

Lessons Learned from Restoring Solar Evaporation Ponds in the San Francisco Estuary

Jon Cook, UC Davis, joncook@ucdavis.edu
Patrick Crain, UC Davis, Pat.Crain@icfi.com
James Hobbs, UC Davis, jahobbs@ucdavis.edu

Greater than 90% of tidal wetlands in the San Francisco Bay Estuary were reclaimed for urban and agricultural uses including industrial salt production ponds in the early 1900's. Currently we are restoring 15,100 acres of salt ponds in South San Francisco Bay to fully tidal, muted tidal and managed wetlands to benefit the estuaries biota, and buffer coastal communities against sea level rise from climate change. In 2010, we began an effort to monitor and document the benefits of salt pond restoration for fish and macro-invertebrates. We conducted monthly surveys of restored salt ponds using a variety of sampling techniques in the Alviso Marsh, Eden Landing and Bair Island. We have documented over 90 species from 40 identifiable taxa of fish invertebrates using newly restored salt ponds. We discovered communities using restoration sites were similar to adjacent extent slough and marsh habitat and at times, abundance was greater in restoration sites. The restoration sites provided nursery habitat for many important fish species including, Pacific herring, Northern anchovy, the state threatened longfin smelt, and supported high primary and secondary production. It was clear that salt pond restoration provided benefits to fish and macro-invertebrates however; not all restorations were created equal. Muted tidal and managed salt ponds supported fewer species, had more invasive species and poor water quality in summer. Tidally muted and managed ponds also resulted in significant environmental regulation and costs to the restoration project. We discuss the benefits of tidal marsh restoration in the San Francisco Estuary for our ailing native biota in the light of environmental regulation, future restoration activities and climate change.

Keywords: Salt pond restoration, Alviso Marsh, Eden Landing, Bair Island

Poster Topic: Habitat Restoration: Salt Ponds

No Rain Much Pain: Challenges and Lessons Learned in Transition Zone Restoration during a Drought

Nissa Kreidler, Save the Bay, nkreidler@savesfbay.org

Bryan Derr, Save the Bay, bderr@savesfbay.org

Jon Backus, Save the Bay, jbackus@savesfbay.org

Donna Ball, Save the Bay, dball@savesfbay.org

The transition zones between coastal marshes and upland areas of San Francisco Bay are critical habitat for hundreds of species, some threatened or endangered. Transition zones are integral habitat for wildlife as they move between marshes and uplands during high tides and storm surges. These areas provide cover from predators and a food source for insects, birds, reptiles, and small mammals. Save the Bay's habitat restoration department has focused on enhancing transition zones around the Bay for the past 15 years. In 2013 Save the Bay began work at a 4.25-acre site at Eden Landing Ecological Reserve in Hayward, CA, where restoration efforts have been challenged by the size of the levee transition zone and difficult restoration conditions including drought, harsh soils, and limited work window due to the site's proximity to a nesting area for a federally threatened species.

Unpredicted drought conditions lead to a failed hydroseed attempt, an increased need for supplemental watering for newly installed plants, and an increase in staff resources to help support the supplemental watering effort. Hypersaline soil conditions required extra watering to improve soil conditions for plant growth and recruitment. Reduced rainfall slowed this process, leaving a harsher medium for plants to establish and requiring more staff time to water plants. Site visits by restoration staff were also limited by proximity to nesting Snowy Plovers. This subsequently reduced access to the plants between November and March over a two-year period and limited the amount of watering and maintenance that could be done during the Spring and Summer seasons.

These challenges provide insight into performing restoration work under restricted conditions and provide the opportunity to experiment and adjust our restoration strategy including adding soil amendments and modifying the plant palette. These lessons learned can be applied to existing and future transition zone restoration designs.

Keywords: Transition Zones, Drought, Habitat Restoration, Eden Landing, Salt Ponds

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