



Alternative 13 - Summary

East-Side Foothills Conveyance

Emphasis

Construct an isolated conveyance facility on the east side of the Sacramento and San Joaquin Valleys to an ultimate connection with the California Aqueduct in Kern County and relocate a portion of the SWP and CVP diversions north of the Sacramento/Feather River confluence. The facility would operate in the winter and spring to capture flood flows for groundwater recharge and banking and subsequent use.

Distinguishing Features

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

Physical/Structural	Operational/Management	Institutional/Policy
<ul style="list-style-type: none"> • Conveyance facility on the east side of the Sacramento and San Joaquin Valleys • Interconnect with east-side tributaries and water conveyance projects • Moderate level of levee improvements • Moderate level of habitat restoration in the Delta and on the Sacramento and the San Joaquin Rivers • Screens on high and moderate priority diversions • New screened intake at Italian Slough 	<ul style="list-style-type: none"> • Improve operational flexibility with new facility and interconnections • Manage upstream reservoir releases to release water for diversion into the east-side conveyance facility • Obtain 100,000 AF on San Joaquin River and manage for environmental purposes • Expand conjunctive use and groundwater storage programs 	<ul style="list-style-type: none"> • Funded levee improvements, emergency management plan, and landside buffer zones to reduce system vulnerability

Benefits

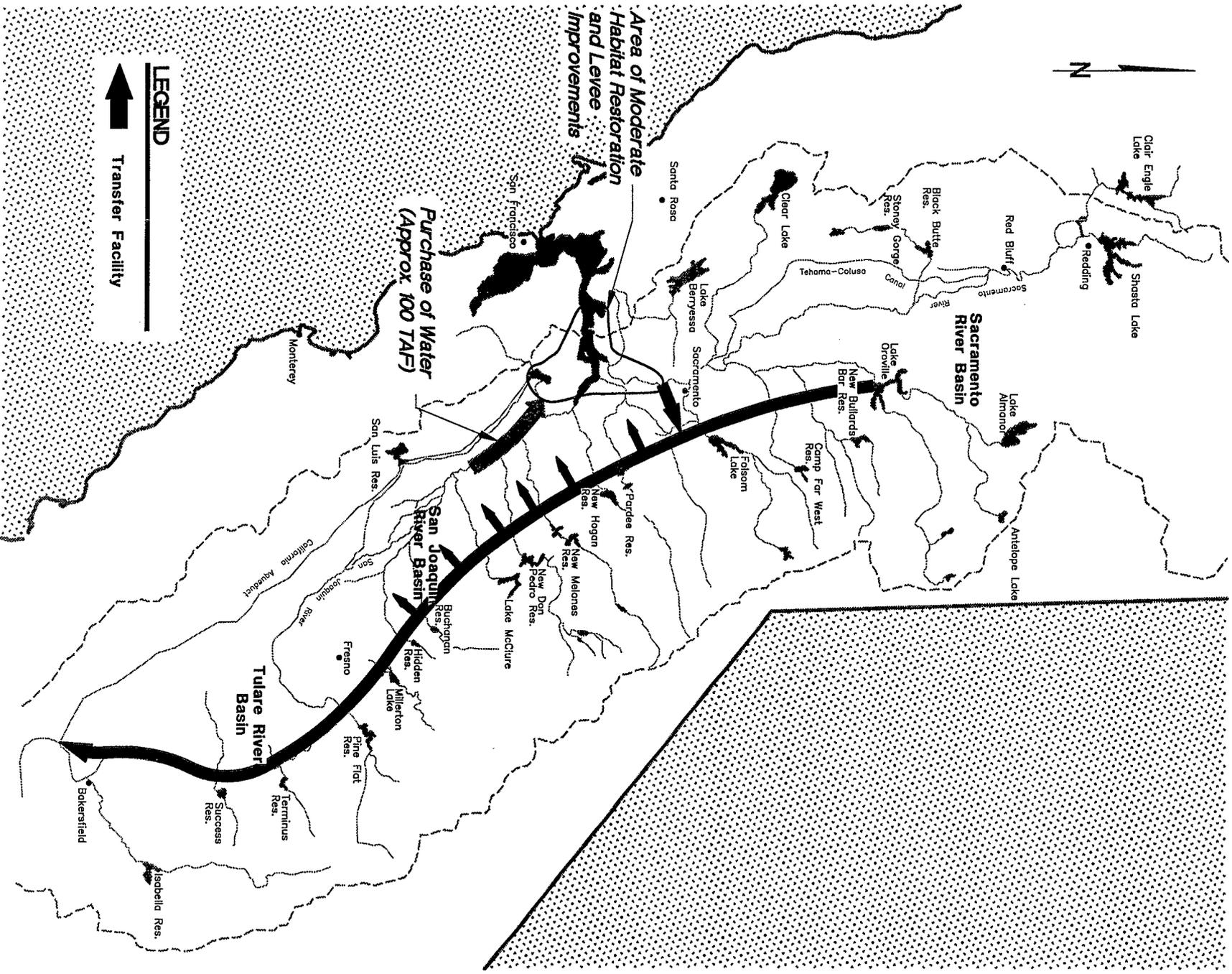
- Increases reliability of water supplies and improves quality of export water
- Funded levee management program decreases vulnerability of Delta functions to catastrophic failure
- Habitat improvement and reduced diversion effects improves ecosystem quality and fish populations

Constraints and Concerns

- Some Delta islands remain vulnerable to catastrophic failure
- Site specific impacts associated with new facilities
- Possible reductions in central and south Delta water quality
- Would reduce instream flows on Sacramento, Feather, and American Rivers
- Continued yet reduced diversion of export supplies and entrainment in south Delta
- Screening and real-time monitoring may not be as effective as necessary

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Overview

This alternative will reduce fish entrainment in the Delta and upstream by restructuring the water distribution system. A portion of export diversions will be moved to a less environmentally sensitive location, reducing fish losses. Moderate habitat restoration will further increase fish populations.

*diversions are
relocated to save
fish*

Currently, the SWP and CVP pumps create reverse flows that move fish into the South Delta, where many of the fish are entrained. Under the ESA, limits are set on fish entrainment (take limits) to avoid jeopardizing fish populations. When these limits are approached, pumping is temporarily reduced or stopped. The constant threat of a temporary pumping reduction or shut-down makes it difficult for export water users to predict or rely on their supply. This alternative moves a portion of the SWP and CVP diversions to the Sacramento and Feather Rivers upstream of the Delta. This will reduce reverse flows and cause fewer fish to be drawn into the South Delta and entrained. Also, moderate levels of habitat restoration and fish screening will improve overall ecosystem health and further increase fish populations. Consequently, larger fish populations will make ESA take limits less of a factor in water supply operations, not only for the SWP and CVP, but for all water users in the Sacramento and San Joaquin Basins.

*saving fish
improves water
supply reliability*

*new isolated
conveyance
facility*

A portion of the SWP and CVP diversions will be relocated upstream of the Sacramento River/Feather River confluence. New diversions will be constructed on the Sacramento and Feather rivers to supply a new canal. This canal will convey water south along the east side of the Sacramento and San Joaquin valleys to the California Aqueduct in Kern County. The existing Folsom South, Madera, Friant Kern and Cross Valley Canals may be modified to incorporate the new canal. The new canal will be connected to east side projects (e.g., Mokelumne Aqueducts) to improve water supplies, facilitate water transfers and increase instream flows in east side rivers. Water will also be delivered for groundwater recharge and banking in the San Joaquin Valley, including San Joaquin county. The new canal will operate mostly in the winter and spring to capture flood flows for banking and subsequent use. This will reduce the need to divert from the Delta during more environmentally sensitive periods. Additionally, remaining exports from the existing facilities may encounter reductions in water quality as a result of upstream diversions.

*a new canal runs
from the
Sacramento and
Feather Rivers to
the California
Aqueduct in Kern
County*

This alternative will moderately improve habitat along the Sacramento River downstream of Sacramento and will restore channel features on the San Joaquin River to improve survival of anadromous fish. Moderate habitat restoration in the Delta will include improvement of shallow riverine and riparian habitats to improve conditions for anadromous fish. Moderate levee improvements will incorporate habitat restoration. Moderate levels of shallow tidal habitat will be developed in Suisun Marsh to benefit migrating salmon and provide spawning and rearing areas for Delta Smelt.

*moderate habitat
restoration
upstream, in the
Delta, and in
Suisun Marsh*

With a portion of the SWP and CVP diversions relocated, inflow to the Central and South Delta will be reduced, threatening water quality in these areas and for some export users. Therefore, this alternative includes new in-Delta storage facilities, flow barriers, and a water supply purchased from willing San Joaquin River Basin water users. The in-Delta storage and water purchases will increase the flexibility of environmental releases of water, protecting water quality in the Central and South Delta while improving fish transport through the Delta. Additionally, overall water quality will be improved by pollutant source controls.

water purchases and storage to protect water quality and improve fish transport

By increasing fish population and improving aquatic habitat, ESA take limits that affect pumping operations will be less constraining, thereby improving water supply reliability and predictability. Habitat restoration simultaneously reduces system vulnerability and protects overall water quality.

Physical and Structural Features

Water Transport

Activities	Benefits
<ul style="list-style-type: none"> Partially relocate SWP and CVP diversions to the Sacramento and Feather Rivers Construct East Valley Conveyance Facility from new diversions to the California Aqueduct in Kern County 	<ul style="list-style-type: none"> Reduces fish entrainment effects Provides access to higher quality Sacramento River water
<ul style="list-style-type: none"> Construct tide gates and/or flow barriers in south Delta 	<ul style="list-style-type: none"> Better manage flow circulation Increase water stages for south Delta diversions
Considerations	
<ul style="list-style-type: none"> Equip new diversions with state of the art fish screens. Interconnect East Valley Conveyance Facility with east side projects such as Mokelumne Aqueducts, Hetch-Hetchy, New Melones, and Friant Kern Unit and east side tributaries for water supply, groundwater recharge, groundwater banking, and instream flow enhancement. Parallel or modify existing Folsom South, Madera, Friant Kern, and Cross Valley Canals. 	

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

Activities	Benefits
<ul style="list-style-type: none"> • Restore Delta and floodway corridor shallow water, riparian, terrestrial, and tidal wetland habitat • 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 and 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 and 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 1,500 to 2,500 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)
<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Improves fish survival
Considerations	
<ul style="list-style-type: none"> • Sacramento River Channels – Feasible and cost-effective habitat restoration implemented between Sacramento and Collinsville. • 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 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 outmigrating fish to stay in San Joaquin River • Allows for managing flows down Old River
<ul style="list-style-type: none"> • Install fish screens on moderate and high priority diversions in the Delta, rivers, and tributaries 	<ul style="list-style-type: none"> • Reduces entrainment of fish
<ul style="list-style-type: none"> • Construct new screened State Water Project intake at Italian Slough 	<ul style="list-style-type: none"> • Avoids fish predation and entrainment in Clifton Court Forebay when diversion rates are low
<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 moderate 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"> • Improve flood conveyance capacity of Delta channels through channel maintenance and improvements 	<ul style="list-style-type: none"> • Manages vulnerability of Delta functions • Improves 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"> 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 Supply Management

Activities	Benefits
<ul style="list-style-type: none"> • Expand groundwater storage and conjunctive use programs 	<ul style="list-style-type: none"> • Provides flexibility needed to respond to operational requirements for changing timing of diversions
Considerations	
<ul style="list-style-type: none"> • Coordinate surface water releases with groundwater storage releases. 	

Water Diversion Management

Activities	Benefits
<ul style="list-style-type: none"> • Acquire about 100,000 AF of water from willing sellers in the San Joaquin basin 	<ul style="list-style-type: none"> • Transports fish through San Joaquin River and Delta • Improves water quality • Improves management flexibility for diversions to reduce fish loss
<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"> • Improve real-time monitoring of locations of fish species of special concern and modify water diversions to avoid fish entrapment 	<ul style="list-style-type: none"> • Provides an additional tool to help reduce entrapment of special-concern species • Improves flexibility to divert water during critical fish migration periods
<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 entrapment and predation • Allows for continued water diversions at current locations

Activities	Benefits
<ul style="list-style-type: none"> • Manage new conveyance facility to improve water supplies, facilitative water transfers, and increase instream flows in east-side rivers 	<ul style="list-style-type: none"> • Improve operational flexibility
Considerations	
<ul style="list-style-type: none"> • 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. 	

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
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"> • Increase enforcement of source control regulations for agricultural drainage and implement farming best management practices for water quality 	<ul style="list-style-type: none"> • Improves Delta water quality
<ul style="list-style-type: none"> • Increase enforcement of source control regulations for urban and industrial runoff and implement best management practices for water quality 	<ul style="list-style-type: none"> • Improves Delta water quality
<ul style="list-style-type: none"> • Integrate existing land retirement and fallowing programs for agricultural lands with drainage problems 	<ul style="list-style-type: none"> • Improves Delta water quality • Provides potential land habitat benefits
<ul style="list-style-type: none"> • Integrate existing and support appropriate on-site mine drainage remediation measures to the maximum extent feasible 	<ul style="list-style-type: none"> • Improves Delta water quality

Considerations
<ul style="list-style-type: none"> • 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
<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 acquiring 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. 	

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 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 100 to 150 yards wide dedicated to shallow wetlands. 	

Preliminary Assessment

Benefits

- Increases reliability of water supplies and improves quality of export water
- Funded levee management program decreases vulnerability of Delta functions to catastrophic failure
- Habitat improvement and reduced diversion effects improves ecosystem quality and fish populations

Constraints and Concerns

- Some Delta islands remain vulnerable to catastrophic failure
- Continued diversions of export supplies and resulting fish entrainment in the south Delta, although at a reduced amount
- Best available screening technology and real-time monitoring may not be as effective as necessary in avoiding entrainment effects at the new diversion locations.
- Site specific impacts associated with new facilities
- Possible reductions in central and south Delta water quality
- Would reduce instream flows on Sacramento, Feather, and American Rivers