Linking Invasive Eradication with Native Plantings in a Changing Climate

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State of the Estuary
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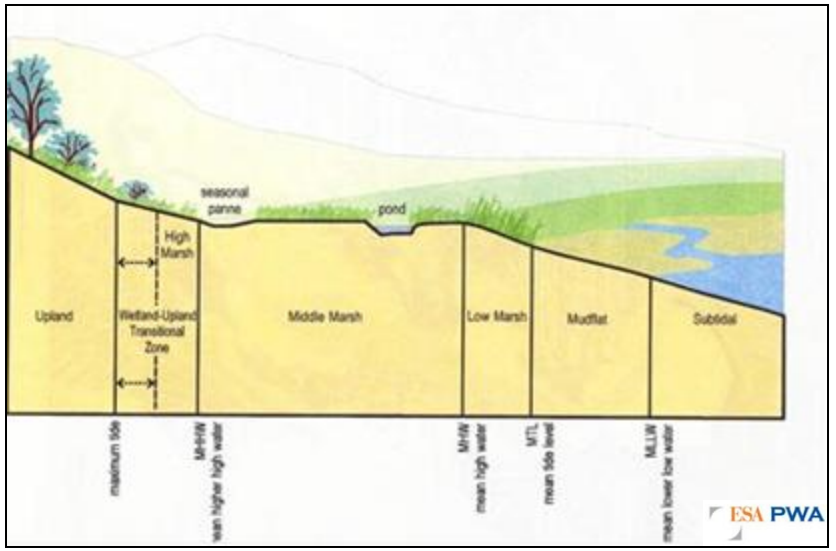
Outline



- Why talk about ISP in Regionally Advancing Living Shorelines session?
  - Learn from our work enhancing tidal marshes and marsh-upland transition zones – SF Bay's existing "vegetated shorelines"
- Overview of ISP
- ISP Treatment Program – brief update on treatment progress
- ISP Restoration Program – habitat enhancements by marsh zone
- Lessons Learned and Recommendations

A Few Invasive Plant Species in San Francisco Bay Tidal Marshes

...and just some of the impacts:

- Outcompete native species
- Change species composition and habitat structure
- Decrease biodiversity
- Ecosystem engineer (hybrid Spartina)
- Spread could result in extinction of native species (hybrid Spartina)

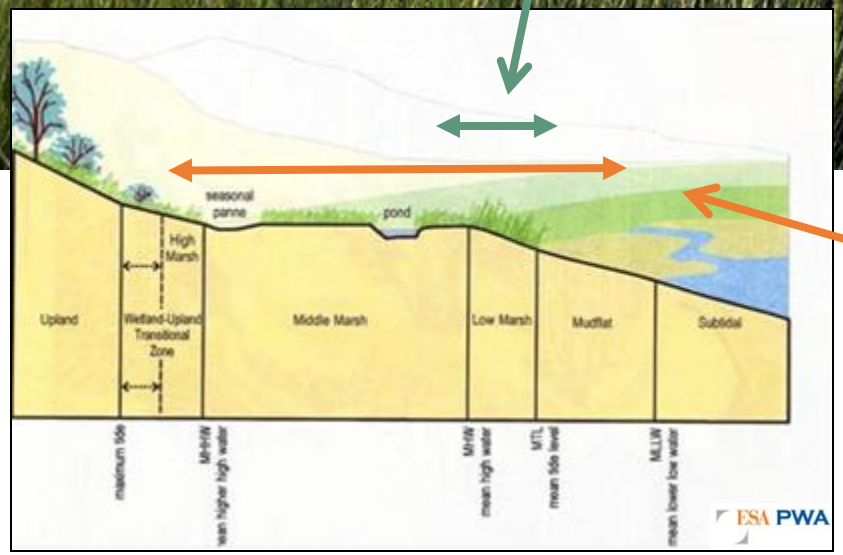
Seaside alkaligrass
(Puccinellia maritima)

Algerian sea lavender
(Limonium ramosissimum)

Hybrid Spartina
(Spartina alterniflora x S. foliosa)

Seashore paspalum
(Paspalum vaginatum)

Native Pacific Cordgrass (*Spartina foliosa*)



Hybrid Spartina (*S. alterniflora* × *foliosa*)

Why is hybrid *Spartina* a problem?

- Outcompetes other species > monoculture
- Spreads across mudflats > loss of shorebird foraging habitat (Point Blue Cons. Science)
- Changes mudflat invertebrate community (UC Davis)
- Endangers native Pacific cordgrass (UC Davis)
- Reduces flood control capacity
- Creates mosquito breeding areas

Undermines native tidal marsh restoration

SF Estuary
Invasive *Spartina* Project

Regionally coordinated, Estuary-wide *Spartina* control efforts

Co-directed by:

Coastal Conservancy

U.S. Fish & Wildlife Service

Began full-scale implementation in 2005

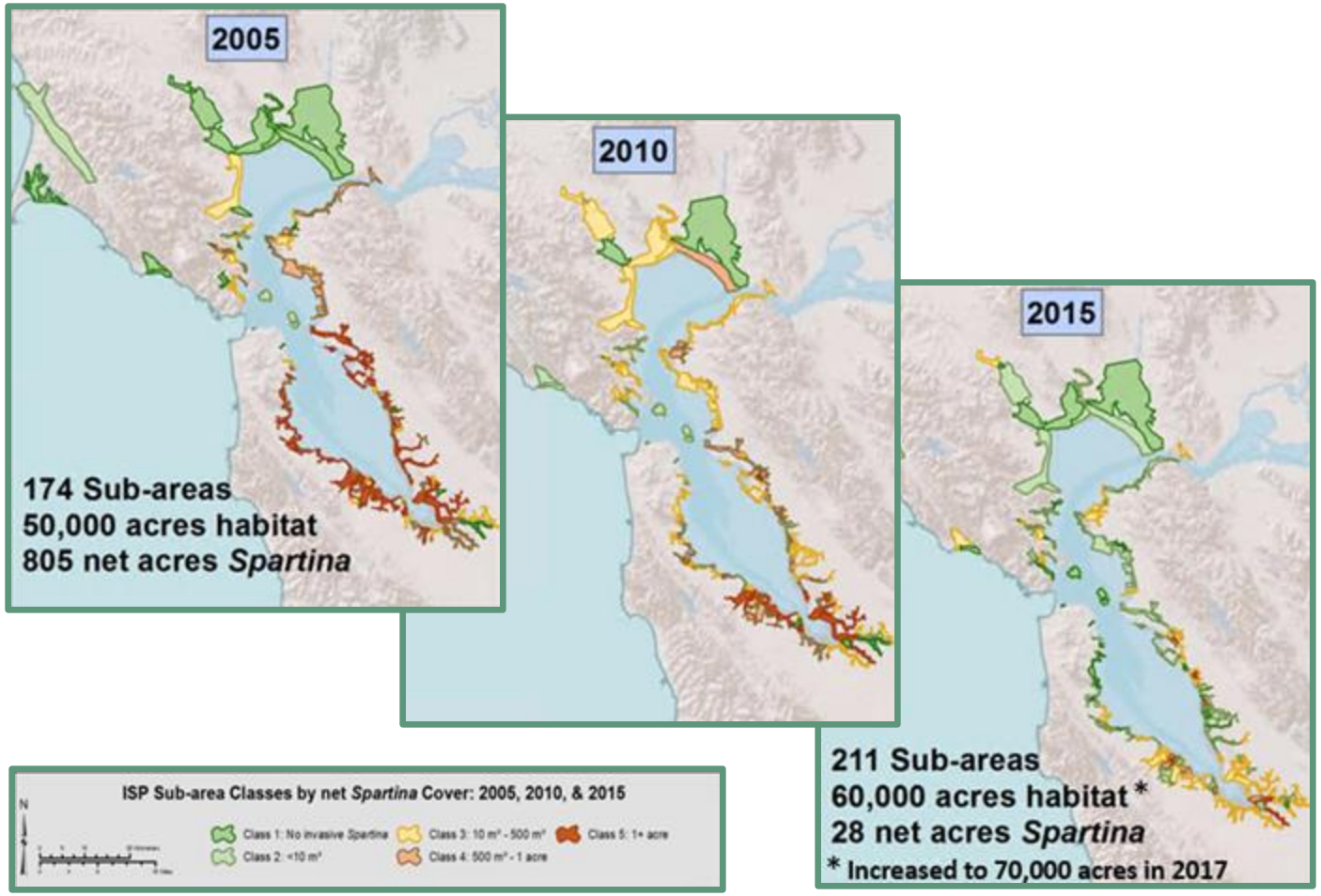
Annual Baywide surveys to map and treat

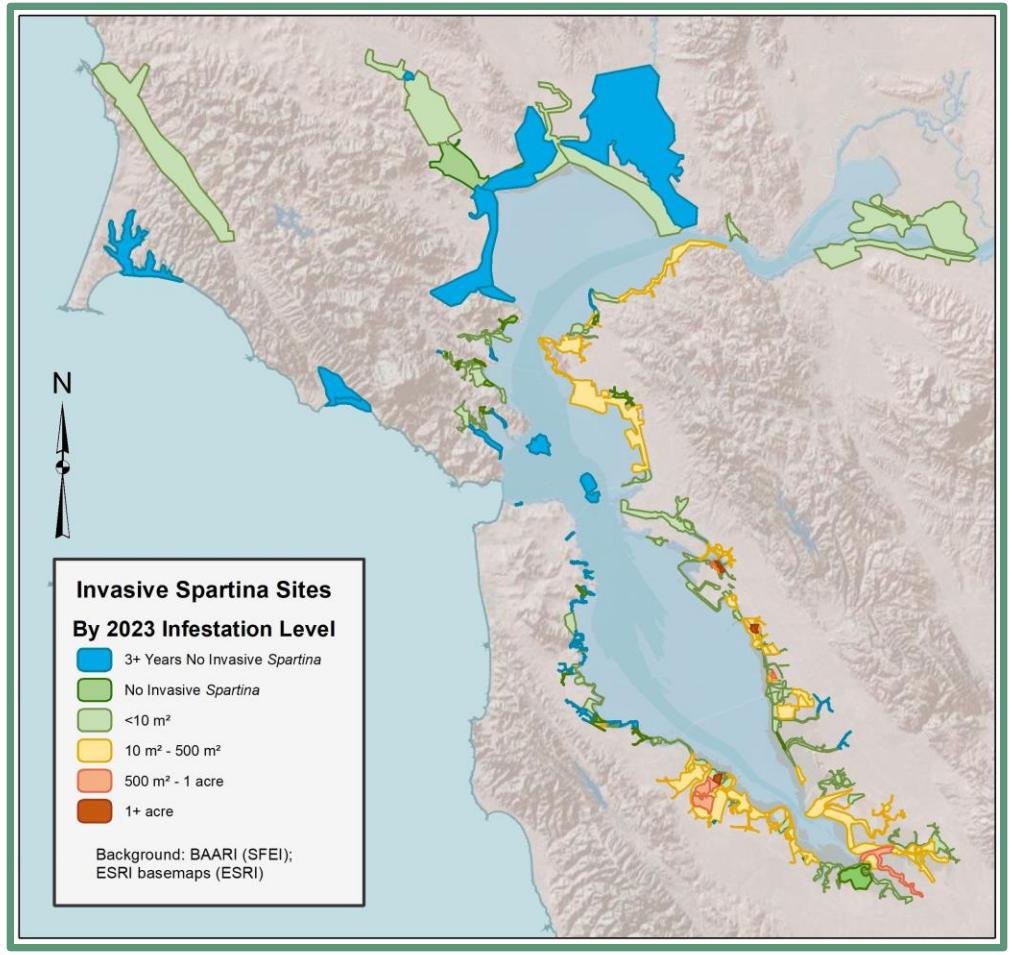
CAL IPC
CALIFORNIA INVASIVE PLANT COUNCIL

OEI

Update on Treatment Progress:

Invasive *Spartina* Cover Reduction 2005-2023





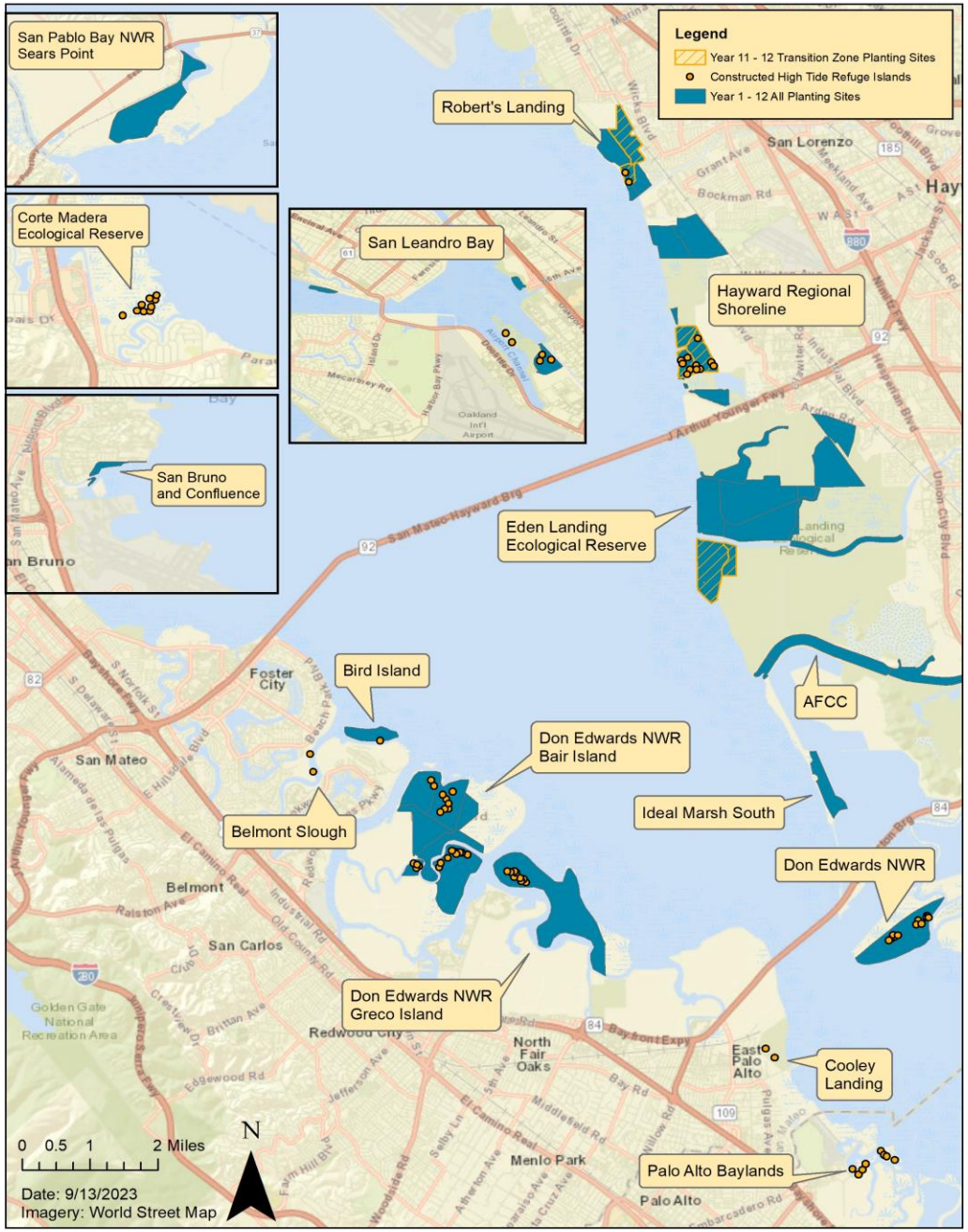
ISP Restoration Program

Supports inventory/treatment of invasive Spartina

13 years: 2011-ongoing

Focus on critical components of rail habitat: **cover** from predators for foraging, nesting, high tide refuge

Rapid habitat enhancement to promote marsh resiliency

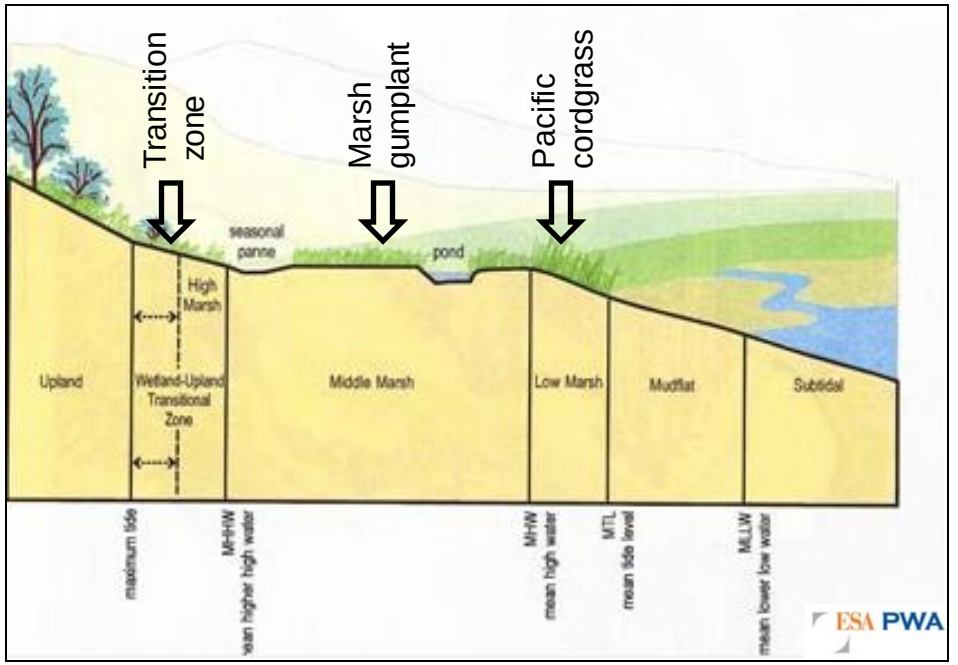


Habitat Enhancements

Program: 40+ sites, 580K+ plantings

Low marsh: Pacific cordgrass (*Spartina foliosa*)
Mid- to high marsh: marsh gumplant (*Grindelia stricta*)
Two types of high tide refuge:

- T-zone - focus on rhizomatous perennial plants
- Constructed 82 high tide refuge islands at 16 sites (with H.T. Harvey & Associates)

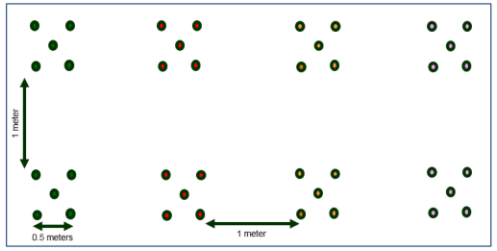


Site Selection

- Goal – **functional native habitat** for California Ridgway's rail and other wildlife
- Focus on critical components of rail habitat: cover from predators for foraging, nesting, high tide refuge
- Focus on sites with impacts from invasive Spartina removal – habitat loss
- **Older Restoration sites** – assess progress, lacking habitat cover?

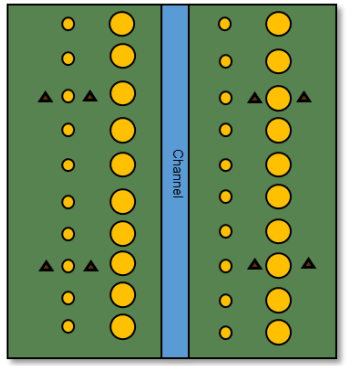
Planting Designs

Goal: rapid habitat enhancement
Design: plant dense, single species “clusters” of tall and/or “spreading” perennials



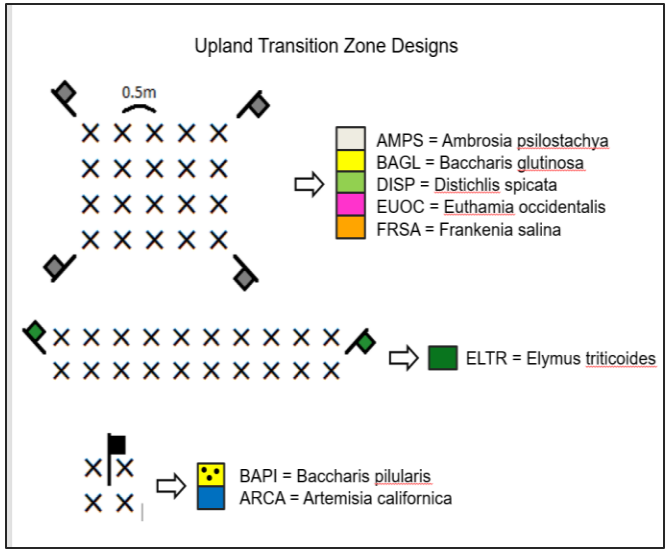
Low marsh: Pacific cordgrass

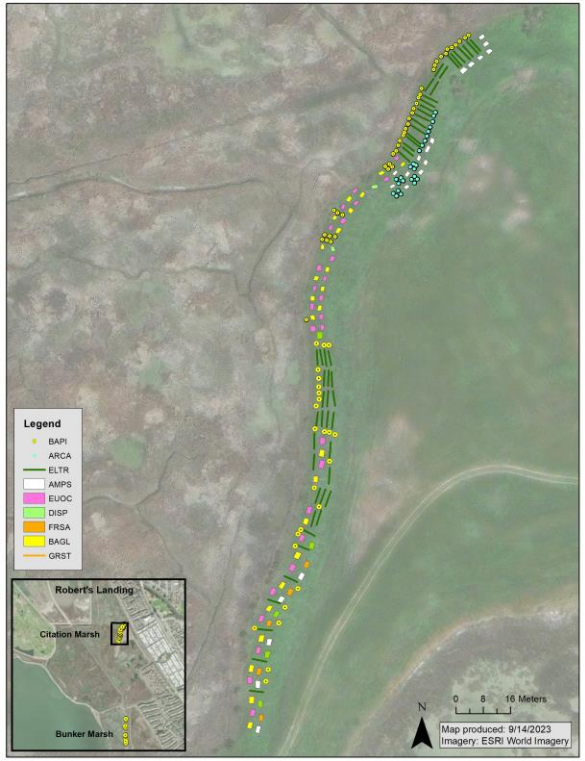
Mid- and high-marsh:
Marsh gumplant



Marsh-upland T-zone:

- Western goldenrod – rhizomatous
- Western ragweed – rhizomatous
- Marsh baccharis – rhizomatous
- Alkali heath – rhizomatous
- Salt grass – rhizomatous
- Creeping wild rye grass – rhizomatous
- Coyote brush – shrub
- CA sagebrush - shrub

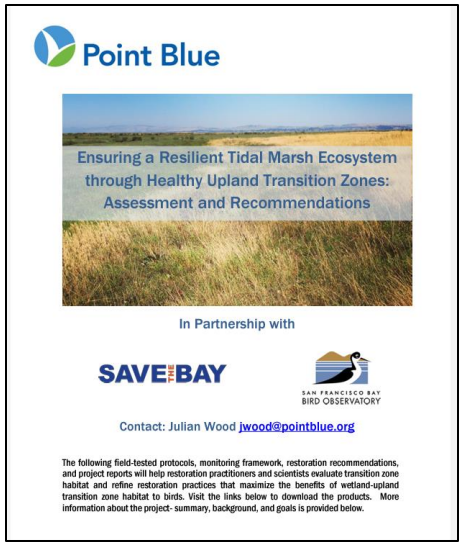




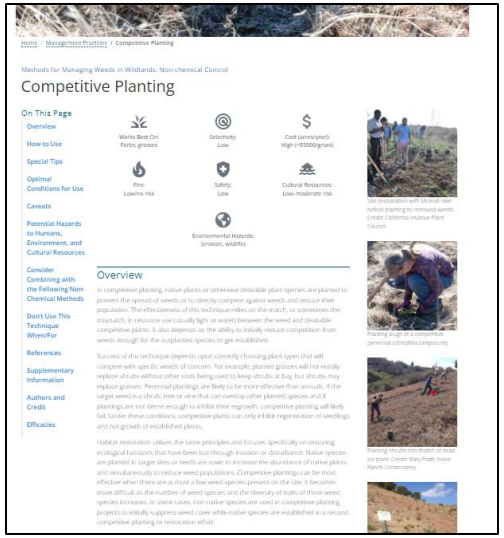
Before/After Habitat Enhancement

Pacific Cordgrass
(*Spartina foliosa*)

Marsh Gumplant
(*Grindelia stricta*)



Why/How Enhance Older Restoration T-zones?



Existing T-zone vegetation = primarily annual WEEDS

T-zone Recommendations for Tidal Marsh Birds

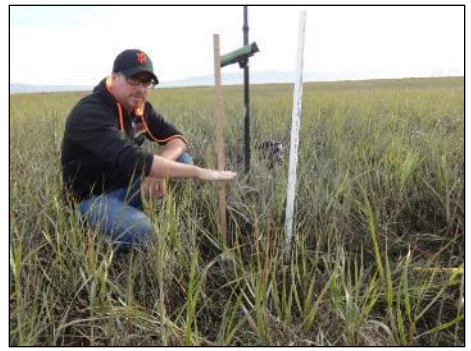
- Dense vegetation: at least 15% of area covered in dense veg (>30cm from ground)
- Tall plants: 50-100cm, associated with increasing RIRA populations
- Wider transition zones: >25m wide good for tidal marsh bird population growth
- Steep levees have benefits: wide better but no negative effect of steep sloped T-zone
- Multiple species
- Grasses can be beneficial

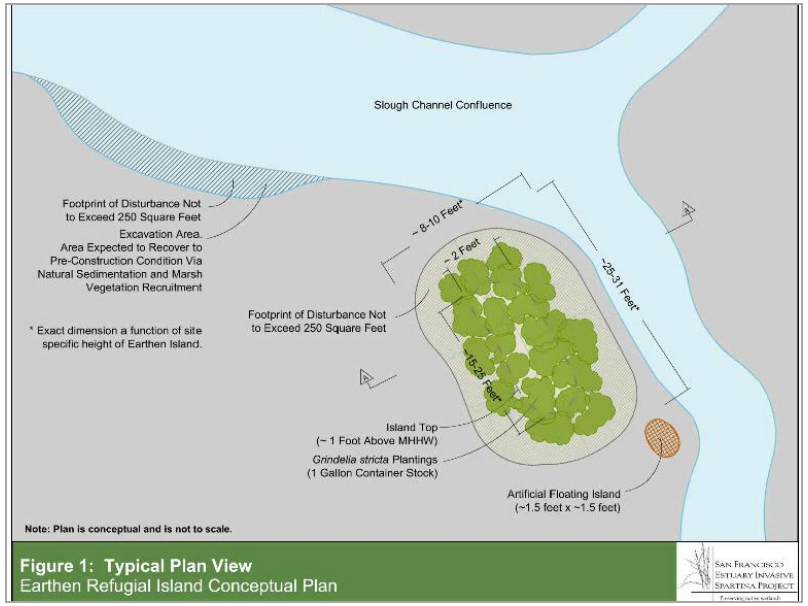
Use competitive planting to help reduce weeds:

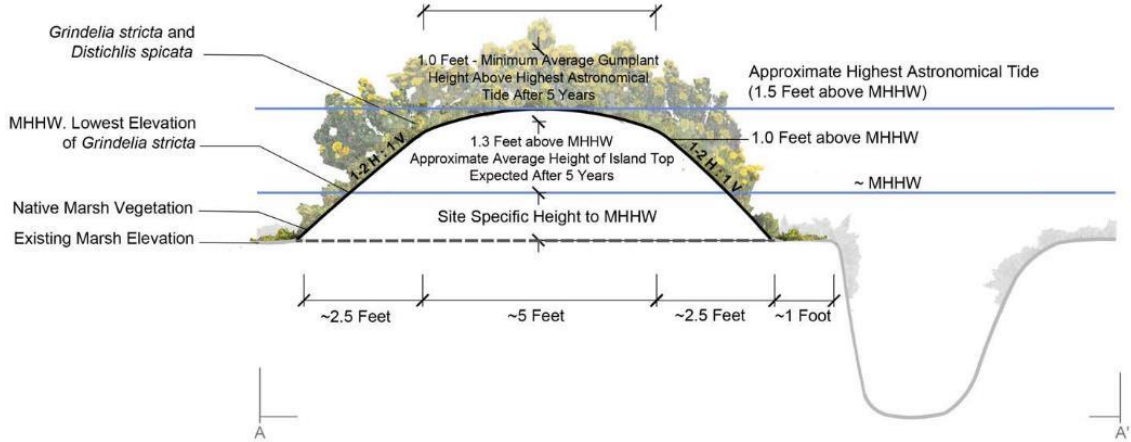
- Hardy, salt tolerant, “weedy” natives
- Rhizomatous perennial forbs and grasses
- Dense planting designs
- Container plants

Before and After T-zone Habitat Enhancement

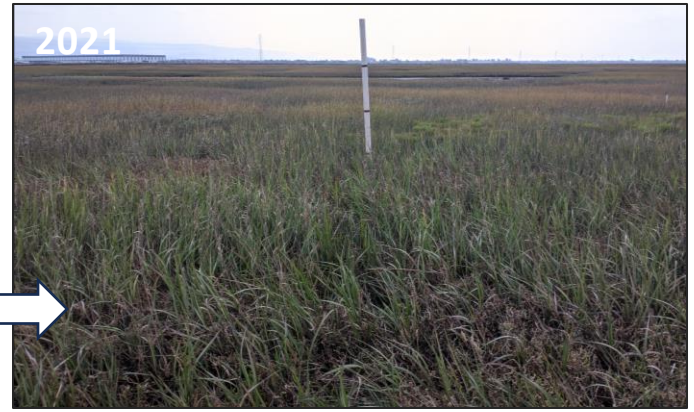
High Tide Refuge Islands

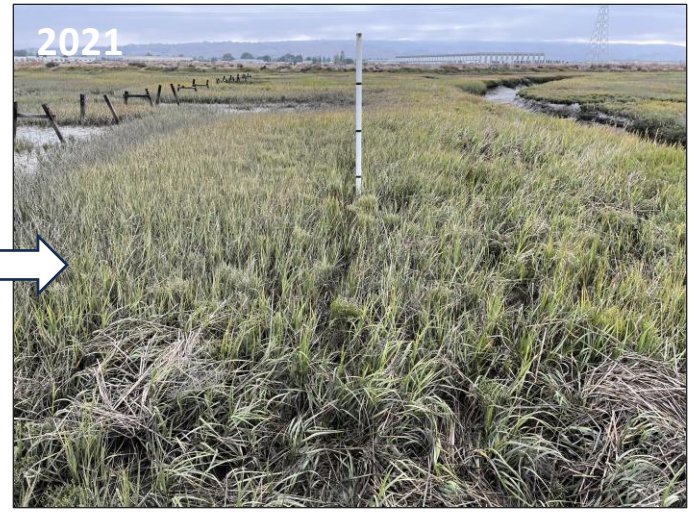


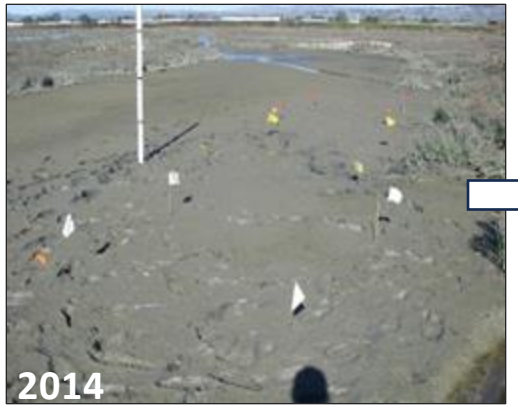




Eden Landing Ecological Reserve







Lessons Learned - Recommendations

Invasives species management – integral part of projects!

Rapid enhancement - plant high density, single species plots

T-zones – think competitive planting

- Plant “weedy” natives
- Plant rhizomatous “spreaders” – can survive dry years, bounce back wet years
- Ongoing maintenance - "Friends of" groups to promote native habitat

RAPID enhancement now to promote tidal marsh resiliency

Questions?

Thank you to all our partners and to the small but mighty crew at ISP!

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