Alternative 14

CALFED
BAY-DELTA
PROGRAM

B-001227

Alternative 14 - Summary

Small West-Side Conveyance Facility

Emphasis

Reduce export entrainment impacts and increase supplies by shifting the location and timing of a portion of exports.

Distinguishing Features

3,000

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

Physical/Structural	Operational/Management	Institutional/Policy
• New diversion at Thermalito Afterbay on the Feather River and Red Bluff on the Sacramento River • West-side Sacramento Valley offstream storage facility (2 million AF) with canals connecting to selected agricultural canals • Isolated conveyance facility (5,000-10,000 cfs) connecting to the export pumps • Moderate level of habitat restoration in and above the Delta • New screens on high and moderate priority diversions • Moderate level of levee improvements • New screened intake at Italian Slough	• Diversions through the Tehama Colusa Canal are at capacity year round • Diversions from Thermalito Afterbay take place during surplus conditions • Real-time monitoring to reduce entrainment • Obtain 100,000 AF on San Joaquin River and manage for environmental purposes • Water reclamation projects • Groundwater banking and conjunctive use programs	• Funded levee improvements, emergency management plan, and landside buffer zones to reduce system vulnerability • Moderate water quality improvements

Benefits

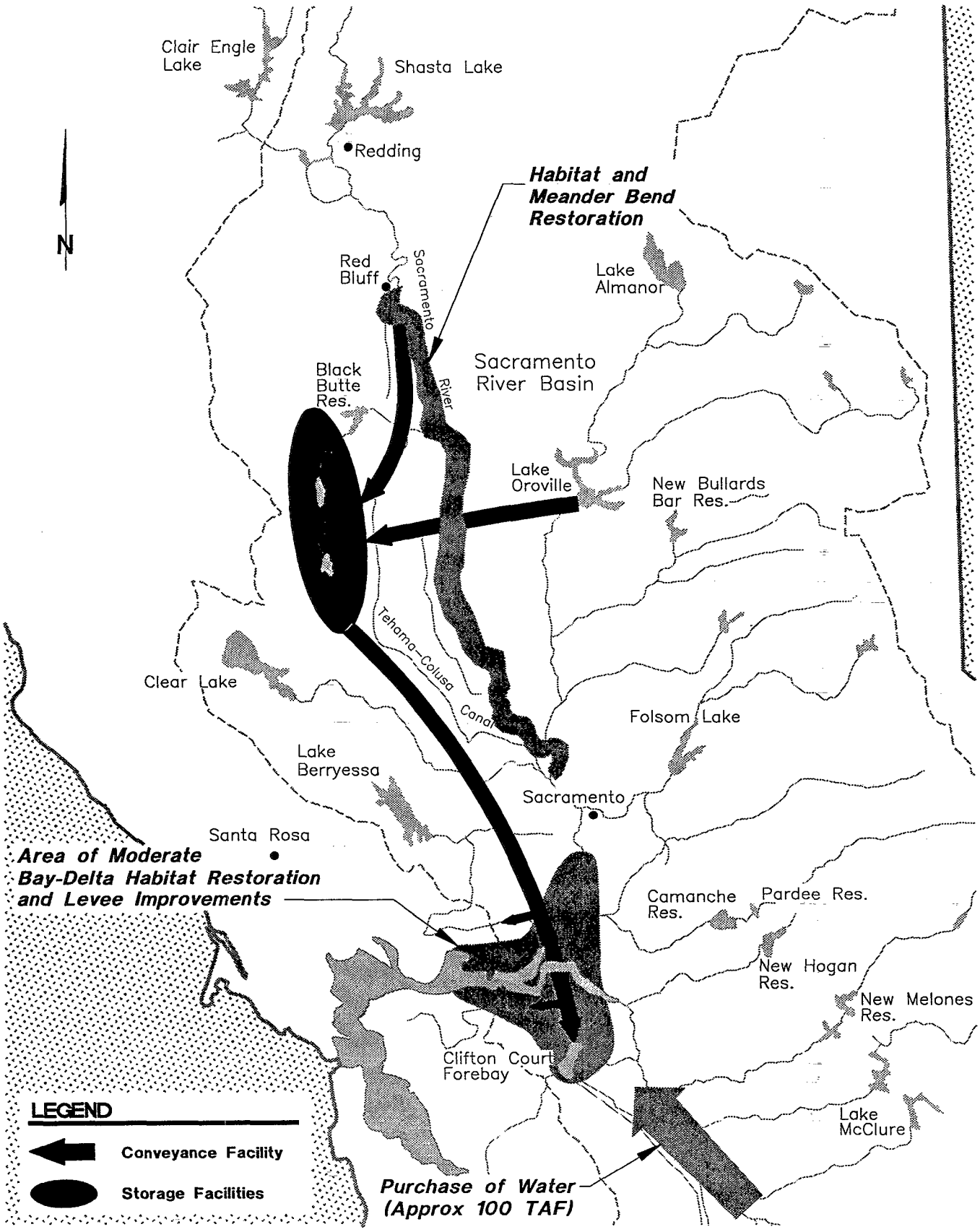
- Increases dry year water reliability, improves flexibility of diversion timing, and increases water transfer opportunities, particularly north-south transfers
- Improves export water quality
- Reduces vulnerability of Delta island and Delta water supplies
- Improves environmental instream flows and reduces fish mortality caused by operations

Constraints and Concerns

- Fish mortality in South Delta export facilities not eliminated
- Reduced instream flows below Thermalito, Tehama Colusa diversion points
- Possible reductions in south Delta water quality
- Possible new entrainment of salmon smolts into Tehama Colusa diversion
- Adverse hydrological conditions continue in the Delta due to south Delta exports

Small West-side Conveyance

Alternative 14



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CALFED BAY-DELTA PROGRAM

Alternative 14
West-Side Sacramento Small Conveyance Facility

Overview

This alternative emphasizes a combination of habitat restoration, system reliability improvements, and actions to improve water supply. A portion of Delta export diversions will be relocated to two locations upstream of the Delta in order to reduce fish entrainment and improve export water quality. Water storage facilities will be constructed upstream of and in the Delta, increasing the capacity to capture, store, and use flows for environmental and water supply benefits.

relocate export diversions

High quality water will be diverted during flood flows from the Sacramento River at Red Bluff and from the Feather River at Thermalito Afterbay. Water from both diversions would be conveyed to a new off-stream storage facility of approximately 1.5 to 2 million acre-feet, located on the west side of the Sacramento Valley. Sacramento River water would be diverted using the pumps at the Red Bluff diversion dam and conveyed to the reservoir via the Tehama-Colusa Canal. A new conveyance facility connecting Thermalito Afterbay to the new reservoir would siphon under the Sacramento River. A transfer facility would be constructed from the new reservoir to pumps in the south Delta. Possible interties could also be created to the North Bay Aqueduct, Contra Costa Canal, the Mokelumne Aqueduct, and the South Bay Aqueduct.

2 million AF of new storage in the Sacramento Valley

Water storage will be constructed on Delta islands to better manage water transfers and capture unregulated flows. This will also minimize storage constraints on exports and allowed to be supplied to users during critical periods while avoiding adverse effects on fish. In addition, water will be purchased from San Joaquin River users to improve transport of fish through the Delta and improve south Delta water quality.

Delta storage and purchased water for the environment

This alternative combines water supply actions and environmental restoration with actions to improve levee stability and protect land uses and infrastructure in the Delta. Upstream of the Delta, habitat restoration and screening of high and moderate priority diversions will increase fish populations. In the Delta, levees will be improved to protect critical western islands and islands with important local and regional infrastructure or important habitat. Restoration of riverine and riparian habitat in combination with restoration of Suisun Bay tidal wetlands will also benefit fish populations. Water quality improvements in the Delta will be achieved through pollutant source control actions.

restore habitat, improve levees, and control pollutant sources

By providing new upstream diversion points and a transfer facility for a portion of Delta exports, this alternative supports better management of diversions, improves water quality and reduces fish mortality. Additional water storage throughout the system further maximizes flexibility to meet various water needs.

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	• 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
• Restore **upper Sacramento River** habitat and natural channel functions	• Increase survival and spawning success of anadromous fish
• Restore **Delta and floodway corridor** shallow water, riparian, terrestrial, and tidal wetland habitat	• Provides spawning areas for Delta native fish and 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 and forage areas and escape cover for juvenile salmon, Delta smelt, splittail, and other species. Provides improvements in water supply reliability and water quality
• Restore and protect **channel islands** from erosion and enhance habitat	• Provides habitat for aquatic and terrestrial plant and animal species • Improves water quality
• Restore about 1,500 to 2,500 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)
• Restore riverine channel features in the **San Joaquin River** above the Delta to lower water temperature and to protect young fish from predation and straying	• Improves fish survival

Considerations
• **Sacramento River Channels** – Feasible and cost-effective habitat restoration implemented between Sacramento and Collinsville. • **Upper Sacramento River** – Create meander belts where feasible (e.g., Red Bluff to Colusa) and riparian sections in other areas (e.g., Colusa Knights Landing). • **Delta** – Candidate areas for shallow water habitat restoration include Prospect Island, Liberty Island, Little Holland Tract, Hastings Tract, Yolo Bypass, and the southeast Delta. Candidates for Delta levee habitat restoration include Twitchell Island along Threemile Slough and Sevenmile Slough, Georgiana 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. • **San Joaquin River** – Confine wide, shallow channels and isolate in-channel gravel quarry areas. May not be self-sustaining.

Water Transport

Activities	Benefits
• Construct a **new diversion** from the Feather River system connected to the Thermalito Afterbay • Construct a **new conveyance facility** to transport water from the new diversion to the west-side storage facility	• Anadromous fish are not exposed to major diversion thereby reducing entrainment during export diversion • Improves water quality because the diversion is above major pollution sources
• Construct a **new conveyance facilities** to transport water from the west-side storage point to existing pumping plants in the south Delta	• Improves water quality for export users • Offers the capability to provide water supplies to users on the North Bay Agueduct, Contra Costa Canal, the Mokelumne Aqueduct, and the South Bay Aqueducts • Improves water supply reliability by adding flexibility of a second diversion point upstream of most Delta native fish habitat

Considerations
• Diversion and conveyance facilities from Thermalito afterbay sized to transport up to 2,000-7,000 cfs to new storage facility. • Diversion and conveyance at Red Bluff Diversion Dam sized to transport up to 2,500 cfs to new storage facility. • Divert only during flood flows to minimize fisheries impacts. • From the new off-stream storage facility convey 5,000 to 10,000 cfs through siphons and canals across Delta to avoid environmental, water quality, and flood conveyance impacts. • Provide turnouts from conveyance facilities to stream flow augmentation points and to groundwater and conjunctive use areas on the west and east sides of the Sacramento Valley.

Water Storage

Activities	Benefits
• Develop about 100,000 AF of **new water storage** in the Delta dedicated to environmental uses	• Provides additional diversion flexibility • Reduces entrainment of fish • Reduces frequency and duration of export curtailments, thus improving water supply reliability
• Construct about **1.5 to 2 million AF of offstream storage** on West Side of Sacramento Valley	• Adds new source of water supply for all beneficial users

Considerations

- Construct new off-line storage around Colusa-Sites Reservoir site.
- 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
• Construct a **San Joaquin River bypass** at the head of Old River	• Encourages outmigrating fish to stay in San Joaquin River • Allows for managing flows down Old River
• Install **fish screens** on moderate and high priority diversions in the Delta, rivers, and tributaries	• Reduces entrainment of fish
* • Construct new screened State Water Project intake at **Italian Slough**	• Avoids fish predation and entrainment in Clifton Court Forebay when diversion rates are low
• Improve drainage in **floodway corridors**	• Reduces fish stranding

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 **moderate 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
• **Improve flood conveyance capacity** of Delta channels through channel maintenance and improvements	• Manages vulnerability of Delta functions • Improves flood conveyance • Provides opportunities for habitat restoration

Considerations

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

  All critical western islands such as Jersey Island.

  Islands with important regional infrastructure (e.g., Highway 12) such as Terminous Island

  Islands with both valuable habitat and important regional infrastructure (e.g., transmission lines) such as Lower Roberts Island.
- 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.
- Improvements to channels include dredging for sediment removal in channels with restricted flood capacity.

Operational and Management Features

Water Diversion Management

Activities	Benefits
• **Acquire about 100,000 AF** of water from willing sellers in the **San Joaquin basin**	• Transports fish through San Joaquin River and Delta • Improves water quality • Improves management flexibility for diversions to reduce fish loss
• **Improve CVP and SWP operations** through predation control, coordinating operations, and improving fish salvaging and handling	• Reduces fish losses
• Improve **real-time monitoring** of locations of fish species of special concern and modify water diversions to avoid fish entrainment	• Provides an additional tool to help reduce entrainment of special-concern species • Improves flexibility to divert water during critical fish migration periods

Activities	Benefits
• Evaluate, improve, and install **behavioral barriers** for anadromous fish	• Diverts anadromous fish from areas of potential entrainment and predation • Allows for continued water diversions at current locations

Considerations

- Can use San Joaquin environmental water for pulse flows for fish transport or diluting poor quality flows.
- Coordinate use of San Joaquin environmental water with the operation of new Delta storage to improve timing of diversions.
- 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
• Encourage groundwater banking program	• Provides additional dry year water supply flexibility
• Implement feasible reclamation and reuse projects for urban and agricultural supplies	• Reduces demand for water from Delta • Improves water quality

Considerations

- Possible state and federal co-sponsorship for reclamation programs.

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.

Water Quality Management

Activities	Benefits
• Increase enforcement of source control regulations for **agricultural drainage** and implement farming best management practices for water quality	• Improves Delta water quality

Activities	Benefits
• Increase enforcement of source control regulations for **urban and industrial runoff** and implement best management practices for water quality	• Improves Delta water quality
• Integrate existing **land retirement and fallowing** programs for agricultural lands with drainage problems	• Improves Delta water quality
• Integrate existing and support appropriate on-site **mine drainage remediation** measures to the maximum extent feasible	• Improves Delta water quality
Considerations	
• Identify priority pollutant sources such as Iron Mountain Mine and west-side San Joaquin agricultural lands. • Provide regulatory and institutional incentives for implementation of remediation measures.	

Institutional and Policy Features

Habitat Programs

Activities	Benefits
• Integrate recommended **habitat restoration actions from other programs**, including 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.	

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 as fishery populations improve
Considerations	
• 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
• 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 • Could be used to provide habitat benefit
Considerations	
• Determine extent and cost effectiveness of levee management programs and buffer zones. • Buffer strip approximately 100 to 150 yards wide dedicated to shallow wetlands.	

Preliminary Assessment

Benefits

- Improves environmental instream flows and reduces fish mortality caused by operations
- Improves export water quality
- Reduces vulnerability of Delta island and Delta water supplies
- Increases dry year reliability of system, improves flexibility of diversion timing, and increases opportunities for market transfers, particularly north-south transfers

Constraints

- Mortality in South Delta export facilities not eliminated
- Reduced instream flows below Thermalito, Tehama Colusa diversion points
- Possible reductions in south Delta water quality
- Possible new entrainment of salmon smolts into Tehama Colusa diversion
- Adverse hydrological conditions continue in the Delta due to south Delta exports