

## Chapter 18 Ongoing Management Programs that Address State Water Project and Central Valley Project Impacts

The material provided in this chapter is for informational purposes only and provides background and a general summary of the various cooperative management programs that help protect listed species and address effects on critical habitat. Although many of these actions are included as part of the overall project description in Chapter 2, Environmental Species Act (ESA) coverage for these actions is not requested under the Operations Criteria and Plan (OCAP) consultation, but have been addressed under separate Section 7 consultations.

This chapter also summarizes ongoing planning activities that could result in future actions and provides informational needs to benefit listed species. The Bureau of Reclamation (Reclamation) and the California Department of Water Resources (DWR) are working with U.S. Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS), California Department of Fish and Game (DFG), and various stakeholders on multiple actions, and funding frameworks, to mitigate losses of salmon, delta smelt, steelhead and green sturgeon. Several agreements and programs are in place that, in combination with the actions described in the Project Description, help mitigate for direct losses attributable to the State Water Project (SWP) and Central Valley Project (CVP), and help improve and restore fishery resources. Chinook salmon, delta smelt, steelhead and green sturgeon are among the species that benefit from the various actions provided under these agreements and programs.

### Central Valley Project Improvement Act

On October 30, 1992, the Reclamation Projects Authorization and Adjustment Act of 1992 (Public Law 102–575) was signed into law, including Title XXXIV, the Central Valley Project Improvement Act (CVPIA). The CVPIA amends the authorization of the 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 purpose equal to power generation. Implementation of CVPIA measures to double anadromous fish populations, improve habitat, and reduce losses of steelhead, spring-run salmon, and other salmon races include habitat restoration, improvement of fish passage, and diversion screening.

DFG has identified the CVPIA as one of the two major restoration plans addressing habitat restoration projects to benefit Chinook salmon, with great potential to successfully fund and implement restoration actions needed to protect and restore the run (DFG, 1998). The other major restoration plan is DFG's action plan for restoring Central Valley streams (DFG, 1993).

Since passage of the CVPIA, Reclamation and the FWS, with the assistance of the State of California and the cooperation of many partners, have completed many of the necessary administrative requirements, conducted numerous studies and investigations, implemented hundreds of measures, and have generally made significant progress towards achieving the goals and objectives established by the CVPIA. A summary of the actions completed in these past 14

years is provided below in Table 18–1. A more detailed narrative discussion of these efforts and of the progress toward achieving CVPIA goals follows.

CVPIA Sections 3406 (b)(1) through (21) authorize and direct actions that will ultimately assist in protecting and restoring salmon and steelhead. These actions include modification of CVP operations, management and acquisition of water for fish and wildlife needs, and mitigation for pumping plant operations. Also included are actions to minimize and resolve fish passage problems, improve fish migration and passage (pulse flows, increased flows, seasonal fish barriers), replenish spawning gravels, restore riparian habitat, and establish a diversion screening program.

**Table 18–1 Summary of CVPIA accomplishments – 1992–2007**

PROGRAM OR PROJECT	STATUS
<b>Anadromous Fish – Habitat Restoration</b>	
Anadromous Fish Restoration Program (AFRP)	<p>Developed Restoration Plan to guide implementation efforts, partnered with local watershed groups, acquired over 8,200 acres and enhanced over 1,000 acres of riparian habitat, restored over 16 miles of stream channel, placed 72,600 tons of spawning gravels, and eliminated predator habitat in San Joaquin River tributaries. Between 2002 and 2007, the program reopened nearly 200 miles of river to fish passage through the removal or bypass of 7 fish barriers.</p> <p>The program identified 128 structural and non-structural actions to be taken in support of fish doubling goals (53 structural actions and 75 non-structural actions).</p> <p>The 1992-2007 average natural production for all races of Chinook salmon is 477,312, approximately 48% of the doubling target. However, average Chinook salmon production for the period 1992-2006 has exceeded the doubling goal target on Clear and Butte Creeks where substantial funding for passage or habitat improvements has occurred.</p>
Dedicated CVP Yield	<p>The program manages the dedication of 800,000 AF/year for CVPIA purposes. The target has been met each year since 2000; in 2005 and 2006 (both wet years) a portion of this water was banked for future use. In 2007, Reclamation dedicated 800,000 acre-feet of 2007 water and approximately 195,000 acre-feet of banked 2006 water through the (b)(2) program.</p> <p>Improved stream flows created by the dedicated yield in Clear Creek, Sacramento River, American River and Stanislaus River have resulted in increased survival of juvenile anadromous fish passing through the Delta.</p>
Water Acquisition Program (Anadromous Fish Focus)	<p>On average, the program has achieved approximately 50% of its 200,000 AF/year target for annual instream water acquisitions since 2001. Most of this water was acquired pursuant to the San Joaquin River Agreement.</p> <p>An additional purchase of 35,000 AF in 2007 provided water for the federally-listed delta smelt.</p>

PROGRAM OR PROJECT	STATUS
Clear Creek Fishery Restoration	<p>Reclamation and the Service removed McCormick-Saeltzer Dam in 2000, immediately providing access to upstream reaches. As of 2007, the agencies have restored 1.6 miles (of targeted 2 miles) of stream channel and approximately 68 acres of floodplain.</p> <p>Approximately 103,371 tons of spawning gravel were added to the stream since 1995 to create anadromous fish spawning habitat. Approximately 152 acres of shaded fuelbreak were constructed. 12 miles of roadway were treated to control erosion.</p>
Gravel Replenishment and Riparian Habitat Protection	<p>Since 1997 placed a total of 151,000 cubic yards of gravel on the Sacramento, Stanislaus and American rivers to create anadromous fish spawning habitat.</p> <p>Program monitoring has shown improvement in spawning distribution relative to total escapement (Sacramento and Stanislaus rivers) and redd density per square meter (American River). Salmonids have been observed spawning on the gravel at each of the placement sites on the three rivers.</p> <p>In 2007, environmental permitting was acquired for gravel addition at eight new sites in the Stanislaus River. Aerial photos of the American River reviewed in 2007 showed more anadromous fish than available spawning habitat; data will be used in 2008 for gravel placements.</p>
Trinity River Restoration Program	<p>Since 1997 the program has made significant progress toward goals. The flow evaluation study was completed in 1999 and the Record of Decision (ROD) for the Trinity River Mainstem Fisheries Restoration EIS/EIR was issued in 2000.</p> <p>The program completed an inventory of floodplain structures for more than 500 private parcels, replaced 3 bridges, relocated 1 house, improved 1.5 miles of road accessing private homes, and completed all other necessary infrastructure improvements to allow for peak releases of up to 11,000 cfs in compliance with the ROD. The program also has completed 8 mechanical channel rehabilitation projects and added 12,000 tons of coarse sediment (spawning/rearing gravel) to the river.</p> <p>Reclamation has achieved full ROD flows since 2005 following successful resolution of litigation that initially constrained ROD flows in 2001-2004. Water year types since 2005 have included Normal, Extremely Wet, and Dry, with volumes ranging from 453,000 AF to 815,000 AF. More than 1.5 million additional acre-feet of water have been released into the Trinity River since 2001 than would have been without the ROD.</p>

PROGRAM OR PROJECT	STATUS
<b>Anadromous Fish – Structural Measures</b>	
Jones Pumping Plant Mitigation	<p>As of 2007, the program has completed 10 of the 23 identified actions (43%) related to improving fish protection.</p> <p>2007 actions include continued study efforts to determine the TFCF's present-day fish salvage efficiency, assessment of above-ground holding tanks in the lab (Denver), re-assessment of the outdated Bates Table used for establishing fish hauling densities during transport, improvement to debris and predator management as well as hydraulic control of the facility, collection of water quality data at the entrance to the DMC, distribution of various Tracy Research Volume Series and publications, and updating of the Tracy Research Web site.</p> <p>Also, Reclamation proceeded with replacement of fish transfer buckets and new fish haul trucks and tanks, and began construction of a new onsite research building.</p> <p>All improvements to date have already significantly improved Reclamation's ability to successfully salvage all species of Delta fish, including anadromous fish, and release them safely back into the Delta Estuary.</p>
Contra Costa Canal Pumping Plant Mitigation	<p>Established cooperative program for fish screen project for Rock Slough intake of Contra Costa Canal (CCC); 90% designs and environmental evaluation completed in 2002; reassessment of design alternatives completed in 2007.</p> <p>Implemented an expanded fish-monitoring program in 2004 to assess the status of the fisheries near the pump; conducted in 2006 a Cumulative Impacts Assessment to serve as the basis for future NEPA documentation, identified existing conditions and potential future alternatives.</p>
Shasta Temperature Control Device (TCD)	<p>Program completed in 1999.</p> <p>TCD approved for operation February 1997; final construction report/closeout of construction contract completed in 1999.</p> <p>The TCD has increased operators' ability to control river temperature, turbidity and dissolved oxygen without bypassing power generation (loss in power generation pre-TCD was \$35 million over seven years).</p>
Red Bluff Dam Fish Passage Program	<p>Completed interim actions and modification of Red Bluff Diversion Dam operations to meet needs of fish and water users in 1993; as a result, approximately 20 percent of the adult spring-run Chinook and approximately 50 percent of the green sturgeon achieve passage. Draft EIS/EIR of fish passage alternatives issued in 2006; final EIS/EIR expected 2008.</p> <p>Implemented operational changes in 2007 in response to loss of adult green sturgeon near the dam, preventing further loss.</p> <p>Achieved 100% of 25,000 AF of refuge water conveyance capacity.</p>

PROGRAM OR PROJECT	STATUS
Coleman National Fish Hatchery Restoration and Keswick Fish Trap Modification	<p>Two phases of the nine-phase Station Development Plan (SDP) remain to be implemented and are expected to be complete by 2010.</p> <p>To date, the program has completed the following SDP projects: installed an ozone water treatment system, installed fish trap improvements, improved raceways and barrier weir and ladders, and installed interim screens at intakes.</p>
Anderson-Cottonwood Irrigation District (ID) Fish Passage	<p>Program completed in 2001.</p> <p>Monitoring program of adult passage through fish ladders completed in 2003.</p> <p>Modified dam and operations to improve fish passage; designed new fish ladders and screens.</p>
Glenn-Colusa ID Pumping Plant	<p>Program completed in 2007</p> <p>Constructed fish screen for 3,000 cubic feet per second (cfs) diversion, completed water control structure and access bridge, completed improvements on side channel, implemented biological and hydraulic testing and monitoring to determine if facility is operating per the design criteria.</p> <p>Mitigating actions to reduce impact on terrestrial species near the pumping plant included transplanting 211 elderberry shrubs; planting 6,718 elderberry bush associate plants; will provide 10 years maintenance and monitoring.</p> <p>The program has screened up to 105,000 AF of firm annual water supply to 20,000 acres of Sacramento NWR lands.</p>
Anadromous Fish Screen Program	<p>Since 1994, the program has worked with the state of California and assisted irrigation districts and water companies with fish screening at 23 diversions ranging from 17 cubic feet per second (cfs) to 960 cfs. Cumulatively, the program has supported/funded the screening of more than 4,200 cfs of diversions.</p> <p>Majority of fish screen projects have been on the Sacramento River; e.g., the Sutter Mutual Water Company (SMWC) Tisdale Positive Barrier Fish Screen Project, which screens the largest unscreened diversion (960 cfs) on the Sacramento River; and the Reclamation District 108 Fish Screen Project, which screens three diversions at a new, consolidated 300 cfs diversion.</p>
<b>Refuges and Waterfowl</b>	
Refuge Water Conveyance/Wheeling	<p>Since 1992, the program has, on average, delivered approximately 75% of Level 2 water (out of a target of 422,251 AF); and has delivered all of the Incremental Level 4 water acquired by the Refuge Water Acquisition program.</p>
Facility Construction/ San Joaquin Basin Action Plan	<p>To date, the programs have completed 31 of 46 actions (structures or projects) identified in the environmental documents and related design and specification documents.</p> <p>The success of the program is measured by the capacity of each refuge to accept Full Level 4 water delivery; 14 of the 19 CVPIA refuges now have sufficient external conveyance capacity to accept Full Level 4 water.</p>

PROGRAM OR PROJECT	STATUS
Refuge Water Acquisition	From 2002 to 2006, the program has acquired 60,000 - 85,000 AF of Incremental Level 4 water, representing approximately 50 percent of the quantity mandated in CVPIA.
<b>Other Fish and Wildlife</b>	
Habitat Restoration Program	The program has funded 89 projects supporting the recovery of threatened and endangered species; program funds have also been used to protect 100,000 acres of native habitat for threatened and endangered species.
Land Retirement Program	<p>Launched the Land Retirement Demonstration Program, a pilot program to study environmental impacts and effective restoration strategies for land retirement.</p> <p>Through the pilot program, acquired 9,203 acres and retired 8,345 acres from agricultural production in the San Joaquin Valley. To date, 4,440 of these acres have been restored through the program.</p>
<b>Monitoring</b>	
Comprehensive Assessment and Monitoring Program	Four annual reports have been produced since 1995 to document monitoring activities and the assessment of the biological results and effectiveness of fish restoration activities. The most recent 1997 annual report provides an overview of population numbers from 1992 to 2006 and discusses relevant anadromous fish production trends.
<b>Studies, Investigations, and Modeling</b>	
Flow Fluctuation	Coordinated management of CVP facilities and developed standards to minimize fishery impacts from flow fluctuation; studies on American and Stanislaus rivers are ongoing; Draft Stanislaus River flow fluctuation study to be completed.
Shasta and Trinity Reservoir Carryover Storage Studies	Biological assessment for the CVP Operations Criteria and Plan (OCAP) completed June 2004; included the analysis of storages in Trinity and Shasta reservoirs; identified requirements to ensure the protection of fisheries resources on the lower American and Stanislaus Rivers.
San Joaquin River Comprehensive Plan	<p>Goal is to reestablish and sustain naturally reproducing salmon in the San Joaquin River below Friant Dam to the confluence with the Sacramento-San Joaquin Delta. An 18-year legal challenge has delayed development of the Plan.</p> <p>In support of the Plan's development, in 2007 initiated organizational and management actions with CVPIA authority and funding including development of a Program Management Plan, public involvement/outreach program, and a process for preparation of technical documents for PEIS/R.</p>

PROGRAM OR PROJECT	STATUS
Stanislaus River Basin Water Needs	Prepared Stanislaus and Calaveras river-water-use program and federal Endangered Species Act (ESA) report; additional studies were performed concurrent with the development of Stanislaus River long-term management plans to assess water temperature parameters, refine analysis of groundwater resources, determine effects of flood-lain development and the relationship between reservoir management and the ecological functioning of the river.
Central Valley Wetlands Water Supply Investigations	Program completed in 2000. Report completed that identified private wetlands and water needs, alternative supplies, and potential water supplies for supplemental wetlands. Developed geographic information system (GIS) database to identify potential water supply sources.
Investigation on Maintaining Temperatures for Anadromous Fish	Program completed in 2001. Completed report in 2001 on maintaining temperatures for anadromous fish; included field investigations on interaction between riparian forests and river water temperatures and on the general effects on water temperature of vegetation, irrigation return flow and sewage effluent discharge. Completed report including investigations on tributary enhancement in 1998 and submitted to Congress in 2000.
Investigations on Tributary Enhancement	Program completed in 1998. Completed report on investigations to eliminate fish barriers and improve habitat on all Central Valley tributary streams.
Report on Fishery Impacts	Program completed in 1995. Completed report describing major impacts of CVP reservoir facilities and operations on anadromous fish.
Ecological and Hydrologic Models	Developed six of nine models designed to evaluate existing and alternative water management strategies and improve scientific understanding of ecosystems in the Sacramento, San Joaquin, and Trinity river watersheds. Since 1998, the Ecological/Water Systems Operations Model Program has provided a high level of support for CALSIM, the integrated CVP/SWP model. CALSIM is available to the public and has been used in many large-scale water supply improvement studies including the CVP OCAP and the CALFED feasibility study for storage and conveyance.
Project Yield Increase (Water Augmentation Program)	Program completed in 1996. Developed least-cost plan considering supply increase and demand reduction opportunities; submitted to Congress.

## Tracy Fish Facility Improvement Program

The Tracy Fish Facility Improvement Program (TFFIP) is a component of CVPIA Section 3406(b)(4) and its primary focus is identifying and making physical improvements and

operational changes, assessing fishery conditions, and monitoring salvage operations at the TFCF in order to reduce the loss of delta fish species during the salvage and trucking process. Research and evaluation efforts to date have included predator removals, whole facility efficiency estimates for various species of interest, holding tank fish stress and damage analysis, biology and movements of local native species within and around the facility (Chinook salmon, delta smelt, splittail, striped bass, etc), evaluation of debris impacts and recommendations for improvement, water quality monitoring, egg and larvae density studies, improved fish handling, and improved fish identification. Facility improvements have included new fish hauling trucks and fish transfer buckets, new primary louver transition boxes, predator removal operations, improved instrumentation, and surface painting of holding tanks to minimize fish abrasion. All activities accomplished under the TFFIP are documented in Reclamation reports as part of the Tracy report series. To date, approximately 35 reports have been completed or are currently under preparation. Reclamation's research efforts are coordinated with the other water and regulatory agencies through the IEP and CALFED. ESA considerations are covered either through language contained in the biological opinions or application of ESA Section 10 permits.

Reclamation is conducting research efforts on-site at Tracy and in Reclamation's lab in Denver to test and assess similar fishery conditions and demonstrate new technologies to be used in the south Delta for improved fish protection.

## **Chinook Salmon and Steelhead Benefits**

Chinook salmon and steelhead benefit greatly through the efforts of the TFFIP and implementation of measures to reduce their loss during the salvage and trucking process. Examples of where improvements have benefited salmon as well as steelhead include:

### **Primary Louver Bypass Modification at TFCF**

Fish bypass transition boxes have deteriorated and were replaced in May 2004. The new transition boxes were previously modeled in Reclamation's lab in Denver and will be modeled again for velocity field conditions after installation. Additional hydraulic testing was completed in 2005. Field fishery evaluation of the new transition boxes were completed using Sacramento blackfish as a substitute species.

### **Tracy Fish Screen Debris Studies**

The existing TFCF does not handle incoming debris loads very well. Several projects are scheduled over the next several years to improve Reclamation's ability to clear debris from the trashrack and louver structures such that they operate more as originally designed. Other research will be conducted on-site to explore improved debris removal at various points in the system.

### **TFCF Full Facility Evaluation**

Reclamation will be conducting full facility evaluations of the TFCF as it relates to the various species of fish entering the facility, especially those that are listed or POD species, and how well the system can effectively louver fish into the holding tanks for release back into the Delta. Research has already been conducted within the secondary louver system for several different species.



## **Improve Removal Procedures from Fish Holding Tanks**

Recently conducted studies indicate that survival of fish in holding tanks could be improved with new fish removal procedures, especially during high debris events. The studies will consider new designs that would have application to both the Tracy and Federal fish facilities. Tank and valve development, fish separation strategies, and consideration of pumping techniques that are less stressful on fish will be analyzed and considered for future modifications.

## **Delta Fish Agreement Summary**

### **Introduction and Background: Delta Pumping Plant Fish Protection Agreement**

On December 30, 1986, the Directors of the California Department of Water Resources (DWR) and the California Department of Fish and Game (DFG) signed an agreement to provide for offsetting direct losses of fish caused by the diversion of water at the Harvey O. Banks Delta Pumping Plant (Delta Pumping Plant). The Agreement is commonly known as the Delta Fish Agreement. Because it was adopted as part of the mitigation package for four additional pumps at the Delta Pumping Plant, it has also been referred to as the Four Pumps Agreement. The 1986 Delta Fish Agreement offsets direct losses of striped bass, Chinook salmon, and steelhead. Among its provisions, the Delta Fish Agreement provides for the estimation of annual fish losses and mitigation credits, and for the funding and implementation of mitigation projects. The Agreement gives priority to mitigation measures for habitat restoration and other non-hatchery measures to help protect the genetic diversity of fish stocks and reduce over reliance on hatcheries. The 1986 Delta Fish Agreement indicates that mitigation for project effects may be quantified in smolt or yearling “equivalents,” or may be unquantified recognizing that some benefits are not measurable. In the case of Chinook salmon, priority is given to salmon protection measures in the San Joaquin River system.

The 1986 Delta Fish Agreement has been amended three times to extend the period for expenditure of the \$15 Million Lump Sum funding component of the original Agreement, with the most recent extension through December 2007. The other funding component of the Agreement is the Annual Mitigation funding, which has no termination date. Since 1986, approximately \$60 million in combined funding from the Annual Mitigation and \$15 Million Lump Sum components have been approved for over 40 fish mitigation projects through December 2007. About \$47 million of the approved funds have been expended to date and the remaining approved funds are allocated for new or longer term projects. Examples of the types of projects that are ongoing, have been completed, or will be implemented in future years that are funded under the existing 1986 Delta Fish Agreement are: fish screens in Butte Creek, San Joaquin River tributaries, and Suisun Marsh; enhanced law enforcement projects to reduce illegal harvest in the Bay-Delta and upstream in the Sacramento-San Joaquin basins; a seasonal fish barrier on the San Joaquin River; fish ladders in Butte Creek; cost-share funding for Chinook salmon production at the Merced River Fish Hatchery; habitat enhancement and river restoration projects in San Joaquin River tributaries and the upper Sacramento River; and water exchange projects on Deer Creek and Mill Creek.

The 1986 Delta Fish Agreement Article V, Paragraph B states measures to offset direct losses for fish species not targeted by the original Agreement shall be included when more information is obtained to develop effective measures, and provides for the addition of other species to the Agreement. Article VII of the Agreement directs DFG and DWR to develop ways to offset the adverse impacts of the State Water Project (SWP) to fish not addressed in the Agreement, and provides for the resolution of indirect impacts to fish through the existing Agreement.

## **Description of Delta Fish Agreement 2008 Amendment**

On May 7, 2007, DWR and DFG entered into a Memorandum of Understanding (MOU) in order to facilitate and expedite completion of the reinitiated consultation of the federal Biological Opinions (BiOps) on the coordinated SWP and Central Valley Project (CVP) operations, commonly referred to as the Operations Criteria and Plan (OCAP). In Paragraph 7 of the MOU, the parties agreed to begin negotiations to amend the 1986 Delta Fish Agreement to “at least address direct and indirect take of delta smelt and indirect take of salmon and methods to develop mitigation credits for this take.”

DWR and DFG are finalizing the 2008 Amendment to the Delta Fish Agreement between DWR and the DFG (hereafter “2008 Amendment”), and anticipate that the Amendment will be executed prior to the issuance of the OCAP BiOps. The mitigation actions currently identified in the draft 2008 Amendment are described in this section as “conservation actions” for the OCAP Biological Assessment and subsequent BiOps issued by U.S. Fish and Wildlife Service (USFWS) and NOAA National Marine Fisheries Service (NMFS). The Amendment sets forth the process which will be used to identify and implement actions to preserve species (hereafter “conservation actions”), and requiring specific evaluations, acceptance, progress review, timing and financing of conservation actions. The Amendment acknowledges that the impact estimates and mitigation requirements will be refined based on the actual Export/Inflow ratio parameters set in the BiOps issued by USFWS and NMFS and that details concerning some of the identified conservation actions that have been identified may be modified or refined; and new conservation actions may be proposed.

The draft 2008 Amendment identifies actions, including habitat restoration, for the preservation of Sacramento River winter-run Chinook salmon (hereafter “winter-run Chinook Salmon”), Central Valley spring-run Chinook salmon (hereafter “spring-run Chinook salmon”), delta smelt, and longfin smelt to address impacts by the operation of the Harvey O. Banks Delta Pumping Plant, Clifton Court Forebay, Skinner Fish Facility, and Barker Slough Pumping Plant (collectively, “SWP Delta Pumping Facilities”).

DWR and DFG agree that SWP Delta Pumping Facilities cause direct losses of some species other than those specifically listed in the original Agreement and also cause indirect losses. Pursuant to Article V and VII of the 1986 Agreement, under the 2008 Amendment DWR will mitigate for direct and indirect losses of winter-run Chinook salmon, spring-run Chinook salmon, delta smelt, and longfin smelt (referred to hereinafter as “target species”) caused by the SWP Delta Pumping Facilities. Measures provided under this Amendment may also benefit non-target fish species.

In the current draft of the 2008 Amendment to the Delta Fish Agreement, DWR would provide direct and indirect benefits to the target species through restoration of aquatic habitat in the Delta and Suisun Marsh, in the amount determined by the DFG methodology described in the DFG Rationale for Effects of Exports, to mitigate for impacts to surface acres of aquatic habitat in the Delta determined to have been impacted by the SWP Delta Pumping Facilities. DWR would also provide direct and indirect benefits to the anadromous target species through funding of mitigation actions described in this section, or equivalent actions, as determined by DFG.

### **Commitments, Timing, and Financing**

DWR and DFG are finalizing the 2008 Amendment. As per the current draft of the 2008 Amendment, DWR and DFG shall work together, in coordination with the USFWS and NMFS, to implement accepted conservation actions using a phased approach to ensure funding and implementation of actions (Year One), and to provide for the funding and development of additional actions (Years Two to Ten). DFG will use the process outlined in the *Evaluation, Acceptance and Progress Review of Conservation Actions* section below to accept conservation actions. As currently anticipated in the 2008 Amendment, to immediately start mitigation to restore habitats needed to provide sufficient nutrient production, spawning and rearing for target species, during Year One, DWR will fund, plan, and implement to the extent practicable the early implementation actions chosen by DWR and DFG, at an estimated cost of \$36 million. These early implementation actions include, but are not limited to, protection and restoration of the Cache Slough Complex with an initial focus on Prospect and Liberty Islands, a fixed cost contribution to the Battle Creek Restoration Project, restoration of Hill Slough West Tidal Marsh, and a one-time contribution to the Delta Smelt Refugium Culture Facility. These actions, which are described in greater detail under *Early Implementation Actions* in the Delta Fish Agreement Appendix Y, will be part of the Year One commitments with a funding commitment of \$36 million. These actions will be subject to final agreement on the 2008 Amendment to the Delta Fish Agreement by DWR and DFG, DFG acceptance of these actions, and completion of all necessary environmental review and permitting. DWR will also continue funding and implementation of several ongoing annual conservation actions described in detail under *Ongoing Actions* in the Delta Fish Agreement Appendix Y.

Potential additional conservation actions for Years Two to Ten include, but are not limited to, projects in the Yolo Bypass, Sacramento Basin, the Delta, Suisun Marsh, and Cache Slough Complex that are determined by DFG to provide direct and indirect benefits to the target species. These actions are also described in greater detail under *Other Potential Conservation Actions* in the Delta Fish Agreement Appendix Y. These potential additional actions will be identified by DFG and DWR with assistance from USFWS and NMFS and submitted for final acceptance to DFG.

### **Year One Commitments and Financing**

As currently anticipated in the 2008 Amendment, in Year One DWR will initiate or continue implementation of conservation actions identified by DFG and DWR as early implementation actions. DWR will also continue funding and implementation of the following ongoing actions, which are annual conservation actions under the existing Delta Fish Agreement: Salmon Stock Ocean Harvest Inland Escapement Data Processing Program; Deer Creek Flow Enhancement

Program; Mill Creek Water Exchange Program; Butte Creek Fish Passage Monitoring and Maintenance Program; Spring-run Chinook Salmon Warden Protection Program.

DWR will initiate or continue early implementation conservation actions identified above (and possibly others), including several ongoing annual conservation actions under the existing Delta Fish Agreement. DWR will fund the early implementation conservation actions specified above, in Year One, at an estimated cost of \$36 million through direct implementation or as cost-share partners in the project. During the first six months, DFG and DWR shall develop an Implementation Schedule and Plan that will identify conservation actions, costs, targeted acreage, and a timeline for DWR's implementation over the term of the Amendment. Pursuant to the 2008 Amendment, plans for individual conservation actions shall include DWR funding sufficient to accomplish full implementation of the action, which may include restoration planning, environmental review, permitting, interim management prior to restoration, restoration implementation, operation and maintenance activities, and monitoring to evaluate project success in meeting the planned restoration objectives.

### **Years Two through Ten Commitments and Financing**

As currently anticipated in the 2008 Amendment, in Years Two through Ten, DWR will work with DFG to initiate or continue implementation of conservation actions identified by DFG in Year One and through the Implementation Plan and Schedule. DWR and DFG will follow the Implementation Plan and Schedule to mitigate the impacts to in-Delta aquatic habitat until the required mitigation acreage is met. Pursuant to the 2008 Amendment DWR will reimburse DFG's staffing costs to plan and implement mitigation actions including tracking compliance with the Implementation Schedule, negotiating land transfer agreements, managing transferred lands, assessing and evaluating results, and helping develop adaptive management plans.

### **Evaluation, Acceptance and Progress Review of Conservation Actions**

The conservation actions, including but not limited to those described in *Early Implementation Actions*, *Ongoing Actions*, and *Other Potential Conservation Actions* in the Delta Fish Agreement Appendix Y, will be identified by DFG and DWR with assistance from USFWS and NMFS and submitted for final acceptance to DFG. Conservation actions could include any of the following, subject to the process outlined below: Ecosystem Restoration Program (ERP) Directed Actions; Ecosystem Restoration Program Proposal Solicitation Process (PSP); DWR sponsored projects; purchase of credits at mitigation banks; cost-share projects or other actions mutually agreed upon by DWR and DFG. DWR and DFG will comply with the California Environmental Quality Act (CEQA) for proposed projects under the Amendment. The process for accepting, implementing, and reviewing conservation actions is outlined below.

Additional Delta Fish Agreement 2008 Amendment information such as the descriptions of proposed conservation actions; action areas; best management practices; avoidance and minimization measures; adaptive management strategy; status of the species; effects of the proposed actions on federally listed species; cumulative effects; determinations; and references are all included in the Delta Fish Agreement Appendix Y.

A. Conservation Action Development and Evaluation Process:

1. Conservation actions will be developed by DFG and DWR in cooperation with USFWS, NMFS, and other responsible regulatory agencies.
2. DFG and DWR shall evaluate each proposal following the guidelines set forth in the Agreement and the criteria set forth in Section B below.
3. Proposed conservation actions will be evaluated using the Delta Regional Ecosystem Restoration Implementation Plan (DRERIP) conceptual models and peer reviewed through the ERP Directed Action Process.
4. Proposed mitigation actions will be submitted to the Delta Fish Agreement Advisory Committee for review and comment.
5. Proposed mitigation actions may be modified by input which includes, but is not limited to, that from the public, the Delta Fish Agreement Advisory Committee, or the DRERIP evaluation.
6. The finalized proposal will be submitted to DFG for acceptance of the proposed mitigation action.

B. Criteria: DFG will accept mitigation actions using the following process and criteria:

1. Aquatic habitat actions in the Delta and Suisun Marsh, primarily for the benefit of pelagic target species, which will focus on restoration of intertidal, shallow subtidal, floodplain, and adjacent open water habitats. The acres of habitat restored or enhanced are expected to provide both direct and indirect benefits by enhancing spawning and rearing habitat, increasing primary and secondary productivity in the Delta, and providing export of nutrients to adjacent openwater habitats. These habitat actions are expected to mitigate for productivity impacts which occur as a result of SWP Delta Pumping Facilities exports and support higher larval and juvenile fish survival and increased fitness of spawning adults by improving conditions for the production of forage species. Restored intertidal or shallow subtidal habitats will be expected to: a) provide net export of nutrients to adjacent open water (pelagic) habitat; b) have appropriate hydrodynamic and/or salinity and water quality characteristics to minimize or discourage invasion by non-native submerged aquatic vegetation (*e.g. Egeria*) and *Microcystis* blooms; and/or c) function as spawning and/or rearing habitats for the target species; and d) be located in areas not subject to the near-field effects of SWP Delta Pumping Facilities.
2. Conservation actions primarily for the benefit of the salmonid target species includes, a) provision of flows in tributary streams to enhance upstream passage, over-summering, spawning and rearing habitat, b) barrier removal which improves access to suitable

habitat described above, and/or c) restoration of functional stream geomorphology and floodplain which provides spawning habitat and rearing habitat for out-migrating smolts. These actions are expected to increase available spawning habitat, improve over-summering adult survival, increase spawning success, and increase juvenile survival and fitness.

3. DFG will use its Habitat Management Land Acquisition Checklist to evaluate the acceptability of any property to be transferred as part of its consideration of the proposed conservation action.

C. Review of Progress – DFG will monitor for the effectiveness of the conservation actions towards meeting the criteria in Section B, as follows:

1. The results of mitigation actions will be evaluated by an independent science panel or advisor as agreed to by DWR and DFG at Years Five and Eight of the Amendment, or earlier if necessary, in order to determine if the mitigation actions are meeting intended mitigation criteria for target species.
2. DFG, in coordination with DWR, will review implementation of mitigation actions after Year Four of the Amendment and each two years thereafter, to determine progress towards achieving mitigation acreage.
3. If the review of progress indicates that mitigation actions are not performing adequately, DWR and DFG will implement adaptive management measures as necessary.

D. Mitigation Acreage:

1. As part of its review and acceptance of each conservation action, DFG will determine the amount of acreage to be credited to DWR. The amount of acreage credit will be based upon the criteria in Section B (above) and the evaluation conducted in Section A (above).
2. For cost-share conservation actions, acreage credit will be pro-rated based on DWR's funding contribution towards the implemented action. DFG will determine the pro-ration of acres by using the percentage of funding contributed towards the conservation action by DWR through this Amendment. Or if the action contains distinct elements, DFG will credit the acreage of those elements to the extent funded by DWR through this Amendment. For each individual conservation action, DFG will determine the appropriate method of pro-ration based on which method is more beneficial to the resource.

- E. Notwithstanding the foregoing, DFG may accept proposals for mitigation from DWR without reference to the process and criteria set forth above, upon DFG first determining in its sole discretion that circumstances regarding the status of the target species warrant such action. Such mitigation may include, without limitation, the funding of actions or the provision of assets, provided that DFG determines that the action or assets will provide mitigation benefit to the target species. In such event, DFG will credit mitigation acreage to DWR in the amount determined to correspond to the mitigation benefit provided. DFG will advise DWR of the amount of acreage to be credited prior to the funding or implementation of the action.

## CALFED Bay-Delta Program

State and federal agencies in the CALFED Bay-Delta Program adopted a Record of Decision (ROD) for the Programmatic Environmental Impact Statement and Report (EIS/EIR) in August 2000. This action committed the Program to a 30-year plan to meet objectives for levee system integrity, ecosystem restoration, water supply reliability and water quality. The agencies also agreed to a preferred program alternative – including moving water across the Delta in what is known as “through-Delta conveyance” – and required an evaluation of its performance at the end of the ROD’s first seven years (Stage 1) of the 30-year proposed plan of action.

The CALFED Program has made progress toward meeting its objectives during the first seven years, particularly in areas outside the Delta, however progress within the Delta has been limited. In the past four years there has been a dramatic decline in abundance of the pelagic (open water) species in the Delta, including the threatened delta smelt, which has reached its lowest recorded levels. This decline, combined with increasing knowledge and awareness of future challenges, including climate change and sea level rise, seismic risk and population growth, calls into question whether current uses of the Delta are sustainable. It further leads to the conclusion that the preferred program alternative for conveyance – through-Delta conveyance as originally envisioned – is unlikely to achieve its objectives.

The four CALFED Program objectives outlined in the ROD remain valid for all efforts to develop and manage a sustainable Delta. The End of Stage 1 Report evaluates progress across all areas of the CALFED Program and outlines a plan to build on the interagency cooperation and work already under way, and incorporate the direction provided by the Governor’s Delta Vision, the BDCP and other initiatives to help implement a long-term management plan for a sustainable Delta.

The following conclusions have been reached based on the results of Stage 1 implementation and information that is now available:

**California’s population and demand for water are increasing.** Forecasts indicate that California’s population may reach 90 million by 2100. More people will mean more demand for water, greater impacts to existing water resources and an increasing strain on Delta resources. California’s existing water infrastructure is struggling to meet the State’s current needs and will not be able to meet the demands of the future. Californians will need to support a comprehensive plan that includes improved conveyance of Delta waters, increased surface and groundwater storage, and programs aimed at increasing regional self-sufficiency.

**Climate change and sea level rise will increase the risk to the State's water supplies.** Climate change and the corresponding rise in sea level will have significant adverse impacts in the Delta. Scientists expect California's climate to become warmer during this century. Storm runoff is likely to become more intense, with higher snow lines causing more winter precipitation to fall in the mountains as rain rather than snow. Average winter flows to the Delta are likely to become larger in the future, which will cause more flooding. As sea level rises and winter storms become more intense, fragile Delta levees will be overwhelmed. This will result in the loss of Delta islands to flooding and will put the State's largest water supply at risk.

**Seismicity and risk of levee failures.** A growing body of information supports the fact that Delta levees are at risk of failure due to earthquakes on faults in or near the western Delta. Such a failure would lead to near-instant contamination of the State's water supply from saltwater intrusion, a disruption in operation of state and federal pumps, and shutdown of the Delta infrastructure of highways, railroads, navigation channels, ports and utility supply lines. Homes, business, and agricultural lands would be flooded and recovery would take years and cost billions.

**Restoring ecosystem function in the Delta remains a challenge.** Large scale restoration of upstream tributaries and floodplains has been initiated and is continuing successfully. In the Delta, emphasis on targeted research has greatly increased understanding of Delta ecosystem processes, but restoration solutions remain elusive. As in the years preceding CALFED, there remains a conflict between water exports and ecosystem protection in the Delta. The decline in pelagic fishes has highlighted this conflict and the uncertainty surrounding any proposed solutions. Major investments in large-scale experimentation and adaptive management may be needed to clarify how ecosystem function can be improved, given the highly-altered nature of the Delta.

**Species invasions need to be controlled.** Non-native invasive species constitute one of the greatest obstacles to recovering native species in the Delta. Preventing new invasions and containing and managing existing invasions are essential if viable populations of some native species are to be sustained. Containing aquatic invasive species is particularly challenging. Current scientific thinking is that managing the Delta to increase spatial and temporal habitat variability may improve conditions for native species. While undoubtedly posing trade offs for other Delta constituencies, including agriculture.

**Through-Delta Conveyance needs to be reassessed.** A growing body of information related to risk of levee failure, water quality, fish losses at export pumps, and rising sea level raises questions about the ability of through-Delta conveyance to meet future water and environmental management objectives. Alternative conveyance methods need to be identified and their costs and benefits assessed to ensure that the water management infrastructure is able to meet future needs of water supply and water quality.

CALFED anticipated a reevaluation of the preferred alternative at the end of Stage 1. In doing so, it allowed for the possibility for changes in programs and projects that would best enable the agencies to meet the still-valid CALFED goals of a reliable supply of water from the Delta, improved water quality for both the ecosystem and for drinking, a restored ecosystem and improved levee stability. Two major efforts now underway will set the stage for how we move forward in the Delta. The challenges of managing a sustainable Delta and providing for the



state's water future will be met through cooperative commitment of state and federal CALFED agencies and collaborative efforts with Delta landowners.

## Highlights of Accomplishments in Years 1-7

CALFED Program funding has totaled approximately \$2.8 billion for water supply reliability projects and programs. Since the ROD was signed, more water has been reliably delivered than in the years of crisis that led to the establishment of the CALFED Program. New groundwater storage and recycling projects are expected to provide a projected 687,000 to 860,000 acre-feet of new water. Favorable hydrology and implementation of projects to increase operational flexibility have resulted in meeting the target of 65 to 70 percent of contract amounts for water deliveries to the Central Valley Project (CVP) south-of-Delta water users in most years since the ROD was signed. In urban areas, investments in water use efficiency, recycling and storage have helped stabilize demand for Delta water. Surface storage feasibility studies are continuing on four potential projects that could increase the State's water storage capacity and add flexibility needed to protect at-risk species, meet water quality standards, and ensure reliable water supplies to cities and farms. Much has been learned about the Bay-Delta system relevant to water supply reliability.

One of the cornerstones of the CALFED Ecosystem Restoration Program (ERP) has been the development of a common vision or single "blueprint" for ecosystem restoration. The ERP was also instrumental in developing a framework for adaptive management. Numerous important projects have been implemented, ranging from targeted research to full-scale restoration. Significant investments in fish screens, temperature control, fish passage improvements and improvements in upstream habitats have improved the outlook for most salmon populations throughout the Central Valley. CALFED ERP agencies have been successful at acquiring and protecting important lands in the Delta and along its tributary rivers and streams.

CALFED-funded research on the Delta has fundamentally changed how scientists now understand Delta functioning. During Stage 1 understanding of the problem of species and ecosystem restoration in the Delta has become clearer, but practical solutions remain elusive. To date, more than 130,000 acres of habitat targeted for important species have been enhanced, protected or restored. More than 54,000 acres of agricultural lands have been protected for their value as habitat. ERP funding has neared the \$1 billion ROD target, totaling approximately \$900 million and funding an estimated 550 projects.

The CALFED Water Quality Program set as a goal the continuous improvement of Delta water quality for all uses, including in-Delta, drinking water, environmental and agricultural uses. Since the CALFED ROD was signed, drinking water quality standards at the tap have generally been met, but little or no improvement has yet occurred in Delta source water quality. Advances in treatment technology have allowed water users to remain in compliance despite an increasingly challenging water quality and regulatory environment. Research has resulted in a better understanding of how mercury is methylated in the Bay-Delta system and how this affects wildlife and human health. CALFED agencies made progress in understanding and reducing the impacts to water quality from low-dissolved oxygen in the San Joaquin River deep-water ship channel near Stockton, pesticides and toxicity and the bioaccumulation of selenium. Despite meeting current regulatory standards, risks to human health from Delta drinking water remain. It seems likely that regulatory standards for drinking water will become progressively stricter so

that future provision of safe and affordable drinking water will depend on improved source water quality. Actual spending during Stage 1 from State and federal sources was approximately \$125 million in water quality programs.

The Levee System Integrity Program funds earmarked for levee improvements in State Propositions 13 and 50 were used to replace the State's share of levee maintenance. As a result levee maintenance programs were funded, but long-term levee improvements defined under the CALFED ROD were under funded. Funding to reimburse local maintenance districts for eligible expenditures has reduced the rate of catastrophic levee failure during Stage 1. Substantial progress has been made for reusing dredge material to help stabilize Delta levees and improving the Delta Emergency Response Plan. A Levee Risk Analysis was conducted and resulted in the launching of a study called Delta Risk Management Strategy, which is now underway and shows promise of providing important information on statewide risks associated with Delta levee failure. Program funding from state and federal sources was approximately \$140 million, with a Federal share of \$1.4 million. Of the state's contribution, approximately \$60 million was spent to reimburse local districts for about half of their expenditures on levee maintenance.

## **Delta Vision – One Vision for the Delta**

Delta Vision is a broad initiative designed to study the Delta from all perspectives – not only as a source of water or a unique ecosystem. It was created by Executive Order of the Governor and given the ultimate task of developing a strategy for the Delta's sustainable future by the end of 2008.

The Sacramento-San Joaquin Delta is a unique natural resource of local, State, and national significance. Although it builds on work done through the CALFED Bay-Delta Program, Delta Vision has broadened the focus of past efforts within the Delta to recommend actions to address the full array of natural resource, infrastructure, land use, and governance issues necessary to achieve a sustainable Delta. Delta Vision is based on a growing consensus among scientists, and also supported by recent legislation and other information, indicating that:

- Environmental conditions and current Delta “architecture” are not sustainable.
- Current land and water uses and related services dependent on the Delta are not sustainable based on current management practices and regulatory requirements.
- There is growing consensus that the Delta is dependent upon a levee system that is aging and deteriorating.
- Factors outside of our control will significantly change the Delta during the coming decades. These include seismic events, land subsidence, sea level rise, increasing temperature, more intense winter storms, species invasions and population growth.
- Current fragmented and complex governance systems within the Delta are not conducive to effective management of its fragile environment in the face of the cumulative threats identified above.
- Failure to act to address identified Delta challenges and threats will lead to potentially devastating environmental and economic consequences of statewide and national significance.

A key component of Delta Vision was the appointment of an independent Blue Ribbon Task Force by the Governor that is responsible for recommending future actions to achieve a sustainable Delta. The Task Force has extensively evaluated the existing and proposed land and water uses, ecosystem functions and processes, and management practices in the Delta. Alternative Delta management scenarios are being identified and evaluated. By applying the best available scientific information, and input provided by experts and the public during its open meetings, the Task Force has recommended natural values and functions, services and management practices that should be considered priorities for future management as part of a sustainable Delta.

The Strategic Plan that emerges from Delta Vision will identify and evaluate alternative measures and management practices that would be necessary to implement Delta Vision recommendations. These implementation recommendations will involve considering changes in the use of land and water resources, services to be provided within the Delta, governance, funding mechanisms, and ecosystem management practices. The final Task Force Strategic Plan recommendations will be submitted to the public and the Delta Vision Committee by October 31, 2008. The Delta Vision Committee will submit its report on the final Delta Strategic Plan to the Governor and Legislature by December 31, 2008.

The Delta Vision Strategic Plan will define actions including those that will be implemented in Stage 2 of the CALFED Program.

## **Bay-Delta Conservation Plan – Conservation Planning**

State and federal agencies, along with stakeholders, are developing a conservation plan for the Delta. The Bay-Delta Conservation Plan (BDCP) is intended to provide state and federal endangered species authorizations for the state and federal water projects and their contractors. The BDCP is being developed by a steering committee of state and federal water management and resource agencies, water contractors and non-governmental organizations. When approved, it will provide for conservation of the covered species, water supply reliability, regulatory assurances and funding assurances for implementation of conservation actions. These actions would contribute to implementation of many parts (water quality, supply and ecosystem) of the CALFED Bay-Delta Program. While not intended to be a comprehensive approach to ecosystem restoration of the Delta, the BDCP is focused on the conservation of species closely associated with aquatic habitats that may be affected by water conveyance through the Delta.

On October 6, 2006, DWR and DFG, along with the California Resources Agency, Reclamation, FWS, the NMFS, seven water agencies and other Delta water users, and four non-governmental organizations, signed the BDCP Planning Agreement. Consistent with the NCCP Act, the Planning Agreement recognized that the parties could “elect to preserve, enhance, or restore, either by acquisition or other means, aquatic and associated riparian and floodplain habitat in the Planning Area that support native species of fish, wildlife, or natural communities prior to approval of the BDCP” and that DFG, FWS, and NMFS could agree, if appropriate, to “credit such resources toward the land and water acquisition or habitat protection, enhancement, and restoration requirements of the BDCP.”

The completed BDCP is expected to cover a subset of species and habitats within CALFED's purview and provide a mechanism with which to address improvements. A BDCP Planning Agreement has been completed and a draft BDCP is scheduled for completion in late 2008.