

**CALFED Bay-Delta Program**

**Ecosystem Restoration Program Planning**

**Development of Implementation Objectives and Targets for Key Resources**

**Ecological Zone: Mainstem Rivers**

**Ecological Subzone: San Joaquin River (Merced River to Vernalis)**

**KEY RESOURCES AND STREAM HABITATS:**

**Resource:** Fall-run chinook salmon

**Stream habitat:** Upstream adult migration and holding; juvenile rearing and outmigration.

**Implementation Objective:** Restore corridor for up and downstream migration; restore suitable juvenile rearing habitat.

**Target:** No numeric target.

**Action:** Eliminate illegal harvest of adults.

Install state-of-the-art fish screens at El Solyo, Patterson, West Stanislaus Irrigation District diversions, and numerous small and medium-sized diversions to reduce entrainment losses of juveniles.

Reduce diversions when juvenile salmonids are migrating through the reach.

**Resource:** Late fall-run chinook salmon

**Stream habitat:** Upstream adult migration and holding; juvenile rearing and outmigration.

**Implementation Objective:** Restore corridor for up and downstream migration; restore suitable juvenile rearing habitat.

**Target:** No numeric target.

**Resource:** Steelhead

**Stream habitat:** Upstream adult migration and holding; juvenile rearing and outmigration.

**Implementation Objective:** Restore corridor for up and downstream migration; restore suitable juvenile rearing habitat.

**Target:** No numeric target.

**Resource:** Splittail

**Stream habitat:** Spawning and rearing

**Implementation Objective:** Restore splittail use of the San Joaquin River.

**Target:** No numeric target.

**Resource:** American shad

**Stream habitat:** Spawning and rearing.

**Implementation Objective:** Restore American shad population utilizing the San Joaquin River.

**Target:** No numeric target.

**Resource:** White and green sturgeon

**Stream habitat:** Spawning and rearing.

**Implementation Objective:** Restore populations of white and green sturgeon utilizing the San Joaquin River.

**Target:** No numeric target.

**Resource:** Native resident fish community

**Stream habitat:** All life stages

**Implementation Objective:** Maintain diversity of native fishes.

**Target:** No numeric target.

**Resource:** Macroinvertebrates

**Stream habitat:** Larval stages.

**Implementation Objective:** Maintain diverse community of macroinvertebrates.

**Target:** No numeric target.

#### **KEY ECOSYSTEM FUNCTIONS/PROCESSES AND STRESSORS:**

**Function/Process:** Hydrologic cycle

**Stressor:** Upstream water diversions alter the natural hydrologic cycle; insufficient flows are available to maintain life stages of key resources utilizing this reach.

**Implementation Objective:** Maintain suitable flows to provide up and downstream passage for anadromous salmonids, provide spawning and rearing habitat for American shad and sturgeon, habitat for native resident fish community, and growth of riparian vegetation.

**Target:** See flow analysis.

**Action:** Evaluate the feasibility of providing suitable flows from upstream reservoirs.

**Function/Process:** Stream temperature regime

**Stressor:** Upstream water diversions and reservoir management result in altered water temperatures. In the fall, upstream migration and spawning of fall-run chinook salmon is delayed. In the spring, elevated water temperatures result in conditions that reduce survival of outmigrating juvenile salmon and steelhead.

**Implementation Objective:** Maintain suitable water temperatures for all life stages of key resources.

**Target:** Provide suitable water temperatures for up and downstream migration and rearing of coldwater species.

**Action:** Evaluate the feasibility of using multilevel outlets on upstream reservoirs/managing reservoir releases to maintain suitable water temperatures for coldwater species.

Evaluate the potential for riparian vegetation restoration to reduce water temperatures.

**Function/Process:** Downstream transport of contaminants

**Stressor:** Drainage water entering the river from upstream areas contains high salinity and contaminant levels, resulting in toxicity/reduced habitat availability for key species downstream to the Delta.

**Implementation Objective:** Reduce discharge of contaminants; enforce water quality standards.

**Target:** Meet water quality standards.

**Action:** Strictly enforce existing water quality standards; strengthen standards if needed.

Evaluate the use of real-time releases from tile drainage.

**Function/Process:** Stream shading/nutrient input from riparian vegetation

**Stressor:** Riparian vegetation removal reduces stream shading, nutrient input, and input of woody debris to stream.

**Implementation Objective:** Protect and restore diverse riparian community.

**Target:** Restore \_\_\_\_\_ stream miles/acres of riparian vegetation.

**Action:** Restrict further removal of riparian vegetation.

Encourage implementation of improved land management and livestock grazing practices along stream/riparian zones.

Implement riparian restoration program.

Evaluate the potential for levee deauthorization.

**Function/Process:** River/Floodplain Dynamics

**Stressor:** Changes in magnitude and timing of streamflows alter river/floodplain dynamics.

**Implementation Objective:** Reestablish defined floodplain and river/floodplain hydrology and dynamics; reestablish stream meander zone.

**Target:** No numeric target.

**Action:** Restore stream hydrology.

Reestablish defined floodplain. Acquire floodplain and riparian land required to meet restoration Implementation Objective.

Evaluate the potential for levee deauthorization.

**Function/Process:** Sediment Budget/Channel Morphology

**Stressor:** High rates of fine sediment input and impaired sediment transport due to altered streamflow result in the accumulation of fine sediments.

**Implementation Objective:** Restore balanced sediment budget.

**Target:** Maintain sediment input in balance with transport from the system.

**Action:** Facilitate transport of fine sediments by restoring the balance between river channel configuration, flow regime, and sediment supply.

Encourage implementation of improved land management and livestock grazing practices along stream/riparian zones in the basin to reduce streambank erosion and sediment input.

Implement fine sediment removal program.