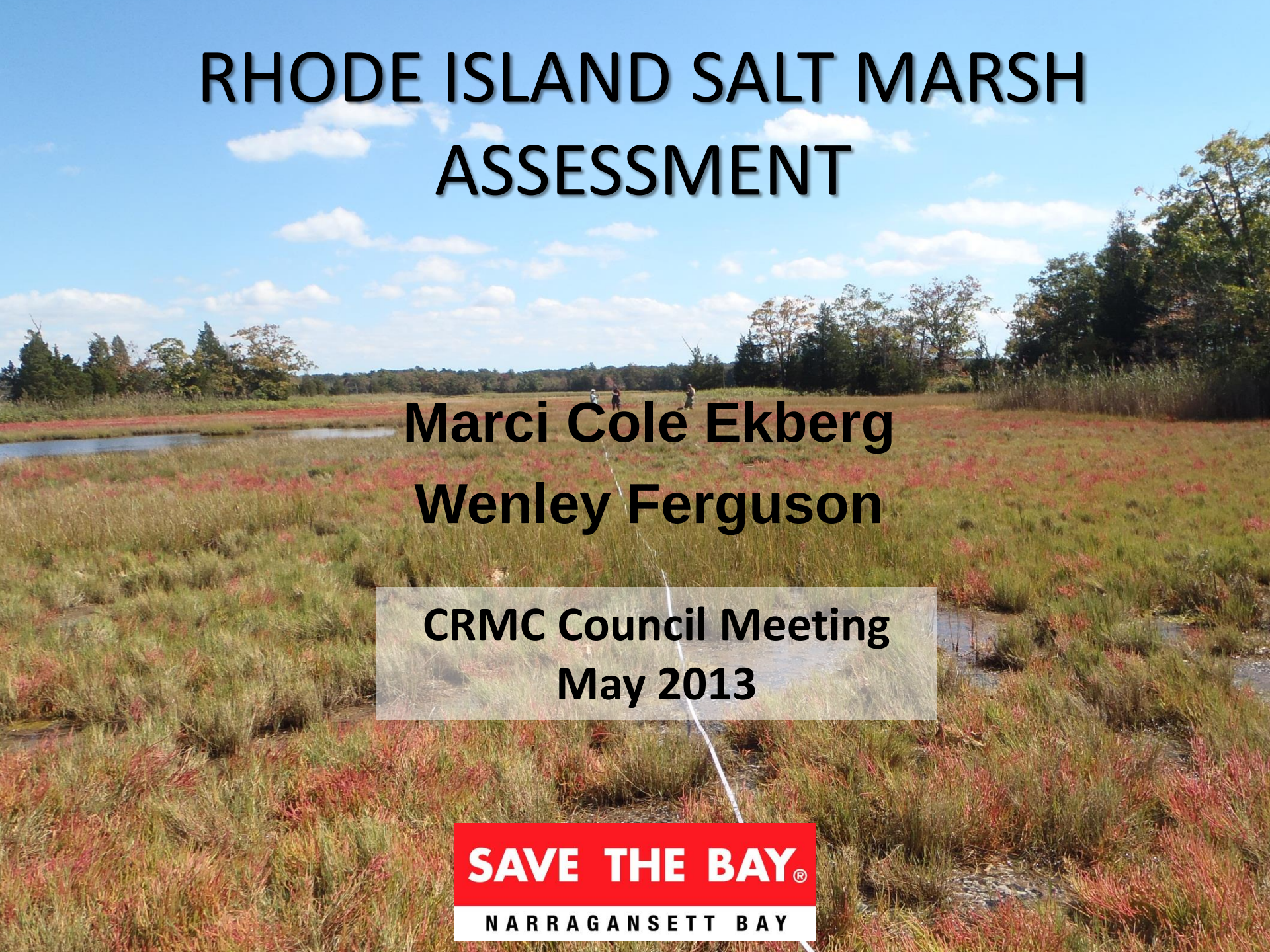
RHODE ISLAND SALT MARSH ASSESSMENT



Marci Cole Ekberg
Wenley Ferguson

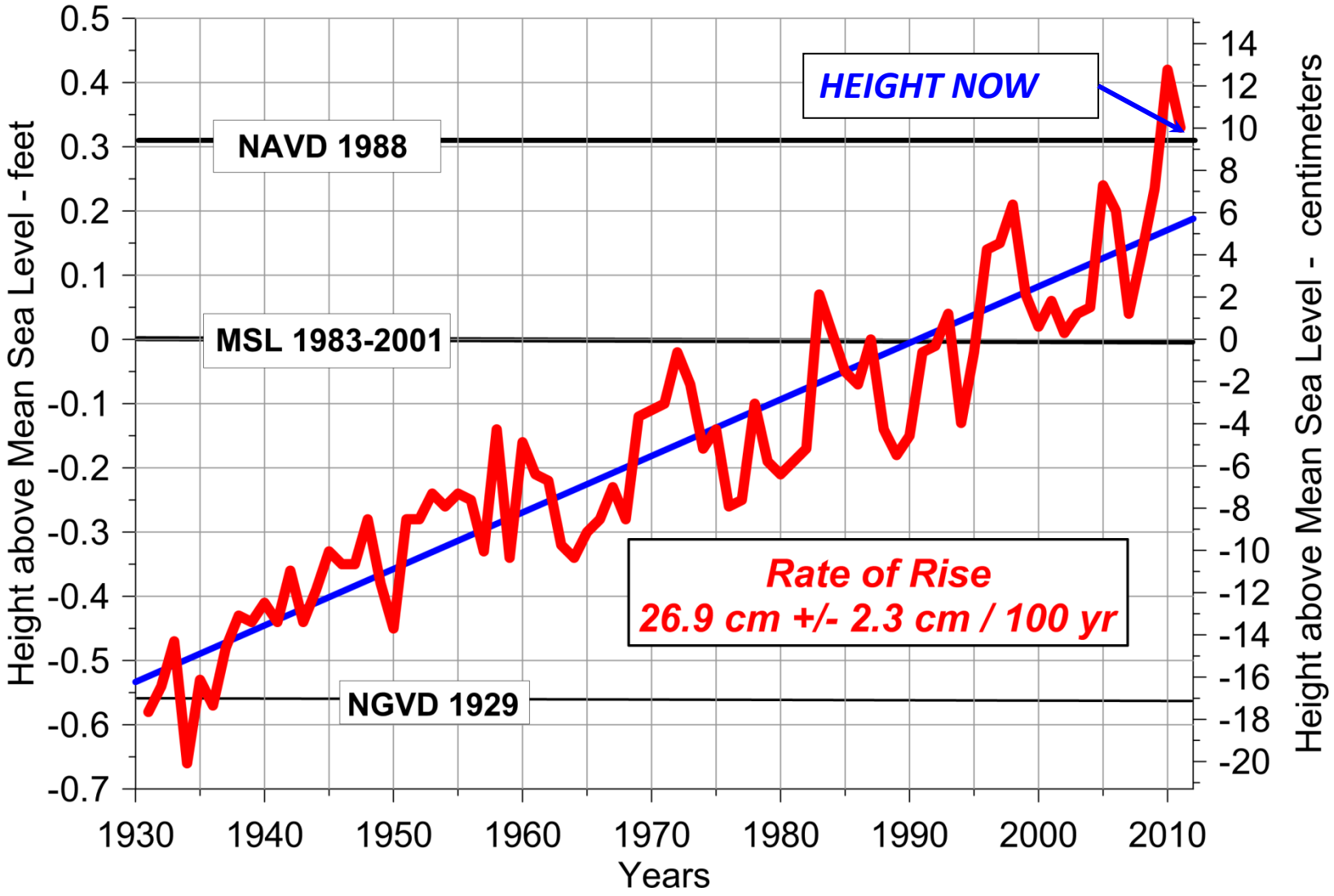
CRMC Council Meeting
May 2013

SAVE THE BAY®
NARRAGANSETT BAY

STB's 10 years of restoration monitoring has shown that conditions can change rapidly in tidally restricted marshes

Recently, similar degraded conditions have been observed in marshes with no tidal restrictions

HISTORIC SEA-LEVEL RISE - Newport, RI



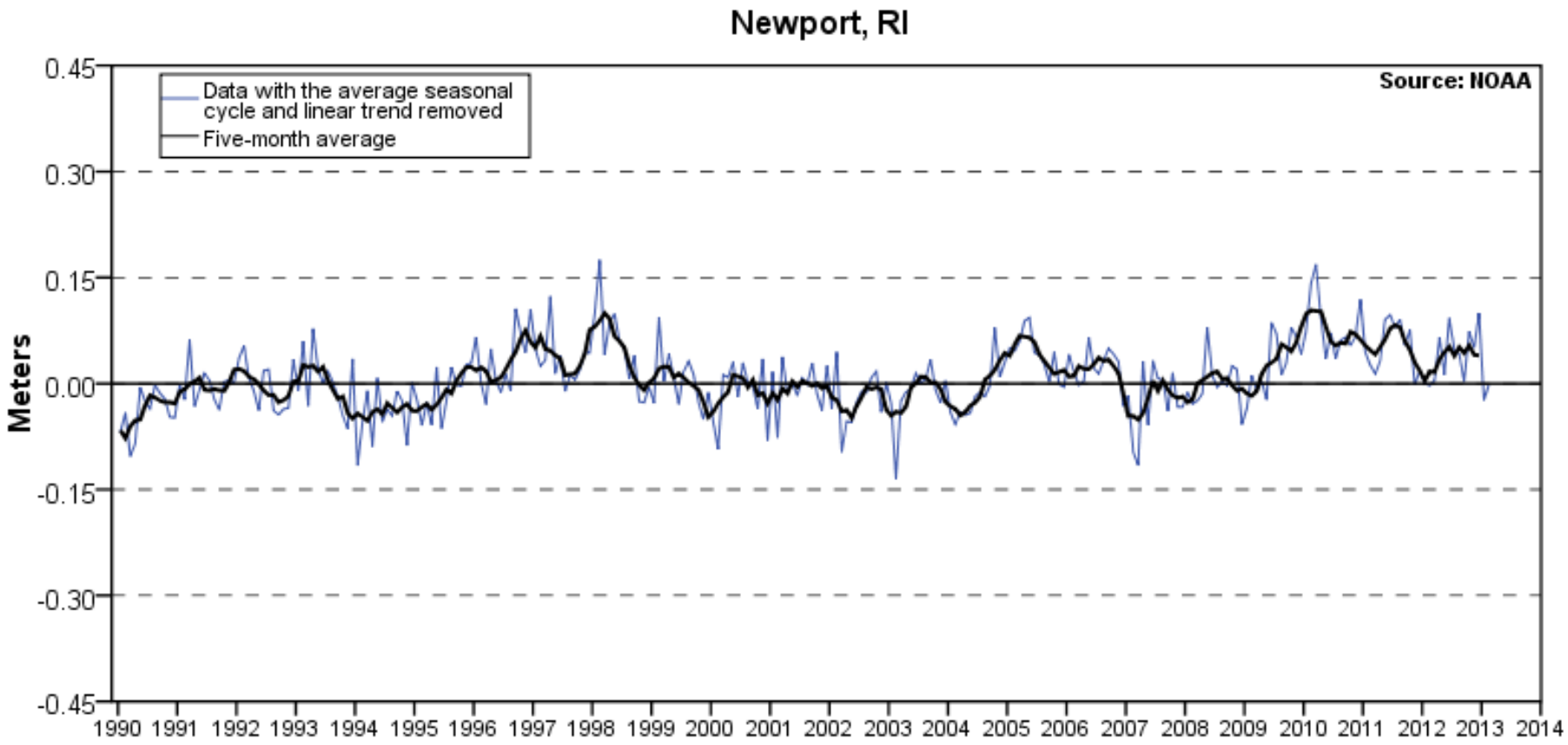
Adapted from:
http://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=8452660%20Newport,%20RI

GEOLOGICAL SURVEY — RHODE ISLAND

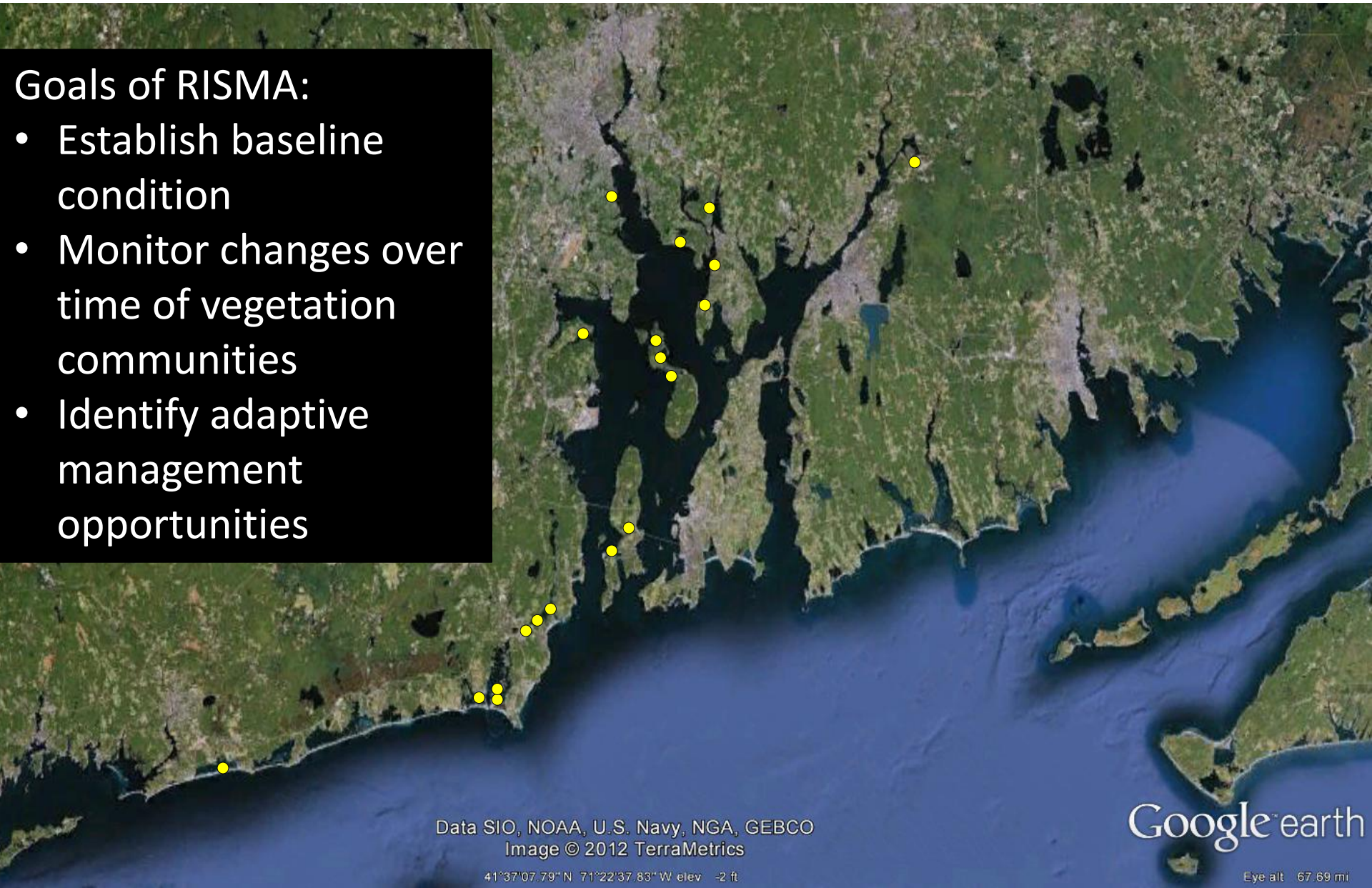
COASTAL HAZARDS GROUP — GEOSCIENCES — Univ RI

Boothroyd 2012

Interannual Variation of Monthly Mean Sea Level since 1990



Region-wide assessment of Narragansett Bay and RI South Shore salt marshes: Summer/Fall 2012



Belt Transect

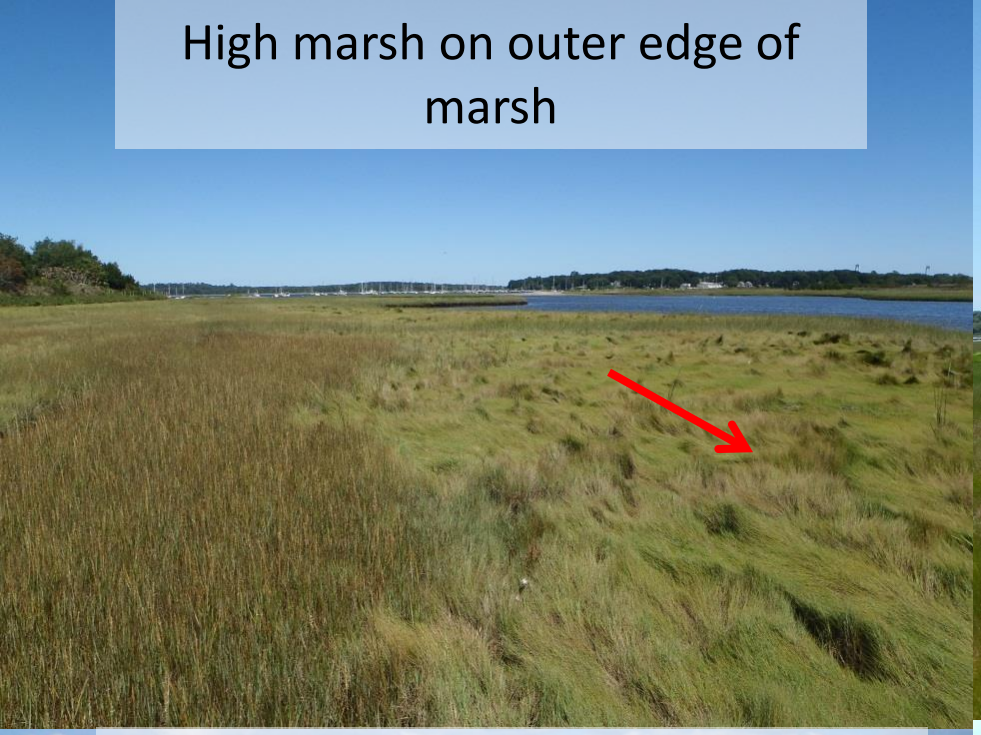
Bearing Capacity

- Point intercept (every 10 m)
- *S. alterniflora* height (every 10 m)
- Zone width of dominant species
- Bearing capacity (in 5 zones)
- Additional data – salinity, mosquito density, fish presence

Eroding Edge/Vanishing Low Marsh

Shallow ponded water

Defined pool in foreground versus shallow standing water


High marsh on outer edge of marsh


Short form *S. alterniflora* dominates the marsh


Degraded short form *S. alterniflora*


Narrow high marsh

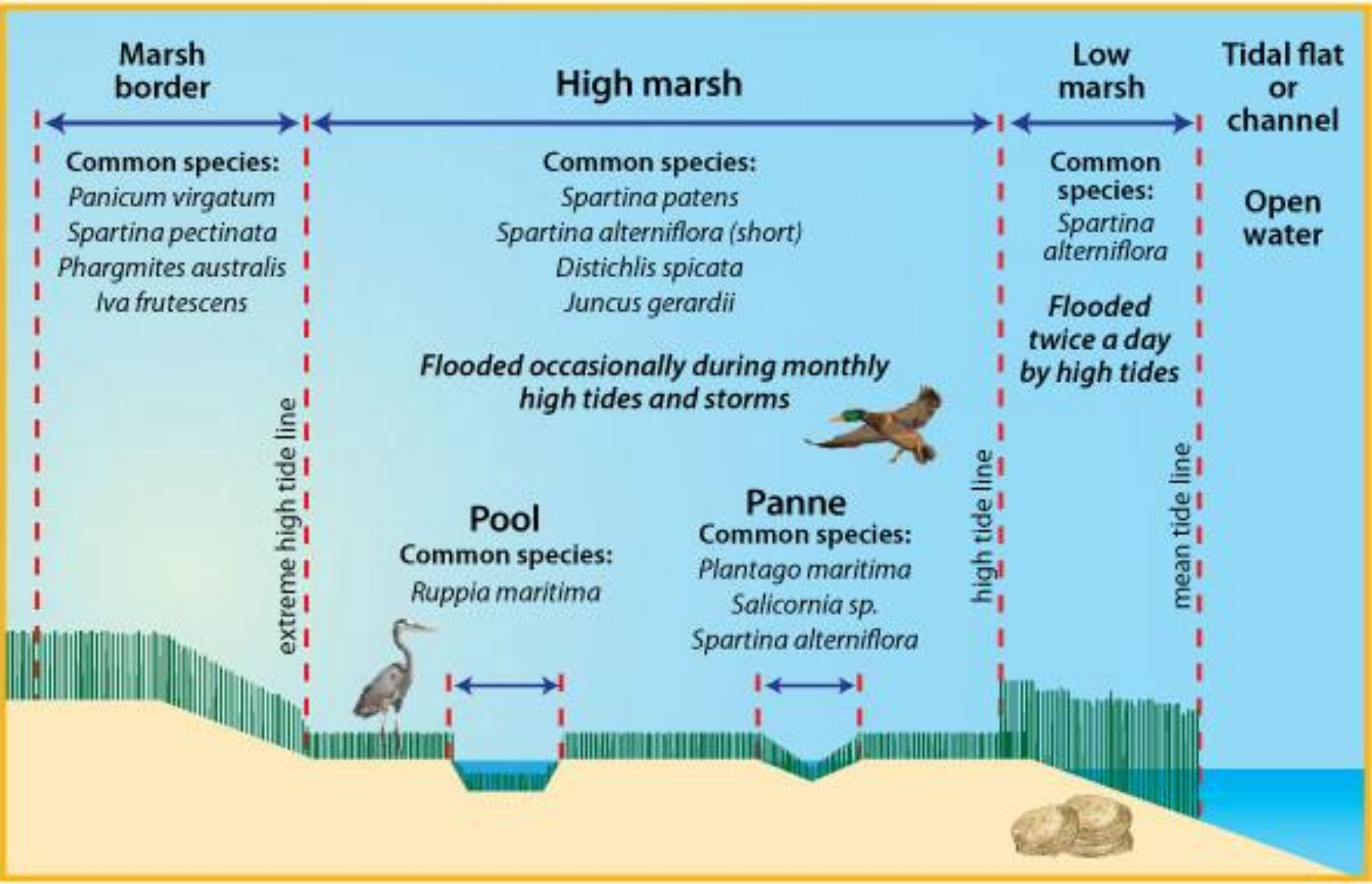
Marsh migration

Breen and Pasadena Avenue: Westerly

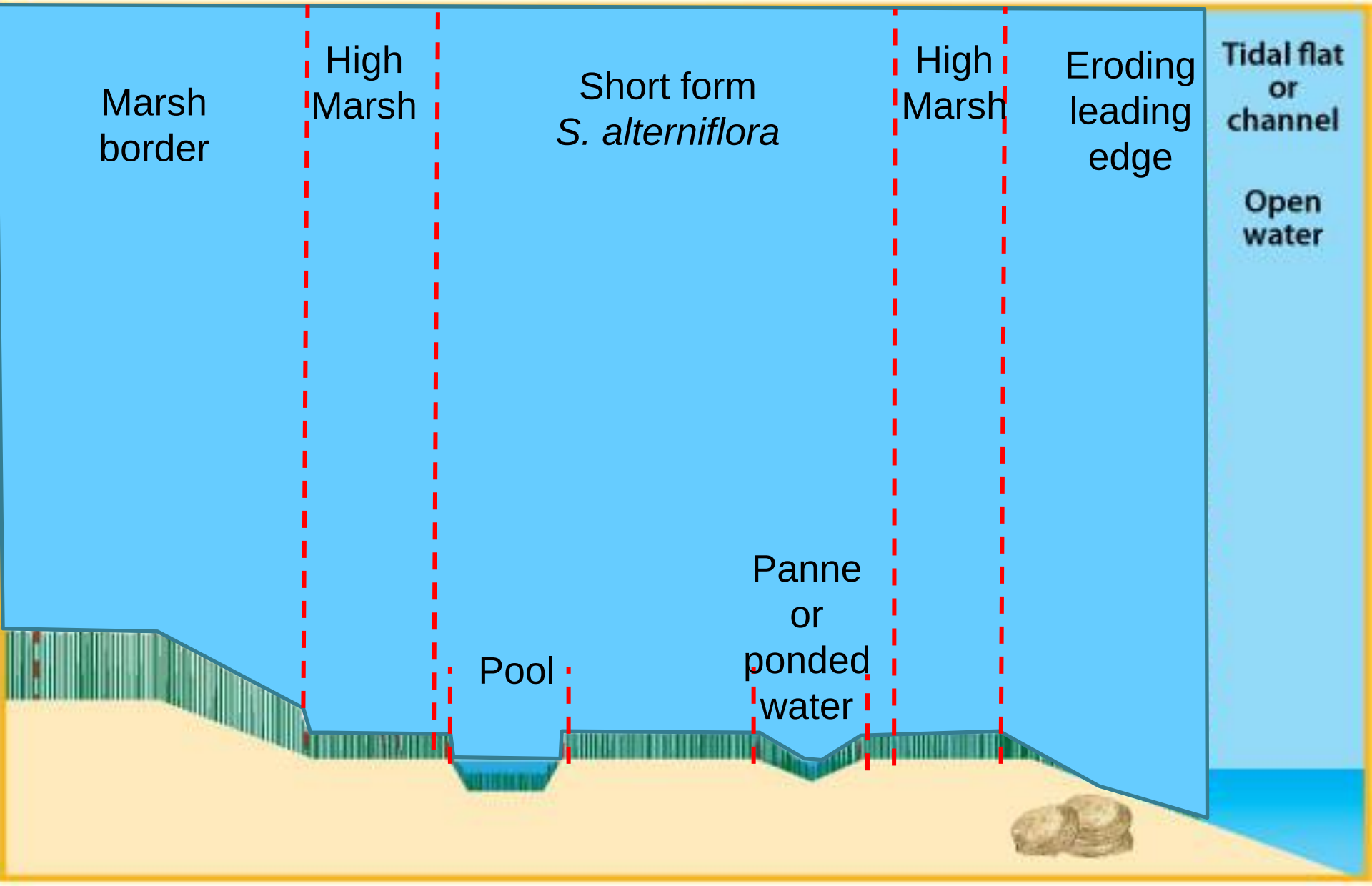
1: Pasadena Ave

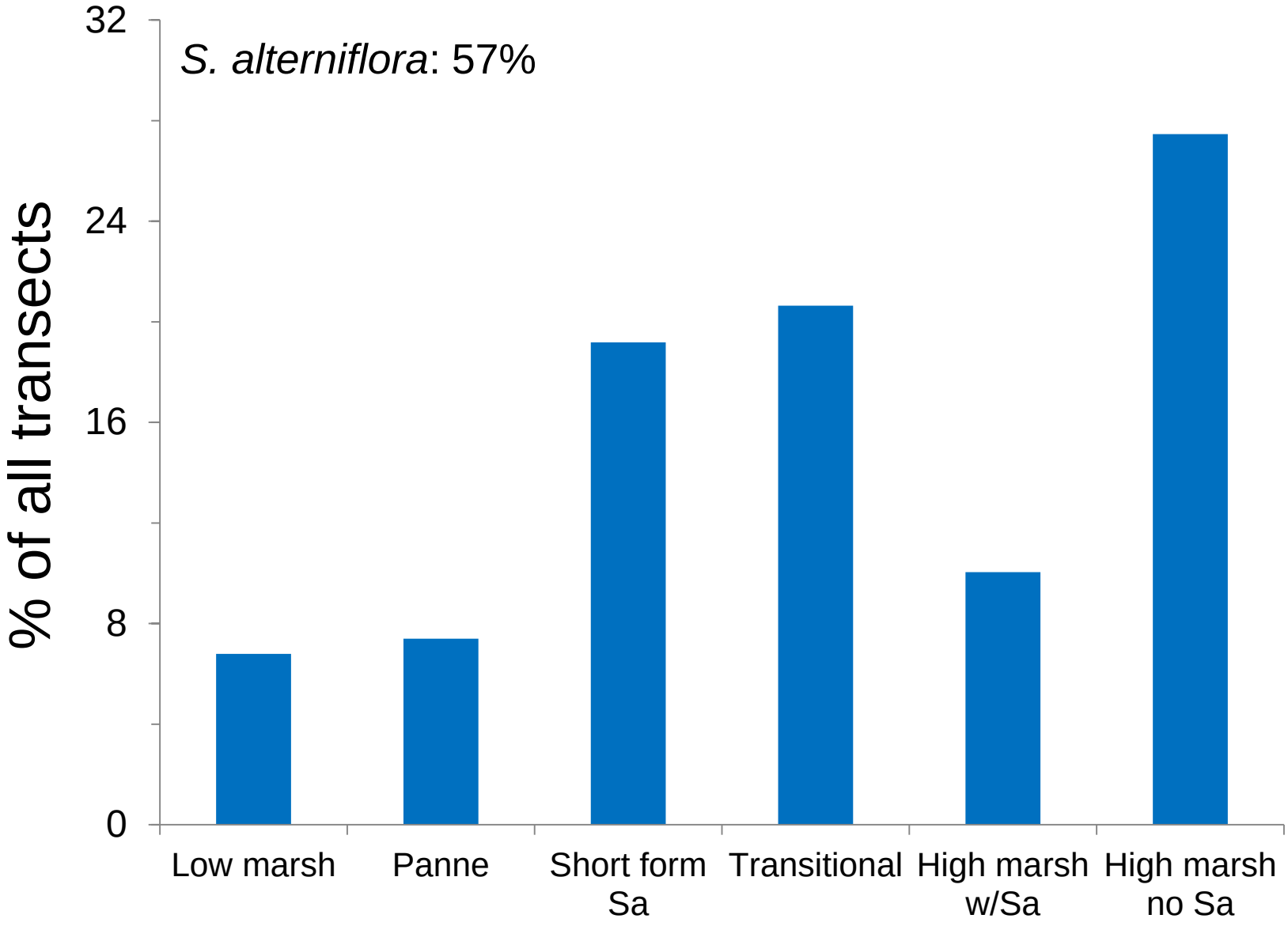
2: Breen Road

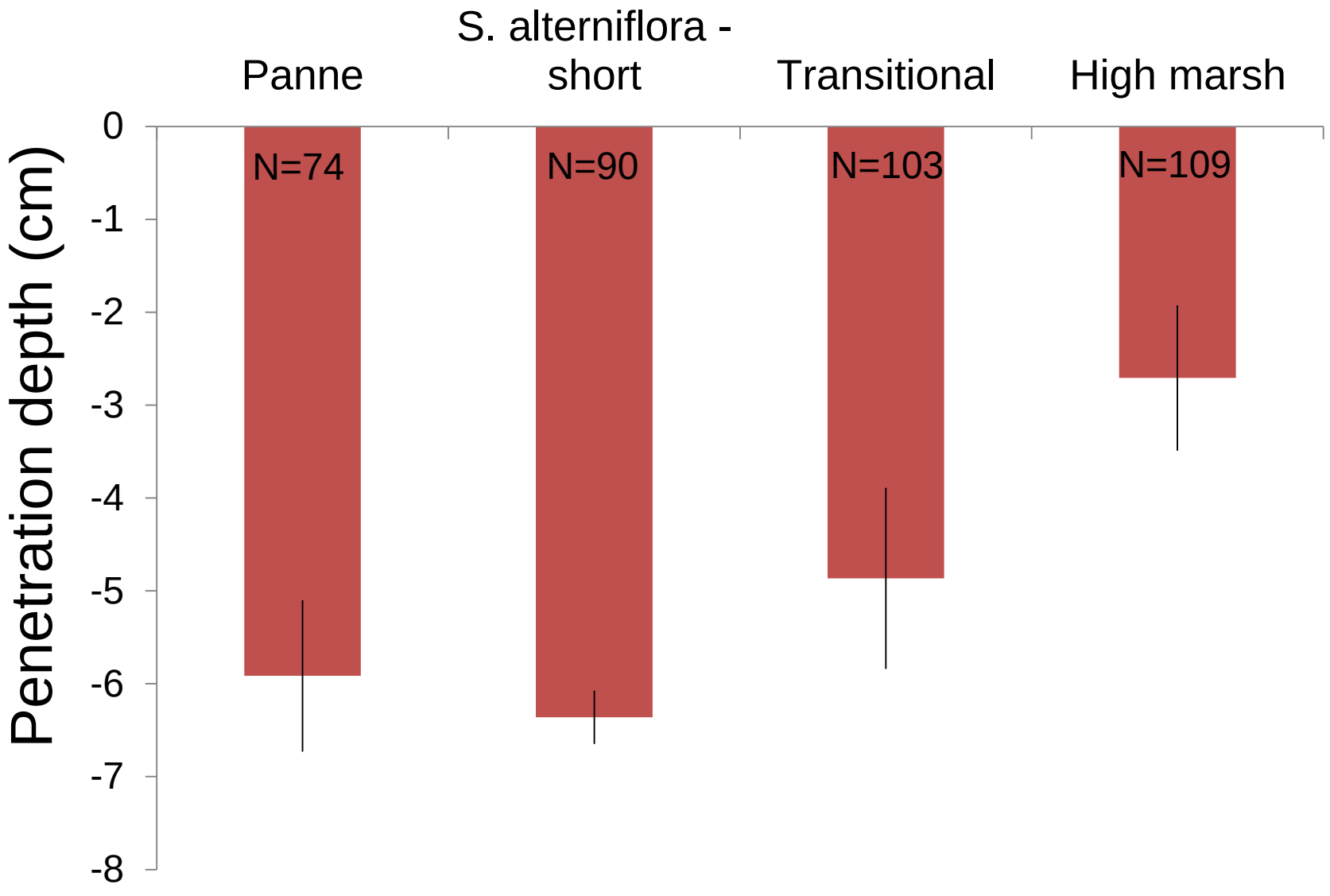
2: Breen Road; looking E at house on upland island surrounded by wetlands



Source: Maine SeaGrant


Marsh border
High Marsh
Short form
S. alterniflora
High Marsh
Eroding leading edge
Tidal flat or channel
Open water
Pool
Panne or ponded water


S. alterniflora: 57%
% of all transects
32
24
16
8
0
Low marsh
Panne
Short form Sa
Transitional
High marsh w/Sa
High marsh no Sa


Panne
S. alterniflora - short
Transitional
High marsh
Penetration depth (cm)
0
-1
-2
-3
-4
-5
-6
-7
-8
N=74
N=90
N=103
N=109

Next steps:

- Continue assessment this season.
- Conduct isotope analysis.
- Conduct GIS analysis of marsh edge erosion, extent of shallow ponded water and buffer land use.
- Compare results to salt marsh and seaside sparrow population assessments.
- Share data with resource managers.

Future Questions

- Can we adapt this protocol to use across a broader geographic area?
- What should the monitoring interval be?
- Should additional parameters be included (nekton, birds, soil pH)
- What adaptation strategies can be implemented?

Adaptive Management


1992


Before


After


Impounded water: former high marsh
Excavated blockage in creek
Hog Island
2010
© 2010 Google
Imagery Date: May 1, 2010
41°38'18.85" N 71°16'36.86" W elev 3 ft
Eye alt 1323 ft

Gooseneck Cove adaptive management

Winnapaug Marsh adaptation project

Barrington Beach Salt Marsh (RISD Beach): 2012

Water impounded on former marsh area

Culvert under footpath blocked

Google

31.67" N 71°19'21.02" W elev 13 ft

Thank You





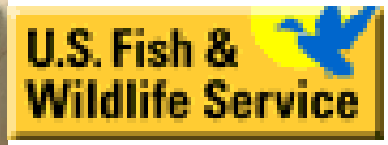








C R M C
COASTAL RESOURCES MANAGEMENT COUNCIL


U.S. Fish &
Wildlife Service

Coastal Adaptation Opportunities

Identify areas where sea level rise and increased storminess intensifies flooding of natural resources and low lying infrastructure and define/plan adaptation strategies

City Park Beach shoreline regrading, Warwick

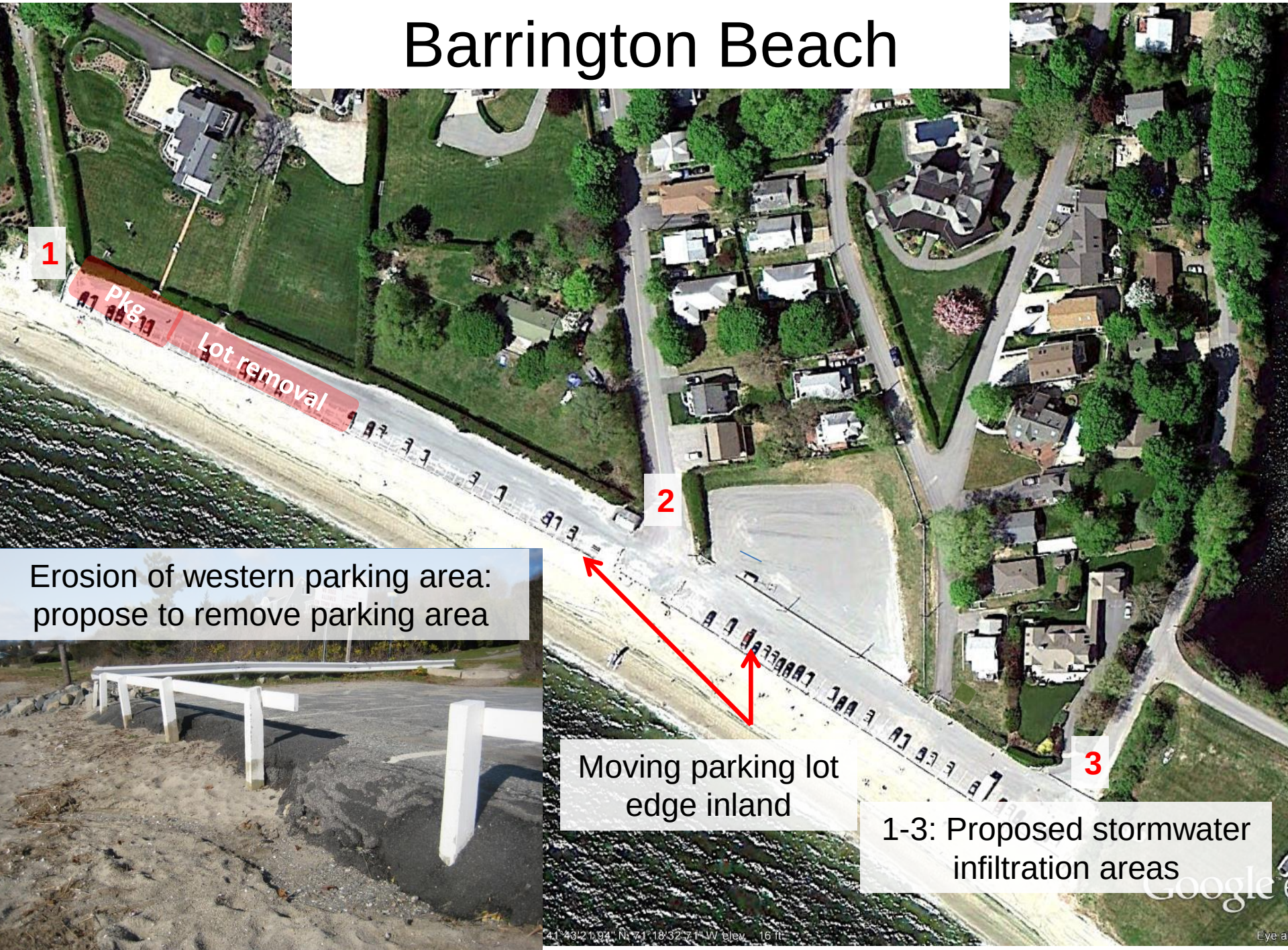
Photo taken 9.12

Photo taken 6.10

Photo taken 9.11

Non structural shoreline protection, Barrington

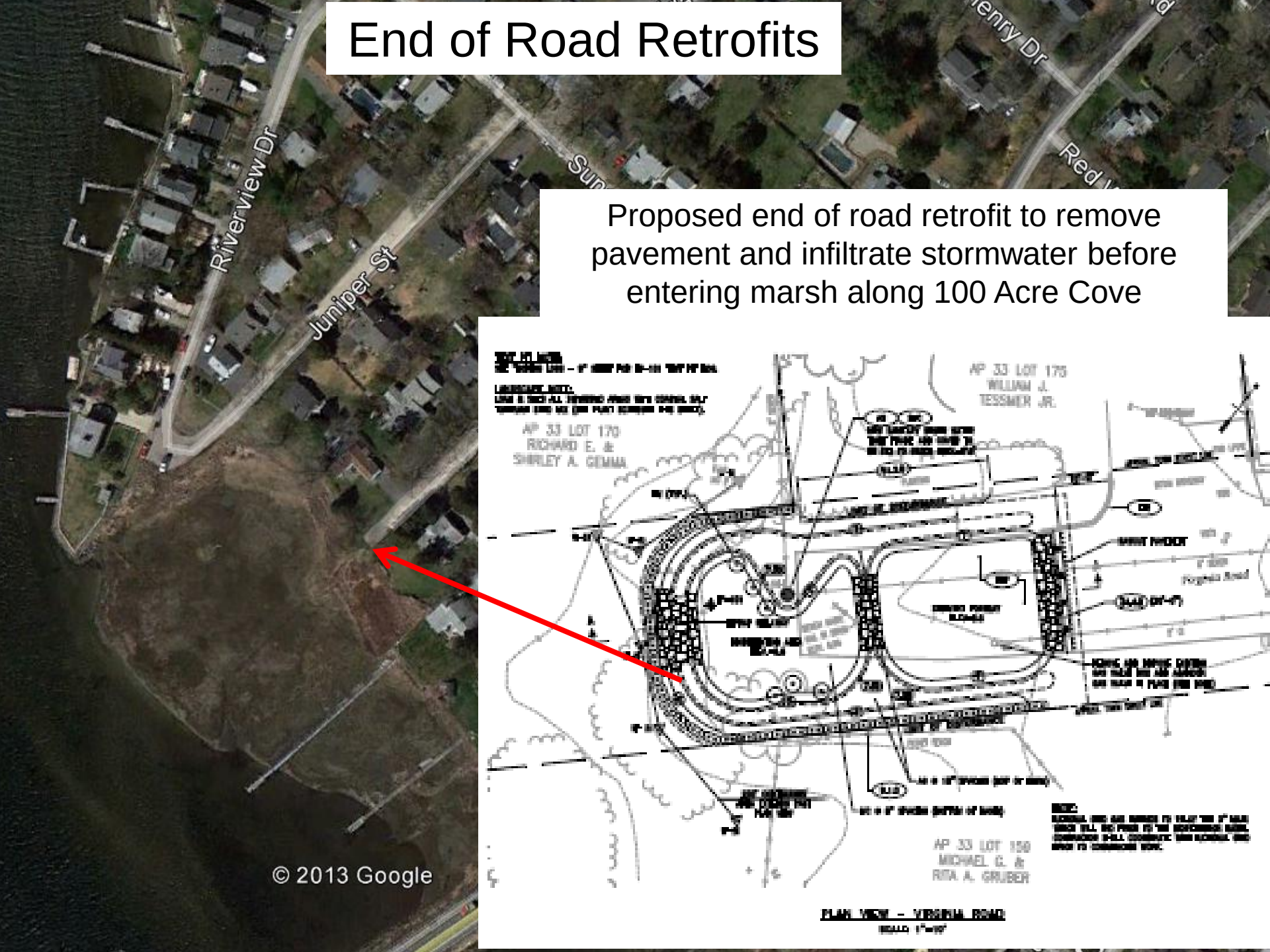
Barrington Beach



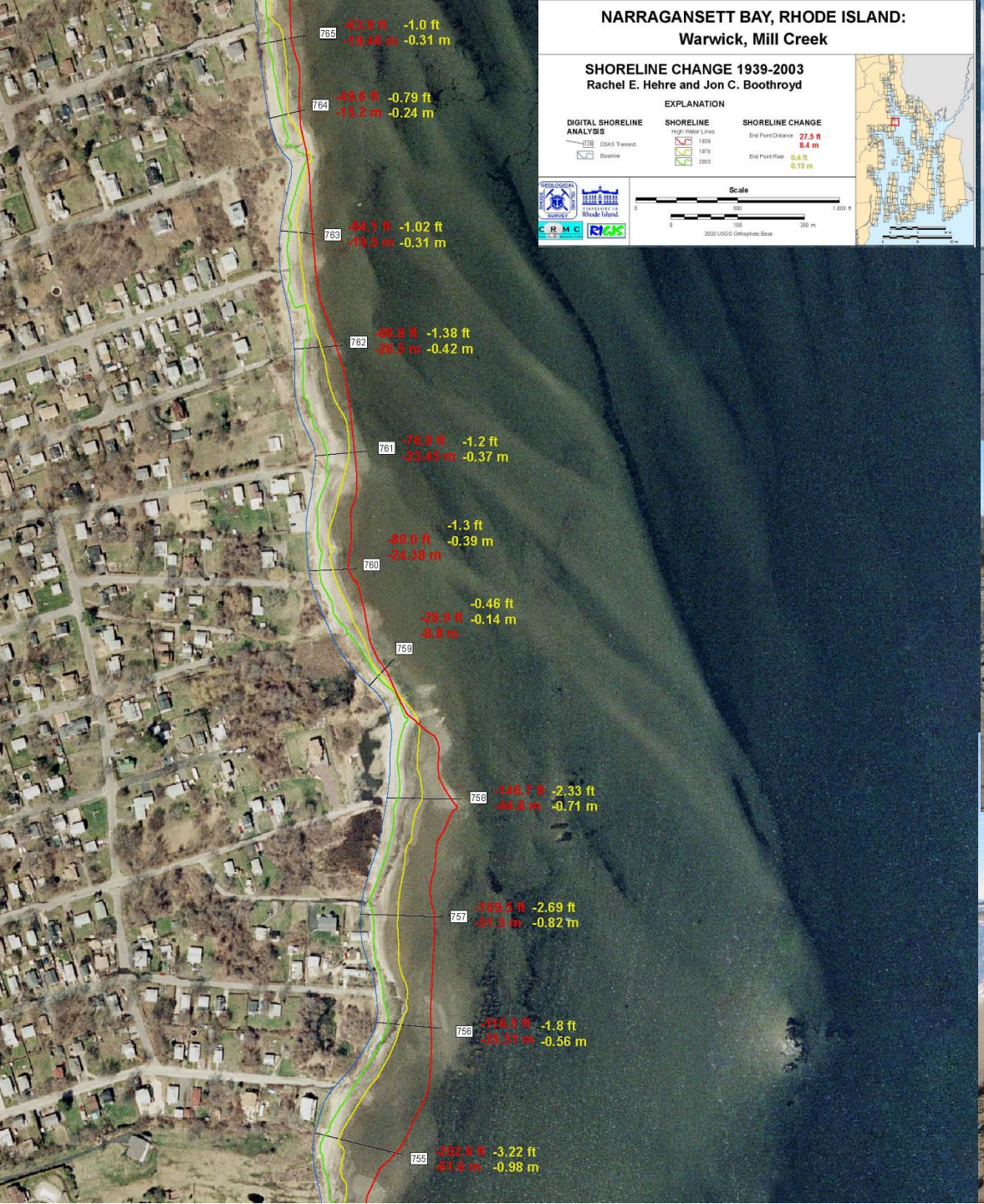
Erosion of western parking area: propose to remove parking area

End of Road Retrofits

Proposed end of road retrofit to remove pavement and infiltrate stormwater before entering marsh along 100 Acre Cove




Conimicut
Conimicut Pt
Mill Cr
Longmeadow
Highland Beach
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
BRISTOL, R.I.-MASS.
N4137.5 – W7115/7.5
1955



NARRAGANSETT BAY, RHODE ISLAND:
Warwick, Mill Creek

SHORELINE CHANGE 1939-2003
Rachel E. Hehre and Jon C. Boothroyd

EXPLANATION

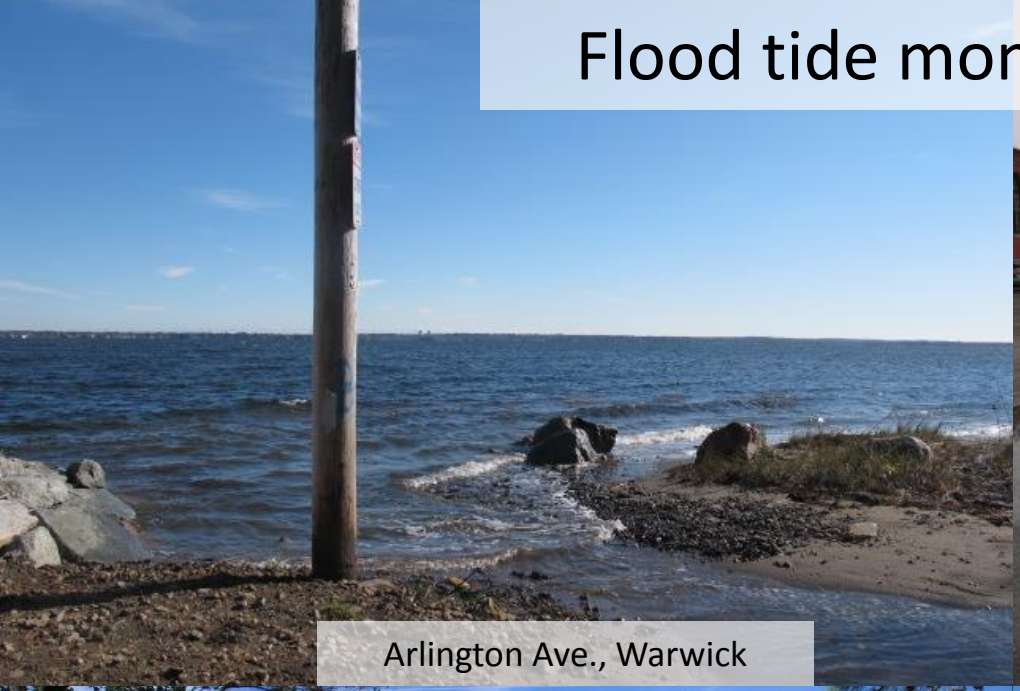
DIGITAL SHORELINE ANALYSIS
DSAS Transect
Baseline

SHORELINE
High Water Lines
1939
1975
2003

SHORELINE CHANGE
End Point Distance 27.5 ft 8.4 m
End Point Rate 0.4 ft 0.13 m

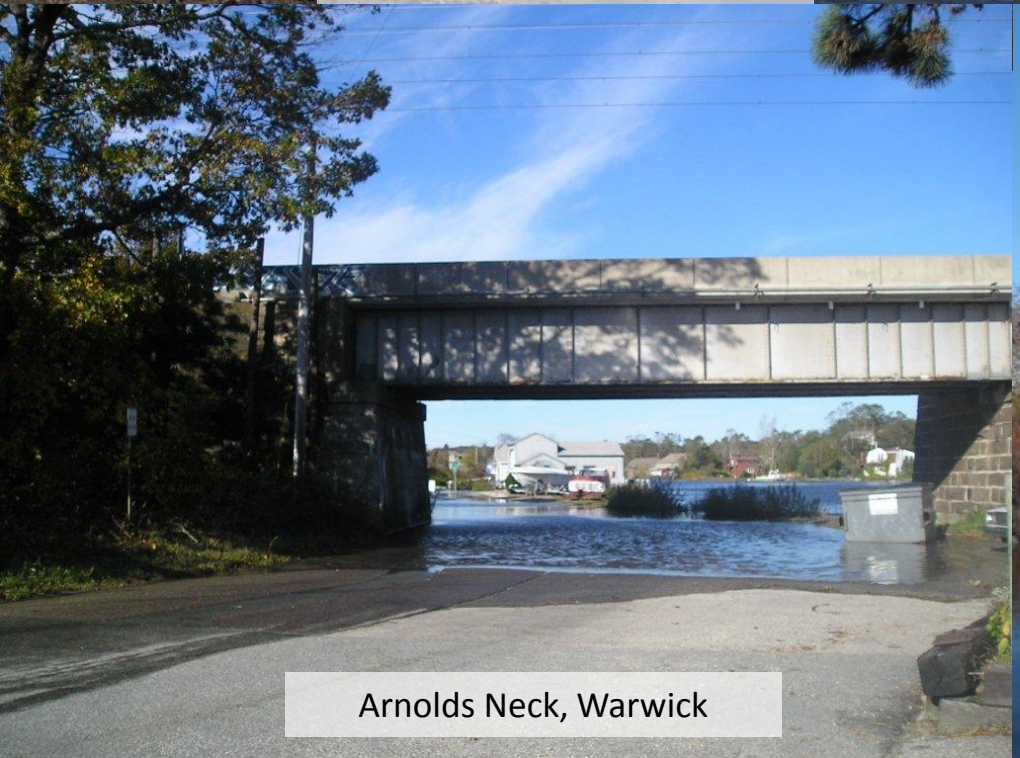
Scale
0 500 1,000 ft
0 100 200 m
2003 USGS Orthophoto Base

Flood tide monitoring



Arlington Ave., Warwick

Tourister Pkg lot, Warren



Arnolds Neck, Warwick

South Shore Road and Caldwell Street looking North, Warwick

Belcher Cove, Warren RI:
Tidal creek at flood tide

Storm drain on Market Street flooded with salt water

Barrington, RI Adaptation Assessment

1. Bioengineering and buffer planting
2. Shoreline regrading
3. Pavement removal
4. Move utility poles
5. End or road stormwater retrofit
6. Shoreline regrading
7. Salt marsh adaptation
8. Install larger culvert
9. Bank stabilization along roadway

Poppasquash Road: Bristol, RI

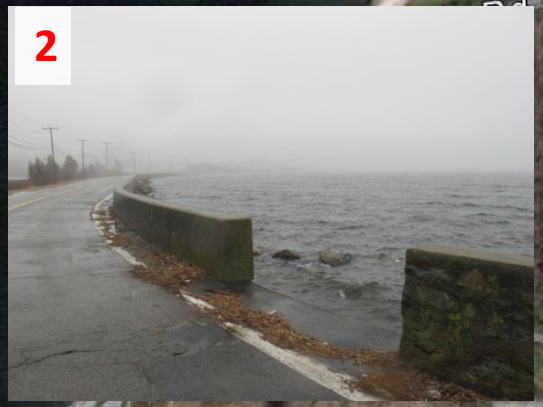
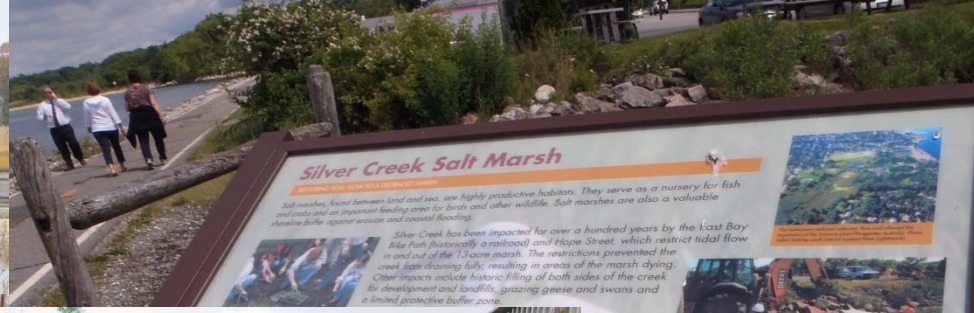


Photo taken 1.17.12

2

10.16.12 5.0’ tide (Newport)

1


Silver Creek Salt Marsh
Salt marshes, found between land and sea, are highly productive habitats. They serve as a nursery for fish and crabs and an important feeding area for birds and other wildlife. Salt marshes are also a valuable shoreline buffer against erosion and coastal flooding.
Silver Creek has been impacted for over a hundred years by the East Bay Bike Path (historically a railroad) and Hope Street, which restrict tidal flow in and out of the 13-acre marsh. The restrictions prevented the creek from draining fully, resulting in areas of the marsh dying. Other impacts include historic filling of both sides of the creek for development and landfills, grazing geese and swans and a limited protective buffer zone.
A culvert located between the East Bay Bike Path and Hope Street was removed to increase the tidal range within the marsh.
Excavation of clogged creeks enhanced the drainage of fresh water and the regular flooding of salt water, and is reducing breeding habitat for mosquitoes.
RG/SILVER_CREEK