CENTRAL VALLEY
FLOOD MANAGEMENT
PLANNING PROGRAM

FloodSAFE
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## Appendix D

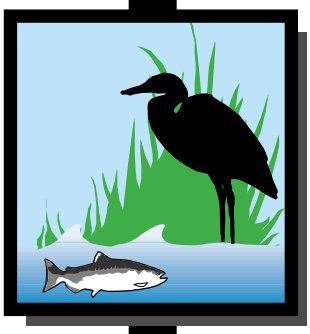
## CALFED Bay-Delta Program Final Programmatic Environmental Impact Statement/Environmental Impact Report: Executive Summary

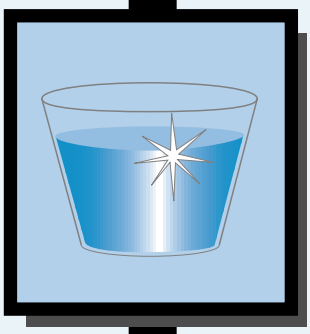
# 2012 Central Valley Flood Protection Plan

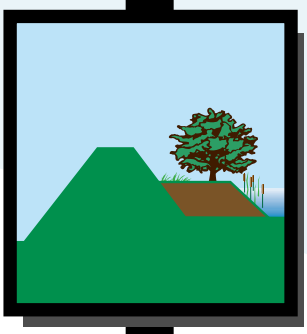
## Draft Program Environmental Impact Report

March 2012

SCH#: 2010102044







CALFED
BAY-DELTA
PROGRAM

# Executive Summary of the Final Programmatic Environmental Impact Statement/Environmental Impact Report

July 2000

CALFED
BAY-DELTA
PROGRAM

# Executive Summary

**Final Programmatic Environmental Impact Statement/
Environmental Impact Report**

**July 2000**

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You can contact the CALFED Bay-Delta Program toll-free at (800) 900-3587 or (916) 653-5820, or visit us at our website: http://calfed.ca.gov

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# Executive Summary

For decades, the Bay-Delta has been the focus of competing economic, ecological, urban, and agricultural interests. The CALFED Bay-Delta Program is a cooperative inter-agency effort that has developed a long-term solution to fish and wildlife, water supply reliability, flood control, and water quality problems in the Bay-Delta.


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# Executive Summary

## INTRODUCTION

The San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta) is the largest estuary on the West Coast. It consists of a maze of tributaries, sloughs, and islands and is a haven for plants, fish, and wildlife—supporting more than 750 plant and animal species. The Bay-Delta includes over 738,000 acres in five counties and is critical to California's economy, supplying drinking water for two-thirds of all Californians and irrigation water for over 7 million acres of the most highly productive agricultural land in the world. Although all agree on its importance for both habitat and as a reliable source of water, few have agreed on how to manage and protect this valuable resource.

For decades, the region has been the focus of competing economic, ecological, urban, and agricultural interests. These conflicting demands have resulted in declining wildlife habitat, native plant and animal species becoming threatened with extinction, the degradation of the Delta as a reliable source of high quality water, and a Delta levee system faced with a high risk of failure.

Even though environmental, urban, and agricultural interests have recognized the Delta as a critical resource, they have been unable to agree on appropriate management of the Delta resources.

Seeking solutions to the resource problems in the Bay-Delta, state and federal agencies signed a Framework Agreement in June of 1994 that provided increased coordination and communication for environmental protection and water supply dependability. The impetus to forge this joint effort came at the state level in December 1992 with formation of the State Water Policy Council and the Bay-Delta Oversight Council. In September 1993, the Federal Ecosystem Directorate was created to coordinate federal resource protection and management decisions for the Bay-Delta system. The Framework Agreement laid the foundation for the Bay-Delta Accord and the CALFED Bay-Delta Program (Program). The Bay-Delta Accord detailed interim measures for both environmental protection and regulatory stability in the Bay-Delta.

The Program oversees the coordination and increased communication between federal agencies, state agencies, and stakeholders in three areas outlined in the Framework Agreement:

- Substantive and procedural aspects of water quality standard setting.
- Improved coordination of water supply operations with endangered species protection and water quality standard compliance.

- Development of a long-term solution to fish and wildlife, water supply reliability, flood control, and water quality problems in the Bay-Delta.

The Program is charged with responsibility for the third issue identified in the Framework Agreement. This Final Programmatic Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) evaluates this long term program.

## THE CALFED PROGRAM

The Program is a cooperative, interagency effort involving 18 state and federal agencies with management and regulatory responsibilities in the Bay-Delta.

Bay-Delta stakeholders also contribute to the Program design and to the problem-solving/decision-making process. Public participation and input have been essential throughout the process, received through the Bay-Delta Advisory Council (BDAC), public participation in workshops, scoping meetings, com-ment letters, and other public outreach efforts.

BDAC is chartered under the Federal Advisory Committee Act and is comprised of stakeholders in organizations from throughout California. This group of public advisors helps to define problems in the Bay-Delta, helps to assure broad public participation, comments on environmental analysis and reports, and offers advice on proposed solutions.

### Role of CALFED Agencies in Preparation of Programmatic EIS/EIR

**Lead Agencies**—State and federal agencies who have the principal responsibility for carrying out or approving the project:

- Resources Agency of California
- U.S. Fish and Wildlife Service
- U.S. Bureau of Reclamation
- U.S. National Marine Fisheries Service
- U.S. Environmental Protection Agency
- U.S. Natural Resource Conservation Service
- U.S. Army Corps of Engineers

**Responsible Agencies**—State agencies, other than the lead agency, with a legal responsibility for carrying out or approving the project:

- California Environmental Protection Agency
- California Department of Fish and Game*
- California Department of Water Resources
- California State Water Resources Control Board

**Cooperating Agencies**—Federal agencies, other than the lead agencies, with jurisdiction by law or special expertise with respect to any environmental impact:

- U.S. Forest Service
- U.S. Geological Survey
- U.S. Western Area Power Administration
- U.S. Bureau of Land Management

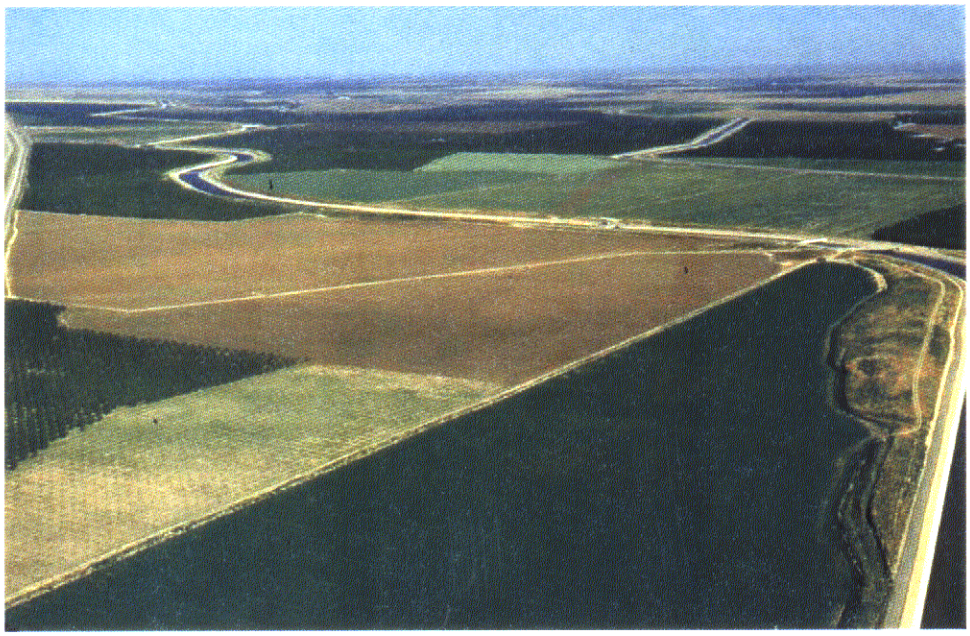
**Other Agencies**—Agencies that regularly participate:

- Delta Protection Commission
- California Department of Food and Agriculture
- The Reclamation Board

* The California Department of Fish and Game is also a trustee agency with jurisdiction over natural resources held in trust for the people of California.

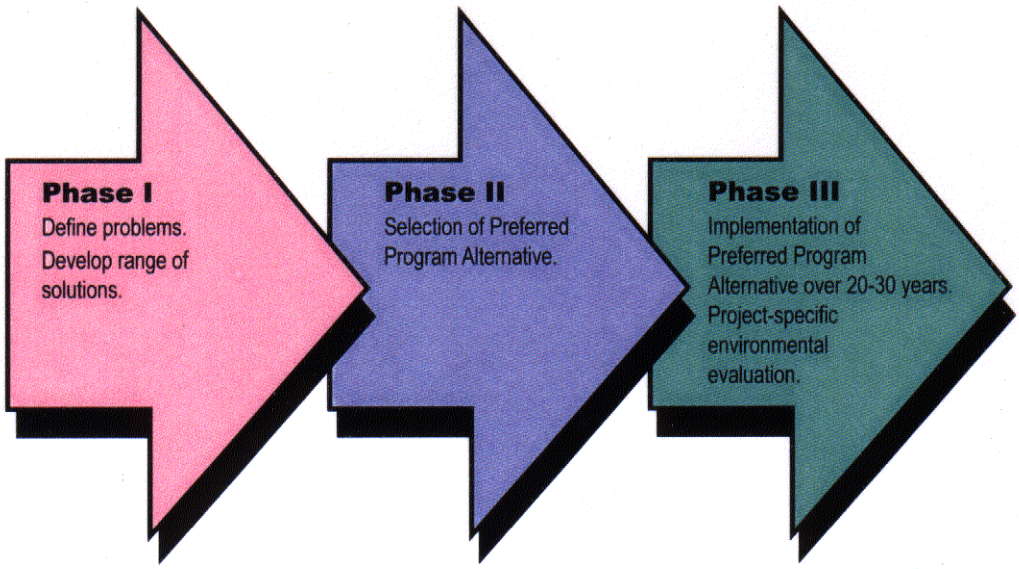
## PROGRAM PURPOSE

The purpose of the Program is to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta system. To practicably achieve this Program purpose, CALFED will concurrently and comprehensively address problems of the Bay-Delta system within four critical resource categories: ecosystem quality, water quality, water supply reliability, and levee system integrity. Important physical, ecological, and socioeconomic linkages exist between the problems and possible solutions in each of these categories. Accordingly, a solution to problems in one resource category cannot be pursued without addressing problems in the other resource categories.



## THE CALFED PROGRAM WAS DIVIDED INTO THREE PHASES

In Phase I, completed in August 1996, the Program identified the problems confronting the Bay-Delta, and developed a mission statement, solution principles, and objectives (next page). Following scoping, public comment, and agency review, an initial group of actions was developed and refined into three preliminary categories of solutions to be further analyzed in Phase II.




Phase II is ongoing and will culminate with a Record of Decision and Certification (ROD/CERT) of the EIS/EIR in 2000. In Phase II, the Program conducted a comprehensive programmatic environmental review and released a Draft Programmatic EIS/EIR in March 1998.

Because a Preferred Program Alternative (Section 1.4.2 in the Final Programmatic EIS/EIR presents the Phase II alternative development process) was identified after the March 1998 Draft Programmatic EIS/EIR, the Program decided to rewrite the Draft Programmatic EIS/EIR. The primary difference between the two documents was analysis associated with the Preferred Program Alternative, although CALFED also took the opportunity to update its analysis of consequences for all alternatives and to restructure the document into a more reader-friendly format. A Multi-Species Conservation Strategy and Implementation Plan also were added. A public comment period ran from June through September 1999. Sixteen public hearings also were held during this time to solicit public testimony.

## CALFED Bay-Delta Program Mission Statement

The mission statement does not stand alone as a single statement of Program purpose. Rather, the mission statement is supported by sets of primary objectives and solution principles. The mission statement is important and reflects the basic intent of the Program. However, the full expression of the Program mission is reflected in the mission statement, objectives, and solution principles, read together.

**Mission Statement**

The mission of the CALFED Bay-Delta Program is to develop a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta system.

**Primary Objectives of the CALFED Program**

- *Ecosystem Quality* - Improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta to support sustainable populations of diverse and valuable plant and animal species.
- *Water Supply* - Reduce the mismatch between Bay-Delta water supplies and the current and projected beneficial uses dependent on the Bay-Delta system.
- *Water Quality* - Provide good water quality for all beneficial uses.
- *Vulnerability of Delta Functions* - Reduce the risk to land use and associated economic activities, water supply, infrastructure, and the ecosystem from catastrophic breaching of Delta levees.

**Solution Principles**

The solution principles were developed as a means to achieve the Program's objectives in the context of a multi-purpose mission and a history of (competing) contentious environmental, political, and institutional influences on the affected resources. The solution principles provide an overall measure of the acceptability of alternatives and guide the design of the institutional part of each alternative. The solution principles are:

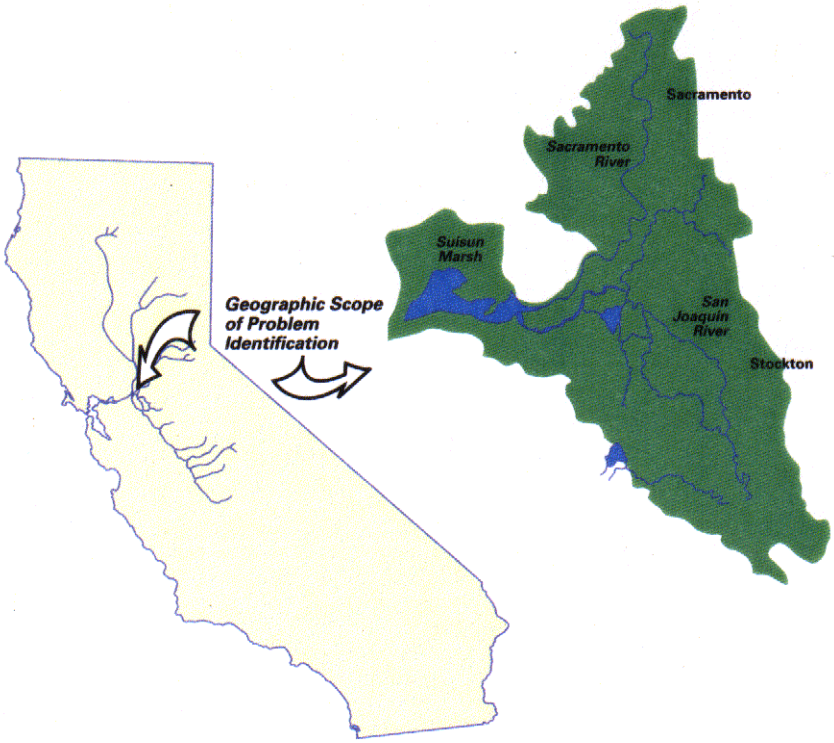
- **Reduce conflicts in the system**. Solutions will reduce major conflicts among beneficial uses of water.
- **Be equitable**. Solutions will focus on solving problems in all problem areas. Improvement for some problems will not be made without corresponding improvements for other problems.
- **Be affordable**. Solutions will be implementable and maintainable within the foreseeable resources of the Program and stakeholders.
- **Be durable**. Solutions will have political and economic staying power and will sustain the resources they were designed to protect and enhance.
- **Be implementable**. Solutions will have broad public acceptance and legal feasibility, and will be timely and relatively simple to implement compared with other alternatives.
- **Pose no significant redirected impacts**. Solutions will not solve problems in the Bay-Delta system by redirecting significant negative impacts, when viewed in their entirety, within the Bay-Delta or to other regions of California.

During Phase III, the CALFED agencies will implement the Preferred Program Alternative. The first 7 years of Program implementation will be guided by the Implementation Plan. This phase will include any necessary studies and site-specific environmental review and permitting. Because of the size and complexity of the Program alternatives, implementation is likely to take place over a period of 30 years or more. Part of the challenge for Phase II is designing an implementation strategy that

acknowledges this long horizon and ensures that all participants remain committed to the successful completion of all phases of implementation.

## GEOGRAPHIC SCOPE OF PROGRAM STUDY AREA

The geographic scope of analysis and actions for the Program evolved through both technical and public forum discussions. The geographic scope focuses on the Bay-Delta system for purposes of problem definition, while allowing solution generation from a much broader area.




The Program is addressing problems that are identified in or closely linked to the Suisun Bay/Suisun Marsh and Delta area. However, the scope of possible solutions to these problems encompass any action that can be implemented by the CALFED agencies, or can be influenced by them, to address the identified problems—regardless of whether implementation takes place in the Delta, Suisun Bay, or Suisun Marsh area.

The geographic **scope of the problems** consists of the legally defined Delta, Suisun Bay (extending to the Carquinez Strait), and Suisun Marsh.

The geographic **scope for developing possible solutions** includes a much broader area that extends both upstream and downstream of the Bay-Delta. This solution includes the Central Valley watershed; the southern California water system service area; San Pablo Bay; San Francisco Bay; near-shore portions of the Pacific Ocean out to the Farallon Islands and north to the Oregon border; and the Trinity River watershed, from which flows are diverted into the Bay-Delta system.

## PROGRAM ALTERNATIVES

Each of the alternatives include the Ecosystem Restoration, Water Quality, Levee System Integrity, Water Use Efficiency, Water Transfer, Watershed, Storage, and Conveyance elements. Each alternative includes an assessment with additional storage up to 6 million acre feet [MAF] and without additional storage. The descriptions of each of the Program elements, except for Conveyance, do not vary among the alternatives.

### Program Alternatives

**Alternative 1 - Existing System Conveyance.** Delta channels would be maintained essentially in their existing configuration. Several improvements would be made in the south Delta.

**Alternative 2 - Modified Through-Delta Conveyance.** Significant improvements to north Delta channels would accompany the south Delta improvements contemplated under Alternative 1.

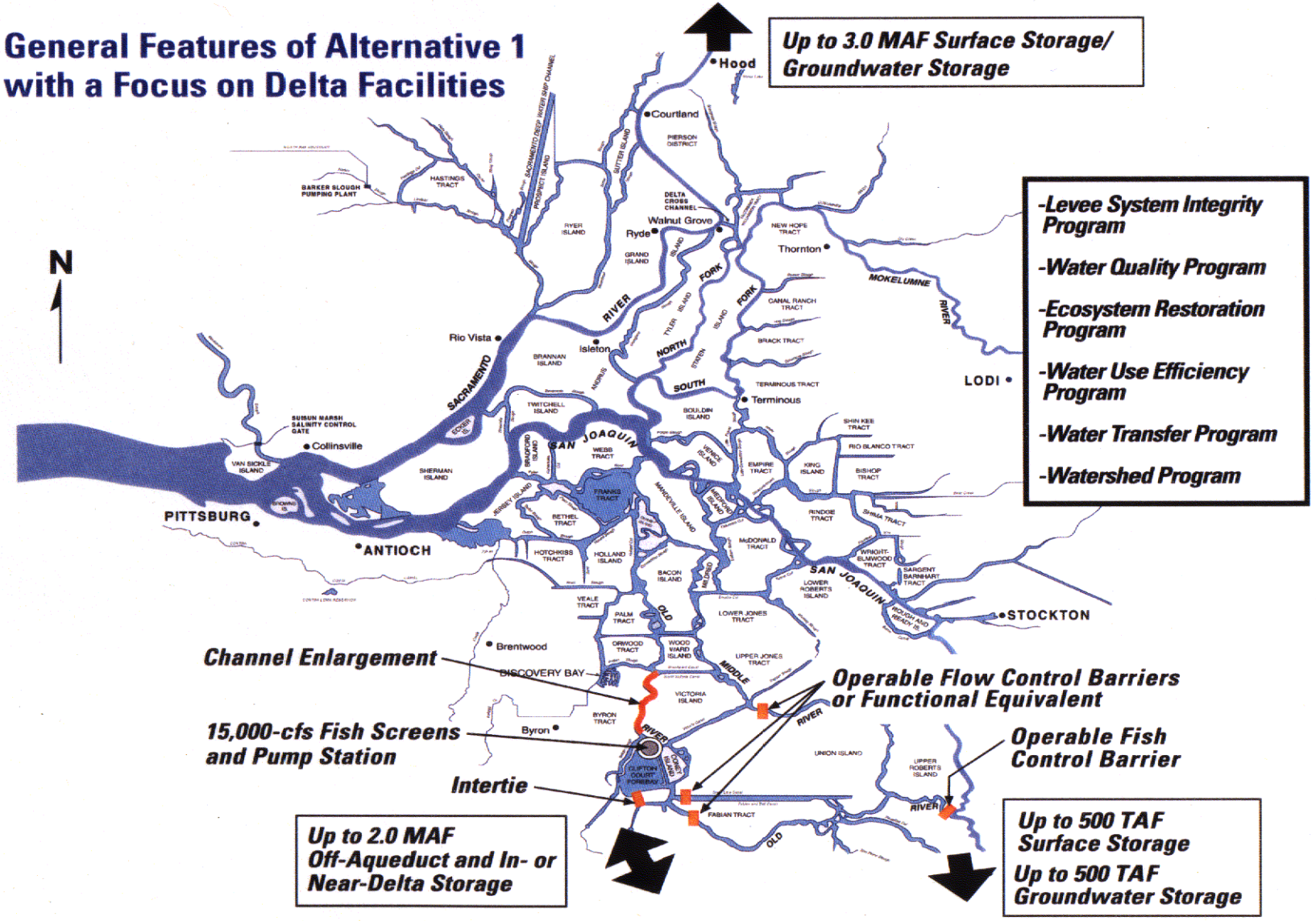
**Alternative 3 - Dual-Delta Conveyance.** The dual-Delta conveyance alternative is formed around a combination of modified Delta channels and a new canal or pipeline, connecting the Sacramento River in the north Delta to the SWP and CVP export facilities in the south Delta.

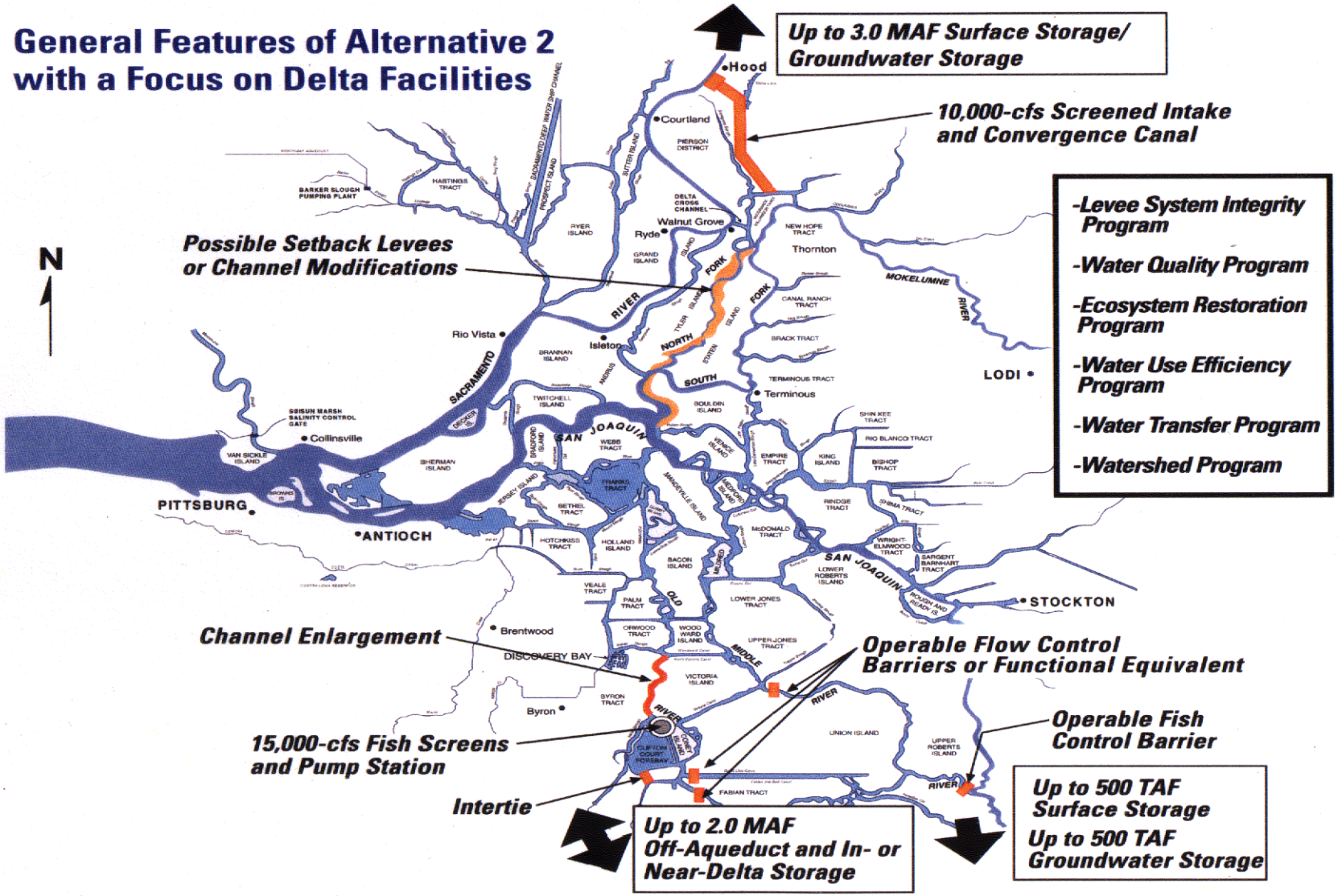
**Preferred Program Alternative - Through-Delta Conveyance.** The Preferred Program Alternative incorporates elements similar to some of the elements in Alternatives 1 and 2. While it includes a diversion facility on the Sacramento River and channel to the Mokelumne River, the size of this facility would be considerably smaller than Alternative 2. If, after additional analysis, the diversion facility is not constructed, the Preferred Program Alternative would be most similar to Alternative 1.

**No Action Alternative.** The No Action Alternative is a description of the anticipated physical, project operation, and regulatory features that would be in place in 2020 if the Program is not approved. The No Action Alternative was used as a basis for comparison of the Program alternatives. The purpose of this comparison is to highlight the changes to the environment that would take place as a result of implementing the various alternatives. The Program also compared the alternatives to existing conditions, referred to as the "affected environment" in the Final Programmatic EIS/EIR.

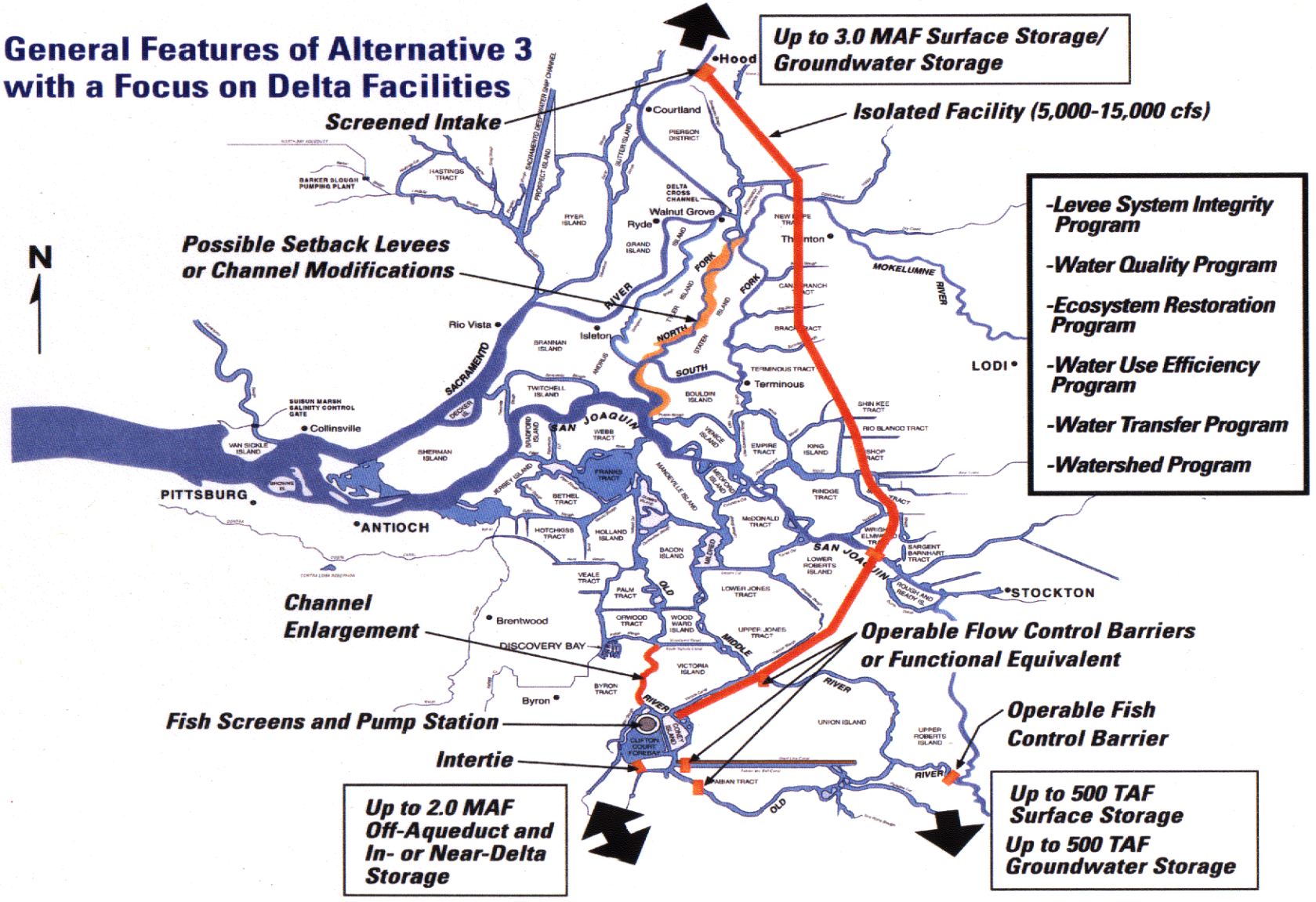
The descriptions of the alternatives are programmatic in nature, defining broad approaches to meet Program purposes. The alternatives are not intended to define the site-specific actions that ultimately will be implemented. The figures on the following pages show the general features of the Program alternatives with a focus on Delta facilities.

## General Features of Alternative 1 with a Focus on Delta Facilities

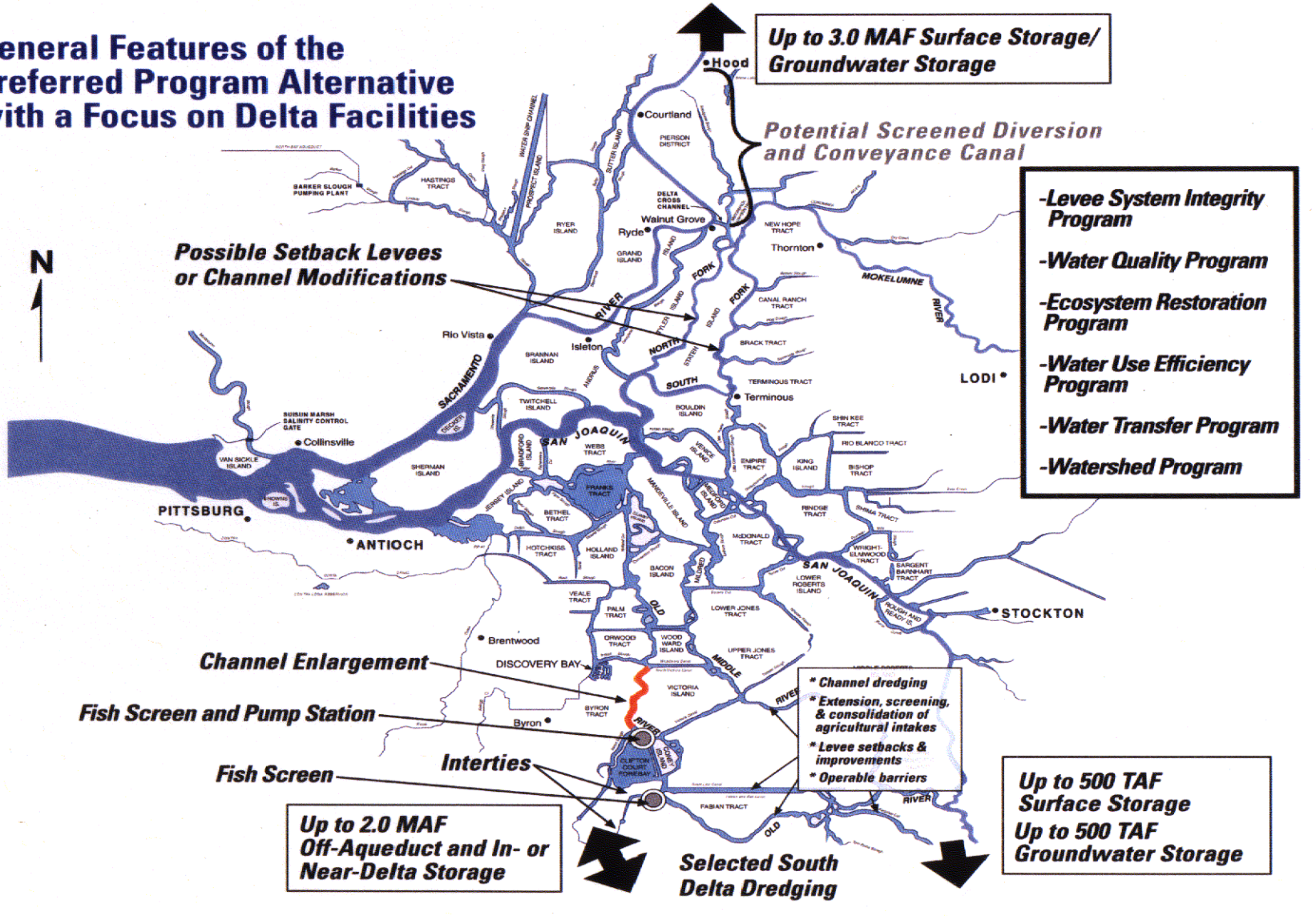



General Features of Alternative 2 with a Focus on Delta Facilities
Up to 3.0 MAF Surface Storage/ Groundwater Storage
10,000-cfs Screened Intake and Convergence Canal
-Levee System Integrity Program
-Water Quality Program
-Ecosystem Restoration Program
-Water Use Efficiency Program
-Water Transfer Program
-Watershed Program
Possible Setback Levees or Channel Modifications
N
Channel Enlargement
Operable Flow Control Barriers or Functional Equivalent
Operable Fish Control Barrier
15,000-cfs Fish Screens and Pump Station
Intertie
Up to 2.0 MAF Off-Aqueduct and In- or Near-Delta Storage
Up to 500 TAF Surface Storage
Up to 500 TAF Groundwater Storage
Hood
Courtland
Walnut Grove
Ryde
Thornton
Rio Vista
Isleton
Terminous
LODI
Collinsville
PITTSBURG
ANTIOCH
STOCKTON
Brentwood
DISCOVERY BAY
Byron
SACRAMENTO RIVER
NORTH FORK
SOUTH FORK
SAN JOAQUIN RIVER
MOKELUMNE RIVER
OLD RIVER
MIDDLE RIVER

## General Features of Alternative 3 with a Focus on Delta Facilities

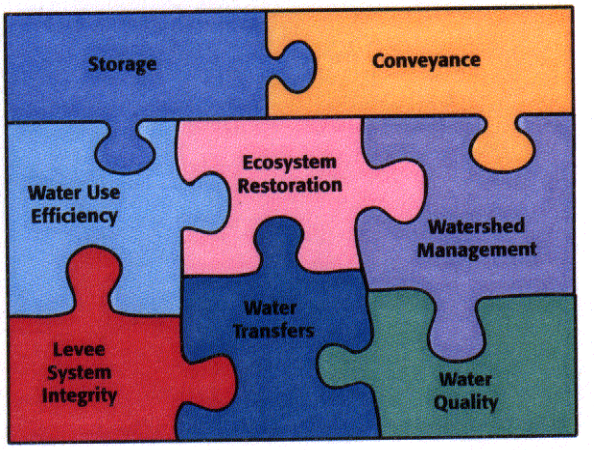


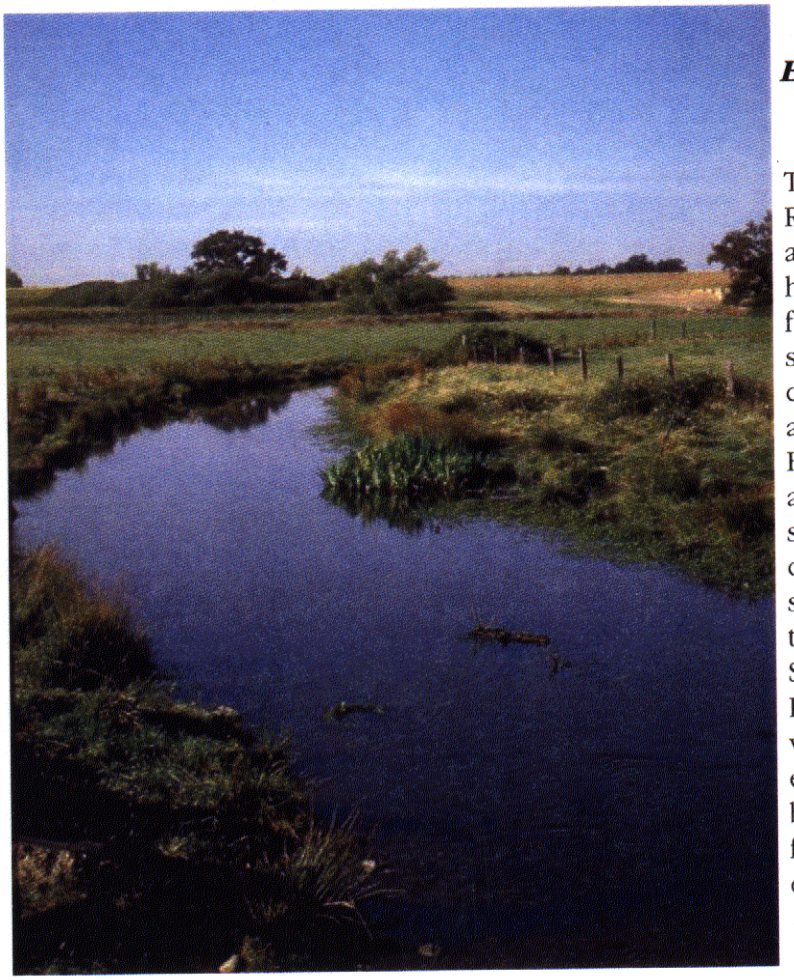
# General Features of the Preferred Program Alternative with a Focus on Delta Facilities



## Overview of the Eight Program Elements

The eight Program elements provide the foundation for overall improvement in the Bay-Delta system. Implementation of these Program elements will result in a significant investment in and improvement of the resource conflicts in the system. For more detailed information on each of these elements, please see the Phase II Report as well as specific program plans.



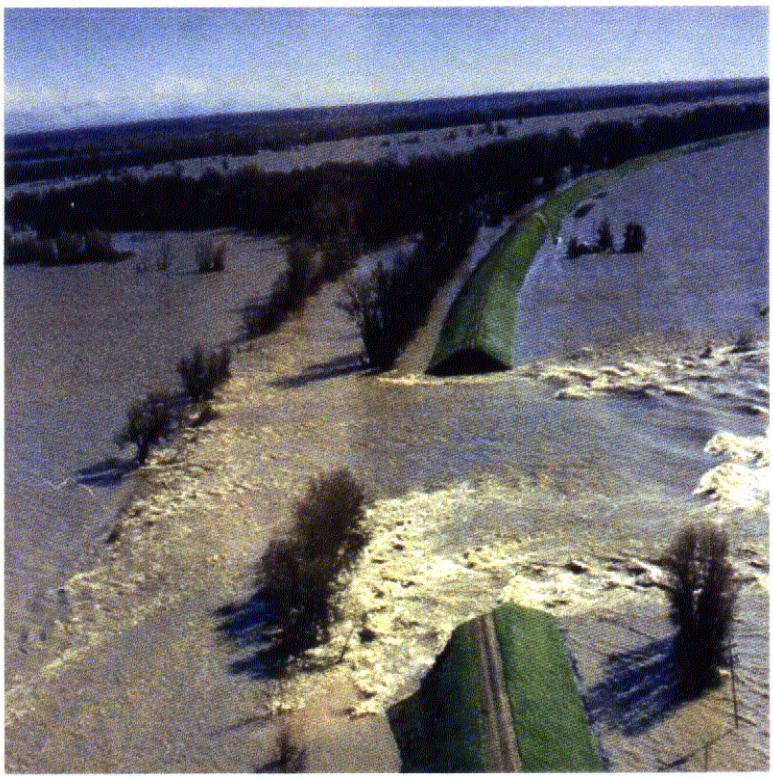



### *Ecosystem Restoration Program*

The goal of the Ecosystem Restoration Program is to improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta system to support sustainable populations of diverse and valuable plant and animal species. In addition, the Ecosystem Restoration Program, along with the water management strategy, is designed to achieve or contribute to the recovery of listed species found in the Bay-Delta and, thus, achieve goals in the Multi-Species Conservation Strategy. Improvements in ecosystem health will reduce the conflict between environmental water use and other beneficial uses, and allow more flexibility in water management decisions.

## *Water Quality Program*

The Program is committed to achieving continuous improvement in the quality of the waters of the Bay-Delta system—with the goals of minimizing ecological, drinking water, and other water quality problems and of maintaining this quality once achieved. Improvements in water quality will result in improved ecosystem health, with indirect improvements in water supply reliability. Improvements in water quality also increase the utility of water, making it suitable for more uses.



## *Levee System Integrity Program*

The Levee System Integrity Program focuses on improving levee stability to benefit all users of Delta water and land. Actions described in this program element protect water supply reliability by maintaining levee and channel integrity. Levee actions will be designed to provide simultaneous improvement in habitat quality, which would indirectly improve water supply reliability. Levee actions also would protect water quality, particularly during low-flow conditions when a catastrophic levee breach would draw salty water into the Delta.

## *Water Use Efficiency Program*

The Water Use Efficiency Program includes actions to assure efficient use of existing and any new water supplies developed by the Program. Efficiency actions can alter the pattern of water diversions and reduce the magnitude of diversions, providing ecosystem benefits. Efficiency actions also can result in reduced discharge of effluent or drainage, improving water quality.

The Water Use Efficiency Program will build on the work of the existing Agricultural Water Management Council and California Urban Water Conservation Council Process.

## *Water Transfer Program*

The Water Transfer Program proposes a frame-work of actions, policies, and processes that, collectively, will facilitate water transfers and the further development of a state-wide water transfer market. The framework also includes mechanisms to provide protection from third-party impacts. A transfers market can improve water availability for all users, including the environment. Transfers also can help to match water demand with water sources of the appropriate quality, thus increasing the utility of water supplies.

## *Watershed Program*

The Watershed Program provides financial and technical assistance to local watershed programs that benefit the Bay-Delta system. Watershed actions can improve reliability by shifting the timing of flows, increasing base flows, and reducing peak flows. These actions also help to maintain levee integrity during high-flow periods. Other watershed actions will improve water quality by reducing the discharge of parameters of concern.

## *Storage*

Groundwater and or surface water storage can be used to improve water supply reliability, provide water for the environment at times when it is needed most, provide flows timed to maintain water quality, and protect levees through coordinated operation with existing flood control reservoirs.

Decisions to construct groundwater or surface water storage will be predicated on compliance with all environmental review and permitting requirements and maintaining balanced implementation of all Program elements.

### *Conveyance*

Modifications in conveyance would result in improved water supply reliability, protection of and improvement in Delta water quality, improvements in ecosystem health, and reduced risk of supply disruption due to catastrophic breaching of Delta levees.

The four alternate conveyance approaches are:

-Alternative 1 - existing system conveyance

-Alternative 2 - modified through-Delta conveyance

-Alternative 3 - dual-Delta conveyance

-Preferred Program Alternative - through-Delta conveyance

## PREFERRED PROGRAM ALTERNATIVE

The Preferred Program Alternative consists of a set of broadly described programmatic actions that set the long-term, overall direction of the Program. Implementation of these actions would fulfill the Program mission to develop a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta system. Implementation of the Preferred Program Alternative also would achieve the Program's objectives for ecosystem quality, water quality, levee and channel system integrity, and water supply reliability.

## OVERVIEW OF THE PREFERRED PROGRAM ALTERNATIVE

The problems and potential solutions facing the Bay-Delta involve a complex set of interrelated biological, chemical, and physical systems. This complexity, coupled with the broad scope and number of actions needed to implement the Program, the 30-year or more implementation period, the need to test hypotheses, and resource limitations make it necessary to implement the Program in stages. Consequently, the Preferred Program Alternative provides for implementation of the Program in a staged manner and establishes mechanisms to obtain the necessary additional information to guide the next stage of decision making.

The Preferred Program Alternative consists of a through-Delta conveyance approach, coupled with ecosystem restoration, water quality improvements, levee system improvements, increased water use efficiency, improved water transfer opportunities, watershed restoration, and a Water Management Strategy that includes an integrated storage program. The Preferred Program Alternative meets the Program's multiple purposes, reduces adverse environmental effects, and provides a system of research and monitoring to determine whether modifications or additional actions are needed. It provides multiple benefits, including:

- Modifying the timing and magnitude of flow to restore ecological processes and to improve conditions for fish, wildlife, and plants in the Bay-Delta system.
- Improving and increasing aquatic and terrestrial habitats.
- Modifying and eliminating fish passage barriers.
- Constructing fish screens that use the best available technology.
- Reducing the loads and impacts of bromide, total organic carbon, pathogens, nutrients, salinity, and turbidity.
- Reducing the impacts of pesticides.
- Reducing the impacts of trace metals, mercury, and selenium.
- Improving and maintaining the stability of the Delta and Suisun Marsh levee system.
- Enhancing flood protection for key Delta islands.
- Expanding and implementing agricultural and urban conservation incentive programs.
- Implementing better water management for managed wetlands.
- Facilitating water transfers while protecting from third parties from potentially significant adverse impacts.
- Supporting local watershed restoration, maintenance, and conservation activities.
- Developing appropriate groundwater and surface storage in conjunction with specified water conservation, recycling, and water transfer programs to provide water for the environment at times when it is needed most, and to improve water supply reliability.
- Modifying existing Delta conveyance systems for improved water supply reliability and water quality, improved ecosystem health, and reduced risk of supply disruption due to catastrophic breaching of Delta levees.

There is concern whether a through-Delta conveyance approach can meet future water quality objectives and not adversely affect the recovery of threatened and endangered fish species. Although some scientific and engineering evidence suggests that a dual-Delta conveyance configuration may improve export water quality and achieve fish recovery more effectively, other evidence indicates that such a conveyance configuration can cause in-Delta water quality problems. In addition, during scoping and public meetings, some stakeholders and agencies voiced concern that moving water around the Delta instead of through it may:

- Cause difficulty in ensuring the appropriate operation of such a facility.
- Create impacts from construction.

- Increase the amount of land needed for the facility.
- Provide an engineered solution when non-structural modifications and reoperation of existing facilities may provide similar benefits.

Although the CALFED agencies did not rule out the possibility of constructing an isolated conveyance facility in the future, they were mindful that, even if approved immediately following the ROD/CERT, such a facility could not be studied, approved, funded, and constructed within the first stage (7 years) of implementation.

In light of the technical and feasibility issues discussed above, the CALFED agencies propose to begin with through-Delta modifications. As part of the Preferred Program Alternative, the Program also would:

- Continue to investigate storage opportunities in the context of the broader Water Management Strategy.
- Implement the first stage of the Ecosystem Restoration, Water Quality, and Levee System Integrity Program Plans, Water Use Efficiency, Water Transfers and Watershed.
- Monitor the results of these actions to determine whether an isolated conveyance facility as part of a dual-Delta conveyance configuration is necessary to meet the Program objectives.

## ENVIRONMENTALLY PREFERRED ALTERNATIVE

As described above, the Preferred Program Alternative adopts a set of programmatic actions designed to achieve the objectives for each of the resource areas while evaluating the effectiveness of those actions, and assessing whether modifications may be needed to meet Program goals and objectives. The Preferred Program Alternative accordingly constitutes the "Environmentally Preferable Alternative" as that term is used in NEPA, and the "Environmentally Superior Alternative" as that term is used in CEQA.

## ALTERNATIVES CONSIDERED BUT ELIMINATED

The three basic alternative approaches developed in Phase I were carried into Phase II. Seventeen alternative configurations of the three basic alternative approaches were developed to further explore potential refinements for storage and conveyance in Phase II. Of the 17 configurations, 5 were eliminated based on the results of a narrowing process. The narrowing process primarily focused on technical deficiencies and the conveyance options used in each alternative. In addition, if alternatives provided the same conveyance function with similar impacts, the less expensive alternatives were retained. Alternatives with lower cosets but higher adverse impacts were eliminated. Twelve alternatives were evaluated in the March 1998 Draft Programmatic EIS/EIR. Based on public and agency comments on the March 1998 Draft Programmatic EIS/EIR and on additional technical analysis, the Program was able to further refine and narrow the number of alternative solutions to the four evaluated in the June 1999 Draft Programmatic EIS/EIR. The four alternatives evaluated in the June 1999 Draft Programmatic EIS/EIR were carried forward to the Final Programmatic EIS/EIR and were further refined based on comments received.

## SUMMARY OF CONSEQUENCES OF PREFERRED PROGRAM ALTERNATIVE

The Program alternatives were analyzed to determine the potential for adverse and beneficial consequences. The most significant potential consequences of the Preferred Program Alternative are related to the resource areas listed below. For detailed information about impacts on all environmental resource areas, please refer to Chapters 5, 6, and 7 in the impact analysis document. Chapter 3 in the impact analysis document provides a summary comparison of the consequences for all resources and Program alternatives.

| RESOURCE | BENEFICIAL CONSEQUENCES | POTENTIALLY ADVERSE CONSEQUENCES |
|---|---|---|
| WATER SUPPLY AND WATER MANAGEMENT | Improvements in water supply through coordinated implementation of Water Use Efficiency, Water Transfer, Water Quality, and Watershed Programs; facilities reoperation and integration; and, if appropriate, additional groundwater and/or surface water storage. | Temporary local water supply interruptions due to turbidity of water during construction of facilities and habitat restoration activities. |
| WATER QUALITY | Improved water quality for environmental and urban or agricultural uses from reduced concentrations of many contaminates, including heavy metals, pesticide residues, salts, selenium, pathogens, suspended sediments, total organic carbon, and bromides. | Increases in concentrations of bromide, salinity, total dissolved solids, and total organic carbon in the Delta; increased diversions of water from the Delta, reducing outflow to the Bay and changing Bay salinity; releases of inorganic or organic suspended solids, or toxic substances into the water column in the Delta; increased water temperatures and decreased dissolved oxygen concentrations in the Delta; potential decreased in-stream water quality from reduced in-stream flows associated with new storage facilities. Possible increases in salinity (expressed as EC) in localized areas in the central Delta. Without operation of a diversion facility on the Sacramento River, increases in salinity would be more widespread in the central Delta. |
| GROUNDWATER | In areas undertaking managed groundwater use programs, long-term increased groundwater levels, reduced pumping-induced subsidence, improved groundwater recharge, locally reduced potential for salt-water intrusion or pumping-induced migration of existing contaminants, and reduced groundwater extraction and reduced long-term lift costs. | Increased groundwater extractions in the Sacramento Valley and, to a lesser extent, in the San Joaquin Valley, resulting in land subsidence, lower groundwater levels, and higher pumping costs; degradation of groundwater quality; or losses of existing wells. In areas where groundwater basins are recharged mainly from percolation of applied water, agricultural and landscape water use efficiency could reduce recharge and result in declines of shallow water tables. |
| FISHERIES AND AQUATIC ECOSYSTEMS | Reactivated and maintained ecological processes and structures that sustain healthy fish, wildlife, and plant populations; increased abundance and distribution of desired aquatic species; improved streamflow, sediment supply, floodplain connectivity, stream temperature, and biological productivity; and reduced entrainment losses. | Increased non-native species abundance and distribution; blocked access to habitat and potentially altered water quality and flow conditions from placement of barriers in the south Delta; altered natural ecosystem structure, removal of benthic communities, and creation of conditions that may damage habitat for desired species from dredging activities; short-term disturbance of existing biological communities and species habitat, mobilized sediments, and input contaminants from construction activities; reduced streamflow and Delta outflow, changed seasonal flow, water temperature variability, and changes in salinity potentially resulting in reduced habitat abundance, impaired species movement, and in-creased loss of fish to diversions; increased entrain-ment loss of chinook salmon and other species from diversions to |

| RESOURCE | BENEFICIAL CONSEQUENCES | POTENTIALLY ADVERSE CONSEQUENCES |
|---|---|---|
| FISHERIES AND AQUATIC ECOSYSTEMS (Continued) | | new off-stream storage; reduced fre-quency and magnitude of net natural flow conditions in the south and central Delta from Delta Cross Channel operations and south Delta barriers; with a Sacramento River diversion facility, impacts on individual organisms of special status-species from reduced net flow conditions in the Sacramento River down-stream of the diversion, increased mortality through abrasion, increased predation, and other factors from a new fish screen facility for the through-Delta ele-ment on the Sacramento River, and delayed migration and reduced spawning success for adult fish. |
| VEGETATION AND WILDLIFE | Net increases in target habitat types, increased protection for natural habitats, reduced toxic organic and inorganic constituents in the food web; increased quality and quantity of wetland and riparian habitats; increased habitat diversity; improved vigor of target populations (including special-status species); and long-term flood protection for existing and restored wetland, riparian, upland, and agricultural habitats. | Fragmentation of existing habitat corridors on small or ephemeral tributaries as a result of inundation by storage reservoirs, potentially blocking the movement and interchange of populations of some wildlife species from upper to lower watershed locations; loss of habitat and direct impacts on special-status species; loss of incidental wetlands and riparian habitats that depend on agricultural water use inefficiencies; temporary or permanent loss or disturbance of wetland or riparian communities, wintering waterfowl habitat, portions of rare natural communities and significant natural areas, and quantity or quality of forage for species of concern. |
| AGRICULTURAL LAND AND WATER USE | Increased certainty in availability of irrigation water, potential for higher value crops and higher grazing productivity because of better water quality, increased property protection through levee improvement and reduction of salt-water intrusion, updated aging and inefficient irrigation systems, and opportunities for water transfers that could make irrigation water available where it may not have been otherwise. | Conversion of prime, state-wide important, and unique farmland; conflicts with adjacent land uses; and conflicts with local government plans and policies. |
| AGRICULTURAL ECONOMICS | Increased property protection through levee improvements, long-term savings, increased revenues, and increased certainty to the agricultural economy. | Reduction in agricultural incomes in local areas. |
| AGRICULTURAL SOCIAL ISSUES | Some localized increases in agricultural-related employment, protection of agricultural jobs and income from catastrophic loss due to levee failure, and reduced future social dislocations due to water reliability. | Localized social effects related to reduced agricultural incomes. |
| URBAN LAND USE | Greater flood protection for urban centers. | Displacement of existing urban residences, physical disruption or division of established communities, and potential conflicts with local general plans. |
| URBAN WATER SUPPLY ECONOMICS | Lower treatment and regulatory costs, improved water quality, relocated water supply intakes, reduced risk of export interruptions caused by levee failure, and increased water supply availability. | Additional costs through payment for Program elements. Many economic effects cannot be determined until more specific information is available. |
| UTILITIES AND PUBLIC SERVICES | Reduced risk to electrical or natural gas transmission lines, utility facilities, communication infrastructure, and emergency service centers due to protection against levee failure. | Relocation or modification of major infrastructure components; increased risk of gas line rupture during construction. |

| RESOURCE | BENEFICIAL CONSEQUENCES | POTENTIALLY ADVERSE CONSEQUENCES |
|---|---|---|
| RECREATION RESOURCES | Increased open space; enhanced or restored wetland or wildlife habitat; improved water quality; increased fishing, hunting, and wildlife viewing opportunities; more recreation-related jobs; increased quality of recreational experience; increased flood protection for camping facilities and boat launches; and increased or improved access to public recreation areas. | Temporary or permanent closure of some recreation areas or facilities; reduced access to recreation facilities; decreased recreation opportunities from changes in reservoir levels; loss of terrestrial and on-stream recreation by innundation from reservoirs; temporary and permanent changes to motorized boating in the Delta from speed limits, channel closures, and installation of flow and fish control barriers; decrease in flooded lands suitable for wildlife viewing, hunting, and fishing; reduced water-contact recreation quality from releases of reservoir cold water. |
| FLOOD CONTROL | Easier inspection, maintenance, and repair of the flood control system; improved flood flow conveyance capacities; and reduced incidences of instability and overtopping failures; levees improved to the Public Law 84-99 standards and restored floodplains would provide additional system-wide flood control benefits. | Reduced levee stability and reductions in a channel's flow conveyance from barriers in the channel; increases in seepage, wind fetch, and wave erosion on landside levee slopes; level of flooding downstream of diversions after removal of Sacramento River tributary diversion structures and other flow obstructions; flood stages along streams; localized subsidence, resulting in levee slumping or cracking near levees; and adverse effects on water quality from use of dredged materials. |
| POWER PRODUCTION AND ENERGY | Some increase in hydropower generation if new storage is constructed. | Decrease in amount of energy available for non-project uses; possible air quality and land use impacts from new power plants to replace lost power. |
| REGIONAL ECONOMICS | Increases in recreation-related or construction-based economies; increased land values due to flood protection; reduced cost to some water supplies due to increased storage; and some increases in regional revenues and jobs associated with the Storage element. | Adverse effects to agricultural sector in the Delta. Amount and allocation of costs are currently uncertain. |

## COMMENTS

As the CALFED Program and the Programmatic EIS/EIR were being developed, several items were often mentioned by agencies, stakeholders, and the public. These topics have been addressed in the Final Programmatic EIS/EIR and in a set of Common Responses that are included in the Response to Comments Appendix to the Final Programmatic EIS/EIR. The following list is intended to provide the reader a cursory impression of the types of items mentioned:

- How should measures to increase water supply and measures to decrease water demand be combined? Is demand management alone adequate to meet California's needs, what kind of water storage should be considered, and how should supplies be managed for different uses and different geographic areas?
- How should water be moved through the Delta and how much water should be moved through the Delta?
- How will different areas of the Program, including ecosystem restoration, water transfers, and water supply actions affect agriculture?
- How will actions be funded? How will decisions be made?
- What should be the magnitude of the ecosystem restoration effort?

- How will the Environmental Water Account be operated?
- How will the Program affect growth and local planning?
- How will water quality be improved and what are the best methods for improvement?
- How will the Program handle area of origin, water rights, and the Public Trust Doctrine?
- As the Program is implemented, how do we ensure that all the components of the Program move forward together?
- Does the Program meet the "solution principles"? Are there any significant redirected impacts? Are conflicts in the system reduced? Is the Program equitable?

## ENVIRONMENTAL JUSTICE

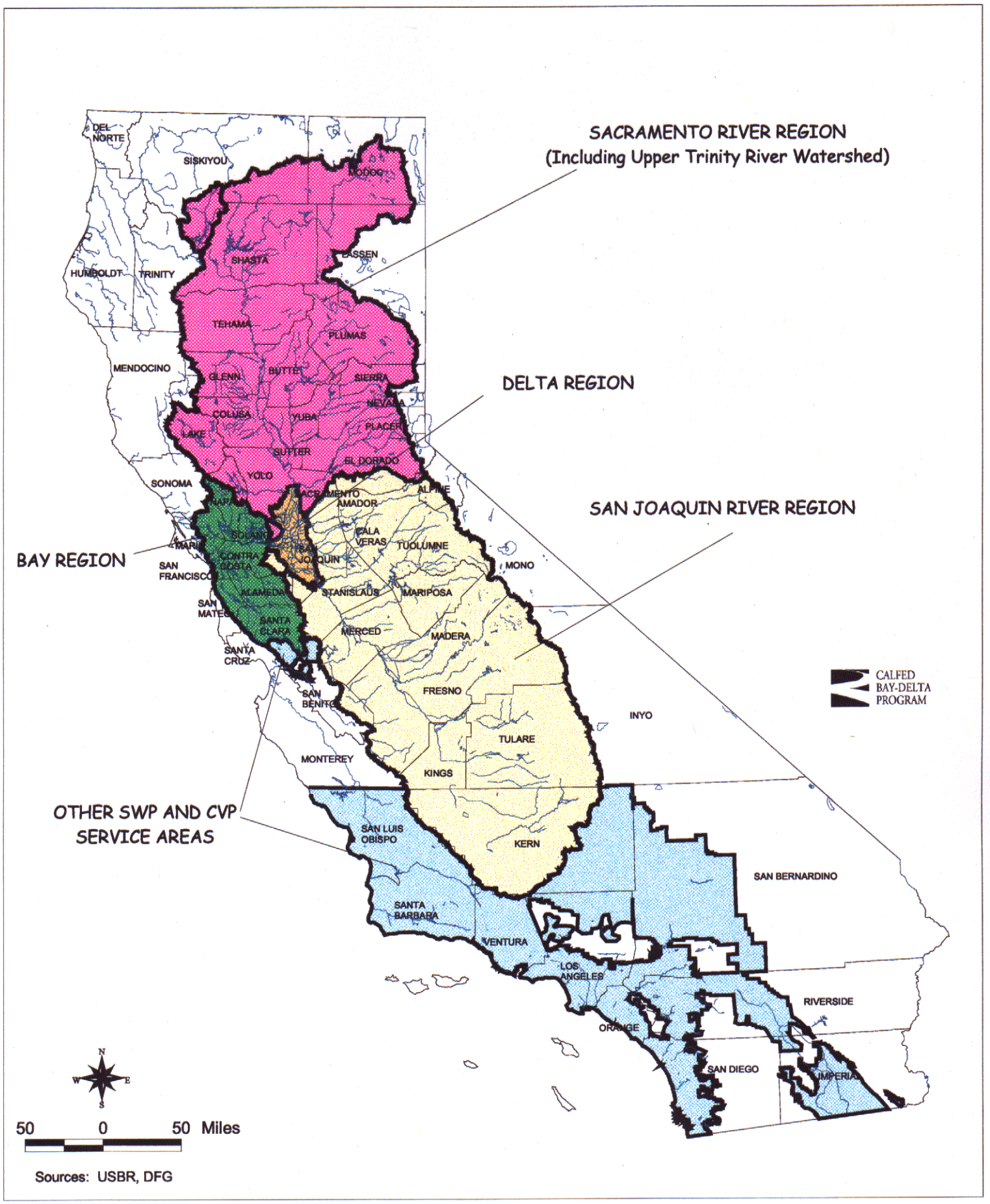
Executive Order 12898 requires federal agencies to analyze the impacts of alternatives in order to identify and evaluate disproportionate impacts on minorities and low-income populations. The geographic scope of the CALFED solution area encompasses a large portion of the state of California; therefore, it is difficult to conclude, at a programmatic level of analysis, that one social group would be adversely affected to a greater extent than any other group by any alternative. Site-specific NEPA and CEQA documentation will occur for specific projects that tier from this Programmatic EIS/EIR. Environmental justice issues will be addressed as part of the NEPA process for future site-specific projects.

## INDIAN TRUST ASSETS

Federal policy is to protect American Indian trust assets and to determine whether alternatives would affect the use and enjoyment of trust assets. At the programmatic level of analysis, no alternative would adversely affect reserved water rights, water quality of the water rights, hunting and fishing rights, or noise near a land asset. Increases stream flows and improved water quality associated with the alternatives could positively affect Indian trust assets located adjacent to rivers and streams and the associated hunting and fishing rights. Site-specific NEPA and CEQA documentation will occur for specific projects that tier from this Programmatic EIS/EIR. Indian trust assets will be addressed as part of the NEPA process for future site-specific projects.

## NEXT STEPS

Following the ROD/CERT of the Final Programmatic EIS/EIR, the CALFED agencies will implement the Program. For more information on implementation, please see the Phase II Report and the Implementation Plan.




**CALFED Bay-Delta Program Programmatic EIS/EIR Study Area**