

Active Revegetation to Benefit California Ridgway's Rail in San Francisco Bay's Tidal Marshes

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San Francisco Estuary Invasive *Spartina* Project (ISP) – a project of the State Coastal Conservancy



ISP Revegetation Program Overview

Goal: rapidly revegetate tidal marshes affected by the invasion and subsequent removal of non-native *Spartina*.

Why: spread of non-native *Spartina* occurred coincident with large-scale tidal marsh restoration in San Francisco Bay, resulting in many restored sites becoming infested.

How: following removal of non-native *Spartina*, plant native tidal marsh species that are critically important for Ridgway's rail.



Pacific cordgrass installation at Cargill Mitigation Marsh, Eden Landing Ecological Reserve



Marsh gumplant installation at Mt. Eden Creek, Eden Landing Ecological Reserve



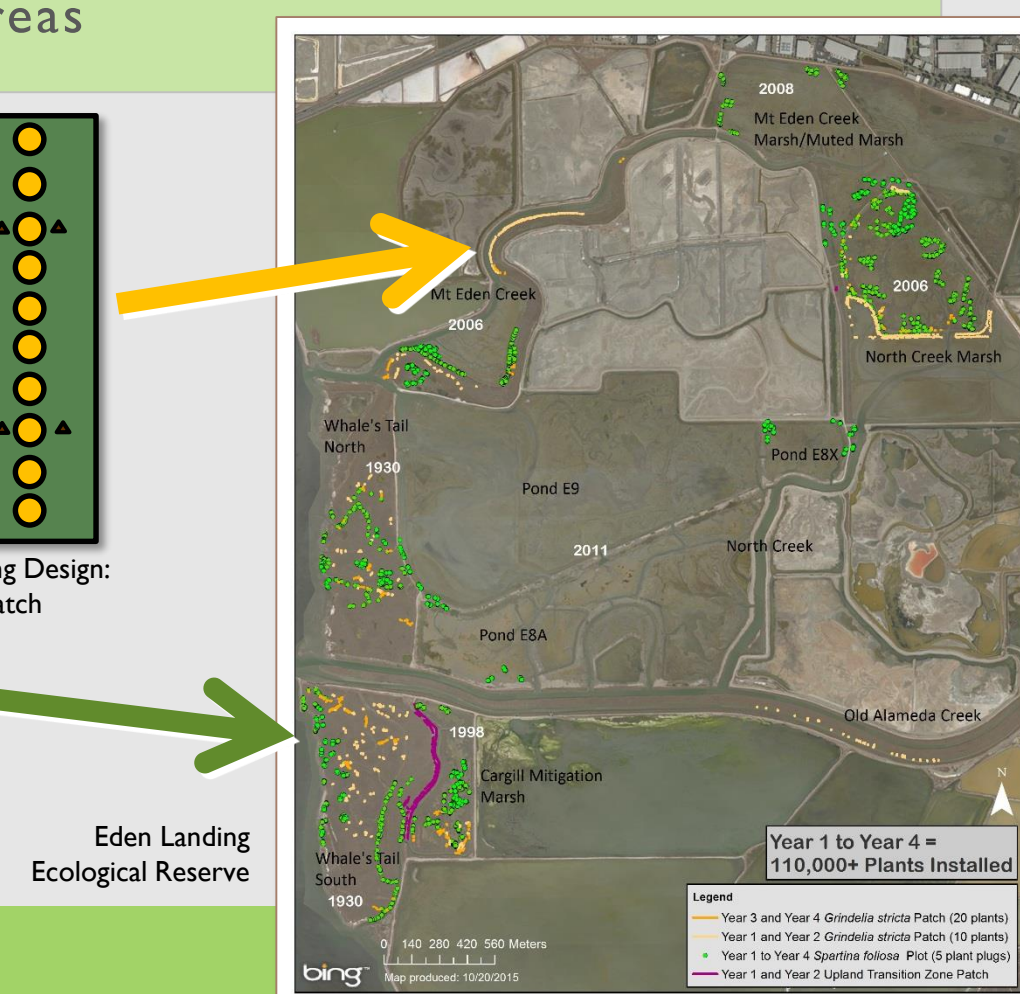
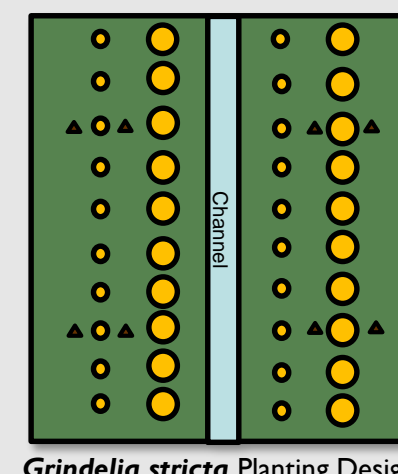
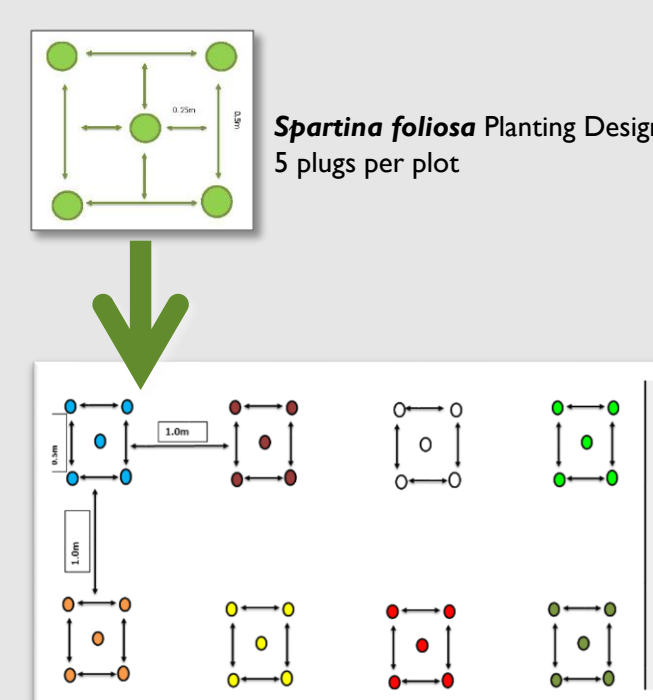
Pacific cordgrass installation at Whale's Tail South, Eden Landing Ecological Reserve

Why Plant Marsh Gumplant (*Grindelia stricta*) and Pacific Cordgrass (*Spartina foliosa*)?

- Provide cover and food resources for many wildlife species, including the endangered California Ridgway's rail (*Rallus obsoletus obsoletus*)
- Species still missing from or occur in very low numbers at some restoration sites

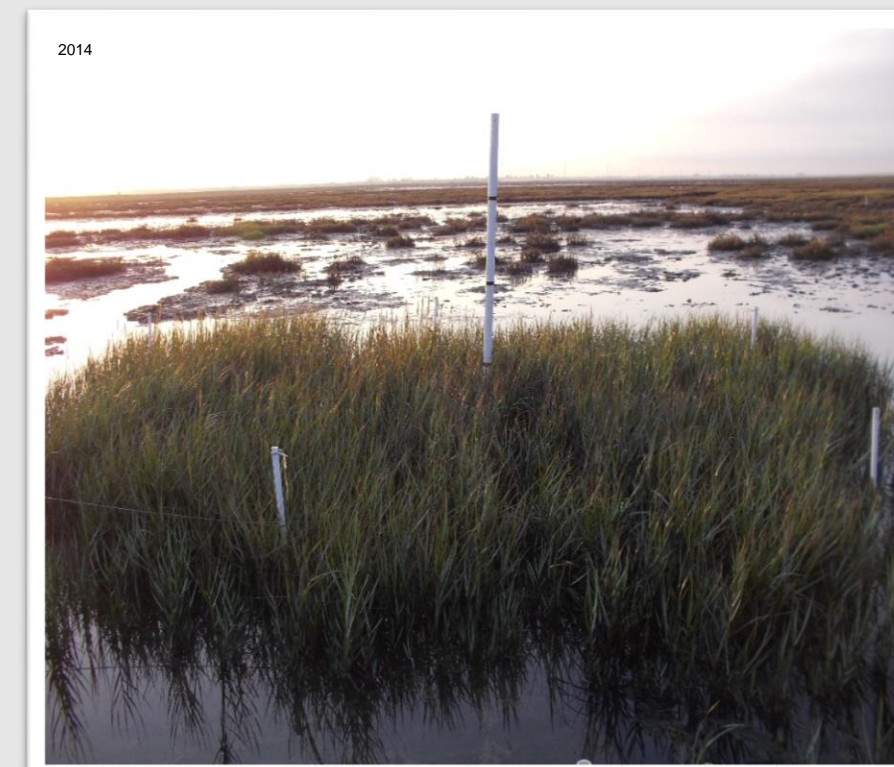
High density grid planting design:

- Designed for fast, simple plant installation
- Repeated design within and across sites
- Rapidly established plant cover
- Established plants will provide propagules that will be distributed on tides to other nearby unvegetated areas



Before and After

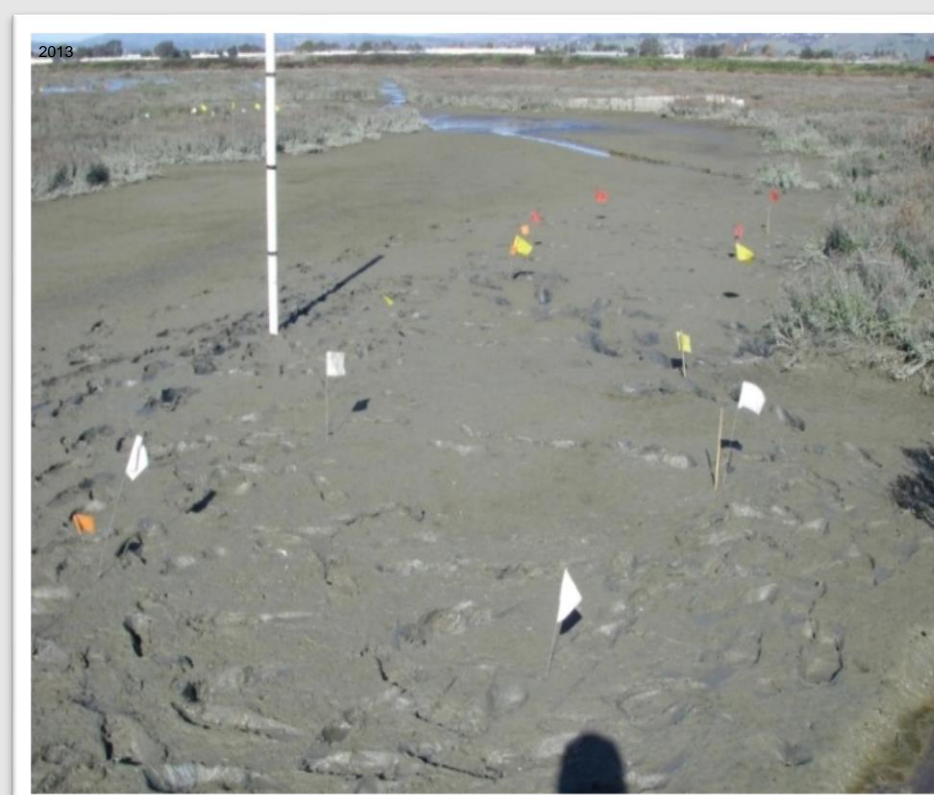
300,000+ plants installed at over 40 marshes



Cordgrass planted at North Creek Marsh, Eden Landing Ecological Reserve



Gumplant planted along marsh channel on Mt. Eden Creek, Eden Landing Ecological Reserve



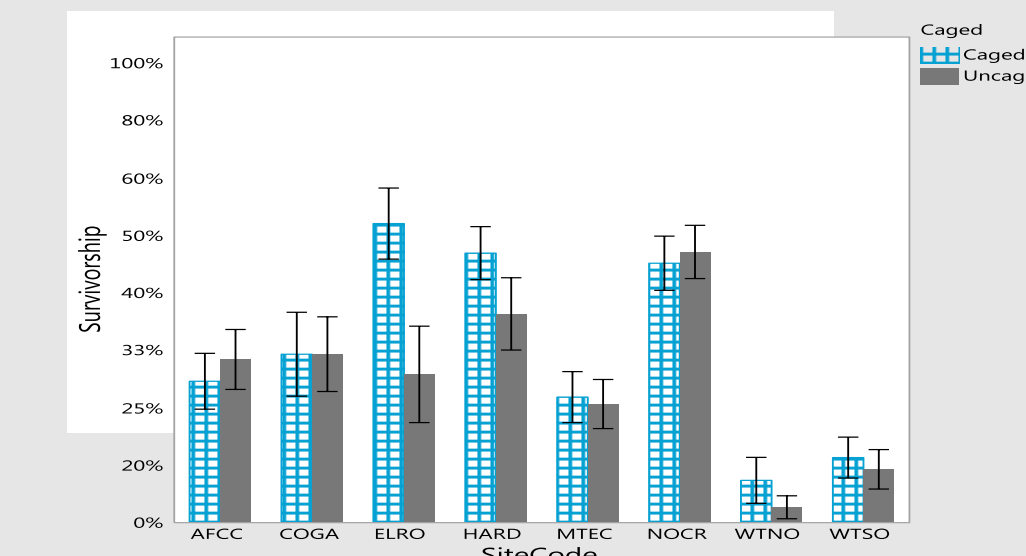
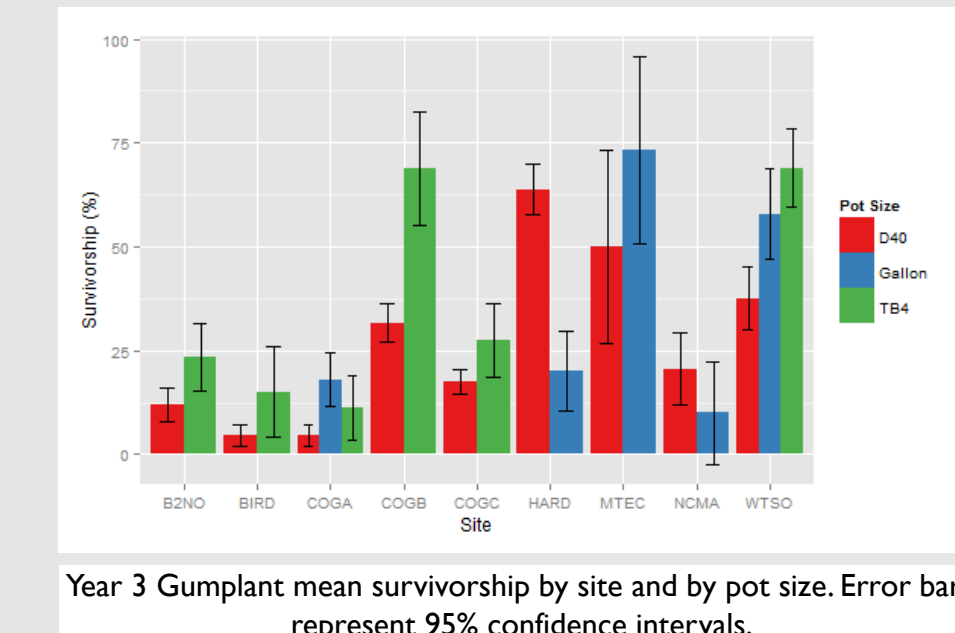
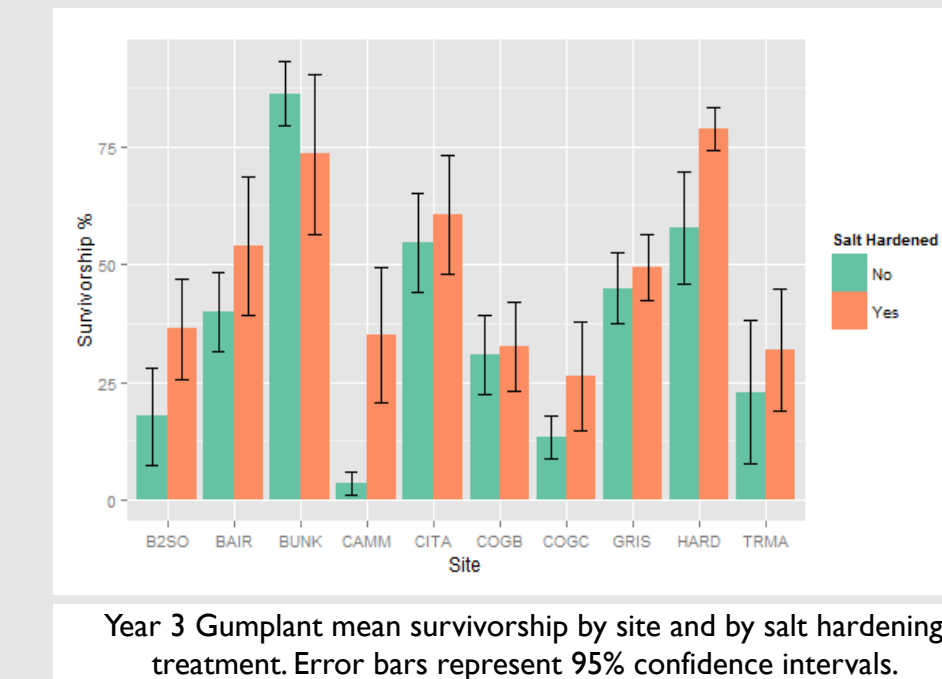
Cordgrass planted at North Creek Marsh, Eden Landing Ecological Reserve

Planting Plot Monitoring Results

Survivorship of planting plots varied across sites, species, planting designs and treatments (e.g., caging). First year overall survivorship for Year 1 to Year 3 plantings was:

- Marsh gumplant: 34-54%, with sites as high as 86%
- Pacific cordgrass: 31-36%, with sites as high as 66%

Plantings from Year 3 initial survivorship data shown below.



Lessons Learned

- Salt hardening increased gumplant seedling survivorship by 6%
- Larger pot sizes of gumplant survived better (TB4s and gallons)
- Caging cordgrass increased survivorship (protects against grazing)
- Planting sites with different cordgrass source populations increased chances of success