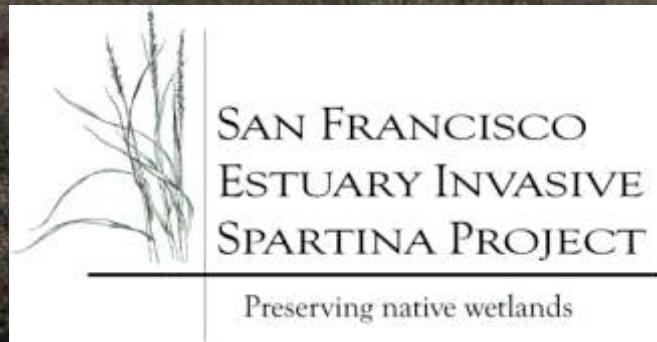


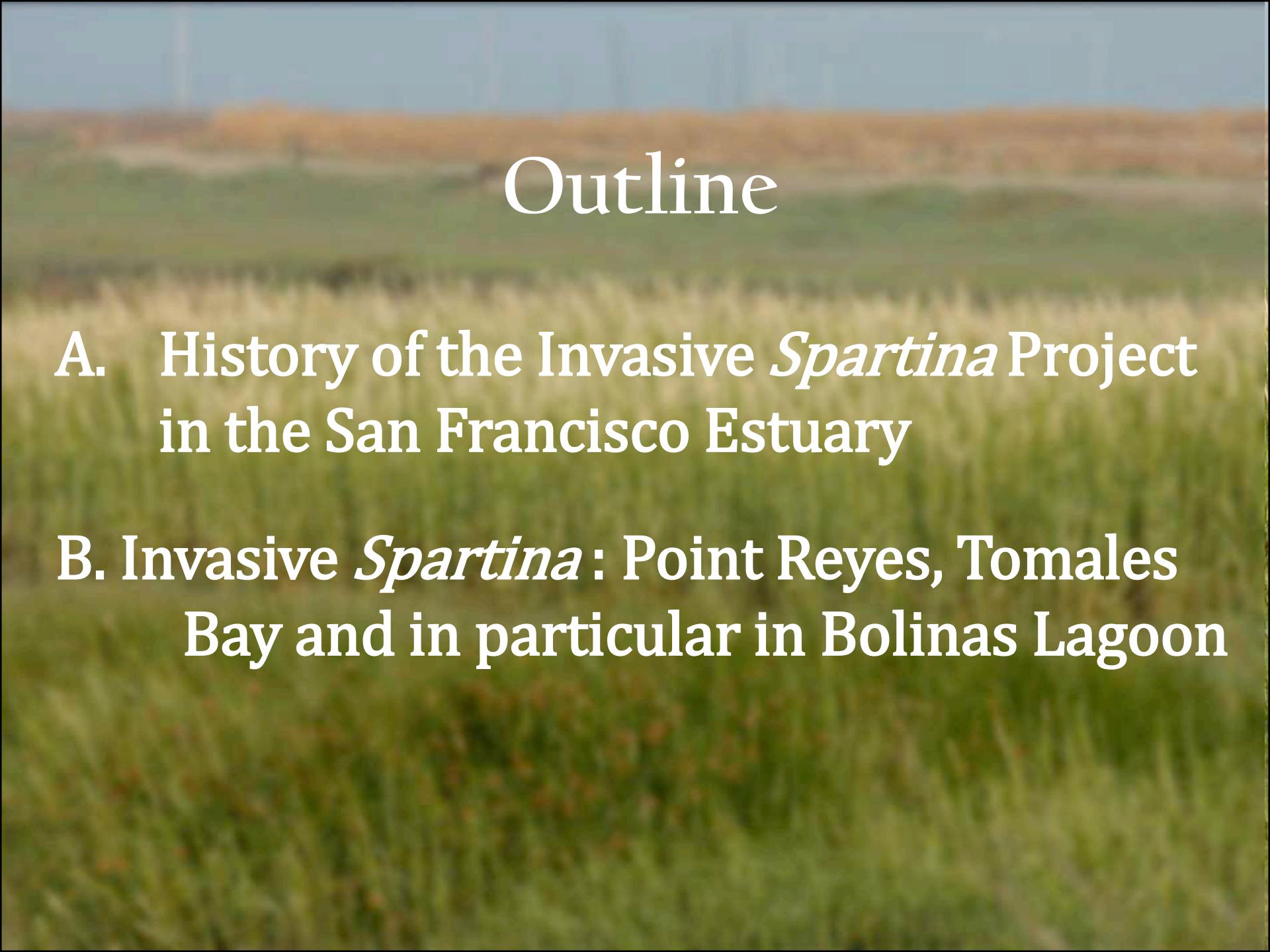


The Story of Invasive Spartina: The Bolinas Lagoon



Katy Zaremba
Olofson Environmental, Inc.
ISP Restoration Program Manager





Outline

- A. History of the Invasive *Spartina* Project in the San Francisco Estuary
- B. Invasive *Spartina*: Point Reyes, Tomales Bay and in particular in Bolinas Lagoon

Native Pacific Cordgrass

Spartina foliosa



Spartina alterniflora



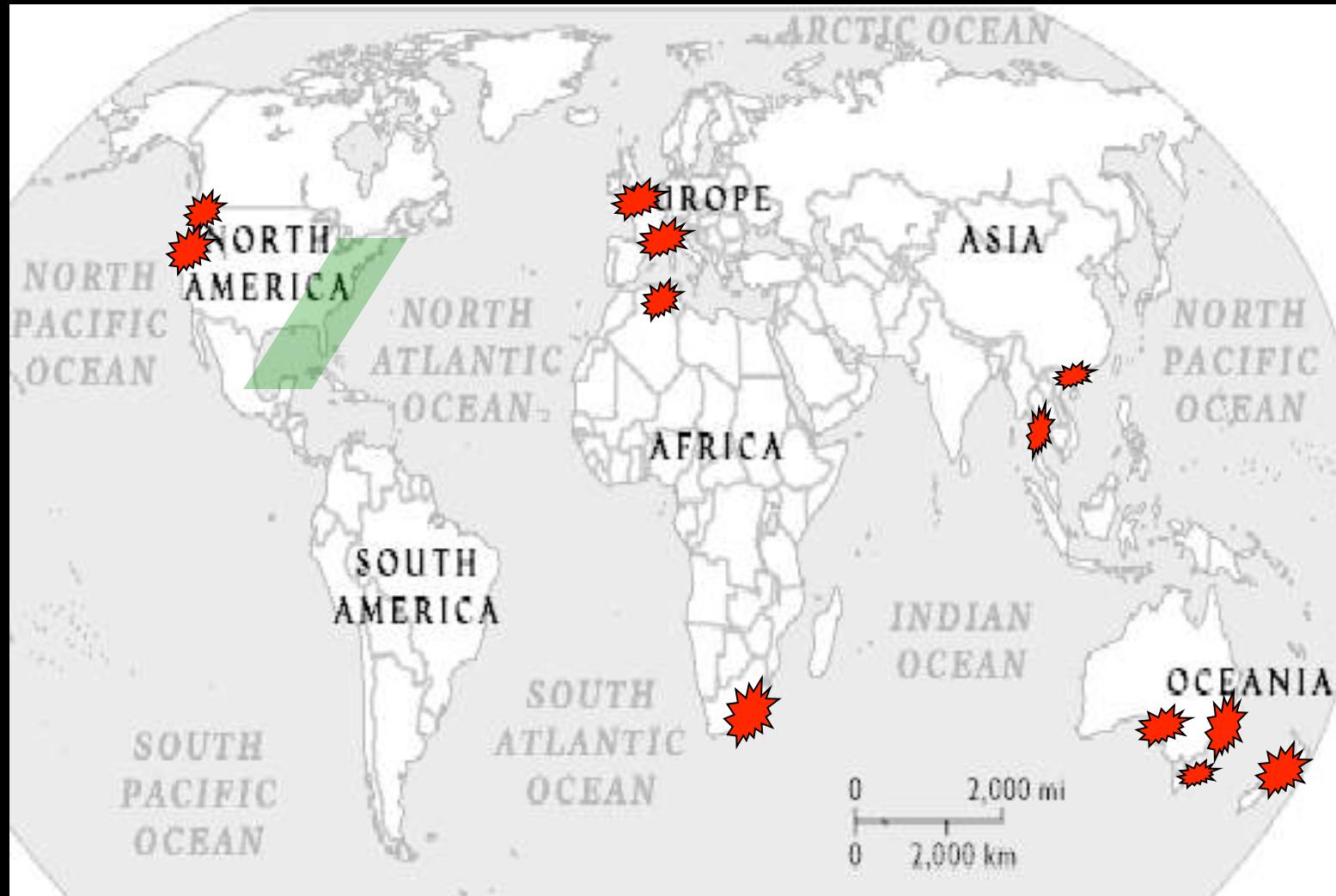
Spartina densiflora

Spartina patens



Spartina anglica

Worldwide Introductions of *Spartina*





Hybridized Atlantic Cordgrass
(S. alterniflora x foliosa)



Colma Creek 2006

California Clapper Rail

- Secretive hen-sized bird
- Lives in salt and brackish marsh
- Hides in dense vegetation
- Only in San Francisco Estuary
- 1800s: 10s of thousands
- Currently: < 1,000



Why is hybrid Spartina a Problem ?

Degrades endangered species habitat

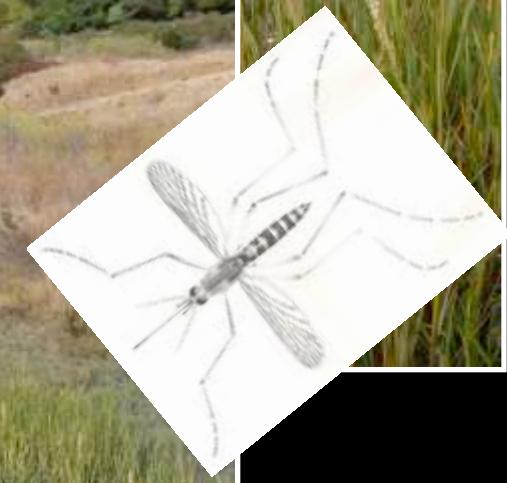
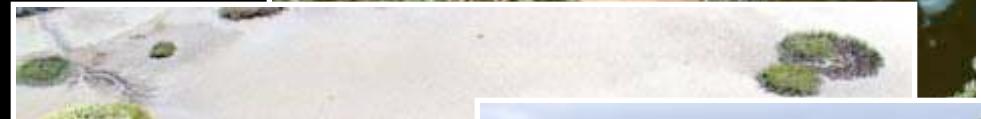
Dominates mudflats and changes hydrology

Potentially endangers native Pacific cordgrass

Reduces flood control capacity

Creates mosquito breeding areas

Causes failed tidal marsh restoration



- 1970s: Introduced
- 1980s: Hybridized
- 2002 : 200 net acres east and south bay
- 2006: 800 net acres disbursed through 24,000 acres of estuary

**Including
Every tidal marsh
restoration project**



Coordinated Regional Response

- Mapped entire infestation
- Acquired funds
- Developed strategies
- Prepared plans
- Acquired permits
- Formed partnerships
- Conducted treatment
- Monitored results
- Improved plans each year





SAN FRANCISCO
STATE UNIVERSITY

PORT OF OAKLAND

UCDAVIS
UNIVERSITY OF CALIFORNIA



Aquatic Environments, Inc.
Where land meets water...

CITY of PALO ALTO



Cal-IPC



NATIONAL
WILDLIFE
REFUGE
SYSTEM

East Bay
Regional Park District



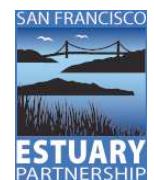
Audubon
CALIFORNIA CITY OF OAKLAND

CALFED
BAY-DELTA
PROGRAM

Marin Audubon Society



Coastal
Conservancy



ISP Partnership



Welcome to the
City of Petaluma, California



SAVE THE BAY

California Environmental Protection Agency
SAN FRANCISCO BAY REGIONAL
WATER QUALITY CONTROL BOARD



Shelterbelt Builders
An Open Land Management & Restoration Company

Santa Clara Valley
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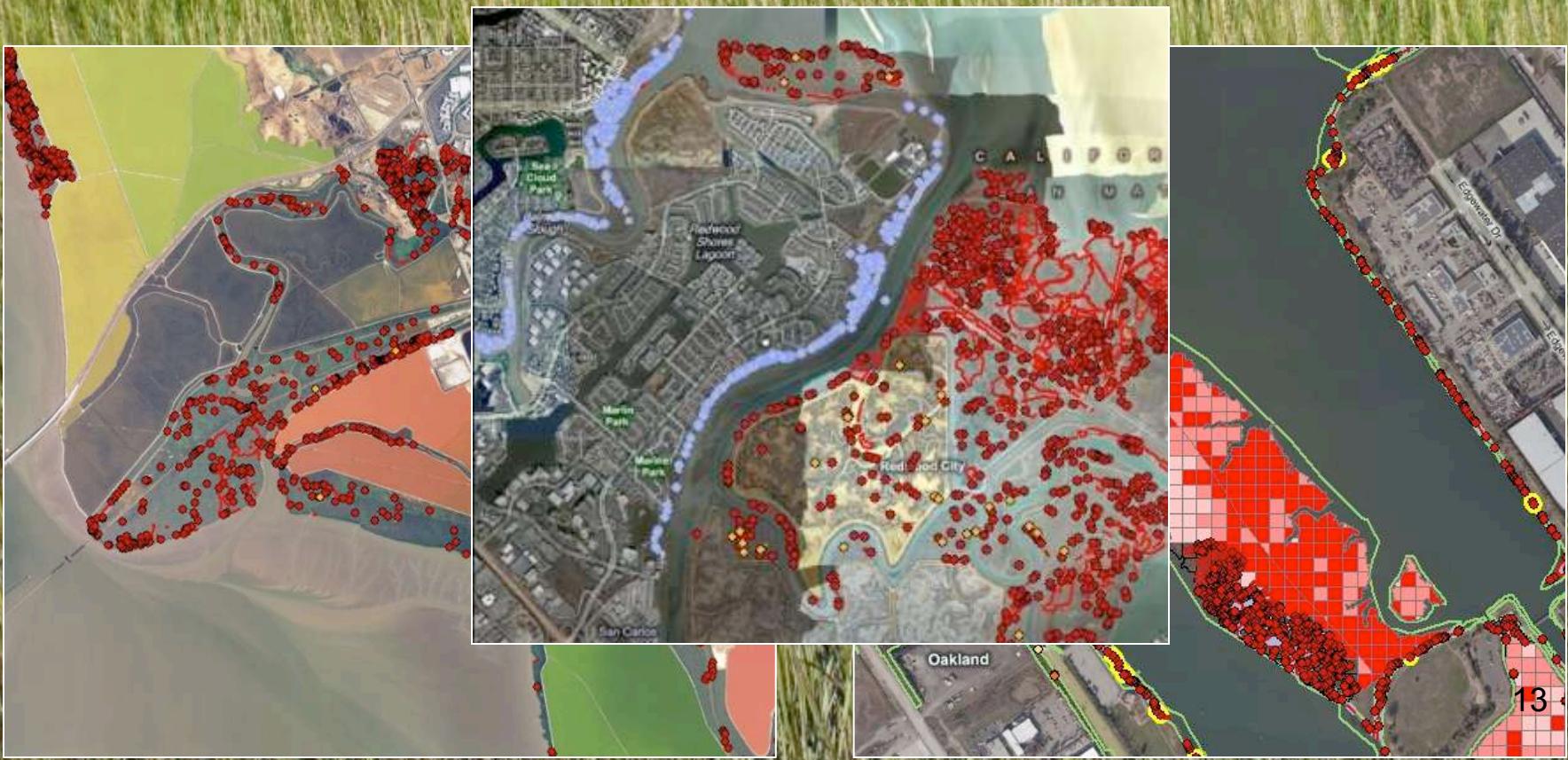


H.T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS

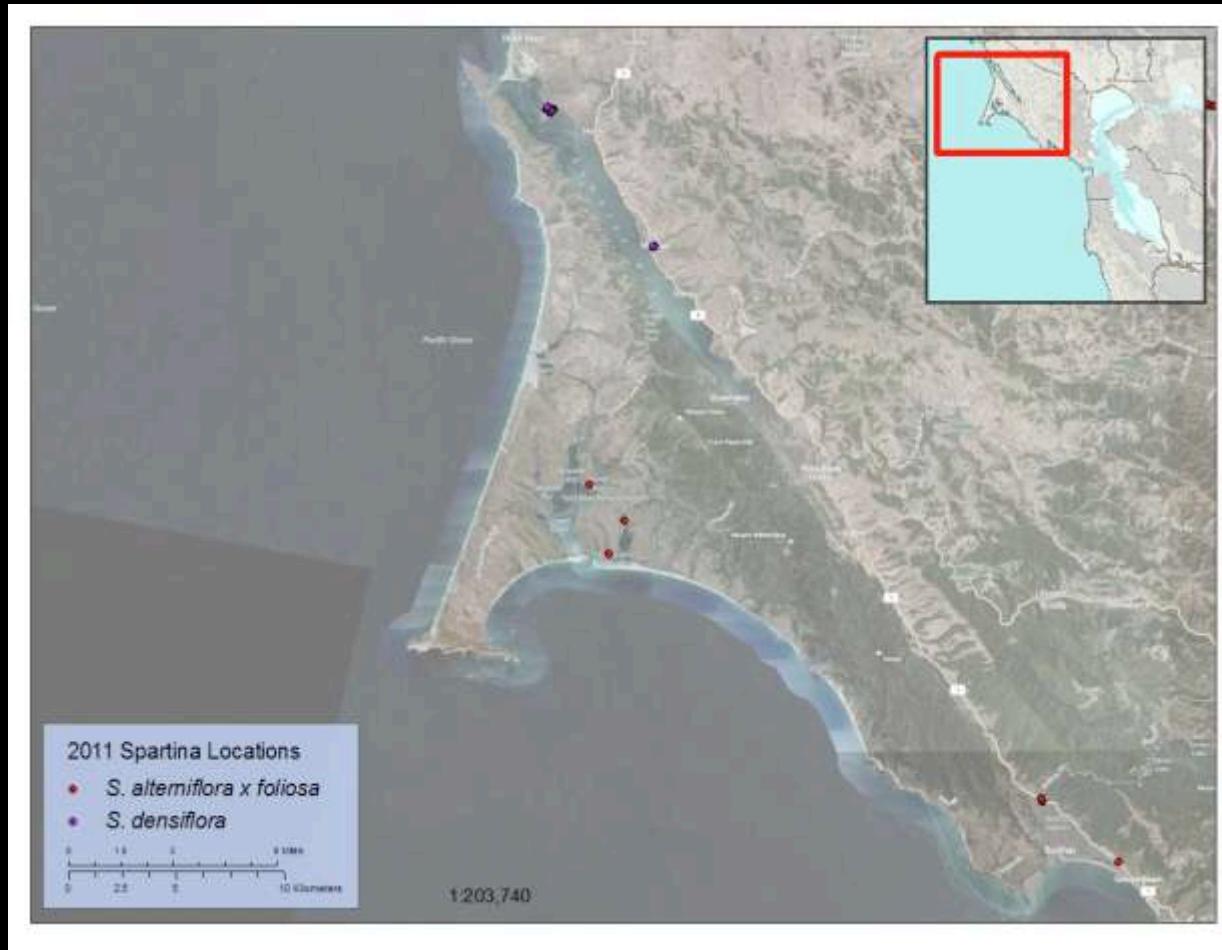
12

Evolution of Monitoring

- Extent of infestation → location of plants
- End of year → tomorrow
- Efficacy → what was missed?



Point Reyes – Bolinas 2011



Bolinas Lagoon 2001



Bolinas Lagoon 2002



Bolinas Lagoon 2003



Bolinas Lagoon 2004



Bolinas Lagoon 2008



Bolinas Lagoon 2010



Bolinas Lagoon 2011



Bolinas Lagoon South 2003



Bolinas North 2008



Southern end



East side



North end



Bolinas Lagoon 2009



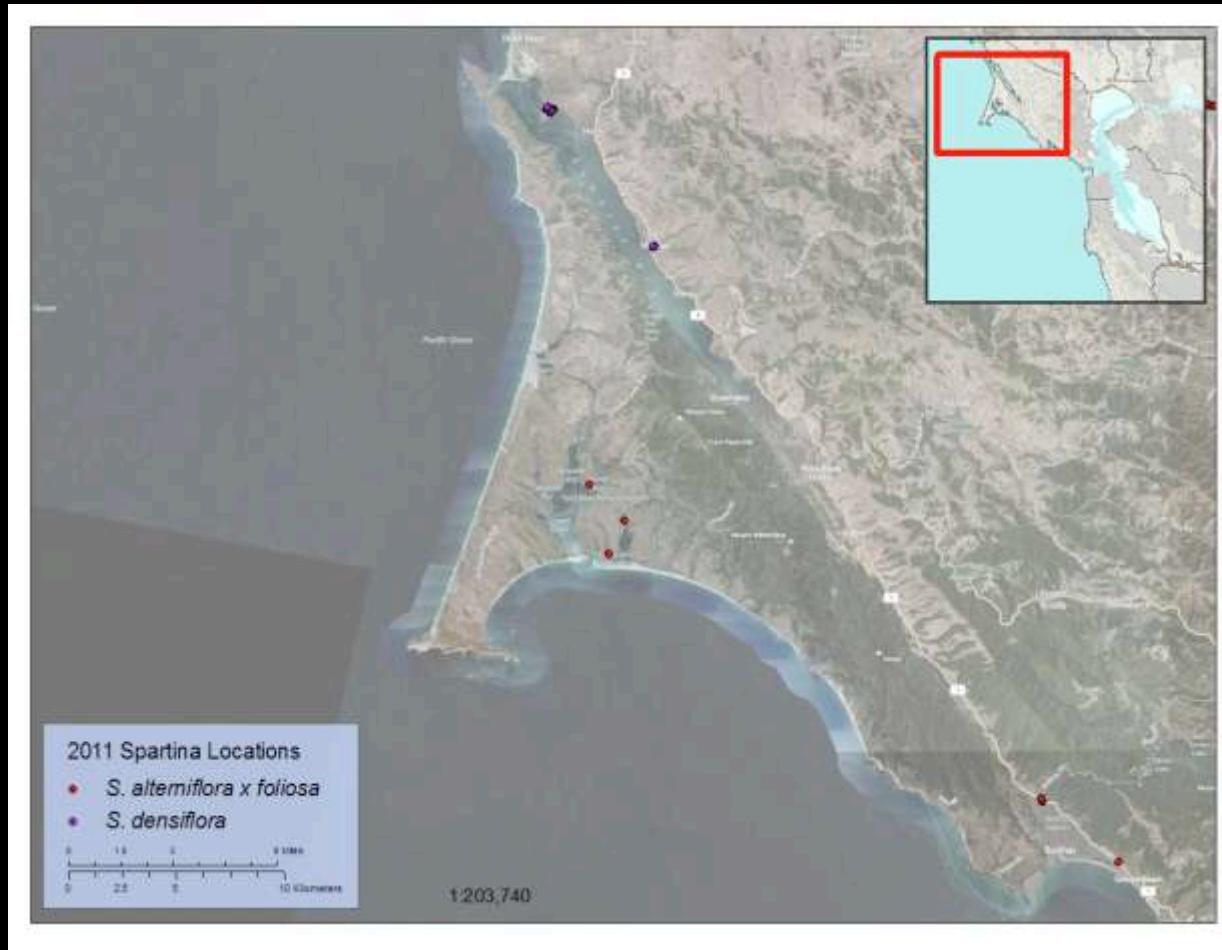
Bolinas Lagoon 2011



Bolinas Lagoon 2011



Point Reyes – Bolinas 2011



Point Reyes 2003



Drakes Estero 2006



Drakes Estero 2006



Drakes Estero 2007



Home Bay 2007



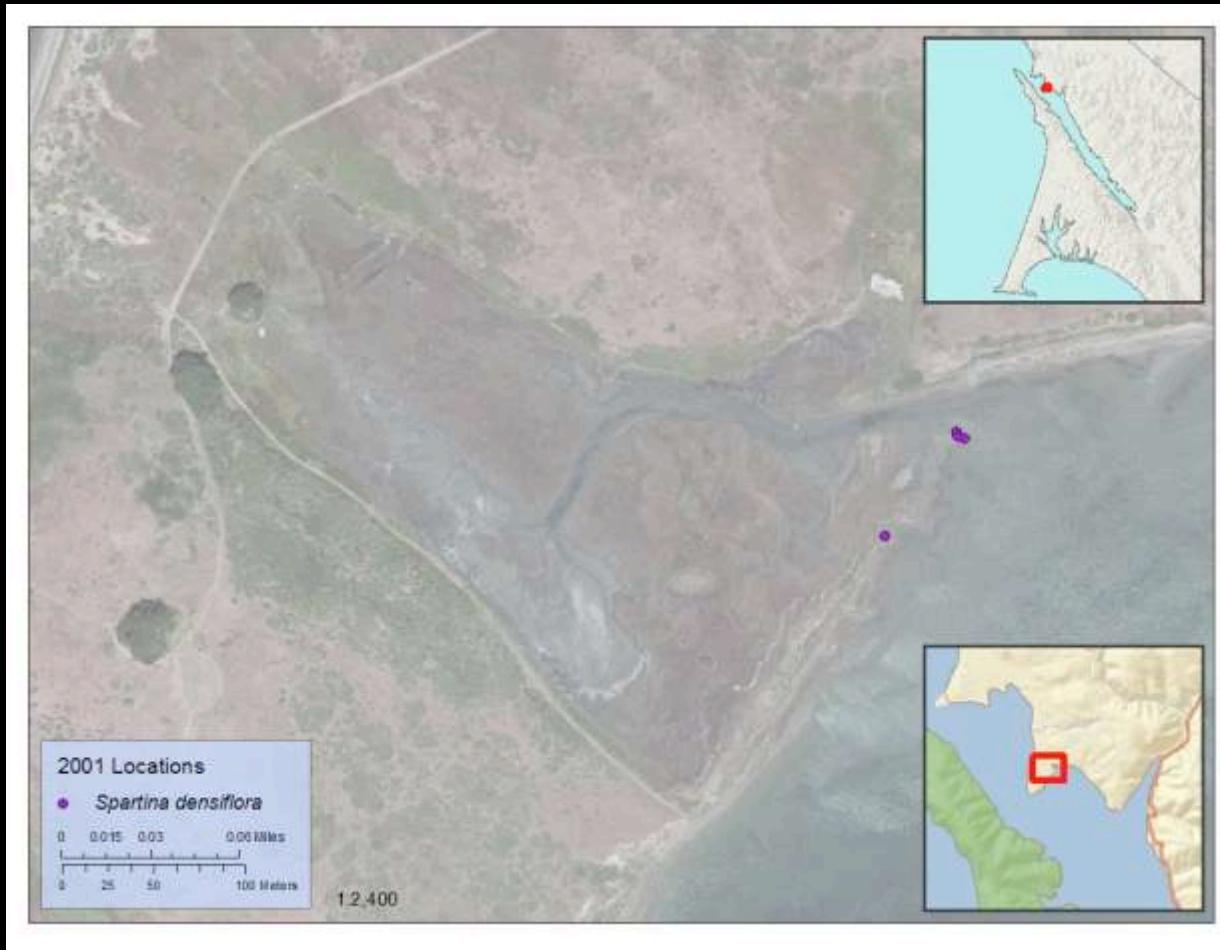
Home Bay 2008



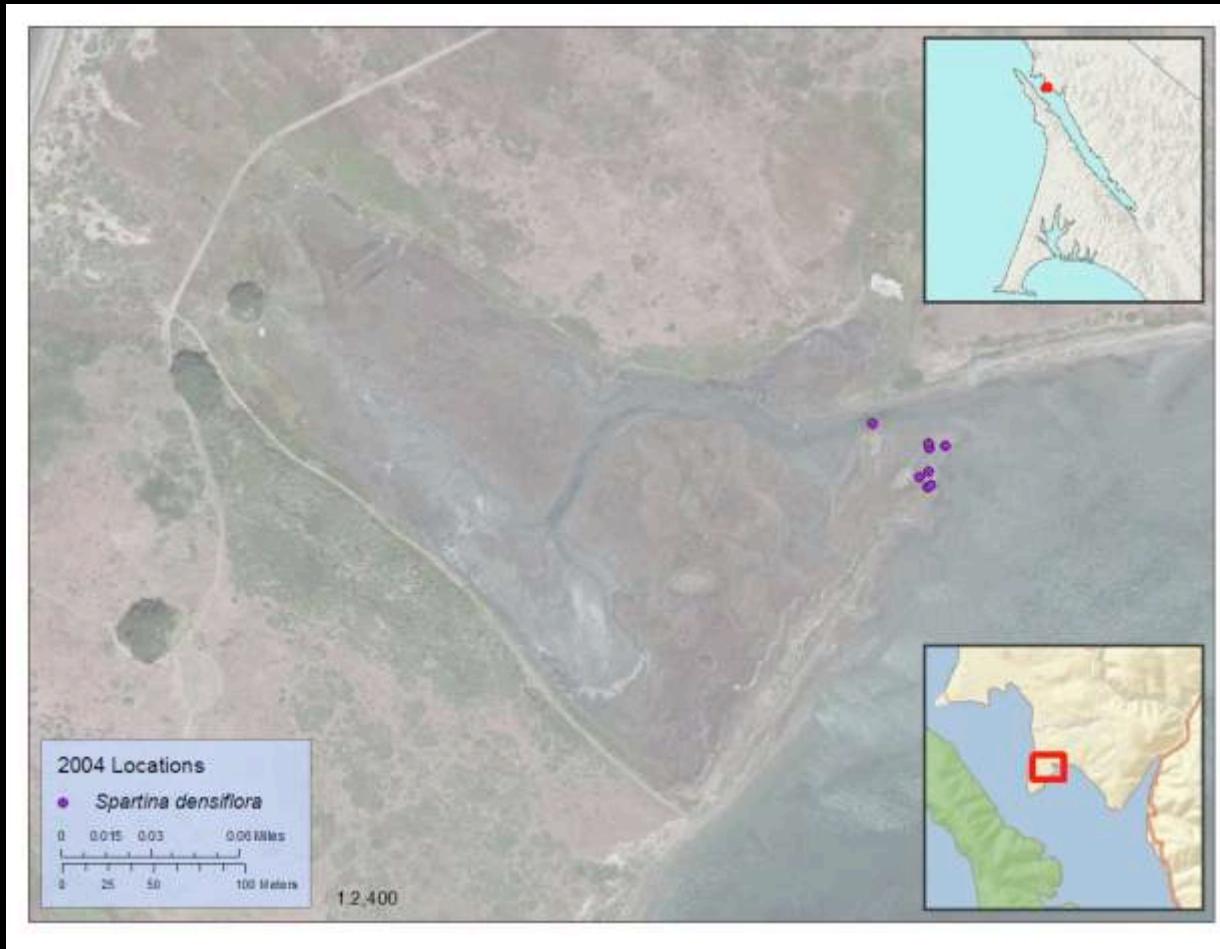
Home Bay 2010



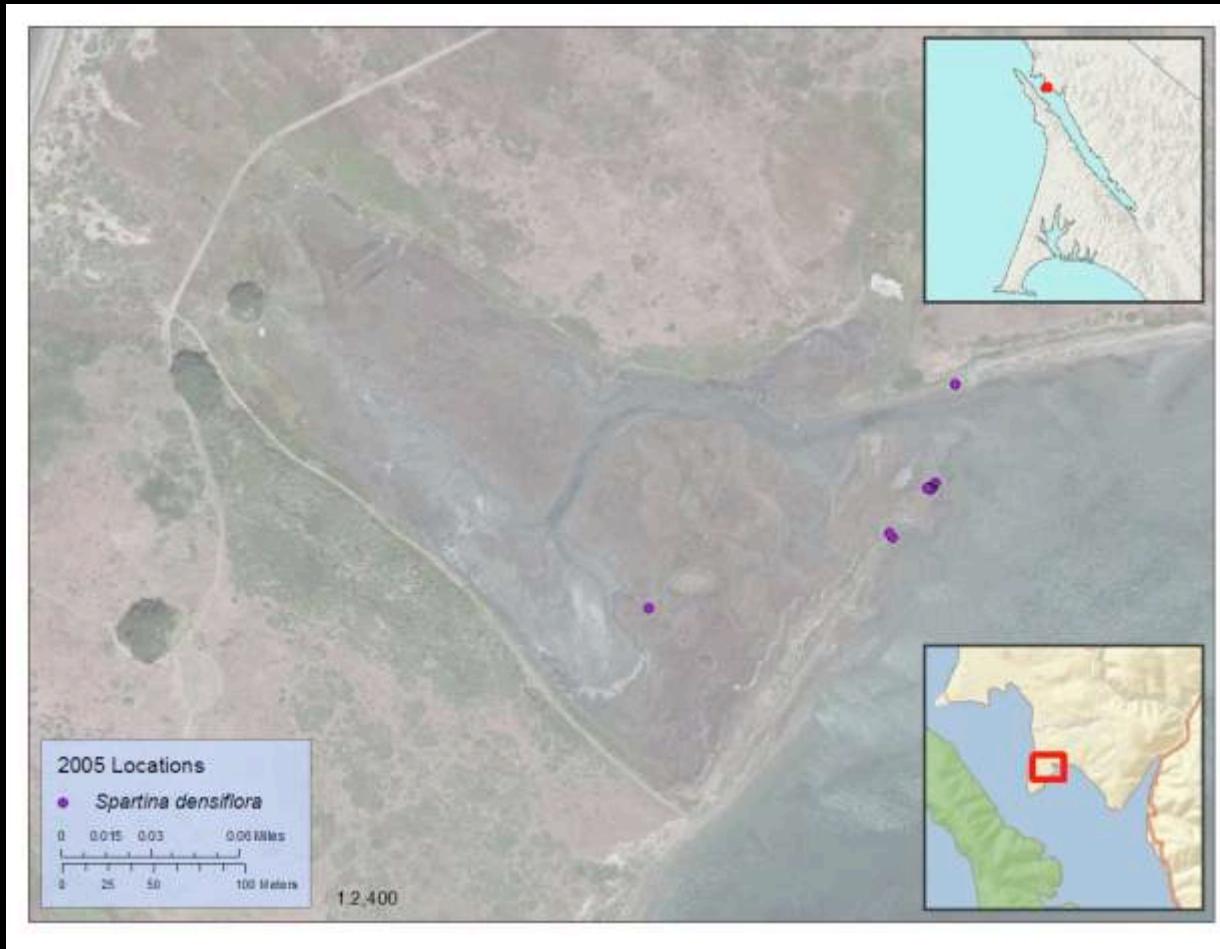
Tom's Point 2001



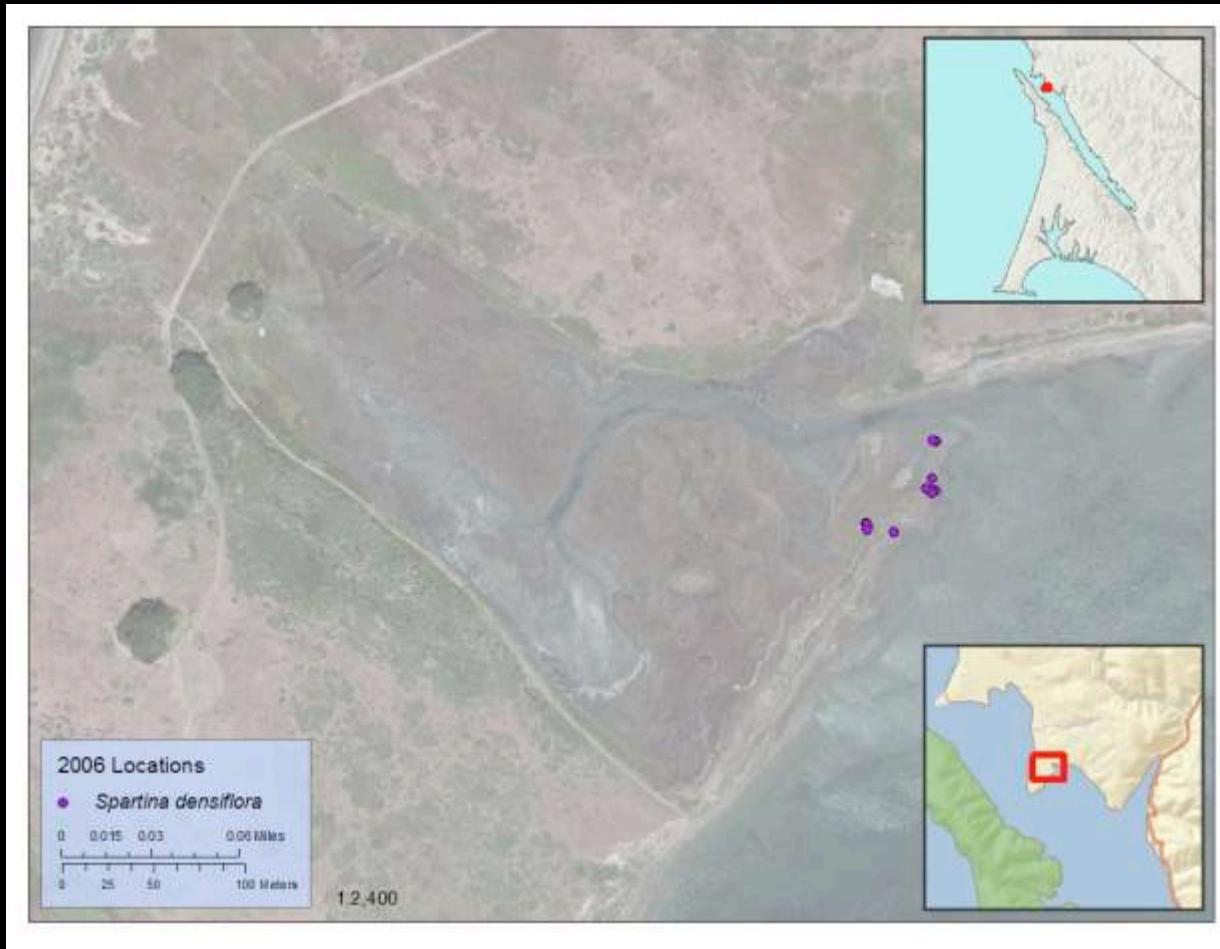
Tom's Point 2004



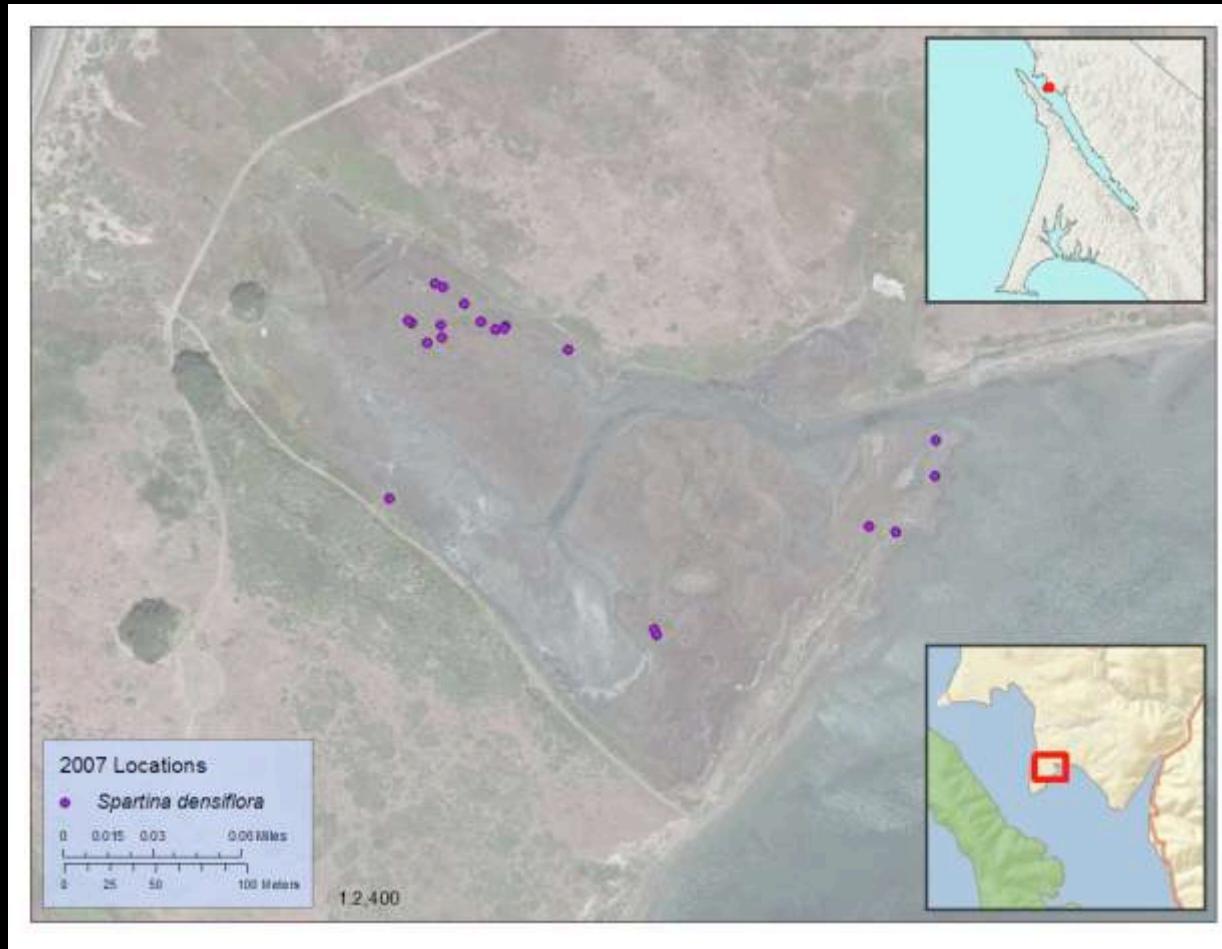
Tom's Point 2005



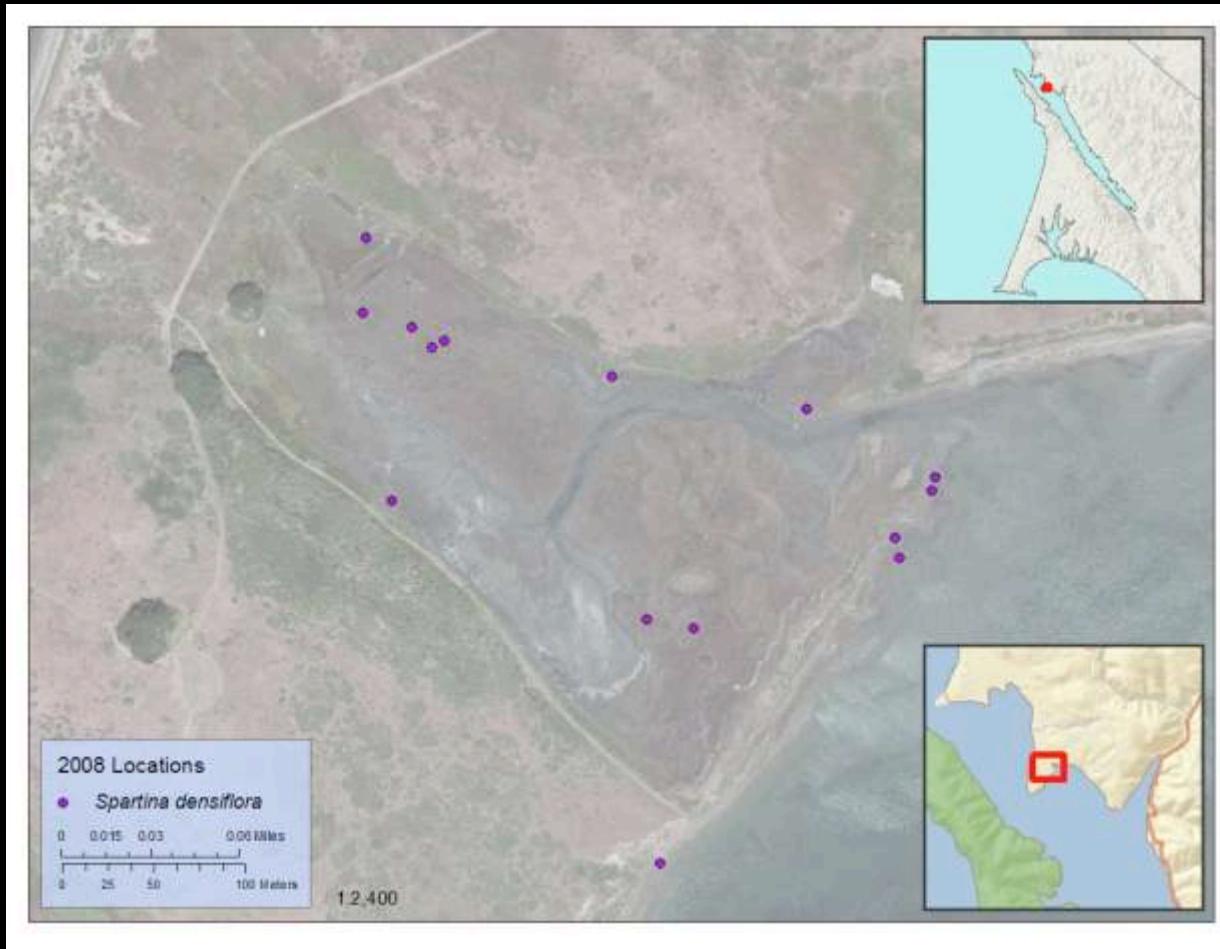
Tom's Point 2006



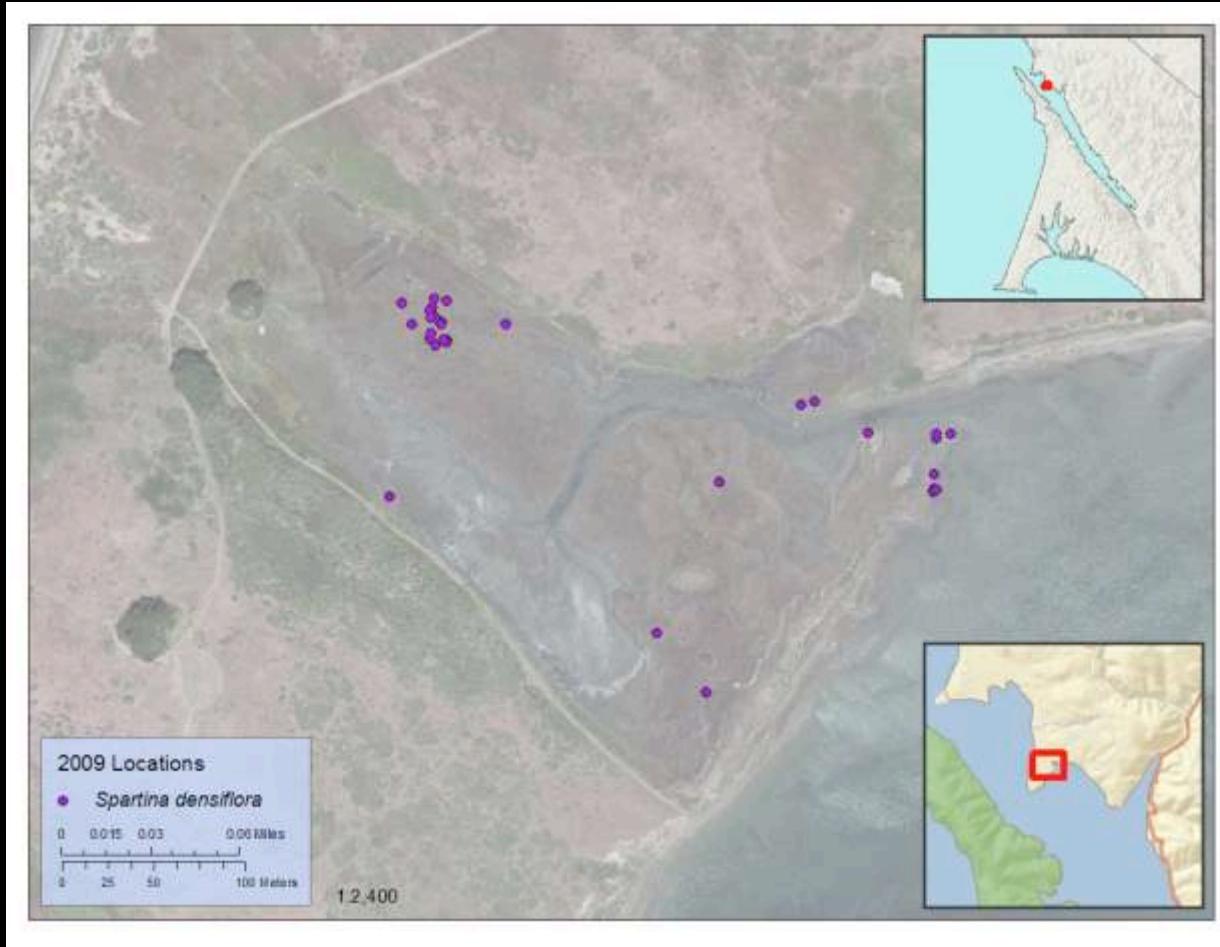
Tom's Point 2007



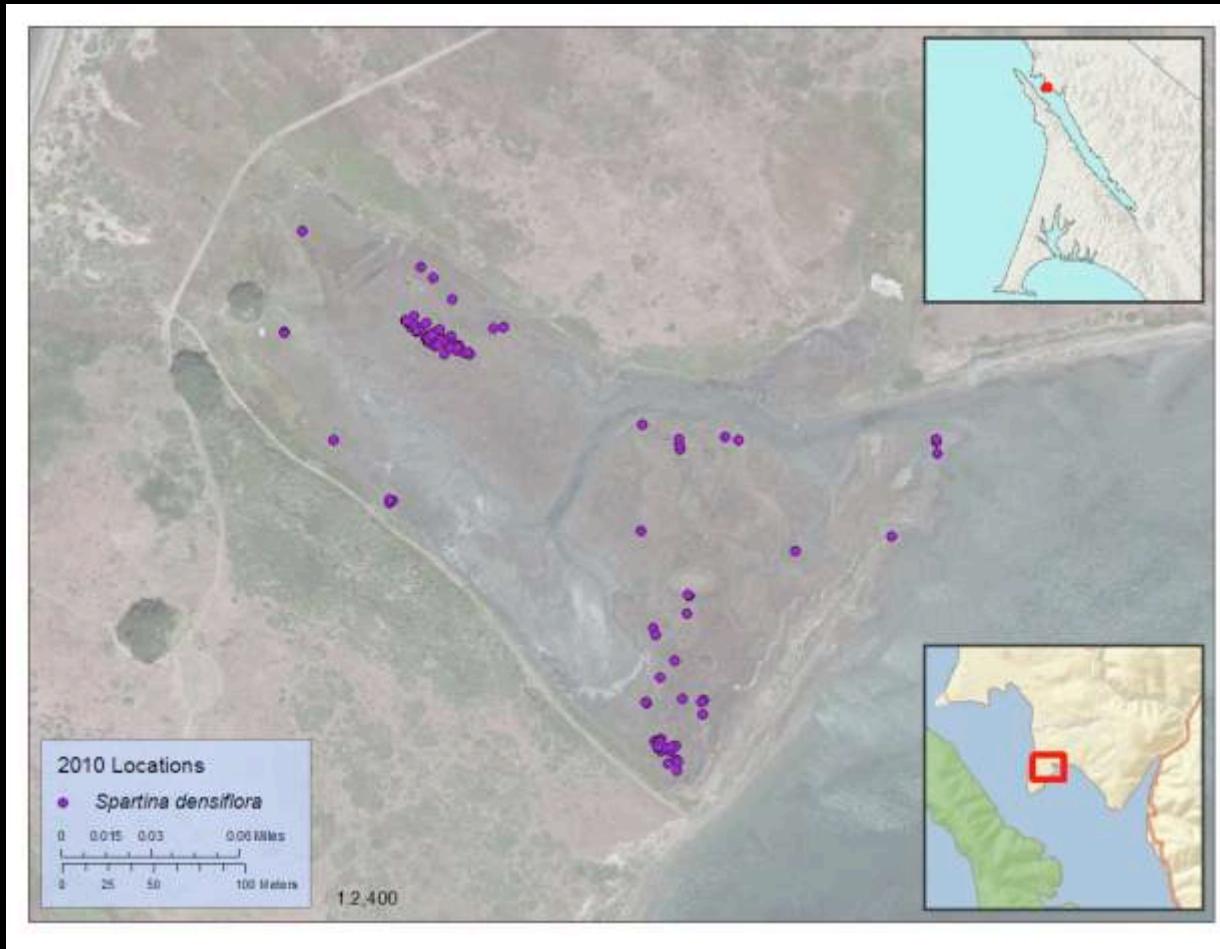
Tom's Point 2008



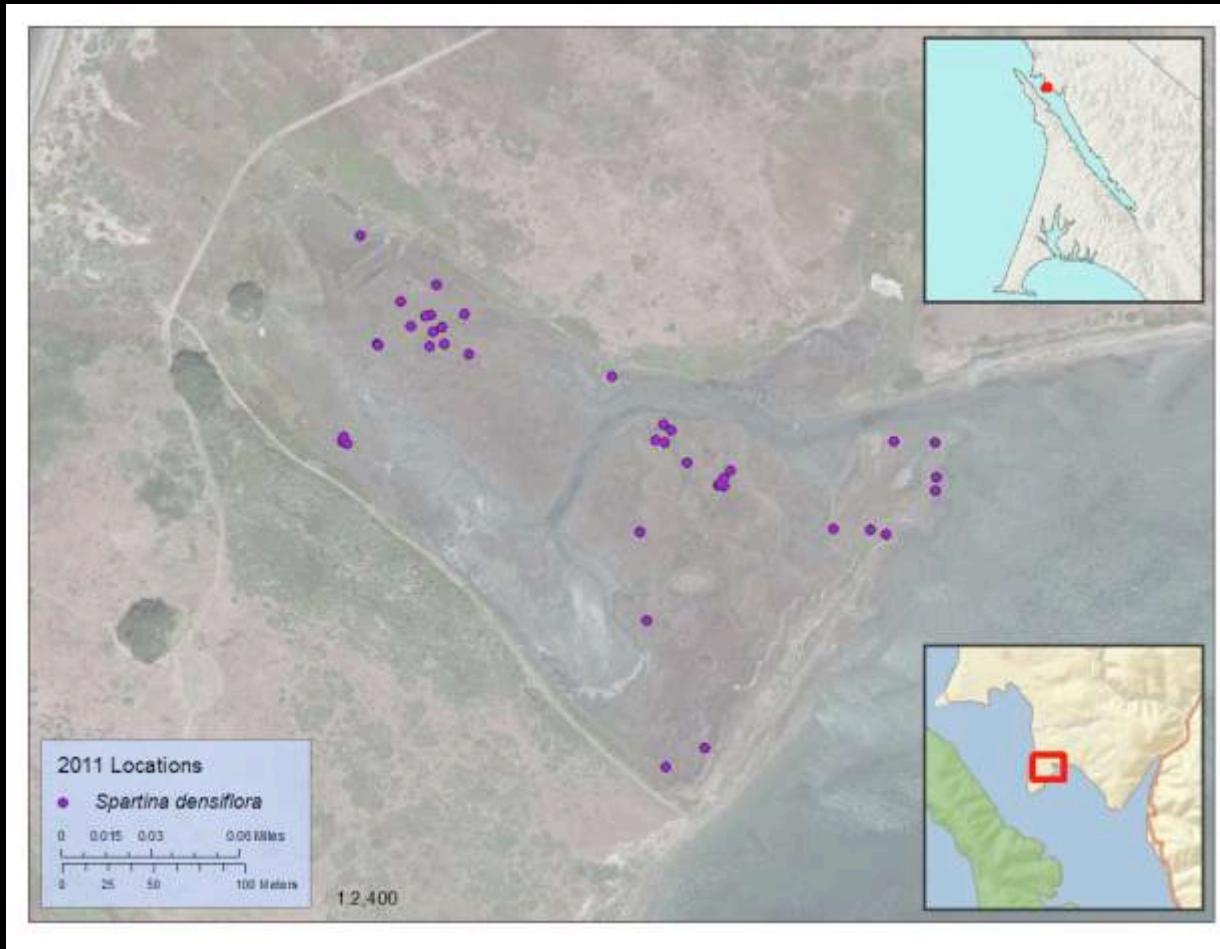
Tom's Point 2009



Tom's Point 2010



Tom's Point 2011



Tomales 2008



Tom's Point 2008



Tom's Point 2009



The Story of The Invasive Spartina Project: “Preserving Native Wetlands”



Thank You!