

---

## 4. Environmental Consequences and Mitigation Measures

---

### 4.12 CUMULATIVE EFFECTS

Cumulative effects are defined as the combined impact upon the environment which results from the summation of all the incremental effects of the proposed project plus other past, present, and reasonably foreseeable future actions undertaken by the same or other agencies or persons (USBR 1997d). Cumulative impacts can result from individually minor but collectively significant actions taking place over the life of the project. This section identifies a list of related projects (including plans and programs), summarizes the environmental effects of these related projects, qualitatively analyzes the cumulative impacts of the proposed project (in the context of the related projects), and recommends mitigation measures for any significant cumulative impacts.

#### 4.12.1 Actions Included in the Cumulative Impacts Analysis

Actions that may contribute to cumulative effects include the following programs which are described in the following sections.

- State Water Resources Control Board Bay/Delta Process
- Central Valley Project Improvement Act (especially Section 3406(b)(2))
- Interim South Delta Program
- CALFED Bay-Delta Program
- New Melones Long-Term Plan of Operation
- SSJID South County Water Supply Project
- OID/SSJID Water Transfer Project to SEWD

##### 4.12.1.1 State Water Resources Control Board Bay/Delta Process

In 1995, the State Water Resources Control Board (SWRCB) adopted a water quality control plan for the San Francisco Bay/Sacramento-San Joaquin Rivers Delta Estuary (1995 WQCP). The plan identifies municipal and industrial, agriculture, and fish and wildlife beneficial uses and specifies objectives to protect these uses. The objectives consist of numeric objectives for flow, numeric objectives for water quality constituents (salinity and dissolved oxygen), numeric operational constraints, and two narrative objectives for the protection of salmon and brackish tidal marshes in Suisun Marsh. The objectives in the 1995 WQCP are currently implemented through Biological Opinions issued by the U.S. Fish and Wildlife Service (Service) and the National Marine Fisheries

---

## 4. Environmental Consequences and Mitigation Measures

---

Service (NMFS) for protection of Delta smelt and winter-run chinook salmon, respectively, and through SWRCB water right decision 1485 (D-1485). Under the Biological Opinions, D-1485, and the interim order, responsibility for meeting most of the objectives is assigned to the State Water Project (SWP), operated by the California Department of Water Resources (DWR), and to the federal Central Valley Project (CVP), operated by the U.S. Bureau of Reclamation (Reclamation). The SWRCB program is an adjudicatory action designed to implement the 1995 WQCP by determining and allocating responsibility for achieving the 1995 WQCP objectives to water right holders (SWRCB 1998).

### 4.12.1.2 Central Valley Project Improvement Act (Bureau of Reclamation)

On October 30, 1992, the President signed into law the Reclamation Projects Authorization and Adjustment Act of 1992 (Public Law 102-575) that included Title XXXIV, the Central Valley Project Improvement Act (CVPIA). This act amended previous authorizations of the California Central Valley Project (CVP) to include fish and wildlife protection, restoration, and mitigation as project purposes having equal priority with irrigation and domestic uses, and fish and wildlife enhancement as a project purpose equal to power generation. The CVPIA identifies a number of specific measures to meet these new purposes and directs the Secretary of the Interior (Secretary) to operate the CVP consistent with these purposes, to meet the Federal trust responsibilities to protect the fishery resources of affected federally recognized Indian tribes, and to meet all requirements of Federal and California law and to achieve a reasonable balance among competing demands for use of CVP water (USBR 1997d).

The CVP is the system of reservoirs, powerplants, pumping plants, and canals managed by the federal Bureau of Reclamation in California. The combined storage capacity is about 12 million acre-feet, which accounts for approximately 25 percent of California's developed surface water supply. Interior is developing policies and programs to modify the operations, management, and physical facilities of the CVP and to renew existing CVP water services and repayment contracts to comply with the purposes and goals of the CVPIA (CALFED 1998).

The CVPIA mandates changes in the management of the CVP, particularly operation of the CVP to dedicate and manage 800,000 acre-feet of CVP yield for the protection, restoration, and enhancement of fish and wildlife (Section 3406(b)(2)). On November 20, 1997, Interior published its "Final Administrative Proposal on the Management of Section 3406(b)(2) Water" (USBR 1997n). This paper presents how Interior intends to comply with the statutory mandate to dedicate and manage the water dedicated pursuant to Section 3406(b)(2) of the CVPIA. It designates a set of fish, wildlife, and habitat restoration measures that will be implemented over a 5-year (or greater) period. These measures could result in water delivery impacts of 800,000 acre-feet of CVP yield. Actions included in the "(b)(2) water" management program include VAMP and ramping of San Joaquin River flows (after the 31-day pulse flow period). Interior determined that NEPA was not required for the

---

#### 4. Environmental Consequences and Mitigation Measures

---

implementation of Section 3406(b)(2) actions, and this EIS/EIR is addressing only the program to acquire water that would be needed to meet the San Joaquin River flow objectives of VAMP and other needs of the San Joaquin River system. Subsequent litigation on the NEPA exemption for “(b)(2) water” confirmed Interior’s position. The CVPIA program also includes water acquisitions actions designed to meet instream target flows (Section 3406 (b)(3)) for the benefit of fish and wildlife.

Physical measures to restore fish and habitat include: establishment of fish screening programs; development and implementation of measures on the Sacramento River to minimize fish passage problems; expansion of the U.S. Fish and Wildlife Service’s existing hatchery facility; development and implementation of a continuing program to restore and replenish lost spawning gravel; development and implementation of a program that provides for modified operations or new and improved control structures at the Delta Cross Channel and Georgiana Slough; and design and construction of new fish protection structures at selected agricultural pumping facilities (CALFED 1998).

##### **4.12.1.3 Interim South Delta Program (California Department of Water Resources/ Bureau of Reclamation)**

The objectives of the Interim South Delta Program (ISDP) are to improve water levels and circulation in South Delta channels for local agricultural diversions, improve South Delta hydraulic conditions to increase diversions into Clifton Court Forebay to optimize the frequency of full pumping capacity at the Harvey O. Banks Pumping Plant, and improve fishery conditions for salmon migrating along the San Joaquin River (CALFED 1998).

The preferred alternative for the ISDP is comprised of selected channel dredging of a 4.9-mile reach of Old River from the northwest corner of the Clifton Court Forebay to North Victoria Canal; construction and operation of a new intake gate at Clifton Court Forebay; and construction and operation of three radial gate flow control structures and one radial gate fish control structure in the south Delta, to increase water supply availability for local diverters and improve local fishery conditions. In addition, DWR is seeking a permit from the U.S. Army Corps of Engineers to divert up to 20,430 acre-feet of water per day on a monthly averaged basis from the Delta into Clifton Court Forebay. Collectively, these actions are intended to enhance the management of south Delta water resources to benefit local diverters, Delta fisheries and State Water Project water supply (CALFED 1998).

A Draft EIS/EIR and 404(b)(1) Analysis for ISDP was released for public review and comment in July 1996. The draft documents identified both beneficial and adverse impacts associated with the implementation of ISDP.

---

## 4. Environmental Consequences and Mitigation Measures

---

Potential adverse impacts upon aquatic resources include loss of habitat due to dredging of Old River; loss of habitat due to the construction of the proposed facilities; negative flows in channels leading to the South Delta due to the operation of the barriers; and increased straying, predation, and entrainment losses due to high SWP export pumping during the fall, winter, and early spring. Concurrently the project could benefit San Joaquin River fall-run chinook because the spring and fall fish control structure at the Head of Old River would reduce entrainment/predation loss of San Joaquin River salmon smolts at the Tracy and Harvey O. Banks Pumping Plants and improve dissolved oxygen levels in the San Joaquin River (CALFED 1998).

Water quality could be substantially improved in two ways and potentially degraded in one way. First, increased pumping would allow reductions in exports during critical seasons. This change in operation could lead to fewer conflicts among beneficial use of Delta waters. Secondly, the installation of barriers could improve water levels and circulation in the South Delta, and thereby enhance agricultural and municipal uses of the water. However, the operation of the barriers also could degrade water quality by rerouting relatively saline waters of the San Joaquin River away from the South Delta pumping plants, and towards the central Delta (CALFED 1998).

### 4.12.1.4 CALFED Bay-Delta Program

The CALFED Program began in June of 1995 to address the complex issues that surround the management of the Delta. The CALFED Program is a cooperative, interagency effort involving 15 state and federal agencies with management and regulatory responsibilities in the Bay-Delta. The purpose of the CALFED Program is to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta system (CALFED 1998).

To achieve the programs purpose, CALFED concurrently addresses problems of the Bay-Delta system within four critical resource categories: ecosystem quality, water quality, water supply reliability, and levee system integrity. Important physical, ecological, and socioeconomic linkages exist between the problems and possible solutions in each of these categories. In addition to these four, core-element, categories, the CALFED program is evaluating water storage and conveyance alternatives (CALFED 1998).

New storage is being considered to provide opportunities for enhanced timing and flow management to more effectively and efficiently satisfy urban, agricultural, and environmental beneficial users. Options under consideration include enlarging existing storage facilities, developing new off-stream and on-stream storage reservoirs, and groundwater storage. Conveyance options, intended to convey water from north of the Delta to south of the Delta, are also part of the program alternatives. The various conveyance components range from modifications to existing facilities in the south

---

## 4. Environmental Consequences and Mitigation Measures

---

Delta, to improvements of existing Delta channels, to the construction of an isolated transfer facility (CALFED 1998).

The Draft Programmatic EIS/EIR for the Bay-Delta Program was released for public comment in March 1998. A final document is expected to be completed in mid 1999.

### 4.12.1.5 New Melones Long-Term Plan of Operation

Reclamation is committed to completing the New Melones Long-Term Operation Plan with the participation of a wide range of stakeholders in the Stanislaus River Basin. The long term operations of the Stanislaus River will be affected by several pending actions including the SJRA. The stakeholders input combined with resolution of pending actions and planning studies will result in a revision of the 1997 Interim Plan of Operation to produce the long-term plan.

The Interim Operation Plan for New Melones Dam and Reservoir (USBR 1997) will expire October 1, 1998. Based on the general consensus of stakeholders in June 1998, Reclamation will continue to operate under the interim plan through October 1, 1999. Beginning in April 1999, Reclamation will sponsor discussions to consider the Interim Operation Plan for the years 2000 and 2001. (Ploss 1998, e-mail communication)

### 4.12.1.6 SSJID South County Surface Water Supply Project

The SSJID South County Surface Water Supply project as currently proposed consists of the construction of a water treatment plant to treat water currently held by SSJID under its pre-1914 water rights for use in the Southern San Joaquin County communities of Manteca, Escalon, Lathrop, and Tracy. The project would proceed in two stages. First, SSJID would construct a water treatment plant and associated conveyance facilities with a capacity of up to 30,000 acre-feet annually. The second stage would consist of expanding both the treatment plant and conveyance facilities as needed to a capacity of up to 50,000 acre-feet annually.

An initial study for the SSJID South County Surface Water Supply Project was released in February, 1998. The initial study concluded that an EIR would need to be prepared. SSJID is currently in the process of developing an EIR, and anticipates releasing a draft EIR in early 1999.

### 4.12.1.7 OID/SSJID Water Transfer Project to SEWD

The OID/SSJID Water Transfer Project to SEWD as currently proposed would transfer up to 30,000 acre-feet of surface water annually over a ten-year period from OID and SSJID through existing conveyance facilities to the SEWD, the City of Stockton, and the Lincoln Village and Colonial Heights Maintenance District. The transferred water would be used by SEWD primarily for direct

---

## 4. Environmental Consequences and Mitigation Measures

---

municipal and industrial use by the City of Stockton, California Water Service company, and the Lincoln Village and Colonial Heights Maintenance District in order to reduce groundwater pumping and enhance recovery of the Eastern San Joaquin Groundwater Basin.

A Draft Initial Study and Proposed Negative Declaration for the project was released in December, 1997. After reviewing the comments received on that document, OID and SSJID determined that a focused EIR was necessary to address some of the potential environmental impacts of the project. OID and SSJID anticipate that a DEIR for the project will be released in early 1999.

### 4.12.2 Cumulative Impact Analysis

The following is an analysis of projects discussed in Section 4.12.1 and their potential cumulative impacts. The analysis is qualitative in nature. Impacts were based on identified resources potentially affected by each project extracted from the CALFED Bay-Delta Draft Programmatic EIS/EIR (1998). The CALFED analysis based their determination upon available environmental documents/studies or knowledge of the generally expected kinds of effects of similar projects (CALFED 1998). Because of the preliminary phase of most of the projects (environmental reviews have not been initiated, drafted, or finalized), comparable environmental information for identifying cumulative impacts was not available. Table 4.12-1 summarizes the effects of all actions including the SJRA proposed action.

#### 4. Environmental Consequences and Mitigation Measures

**Table 4.12-1: SUMMARY OF CUMULATIVE IMPACTS**

Region	Actions Involved	Potential Cumulative Impacts from All Actions
<b>Delta Region</b>	<ul style="list-style-type: none"> <li>• SWRCB Bay/Delta Process</li> <li>• Interim South Delta Program</li> <li>• Central Valley Project Improvement Act</li> <li>• CALFED Bay-Delta Program</li> </ul>	<ul style="list-style-type: none"> <li>• Beneficial and detrimental impacts to fisheries and Delta species listed as threatened or endangered</li> <li>• Beneficial and detrimental impact to water quality and supply availability</li> </ul>
<b>Sacramento River Region</b>	<ul style="list-style-type: none"> <li>• SWRCB Bay/Delta Process</li> <li>• Central Valley Project Improvement Act</li> <li>• CALFED Bay-Delta Program</li> </ul>	<ul style="list-style-type: none"> <li>• Beneficial impacts to fisheries and water quality</li> <li>• Adverse impact to water supply availability</li> <li>• Beneficial and/or adverse impacts to recreation</li> </ul>
<b>San Joaquin River Region</b>	<ul style="list-style-type: none"> <li>• SWRCB Bay/Delta Process</li> <li>• Central Valley Project Improvement Act</li> <li>• CALFED Bay-Delta Program</li> <li>• Interim South Delta Program</li> <li>• New Melones long-term plan of operation</li> <li>• SSJID South County Water Supply Project</li> <li>• OID/SSJID Water Transfer to SEWD</li> </ul>	<ul style="list-style-type: none"> <li>• Beneficial impacts to water supply reliability and the protection of water rights</li> <li>• Beneficial and detrimental impact to water quality</li> <li>• Beneficial impact to riparian vegetation, special-status and other wildlife species</li> <li>• Long-term beneficial impacts to fisheries</li> <li>• Adverse impacts to agricultural production</li> <li>• Adverse impacts to groundwater</li> </ul>
<b>SWP and CVP Service Areas</b>	<ul style="list-style-type: none"> <li>• All Projects Analyzed</li> </ul>	<ul style="list-style-type: none"> <li>• Adverse impacts to water supply availability and quality</li> </ul>

Notes: \* All actions include the specific programs mentioned and the SJRA proposed action. Actions have both negative and positive effects as indicated. The summary does not attempt to arrive at a net effect. See subsections of Section 4.12.2 for discussion of individual impacts.

The analysis above represents an approach that combines large projects/plans/programs and two specific recent projects in the OID/SSJID service areas in Stanislaus County. The SJRA proposed action is one component in the larger plans underway by the CALFED Bay-Delta Program and in the implementation of long-term water contracts under the CVPIA. The NEPA/CEQA documents prepared for these regional projects provide detailed analysis of collectively significant projects occurring over the 12-year time frame of the proposed action. Further detailed information on cumulative impacts is provided in the Draft PEIS on the CVPIA (USBR 1997d-n), and this information is herein incorporated by reference.

---

## 4. Environmental Consequences and Mitigation Measures

---

### 4.12.2.1 Delta Region

The SWRCB Bay/Delta Process would result in beneficial cumulative water quality and fishery impacts within the Delta. The proposed (SJRA) project and alternative (SWRCB Water Right Priority System) actions contribute beneficially to the attainment of most SWRCB Bay/Delta Process objectives for protection of beneficial uses.

Interior's CVPIA Administrative Proposal for management of (b)(2) water (USBR 1997n) includes Appendix B, Summary of Simulated CVP and SWP Delivery Impacts by Year Type. The impact varies based on hydrologic conditions with the greatest impacts occurring in dry years. Up to 800,000 acre-feet of CVP yield will be dedicated to actions that would benefit fish and wildlife and their habitats which include the Delta ecosystem.

One of the purposes of the (b)(2) water is to assist the State in its efforts to protect the waters of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. Delta actions in the Administrative Proposal include the following: VAMP, Head of Old River barrier/fish control structure, additional X2 protection, maintain Sacramento River flow, ramping of San Joaquin River flows, closure of Delta cross-channel gates based on spring-run chinook salmon protection plan, July flows and exports, and evaluate effects of exports on smolt survival in December-January. Measures to accomplish the actions to benefit Delta and upstream fish and wildlife are: increased Delta export, upstream purchases, joint point of diversion, export deliveries, land retirement, and water reserve account.

VAMP includes flow and export rate manipulation and installation of a barrier at the head of Old River. See Table 2.1-3 for target flows and export rates.

The Interim South Delta Program (ISDP) would have both beneficial and adverse cumulative impacts. Potential adverse impacts include the loss of aquatic resource habitat due to dredging and construction of intake and control structures; increases in reverse flow in some channels under low flow conditions due to the operations of barriers; and increased straying, predation, and entrainment losses due to high export pumping during the fall, winter, and early spring (CALFED 1998).

The ISDP includes the installation and monitoring of temporary flow and fish control structures for potential effects on threatened and endangered species, including a fish control structure at the Head of Old River near Mossdale during the April through June period to protect San Joaquin River salmon migrating through the Delta. A fall flow control structure would also be installed at the Head of Old River to improve dissolved oxygen levels in the San Joaquin River between the Head of Old River and Medford Island to aid salmon migration in the San Joaquin River. Other temporary flow control structures are proposed to reduce dissolved oxygen problems, to avoid salt buildup in south Delta channels, and to lower the salt load in the Delta-Mendota Canal (USFWS 1996b). In particular, the

#### 4. Environmental Consequences and Mitigation Measures

---

operation of the fish and flow control structures in coordination with the export facilities determines the magnitude of impact to endangered species such as the delta smelt. The beneficial fishery impacts of high spring flows from the San Joaquin (due to project implemented pulse flows) could be offset by adverse impacts to delta smelt from the other projects. Mortalities of delta smelt, entrained into the SWP/CVP export facilities, could be high if the fish control structure at the Head of Old River (which protects emigrating chinook salmon) results in large reverse flows in the southern and central Delta. This hydrologic condition could result in more delta smelt being exposed to entrainment losses as the export facilities zone of influence extends northward. Currently, this condition of protecting delta smelt versus chinook salmon is managed by making the fish control structure at the Head of Old River “operable”; i.e., capable of allowing some flow through the structure to offset reverse flows created in the southern Delta by SWP/CVP exports. The relationship between export levels, operation of the Old River fish control structure, coordination with spring pulse flows in the San Joaquin River, and protection of delta smelt and chinook salmon is currently undergoing intensive study by DWR. At this time, however, adverse impacts to delta smelt could occur in the south Delta depending upon the operational conditions existing at the time of major project actions (e.g., release of spring pulse flows). These cumulative impacts can range from less than significant to significant based on the abundance and distribution of delta smelt, the ratio of flow in the San Joaquin River to SWP/CVP export, and the operation of the Old River fish control structure.

The fish control structure included in VAMP is the ISDP fish control structure described above. The Service issued a Formal Endangered Species Consultation and Conference on the Proposed South Delta Temporary Barrier Project for 1996 through 2000 (USFWS 1996b). They concluded that “the proposed continuation of the Temporary Barriers Project will likely adversely affect delta smelt and Sacramento splittail, and adversely modify or destroy delta smelt critical habitat, both directly and indirectly.” However, the Service also concluded that the temporary installation of the rock barriers are not likely to jeopardize the continued existence of the delta smelt and the proposed Sacramento splittail, or result in the destruction or adverse modification of critical habitat for delta smelt because the impacts are temporary in nature, there are several protective measures in place to reduce the effects of the project, and there will be overall integration of this project with CVP/SWP operations and the Operations Group (USFWS 1996b). Although the temporary fish control structure would not be in place for the full period of VAMP implementation, its continuation or replacement for VAMP would occur under the ISDP.

Beneficial cumulative water quality impacts of the Interim South Delta Program are also expected. Increased pumping would allow reductions in exports during critical seasons when pulse flows from the San Joaquin River were being released. This change in operation could lead to fewer conflicts among beneficial uses of Delta waters. In addition, the installation of fish and flow control structures could improve water levels and circulation in the south Delta, and thereby enhance agricultural and municipal uses of the water. However, the operation of either the Grant Line or Head of Old River

---

## 4. Environmental Consequences and Mitigation Measures

---

barriers could degrade water quality by rerouting relatively saline waters of the San Joaquin River away from the south Delta pumping plant, and toward the central Delta. This degradation of water quality could be exacerbated during the summer as flows from the San Joaquin River drop.

The CVP/SWP project operations may adversely affect fish production and survival in Delta waterways when combined with potential impacts associated with the CALFED or other options to increase storage within the Delta (e.g., Delta Wetlands Project). Potential effects would depend largely on the volume of water released, and the operation of the downstream releases. However, proposed new storage sites and modifications to existing sites associated with the projects within the Sacramento River Region could potentially benefit fisheries resources in the Delta by dampening the water-level fluctuations and improving water quality by increasing the concentration of dissolved oxygen. In-Delta storage projects (CALFED or Delta Wetlands Project) could potentially add adverse effects to Delta water quality and circulation by the discharge of lower quality or potentially contaminated water to receiving waters. All four of the Delta Region actions (Table 4.12-1) could benefit water availability and Delta exports.

### 4.12.2.2 Sacramento River Region

The conditions for water quality and fisheries in the Sacramento River Region would generally improve with implementation of any of the actions involved (SWRCB, CVPIA, CALFED). This results from increased flows and non-flow actions (CVPIA, CALFED) such as fish screens and fish passage improvements, habitat restoration, improved water quality, and predator control.

Upon implementation of the San Joaquin River Agreement, the Sacramento River flows would likely (1) decrease or remain constant during the pulse flow and (2) increase or remain constant depending on the hydrologic conditions and applicable outflow objectives as SJRA project area reservoirs refill.

Outflow can be increased through a reduction of export rates as well as through increased river flows. Depending on the operation of storage reservoirs, which would provide this additional water for flows, recreation could be adversely affected by water levels and discharge/recharge cycles. Non project water users in the Sacramento Valley would not be affected. New storage capacity (under CALFED or CVPIA) would benefit recreation in the long term and have a cumulative beneficial impact on direct recreation activities and indirect activities by increasing water recreation opportunities within the region.

### 4.12.2.3 San Joaquin River Region

Implementation of the preferred alternative (SJRA) would positively impact the SWRCB Bay/Delta Process. A negotiated settlement would avoid potentially contentious and protracted proceedings to protect Delta beneficial uses. The SJRA action would benefit water supply reliability to meet the objectives of the SWRCB Bay/Delta Process. This would also have beneficial impacts to the

#### 4. Environmental Consequences and Mitigation Measures

---

protection of water rights in the region since willing sellers, rather than water right modifications, would be used to meet SWRCB Vernalis flow objectives.

Special-status and other wildlife species in the San Joaquin River Region would benefit from the CVPIA project due to land fallowing and retirement, riparian restoration, increased spring flows, and refuge water supply increases for wetland habitat. The CVPIA land retirement program in the San Joaquin River Region, however, would impact agricultural land use by reducing the amount of available farmland. Reductions in delivery, related to water storage short-falls, could add incrementally to the loss of agricultural production in the Region. Use of groundwater to offset these surface water delivery shortages would have potentially adverse impacts to groundwater resources in an area already characterized by overdraft problems.

As explained in Section 4.12.2.1, the Administrative Proposal for management of (b)(2) water includes much of the proposed action: VAMP 31-day spring pulse flow (up to 110,000 acre-feet) and ramping flows around the pulse flow. The October flow would be in addition to the (b)(2) action and represents an additional benefit.

Fisheries resources would obtain long-term benefits from the CVPIA and CALFED actions by improved conditions along the lower San Joaquin River with respect to temperatures, improved habitat, reduced losses to diversion, and improved fish movement. These benefits would be incrementally increased by the actions proposed in the current project (SJRA), since they involve increased flows to enhance movement of salmon in the basin.

The Interim South Delta Project would have a beneficial cumulative impact on the San Joaquin River fall-run chinook salmon because the spring and fall barriers at the Head of Old River would reduce entrainment/predation loss of San Joaquin River salmon smolts at the Tracy and Harvey O. Banks pumping plant and improve dissolved oxygen levels in the San Joaquin River.

The SSJID South County Water Supply Project and the OID/SSJID Water Transfer Project to SEWD would shift water use away from irrigation use to municipal and industrial uses in San Joaquin County. Such a transfer has the potential for adverse environmental impacts on the Stanislaus River through reduced flows, but because it is anticipated that the water for both projects would be made available largely through conservation and improved conjunctive use of water, these impacts would likely be insignificant. The projects may result in additional groundwater use within OID and SSJID, with possible adverse environmental impacts; but they would likely result in lower groundwater use in the areas receiving the water, thereby reducing groundwater depletion, subsidence, and saltwater intrusion into the aquifers of San Joaquin County, which would be a beneficial environmental impact.

## 4. Environmental Consequences and Mitigation Measures

---

### 4.12.2.4 SWP and CVP Service Areas

A cumulative impact of all the projects analyzed which change operations or add substantially to upstream storage, is the potential to contribute to adverse cumulative water supply availability and water quality impacts within the SWP and CVP Service Areas. When combined with higher instream flow requirements and increased consumptive water use demands placed on water within the SWP and CVP service areas, the cumulative impacts on water supply availability may be significant. Mitigation of these impacts would include the (1) use of water transfers to redistribute water efficiently and as needed, and (2) development of additional water storage facilities. These facilities would primarily be conjunctive use projects that would store surface water in underground aquifers for later withdrawal and use. Potential water quality cumulative impacts would be adverse but not significant (CALFED 1998).

**4. Environmental Consequences and Mitigation Measures**

---

**4.12 CUMULATIVE EFFECTS ..... 143**

**4.12.1 Actions Included in the Cumulative Impacts Analysis .... 143**

**4.12.1.1 State Water Resources Control Board  
Bay/Delta Process ..... 143**

**4.12.1.2 Central Valley Project Improvement Act  
(Bureau of Reclamation) ..... 144**

**4.12.1.3 Interim South Delta Program (California  
Department of Water Resources/ Bureau of  
Reclamation) ..... 145**

**4.12.1.4 CALFED Bay-Delta Program ..... 146**

**4.12.2 Cumulative Impact Analysis ..... 148**

**4.12.2.1 Delta Region ..... 150**

**4.12.2.2 Sacramento River Region ..... 152**

**4.12.2.3 San Joaquin River Region ..... 152**

**4.12.2.4 SWP and CVP Service Areas ..... 154**