



# Evolution of community-based restoration techniques for transition zone habitat at Eden Landing Ecological Reserve.

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## Eden Landing Ecological Reserve Hayward, California Save the Bay Previous, Current, and Future Projects



- > Completed STB Projects
- In Progress STB Project
- Future STB Project

### Abstract

The transition zones between the coastal marshes and upland areas of San Francisco Bay are critical habitat for hundreds of species, some of which are 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 a food source for insects, birds, reptiles, and small mammals. A vast majority of coastal marshes have been filled in for development, or converted into salt ponds and agricultural lands. Adjacent transition zones have become severely degraded and condensed into fragments of their historic ranges.

For over 13 years, Save The Bay has led community-based volunteer restoration programs to remove invasive species and plant California natives, restoring transition zone habitat on narrow levee slopes around the Bay. Using Eden Landing Ecological Reserve as a model, we demonstrate how our restoration approach has adapted over time to meet restoration goals. Save The Bay managed three separate transition zone projects over a six-year period at Eden Landing Ecological Reserve. Our sites and strategies have evolved from restoring narrow levee slopes to include more broad, gentle slopes, while also shifting to an emphasis on site-specific plant diversity. We use a mix of plants native to the coastal marsh shoreline as well as native annual and perennial grasses to create a dense habitat mosaic. With an increased capacity we have also been able to provide our native seedlings with supplemental water and mulch as needed. The lessons learned from our work can be applied to existing and future transition zone restoration designs.



### Lessons Learned

#### Sites:

- ✓ Broad transition zones with a more gradual slope are more optimal for restoration goals. These areas will provide more functional habitat and will be able to withstand rising sea levels.
- ✓ Create and foster lasting relationships with site partners. Save The Bay partners with project managers and land owners at our restoration sites. We also depend on partner agencies to assist in access to levees, haul away invasive plants, supplemental watering, and site preparations.

#### Strategies:

- ✓ Water newly planted seedlings as much as possible in the first 5 months. Levee soils are dry, very hard and exposed to the elements without any freshwater inputs. Full time field staff provide supplemental watering to sites when needed.
- ✓ Mulch new seedlings with a thick layer of wood chips to help retain moisture and suppress invasive plants. Reapply mulch throughout the year as it breaks down.
- ✓ Adequate site preparation including grading and tilling helps to create a more gentle slope and allow for better water retention.

#### Plant Palette:

- ✓ Hydroseed lower levee with native halophytic marsh plants and upper levee with native upland species. Hydroseeding jumpstarts planting and adds nutrients and organic matter to the soils
- ✓ Identify native vegetation already existing on site as reference for restoration plant palette.
- ✓ Plant fewer upland species and more rhizomatous species. Upland diversity may provide temporary cover but will not survive should sea level rise and inundate upland soils. Semi salt tolerant, rhizomatous species spread quickly and compete with invasives.

#### Eden A

- Length: 2,400 ft.
- Width: 20 ft.
- Slope: broad, wide
- Area: 48,000 sq. ft.
- Time Frame: 2006 - 2012
- Plant Palette: 11 species
- Strategy: Invasive removal, plant natives species, initial mulch and water



2006



2007-2008



2012



#### Eden C

- Length: 2,300 ft.
- Width: 10ft
- Slope: Narrow, steep
- Area: 23,000 sq. ft.
- Time Frame: 2009 - 2012
- Plant Palette: 17 species
- Strategy: Invasive removal, plant native species, initial watering, annual monitoring



2009



2010



2011-2012



#### Eden D

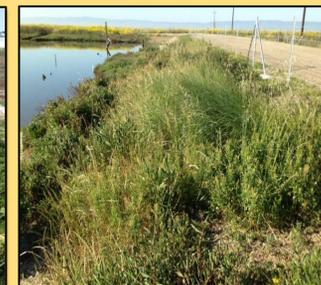
- Length: 1,000 ft.
- Width: 20 ft.
- Slope: broad, wide, shallow gradient
- Area: 20,000 sq. ft.
- Time Frame: 2011 - 2013
- Plant Palette: 9 species
- Strategy: Invasive removal, grade and till, hydro seed, plant native species, initial mulch and water with supplemental mulching and watering, annual monitoring



2010-2011



2011



2013



#### POTENTIAL SITE: Eden E9/E14

- Length: 4,356 ft.
- Width: 25 ft.
- Slope: broad, wide, shallow gradient
- Area: 108,900 sq. ft.
- Time Frame: 2013
- Plant Palette: 7 species
- Strategy: Invasive removal, grade and till, hydro seed, plant native species initial mulch and water, supplemental mulching and watering, annual monitoring



2013

