

Alternative 7

Water Management with Environmental Storage

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This alternative focusses on reducing the conflict between exports of water from the Delta and Delta environmental quality by: (1) suppressing future increases in exports; (2) improving Delta habitat; and (3) the development of new storage dedicated to environmental purposes.

The future growth in exports is eliminated through conservation, reclamation, agricultural land retirement and fallowing, and through expansion of water markets. Delta habitat is improved through various restoration programs, screens, changed operations, and other means. Storage sites in the south Delta and areas of the south Delta being dedicated to the environment will allow environmental agencies to reduce the impacts of diversions or to increase outflows through changed operations.

Physical and Structural Features

In-Delta Storage Facilities— Convert several Delta islands south of the San Joaquin River into facilities capable of storing 200,000 to 300,000 acre-feet of water (e.g., Bacon Island and Webb Tract). The storage would be controlled by environmental agencies.

Delta Channel Capacity Improvement— The capacity of channels in the southern Delta would be increased to allow use of the export pumps at their full 15,000 cfs capacity. The increased export capacity would be used to shift current pumping needs away from environmentally damaging periods to lower impact periods without increasing total diversions.

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. 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 Threemile Slough and Sevenmile 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, Decker Island, 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.

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.

Other Programs— Implement recommended habitat restoration actions from other programs, including CVPIA and the Anadromous Fish Restoration Plan. Examples of specific actions include small dam removal on Clear Creek, dam removal on Battle Creek, establishment of a population of winter run chinook salmon on Battle Creek.

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 percent by COE.

Flood Protection Level— This action provides a 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 and Jersey islands), with important regional infrastructure (e.g. the Mokelumne Aqueduct, transmission lines, Highway 160, etc.); and 2) islands with both valuable habitat and infrastructure (such as New Hope Tract, Bouldin Island, Sherman Island, Palm Tract, Lower and Upper Jones Tracts, and Lower Roberts Islands).

Channel Improvements and Levee Maintenance— A minimal 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, providing funding for maintenance and stabilization, and maintaining and/or reconstructing levees 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.

Operational and Management Features

Operations/Standards— Changes in current operational patterns/standards will be made in the following areas:

- **Real Time Management** Monitoring and real time operations will be implemented intensively with the goal of reducing diversion impacts on the environment while retaining water supply reliability. As with the Operations Group currently, real time management could include exports at levels above the nominal standards, if coupled to reductions in exports at other times sufficient to provide a net environmental benefit.
- **Environmental Storage** Environmental agencies would control the storage in the Delta islands and in new groundwater storage south of the Delta. Decisions on when to fill and when to release would be made at their discretion, subject to overall guidelines. One guideline would mandate that the top priority for use of the storage must be to avoid interruptions in export supplies due to take limits. In general, water could be released for environmental purposes (e.g., to boost outflows), exchanged (e.g., turned over to the export projects in return for lower export rates), sold (to generate money for operational costs), or used to guarantee real time

operations in which the environment accepts a debt to water users. Examples of likely operations would include:

- Use of storage to reduce exports below 35% of inflow.
- Use of storage to reduce exports below 100% of San Joaquin inflow during April and May (or to provide a substitute source of water for the pumps from the islands, thereby reducing the damage caused by export pumps).
- New Standards. A new salinity X2 compliance point in San Pablo Bay structured to assure that an adequate frequency of pulse flows are allowed to flow into San Francisco Bay. The increased south Delta export capacity would be subject to new export standards limiting the time of use to high flow periods.
- Barriers. Establish standard operating standards for the Delta Cross Channel operations from November -- June. In general, the DCC will remain closed during this period unless environmental agencies are confident that out migrating salmon smolts are not present or that the barrier should remain open to reduce reverse flows. Operate the Old River barrier during April-May outmigration pulses.

Real Time Monitoring— Establish adequate real-time monitoring to determine location of species of special concern so that project operations can be effectively managed to reduce losses of fish and minimize effects on habitat.

Acoustic Barrier at Mouth of Georgiana Slough— Operate an acoustic barrier at the mouth of Georgiana Slough. Work to improve the effectiveness of behavioral barriers. Evaluate use of acoustic barriers at the Delta Cross Channel and Threemile Slough.

Modify Clifton Court Forebay Operation— Modify operations of Clifton Court Forebay so that it does not entrain as many fish into the forebay during typical operation. Install regulating gates into Italian Slough so that water can be drawn in over time at a lower velocity. This will reduce the number of fish lost to predation in the forebay.

Mark Hatchery Fish— Mark salmon produced in hatcheries to facilitate selective catch by commercial and recreation fisheries.

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.

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 non-native species introduced to the Bay-Delta. Carry out continuing management programs for nuisance species such as water hyacinth.

Mine Drainage Remediation— Remediate discharges from abandoned mines in tributaries of the upper Sacramento River downstream of Shasta Dam to the maximum extent reasonably possible.

Management of Water Quality— Implement actions such as source control regulations for agricultural drainage, retiring lands with drainage problems, and other cost-effective management of urban, agricultural, and industrial discharges and runoff to improve Delta water quality.

Modify Timing of Releases— Using real time 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 to provide higher levels of water quality protection. Implementation is at a higher level than the core actions reflect. Modify downstream reservoir releases, and groundwater storage releases in Sacramento and San Joaquin Valleys and in export service areas to improve water quality while also providing, to a lesser degree of emphases, instream habitat benefits such as improved temperature levels and improved instream flows to support aquatic habitat.

Groundwater Storage South of the Delta— Groundwater storage in the west and southern San Joaquin Valley will be used more actively for storage purposes. Direct percolation will be used to bank water supplies. Also, in lieu conjunctive use programs (higher deliveries of surface supplies in wet years, lower deliveries in dry years) will be greatly expanded. This expansion may require a restructuring of state and federal contracts and/or new conveyance/distribution facilities. The new storage would be controlled by environmental agencies.

Institutional and Policy Features

Export Demand Management— Cap average diversions from the Bay-Delta tributaries and from the Delta at current levels. Require demand management measures so that demand more closely matches diversion capacity.

- **Conservation**. Improve implementation of urban Best Management Practices (BMPs). Tighten BMPs to require inclining block rate pricing (designed to reduce landscape water use). Implement agricultural Efficient Water Management Practices (EWMPs). EWMPs including: measurement of deliveries; pricing and incentives designed to optimize management (efficiency of use, conjunctive use), promotion of water markets.
- **Reclamation**. Includes both urban and agricultural supplies. Urban options include local non potable use, potable reuse, and urban-agricultural water exchange.
- **Land Retirement**. Fund retirement of significant amounts of land south of the Delta. Emphasize lands which contribute to drainage and water quality problems.
- **Water Transfers**. Create a transfer clearinghouse to facilitate the movement of water from willing sellers to willing buyers. Reduce transaction costs by developing criteria for fast track transfers. Buyers willing to abide by the criteria for fast track transfers (timing, source of water, mitigation) would face minimal regulatory requirements for transfer, including transfer from north to south of the Delta.

Preserve Agricultural Land Uses— Establish programs to preserve agricultural land uses that help to protect the ecosystem. Examples include limiting levee restoration to levels that are inadequate to permit residential construction on Delta islands, and incentive programs to preserve habitats such as pasture, which is important for sandhill cranes.

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 25 and 50 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.

CALFED Regulatory Team— Determine how to implement a regulatory team to facilitate getting permits for environmental restoration projects. Each member agency would have a key person on team.

Dredge Materials— Establish a policy that all future clean dredge material out of the Delta above Chipps Island should go into Delta restoration projects.

Safe Harbor for Maintenance— Encourage farmers and levee maintenance districts to leave habitat areas undisturbed when feasible by providing protection from ESA provisions.

Preliminary Assessment

Benefits

Ecosystem Quality— This alternative would provide moderate improvements in environmental quality. Average demand would be capped at current levels and seasonal diversion patterns would be shifted toward times of lower impacts. Real time management, the operation of various barriers, a moderate level of habitat restoration, and the water quality core actions would also promote environmental health.

Water Supply— This alternative would improve the reliability of water supplies by: (1) improving real time management techniques, (2) requiring new storage to be used first for responding to ESA take problems, (3) reducing the transaction costs for water transfers, (4) reducing demand, and (5) increasing the proportion of reclaimed water in the supply mix.

Water Quality— The core elements, agricultural land retirement, source control, and pollutant management elements should improve the quality of water entering the Delta. Barriers in the south Delta should improve water quality for agriculture use.

System Reliability— This alternative provides significant improvements in levee stability.

Constraints and Concerns

Environmental Benefits— The alternative only reduces the impacts of the export pumps on fish, it does not eliminate it. Mortality at south Delta export facilities remains significant. Mortality at south Delta export facilities remains significant.

Export Urban Water Quality— There may be only minor improvements in the quality of water in this alternative.

Levee Stability Reliability— A significant chance of major levee failures remains, therefore export supplies, Delta habitat, and Delta farming remain at some risk.

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Emphasis

Reduce the conflict between diversions and ecosystem by reducing diversions, improving diversion methods, constructing storage for environmental purposes, and improving habitat.

Distinguishing Features

Physical and Structural Features

New storage placed under control of environmental agencies. A low level of physical environmental improvements in and above the Delta, including restoration of various types of habitat, new screens, and a facility to prevent salmon from entering Old River. Conversion of one or more south Delta islands to storage. Levee improvement projects and south Delta barriers to support agriculture are key features.

Operational and Management Features

Intensive real time monitoring and management of exports. Shifts in exports away from periods of high impacts toward lower impact periods. A new San Pablo salinity standard to assure adequate inflows to San Francisco Bay. More frequent closures of the Delta Cross Channel. Modify Clifton Court Forebay operations to reduce entrainment.

Institutional and Policy Features

Major programs to reduce diversion levels, including urban and agricultural conservation, reclamation, conjunctive use programs, land retirement and fallowing and extensive use of market mechanisms. Subsidence management program on the Delta islands. Real time management component has institutional implications.

Benefits

- Improves physical habitat and Delta outflows
- Reduces fish mortality caused by diversions
- Improves timing of pollutant discharges
- Reduces long-term island subsidence
- Slightly improves reliability of export supplies
- Increase flexibility of Delta operations to enhance ecosystem functions

Constraints and Concerns

- Mortality in south Delta export facilities remains significant
- Export water quality remains problematic
- Export capacity remain highly constrained
- Delta water supplies remain vulnerable to interruption
- Delta islands remain vulnerable to flooding

