the entire 90 taf, the remaining export capacity could be used by the SWP, CVP, or for transfers.
Remaining capacity:
1st priority: SWP
2nd priority: CVP (up to 500 cfs)
3rd priority: EWA/CVP (50-50)</td></tr>
<tr><td>August</td></tr>
<tr><td>September</td></tr>
</table>

[a] Under this scenario, DWR would annually convey up to 100,000 acre-feet of CVP Level 2 Refuge water through CCF and SWP Banks in July and August, and Reclamation would provide SWP up to 75,000 acre-feet from CVP storage facilities north of the Delta to meet a portion of the SWP's obligation to comply with Bay-Delta water quality and flow requirements. Because DWR is committed to diverting and pumping Level 2 water, this water would be pumped as part of SWP first priority to pumping capacity.

CVPIA, the State Water Board D-1641, and consistent with goals and programs under the CALFED ROD. Similar to current conditions, EWA would be used to alleviate water supply impacts while curtailing pumping for the protection of sensitive fish species. In addition, this scenario would dedicate up to 1,820 cfs per day to EWA in July, August, and September to provide water that can be used later to offset the effects of fish protection actions.

Diversion and Use

Operational Scenario B increases the maximum allowable rate of diversion to 8,500 cfs for approximately 5 months out of the year. During these months, 3-day average diversion into CCF would not exceed 9,000 cfs, and 7-day average diversion would not exceed 8,500 cfs.

Under this operational scenario, the maximum rate of diversion would be reduced to 6,680 cfs, unless conditions allow an increased rate of diversion, in approximately 7 months per year to provide protection for sensitive fish species (Table 2-3).

The specific months, diversion, and priority of use are further described below.

October 1 through November 30

The maximum allowable rate of diversion into CCF would not exceed a 3-day average of 9,000 cfs, and 7-day average diversion would not exceed 8,500 cfs. First priority use of the water goes to SWP. Second priority would go equally to EWA and CVP.

December 1 through June 30

This is a period of fish protection for juvenile Chinook salmon and delta smelt. The maximum diversion would be held at 6,680 cfs except during periods when fish are not present at densities that warrant entrainment protection, at which time diversion could increase to 8,500 cfs. The maximum allowable rate of diversion into CCF would not exceed a 3-day average of 9,000 cfs, and the 7-day average diversion would not exceed 8,500 cfs. For analysis purposes, a monthly maximum diversion of 7,180 cfs was used from December through June. During the VAMP period (April 15–May 15), pumping would be curtailed substantially at both SWP and CVP export facilities below the maximum capacities to conduct the VAMP experiment.

July 1 through September 30

The maximum allowable rate of diversion into CCF would not exceed a 3-day average of 9,000 cfs (17,852 acre-feet), and 7-day average diversion would not exceed 8,500 cfs (16,860 acre-feet). Of that amount, up to 1,820 cfs per day of export capacity would be dedicated to EWA to export water acquired upstream and reduce any EWA water debt. For the remainder of the 8,500 cfs, including unused capacity dedicated for EWA transfers, SWP would receive first priority use, and second priority use would be split equally between EWA and CVP, as necessary.

Annual Commitments

Under this scenario, DWR would not commit to conveying any CVP Level 2 Refuge water and Reclamation would not commit to releasing water from CVP reservoirs north of the Delta to help meet SWP Delta water quality obligations.

Operational Scenario C

Similar to the diversions under Operational Scenario B, operations under Operational Scenario C would vary during different months of the year to allow DWR to use greater diversion capacity during less-sensitive time periods for fish (i.e., October–March and July–September). Similar to Operational Scenarios A and B, operations would be conducted in a manner that (1) will not impair in-Delta uses, and (2) will be consistent with fishery, water quality, and other flow and operational requirements imposed under CWA and ESA, the CVPIA, the State Water Board D-1641, and consistent with goals and programs under the CALFED ROD. This operational scenario restricts diversions to 6,680 cfs (3-day average basis) from March 16 through June 30 in order to provide additional protection for species such as salmon, steelhead, and delta smelt. Similar to current conditions, EWA would be used to alleviate water supply impacts while curtailing pumping for the protection of sensitive fish species. In addition, this scenario would dedicate up to 90 taf of pumping capacity to the EWA from July through September to reduce any EWA debt (Table 2-3).

Diversion and Use

Under Operational Scenario C, the maximum allowable rate of diversion would increase from 6,680 cfs to 8,500 cfs for approximately 8.5 months of the year. During these months, the 3-day average diversion into CCF would not exceed 9,000 cfs and the 7-day average diversion would not exceed 8,500 cfs. Under this operational scenario, pumping would be limited to its current maximum of 6,680 cfs (3-day average) for 3.5 months out of the year. The specific months, diversion, and priority of use are further described below.

October 1 through March 15

The maximum allowable rate of diversion into CCF would not exceed a 3-day average of 9,000 cfs, and 7-day average diversion would not exceed 8,500 cfs. First priority use of the water goes to the SWP. Second priority goes equally to EWA and CVP.

March 16 through June 30

The maximum allowable rate of diversion would be 6,680 cfs on a 3-day average basis; no increases to 8,500 cfs would be allowed. During the VAMP period (April 15–May 15), diversion and pumping would be substantially curtailed at both SWP and CVP export facilities below these maximum capacities to conduct the VAMP experiment. First priority use of the water goes to the SWP. Second priority use goes equally to the EWA and the CVP.

July 1 through September 30

The maximum allowable rate of diversion into CCF would not exceed a 3-day average of 9,000 cfs, and 7-day average diversion would not exceed 8,500 cfs. Of that amount, up to 90 taf of export capacity is dedicated to the EWA to export water acquired upstream and reduce any EWA water debt. The remainder of the 8,500 cfs, including unused capacity dedicated for EWA transfers, would go first to SWP; CVP would receive second priority up to 500 cfs, and third priority would be split equally between CVP and EWA, as necessary.

Annual Commitments

Under this scenario, DWR would not commit to conveying any CVP Level 2 Refuge water and Reclamation would not commit to releasing water from CVP reservoirs north of the Delta to help meet SWP Delta water quality obligations.

Physical/Structural Component

Permanent Operable Gates

Gate Construction

The physical/structural component of the alternatives comprise four main actions: fish and/or flow control structure (hereafter *gate*) construction, conveyance dredging of selected portions of south Delta channels, maintenance activities for gates and dredging, and extension of agricultural diversions. The fish control gate is intended to prevent migrating and outmigrating salmon from entering Old River from the San Joaquin River, thus minimizing exposure to the SWP and CVP pumping facilities. The flow control structures are intended to assist in maintaining water levels and water quality for south Delta agricultural diverters (Figure 2-2). Dredging is intended to improve water conveyance and the operation of private agricultural siphons and pumps. Some agricultural siphons and pumps become surrounded by sediment such that their ability to function is diminished. In some cases, the intake levels of agricultural siphons and pumps are too shallow, and fluctuating tides combined with SWP and CVP pumping operations can affect their ability to operate continuously and reliably. As a result, SDWA diversions that are –2 feet msl or shallower, based on NGVD, would need to be extended. There are two potential gate construction methods, which are described in detail below. Details on the location, design and construction, maintenance, and other particulars of these components are provided below. The gate construction scheduling is described below and presented in Table 2-4.

Table 2-4. Gate Fabrication and Construction Schedule

Gate	Total Number of Construction Days	Fabrication Begins	Construction Ends	Total Months of Construction
Head of Old River	635	September 2006	April 2009	32 months
Middle River	451	September 2006	April 2009	32 months
Grant Line Canal	654	September 2006	April 2009	32 months
Old River at DMC	597	September 2006	April 2009	32 months

Gate Construction Methods

There are two potential methods of constructing the gates: (1) using cofferdam construction, which creates a dewatered construction area for ease of access and egress; and (2) in-the-wet construction, which allows the river to flow unimpeded and eliminates the time, material, and cost of constructing a cofferdam. All in-water work, including the construction of cofferdams, sheetpile walls and pile foundations, placing rock bedding and stone slope protection, and dredging, would occur between August 1 and November 30 to minimize effects on delta smelt and juvenile salmonids. Thus, gate construction would not affect VAMP experiments. All other construction would take place from a barge or from the levee crown and would occur throughout the year. Any work performed in the channel after November 30 would be done from a barge and within a cofferdam, silt curtain or similar containment system. The containment system would be installed in the work area between August 1 and November 30. The Head of Old River fish control gate and the Middle River and Old River at DMC flow control gates would be constructed adjacent to the existing temporary barrier location. The Grant Line Canal flow control gate would be constructed approximately 5 miles west of the existing temporary barrier location. The temporary barriers installed in south Delta channels would continue to be installed until the permanent gates became fully operable. The construction window necessary for in-channel activities would vary for each, as outlined below.

Cofferdam Construction

The cofferdam construction method would enable the gates to be constructed in two phases and would allow in-water work to continue through the winter. The first phase would involve the placement of a cofferdam in half of the channel between August 1 and November 30, and then dewatering the area so the bottom of the channel could be used as a project construction site. The gates would be constructed within this area and on the adjacent levee. The cofferdam would remain in the water until the completion of half of the gate. It would then either be removed or cut off at the required invert depth and another cofferdam would be installed in the other half of the channel. In the second phase, the gate would be constructed using the same methods, with the cofferdam either removed or cut off, and incorporated into the final gate layout. Cofferdam construction would begin in August and last approximately 35 days. Construction activities within the cofferdam project area would last until approximately early November or could occur throughout the winter, depending upon weather and river flow conditions. The temporary barriers would continue to be installed and removed as they are currently until the permanent gates are fully operable.

In-the-Wet Construction

This method would involve working within the natural channel as it flows. No cofferdam or dewatering of the construction site would occur. Each gate would be constructed within the confines of the existing channel, and there would be no levee relocation. The channel invert would be excavated to grade using a sealed clamshell excavator working off the levee or from a barge. H-piles would be placed in the channel. Gravel and tremie concrete would be placed for the foundation within the confines of the H-piles. Reinforced concrete structures would then either be floated in or cast in place using prefabricated forms to be placed on top of the gravel, tremie concrete, and H-piles. Divers would complete the final connections between the concrete structures and the piles. All in-water work, including the construction of sheetpile walls and pile foundations, placing rock bedding and stone slope protection, and dredging, would occur between August 1 and November 30 to minimize effects on delta smelt and juvenile salmonids. Construction of all other components would take place from a barge or from the levee crown and would occur throughout the year.

Further details specific to each gate location, such as approximate amounts of materials, access routes, and associated structures, are described below.

Gate Design and Construction Detail

Each gate would be constructed within the confines of the existing channel, and there would be no levee relocation. Construction of each gate would occur in two phases. The first phase would include dredging using a sealed clamshell, construction of a sheetpile cofferdam (if the cofferdam construction method is chosen), and construction of half of the control gates, control building, operator's building, and boat lock (except at the Middle River flow control gate). To ensure the stability of the levee, a sheetpile retaining wall would be installed in the levee where the gate would be constructed. For more information regarding the dredging methods, drying methods, and disposal methods, refer to the Dredging section below.

The first half of the control gates would be constructed in half of the channel cross section with the use of either a sheetpile-braced cofferdam (which would be cut and incorporated into the final project design upon completion of construction), or an in-the-wet construction method. The masonry control building would be constructed to house the emergency generator, control panels for the control gates, circuit breakers, and storage area for operation and maintenance equipment. Per a developing agreement with south Delta water users, three agricultural gates may include structural and wiring features that would allow the easy addition of low head pumps and piping, should this contingency prove necessary and appropriate in the future.

All gates except for the Middle River gate would include a boat lock to be used by the public. The proposed Middle River gate structure does not have a boat lock or attended boat ramp facility. The current temporary rock barrier at this location also has no boat facility, and is only traversed at high tide by anglers in shallow draft boats. The proposed gate structure would also be traversed in like manner. Since the gate would be dropped to allow tides to flood up-stream, the structure could be traversed prior to high tide because the clearance would be greater than it is currently. A small masonry operator's building would be located adjacent to the control building to provide the operator with an unobstructed view of the lock chamber. The boat lock operator building would house the controls for the boat lock gates and would also have observation windows to allow unimpaired view of the boat lock. Each boat lock would measure 20 feet wide and 70 feet long. The boat lock would be constructed using sheetpiles and include two bottom-hinged gates on each end measuring 20 feet wide and 10 feet high. Each gate would weigh approximately 8 tons and would be opened and closed using an air-inflated bladder. The invert of the lock would be at elevation –8.0 feet msl, and the top of the lock wall would be at elevation 15 feet. The boat lock would transport boats with the use of the bottom-hinged gates and a valve system for equalizing water levels, and would function by filling and emptying the lock chamber with a 36-inch valve. For boats traveling upstream, the lock chamber would be emptied to the downstream water level. The downstream gates would be opened and boats would enter the lock chamber. With the gates closed, the lock chamber would be filled to the upstream water level and the upstream gates would be opened to allow boat passage. For boats traveling from downstream, the procedure would be reversed.

In addition to the boat locks, boat ramps would be built at the Old River at DMC gate and at the Middle River gate to allow DWR access to the gate sites. Only two ramps are necessary because the Old River at DMC gate ramp can be used to access the Grant Line Canal gate and head of Old River fish control gate sites. The ramps will contain a single 12-foot-wide lane constructed at 12% slope extending from the top of the levee down to –4.5 feet (North American Vertical Datum of 1988 [NAVD 88]). The ramp will be built with soil and rock backfill and covered with an articulating concrete mat.

The second phase would include constructing the second half of the flow control gates using a sheetpile-braced cofferdam (which would be cut and incorporated into the final design), or an in-the-wet construction method. In this phase the equipment storage area and the remaining fixtures, including a communications antenna, would be constructed. Each gate would have a permanent storage area (180 by 60 feet) for equipment and operator parking. Fencing and gates would control access to the structure. A communications antenna for telephone and telemetered data transmission would also be constructed and a propane tank would supply emergency power backup.

Maintenance

All four gates would be owned, operated, and maintained by DWR. Periodic maintenance of the control gates would occur every 5 to 10 years. Maintenance of the motors, compressors, and control systems would occur annually and require a service truck. Maintenance dredging around the gate would be necessary to clear out sediment deposits. Dredging around the gates would be conducted using a sealed clamshell dredge. Depending on the rate of sedimentation, maintenance would occur every 3 to 5 years, removing no more than 25% of the original dredged amount, using a sealed clamshell dredge. Because of constraints related to fish and other species of concern, maintenance dredging would occur only between August 1 and November 30 and would not last longer than 30 days. Spoils would be dried in the areas adjacent to the gate site. A formal dredging plan with further details on specific maintenance dredging activities will be developed prior to dredging activities.

Fish Control Gate

Head of Old River

Location. The head of Old River fish control gate (–121.328513 latitude; 37.808166 longitude) would be located at the divergence of the head of Old River and the San Joaquin River (Figure 2-3).

Design and Construction. The head of Old River fish control gate (Figures 2-4a and b) would be approximately 210 feet long and 30 feet wide, with top elevation of 15 feet msl (NAVD 88). This control structure would consist of seven bottom-hinged gates approximately 125 feet in length. Other components associated with the gate are a fish passage, a boat lock, a control building, boat lock operator's building, and communications antenna. Other appurtenant components associated with the structure would include floating and pile-supported warning signs, water level recorders, and navigation lights.

The boat lock would include a 20-foot-wide-by-70-foot-long lock. The lock would have floating boat docks for temporary mooring, navigation signs and lights, warning signs, and video surveillance capability.

The fishway will be designed according to guidelines established by NOAA Fisheries and USFWS for several species including salmon, steelhead and green sturgeon. The fishway would be approximately 40 feet long and 10 feet wide and constructed with reinforced concrete. It would likely be closed during the spring and open during the summer and fall. Stoplogs would be used to close the fishway during the spring when not in use to protect it from damage.

During the summer and fall when the gate is partially closed, flow would pass through the fishway traversing a series of baffles. The fishway is designed to maintain a 1-foot-maximum head differential across each set of baffles. The historical maximum head differential across the gate is 4 feet; therefore, four sets of baffles are required. The vertical slot fishway is entirely self-regulating and operates without mechanical adjustments to maintain an equal head drop through each set of baffles regardless of varying upstream and downstream water surface elevations.

For construction, workers and equipment would access the project from the south on a county road. The private access road is currently a dirt road and would be improved by the construction of 2 miles of private access road. The road would be improved to a minimum 16-foot width, would have a gravel surface and would accommodate cranes and loaded 10-wheel trucks. The road would begin at the end of Undine Road and proceed east directly to the San Joaquin River levee. The road would continue south and west along the levee to the gate site. A construction staging area (approximately 10,000 square feet) would be located on the south side of Old River just outside the levee roads. For periodic maintenance, an existing private access road north of the gate would be used.

The complete gate would be constructed with approximately 1,500 cubic yards of concrete. The gate would have a permanent storage area, 180 by 60 feet (10,800 square feet), for equipment and operator parking. A communications antenna for telephone and telemetered data transmission would also be constructed, and a propane tank would be installed to supply emergency power backup. During the second construction phase, a fish passage structure would be constructed.

Approximately 11,000 square feet (450 linear feet) of riprap would be used as slope protection on levees near the gate and on the channel bottom. In addition fine materials such as sand would be placed adjacent to the riprap to create a smooth slope from the channel bottom to the gate sill. The construction period is estimated to be up to 32 months, starting in September 2006 and ending in April 2009, with a maximum construction crew of 80 people.

Flow Control Gates—
Middle River/Grant Line Canal/Old River

Up to three flow control gates, one each at Middle River, Grant Line Canal, and Old River, would be constructed and operated as a part of the SDIP. The operation of the three flow control gates would vary over the course of the agricultural irrigation season. This section describes the specific location, design, and construction of each gate.

Middle River Gate

Location. The proposed Middle River gate (–121.482544 latitude; 37.885629 longitude) would be located in Middle River, San Joaquin County, near its confluence with Victoria Canal, North Canal, and Trapper Slough, approximately 13 miles southwest of Stockton (Figure 2-3).

Design and Construction. The Middle River gate (Figures 2-5a and b) would include twelve 16-foot-wide-by-10-foot-high bottom-hinged gates with a top elevation of 5.5 feet (NAVD 88) supported on a reinforced concrete foundation and steel-sheetpile wall, a permanent storage facility, and other related structures. The footprint of the structure would be roughly 300 feet long by 20 feet wide. The construction of the gate would require dredging the channel 100 feet upstream and downstream from the gate site using a sealed clamshell to allow easy placement and construction. Access/haul route roadwork would include improving existing access roads in the immediate vicinity of the gate site; roads would be at least 16 feet wide and composed of gravel. Roads would accommodate large cranes (40 tons) and loaded 10-wheel trucks.

The staging areas would be located on farm property on both sides of the gate. On the north side of the gate, the staging area would be approximately 1,800 feet upstream of the gate adjacent to farm buildings at the toe of the levee. On the south side of the gate the staging area would be moved near the farm buildings adjacent to the gate. The dredge spoil area for this location would be at the DWR property on Union Island. This property is adjacent to North/Victoria Canal immediately west of where Calpack Road meets the levee. This property is currently farmed by a tenant and was previously used as a levee test area for the proposed peripheral canal.

A permanent storage area, 50 feet long by 25 feet wide, would be located next to the control building on the south levee and used to store equipment and provide vehicle parking. A 6-foot-high chain link fence with an access gate would enclose the parking area. Approximately 11,000 square feet (700 linear feet) of riprap would be used as slope protection on levees near the gate and on the channel bottom. In addition fine materials such as sand would be placed adjacent to the riprap to create a smooth slope from the channel bottom to the gate sill.

Construction of the Middle River gate would extend from April 2006 through November 2007 for up to 20 months, with a maximum construction crew of about 50 people.

Grant Line Canal Gate

Location. The Grant Line Canal gate (–121.544434 latitude; 37.819324 longitude) would be located near the confluence of Grant Line Canal and Old River (Figure 2-3).

Design and Construction. The gate consists of two adjacent flow control structures, one in Grant Line Canal and the other in Fabian-Bell Canal, connected across the center island. The Grant Line Canal gate consists of eight 16-foot-wide bottom-hinged gates, and the Fabian-Bell Canal gate consists of six 16-foot-wide bottom-hinged gates. The control structures would be supported on a pile foundation with a steel sheetpile cutoff wall.

Another sheetpile wall 210 feet long with the top of the wall at elevation 6.5 feet msl (NAVD 1988) would be constructed across the center island between Fabian-Bell and Grant Line Canals, connecting the two structures. Access/haul roads would be at least 16 feet wide and composed of gravel. Roads would accommodate large cranes (40 tons) and loaded 10-wheel trucks. A total of 15,250 linear feet on the north levee and 10,000 linear feet on the south levee would be paved with gravel to allow access to the project area. Construction staging areas would be situated on the north and south sides of the canal. The north and south staging areas would be located on agricultural land and would be approximately 100 feet by 100 feet each.

The boat lock and control structure would be constructed within the channel; therefore, relocation of the levees would not be necessary. The boat lock would include a 20-foot-wide-by-70-foot-long lock. The lock would include floating boat docks for temporary mooring, navigation signs and lights, warning signs, and video surveillance capability. The boat lock operator building would be on top of the control building adjacent to the boat lock, giving the operator an unobstructed view of the boat lock.

The gate would also include buried utility lines supplying electricity and communications to the area, access/haul roads, and an equipment storage area (Figures 2-6a and b). Additional structures include a control building to house the control systems for the gates and the secondary propane power generator.

Approximately 1,500 cubic yards of material and up to 600 lineal feet of channel in the gate area would be excavated using the sealed clamshell dredging method.

The northern permanent storage area would consist of a 25-foot-wide-by-50-foot-long area (1,250 square feet) enclosed by an access control gate and fence. An emergency generator, fuel tank, and radio antenna to be used for telemetered data communication would be located within the storage areas.

Approximately 15,400 square feet (900 linear feet) of the waterside slope of the existing levees near the gate and on the channel bottom would be protected with riprap. In addition fine materials such as sand would be placed adjacent to the riprap to create a smooth slope from the channel bottom to the gate sill.

Construction would last up to 32 months, beginning in April 2006 and ending in November 2008, with a maximum crew of 90 people.

Old River at Delta-Mendota Canal Gate

Location. The gate on Old River (–121.544579 latitude; 37.810875 longitude) would be located east of the DMC approximately 4,000 feet southeast of the intersection of the Alameda, Contra Costa, and San Joaquin County lines (Figure 2-3).

Design and Construction. The gate would consist of a control structure equipped with eleven 16-foot-wide bottom-hinged gates with top-of-gate elevation at 5.5 feet msl (NAVD 88). The control structure would be supported on a pile foundation with a steel sheetpile cutoff wall. The footprint of the flow control structure would be roughly 220 feet long by 20 feet wide.

Other components associated with the gate are a 20-foot-wide-by-70-foot-long boat lock (Figures 2-7a and b), a control building, boat lock operator's building, and communications antenna. The boat lock operator building would be on top of the control building adjacent to the boat lock, providing the operator an unobstructed view of the boat lock.

The gate would also include buried utility lines supplying electricity and communications to the area, access/haul roads, and equipment storage area. Other components associated with the structure would include floating and pile-supported warning signs, water level recorders, and navigation lights.

A boat ramp would be constructed immediately downstream of the gate to allow maintenance boats to access the control gates. Access/haul route roadwork would include improving existing access roads in the immediate vicinity of the gate site; roads would be at least 16 feet wide and composed of gravel. Roads would accommodate large cranes (40 tons) and loaded 10-wheel trucks. Construction staging areas would be situated on the north and south sides of the river and be approximately 10,000 feet square each.

Approximately 1,500 cubic yards of material would be excavated from the channel using a sealed clamshell. Approximately 15,400 square feet (920 linear feet) of the slope of the existing levee near the gate and the channel bottom would be protected with riprap. In addition fine materials such as sand would be placed adjacent to the riprap to create a smooth slope from the channel bottom to the gate sill.

The northern permanent storage area would consist of a 25-foot-wide-by-50-foot-long area (1,250 square feet) enclosed by an access control gate and fence. Within the storage areas would be an emergency generator, fuel tank, and a radio antenna to be used for telemetered data communication. Construction would last up to 32 months, from April 2006 through November 2008, with a maximum crew of about 100 people.

Gate Operations

Gate Operations Review Team

A federal and state interagency team will be convened to discuss constraints and provide input to the existing Data Assessment Team (DAT). The Gate Operations Review Team will make recommendations for the operations of the fish control and flow control gates to minimize impacts of resident threatened and endangered species and to meet water level and water quality requirements of south Delta water users. The interagency team will include representatives of DWR, Reclamation, USFWS, NOAA Fisheries, and DFG, and possibly others as needs change. The interagency team will meet through a conference call, approximately once a week. DWR will be responsible for providing predictive modeling, and SWP will provide operations forecasts and the conference call line. Reclamation will be responsible for providing CVP operations forecasts, including San Joaquin River flow, and data on current water quality conditions. Other members will provide the team with the latest information related to south Delta fish species and conditions for crop irrigation.

Head of Old River Fish Control Gate Operations

The operation (or closing) of the head of Old River fish control gate is intended to benefit the San Joaquin River watershed Central Valley fall-/late fall–run Chinook salmon by reducing the downstream movement of the salmon into the south Delta channels via Old River. Because the gate is functional, operations can be more flexible in response to the detection of fish presence and/or water quality. Operation of the gates in Middle River and Old River at DMC could provide more net flows from Victoria Canal into Middle River and from Old River at Clifton Court Ferry into the Old River channel upstream of the CVP Tracy facility. The operation of the head of Old River fish control gate for fish protection and during other times of the year would lower the electrical conductivity (EC) of the western portion of these channels. This gate can have the largest effect on south Delta salinity. The salinity in the south Delta channels can be reduced to approach the EC of the SWP exports if the San Joaquin River diversion flow into the head of Old River is reduced.

Spring Operations/Vernalis Adaptive Management Plan

Operation (closing) of the head of Old River fish control gate is proposed to begin on April 1. Spring operation is generally expected to continue through May 31, to protect outmigrating salmon and steelhead. During this time, the head of Old River gate would be fully closed.

If, in the opinion of the USFWS, NOAA Fisheries, and DFG, the gate needs to be operated at a different time or for a longer period, it may be operated provided the following criteria are met:

- it is estimated that such operation would not increase take of species in excess of the take authorized by the original proposed operation;
- outmigrating salmon or steelhead are present; and
- SDWA agricultural diverters are able to divert water of adequate quality and quantity.

Summer and Fall Operations

During June 1 through November 30, the gate would be operated to improve flow in the San Joaquin River, thus assisting in avoiding historically present hypoxic (i.e., low dissolved oxygen) conditions in the lower San Joaquin River near Stockton. During this period, partial operation of the gate (partial closure to allow approximately 500 cfs of San Joaquin River flow into Old River) may be warranted to protect water quality in the South Delta channels. Gate operations during this period would be at the request of DFG, NOAA Fisheries, and USFWS. Operations would not occur if the San Joaquin River flow at Vernalis is greater than 5,000 cfs because it is expected that this flow would maintain sufficient DO in the San Joaquin River.

During other low-flow periods on the San Joaquin River, there may be some need to operate the gate to improve the hypoxic conditions. If, in the opinion of USFWS, NOAA Fisheries, and DFG, the gate needs to be operated at a different time or for a longer period, it may be operated provided the following criteria are met:

- it is estimated that such operation would not increase take of species in excess of the take authorized by the original proposed operation;
- there is a verified presence of outmigrating salmon or steelhead.

The exact timing of both the fall and spring operations could be modified annually, in coordination with Gate Operations Review Team. Operations may also be modified in response to varying conditions to avoid impacts on winter-run salmon and delta smelt. During non-operational times of the year, the gates would remain fully lowered (open).

Flow Control Gates

The three flow control gates, Middle River, Grant Line Canal, and Old River near the DMC, would be operated (closed during some portion of the tidal cycle) throughout the agricultural season and on an as-needed basis during the rest of the year to protect water quality and levels.

Reclamation and DWR have committed to maintaining water levels during these times at 0.0 foot msl in Old River near the CVP Tracy facility, 0.0 foot msl at the west end of Grant Line Canal, and 0.5 foot msl in Middle River at Mowry Bridge. It is anticipated that the target level in Middle River would be lowered to 0.0 foot msl following extension of some agricultural diversions. Water levels are based on 1929 National Geodetic Vertical Datum [NGVD].

Proposed flow control gate operations would require forecasting of water levels and potential changes in water quality in south Delta channels and operating the gates to maintain the agreed-upon water levels and water quality objectives. Forecasting would be performed on a weekly basis using the Delta Simulation Model 2 (DSM2), using forecasted tides, and proposed diversion rates of the projects.

DSM2 calculates hydraulic parameters for hundreds of points in Delta channels at 15-minute intervals. DSM2 uses simulation of pumping rates, release schedules, and forecast tides to predict the water levels, tidal flows, and EC throughout the south Delta channels. Where level is predicted to be below the criteria or water quality conditions are predicted to approach the objectives, the gates would be operated to maintain the specified water level, and increase tidal circulation in the south Delta channels. The gates would be opened to enhance flow through these channels during all flood-tide (i.e., rising water level) periods, once the downstream water level was greater than 0.0 feet.

Actual gate operations would likely vary from this general circulation plan and would be discussed on a weekly basis by the Gate Operations Review Team.

The extension of agricultural diversions in the south Delta that are currently shallower than –2 feet msl (1929 NGVD) may lower the water level response criteria and subsequently further reduce the need to operate gates.

Winter Operations

For the period from December through March, the Middle River, Grant Line Canal, and Old River near the DMC gates may be operated only with permission from USFWS, NOAA Fisheries, and DFG if the following criteria are met:

- USFWS, NOAA Fisheries, and DFG determine that such operation would not increase take of species in excess of the take authorized by the biological opinion (BO) for SDIP;
- USFWS, NOAA Fisheries, and DFG determine that any impacts associated with gate operation during this period would not result in additional impacts on threatened and endangered species outside the scope of impacts analyzed by the said agencies in issuing BOs and a take permit for gate operations.

Dredging

Portions of West Canal, Middle River, Old River, Victoria Canal, North Canal, and Grant Line Canal would be dredged to improve conveyance and/or the operation of private agricultural siphons and pumps (Figure 2-3). In total, up to 300,000 cubic yards of material would be dredged and spoiled within the south Delta. Dredging would be conducted in the center of the channel to avoid tidal emergent wetlands and riparian habitat. A description of each method follows.

Gate Dredging

As described above under the gate design and construction detail section, dredging within the footprint of the gate would be necessary to clear the channel bottom for gate placement. Up to 150 feet upstream and 350 feet downstream from each gate site would be dredged using a sealed clamshell, as described below, to clear the area for construction and placement of the gate. In total, up to 6,000 cubic yards of material would be dredged at the gate sites. The dredging of the upstream and downstream areas would avoid sensitive habitats such as tidal emergent wetlands and riparian areas. This avoidance measure is described in detail in the Environmental Commitments section below. Dredging would occur between August 1 and November 30, lasting approximately 15 days at each gate site. A 50,000-square-foot area would be purchased adjacent to each gate site and would be used as a runoff management basin for both initial dredging and maintenance dredging (described below).

Sealed Clamshell Dredging Method

Clamshell dredging could occur from either a barge within the river channel or from the top of a levee, depending on restrictions caused by vegetation on channel banks or the width of a channel. Barge clamshell dredges are not self-propelling and would therefore need a small tugboat to maneuver within the channel. From a barge, the operation would begin when the bucket assembly, attached by a boom (up to 100 feet) is lowered into the channel to collect sediments. It would scoop up to 5 cubic yards of water-sediment slurry and deposit it into either a runoff management basin constructed on the landside of the levee adjacent to the channel, or onto a barge that would move it to a runoff management basin in a different location. The clamshell dredge may sit atop the levee and scoop up to 5 cubic yards of water-sediment slurry from the channel bottom, using the same method as from a barge, and deposit the dredged material into a runoff management basin.

A runoff management basin is typically rectangular and uses the levee as one of its walls. The remaining three walls are constructed of compacted local soil. The three constructed walls would not exceed 6 feet in height. Runoff management basins are necessary to contain the 50% moisture sediment slurry and prevent drainage into agricultural ditches and channels. The slurry would reach 25% moisture content in 2 to 6 weeks, depending on the climate and the thickness of the spread. Once the moisture content is approximately 25% or less, it may be used beneficially for levee reinforcement or for agricultural soil supplement.

The clamshell dredging method is more cost efficient than the hydraulic method. However, it can cause greater disruption to channel vegetation when the bucket scrapes layers of sediments from the channel bottom. This method would likely be used in situations where there is limited space for settling ponds, the likelihood of major disruption to vegetation and other organisms in the channel bottom is minimal, the area to be dredged is small, there are channel islands, or when there are no issues concerning temporary turbidity and sedimentation in the water. It is possible, however, to reduce turbidity generated by this method through the implementation of dredging practices such as lowering and raising the clamshell bucket slowly, or using a closed bucket.

Conveyance Dredging

In addition to the dredging required to construct the gates, portions of West Canal, Middle River, and Old River would be dredged to improve conveyance and the operation of private agricultural siphons and pumps (Figure 2-3). In total, up to approximately 250,000–300,000 cubic yards of material would be dredged and spoiled within the south Delta. Dredging would be conducted in the near-center of the channel to avoid tidal emergent wetlands and riparian habitat. Conveyance dredging would be conducted using either a sealed clamshell dredge or a hydraulic dredge, as described below. A decision on which method to use would be made prior to commencing work, based on access, sediment composition, and potential impacts on vegetation and other organisms.

Conveyance dredging in Middle River, West Canal, and Old River to the east of the CVP intake would occur between August 1 and November 30 to minimize effects on delta smelt and juvenile salmonids.

Hydraulic Dredging Method

The hydraulic dredging method siphons a water-sediment slurry (4 parts water for every 1 part sediment) from the bottom of a channel and deposits it into a settling pond to dry. Hydraulic dredging is used in situations where there are large areas to be dredged, the concern for induced turbidity and harm to benthic vegetation is great, and there is ample area available for settling ponds. This dredging method is relatively expensive ($21 per cubic yard) but does not cause excessive turbidity in the channel and only minimally disrupts vegetation and other benthic organisms outside the dredge area. It also allows options in disposal sites, as flexible piping may be extended inexpensively from the settling pond to the dredge area, which may be some distance away.

Because of the difficulty involved with starting and stopping the dredge equipment, hydraulic dredges are generally in operation 24 hours a day, 7 days a week, until dredging is complete. A pipe is lowered from a dredging barge in the channel into the bottom sediment. The pipe is used to siphon the water-sediment slurry into a flexible pipe that may be effectively extended up to 3,000 feet up or down the channel. This pipe may be weighted down to avoid interfering with boat navigation near the project site. The flexible pipe is attached to a semipermanent, stationary pipe that is braced to the waterside of the levee, extends across the top, and down the landside of the levee into the primary basin of a settling pond. The stationary pipe would range from 8 to 18 inches in diameter and would require that gravel be placed on either side to create a ramp over the pipe for vehicles and agricultural equipment. The direct deposition of the material into settling ponds on adjacent lands allows uninterrupted dredging up to the capacity of the settling pond. Up to 5,000 cubic yards of material may also be transported to settling ponds by barges. The settling ponds would be constructed on the landside of the levee adjacent to the channels, and would be used for the decanting process, effectively separating the sediment from the water and allowing dried material to be put to beneficial use. The ponds would be constructed of local compacted soils to avoid toxicity and erosion of side slopes. (See Figure 2-8.)

Settling ponds are typically composed of three basins: primary, secondary, and return basins. The primary and secondary basins serve to settle sediments out of the dredged slurry. When water reaches the return basin, most suspended sediment has settled out, and the water is then pumped back into the channel from which it was taken; the discharge is subject to Corps and RWQCB discharge requirements. (Figure 2-9.) The sediment would take between 24 and 36 days to settle out of the water. A single settling pond, 3,600 feet long, 1,600 feet wide, and up to 6 feet high, can hold up to 284,444 cubic yards of the water-sediment slurry if the pond is filled up to 4 feet with dredged material. However, the largest settling pond would be up to 80 acres. (Figure 2-10.) As water moves from the primary to the secondary basins, more area becomes available for additional dredged material.

The absolute capacity of a single pond would be determined by the rate at which the sediments settle, the rate at which the water is pumped from the return basin, and the rate of dredging. The pond is then reused or left to dry. Dried material could be used as levee reinforcement or as soil supplement to surrounding agricultural lands.

Approximately 5% of all the spoils would be used for levee reinforcement. The semi-dry material would be placed approximately 1 foot deep on the landside of existing levees. To avoid any impacts on sensitive vegetation and wildlife, areas of levees with vegetation would not be reinforced. All applicable permits would be secured prior to levee reinforcement to ensure compliance with the CWA and other pertinent regulations. The other 95% of the material would be spread over agricultural land at an approximate depth of 1 foot and could improve the quality of the existing soil.

All dredging would occur between August 1 and November 30 to minimize effects on delta smelt and juvenile salmonids. Other details pertaining to the operations and methods, including a schedule of operations, exact dredge spoil locations, responsible parties and contacts, and compliance with applicable laws and regulations, along with permit approvals and appropriate environmental documentation, would be included in a dredging plan.

Table 2-5 shows a summary of the proposed conveyance dredging activities. A more detailed discussion of each of the proposed dredge areas and spoils placement is presented below.

Table 2-5. SDIP Conveyance Dredging Detail

			Cost		Maximum Dredge Amount per Day	
Channel	Amount of Dredge (cubic yards)	Number of Dredging Operations	Hydraulic $21/cubic yard ($)	Clamshell $7/cubic yard ($)	Hydraulic 300 cubic yards/hour	Clamshell 50 cubic yards/hour
Middle River	200,000	1	4,200,000	1,750,000	7,200	1,200
West Canal	40,000	1	840,000	280,000	7,200	1,200
Old River	10,000	1	210,000	70,000	7,200	1,200
Total	250,000	3	5,250,000	2,100,000	21,600	3,600

Middle River

Middle River would be dredged from the head at Old River to approximately 5.3 miles west (Figure 2-3) to an elevation of –8 feet msl to accommodate agricultural siphons and pumps. Dredging would be done hydraulically from a barge. Approximately 200,000 cubic yards of material would be dredged at one or more drying areas on Union or Roberts Islands, or on Stewarts Tract over a period of 4 years (Figure 2-10). It is estimated that the dredged material would occupy a total area of approximately 165 acres for spoiling ponds, assuming they can be reused during each dredging phase. Dredging estimates are based on a dredging efficiency of the 20% solids removal commonly achieved by hydraulic dredging. The dredged material would be dried to a moisture content of approximately 25% and then could be reshaped to reinforce the levees or used for beneficial agricultural uses in the project vicinity.

West Canal

West Canal is a major artery carrying water to the SWP and CVP. When exports are high and San Joaquin River flow is low, the velocities in the channel become high enough to cause scouring and erosion of the channel bottom. Data collected from a DWR scour monitoring project at two locations in West Canal indicate erosion of approximately 5 feet of channel bottom within 4 years (reference 1997 to 2001). To reduce these velocities that cause scouring, West Canal would be enlarged by hydraulic dredging 3 feet from the channel bottom from the CCF intake north to the point where Victoria Canal meets West Canal (Figure 2-3). Up to 40,000 cubic yards of material would be removed over a period of 4 years. Dredged spoils would be dried in either settling ponds or runoff management basins at Widdows Island, depending on the method used (Figure 2-3). The hydraulic method would require an area of approximately 40 acres for spoils ponds, assuming they can be reused during each annual dredging phase. No more than one pond would be necessary to spoil all the dredged water-sediment slurry. The clamshell method would require no more than 7 acres if runoff management basins were filled to a depth of 4 feet. Dredging estimates are based on a dredging efficiency of the 20% solids removal commonly achieved by hydraulic dredging, and the 50% solids for clamshell dredging.

Old River

Several agricultural siphons and pumps on Old River provide water for agriculture in the south Delta. Near the area where Old River, Paradise Cut, and Tom Paine Slough meet, sedimentation has accumulated near these siphons and pumps and is affecting the ability of these diversion facilities to provide water for agricultural uses. Dredging in this area would be conducted to improve siphon and pump operation. The dredging method may be hydraulic or clamshell dredging by barge, depending on the areas that are in need of dredging. Up to 10,000 cubic yards of dredged material would be removed from the channel for conveyance purposes and either placed in settling ponds (hydraulic) or placed in runoff management basins (clamshell) to dry to an approximate moisture content of 25%. Ponds and/or basins would be placed on Stewart Tract (Figures 2-3 and 2-10). It is estimated that all of the dredged material would occupy an area of less than 10 acres if done hydraulically and less than 3 acres if the clamshell method is used. Hydraulic dredging estimates are based on a dredging efficiency of the 20% solids removal commonly achieved by hydraulic dredging, and the 50% solids removed for clamshell.

Spot Dredging for Agricultural Diversions in Old River, Middle River, and Victoria, North, and Grant Line Canals

Dredging in specific areas around siphons in the south Delta may also be performed as part of the dredging operation. Siphons that have sediment blockage that prohibits the effective diversion of water would have an area up to 100 square feet cleared around them. Siphons that are –2 feet msl or shallower would be extended and dredged around to ensure effective and operable diversion. These siphons are located primarily in Old River and Middle River (outside the areas mentioned above to be dredged to improve conveyance and remove accumulated sediment) and in Victoria, North, and Grant Line Canals. Refer to the Extension of Agricultural Diversions discussion below for more detail regarding the location of potential spot dredging. All spot dredging activities would occur within the channel and would not affect the adjacent land or levees. A total of up to 44,000 cubic yards of sediments would be removed from these areas.

Maintenance Dredging

Maintenance dredging may be necessary to remove collected sediment in channels as well as near agricultural pumps and siphons. Depending on the rate of sedimentation, DWR would perform one round of maintenance dredging up to 5 years after initial dredging. It is estimated that up to 25% of the original dredge removal amount would be necessary for maintenance purposes within this timeframe. Maintenance dredging and spoiling methods would be similar to those described above. A formal dredging plan with additional details on specific maintenance dredging activities will be developed prior to dredging activities.

Disposal of Dredged Materials

Each method (sealed clamshell and hydraulic) would effectively dry the dredged material so that it could be beneficially used in the south Delta. Approximately 5% of all the dredged material would be used for levee reinforcement. The semidry material would be placed approximately 1 foot deep on the landside of existing levees. To avoid any impacts on sensitive vegetation and wildlife, levee areas with vegetation would not be reinforced. The remaining 95% of the dredged material would be spread over agricultural land at an approximate depth of 1 foot and could improve the quality of the existing soil.

According to the DWR report "Environmental Study of Dredged Materials Grant Line Canal" for previous dredging in the Grant Line Canal,

> The results of the physical measurements, chemical analyses, and other tests on these sediments indicate that they would be suitable for most reasonable uses, which may include levee stabilization, upland, or agricultural applications. Gross sediment contamination was not present, and only low concentrations of any constituents of concern were found at levels below applicable regulatory limits.

In addition, although the results of testing included in the report indicate that there may have been heavy metals detected, these constituents were in such low amounts compared to the standard that there should be little concern. (California Department of Water Resources 2000a) While the 2000 study indicates the lack of potential to adversely affect farmlands from the disposal of dredged material onto farmlands in the study area, the study is confined to certain areas within Grant Line and Fabian Bell Canals; thus, additional sediment testing would be conducted to ensure that the SDIP does not result in adverse or significant impacts on farmlands from the disposal of dredged material.

Extension of Agricultural Diversions

Approximately 160 agricultural water pumps and siphons deliver water to agricultural lands bordering Old and Middle Rivers, Grant Line Canal, and other channels in the south Delta. Some agricultural siphons become surrounded by sediment to the extent that their ability to function is diminished. In some cases, the intake elevations are too shallow. Fluctuating tides and SWP and CVP pumping can affect continuous and reliable operation. As a result, diversions that are –2 feet msl or shallower would need to be extended. Approximately 24 diversion intakes, most of them on Middle and Old Rivers, are currently at -2 feet msl or shallower (Figure 2-11). Table 2-6 shows the number of diversion extensions necessary for each channel.

Table 2-6. Diversions Proposed for Extension

Channel	Siphons/Pumps	Siphons/Pumps That Require Extension
Grant Line Canal	19	2
Middle River	64	9
Old River	66	12
West and Victoria Canals	11	1
Total	**160**	**24**

Total Project Cost

In total, up to $24 million is proposed to fund protection and restoration of fish habitat in the Delta and wildlife habitat, and to study the effectiveness of mitigation for the special-status fish and wildlife species. Of this $24 million, $2 million would be allocated to the indirect effects conservation measure only applicable to the Stage 2 decision, and the $6 million allocated for fishery investigations would be applicable to both the Stage 1 and Stage 2 decisions. Table 2-7 shows the estimated cost of constructing and operating the SDIP physical/structural and operational components, and the estimated cost for mitigation, enhancement, and conservation actions.

Table 2-7. SDIP Estimated Costs for Construction, Operations and Maintenance, and Mitigation, Enhancement, and Conservation

Action	Estimated Cost ($)	Yearly Estimated Cost ($)
Construction		
Permanent operable gates	75 million	
Dredging	9 million	
Agricultural Extensions	2.5 million	
Operations & Maintenance		Up to 1 million
Mitigation, Enhancement, and Conservation		
Acquire and Restore Habitats in the South Delta	10 million	
Mitigation for other project impacts (e.g., dredging impacts)	Up to 6 million	
Fishery Investigations[1]	6 million[1]	
Indirect Effects Conservation Measure[2]	2 million[2]	
Total	110.5 million	Up to 1 million

Notes:

[1] This amount includes the total mitigation necessary for implementing both Stage 1 and Stage 2 decisions.

[2] This measure applies to the implementation of the Stage 2 decision.

Environmental Commitments

As part of the project planning and environmental assessment process, DWR and Reclamation will incorporate certain environmental commitments and best management practices (BMPs) into the SDIP alternatives to avoid or minimize potential impacts. DWR and Reclamation will also coordinate planning, engineering, design and construction, operation, and maintenance phases of the project with the appropriate agencies. These environmental commitments have been incorporated into the project.

Standard Design Features and Construction Practices

DWR and Reclamation determined the following design features and construction practices to be potentially feasible and implementable measures to reduce or mitigate certain short-term, construction-related effects. These measures would be implemented at a site-specific level, as appropriate, depending on the location of construction and surrounding land uses. The identified measures are listed below:

- Stopping work immediately if a conflict with a utility facility occurs and contacting the affected utility to (1) notify it of the conflict, (2) aid in coordinating repairs to the utility, and (3) coordinate to avoid further conflicts in the field.
- Constructing structures in accordance with California Building Code and County General Plan Standards to resist seismic effects and to meet the implementation standards outlined in the San Joaquin and Contra Costa County general plans.
- Ensuring that any new structures will have water systems that meet county fire flow requirements or provide adequate on-site water storage, as determined by the County Fire Warden or by the local fire district.
- Notifying the four known aerial spray applicators in the south Delta region (Haley's, Trinkle and Boys, Aerial Control, and Cavanagh) of the location and expected construction schedule upon beginning construction activities. These applicators will be required to take precautions, including spraying on Sundays or early mornings, or spraying only parts of fields, when construction workers are within a distance that may pose a threat to their health. Notification of the presence of people near the potential spray area to the above businesses would avoid any public heath risk as a result of pesticide application.
- Ensuring that changes within the south Delta channels will not significantly affect navigation and emergency access by having Rio Vista Coast Guard Station review plans to assess safety issues associated with changes.
- Eliminating any disease-carrying mosquitoes and threats to public safety through coordination with the San Joaquin County mosquito abatement district and funding by DWR and Reclamation if it is found that the project components, specifically the settling ponds and/or runoff management basins, pose a threat to public health.

Access Point/Staging Areas

DWR and Reclamation, will establish staging areas for equipment storage and maintenance, construction materials, fuels, lubricants, solvents, and other possible contaminants in coordination with the resource agencies. Practices and procedures for construction activities along city and county streets will be consistent with the policies of the affected local jurisdiction.

Staging areas will have a stabilized entrance and exit and will be located at least 100 feet from bodies of water. If an off-road site is chosen, qualified biological and cultural resources personnel will survey the selected site to verify that no sensitive resources that would be disturbed by staging activities. If sensitive resources are found, an appropriate buffer zone will be staked and flagged to avoid impacts. If impacts on sensitive resources cannot be avoided, the site will not be used. Where possible, no equipment refueling or fuel storage will take place within 100 feet of a body of water. However, dredging equipment, specifically located on the barge, would be refueled within the channel and would abide by the measures set forth in a stormwater pollution prevention plan (SWPPP) (as described below).

For areas where construction activities do not exist in the road right-of-way, the biological and cultural resources personnel will determine whether the selected staging area meets the criteria identified above and whether additional environmental clearance is required for the site. If sensitive resources are identified on the site that cannot be protected by environmental commitments for similar resources, an alternate site will be selected.

Erosion and Sediment Control Plan

DWR and Reclamation will prepare and implement an erosion and sediment control plan to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas affected by construction activities. The plan will include all the necessary local jurisdiction requirements regarding erosion control and will implement BMPs for erosion and sediment control as required.

Stormwater Pollution Prevention Plan

A SWPPP will be developed by a qualified engineer or erosion control specialist and implemented prior to construction. The objectives of the SWPPP would be to (1) identify pollutant sources associated with construction activity and project operations that may affect the quality of stormwater, and (2) identify, construct, and implement stormwater pollution prevention measures to reduce pollutants in stormwater discharges during and after construction. DWR and Reclamation, and/or their contractor(s) will develop and implement a spill prevention and control plan as part of the SWPPP to minimize effects from spills of hazardous, toxic, or petroleum substances during construction of the project. The program will be a component of the SWPPP, which will be completed before any construction activities begin. Implementation of this measure would comply with state and federal water quality regulations. The SWPPP will be kept on site during construction activity and during operation of the project and will be made available upon request to representatives of the RWQCB. The SWPPP will include, but is not limited to the following items:

- a description of potential pollutants to stormwater from erosion,
- management of dredged sediments and hazardous materials present on site during construction (including vehicle and equipment fuels),
- details of how the sediment and erosion control practices comply with state and federal water quality regulations, and
- a description of potential pollutants to stormwater resulting from operation of the project.

Dredging, Sampling and Analysis Plan, and Spoils Disposal

DWR and Reclamation, or their contractors, will ensure that dredging activities occur within the center channel and that no wetland, riparian, or other sensitive habitats are disturbed during, or as a result of, dredging activities. In addition, dredging would not affect or reduce intertidal habitats or channel islands within the dredge areas.

To ensure that potentially contaminated dredged materials do not affect surface water or groundwater resources, project proponents and/or their contractors would require a sampling and analysis plan (SAP) for proposed dredging areas no more than 1 year before proposed dredging activities. The SAP would be consistent with both EPA and RWQCB standards.

Channel core samples equivalent to approximately one core for every 5,000 cubic yards (cy) of dredged material will be collected. Sediment cores will be taken to project depth plus 1-foot overdredge allowance where dredging is proposed to occur. These cores will be combined into samples for testing, with samples of the individual original cores archived for future reference if necessary.

Both the dredged and disposal site material composite samples will be subjected to chemical analysis for the required list of analytes as requested in the waste discharge requirements (WDRs) General Order 5-00-183 (11 August 2000) and as recommended in the Delta Dredging and Reuse Strategy (CVRWQCB, Central Valley Region, June 2002).

Standard elutriate tests (SET) will be conducted to simulate the action of the clamshell dredge, which might cause mobilization of soluble metals during the dredging process. DI-WET tests will also be done on these sediment composite samples to evaluate the potential for subsequent freshwater leaching of these sediments on the disposal site. The analysis for acid-generating and -neutralizing potential of the dredged sediment will be carried out to aid the evaluation of potential future impacts of leachate on surface and groundwater quality.

In addition, acute toxicity tests using *Pimephales promelas* (fathead minnow) will be carried out on each composite sample and on both background water samples. The toxicity test data from the dredge sites will be compared statistically to the toxicity data from tests carried out on the background waters. As the dredged sediments are proposed for upland disposal and will not offer an exposure pathway to benthic organisms, benthic toxicity tests are not appropriate for this program.

If the SAP indicates any layer of toxic materials above applicable standards, contractors will dredge so that either that layer is not disturbed or the entire layer is removed. This would effectively eliminate the potential for exposure of the benthic environment to toxic layers.

If the SAP concludes that dredged material is found to possess contaminants, its disposal may lead to significant impacts on groundwater quality by leaching contaminants into the underlying soil. However, the SAP would be followed by a suitability analysis in which a suitable environment for the disposal of contaminated soils would be chosen.

Once the spoils testing is completed and the results analyzed, one or more of three methods would be used to dispose of the spoils:

Untreated Upland Disposal and Reuse

If the results of spoils tests indicate that the material is consistent with the composition and chemical properties of the proposed upland disposal areas, and would not result in a change in the soils' suitability for continuing use as farm or grazing land, project proponents would dispose of up to 294,000 cy of decanted spoils material (250,000 cy from conveyance dredging and 44,000 cy from spot and gate dredging) by means of upland disposal and reuse. If a part of the spoils tested is deemed incompatible and/or contains hazardous levels of any chemical or element considered toxic, such spoils shall be disposed of as described below. Remaining spoils that are deemed compatible with the upland disposal and reuse method would be disposed of in that manner.

Spoils materials that are disposed of using the upland disposal and reuse method shall not exceed 1 foot in thickness in the application process and shall meet the water quality requirements of the Central Valley and San Francisco Bay Area (in Contra Costa County) RWQCBs. Specific upland disposal and reuse application and soil integration methods shall be specified in the spoils disposal plan. The Plan will include CALFED Programmatic Agricultural Land and Water Use Mitigation Measures 22, 23, and 30 (shown in Table 2-8 below).

Table 2-8. CALFED Programmatic Agricultural Land and Water Use Mitigation Measures 22, 23, and 30

Mitigation Measure	Mitigation
22	Implement erosion control measures to the extent possible during and after construction activities.
23	Protect exposed soils with mulches, geotextiles, and vegetative ground covers to the extent possible during and after project construction activities in order to minimize soil loss.
30	Implement seepage control measures.

Treated (Amended) Upland Disposal and Reuse

If the results of spoils tests indicate that the material is incompatible with the composition and chemical properties of the proposed upland disposal areas, and could result in a change in the soils' suitability for continuing use as farm or grazing land but does not contain hazardous levels of any chemical or element considered toxic, such soils may be disposed of and reused locally with the use of soil amendments. Soil amendments would serve to adjust the composition and chemical properties of the spoils to allow the best integration with the existing soils of the upland disposal and reuse sites to the greatest extent feasible. If a part of the spoils tested contains hazardous levels of any chemical or element considered toxic, such spoils will be disposed of as described in the Landfill method below. Remaining spoils that are deemed compatible with the amended upland disposal and reuse method will be disposed of in that manner.

Spoils materials that are disposed of using the amended upland disposal and reuse method shall not exceed 1 foot in thickness in the application process and shall meet the water quality requirements of the Central Valley and San Francisco Bay Area (in Contra Costa County) RWQCBs. Specific upland disposal and reuse application and soil integration methods shall be specified in the spoils disposal plan. The plan will include CALFED Programmatic Mitigation Measures 21, 22, 23, and 30.

Upland Disposal

If the results of testing indicate that all or part of the spoils tested contain hazardous levels of any chemical or element considered toxic, such materials shall be handled, transported, and disposed of in accordance with all appropriate health and safety regulations, and with the project's hazardous materials management plan.

DWR and Reclamation will dispose of up to 294,000 cy of decanted spoils material by means of transport to lands currently owned by DWR for permanent disposal. Details on handling and transportation methods will be identified in the spoils disposal plan and assessed for impacts by subsequent environmental review (if necessary). For hazardous material handling, transport, and disposal discussion, refer to Section 7.8, Public Health and Environmental Hazards.

Traffic and Navigation Control Plan and Emergency Access Plan

DWR and Reclamation, in coordination with affected jurisdictions, will develop and implement a traffic and navigation control plan, which will include an emergency access plan, to reduce construction-related effects on the local roadway and waterway systems and to avoid hazardous traffic and circulation patterns during the construction period. All construction activities will follow the standard construction specifications and procedures of the appropriate jurisdictions.

The traffic and navigation control plan will include an emergency access plan that provides for access into and adjacent to the construction zone for emergency vehicles. The emergency access plan, which requires coordination with emergency service providers such as the Coast Guard before construction, would require effective traffic and navigation direction, substantially reducing the potential for disruptions to response routes.

The traffic and navigation control plan will include, but not be limited to, the following actions:

- coordinating with the affected jurisdictions on construction hours of operation;
- following guidelines of the local jurisdiction for road closures caused by construction activities;
- installing traffic control devices as specified in the California Department of Transportation's (Caltrans') *Manual of Traffic Controls for Construction and Maintenance Works Zones*;
- notification to the public of road closures in the immediate vicinity of the open trenches in the construction zone and/or of temporary closures of sidewalks, bike lanes, and recreation trails;
- posting signs that conform to the California Uniform State Waterway Marking System upstream and downstream of the dredge areas to warn boaters of work;
- providing access to driveways and private roads outside the immediate construction zone;
- monitoring road damage and repairing when necessary levee roads and any other roads damaged during construction; and

- coordinating with emergency service providers before construction to develop an emergency access plan for emergency vehicles' access into and adjacent to the construction zone; the emergency access plan would require effective traffic direction, substantially reducing the potential for disruptions to response routes.

Dust Suppression Plan or Fugitive PM10 Management Plan

According to 1991 Air Resources Board emission inventory, fugitive dust is a major contributor to total particulate matter 10 microns in diameter or less (PM10) emissions within the San Joaquin Valley Air Pollution Control District. DWR and Reclamation will comply with the San Joaquin County fugitive dust rules by implementing a fugitive PM10 management plan (FPMP). The purpose of an FPMP is to achieve a PM10 control efficiency of 50% and to comply with San Joaquin County fugitive dust rules. The FPMP may include, but is not limited to watering haul roads—one application for every 75 vehicle trips.

To mitigate potential exceedances of particulate dust thresholds from drying beds of excavated material, a dust suppression plan will be developed and implemented.

In July 1997, the EPA revised the ambient air quality standard for particulates to reflect direct impacts on human health by setting the standard for PM10; this involves fugitive dust whether contaminated or not.

The following techniques have been shown to be effective for controlling the generation and migration of dust during construction activities and could be included in the dust suppression plan:

- applying water on haul roads;
- wetting equipment and excavation faces;
- spraying water on buckets during excavation and dumping;
- hauling materials in properly tarped or watertight containers;
- restricting vehicle speeds to 10 miles per hour (mph);
- covering excavated areas and material after excavation activity ceases;
- reducing the excavation size and/or number of excavations;
- employing additional dust suppression techniques if dust is observed leaving the working site;
- requiring performance of particulate monitoring using real-time particulate monitors and monitoring PM10;
- using quality assurance/quality control plans to ensure the validity of the fugitive dust measurements that include the following critical features:

periodic instrument calibration, operator training, daily instrument performance (span) checks, and a recordkeeping plan; and

- notifying the Division of Air Resources in writing within 5 working days should the action level of 150 micrograms per cubic meter ($\mu g/m^3$) be exceeded and including a description of the control measures implemented to prevent further exceedances.

If the dust suppression techniques being used at the site do not lower particulates to an acceptable level (that is, below 150 $\mu g/m^3$ and no visible dust), work must be suspended until appropriate corrective measures are approved to remedy the situation. Also, the evaluation of weather conditions will be necessary for proper fugitive dust control (NY State Department of Environmental Conservation, Division of Hazardous Waste Remediation 1989).

Fire Control Plan

DWR and Reclamation will develop and implement a fire management plan in consultation with the appropriate city, county, and state fire suppression agencies to verify that the necessary fire prevention and response methods are included in the plan. The plan will include fire precaution, pre-suppression, and suppression measures consistent with the policies and standards in the affected jurisdictions.

Hazardous Materials Management Plan

DWR and Reclamation, or their contractors, will not use any hazardous material in reportable quantities, as specified in Title 40, CFR, Part 355, Subpart J, Section 355.50, unless approved in advance by the Office of Emergency Services (OES).

The project owner will provide to the OES in the annual compliance report a list of hazardous materials contained at the facility in reportable quantities.

The project owner will include in its monthly compliance report copies of all regulatory permits/licenses acquired by the project owner and/or subcontractors concerning the transport of hazardous substances. Transporters will have applicable certification to transport hazardous substances.

The project owner will prepare a risk management plan (RMP). The RMP will be submitted to EPA and will reflect the comments of the San Joaquin County Certified Unified Program Agency (CUPA). The project owner will also prepare a safety management plan for the delivery of ammonia.

The plan will include procedures, protective equipment requirements, training and a checklist.

At least 60 days prior to the start of construction, or a lesser period of time as mutually agreed upon, the project owner will provide the final RMP and the safety plan to the Certified Property Manager (CPM).

Gate Operations Adaptive Management

To ensure that the desired water level is maintained within the south Delta, an adaptive tidal gate management strategy will be developed, similar to the existing water level response plan, to incorporate knowledge and data gathered during the actual operation and use of the tidal gates. This management strategy would ensure that tidal flows, including low tides, are protected to reduce the risk of adverse effects on in-Delta resources.

Marinas and Other Recreational Facilities

Several privately owned marinas in the project area may be affected by the construction and operation of permanent gates. If any marinas in the area are adversely affected by the permanent gates, DWR and Reclamation will work with the marina owner(s) to reduce those adverse effects. One such marina owner and other landowners with plans for development in the area have been contacted to address their needs and potential adverse effects. DWR and Reclamation will continue to work with these businesses and will address any new adverse effects resulting from gate construction or operation. In addition, DWR will coordinate with the Delta Protection Commission Recreation Citizens Advisory Committee to identify potential recreational enhancements and the funds necessary to implement those enhancements.

Spoils Drying Areas and Agricultural Land (Return)

Up to seven spoils ponds would be located on agricultural lands adjacent to the dredging areas of West Canal and Middle River, and on the Stewarts Tract. The dredge spoils from initial dredging and one round of subsequent dredging in the West Canal, Middle River, and Old River would be decanted in up to seven spoils ponds measuring up to 80 acres each; total combined acreage would be approximately 205 acres.

The spoils ponds would be located on agricultural land and would avoid wetlands. The spoils ponds would be used up to two times over a period of up to 7 years. After the second use, the spoils ponds would be decommissioned; decommissioning will involve the complete excavation of remaining spoils, site leveling, and the return of the sites to as close to preproject agricultural conditions as is possible.

Prior to construction activities, existing (preproject) soil conditions and elevations at each potential spoils pond site will be tested and documented as part of the spoils disposal plan. Following the excavation of the second round of dredge spoils and leveling of the spoils pond sites, the soil conditions and elevations at each spoils pond site again will be tested and documented. The soils and elevations of preproject and postproject conditions will be compared for consistency in soil composition, chemical properties, and other characteristics related to classification of soil types.

To ensure that the agricultural lands used for spoils ponds are returned to as close to preproject conditions as is feasible, the 1999 Natural Resources Conservation Service (NRCS), *Soil Taxonomy, A Basic System of Soil Classification for Making and Interpreting Soil Surveys, Second Edition*, will be used to identify and compare preproject and postproject soil classifications.

Spoils Disposal Plan

Subsurface conditions in dredge spoil areas will be investigated prior to disposal activities and documented in the form of a soil suitability analysis or geotechnical report. Soil borings will be drilled throughout the potential dredged material disposal area to determine stratigraphic conditions beneath the settling pond area and the depth and thickness of peat units present. Samples of the peaty soils will be collected from each boring and will be submitted to a geotechnical laboratory; the density of each sample will be measured according to American Society for Testing and Material (ASTM) standards. These data would be used in conjunction with the stratigraphic information to determine the maximum amount of compaction that could occur beneath the site. The disposal method would be designed to account for the type and depth of materials present below the disposal sites. The sediment and water depth would be kept at a minimum to reduce the risk of settlement of the underlying soils. Additionally, the amount of dredged material to be placed could offset the amount of land subsidence if it raises the ground surface to a height greater than or equal to the depth of anticipated land subsidence.

Environmental Training

DWR and Reclamation will provide training to the construction personnel and managers as to the importance of protecting environmental resources. DWR and Reclamation will provide education to field management and construction personnel on the need to avoid and protect resources. Communication efforts and training will occur at preconstruction meetings so that construction personnel are aware of their responsibilities and the importance of compliance.

Construction personnel will be educated on the types of sensitive resources located in the project area and the measures required to avoid impacts on these resources. They will attend an environmental training program before groundbreaking activities associated with the proposed project are initiated. Materials covered in the training program will include environmental rules and regulations for the proposed project and requirements for limiting activities to the construction right-of-way and avoiding demarcated sensitive resources areas.

Training seminars will be held to educate construction supervisors and managers on:

- the need for resource avoidance and protection,
- construction drawing format and interpretation,
- staking methods to protect resources,
- the construction process,
- roles and responsibilities,
- project management structure and contacts,
- environmental commitments, and
- emergency procedures.

DWR would operate the gates, control facilities, and boat ramp and boat locks, and will also implement a Boating Educational Program in an effort to educate boaters regarding the new structures in the area. Education for boaters would be to improve recreation in the project area and would reduce misconceptions regarding perceived difficulty of navigating past the new structures. DWR's education of boaters could occur through a variety of methods, including, but not limited to:

- posting clearly readable instructional signs on the banks and waterways at all approaches to a gate site (in multiple languages),
- distributing educational flyers containing maps and operation schedules (in multiple languages),
- offering classes at local marinas regarding the use of the lock facility,
- providing an information telephone hotline (in multiple languages), and
- providing information via an Internet homepage regarding operation of the gates (in multiple languages).

Noise Compliance

DWR and Reclamation and/or their contractors will comply with local noise regulations by limiting construction to the hours specified by relevant counties, except during conveyance dredging activities which would occur 24 hours a day. It is assumed that construction activities would occur during normal working hours, between 7:00 a.m. and 7:00 p.m., Monday through Friday, and between 8:00 a.m. and 5:00 p.m., Saturday and Sunday. In San Joaquin County, construction activities that occur between the hours of 6:00 a.m. and 9:00 p.m.

Sunday and Saturday are exempt from the County's noise ordinance. In Alameda County, construction activities that occur between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday and between 8:00 a.m. and 5:00 p.m. Saturday and Sunday are exempt from the County's noise ordinance.