

# Environmental Water Caucus

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## COMPREHENSIVE BAY-DELTA ECOSYSTEM RESTORATION PROGRAM

### KEY FEATURES OF THE PROGRAM

The objectives of the ecosystem restoration program are to:

- Restore healthy populations and communities of native estuarine biota and other desirable species (health = recovery; > non-jeopardy).
- Maintain target fish and wildlife populations at sustainable levels for commercial and recreational harvest.
- Eliminate toxicity and other causes of mortality and/or degradation of biological resources from anthropogenic sources.
- Control rate of invasions by exotic species.

The fundamental approach of the ecosystem restoration program is to:

- Protect existing estuarine habitats and maintain baseline flow conditions.
- Restore natural processes and self-sustaining ecosystem to the maximum extent possible.

- Restore a natural diversity of key habitat types throughout the estuary (including the Delta, the Sacramento and San Joaquin River watersheds, Suisun, San Pablo, and San Francisco Bays, and nearshore coastal waters).
- Restore on a broad scale, with large (>200 acre), interconnected habitat patches, linking migration corridors, and upland buffer zones.

Adaptive management will guide long-term implementation of the program:

- Appropriate ecological indicators will be selected as performance measures.
- Restoration targets will be set as needed to achieve performance measures, based on the best available scientific knowledge.
- The restoration program will be implemented over time to allow for testing and demonstration.
- Restoration targets will be revised as needed to achieve performance measures.
- Performance measures will be revised to incorporate new scientific information from adaptive management process.

A successful ecosystem restoration program also assumes that:

- Critical information needs to develop and revise a long-term Bay-Delta ecosystem restoration plan will be addressed.
- Voluntary arrangements to acquire and/or manage areas for habitat restoration will be used.
- Long-term assured funding for the program (including long-term adaptive management) will be secured.
- Existing adverse environmental impacts are not redirected to other components of the ecosystem.

## ELEMENTS OF THE PROGRAM

### I. A comprehensive program of physical habitat restoration...

#### *In the Delta:*

- restoration of freshwater tidal marshes and slough channels implemented in the near term on islands or portions of islands with mild subsidence (i.e., -2 to -5 ft) in the eastern (potential sites include New Hope, Canal Ranch, Brack, Terminous), central (Webb, Bouldin, Venice, Empire, Staten, Tyler) and northwestern Delta (Hastings, Ryer). Also, on the west shore of the Sacramento River between Rio Vista and Collinsville, and in Contra Costa County between Antioch and Pittsburg.
- reversal of subsidence on islands experiencing severe subsidence (i.e., > -5 to -8 ft) implemented over the long term in the western and central Delta (potential sites include Sherman, Twitchell, Brannan, Mandeville, Holland, Palm, Bacon, McDonald) in order to restore freshwater tidal marshes and slough channels, other aquatic habitats, and/or permanent seasonal freshwater marshes, and to reduce vulnerability of Delta ecosystem to levee failure. Strategies to reverse subsidence include use of tidal and nontidal marsh management regimes to encourage natural sedimentation processes, use of vegetation to break up wave action, application of clean dredge spoils, and other approaches.
- restoration of shaded riverine habitat and riparian woodland in the northern and eastern Delta (including the Mokelumne and Cosumnes Rivers, Cache Creek, Lindsay, Hess, Stag, Prospect, Sutter, Steamboat, Georgiana, Snodgrass, Beaver, Hog, Sycamore, White, Disappointment and 14 Mile Sloughs) and elsewhere, using waterside benches, levee setbacks, and establishment of SRA in the interior of flooded islands.
- restoration of "edge habitat" patches, including channel islands, berms in Delta channels, fringing marsh and shallow shoal habitat, particularly in the sloughs and channels of the western and central (including the Sacramento and San Joaquin Rivers, False River, Franks Tract, Taylor, Sand, Mound, Holland, Connection, Latham and Potato Sloughs) and northwestern Delta (Liberty I., Prospect I., Miner Slough).
- restoration of freshwater seasonal wetlands in a continuum with freshwater tidal wetlands and uplands (particularly in upslope areas where tidal marsh is not appropriate) in the eastern (potential sites include New Hope, Canal Ranch, Brack, Terminous, Staten I.) and southern Delta (Fabian Tract, Union, Roberts I.).

- restoration of floodplain habitat on the lower Mokelumne and Cosumnes River, including levee setbacks, enlargement of functional floodways, and ending removal of snags and clearing of trees.
- enhancement of wildlife habitat values on existing agricultural lands, including winter flooding and delayed harvest of crops, modification of irrigation ditches, establishment of set-asides, seasonal and permanent wetlands, and wildlife cropping operations, focusing primarily on private lands in the eastern Delta.

*In the Sacramento River watershed:*

- restoration of shaded riverine habitat and riparian woodland within the active meander corridor on the mainstem Sacramento River, along all tributaries of the Sacramento River, along tributaries to the bypasses, and in appropriate areas of the bypasses, using waterside benches to establish riparian woodland, levee stabilization alternatives to rock riprap, and ending the removal of snags and clearing of trees from tributary floodways.
- restoration of meander corridors along the mainstem Sacramento River, using land acquisition and management in the upper reaches (Red Bluff to Chico) and the removal of levees, use of setbacks and enlargement of functional floodways in the middle reaches (Chico to Sacramento). These and other changes in flood flow conveyance and storage should not adversely impact flood control or water quality requirements (such as X2/Delta outflow).
- restoration of floodplain wetlands along the middle reaches of the mainstem Sacramento River (Chico to Sacramento) and its bypasses (including the Colusa Drain), using levee removal, waterside benches, increased flood stages, raised floodplains, and other methods.
- reconfiguration and reoperation of major bypasses to enhance fish and wildlife values, including modification of Yolo bypass to enhance spawning and rearing habitat and establish riparian woodland, lowering Fremont Weir to increase frequency of overflows, enlargement of Sutter bypass and modification of Sutter Basin management for seasonal wetland habitat, modification of Butte Basin weir to increase frequency of overflows and modification of Butte Basin water management to delay return flows to Sacramento River, and establishment of floodplain wetlands along the Colusa Drain.
- restoration of natural sediment budgets (including bypassing of sediment around dams, elimination or modification of instream gravel mining operations, and, where natural processes cannot be restored, structural solutions).

- enhancement of wildlife values on existing agricultural lands, including winter flooding and delayed harvest of crops, modification of irrigation ditches, establishment of set-asides, seasonal and permanent wetlands, and wildlife cropping operations.
- restoration of seasonal freshwater wetlands adjacent to the middle reaches of the Sacramento River and its bypasses.

*In the San Joaquin River watershed:*

- restoration of shaded riverine habitat, particularly on the lower reaches of the Stanislaus, Tuolumne and Merced Rivers.
- removal of gravel pits and other adverse effects of gravel mining on the lower reaches of the Stanislaus, Tuolumne and Merced Rivers.

*In Suisun Bay:*

- restoration of brackish tidal wetlands and slough channels in Suisun Bay, including creek mouths, marsh peripheries and appropriate interior areas.
- restoration of riparian corridors along all tributary streams.
- creation of seasonal wetlands and upland buffer zones to replace habitats displaced by tidal marsh restoration activities.

*In San Pablo Bay:*

- restoration of tidal wetlands and slough channels along a natural salinity gradient at the mouths of the Napa and Petaluma Rivers, and in large, contiguous blocks along the north shore of San Pablo Bay.
- restoration of riparian corridors along the Napa and Petaluma Rivers, and Sonoma, San Antonio, Novato, Miller, Wildcat and San Pablo Creeks.
- creation of seasonal wetlands and upland buffer zones to replace habitats displaced by tidal marsh restoration.

## II. Changes to the baseline flow and operational requirements...

### *In the Sacramento River watershed:*

- flow regimes that improve baseline flows and replicate natural hydrological patterns during appropriate periods on the mainstem Sacramento River and all tributaries in order to support native biota, with particular emphasis on anadromous fish life history requirements.
- reoperation of major reservoirs to replicate natural hydrological patterns, provide colder releases for salmon protection, allow variable disturbance flood flows within acceptable limits, and reflect increased valley floor flood flow conveyance and storage.

### *In the San Joaquin River watershed:*

- flow regimes and reoperation of major reservoirs that improve baseline flows and replicate natural hydrological patterns on the mainstem San Joaquin River and major tributaries in order to support native biota, with particular emphasis on anadromous fish life history requirements, and reduce reverse flow conditions.

### *In Suisun Bay:*

- additional outflow during key periods to improve spawning and rearing habitat conditions for aquatic organisms and restore Suisun Bay brackish tidal marsh plants, animals and habitat .
- enhancement of local flow contribution to Green Valley Creek and Suisun Slough.

### *..In South San Francisco Bay:*

- sufficient outflow to provide flushing and stratification flows.

### *..In nearshore coastal waters:*

- sufficient outflow to maintain ecological benefits of the Golden Gate freshwater plume.

III. Programs to control other factors that adversely affect the Bay-Delta ecosystem...

*In the Delta:*

- reduction of fish entrainment by consolidating, relocating and screening diversions, and by changing timing of diversions.
- reduction in pollutant loading by retiring islands with peat soils from agricultural use, implementing efficient water management practices for agriculture, and other measures.
- control of exotic species by removing invasive aquatic vegetation and halting ballast discharge of live organisms in the Delta.
- reduction of erosion from boat wakes by restricting boating to <5 mph, <10hp, or non-motorized craft in key areas.
- reduction of poaching losses by hiring additional wardens and other measures.

*In the Sacramento River watershed:*

- removal of barriers to fish migration by removing dams and other obstructions that are highly adverse to sensitive fish species and which represent low value for offstream use; using fish passage structures to allow increased access to upstream spawning habitat areas; and through other measures on the mainstem Sacramento River and its tributaries.
- reduction of fish entrainment by consolidating, relocating and screening diversions, and by changing the timing of diversions, including the use of groundwater during critical migration periods, on the mainstem Sacramento River and its tributaries.
- reduction in pollutant loading by eliminating toxic discharges from abandoned mines, implementing efficient water management practices for agriculture, minimizing urban wastewater discharges and urban runoff, and other measures throughout the Sacramento River watershed.
- re-evaluation of artificial salmon enhancement programs to ensure that genetic diversity of wild stocks is protected and other values of natural production maintained.
- initiation of groundwater management/conjunctive use programs.

- reduction of poaching losses by hiring additional wardens and other measures.

*In the San Joaquin River watershed:*

- reduction in pollutant loading to the San Joaquin River, particularly salts and trace elements from subsurface agricultural drainwaters, by retiring high-priority drainage problem areas from irrigated agricultural use, implementing efficient water management practices for agriculture, and other measures.
- reduction of fish entrainment by consolidating, relocating and screening diversions, and by changing the timing of diversions, including the use of groundwater during critical migration periods, on the mainstem San Joaquin River and its tributaries.
- removal of barriers to fish migration, including removal of obsolete dams, installation of fish passage structures, and other measures on the mainstem San Joaquin River and its tributaries.
- re-evaluation of artificial salmon enhancement programs to ensure that genetic diversity of wild stocks is protected and other values of natural production maintained.
- initiation of groundwater management/conjunctive use programs.
- reduction of poaching losses by hiring additional wardens and other measures.

*In Suisun Bay:*

- modification of industrial facility pumping operations to reduce entrainment of eggs, larvae and juveniles of aquatic species.
- reduction of pollutant loading from Suisun Bay refineries (i.e., dioxins, selenium).
- control of exotic species by ending ballast discharges of live organisms in Suisun Bay and other measures.

*In San Pablo Bay:*

- reduction of pollutant loading from San Pablo Bay refineries.
- control of exotic species by ending ballast discharges of live organisms in San Pablo Bay and other measures.

*In nearshore coastal waters:*

- additional fish harvest management measures as appropriate.