Audubon California

Sonoma Creek Marsh Enhancement Project

Location
Sonoma Creek, CA

Project Budget
$2.7 million (total funded)

Schedule
- Fund raising, planning, design, environmental compliance and permitting: 5 years (2010-2015)
- Construction: Phase 1, four months in fall 2015. Phase 2, 1.5 weeks in 2020
- Post-construction Monitoring: ongoing

Sponsors
- U.S. Fish and Wildlife Service - National Coastal Wetlands Conservation Grant
- California Wildlife Conservation Board
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- California State Coastal Conservancy
- U.S. Environmental Protection Agency
- Marin-Sonoma Mosquito and Vector Control District
- San Pablo Bay National Wildlife Refuge
- Point Blue Conservation Science-STRAW program
- Individual donors and volunteers

Project Goals and Objectives

- Improve the tidal connection, thus improving drainage, encouraging the natural marsh-building process of sedimentation, and improving ecosystem connectivity with the Sonoma Creek/San Pablo Bay aquatic system.
- Reduce mosquito production in the Project area, thus reducing surveillance and mosquito larvicide application efforts
- Improve marsh ecosystem functions to benefit fish and wildlife species, including state and federal endangered and threatened species.

Project Overview

The Sonoma Creek Marsh Enhancement Project improved 400 acres of fringing tidal marsh along San Pablo Bay. The Sonoma Creek Marsh is a centennial marsh, formed from large sediment loads created by hydraulic gold mining activities in the 19th century. Prior to the Project improvements, the marsh routinely ponded water for long periods following spring tides and storm events, resulting in high mosquito production rates and reduced vigor of marsh vegetation. In addition, a series of abandoned former agricultural levees and ditches existed along the western boundary of the marsh, further impeding marsh drainage. The objective of the Sonoma Creek Marsh Enhancement Project was to re-introduce tidal flow into the marsh to improve habitat conditions and ecological function for special-status species and reduce mosquito populations by drastically increasing tidal exchange and improving drainage.

Phase 1 of the Project was constructed in 2015 and involved excavating a large, 4,550-ft long tidal channel through the center of the marsh and using the excavated soils to construct marsh mounds along the channel alignment, as well as a wetland-upland habitat transition "ramp" (or ecotone slope) along the existing perimeter levee. The gently sloped habitat "transition ramp" from the tidal marsh to the levee provides high tide refuge for wildlife, and serves as a natural climate adaptation structure to provide flood protection while allowing habitats and species to migrate upslope as sea levels rise.

Phase 2 of the project, completed in October 2020, extended the central tidal channel an additional 1,150 feet and utilized the excavated soils to construct a series of marsh mounds along the channel. It also enlarged and extended existing tidal marsh channels into persistent open water impoundments on the east side of the central tidal channel to improve tidal exchange and drainage within these areas.

Project Benefits

The project resulted in 291 acres of tidal marsh habitat enhancement including 9.42 acres of tidal channels and 3 acres of transition and refugia habitat for tidal marsh species.

Increased tidal exchange improved wildlife habitat and water quality by increasing circulation and reducing the amount of pesticides needed to control mosquito production.

The gently graded (20H:1V and flatter) high marsh transition zone connecting the lower marsh to the existing agricultural levee provides critical high tide refugia for Ridgway's rails and small mammals.

The project also provides hands-on educational opportunities for underserved children and students who would not otherwise experience natural history in the field setting.

The Sonoma Creek Marsh Enhancement Project is one of many actions identified in the San Pablo Bay National Wildlife Refuge Comprehensive Conservation Plan and Mosquito Management Plan (CCP/MMP), which also include the following actions:

- Existing refuge management activities (including vector control conducted by the Marin-Sonoma and Solano Mosquito Abatement Districts),
- Biological surveys and monitoring throughout the San Pablo Bay National Wildlife Refuge,
- USGS sediment elevation monitoring,
- Tolay Creek Enhancement Project – Ditch excavation and Channel widening,
- Guadacanal Trail and Wildlife Observation/Fishing Pier, and others.

Regulatory Permitting Reflections

- Overall, the project placed approximately 15 acres, 31,565 cubic yards of fill on tidal marsh to create and enhance the productivity, functioning, and habitat value of the marshlands. The project resulted in conversion of approximately 3 acres of tidal marsh to transitional/upland refugia habitat to accommodate the 10-acre ecotone slope. Permanent impacts from the Sonoma Creek Marsh Enhancement Project were evaluated together with other actions identified in the San Pablo Bay National Wildlife Refuge CCP/MMP and as such compensatory mitigation for project-specific actions were not designated by the regulatory agencies. For example, mitigation requirements for the CCP/MMP included enhancement of 13.7 acres tidal marsh habitat, completion of a second 5-acre tidal marsh enhancement project on Tolay Creek, and 40-acres of pepperweed control over 15-years.
- The USACE provided project coverage under Nationwide Permit Program No. 27 for *Aquatic Habitat Restoration, Establishment and Enhancement Activities* (2012). The current NWP-27 (2021) does not authorize the relocation of tidal waters or the conversion of tidal waters, including tidal wetlands, to other aquatic uses, such as the conversion of tidal wetlands into open water impoundments.

- The San Francisco Bay Conservation and Development Commission (BCDC) granted conditional approval for the project after the project team demonstrated the fill was the minimum necessary to achieve the project goals. However, gaining BCDC's approval required reducing the project fill by 5 acres and 3,000 cubic yards. BCDC's approval was issued six months after all other regulatory agencies had approved the original project design and commitments, thus the project team had to make last minute project adjustments to obtain BCDC's approval.
- BCDC required a 10-year monitoring program of physical processes, vegetation establishment, and invasive vegetation management. The program also requires 25-years of monitoring how wetlands transgress up the transitional slope with rising tides, noting changes in biodiversity, species composition, and elevation changes along the inland edge of the marsh. And an expert technical advisory committee to review monitoring results and identify remedial actions if needed. The original post-construction monitoring plan was for three years.
- The Public Access Plan requested by BCDC was implemented off-site due to the lack of public access at the project site.
- Use of herbicides for tidal marsh vegetation management was approved by USFWS.
- Motorized equipment, including scrapers and excavators, were approved for vegetation removal by USFWS, after a monitor flushed wildlife, including salt marsh harvest mice, from the work zone. More recently (2020+) USFWS and CDFW do not allow motorized equipment for vegetation removal within salt marsh harvest mice habitat.
- The USFWS Biological Opinion required fence installation to exclude wildlife, particularly salt marsh harvest mice, from the construction zone. However, the USFWS later approved eliminating the fence installation requirement from both construction phases, which resulted in construction cost savings. No wildlife species 'take' occurred during construction.
- The RWQCB was lead agency under CEQA and certified the project MND.