

Central Valley Project Improvement Act

Final Programmatic Environmental Impact Statement

Executive Summary

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Introduction

On October 30, 1992, the President signed into law the Reclamation Projects Authorization and Adjustment Act of 1992 (Public Law 102-575), which included Title XXXIV, the Central Valley Project Improvement Act (CVPIA). The CVPIA amends previous authorizations of the California Central Valley Project (CVP) to include fish and wildlife protection, restoration, and mitigation as project purposes having equal priority with irrigation and domestic water supply uses, and fish and wildlife enhancement having an equal priority with power generation.

This document summarizes the Programmatic Environmental Impact Statement (PEIS) which addresses the potential impacts of implementation of the Central Valley Project Improvement Act. The PEIS was prepared pursuant to the National Environmental Policy Act (NEPA) by the U.S. Bureau of Reclamation (Reclamation) and the U.S. Fish and Wildlife Service (Service) for the Department of the Interior.

Central Valley Project Water Facilities

The CVP is one of the largest water storage and conveyance systems in the world. The project includes 20 dams and reservoirs capable of storing 11 million acre-feet of water, 11 power plants, 500 miles of major canals and aqueducts, three fish hatcheries, and various related facilities. The CVP conveys about 20 percent of the state's developed water from the Sacramento, Trinity, American, Stanislaus, and San Joaquin rivers to agricultural and municipal water users and wildlife refuges in the Sacramento and San Joaquin valleys and the San Francisco Bay Area.

The CVP operations affect the Sacramento-San Joaquin Delta. These operations must be coordinated with the State Water Project (SWP), which also conveys water through the Delta. The SWP conveys water from the Feather River to SWP agricultural and municipal water service contractors and water rights contractors in the Sacramento and San



Joaquin valleys, the San Francisco Bay Area, and the Central and Southern California Coastal areas.

The CVP and SWP are operated in accordance with their respective water rights permits and licenses administered by the State Water Resources Control Board (SWRCB). Operation of the two projects is managed through the Coordinated Operating Agreement (COA). The CVP and SWP, under their water rights permits, are required to meet water quality standards and the needs of senior water rights holders. Under the existing Biological Opinions issued under authority of the Federal Endangered Species Act, the two projects must also operate in a manner that is not likely to jeopardize the endangered winter-run chinook salmon and threatened Delta smelt.



Purpose and Need

Purpose and Need for the Federal Action

The Federal action to be taken by the Department of the Interior (Interior) is to implement provisions of the CVPIA. The general purposes of the CVPIA and the action proposed by Interior were identified by Congress in Section 3402. These purposes respond to a need to modify the existing water operations and physical facilities of the CVP.

Purpose and Use of the Programmatic Environmental Impact Statement

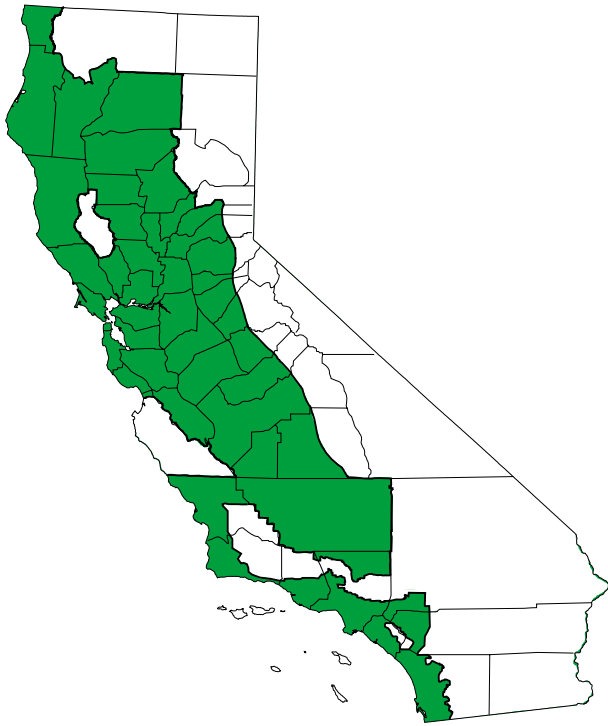
The purpose of the PEIS is to evaluate the impacts of implementing the CVPIA. The PEIS addresses the CVPIA's region-wide impacts on communities, industries, economies, and natural resources and provides a basis for selecting a decision among the alternatives. Because it is a programmatic document, the PEIS presents a system-wide analysis, rather than presenting detailed analyses of specific projects and sites.

While the Final PEIS examines the "big picture" of the CVPIA, a more detailed evaluation will also be done for many of the actions as they are implemented. The PEIS will be used as a basis for tiered environmental documentation to be completed prior to long-term implementation of some CVPIA provisions.

Provisions of the CVPIA that are addressed in this PEIS include:

- CVP water contract renewals
- Water transfers
- Tiered water pricing
- CVP operational changes
- Fish and wildlife water dedication and management
- Fish and wildlife water acquisitions
- Fish and wildlife habitat improvements
- Refuge water supplies
- Land retirement
- Facility modifications

The proposed action would not include programmatic implementation of increased instream fish flows in the Trinity River. That program is being analyzed in a separate and concurrent EIR/EIS. This PEIS includes assumptions about Trinity River flows solely for the purpose of programmatic analysis of the proposed action.



Definition of the Study Area and Study Period

Study Area

The Study Area for the PEIS includes the Central Valley and coastal areas in California. Criteria for defining the Study Area were developed through an extensive public scoping process and includes:

- Areas that include CVP facilities, CVP water users, or water rights holders affected by CVP operations.
- Areas that could be directly impacted by changes in CVP operations or actions implemented under the CVPIA.
- Areas that could be directly impacted by water transfer programs that involve CVP water users or CVP facilities.

Study Period

The PEIS analyzes projected conditions in the Year 2025 which allows for the period to complete the environmental documentation and the term of 25 years for the long-term water service contracts.

CVPIA PURPOSES (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 CVP on fish, wildlife, and associated habitats;
- c.** to improve the operational flexibility of the CVP;
- d.** to increase water-related benefits provided by the CVP 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;
- f.** to achieve a reasonable balance among competing demands for use of CVP water, including the requirements of fish and wildlife, agriculture, and municipal, industrial, and power contractors.



Background

Over the past 150 years, competition for water has escalated within the tributary area of the Sacramento-San Joaquin Delta. Particularly in recent decades, population growth, with its attendant municipal and economic development, has placed increasing pressure on water resources.

Agricultural and urban water demands have contributed to groundwater depletion. Wastewater discharge and contamination in runoff have affected water quality in Central Valley rivers and the Delta. Agricultural and municipal development, as well as construction and operation of water systems such as the CVP, the State Water Project, and local projects and levee systems have also sharply reduced habitat that supports fish and wildlife resources in the Central Valley.

As early as the 1920's, California began seriously planning major public works projects that would allow greater use of the State's water resources through storage and diversions. Originally envisioned as part of the State Water Project, several of the cornerstone facilities, such as Shasta and Friant dams, were pursued under Depression-era federal policies. In the 1930's, the Bureau of Reclamation was authorized to construct the CVP with multiple objectives including navigation, flood control, water for agricultural and municipal use, and power to support these purposes.



Changes Due to Water Resource Projects

The CVP and other water projects have helped make the Central Valley the richest agricultural region in the nation. Low-cost water and power have also brought manufacturing, service, commerce, entertainment, and defense industries to the state, along with millions of jobs. Economic growth created increasing demand for goods and services that led to the large-scale conversion of natural habitat to agriculture and other uses.

Prior to the development of water resource projects in California, most anadromous fish migrated upstream to spawn from fall through spring. Storm flows also helped to move fish back downstream from spawning areas in the upper reaches. Runoff from rain and snow also repelled saltwater intrusion in the Delta.

Water resource projects throughout the Central Valley and foothills modified the flow patterns by shifting peak river flows to summer months, and highly impacting spawning and rearing conditions for anadromous fish species. In addition, reservoirs and diversions altered the temperature of some stream reaches, blocked fish passage to some colder water stream reaches that were needed for spawning and rearing, and entrained juvenile fish in the diversions.

Water resource development in California has, in general, led to expansion of both the demand and supply that impact water resources and the ecosystems that are dependent on them. Through the CVPIA, Interior will be implementing the programs to help restore environmental conditions altered by the CVP.





No-Action Alternative Definition

- All Existing Facilities and Land Uses
- Shasta Temperature Control Device funded by non-CVPIA funds. Facilities under construction during Draft PEIS preparation
- Bay-Delta Plan per SWRCB Water Rights Decisions
- CVP Water Contract Renewals
- Level 2 Refuge Water Supplies from Historic Sources
- Trinity River Instream Flows of 340,000 acre-feet/year
- Increased Water Rights Demands per Department of Water Resources Bulletin 160-93
- Service/Reclamation Conservation Program
- Implement CVP Conservation Program to benefit priority and special status species

No-Action Alternative Physical Features

- All Existing Facilities
- Shasta Temperature Control Device
- State Water Project Coastal Aqueduct
- Metropolitan Water District Eastside Reservoir
- Contra Costa Water District Los Vaqueros Reservoir
- Coleman Fish Hatchery
- Stone Lakes National Wildlife Refuge
- Old River Barrier

Description of the No-Action Alternative

The alternatives were analyzed for their impacts in comparison to a No-Action Alternative. The No-Action Alternative reflects conditions expected to exist in the Year 2025 if the CVPIA had not been adopted and provides a basis for comparison of other alternatives. It includes existing facilities and land uses, as well as projections concerning future growth, land use changes, and changes in CVP operational policies which are being considered and have undergone separate environmental documentation. The No-Action Alternative also includes assumptions concerning concurrent, but separately evaluated issues. One example is the assumption that ocean harvest limitations for sport and commercial salmon fishing would be consistent with 1992 policies. The PEIS recognizes that those issues may be evaluated in a separate process, but not by the PEIS.

Assumptions for Physical Features Under the No-Action

Existing physical features of the CVP constitute the starting point for defining the No-Action Alternative. The No-Action Alternative also includes projects that would have been implemented without adoption of the CVPIA. The criteria for inclusion of the future facilities in the No-Action Alternative required that the project have:

- Authorization and funding for design;
- Final environmental documents, permits, and approvals; and
- Initial authorization and funding for construction without CVPIA.

Assumptions for Operations Under the No-Action Alternative

The operational and regulatory policies and assumptions included in the No-Action Alternative were already in existence or were being developed prior to the adoption of CVPIA. The No-Action Alternative includes assumptions about results of ongoing evaluation processes for these policies. For example, the No-Action Alternative includes assumptions for implementation of the Bay-Delta Plan Accord.

Description of PEIS Programs

The CVPIA modifies the operation, management, and physical features of the CVP. The PEIS analyzes a full range of implementation options across various scenarios. A public scoping process helped identify two types of implementation provisions in the CVPIA: core programs and multiple option programs.

Core programs have a single method of implementation at the programmatic level and are the same in all action alternatives.

Multiple option programs have multiple implementation methods at the programmatic level and vary among action alternatives. The multiple option programs include CVP water system operations, CVP water pricing, and fish and wildlife habitat improvements (including water acquisition from willing sellers). Supplemental Analyses were developed to address additional actions under the base alternatives to provide additional comparisons.

The core programs and multiple option programs were used to formulate the Preferred Alternative, as well as the four other Alternatives and 15 Supplemental Analyses.



Core Programs in All Alternatives

CVP Water Contract Renewals (Section 3404(c))

Water Measurement (Section 3405(b))

Water Conservation (Section 3405(e))

(b)(1) "other" Program (Section 3406(b)(1))

**Tracy and Contra Costa Pumping Plants
Fish Protection Facilities Modifications
(Section 3406(b)(4-5))**

**Shasta Temperature Control Device
Construction (Section 3406(b)(6))**

**Coleman Fish Hatchery Modifications
(Section 3406(b)(11))**

**Clear Creek Restoration and Structural
Modifications (Section 3406(b)(12))**

**Non-Flow Habitat Restoration Programs on
Central Valley Streams (Section 3406(b)(13))**

**Anderson-Cottonwood Irrigation District
Diversion Modification (Section 3406(b)(17))**

**Glenn-Colusa Irrigation District Diversion
Modification (Section 3406(b)(20))**

**Fish Screens/Bypasses on Central Valley Streams
(Section 3406(b)(21))**

**Seasonal Field Flooding of up to 80,000 Acres
(Section 3406(b)(22))**

**Increased Minimum Trinity River Flows (Section
3406(b)(23))**

**Purchase 30,000 Acres of Retired Lands from
Willing Sellers (Section 3408(h))**



Multiple Option Programs

Fish and Wildlife Management Programs

One of the programs having multiple implementation options is the Fish and Wildlife Management Program. This program includes actions to improve habitat, as defined by the Anadromous Fish Restoration Program (AFRP), and refuge water supplies. The program associated with refuge water supplies was defined in the 1989 Refuge Water Supply Study and the San Joaquin Basin Action Plan completed by the Bureau of Reclamation (Reclamation).

Anadromous Fish Restoration Program

The AFRP's goal is to undertake reasonable efforts to sustain the natural production of anadromous fish in the Central Valley rivers and streams by the year 2002, at numbers double the average levels exhibited during the period from 1967 through 1991. The objectives of the AFRP are to:

- Obtain the best available scientific and commercial data;
- Develop a long-term Restoration Plan that identifies the general approaches and actions to attain the goal; and
- Develop short-term implementation plans as tiers to the Restoration Plan.

The PEIS alternatives incorporate instream and Delta habitat and flow improvements, which are major elements of the AFRP. The flow improvements were based upon information developed by the U.S. Fish and Wildlife Service (Service) in October 1996. The following three tools were identified in the CVPIA to improve flows.

- **Reoperation of the CVP in accordance with Section 3406(b)(1)(B)** Reoperation is defined as changes in CVP operations that do not impact water deliveries to CVP water users.
- **Dedication of 800,000 acre-feet of CVP water in accordance with Section 3406(b)(2)** The "(b)(2) Water Management" is defined as operation of the CVP in a manner that would allow the CVP to dedicate and manage 800,000 acre-feet/year of CVP yield for fish and wildlife purposes. For the PEIS, the (b)(2) Water Management included an instream component for CVP-controlled streams, a Bay-Delta Plan component for the CVP, and an additional Delta component.
- **Water acquisitions in accordance with Section 3406(b)(3)** Water acquisitions from willing sellers would be used to provide increased instream flows in specific months to improve habitat, in accordance with preliminary information developed by AFRP. The acquisition targets vary among action alternatives.

Refuge Water Supply

Many refuges historically received water supplies from multiple sources such as irrigation return flows and temporary annual water contracts. In years preceding the CVPIA, water conservation programs and increased demand for water reduced the reliability of these sources. The CVPIA provides for a firm water supply for Central Valley wildlife refuges from existing CVP yield at the levels described in the 1989 Refuge Water Supply Study and the San Joaquin Basin Action Plan. The refuges include both National Wildlife Refuges and state-owned Wildlife Management Areas.

- All alternatives, except the No-Action Alternative, provide firm Level 2 CVP water supplies to 21 refuges. Level 2 water supply is the average historic water delivery between 1978 and 1984.
- The Preferred Alternative, Alternatives 2, 3, 4, and the associated supplemental analyses, also include firm Level 4 CVP water supplies. Level 4 is the water supply needed to fully develop the refuges as defined in the 1989 Refuge Water Supply Study and the San Joaquin Basin Action Plan.



Water Pricing

The PEIS analyzed three different methods of implementing tiered water pricing. Tiered water pricing is an incremental pricing system required by the CVPIA in which water costs rise with increased demand. Two of the options include the Ability-to-Pay policy, which forgives a portion of the capital repayment obligations. The third option would not include this policy.

Three water pricing options were considered in the PEIS. They range from water priced at the contract rate to water priced at full cost plus 20% without the Ability-to-Pay policy applied to the option.

Water Transfer Programs

The CVPIA provides for water transfers between willing buyers and sellers, but does not mandate such transfers. The PEIS analyzed the opportunities for water transfers and the way other CVPIA provisions affect these transfers. The PEIS makes assumptions about the volume of transferred water based on the following assumptions:

- All CVP water would be transferable;
- Transfers would be limited by existing conveyance capacity and no new groundwater or recharge would be used to expand conjunctive use programs; and
- The cost of the transferred water would be equal to the capital plus operation and maintenance costs and the net income lost as a result of the transfer.

Development of the Alternatives

The PEIS evaluated various alternatives for implementing the provisions of the CVPIA. These alternatives were developed through an extensive public scoping effort and screening process. The alternatives evaluate a range of actions or programs to meet CVPIA objectives. Multiple option programs provided the variability and flexibility needed to create such a range. The PEIS analyzed a No-Action Alternative, 5 Main Alternatives, including a Preferred Alternative, and 15 Supplemental Analyses.

The alternatives include implementation of the following programs:

- Anadromous Fish Restoration Program with flow and non-flow restoration methods and fish passage improvements;
- Reliable Water Supply Program for refuges and wetlands identified in 1989 Refuge Water Supply Study and the San Joaquin Basin Action Plan;
- Protection and restoration program for native species and associated habitats;
- Land Retirement Program for willing sellers of land characterized by poor drainage; and
- CVP Water Contract Provisions for contract renewals, water pricing, water metering/monitoring, water conservation methods, and water transfers.

The Alternatives were compared to the No-Action Alternative for their impacts.

PEIS Alternatives Defined

The PEIS includes a No-Action Alternative, 5 Main Alternatives, including a Preferred Alternative, and 15 Supplemental Analyses. The alternatives were developed in a building block fashion to reflect various levels of implementation that may occur depending on the level of willingness to participate and partner in the CVPIA programs. The Supplemental Analyses were analyzed to determine the impacts similar actions would have on the main Alternatives. Many of the Supplemental Analyses' actions are similar, but their outcomes differ depending on the main alternative with which they are combined.

Preferred Alternative

The Preferred Alternative was defined in response to the results of the Draft PEIS analysis, public comments received on the Draft PEIS and the Supplement to the Draft PEIS, public comments received on related Administrative Proposals, and the results of early implementation of several CVPIA provisions. The Preferred Alternative was constructed to implement CVPIA in a manner that best balances environmental benefits, affordability, and technical feasibility. As such, it does not include provisions that would clearly exceed the funding mechanisms of CVPIA, and require additional congressional authorization.

The Preferred Alternative includes Core Programs to meet CVPIA objectives. The Core Programs address contract renewal, water measurement and conservation, modification of various facilities and habitat to protect fish, seasonal field flooding, and land retirement. The Preferred Alternative uses reoperation of the project, under Section 3406(b)(1)(B), to provide greater benefit to fish and wildlife. The Preferred Alternative uses (b)(2) water to meet the CVP share of the Bay-Delta Plan, Instream Components, and Delta Components. The Preferred Alternative also implements Contract-to-Full-Cost tiered pricing rate, with the ability to pay policy, which begins at the contract rate for the first 80%, the average between contract and full-cost rates for the next 10% of water, and full cost for the final 10% of water.

The Preferred Alternative includes acquisition of up to 110,000 AF of water from willing sellers on the Stanislaus, Tuolumne, and Merced rivers and up to 30,000 AF on the Sacramento River tributaries. The acquired water would be used to increase the instream flows and partially to increase Delta outflow. CVP water would be used to provide reliable Level 2 refuge water supplies. Water acquired from willing sellers would be used to provide level 4 refuge water supplies. The Preferred Alternative includes retirement and revegetation of drainage problem lands.

The Preferred Alternative also includes provision for transfer of water between willing buyers and sellers, with no additional transfer fees.

Studies concerning Delta barriers, improvements at Red Bluff Diversion Dam and other CVPIA provisions are currently underway. Due to the status of these studies, the Preferred Alternative

recognizes the benefits of these programs, but does not include specific recommendations.

Alternative 1

This Alternative includes Core Programs to meet CVPIA objectives. The Core Programs are implemented in all five main alternatives, including the Preferred Alternative and address contract renewal, water measurement and conservation, modification of various facilities and habitat to protect fish, seasonal field flooding and land retirement. In addition to Core Programs, Alternative 1 uses reoperation of the project to provide greater benefit to fish and wildlife. Alternative 1 uses (b)(2) water to meet the CVP share of the Bay-Delta Plan as well as (b)(2) Instream Components. Alternative 1 also implements Contract-to-Full-Cost tiered pricing rate, which begins at the contract rate for the first 80%, the average between contract and full-cost rates for the next 10% of water, and full cost for the final 10% of water.

Alternative 1 does not acquire water for instream flow improvements or make permanent structural improvements to Old River Barrier or Georgiana Slough, but it does provide Level 2 refuge supplies with a shortage provision based on the Shasta inflow index.

Supplemental Analysis 1a

Supplemental Analysis 1a, as do all supplemental analyses' actions, builds on or adds to the main Alternative. Under Supplemental Analysis 1a, the (b)(2) Delta Component of the AFRP is added to the Bay-Delta and the Instream Components in the project reoperation and use of (b)(2) water.

Supplemental Analysis 1b

This alternative adds structural improvements in the Delta to protect young salmon and other fish as they migrate through the Delta. Modified operation at the Delta Cross Channel and permanent structures at Georgiana Slough and a seasonally operated barrier at Old River will improve survivability of young fish as they migrate downstream.

Supplemental Analysis 1c

All main Alternatives change current water pricing in some manner. Supplemental Analysis 1c builds on Alternative 1 by implementing the tiered pricing requirement of the CVPIA through the Full-Cost-Plus method. The first 80% of contract allocation is priced at full cost, the next 10% of allocation is 110% of full cost, and the final 10% of allocation is 120% of full cost.

Supplemental Analysis 1d

Supplemental Analysis 1d builds on the refuge water supply element of Alternative 1 by eliminating the shortage provision. In Supplemental Analysis 1d, refuges will receive full Level 2 supply in all years.

Supplemental Analysis 1e

Supplemental Analysis 1e includes fees for the transfer of CVP water, as specified by the CVPIA, and allows transfer of CVP water to non-CVP users.

Supplemental Analysis 1f

This alternative is similar to Supplemental Analysis 1e in its purpose, but would add a \$50/acre-feet (AF) fee on all CVP transfers, with the additional funds added to the Restoration Fund. This alternative and others that impose the additional fee would require additional Congressional authorization.

Supplemental Analysis 1g

Supplemental Analysis 1g removes the current ability-to-pay policy applied to the 80/10/10 Contract-to-Full-Cost tiered pricing implemented in the main Alternative 1.

Supplemental Analysis 1h

Restoration Funds would be used under this alternative to develop and implement a formal Revegetation Program for the retired lands. This alternative increases the use of the Restoration Funds for habitat restoration and enhancement.

Supplemental Analysis 1i

Supplemental Analysis 1i provides year-round opening of the Red Bluff Diversion Dam gates. This alternative will improve operational flexibility and provide greater balance among water supply and fish and wildlife demands. Diversions to the Tehama-Colusa Canal do not change from previous alternatives.

Alternative 2

Alternative 2 builds on Alternative 1 by acquiring, from willing sellers, 60,000 AF of water on both the Stanislaus and Tuolumne rivers, 50,000 AF on the Merced River, and an undetermined amount on Upper Sacramento River Tributaries. Refuge water supplies are increased to Level 4, subject to hydrologic shortages, through water purchase from willing sellers.

The acquired water would be used to improve fishery conditions on rivers tributary to the Delta. In addition to assisting in meeting target flows for the streams, the water would also be used to increase flows through the Delta and would not be exported.

Supplemental Analysis 2a

Supplemental Analysis 2a, like alternative 1b, would add structural improvements in the Delta to protect young salmon and other fish as they migrate through the Delta.

Supplemental Analysis 2b

This alternative allows transfers from CVP to non-CVP water users and includes fees specified in the CVPIA, similar to Supplemental Analysis 1e.

Supplemental Analysis 2c

Supplemental Analysis 2c is similar to 1f, which adds a \$50/AF fee to all transfers of CVP water.

Supplemental Analysis 2d

Supplemental Analysis 2d is similar to alternative 1c as it implements the tiered pricing requirement of the CVPIA through the Full-Cost-Plus method.

Alternative 3

Alternative 3 continues to build on the previous main Alternatives by retaining all of Alternative 1 and the Refuge Water Supply provision of Alternative 2 and adds to the volume and number of streams on which water is acquired.

Alternative 3 will acquire 200,000 AF on each of the Stanislaus, Tuolumne, and Merced rivers; 30,000 AF on the Calaveras River; 70,000 AF on the Mokelumne River; and 100,000 AF on the Yuba River. An undetermined amount of water will also be acquired on Upper Sacramento River Tributaries.

Alternative 3 is further distinguished from Alternative 2 in that acquired water is not specifically used to increase in-Delta Flows. As a result, acquired water is available for export under Alternative 3 once requirements of the Bay-Delta Accord have been met.

Supplemental Analysis 3a

This alternative repeats the water transfer implementation, as in Supplemental Analyses 1e and 2b, which includes only fees specifically mandated by the CVPIA.

Alternative 4

Alternative 4 builds from Alternative 3 by adding the Delta Component of the AFRP to the reoperation and (b)(2) water program and using the acquired water for Delta flow increases. Acquired water is not available for export from the Delta.

This Alternative completes the upper range of water acquisition and instream use. It provides the same acquisition levels in all streams as Alternative 3 and provides no export of acquired water as in Alternative 2.

Supplemental Analysis 4a

This alternative repeats the water transfer implementation as in Supplemental Analyses 1e, 2b, and 3a, which includes only fees specifically mandated by the CVPIA.



Summary of Impact Assessment

The alternatives were analyzed to determine the potential for adverse and beneficial impacts associated with implementation of the various CVPIA programs. Impacts under the alternatives, as compared to the No-Action Alternative, are the result of changes in water facilities operations and deliveries, and structural improvements which, in turn, directly or indirectly affect surface and groundwater, power resources, fish and wildlife, vegetation, agricultural land use, recreational opportunities, the regional and local economy, social conditions, and cultural resources. Changes to other resource areas could not be defined at the programmatic level.

Changes in Water Facilities Operations and Deliveries

Changes to CVP operations are similar in all alternatives and were primarily related to 1) assumed reduced diversions from the Trinity River Basin to the Sacramento River; 2) increased releases from Shasta Lake in fall, spring, and summer to meet target flows and to meet requirements in the Sacramento River that had been partially met by water from the Trinity River Basin; 3) increased flows on Clear Creek in non-critically dry years; 4) reduction in summer

releases from Folsom Lake to increase storage in September and to stabilize flows from October through February in the American River; and 5) increased instream flows in the Stanislaus River during non-critically dry years.

Primarily as a result of assumed decreased Trinity River Basin diversions to the Sacramento River and (b)(2) Water Management, average annual CVP exports in the Delta decrease. CVP operations in the Delta under the Preferred Alternative include a combination of instream releases and water acquisitions to increase Delta outflows during some periods and export limitations. The CVP operations in the Delta are similar in Alternatives 1 and 2 and Supplemental Analyses 1b through 1i and 2a through 2c. Under Alternative 3 and Supplemental Analysis 3a, acquired water could be exported and, therefore, the annual exports by both the CVP and SWP increase as compared to other alternatives. Under Alternative 4 and Supplemental Analyses 1a and 4a, Delta exports are reduced as compared to the other alternatives due to the implementation of (b)(2) Water Management in the Delta in addition to the Bay-Delta Plan and use of acquired water in the streams and in the Delta.

The alternatives have varying effects on CVP water deliveries. Water deliveries to CVP water service contractors are less in each of the alternatives as compared to the No-Action Alternative. Water deliveries to the water rights contractors and exchange contractors do not change between the No-Action Alternative and the other alternatives. CVP water operations could vary significantly under Supplemental Analyses 1c and 2d as compared to the other alternatives. Under these alternatives, CVP water service contract demands are reduced by 570,000 acre-feet/year due to the high price of CVP water under the alternatives. The water could be reallocated to other CVP contractors, used to meet other fish and wildlife needs, or transferred by the CVP contractors with reduced demands. If this water is used by other CVP contractors or transferred, CVP operations may not change noticeably. If the water is used for fish and wildlife needs, reservoir storage and stream flows may change significantly.

Several alternatives call for water acquisitions to increase instream flows in the river where the water is acquired and also in downstream rivers and in the Delta. For the water acquisition actions under the Preferred Alternative, water generally would either be released in the spring or stored for release in the fall. Similar operations are assumed for Alternatives 2, 3, and 4 and Supplemental Analyses 2a through 2d, 3a, and 4a.

Changes in Groundwater Resources

Impacts on groundwater result from changes in surface and groundwater use, crop mix and irrigation techniques, and stream flows.

Groundwater depth increases in the Sacramento Region, San Joaquin Region and the Tulare region under the Preferred Alternative. In Alternatives 1, 2, and 3, the groundwater depth would increase in Sacramento, San Joaquin, and the northern Tulare Lake regions. Depth would decrease in the southern Tulare Lake region. All regions would have a depth increase in Alternative 4.



Changes in Power Resources

Changes in CVP operations, especially increased flows in the Trinity River Basin, shift patterns of CVP power generation. Under all alternatives, generation shifts from summer months to the spring and fall months when the demand for hydropower is less. Overall, generation is reduced. The cost of replacement power to meet summer month loads may increase the overall cost of power supplies to CVP preference power customers. Under the Preferred Alternative, CVP loads are reduced. CVP loads were reduced in all other PEIS Alternatives.

Changes in Fishery Resources

Conditions for fish in CVP-controlled rivers and the Delta generally improve under all alternatives and supplemental analyses as a result of increased flows and non-flow actions such as fish screen and fish passage improvements, habitat restoration, improved water quality, and predator control.

Under the Preferred Alternative, flows and habitat for fish are increased on the Sacramento, American, Stanislaus, Tuolumne, and Merced rivers, Clear Creek and tributaries to the Sacramento River as compared to the No-Action Alternative. Fishery conditions in the Delta would improve due to increased Delta inflows and out-

flows, reduced pumping and additional fish protections.

Under Alternative 1 and Supplemental Analyses 1a through 1i, flows for fish are increased on CVP-controlled rivers, and reservoirs are reoperated to reduce short-term flow fluctuations. These actions generally improve environmental conditions although adverse effects occur on some streams for some species. Supplemental Analyses 1a and 1b improve fishery conditions in the Delta as compared to Alternative 1 due to increased Delta inflows, reduced pumping, and additional fish protection.

Alternative 2, and Supplemental Analyses 2a through 2d include all the benefits of Alternative 1 and improve conditions in the Stanislaus, Tuolumne, Merced, and the lower San Joaquin rivers and in the Delta with respect to temperatures, improved habitat, reduced losses to diversions, improved fish movement, and improved food web support. Additional fish protection under Supplemental Analysis 2a would further improve fishery conditions in the Delta.

Alternative 3 and Supplemental Analysis 3a include all benefits of Alternative 2 and further improve conditions on the Yuba, Mokelumne, Calaveras, Stanislaus, Tuolumne, and Merced rivers and in the Delta.

Alternative 4 and Supplemental Analysis 4a include all the benefits of Alternative 3 and add improvements to passage, diversions, and flow in the Delta.

Changes in Vegetation and Wildlife

Under the Preferred Alternative, land fallowing and retirement would benefit special-status and other wildlife species in the San Joaquin River and Tulare Lake regions. Riparian restoration on rivers in the Sacramento River and San Joaquin River regions has locally beneficial effects on the extent and condition of riparian habitat. Level 2 refuge water supplies increase wetland habitat available to waterfowl and shorebirds. Flooding of up to 80,000 acres of agricultural habitat during winter offers major benefits to migratory waterfowl, shorebirds, and wading birds, including special-status species. Implementation of the (b)(1) "other" program would benefit species not specifically identified in the CVPIA through habitat restoration, maintenance, enhancement, and protection.

The impacts associated with implementing Alternative 1 and Supplemental Analyses 1a through 1i are similar to the Preferred Alternative.

Impacts of Alternative 2 and Supplemental Analyses 2a through 2d are similar to those of Alternative 1; in addition, higher spring flows on the Stanislaus, Tuolumne, and Merced rivers increase water levels in the San Joaquin River at Vernalis, and benefit riparian habitat. Level 4 refuge water supplies allow optimal management of refuges.

Impacts of Alternatives 3 and 4 and Supplemental Analyses 3a and 4a are similar to those of Alternative 2, plus additional agricultural land is fallowed and conservation easements may be acquired on a portion of the land. Further, increased flows in the Stanislaus, Tuolumne, and Merced rivers lead to greater improvements in riparian vegetation on the San Joaquin River near Vernalis.

Changes in Agricultural Land Use and Economics

Throughout the Central Valley, a reduction of irrigated acreage and gross revenue reduction would be expected under all alternatives, with the highest reductions occurring under Alternative 4.

In all alternatives, the total percentage change in irrigated acreage would be greatest in the San Joaquin River region which includes the land retirement program. Land retirement actions would also reduce irrigated acreage in the Tulare Lake region.





The provisions that would potentially affect agricultural land use and economics include (b)(2) water management for fish and wildlife, water acquired for stream flows and refuges, water pricing, restoration payments, water conservation and measurement, land retirement, and water transfers.

Changes in Recreational Opportunities

Recreational opportunities under the No-Action Alternative are about \$145 million per year in recreation-related expenditures at major reservoirs and refuges in the Sacramento River region and about \$85 million per year in the San Joaquin River and Tulare Lake regions combined.

Under the Preferred Alternative, recreational use at major reservoirs changed less than 1 percent although recreational use of refuges increased significantly. This impact also occurred under all PEIS alternatives. Recreational use of refuges increased over 60% with implementation of the Preferred Alternative as compared to the No-Action Alternative. Recreation use at refuges increased over 25% under Alternative 1 and Supplemental Analyses 1a through 1i and over 60% in all other alternatives, as compared with the No-Action Alternative.

Changes to Regional Economics and Social Conditions

By increasing water related benefits provided by the Central Valley Project, the provisions of CVPIA would contribute to the overall economic and environmental sustainability of California. Implementation of CVPIA results from a variety of impacts to the regional economy and social conditions.

The Preferred Alternative would result in the lowest total estimated impact on jobs, approximately 0.04% loss in the Central Valley, compared to the other PEIS alternatives. Impacts under all alternatives would be partially offset by increases in economic activity during the period of construction of restoration actions. The loss of jobs also would be partially offset by a slight increase in economic activity due to increased revenues from water sales and increased recreation expenditures. The job losses would not be significant if distributed uniformly over an entire region, such as in the Sacramento River region. However, farm communities in the San Joaquin River and Tulare Lake regions on the Westside may be more severely affected.



Cultural Resources

Under some alternatives, including the Preferred Alternative, cultural resources may be affected; however, those impacts could not be quantified at the programmatic level. As project-specific documentation is undertaken, those impacts can be properly assessed and mitigation measures developed, as appropriate.

Before implementing individual actions, Interior will comply with Section 106 of the National Historic Preservation Act to account for the effects on historic properties. Interior will develop mitigation measures pursuant to Section 106 and will consult with the Advisory Council and State Historic Preservation Office.

Environmental Justice and Indian Trust Assets

Executive Order 12898 requires that federal agencies analyze the impacts of alternatives to identify and evaluate disproportionate impacts to minorities and low income populations. The impacts of the Preferred Alternative and other Alternatives occur throughout the Central Valley; therefore, it is difficult to conclude that one social group would be adversely affected to a greater extent by any of the alternatives. The impacts reflect the type of labor requirements required for agricultural production and skill and education level.

Reclamation policy is to protect American Indian Trust Assets and to determine if alternatives would affect the use and enjoyment of trust assets. None of the alternatives would adversely affect reserved water rights, water quality of the water rights, hunting and fishing rights, or noise near a land asset. Increased stream flows associated with the alternatives could positively affect Indian Trust Assets located adjacent to rivers and the associated hunting and fishing rights.





PEIS Public Involvement Summary

Public and stakeholder involvement was crucial in creating an open and inclusive process to develop the CVPIA implementation program. Throughout the preparation of the PEIS, meetings were held with the Cooperating and Consulting Agencies, other agencies, interest groups, and the public.

Preparation of the PEIS began during the Scoping phase. Scoping served as a fact-finding process that helped identify public concerns and recommendations about the CVPIA, the PEIS process, issues that would be addressed in the PEIS, and the scope and level of detail for the analyses. Scoping activities formally began in January 1993 after a Notice of Intent to prepare the PEIS was filed in the Federal Register and formally ended in April 1993 with the release of the Scoping Report and the Public Involvement Plan. Public participation continued, however, on an informal basis to ensure that new issues and concerns were considered throughout the PEIS process.

Post Draft PEIS Activities

Public Involvement continued after release of the Draft PEIS. During a comment period that lasted over 200 days, Information Forums and Public Hearings were held throughout northern California. In addition, Interior continued to hold small group briefings on request.

Just prior to releasing the Draft PEIS in November 1997, Interior discovered that PROSIM, one of the primary analytical tools used in the PEIS, included inconsistent hydrologic input data. Interior released the revised model, PROSIM 99, at the PROSIM Workshop in November 1998.

In July 1999, Interior released the Supplement to the Draft PEIS to display the impacts of using PROSIM99 with the PEIS Alternatives. The evaluation showed no change in the analyses. Information Forums and Public Hearings for the supplement were held throughout northern California.



Agencies that Participated in Draft PEIS Preparation

Cooperating Agencies that Participated in Draft PEIS Preparation

- California Department of Fish and Game
- California Department of Water Resources
- California State Water Resources Control Board
- Hoop Valley Tribe
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- National Marine Fisheries Service
- Western Area Power Administration

Consulting Agencies That Participated in Draft PEIS Preparation

- U.S. Geological Survey
- U.S. Natural Resources Conservation Service
- U.S. Bureau of Indian Affairs

The PEIS is intended to provide the basis for a decision on whether to implement at the programmatic level provisions of CVPIA, including:

- Water contract renewals
- Water Transfers
- Tiered water pricing
- CVP Operations
- Fish and Wildlife Water Acquisition
- Fish and Wildlife habitat restoration
- Water Acquisition to Increase Refuge Water Supplies
- Land Retirement
- Facility Modifications

For many provisions, additional environmental documentation will be necessary to determine site-specific impacts. The PEIS is designed to allow subsequent environmental documents to incorporate PEIS analysis by reference and to limit the need to re-evaluate the region-wide and cumulative impacts of CVPIA.

This PEIS will not provide the basis for a decision about whether to implement (b)(2) water dedication and management or Level 2 refuge water supplies, because the nature of these mandates does not require compliance with NEPA before implementation.

This PEIS alone will not provide the basis for a decision to implement the increased instream flows in the Trinity River. That program is being analyzed in the Trinity River Mainstem Fishery Restoration EIS/EIR, a separate and concurrent NEPA document.

To obtain a copy the Final PEIS please contact:

U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, California 95825-1898
www.mp.usbr.gov

U.S. Fish and Wildlife Service
2800 Cottage Way
Sacramento, California 95825-1898
www.fws.gov

MISSION STATEMENT

U.S. Department of the Interior

As the Nation's principal conservation agency, the U.S. Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources; protecting fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. Administration.

Bureau of Reclamation

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

U.S. Fish & Wildlife Service

The mission of the U.S. Fish & Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.