

**Alternative 19**  
**Pollutant Source Controls and**  
**Operational Changes**

**E-009026**

## **Alternative 19**

### **Improve Delta Flow Through Source Pollutant Controls and Operational Changes**

#### **Emphasis**

This alternative maximizes water quality improvements in the Bay-Delta through managing and controlling pollutant sources and implementing operational modifications to upstream storage and diversion systems.

#### **Distinguishing Features**

##### Physical and Structural Features

Construct flow and fish barriers at Delta Cross Channel, Georgiana Slough, and Three-Mile Slough, and tide gates or flow barriers in southern Delta. Manage pollutant flows such as agricultural drainage and stormwater runoff. Restore Delta and upstream habitats. A moderate level of habitat restoration.

##### Operational and Management Features

Use real-time flow monitoring and adaptive management to control upstream reservoir releases to dilute contaminants and repel salinity intrusion.

##### Institutional and Policy Features

Improve pollutant source controls for urban and agricultural drainage, establish water quality BMPs, remediate on-site mine drainage, and use a watershed management approach to reduce and treat high-priority pollutant sources. Increase groundwater storage capacity and conjunctive use to increase system flexibility. Implement actions that address conservation, reclamation, desalination, land fallowing, and water pricing measures.

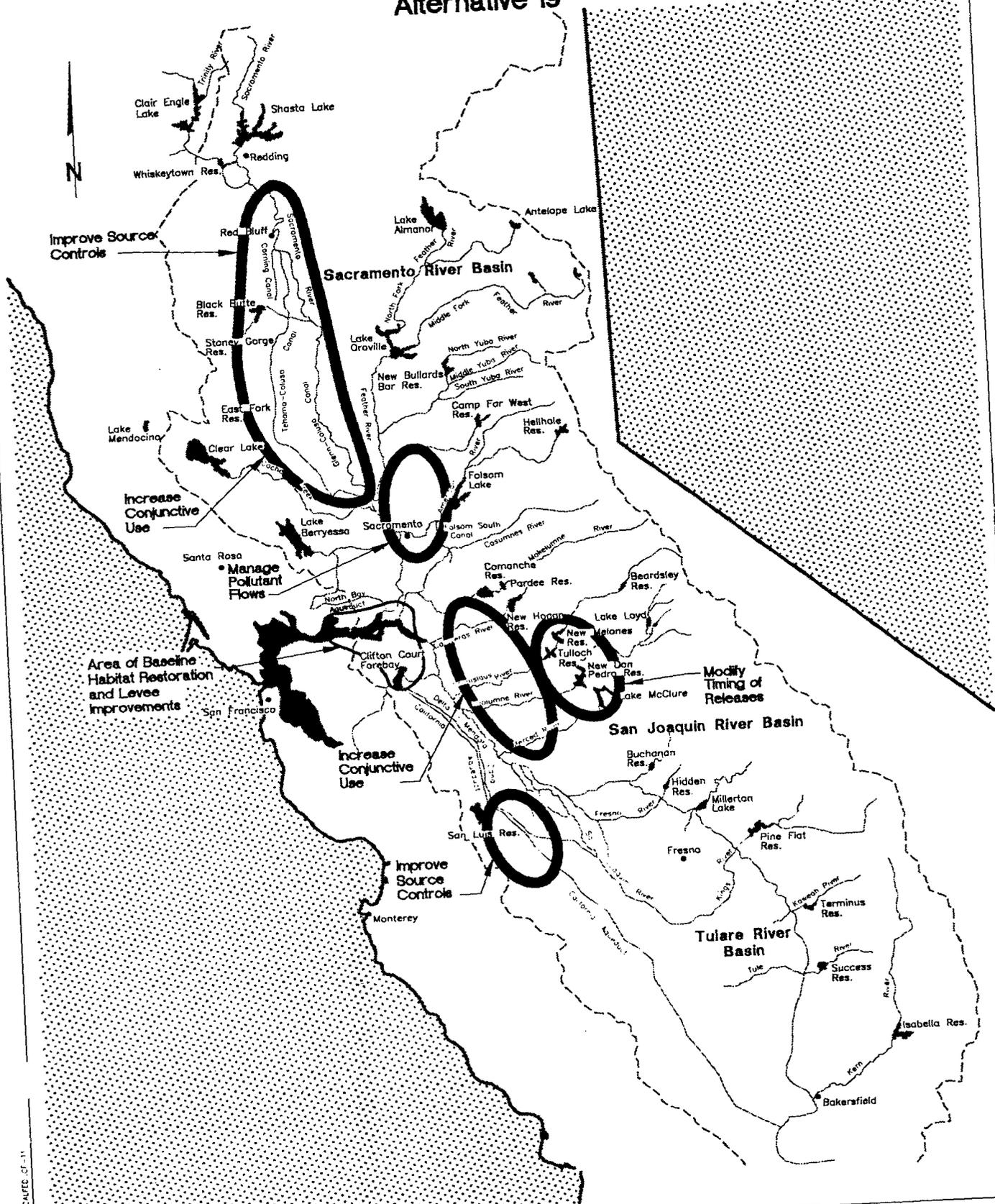
#### **Benefits**

- Improves management of salinity intrusion
- Improves ecosystem quality
- Improves Delta water quality
- Reduces Delta vulnerability by levee and channel improvements
- Improves water supply reliability by decreasing regulatory intervention in operations

#### **Constraints and Concerns**

- Mortality at diversion facilities remains high
- Water supply operations remain vulnerable to interruption due to ESA take limitations
- Some Delta islands remain vulnerable to flooding

# Pollutant Source Controls Operational Changes Alternative 19



S. DAVIS CONSULTING, INC.

## **Alternative 19**

### **Pollutant Source Controls and Operational Changes**

This alternative focuses on improving water quality in the Bay-Delta by minimizing and managing pollutant sources, including salinity, and utilizing primarily operational modifications to the upstream and downstream storage and conveyance, and diversion systems.

Key elements of this approach include identification of the problem pollutants and their sources, selection and implementation of appropriate source controls and management techniques, and operational modifications to improve reservoir storage and releases and to manage the timing of diversions. Management of pollutant sources include actions directed at source reduction and the elimination and treatment of nonpoint source discharge prior to entering the Delta. Improving water quality by focusing on operational modifications to the storage, conveyance, and diversion system requires development of real time flow monitoring and management of the system. Generally, releases from reservoirs could be modified to increase summer and fall flows through the Delta while providing the needs of localized water quality problem areas such as salinity in the south Delta. The timing of Delta and export diversions would also be managed more precisely during seasonal and localized poor water quality conditions, through implementation of various conjunctive use programs. Increasing groundwater storage and optimizing conjunctive use programs to capture high flows during the early winter months (which are then utilized during summer months) allows for a decrease in diversions from the Delta during the critical late winter, spring and summer months, thus increasing operational flexibility to improve water quality. This alternative achieves water quality benefits by integrating actions related to water supply and ecosystem quality with those that improve flow conditions for water quality control.

### **Physical and Structural Features**

*Control Volume and Temperature of Agricultural Discharges*— Selected agricultural water quality management measures, such as those directed at drainage volume control, can reduce agricultural water demands and increase in-Delta flows. Exporting agricultural drainage from the San Joaquin Valley to the least sensitive locations in the ocean or salt sinks will greatly reduce water quality problems including elevated temperature in the San Joaquin River and southern Delta while minimizing impairment of

agricultural lands and resultant losses in production.

***Install Barriers***— Construct flow and fish barriers to better manage water movement in the Delta, minimize reverse flows and salinity intrusion, and facilitate fish migration into and from the Delta. Potential fish barrier locations include the Delta Cross Channel, Georgiana Slough, and Three Mile Slough. Construct tide gates and/or flow barriers in the southern Delta to better manage south Delta water quality. Operation of the fish barriers will be coordinated with assistance from real time monitoring of anadromous fish population and movement.

***Restore Delta and Upstream Habitat***— Restore a variety of habitat types (shallow water, riverine, riparian, tidal wetland) upstream of and within the Delta by providing and protecting, spawning areas, forage areas, and covered habitat areas.

***Flood Protection Level***— Action provides the minimum level of protection to Delta system levees. First, all levees not yet providing a level of protection equivalent to the hazard mitigation plan (HMP) will receive the necessary upgrades to their levees to meet HMP standards. A level of flood protection equivalent to the US Army Corps of Engineers' Public Law (PL)- 99 standard would be provided to: 1) critical western Delta islands (such as Sherman Islands), with important regional infrastructure (e.g. the Mokelumne Aqueduct, transmission lines, Highway 160, etc.); 2) other islands having infrastructure of local importance (such as New Hope Tract, Bouldin Island, Palm Tract, Lower and Upper Jones Tracts, and Lower Roberts Island).

***Channel Improvements and Levee Maintenance***— A moderate level of channel improvements (e.g. widening for improved conveyance), levee maintenance and stabilization (e.g. stabilizing berms), the modification of agricultural practices to reduce subsidence potential, setback levees, and providing funding for maintenance and stabilization, are indicative of the range of actions that would be implemented with the intent of reducing the risk of the Delta levee system with respect to its value in providing water supply, water quality, ecosystem quality, and land use/infrastructure benefits.

***Delta Levee Habitat Restoration***— Restore approximately 100 levee miles of shallow water, riverine and riparian habitat in the Delta to provide forage and cover habitat for resident and anadromous fish, and to provide other benefits associated with riparian habitat. Actions might include setback levees, creation of berms, creation of shallow water habitat, and increased vegetation on levees in coordination with efforts to improve flood protection. Considerations for site selection will include distance from hazards

such as pumping plants, protection from waves generated by wind and boat wakes, importance of island integrity to the maintenance of Delta water quality, and need to improve channel capacity and structural stability of levees. Good candidate areas are Twitchell Island along Three Mile Slough and Seven Mile Slough, Georgiana Slough, and the north and south forks of the Mokelumne River.

***Delta Habitat Restoration***— Restore shallow water and tidal wetland habitat in the Delta to provide spawning areas, forage areas, and escape cover for juvenile salmon, Delta smelt, splittail, and other species. Candidate areas include Prospect Island, Liberty Island, Little Holland Tract, Hastings Tract, Yolo Bypass, and the southeast Delta. Also restore shallow water shoreline habitat along margins of the lower Sacramento and San Joaquin channels, and tributary sloughs including Barker Slough, Lindsey Slough, and Parker Island. Riparian, wetland, and terrestrial habitat would also be restored on Delta islands and upland areas adjacent to river channels such as Decker Island.

***Bay Habitat Restoration***— Restore about 1,000 acres of tidal wetlands between Collinsville and Carquinez Strait. Actions may include conversion of diked wetlands to tidal wetlands or use of dredge spoils to create wetland areas. The resulting habitat types will provide wet year spawning habitat for Delta smelt, rearing areas for salmon, as well as habitat for diverse wildlife including canvasback and redhead ducks.

***Install Bypass at Mouth of Old River***— Construct a bypass at the mouth of Old River that will encourage outmigrants to stay in San Joaquin River while allowing a managed flow down Old River.

***Fish Screens***— Install fish screens on diversions over 250 cfs that are on fish migration routes in the Delta, rivers, and tributaries.

## **Operational and Management Features**

***Manage Pollutant Flows***— Utilize wetlands or holding ponds to store agricultural drainage for release during periods of higher instream flow to improve water quality through dilution to improve water quality through dilution. Look for opportunities, such as Colusa drains, to reuse drainage water on selected crops. With the implementation of source controls, the drainage water may be applied to additional types of crops.

***Modify Timing of Releases***— Using real time flow monitoring and adaptive management, manage upstream reservoir releases from New Melones, Folsom, and other reservoirs both seasonally and annually to improve Delta water quality through dilution of land- and activity-derived contaminants, and ocean salinity repulsion. Modify Sacramento and San Joaquin Valley as well as export area reservoir releases and groundwater storage releases in conjunction with upstream operations to accommodate system demands. Focus the timing of releases on water quality improvements while also providing (to a lesser degree of emphasis) instream aquatic habitat benefits such as improved temperature levels and optimal flows.

***Modify Timing of Diversions***— To improve Delta water quality, manage the timing of Delta and export diversions to increase selected Delta channel flows during poor water quality conditions. Increase export capacities and/or rates when and where flows are not needed for water quality improvements such as during surplus flow conditions in wet winters. Install fish screens to reduce entrainment effects in selective locations when diversions are needed. Increase groundwater storage capacity and conjunctive use to maximize use of Delta diversion potential when water is available without environmental cost, and reduce it when the environmental costs are significant.

***Acoustic Barrier at Mouth of Georgiana Slough***— Operate an acoustic barrier at the mouth of Georgiana Slough for anadromous fisheries. Work to improve the effectiveness of behavioral barriers. Evaluate use of acoustic barriers at the Delta Cross Channel and 3-Mile Slough.

***Mark Hatchery Fish***— Mark salmon produced in hatcheries to facilitate selective catch of hatchery fish by commercial and recreation fisheries to improve natural (wild) populations.

***Pen Rearing of Striped Bass***— Rear striped bass in pens to maintain recreational fishery and avoid operational constraints on water projects due to spawning bass.

## **Institutional and Policy Features**

***Improve Pollutant Source Controls***— Existing source control regulations for pollutants may not be sufficiently comprehensive nor enforced to levels required to protect beneficial uses in the Bay-Delta system and tributary rivers. These actions would provide for increased source reduction activities such as additional regulation of

agricultural and urban drainage, establishing BMP's for of activities affecting Delta water quality such as levee maintenance and pest control practices, and supporting and enhancing existing land retirement and fallowing programs. Using a watershed management approach, identify and control high priority pollutant sources through a combination of source reduction and treatment actions. Intense application of core level actions such as implementing source control regulations for pollutants, levee maintenance best management practices to encourage use of materials compatible with good water quality, retirement of lands with serious drainage disposal problems, retirement or fallowing agricultural lands with salt or other contaminant drainage problems to reduce land-derived salt contamination, management of irrigation tailwater, and retention and management of stormwater would improve water quality management.

Implement on-site mine drainage remediation measure. Provide regulatory incentives and develop institutional agreements to enable focusing resources on priority sources. Through changes in water pollution requirements, give urban areas flexibility to fund high-priority mine cleanup in lieu of increasing expenditures on treatment plant improvements.

***Reduce Water Demand on Delta to Increase In-Stream Flows***— Use a variety of actions involving increased agricultural, municipal, and industrial conservation and reclamation; acquisition of supplemental water; and expanded use of desalination with the intent of reallocating the conserved water supplies for use as instream dilution flows. Conservation strategies would include encouraging land fallowing and water pricing measures. The conserved supplies would then be available to provide water quality protection through dilution and habitat improvements such as improved temperature and pulse flows during critical migration periods.

***Groundwater Banking and Conjunctive Use***— Expand groundwater storage and conjunctive use programs to maximize the full capability to respond to operational requirements which can increase the flexibility in the timing of diversions and exports to improve water quality and reduce environmental effects.

***Sacramento River Habitat Restoration***— Restore riparian, shaded riverine, and shallow water habitat along the Sacramento River from Sacramento to Collinsville. First step will be to provide matching funds for Corps of Engineers feasibility study. Subsequent restoration would be funded 75% by COE.

***Response Program for Introduced Species Control***— Establish and fund a rapid response program among environmental agencies to provide a fast and effective means of managing introduced species non-native to the Bay-Delta. Carry out continuing management programs for nuisance species such as water hyacinth.

***Subsidence Reduction***— Efforts to reduce the subsidence on Delta islands with deep peat soils (such as parts of Grand, Twitchell, Sherman, Andrus, and Bouldin islands) will include the establishment of a landside buffer zone between 50 and 100 yards in width, located adjacent to the levee.

***Emergency Levee Management Plan***— An emergency levee management plan would provide necessary funding and direction to reclaim Delta islands in the event of inundation to continue protection of Delta functions as an integrated resource system. Funding would be provided to ensure that a suitable amount of equipment and materials would be readily available to rapidly respond to flood fights.

## **Preliminary Assessment**

### ***Benefits***

***Ecosystem Quality***— This alternative results in an improvement in ecosystem quality through habitat restoration and instream flow management above current levels and through major reductions in pollutants entering the system.

***Water Supply***— This alternative improves water supply reliability by increasing fish populations, reducing the likelihood of regulatory intervention in operations.

***Water Quality***— Water quality improvements are achieved by controlling and managing contaminant sources, providing increased flows at times needed to dilute water quality contaminants and reduce salinity levels, increasing the supply available for in-stream flows, and reducing the risk of island inundation. Stabilization of levees and channels reduces the risk of a catastrophic event causing degradation in the water quality (e.g. island inundation has the potential to increase salinity levels at diversion locations).

***System Reliability***— The island and levee maintenance and stabilization support action will reduce the vulnerability of the Delta from catastrophic inundation.

***Constraints and Concerns***

***Water Supply***— Exports remain highly constrained and vulnerable to interruptions due to ESA take restrictions.

***Transfers***— Water transfers remain highly constrained because Delta configuration is unchanged and remaining uncertainty due to ESA restrictions.

***Fish***— Mortality at diversion facilities unchanged.