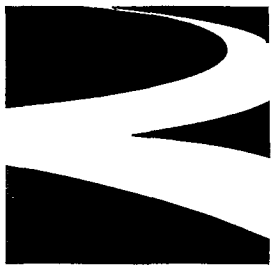


CALFED
BAY-DELTA
PROGRAM

Alternative 7

Alternative 7 - Summary

Water Management with Environmental Storage

Emphasis

This alternative increases fish populations while attempting to maintain Delta diversions by shifting diversion timing to less environmentally sensitive periods. In addition, new in-Delta water storage would be constructed to be used for environmental purposes, reducing entrainment effects, and improving habitat to benefit fish populations.

Distinguishing Features

This alternative is intended to provide **low to moderate** levels of resource improvement and conflict resolution.

Physical/Structural	Operational/Management	Institutional/Policy
• Basic level of aquatic and wetland habitat restoration in the Delta and in Suisun Bay • Convert one or more south Delta islands to water storage facilities for environmental purposes • Screens on high priority diversions to reduce fish entrainment • Fish movement barriers at Old River and Georgiana Slough • Basic level of levee improvement projects • Improved conveyance channels through Delta to allow higher pumping rates during non-sensitive periods	• Divert water into Delta island storage from November to January • Release water as needed to transport fish through the Delta • Real time management to reduce entrainment • Modify diversion timing away from February to June period	• Funded levee improvements, emergency management plan, and landside buffer zones to reduce system vulnerability • Improved hatchery operations • Pollutant source control to improve water quality • Demand management implemented through conservation, reclamation, and land retirement

Benefits

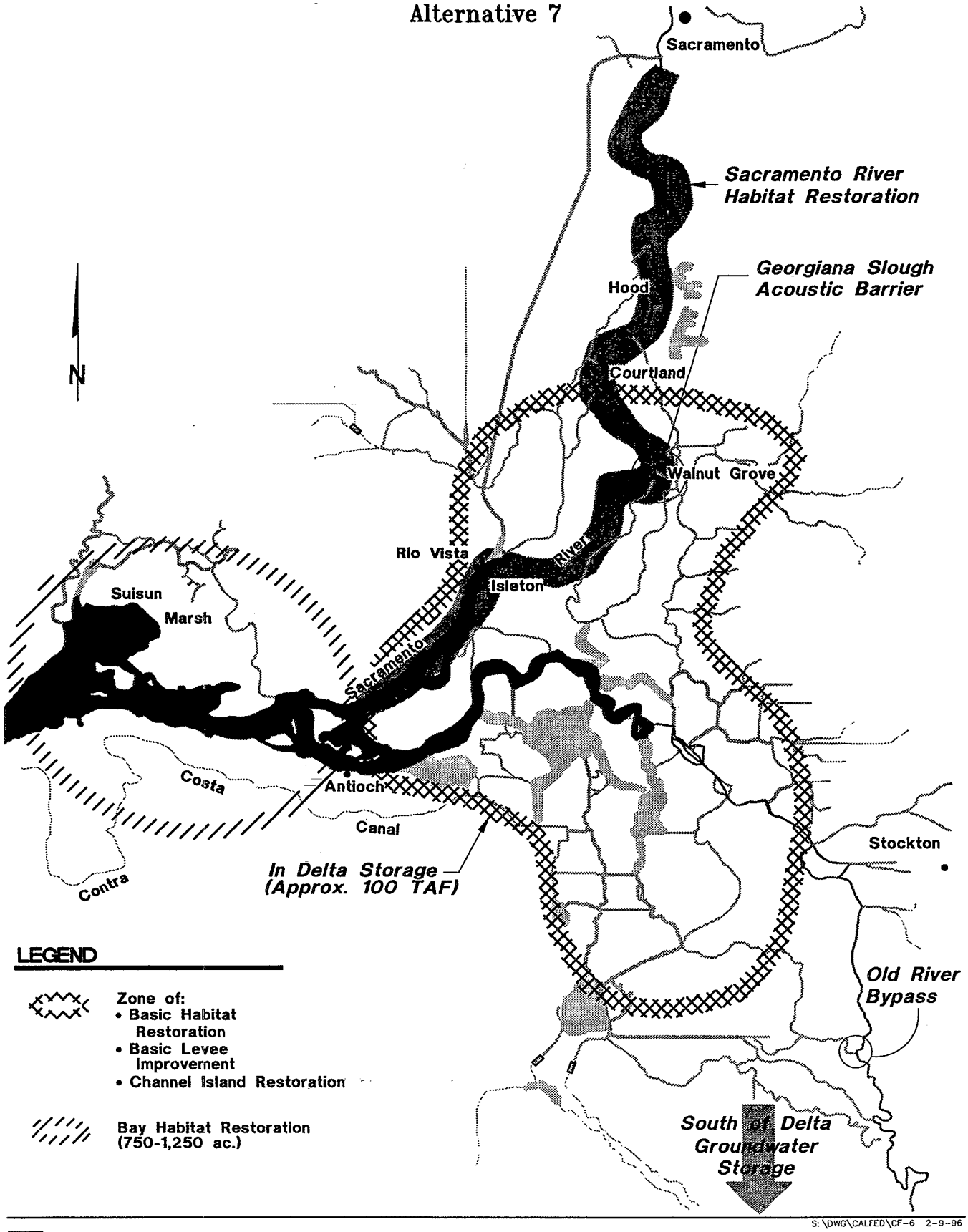
- Improves aquatic and wetland habitat and enhances fishery by improving spring outflows
- Reduces pollutant mass loading
- Shifts timing of export diversions to less sensitive periods
- Improves Delta levee stability

Constraints and Concerns

- Fish mortality in south Delta export facilities remains substantial
- Export water quality remains problematic
- Water transfer opportunities highly constrained
- Delta islands remain vulnerable to flooding
- Uncertainty that ecosystem restoration will result in reduced constraints on diversions
- Significant constraints to exporting water November through June

Water Management With Environmental Storage

Alternative 7



S:\DWG\CALFED\CF-6 2-9-96

CALFED BAY-DELTA PROGRAM

B—001149

B-001149

Alternative 7
Water Management with Environmental Storage

Overview

This alternative constructs in-Delta water storage facilities dedicated to environmental purposes and improves Delta channels for conveyance. These structural improvements will allow changes in the timing of Delta export operations to benefit fish populations while maintaining annual export volumes. Delta diversions will be shifted away from the February - June period to allow increases in spring outflow, providing benefits to fish transport and ecosystem productivity.

change diversion timing to protect fish

Water diverted to the new in-Delta storage during periods when fish are not vulnerable will be later released to aid transport of fish from the Delta. This storage can also be used to supply export diversions at times when fish are not vulnerable. The in-Delta storage will be operated by environmental resource agencies. Increased conveyance capacity in Delta channels will allow the export pumps to operate at full capacity when fish are not vulnerable to entrainment. Diverting at full capacity during these times makes it possible to curtail diversions when fish are vulnerable without reducing water supply reliability.

in-Delta storage and increased Delta channel capacity

Changes to Delta water operations will be implemented to substantially reduce effects on fish and habitats. Real-time monitoring will be used to curtail diversions to avoid entrainment during sensitive periods and to allow increased diversions during other nonsensitive periods. To further reduce entrainments at the existing diversion locations, fish screens will be installed on high priority diversions throughout the Bay-Delta system. Behavioral fish barriers will be operated at the head of Old River and Georgiana Slough, and export forebay operations will be modified to reduce fish losses at the pumps. Finally, the Delta Cross Channel will remain closed during November-June to prevent diversion of Sacramento River salmon outmigrants to the central Delta. Environmental agencies could allow gates to be opened when salmon smolts are not present or the barriers should remain open to reduce reverse flows.

divert water during less environmentally sensitive periods

This alternative also includes various demand management actions to enhance water supplies for water users. Demand management will focus primarily on water conservation, water reclamation, and land retirement actions, producing substantial savings in water use and alternative supplies for other users. Land retirement would focus on marginally productive lands, especially those that contribute substantially to regional drainage and water quality problems. To facilitate shifting of Delta diversions away from the spring period without reducing total exports, this alternative also includes actions to increase conjunctive use and groundwater banking in the southern San Joaquin Valley, and uses market mechanisms and incentives to facilitate water transfers.

demand management and conjunctive use/groundwater banking help diversion timing

Physical and Structural Features

Habitat Restoration

Activities	Benefits
• Restore riparian, shaded riverine, and shallow water habitat along the **Sacramento River channel** between Sacramento and Collinsville	• Improves aquatic and wetland habitat quality and ecosystem productivity • Increases survival and spawning success of anadromous and Delta native fish
• Restore **Delta** shallow water, riparian, terrestrial, and tidal wetland habitat	• Provides spawning areas for Delta native and resident 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
• Restore approximately 75 to 125 miles of shallow water, riverine, and riparian habitat along **Delta levees**	• 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
• Protect **channel islands** from erosion and enhance habitat	• Provides habitat for aquatic and terrestrial plant and animal species • Improves water quality
• Restore about 750 to 1,250 acres of tidal wetlands in **Suisun Bay**	• Provides wet-year spawning habitat for Delta smelt, rearing areas for salmon, and wildlife habitat (e.g., canvasback and redhead ducks)

Considerations

- **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 Transport

Activities	Benefits
• Improve Delta channels to allow export pumps to operate at full 15,000 capacity when fish are not vulnerable	• Allows curtailment of exports during sensitive periods and increased diversion rates during high flows shifting exports to less environmentally sensitive periods

Considerations
• Would require increase in permitted capacity (to physical capacity) of Delta export facilities.
• Closure of Delta Cross Channel gates significantly reduces ability to transport water to the export pumps.

Water Storage

Activities	Benefits
• Develop about 100,000 AF of **new water storage** in the Delta dedicated to environmental uses	• Improves transport of fish through Delta • Reduces frequency and duration of export curtailments, thus improving water supply reliability
Considerations	
• Locate new environmentally dedicated storage on one or more islands for X2 management or in other areas to benefit fish transport. Reservoir could be filled during times of high river flow. • 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
• Construct a **San Joaquin River bypass** at the head of Old River	• Encourages out-migrating fish to stay in the San Joaquin River • Allows for managing flows down Old River
• Install **fish screens** on highest priority diversions in the Delta, rivers, and tributaries	• Reduces entrainment of fish
• Operate barrier to fish movement into Georgiana Slough	• Reduces entrainment of salmon outmigrants in central and south Delta
Considerations	
• 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
• Provide a **basic level of protection and stabilization** of Delta levees through levee maintenance and stabilization actions	• 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

Activities	Benefits
• **Maintain flood conveyance capacity** of Delta channels through channel maintenance actions or in conjunction with levee stabilization	• Manages vulnerability of Delta functions • Maintains flood conveyance • Provides opportunities for habitat restoration

Considerations

- Provide flood protection equivalent to Army Corps of Engineers PL 99 standard for these islands:

  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 Supply Management

Activities	Benefits
• Expand groundwater storage and conjunctive use supply programs	• Provides flexibility needed to respond to operational requirements for changing timing of diversions • Allows shifting of exports away from February-June period critical for fish
• Modify timing of reservoir releases	• Improves Delta water quality through dilution and salinity repulsion and improved instream aquatic habitat benefits
• Expand water conservation best management practices (BMPs) and implement and expand efficient water management practices (EWMPs)	• Reduces demand for water from the Delta
• Implement feasible reclamation and reuse projects for urban and agricultural supplies	• Reduces demand for water from the Delta
• Acquire supplemental water from willing sellers	• Provides additional water for water quality, ecosystem, and water users
• Integrate land retirement and land fallowing programs with existing programs such as CVPIA and San Joaquin Drainage Program	• Reduces demand for water from the Delta • Improves water quality • Increases flexibility of water supplies

Considerations
• Use real time monitoring for reservoir releases to improve water quality and ecosystem flow management.
• Coordinate surface water releases with groundwater storage releases.
• Possible state and federal cosponsorship of conservation and reclamation programs
• Land retirement and land fallowing will focus on marginal agricultural lands and lands from willing sellers.

Water Diversion Management

Activities	Benefits
• Improve **real-time monitoring** to determine locations of special-concern fish species and modify water diversions to reduce fish entrainment	• Reduces entrainment of special-concern species • Improves flexibility to divert water during periods when fish are not vulnerable
• **Improve CVP and SWP operations** through predation control, coordinating operations, and improving fish salvaging and handling	• Reduces fish losses
• Evaluate, improve, and install **behavioral barriers** for anadromous fish	• Diverts anadromous fish from areas of potential entrainment
• Close Delta cross channel during November-June	• Reduces diversion of salmon outmigrants to central Delta
Considerations	
• Evaluate continued use of an acoustic barrier at the mouth of Georgiana Slough. • Evaluate behavioral barriers for Delta Cross Channel and Threemile Slough.	

Fisheries Management

Activities	Benefits
• **Mark salmon** produced in hatcheries	• Facilitates selective catch of hatchery salmon by commercial and recreational fisheries
• Conduct **net-pen rearing of striped bass** to supplant natural production	• Maintains recreational fishery • Reduces operational constraints on water diversions
Considerations	
• 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.	

Institutional and Policy Features

Habitat Programs

Activities	Benefits
• Integrate recommended **habitat restoration actions from other programs**, including CVPIA and the Anadromous Fish Restoration Program	• Provides additional habitat restoration
• Establish programs to **preserve agricultural land uses** that provide valuable habitat functions	• Protects existing habitats
• Establish a CALFED team to coordinate and **expedite habitat restoration permits**	• Accelerates acquisition of permits for environmental restoration projects and other CALFED projects
• Establish and fund a management program and rapid response team to **manage introduced species**	• Protects existing valuable species and habitat
• Establish a program to identify and use clean **dredge materials** from the Delta for habitat restoration and levee maintenance in the Delta	• Provides materials for habitat and levee improvements
• Encourage farmers and levee maintenance districts to **leave habitat areas undisturbed** by working with resource agencies	• Protects existing habitats • Increases flexibility in maintenance programs
Considerations	
• Coordinate activities to avoid duplication of effort.	

Water Management

Activities	Benefits
• Increase exports during periods of high winter Delta flows and when environmental concerns are low	• Increases supply predictability by shifting a large portion of diversions away from environmentally sensitive periods that currently constrain pumping activities • Provide export water quality benefit
• Establish a **coordinated CALFED program** to manage Delta flow operations	• Provides capability for rapid objective response to changing Delta conditions
• Create a coordinated CALFED program to expedite and expand the use of **water transfers** to meet water needs during droughts	• Provides flexibility to transfer water for environmental or export purposes

Considerations
• Determine institutional needs to implement programs.
• Regulatory changes would be required to increase winter exports. Could include trade off pumping incentives for higher diversion during acceptable winter months and reduction in exports during more environmentally sensitive periods.
• Would require increase in permitted capacity (to physical capacity) of Delta export facilities to maximize benefit of export criteria modification in conjunction with additional off-stream storage south of the Delta.

Water Quality Standards

Activities	Benefits
• Reevaluate **Delta export/inflow ratios** during triennial reviews as habitat effectiveness is realized	• Allows for higher level of water transfer based on actual fish population improvements
Considerations	
• Monitor to verify effectiveness of habitat and entrainment reduction programs. Develop an adaptive management program and modify habitat restoration and export/inflow ratios in response to improved sustainability of important species.	

Management of System Vulnerability

Activities	Benefits
• Establish and fund an **emergency levee management plan** to respond to levee failures	• Provides resources to protect Delta functions through proactive and preventative measures
• Establish **landside buffer zones** adjacent to levees on islands with deep peat soils	• 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 benefits
Considerations	
• 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

- Improves aquatic and wetland habitat and spring outflows
- Reduces pollutant mass loading
- Shifts timing of export diversions to less sensitive periods
- Improves Delta levee stability

Constraints and Concerns

- Mortality in south Delta export facilities remains substantial
- Uncertainty that ecosystem restoration will result in reduced constraints on diversions
- Delta islands remain vulnerable to flooding
- Export water quality remains problematic
- Transfer opportunities highly constrained