



Alternative 2

Alternative 2 - Summary

Drought Water Management Program

Emphasis

Develop the institutional mechanisms necessary to establish a long-term drought water bank to provide increased security to environmental uses and water users. This alternative focuses on increasing the predictability of water supplies during drought conditions only. Physical modifications in the Delta are limited to habitat improvements and levee and channel improvements for flood control.

Distinguishing Features

This alternative is intended to provide a low level of resource improvement and conflict resolution.

Physical/Structural	Operational/Management	Institutional/Policy
<ul style="list-style-type: none"> • Basic habitat restoration to increase fish population and ecosystem function • Basic level of levee improvements • Screens on high priority diversions to decrease fish loss 	<ul style="list-style-type: none"> • Reclamation and conservation to reduce demand for Delta water • In-lieu groundwater banking facilities in the southern San Joaquin valley to reduce demand for surface water during dry years • Increase conjunctive use in the Sacramento Valley • Increase hatchery production on the San Joaquin or its tributaries to help re-establish natural fall run salmon populations 	<ul style="list-style-type: none"> • Long-term drought water bank program to facilitate dry-year water transfers • Funded levee improvements, emergency management plan, and landside buffer zones to reduce system vulnerability

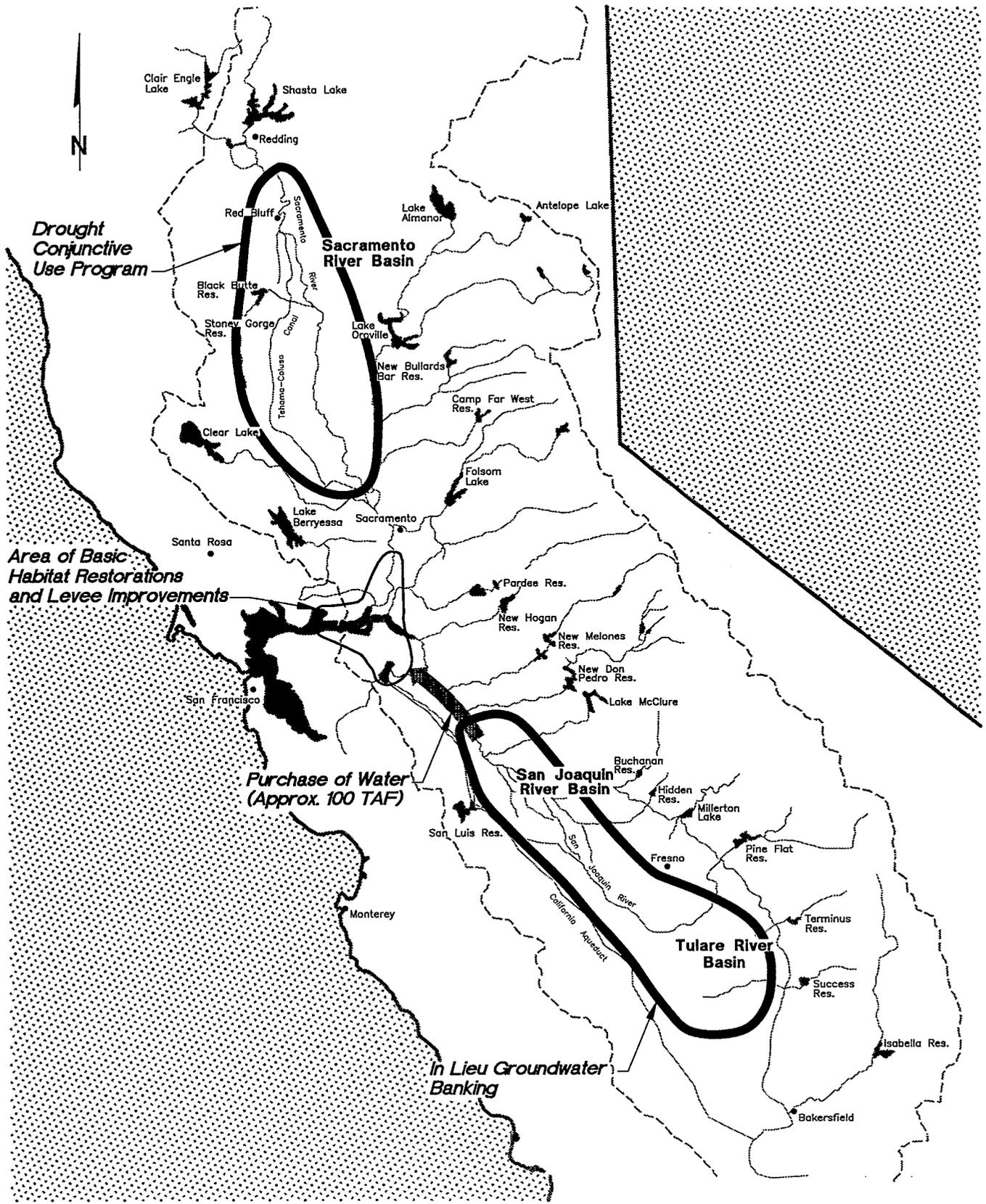
Benefits

- Habitat restoration and change in timing of diversions improves ecosystem quality and restores the fishery
- Increases water supply predictability during dry years
- Funded levee management program decreases vulnerability of Delta functions to failure
- Delta water quality marginally improved
- New screens reduce fish entrainment at diversions

Constraints and Concerns

- Uncertain that drought bank will develop enough water to supply all needs
- Fish entrainment is reduced but still a concern
- Provides little improvement in water quality
- Does little to address water needs outside of dry year periods
- Delta water supplies are highly constrained and remain vulnerable to interruption
- Some Delta islands remain vulnerable to flooding
- Mortality in south Delta export facilities remains significant

Drought Water Management Program Alternative 2



Alternative 2

Drought Water Management Program

Overview

This alternative focuses on increasing the predictability of water supplies during drought conditions only. It develops institutional mechanisms to implement long-term contracts for drought water supply. Conjunctive use, groundwater banking, and demand management programs reduce demand for Delta water during dry years and produce water for drought transfers.

*increase water
supply
predictability*

During dry and critically dry years, many water users experience significant supply shortages. This alternative establishes a long-term drought water bank to improve supply reliability. The bank will enter into long-term contracts to acquire dry-year water from willing transferors. The bank will then contract with transferees to deliver dry-year water. Transferors will reduce their dry-year need for surface water through demand management and conjunctive use programs, and will use groundwater to make surface water available for drought year transfers.

*water transfers
for dry years*

An in-lieu groundwater program will convey surface water to users currently relying on over-drafted groundwater basins. In wet years, these users will curtail groundwater pumping. In dry years, the resulting stored groundwater will be pumped and delivered to users in lieu of surface water deliveries. This will make the surface water available for transfers.

*in-lieu
groundwater
program*

This alternative includes a variety of demand management actions. Best management practices (BMPs) for urban water conservation will be expanded and implemented uniformly. Inclining block rates will encourage reduced landscape irrigation use, and new BMPs such as increased water-use efficiency in home appliances may be adopted. In the agricultural sector, efficient water management practices will be implemented and expanded to include water use measurement and water pricing that encourages greater efficiency. Feasible and affordable urban and agricultural wastewater reclamation efforts will be targeted. While emphasizing local projects, water reuse and demand management programs could be state and federally co-sponsored in water project service areas.

*demand
management
water reclamation*

Basic levels of habitat restoration and levee improvements are included in this alternative. Habitat actions include restoring riparian, wetland, and terrestrial habitat on Delta and channel islands, and restoring tidal wetlands in Suisun Bay. These efforts will support increased survival and productivity of key fish species. Fish screens on high priority diversions and water storage dedicated for environmental uses will also provide benefits for fish. Flood protection will be provided by upgrading levees to a basic level. Other protection actions include levee maintenance and stabilization using berms, modification of agricultural practices to reduce subsidence, setback levees, and funding for maintenance and an emergency levee management plan.

*basic level of
habitat
restoration*

*basic level of
levee
improvements*

Through institutional mechanisms to improve drought year water supply, this alternative provides benefits for all users of Delta water, while providing a basic level of levee improvements.

benefits in four objective areas

Physical and Structural Features

Habitat Restoration

Activities	Benefits
<ul style="list-style-type: none"> Restore riparian, shaded riverine, and shallow water habitat along the Sacramento River channel between Sacramento and Collinsville 	<ul style="list-style-type: none"> Provides substantial improvement in aquatic habitat as well as improvements in water supply reliability and water quality Increases survival and spawning success of anadromous and Delta native fish
<ul style="list-style-type: none"> Restore Delta and floodway corridor shallow water, riparian, terrestrial, and tidal wetland habitat 	<ul style="list-style-type: none"> Provides spawning areas for Delta native fish as well as forage areas and escape cover for juvenile salmon, Delta smelt, splittail, and other species. Provides improvements in water supply reliability and water quality
<ul style="list-style-type: none"> Restore approximately 75 to 125 miles of shallow water, riverine, and riparian habitat along Delta levees 	<ul style="list-style-type: none"> Provides spawning areas for Delta native fish as well as forage areas and escape cover for juvenile salmon, Delta smelt, splittail, and other species. Provides improvements in water supply reliability and water quality
<ul style="list-style-type: none"> Protect channel islands from erosion and enhance habitat 	<ul style="list-style-type: none"> Provides habitat for aquatic and terrestrial plant and animal species Improves water quality
<ul style="list-style-type: none"> Restore about 750 to 1,250 acres of tidal wetlands in Suisun Bay 	<ul style="list-style-type: none"> Provides wet-year spawning habitat for Delta smelt, rearing areas for salmon, and wildlife habitat (e.g., canvasback and redhead ducks)
<h3>Considerations</h3>	
<ul style="list-style-type: none"> Sacramento River Channel – Feasible and cost-effective habitat restoration implemented between Sacramento and Collinsville. Delta – Candidate areas include Prospect Island, Liberty Island, Little Holland Tract, Hastings Tract, Yolo Bypass, and the southeast Delta. Candidate areas for Delta levee habitat restoration include Twitchell Island along Threemile Slough, Sevenmile Slough, and the North and South Forks of the Mokelumne River. Floodway Corridors – Habitat restoration must not impair capacity of floodways. Suisun Bay – Convert diked wetlands or create tidal wetlands with dredge spoils between Collinsville and Carquinez Strait. 	

Water Storage

Activities	Benefits
<ul style="list-style-type: none"> Develop about 100,000 AF of new water storage in the Delta dedicated to environmental uses 	<ul style="list-style-type: none"> Provides additional diversion flexibility Reduces entrainment of fish Reduces frequency and duration of export curtailments, thus improving water supply reliability Improves fish transport through the Delta Could significantly improve response time (compared to Folsom and Shasta reservoirs) for releasing water for improved management of X2
Considerations	
<ul style="list-style-type: none"> Locate new environmentally dedicated Delta storage reservoir near export pumps on one or more islands such as Bacon, Mandeville, or Victoria. Divert water during November, December, and January; release water from March to July as needed. With real-time monitoring, divert when species of concern are not present and release water to move fish or release for diversion. Environmentally dedicated water storage in the Delta allows reduction in diversions during critical periods. Creation of a wide riparian and shallow water habitat corridor around the perimeter of Delta island storage would provide additional fish and wildlife benefits. 	

Fish Protection and Transport

Activities	Benefits
<ul style="list-style-type: none"> Construct a San Joaquin River bypass at the head of Old River 	<ul style="list-style-type: none"> Encourages out-migrating fish to stay in the San Joaquin River Allows for managing flows down Old River
<ul style="list-style-type: none"> Install fish screens on highest priority diversions in the Delta, rivers, and tributaries 	<ul style="list-style-type: none"> Reduces entrainment of fish
<ul style="list-style-type: none"> Improve drainage in floodway corridors 	<ul style="list-style-type: none"> Reduces fish stranding
Considerations	
<ul style="list-style-type: none"> Select diversions for screening according to criteria including size of intake, location, peril to fish, and screening feasibility. 	

Flood Protection and Levee Stabilization

Activities	Benefits
<ul style="list-style-type: none"> • Provide a basic level of protection and stabilization of Delta levees through levee maintenance and stabilization actions 	<ul style="list-style-type: none"> • Manages vulnerability of Delta land use and infrastructure • Manages vulnerability of Delta water supply to salinity intrusion • Manages vulnerability of Delta ecosystem functions • Provides opportunities for habitat restoration
<ul style="list-style-type: none"> • Maintain flood conveyance capacity of Delta channels through channel maintenance actions or in conjunction with levee stabilization 	<ul style="list-style-type: none"> • Manages vulnerability of Delta functions • Maintains flood conveyance • Provides opportunities for habitat restoration
Considerations	
<ul style="list-style-type: none"> • Provide flood protection equivalent to Army Corps of Engineers PL 99 standard for these islands: <ul style="list-style-type: none"> Critical western islands with important regional infrastructure (e.g., Highway 160) such as Sherman Island Islands with both valuable habitat and important regional infrastructure (e.g., I-5) such as New Hope Tract • Upgrade all other Delta levees to meet at least the Hazard Mitigation Plan (HMP) standards. • Integrate protection and stabilization of levees with Delta habitat restoration activities. • Provide stable funding mechanism for ongoing levee and habitat monitoring, maintenance, and management. 	

Operational and Management Features

Water Diversion Management

Activities	Benefits
<ul style="list-style-type: none"> • Improve real-time monitoring for locations of special-concern fish species and modify water diversions to reduce fish entrainment 	<ul style="list-style-type: none"> • Provides an additional tool to help reduce entrainment of special-concern species • Improves flexibility to divert water during critical fish migration periods
<ul style="list-style-type: none"> • Improve CVP and SWP operations through predation control, coordinating operations, and improving fish salvaging and handling 	<ul style="list-style-type: none"> • Reduces fish losses
<ul style="list-style-type: none"> • Evaluate, improve, and install behavioral barriers for anadromous fish 	<ul style="list-style-type: none"> • Diverts anadromous fish from areas of potential entrainment • Allows for continued water diversions at current locations

Considerations

- Evaluate continued use of an acoustic barrier at the mouth of Georgiana Slough.
- Evaluate behavioral barriers for Delta Cross Channel and Threemile Slough.

Water Supply Management

Activities	Benefits
<ul style="list-style-type: none"> • Establish a long-term drought water bank • Increase conjunctive use for Sacramento Valley 	<ul style="list-style-type: none"> • Provides for long-term contracts for drought-year water
<ul style="list-style-type: none"> • Implement in-lieu groundwater banking in the San Joaquin Basin 	<ul style="list-style-type: none"> • Makes surface water available for drought-year transfer
<ul style="list-style-type: none"> • Expand water conservation best management practices (BMPs) and implement and expand efficient water management practices (EWMPs) 	<ul style="list-style-type: none"> • Reduces demand for Delta water • Could make water available for drought-year transfer
<ul style="list-style-type: none"> • Include inclining block rates • Include measurement of agricultural deliveries and water pricing structures to encourage efficient water use • Implement wastewater reclamation programs • Possible use of gray water for urban landscape irrigation • Use of reclaimed wastewater for agricultural purposes • Encourage land fallowing during drought periods 	<ul style="list-style-type: none"> • Reduces demand for Delta water • Could make water available for drought-year transfer
<p>Considerations</p> <ul style="list-style-type: none"> • Need to develop insitutional mechanisms for long-term operation of drought water bank. 	

Fisheries Management

Activities	Benefits
<ul style="list-style-type: none"> • Mark salmon produced in hatcheries 	<ul style="list-style-type: none"> • Facilitates selective catch of hatchery salmon by commercial and recreational fisheries
<ul style="list-style-type: none"> • Conduct net-pen rearing of striped bass to supplant natural production 	<ul style="list-style-type: none"> • Maintains recreational fishery • Reduces operational constraints on water diversions
<ul style="list-style-type: none"> • Increase hatchery production for fall run chinook salmon on the San Joaquin River or its tributaries 	<ul style="list-style-type: none"> • Helps re-establish the natural fall run

Considerations
<ul style="list-style-type: none"> • Actions are intended to maintain recreational and commercial fisheries as well as enhance native salmon stocks. • Need to assess impact of incidental mortality on native (unmarked) fish.

Water Quality Management

Activities	Benefits
<ul style="list-style-type: none"> • Implement on-site mine drainage remediation measures based on requirements in current regulations 	<ul style="list-style-type: none"> • Improves Delta and Sacramento River water quality
Considerations	
<ul style="list-style-type: none"> • Identify priority sources and provide regulatory and institutional incentives for implementation. 	

Institutional and Policy Features

Habitat Programs

Activities	Benefits
<ul style="list-style-type: none"> • Integrate recommended habitat restoration actions from other programs, including CVPIA and the Anadromous Fish Restoration Program 	<ul style="list-style-type: none"> • Provides additional habitat restoration
<ul style="list-style-type: none"> • Establish programs to preserve agricultural land uses that provide valuable habitat functions 	<ul style="list-style-type: none"> • Protects existing habitats
<ul style="list-style-type: none"> • Establish a CALFED team to coordinate and expedite habitat restoration permits 	<ul style="list-style-type: none"> • Accelerates acquisition of permits for environmental restoration projects and other CALFED projects
<ul style="list-style-type: none"> • Establish and fund a management program and rapid response team to manage introduced species 	<ul style="list-style-type: none"> • Protects existing valuable species and habitat
<ul style="list-style-type: none"> • Establish a program to identify and use clean dredge materials from the Delta for habitat restoration and levee maintenance in the Delta 	<ul style="list-style-type: none"> • Provides materials for habitat and levee improvements
<ul style="list-style-type: none"> • Encourage farmers and levee maintenance districts to leave habitat areas undisturbed by working with resource agencies 	<ul style="list-style-type: none"> • Protects existing habitats • Increases flexibility in maintenance programs
Considerations	
<ul style="list-style-type: none"> • Coordinate activities to avoid duplication of effort. 	

Water Quality Standards

Activities	Benefits
<ul style="list-style-type: none"> • Reevaluate Delta export/inflow ratios during triennial reviews as habitat effectiveness is realized 	<ul style="list-style-type: none"> • Allows for higher level of water transfer as fishery populations improve
Considerations	
<ul style="list-style-type: none"> • Monitor to verify effectiveness of habitat and entrainment reduction programs. Develop an adaptive management program to modify habitat restoration and export/inflow ratios in response to improved sustainability of important species. 	

Management of System Vulnerability

Activities	Benefits
<ul style="list-style-type: none"> • Establish and fund an emergency levee management plan to respond to levee failures 	<ul style="list-style-type: none"> • Provides resources to protect Delta functions through proactive and preventative measures
<ul style="list-style-type: none"> • Establish landside buffer zones adjacent to levees on islands with deep peat soils 	<ul style="list-style-type: none"> • Provides increase in stability of Delta levees and reliability of Delta functions by reducing subsidence adjacent to levees • Buffer could be used to provide habitat benefit
Considerations	
<ul style="list-style-type: none"> • Determine extent and cost effectiveness of levee management programs and buffer zones. • Buffer strip approximately 75 to 100 yards wide dedicated to shallow wetlands. 	

Preliminary Assessment**Benefits**

- Habitat restoration and change in timing of diversions improves ecosystem quality and restores the fishery
- Increases water supply predictability during dry years
- Delta water quality marginally improved
- Funded levee management program decreases vulnerability of Delta functions to failure
- New screens reduce fish entrainment at diversions

Constraints and Concerns

- Uncertain that drought bank will develop enough water to supply all needs
- Negative effects such as reversing south-Delta flow remain unresolved
- Provides little improvement in water quality
- Fish entrainment is reduced but still a concern
- Fish mortality in south Delta export facilities remains significant
- Delta water supplies are highly constrained and remain vulnerable to interruption
- Some Delta islands remain vulnerable to flooding