

10 Years of Progress

DRAFT

Central Valley Project
Improvement Act

Title 34 - P.L. 102-575
1993 - 2002

DRAFT

Central Valley Project Improvement Act

10 Years of Progress

A Summary of Activities and Accomplishments in the
Implementation of the
Central Valley Project Improvement Act

Title 34, Public Law 102-575

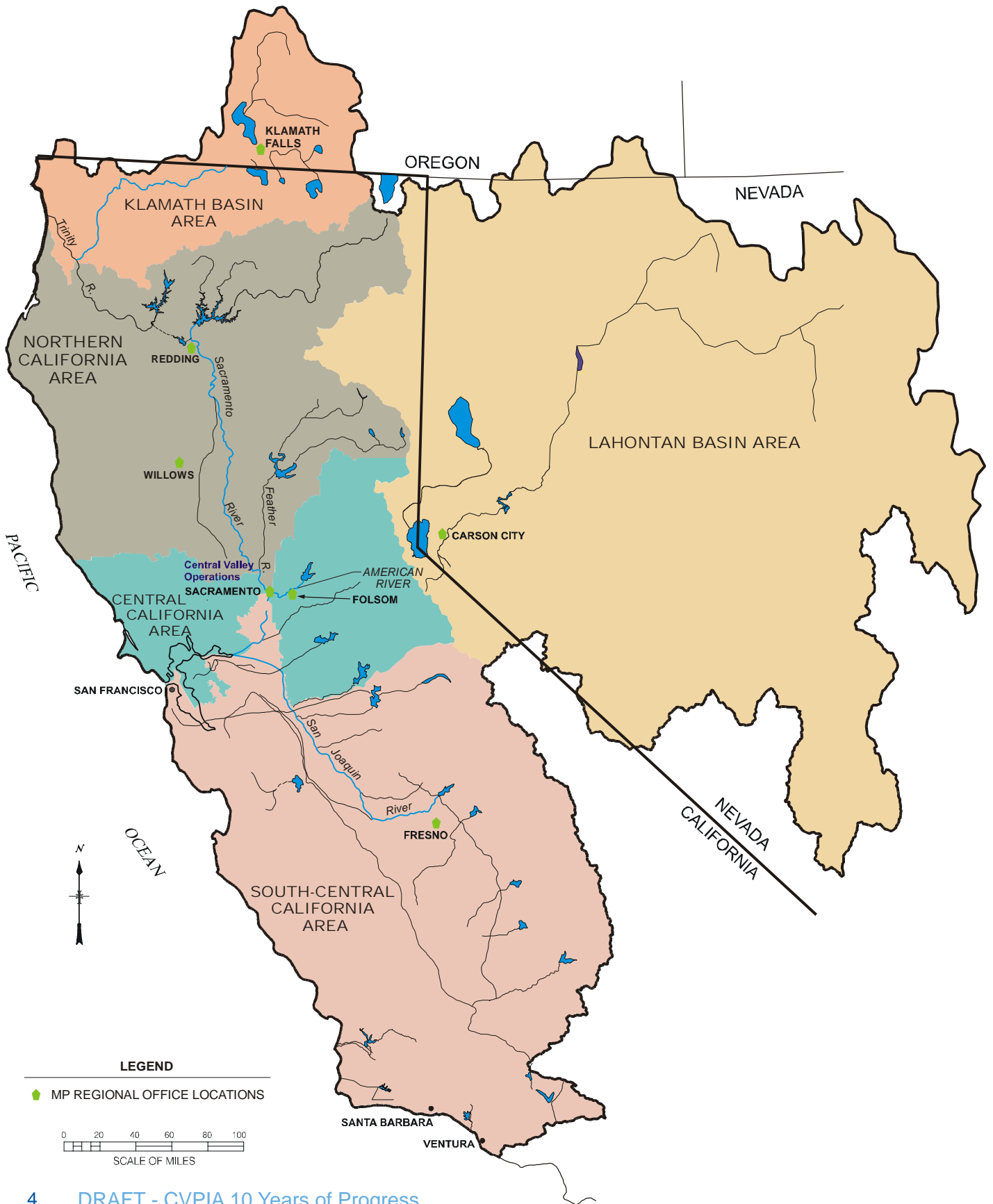
1993 - 2002



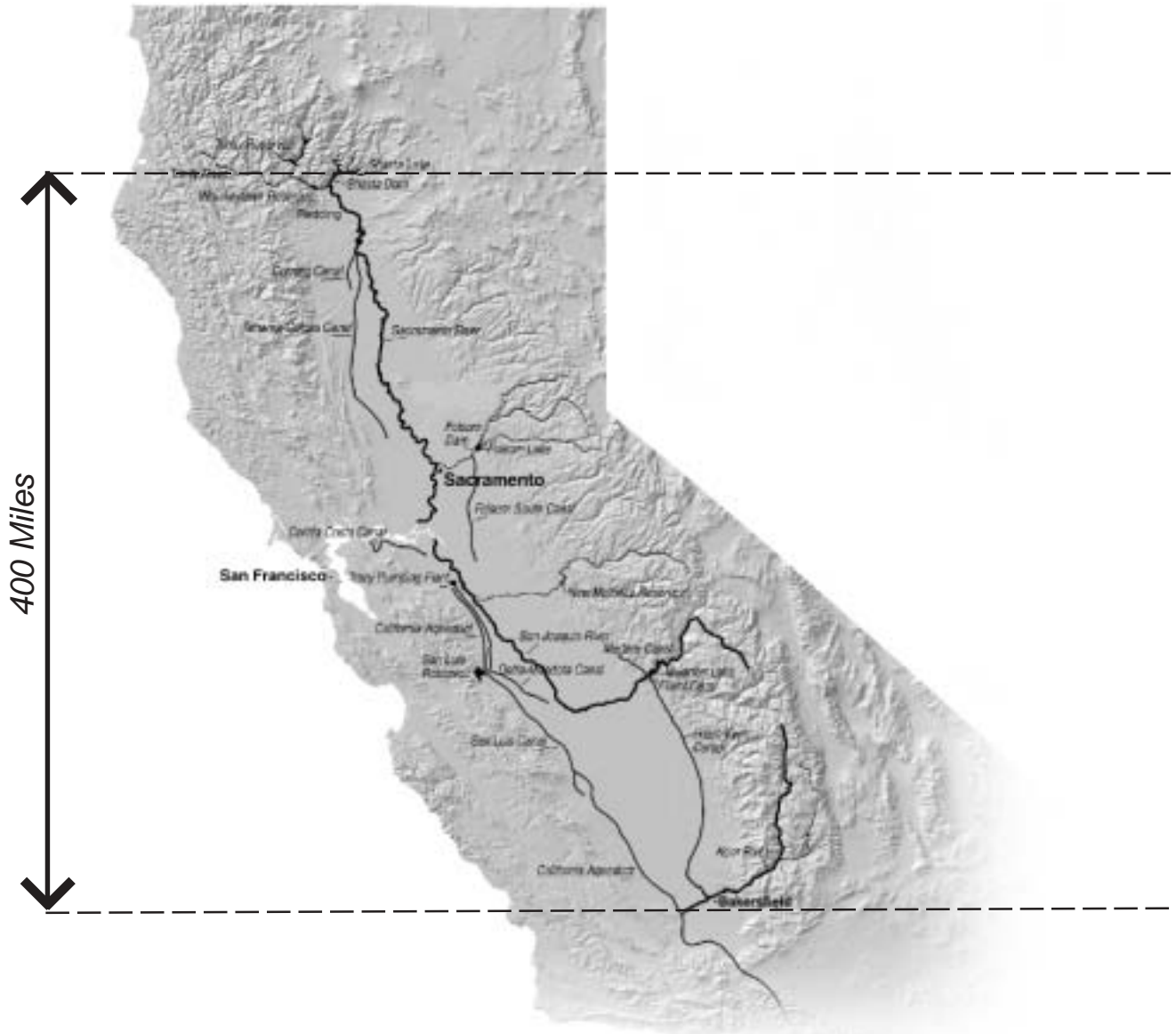
U.S. Department of the Interior
Bureau of Reclamation
U.S. Fish & Wildlife Service
Sacramento, CA



THE MID-PACIFIC REGION



The Central Valley Project



Begun in 1930, the Federal Central Valley Project (CVP) is one of the Nation’s major water conservation developments. It controls floods, and stores and distributes water to meet many of the needs of the great Central Valley of California. The CVP extends from the Cascade Range in the north to the semi-arid but fertile plains along the Kern River in the south, a distance of about 400 miles. Today, the CVP delivers about 20 percent of California’s developed water to farms and communities, and generates about 5 million 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).

Table of Contents



Forward

CVPIA 10 Years of Progress 7

Introduction

Background 8
 Central Valley Project’s Role in California’s Water Resources 10
 CVPIA Mandate 11

Implementing the CVPIA

Process 12

Funding

Funding 14
 CVP Expenditures 1993 - 2002 15

Accomplishments

Accomplishments 1993 - 2002 16
 Anadromous Fish - Habitat Restoration 17
 Anadromous Fish - Structural Measures 18
 Refuges and Waterfowl 19
 Other Fish and Wildlife Resources 20
 Studies, Investigations, and Modeling 21

Discussion of CVPIA Implementation and Results

Fish and Wildlife Measures 22
 Focus for Anadromous Fish 23
 Anadromous Fish - Biological Response 24
 Focus for Central Valley Refuges and Other Waterfowl Habitats 26
 Refuges and Waterfowl - Biological Response 28
 Focus for Other Fish and Wildlife and Associated Habitats 29
 Benefits of Other Fish and Wildlife and Associated Habitats 30
 Other Fish and Wildlife - Accomplishments 31
 Other CVPIA Activities 31
 Conclusions 33

Forward

CENTRAL VALLEY PROJECT IMPROVEMENT ACT 10 YEARS OF PROGRESS

In 1992, Congress passed the Central Valley Project Improvement Act (Act, or CVPIA), which amended previous authorizations of the California Central Valley Project (CVP) to include fish and wildlife protection, restoration, enhancement, and mitigation as project purposes having equal priority with power generation, and irrigation and domestic water uses. Congress directed the Secretary of the Interior, through the Bureau of Reclamation (Reclamation) and the U.S. Fish and Wildlife Service (Service), to operate the CVP consistent with the purposes of the Act, to meet the Federal trust responsibilities to protect the fishery resources of affected Federally recognized Indian tribes, and to achieve a reasonable balance among competing demands for use of CVP water.

For the past 10 years, Reclamation and the Service, working together to implement the CVPIA, have embarked on one of the Nation's largest fish and wildlife restoration efforts.

Reclamation and the Service have developed programs to improve environmental conditions and modify operations, management, and physical facilities, and thus, the associated environmental conditions of the CVP to comply with the purposes and goals of the Act. All of the Act's restoration measures are planned and implemented by Reclamation and the Service and coordinated with the State of California, CALFED, and other partners.

In the following pages, you will find a summary of the protection, restoration, enhancement, and mitigation measures that have been implemented as of the end of fiscal year 2002, demonstrating the contributions Reclamation and the Service have made to the Central Valley. As you read the summary, it should become clear that progress is being made in unprecedented programs, and advancements have been made in resolving complicated watershed issues throughout the Central Valley. Yet much work lies ahead.

We are pleased to present the *Central Valley Project Improvement Act - 10 Years of Progress* summary to you.



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Introduction

It has been 10 years since Congress passed, and the President signed, the Central Valley Project Improvement Act (CVPIA or Act). Officially known as Title 34 of Public Law 102-575, this landmark piece of legislation mandates changes in the management of the Bureau of Reclamation's vast Central Valley Project (CVP) and directs the Secretary of the Interior to undertake a monumental fish and wildlife restoration and enhancement program. The Secretary, in turn, 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), both agencies of the Department of the Interior.

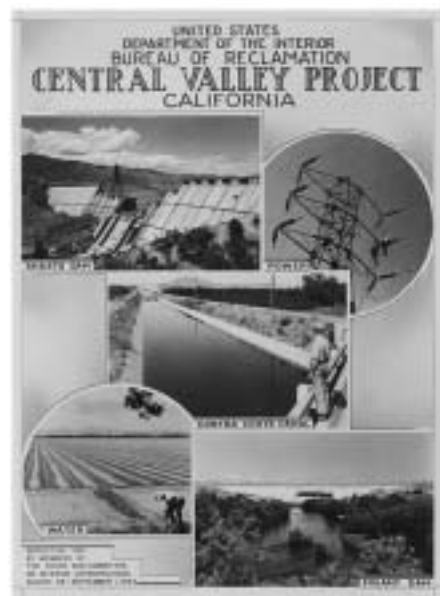
***Since 1992,
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CVPIA presents.***

Since 1992, Reclamation and the Service have worked tirelessly to meet the challenges that the CVPIA presents. Its implementation has been afforded highest priority and major strides have been made in accomplishing the mandate that Congress provided. Many of the Act's provisions have been completed and most of the others are well under way. More than \$630 million of State and Federal money has been spent thus far to do what has been directed. More time, effort, and funds will be expended in the future. This report is a summary of the actions taken by Reclamation and Service personnel, working together with their counterparts in the State of California and numerous other partners and stakeholders, in the 10 fiscal years (1993-2002) since enactment.

Background

Over the past 150 years, competition for the limited water supplies of the Central Valley of California has escalated. As development progressed, water resources were increasingly controlled, first for flood control, later for irrigated agriculture, and, particularly in recent decades, for municipal and industrial purposes to support the State's burgeoning population.

Prior to development of the water resources in the Central Valley, rivers and streams in



Cover for a binder used on an inspection trip of a House subcommittee on Interior appropriations, August 26 - September 1, 1943.

the basin were unobstructed and anadromous species such as chinook salmon and steelhead trout could move freely from the ocean, through the Sacramento-San Joaquin River Delta and into the headwater reaches of their natal streams where they completed their life's cycle. Later, the offspring of these fish would retrace the journey in reverse as they moved out of freshwater, often aided by stormflows and snowmelt, to the sea to mature.

Because of the inherently variable rainfall in California, several races of these species evolved to accommodate differing hydrologic conditions. The valley also offered millions of acres of wetland and riparian habitats to support wintering Pacific Flyway waterfowl, shorebirds and countless other migratory bird species. Upland wildlife also thrived, dependent to one degree or another on availability of a common resource – water and the habitats it sustained and influenced.

Over the years, however, water resource projects needed to support development resulted in hydrologic and landscape changes detrimental to the valley's fish and wildlife resources. Dams and diversions blocked many streams and altered streamflow and stream temperature patterns. Dams also prevented the replenishment of gravels necessary for anadromous fish spawning and diversions entrained juveniles as they passed on their downstream migrations.

As a consequence, populations of many native fish species declined significantly. Several species of anadromous fish were listed or were candidates for listing as threatened or endangered: all of the other anadromous fish species were in serious decline. Flood control projects and land-use conversions eliminated an estimated 95 percent of the wetland habitats that existed in the valley at statehood. The limited acreage that remained had to be intensively managed to support the millions of wintering waterfowl, shorebirds, and other species that depend on those habitats to survive.

Other fish and wildlife habitats throughout the valley also experienced great reductions as land use changes facilitated by water resource development projects progressed. Lands once prone to flooding were protected and made developable and arid lands made fertile by the application of irrigation water from the projects. Agricultural and urban water demands have also contributed to groundwater depletions while wastewater discharges and contaminated runoff have degraded water quality in many Central Valley streams and in the Delta. Native species that depended on these habitats declined commensurately, in many cases to the point of being listed as threatened or endangered.

Water Fact

The Central Valley Project is one of the largest water storage and transport systems in the world. Its benefits extend worldwide.

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 the State equally 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, where CVP water co-mingles with other supplies, such as those of the State Water Project. 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 Central Valley 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.

Purposes of the CVPIA (Section 3402)

- (a) to protect, restore, and enhance fish, wildlife, and associated habitats in the Central Valley and Trinity River basins of California;
- (b) to address impacts of the Central Valley Project on fish, wildlife, and associated habitats;
- (c) to improve the operational flexibility of the Central Valley Project;
- (d) to increase water-related benefits provided by the Central Valley Project to the State of California through expanded use of voluntary water transfers and improved water conservation;
- (e) to contribute to the State of California's interim and long-term efforts to protect the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; and
- (f) to achieve a reasonable balance among competing demands for use of Central Valley Project water, including the requirements of fish and wildlife, agricultural, municipal and industrial, and power contractors.

The sensitive ecosystems of the Central Valley, Delta estuary, and San Francisco Bay are affected by water diversions, particularly in drought years - so much so that the courts have intervened to ensure that adequate fresh water enters this system. In addition, compliance with Endangered Species Act and water quality requirements necessitate releases from CVP dams to regulate water temperatures and instream flows, and limit water diversions to protect listed fish species from the effects of pumping. These factors have greatly increased the competition for existing water supplies, and have focused new scrutiny on the ways that water resources are being used.

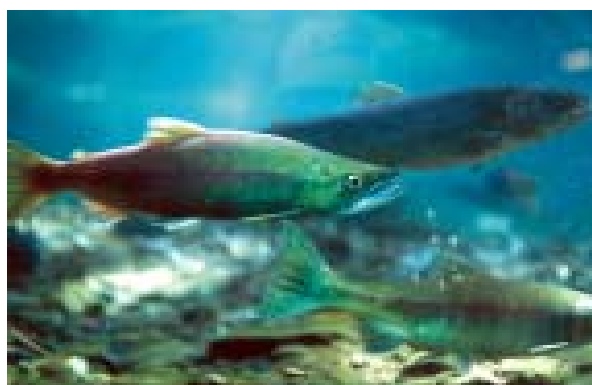
Conditions have greatly changed since the CVP began in 1930. Population growth and development have increased farm, urban, and industrial water demands. Stocks of fish and wildlife have declined, and some species are listed as endangered or threatened due to severe habitat losses from various kinds of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

CVPIA Mandate

The intent of Congress in passing the CVPIA is contained in Section 3402. Through the CVPIA, Congress identified the importance of the CVP in California's water resources picture, but made significant changes in the policies and administration of the project – more than any other legislation in the CVP's 70-year history. The CVPIA also redefined the purposes of the CVP and identified several specific goals and objectives for Interior to meet.

To achieve the CVPIA's purposes and the identified goals and objectives, a large number of provisions were incorporated into the statute. These include specific programs and measures to be undertaken as well as operational and management directives, all to be implemented consistent with the requirements of California and Federal law. These provisions deal with water contracts, improved water management, restoration of anadromous fish populations, water supplies for State and Federal refuges, mitigation for other fish and wildlife impacted by the CVP, and retirement of drainage-impaired farm lands. They also provide for the modeling of ecosystem parameters in areas affected by the CVP, numerous investigations and studies, and monitoring of results and biological benefits of implementing CVPIA measures.

To help implement these measures, the Act provides for establishment of a Restoration Fund, derived from fees paid by those who have benefited from the CVP's water and power supplies.



Salmon in Butte Creek



A wheat field in the Central Valley

The CVP and other water projects have helped make the Central Valley the richest agricultural region in the Nation, while helping to support the largest population of any State in the Nation. California leads the Nation in water use, both surface water and groundwater. Development and use of this precious resource has been a boon to the economy of the State; but, added to other ongoing actions, has helped lead to significant impacts to the natural environment.

The CVPIA has afforded the Department of the Interior a prime opportunity to help restore conditions favorable for Central Valley fish and wildlife, while providing for the continuation of its rich agricultural heritage and service to municipal and industrial users throughout the State.

Implementing the CVPIA

Process

Immediately upon passage of the CVPIA, Reclamation and the Service adopted the three fish and wildlife restoration goals prescribed by the Act: (1) make all reasonable efforts to at least double the natural production of six anadromous species believed to have been affected by construction and operation of the CVP; (2) supply water to Federal and State refuges and other migratory waterfowl habitat in the Central Valley; and (3) mitigate for impacts of the CVP to other fish and wildlife species, impacts that were not specifically addressed in other provisions of the Act and had not been previously offset.

One of the most ambitious goals was to make all reasonable efforts to double the production of anadromous fish. Another was to supply water to Central Valley refuges and other migratory waterfowl habitats. The third was to mitigate for other identified impacts of the CVPIA.

We then began to develop procedures to implement the specific provisions of the Act. First, we developed a set of procedural objectives to guide our activities. Measures proposed for implementation are to be prioritized. Any measures undertaken to implement the Act must be designed to achieve CVPIA goals while providing the greatest public benefit and minimizing adverse impacts to other beneficial uses.

Great emphasis is placed on forming partnerships and coordinating with other efforts planned or already under way throughout the valley. Stakeholders and the public are to be fully involved and informed. Another key procedural objective is to use the funds available to us in the most cost-effective manner.

Several factors are considered in establishing priorities for implementing CVPIA actions. These include the importance of the action to achieving CVPIA program goals, its readiness or the amount of planning needed to implement the action, coordination with other ongoing programs, and funding. Some sections of the Act clearly direct specific actions: others call for plans or studies prior to taking action. Other provisions of the Act relate to administrative matters, such as authorization of funds and compliance with State and Federal laws that must be undertaken before measures can be implemented. Because the Act specified compliance dates for some actions, implementation in some cases was responsive to the prescribed dates.

Cooperation through partnerships is essential to the CVPIA's success. Interior has developed numerous partnerships and extensive coordination with local, State, and Federal agencies, and private groups. These partnerships include various existing programs, as well as new programs formed specifically to carry out CVPIA mandates. CVPIA implementa-

***Cooperation through
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tion continues to be 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; and CALFED, a consortium of Federal and State agencies working with stakeholders and interest groups to develop alternatives for a long-term solution to Delta problems.

Coordination with CALFED is particularly important. Most of CALFED's actions have the same or similar objectives, and address many of the same natural resource and water management problems, as CVPIA. Close coordination and a focus on functional integration of CVPIA and CALFED have helped us to achieve common goals and avoid duplication. An example of this coordination is Interior's willingness and effort to have CALFED provide "expert level" review and comment on proposed CVPIA programs and actions. This review is expected to lead to a more broad-based ecosystem management strategy that more effectively addresses fish and wildlife mitigation, restoration, and enhancement, and assists in the selection of worthy projects

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We have encouraged CALFED and other potential partners to enter into cooperative relationships to implement appropriate CVPIA measures or to help achieve CVPIA goals and objectives through their own programs. Frequently, Interior will provide funds and services to these partners, allowing for the completion of pre-approved restoration actions. The CVPIA provides the Secretary with the flexibility to use several mechanisms for funding non-Federal entities. At other times, funds from these other programs are used to implement measures identified by the CVPIA.

Most of the programs established to address specific CVPIA provisions had the same initial steps in common. All required an administrative structure, public and stakeholder involvement, and coordination with potential partners to develop a program plan. 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.

For planning and budgeting purposes, all CVPIA actions were classified into one of eight action categories. These categories are commonly used in partnering and summarizing our activities in discussions with the public and stakeholders, many of whom are interested in only certain facets of CVPIA implementation. Each of the categories involves many individual programs and related actions.

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 Resources
- Studies, Investigations, and Modeling
- Monitoring

Funding



Installation of the Shasta Temperature Control Device took place between 1995 - 1997.

Approximately \$630 million has been obligated toward the implementation of the CVPIA's prescribed actions and programs through the first 10 years. It must be recognized, however, that many of the measures implemented pursuant to CVPIA were already being planned or in progress at the time the Act was passed and that 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 (\$20 million), and fixing the fish passage problems at the Red Bluff Diversion Dam (\$34 million) and the Tracy and Contra Costa Canal Pumping plants (\$17 million).

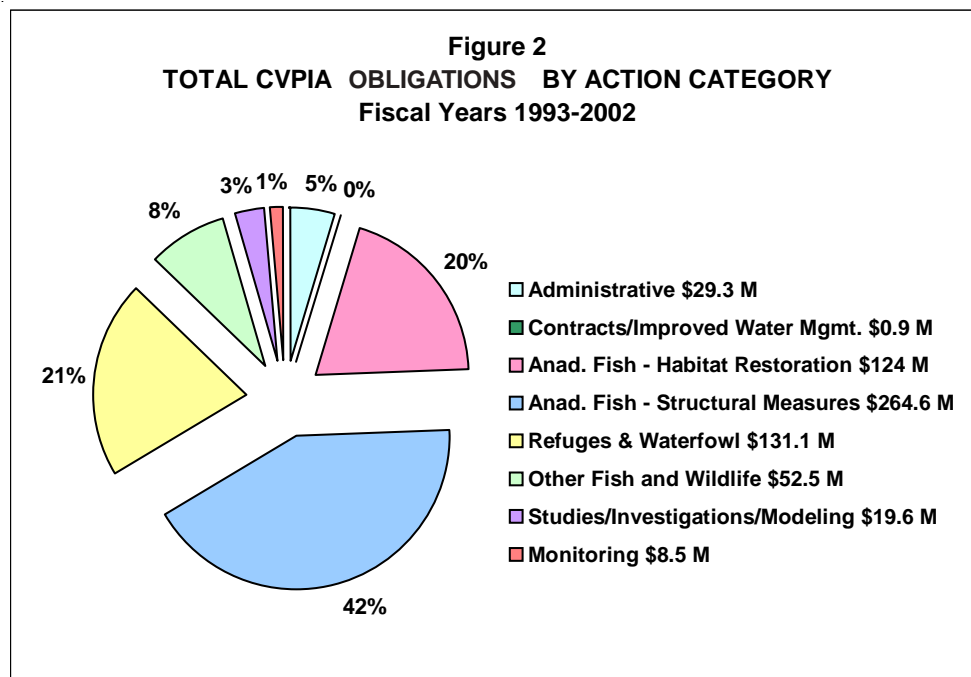
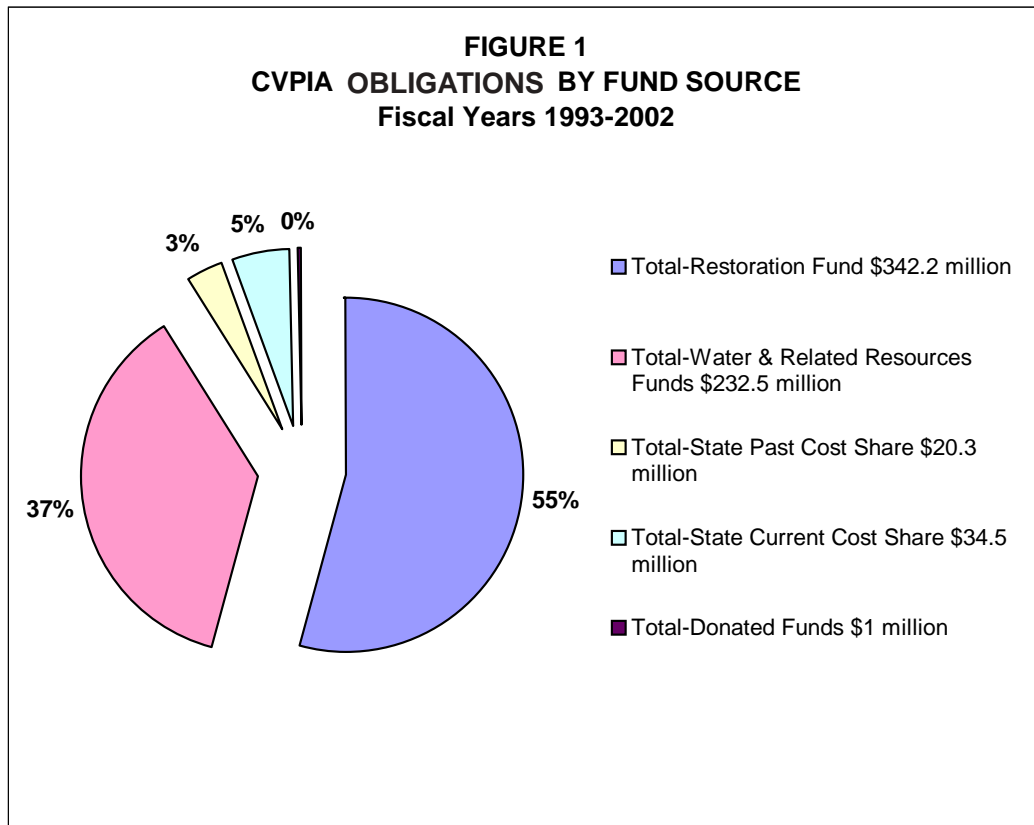
Most of the \$630 million obligated thus far has come from the Restoration Fund, which was established in accordance with the CVPIA. These funds are derived from fees paid by the beneficiaries of the CVP's water and power supplies. The rest of the monies come from Reclamation's Water and Related Resources appropriations, contributions provided by the State of California, and donated funds (Figure 1).



The Red Bluff Demonstration Pump Project fixed fish passage problems at Red Bluff Diversion Dam.

The largest portion of the monies obligated since 1993 have been spent on 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. Large amounts were also obligated on habitat restoration measures for anadromous fish, measures believed necessary to help achieve our goal of doubling the natural production of these species, and on water for refuges and the Agricultural Waterfowl Incentives Program. Figure 2 at right shows the total distribution of these obligations..

CVPIA Obligations 1993 - 2002



ACCOMPLISHMENTS -- 1993 TO 2002

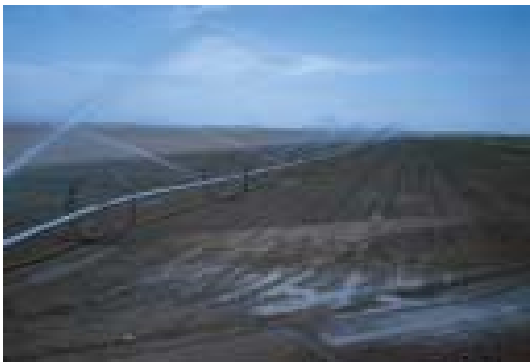
Since passage of the CVPIA, Reclamation and the Service, with assistance from the State of California and the cooperation of many partners, have completed many of the necessary administrative requirements, conducted many studies and investigations, implemented hundreds of measures, and have generally made significant progress toward achieving the goals and objectives established by the CVPIA. Positive effects in the Central Valley ecosystem are being observed in many species and habitat types. Clearly, much more needs to be done and it will be many years before we can report success, but we appear to be on the right track

Positive effects in the Central Valley ecosystem are being observed in many species and habitat types.

A summary of the actions completed in these past 10 years is provided below. A more detailed discussion of these efforts and the progress toward achieving CVPIA goals follows.

Administrative Processes (Page 15, Figure 2)

- The Restoration Fund was established pursuant to Section 3407 of the Act. More than \$353 million was collected from 1993 to 2002.
- A Cost-Share Agreement with the State of California was negotiated and signed in 1994. Twelve task orders have been processed under the agreement and more than \$54 million contributed to CVPIA measures.
- A Programmatic Environmental Impact Statement (PEIS) covering the implementation of the CVPIA was completed in November 1999. An Endangered Species Act biological opinion was rendered in November 2000, and the PEIS Record of Decision was signed by Reclamation and the Service in January 2001.
- Interim guidelines and criteria for 10 sections of the CVPIA have been developed. Final rules and regulations will follow now that the PEIS Record of Decision has been signed.



Irrigation water flows in the Central Valley.

Contracting and Improved Water Management (Page 15, Figure 2)

- Reclamation negotiated and executed 68 “interim” renewal contracts and 44 binding agreements for early renewal of long-term water supply contracts while waiting for completion of the PEIS.
- Since completion of the PEIS, Reclamation has executed 27 long-term contracts and negotiated 24 others. All contract negotiations are expected to be completed in 2002.

- Reclamation has approved the transfer of more than 4.3 million acre-feet of water for agricultural and municipal uses within the CVP service area. An additional 396,000 acre-feet was approved for transfer to meet refuge water supply needs and 5,000 acre-feet for the CALFED Environmental Water Account.
- A Water Conservation and Advisory Center was established in Sacramento and later relocated to Folsom.
- An American River Water Education Center was constructed at Folsom Dam. This facility incorporates the original Water Conservation and Advisory Center.
- Reclamation developed criteria for evaluating water management plans and has approved 100 such plans to date.

Anadromous Fish – Habitat Restoration

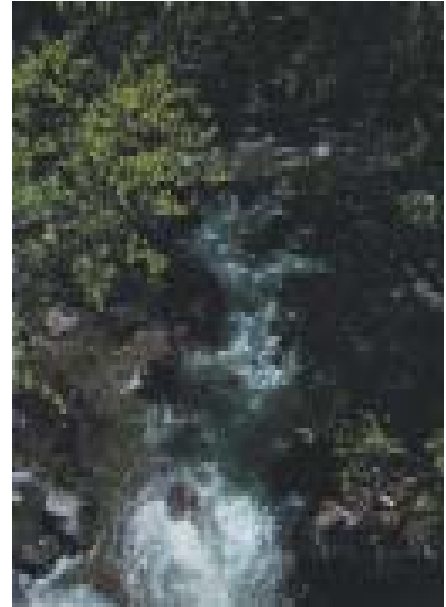
(Page 15, Figure 2)

Valley-wide

- Up to 800,000 acre-feet of Central Valley Project water has been applied each year to improve streamflows for salmon, steelhead, and other fish on the Sacramento, American, and Stanislaus rivers and on Clear Creek. This water has also been used to increase survival of juvenile anadromous fish passing through the Delta on their way to the sea, and to assist the CVP to meet endangered species and water quality obligations.

Sacramento River Basin

- Five dams and 15 diversions have been removed from streams in the basin, providing improved access to more than 24 miles of upstream spawning areas for and enhancing survival of juvenile out-migrants.
- More than 8,000 acres of riparian habitat has been acquired and more than 500 acres restored or enhanced along 30 miles of basin streams to provide cover and shade.
- More than 108,000 acre-feet of water have been acquired through purchase or exchange to improve fish habitat and passage, streamflows, and water temperatures.
- Approximately 156,000 tons of gravel have been added to streams to improve spawning success.



Battle Creek in northern California was the most important salmon-producing tributary to the Sacramento River. It was restored under a CALFED initiative.

Five dams and 15 diversions have been removed ... providing improved access to more than 24 miles of upstream spawning areas



The Sacramento-San Joaquin Delta as seen from space.

Sacramento-San Joaquin Delta

- Operational changes to protect fish have been made at the State and Federal pumping plants and at the Delta Cross Channel gates.
- VAMP, the Vernalis Adaptive Management Program, was implemented. This experimental program involves acquisition of water as necessary on San Joaquin River tributaries to improve flows in the Delta, and reductions in pumping at State and Federal facilities to reduce entrainment of juvenile salmon as they migrate to ocean waters.

San Joaquin River Basin

- More than 172 acres of riparian habitat has been acquired and more than 500 acres restored or enhanced along 8.7 miles of basin streams to provide cover and shade.
- More than 5.4 miles of stream channel has been enhanced as instream habitat for anadromous fish.
- More than 844,000 acre-feet of water have been acquired for restoration of fish friendly instream flows.
- Nearly 72,000 tons of gravel have been placed in San Joaquin River Basin streams to increase spawning habitat availability for native fishes.

Anadromous Fish – Structural Measures

(Page 15, Figure 2)

Sacramento River Basin

- Nineteen diversions with a total capacity of more than 6,700 cubic feet per second have been screened or otherwise modified to reduce entrainment of juvenile fishes. Approximately 70-75 percent of all water diverted from the mainstem Sacramento River is now taken in a fish-friendly manner.
- A temperature control device has been installed at Shasta Dam to provide water of suitable temperature for anadromous fish spawning and rearing.
- The Coleman National Fish Hatchery is being rehabilitated. Raceways have been improved and a new water treatment system installed to protect hatchery production.
- A new hatchery, the Livingston Stone National Fish Hatchery, has been constructed on the mainstem Sacramento River to assist in the management and recovery of winter-run chinook salmon, a listed endangered species.
- The Keswick Fish Trap has been modified and improved.

Approximately 70-75 percent of all the water diverted from the mainstem Sacramento River is now taken in a fish-friendly manner.

Sacramento-San Joaquin Delta

- Six diversions have been screened to protect juvenile fish.
- A barrier at the head of Old River has been seasonally installed to guide juvenile salmon and reduce the influence of the State and Federal pumping facilities during their spring time out-migration.

San Joaquin River Basin

- A barrier to fish migration on the Cosumnes River has been removed.

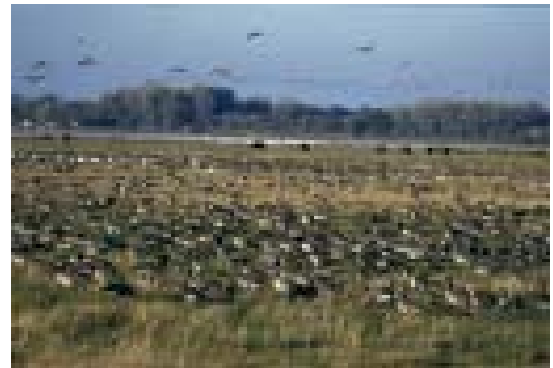
Refuges and Waterfowl (Page 15, Figure 2)

Valley-wide

- An average of 40,000 acres of agricultural lands have been seasonally flooded each year for the past 6 years for migratory waterfowl habitat, increasing the overall Central Valley seasonal wetland habitat by as much as 15 percent.

Sacramento Valley

- An annual water supply of 20,656 acre-feet and 6,300 acre-feet of permanent water supply has been acquired for delivery to Basin refuges, resulting in the enhancement of existing wetlands and nearly 500 acres of additional wetlands available throughout the year for wildlife needs.
- Agreement was reached with the Glenn-Colusa Irrigation District on a conveyance agreement to deliver water to the Sacramento National Wildlife Refuge complex.
- Construction was completed on the Stony Creek Siphon, a critical feature for delivering water to the Sacramento National Wildlife Refuge complex.



A Sacramento Valley wetland enhanced with CVPIA water.

San Joaquin Valley

- An annual water supply of 445,990 acre-feet was acquired for delivery to valley refuges and the Grasslands Resource Conservation District to meet the habitat needs of migratory waterfowl, shorebirds and other wetland-dependent wildlife.
- Construction of three facilities needed to convey water to valley refuge areas was completed and six interim agreements were executed with private parties to wheel water to other refuge units.



Riparian habitat restoration in the Sacramento Valley.

Other Fish and Wildlife Resources

(Page 15, Figure 2)

Sacramento Valley

- More than 5,650 acres of upland and riparian habitat have been acquired with contributions from the CVPIA to benefit other species of wildlife affected by the CVP. More than 650 acres have been enhanced or restored, including habitat for species listed under the Endangered Species Act.

Sacramento-San Joaquin Delta

- CVPIA funds were used to acquire 1,200 acres of land in the Delta for protection and restoration of native habitats and populations of native species.

San Joaquin Valley

- CVPIA funds have contributed to the acquisition of more than 82,200 acres of habitat, including nearly 2,400 acres of riparian habitat, to benefit native species in the valley. Restoration and enhancement measures have been applied to an additional 456 acres.
- Nearly 8,800 acres of drainage-impaired lands have been acquired and retired from irrigated agriculture, resulting in a reduction in the amounts of agricultural drainage entering the San Joaquin River system. More than 2,200 acres of these lands have been treated to reduce the threat of contamination and to provide increased habitat for native wildlife species.

**Nearly 8,800 acres of
drainage-impaired
lands have been
acquired and retired
from irrigated
agriculture ...**

Studies, Investigations and Modeling

(Page 15, Figure 2)

- Operations of CVP facilities have been coordinated and standards developed to minimize the impacts of flow fluctuation on fish on the Sacramento, American, and Stanislaus rivers.
- An evaluation of the potential to re-establish anadromous fish on the San Joaquin River mainstem below Friant Dam was initiated. This effort was discontinued due to public opposition and a Congressional directive terminating funding.
- A transition report for the *American River-Folsom South Conjunctive Use Optimization Study* and the *Stanislaus River Basin and Calaveras River Watershed Use Program, Threatened and Endangered Species Report* was prepared.
- We completed a report for the *Central Valley Wetlands Water Supply Investigation* that identified ways to improve the reliability and quality of the existing water supplies for private wetlands and any need for additional supplies. It also described the water supply and delivery requirements necessary to provide full development for wetland-dependent wildlife on 120,000 acres supplemental to the acreage identified in the Central Valley Habitat Joint Venture's Implementation Plan.
- A report on the *Influence of Riparian Vegetation on Water Temperature in the Sacramento River* was completed.
- Investigations were completed and a report produced on measures to eliminate barriers and improve habitat for salmon and steelhead trout on Central Valley tributary streams.
- A report describing the major impacts of the CVP on anadromous fish populations and on the fisheries, communities, tribes, and other interests associated with those resources was completed.
- New data has been developed and significant improvements made to models of hydrologic and ecological systems in the Central Valley. These will enhance our understanding of the effects of project operations and implementation of CVPIA measures.
- A report on a least-cost plan to increase CVP yield to offset the impact to contractors of the water supply dedicated to fish and wildlife was developed. The report also addressed alternatives and opportunities for demand reduction.

New data has been developed and significant improvements made to models of hydrologic and ecological systems in the Central Valley.



A Central Valley wetland that receives water from the CVPIA.

Monitoring

- The *Comprehensive Assessment and Monitoring Program* (CAMP) was developed to evaluate the effectiveness of CVPIA actions and monitor the status of target resources. CAMP has funded trawl surveys for striped bass and American shad, angler surveys, screw trap studies, and a hatchery-marking program for salmon and steelhead trout. Annual reports of findings are prepared and disseminated to interested parties.
- Completed a riparian habitat-mapping program for the Sacramento River and tributaries.

DISCUSSION OF CVPIA IMPLEMENTATION AND RESULTS

Fish and Wildlife Measures

In accordance with the wording in the CVPIA itself, specific emphasis has been placed on restoration of natural habitat components and ecosystem function and viability.

Reclamation and the Service have attempted to implement, in a purposeful, proactive manner, those fish and wildlife provisions of the Act believed to be most important, most urgent, or that would result in the greatest or most immediate contribution to attainment of the three fish and wildlife restoration goals (doubling the natural production of anadromous fish, providing water to refuges, and mitigating for other CVP impacts). To prioritize and guide our efforts for fish and wildlife over the short-term (3-6 years), we use a “focus area” approach that takes into account:

- The species or populations of greatest concern
- The controllable factors that have the greatest influence on these species or populations
- The geographic areas or habitats in most critical need of help for the priority species and/or for the greatest number of species.

In accordance with the wording in the CVPIA itself, specific emphasis has been placed on restoration of natural habitat components and ecosystem function and viability. Whenever possible, we have attempted to put together “packages” of projects to get the greatest biological benefit in the most critical geographic areas. The technical feasibility and readiness of measures for implementation, as well as the support and availability of funding and partners, has also played a key role in our decisions about which projects to implement over the past 10 years.

Focus for Anadromous Fish

The CVPIA [Section 3406(b)(1)] directed Interior to develop and implement a program to make all reasonable efforts to at least double, by the year 2002, the “natural” production of six species of anadromous fish in Central Valley rivers and streams over average levels that existed between 1967 and 1991. Twenty of the other 22 measures and programs in Section 3406(b) were intended to contribute to that effort and are all part of CVPIA efforts to achieve the doubling goal.

The Delta is one of the highest priority focus areas for anadromous fish, primarily because it has been highly altered by water resource development projects and operations, and because all species and races of anadromous fish must pass through the Delta, both as adults moving upstream and as juveniles on their way to San Francisco Bay and the open ocean. These fishes depend on critical water quality and habitat conditions in the Delta and are greatly affected by the operation of the Delta’s water supply facilities. Our emphasis in the Delta has been on increasing streamflows and reducing water diversions during peak periods in the out-migration of juvenile anadromous salmonids or when other threatened or endangered species, such as the delta smelt, are in the vicinity of the diversion pumps. Other operational changes and structural measures, such as closures of the Delta Cross Channel gates and installation of a seasonal barrier at the head of Old River, to enhance conditions during out-migration are also being employed.

The east-side tributaries of the Sacramento River are another major focus area for anadromous fish, particularly Butte, Deer and Mill creeks and, to a lesser extent, Big Chico Creek. These streams support the last significant runs of the threatened spring-run chinook salmon. Once the most numerous race in the valley, the spring-run had dwindled to less than 2,000 fish in 1991. Access to most of their historic habitat has been blocked by dams. Flows needed to provide pools of cool water for them to survive over the summer (they migrate into the streams in spring and delay spawning until fall) have been diverted. Emphasis in these streams has been on acquiring water for instream flow, laddering or removing dams and other impediments to migration, screening or removing diversions, and acquiring or restoring riparian habitats to provide shading to the streams and some relief from solar heating of the water.



Sacramento River and its major tributaries.

CVPIA Implementation and Results

Species of Anadromous Fish to be Restored Under CVPIA

- Chinook salmon
 - spring-run (threatened species)
 - fall-run (candidate for listing)
 - late fall-run (candidate for listing)
 - winter-run (endangered species)
- Steelhead trout (threatened species)
- Striped bass
- American shad
- White sturgeon
- Green sturgeon

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Other eastside and Sacramento River tributaries, most notably Battle, Clear, and Antelope creeks, and the Yuba River have also been targeted for restoration efforts. Along with Deer, Mill, and Butte creeks, these streams support naturally spawning populations of steelhead trout, another listed threatened species. Juveniles of this species generally spend a year in their natal streams, and must over-summer there. They are subject to many of the same limiting factors as the spring-run chinook salmon, most notably the need to access the cooler upper reaches of streams and adequate supplies of summer water. Emphasis for these streams has been the same as for the spring-run chinook on Butte, Deer, and Mill creeks.

Considerable work has also been done on the three major tributaries of the San Joaquin River - the Merced, Tuolumne, and Stanislaus rivers. These are essentially the only streams in the southern end of the Central Valley that still support an anadromous fish resource,

primarily fall-run chinook salmon, a candidate for listing under the Endangered Species Act. They have been severely impacted by reductions in streamflow during critical times of the year and by degradation of instream habitat conditions. These factors have resulted in unacceptably high water temperatures, reduced spawning habitat availability, and increased predation by slackwater fishes on juvenile salmonids.

Efforts in these streams have focused on increasing streamflows, acquisition and restoration of riparian habitats to provide shade and cover, restoration of degraded sections of stream channel to improve salmonid habitat and eliminate conditions favorable to predatory species, and placement of fresh gravels for spawning.



Gravel is placed to improve spawning.

Anadromous Fish - Biological Response

In the 10 years since CVPIA was enacted, hundreds of measures have been implemented in rivers and streams throughout the Central Valley. More than \$350 million has been expended and much has been accomplished. It will take many more years of work to implement all of the

measures identified in the Anadromous Fish Restoration Program Plan and even longer to see if these measures achieve the desired goal of doubling the natural production of these species on a long-term sustainable basis. However, results to date for several species and in some geographic focus areas have been very encouraging. Valley-wide salmon populations have been increasing and the numbers of other species are either on the increase or stable. Clear Creek provides a good example of our focused work efforts that have produced a positive biological response.

On Clear Creek, Reclamation and the Service, working with the Bureau of Land Management, California Department of Fish and Game, and local interests, increased streamflows during critical periods for fall-run chinook salmon; added spawning gravels to the stream; restored degraded portions of the stream channel, floodplain, and adjacent riparian habitats; and controlled erosion and sedimentation from sources within the watershed. Most recently, in late 2000, Interior negotiated and funded the removal of McCormick-Saeltzer Dam and an unscreened diversion from the stream. The dam had been a major impediment to the upstream passage of salmon and steelhead.

The fall-run chinook salmon runs in Clear Creek have improved greatly as a result of these measures.

Removal of McCormick-Saeltzer Dam



Before



After

The fall-run chinook salmon runs in Clear Creek have improved greatly as a result of these measures. These runs, which in the 10 years prior to CVPIA had averaged less than 2,200 fish, have increased to an average of 6,400 in the 10 years since. Just as importantly, the improvement in flows and the removal of McCormick-Saeltzer Dam have made possible restoration of significant numbers of steelhead trout and spring-run chinook salmon, both of which are listed as threatened species. Returns over the next several of years should indicate whether there will be significant increases in numbers of these species and confirm whether the fall-run response is a long-term upward trend induced by CVPIA actions or just a temporary or cyclical increase resulting from other factors. At this time, however, the results are very encouraging.

Very positive responses have been observed on several other streams where CVPIA efforts have been focused. Notable among these are Butte Creek, where spring-run chinook returns are steadily improving, and on the Stanislaus River, where newly placed gravels in the stream were immediately covered by spawning fall-run chinook salmon.

Focus for Central Valley Refuges and Other Waterfowl Habitats

Central Valley Refuge Areas

Receiving CVPIA Water

- Sacramento National Wildlife Refuge
- Delevan National Wildlife Refuge
- Colusa National Wildlife Refuge
- Sutter National Wildlife Refuge
- Gray Lodge Wildlife Management Area
- North Grasslands
- San Luis National Wildlife Refuge
- Volta Wildlife Management Area
- Merced National Wildlife Refuge
- Los Banos Wildlife Management Area
- Grasslands Resource Conservation District
- Mendota Wildlife Management Area
- Pixley National Wildlife Refuge
- Kern National Wildlife Refuge
- San Joaquin Basin Action Plan Lands

With the decline of natural wetlands in the Central Valley, wildlife specialists have been forced to intensively manage the remaining 300-400,000 acres of wetlands to accommodate the millions of wintering waterfowl, shorebirds, and other wildlife that depend on wetlands for survival. This management has required careful husbanding of meager and uncertain water supplies to provide for only the most critical of needs for a limited number of species. Some very difficult trade-offs of one species for another were the rule rather than the exception. Very few permanent pond areas and permanent wetlands could be sustained, leaving many species that require these conditions, such as the giant garter snake, with no adequate habitat on these refuge areas. Breeding areas for resident waterfowl were virtually nonexistent.

With the passage of CVPIA, a full and reliable supply of water to meet identified needs was made available to the identified Central Valley State and Federal refuges and private wetland areas. A base level of supply (referred to as Level 2 supplies) was made available immediately; the remaining portions of their full supply (referred to as Level 4 supplies) were to be made available in 10 percent increments over 10 years. The total amount of water to be

supplied annually to the 14 refuge units is 563,000 acre-feet, with limited reductions under certain hydrologic circumstances. These greatly increased supplies of firm water will enable managers to enhance existing habitats, expand their wetland base, and maximize the benefits provided to all wetland-dependent species.

Because the refuge areas amounts of water to be supplied, and schedule for delivery were prescribed in the Act, there was no need to establish biological priorities for the refuge water supply program. Facilities to convey the water to the various wetland units, however, were not in place in several instances.

The main focus of the program, therefore, has been to independently develop the necessary conveyance capacity (or obtain it through agreements with other parties) and to acquire the requisite water to meet the prescribed needs. Concurrently, long-term contractual agreements between Reclamation and the Central Valley National Wildlife Refuges, State Wildlife Management Areas, and Grasslands Resource Conservation District were negotiated and implemented.

To date, 474,490 acre-feet of annual water supplies and 6,300 acre-feet of permanent water supplies have been acquired for delivery to Central Valley refuge areas. All refuge units have received their full allocations each year except in those instances where facilities to convey the water were not available or an individual refuge was not ready to receive its allocation (e.g. internal facilities to distribute the water had not yet been constructed). Two Sacramento Valley and three San Joaquin Valley refuge units will not be able to receive their full supply until construction of conveyance facilities has been completed, currently scheduled for 2006.



Waterfowl in flight over a Central Valley refuge.

Eight agreements with private parties to use their facilities to deliver water to refuges have been signed and others are being pursued. Five of these agreements are long-term, while the remaining three are interim agreements to deliver water until other facilities can be constructed.

Five projects to build facilities to provide water to the targeted refuge units have been initiated, and four of these have been completed. Completed projects include the installation of a well and associated groundwater pumping facilities at Pixley National Wildlife Refuge; extension of the San Luis Canal Company's Island "C" Canal, providing supplies to the West Bear Creek Unit of the San Joaquin Basin Action Plan lands; Central California Irrigation District's Newman Canal and "J" Lateral to convey water to the China Island Unit of the San Joaquin Basin Action Plan lands; and construction of a siphon at Stony Creek and 127 other facility improvements within the Glenn-Colusa Irrigation District's system to provide water to the Sacramento, Delevan, and Colusa National Wildlife Refuges. Construction of additional facilities will most likely be necessary.

In addition to our efforts to supply water to designated refuges, an "Agricultural Waterfowl Incentives Program" has been implemented. Farmers are paid to keep private agricultural fields flooded during the winter months when it would result in greater amounts of habitat and

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increased food availability for waterfowl. This program has been enrolling lands for participation since fiscal year 1997.

Over that 6-year period, a total of over 237,900 acres have been enrolled, providing an average of nearly 40,000 acres of additional waterfowl habitat containing a nourishing food supply annually. This program, with its conjunctive use of lands for agriculture and waterfowl, will expire by the end of 2002 unless otherwise reauthorized and funded. The need to expand the wetland resource base will remain.



A blue heron searches for food in a Central Valley refuge.

Refuges and Waterfowl – Biological Response

Work is still in progress to complete the necessary water conveyance facilities to deliver full supplies to all targeted refuges. As of 2002, two north-of-Delta and three south-of-Delta refuge units do not have the necessary facilities to transport or receive their full supplies. These are expected to be in place by 2006.

However, supplies at all refuges, if not at full entitlement, have been greatly improved and the waterfowl, shorebirds and other wetland-dependent wildlife have benefited as their habitats have been expanded and enhanced. Valley refuges report an average annual increase of 12,000 acres of wetland habitats, and these refuges can now provide wetted habitats for longer periods of time.

In addition to this, the Agricultural Waterfowl Incentives Program has created an average of 40,000 acres of habitat each year, replete with waste grains. This not only provides a good and nutritious food source for the waterfowl but has also helped to spread the birds in the valley out over a wider area and alleviate the overcrowding experienced at some refuge units, particularly in the Sacramento Valley. Incidence of waterfowl disease-related mortality, usually caused by overcrowding - too many birds on too little habitat - has decreased markedly in the valley as birds take advantage of the greater habitat base and increased food availability.

Water availability has also enhanced refuge managers' ability to provide a food supply for the winter migrants. Waterfowl food production has increased tenfold in some refuge areas. The Grasslands Resource Conservation District was able to increase its acreage of enhanced seed production for 4,000 to 40,000 acres.

Waterfowl use has increased nearly as much. In the Grasslands, waterfowl use in the early fall increased by 300 percent: other areas

Not only has waterfowl use increased but visits to these areas by the public have increased as well ...

have recorded increases of 800 percent, from 2 million to over 18 million waterfowl use days per year. Not only has waterfowl use increased but visits to these areas by the public have increased as well, drawn by the prospect of seeing hundreds of thousands of birds of many species at one time in a far more natural setting than was previously possible. The Sacramento National Wildlife Refuge complex experienced a 61 percent increase in visitor use.

Species other than waterfowl have benefited from the water provided to the refuge areas. 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 have noted increases in populations of giant garter snake and in the nesting of western, Clark's, and eared grebes; black-crowned night herons; and tri-colored blackbirds. The Grasslands Resource Conservation District has reported an increase in two large roosting flocks of white-faced ibis. Valley-wide, shorebird use on shallow wetlands has increased by hundreds of thousands as sandpipers, dunlins, yellowlegs, phalarope, and dowitchers respond to the increased wetland acreage and their invertebrate food supply.

Focus for Other Fish and Wildlife and Associated Habitats

The CVPIA directs Interior to make all reasonable efforts to address the environmental impacts of the CVP that are not specifically dealt with in the other fish and wildlife provisions of the Act. Identifying those impacts some 50 years after the CVP was initiated is problematic at best, especially for those indirect effects that were realized in the CVP service area.

Our approach has been to initiate a habitat trends analysis to use as one of several tools to determine what habitats, and consequently what species, experienced the greatest reductions over the last half-century in areas affected by CVP operations or water service. While this data is being gathered and analyzed, the focus of our efforts has been on habitat protection and restoration for those species in the CVP operations and service area that are in greatest need of assistance, primarily listed threatened, and endangered species not addressed in other provisions of the CVPIA, some of which are on the verge of extinction. Emphasis has been on acquisition, protection, and restoration of habitat for species like the riparian brush rabbit, giant garter snake, vernal pool invertebrates, and San Joaquin Valley floor species like the San Joaquin kit fox, blunt-nosed leopard lizard, and several listed species of kangaroo rats.

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Giant garter snake habitat benefitted from water provided by the CVPIA.

Initial efforts of the San Joaquin River Riparian Restoration Program have been directed toward developing a sound scientific basis for identifying sites where restoration has a likelihood of success.

Two habitat programs have evolved to accomplish these objectives. These are the Habitat Restoration Program, with a broad focus on habitat and species affected by the CVP and particularly on listed threatened or endangered species; and the San Joaquin River Riparian Habitat Restoration Program, focusing on restoration of riparian areas on the San Joaquin River from Friant Dam to the Merced River. These programs are closely coordinated, and both rely on extensive partnerships with other agencies, conservation groups, and stakeholders to accomplish their objectives.

Benefits of Other Fish and Wildlife and Associated Habitats

Notable examples of Habitat Restoration Program projects include the Pine Hills Ecological Reserve and the program to prevent the extinction and assist in the recovery of the riparian brush rabbit. Interior has contributed funding over several years toward the acquisition of the Pine Hills Ecological Reserve in El Dorado County. As of spring 2002, CVPIA funds, along with monies from other partners, have been used to acquire 2,615 acres of the planned 5,000-acre preserve that will protect five listed and three candidate plant species in this extremely rare natural community associated with gabbro soils. We are also involved in the development and implementation of a management plan for this fire dependent community.



The San Joaquin River

A riparian brush rabbit habitat enhancement, captive breeding, and reintroduction program has been supported by the Habitat Restoration Program. First funded in 1997, this program is a last ditch effort to save an endangered species that was once among the most abundant in the Central Valley. To date, 258 acres at Caswell State Park have been enhanced and/or restored after populations there were devastated by a major flooding event. The captive-breeding component of the effort is a joint venture with several State and Federal agencies and the Endangered Species Recovery Program at California State University – Stanislaus. Species surveys, construction of breeding pens, genetic studies, radio tagging, removal of exotic species, and educational outreach are all part of the effort. More than 40 rabbits have been born in captivity and are being reintroduced at the San Joaquin River National Wildlife Refuge. This is the first time an endangered mammal has been bred in captivity in California.

Initial efforts of the San Joaquin River Riparian Restoration Program 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 Interior’s efforts. A major project of this program has been the evaluation of the effects of increased releases from Friant Dam on the growth and regeneration of riparian vegetation and how that might benefit riparian wildlife species. The studies also look at the impacts of these flows on channel roughness, groundwater-surface water interactions, and other physical and biological functions.



Alkali sacaton (Sporobolus airoides - above) and Purple owl's clover (Castilleja exserta - right) are two plant species benefiting from the Land Retirement Program.

Also in this category is the Agricultural Land Retirement Program. This program was established to retire key parcels of drainage-impaired agricultural land from irrigated agriculture, and use the retired lands to assist in the recovery of habitat for a variety of native wildlife species. Focus is on lands in the San Joaquin Valley, where drainage-related problems resulted in adverse impacts to waterfowl, shorebirds, and other wildlife.

A critical question to be answered is how the retirement of these lands will affect the generation of contaminated agricultural drainage and whether the native vegetation subsequently grown on the lands will be free of contaminants that might affect the wildlife that move into these habitats. A “demonstration” program to answer these questions has been initiated.

Other Fish and Wildlife – Accomplishments

Since the Habitat Restoration Program began in fiscal year 1996, efforts to protect and provide habitat for fish and wildlife species *other than anadromous fish and wetland-dependent wildlife* have resulted in the acquisition, through partnerships with others such as The Nature Conservancy, of more than 87,000 acres and the restoration of more than 1,100 acres of habitat for native species.

The San Joaquin River Riparian Habitat Restoration Program has worked to improve desirable plant and animal habitat along the San Joaquin River from Friant Dam to the river’s confluence with the Merced River. Over the next several years, we anticipate that the popula-

The Agricultural Land Retirement Program has acquired 1,200 acres of farmland in the Sacramento-San Joaquin Delta and nearly 8,800 acres of irrigated agricultural land in the San Joaquin Valley.

CVPIA Implementation and Results

tions of species associated with these habitats, and particularly those that are considered threatened or endangered, will increase substantially.

The Agricultural Land Retirement Program has acquired 1,200 acres of farmland in the Sacramento-San Joaquin Delta and nearly 8,800 acres of irrigated agricultural land in the San Joaquin Valley. A demonstration program has been implemented that experiments with a variety of restoration techniques. To date, 2,200 acres of retired lands have been treated and are in some stage of recovery.

Other CVPIA Activities

- Entered into binding cost-share agreement with the State of California
- Established Restoration Fund and collected over \$353 million from 1993 through 2002
- Initiated "Rulemaking" and prepared Interim Guidelines for 10 CVPIA programs
- Completed PEIS
- Executed "interim" renewal contracts: executed 27 and negotiated additional 24 long-term contracts for water service
- Approved transfer of more than 4.7 million acre-feet of CVP water
- Implemented water conservation program
- Implemented Comprehensive Assessment and Monitoring Program for CVPIA
- Initiated studies on flow fluctuations, reservoir carryover storage and Stanislaus River Basin water needs
- Terminated San Joaquin River Comprehensive Plan
- Completed three of six Supporting Anadromous Fish Investigations
- Completed CVP Fishery Impacts Report, Report on CVP Yield Increase, and Central Valley Wetlands Water Supply Investigation

Other CVPIA Activities

A great deal of time and effort have also gone into meeting the requirements of CVPIA that deal with water contracting, water transfers, improved water management, conservation, studies and investigations, modeling, monitoring, and environmental compliance.

One of the most challenging tasks was the development and completion of a PEIS to address the direct and indirect effects and benefits of implementing the CVPIA. Many CVPIA actions could not be undertaken or completed until the PEIS was finished. All subsequent CVPIA actions are expected to tier off the PEIS. This was a massive effort involving a very large number of stakeholders and very sensitive issues.

The Draft PEIS was completed and circulated for review in November 1997; the comment period closed in April 1998. The Final PEIS was released in October 1999 and, after completion of consultation pursuant to the Endangered Species Act on CVPIA implementation and CVP operations, Reclamation and the Service signed the Record of Decision in January 2001. The PEIS included 33 appendices, 18 of which address technical resource issues. A CD-ROM set was prepared that contains the entire document and the models, input data, and output files that were used in the analysis of effects.

Most of the studies and investigations required by the CVPIA have been implemented or initiated. These include the CVP Fisheries Impact Report, Central Valley Wetlands Water Supply Investigation, and studies on the problems and options available to assist in the restoration of populations of anadromous fish, particularly chinook salmon and steelhead trout. Much of the information is being applied in the on-the-ground efforts being implemented under the Anadromous Fish Restoration Program and the similar efforts of CALFED.

The development of ecological and hydrologic models is another major effort that is continuing and is receiving valuable data from other CVPIA programs and studies. To date, efforts have focused on new model development and documenting the data and logic to improve models. One major model being developed is CALSIM II, jointly being funded and executed by Reclamation and the California Department of Water Resources. This is a reservoir system model that replaces the separate models previously used to simulate the operations of the CVP and the State Water Project. It explicitly addresses activities such as the Vernalis Adaptive Management Program and the CALFED Environmental Water Account.

Although Interior is rightfully proud of its progress in the implementation of this monumental restoration effort, we could not have done it without the participation of the State and other partners.

Conclusions

Over the past 10 years, a great deal has been done to implement the Central Valley Project Improvement Act, and Interior is well on the way to accomplishing the goals and objectives set by Congress. Most of the administrative requirements have been completed or are well under way. Renewal of long-term contracts is progressing well. Much, however, remains to be done.

Populations of some races of salmon are on the rise valley-wide, but additional work is needed on other races of salmon and on the other species of anadromous fish. Within a few years, conveyance facilities to deliver all of the necessary water to critical wetland refuges will be completed. But, the annual costs for the water supplies themselves is large and getting larger as other demands for water escalate. Most of the Restoration Fund could soon be dedicated to this one purpose alone, leaving little money available to meet other CVPIA objectives. Purchase of permanent or long-term water, rather than annual supplies, is the best answer but these are not readily available on the market and are very expensive when they can be found.



Although Interior is rightfully proud of its progress in the implementation of this monumental restoration effort, we could not have done it without the participation of the State and other partners. The monies spent thus far do not even include contributions by other programs and groups such as CALFED and non-profit conservation organizations. It is abundantly clear that Interior cannot do it alone. Nor can we step back and expect others to do it. Interior must continue with at least the same level of effort and encourage others to do the same.

We cannot at this time predict when, or even if, we will fulfill all of the goals and objectives in the CVPIA. We **will meet** the refuge water supply requirements. We **will help** to recover listed threatened or endangered species, but CVPIA is not the sole savior for those species on the brink. We **will take all reasonable actions** to double the natural production of anadromous fish, but it must be recognized that factors beyond Interior's control exert a very great influence over the populations of these species. Only time will tell how successful we will be in this regard. The public can be assured, however, that we will do our utmost to fulfill our obligations and meet the intent of Congress when this landmark legislation was enacted.

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