

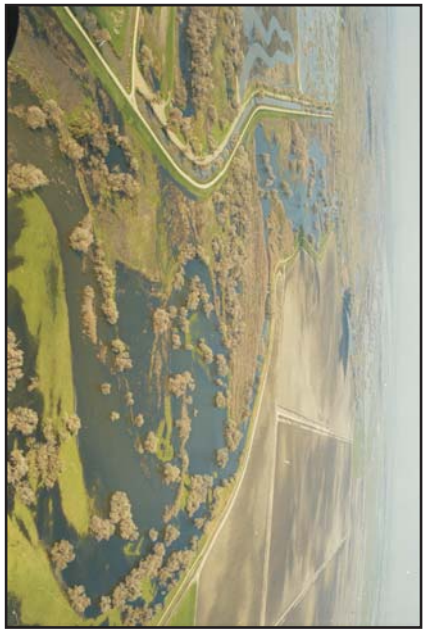


CVPIA

10 YEARS OF PROGRESS

Fish and Wildlife Service
California/Nevada Operations Office

Bureau of Reclamation
Mid-Pacific Region

2800 Cottage Way • Sacramento, California 95825-1898

IMPLEMENTATION
OF THE
CENTRAL VALLEY PROJECT IMPROVEMENT ACT

10 YEARS OF PROGRESS

Fiscal Years 1993-2002

May 2004

U.S. Department of the Interior
Bureau of Reclamation
Fish and Wildlife Service

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Abbreviations and Acronyms

ACID	Anderson-Cottonwood Irrigation District
Act	Central Valley Project Improvement Act
AFRP	Anadromous Fish Restoration Program
AFSP	Anadromous Fish Screen Program
BLM	Bureau of Land Management
CALFED	California-Federal (as in CALFED Bay-Delta Program)
CAMP	Comprehensive Assessment and Monitoring Program
CD-ROM	compact disc read-only memory
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
Delta	Sacramento-San Joaquin River Delta
DFG	California Department of Fish and Game
DWR	California Department of Water Resources
EA	environmental assessment
EIS/EIR	environmental impact statement/environmental impact report
EWA	Environmental Water Account
FONSI	finding of no significant impact
FY	fiscal year
GCID	Glenn-Colusa Irrigation District
Interior	U.S. Department of the Interior
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NWR	National Wildlife Refuge
O&M	operations and maintenance
PEIS	programmatic environmental impact statement
PG&E	Pacific Gas and Electric Company
RBDD	Red Bluff Diversion Dam
RCD	Resource Conservation District
Reclamation	U.S. Bureau of Reclamation
Restoration Fund	Central Valley Project Restoration Fund
Service	U.S. Fish and Wildlife Service
SWP	State Water Project
SWRCB	State Water Resources Control Board
TCC	Tehama-Colusa Canal
TCD	temperature control device
USBR	U.S. Bureau of Reclamation
VAMP	Vernalis Adaptive Management Plan

PART I - INTRODUCTION

Purpose of 10 Years of Progress Report

This report is a summary of the actions taken in the 10 fiscal years, 1993-2002, by the Department of the Interior (Interior) to implement Title 34 of Public Law 102-575, the Central Valley Project Improvement Act (CVPIA or Act). The CVPIA was passed by Congress and signed into law by the President on October 30, 1992. The Secretary of the Interior (Secretary) assigned primary responsibility for implementing CVPIA's many provisions to the U.S. Bureau of Reclamation (Reclamation) and the U.S. Fish and Wildlife Service (Service). This report is intended to provide the general public, as well those more familiar with the Act and Interior's efforts to implement it, with an overview of what has been accomplished since passage of this landmark legislation. Greater detail on any of the programs and projects described herein can be obtained by contacting Reclamation or the Service directly at the address listed on the inside front cover of this document.

CVPIA activities are being implemented and reported through other instruments as well. For example, there are CVPIA Annual Work Plans for each of the sections of the CVPIA, CVPIA Annual Financial Reports, and CVPIA Annual Accomplishment Reports. Many of these documents can be retrieved via the internet (www.mp.usbr.gov).

Reclamation and the Service have given the highest priority to implementation of CVPIA and significant progress has been made. Programs to carry out all of the Act's key provisions are either in place or have been completed. This report summarizes that progress. The following part (Part II) of this report describes the approach Reclamation and the Service have used in this massive undertaking, how actions were prioritized, and how coordination with other programs and the various stakeholders that would be affected by CVPIA implementation was achieved. Part III of the report summarizes the actions taken by the U.S. Department of the Interior (Interior), both by category of action and by specific CVPIA provision.

The results and relative success of those actions are evaluated and presented in Part IV. Appendices also are provided in order to present more detailed information on the status of individual programs.

Reclamation and the Service coordinated the planning and preparation of a draft of this report with the Restoration Fund Roundtable* and other stakeholders. Comments from all were considered and used in the development of the draft report. The draft was subsequently advertised for review in the Federal Register and responses were received from 13 entities. Many of the comments were on the content or format of the report: others were of a more general nature or asking for information of a much more detailed nature than intended for this report. The text the 10-Year Report has been revised as appropriate to incorporate the comments received from the public. Comments relating changes and/or results after fiscal year 2002, or those requesting very detailed financial information, will be answered in Annual Accomplishment Reports or in detailed CVPIA Financial Reports. Any remaining questions or comments will be addressed directly in meetings and/or correspondence with the concerned entities.

The Central Valley Project's Role in California's Water Resources

For more than 60 years, California has depended on the Central Valley Project (CVP) for a large part of its water needs, particularly for agriculture. Plagued by consecutive years of drought, often followed by wet years bringing floods, the State relies heavily on dams and reservoirs to help balance and control its water resources. Its climate and geography make California equally

* The Restoration Fund Roundtable was formed by interested stakeholder groups in California and represents some of the interests of agriculture, municipal and industrial groups and the environmental community. It provides comment to Interior on various components of planning and implementation associated with the CVPIA.

dependent on extensive water distribution systems to match water supplies with regional needs.

Much of the State's water originates in the north and is conveyed southward, primarily through the Sacramento River system. Some water is diverted along the way, and the rest flows into the Sacramento-San Joaquin River Delta (Delta), where CVP water co-mingles with other supplies, such as those of the State Water Project (SWP). About half of the water entering the Delta is pumped south: the remainder discharges to San Francisco Bay and the Pacific Ocean. Because of the way water is captured and moved through the system, the CVP affects, and is affected by, the many unresolved water issues in California involving ecosystem balance in the river systems and the Delta.

The sensitive ecosystems of the Delta estuary and San Francisco Bay are affected by water diversions, particularly in drought years, and the courts have intervened to ensure that adequate fresh water enters this system. Compliance with Endangered Species Act (ESA) and water quality requirements mandate releases from CVP dams to regulate water temperatures and instream flows, and constrains water diversions when necessary to protect listed fish species from the effects of pumping. These factors have greatly increased the competition for existing water supplies, and have focused scrutiny on the ways that water resources are being used.

Conditions have greatly changed since the CVP began in 1930. Population growth and development have increased farm, urban, and industrial water demands. Stocks of fish and wildlife have declined, and some species are listed as endangered or threatened due to severe habitat losses from various developments over the last century, including water projects. There is a new imperative for resource management that includes ecological stewardship.

These competing demands for water create complex issues that only can be resolved cooperatively, involving the public and all stakeholders in the process. Whenever water is gained for one purpose, it is frequently lost for another. Innovative approaches to water use and re-use, developed through negotiation and compromise, are vital to reduce conflicts and improve water management for all needs.

The CVPIA Mandate

The CVPIA addressed the importance of the CVP in California's water resources picture and made significant changes in the policies and administration of the project – more than any other legislation in the project's 70-year history. The CVPIA has redefined the purposes of the CVP to include the protection, restoration, and enhancement of fish, wildlife, and associated habitats; and to contribute to the State of California's interim and long-term efforts to protect the San Francisco Bay/Sacramento-San Joaquin River Delta Estuary. Overall, the CVPIA seeks to "achieve a reasonable balance among competing demands for use of [CVP] water, including the requirements of fish and wildlife, and agricultural, municipal and industrial, and power contractors."

The Central Valley Project

Beginning in 1930, the Federal government built the Central Valley Project (CVP) in California to control floods and to store and distribute water for the agricultural development of the great Central Valley. Today, the CVP delivers about 20 percent of California's developed water to farms and communities, and generates about 5 billion kilowatt-hours of hydroelectric power. The CVP supplies about 7 million acre-feet of water to its customers throughout the valley, transported via canals, aqueducts, and the river systems themselves.

(One acre-foot is the amount needed to cover the size of a football field in water 1 foot deep. One acre-foot—about 326,000 gallons—will supply all the water needs of an average family of five for a year, or drip-irrigate about 1 acre of grape vines).

PART II - INTERIOR'S IMPLEMENTATION APPROACH

Implementing the CVPIA

Immediately upon passage of the CVPIA, Interior began to develop procedures to implement the specific provisions of the Act.

Interior first developed a set of procedural objectives designed to achieve the stated goals while providing the greatest public benefit and minimizing adverse impacts. These objectives placed a high priority on forming partnerships and coordinating with other efforts and in using CVPIA funds in the most cost-effective manner.

Interior immediately adopted the three fish and wildlife restoration goals prescribed by the Act. One of the most ambitious goals was to make all reasonable efforts to double the natural production of six species of anadromous fish, species believed to have been most affected by CVP construction and operation. Another goal was to supply much-needed water to Federal and State refuges and other migratory waterfowl habitats in the Central Valley. The third was to mitigate impacts of the CVP to other fish and wildlife, impacts that are not specifically addressed in other provisions of the Act and that had not been previously offset. In addition to these fish and wildlife goals, Interior has embraced the goal of improving the operational flexibility of the CVP in order to more effectively balance and meet the many competing demands for project water and power supplies.

Implementation Priorities

Several factors are considered in establishing priorities for implementing CVPIA actions. These include: the importance of the action to achieving program goals; the planning or readiness needed for implementing the action; coordination with other ongoing programs; and funding. Some sections of the Act direct specific actions: others call for studies or investigations or relate to administrative matters, such as authorization of funds and compliance with State and Federal laws. Because the Act specified compliance dates for some provisions, implementation in those cases was responsive to the prescribed dates.

Most of the programs established to address specific CVPIA provisions had the same initial steps in common. All required an administrative structure, opportunity for public and stakeholder involvement, and coordination with potential partners to develop program plans. There were large differences in the amount of time and effort required to complete these steps for the various programs, primarily dependent upon the relative complexity of the issue and degree of public interest or controversy. For some programs, plans were developed within the first year while, for others, plans are still being completed.

Interior is generally implementing the Act to provide immediate response to the needs of the most threatened species of fish and wildlife, while taking care to involve all stakeholders in the development and implementation of all CVPIA programs.

To prioritize activities and the expenditure of funds, Interior has developed biological focus areas. These focus areas are based on integration of three parameters: the species of greatest concern, factors most influencing the populations of those species, and the geographic areas or habitats critical to those populations. Interior channeled its efforts to areas where the three parameters overlap to focus funds and gain the greatest biological benefit.

An Urgent Priority: Shasta Temperature Control Device

In some cases, urgency gave a project high priority. Interior was responsive to such an exigency in the planning and construction of the Shasta Temperature Control Device (TCD). Millions of dollars in power revenues were being lost in summer and fall when cold water had to be released from low outlets at Shasta Dam to help meet the needs of the Federally listed winter-run Chinook salmon. A solution was needed that would send cold water downstream without interrupting power generation. Reclamation began research to solve this problem in 1989.

The solution was an $84 million steel frame structure that allows the selective withdrawal of water from different reservoir depths without bypassing power generation. The 8,000-ton, 300-foot-tall structure is connected to the upstream face of the dam. It has been compared with building a 25-story steel skyscraper under water.

Construction required a team of divers using a diving bell and a pressurized living chamber at the surface to allow "saturation diving" at depths to 300 feet.

Despite the technological challenges of this pioneering and unique project, planning and design were completed within 2 years after CVPIA passage. Construction began in November of 1994 and the TCD was operating in February 1997. Since then, the TCD has operated to reduce temperatures in the upper Sacramento River, while allowing power generation. Although this project required a large commitment of CVPIA funds, the revenues from otherwise-lost power generation will eventually exceed the cost for this project.

Coordination with Other Programs

To facilitate coordination and communication within Interior, each section of the Act was assigned a program manager from each of the two agencies, Reclamation and the Service. Generally, one is designated the lead agency, but both have equal responsibility to work together to develop a program plan and to involve other agencies and interested groups in its development and refinement.

Cooperation through partnerships is very important to the success of the CVPIA. Interior has developed numerous partnerships and extensive coordination linkages with local, State, and Federal agencies, and private groups. There are partnerships with many previously existing programs, as well as new programs and groups formed specifically to carry out specific provisions of CVPIA. CVPIA implementation is closely coordinated with existing and ongoing restoration efforts such as the State of California's efforts to restore salmon and steelhead populations, the State Water Resources Control Board's Water Quality Control Plan for the Sacramento-San Joaquin River Delta, and the California Bay-Delta Authority's efforts to develop long-term solutions to Central Valley and Delta problems. Interior encourages potential partners to enter into cooperative relationships to implement appropriate CVPIA measures or to help achieve CVPIA goals and objectives through their own programs. Through various mechanisms, Interior can provide funds and services to these partners, allowing for the completion of pre-approved restoration actions. The CVPIA (Section 3407(e)) provides the Secretary with the flexibility to use several mechanisms for funding non-Federal entities.

Some of the concurrent programs affecting CVPIA are the Coordinated Operation Agreement between the CVP and the SWP to meet Delta water quality and flow standards, and the California Bay-Delta Authority's programs. These include an Ecosystem Restoration Program, an Environmental Water Account, and a scientific expert review and advisory program to guide restoration efforts.

MAJOR PROGRAMS INFLUENCING CVPIA IMPLEMENTATION

Coordinated Operation Agreement
USBR-DWR agreement defining responsibilities of CVP and SWP to meet Delta water quality and flow standards set by State Water Resources Control Board (SWRCB). (SWRCB is in the process of determining contributions of other water right holders.)

California Bay-Delta Authority (formerly CALFED)
A consortium of State and Federal agencies (appointed by the Secretary of the Interior and the Governor) working with other urban, agricultural, fishery and environmental representatives to solve Delta water quality and reliability problems. The Authority has developed plans for a long-term solution to many of these problems. Their Ecosystem Restoration Program is also working on fish and wildlife habitat restoration projects upstream and in the Delta.

CALFED Record of Decision (ROD)
The ROD represents the culmination of the National Environmental Policy Act and the California Environmental Quality Act process. The ROD reflects the final selection of a long-term plan that includes specific actions to fix the Bay-Delta, describes a strategy for implementing the plan, and identifies complementary actions the associated agencies will also pursue.

Linkage with the Ecosystem Restoration Program (ERP) is a very significant factor in the

implementation of the CVPIA. Many of the ERP actions have the same or similar objectives, and address most of the same natural resource and water management problems, as actions under CVPIA. Close coordination and a focus on functional integration of CVPIA and ERP have been necessary to achieve common goals and avoid duplication. To ensure coordination in the prioritization of fund expenditures and implementation of CVPIA projects, Interior has worked extensively with ERP staff and stakeholder groups. An example of this coordination is Interior's willingness and effort to have ERP scientists provide "expert level" review and comment on proposed CVPIA programs and actions. This review assists in the selection of the most worthy projects for achieving CVPIA goals and is expected to lead to a more broad-based ecosystem management strategy that more effectively addresses fish and wildlife mitigation, restoration, and enhancement.

In addition to the Ecosystem Restoration Program, program and project coordination has also been achieved, and funding partnerships formed, with other entities, both public and private. Among the most notable examples are the establishment of watershed work groups on many Central Valley rivers and streams. These groups, comprised of affected interests within each watershed, assist Interior's efforts to restore anadromous fish populations by developing workable solutions to the problems specific to each watershed.

PART III - SUMMARY OF ACCOMPLISHMENTS

Organization of CVPIA Implementation Actions

Interior has grouped the actions in individual sections of the CVPIA into eight categories for administration and budgeting purposes. These action categories are also commonly used in partnering and public involvement discussions. Each one involves several individual programs and actions. These categories were used to group related actions for the narrative discussion of accomplishments that follows.

CVPIA ACTION CATEGORIES

- Administrative Processes
- Contracting and Improved Water Management
- Anadromous Fish - Habitat Restoration
- Anadromous Fish - Structural Measures
- Refuges and Waterfowl
- Other Fish and Wildlife
- Monitoring
- Studies, Investigations and Modeling

A Summary Table of Accomplishments at the end of this part presents the major accomplishments of CVPIA implementation for each of these action categories in a concise tabular form. Aquatic and terrestrial restoration activities associated with these accomplishments are shown in Figures 6 through 9 following the Summary Table. More detailed information on each individual program is provided in the Appendices, in the same order as the action categories.

Administrative Processes

The administrative element of implementing the CVPIA has been extremely challenging for all the agencies involved, and has required a large commitment of resources over the past 10 years because of the many comprehensive programs to be implemented. Many of the programs have required extensive documentation and reports for environmental compliance, in addition to the required Programmatic Environmental Impact Statement (PEIS). Public involvement and partnering arrangements have also been extensive.

Because of Interior's strong commitment to implementation, and the enthusiastic cooperation of partnering agencies, including the State of California, many of the programs have advanced rapidly: others are nearing completion of the administrative groundwork. In view of the complexity and controversial nature of the CVPIA to CVP contractors and other stakeholders, it has been extremely important to work closely with all parties to address issues. In reviewing the progress of implementation, it will be apparent that some of the more contested actions require more time for completion of the administrative steps.

Programmatic Environmental Impact Statement (PEIS)

The Act required a PEIS to assess the effects of implementing the actions specified in the CVPIA. Because the findings of the PEIS would influence many of the actions, the PEIS was among the first steps and proceeded concurrently with other early implementation actions needed to carry the CVPIA. The PEIS analyzes the direct and indirect impacts of implementing the CVPIA, was the most comprehensive document to be prepared for CVPIA implementation, and required partnering with nine agencies, extensive public involvement, and significant technical efforts. The draft, including more than 30 technical appendices, was released for public comment in November 1997. The final PEIS was released in October 1999 and the Record of Decision signed by Reclamation and the Service in January 2001.

Rules and Regulations

Interior almost immediately initiated a public involvement process to develop the necessary direction for interpreting and implementing sections of the CVPIA. However, formal rules and regulations could not be promulgated until the PEIS was completed. Consequently, to inform the public of our approach to CVPIA implementation and to provide Interior personnel with interim guidance pending formal rules and regulations, Interior developed interim guidelines and criteria for dealing with seven CVPIA issues or topic areas. We then held public scoping workshops to solicit comments on rulemaking. The topic areas covered by interim guidelines were: Interim Contract Renewals; Water Transfers; Restoration Fund Payments and Charges; Section 3406(b)(2) Water; Land Retirement; Water Conservation Proposals; and the Section 3406(b)(22) Agricultural Waterfowl Incentives Program.

Criteria were developed for evaluating water management plans and on the use of project power for fish and wildlife measures.

Administrative Proposals

In September 1995, Interior invited the public to identify any concerns they had regarding implementation of the CVPIA. To facilitate public input and discussion, representatives of Interior held a series of public meetings between September 1995 and April 1996. During these meetings, the following 11 major areas of concern were identified, and individuals volunteered to form work teams and discuss the specific issues pertaining to those areas: Trinity River; Water Conservation; Urban Water Reliability; San Joaquin River; Stanislaus River; Section 3406(b)(2)--dedicated water--combined with the Anadromous Fish Restoration Program; Water Transfers; Contracting Policies; Refuge Water Supplies; and the Restoration Fund. In April 1996, Interior committed to preparation of "Administrative Proposals" on each of the 11 areas of concern, addressing the principal issues raised by stakeholders during the public forum and work team meetings.

One of the more controversial administrative proposals, studied at length by a team of Interior personnel and stakeholders, concerned Section 3406(b)(2), management of the 800,000 acre-feet of dedicated CVP yield. Considerable debate occurred over interpretation of this section, primarily regarding how the water should be accounted and how it was to be used. Various approaches were developed and tested, all with extensive stakeholder input.

Despite the lengthy public involvement process and Interior's best efforts to move the participants toward consensus, some groups still contested Interior's proposed management of dedicated yield and took the matter to court. Pursuant to the court's direction, Interior developed a "final" *Decision on Implementation of Section 3406(b)(2) of the Central Valley Project Improvement Act* in October 1999. This decision also was litigated and the court held that parts of the decision were unlawful, arbitrary, and capricious. Consequently, Interior has revised the accounting procedures to comport with the Court's decision.

The strong feelings on this issue--some CVP users believing the formula resulted in too much water dedicated to fish, and environmental groups, too little--are indicative of the value placed on water in California. These and other issues identified during preparation of the PEIS are now part of the administrative record.

Funding Arrangements

Funding for CVPIA comes from several sources, and these have been formalized in written agreements and planning processes. Three funding mechanisms are proposed in CVPIA and have been established: the Restoration Fund, cost-share with the State of California, and funding agreements with non-Federal entities.

The Restoration Fund funds most CVPIA projects. The Restoration Fund serves as the depository in the Treasury of the United States for all revenues received by the Secretary from the following sources: pre-renewal charges, tiered water revenues, transfer revenues, Friant surcharges, Municipal and Industrial surcharges, restoration payments, and non-Federal contributions. The Restoration Fund has a public involvement component, including interaction and coordination with the Restoration Fund Roundtable (a stakeholder organization) and with the California Bay-Delta Authority.

Other CVPIA actions have been funded entirely or in part from Reclamation's Water and Related Resources Appropriation. In addition, pursuant to an agreement with the State of California signed in June 1994, State funds have been appropriated and used for various CVPIA projects and programs that call for State cost-share. Interior has also entered into numerous contracts, grants, and cooperative agreements for individual projects.

Over $629 million were obligated toward the implementation of the CVPIA's prescribed actions and programs through the first 10 years. It must be recognized, however, that many CVPIA measures were already being planned or in progress at the time the Act was passed and a large portion of these expenditures would have occurred even in the absence of the CVPIA. These include the Shasta Temperature Control Device ($84 million to implement, but saving $5 million per year in lost power generation); Glenn-Colusa Irrigation District Fish Screen Project ($41 million); rehabilitation of

Coleman National Fish Hatchery ($21 million); and fixing the fish passage problems at the Red Bluff Diversion Dam ($35 million) and the Tracy and Contra Costa Canal pumping plants ($15 million).

Of the $629 million spent during these first ten years, 54% (342 million) came from Restoration Fund appropriations. As indicated, these funds are derived from fees paid by the beneficiaries of the CVP's water and power supplies. Approximately $229 million (36%) came from Reclamation's Water and Related Resources appropriations, another $58 million (9%) from State of California cost share, and $1 million from donated funds (Figure 1).

Nearly $263 million (41.7%) of the monies obligated to implement CVPIA in these first 10 years were for structural measures, such as the Shasta Temperature Control Device and the Glenn-Colusa Irrigation District Fish Screen Project, projects that benefit water and power users as well as anadromous fish. Another $125 million (19.8%) were obligated for habitat restoration measures for anadromous fish, $132 million (20.9%) to provide water to refuge areas and on the Agricultural Waterfowl Incentives Program, and $52.5 million (8.3%) on acquisition of habitats for other fish and wildlife species, primarily those listed under the provisions of the Endangered Species Act. Administrative requirements and processes accounted for $29.3 million (4.7%) of the obligations while contracting/improved water management, studies and investigations, and monitoring accounted for the balance (Figure 2).

Figures 3-5 display the amounts obligated on each action category by each of the major fund sources - Restoration Fund, Water and Related Resources appropriations, and State cost-share. The $1 million of donated funds were used exclusively for the restoration of Clear Creek (Anadromous Fish – Habitat Restoration action category).

Fiscal data for each of the sections of the CVPIA on an annual basis is provided in the appendices and reflect the sources mentioned above, i.e., Restoration Fund, Water and Related Resources appropriations, and contributed funds (State cost-share and donated monies).

Figure 1
TOTAL CVPIA OBLIGATIONS BY FUND SOURCE
Fiscal Years 1993-2002

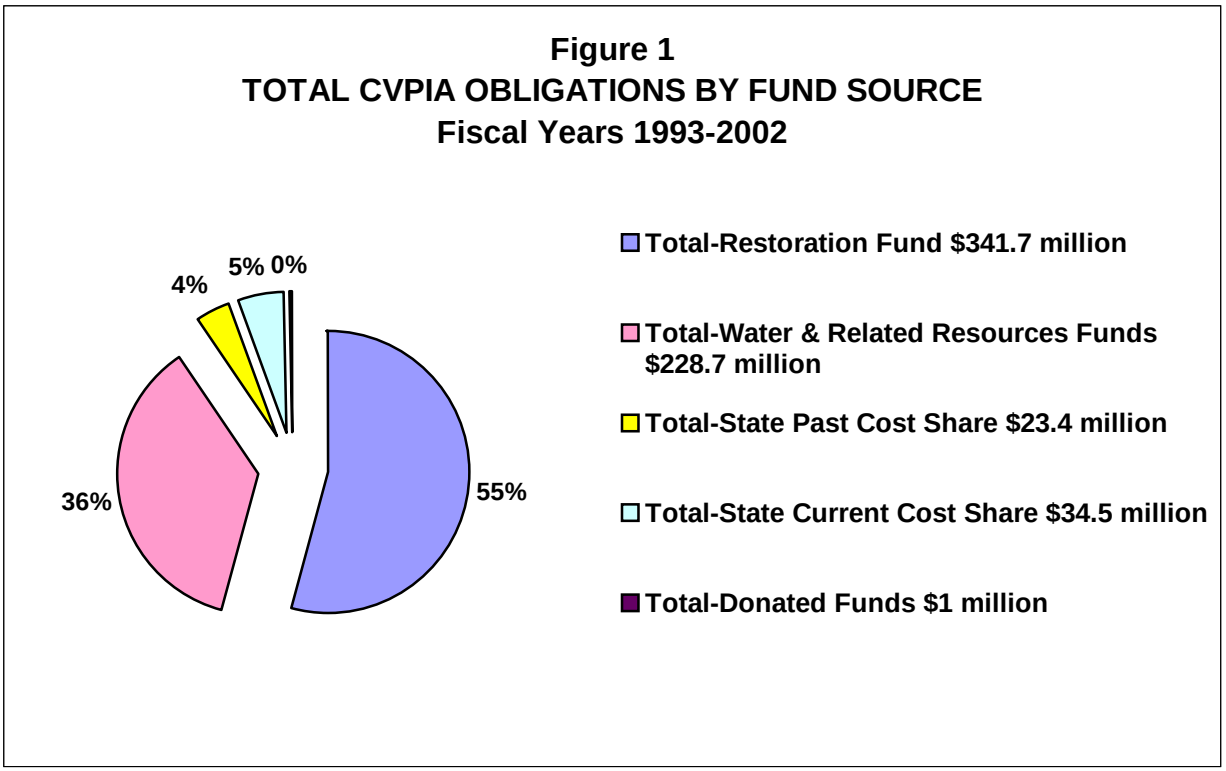


Figure 2
TOTAL CVPIA OBLIGATIONS BY ACTION CATEGORY
Fiscal Years 1993-2002

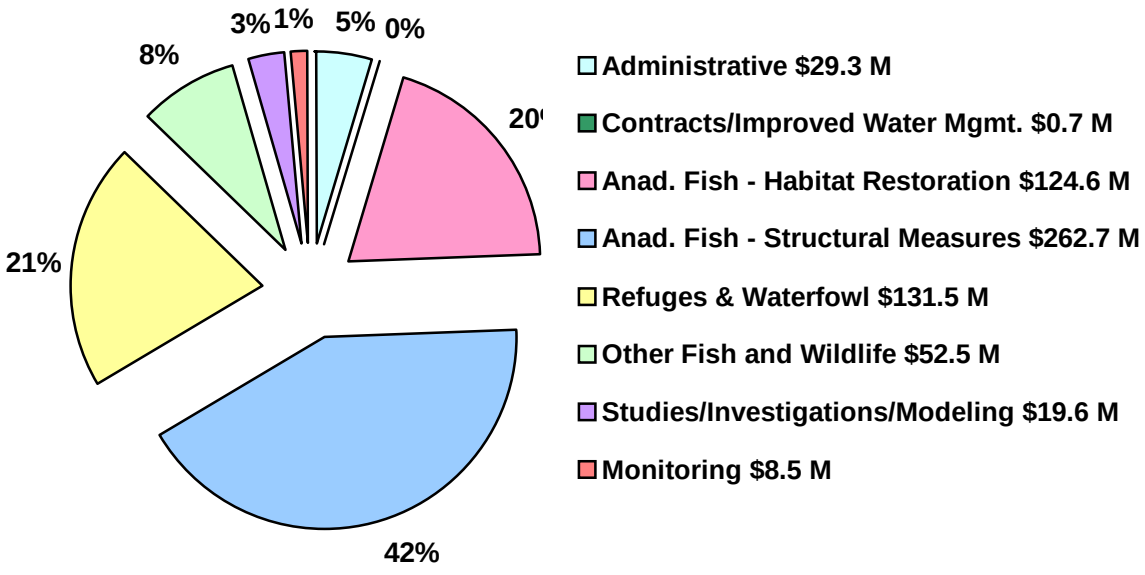


Figure 3
RESTORATION FUND OBLIGATIONS BY ACTION CATEGORY
Fiscal Years 1993-2002

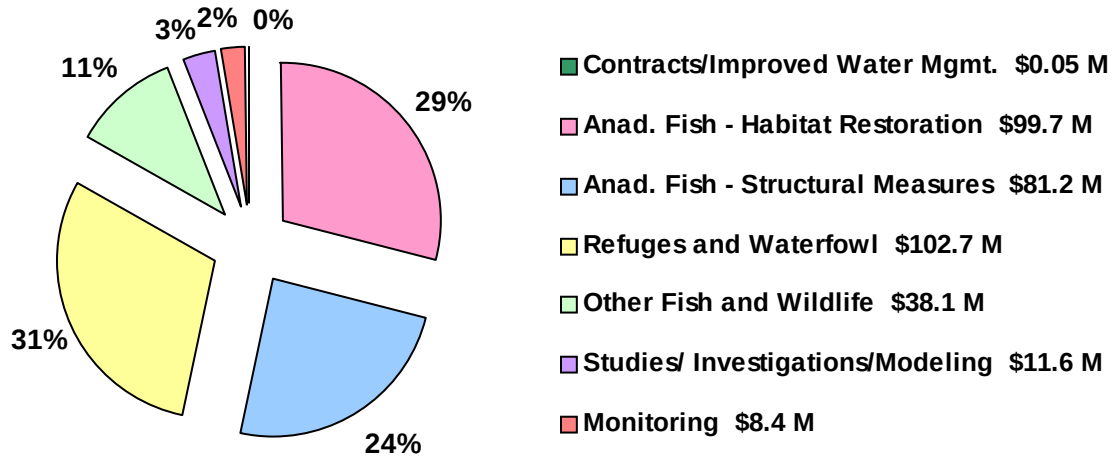


Figure 4
WATER & RELATED RESOURCE FUND OBLIGATIONS
BY ACTION CATEGORY
Fiscal Years 1993-2002

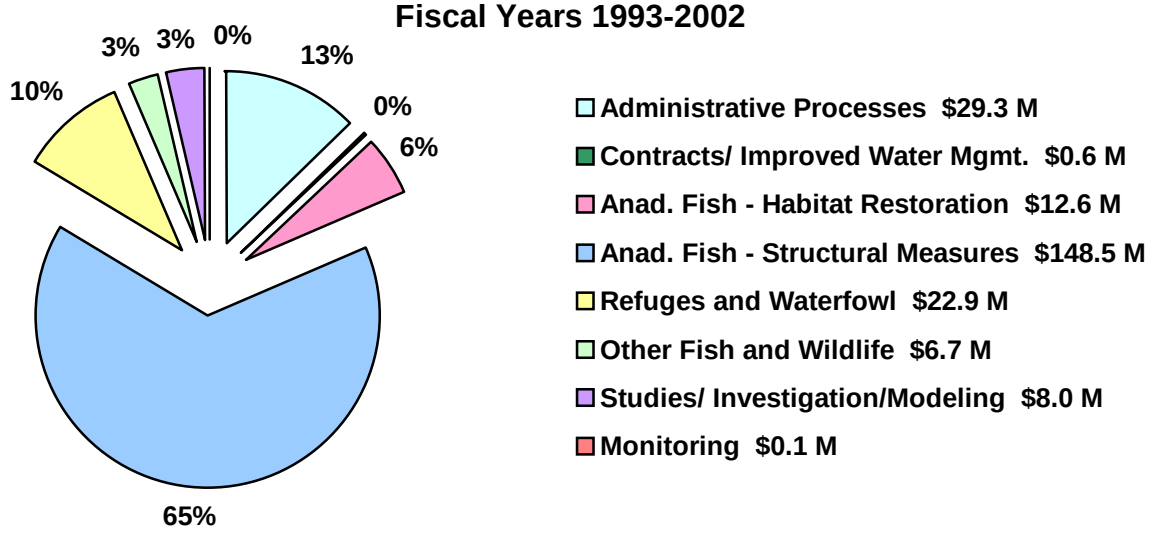
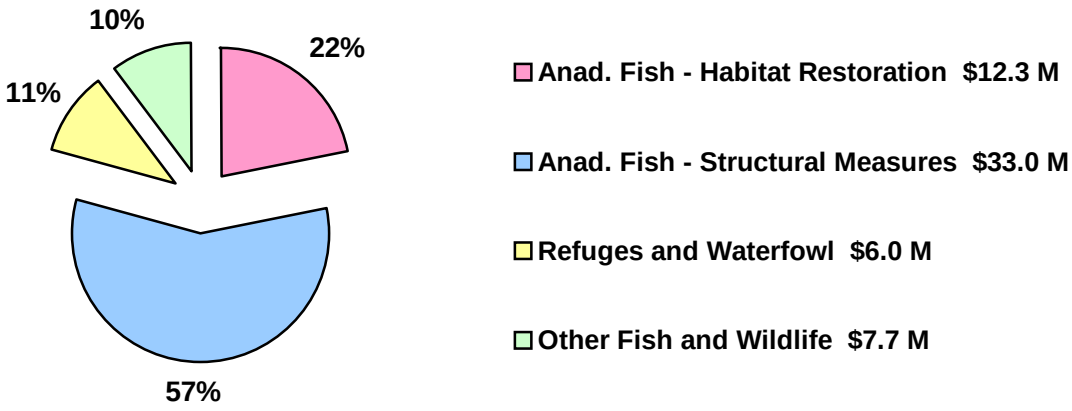


Figure 5
CONTRIBUTED FUND OBLIGATIONS BY ACTION CATEGORY
Fiscal Years 1993-2002



Contracting and Improved Water Management

This category includes provisions in the Act for renewing CVP contracts, and the management of water supplied by the CVP. Changes to be implemented by Interior included new contracting terms and conditions, and new programs for water transfers and water conservation.

Contract Renewals

The CVPIA prohibited new contracts and restricted the long-term renewal of existing contracts for water until the PEIS process was

completed. It provided for interim short-term renewal of existing long-term contracts that had expired and, for those existing contracts that had not expired, provided for the execution of binding agreements requiring renewal immediately upon completion of the PEIS. Any contractor not signing a binding agreement was subject to a penalty of 1½ times the normal Restoration Fund payment. Prior to completion of the PEIS, 68 interim renewal contracts and 44 binding agreements were negotiated and signed. The PEIS was completed and the Record of Decision signed on January 9, 2001

After completion of the PEIS, 27 long-term renewal contracts were executed. Twenty-four other contracts were negotiated when efforts were suspended pending development and negotiation of a CVP-wide form of contract. That effort was still underway at the close of fiscal year 2002. In the meanwhile, Reclamation continued water deliveries pursuant to binding agreements and the interim renewal contracts.

Water Transfers

Interior developed Interim Water Transfer Guidelines to establish conditions for transfer of CVP water until final rules and regulations for the CVPIA are completed. Reclamation is currently in the process of formally revising the 1993 Interim Guidelines to conform to the sunset provisions of subsection 3405(a)(3) of the CVPIA. The process is expected to be completed, and Revised Interim Guidelines finalized, sometime after the end of 2002.

Among conditions that sunsetted according to subsection 3405(a)(3) were the right of first refusal by entities within the CVP service area before CVP water can be transferred outside the CVP service area; the condition for the Secretary to determine that the transfer will have no unreasonable impact on the water supply, operations, or financial conditions of the transferor's contracting district or agency or its water users; and the condition for the Secretary to make a determination that the transfer will have no significant long-term impact on groundwater conditions in the transferor's service area.

In April 2002, Reclamation executed a Memorandum of Understanding (MOU) with the California Department of Water Resources and the California State Water Resources Control Board regarding establishment of a water transfer information clearinghouse.

In 1996, Interior developed an Administrative Proposal to address the public's concerns regarding Interior's implementation of the CVPIA transfer provisions and the need to refine the water transfer process. In addition, a programmatic review and approval process was developed to facilitate approval of water transfers within the CVP that had historically occurred between CVP contractors inside the same service areas, to simplify the approval process, and to ensure short-term water management goals were met. In the 1998 Final CVPIA Administrative Proposal on Water Transfers, Interior committed to establish a water transfer clearinghouse to be jointly operated by Interior and the California Resources Agency to track water transfers and provide data that could be used to quantify and evaluate third-party impacts.

The 2002 MOU establishes the framework of agency roles and responsibilities for managing and implementing a water transfer information clearinghouse to improve access to information about water transfers through the development of an on-line water transfer information website. The website is a collaborative effort by the agencies to clarify the agencies' water transfer policies and procedures and to provide up-to-date information about ongoing water transfer activities.

This increased market information will provide a unique opportunity for the water-user community to monitor the availability and use of transferred CVP water. It will also promote public disclosure of water transfer activities and assist third parties (including local communities) to track water transfers that may affect them and to identify related outcomes from those transfers.

Water Conservation

Reclamation has completed the implementation of the water conservation program specified in the Act. A Water Conservation Advisory Center was established in Sacramento in 1993, and has since been relocated to Folsom. Other centers are being planned or implemented throughout the State, including a Virtual Water Conservation Center on the Internet (www.watershare.mp.usbr.gov).

Reclamation's Water Conservation Office has prepared Criteria for Evaluating Water Conservation Plans (1993 and revised in 1996 and 1999) for the guidance of water and irrigation districts. Reclamation has reviewed the water management plans submitted, and has approved 85 as adequate under CVPIA. To support water conservation efforts, Reclamation developed a database that provides each water district with specific information to enable the district to prepare its annual plan update. The database also provides examples of successful programs and capabilities for sharing information and research.

Reclamation's Water Conservation Office also developed guidelines and criteria for a cost-share program for water conservation projects, and issued four proposal solicitations. This program elicited little interest from CVP contractors and was ended in late 1997.

Anadromous Fish Restoration

The Anadromous Fish Restoration Program (AFRP), the most complicated of the directed programs under CVPIA, influences or is influenced by most of the other programs created by the Act. Interior's efforts to restore anadromous fish populations in the Central Valley are divided into two "Action Categories": Anadromous Fish-Habitat Restoration and Anadromous Fish-Structural Measures. Most of the efforts in these action categories fall within the various provisions of Section 3406(b) of the CVPIA, but many other CVPIA provisions also provide some level of benefit for anadromous fish.

The CVPIA provides both specific direction and general guidance for anadromous fish restoration. Specific, directed actions include projects such as the construction of fish screens at Glenn-Colusa Irrigation District's Hamilton City Pumping Plant and at the Contra Costa Canal Pumping Plant. More general guidance comes in the form of directed programs, such as the Clear Creek Fishery Restoration Program and the Gravel Replenishment and Riparian Habitat Protection Program. Because it was necessary to better define these program level efforts, Interior developed large-scale planning processes that included other agencies, the public, and stakeholder groups.

The Final Restoration Plan for the Anadromous Fish Restoration Program (AFRP Restoration Plan) was developed by the Service and Reclamation to guide Interior in making all reasonable efforts to at least double the natural production of anadromous fish in Central Valley rivers and streams. The AFRP was formulated, and its program plan created, by a coalition of senior fish experts from the Service, Reclamation, Environmental Protection Agency, National Marine Fisheries Service, and California's Departments of Fish and Game and Water Resources, with extensive public involvement.

The AFRP Restoration Plan has become the cornerstone of many actions aimed at restoring natural production of anadromous fish in the Central Valley, and includes partnerships, local involvement and public support. The plan, which describes Interior's overall goals, objectives and strategies for anadromous fish restoration in the Central Valley, identifies nearly 300 prioritized restoration actions and evaluations, all partitioned by watershed. It includes anadromous fish restoration actions found in other sections of the CVPIA as well as actions not specifically prescribed in the CVPIA but considered necessary by the experts to accomplish the goal of doubling the natural production of anadromous fish (doubling is expressed as twice the average production for the period 1967-91).

Restoration actions for anadromous fish have been focused in four geographic areas:

Sacramento-San Joaquin Delta - Emphasis in the Delta has been on offsetting effects of CVP and SWP export facilities (entrainment, impingement, diversion, and increased predation) on all species of anadromous fish. This is particularly important because all anadromous fishes of the Central Valley watershed use the Delta as a migration corridor and/or as habitat for some part of their life cycle.

Sacramento River Tributaries - Actions have focused on riparian and shaded riverine aquatic habitat restoration; improved access to available upstream habitat; improvement of flows; and reduction of losses at diversions, especially for spring-run Chinook salmon and steelhead.

Sacramento River - Actions have focused on flow and temperature control, restoration of spawning habitat, reduction of losses at diversions, and acquisition of riparian lands to improve rearing habitat, especially for winter-run Chinook salmon.

San Joaquin River and Tributaries - Actions have focused on improvement of flows, restoration of river channels, spawning gravels, and riparian cover, and on the elimination of predator habitat. Most of the actions undertaken have been on tributaries to the mainstem San Joaquin River.

The ultimate success of Interior's anadromous fish restoration effort depends on the successful linkage of all CVPIA programs and actions, and those related efforts underway in other processes and by other entities. Increasing and sustaining the natural production of anadromous fish in the Central Valley is an ecosystem-level effort. It will require the provision of adequate instream habitat including appropriate management of available water supplies, improving adult access to spawning areas, and protection of juveniles from mortality due to diversion and other man-induced causes.

Monitoring and additional studies will also be essential to assess the relative success of CVPIA actions and to enable Interior to adaptively manage actions in the future.

Anadromous Fish - Habitat Restoration

Habitat restoration actions that have been completed include the acquisition and dedication of water for instream flows, channel restoration and enhancement, removal of dams and blockages that interfere with fish migration, gravel replenishment, acquisition and restoration of riparian habitat, and erosion control to decrease the deposition of fine sediments in spawning gravels.

Interior has used the 800,000 acre-feet of dedicated CVP yield annually since 1993 to help meet AFRP targeted needs. This water was applied to improve adult migration, spawning, egg incubation, and fry and juvenile rearing and migration, especially in the Delta. Interior has also acquired over 913,000 acre-feet of supplemental water from willing sellers to meet anadromous fish needs in both the Sacramento and San Joaquin basins. In addition, up to 95 cubic feet per second of additional water was made available at appropriate times of the year for anadromous fish on Butte and Clear Creeks as a result of removing diversions.

Anadromous Fish in the Central Valley

Anadromous fishes are those that begin their lives in freshwater streams, and then migrate to the ocean to mature, returning to their natal streams to spawn and die. California's stocks of anadromous fish (salmon, steelhead, striped bass, American shad, sturgeon) have greatly declined from their historic numbers. A century of land uses such as mining, logging, farming and urban development--and water development to serve them--has greatly reduced the habitat available to fish. While fish losses can result from natural weather conditions (floods, droughts, ocean warming), habitat deterioration is known to be a major cause of declines in the Central Valley.

Chinook salmon and steelhead, two of the anadromous species covered by the provisions of the CVPIA, are present in the Sacramento-San Joaquin River system year-round and rely on adequate habitat conditions within the system to survive. Four separate runs of Chinook salmon occur in the Central Valley and are distinguished by the time of year they begin their upstream migrations (spring, fall, late fall and winter).

In the Sacramento River system, winter-run Chinook salmon has been designated endangered, and the spring-run Chinook salmon and steelhead have been designated threatened species.

In the San Joaquin River system, while remaining anadromous fish populations have been dramatically reduced from historic levels and at least one race of salmon has been extirpated (the spring-run Chinook salmon), the steelhead is currently listed as a threatened species.

At times when anadromous fish are dependent on freshwater, they require a variety of habitat components that include spawning gravel, adequate flows and temperatures for all life stages, protection from predators, and relief from diversion intakes, pumps and obstructions such as dams. The AFRP has had to address all these habitat needs for their restoration efforts to work. It was also important to coordinate with other programs, because actions to improve conditions for one run or one species could be harmful for another.

Other anadromous fish habitat restoration efforts have occurred along nearly 40 miles of river and stream corridors, valley-wide. These actions included the improvement of instream habitats through erosion control, channel improvement, replenishment of over 242,788 tons of spawning gravel, and the restoration of terrestrial habitats

adjacent-to-stream channels including acquisition of over 7,900 acres of riparian and floodplain habitat and the restoration of an additional 883 acres. With the participation and assistance of DFG, the program to replenish gravel and protect riparian habitat on CVP streams has developed, and is implementing, long-term plans for the restoration and protection of spawning gravels on the Sacramento, American and Stanislaus rivers.

The Clear Creek Fishery Restoration Program is an example of a program focusing many of these habitat actions in a single watershed to restore anadromous fish habitat. Efforts on Clear Creek include the removal of McCormick-Saeltzer Dam (an impediment to upstream salmon and steelhead migration) and a related 55 cubic foot per second diversion, improvements in instream flows, replenishment of spawning gravels, restoration of portions of the stream channel that were degraded, and acquisition and restoration of floodplain and riparian habitats. Additionally, projects have been implemented to control erosion in the watershed that has been adversely affecting the stream.

The Tuolumne River is another area where extensive habitat restoration actions are being implemented. Large-scale stream channel re-construction actions have been implemented in concert with floodplain restoration and re-vegetation and gravel replenishment in a reach of the Tuolumne where gravel mining had essentially captured portions of the river channel in a series of aggregate pits, upsetting the natural geomorphologic and hydrologic processes and degrading the value of the active channel for salmonids. Over 7 miles of the river channel have been or are in the process of being re-constructed and a 500-foot wide floodplain restored. In addition, over 50,000 tons of spawning gravels have been placed below LaGrange Dam.

Anadromous Fish - Structural Measures

Anadromous fish structural measures include construction or modification of devices to improve instream habitat, such as the Temperature Control Device on Shasta Dam; to improve access or reduce mortality during fish migrations, such as fish ladders on dams and screens at diversions; and to supplement fish populations, such as the improvements to the Coleman National Fish Hatchery and construction of the Livingston Stone National Fish Hatchery. A great many structural projects have been completed, and others are in progress. Some of these efforts have been able to proceed rapidly because planning was already in progress prior to passage of the CVPIA and/or support funding was available through partners.

The most impressive structural project completed under CVPIA is the Shasta Temperature Control Device (TCD). This innovative structure permits the selective release of water from Shasta Dam to provide cooler water for fish without bypassing the powerplant and has prevented the loss of power supplies and millions of dollars in revenues from hydroelectric power since its completion in 1997.

Since 1993, 57 major structural improvement actions aimed at correcting anadromous fish problems have been completed, resulting in improved adult passage to spawning areas and reduced mortality of juvenile fish as they migrate to the sea. The installation of 29 fish screens, the laddering or removal of 29 dams, weirs, diversions, or other obstacles to migration, construction of 2 bypass facilities, and changes in operation at several CVP facilities have provided improved access and survival of anadromous fish in approximately 190 miles of Central Valley rivers and streams.

The Anadromous Fish Screen Program has provided grants for 27 screening projects in the Central Valley. As of the end of fiscal year 2002, 15 had been completed and construction was underway on 3: the rest were in feasibility or design stages. Over 3,500 cubic feet per second of diversion capability had been made fish safe through this one program alone. The installation and/or improvement of fish screens at diversions have not only increased the survival of juvenile anadromous fish as they migrate to the sea. They also benefit CVP contractors by improving the reliability of their water supplies.

In addition to Anadromous Fish Screen Program projects, other important structural projects to improve fish passage and survival that have been completed include improvements at the Red Bluff Diversion Dam to reduce fish entrainment and improve the fish ladder, and a major project to mitigate serious fishery impacts at the Glenn-Colusa Irrigation District's 3,000 cubic foot per second Hamilton City Pumping Plant. Both of these projects are on the Sacramento River

An excellent example of a comprehensive effort utilizing both structural and habitat restoration techniques to enhance fish passage is the large-scale effort undertaken on Butte Creek, an important spring-run Chinook salmon stream. Focusing on improvement of access for upstream migrating adults and survival of downstream migrating juveniles, four dams have been removed and three have been laddered. Twelve diversions have been removed, four have been screened, and two others modified to preclude fish from becoming entrained. Instream flows have been significantly enhanced. Work will continue on screens and ladders at the remaining dams and diversions until all impediments to fish migration and survival in the lower 85 miles of the stream have been addressed.

The Delta is one of Interior's highest priority focus areas because all species and races of anadromous fish migrate through the Delta--moving as adults to upstream spawning areas and as juveniles to San Francisco Bay and the ocean. Important programs in the Delta have focused on efforts to minimize the effects of CVP and SWP export facilities on anadromous fish. Structural efforts in the Delta have included improvements at the Tracy Pumping Plant, fish screen design at the Contra Costa Canal Pumping Plant, modification of operations at the Delta Cross Channel to reduce mortality of anadromous fish, and installation of an acoustic barrier on Georgiana Slough to redirect fish movement.

Other structural project accomplishments include modifications to the Keswick Dam fish trap, modifications to the Anderson-Cottonwood Irrigation District Diversion Dam to allow removal of its boards at higher flows, construction of a fish bypass and relocation of diversion

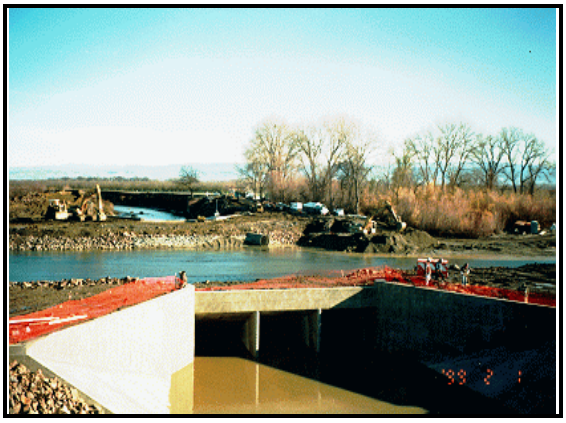
facilities on Big Chico Creek, installation of an ozone water treatment facility at the Coleman National Fish Hatchery, and construction of a new hatchery facility on the Sacramento River below Keswick Dam (Livingston Stone National Fish Hatchery).

Refuges and Waterfowl

The CVPIA identifies wetland restoration as a key component of wildlife protection and enhancement in the Central Valley. The Act directs Interior to provide a firm, reliable water supply to Central Valley waterfowl refuges. The Act also authorized an incentives program to encourage farmers to seasonally flood their fields to create additional waterfowl habitat while still maintaining the farmland for crop production. Rice growers can flood fields to decompose rice straw, creating seasonal wetlands without interfering with farming operations.

There are several programs charged with meeting these mandates: the Water Acquisition Program (Refuge Focus), the Refuge Conveyance Program (Wheeling), the Refuge Construction Program (Facilities Construction and San Joaquin Basin Action Plan Lands), and the Agricultural Waterfowl Incentives Program. The refuge programs are managed by Reclamation and are a joint effort with the Service. The Service manages the Waterfowl Incentives Program.

Significant progress has been made on these programs. A major goal of the Water Acquisition Program is to acquire water to upgrade refuge water supplies from Level 2 to Level 4 (Level 4 is the full water allocation for optimum management of wetlands in Reclamation's 1989 Refuge Water Supply Report and for remaining water needs in the San Joaquin Basin Action Plan.). The total increase, approximately 159,000 acre-feet over Level 2 supplies, is to be achieved in increments of 10 percent per year. Interior has acquired temporary water supplies each year to meet the annual requirement since the program was established in 1993. At the end of fiscal year 2002, a total of 484,114 acre-feet of annual water supplies had been acquired. In addition, in 1998 Interior acquired the first 6,300 acre-feet of permanent water supply to help meet Level 4 requirements.



Since 1993, Reclamation has increased the reliability of existing supplies to managed wetlands that have conveyance systems. Under the Refuge Conveyance Program, Interior executed eight water-wheeling agreements that provide for the delivery of up to 556,000 acre-feet of Level 2 and Level 4 water to wetlands. Under the Refuge Construction Program, critical conveyance facilities to three refuges in the west Sacramento Valley have been constructed. This was the result of a cooperative agreement reached with the Glenn-Colusa Irrigation District, which resulted in the expansion of water delivery systems enabling water deliveries to the refuges. Three additional projects to deliver water to San Joaquin valley refuge areas have also been completed and others are under consideration.

The Agricultural Waterfowl Incentives Program has been extremely and increasingly successful since its initial start in the winter of 1997-98. In that first year, 41 farmers participated in the program and created 22,314 acres of habitat for

wintering migratory waterfowl. Monitoring that year showed

Central Valley Wetlands

The Central Valley is 400 miles long and contains about 10 million acres of land, of which at least 4 million acres were once wetlands, both permanent and seasonal. Historically, valley waterways regularly overflowed their banks in the winter, and much of the valley floor functioned as seasonal wetlands. Just prior to CVPIA, a little more than 300,000 acres of wetlands remained, and the bulk of those had to be intensively managed to support waterfowl, other migratory birds, and resident wildlife in the Central Valley.

The valley is on the Pacific Flyway, a major route for millions of North America's ducks, geese, and other migratory birds. Despite the greatly reduced habitat, Central Valley wetlands are host to large annual migrations and support 20 percent of North America's continental waterfowl populations. As a result of inadequate or unreliable water supplies, most of the Federal, State, and private refuges that host these birds have had to operate on what is, in ecosystem term, a critical edge to provide the food and habitat necessary to support these millions of wintering visitors. Thus, any wisely applied addition to their water supply helps immensely to overcome the reduction in the historical habitat base.

as many as 40,000 ducks and geese at one time using a single 80-acre newly flooded field. Herons, egrets, cranes, ibis and several species of shore birds also used these new seasonal wetlands, adding to the species diversity of the areas. Program participation has grown since then, with 84 farmers participating in the winter of 2000-01 and enrolling over 58,000 acres. Tens of millions of bird use-days have been recorded on enrolled fields in the 5 years since the program was initiated. Unfortunately, even though interest remains high, enrolled acreage was down slightly in 2002 as a result of reduced budgets. Participation and enrolled acreage would have continued at a high level if funding were not an issue. In accordance with the language of CVPIA, funding for this program was terminated at the end of fiscal year2002.

Other Fish and Wildlife

This category includes actions to mitigate for other impacts of the CVP that are not specifically provided for elsewhere in the Act. Programs in this category include the Habitat Restoration Program, the San Joaquin River Riparian Habitat Restoration Program, and, because of its benefits to other fish and wildlife, the Land Retirement Program.

Since 1996, the Habitat Restoration Program has focused its efforts on the protection and enhancement of habitats and species most dramatically affected over the last 60 years. To date, this program has collaborated with numerous partners in the acquisition and/or restoration of crucial terrestrial habitats on 89,375 acres of land valley-wide.

Projects have been distributed throughout the Central Valley from as far north as Shasta County along the Sacramento River south to Kern County. The program has obtained contributions of nearly $48 million from various partners, approximately 50 percent of program costs to date. Fee title acquisitions and conservation easements totaling 88,364 acres through FY02 have ensured the protection and allow for the restoration and enhancement of a diversity of native habitats, habitats that have significantly declined since construction of the CVP began. Habitats have been restored or enhanced on an additional 1,111 acres. A variety of Federal and State-listed species are expected to benefit directly from these actions. In addition, the development and implementation of management plans for these areas should further improve conditions for these species and contribute towards their recovery. Efforts are underway to track the benefits of these efforts.

A San Joaquin River Riparian Habitat Restoration Program has been developed and implemented to improve desirable plant and animal habitat along the river from Friant Dam to the San Joaquin's confluence with the Merced River. This program has been able to identify from studies, field

investigations, Geographic Information System (GIS) mapping, and modeling efforts, numerous issues and data needs associated with San Joaquin River riparian habitat improvement and long-term restoration. From the issues and data needs identified, a prioritization system will be defined, methods for filling data gaps developed, and restoration techniques refined.

For example, through field investigations and GIS vegetative mapping, the Program has prioritized the development and implementation of an invasive plant removal and re-vegetation management plan for the San Joaquin River. It also funded the development of a new model for calculating river channel roughness that is more accurate than other methods historically used and will have widespread application.

Through stakeholder partnerships, the San Joaquin River Riparian Habitat Restoration Program has also initiated several site-specific restoration actions and programs and supported river education activities and workshops for the surrounding community.

The Land Retirement Program was developed in concert with habitat restoration and other CVPIA purposes and provides one means to manage drainage-related problems within the central and western side of the San Joaquin Valley. The program's principal objectives are to decrease drainage problems; rehabilitate upland habitat; contribute to the recovery of wildlife species, including listed species; and acquire water for other CVPIA purposes.

Implementation of the CVPIA Land Retirement Program is provided through an interagency effort of Reclamation, Bureau of Land Management, and the Service. An interagency team including these three agencies developed interim guidelines to purchase from willing sellers land poorly suited for agricultural uses. Adaptive management of the program stresses minimizing, to the greatest extent possible, any harmful effects on fish and wildlife.

The program acquired Prospect Island in the Sacramento-San Joaquin Delta in 1995. This island contains 1,228 acres of existing and potential wildlife and fisheries habitats. Beginning in 1997, the program began soliciting offers from willing sellers within eligible areas in the San Joaquin Valley and Tulare basin. A total of 70 applications were received, amounting to approximately 45,000 acres. By the end of fiscal year 2002, a total of 8,694 acres had been acquired by the Land Retirement Program and another 485 acres was added to the program through acquisitions under the Habitat Restoration Program. Upland habitat on over 1,800 acres of these retired lands was treated and managed to enhance wildlife values. A Demonstration Project was initiated in 1998 on 1,891 acres in the Westlands Water District in Fresno County to study land retirement effects upon ground-water levels, groundwater and surface-water quality, soil chemistry, wildlife and plants. The Demonstration Project has been expanded and will cover up to 15,000 acres, both in Westlands and in the Tulare Basin. The Demonstration Project is expected to take 5 years and will provide the necessary information to assess the ecological risks that might be associated with land retirement. Demonstration Project results will also provide information necessary for establishing future long-term land retirement goals and the data needed for completion of an environmental (National Environmental Policy Act) document for the larger Land Retirement Program.

As the Land Retirement Program is implemented, and the drainage problem reduced through various treatments and land restoration measures, both the aquatic and terrestrial environments in the San Joaquin Valley and downstream in the estuary will benefit.

Monitoring

An adequate monitoring program is essential if we are to assess the long-term results of implementing CVPIA actions and programs, make needed adjustments to improve our effectiveness, and achieve the purposes of the Act. A three-tiered monitoring process has been established that consists of:

(1) CVPIA action-specific monitoring to assess an individual measure's results and effectiveness. The responsibility for developing this tier of information is at the project level. CAMP serves as the repository for the information once it has been collected;

(2) ecosystem-level monitoring provided to assess the overall effectiveness of programs and groups of actions carried out under

Section 3406(b) of the CVPIA. CAMP develops this tier of information with input from the various CVPIA programs. An example of this type of information would be an assessment of the effectiveness of a suite of actions undertaken on a specific stream, such as on Clear Creek or Butte Creek, or the overall and relative effectiveness of a single program, such as the Anadromous Fish Screen Program, towards achieving the CVPIA doubling goal; and

(3) the analysis of monitoring data from many other related efforts to ascertain "landscape level" results. Good examples of this tier of the CAMP program would be the use of Pacific Fisheries Management Council salmon data and funding the Department of Fish and Game to conduct angler surveys. The combined collected data would then be analyzed to determine progress towards achieving the doubling goal valley-wide.

Interior began in 1994 by evaluating existing monitoring programs to determine their suitability for meeting CVPIA needs. This also provided a baseline for development of a CVPIA program to evaluate the biological results and effectiveness of CVPIA actions. Following that assessment, an ecosystem-level monitoring effort, the Comprehensive Assessment and Monitoring Program (CAMP), was developed to monitor various target fish species including Chinook salmon, steelhead, striped bass, and American shad. This program includes an Implementation Plan that describes in detail how field monitoring is to be accomplished and how data is to be processed and evaluated, and a Conceptual Plan for evaluating the overall success of various actions. The program will provide information on long-term changes at the population or landscape level that accrue as a result of programs or suites of actions.

Data under the CAMP program began to be gathered in 1995 and has been collected insofar as funding has allowed every year since. Data generated by CAMP is provided to the Interagency Ecological Program for management and to be shared with others working on related activities. (The IEP was established to provide information on factors that affect ecological resources associated with the Sacramento-San Joaquin Delta) CAMP has supported several monitoring efforts, including surveys of shad and striped bass populations in the estuary, emigration monitoring of juvenile salmonids in the Yuba, Merced, and Tuolumne rivers, and a creel survey to gauge the numbers of Central Valley salmon and steelhead being caught in the inland recreational fisheries. To date, however, the ability to undertake a truly comprehensive assessment has been constrained somewhat by the availability of funds to implement needed assessment measures and meet established sampling protocols.

Annual reports of the findings of the CAMP-funded and other monitoring activities are prepared and disseminated. CAMP also undertook and completed a riparian mapping program for the Sacramento River and its tributaries in 1994.

Studies, Investigations and Modeling

Extensive studies, investigations and modeling efforts are required to help develop some of the actions needed to implement the CVPIA. They have been, and will continue to be, important sources of information to help make CVPIA implementation decisions and to evaluate the probable results of proposed changes. These are a necessary first step in planning for many CVPIA actions. Many studies, investigations and models have been prepared jointly with, or contracted to, other agencies.

Numerous studies have been completed, and others are ongoing, in connection with efforts to restore anadromous fish. These include analyses of flow fluctuations due to CVP operations, release patterns on the American and Stanislaus rivers, and carryover storage requirements; evaluations of temperature control and tributary enhancement opportunities; and an assessment of the major impacts of CVP facilities and operations on anadromous fish.

With regard to the Refuges and Waterfowl thrust, the Central Valley Wetlands Water Supply Investigations has developed a geographic information system (GIS) database to identify private wetlands and additional water needs, as well as to identify potential water supplies for supplemental wetlands.

Ecological and hydrologic models are being prepared to evaluate effects of various operations of water facilities and systems in the Sacramento,

San Joaquin and Trinity River watersheds. This is a cooperative effort with the California Department of Water Resources, U.S. Geological Survey (USGS) and others to evaluate potential impacts of various CVP actions.

A study has also been completed to develop a least-cost plan to increase the yield of the CVP by the amount dedicated to fish and wildlife purposes in the CVPIA. This plan was submitted to Congress in 1996. To date, there has been no congressional action on the plan. A copy of the plan is available through the Mid-Pacific Regional Office, Bureau of Reclamation, and Public Affairs Office, at 2800 Cottage Way in Sacramento.

Table 1 - Summary of Activities and Accomplishments – 1993-2002

CVPIA SECTION	PROGRAM OR PROJECT	STATUS
Appendix A: Administrative Processes		
3406(h)	Cost-Share Agreement with State of California	Agreement signed 6/27/94. Twelve Task Orders processed. Additional State funding required. **Continuing.**
3407	Restoration Fund	Established Fund. Collected $354,998,786 (1993-2002). **Continuing**.
3408(a)	Rules and Regulations	Interim guidelines & criteria developed for 10 CVPIA sections. Administrative Proposal process concluded. Final rules will follow now that PEIS Record of Decision has been signed. **Continuing**.
3409	Programmatic EIS	Draft PEIS released November 1997. Final released November 1999. Record of Decision signed January 2001. **Completed.**
Appendix B: Contracting and Improved Water Management		
3404	Contracting	Negotiated and executed 68 interim renewal contracts and executed 44 of 45 binding agreements for early renewal of long-term contracts. Since completion of PEIS, executed 27 long-term contracts and negotiated 24 others. Negotiations with remaining CVP contractors suspended pending development of a CVP-wide form of contract. **Continuing.**
3405(a)	Water Transfers	Developed & streamlined transfer approval process within CVP. Approved transfers of more than 4.3 million acre-feet for agricultural and municipal uses and more than 396,000 acre-feet for Level 4 refuge needs. No transfers yet approved outside CVP service area. Most of the 4.3 million acre-feet of CVP water approved for transfer were approved for a period of up to 5 years with annual reviews. Approved transfer of 5,000 acre-feet to CALFED Environmental Water Account. **Continuing.**
3405(b) and (e)	Water Conservation	Established Water Conservation and Advisory Center. Developed criteria and database to track plan implementation. Approved 85 water management plans. Provided cost-share and technical help. **Continuing.**
3408(i)	Water Conservation Projects	Program established, but no serious interest from CVP contractors before 1999 sunset date. **Completed.**
Appendix C: Anadromous Fish - Habitat Restoration		
3406(b) (1)	Anadromous Fish Restoration Program	Established AFRP and developed Restoration Plan to guide implementation of efforts. Partnered with local watershed groups in acquisition of nearly 8,000 acres and restoration of 883 acres of riparian habitat. Restored over 15 miles of stream channel and placed 71,388 tons of spawning gravels. Eliminated predator habitat in San Joaquin River tributaries. Provided for fish protective devices at seven diversion structures on Butte Creek. **Continuing.**
3406(b)(2)	Dedicated CVP Yield	Implemented management of 800,000 acre-feet of water dedicated to CVPIA purposes. **Continuing.**
3406(b) (3)	Water Acquisition Program (Anadromous Fish Focus)	Acquired 913,452 acre-feet of water for anadromous fish from 1993-2002. **Continuing.**
3406(b)(12)	Clear Creek Fishery Restoration	Removed Saeltzer Dam and diversion. Increased flows, restored 2.0 miles of stream channel and 68 acres of floodplain, and added 54,000 tons of spawning gravel to stream. 152 acres of shaded fuelbreak have been constructed and 12 miles of roadway treated to control erosion. **Continuing.**

Table 1 - Summary of Accomplishments

CVPIA SECTION	PROGRAM OR PROJECT	STATUS
3406(b)(13)	Gravel Replenishment and Riparian Habitat Protection	Developed long-term plans for CVP streams and placed 126,488 tons of gravel in Sacramento, American and Stanislaus rivers. **Continuing.**
3406(b)(23)	Trinity River Fishery Flow Evaluation Program	Completed flow evaluation studies and EIR/EIS to analyze range of alternatives for restoring and maintaining fish populations downstream from Lewiston Dam. Record of Decision signed December 2000. Construction underway on improvements to infrastructure to accommodate increased streamflows. **Continuing.**
Appendix D: Anadromous Fish – Structural Measures		
3406(b)(4)	Tracy Pumping Plant Mitigation	Improved predator removal and increased biological oversight of pumping. Developed better research program, new lab and aquaculture facilities and improved/modified existing facilities. **Continuing.**
3406(b)(5)	Contra Costa Canal Pumping Plant Mitigation	Established cooperative program for fish screen project for Rock Slough intake of Contra Costa Canal. 90% designs and environmental evaluation completed. New short-term, low-cost mitigation measures are being developed to allow for an extension of the construction completion date. Final design and construction pending results of CALFED Stage 1 and other studies**. Continuing.**
3406(b)(6)	Shasta Temperature Control Device	Construction finished 2/28/97. Dam now operated to reduce river temperatures without interruption to power generation operations**. Completed.**
3406(b)(10)	Red Bluff Dam Fish Passage Program	Completed interim actions and modification of Red Bluff Diversion Dam to meet needs of fish and water users. Studies of fish passage alternatives are ongoing. **Continuing.**
3406(b)(11)	Coleman National Fish Hatchery Restoration and Keswick Fish Trap Modification	Installed ozone water treatment system, improved raceways and barrier weir and ladders, and installed interim screens at CNFH intakes. Installed fish trap improvements at Keswick dam. Established Livingston Stone National Fish Hatchery. **Continuing.**
3406(b)(17)	Anderson-Cottonwood I.D. Fish Passage	Modified dam and operations to improve fish passage. Designed new fish ladders and screens for project completed with ERP funding**. Completed.**
3406(b)(20)	Glenn-Colusa I.D. Pumping Plant	Constructed fish screen for 3,000 cfs diversion. Completed water control structure and access bridge and improvements on side channel. **Construction completed, testing underway.**
3406(b)(21)	Anadromous Fish Screen Program	Established program. Installed 18 screens and 3 fish ladders at diversions totaling about 2,500 cfs capacity; removed 4 dams and 14 diversions totaling 750 cfs. Three screens under construction: others in design**. Continuing.**
Appendix E: Refuges and Waterfowl		
3406(b)(3) & (d)(2)	Water Acquisition Program (Refuge Focus)	Acquired 484,114 acre-feet of interim and 6,300 acre-feet of long-term water for refuge Level 4 supplies. **Continuing.**
3406(b)(22)	Agricultural Waterfowl Incentives Program	Created nearly 238,000 acres of new seasonal waterfowl habitat during the six winters the program has been in existence. **Program expired.**
3406(d)(1,3-5)	Refuge Water Conveyance (Wheeling) and Construction	Assisted in the acquisition of 484,114 acre-feet of Level 4 water supplies. Executed 8 interim "wheeling" agreements. Completed construction on 4 conveyance facilities**. Continuing.**

Table 1 - Summary of Accomplishments

CVPIA SECTION	PROGRAM OR PROJECT	STATUS
Appendix F: Other Fish and Wildlife		
3406(b)(1)	Habitat Restoration Program	Established Habitat Restoration Program and San Joaquin River Riparian Habitat Restoration Program. Participated in acquisition of 88,364 acres of native habitat and restore 1,111 acres. **Continuing.**
3408(h)	Land Retirement Program	Established land retirement program to decrease drainage problems in San Joaquin Valley and enhance wildlife habitat and recovery of endangered species. Acquired 8,694 acres from willing sellers and added 485 from Habitat Restoration Program. Demonstration project underway with various land treatments applied on over 1,800 acres of retired lands to date**. Continuing.**
Appendix G: Monitoring		
3406(b)(16)	Comprehensive Assessment and Monitoring Program	Established program to evaluate success of restoration efforts. **Continuing.**
Appendix H: Studies, Investigations and Modeling		
3406(b)(9)	Flow Fluctuation	Coordinated management of CVP facilities and developed standards to minimize fishery impacts from flow fluctuation. Conducting studies on American and Stanislaus rivers. **Continuing.**
3406(b)(19)	Shasta and Trinity Reservoir Carryover Storage Studies	Studies underway. [related studies funded under 3406(b)(9)]. **Continuing.**
3406(c)(1)	San Joaquin River Comprehensive Plan	Initiated evaluation to reestablish anadromous fish from Friant Dam to Bay-Delta Estuary. **Continuing.**
3406(c)(2)	Stanislaus River Basin Water Needs	Prepared Stanislaus and Calaveras River water use program and ESA report. Additional studies ongoing concurrent with development of Stanislaus River long-term management plans. **Continuing.**
3406(d)(6)	Central Valley Wetlands Water Supply Investigations	Report completed identifying private wetlands and water needs, alternative supplies and potential water supplies for supplemental wetlands. Developed GIS database to identify potential water supply sources**. Completed.**
3406(e)(1)	Investigation on Maintaining Temperatures for Anadromous Fish	Completed field investigations and report 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.**
3406(e)(3, 6)	Investigations on Tributary Enhancement	Prepared report in 1998 on investigations to eliminate fish barriers and improve habitat on all Central Valley tributary streams. **Completed.**
3406(f)	Report on Fishery Impacts	Prepared report in 1995 describing major impacts of CVP reservoir facilities and operations on anadromous fish. **Completed.**
3406(g)	Ecological and Hydrologic Models	Developing models and data to evaluate effects of various operations of water facilities and systems in Sacramento, San Joaquin and Trinity River watersheds (to evaluate potential impacts of various CVP actions). Cooperative effort with DWR, USGS, others**. Continuing.**
3408(j)	Project Yield Increase (Water Augmentation Program)	Developed least-cost plan considering supply increase and demand reduction opportunities and submitted to Congress. **Completed.**

Figure 6

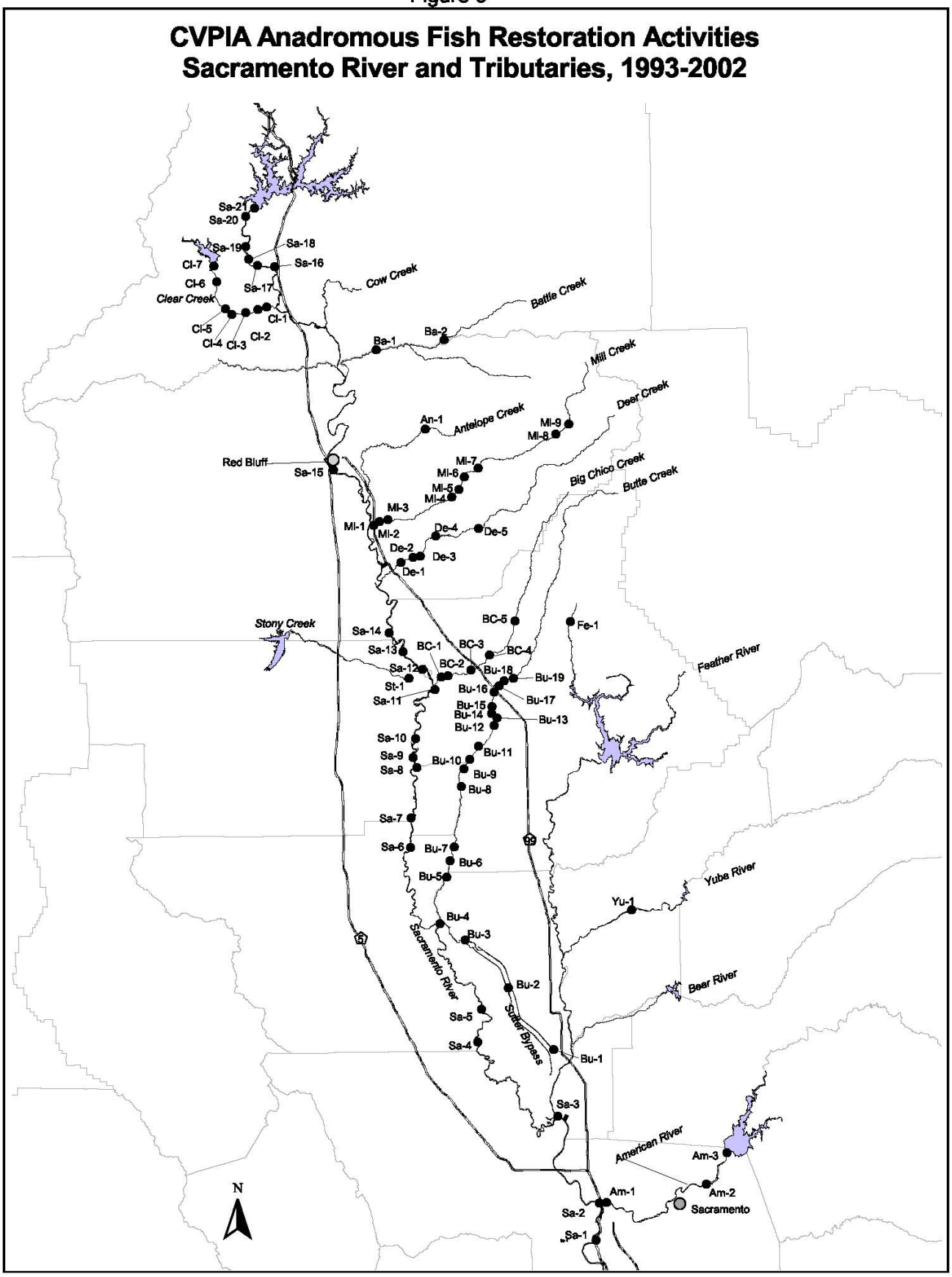

CVPIA Anadromous Fish Restoration Activities
Sacramento River and Tributaries, 1993-2002
Sa-21
Sa-20
Sa-19
Sa-18
Sa-16
Sa-17
Cl-7
Cl-6
Clear Creek
Cl-5
Cl-4
Cl-3
Cl-2
Cl-1
Cow Creek
Battle Creek
Ba-1
Ba-2
Mill Creek
Deer Creek
An-1
Antelope Creek
Ml-9
Ml-8
Red Bluff
Sa-15
Ml-7
Ml-6
Ml-5
Ml-4
Big Chico Creek
Butte Creek
Ml-3
Ml-1
Ml-2
De-4
De-5
De-2
De-3
De-1
Stony Creek
Sa-14
BC-5
Fe-1
Sa-13
BC-1
BC-3
BC-4
Sa-12
BC-2
Bu-18
Bu-19
St-1
Bu-16
Sa-11
Bu-17
Bu-15
Bu-14
Bu-13
Bu-12
Feather River
Sa-10
Sa-9
Bu-10
Bu-11
Sa-8
Bu-9
Bu-8
Sa-7
Sa-6
Bu-7
Bu-6
Bu-5
Yu-1
Yuba River
Bu-4
Bu-3
Sacramento River
Bu-2
Bear River
Sa-5
Sutter Bypass
Sa-4
Bu-1
Sa-3
American River
Am-3
Am-1
Am-2
Sacramento
Sa-2
Sa-1
N

Figure 6 **CVPIA Anadromous Fish Restoration Activities**
Sacramento River Basin - 1993-2002

Activities by Watershed

American River
Am-1 Initiated construction of fish screen at Fairbairn diversion
Am-2 Enhanced and replenished gravels below Nimbus dam
Am-3 Reconfigured Folsom Dam shutters for temperature control
NSA Developed and implemented more appropriate instream flows

Antelope Creek
An-1 Completed flow and temperature gage installation
NSA Funded increased enforcement of regulations

Battle Creek
Ba-1 Completed ozonation, interim screening of diversion, raceway rehabilitation ladder improvements, and instream work at Coleman NFH
Ba-2 Partnered in acquisition of a 990 acre conservation easement at Eagle Canyon
NSA Partnered in acquisition of a total of 86,569 acre-feet of water for instream use

Big Chico Creek
BC-1 Partnered in acquisition of 0.5 miles (58 acres) of riparian corridor – Peterson property
BC-2 Eliminated M&T diversion
BC-3 Installed flow and temperature gage
BC-4 Installed bypass structure at One-mile Pool
BC-5 Partnered in acquisition of the 2,724 acre Simmons Ranch

Butte Creek
Bu-1, 3, 4, 5, 8, 16 Installed flow & temperature gages
Bu-2 Constructed fish passage improvements on west side of Sutter Bypass
Bu-6 Constructed fish exclusion device at Drumheller Slough
Bu-7 Constructed fish passage improvements at Sanborn Slough Bifurcation
Bu-9 Removed McPherin Dam
Bu-10 Removed McGowan Dam
Bu-11 Removed two Western Canal Dams and diversions; construct siphon
Bu-12 Constructed ladder and screen at Gorrill Dam and diversion
Bu-13 Constructed ladder and screens at Rancho Esquon Dam and diversion
Bu-14 Participated in acquisition of 0.7 miles (56 miles) of riparian corridor – Keeney property
Bu-15 Removed concrete blockage from stream
Bu-17 Constructed ladder and screens at Durham Mutual Dam
Bu-18 Constructed screen at Parrott-Phelen Dam
Bu-19 Participated in acquisition of 0.8 miles (90 acres) of riparian corridor – McAmis property
NSA Provided additional 40 cfs through water exchange

Clear Creek
Cl-1 Completed instream channel restoration along 1.5 miles of stream
Cl-2 Restored 68 acres of floodplain along 2 miles of stream
Cl-3 Placed spawning gravel below McCormick-Saeltzer Dam
Cl-4 Removed McCormick-Saeltzer Dam
Cl-5 Restored 0.5 miles of channel at Reading Bar
Cl-6 Completed flow and temperature gage installation
Cl-7 Placed spawning gravel below Whiskeytown Dam
NSA Increased minimum instream flows between Oct to May
NSA Constructed fuel breaks and road improvements to control erosion in watershed

Deer Creek
De-1 and 5 Installed flow and temperature gages
De-2 Fenced 8.7 acres of riparian habitat along 2.7 miles of stream Leininger property
De-3 Participated in acquisition of 4.7 miles (456 acres) of riparian corridor – L&L Hamilton property
De-4 Acquired 7.1 miles (967 acres) of riparian corridor – L&L Gaumer property

Feather River
Fe-1 Installed flow & temperature gage

Mill Creek
Mi-1 and 4 Completed flow and temperature gage installation
Mi-2 Restored 2.4 acres of riparian along 0.2 miles of stream - Brown's Ranch
Mi-3 Restored 1.5 acres of riparian along 0.1 miles of stream - Runyon site
Mi-5 Participated in acquisition of 0.2 miles (2.0 acres) of riparian corridor – Birkes property
Mi-6 Converted groundwater pumps facilitating additional instream flows
Mi-7 Removed concrete debris from stream channel
Mi-8 Participated in acquisition of 0.1 miles (5.5 acres) of riparian corridor – Dana property
Mi-7 Participated in acquisition of 3.8 miles (1,629 acres) of riparian corridor – Latimer property

Sacramento River Mainstem
Sa-1 Participated in acquisition of 1.5 miles (10.5 acres) of riparian corridor at Chicory Bend
Sa-2 Initiated construction of the City of Sacramento Fish Screen
Sa-3 Completed flow and temperature gage installation
Sa-4 Completed screening of Pelger-Mutual Water Company diversion
Sa-5 Completed screening of Reclamation District 108 diversions
Sa-6 Completed screening of Maxwell ID diversion
Sa-7 Completed screening of Reclamation District 1004 diversion
Sa-8 Participated in acquisition of 189 acres of riparian habitat property at Hartley Island
Sa-9 Near completion of screen at Princeton-Cordora-Glenn/Provident ID diversion
Sa-10 Participated in acquisition of 122 acres of riparian habitat at Millar-Farms property
Sa-11 Completed screening M&T Ranch diversion
Sa-12 Participated in acquisition of 430 acres of riparian habitat at Pine Creek Orchards property
Sa-13 Completed screening of Wilson Ranch diversion
Sa-14 Continued effort to screen Glenn-Colusa ID diversion
Sa-15 Initiated efforts to evaluate fish passage at Red Bluff Diversion Dam
Sa-16 Anderson-Cottonwood ID: Completed initial improvement of operations; Completed agreement eliminating flow reduction requests below 10,000 cfs; Initiated efforts to screen & place a ladder at the diversion
Sa-17 Placed gravel below Keswick Dam at Salt Creek
Sa-18 Placed gravel below Keswick Dam
Sa-19 Constructed Livingston Stone National Fish Hatchery
Sa-18 Completed renovation of fish escape channel at Keswick Dam
Sa-19 Completed temperature control device at Shasta Dam
NSA Developed & implemented a more appropriate instream flow

Stony Creek
St-1 Installed siphon on Stony Creek, improving anadromous fish passage

Yuba River
Yu-1 Constructed fish screen at Browns Valley Irrigation District diversion

MSA = *Non-Point Specific Activity*

Figure 7

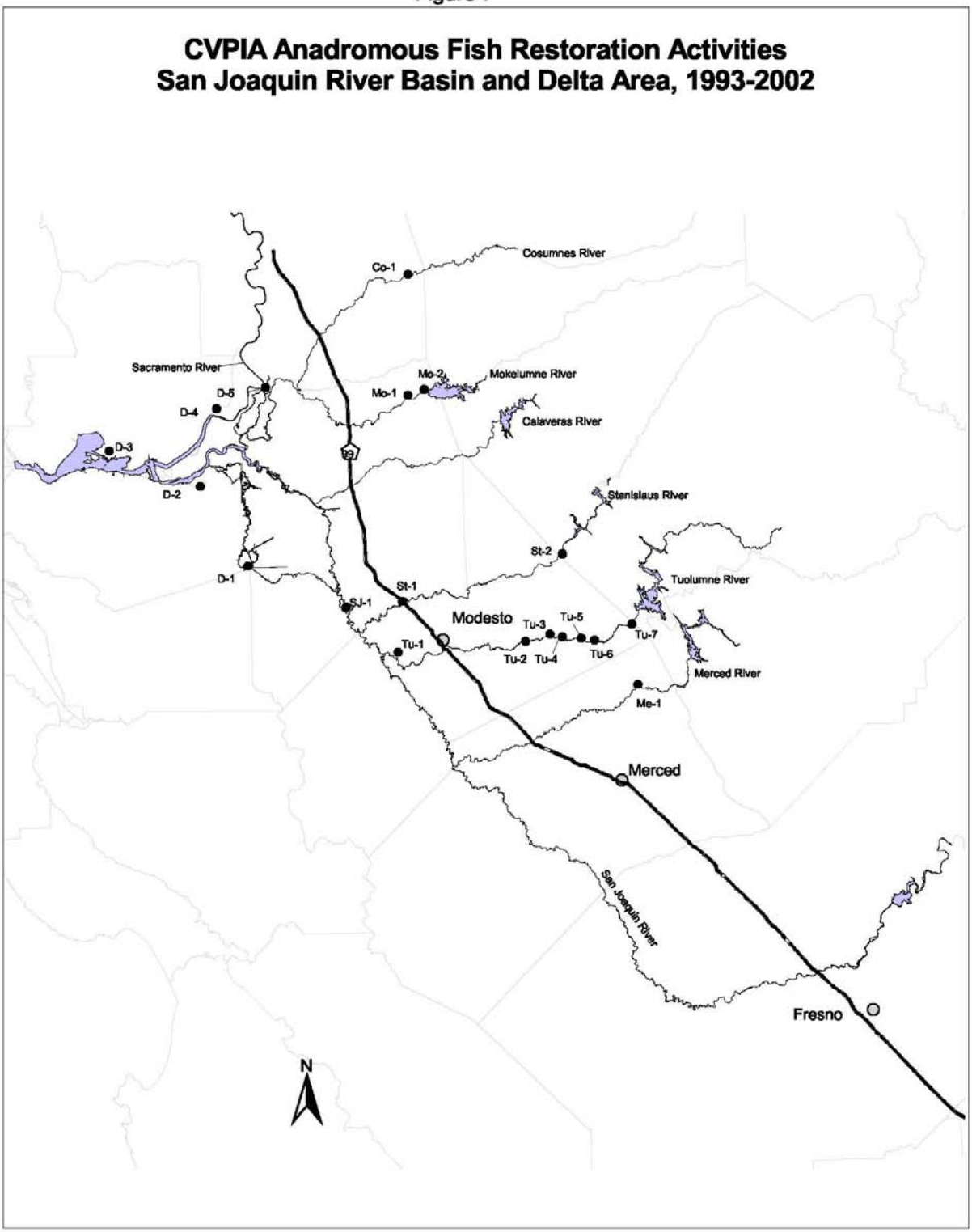


Figure 7 **CVPIA Anadromous Fish Restoration Activities**
San Joaquin River Basin and Delta Area - 1993-2002

Activities by Watershed

Delta Area

- De-1 Initiated improvements at Tracy Pumping Plant
- De-2 Initiated screening of Contra Costa Canal Pumping Plant
- De-3 Installed fish screens at 5 Suisun Resource Conservation District diversions
- De-4 Installed fish screens at Dayly Lee diversion
- De-5 Modified operations at Delta Cross Channel
- NSA Improved flows and modified operations during anadromous fish migration periods

Cosumnes River

- Co-1 Removed barrier to fish migration

Mokelumne River

- Mo-1 Enhanced and replenished (11,450 tons) spawning gravels
- Mo-2 Fenced/restored 0.8 miles (2.3 acres) of riparian corridor

Merced River

- Me-1 Restored riparian (30 acres) and instream habitat (0.5 miles) at Ratzlaff site
- NSA Acquired 96,609 acre-feet of water for instream flows

San Joaquin River

- SJ-1 Constructed fish screen at Banta-Carbona ID diversion
- NSA Acquired 453,275 acre-feet of water for pulse flows

Stanislaus River

- St-1 Participated in acquisition of 0.2 miles (35 acres) of riparian corridor - Mohler property
- St-2 Replenished spawning gravel (9,488 tons) below New Melones Dam
- NSA Acquired 272,031 acre-feet of water for instream flows
- NSA Modified operations using (b)(2) water

Tuolumne River

- Tu-1 Participated in acquisition of an easement and restored 1.2 miles (137 acres) of riparian corridor - Greyson River Ranch
- Tu-2 Enhanced riparian (30.3 acres) & channel habitat (0.8 miles) at “Special Run Pool 9 & 10”
- Tu-3 Initiated efforts to restore 0.9 miles of channel in the Reed segment of Mining Reach
- Tu-4 Initiated riparian (84.8 acres) & channel habitat (1.4 miles) restoration at Warner-Deardorff segment
- Tu-5 Initiated 66.7 acre riparian restoration along 1.1 miles of stream at Ruddy Reach segment
- Tu-6 Enhanced riparian (163.6 acres) & channel habitat (2.7 miles) at 7/11 segment
- Tu-7 Placed 50,850 tons of gravel for spawning below LaGrange Dam
- NSA Acquired 4,998 acre-feet of water for instream flows

NSA = Non-Point Specific Activity

Figure 8

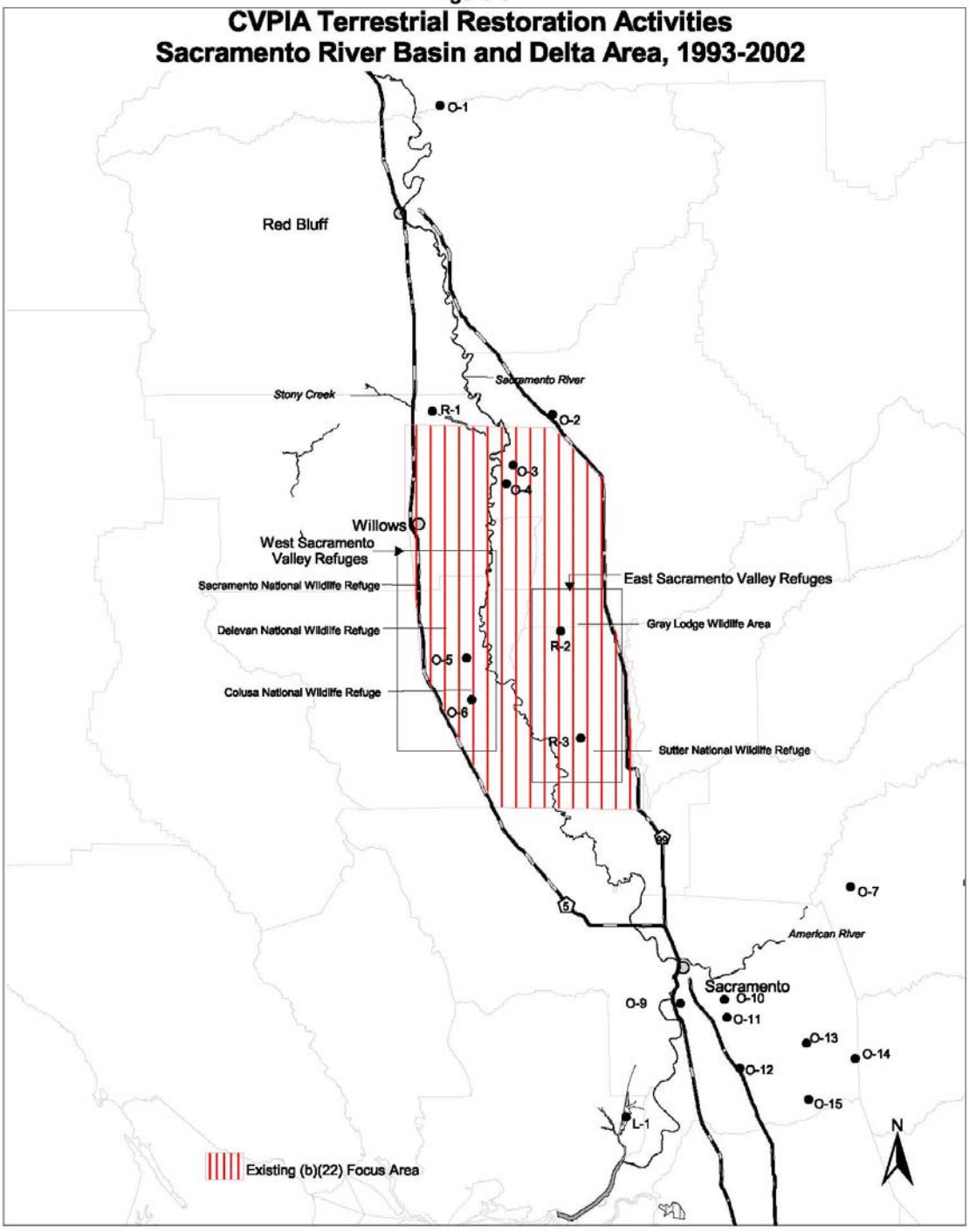

CVPIA Terrestrial Restoration Activities
Sacramento River Basin and Delta Area, 1993-2002
O-1
Red Bluff
Stony Creek
Sacramento River
R-1
O-2
O-3
O-4
Willows
West Sacramento Valley Refuges
East Sacramento Valley Refuges
Sacramento National Wildlife Refuge
Delevan National Wildlife Refuge
Gray Lodge Wildlife Area
R-2
O-5
Colusa National Wildlife Refuge
O-6
R-3
Sutter National Wildlife Refuge
O-7
American River
Sacramento
O-10
O-9
O-11
O-13
O-14
O-12
O-15
L-1
N
Existing (b)(22) Focus Area

Figure 8 CVPIA Terrestrial Habitat Restoration Activities
Sacramento River Basin and Delta Area – 1993-2002

Refuge Activities

R-1 Completed siphon on Stony Creek to assist water conveyance to refuges
R-2 Initiated planning for conveyance to Gray Lodge WA
R-3 Initiated planning for conveyance to Sutter NWR
NSA Acquired 107,980 acre-feet of water supplies for Sacramento River Basin refuges
NSA Acquired 6,300 acre-feet of long-term water supplies for Sacramento River Basin refuges

Other Fish and Wildlife Activities

O-1 Participated in acquisition of the 2,180 acre Fenwood property for multiple species benefits
O-2 Participated in acquisition of 264 acre Schmidbauer property for multiple species benefits
O-3 Participated in the restoration of 206 acres of riparian at Llano Seco to benefit valley elderberry longhorn beetle and neo-tropical songbirds
O-4 Participated in acquisition of 73 acres at the Southam property to benefit valley elderberry longhorn beetle and neo-tropical songbirds
O-5 Participated in acquisition of 376 acres of the Boeger and Ward properties to benefit valley elderberry longhorn beetle and neo-tropical songbirds
O-6 Funded studies and enhancement of habitat for giant garter snake on 450 acres at Colusa NWR
O-7 Participated in acquisition of 476 acres at the Pine Hills Ecological Reserve for rare plant protection
O-8 Participated in acquisition of 54 acres along North Webber Creek for red-legged frog
O-9 Funded the acquisition of 100 acres at Stone Lakes NWR to benefit vernal pool species
O-10 Participated in acquisition of 80 acres at the Silva property to benefit vernal pool species
O-11 Participated in acquisition of 2,054 acres at Deer Creek Hills for multiple species benefits
O-12 Participated in acquisition of the 4,356 acre Valensin Ranch for multiple species benefits
O-13 Participated in acquisition of the 1,136 acre Schneider Ranch to benefit vernal pool species
O-14 Participated in acquisition of a conservation easement on 370 acres at the Ben Brown Ranch to benefit vernal pool and grassland species
O-15 Participated in acquisition of the 13,000 acre Howard Ranch for multiple species benefits
NSA Enrolled 231,909 acres of agricultural lands in the section 3406(b)(22) Agricultural Waterfowl Incentives Program over 6 years, providing seasonal habitat for waterfowl and other water-oriented wildlife

Land Retirement Program

L-1 Completed acquisition of 1,228 acre Prospect Island for multiple species benefits

NSA – Non-Point Specific Activity

Figure 9

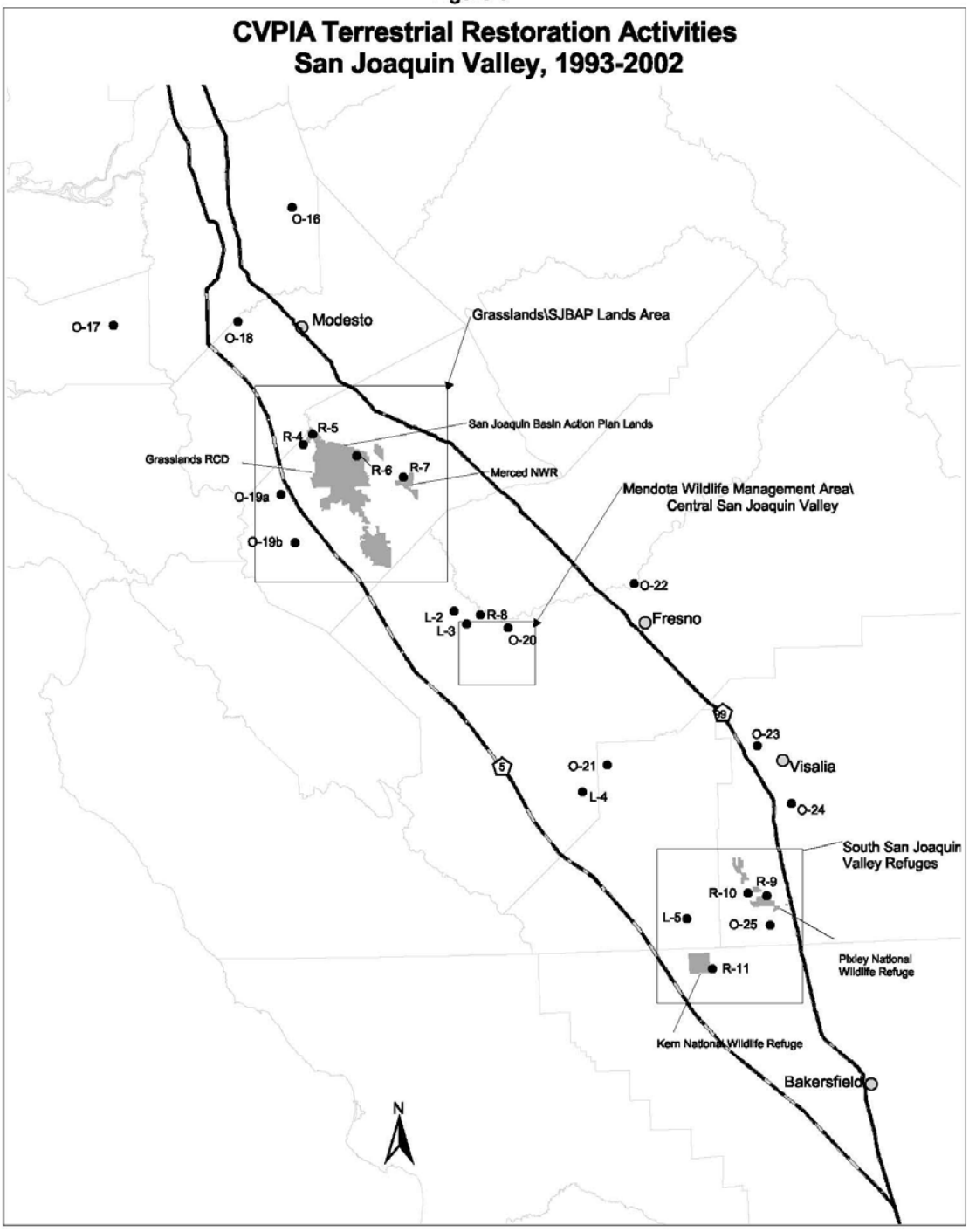

CVPIA Terrestrial Restoration Activities
San Joaquin Valley, 1993-2002
O-16
O-17
O-18
Modesto
Grasslands\SJBAP Lands Area
San Joaquin Basin Action Plan Lands
R-4
R-5
Grasslands RCD
R-6
R-7
Merced NWR
O-19a
O-19b
Mendota Wildlife Management Area\
Central San Joaquin Valley
O-22
L-2
L-3
R-8
O-20
Fresno
99
O-23
Visalia
5
O-21
L-4
O-24
South San Joaquin
Valley Refuges
R-9
R-10
L-5
O-25
Pixley National
Wildlife Refuge
R-11
Kern National Wildlife Refuge
Bakersfield
N

Figure 9 **CVPIA Terrestrial Habitat Restoration Activities**
San Joaquin Valley Area – 1993-2002

Refuge Activities

R-4 Completed Newman Canal and J Lateral for China Island Unit
R-5 Initiated construction of pumping plant/pipeline at China Island unit
R-6 Completed construction on Island "C" Canal San Luis NWR
R-7 Completed repair of Merced ID diversion helping to "firm" refuge water supplies
R-8 Initiated evaluations to replace Mendota Dam
R-9 Initiated planning to develop water supply to Pixley NWR
R-10 Completed well and associated facilities at Pixley NWR
R-11 Initiated planning to develop water supply to Kern NWR
NSA Acquired 376,134 acre-feet of water for San Joaquin Valley refuges

Other Fish and Wildlife Activities

O-16 Participated in acquisition of the 960 acre Farmington property to benefit vernal pool species
O-17 Developed & implemented restoration and management program for large-flowered fiddleneck
O-18 Enhanced 258 acres of riparian brush rabbit habitat at Caswell State Park
O-19 Participated in acquisition of 61,043 acres at (a) Newman & (b) Romero Ranches for various species
O-20 Participated in placement of fencing at Alkali Sink
O-21 Developed management and restoration plan for San Joaquin kangaroo rat at Livermore NAS
O-22 Participated in acquisition of 156 acre Jensen Ranch for multiple species benefits
O-23 Funded acquisition of 16 acres at Stone Corral Ecological Reserve to benefit vernal pool species
O-24 Participated in acquisition of the 725 acre Herbert Property and the enhancement of 100 acres to benefit vernal pool species
O-25 Participated in acquisition of 460 acres at Allensworth Ecological Reserve for multiple species benefits
NSA Enrolled 6,000 acres of agricultural lands in the section 3406(b)(22) Agricultural Waterfowl Incentives Program over 3 years, providing seasonal habitat for waterfowl and other water-oriented wildlife

Land Retirement Program Activities

L-2 Acquired 591 acres in Westlands Water District in FY 96
L-3 Acquired 1,055 acres in Westlands Water District in FY 98
L-4 Acquired 444 acres and improved 800 acres in Westlands Water District in FY 01and FY 02
L-5 Acquired 5,861 acres (485 acres from Habitat Restoration Program, pg. F3) and improved 1,000 acres in Atwell Island Irrigation District in FY 00, FY 01, and FY 02

NSA – Non-Point Specific Activity

PART IV - ASSESSING THE RESULTS

The Ecosystem Response

From all indications, the CVPIA has had very positive results from its efforts to protect, restore and enhance fish and wildlife and their habitats in the Central Valley. The numbers of anadromous fish returning to Central Valley rivers and streams have increased, and salmon have returned to spawn in areas where they have not been seen for many years. Hundreds of thousands of ducks and geese and other migrating birds and waterfowl have used new wetlands areas the CVPIA programs have created, and avian diseases have declined.

While the ecosystem and fish and wildlife populations are undoubtedly influenced by other factors, it is certain that many of the beneficial effects being observed throughout the Central Valley are due to CVPIA actions. However, it will be difficult to separate the effects of CVPIA actions from other influences. Factors such as weather, ocean conditions, pollution, and the introduction of non-native species, also affect fish and wildlife and their ecosystems. It will take many years of study and monitoring before the results of CVPIA actions, individually and collectively, can be teased apart from other causes of ecosystem change and assessed with confidence.

Interior has developed and is implementing programs to assess the results and effectiveness of CVPIA actions in terms of ecosystem response. The largest of these programs is the Comprehensive Assessment and Monitoring Program. This program will provide information on long-term changes at the population or landscape level that accrue as a result of programs or suites of actions.

Separating CVPIA implementation effects from other influences also requires a thorough understanding of the ecosystem of the Central Valley and its many inter-relationships. The Ecosystem and Water System Operations Models have furnished improved scientific understanding of the Central Valley ecosystem and hydrology, and the interactions of various factors in surface water and ground water, watersheds, reservoirs, and fish and wildlife habitats. The knowledge gained on ecosystem functions, together with the data gathered by the Comprehensive Assessment and Monitoring Program, will help Interior to develop model improvements to more accurately assess the results of CVPIA actions over time.

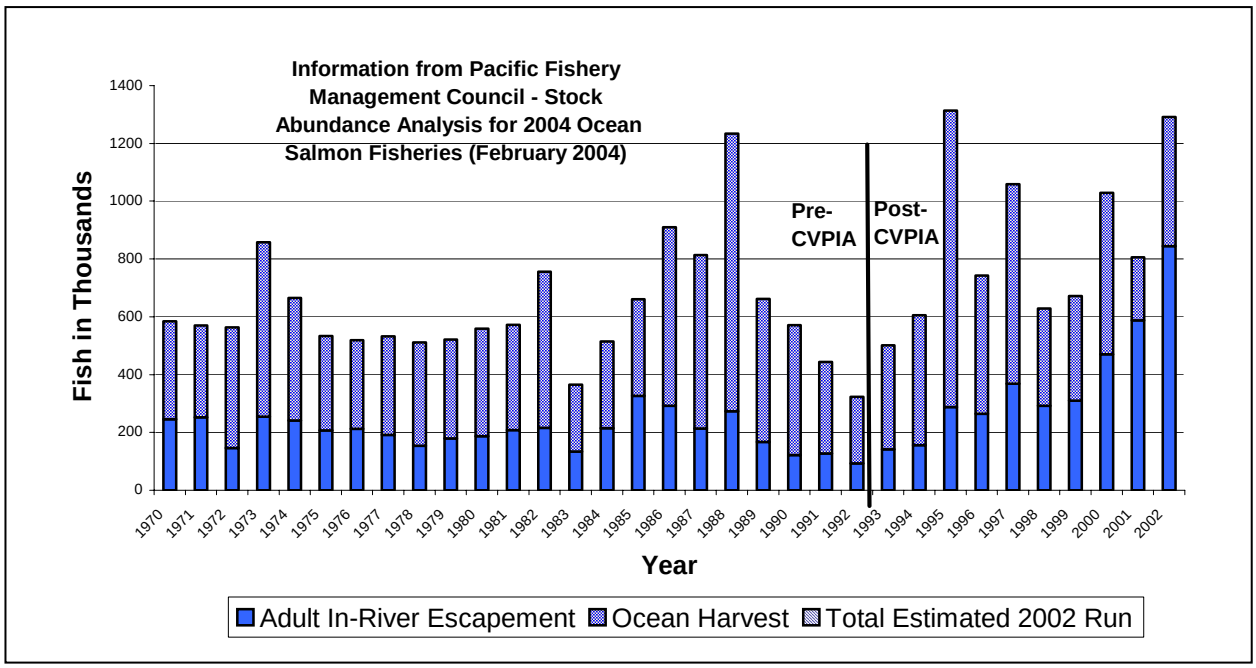
CVPIA actions and monitoring programs have been in effect for a relatively few years. While we have been able to ascertain the effectiveness of many of the individual actions over this short time span and within a limited geographic area, assessing the overall effectiveness of CVPIA programs in meeting valley-wide goals will take many more years. At this time it is possible only to identify trends in fish and wildlife populations that align with Interior's CVPIA efforts and which suggest a likely response. When monitoring and modeling programs have been in effect longer, there will be a more scientific basis to show a cause and affect relationship between CVPIA actions and ecosystem response.

Extensive research by Federal, State and local agencies has followed the changing Central Valley environment for many years. Data from this research have been used to discern environmental trends during the 1993 through 2002 period for this report. Though it does not conclusively identify the extent to which changes can be attributed to CVPIA, the trends aligned with CVPIA actions are a good indication that the ecosystem is responding positively to CVPIA implementation.

Anadromous Fish Species

Chinook salmon have been a high priority for CVPIA restoration efforts. While their numbers along the entire west coast have generally declined during this period, returns to the Central Valley and the catch off the California coast, as identified by the Pacific Fishery Management Council (Figure 10), have increased significantly since CVPIA measures began to be implemented in 1993. Factors such as hydrology, ocean conditions, and fishing regulations have undoubtedly had some effect, however, other west coast fisheries have been subject to the same factors and, in many cases, similar conditions. To a large extent, factors within and unique to the Central Valley are responsible for the increasing salmon population trends valley-wide.

Figure 10
Central Valley Chinook Salmon Abundance Indicies



Some CVPIA actions, such as placement of gravel for spawning in the Sacramento, American, Mokelumne, Stanislaus, and Tuolumne rivers and Clear Creek, have resulted in almost immediate benefits to anadromous fish species such as Chinook salmon and steelhead. In several instances, fish successfully spawned where none had spawned for many years and juvenile production seems to have increased substantially as a result. Whether such immediate results will translate into long-term population increases will take more time to ascertain. The long-term benefits of measures to improve conditions for juvenile fishes generally do not become apparent until the resultant adult fishes return years later. However, there is strong evidence of the success of CVPIA actions in the Clear Creek and Butte Creek watersheds. After years of diversion and other human uses, anadromous fish populations were very low in these streams. Interior has focused CVPIA efforts in these watersheds since 1993, and adult salmon returns have increased dramatically in both streams (Figures 11 and 12).

Implementation of actions under the CVPIA is certainly providing momentum for these increases in Chinook salmon in the valley. Even if CVPIA actions are only partly responsible, the increased abundance is certain evidence that the ecosystem is resilient and can support greater fish populations. This is encouraging for the probable success of CVPIA efforts, and reinforces the importance of continuing the restoration efforts.

Figure 11
Clear Creek Fall-Run Chinook Salmon
Escapement and CVPIA Implementation

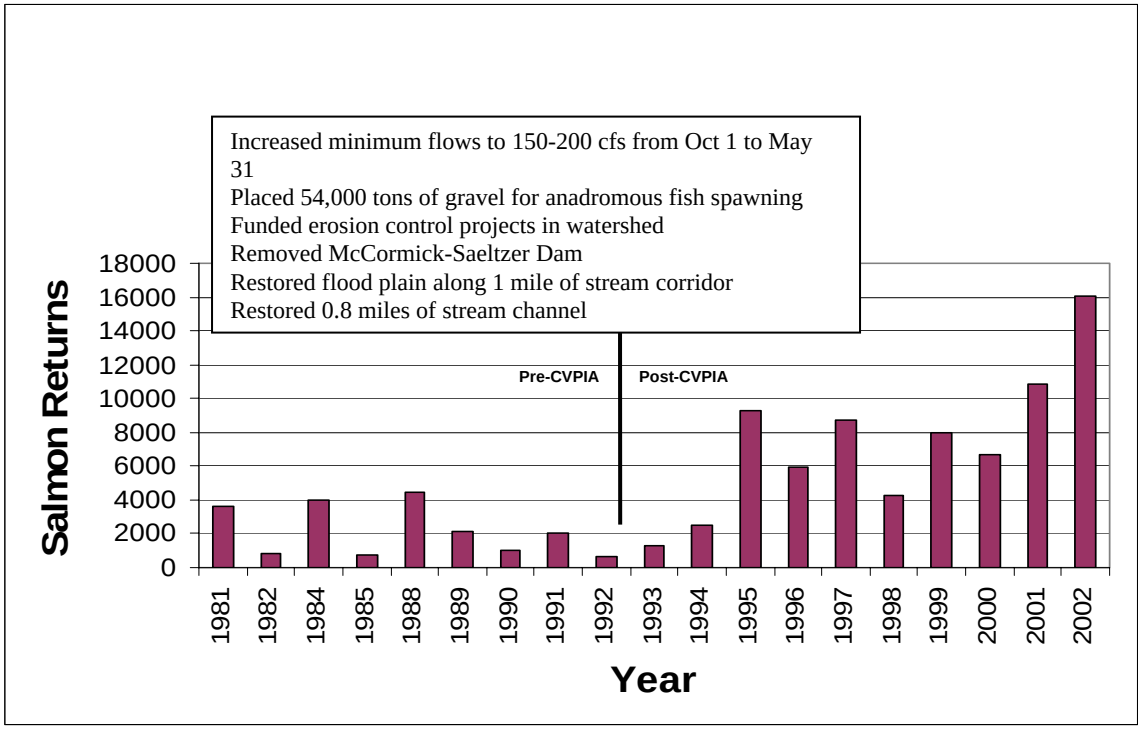
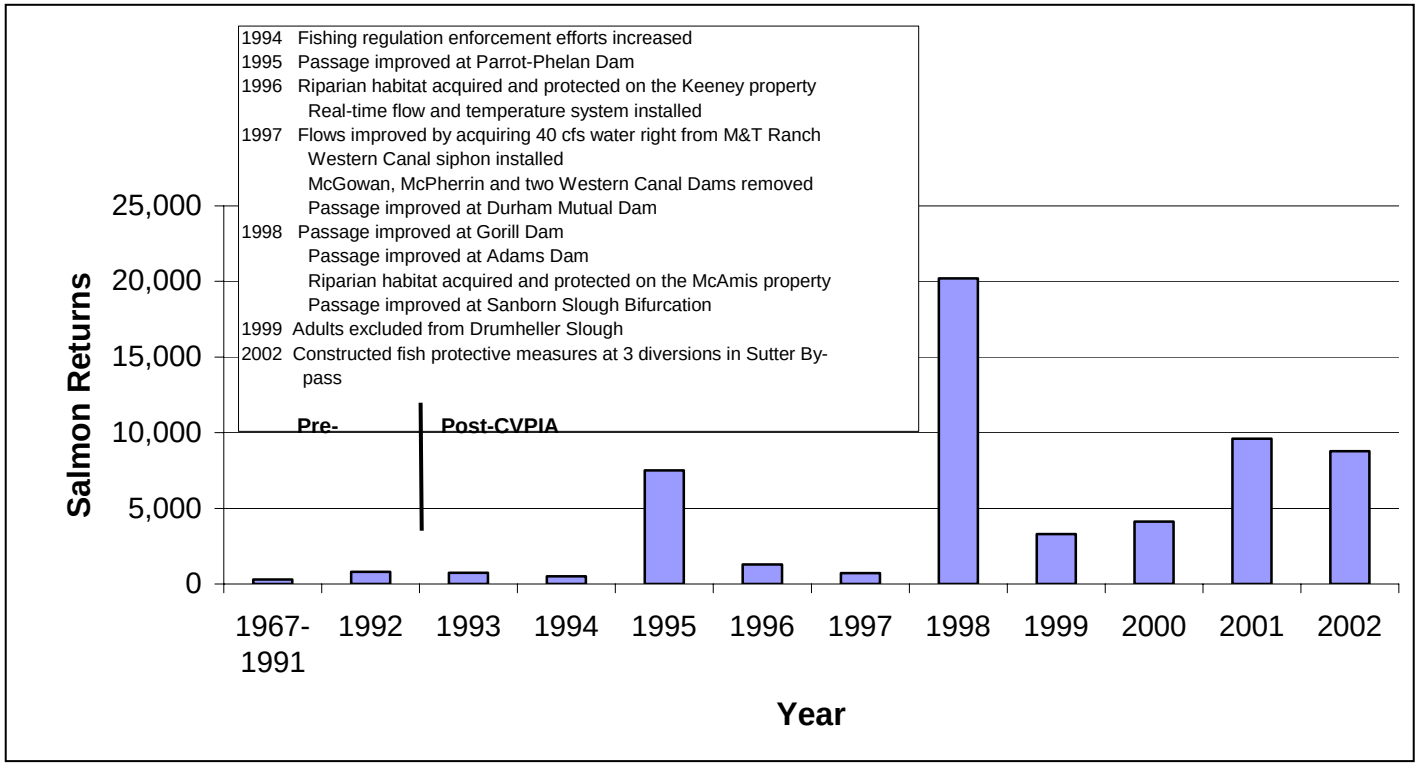


Figure 12
Butte Creek Spring-Run Chinook Salmon
Escapement and CVPIA Implementation



Refuges and Waterfowl

Most of the historic wetland areas in the Central Valley have been converted to other uses. Less than 5 percent of the more than 4 million acres of seasonal and permanent wetlands that existed 150 years ago remain and the bulk of these must be intensively managed to continue to support the 20 percent of North America's waterfowl populations that depend on the Central Valley for wintering habitat. Federal, State, and private refuges have had to operate on what is, in ecosystem terms, a critical edge. Thus, any wisely applied addition to the water supply, or increase in the acreage of wetlands under management, generates a reduction in the habitat deficit. As a result, the benefits of CVPIA efforts have made a dramatic difference.

Central Valley wetlands receiving CVP water supplies have increased by more than 20,000 acres since passage of the CVPIA. The average annual increase was above 13,000 acres, a 35 percent increase. This increase in overall wetland acreage helps explain the 75 percent decrease in waterfowl disease-related mortality in some wetland areas as the birds spread out over a greater area. At least as important as the increase in acreage, however, is the improvement in the quality of previously existing wetlands that has resulted from having a firm and adequate supply of water available over more of the year, enabling managers to implement improved management techniques.

Increased acreage and improved conditions have resulted in more waterfowl use and lower mortality rates. Sacramento Valley areas receiving CVP water have seen a 20-percent increase in waterfowl use, according to California Waterfowl Association data.

On Grassland Resource Conservation District lands only limited moist-soil summer irrigation or soil salinity treatments were possible before the CVPIA. With the improved water supply, the area managed for production of waterfowl food plants such as swamp timothy and watergrass was increased from 4,000 acres in 1991-92 to 26,000 acres by 2002. The yield per acre in these areas has doubled as well as a result of their improved water supply. The result was a net 300 percent increase in waterfowl use in some areas as early as 1995. Waterfowl numbers and the health of these birds have responded commensurately.

Other areas of the valley also experienced increases in waterfowl use. An increase of 18 million waterfowl-use days occurred at the Gray Lodge Wildlife Area in 1995. In other areas, waterfowl and shore bird food production increased by more than 300 percent, with a corresponding increase in use.

As a result of new wetlands and enhancement of previously existing wetlands made possible by improved water supplies, populations of Federal and State listed threatened species at Sacramento and San Joaquin Valley refuge areas have increased. The species benefited include the peregrine falcon, southern bald eagle, tri-colored blackbird and white-faced ibis. White-faced ibis have been particularly remarkable in their response to late-spring and summer water. This water provides nesting habitat and increases the numbers of frogs, snails, insects, and small fish on which they feed. At Sutter National Wildlife Refuge, the population of ibis increased for 100 birds in 1991 to over 15,000 in 2002. Kern National Wildlife Refuge experienced a similar increase, with the number of white-faced ibis increasing from 50 birds to 5,600 birds from 1993 to 2001.

In addition to enhanced conditions on established refuges, the incentive program for farmers to flood harvested fields has created seasonal habitat for a host of wildlife species, including waterfowl and shore birds. This program has resulted in an average of nearly 40,000 acres of additional habitat being available each year for migratory water birds in the 6 years the program has been in existence. These have supported tens of millions of bird use-days annually over the same period. This increase in available habitat area off-refuge during peak waterfowl use periods, in combination with increases on refuge areas provided by the delivery of Level 2 and Level 4 water supplies, seems to have contributed to the significant decrease in overall waterfowl disease-related mortality that we have observed. The additional food supply also helps to ensure that birds are in peak condition when they begin their migrations back to their breeding grounds in spring.

The improvement of conditions at refuges also increases the support they provide for a very long list of species other than waterfowl, including many special-status species. Protecting these plants and animals, many of which are

interdependent, makes the overall ecosystem more stable and increases its ability to function despite adverse changes.

Increasing water supplies to wetlands also has the effect of improving water quality, both on and off refuges. The increased seepage has had the benefit of bio-filtration, thus entering the ground water as a much more valuable contribution to the overall water supply. Providing firm, quality water supplies has also reduced the exposure of waterfowl and shore birds spending the winter in the Grasslands area of the valley to contaminants. In a report on selenium in aquatic birds from the Central Valley, 1986-1994, Fish and Wildlife Service scientists noted that application of freshwater resulted in the decline of selenium contamination in mallard and northern pintail ducks, American coots and black necked stilts.

Other Fish and Wildlife

Since 1996, the CVPIA Habitat Restoration Program has implemented actions to mitigate for impacts of the CVP to habitats and species not specifically provided for elsewhere in the Act. Primary emphasis has been on the protection, acquisition, and enhancement of habitats most dramatically affected since construction of the CVP began and on improving conditions for a variety of Federal and State listed species. As described earlier, the Habitat Restoration Program has participated in the acquisition of 88,364 acres of crucial terrestrial habitats throughout the valley and in the restoration of more than 1,111 acres to benefit listed plants and animals. (See figures 8 and 9 and Appendix F for a complete list of actions)

These efforts have resulted in the preservation, in perpetuity, of many native habitats including riparian, wetland, grassland, hardwood woodland, and vernal pool habitats, and have directly improved conditions for numerous fish and wildlife species, including several listed species. In some instances, immediate improvement of habitat conditions for listed species like the giant garter snake, vernal pool plant and invertebrate species, and gabbro soil plant species in the foothills of the Sierra Nevada has been realized. For example, restoration activities for giant garter snake habitat at the 450-acre Zumwalt tract of the Colusa National Wildlife Refuge were initially funded in 1997. Construction of wetlands on this parcel was completed in 1999 and a 3-year monitoring program was initiated in 2000 to assess the benefits of the restored wetland habitat for giant garter snakes. Results to date indicate a healthy population of giant garter snakes with successful recruitment of the young in the vicinity of the restoration project. Data from this effort will also provide valuable information for use in developing a giant garter snake habitat management plan for the refuge and contribute towards species recovery.

In addition to the efforts of the Habitat Restoration Program, the Land Retirement Program also provides benefits to fish and wildlife. To date, this program has acquired and retired from irrigated agriculture 10,000 acres of land in the valley. The acquisition of Prospect Island provided for the preservation and restoration of 1,228 acres of wetland habitat in the Delta, benefiting both fish and wildlife species. The retirement of an additional 7,951 acres of drainage impacted agricultural land in the San Joaquin Valley began an evaluation process that will shape the program in the future. The various treatments and restoration measures on these retired lands have demonstrated that they can safely provide much needed habitat for many valley floor species while simultaneously lowering the levels of the highly saline perched groundwater tables and reducing the volume of contaminated drainwater they generate. Almost immediately following restoration efforts, treated lands in the Westlands Water District were supporting 17 special status bird species. In addition, populations of small mammals increased significantly, including 3 special status mammalian species found on retired lands in the Atwell Island Irrigation District. Monitoring of vegetation, invertebrates, and small mammals for bio-accumulated selenium in these areas has shown no significant increases of this sometimes-toxic element. All levels measured have been well below concentrations of concern to the Service and the Environmental Protection Agency.

APPENDIX A

Administrative Processes

Appendix A Administrative Processes

Cost-Share Agreement with the State of California

Reference Section of CVPIA: 3406(h) Start Date: 1993 Status: Ongoing

Objective

- Enter into a binding cost share agreement with the State of California to address State responsibilities under CVPIA

Accomplishments

- Signed a State-Federal Master Cost-Share Agreement on June 27, 1994
- Executed seven task order agreements pursuant to the Master Agreement providing State funds for CVPIA projects

Section 3406(h) states, "The Secretary shall enter into a binding cost-share agreement with the State of California with respect to the timely reimbursement of costs allocated to the State in this title. Such agreement shall provide for consideration of the value of direct reimbursements, specific contributions to the Restoration Fund, and water, conveyance capacity, or other contributions in-kind that would supplement existing programs and that would, as determined by the Secretary, materially contribute to attainment of the goals and objectives of this title."

A State-Federal Master Cost-Share Agreement for implementation of the CVPIA was signed by the Regional Directors of Reclamation and the Service and by the Directors of the DWR and DFG on June 27, 1994. The agreement includes provisions describing the term and scope of the agreement, cost-sharing principles, task orders, budgeting, funding, and coordination of 16 restoration actions identified in the agreement and in CVPIA Sections 3406 (b), (d), and (g).

The Cost-Share Agreement establishes a common goal to maximize flexibility to carry out these restoration actions. The agreement was structured so that either party may fund all, none, or any percentage of a specific restoration action in any year, based on available appropriations. The Cost-Share Agreement allows the State to fund its share or provide in-lieu services.

In 1996, State Senator Costa introduced Senate Bill (SB) 900, the "Water Resources and Delta Restoration Act of 1996," as amended. Voters subsequently approved Proposition 204, a bond issue based on SB 900 to provide funds for, among other things, water projects, facilities, and programs associated with the CVPIA process. It authorized $93 million to meet the State's cost-share responsibility for fish, wildlife, and habitat restoration measures required by the CVPIA.

The State identified sections of the CVPIA considered priorities for the bond monies and suggested that this funding be incorporated into a 3- to 5-year budget allocation process. The State and Interior have negotiated task order agreements for eight projects pursuant to the Master Cost-Share Agreement (Shasta Dam Temperature Control Device, Red Bluff Diversion Dam Improvements, Glenn-Colusa Irrigation District Fish Screen, Anadromous Fish Screen Program, Clear Creek Restoration, Anderson Cottonwood Irrigation District Fish Passage, Contra Costa Canal Fish Screen, and Spawning Gravel Replenishment. A task order agreement is being negotiated for the Refuge Water Supply and Facilities program.

Projects Identified for State Funding

- Shasta Dam Temperature Control Device
- Red Bluff Diversion Dam improvements
- Glenn-Colusa Irrigation District fish screen
- Contra Costa Canal fish screen
- Anadromous Fish Screen Program
- Vernalis Adaptive Management Plan
- Anderson-Cottonwood Irrigation District fish passage
- Spawning Gravel Replenishment Program
- Refuge Water Supply and Facilities Program
- Clear Creek restoration

Restoration Fund

Reference Section of CVPIA: 3407 Start Date: 1993 Status: Ongoing

Objective

- Provide a funding source for implementing CVPIA habitat restoration, improvement, and acquisition provisionS

Accomplishments

- Established the Restoration Fund in the U.S. Treasury
- Created separate fund codes to identify CVPIA payments, contributions, and charges
- Established interim guidelines for calculation, assessment, and collection of revenues and surcharges
- Collected $354,998,786 in revenues for fiscal years 1993-2002

Fiscal Data

Fiscal Year	Collections
1993	$8,771,053
1994	$20,980,543
1995	$33,562,061
1996	$46,825,028
1997	$36,671,962
1998	$24,631,645
1999	$48,700,853
2000	$46,994,978
2001	$36,110,545
2002	$51,750,118

Section 3407 states, “There is hereby established ... the “Central Valley Project Restoration Fund” (hereafter “Restoration Fund”) which shall be available for deposit of donations from any source and revenues provided under sections 3404(c)(3), 3405(f), 3406(c)(1), and 3407(d) of this title. Such sums as are necessary, up to $50,000,000 per year (October 1992 price levels), are authorized...to carry out programs, projects, plans, and habitat restoration, improvement, and acquisition provisions of this title.”

In 1992, the Restoration Fund was established in the Treasury of the United States for deposit of revenues associated with the CVPIA. Separate fund codes were established to identify the different sources of payments and contributions received as well as to track expenditures. Consistent with section 3407, collections into the Restoration Fund began immediately and, in that first year (fiscal year 1993), $8,771,053 was collected. Total Restoration Fund revenues collected for fiscal years 1993-2002 were $354,998,786.

In 1993, interim guidelines were developed that provide instruction on the calculation, assessment, collection, and crediting of payments and charges to be paid by CVP water and power beneficiaries. Rules and regulations are being written for many of the subjects covered by the interim guidelines.

Although the CVPIA became law on October 30, 1992, and Restoration fund collections began that same fiscal year (fiscal year 1993), funds were not appropriated to Interior to implement provisions of the Act until fiscal year 1994. Consequently, existing fund sources were used in that first fiscal year to initiate CVPIA implementation. Most CVPIA actions in fiscal years since 1993 have been funded by the Restoration Fund; however, a number were funded (or partly funded) with a combination of Reclamation’s Water and Related Resources Appropriation and California State cost-share funding provided under section 3406(h). About 62 percent of the total funds obligated for CVPIA were for actions to benefit anadromous fish.

The Restoration Fund has an extensive public involvement component, including interaction and coordination with the Restoration Fund Roundtable (a stakeholder organization) and CALFED.

Rules and Regulations

Reference Section of CVPIA: 3408(a) Start Date: 1993 Status: Ongoing

Objective

- Establish guidelines and regulations for implementing CVPIA

Accomplishments

- Developed interim guidelines or criteria for 10 CVPIA sections
- Held public scoping workshops to solicit comments on rulemaking
- Published "Advance Notice of Proposed Rulemaking" and listed CVPIA sections proposed for rulemaking
- Prepared nine Administrative Proposals interpreting the intent of CVPIA to be included in rules and regulations

Section 3408(a) states, "The Secretary is authorized and directed to promulgate such regulations and enter into such agreements as may be necessary to implement the intent, purposes and provisions of this title."

Interior has been conducting a public involvement process to develop rules and regulations for CVPIA implementation. In August and December 1994, Federal Register notices announced public scoping and requested comments on the preliminary list of CVPIA sections designated for rulemaking. Through a series of public workshops, Interior obtained comments on the proposed rules. Interior is currently developing a detailed analysis for each section of CVPIA identified for rulemaking to see whether rulemaking is necessary for those sections. Implementation of each CVPIA section is at a different stage of progress; for example, studies are ongoing on sections such as land retirement and "3406(b)(2) water" (dedication of 800,000 acre-feet of CVP water for fish and wildlife restoration). As a result, rules and regulations are being accomplished in two phases.

The following CVPIA sections were identified for rulemaking:

Phase 1

- 3404(c) - Renewal of Existing Long-Term Contracts
- 3405(a) - Water Transfers
- 3405(b) - Metering of Water Use Required
- 3405(c) - State and Federal Water Quality Standards
- 3405(d) - Water Pricing Reform
- 3405(e) - Water Conservation Standards
- 3407 - Restoration Fund
- 3408(c) - Contracts for Additional Storage and Delivery of Water
- 3408(d) - Use of Project Facilities for Water Banking

Phase 2

- 3406(b)(2) - Fish and Wildlife Restoration, 800,000 acre-feet of CVP Yield
- 3406(b)(3) - Fish and Wildlife Restoration, Supplemental Water Acquisition
- 3406(d) - Central Valley Refuges and Wildlife Habitat Areas
- 3408(b) - Use of Electrical Energy (Project Power for Fish and Wildlife)
- 3408(h) - Land Retirement

CVPIA Administrative Proposals	
Proposal	**Date of Release**
Trinity River	March 20, 1997
Water Conservation	March 20, 1997
Urban Reliability	June 9, 1997
San Joaquin River	June 9, 1997
Stanislaus River	June 23, 1997
3406 (b)(2) Water	November 20, 1997
Water Transfers	April 16, 1998
Contracting Policies	April 16, 1998
Refuge Water Supplies	April 16, 1998
AFRP	Addressed through proposal for 3406 (b)(2)

Between September 1995 and April 1996, Interior held a series of public meetings to identify concerns regarding implementation of the CVPIA. Interior identified twelve major areas of concern. In April 1996, Interior committed to prepare "Administrative Proposals" to address the principal areas of concern about how Interior would implement specific sections of CVPIA. Nine final Administrative Proposals were completed and released to the public. The proposals on 3406 (b)(2) and AFRP were combined. An Administrative Proposal dealing with the Restoration Fund was not completed at the time the process concluded.

RULES AND REGULATIONS

Guidelines were developed for:

- Interim renewal contracts
- Water transfers
- Restoration Fund payments and charges
- Section 3406(b)(2) water
- Land retirement
- Water conservation cost-share proposals
- Flooding agricultural lands for waterfowl habitat and the CVP yield enhancement and incentive program

Criteria were developed for:

- Evaluating water management plans
- Project-use power for CVPIA (Draft)

Both the initial process to develop interim guidelines and criteria and the Administrative Proposal process are a significant part of the administrative record for promulgation of the rules and regulations. Also important are issues identified during preparation and review of the PEIS. The drafting of final rules has been initiated.

Programmatic Environmental Impact Statement

Reference Section of CVPIA: 3409 Start Date: 1993 Status: Completed

Objectives

- Describe the impacts of implementing the CVPIA
- Provide a public forum to exchange information about the CVPIA
- Allow for public input and refinement of alternatives
- Provide information to Federal decision makers to allow an informed decision

Accomplishments

- Completed and released the draft and final PEIS
- Maintained an extensive public involvement process and modified alternatives accordingly
- Record of Decision signed January 2001

Fiscal Data

Fiscal Year	Obligation
1993	$3,754,962
1994	$3,800,000
1995	$7,091,119
1996	$6,880,075
1997	$4,197,745
1998	$1,103,491
1999	$1,397,189
2000	$2,069,651
2001	-$973,733

** The negative is a credit

Section 3409 states, "Not later than three years after the date of enactment of this title, the Secretary shall prepare and complete a programmatic environmental impact statement pursuant to the National Environmental Policy Act analyzing the direct and indirect impacts and benefits of implementing this title, including all fish, wildlife, and habitat restoration actions and the potential renewal of all existing Central Valley Project water contracts."

In coordination with the Service, Reclamation took the lead in developing the Programmatic Environmental Impact Statement (PEIS) for implementing the CVPIA. The Notice of Intent to prepare a PEIS and the notice of scoping meetings were published in the Federal Register (Vol. 58, No. 23) on February 5, 1993. A Plan of Action and Public Involvement Plan were developed in 1993.

Extensive public workshops and briefings were conducted throughout the preparation of the draft PEIS to describe key assumptions, analysis techniques, and results.

In March and April 1993, Interior conducted public scoping sessions to identify the issues, selected a contractor to assist with preparing the PEIS, and prepared cooperating agency agreements with nine governmental entities. These governmental agencies, the "Interagency Group," met at least four times a year during the draft PEIS process to guide the development of the document. Representatives from the Interagency Group also served on work groups that contributed to the preparation of major PEIS work products.

In 1996, the PEIS was updated to include the changes occasioned by the Bay-Delta Accord and subsequent State Water Resources Control Board issuance of a water rights permit to support the Accord. Additionally, the PEIS database was updated to reflect current interpretations of dedicated water described in Section 3406(b)(2), refuge water supply, and estimates of future Trinity River flows. The PEIS team worked with the AFRP team to properly reflect the actions to be taken to make reasonable attempts to double anadromous fish populations in the Central Valley rivers and streams as prescribed by the CVPIA.

The draft PEIS was released in November 1997, and the public comment period closed in April 1998. The PEIS includes 33 technical appendices that describe the major work efforts on the PEIS. Of the 33 appendices, 18 are technical appendices describing specialized resource issues such as surface water; soils and geology; recreation; and fish, wildlife, and recreation economics. A CD-ROM set was developed that contains the PEIS and all technical appendices, as well as the models, input data, and output files that were used in PEIS.

The final PEIS was released in October 1999. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service issued Biological Opinions pursuant to Section 7 of the Endangered Species Act on the implementation of the CVPIA in November 2000. The Record of Decision, reflecting a decision that was a

hybrid of the alternatives in the PEIS and which was in conformance with the Biological Opinions, was signed in January, 2001.

REPORTS PREPARED FOR SECTION 3409

- Scoping Report, May 1993
- Various Public Involvement Documents
- Draft PEIS, November 1997
- Supplement to Draft PEIS, June 1999
- Final PEIS, October 1999
- ESA Biological Opinions, November 2000
- Record of Decision, January 2001

APPENDIX B

Contracting and Improved Water Management

Appendix B Contracting and Improved Water Management

Limitation on Contracting and Contract Reform

Reference Section of CVPIA: 3404(a-c) Start Date: 1993 Status: Ongoing

Objectives

- Restrict new contracts for CVP water, except for fish and wildlife
- Provide for successive interim renewal contracts pending environmental review
- Amend "Friant 14" contracts to comply with existing law
- Encourage early renewal of existing long-term contracts
- Make successive long-term renewal a discretionary action and limit such renewals to 25 years
- Assess and collect all payments and charges from all contractors in accordance with CVPIA

Accomplishments

- Entered into a new contract to meet water needs of the San Joaquin Valley National Cemetery
- Negotiated and executed 68 interim renewal contracts for 3-year periods and subsequent successive 2-year contracts
- Negotiated and executed interim renewal contracts with Friant 14
- Executed 44 of 45 proposed binding agreements providing for early renewal of existing long-term contracts
- Assessed and collected all required payments and charges consistent with the CVPIA and Restoration Fund guidelines
- Post-PEIS, executed 27 long-term contracts and negotiated an additional 24 to be executed
- Negotiations with remaining contractors underway

Section 3404 states, "...[T]he Secretary shall not enter into any new short-term, temporary, or long-term contracts or agreements for water supply from the Central Valley Project for any purpose other than fish and wildlife before: (1) the provisions of subsections 3406(b)-(d) of this title are met...The prohibition on execution of new contracts…shall not apply to contracts executed pursuant to...Pub. L. 102-250 or...Pub. L. 101-514 or to one-year contracts for delivery of surplus flood flows or contracts not to exceed two years in length for delivery of class II water in the Friant Unit...The Secretary shall, upon request, renew any existing long-term repayment or water service contract for the delivery of water from the Central Valley Project for a period of 25 years and may renew such contracts for successive periods of up to 25 years each."

Section 3404(c)(3) precludes long-term renewals until completion of required environmental documentation. Pending completion, contract renewals are limited to an initial interim period not to exceed 3 years and successive periods of no more than 2 years. Consistent with these requirements, the Secretary finalized guidelines to address the interim renewal program (1994) and subsequently negotiated and executed initial interim renewal contracts providing for continued water service to 68 contractors, all of which have been subsequently renewed at least once.

Section 3404(c)(1) requires the Secretary to incorporate all modifications necessary to comply with existing law into all CVP contracts renewed since January 1, 1988. The required modifications, which were delayed pending completion of a Federal court appeal related to the subject contracts, were completed in 1998 through negotiation and execution of interim renewal contracts with the "Friant 14" (Chowchilla Water District, Delano-Earlimart Irrigation District, Exeter Irrigation District, Ivanhoe Irrigation District, Lindmore Irrigation District, Lindsay-Strathmore Irrigation District, Lower Tule River Irrigation District, Orange Cove Irrigation District, Porterville Water District, Saucelito Water District, Southern San Joaquin Municipal Utilities District, Stone Corral Irrigation District, Terra Bella Irrigation District, and Tulare Irrigation District)

As provided in Section 3404(c)(2), all interim renewal contracts must include provision for payments required by the CVPIA and other modifications to comply with existing law. Consistent with this directive, all existing interim renewal contracts, including the Friant 14, incorporated all legal requirements related to the assessment and collection of restoration payments and Friant surcharges, water metering, State and Federal water quality, water conservation, and repayment and water rate deficits. In addition to these requirements, Reclamation has also included the tiered water pricing provisions of Section 3405(c) in the two long-term water service contracts that have been amended since passage of the CVPIA.

Section 3404(c)(2) requires the Secretary to administer all existing contracts (that is, those that have not been renewed or amended under CVPIA) in conformance with the CVPIA. Such requirements principally focus upon application of various payments and charges. Such rates and charges have been assessed and collected from all contractors subject to existing long-term contracts in full accordance with the CVPIA.

With the exception of the long-term contracts previously held by the Friant 14, Section 3404(c)(3) also requires the Secretary to impose on all contractors having existing long-term contracts an additional mitigation and restoration payment beginning on October 1, 1997, for each acre-foot of delivered CVP water, unless the contractor has previously executed a binding agreement stating the contractor's intent to renew early. In 1997, Reclamation developed and offered a proposed form of binding agreement to each of 41 CVP contractors having a total of 45 existing long-term contracts. The contractors and the United States subsequently executed binding agreements covering 44 of the 45 existing long-term contracts.

Following completion of all required environmental documentation, the Secretary is authorized to enter into long-term renewal contracts having a term of 25 years. Reclamation opened negotiations with 114 contractors in November 1999 and 27 long-term contracts in the Friant, Hidden and Buchanan units were executed. An additional 24 contracts with the Delta-Mendota Canal and Cross-Valley Canal contractors and the Feather Water District had been negotiated when efforts were suspended pending development of a CVP-wide form of contract. That effort was still underway at the close of fiscal year 2002. In the interim, Reclamation is continuing to deliver water to the contractors pursuant to the binding agreements and interim renewal contracts.

REPORTS PREPARED FOR SECTION 3404 (a-c)

- Interim Contract Renewal Guidelines, 1994
- Environmental Assessments for Interim Contract Renewals

Water Transfers

Reference Section of CVPIA: 3405(a) Start Date: 1993 Status: Ongoing

Objective

- Assist water users in meeting future water needs through voluntary transfers of CVP water

Accomplishments

- Developed Interim Guidelines for implementation of water transfers
- Developed a final Administrative Proposal on water transfers
- Developed and implemented a programmatic approval process to facilitate water transfers
- Executed a Memorandum of Understanding with DWR and SWRCB establishing a water transfer clearinghouse
- Approved the transfer of more than 4.3 million acre-feet of CVP water for agricultural and municipal purposes within the CVP and more than 396,000 acre-feet of CVP water to meet Level 4 refuge water supply needs and 5,000 acre-feet for the CALFED EWA
- Established a formal procedure to coordinate the Service's review of water transfers and ensure compliance with the ESA
- Approved two long-term (25-year) transfers of CVP water

Section 3405(a) states, "In order to assist California urban areas, agricultural water users, and others in meeting their future water needs...all individuals or districts who receive Central Valley Project water under water service or repayment contracts, water rights settlement contracts or exchange contracts entered into prior to or after the date of enactment of this title are authorized to transfer all or a portion of the water subject to such contract to any other California water user or water agency, State or Federal agency, Indian Tribe, or private non-profit organization for project purposes or any purpose recognized as beneficial under applicable State law."

Reclamation finalized Interim Guidelines for implementing the water transfer provisions of CVPIA in February 1993, following public review and comment.

In 1995, Reclamation established a formal procedure with the Service to coordinate the Service's review of water transfers to ensure that conditions necessary for compliance with the Endangered Species Act would be met under each transfer action.

In 1996, Interior developed an Administrative Proposal on water transfers to address public concerns on Interior's implementation of the CVPIA water transfer provisions. Interior's final Administrative Proposal on water transfers was completed in April 1998. The Interim Guidelines and the Administrative Proposal provide information to CVP water contractors and interested parties on how Reclamation will consider water transfer proposals pending final rules and regulations.

In addition, Reclamation developed a programmatic review and approval process to facilitate the approval of those water transfers within the CVP that had historically occurred between contractors within the same service area. This review streamlined the transfer approval process and resolved issues raised by CVP contractors that the transfer provisions were cumbersome and an impediment to meeting short-term water management goals.

Active markets have developed for short-term transfers of CVP water (periods of 1 year or less). Since enactment of the CVPIA, more than 4.3 million acre-feet of CVP water has been approved for transfer by contractors within the various divisions of the CVP both north and south of the Delta. The majority of these transfers were accomplished for agricultural uses under the CVPIA programmatic review and approval process. More than 396,000 acre-feet of water has also been transferred by CVP contractors to Interior's Water Acquisition Program to meet Level 4 refuge water supply needs within the Central Valley and 5,000 acre-feet has been transferred to the CALFED Environmental Water Account (EWA). As of the end of fiscal year 2002, two long-term (25-year) transfers had been approved. One involved the transfer of 22 acre-feet of water to a non-CVP customer for municipal and industrial (M&I) uses and is subject to the required additional M&I restoration surcharge and the M&I cost-of-service rate. The second long-term transfer involved the transfer of up to 25,000 acre-feet of water between CVP contractors for agricultural purposes. No transfers involving the CVP water outside the CVP service area have occurred.

Water Conservation

Reference Section of CVPIA: 3405(b) and (e) Start Date: 1993 Status: Ongoing

Objectives

- Establish a water conservation center
- Develop criteria to evaluate water management plans
- Review and evaluate new and revised water management plans
- Make sure districts use water measuring devices

Accomplishments

- Established a Water Conservation and Advisory Center and constructed the American River Water Education Center
- Developed criteria for evaluating water management plans in 1993, 1996, and 1999
- Deemed 85 water management plans adequate
- Developed a water conservation database to track plan implementation
- Developed a final Administrative Proposal on water conservation
- Provided cost-share and technical assistance to implement best management practices

Fiscal Data

Fiscal Year	Obligation
1994	$32,474
1995	$17,553
1996	$777
1997	$1,773
1998	$4,385
1999	$196,240
2000	$193,440
2001	$232,655

***Includes funds for Section 3408(i) actions

Section 3405(e) states, "The Secretary shall establish and administer an office on Central Valley Project water conservation best management practices,...develop criteria for evaluating the adequacy of all water conservation plans developed by project contractors, including those plans required by section 210 of the Reclamation Reform Act of 1982. Criteria... shall be established within six months following enactment of this title and shall be reviewed periodically thereafter, but no less than every three years..."

A Water Conservation and Educational Center was opened in early 1993 at Reclamation's Mid-Pacific Regional Office in Sacramento and later was relocated to Reclamation's Central California Area Office in Folsom. The American River Water Education Center, which incorporates the original Center, was constructed at Folsom Dam and opened in 1999. A virtual water conservation advisory center was established on the Internet at: www.watershare.usbr.gov. It features interactive water conservation units on the environment, urban conservation, and agriculture, targeting students and providing teacher lesson plans.

Reclamation released "Criteria for Evaluating Water Conservation Plans" in April 1993 and revised the document in September 1996 and December 1999. This revised document describes the criteria Reclamation follows in evaluating water management plans submitted by water and irrigation districts. Reclamation has deemed more than 100 water management plans adequate under the CVPIA. Contractors are required to update the progress of their Best Management Practices by filing annual update reports. These reports can now be filed on the internet via the WaterShare web site at www.watershare.usbr.gov (for agricultural contractors) and at the California Urban Water Conservation Council's website, www.cuwcc.org (for urban contractors).

The water management plans also require contractors to address water measurement. Section 3405(b) states, "...the contracting district or agency shall ensure that all surface water delivery systems within its boundaries are equipped with water measuring devices or water measuring methods of comparable effectiveness acceptable to the Secretary..." The evaluation criteria establish measurement to the customer by devices with, in most cases, an accuracy of plus or minus 6 percent.

To support conservation efforts, Reclamation developed a database with examples of successful water conservation programs to help districts to prepare their annual water management plan update. A guidebook and training were offered to districts in both the urban and agricultural sectors. Technical assistance to implement plan measures was provided to districts through California Polytechnic State University's Irrigation Training and Research Center and through the Water Conservation Field Services Program and Efficiency Incentives Program.

Water Conservation Projects

Reference Section of CVPIA: 3408(i) Start Date: 1994 Status: Concluded

Objective

- Establish cost-sharing agreements with CVP contractors to implement water conservation projects

Accomplishments

- Developed guidelines to administer the cost-sharing program
- Solicited proposals for water conservation projects in 1995, 1996, and 1997. No final proposals submitted.

Fiscal Data

Refer to Section 3405(b) and (e) above.

Section 3408(i) states, "The Secretary is authorized to undertake, in cooperation with Central Valley Project irrigation contractors, water conservation projects or measures needed to meet the requirements of this title." All projects or measures must be fully implemented by September 30, 1999. The water conserved under this cost-sharing program can be used to achieve the restoration goals of the CVPIA and provide additional benefits for fish, wildlife, and associated habitats in the Central Valley.

In 1995, Reclamation's Water Conservation Office developed guidelines for administering this section of the CVPIA and established criteria to assess water conservation proposals submitted by CVP contractors.

Interior issued four requests for cost-sharing proposals between November 1995 and September 1997. In response, Tulare Irrigation District submitted a preliminary proposal in 1996, and Chowchilla Water District submitted one in 1997. Each district submitted information so Reclamation could determine whether the proposed projects would meet the minimum eligibility requirements under the guidelines.

The preliminary proposal submitted by the Tulare Irrigation District was accepted; however, the District chose not to follow up with a complete proposal. The preliminary proposal from the Chowchilla Water District was determined to be economically infeasible; therefore, Chowchilla did not submit a complete proposal.

The program was concluded on November 30, 1997, because no viable proposals had been received in response to the four proposal solicitations and so few CVP contractors had expressed interest in participating. Further, there was insufficient time to solicit and evaluate an additional round of proposals before the program was scheduled to sunset in 1999. The main reason for the limited response to this program was that districts found it to be more profitable to finance water conservation projects on their own and then provide the conserved water to their customers or sell the water on the open market.

APPENDIX C

Anadromous Fish - Habitat Restoration

Appendix C Anadromous Fish - Habitat Restoration

Anadromous Fish Restoration Program

Reference Section of CVPIA: 3406(b)(1) Start Date: 1993 Status: Ongoing

Objectives

- Improve habitat for all life stages of anadromous fish by providing flows of suitable quality, quantity, and timing
- Reduce or eliminate entrainment of juveniles at diversions
- Improve the opportunity for adult fish to reach their spawning habitats
- Collect fish population, health, and habitat data to help evaluate restoration actions
- Integrate habitat restoration efforts with harvest and hatchery management
- Involve partners in the implementation and evaluation of restoration actions

General Accomplishments

- Established the AFRP Core Group to guide implementation of anadromous fish-related sections of CVPIA
- Released Final Restoration Plan for the Anadromous Fish Restoration Program, January 2001
- Conducted an extensive public involvement and education process and coordinated participation in anadromous fish technical workshops
- Provided criteria for application of water dedicated under Section 3406(b)(2)
- Funded numerous studies on anadromous fish flow and habitat needs, life histories and genetics, habitat and status surveys, and geomorphologic investigations
- Participated in numerous watershed planning groups
- Completed a Handbook of Regulatory Compliance for AFRP restoration planning

Section 3406(b)(1) states, "The Secretary... is authorized and directed to...develop within three years of enactment and implement a program which makes all reasonable efforts to ensure that, by the year 2002, natural production of anadromous fish in Central Valley rivers and streams will be sustainable, on a long-term basis, at levels not less than twice the average levels attained during the period of 1967- 1991." The section also states, "this goal shall not apply to the San Joaquin River between Friant Dam and the Mendota Pool."

The Service and Reclamation approached the directive to "at least double natural production of anadromous fish" by developing the Anadromous Fish Restoration Program (AFRP). The AFRP is the cornerstone of many actions aimed at restoring natural production of anadromous fish in the Central Valley and includes partnerships, local involvement, public support, adaptive management, and flexibility. Early in the AFRP process, a Core Group was formed to direct program development. This group was comprised of a coalition of senior fish experts from the Service and Reclamation, the Environmental Protection Agency, the National Marine Fisheries Service, and California's Departments of Fish and Game, and Water Resources.

Goals of the Anadromous Fish Restoration Program

- Determine the quantity, quality, and timing of flows necessary to protect anadromous fish
- Provide a framework for the management of CVP water dedicated to anadromous fish
- Recommend structural habitat restoration measures
- Guide the acquisition and management of supplemental water needed to meet the biological goals of the CVPIA

To plan and implement a comprehensive program, the AFRP requires ongoing, intensive public involvement at two levels. The first level is programmatic, involving efforts to plan a comprehensive program. The second level is action-specific and involves implementing specific actions in individual watersheds. At the action-specific level, AFRP staff has worked extensively with local agencies and local watershed workgroups.

After extensive public review and input on initial program documents, Interior released a Final Restoration Plan for the AFRP in January 2001. The Restoration Plan presented the overall goal, objectives, and strategies of the AFRP. The Restoration Plan identified and listed in priority order nearly 300 restoration actions and evaluations. The Restoration Plan is a programmatic-level guide to implementation of all applicable sections of the CVPIA. A detailed implementation plan will be completed later. This plan will be an evolving document, amended over time as additional information is gathered, partnerships are formed, and actions are implemented.

By coordinating its actions and forming partnerships with various State and Federal agencies and private interests representing

agriculture, urban, and industrial interests, Interior has been able to implement a substantial number of restoration activities at crucial locations throughout the Central Valley. These actions included restoration of instream and riparian habitats, improvement of flow and temperature conditions, removal of barriers to migration, screening diversions, and replenishing gravels necessary for spawning and egg incubation. Interior's anadromous fish restoration actions, although broad in scope and complexity, have focused on four geographic areas since 1993:

Fiscal Data

Fiscal Year	Obligation
1994	$ 338,581
1995	$ 791,722
1996	$ 4,129,927
1997	$11,151,633
1998	$ 6,545,050
1999	$ 6,797,019
2000	$ 6,754,980
2001	$ 5,311,970
2002	$ 4,999,863

- **Sacramento-San Joaquin Delta** - Emphasis on offsetting effects of CVP and SWP export facilities (entrainment, impingement, diversion, and increased predation).
- **Sacramento River Tributaries** - Actions have focused on improving instream habitat conditions, riparian and shaded riverine aquatic habitat restoration; improved access to upstream habitat; and reduction of losses at diversions, especially for spring – run Chinook salmon and steelhead.
- **Sacramento River** - Actions have focused on restoration of spawning habitat and acquisition of riparian lands to improve rearing habitat, especially for winter-run Chinook salmon.
- **San Joaquin River and Tributaries** - Actions focused on flow improvements, restoration of river channels, spawning gravels, and riparian cover, and on elimination of predator habitat on tributaries.

Sacramento-San Joaquin Delta

- Developed management conditions and flow targets for Delta application of 3406 (b)(2) water and VAMP studies. Assisting in analysis of data for VAMP.
- Assisted other CVPIA efforts at the Tracy Pumping Plant, Contra Costa Canal Pumping Plant, Delta Cross Channel and Georgiana Slough, and in efforts to screen diversions in Suisun Bay.

Sacramento River Tributaries

- Annually provided flow-related objectives for application of water dedicated under Section 3406(b)(2) on the American River.
- Participated in acquisition of 86,569 acre-feet of water supplies for instream flows on Battle Creek, 1995-2000.
- Participated in acquisition of over 6,977 acres and restoration of 81 acres of riparian habitat.
- Improved access to 105 miles of stream habitat by:
- Providing for installation of fish screens, ladders, and other passage protective devices at Durham Mutual and Parrott-Phelan Dams and at five other water diversion facilities on Butte Creek and the Sutter Bypass.
- Participating in removal of McCormick-Saeltzer Dam on Clear Creek
- Participating in development of managed fish passage above Coleman National Fish Hatchery on Battle Creek.
- Partnered with Corps of Engineers to evaluate passage at Daguerre Point Dam on the Yuba River.

Restoration actions were selected and prioritized based on the expected magnitude of their contributions to doubling natural production, the status of target species and races, and on section 3406(b)(1)(A), which directs Interior to give first priority to: (1) measures which protect and restore natural channel and riparian habitat values through habitat restoration actions, (2) modifications to CVP operations, and (3) implementation of the supporting measures mandated by Subsection 3406(b).

To allow for adaptive management in the restoration of anadromous fish populations, a major effort was initiated to determine the flow and habitat needs of the species and the associated impacts of implementing the CVPIA. Using existing information and data gathered from associated studies and investigations, the AFRP has been able to guide or provide an immense array of restoration actions since 1993.

The AFRP developed guidelines and objectives for using the water management tools provided by the CVPIA. These guidelines and objectives for water management, as well as the AFRP itself were then used in developing alternatives for the Programmatic EIS for the CVPIA. They continue to form the basis for discussion among various parties interested in Interior's efforts to develop a long-term water management plan.

Combined with other actions under CVPIA, it is expected that the actions identified in the AFRP will stabilize populations of spring-run Chinook salmon at an enhanced level on tributary streams they currently use, and the identification of areas for expansion of habitat for this species. Similarly, improved spawning and rearing habitat, the elimination of predator habitat, and improved outmigration conditions will help increase and stabilize populations of San Joaquin River fall-run Chinook salmon. Natural populations of steelhead, fall-run Chinook salmon, and late fall-run Chinook salmon should begin to increase dramatically on Battle Creek, and all species should benefit from actions on the Sacramento River mainstem. These actions will not only enhance natural production of target species but will benefit other species of fish (both resident and other anadromous species) and riparian-oriented wildlife.

Sacramento River

- Provided flow-related objectives for application of water dedicated under Section 3406(b)(2) on the Sacramento River annually.
- Initiated and/or completed many studies assisting in the continued survival of winter-run Chinook salmon.
- Participated in acquisition of 751 acres and the restoration of 288 acres of riparian habitat.
- Partnered with local watershed workgroups on Mill, Deer, and Butte Creeks, with the American River Watershed Forum, Sacramento National Wildlife Refuge Complex, and Sacramento River Conservation Area Forum on efforts to restore the Sacramento River meander belt.

San Joaquin River and Tributaries

- Annually provided basin-specific flow-related objectives for application of water dedicated under Section 3406(b)(2) on the Stanislaus and lower San Joaquin Rivers.
- Partnered with Lower Tuolumne River Technical Advisory Committee on watershed improvement projects.
- Participated in acquisition of over 844,000 acre-feet of water supplies in the basin, 1994-2002.
- Provided for acquisition of 172 acres and restoration of 514 acres of riparian habitat.
- Restored and/or enhanced approximately 7 miles of stream channel on the Tuolumne River.
- Provided for the placement of over 71,000 tons of gravel for fish spawning on the Mokelumne and Tuolumne rivers.

REPORT PREPARED FOR SECTION 3406(b)(1)

C Final Restoration Plan for the Anadromous Fish Restoration Program (released as a revised draft in May 1997 and adopted as final in January 2001)

Management of Dedicated CVP Yield

Reference Section of CVPIA: 3406(b)(2) Start Date: 1993 Status: Ongoing

Objectives

- Provide instream flows for fish, wildlife, and habitat restoration
- Assist State efforts to protect the Bay/Delta estuary
- Help meet additional obligations as may be legally imposed on the CVP
- Increase integrated ecological management of all Central Valley fish and wildlife and their habitat

Accomplishments

- Provided water to implement flow and habitat objectives for CVP rivers and the Delta
- Provided water to help meet the Biological Opinions for winter-run Chinook salmon, and Delta smelt.
- Provided water for CVP share of the Delta Accord, 1994-2002
- Coordinated interim management of the dedicated water annually since 1993
- Prepared the final CVPIA Administrative Proposal, 1997
- Initiated updates of the Operational Criteria and Plan to reflect AFRP implementation
- Initiated monitoring and evaluation to assess effectiveness of Section 3406 (b)(2) environmental measures

Fiscal Data

Fiscal Year	Obligation
1994	$ 605,598
1995	$ 435,778
1996	$1,296,689
1997	$1,009,202
1998	$1,105,113
1999	$ 939,321
2000	$ 827,967
2001	$ 676,871
2002	$1,026,107

Section 3406(b)(2) states, "The Secretary... is...authorized and directed to...dedicate and manage annually 800,000 acre-feet of Central Valley Project yield for the primary purpose of implementing the fish, wildlife, and habitat restoration purposes and measures authorized by this title; to assist the State of California in its efforts to protect the waters of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; and to help meet such obligations as may be legally imposed upon the Central Valley Project under State or Federal law following the date of enactment of this title, including but not limited to additional obligations under the Federal Endangered Species Act."

Management of water dedicated under Section 3406(b)(2) has been coordinated annually between Reclamation and the Service since 1993. Each year, as part of the management process, the Service has provided flow-related habitat objectives for use of this water, and Reclamation has modified operations as possible or necessary to meet the objectives. Interior has applied flow-related objectives on Clear Creek, the Sacramento, American, and Stanislaus rivers, and the Delta.

In 2001 and 2002, Interior coordinated the implementation of Section 3406(b)(2) with the implementation of CALFED Bay Delta Programs' Environmental Water Account (EWA). In August 2000, the CALFED Programmatic Record of Decision established an EWA to provide protection (supplemental to a baseline level of protection) to the fish of the Bay-Delta estuary.

Administrative tasks necessary for proper management and accounting of the water dedicated under this section began in 1994 as part of a long-term water management planning effort. Considerable debate occurred over interpretation of Section 3406 (b)(2), primarily regarding how the water may be used and how it should be accounted.

Anticipated Benefits of Dedicated Yield

- Instream temperatures suitable for incubation and juvenile anadromous fish rearing
- Restoration of instream habitat
- Improved migration conditions
- Assistance for riparian and wetland habitat restoration efforts

In December 1994, Interior issued draft guidelines on management of the water, and received comments from many sources. The draft guidelines were revised and reissued in September 1995. Further discussions began in 1995 when stakeholders identified a long list of issues surrounding management of the dedicated water. In an attempt to reach consensus on the issues, Interior convened a large and diverse group of stakeholders into a work team to develop an Administrative Proposal dealing with the management and accounting of the dedicated water. After 2 years of work and a series of public outreach efforts, the final Administrative Proposal was released in November 1997. It

described Interior's approach to resolution on the major issues. However, despite the lengthy public involvement process and Interior's best efforts to move the stakeholders to consensus, the matter ended up in the courts.

Interior was subsequently ordered by the court to devise a new method of managing and accounting for the dedicated yield. As directed, Interior developed a "final" *Decision on Implementation of Section 3406(b)(2) of the Central Valley Project Improvement Act* in October 1999. This decision also was litigated and in March 2002, the Court held that parts of the decision were unlawful, arbitrary, and capricious. Pursuant to the Court's direction, Interior has revised the accounting procedures and, at the close of fiscal year 2002, was in the process of modifying the October 1999 decision.

Since 1993, under the various management and accounting procedures that have been developed, the dedicated CVP yield has been applied to improve instream conditions for anadromous fishes, primarily salmon and steelhead. It has also been directed to help protect species listed under the Federal Endangered Species Act and to meet the CVP share of protecting the Delta. To date, actions under this program have included improved instream flows from increased releases and/or increased reservoir carryover, Delta export curtailments, and Delta Cross Channel gate closures. These efforts have provided benefits for anadromous fish in the form of improved adult attraction flows; better instream temperatures for spawning, incubation, and juvenile rearing; and improved flows for juvenile migration, resulting in increased anadromous fish production in Central Valley streams and the Delta. They have also helped greatly to reduce mortality of both anadromous fish and the listed delta smelt in proximity to pumping facilities in the delta. Application of dedicated water to meet these fish needs has also assisted in restoring riparian and adjacent wetland habitats and estuarine areas, and has provided associated wildlife benefits.

Adult salmon returning to Central Valley rivers and streams in fall 1995 were the first to utilize 1993 flow and export conditions improved, in part, as a result of Section 3406(b)(2). The numbers of returning adults were the best in over 40 years, and both recreational and commercial harvests improved significantly. Counts in subsequent years were equally improved, especially on Clear Creek and on Butte Creek, where other CVPIA actions have also been employed. Although these other actions and other factors outside the control of Interior have undoubtedly played a role in these increases, the valley-wide improvements in returns indicate that actions taken under (b)(2) have played a major role. The extent of that role is being analyzed in many ongoing study and evaluation efforts.

REPORTS PREPARED FOR SECTION 3406(b)(2)

- Draft Water Management Plan, February 1996
- Draft Administration Proposal, July 1996
- Final Administrative Proposal, November 1997
- Final Decision on Implementation of Section 3406(b)(2), October 1999

Water Acquisition Program (Anadromous Fish Focus)

Reference Section of CVPIA: 3406(b)(3) Start Date: 1993 Status: Ongoing

Objective

- Acquire supplemental water for improved instream flow on Central Valley rivers and streams

Accomplishments

- Acquired 86,569 acre-feet of water for improved migration and spawning conditions for spring-run Chinook salmon and steelhead on Battle Creek
- Acquired 826,883 acre-feet of water for improved migration and spawning conditions for fall-run Chinook salmon on the Stanislaus, Tuolumne, Merced, and lower San Joaquin rivers

Fiscal Data

Fiscal Year	Obligation
1994	$1,908,138
1995	$1,950,558
1996	$ 0
1997	$8,752,979
1998	$4,030,454
1999	$8,583,771
2000	$6,797,914
2001	$8,034,451
2002	$7,770,016

Section 3406(b)(3) states, "The Secretary...is authorized and directed to develop and implement a program in coordination and in conformance with the plan required under paragraph (1) of this subsection for the acquisition of a water supply to supplement the quantity of water dedicated to fish and wildlife purposes under paragraph (2) of this subsection and to fulfill the Secretary's obligations under paragraph 3406(d)(2) of this title. The program should identify how the Secretary intends to utilize, in particular the following options: improvements in or modifications of the operations of the project; water banking; conservation; transfers; conjunctive use; and temporary and permanent land fallowing, including purchase, lease, and option of water, water rights, and associated agricultural land."

Interior has focused its efforts to acquire water in those areas offering opportunities to meet the most urgent fish and wildlife water needs. For example, on Battle Creek supplemental water for anadromous fish was acquired by paying for foregone power generation. Battle Creek, a Sacramento River tributary, has exceptionally high restoration potential to support winter-run, tributary spring-run, fall-run, and late-fall run Chinook salmon and steelhead. Flow in the north and south forks of the creek are regulated for hydropower generation by the Pacific Gas and Electric Company (PG&E). One of the major restoration actions identified in the AFRP's Anadromous Fish Restoration Plan is to increase flow past PG&E's hydropower diversions.

Interior, the National Marine Fisheries Service, State of California, and PG&E are working to develop a long-term restoration plan for Battle Creek. To initiate restoration efforts, Interior compensates PG&E to maintain minimum year-round flows of 30 cfs on the north and south fork and mainstem of Battle Creek. PG&E contributes the first 12.5 cfs of flow without cost to Interior. Without this partnering arrangement, flows on Battle Creek could be as little as 3-5 cfs during summer and fall. Increasing the minimum flow provides improved emigration, migration, holding, spawning, and rearing habitat for spring-run Chinook salmon and steelhead. This partnering arrangement has been in place since 1995 and is expected to continue until long-term restoration plan actions are implemented.

In the San Joaquin River Basin, the AFRP Restoration Plan has identified an urgent need to increase flows on the Stanislaus, Tuolumne, Merced, and lower San Joaquin Rivers to facilitate migration, attraction, production, and survival of fall-run Chinook salmon. Since 1994, Interior has acquired temporary water supplies from willing sellers as needed for these purposes, to assist Reclamation in meeting flow and water-quality requirements of the 1995 SWRCB Plan for the San Francisco Bay/ Sacramento-San Joaquin River Delta Estuary, to help meet requirements of the Biological Opinion for delta smelt, and to implement the Vernalis Adaptive Management Plan (VAMP). The VAMP is an important experiment for assessing how juvenile salmon coming down the San Joaquin River in springtime en route to the sea respond to changes in river flows and Bay-Delta operations. A summary of the VAMP is provided in the discussion of Section 3406(g), Ecological and Hydrologic Models, in Appendix H of this document.

To date, acquisition of water to meet the needs of anadromous fish have averaged about 100,000 acre- feet per year. To help focus this effort and make most efficient use of the water and funds available, Interior, in cooperation with the CALFED Environmental Water Program, is developing a "Water Management Strategy and Water Acquisition Plan" for meeting the needs of anadromous fish as well as other CVPIA needs. This

joint effort with CALFED is another example of the partnering that has been taking place between Interior under CVPIA and other programs and entities.

WATER ACQUIRED FOR INSTREAM FLOWS FOR ANADROMOUS FISH

(acre-feet)

	1994	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
		12,090	16,660	20,517	5,948	21,559	9,795		
				85,985	30,000	147,500	77,680	78,650	33,430
Merced River	28,450		16,161	15,000		11,998	12,500	12,500	
Stanislaus River	14,872	33,119		50,000	50,000	65,000	18,700	18,135	22,205
Tuolumne River				4,998					
	43,322	**45,209**	**32,821**	**176,500**	**85,948**	**246,057**	**118,675**	**109,285**	**55,635**

REPORTS PREPARED FOR SECTION 3406(b)(3)

- EA and FONSI for interim water acquisition
- EA's for various water acquisition

Clear Creek Fishery Restoration

Reference Section of CVPIA: 3406(b)(12) Start Date: 1996 Status: Ongoing

Objectives

- Increase minimum flows to increase salmon and steelhead populations
- Restore the degraded stream channel
- Improve salmon and steelhead passage at McCormick-Saeltzer Dam
- Improve spawning habitat by introducing spawning gravel below dams
- Reduce watershed erosion and fine sediment that kills salmon and steelhead eggs

Accomplishments

- Developed a comprehensive proposal for restoration of the lower Clear Creek channel
- Maintained October to May instream flow of 150-plus cubic feet per second since 1995
- Completed 2.0 miles of stream channel restoration
- Acquired and restored 68 acres of floodplain along 2.0 miles of stream
- Placed 54,000 tons of spawning gravel into Clear Creek
- Completed removal of McCormick-Saeltzer Dam
- Eliminated the only significant water diversion from Clear Creek, improving flow to mouth of stream
- Decreased fine sediment input because of erosion control projects along 12 miles of roadway

Fiscal Data

Fiscal Year	Obligation
1996	$ 279,144
1997	$ 591,553
1998	$1,073,057
1999	$1,135,007
2000	$6,857,168
2001	$640,678
2002	$598,228

Section 3406(b)(12) states, "The Secretary... is...authorized and directed to...develop and implement a comprehensive program to provide flows to allow sufficient spawning, incubation, rearing, and outmigration for salmon and steelhead from Whiskeytown Dam as determined by instream flow studies conducted by the California Department of Fish and Game after Clear Creek has been restored and a new fish ladder has been constructed at the McCormick-Saeltzer Dam."

Interior has worked closely with DFG, DWR, the National Park Service, Bureau of Land Management, county and local agencies and organizations, stakeholder groups, and the general public to provide planning and implementation of restoration actions in the Clear Creek watershed. Restoration focused on increases in minimum flows, river channel and floodplain restoration, fish passage at McCormick-Saeltzer Dam, spawning gravel improvement, and watershed management including upland erosion and wildfire fuels control.

Historically, 100 cfs was released from Whiskeytown Dam in November and December, and 50 cfs the remaining months. Since 1995, the amount released between October and May was increased to 150 or 200 cfs. This additional flow was formalized under Section 3406(b)(2) in November 1997. Additional flow in Clear Creek improved fish passage, decreased water temperatures, and increased spawning and rearing habitat for Chinook salmon and steelhead.

Past gravel mining activities in the channel have removed a majority of the gravel and created many gravel pits and braided channels. Beginning in fiscal year 1998, a channel restoration plan was implemented, filling several braided channels and eliminating streamflow into a large gravel pit. This effort removed a significant stranding problem for anadromous fish and concentrated flow in the main channel to improve adult fish passage. In addition, 68.4 acres of floodplain along 2.0 miles of the stream were acquired and restored, improving riparian habitats and enhancing ecosystem functions.

For nearly 100 years, McCormick-Saeltzer Dam has blocked access for spawning salmon and steelhead to upstream habitat areas. Section 3406 (b)(12) of CVPIA envisioned a fish ladder to improve passage. However, after exploring alternatives to solve this passage problem, it was determined more practicable to remove the dam and replace the existing irrigation diversion. The dam and diversion were removed in the fall of 2000, providing unimpeded access to 10 miles of additional habitat for Chinook salmon and steelhead. Elimination of the diversion has resulted in up to 55 cfs of additional flow in the lower portions of the stream.

The lack of appropriately sized gravel in Clear Creek has been a major limiting factor for salmon and steelhead ascending Clear Creek to spawn. Beginning in 1995, spawning gravels have been placed below Whiskeytow n Dam as necessary to support the runs of salmon

and steelhead. High water flows naturally distributed these gravels downstream, creating new spawning riffles. To date, approximately 54,000 tons of gravel has been provided.

In 1996, the Clear Creek Coordinated Resource Management Planning Group was formed to help coordinate restoration activities and increase public involvement on Clear Creek. Composed primarily of local landowners within the Clear Creek watershed, the group released the Lower Clear Creek Watershed Management Plan in September of 1998. Restoration activities outlined in the plan were, and will continue to be, used to assist in meeting Interior's restoration goals and objectives. The plan provides for many associated efforts including the completion of inventories and actions for control of erosion and wildfire fuels within the watershed.

As CVPIA measures began to be implemented over the past several years, adult Chinook salmon escapement in Clear Creek has increased dramatically. While all CVPIA restoration activities in the watershed have benefited instream resources, the most significant contribution thus far has been the increase in baseline instream flows. Since flows were increased, fall-run Chinook salmon escapement increased to an average 7,657 fish annually from 1995 to 2002. This represents a 350 percent increase over the baseline average of 1,689 fish from 1967 to 1991.

REPORTS PREPARED FOR SECTION 3406(b)(12)

- Benefits of Increased Minimum Instream Flows on Chinook Salmon and Steelhead in Clear Creek, Shasta County, California, 1995-1996
- Lower Clear Creek Watershed Analysis, 1996
- Saeltzer Dam Fish Passage Project Engineering Technical Report, 1997
- Lower Clear Creek Spawning Gravel Restoration Projects 1997, 2000, 2001
- Conceptual Plan for Restoration of the Lower Clear Creek Floodway, 1999
- Riparian and Wetland Habitat Restoration Plan, 1999
- Channel Reconstruction, Riparian Vegetation, and Wetland Creation Design Document, 1999
- Flushing Flows: Review of Concepts Relevant to Clear Creek, California, 1999
- Lower Clear Creek Hydraulic Analysis at Whiskeytown Dam – Value Engineering Report, 1999
- Geomorphic Evaluation of Lower Clear Creek Downstream of Whiskeytown Dam, California, 2001

Gravel Replenishment and Riparian Habitat Protection

Reference Section of CVPIA: 3406(b)(13) Start Date: 1995 Status: Ongoing

Objectives

- Restore and replenish spawning gravel for salmon and steelhead
- Reestablish river meander belts
- Limit bank protection activities

Accomplishments

- Developed a draft Long-Term Restoration and Protection Plan for the American, Stanislaus, Sacramento Rivers
- Placed 111,000 tons of gravel in the Sacramento River for salmon and steelhead spawning
- Placed 9,488 tons of gravel in the Stanislaus River, resulting in salmon spawning there for the first time in 13 years
- Participated in efforts to fill an in-river pit and reconfigure a portion of the stream channel on the Stanislaus River
- Assisted DFG in continuing a spawning gravel management program on the American River which involves the enhancement of existing gravels and the placement of an additional 6,000 tons to date

Fiscal Data

Fiscal Year	Obligation
1996	$554,355
1997	$778,345
1998	$ 87,457
1999	$665,623
2000	$886,894
2001	$ 40,196
2002	$559,082

Section 3406(b)(13) states, "The Secretary... is authorized and directed to...develop and implement a continuing program for the purpose of restoring and replenishing, as needed, spawning gravel lost due to the construction and operation of Central Valley Project dams, bank protection projects, and other actions that have reduced the availability of spawning gravel and roaming habitat in the Upper Sacramento River from Keswick Dam to Red Bluff Diversion Dam [and] in the American and Stanislaus Rivers downstream from the Nimbus and Goodwin Dams, respectively. The program shall include preventive measures, such as re-establishment of meander belts and limitations on future bank protection activities, in order to avoid further losses of instream and riparian habitats."

An Interagency Technical Team created to assist in the implementation of this section helped to develop a Long-Term Restoration and Protection Plans for spawning habitat in the American, Stanislaus, and Sacramento Rivers.

Work to restore anadromous fish spawning substrate in the upper Sacramento River began in 1995 and resulted in placement of 10,000 tons of gravel below Keswick Dam in 1996. Another 101,000 tons have been placed in the river since that time. In addition, to trace the fate of gravels placed in the river, electronic "pingers" (gravel with electronic transmitters inserted into holes in individual stones) have been used to track the movement of gravels as they are flushed downstream. Information from this effort will help to guide future efforts.

In 1997, approximately 1,000 tons of gravel was placed in the Stanislaus River downstream from Goodwin Dam, resulting in salmon spawning in the area for the first time in 13 years. An additional 8,400 tons have been placed since then, on occasion requiring the use of helicopters to place the gravels in appropriate, but otherwise inaccessible, areas. Also, several agencies working together initiated a project to fill an in-river pit used by fish species that prey on juvenile anadromous fishes. When complete, this project will also reconfigure the stream channel and substrate below Goodwin Dam at a site approximately 6 miles downstream.

On the American River, DFG surveyed spawning gravel and completed a summary report on recommended gravel management. This program participates with and supports DFG in a pilot gravel management project on the river. Because of high instream flows during 1997, work focused on reaffirming American River "pre-project" conditions. Based on this work, manipulation of gravels, such as streambed ripping and gravel placement in selected riffles, began in 1999. Over 6,000 tons have been placed in the river to be sorted and spread naturally by the river currents.

Gravel Replenishment under the CVPIA

- 1996 - Sacramento River below Keswick Dam, 10,000 tons
- 1997 - Sacramento River below Keswick Dam, 34,000 tons
- 1997 - Stanislaus River below Goodwin Dam, 1,000 tons
- 1999 - Sacramento River below Keswick Dam, 20,000 tons
- 1999 - American River below Nimbus Dam, 6,000 tons
- 2000 - Sacramento River below Keswick Dam, 32,000 tons
- 2000 - Stanislaus River below Goodwin Dam, 8,000 tons
- 2001 - Stanislaus River below Goodwin Dam, 488 tons
- 2002 - Sacramento River below Keswick Dam, 15,000 tons

REPORT PREPARED FOR SECTION 3406(b)(13)

- Long-Term Restoration and Protection Plan for the Sacramento River

Trinity River Fishery Flow Evaluation Program

Reference Section of CVPIA: 3406(b)(23) Start Date: 1993 Status: Ongoing

Objectives

- Determine the effectiveness of increased flows and other habitat restoration measures on habitat and fishery populations in the Trinity River
- Implement measures necessary to restore anadromous fish populations to pre-project levels

Accomplishments

- Prepared and released draft and final reports concerning the effectiveness of increased flows on anadromous fish populations
- Completed draft EIS/EIR in October 1999
- Completed Final EIS/EIR in January 2000
- Record of Decision signed in December 2000

Fiscal Data

Fiscal Year	Obligation
2001	$ 429,990
2002	$6,933,421

Section 3406(b)(23) states, "The Secretary...in consultation with other State and Federal agencies, Indian tribes, and affected interests, is authorized and directed to...provide through the Trinity River Division, for water years 1992 through 1996, an instream release of water to the Trinity River of not less than 340,000 acre-feet per year...and by September 30, 1996, after consultation with the Hoopa Valley Tribe, shall complete the Trinity River Flow Evaluation Study currently being conducted by the U.S. Fish and Wildlife Service...Not later than December 31, 1996, the Secretary shall forward the recommendations of the Trinity River Flow Evaluation Study to...[Congress]."

The Service had initiated the Trinity River Fishery Flow Evaluation Study in 1985 as part of the Trinity River Basin Fish and Wildlife Management Program, a program authorized and funded by Congress prior to enactment of CVPIA. The purpose of the study was to evaluate the effects of increased river flows, in conjunction with other habitat restoration efforts, on fishery habitat and the anadromous fish resources in the Trinity River. In January 1998, a draft Trinity River Fishery Flow Evaluation Report was released for peer and interested party review. The report included salmonid habitat measurement at an intermediate fishery flow and studies on the effects of Trinity River flows on riparian vegetation, water temperatures, and sediment transport. However, prior to completion of the final flow study report, authorization and funding for the Trinity River Basin Fish and Wildlife Management Program expired. A Solicitor's opinion in 1998 concluded that, absent reauthorization of the Trinity River Basin Fish and Wildlife Management Program, the CVPIA provided sufficient authority, subject to certain limitations, to implement the resulting recommendations of the Trinity River Flow Evaluation Study report. Consequently, CVPIA funds were applied to appropriate Trinity River actions commencing in fiscal year 2001.

An Environmental Impact Statement/Environmental Impact Report, analyzing a range of alternatives for restoring and maintaining the natural production of anadromous fish populations of the Trinity River downstream of Lewiston Dam, was prepared and a final "record of decision" signed in December 2000. (Note. This did not entail expenditure of CVPIA funds.) The decision called for a range of flows to be released down the Trinity River for anadromous fish, from 369,000 acre-feet in critically dry years to 815,000 acre-feet in wet years. It also called for physical channel rehabilitation to accommodate the increased flows.

It was subsequently determined that, to handle the increased instream flows, certain bridge modifications need to be made. Four bridges were identified as needing modification. In FY 2001, hydraulic modeling for the projects was completed and design work on the structures was initiated. Environmental compliance documents were prepared and design work continued. Contracts for construction of necessary modifications to one of the four bridges was awarded. This work was accomplished using the CVPIA funds shown above.

REPORTS PREPARED RELATED TO SECTION 3406(b)(23)

- Draft Trinity River Flow Evaluation Report, January 1998
- Final Trinity River Flow Evaluation Report, April 1999
- Draft EIS/EIR, October 1999
- Final EIS/EIR, January 2002 Record of Decision, December 2002

APPENDIX D

Anadromous Fish - Structural Measures

Appendix D Anadromous Fish - Structural Measures

Tracy Pumping Plant Mitigation

Reference Section of CVPIA: 3406(b)(4) Start Date: 1998 Status: Ongoing

Objectives

- Mitigate fishery impacts associated with Tracy Pumping Plant operations

Accomplishments

- Developed new predator removal operations
- Increased biological oversight of pumping operations
- Developed an expanded program with more focused research
- Developed new fisheries laboratories and aquaculture facilities
- Improved and modified existing facilities

Fiscal Data

Fiscal Year	Obligation
1998	$305,178
1999	$2,254,518
2000	$431,735
2001	$4,313,743
2002	$5,259,676

Section 3406(b)(4) states, "The Secretary...is authorized and directed to develop and implement a program to mitigate for fishery impacts associated with operation of the Tracy Pumping Plant. Such a program shall include, but is not limited to, improvement or replacement of the fish screen and fish recovery facilities and practices associated with the Tracy Pumping Plant."

Since 1990, Reclamation has been improving fish survival at the Tracy Fish Collection Facilities under the Tracy Fish Facility Improvement Program (TFFIP). This program is a cooperative effort between Reclamation's Mid-Pacific Region and Denver Technical Service Center, and is coordinated with other agencies including the Service, National Marine Fisheries Service, DFG, and DWR.

Reclamation is identifying and making physical improvements and operational changes, assessing fishery conditions, and monitoring salvage operations at the collection facility. Activities are being performed in conformance with existing Endangered Species Act Biological Opinions, operating permit requirements, and agreements reached with DFG in 1992.

The program was expanded in 1998 to include activities leading to development of a modern on-site demonstration fish screen, the Tracy Experimental Test Fish Facility (TFTF). It is anticipated that this experimental facility will be used to evaluate new technologies for replacement of the existing 40+ year-old facilities at both Tracy (Federal) and Clifton Court (State) intakes. Such a research facility will permit testing and evaluation of all aspects of the fish salvage program at Tracy and Clifton Court and will support technological research needed by CALFED for other South Delta fish screen needs. Design continued through FY02.

Prior to FY98, funding for this program was obtained from Reclamation appropriations for activities other than implementation of the CVPIA. In FY98, CVPIA funding was made available for work at the Tracy Pumping Plant.

Possible Tracy Test Fish Facility Evaluations

- Develop optimum fish screen configuration and operation of bypass flows
- Separate debris from entrained fish
- Separate larger predatory fish from juvenile fish
- Provide fish-friendly pumps and lifting devices to safely transport sensitive species
- Evaluate screen-cleaning mechanisms
- Improve overall handling fish transportation and release
- Develop optimum fish screen configuration and operation of bypass flows

Biological Benefits

- Reduce fish mortality at Tracy fish screen
- Reduce entrainment of fish at the fish screen
- Improve conditions for salmon, striped bass, American shad, splittail and Delta smelt
- Separate debris from entrained fish
- Separate larger predatory fish from juvenile fish
- Provide fish-friendly pumps and lifting devices to safely transport sensitive species
- Evaluate screen-cleaning mechanisms
- Improve overall handling, fish transportation, and release

Contra Costa Canal Pumping Plant Mitigation

Reference Section of CVPIA: 3406(b)(5) Start Date: 1996 Status: Ongoing

Objective

- Mitigate fishery impacts of the Contra Costa Pumping Plant diversion at Rock Slough

Accomplishments

- Established multi-agency management and technical teams
- Prepared a Project Management Plan
- Completed 90% designs
- Completed Value Engineering Report
- Performed laboratory-model test of screen structure and cleaner mechanisms
- Completed environmental evaluation requirements
- Prepared an Environmental Commitments Report

Fiscal Data

Fiscal Year	Obligation
1996	$58,694
1997	$441,352
1998	$1,196,226
1999	$9,799
2000	$344,926
2001	$405,726
2002	$66,729

Section 3406(b)(5) states, "The Secretary...is authorized and directed...to develop and implement a program to mitigate for fishery impacts resulting from operations of the Contra Costa Canal Pumping Plant No. 1. Such program shall provide for construction and operation of fish screening and recovery facilities, and for modified practices and operations."

In FY96, the Contra Costa Fish Screen Management Team and the Contra Costa Technical Advisory Committee were established, consisting of representatives from the Service, Reclamation, National Marine Fisheries Service (NMFS), California Department of Fish and Game (DFG), California Department of Water Resources (DWR) and Contra Costa Water District. These two groups have been assisting in the development and implementation of the fish screen project for the Rock Slough intake of the Contra Costa Canal. In addition, a Peer Review Team reviews planning and design documents.

The Peer Review Team reviewed preliminary conceptual designs and recommended improvements for the fish screen project. A Value Engineering Team explored cost saving alternatives and made recommendations and the 90% designs were completed. Environmental documentation was completed, and an agreement was signed to provide funding participation from the State of California.

Currently, a number of CALFED Stage 1 studies are underway. These include the CALFED Los Vaqueros Reservoir Expansion Study, the CALFED Rock Slough Water Quality Improvement Study, and various ecosystem restoration projects and studies. All these studies and projects have the potential of significantly altering the currently designed fish screen at Rock Slough or possibly eliminating the need for a screened diversion entirely.

As a result of these developments, alternative short-term, lower cost fisheries mitigation measures such as short-term operational flexibility, alternative exclusionary measures, and/or salvage procedures are currently being investigated and developed through an interagency team consisting of Reclamation, the Service, NMFS, DFG, DWR, and the Contra Costa Water District. Progress on the completion of the Rock Slough fish screen project will continue: however, it will now be scheduled more closely with the results of the CALFED Stage 1 and other studies. Preliminary study results are anticipated by December 2004.

With alternative short-term mitigation measures being developed this year, Reclamation will most likely present these measures to the US Fish and Wildlife Service and request an amendment to the Los Vaqueros Biological Opinion for Delta Smelt. The amendment would then extend the construction completion date of the Rock slough fish screen project through December 2008.

REPORTS PREPARED FOR SECTION 3406(b)(5)

- Phase I Feasibility/Pre-design Report
- Phase II Concept/Alternatives Report
- Project Management Plan
- Value Engineering Report
- Environmental Assessment and Initial Study
- Finding of No Significant Impact and Negative Declaration issued
- Endangered Species Act Consultation completed
- Environmental Commitments Report
- Miscellaneous Design Reports

Shasta Temperature Control Device

Reference Section of CVPIA: 3406(b)(6) Start Date: 1993 Status: Completed

Objective

- Allow selective withdrawal of water from Shasta Reservoir to improve temperatures in the Sacramento River to benefit winter-run Chinook salmon and other anadromous fish species without bypassing power generation

Accomplishments

- Completed construction and began operation of the TCD on February 28, 1997
- Operated TCD since 1997 to reduce river temperatures downstream without bypassing power generation operations

Fiscal Data

Fiscal Year	Obligation
1993	$1,802,807
1994	$1,710,555
1995	$25,911,631
1996	$41,292,648
1997	$7,156,076
1998	$4,080,150
1999	$1,979,489
2000	$1,599
2001	-$305

**The negative is a credit

Section 3406(b)(6) states, "The Secretary, in consultation with other State and Federal agencies, Indian tribes, and affected interests, is...authorized and directed to install and operate a structural temperature control device at Shasta Dam and develop and implement modifications in CVP operations as needed to assist in the Secretary's efforts to control water temperatures in the upper Sacramento River in order to protect anadromous fish in the upper Sacramento River."

Instream conditions (especially water temperature) in the upper Sacramento River were found to be inadequate for many native fish species, especially the Federally listed winter-run Chinook salmon, during summer and fall months. During the summers of 1987-1993, temporary river temperature improvement downstream from Shasta Dam was achieved by releasing water through the Shasta Dam lower outlet works, bypassing the Shasta powerplant. Although this operation assisted in meeting instream temperature needs for Chinook salmon, it resulted in a loss in power generation in excess of $35 million over a 7-year period.

The purpose of the Shasta Temperature Control Device (TCD) is to allow the selective withdrawal of water from Shasta Reservoir to enhance downstream temperatures in the Sacramento River without bypassing power generation. Shasta Reservoir, a feature of the CVP located on the Sacramento River just northwest of Redding, stores up to 4.5 million acre-feet of water providing flood control and water for urban, agricultural, power, and environmental benefits.

The TCD includes a gated shutter structure 250 feet wide and 300 feet high that encloses all five powerplant penstock intakes. A low-level intake structure measuring 125 feet wide and 170 feet high accesses the deeper, colder water near the center of the dam and diverts it to the shutter structure. This 8,000-ton, 300-foot-tall steel-frame structure is connected to the upstream face of the dam. A series of gates allows the withdrawal of water at various lake levels, helping with the control of water temperatures downstream.

In 1993, planning and design efforts resulted in the completion of a contract to construct the Temperature Control Device at Shasta Dam. Construction began in November of 1994 and was completed in 1997. After a series of structural load performance tests, the TCD was approved for operation in February 1997.

The temperature device draws water of different temperatures from different reservoir depths. Its operation has increased the ability to control river temperatures, turbidity, and dissolved oxygen, without bypassing power generation. The TCD has benefited upper Sacramento River salmon populations while better allowing CVP operations to meet existing water and power contractual obligations.

The Shasta TCD, which cost approximately $80 million to build, is operated remotely from the Central Valley Control Center in Sacramento.

Preparation of inspection documents and drafting of standard operating procedures were ongoing during FY97 and FY98. In FY98, a 1-year underwater inspection of the TCD structure was conducted to evaluate the protective coating needed for protection of the structure. No additional concerns or items were identified. The final construction report and closeout of the construction contract were completed and the project was transferred to O&M status in FY99. The collection of data to evaluate any effects of TCD operation will be ongoing.

REPORTS PREPARED FOR SECTION 3406(b)(6)

- Shasta Dam Fish Entrainment Study, Pre-TCD Evaluation
- First Year Performance of the Shasta Dam Temperature Control Device
- Shasta TCD Transfer Stipulation Report
- Physical Forcing of Phytoplankton Bloom Dynamics in Shasta Lake, CA
- Pre- and Post-Operational Effects of Temperature Control Device on Physical, Chemical, and Biological Attributes of Shasta Lake, CA, Phase 1, Spring 1995 Through Fall 1997
- One-year Underwater Inspection Report, 1999
- Final Report of Computer Modeling Study, October 1999

Red Bluff Dam Fish Passage Program

Reference Section of CVPIA: 3406(b)(10) Start Date: 1993 Status: Ongoing

Objectives

- Improve upstream and downstream passage of anadromous fish and other species
- Deliver water at the time and quantity required by users, including the Sacramento National Wildlife Refuge
- Implement improvements to existing operations and facilities to benefit fish passage and water delivery
- Maintain Lake Red Bluff and other authorized CVP uses
- Solve fish passage problems while incorporating changes in environmental, institutional, and regulatory environments

Accomplishments

- Conducted studies to evaluate impacts of Research Pumping Plant, including 97-99% survival of juvenile salmon
- Modified the Research Pumping Plant facility to assist in its operation
- Conducted studies to evaluate long-term fish passage and water delivery solutions at Red Bluff Diversion Dam
- Modified Red Bluff Diversion Dam facilities to meet needs of anadromous fish and water users

Fiscal Data

Fiscal Year	Obligation
1993	$9,754,979
1994	$6,553,673
1995	$3,871,389
1996	$3,420,577
1997	$2,308,180
1998	$1,792,222
1999	$1,529,130
2000	$1,607,371
2001	$2,621,074
2002	$1,367,005

Section 3406(b)(10) states, "The Secretary is...authorized and directed to...develop and implement measures to minimize fish passage problems for adult and juvenile anadromous fish at the Red Bluff Diversion Dam in a manner that provides for the use of associated Central Valley Project conveyance facilities for delivery of water to the Sacramento Valley National Wildlife Refuge complex...".

Red Bluff Diversion Dam (RBDD) provides for the diversion of Sacramento River water into the Corning and Tehama-Colusa Canals. The dam has affected anadromous fish by delaying and blocking adult migration, entraining juveniles into diversion canals, killing or injuring juveniles passing through the dam, and increasing juvenile predation due to disorientation as they pass through the dam.

Implementation of this section provides for the continuation of the Red Bluff Diversion Dam Fish Passage Program, started in the late 1980s. This program has evolved through several phases in which fish passage problems were researched and a variety of alternative solutions were evaluated at a preliminary level of analysis. Early solution to the fish passage problem was to remove the gates of the dam and allow the Sacramento River flow unimpeded. This solution, however, affected recreation at Lake Red Bluff immediately upstream from the dam and affected water diversions in the Tehama-Colusa Canal (TCC).

Potential Benefits of Program

- Improved access to habitat for salmon and steelhead spawning
- Better survival rates for downstream-migrating juveniles
- Improved passage for sturgeon, American shad, and striped bass
- More dependable water deliveries to contractors

The interim approach to solving fish passage problems at RBDD currently includes: use of CVP water from Black Butte Reservoir located on Stony Creek to supply water to TCC; use of the Research Pumping Plant during key spring and fall periods; and modifications to facilities and operations during the time when the RBDD gates are out of the water to maximize the use of available water supplies. These interim actions have provided a balance for both natural resource protection and water deliveries.

Program activities have been grouped into four categories: Research Pumping Plant (RPP), planning studies of alternatives to improve fish passage at RBDD, improvements to existing facilities, and other actions.

The purpose of the RPP is to research development of innovative "fish-friendly" pumps to meet water delivery demands when the RBDD gates are out of the river. Reclamation and the Service began baseline studies in 1994 and later entered into a cooperative agreement to conduct additional research when the RPP was completed in 1995.

Research Pumping Plant Studies	Status
Abundance and distribution of juvenile salmonids in vicinity of RPP	Complete
Species, abundance, and distribution of fish predators near RBDD, including RPP+	Complete
Evaluation of colonization of intake sump area by predatory fish species	Complete
Radio telemetry tracking of adult Sacramento pikeminnow and adult Chinook salmon in vicinity of RPP	Complete
Study to develop fish handling and experiment techniques	Complete
Monitoring of entrapment of juvenile anadromous larval fish by pumping plant	Complete
Evaluation of juvenile salmonid survival/injury through pumps	Complete
Studies of bypass pipeline to determine residence time and survival of juvenile salmon	Complete
Field studies to evaluate injury and mortality rates to fish entrained in the existing fish bypass system	Complete
Evaluation of stress and disorientation of juvenile Chinook salmon passing through RPP	Complete
Instrumentation and automation of pump operation and maintenance features	Complete
Installation of additional baffles on the vee-screen structure	Complete
Evaluations of the RPP operational and hydraulic characteristics	Complete
Mechanical evaluations of pumps and facilities	Complete
Synopsis Report summarizing results of the overall biological and engineering studies of the RPP Program	Underway

The planning studies were designed to evaluate technical and environmental issues associated with solutions to fish passage and water delivery problems at Red Bluff Diversion Dam and to arrive at a permanent solution to those problems.

Planning Activities	Year
Report on RBDD fish bypass alternatives	Complete
Study of recreational activity near the RBDD	Complete
Physical model of water delivery requirements	Complete
Assessment of water delivery requirements	Complete
Report on juvenile salmonid migration at RBDD	Complete
Report on adult salmonid behavior at RBDD	Complete
Report on striped bass and squawfish at RBDD	Complete
Select alternatives for final evaluation	Complete
Prepare NEPA compliance documents	Underway
Initiate permitting	Underway
Finalize implementation plan	Underway

In an effort to improve existing facilities, annual operation and maintenance actions were implemented to benefit anadromous fish and water delivery capabilities at Red Bluff Diversion Dam.

Improvements to Existing Facilities	Year
Modified contour of East Sand Slough to prevent entrapment of fish during low water levels	1993
Evaluated approach velocities to the existing rotary drum screen when gates are lowered	1993
Modified west bank fish ladder entrance to improve fish attraction and entrance conditions	1994
Improved fish screens for a series of temporary pumps	1996

Other actions taken to improve resource protection and water delivery capabilities at Red Bluff Diversion Dam included evaluating and permitting the use of Stony Creek as part of the interim solution to fish passage.

Other Actions	Year
Receipt of State Water Resources Control Board permit to allow re-diversion of CVP water stored in Black Butte Reservoir into the Tehama-Colusa Canal	1996
Prepared Water Use and Management Plan for the lower Stony Creek watershed	1998

Coleman National Fish Hatchery Restoration and Keswick Fish Trap Modification

Reference Section of CVPIA: 3406(b)(11) Start Date: 1994 Status: Ongoing

Objectives

- Improve conditions for production of hatchery-raised fish at Coleman Fish Hatchery, including installation of ozone treatment for disease control
- Improve operation of anadromous fish survival at the Keswick Dam Fish Trap

Accomplishments

- Replacement of the barrier weir in Battle Creek
- Replacement of the 50 ft. x 150 ft. raceways
- Hatchery building seismic retrofit completed
- Completed Level 1 water treatment with a capacity of 45,000 gpm by filtration and 30,000 gpm by ozone treatment
- Established the Livingston Stone Fish Hatchery
- Completed designs and associated purchases for modification of the Keswick Dam Fish Trap
- Planning and environmental compliance for hatchery intake modifications initiated

Fiscal Data

Fiscal Year	Obligation
1994	$1,685,834
1995	$1,360,509
1996	$2,289,223
1997	$2,632,601
1998	$7,852,348
1999	$3,149,952
2000	$1,394,418
2001	$402,257
2002	$517,088

Section 3406(b)(11) states, "The Secretary...is...authorized and directed to...rehabilitate and expand the Coleman National Fish Hatchery by implementing the U.S. Fish and Wildlife Service's Coleman National Fish Hatchery Development Plan, and modify the Keswick Dam Fish Trap to provide for its efficient operation at all project flow release levels and modify the basin below the Keswick Dam spillway to prevent the trapping of fish."

Coleman National Fish Hatchery (NFH) is now 60 years old. The facility was originally constructed in 1942 to offset fish habitat losses resulting from the construction of Shasta and Keswick Dams (the cornerstone of the CVP). Planning efforts in the 1980s resulted in completion of the Coleman National Fish Hatchery Station Development Plan, which prioritized recommendations for rehabilitation. The following are actions implemented to date to implement this section of the CVPIA consistent with the Station Development Plan.

Construction of an Ozone water treatment facility at Coleman NFH
Part of the plan included the development and construction of an ozone water treatment plant. Disease and sediment problems associated with the water supply have confounded fish culture programs at Coleman NFH since its inception.

To reduce sediment in the hatchery water supply and to alleviate recurrent disease problems, a water treatment facility capable of filtering 45,000 gallons per minute (gpm) and ozonating 30,000 gpm has been constructed at Coleman NFH. Components of the water treatment facility include: oxygen and ozone generation equipment, ozone removal equipment, water pumping and distribution facilities, and sand filters. Prior to construction and installation, a Water Treatment Cost Study and Alternatives Analysis was completed for Coleman in March 1997 and evaluations pursuant to the National Environmental Policy Act undertaken. Information from these processes resulted in a significant reduction in the amount of water previously thought necessary for ozonation at the facility.

Operation of the ozone water treatment facility is expected to substantially lessen the occurrence of disease in hatchery production and reduce the potential for disease transmission to naturally produced stocks. The ozone facility reached full capacity in 2000, and juvenile fall-run Chinook salmon from brood years 1999, 2000 and 2001 have been reared and released with no incidence of IHNV (infectious hematopoietic necrosis virus), a particularly deadly disease. This is a first in the history of the hatchery. Additionally, higher water quality (i.e., reduced turbidity) resulted in more fish from these brood years reaching the proper size at release than in the past. Proper release size promotes rapid out-migration and potentially higher

survivorship. Rapid out-migraton also limits ecological interactions between hatchery and natural origin juveniles in the freshwater environment. Also of extreme importance, construction of the water treatment facility alleviates concern that passage of salmonids into the watershed above Coleman could result in the introduction of diseases into the hatchery's water supply. This action, therefore, ties directly with efforts to restore 42 miles of habitat in upper Battle Creek.

A 5 to 7-year test period to evaluate efficiency of the system and provide information to help determine the need for any additional disinfection capacity will be continued. Funds from CVPIA have been used to mark and coded-wire tag groups of fish reared on ozonated water as part of an ozone water treatment facility efficacy study. Data from that study will continue to be collected over the next several years.

Replacement of twenty-eight 15 ft. by 150 ft rearing ponds at Coleman NFH

In 1994 and 1995, rehabilitation was completed on 28 badly deteriorated rearing ponds. Replacement of these ponds has resulted in reduced mortality in each pond during to handling events (i.e., fish killed or injured on uneven surfaces) and direct losses of fish in cracks and fissures in the rearing pond walls and floor.

Construction of Livingston Stone National Fish Hatchery

The CVPIA also provided over $1 million to establish the Livingston Stone National Fish Hatchery on the Sacramento River. Livingston Stone NFH, a substation of Coleman NFH, was constructed by the U.S. Bureau of Reclamation in late-1997 and is one of the newest hatcheries in the National Fish Hatchery System. The facility was constructed for the explicit purpose of propagating ESA-listed winter-run Chinook salmon to assist in its recovery. The hatchery allows for rearing of winter-run Chinook salmon in a Sacramento River water supply. Prior to its establishment, winter-run Chinook collected at the Keswick Dam fish trap on the Sacramento River had to be reared at the Coleman NFH, potentially imprinting them to Battle Creek water chemistry and possibly hampering their recovery in the Sacramento River. The construction of the Livingston Stone NFH should assure that the hatchery-origin adults will return to spawning grounds in the upper Sacramento River and not to Battle Creek.

Propagation efforts for winter-run Chinook salmon consist of two programs, the artificial propagation program and the captive broodstock program. Together, these programs are intended to prevent further loss of genetic variability and supplement reproduction of the naturally spawning population. Both programs are supported in the National Marine Fisheries Service's draft Recovery Plan for the species.

The newly constructed hatchery contains facilities for broodstock holding, spawning, and rearing. The production capacity of the facility is about 250,000 juveniles. Between 30,000 and 250,000 juveniles have been reared at the facility annually since it was constructed. As a result primarily of the release of brood year 1998, it has been estimated that about 300 hatchery-origin winter-run Chinook salmon adults from this program returned to the upper Sacramento River in 2001.

For the captive broodstock program, a small number of juveniles (300-1,200) from each brood year are withheld from the release group and are reared to maturity at the Livingston Stone NFH and University of California, Davis' Bodega Marine Laboratory. The main goal of the captive broodstock program is to assure a source of gametes for the winter-run Chinook propagation program if natural returns are too low to provide adequate numbers of adults as broodstock. As of July 2002, approximately 580 captive broodstock from three brood years are currently being held at Livingston Stone NFH.

Modifications at the Keswick Dam Fish Trap and Stilling Basin

The fish trap at Keswick Dam on the Sacramento River is used to collect broodstock for production at both the Coleman and Livingston Stone hatcheries. Historically, the trap has been inefficient, failing to effectively trap and maintain fish at higher flows and to provide a safe work environment for fish collection or facility repairs. Section 3406(b)(11) provides for modification of the trap at Keswick to make it more efficient and safe at all flows.

Design modifications of the Keswick Dam Fish Trap were completed in 1996. These modifications will increase the trap's operational capacity from 15,000 cubic feet per second to about 32,000 cubic feet per second and will

enhance capture of winter-run Chinook salmon during high releases from Keswick Dam. Purchase and installation of bulkhead stop-log structures, a blower system and four winches for operating the stoplogs, and a dewatering pump and associated electrical power supply have been completed. Other modifications include the removal of the ineffective sweep, modifications in the brail, and modifications to the trap/ladder floor. The bulkheads should be fully functional by October 2002, work on the brail should be completed during the fall and winter of 2002, and work on the elevator upgrades should begin in August of 2002. An escape channel was also constructed which permanently connects the Keswick Dam Stilling Basin to the Sacramento River.

Modifications at the Keswick Dam Fish Trap and Stilling Basin have decreased the potential for losses of anadromous salmonids in the trap and in the stilling basin and allow for greater flexibility in operations. Historically, when the river flow inundated the stilling basin, fish of all species would be stranded when the flows receded. The construction of the escape channel has alleviated this trapping/stranding issue and has decreased losses of adult salmon and steelhead in the upper Sacramento River.

Likewise, the improvements have increased efficiency (i.e., operation at higher flows). The trap can now be fished at flows up to 32,000 cfs: at flows above this, escape channels in the brail can be opened to allow fish to exit the trap and move back down the fish ladder. Previously, if dam releases were not reduced to less than 15,000 cfs, the trap could not be safely cleared of all occupants. This meant that fish within the trap would need to remain within the trap until flows could be lowered. Lowering of the flows also meant potential impacts to fish in the river due to flow fluctuations.

The bulkhead system is designed to allow the fish ladder at the trap to be dewatered at any river level (previously the ladder/trap could not be dewatered at flows over 5,000 cfs). Increased/improved seals around the brail have reduced the loss of smaller fish and have helped reduce fish injury in general. The new controls on the elevator will also allow increased flexibility and safety to fish and the operator.

Coleman NFH intake modifications

Planning efforts have been initiated to modify (i.e., screen) the water intake structures at Coleman NFH. The primary purpose of the effort is to protect (i.e., avoid the entrainment and impingement of) natural-origin salmon and steelhead juveniles produced in Battle Creek following restoration efforts within the watershed.

Coleman NFH hatchery building rehabilitation

In its existing condition, the hatchery building (tankhouse), does not meet current earthquake and other life-safety codes. The tankhouse is a critical structure for all propagation programs at Coleman NFH. The building houses structures, equipment, incubators and tanks to facilitate early-life stage rearing of all species produced on station. Rehabilitation of the building, as per the Station Development Plan, will increase efficiency of fish culture operations, enhancing egg and juvenile survival. It will also rectify all safety deficiencies currently associated with the existing building. Construction is currently unscheduled.

REPORTS PREPARED FOR SECTION 3406(b)(11)

- Water Treatment Cost Study and Alternatives Analysis
- EA and FONSI

Anderson-Cottonwood Irrigation District Fish Passage

Reference Section of CVPIA: 3406(b)(17) Start Date: 1996 Status: Completed

Objectives

- Eliminate or avoid dewatering of redds and stranding of juveniles caused by operation of ACID Diversion Dam
- Improve fish passage and decrease fish injury at ACID Diversion Dam and increase access to 3.6 miles of habitat between ACID Diversion and Keswick Dams
- Reduce entrainment of juvenile salmonids into ACID canal

Accomplishments

- Eliminated dewatering of redds and stranding of juvenile salmon upstream from ACID Dam by modifying the dam's structure and operations
- Created ACID Fish Passage Team to plan, design, and implement successful resolution of fishery problems
- Reached consensus on how to resolve all fishery passage problems at ACID
- Evaluated effectiveness of fish passage through old fish ladder
- Finished preliminary designs and permitting and obtained funding for final design.
- Two new state of the art fish ladders and screens at ACID' main diversion were installed with funding provided by CALFED ($10.2 million)

Fiscal Data

Fiscal Year	Obligation
1997	$14,349
1998	$309,462
1999	$14,803
2000	$4,552
2001	-$1,532

**The negative is a credit

Section 3406(b)(17) states, "The Secretary...is authorized and directed to develop and implement a program to resolve fishery passage problems at the Anderson-Cottonwood Irrigation District Diversion Dam as well as upstream stranding problems related to Anderson-Cottonwood Irrigation District Diversion Dam operations."

The Anderson-Cottonwood Irrigation District (ACID) Diversion Dam is within critical habitat of the endangered winter-run Chinook salmon and the threatened spring-run Chinook salmon and Central Valley steelhead. It is also within an area crucial to fall and late fall-run Chinook salmon, species currently not listed under the Federal Endangered Species Act but that are candidates for listing.

The ACID Diversion Dam is installed annually in April and removed in November. A catwalk suspended above the dam allows workers to install wooden flashboards to raise or lower the dam level. Installing or removing the heavy flashboards was unsafe and impossible during even moderate flows, making it necessary for Reclamation to reduce Sacramento River flows to allow ACID to change the dam level. Reducing river flows stranded fish and dewatered salmon spawning areas, often killing eggs and young. In 1996 and 1997, Interior designed and funded the manufacture of lightweight flashboards and a new catwalk, allowing ACID to use the flashboards safely at higher flows. Also, ACID signed an agreement with Reclamation eliminating requests for flow reductions below 10,000 cubic feet per second for adjustment of the dam.

The ACID Diversion Dam has two fish ladders, both of which required replacement. One ladder was old and undersized, and its entrance is poorly oriented for passage of salmon and steelhead. The Service evaluated the structure's effectiveness and determined that only a small percentage of salmon in the river use the ladder. The other fish ladder, small and temporary, was installed in 1991. New fish ladders were designed that will provide better access to prime spawning habitat upstream from the dam.

Historically, the existing fish screen on the ACID diversion failed due to high debris loads when salmon are emerging and in most need of a screening structure. Because ACID has a high rate of diversion during periods when winter-run Chinook salmon emerge from spawning gravels, it was important that the facility be well screened. Also, with the listing of Central Valley steelhead, the screen no longer met the requirements of the Endangered Species Act. A heavier, more adequate screen was designed in coordination with the Anadromous Fish Screen Program.

In 1997, a team was organized to plan, design, and implement the resolution of fishery problems at ACID. The team agreed on the objectives and methods to resolve all fish passage problems. Preliminary designs and environmental permitting were finished in 1998. Funding for final design and construction was obtained from CALFED with the assistance of the team. Construction of the project is complete and monitoring is underway.

Glenn-Colusa Irrigation District Pumping Plant

Reference Section of CVPIA: 3406(b)(20) Start Date: 1993 Status: Ongoing

Objectives

- Provide state-of-the-art fish screens that are reliable, cost effective, and minimize fish losses
- Enable GCID to meet instantaneous peak demands and provide reliable long-term deliveries
- Minimize the potential for failure of the fish screen because of changes in Sacramento River alignment or gradient

Accomplishments

- Completed construction of the fish screen facility, the bypass channel, and downstream side channel improvements
- Completed construction of the water control structure and access bridge
- Completed construction of the gradient control facility in the mainstem of the Sacramento River
- Initiated fish screen system testing program
- Mitigated impacts to valley elderberry longhorn beetle by transplanting elderberry shrubs from the fish screen area to an adjacent parcel

Fiscal Data

Fiscal Year	Obligation
1993	$259,237
1994	$1,296,731
1995	$800,874
1996	$1,379,055
1997	$1,376,455
1998	$11,606,499
1999	$16,450,067
2000	$2,803,935
2001	$2,045,603
2002	$2,944,892

Section 3406(b)(20) states, "The Secretary...is...authorized and directed to...participate with the State of California and other Federal agencies in the implementation of the on-going program to mitigate fully for the fishery impacts associated with operations of the Glenn-Colusa Irrigation District's Hamilton City Pumping Plant. Such participation shall include replacement of the defective fish screens and fish recovery facilities associated with the Hamilton City Pumping Plant."

Fishery impacts associated with operation of the Glenn-Colusa Irrigation District's (GCID) Hamilton City Pumping Plant have been significant. Although GCID's intake channel allows water not diverted through the plant's pumps to flow back to the river, the pumping velocity prevents small fish from escaping back to the river with the flow. Thus, fish screens that allow for the escapement of these small fish back to the river are required.

The effort to design a state-of-the art fish screening system started in the late 1980's. Information from this effort was incorporated into the program to implement Section 3406(b)(20). This program involves a multi-agency team including Reclamation, the Service, U.S. Army Corps of Engineers, National Marine Fisheries Service, DWR, State Reclamation Board, DFG, and GCID.

In 1993, a draft feasibility report presented a wide range of screen designs and locations as well as other facilities in the Sacramento River mainstem for restoring the hydraulic gradient at the screen. During this period, GCID installed flat-plate screen panels on the upstream face of the existing drum screen facility and modified intake and discharge channels to improve hydraulic conditions for returning fish to the river. These interim measures allowed GCID to continue to pump part of its water allocation while meeting fish protection requirements.

In 1994, Interior and the Corps of Engineers initiated the design phase of the project, focusing on the most favorable alternatives identified in the feasibility study. Concept-level designs were developed with significant input and oversight by the participating agencies. Criteria were also developed to aid in selecting the best overall alternative for final design. In 1995, physical and numerical model studies were initiated to better analyze characteristics of the alternatives. These studies showed that a fish screen in the vicinity of the existing screens was the preferred location.

In December 1996, the involved agencies agreed on the preferred alternative, which includes a retrofit and extension of the existing fish screen structure, channel modifications, a gradient facility in the river, and appurtenant facilities.

During 1996 and 1997 final designs were completed for the fish screen and open channel work. Three additional physical model studies were required to ensure the hydraulic designs would meet fish

protection requirements. In addition, environmental compliance requirements were completed, including a joint State-Federal EIR/EIS, State and Federal Biological Assessments and Opinions, a Fish and Wildlife Coordination Act report, and various construction permits.

Construction on the fish screen extension, on retrofitting the existing fish screen, and on the open channel work began in spring 1998. A replacement water control structure and access bridge was completed just downstream from the existing fish screen structure along with placement of a cofferdam for the 634-foot-long fish screen structure extension. The Corps completed the design of the gradient facility and initiated construction of that component in 1999. Construction on all features of the project was completed in 2001. Mitigation for impacts of the fish screen project on valley elderberry longhorn beetle was accomplished by transplanting elderberry shrubs from the fish screen construction area to an adjacent site. A 4-year fish screen system testing/operation optimization program has been initiated.

REPORTS PREPARED FOR SECTION 3406(b)(20)

- Biological Assessments/Biological Opinions
- Joint State-Federal EIR/EIS
- Gradient Restoration Facility Limited Reevaluation Report
- Value Engineering for fish screen system
- Design reports
- Fish and Wildlife Coordination Act Report

Anadromous Fish Screen Program

Reference Section of CVPIA: 3406(b)(21) Start Date: 1994 Status: Ongoing

Objectives

- Develop a basinwide strategy to control anadromous fish loss at diversions
- Implement measures to avoid anadromous fish loss at diversions

Accomplishments

- Established Anadromous Fish Screen Program technical and policy teams
- Completed documentation for program description, screen monitoring and maintenance, and environmental compliance
- Accepted 19 proposals to the program
- Initiated construction on 18 projects, 15 of which have been completed: 3 are still in construction
- Five projects are in various stages of planning

Fiscal Data

Fiscal Year	Obligation
1994	$838,957
1995	$2,665,025
1996	$8,202,526
1997	$11,062,634
1998	$13,173,392
1999	$3,781,948
2000	$9,242,018
2001	$7,204,267
2002	$8,938,817

Section 3406(b)(21) states, "The Secretary, in consultation with other State and Federal agencies, Indian tribes, and affected interests, is...authorized and directed to...assist the State of California in efforts to develop and implement measures to avoid losses of juvenile anadromous fish resulting from unscreened or inadequately screened diversions on the Sacramento and San Joaquin rivers, their tributaries, the Sacramento-San Joaquin Delta, and the Suisun Marsh. Such measures shall include but shall not be limited to construction of screens on unscreened diversions, rehabilitation of existing screens, replacement of existing non-functioning screens, and relocation of diversions to less fishery-sensitive areas."

The Anadromous Fish Screen Program was established to reduce fish mortality associated with diversions in the Central Valley. Currently, 2,109 agricultural diversions are located in the Delta, 450 in the Sacramento River system, 152 in the San Joaquin River system, and 370 in the Suisun Marsh basin. Considering the large number of these diversions, a basinwide screen program, in a context of cooperation and partnership, is the most promising strategy for control of juvenile anadromous fish losses associated with their operation.

Since 1994, Interior has worked with the State of California in efforts to minimize losses of anadromous fish at Central Valley diversions on the Sacramento and San Joaquin Rivers and their tributaries, in the Delta, and in Suisun Marsh. To help accomplish that goal, technical and policy teams were established to evaluate screening proposals and other loss-minimizing methodologies.

Participation by water diverters in the program is voluntary. Proposals are evaluated using established criteria, and those rated the highest are selected.

To date, 25 grants for feasibility and/or construction of fish screen projects in the Central Valley have been executed. Construction was initiated on 18 of these, 15 of which have been completed. Through Anadromous Fish Screen Program cost share and other funding sources, approximately 70% of individual diversions over 250 cfs are now screened throughout the Sacramento, San Joaquin, and Delta systems.

The cumulative total of diversions screened or eliminated with Anadromous Fish Screen Program cost shared funding equals about 3,500 cfs from the Delta, Sacramento River system, and San Joaquin River systems combined. Another 2000 cfs will be screened by 2005 through this program.

A program description was prepared in January 1999 to address the program organization, project eligibility, funding, and project application process, guidelines for prioritization, screen construction criteria, and assurances relative to the Federal Endangered Species Act.

REPORTS PREPARED FOR SECTION 3406(b)(21)

- Program Description
- Evaluation, monitoring, and maintenance plan
- Anadromous Fish Screen Program environmental compliance guidelines

Project Name	Structures	Diversion Capability (in cfs)	Estimated Total Cost	Estimated Federal Cos	Status
American River					
City of Sacramento, Fairbairn Site	1Sc*	210	44,000,000	$14,000,000	Under construction
Big Chico Creek					
Parrot-Phelan Irrigation District/M&T Ranch Eliminate 1 Diversion		150	$4,585,000	$2,284,000	Completed
Butte Creek					
Durham Mutual Water Company	1Sc/ILd	60	$930,000	$465,000	Completed
Gorrill Land Company	1Sc/1Ld	120	$1,551,897	$756,000	Completed
Rancho Esquon Partners	2Sc/1Ld	110	$1,090,000	$545,000	Completed
Western Canal Water District/Western Canal Siphon Construction ▪ Remove 2 Western Canal WD Dams ▪ Remove McGowan Dam ▪ Remove McPherrin Dam ▪ Eliminate 12 Unscreened Diversions	1 Siphon	600	$9,460,000	$3,023,000	Completed
Butte Creek Weir #5	1 Ld	70	$480,000	$240,000	Under construction
Sacramento River					
City of Sacramento, Water Treatment Site	1Sc*	245	$44,000,000	$225,000*	Under construction
Maxwell Irrigation District	1Sc	80	$1,545,000	$709,000	Completed
Meridian Farms	1Sc	190	$2,300,000	$1,150,000	Final design
Natomas Mutual Water Company	2Sc	630	$22,800,000	11,000,000	Final design
Parrot-Phelan Irrigation District/M&T Ranch	1Sc	150	$4,585,000	$2,284,000	Completed
Pelger Mutual Water Company	1Sc	40	$278,000	$139,000	Completed
Pleasant Grove-Verona	1Sc	160	$6,600,000	$3,000,000	Final design
Princeton-Cordora-Glenn/Provident ID	1Sc	605	$10,958,000	$5,350,000	Completed
Reclamation District 108	1Sc	832	$12,051,000	$6,001,000	Completed
Reclamation District 108	2Sc	377	$15,000,000	$7,500,000	Final Design
Reclamation District 1004	1Sc	290	$7,250,000	$1,535,000	Completed
Sutter Mutual Water Company	1 Sc	1,000		$3,154,005	Final design
Wilson Ranch	1Sc	30	$231,000	$90,000	Completed
Yuba River					
Brown's Valley Irrigation District	1Sc	65	$364,000	$115,000	Completed
Sacramento-San Joaquin Delta					
Dayly Lee Diversion	1Sc	17	$38,000	$0	Completed
Suisun Resource Conservation District	5Sc	93	$900,000	$450,000	Completed
San Joaquin River					
Banta-Carbona irrigation District	1Sc	250	$8,800,000	$2,877,000	Under construction

Notes:

* = Counted as same project
Sc = Screen constructed
Ld = Ladder constructed

APPENDIX E

Refuges and Waterfowl

Appendix E Refuges and Waterfowl

Water Acquisition Program (Refuge Focus)

Reference Section of CVPIA: 3406(b)(3) & (d)(2) Start Date: 1993 Status: Ongoing

Objectives

- Acquire water to assure firm reliable supplies of suitable quality water to meet Level 2 and Level 4 refuge water supply requirements.
- Negotiate and execute long-term refuge water supply contracts

Accomplishment

- Acquired 484,114 acre-feet of interim (short-term) water supplies and 6,300 acre-feet of permanent supply to meet the annual Level 4 refuge water supply needs

Fiscal Data

Fiscal Year	Obligation
1994	$440,165
1995	$2,689,512
1996	$1,785,939
1997	$3,929,771
1998	$2,171,002
1999	$1,200,000
2000	$5,103,924
2001	$7,833,879
2002	$13,835,252

Section 3406(b)(3) states, "The Secretary...is authorized and directed to develop and implement a program in coordination and in conformance with the plan required under paragraph (1) of this subsection for the acquisition of a water supply to supplement the quantity of water dedicated to fish and wildlife purposes under paragraph (2) of this subsection and to fulfill the Secretary's obligations under paragraph 3406(d)(2) of this title. The program should identify how the Secretary intends to utilize, in particular, the following options: improvements in or modifications of the operations of the project; water banking; conservation; transfers; conjunctive use; and temporary and permanent land fallowing, including purchase, lease, and option of water, water rights, and associated agricultural land."

Section 3406(d)(2) directs the Secretary to acquire Level 4 refuge water supplies at increments of not less than 10 percent per year. Total Level 4 incremental water supply is approximately 159,000 acre-feet. Level 4 water supplies provide critical wetland wintering habitat and help to increase production of forage for migratory waterfowl and shorebirds of the Pacific flyway, threatened and endangered species, and resident wetland-dependent wildlife resources.

To date, Interior has acquired 484,114 acre-feet of annual water supplies to meet each year's Level 4 requirements. In addition, in early 1998, Interior acquired its first permanent water supply of 6,300 acre-feet from the Corning, Proberta, and Thomes Creek Water Districts. The districts sold this supply (from the Central Valley Project) at a one-time fee of $700 per acre-foot. This CVP water is now available each year to help meet the Level 4 refuge water supply requirements for CVPIA refuge units located within the Sacramento Valley. Through fiscal year 2002, deliveries of Level 4 supplies to various refuge units have been as prescribed by the CVPIA except in instances where the refuge units were not able to receive such supplies, either because facilities were not available to deliver the water or because the on-refuge distribution facilities necessary to apply the water had not been completed. The annual cost of meeting the Level 4 requirements in the future can be expected to increase significantly when facilities are no longer a constraint and full Level 4 deliveries are required at each refuge unit.

REPORTS PREPARED FOR SECTION 3406(b)(3)

- EA and FONSI for Interim Water Acquisition Program, 1995
- EA's for various water acquisitions

WATER ACQUIRED FOR LEVEL 4 REFUGE WATER SUPPLIES (acre-feet)

Willing Seller	1994	1995	1996	1997	1998	1999	2000	2001	2002	Totals
SACRAMENTO RIVER BASIN										
California Department of Fish and Game	15,856									15,856
Corning, Proberta, and Thomes Creek Water Districts				4,800	**6,300***					4,800
Natomas Central Mutual Water Company									855	855
Reclamation District #108									2,458	2,458
Sacramento River Water Rights Settlement Contractors		57,809								57,809
Sutter Mutual Water Co.									1,202	1,202
Yuba Co. Water Agency				25,000						25,000
TOTAL	**15,856**	**57,809**		**29,800**					**4,515**	**107,980**
SAN JOAQUIN VALLEY										
Banta-Carbona Irrigation District	300								6,000	6,300
Broadview Water District									4,000	4,000
Del Puerto Water District									2,000	2,000
Delta-Mendota Canal Contractors	1,559									1,559
Hills Valley Irrigation District						2,324				2,324
Lost Hills Water District									3,550	3,550
Merced Irrigation District							24,748			24,748
Mercy Springs Water District	154									154
Oro Loma Water District	57									57
Pacheco Water District	28									28
Patterson Water District	191									191
Plain View Water District	114									114
San Joaquin River Exchange Contractors		25,000	30,348	40,000		20,000	21,500	49,000	64,500	250,348
San Luis Canal Company	12,000					10,667	16,500	10,905		50,072
San Luis Water District								3,100		3,100
Semitropic Water Storage District		5,200	6,047			6,112				17,359
Tri-Valley Water District						799				799
Tulare County						3,716				3,716
West Side Irrigation District	691									691
West Stanislaus Irrigation District	12						5,000			5,012
Widren Water District	12									12
TOTAL	**15,118**	**30,200**	**36,395**	**40,000**		**43,618**	**67,748**	**63,005**	**80,050**	**376,134**

* Permanent Water Supply – not included in totals

Agricultural Waterfowl Incentives Program

Reference Section of CVPIA: 3406(b)(22) Start Date: 1995 Status: Completed

Objectives

- Create and maintain waterfowl habitat by providing incentives to flood agricultural fields during appropriate time periods
- Enhance migratory bird resources of the Pacific flyway
- Help protect, enhance, and recover threatened and endangered species
- Enhance CVP water supplies

Accomplishments

- Finalized interim guidelines and completed NEPA requirements
- Since 1997, the first year that farmers could enroll in the program, created an average of 40,000 acres of waterfowl habitat each winter, resulting in tens of millions of bird-days of use by ducks and geese each year
- As many as 40,000 birds documented using one 80-acre field in one day

Fiscal Data

Fiscal Year	Obligation
1995	$17,027
1996	$33,373
1997	$1,068,553
1998	$933,184
1999	$996,898
2000	$979,154
2001	$514,603
2002	$544,768

Section 3406(b)(22) states, "The Secretary... is authorized and directed to...provide such incentives as...to encourage farmers to participate in a program, which the Secretary shall develop, under which such farmers will keep fields flooded during appropriate time periods for the purposes of waterfowl habitat creation and maintenance and for Central Valley Project yield enhancement..." The incentives are not to exceed $2 million each year, either directly or through credits against other CVP contractual payment obligations, including tiered pricing waivers. This program is scheduled to terminate on December 31, 2002, in accordance with its CVPIA authorization.

The Agricultural Waterfowl Incentives Program focuses on providing environmental benefits for waterfowl and wetland-dependent migratory birds by encouraging seasonal flooding of agricultural fields to create additional waterfowl habitat and additional food supplies. Planning for the program began in 1995. The Service, working with Reclamation and the Central Valley Habitat Joint Venture, developed Draft Interim Guidelines for the program, that were provided to over 2,500 interested parties for review and comment. NEPA documentation was completed in 1996 and the Interim Guidelines were finalized.

During the winter of 1997-98, 41 farmers participated in the program. Through cooperative agreements, these farmers created 22,314 acres of habitat for wintering migratory waterfowl and enhancement of CVP water supplies. The flooded fields were predominantly post-harvest rice fields in the Sacramento Valley, with one participant each in the Delta (corn) and San Joaquin Valley (wheat). Winter flooding of rice provides both an excellent supplement to existing local wetland habitat and a mechanism to decompose remaining rice straw that must be removed prior to planting the following spring.

Fiscal Year	Farmers Enrolled	Acreage Enrolled
1997	41	22,314
1998	45	41,055
1999	61	53,540
2000	84	58,000
2001	50	31,000
2002	50	32,000

Monitoring showed that as many as 40,000 ducks or geese used these newly flooded fields, resulting in tens of millions of bird-use days over the course of the winter. Herons, egrets, cranes, ibis, and several species of shore birds also used these new seasonal wetlands, adding to the increased species diversity of the areas.

Program Benefits

- Encourages a wider distribution of waterfowl populations
- Decreases potential for avian disease
- Increases available waterfowl food resources
- Potentially increases available water supplies

Program participation in the winter 1998-99 increased substantially, both in the number of farmers participating and in the acreage flooded. A total of 41,055 acres were flooded, almost double the acreage flooded in 1997-98. Interest has continued to grow each year and the program seems limited only by the funds available. A total of 58,000 acres were flooded in the 2001-02 season. The program, however, expired with the expenditure of fiscal year 2002 funds as provided in this section of the Act.

REPORTS PREPARED FOR SECTION 3406(b)(22)

- Agricultural Waterfowl Incentives Program Accomplishments Report, FY 1997-2001

Refuge Water Conveyance (Wheeling) and Construction

Reference Section of CVPIA: 3406(d)(1-5) Start Date: 1993 Status: Ongoing

Objectives

- Assure firm reliable water supplies of suitable quality to CVPIA refuge areas
- Negotiate and execute long-term water service contracts
- Implement construction of required conveyance facilities
- Negotiate and execute long-term water conveyance/wheeling agreements

Accomplishments

- Refuge Water Service Contracts. Executed five 25-year water service contracts providing for delivery of approximately 404,000 acre-feet of Level 2 water and approximately 159,000 acre-feet of Level 4 water to refuge boundaries
- Conveyance/Wheeling. Executed five 25-year and three interim cooperative agreements with non-Federal entities to convey (wheel) up to 581,000 acre-feet of Levels 2 and 4 water to refuges
- Facilities Construction. Initiated construction of conveyance system improvements at five conveyance facilities, completing four

Fiscal Data

Fiscal Year	Obligation
1994	$2,438,922
1995	$2,079,880
1996	$4,295,075
1997	$10,822,006
1998	$18,316,333
1999	$16,729,480
2000	$12,487,094
2001	$9,417,893
2002	$10,883,598

Section 3406(d) states, "...The Secretary shall provide...firm water supplies of suitable quality to maintain and improve wetland habitat areas on units of the National Wildlife Refuge System in the Central Valley of California; on the Gray Lodge, Los Banos, Volta, North Grasslands, and Mendota State Wildlife Areas; and on the Grassland Resources Conservation District in the Central Valley of California...[T]he quantity and delivery schedules of water measured at the boundaries of each wetland habitat area...shall be in accordance with Level 2 of the "Dependable Water Supply Needs"...as set forth in the Refuge Water Supply Report and two-thirds of the water supply needed for full habitat development for those habitat areas identified in the San Joaquin Basin Action Plan/Kesterson Mitigation Action Plan Report prepared by the Bureau of Reclamation." Section 3406(d) also states that the refuge supplies described above shall be provided through long-term contractual agreements and shall be supplemented in increments over ten years until the total supplies provided are in accordance with Level 4 of the "Dependable Water Supply Need" table in the Refuge Water Supply Report and the full water supply for lands identified in the San Joaquin Basin Action Plan/Kesterson Mitigation Action Plan report (commonly referred to as the "Action Plan Lands"). This section also authorizes the Secretary to construct or to acquire from non-Federal entities such water conveyance facilities, conveyance capacity, and wells as are necessary to implement these refuge water supply requirements.

The Refuge Water Supply Program is a joint Reclamation/Service effort to implement Section 3406(d)(1-5) of the CVPIA by providing long-term reliable water supplies to specified Federal, State, and private wildlife refuges in the Central Valley. The program is composed of three distinct yet interrelated components: acquisition of water to meet the specified requirements; obtaining conveyance capacity in non-Federal facilities (referred to as wheeling) to deliver the acquired water to the refuge boundaries; and construction of facilities when appropriate to deliver the acquired water. This section specifically addresses the conveyance/wheeling and the facilities construction components. The refuge water supply acquisitions are discussed in the Water Acquisition Program (Refuge Focus) section on page E-1.

Level 2 and Level 4 Water Supplies

The refuge water identified in Section 3406(d)(1) as Level 2 and two-thirds of the full supply for the Action Plan Lands, collectively referred to as Level 2 supply, equals approximately 404,000 acre-feet. This base level of firm supply was to be provided immediately upon enactment of the CVPIA and has generally been supplied from the yield of the Central Valley Project. There are, however, some exceptions such as when refuges have their own water rights that can be exercised to provide all or a portion of their Level 2 entitlement.

The amount of supplemental water identified in Section 3406(d)(2) as the Level 4 supplies and the full supply for the Action Plan Lands, to be provided in increasing increments of 10 percent per year over ten years, is estimated to be approximately 159,000 acre-feet. This supplemental water, generally referred to as the incremental Level 4 supply, is to be acquired from willing sellers. The first increments were provided in 1993 and the full incremental supply is to be available in contract year 2002 (March 2002 through February 2003).

All refuge units have received their respective Level 2 and Level 4 water allocations each year since enactment of CVPIA, except for reductions due to conveyance capacity and distribution system limitations at some units and/or reductions specifically requested and scheduled by the refuge managers. Two north-of-Delta and three south-of-Delta refuges will not be able to receive their full allocation of water until construction on conveyance facilities is completed. This is currently scheduled for 2006.

Refuge Water Service Contracts

Section 3406(d) requires that refuge water supplies be provided through long-term contractual agreements. In 2001, Reclamation entered into five long-term (25 year) water service contracts; two with the Department of Water Resources for delivery of water to the Gray Lodge, Los Banos, Volta, Mendota, and North Grasslands Wildlife Areas; two with the Service for delivery of water to Sacramento, Delevan, Colusa, Sutter, San Luis, Merced, Kern, and Pixley National Wildlife Refuges; and one with Grassland Water District for delivery of water to the Grassland Resource Conservation District lands. (See map for location of these areas.) The water service contracts provide for the delivery of the full 404,000 acre-feet of Level 2 supplies and the 159,000 acre-feet of Level 4 supplies to the boundaries of the refuges. The contracts also provide for the pooling, transfer, and exchange of water among the various refuge units and limit any dry-year reduction in Level 2 supply to 25 percent.

Conveyance/Wheeling

Reclamation has negotiated five long-term (25 year) and three interim cooperative conveyance agreements with non-Federal entities to convey or wheel water to refuges. The long-term agreements are with the San Luis Canal Company, Central California Irrigation District, Grassland Water District, San Luis-Delta Mendota Water Authority, and the Glenn-Colusa Irrigation District. The three interim agreements are with the Buena Vista Water Storage District, the Biggs-West Gridley Water District, and the Department of Water Resources. The interim agreements will provide for water conveyance until the long-term recommended alternatives identified in the facilities construction component of the Refuge Water Supply Program can be implemented.

Facilities Construction

To accommodate full Level 2 and Level 4 deliveries, it was, and in many cases remains, necessary to improve existing or construct new facilities as authorized under Section 3406(d)(5). From 1996 through 2002, Interior prepared five NEPA documents analyzing the impacts of constructing conveyance facilities and delivering water to refuges. Within the San Joaquin Valley, construction has been completed on several facilities, including in 1994,the installation of a well and associated groundwater pumping facilities at Pixley National Wildlife Refuge; in 1996, the extension of the San Luis Canal Company's Island "C" Canal, providing supplies to the Federal West Bear Creek Unit of the San Joaquin Basin Action Plan lands; and in 2000, the Central California Irrigation District's Newman Canal and "J" Lateral, providing conveyance to the State China Island Unit.

In the Sacramento Valley, one major project has been constructed. In 2001, the Stony Creek Siphon, a feature critical for providing water supplies to the Sacramento NWR Complex using Glenn-Colusa Irrigation District facilities, was completed. In addition, 127 other facility improvements within GCID were implemented, providing for reliable water deliveries to Sacramento Delevan, and Colusa National Wildlife Refuges.

Additional conveyance system improvements are anticipated under this program component, pending negotiation of long-term agreements and receipt of necessary funding.

Biological Benefits

Provision of additional and/or more "firm" water supplies to Central Valley refuges has allowed managers to respond better to the needs of wetland-dependent species. Refuges receiving CVPIA water supplies experienced an approximate 12,000-acre valley-wide increase in average annual wetland acreage when compared to pre-CVPIA conditions. Several wetland types have benefited from the improved supplies, including seasonal, semi-permanent, and permanent regimes. The refuges now have an increased ability to more intensively manage moist soil vegetation. They now have options to provide one or more spring/summer irrigations of essential waterfowl food plants and have been able to increase the amount of wetted habitats for migrating shorebirds and nesting waterfowl. They can also provide for earlier flooding of seasonal wetlands to maximize habitat for early fall migrant waterfowl. As an example of the results of some of these measures, the Grassland Resource Conservation District was able to increase its acreage of enhanced seed production on an annual basis from 4,000 to 40,000 acres.

Responding to more favorable conditions, valley waterfowl populations seem to have increased accordingly. However, because wetland acreage in the Central Valley is only a portion of the overall environmental habitat requirements of the Pacific Flyway waterfowl that use the Central Valley, it is important to remember that other factors have no doubt played a part in the increase. These include conditions elsewhere in the flyway and, within the Central Valley area, upland restorations, agricultural buffer strips and "set-aside" land, and winter flooding of rice fields. The Grassland Resource Conservation District has seen waterfowl use in the early fall increase by 300 percent, while other areas have recorded increases in waterfowl use of 800 percent, from 2 million to over 18 million use-days. Although not necessarily indicative of overall waterfowl trends, winter migratory waterfowl numbers have increased by as much as 100 percent on some refuges receiving CVPIA water supplies (e.g., the Grassland Resource Conservation District). At the same time, waterfowl disease-related mortality appears to be on the decline. This is believed to be the result of increased availability of resting habitat and increased and alternative food supplies. These have all combined to lower the density of waterfowl concentrations (a factor

known to facilitate the spread of disease), producing healthier waterfowl that are more appropriately dispersed.

Refuges receiving CVPIA water supplies have also experienced a significant increase in public use opportunities. The Sacramento NWR Complex was able to enhance habitat associated with tour routes and walking trails, and consequently experienced a 61 percent increase in visitor use. Many Central Valley refuges have been able to provide expanded hunting opportunities, opening new areas to hunting and increasing quotas. As an example, the Salt Slough Unit of the North Grasslands WA has had a ten-fold increase in hunter use.

Other species, including special status species, have also benefited from new opportunities for Central Valley wetland management brought on by application of additional water provided under the CVPIA. Sacramento Valley refuges report increased use by western pond turtles and colonial nesting birds such as the tri-colored blackbird. Refuges in the San Joaquin Valley noted increases in populations of giant garter snake and in the nesting of western, Clark's, and eared grebes; black-crowned night herons; redhead and ruddy ducks; and tri-colored blackbirds. Valley-wide, shore-bird use on shallow wetlands has increased by hundreds of thousands as sandpipers, dunlins, yellowlegs, phalarope, and dowitchers respond to increased wetland acreage during fall and spring migrations and to increases in their invertebrate food supply.

White-faced ibis and sandhill cranes provide a stellar example of how the availability of adequate water supplies enables refuge managers to provide habitat for endemic species that had been in severe decline for decades. Improved and more permanent water supplies have led to an increase in the numbers of frogs, snails, aquatic insects, and small fish and provided habitat for late-spring and summer nesting, essential components for these species. The returns started slowly. Sutter National Wildlife Refuge, for example, hosted 100 white-faced ibis in 1991. That number has increased to 1,000 birds in 2000, 7,000 in 2001, and a staggering 15,000 ibis in 2002. Kern National Wildlife Refuge had a similar experience, with 50 ibis in 1991 and over 5,600 in 2001. Pixley National Wildlife Refuge supported 200 sandhill cranes in 1992 when the CVPIA was passed. They received their first allocation of CVPIA water in 1993 and provided habitat for over 2,000 cranes that year. In 2001, the number had risen to 5,100 sandhill cranes.

REPORTS PREPARED FOR SECTION 3406(d)(1-5)

- NEPA documentation for Level 2 Refuge Water Supply Delivery, 1994
- Report of Recommended Alternatives, Refuge Water Supply and SJBAP Lands, 1995
- Refuge Water Supply Conveyance Alternatives Refinement Memorandum, 1995
- Refuge Water Supply Implementation Plan, 1996
- Draft NEPA documentation for Conveyance of Refuge Water Supply, South San Joaquin Valley Refuges, 1996
- Draft NEPA documentation for Conveyance of Refuge Water Supply, Mendota WMA, 1996
- NEPA documentation for Conveyance of Refuge Water Supply, West Sacramento Valley Refuges, 1997
- NEPA documentation for Conveyance of Refuge Water Supply, East Sacramento Valley Refuges, 1998
- NEPA documentation for Conveyance of Refuge Water Supply, Grasslands/SJBAP Refuges, 1998
- Administrative Proposal on Refuge Water Supply, 1998
- Final Implementation Plan, SJBAP Preferred Alternative, 1998
- Refuge Water Supply Implementation Plan, 1998
- China Island Implementation Plan, 1998

APPENDIX F

Other Fish and Wildlife

Appendix F Other Fish and Wildlife

Habitat Restoration Program

Reference Section of CVPIA: 3406(b)(1) "other" Start Date: 1996 Status: Ongoing

Objectives

- Protect and restore native habitats
- Stabilize and improve populations of native species
- Restore a continuous riparian corridor along the San Joaquin River from Friant Dam to the Merced River

Accomplishments

- Obtained partner contributions of approximately $48 million (match of 4.8 partner: 1 Federal)
- Participated, with partners, in the acquisition of 88,364 acres and restoration or enhancement of more than 1,111 acres, focusing on protection and restoration of native habitats and on stabilization and improvement in populations of native species
- Conducted biological surveys for Federally listed species
- Contributed to development of a breeding program for riparian brush rabbit
- Developed a habitat trend analysis study for the Central Valley
- Completed analyses of historic biological conditions and physical process for the San Joaquin River from Friant Dam to the Merced River

Fiscal Data

Fiscal Year	Obligation
1996	$1,643,236
1997	$5,668,182
1998	$2,104,716
1999	$2,586,442
2000	$4,865,128
2001	$5,044,540
2002	$2,369,651

Section 3406(b)(1) states, "...in the course of developing and implementing this program the Secretary shall make all reasonable efforts consistent with the requirements of this section to address other identified adverse environmental impacts of the Central Valley Project not specifically enumerated in this section."

Two restoration programs were established in response to Section 3406(b)(1).

The first program, termed the Habitat Restoration Program, addresses the needs of native fish and wildlife affected by the CVP and not specifically addressed in other portions of Section 3406. The program has focused on:

- habitats affected by construction and operation activities of the CVP and experiencing the greatest declines;
- species that are Federally listed, proposed, or candidate for listing;
- non-listed State and Federal species of special concern; and
- other associated native wildlife species within the above habitats.

Projects and studies that meet program objectives were identified during other efforts, including the various Endangered Species Act section 7 consultations associated with the CVP, CVP contract renewals, the CVPIA PEIS, and implementation of other CVPIA provisions. Accordingly, the Habitat Restoration Program works in concert with the Central Valley Project Conservation Program. A Central Valley Project Conservation Program Team, comprised of agency professionals with expertise in habitat restoration and the recovery of listed species, ensures integration of the two programs during the solicitation, funding, and implementation of projects.

Program studies focused on the identification and evaluation of potential restoration opportunities, and program projects concentrated on the protection and restoration of native habitats and species in the Central Valley. Two notable examples of funded projects meeting these criteria include the Pine Hills Ecological Reserve and the reintroduction of the riparian brush rabbit.

The Habitat Restoration Program has contributed funding over multiple years towards the acquisition of the Pine Hill Ecological Reserve in El Dorado County. As of spring 2002, 2,615 acres of the planned 5,000-acre reserve have been acquired through multiple funding sources. The Habitat Restoration Program participated in the acquisition of 427 acres of this total. This reserve is being established to protect five Federally listed and three Federal candidates plant species associated with the extremely rare natural community associated with gabbro soils. In addition to the acquisition of lands for the Ecological Reserve, there is a multi-agency effort underway to develop and implement a fire management plan for this fire dependent community. Both the Service and Reclamation are actively involved in this effort.

A riparian brush rabbit habitat restoration, captive breeding and reintroduction program at Caswell Memorial State Park has been supported by the Habitat Restoration Program. This program, first funded in 1997,

represents a last-ditch effort to save an endangered species that once was among the most abundant in the Central Valley. To date, the Habitat Restoration Program has participated in the restoration/enhancement of 258 acres of brush rabbit habitat. The captive-breeding component of the project is a joint venture of several State and Federal agencies. Reclamation, the Service, and the Endangered Species Recovery Program at California State University/Stanislaus in Turlock are managing the program, and primary funding – about $400,000 a year – is being provided under the CVPIA. Other partners include the California Departments of Fish and Game, Water Resources, and Parks and Recreation.

To date, funding has contributed to species surveys, construction of captive breeding pens, genetic studies, radio tagging, removal of exotic species, brush clearing for fire prevention, and educational outreach. More than 40 rabbits have been born in captivity and are being reintroduced into the wild at the San Joaquin River National Wildlife Refuge. This is the first time an endangered mammal has been bred in captivity in California.

The second program established in response to Section 3406 (b)(1), the San Joaquin River Riparian Habitat Restoration Program, was developed to address the fact that the quantity and quality of riparian habitat along the San Joaquin River is inadequate to support production and survival of desirable plant and animal species. Working with the public, interested stakeholders, and agency staff, the program is pursuing a mutually acceptable riparian restoration effort on the San Joaquin River from Friant Dam to the confluence with the Merced River.

Initial efforts have been directed toward developing a sound scientific basis for identifying sites where restoration has a likelihood of success. Analyses of historic biological conditions and physical processes have been completed. The Corps of Engineers and California Department of Water Resources are gathering additional scientific data in conjunction with CVPIA efforts.

HABITAT RESTORATION PROGRAM
ACQUISITION AND RESTORATION PROJECTS

Project	Acres Acquired	Acres Enhanced	Benefit
Participated in Valensin Ranch acquisition on the Consumnes River, Sacramento County.	4,356		Protects grasslands, hardwood woodlands, riparian, and vernal pool habitats to benefit several special status species including giant garter snake, bald eagle, Swainson's hawk, and tri-colored blackbird.
Participated in Howard Ranch acquisition on the Consumnes River, Sacramento County	13,000		Protects existing vernal pool, grassland, and valley oak hardwood habitats to benefit multiple species, including Federally listed vernal pool species.
Participated in Pine Hills Ecological Reserve protection in El Dorado County	476		Contributes to survival and recovery of five listed plant species associated with gabbro soil formations.
Participated in Allensworth Ecological Reserve acquisition, Tulare County	460		Protects vernal pool and alkali sink habitats to benefit Federally listed vernal pool species and the San Joaquin kit fox.
Participated in North Weber Creek acquisition in El Dorado County	54		Protects habitat for one of two known populations of California red-legged frog, a Federally listed species.
Participated in the Simon Newman and Romero Ranches acquisition, western Merced County	61,043		Provides protection of habitat for listed species, including San Joaquin kit fox and California red-legged frog, as well as several other sensitive native wildlife species.
Participated in the Caswell State Park restoration		258	Protects, enhances, and restores habitat for riparian brush rabbit and riparian woodrat.
Participated in Jensen Ranch acquisition on the San Joaquin River, Fresno County	156		Protects habitat along the San Joaquin River for valley elderberry longhorn beetle.
Participated in the acquisition of the	960		Protects a variety of vernal pool species

Project	Acres Acquired	Acres Enhanced	Benefit
Farmington Property, San Joaquin County			
Participated with Sacramento Open Space Conservancy in the acquisition of a large vernal pool complex at the Silva property, Sacramento County	80		Protects a variety of vernal pool species
Participated with The Nature Conservancy (TNC) and Shasta Land Trust in the acquisition of native habitat at the Fenwood property, Shasta County	2,180		Protects oak woodland, riparian, vernal pool, and willow scrub habitat for bank swallow, willow flycatcher, bald eagle, and valley elderberry longhorn beetle
Participated in the acquisition of the Herbert Property, Tulare County	725	100	Protects and improves habitat for a variety of vernal pool species
Participated with TNC in the acquisition of a conservation easement on the Ben Brown Ranch in Sacramento County	370		Protects vernal pool and grassland habitat to benefit Federally listed vernal pool invertebrates
Participated with the Land Retirement Program in the acquisition of the Nickell property in Tulare County	485 (included in Land Retiremen t Program)		Provides protection of habitat for listed species, including San Joaquin kit fox, blunt nosed leopard lizard and kangaroo rats
Participated with TNC in the acquisition of a conservation easement on the Schneider Ranch in Sacramento County	1,136		Provides protection of vernal pool and grassland habitat to protect listed vernal pool species
Participated with Sacramento River Partners in the restoration of riparian habitat at Llano Seco in Colusa County		206	Enhances distribution of valley elderberry longhorn beetle and provides habitat for neotropical migrant birds. Provides water quality and lessens sedimentation of the Sacramento River
Participated in the acquisition of property for Stone Lakes National Wildlife Refuge, Sacramento County	100		Contributes to the survival and recovery of vernal pool habitat and associated listed vernal pool invertebrates
Participated in the acquisition of habitat at Deer Creek Hills, Sacramento County	2,054		Protects oak woodland, grassland, and riparian habitat for a variety of species
Participated in the acquisition of riparian habitat at the Schmidbauer property, Butte County	264		Provides restoration potential for valley elderberry longhorn beetle and habitat for neotropical migrant birds.
Participated in the acquisition of riparian habitat at the Southam property, Colusa County	73		Provides restoration potential for valley elderberry longhorn beetle and habitat for neotropical migrant birds. Provides opportunity to enhance water quality and lessen sedimentation of the Sacramento River
Participated in the acquisition of riparian habitat at the Boeger and Ward properties, Colusa County	376		Provides restoration potential for the valley elderberry longhorn beetle and habitat for neotropical migrant birds.
Funded the enhancement of habitat for the giant garter snake at Colusa NWR, Colusa County		450	Improves habitat conditions and supports recovery of the listed giant garter snake
Funded the restoration of habitat for the San Joaquin kangaroo rat at Lemmore Naval Air Station, Fresno and Kings County		97	Improves habitat conditions and supports recovery of the kangaroo rat and other valley floor species
Participated in the acquisition of property for the Stone Corral Ecological Reserve, Tulare County	16		Protects a variety of vernal pool species
TOTAL	**88,364**	**1,111**	

HABITAT RESTORATION PROGRAM
STUDIES AND MANAGEMENT ACTIVITIES

Study/Activity	Benefit
Conducted biological surveys for Federally listed species	Provides additional life history and population information for listed species in the Central Valley, including California red-legged frog, yellow-billed cuckoo, and giant garter snake.
Funded a captive breeding program for the riparian brush rabbit.	Provides a gene pool for ultimate recovery of the species and a safeguard against extinction in the event of another major flood or other natural catastrophe.
Funded population and genetic studies of the riparian brush rabbit.	Provides critical information to assist in the recovery of the species..
Developed restoration and/or management programs	Provides benefits for large-flowered fiddleneck, giant garter snake, riparian brush rabbit, and riparian woodrat.
Developed a habitat trend analysis study for the Central Valley	Assists in development of restoration goals for priority habitat in the Central Valley.
Developed a riparian model for the Sacramento River	Assists prioritization and location of riparian parcels for acquisition and/or restoration.
Partnered with Alameda County and the City of Livermore to fund a groundwater hydrological model for the Springtown Alkali Sink	Will assist in the prioritization and conservation of key parcels of land in the Springtown Alkali Sink

SAN JOAQUIN RIVER RIPARIAN HABITAT RESTORATION PROGRAM
STUDIES AND MANAGEMENT ACTIVITIES

Activity	Benefit
Funded report on "Historical Riparian Habitat Conditions of the San Joaquin River – Friant Dam to Merced River", April 1998	Provides baseline for evaluating riparian restoration efforts
Funded report on "Analysis of Physical Processes and Riparian Habitat Potential of the San Joaquin River", October 1998	Provides baseline information to assist in identifying and prioritizing areas with potential for riparian restoration
Initiated development of a Geographical Information System (GIS) for the San Joaquin River corridor with layers for physical, biological, and land use/landowner information	Allows joining geo-referenced results of data from other programs and outside analytical efforts. Provides avenue to contact parties that may be affected by proposed site-specific projects.
In cooperation with the Department of Water Resources, mapped riparian vegetation, rip-rapped areas, and water diversions along San Joaquin River from Friant Dam to the Merced River	Provides baseline information to assist in identifying and prioritizing areas with potential for riparian restoration
Funding the development of a Restoration Plan for the 300 acre Milburn/Hansen Unit near Fresno	Provides blueprint for restoration of the habitat and species on site
Funded development of a model and report entitled "Groundwater Model of the San Joaquin River Riparian Zone – Friant Dam to the Merced River", October 2000	Provides information on groundwater/riparian interactions that could enhance riparian restoration efforts
Funded development of a model and report entitled "Hydraulic and Sediment Continuity Modeling of the San Joaquin River from Friant Dam to the Merced River", March 2000	Provides analytical tool to simulate effects of various river restoration and management scenarios
At the request of CVP Friant Division water districts, completed 3 distinct experimental projects on the San Joaquin River between Friant Dam and the Merced River area.	During each experimental project, releases from Friant Dam were made to evaluate the effects of flow on riparian vegetation growth and regeneration, riparian wildlife species, channel roughness, groundwater-surface water interactions, and various other physical and biological functions

Activity	Benefit
Funded Department of Water Resources to identify areas of recent riparian recruitment and study survivorship, to evaluate age class distribution, and evaluate potential for natural recruitment and survival of native riparian under existing hydrologic conditions	Will help identify conditions necessary for riparian recruitment and survival
Initiated development of an "Invasive Plant Control and Re-vegetation Prioritization Plan for the San Joaquin River from Friant Dam to the Merced River	Will provide information essential to control non-native invasive plant species and facilitate restoration with native riparian species

Land Retirement Program

Reference Section of CVPIA: 3408(h) Start Date: 1994 Status: Ongoing

Objectives

- Decrease drainage-related water quality problems in the San Joaquin Valley
- Enhance wildlife habitat and contribute to the recovery of endangered species
- Restore and protect aquatic habitat in the San Joaquin River through improved water quality
- Evaluate habitat rehabilitation techniques and land management options
- Acquire associated water rights for beneficial uses under CVPIA

Accomplishments

- Acquired 1,228 acres of existing and potential fish and wildlife habitat at Prospect Island
- Acquired 7,466 acres of agricultural land in San Joaquin Valley and added 485 acres acquired by Habitat Restoration Program.
- Completed NEPA compliance and initiated a program demonstration project on 1,800 acres of retired lands
- Initiated extensive public involvement and information program
- Created program parcel selection criteria
- Completed a groundwater model of the Panoche Fan
- Funded feasibility study for Panoche-Silver Creek Corridor Project

Fiscal Data

Fiscal Year	Obligation
1994	$50,497
1995	$2,885,152
1996	$1,368,250
1997	$3,206,868
1998	$2,429,889
1999	$1,440,265
2000	$9,157,361
2001	$3,009,695
2002	$4,640,527

Section 3408(h) states, "The Secretary is authorized to purchase from willing sellers land and associated water rights and other property interests...which receives Central Valley Project water under a contract executed with the United States, and to target such purchases to areas deemed most beneficial to the overall purchase program, including the purposes of this title." The Secretary is authorized to purchase agricultural land which, in the opinion of the Secretary, would, "if permanently retired from irrigation, improve water conservation by the district, or improve the quality of an irrigation district's agricultural wastewater and assist the district in implementing provisions of a water conservation plan; or are no longer suitable for sustained agricultural production..."

The Land Retirement Program is based, in part, upon recommendations of the San Joaquin Valley Drainage Program. The program's two principal objectives are to decrease drainage problems in the San Joaquin Valley and to enhance wildlife habitat and the recovery of endangered species. The potential to retire large blocks of land from willing sellers best meets these objectives.

Currently, retirement of land is accomplished under Interim Guidelines and existing Federal regulations. The program, stressing adaptive management, is considered a pilot, or demonstration, program. After the 5-year demonstration program is complete, accumulated information will be used to conduct an ecological risk assessment and complete a programmatic NEPA document. The interim program is based on a competitive process, designed to retain maximum flexibility to the government in selecting and retiring lands.

In 1995, Prospect Island was acquired for nearly $2.9 million. The island, in the northwest Sacramento-San Joaquin Delta, contains 1,228 acres of existing and potential wildlife and fisheries habitats.

The Land Retirement Program established an interagency team with representatives from Reclamation, the Service, and the Bureau of Land Management and issued Interim Guidelines in 1996. Also in 1996, Interior purchased 591 acres of agricultural land in the Westlands Water District, on which DFG began a testing program to evaluate habitat restoration techniques using interim program guidelines and Federal regulations.

Benefits of Land Retirement

- Improved water conservation
- Improved quality of irrigation wastewater
- Potential source of water for Water Acquisition Program
- Potentially enhanced recovery of wildlife resources, including endangered species

Active public involvement began with public meetings and the publishing of notices in local newspapers in 1997. A Memorandum of Understanding was developed between Federal and State agencies outlining a shared vision and solidifying support for the Land Retirement Program. The Interim Guidelines were revised in November 1997, based on insight gained during the first year. Generalized parcel selection criteria addressing drainage, fish and wildlife enhancement, and the acquisition of water for other purposes of the CVPIA were developed, and a total of 12,563 acres were specified for retirement in the first round. Also, in 1997, a 1,891-acre demonstration program was established to monitor groundwater, soils, and biota; to determine effective habitat rehabilitation methods; and to demonstrate alternatives for the disposition of water.

In 1998, Interior expanded the demonstration program to 15,000 acres in an effort to determine if current selection criteria were adequate to accomplish the program's mission. NEPA documentation for the expanded demonstration program has been completed and the demonstration program is well underway. A variety of land treatments and habitat restoration techniques have been applied to approximately 1,800 acres of the retired lands. Twenty 40-acre test plots have been established for four trials and their replicates. In addition, on-going ancillary trials are being conducted on a smaller scale to test alternate restoration techniques. Trials to date have compared imprinting versus drilling of native seeds, seeding calibration, seeding mixes, mychorrizal amendments, nutrient amendments, various topographic contouring methods, and seedbed preparations.

Extensive monitoring of the test and ancillary plots, as well as the remaining acres of the demonstration project lands is providing valuable data that will guide the program in the future and allow management to more quickly adapt to concerns, particularly establishment of non-native vegetation, as habitat is restored.

In 1998, the land retirement program team entered into a 5-year cooperative agreement with BLM to acquire land and conduct restoration activities in Atwell Island Water District in the amount of $12 million dollars. Lands were retired in the Atwell Island Water District beginning in January of 2000 and, as of June 30, 2002, the program had acquired 7,466 acres in the San Joaquin Valley and added 485 acres acquired by the Habitat Restoration Program. An additional 580 acres are in escrow and are expected to close in fiscal year 2003. Approximately 1,240 acres remain in the Atwell Island Water District and these lands are targeted for acquisition by BLM in FY 2003. BLM spends approximately $200,000 each year for habitat restoration costs, which include seed collection and growing nursery stock for transplanting within the project area, as well as the purchase of necessary equipment and supplies. Land Retirement Program dollars fund the current land acquisition and habitat restoration efforts, however, BLM will fund future operation and maintenance costs for these retired lands through the agency's normal budget process. These lands will be managed primarily for upland wildlife habitat. As of June 30, 2002, approximately $1.6 million dollars remain in this interagency agreement, most of the which will be used to acquire the remaining acres within the Atwell Island Water District, and some adjacent lands within the Alpaugh Irrigation District, that have applied to the program.

A Feasibility Report was completed in 1999. This Report analyzed the feasibility and cost of developing a riparian habitat and flood control corridor using retired lands in the vicinity of Panoche Creek. Groundwater model studies of various land retirement scenarios were completed as part of the planning process for the demonstration project. Model results and subsequent monitoring have confirmed the drainage reduction benefits of land retirement in the western San Joaquin Valley.

REPORTS PREPARED FOR SECTION 3408(h)

- Interim Guidelines for Land Retirement, 1996 and 1997
- Demonstration Project Study Plan, 1998
- Environmental Compliance Documents for the Demonstration Program
- Annual Reports for Years 1999, 2000, and 2001

APPENDIX G

Monitoring

Appendix G Monitoring

Comprehensive Assessment and Monitoring Program

Reference Section of CVPIA: 3406(b)(16) Start Date: 1994 Status: Ongoing

Objectives

- Assess the overall effectiveness of CVPIA restoration actions within Section 3406(b)
- Assess the relative effectiveness of: (1) water management modifications, (2) fish screens, (3) other structural actions, and (4) habitat restoration

Accomplishments

- Developed Conceptual Plan and initiated Implementation Plan
- Contracted with DFG to estimate adult American shad population and to monitor adult striped bass, harvest of adult salmon and steelhead, and out migration of juvenile salmonids
- Developed and implemented a fish screen evaluation program
- Funded a hatchery marking program
- Contracted for data management through the Interagency Ecological Program
- Reports of CAMP data and findings are completed and disseminated annually
- Developed plan for constant fractional marking of hatchery salmonids
- Completed a riparian mapping program for the Sacramento River and tributaries

Fiscal Data

Fiscal Year	Obligation
1994	$125,137
1995	$373,526
1996	$1,867,315
1997	$2,034,394
1998	$1,617,838
1999	$1,497,847
2000	$868,778
2001	-$435,955
2002	$530,546

** The negative is a credit

Section 3406(b)(16) states, "The Secretary, is...authorized and directed to establish, in cooperation with independent entities and the State of California, a comprehensive assessment program to monitor fish and wildlife resources in the Central Valley to assess the biological results and effectiveness of actions implemented pursuant to this subsection."

In response to this directive, the Comprehensive Assessment and Monitoring Program (CAMP) was developed to assess four categories of CVPIA actions: (1) water management modifications, (2) fish screens, (3) other structural actions, and (4) habitat restoration efforts. The results of these assessments will be used to identify additional actions that may be required to meet the goals of the Act.

In developing the CAMP program, the Service first evaluated existing fish monitoring programs. This provided the baseline for development of a comprehensive program in 1995 and 1996 specifically focused on evaluating the biological results and effectiveness of CVPIA actions.

Initiation of CAMP proceeded at two levels: (1) development of a Conceptual Plan for evaluating the overall success of various implemented actions (completed in 1995); and (2) development of an Implementation Plan to identify details of actual field work, data processing, and needed evaluations (completed in 1996).

To implement CAMP, several contracts were developed with DFG in order to assess the effectiveness of CVPIA actions. These contracts included efforts to estimate the American shad population, a program to help estimate adult striped bass populations, an angler survey to help estimate changes in adult salmon and steelhead populations, and screw trapping of juvenile chinook salmon on selected streams.

CAMP implemented a data management system through the Interagency Ecological Program, including the establishment of a CAMP Internet homepage. Annual reports of CAMP findings are prepared and disseminated to interested parties approximately 1 year after data collection.

In addition to the monitoring component, Interior provided matching funds to develop a sophisticated mapping program for the Sacramento River and tributaries. The purpose of the mapping program was to develop high-definition maps of riparian habitat. These maps provide baseline data and will assist in evaluating the success of restoration efforts.

REPORTS PREPARED FOR SECTION 3406(b)(16)

- Comprehensive Assessment and Monitoring Plan - Conceptual Plan
- Comprehensive Assessment and Monitoring Plan - Implementation Plan
- Annual Reports for 1995-1997, 1998, and 1999

APPENDIX H

Studies, Investigations and Modeling

Appendix H Studies, Investigations and Modeling

Flow Fluctuation

Reference Section of CVPIA: 3406(b)(9) Start Date: 1994 Status: Ongoing

Objective

- Eliminate, to the extent possible, anadromous fish losses due to flow fluctuations caused by the operation of any CVP storage or re-regulating facility

Accomplishments

- Coordinated management of CVP facilities to reduce flow fluctuations on the American and Stanislaus Rivers
- Worked toward developing reservoir release standards that minimize impacts on fisheries
- Initiated a study to determine threshold flows and ramping rates required protecting anadromous fish species on the American and Stanislaus Rivers

Fiscal Data

Fiscal Year	Obligation
1994	$18,417
1995	$55,552
1996	$309,667
1997	$144,364
1998	$65,516
1999	$173,843
2000	$61,675
2001	$78,349
2002	$44,402

Section 3406(b)(9) states, "The Secretary is authorized and directed to develop and implement a program to eliminate losses of anadromous fish due to flow fluctuations caused by the operation of any Central Valley Project storage or re-regulating facility. The program shall be patterned where appropriate after the agreement between the California Department of Water Resources and the California Department of Fish and Game with respect to the operation of the California State Water Project Oroville Dam complex."

Beginning in 1994, technical staff from Reclamation, the Service, and DFG initiated preliminary work on criteria to reduce flow fluctuations.

In 1996, Interior contracted with DFG to conduct a 3-year study to determine threshold flows and ramping rates required protecting lower American River fishery resources. A multiagency American River Operations Work Group was formed to oversee the contract, develop interim criteria, and adaptively manage reservoir releases to benefit all project purposes including water supply and fish and wildlife management. The operations group has coordinated with stakeholders including water districts and municipalities, public safety organizations, recreational interests, and the environmental community to maintain the best habitat and water temperature conditions for anadromous fish consistent with water availability and reservoir storage. Aided by generally wet weather patterns, the group moderated potential flow fluctuations, provided cool water in spawning areas earlier than had been achieved in the past, and instituted a means of quickly responding in a coordinated fashion to changing meteorological conditions and management needs.

Work accomplished during the cooperative study included aerial and ground surveys, topographic surveys of areas sensitive to flow fluctuation, detailed evaluation of the relationships between water levels and the distribution and quality of salmon spawning and rearing habitat, and biological studies to define the effects of flow management on aquatic populations. A final report, including recommended operational criteria, was completed in 2001. A similar effort on the Stanislaus River was initiated in 1999 and is ongoing.

Evaluation of the effects of flow fluctuations on anadromous fish in all CVP-controlled streams is ongoing. Coordination and cooperation among agencies continue to identify new measures to eliminate losses of anadromous fish as study findings become available.

Other operations criteria to reduce flow fluctuations caused by CVP operations are addressed by the action in Section 3406(b)(2) regarding dedicated water.

REPORT PREPARED FOR SECTION 3406 (b)(9)

- Evaluation of the Effects of Flow Fluctuations on Anadromous Fish Populations in the Lower American River November 2001

Shasta and Trinity Reservoir Carryover Storage Studies

Reference Section of CVPIA: 3406(b)(19) Start Date: 1998 Status: Ongoing

Objective

- Protect and restore the anadromous fishes in the Sacramento and Trinity Rivers

Accomplishments

- Evaluated Shasta Temperature Control Device operations
- Conducted temperature model studies of effects of the Shasta Temperature Control Device

Fiscal Data

Funding for this activity provided under Section 3406(b)(9)

Section 3406(b)(19) states, "The Secretary... is...authorized and directed to...reevaluate existing operational criteria in order to maintain minimum carryover storage at Sacramento and Trinity River reservoirs to protect and restore the anadromous fish of the Sacramento and Trinity Rivers...subject to the Secretary's responsibility to fulfill all project purposes, including agricultural water delivery."

Minimal planning under this CVPIA section was done pending completion of the Anadromous Fish Restoration Plan (Section 3406[b][1]) and the Water Management Plan for the 800,000 acre-feet of CVP dedicated yield (Section 3406[b][2]). Related studies conducted include evaluation of Shasta Temperature Control Device (TCD) and Trinity River operations.

Actions completed under this section include the evaluation of operational criteria to meet water temperature requirements and water supplies in response to changing project operations. Water temperature model studies, combined with the monitoring of actual operations, were used to evaluate the Shasta TCD operations and determine the most efficient use of cold-water resources for various water year types (for example, wet or normal). Results of this study will be incorporated into future studies on Shasta and Trinity Reservoir carryover storage.

In developing the Biological Opinion for winter-run Chinook salmon, the National Marine Fisheries Service evaluated the operational criteria needed to maintain minimum carryover storage in Shasta Reservoir to protect the anadromous fish in the Sacramento River. The Biological Opinion specified that 1.9 million acre-feet should be the minimum carryover storage in Shasta for protection of the winter-run Chinook salmon. Results from the Trinity Reservoir Carryover Study will be used in developing the final storage and operational criteria for the reservoir.

San Joaquin River Comprehensive Plan

Reference Section of CVPIA: 3406(c)(1) Start Date: 1993 Status: Ongoing

Objective

- Develop a comprehensive plan to restore fish, wildlife, and associated habitat along the San Joaquin River

Accomplishments

- Outlined study parameters to address environmental and social needs
- Initiated data collection to establish study area baseline and potential conditions

Fiscal Data

Fiscal Year	Obligation
1993	$596,732
1994	$642,968
1995	$927,725
1996	$ 2,638

Section 3406(c)(1) states, "The Secretary shall...develop a comprehensive plan which is reasonable, prudent, and feasible to address fish, wildlife, and habitat concerns on the San Joaquin River, including but not limited to the streamflow, channel, riparian habitat, and water quality improvements that would be needed to reestablish where necessary and to sustain naturally reproducing anadromous fisheries from Friant Dam to its confluence with the San Francisco Bay/Sacramento-San Joaquin Delta Estuary."

Development of a San Joaquin River comprehensive plan (Comprehensive Plan) for the specific purpose of complying with Section 3406 (c)(1) was initiated in 1993. However the effort to develop such information to support river restoration did not begin with the CVPIA. In 1989, prior to the enactment of the CVPIA, Reclamation was directed by the Secretary to explore opportunities for environmental restoration in the San Joaquin River Basin through the San Joaquin River Basin Resource Management Initiative (Initiative). In 1991 Reclamation and the California Resources Agency (Agency) entered into a Memorandum of Agreement (MOU) for sharing the cost for the Initiative. Among other things, the MOU provides for Reclamation and the Agency to develop a mutually acceptable plan of study for the Initiative which is consistent with the work activities underway in California Department of Water Resources' San Joaquin River Management Program effort, and that the Initiative shall focus primarily on Chinook salmon, water quality conditions, wetlands for waterfowl, wildlife, reservoir fishery, and recreation. When the CVPIA was signed into law, work efforts on the Initiative were redirected to begin working on the Comprehensive Plan which share nearly identical objectives. As data gathering continues including useful information gathered under other CVPIA programs, various complex technical restoration issues have been identified. These issues have included, but are not limited to, the overgrown condition of various reaches of the historic mainstem San Joaquin River channel due to re-direction of Friant Dam flood releases for flood control purposes, the potential effect of different gene pools of anadromous fisheries in the upper and lower San Joaquin, water temperature, water quality, water quantity, and the timing of flows from the San Joaquin to the Delta Estuary. A number of institutional matters were also identified such as determining how to develop and implement a program to restore ecosystem values to the River while ensuring the accomplishment of the authorized purposes of the Friant Division; the need for fish hatcheries, the reliance on human intervention; and private property rights.

Recent efforts to complete the preparation of the Comprehensive Plan have been complicated by (1) public concerns which, in 1995, led to a congressional conference committee directive that funds not be expended on the Initiative in fiscal year 1996; and (2) the ongoing litigation in the NRDC v. Rodgers et.al. lawsuit.

Stanislaus River Basin Water Needs

Reference Section of CVPIA: 3406(c)(2) Start Date: 1993 Status: Ongoing

Objective

- Evaluate and determine existing and future basin needs in the Stanislaus River Basin

Accomplishments

- Developed surface-water and groundwater models
- Conducted environmental modeling (HEP) for the Stanislaus River
- Developed alternatives
- Developed temperature model of the Calaveras River
- Prepared transition report that documented study activities
- Prepared a Stanislaus River Basin and Calaveras River Water Use Program, Threatened and Endangered Species Report

Fiscal Data

Fiscal Year	Obligation
1993	$0
1994	$405,047
1995	$286,182
1996	$24,485
1997	$0
1998	$221,894
1999	$113
2000	$68,669
2001	-$7,284

Section 3406(c)(2) states, "The Secretary shall, by not later than September 30, 1996...evaluate and determine existing and anticipated future basin needs in the Stanislaus River Basin. In the course of such evaluation, the Secretary shall investigate alternative storage, release, and delivery regimes, including but not limited to conjunctive use operations, conservation strategies, exchange arrangements, and the use of base and channel maintenance flows, in order to best satisfy both basin and out-of-basin needs consistent, on a continuing basis, with the limitations and priorities established in the Act of October 23, 1962 (76 Stat. 173)..."

On March 26, 1993, Reclamation and DWR signed a Memorandum of Agreement describing each agency's role in the preparation of an Environmental Impact Statement/Environmental Impact Report for the Stanislaus River Basin and Calaveras River Water Use Program. Reclamation began development of a surface-water model for use in analyzing alternatives, and DWR began development of a groundwater model. The agencies also formulated several alternatives and completed operations studies (computer modeling) for the alternatives. Reclamation developed a temperature model of the Calaveras River from New Hogan Reservoir to the mouth of the Calaveras River.

The Service completed an initial terrestrial habitat model (Habitat Evaluation Procedure [HEP]) for the Stanislaus River riparian corridor from Goodwin Dam to the confluence of the San Joaquin River. A report was also prepared addressing potential impacts that implementation of the Stanislaus River Basin and Calaveras River Water Use Program might have on Federally listed species.

In March 1995, DWR withdrew as a partner in the study after model studies indicated that no additional dependable water supply was available from the Stanislaus River. Reclamation was unable to identify another non-Federal cost sharing partner to continue the study. The results of the data collection and analysis were published in a transition report titled "American River/Folsom South Conjunctive Use Optimization Study," dated May 1996. This report includes information obtained from the American River Water Resources Investigation intended to meet the requirements under Section 3406(c)(2).

REPORTS PREPARED FOR SECTION 3406(C)(2)

- Transition Report, American River/Folsom South Conjunctive Use Optimization Study, 1996
- Stanislaus River Basin and Calaveras River Watershed Use Program, Threatened and Endangered Species Report, 1995

Additional study of the Stanislaus River Basin water needs was initiated in 1998 to assess the water temperature parameters and refine the analysis of the groundwater resources. Two water temperature profilers were purchased for installation in New Melones Reservoir and will collect data to quantify the coldwater resource in the reservoir and help manage river temperatures for Chinook salmon. Work was initiated to extend the groundwater model (San Joaquin County Integrated Groundwater Surface Water Model) to include the area between the Stanislaus River and the Tuolumne River. The extended model will be used to analyze conjunctive use opportunities in the Stanislaus Basin.

Additional evaluations include a study of the effects of flood-plain development, and the relationship between reservoir management and the ecological functioning of the river.

Central Valley Wetlands Water Supply Investigations

Reference Section of CVPIA: 3406(d)(6) Start Date: 1995 Status: Completed

Objectives

- Identify alternatives for improving water supply quality and reliability to privately owned wetlands
- Determine potential water supply locations and delivery requirements for 120,000 acres of potentially restorable wetlands

Accomplishments

- Developed an Interagency Management Team and prepared an administrative draft report
- Identified private wetlands locations and identified some water needs and reliable water supply alternatives
- Developed a GIS database and model to assist in identifying areas of potentially restorable wetlands and associated water supply and delivery requirements
- Completed Water Supply Report

Fiscal Data

Fiscal Year	Obligation
1996	$1,467,425
1997	$488,749
1998	$49,100
1999	$32,433
2000	$11,660
2001	$61,789

Section 3406(d)(6) states, "The Secretary, in consultation with the State of California, the Central Valley Habitat Joint Venture, and other interests, shall investigate and report on the following supplemental actions by not later than September 30, 1997: alternative means of improving the reliability and quality of water supplies currently available to privately owned wetlands in the Central Valley and the need, if any, for additional supplies; and water supply and delivery requirements necessary to permit full habitat development for water dependent wildlife on 120,000 acres supplemental to the existing wetland habitat acreage identified in Table 8 of the Central Valley Habitat Joint Venture's "Implementation Plan" dated April 19, 1990, as well as feasible means of meeting associated water supply requirements."

Interior designated the Service to lead efforts associated with these investigations and reports. Working through the Central Valley Habitat Joint Venture, the Service formed an Interagency Management Team consisting of the Service, Reclamation, DFG, Ducks Unlimited, California Wildlife Conservation Board, California Waterfowl Association, and The Nature Conservancy. This team provided technical guidance.

Completed investigations reviewed water supply needs and quality requirements for private wetlands, identified means to meet those requirements, and assessed the reliability of identified supplies. The investigations also identified potential locations, delivery requirements, and water supplies for full development of 120,000 acres of wetlands supplemental to existing habitats.

The final report on *Central Valley Wetland Water Supply Investigations* was completed and released in December 2000. It has served as a valuable tool for Federal, State, and local government agencies, conservation organizations, water districts, and individual landowners interested in further investigation of wetland water needs and supplies on a site-specific basis.

REPORT PREPARED FOR SECTION 3406 (d)(6)

- Central Valley Wetland Water Supply Investigations December 2000

Investigation on Maintaining Temperatures for Anadromous Fish

Reference Section of CVPIA: 3406(e)(1) Start Date: 1994 Status: Completed

Objective

- Investigate measures to control water temperature by controlling or relocating irrigation and sewage effluent return flows or restoring riparian forests

Accomplishments

- Completed field investigations on the interaction between riparian forests and river water temperatures along Sacramento River
- Evaluated effects of vegetation, agricultural drainage, and sewage discharge on water temperatures

Fiscal Data

Fiscal Year	Obligation
1994	$84
1995	$31,465
1996	$828,177
1997	$985,197
1998	$125,098

***Includes funding for both 3406(e)(1) investigation and 3406(e)(3 and 6) investigation

Section 3406(e)(1) states, "Not later than 5 years after the date of enactment of the title, the Secretary shall investigate and provide recommendations to...[Congress]...on the feasibility, cost, and desirability of developing and implementing...measures to maintain suitable temperatures for anadromous fish survival in the Sacramento and San Joaquin rivers and their tributaries, and the Sacramento-San Joaquin Delta by controlling or relocating the discharge of irrigation return flows and sewage effluent, and by restoring riparian forests."

Salmon and steelhead in the Central Valley evolved in an environment obligating their survival to areas of cold, uncontaminated flowing waters connected to the sea. The temperatures of these streams have changed significantly as a result of modifications to meet society's needs, and some anadromous fish populations, such as winter-run Chinook salmon, are near extinction. The potential benefits of improving instream temperatures in these natal streams include more appropriate instream spawning and rearing conditions, improved survival of adult anadromous fish during migration, and enhanced riparian habitat for feeding, predator avoidance, and resting.

This investigation focused primarily on the interaction between riparian forests and water temperature along the Sacramento River and evaluated the effects of vegetation, agricultural drainage, and sewage discharge on water temperatures in Central Valley rivers and tributaries. A report on the investigation was completed in January 2001.

REPORT PREPARED FOR SECTION 3406(e)(1)

- Influence of Riparian Vegetation on Water Temperature in the Sacramento River, California January, 2001

Investigations on Tributary Enhancement

Reference Section of CVPIA: 3406(e)(3 and 6) Start Date: 1994 Status: Completed

Objectives

- Investigate measures to eliminate barriers to fish passage in Central Valley rivers and tributaries
- Investigate methods to improve habitat on Central Valley tributary streams

Accomplishment

- Completed CVPIA Tributary Production Enhancement Report

Fiscal Data

Funding for this investigation included under Section 3406(e)(1)

Section 3406(e)(3) states, "Not later than five years after the date of enactment of this title, the Secretary shall investigate and provide recommendations to...[Congress]...on the feasibility, cost, and desirability of developing and implementing measures to eliminate barriers to upstream and downstream migration of salmonids in the Central Valley, including but not limited to screening programs, barrier removal programs and programs for the construction or rehabilitation of fish ladders on tributary streams."

Section 3406(e)(6) states, "Not later than five years after the date of enactment of this title, the Secretary shall investigate and provide recommendations to...[Congress]...on the feasibility, cost, and desirability of developing and implementing other measures which the Secretary determines would protect, restore, and enhance natural production of salmon and steel-head in tributary streams of the Sacramento and San Joaquin Rivers, including but not limited to the Merced, Mokelumne, and Calaveras Rivers and Battle, Butte, Deer, Elder, Mill, and Thomes Creeks."

Both of these studies were conducted in coordination with the Anadromous Fish Restoration Program [3406(b)(1)] and investigated the potential benefits of removing anadromous fish barriers and constructing passage facilities. These studies evaluated opportunities for habitat improvement, flow augmentation, and riparian management on all Central Valley streams.

Actions suggested in these studies could increase fish habitat and the production of juvenile anadromous fish in important rivers and streams not regulated by the CVP. Additionally, wildlife species will benefit as riparian and other adjacent terrestrial habitats are included in restoration activities.

A report was completed in 1998 and was submitted to Congress in 2000 along with the report for Section 3406(e)(1). The information in the report has proven to be of great value in identifying potential actions to help in the doubling of anadromous fish populations in Central Valley streams.

REPORT PREPARED FOR SECTION 3406(e)(3 and 6)

- CVPIA Tributary Production Enhancement Report

Report on Fishery Impacts

Reference Section of CVPIA: 3406(f) Start Date: 1994 Status: Completed

Objective

- Prepare a report detailing all effects of the CVP on anadromous fish

Accomplishment

- Completed report in December 1995

Fiscal Data

Fiscal Year	Obligation
1994	$5,374
1995	$951,672
1996	$906,148
1997	-$392,227

** The negative is a credit

Section 3406(f) states, "The Secretary, in consultation with the Secretary of Commerce, the State of California, appropriate Indian tribes, and other appropriate public and private entities, shall investigate and report on all effects of the Central Valley Project on anadromous fish populations and the fisheries, communities, tribes, businesses and other interests and entities that have now or in the past had significant economic, social or cultural association with those fishery resources. The Secretary shall provide such report to...[Congress]...not later than two years after the date of enactment of this title."

In October 1995, a draft report was prepared based on a review of numerous reports and file documents; public meetings; and meetings with appropriate entities such as sport and commercial anglers, business owners, and Indian tribe representatives. The report was finalized in December 1995 and describes the major impacts of CVP reservoir facilities and operations on anadromous fish.

REPORT PREPARED FOR SECTION 3406(f)

- Report on Fishery Impacts of the Central Valley Project

Ecological and Hydrologic Models

Reference Section of CVPIA: 3406(g) Start Date: 1994 Status: Ongoing

Objectives

- Develop and improve scientific models to evaluate existing and alternative Central Valley water system operations and ecologic restoration efforts
- Ensure models are broadly available and readily usable

Accomplishments

- Participated in other modeling efforts
- Increased public awareness of availability and use of models
- Developed model data including hydrology and biological data
- Initiated development of hydrologic, water temperature and ecological models including CALSIM
- Developed specifications to design an integrated modeling environment
- Modified existing models to help plan and execute CVPIA water management provisions
- Initiated the Vernalis Adaptive Management Plan
- Developed simulation routines to address CVPIA components such as VAMP and (b)(2)

Fiscal Data

Fiscal Year	Obligation
1994	$569,985
1995	$328,039
1996	$1,293,680
1997	$1,252,382
1998	$1,379,263
1999	$898,457
2000	$702,741
2001	$869,070
2002	$831,236

***Funds do not include the costs of water for VAMP. Those costs are displayed under Section 3406(b)(3)-Water Acquisition Program – Anadromous Fish Focus on page C-6 of this document

Section 3406(g) states, "The Secretary, in cooperation with the State of California and other relevant interests and experts, shall develop readily usable and broadly available models and supporting data to evaluate the ecologic and hydrologic effects of existing and alternative operations of public and private water facilities and systems in the Sacramento, San Joaquin, and Trinity River watersheds."

The goal of the program is to develop an integrated modeling environment that enables interested parties to use both ecologic and hydrologic models to systematically evaluate the potential impacts of various CVP actions.

Benefits of Improved Models

- Better technical evaluation of actions proposed under CVPIA
- Better understanding of surface-water and ground- water impacts
- Assistance in setting priorities and adaptively managing implementation of CVPIA

To date, efforts have focused on new model development (primarily CALSIM and water temperature models) and documenting the data and logic to improve models. Model development has been coordinated with the U.S. Geological Survey, the U.S. Army Corps of Engineers, CALFED, DFG and DWR. Interior participated in multiagency work groups, including CALSIM development, the Bay-Delta Modeling Forum, the Water Forum, the California Water Plan Update, and the San Joaquin River Technical Committee (SJRTC) and has entered into cooperative agreements with other agencies and research organizations as a means of expanding and complementing its expertise.

CALSIM II development and application is jointly funded and executed by Reclamation and DWR. CALSIM II, a reservoir system model, replaces the separate models and data sets Reclamation and DWR used to simulate the operations of the CVP and the State Water Project. CALSIM II logic explicitly addresses activities such as the Vernalis Adaptive Management Program, Section 3406(b)(2) implementation, and the CALFED Environmental Water Account.

Efforts are under way to document data, model logic, development, and application to assure understanding and acceptance by the widest possible audience. Several multi-day classes have been held for CALSIM. The CALSIM development teams have offered on-going forums to discuss logic and application and have been responsive to requests for change.

Interior's participation in the Vernalis Adaptive Management Plan (VAMP) is evidence of its commitment to better understand how Bay-Delta operations affect the estuarine ecosystem. VAMP brings together scientists from various agencies and stakeholder groups to

study how Chinook salmon respond to changes in river

flows, Bay-Delta water exports, and to the installation of a seasonal barrier at the head of Old River intended to keep juvenile fish migrating down the San Joaquin River away from the State and Federal pumps. The VAMP is essentially an experiment initiated during April-May of each year when juvenile salmon from the San Joaquin River system are out-migrating to the sea. VAMP began in 1999 and is currently in the fourth year of a 12-year program.

Pursuant to a agreement with the San Joaquin River Group Authority, Interior funds the authority to have its member agencies make available up to 110,000 acre-feet of water to meet experimental flow targets at Vernalis on the lower San Joaquin River. The experimental flow targets are met by releases as necessary from reservoirs in the Merced, Tuolumne, and/or Stanislaus rivers. Information on the flows acquired for the lower San Joaquin River to implement the VAMP is included under Section 3406(b)(3) Supplemental Water Acquisition Program, in the table on page C-7 of this document.

Data on fish survival and entrainment in relation to the various flows, export operations, and the Old River barrier are recorded and, as the experiment progresses, is expected to aid in the development of ecological and hydrologic models of the system and in more informed decisions on project operations during these critical anadromous fish migration periods.

Hydrologic Model Development in Progress

- CALSIM II, the Reclamation/CADWR jointly developed model of the CVP and SWP delivery system which features a common model with common data
- Surface-water reservoir operations:
  - Modified SIMYLD, Labadie, et al, Colorado State University (MODSIM)
  - California Simulation Model (CALSIM)

  Ecologically Cogent Operations Simulation Model (ECOSIM-W)

  River and Reservoir temperature models for Sacramento River and tributaries

  Ecologically Cogent Operations Simulation Model (ECOSIM)

  Land-Air-Water Simulator (LAWS) which applies remote sensing technology to software interpretation of satellite imagery (LANDSAT) to identify crop types and areas (initiated and currently support by other funding but candidate for 3406(g)
- Groundwater management:
  - Update Central Valley Groundwater/Surface Water Model (CVGSM)
  - San Joaquin County Integrated Surface/Ground Water Model
  - Tulare Groundwater Model
- Variable time-step surface-water operations
- Three-dimensional temperature for Whiskeytown Reservoir

Ecological Model Development in Progress

- Sacramento River and tributaries Chinook salmon life history
- Sacramento River meander processes
- Response of floodplains and riparian habitat to flow patterns
- Reservoir and stream temperatures for the Stanislaus River
- 3-D estuarine hydrodynamic and salt transport

REPORTS PREPARED FOR SECTION 3406(g)

- Consensus Project, Phase I
- Plunging Flows Study
- Integrated modeling environment design

Project Yield Increase (Water Augmentation Program)

Reference Section of CVPIA: 3408(j) Start Date: 1994 Status: Completed

Objectives

- Develop a least-cost plan to increase the yield of the CVP by the amount dedicated by the CVPIA, and to assist the State of California in meeting future water needs

Accomplishments

- Prepared a least-cost plan describing options for increasing CVP yield by evaluating supply increase and demand reduction opportunities
- Submitted plan to Congress in July 1996

Fiscal Data

Fiscal Year	Obligation
1994	$738,170
1995	$991,446
1996	$59,964
1997	-$712
1998	$0
1999	-$558

Section 3408(j) states, "In order to minimize adverse effects, if any, upon existing Central Valley Project water contractors resulting from the water dedicated to fish and wildlife under this title, and to assist the State of California in meeting its future water needs, the Secretary shall...develop and submit to the Congress, a least-cost plan to increase, within fifteen years after the date of enactment of this title, the yield of the Central Valley Project by the amount dedicated to fish and wildlife purposes under this title."

The Least-Cost CVP Yield Increase Plan was developed with consideration of all reasonable options, including supply increase and demand reduction. The perspectives and viewpoints of various individuals and agencies affected by the CVPIA were incorporated into the planning process. More than 100 yield increase options were identified and evaluated for annual cost, yield, environmental effects, social effects, implementation time, and associated institutional issues. Options that did not have known unacceptable environmental or social impacts, and that could be implemented in the required timeframe (CVPIA requires the plan be implementable by 2007), were incorporated into the plan. The plan also addressed the effects of near-term competition for water in California, both for currently developed supplies and for future supply increases. These effects are increased water costs and loss of options to other developers or purchasers. Options evaluated in the plan had a cumulative yield of approximately 3 million acre-feet.

Water Augmentation Program Options

- Land Fallowing
- Conservation
- Modifications to CVP/SWP Operation
- Supplies from Local Water Projects
- Conjunctive Use
- Water Reuse
- Surface Storage and Conveyance

The marginal cost for implementing the first 800,000 acre-feet of yield increase was estimated to be $175 per acre-foot under 1995 market conditions. As competition increases and options are implemented by others, some options involving the purchase of water could reach $650 to $700 per acre-foot. These higher costs, affected by competitive forces, make non-purchase options such as conjunctive use relatively more attractive than others.

The Least-Cost CVP Yield Increase Plan was submitted to Congress in 1996. To date, Congress has not acted on any of the recommendations in the submitted plan.

REPORT PREPARED FOR SECTION 3408(j)

- Least-Cost CVP Yield Increase Plan