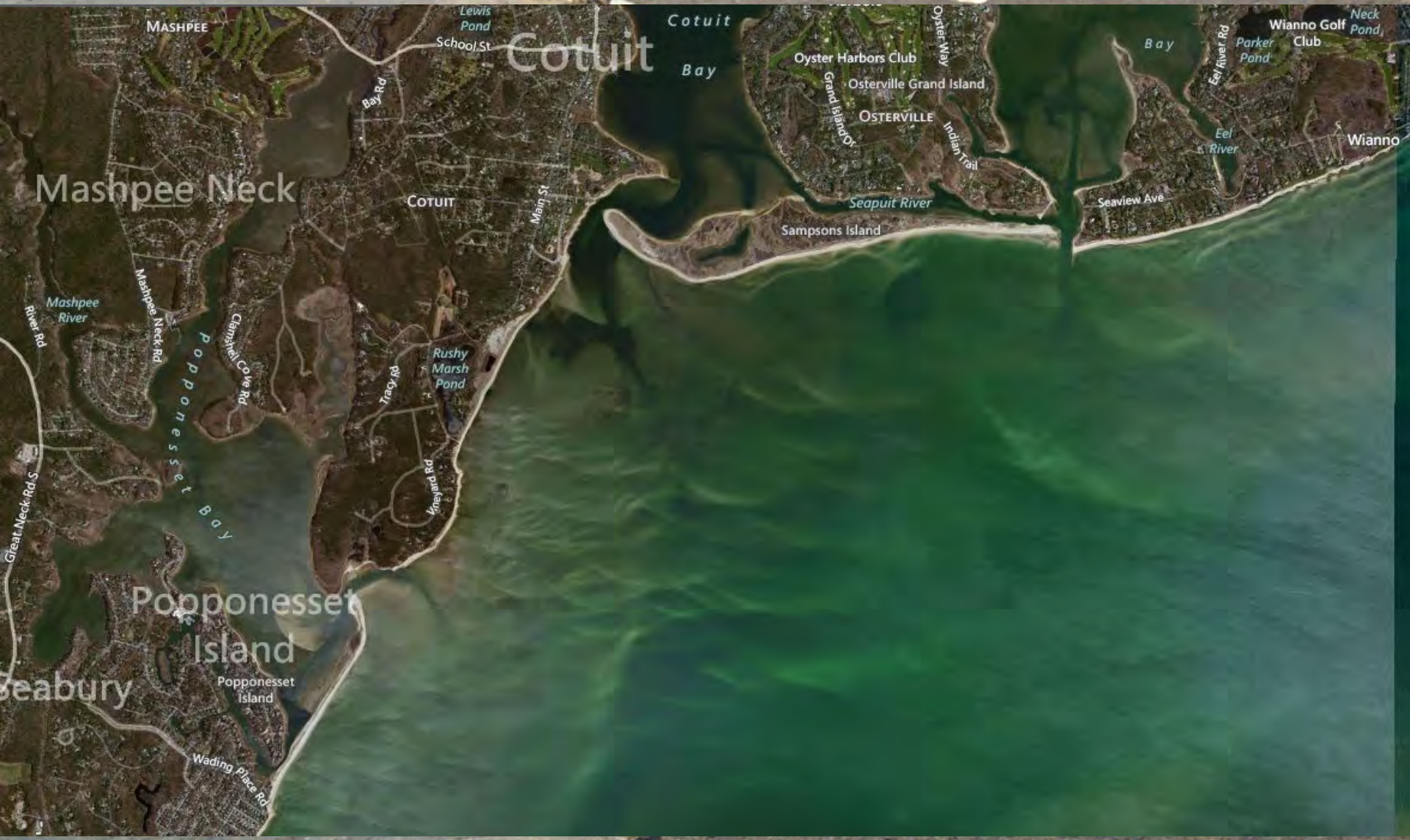
Green Infrastructure for Coastal Resilience
March 28, 2017

Dead Neck & Sampson's Island Backpassing and Nourishment

John S. Ramsey, P.E., D.CE
Applied Coastal Research and Engineering, Inc.

Project Sponsors: Three Bays Preservation & Mass Audubon Society

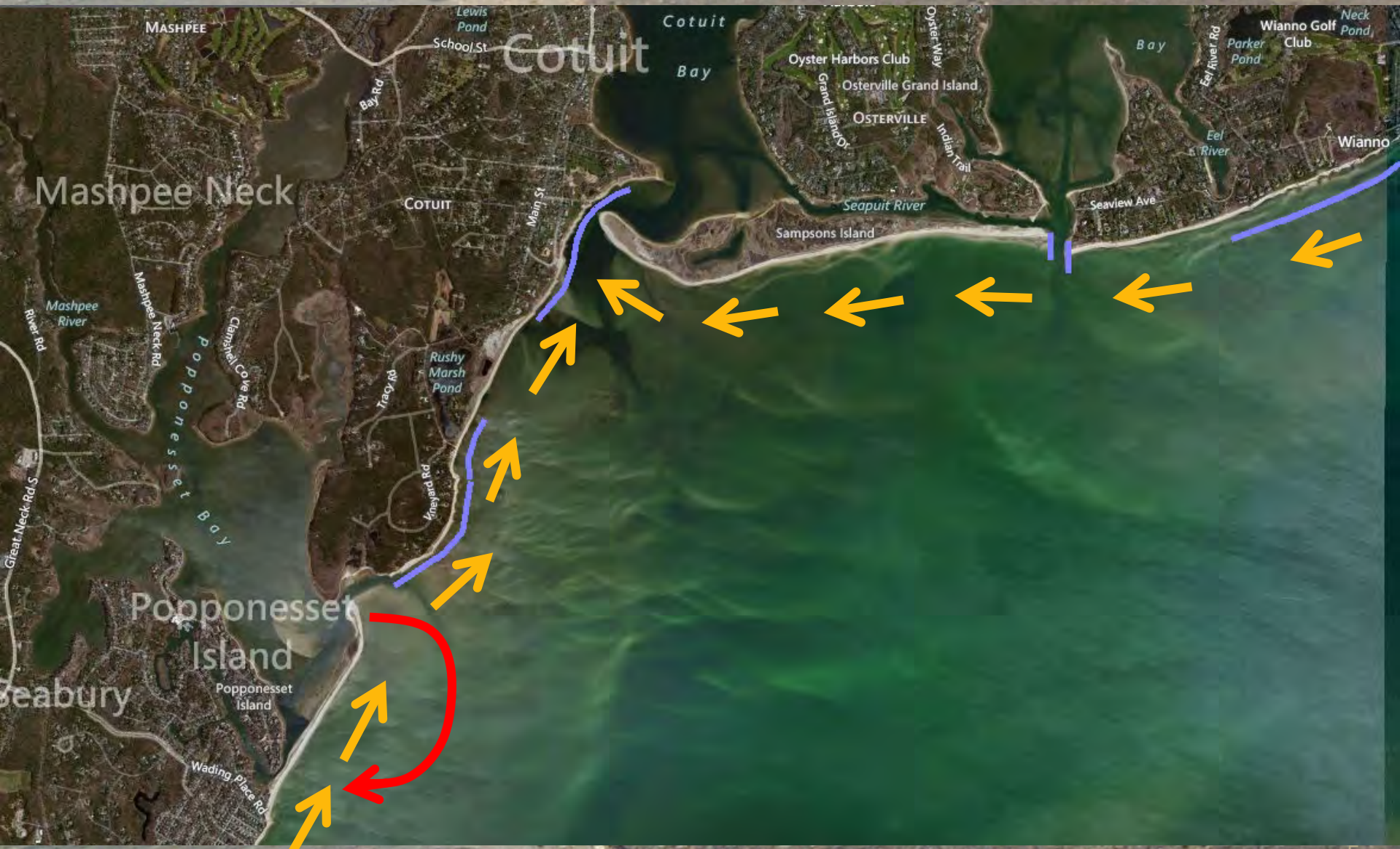
Where is Dead Neck and Sampson's Island?

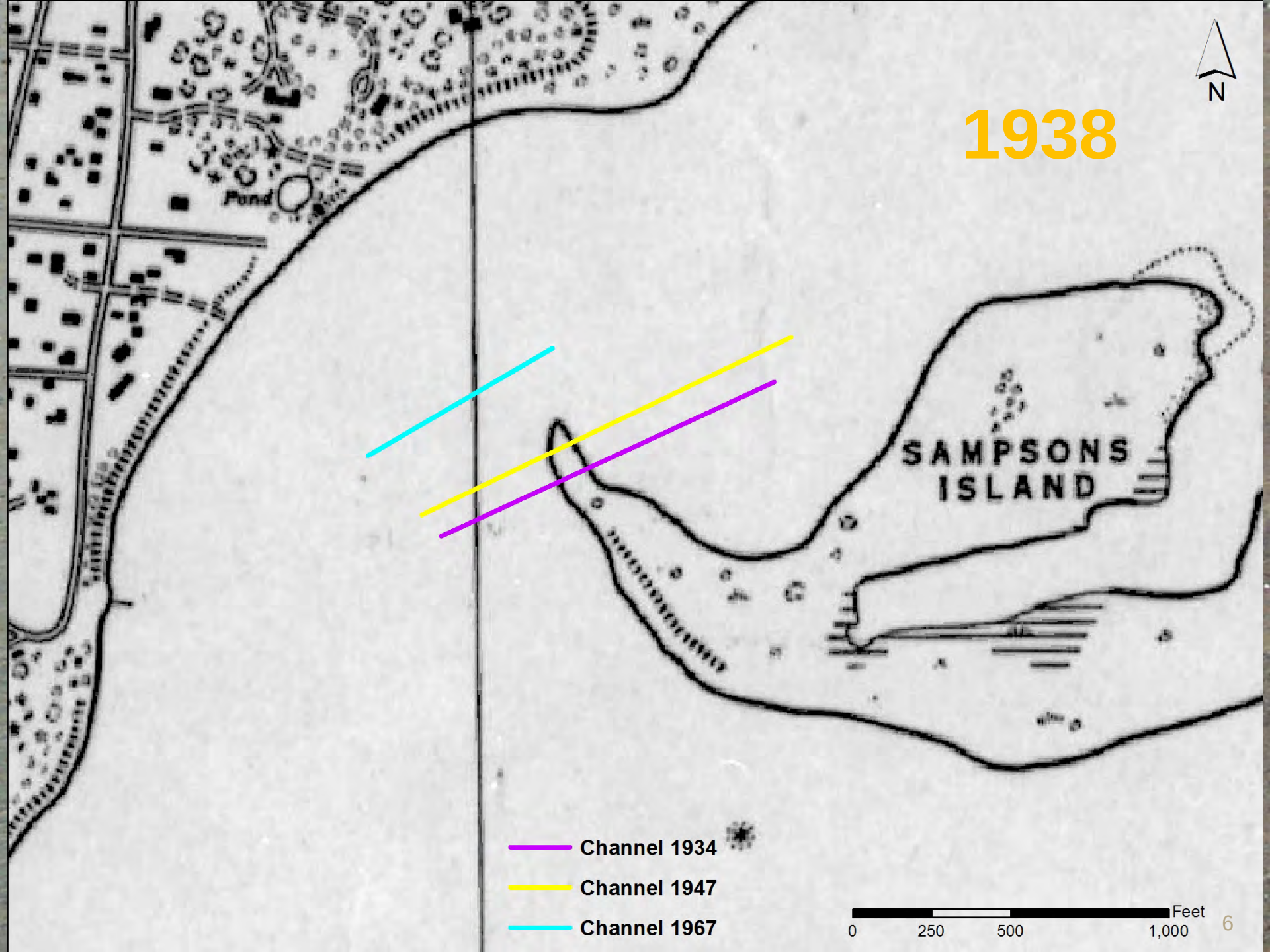


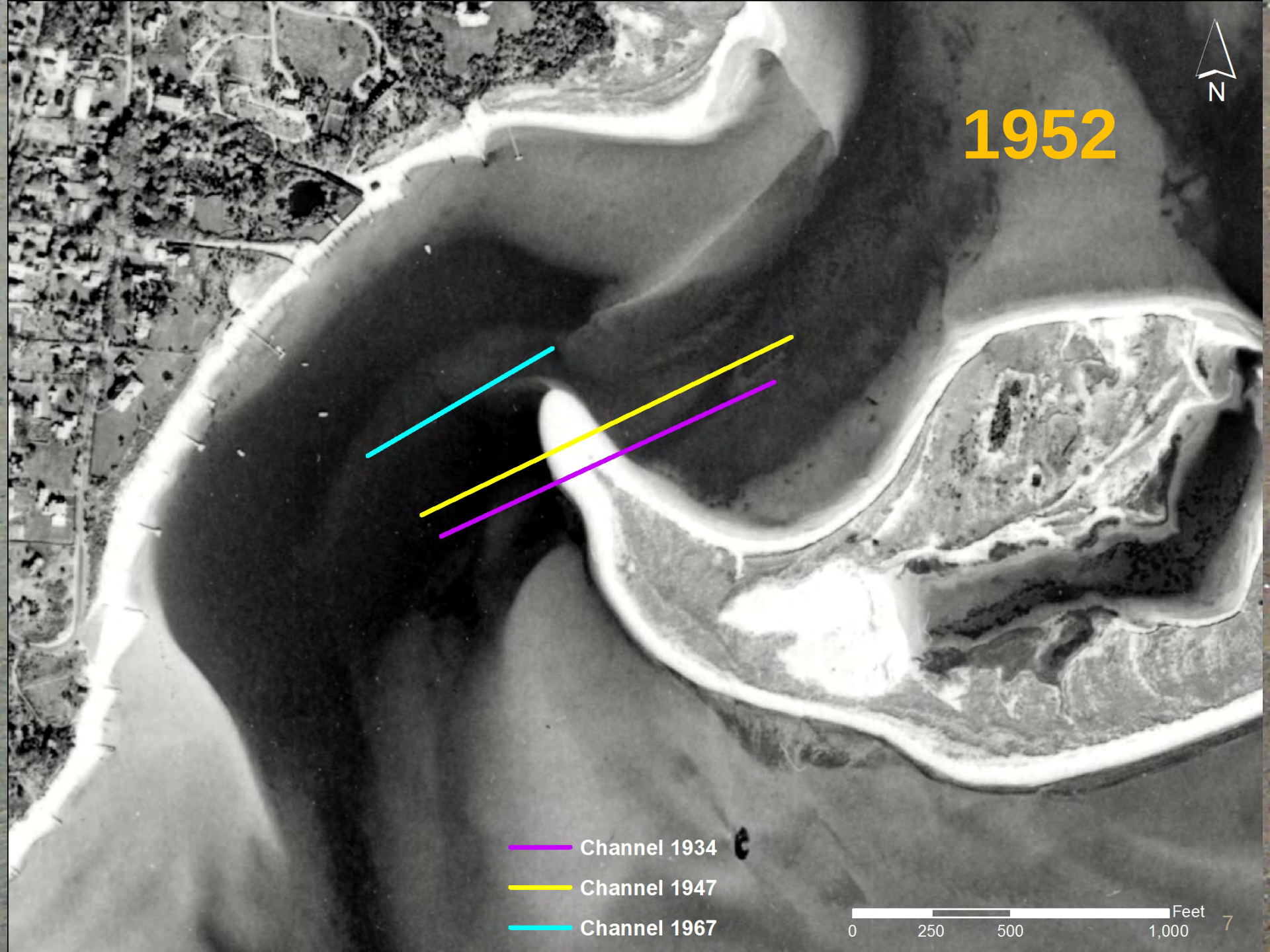
Three Bays - 1897

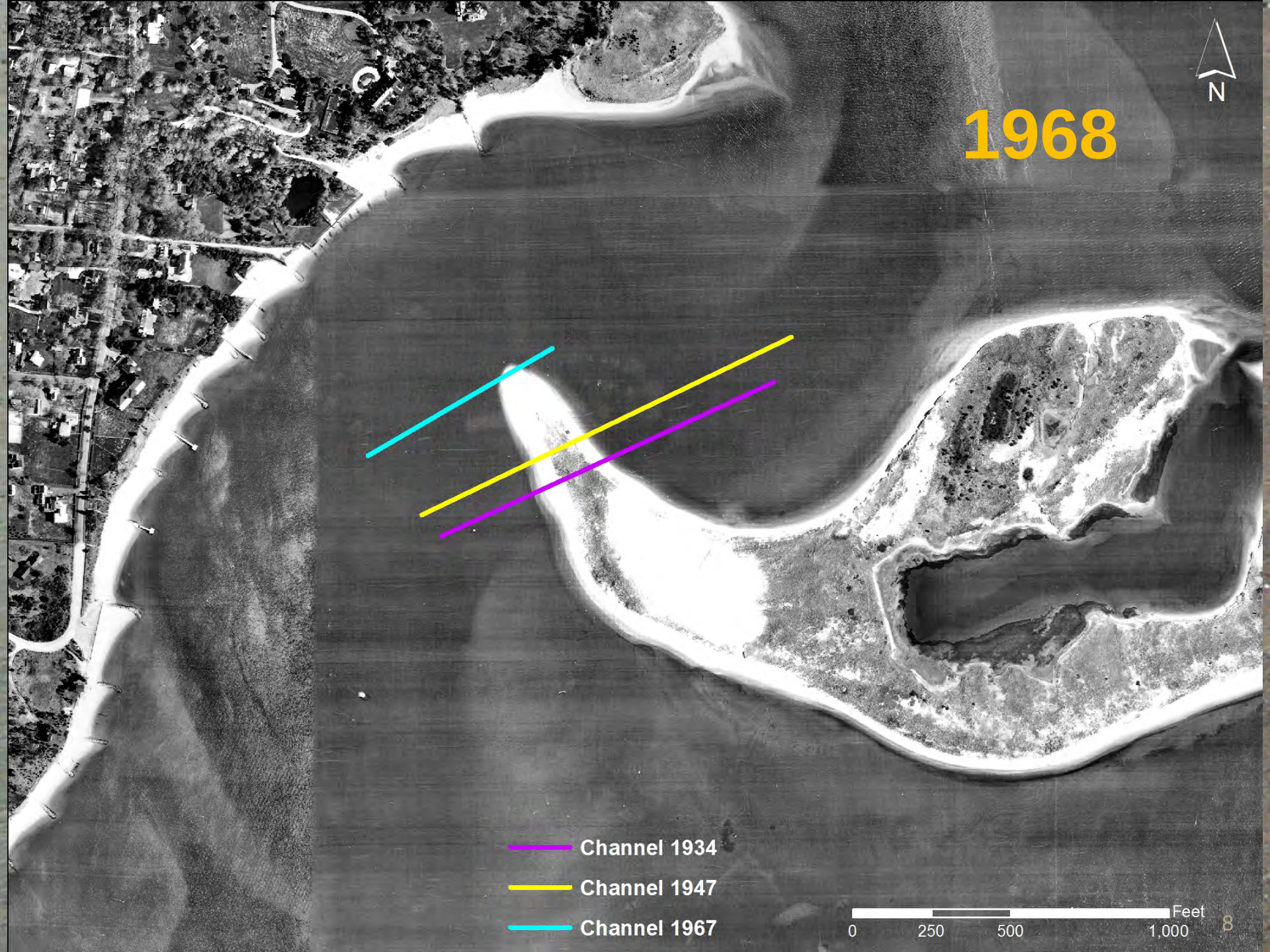
Historical Shoreline Change (1938-2001)

Regional Littoral Transport




1938
N
Pond
SAMPSONS
ISLAND
Channel 1934
Channel 1947
Channel 1967
Feet
0
250
500
1,000


1952
N
Channel 1934
Channel 1947
Channel 1967
0
250
500
1,000
Feet


1968
N
Channel 1934
Channel 1947
Channel 1967
0
250
500
1,000
Feet


N
2011
Channel 1934
Channel 1947
Channel 1967
bing
Feet
0
250
500
1,000


N
Shorelines
July 1938
May 1968
May 1989
Sept 2011
bing
0
250
500
1,000
Feet

230,000 Cubic Yard Nourishment (1999-2000)

1999

Shoreline Surveys (Since 2002)

"How is the 1999 beach fill performing?

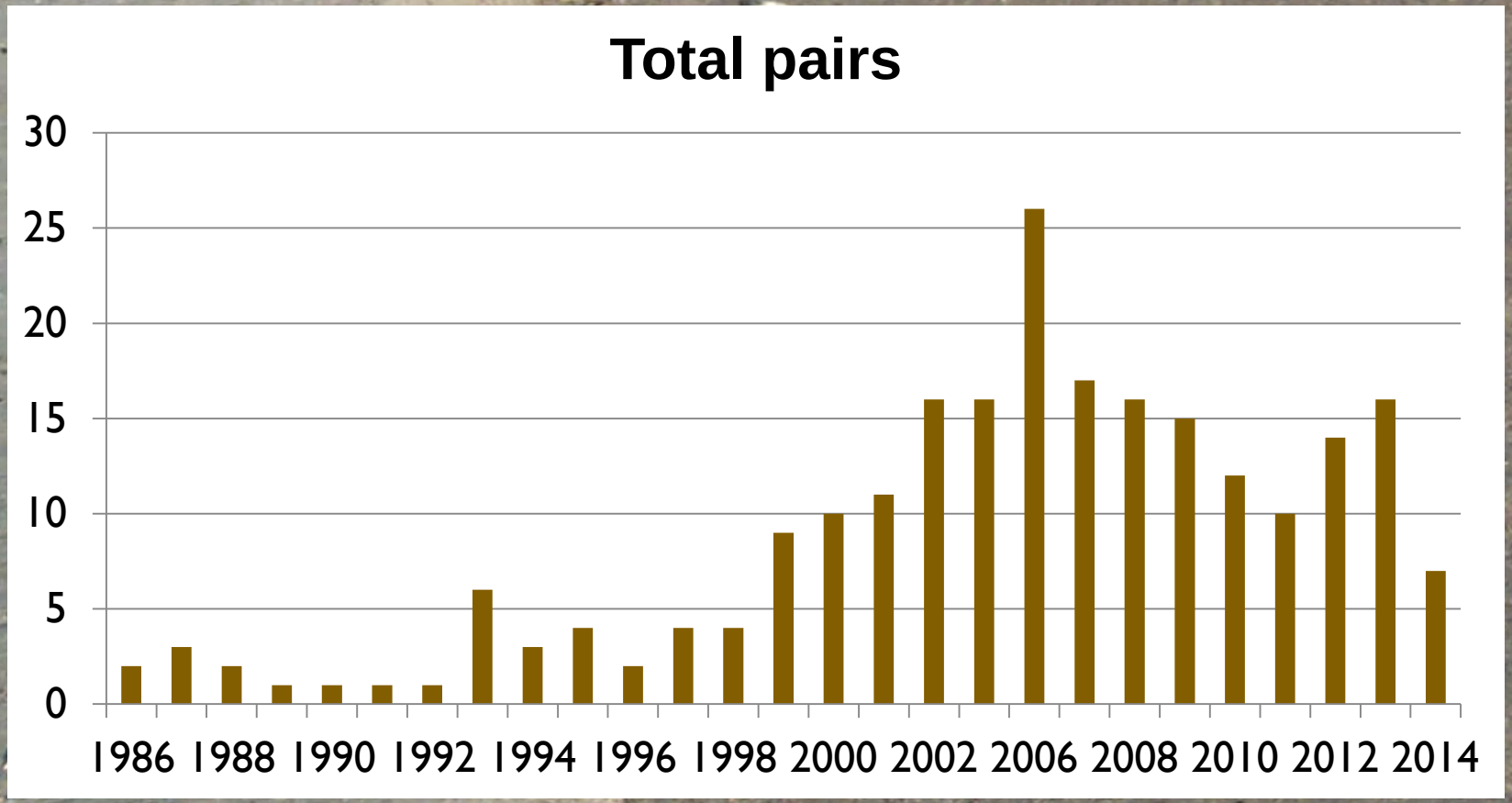
Shoreline Surveys (Since 2002)

"How is the 1999 beach fill performing?


2000 - 2 yrs post-nourishment
2006 - 8 yrs post-nourishment
2011 - 13 yrs post-nourishment
Piping Plover
Least Tern
Common Tern

Piping Plover Abundance

Provided by Katharine C. Parsons, Director
Coastal Waterbird Program



Proposed Dredging Schedule

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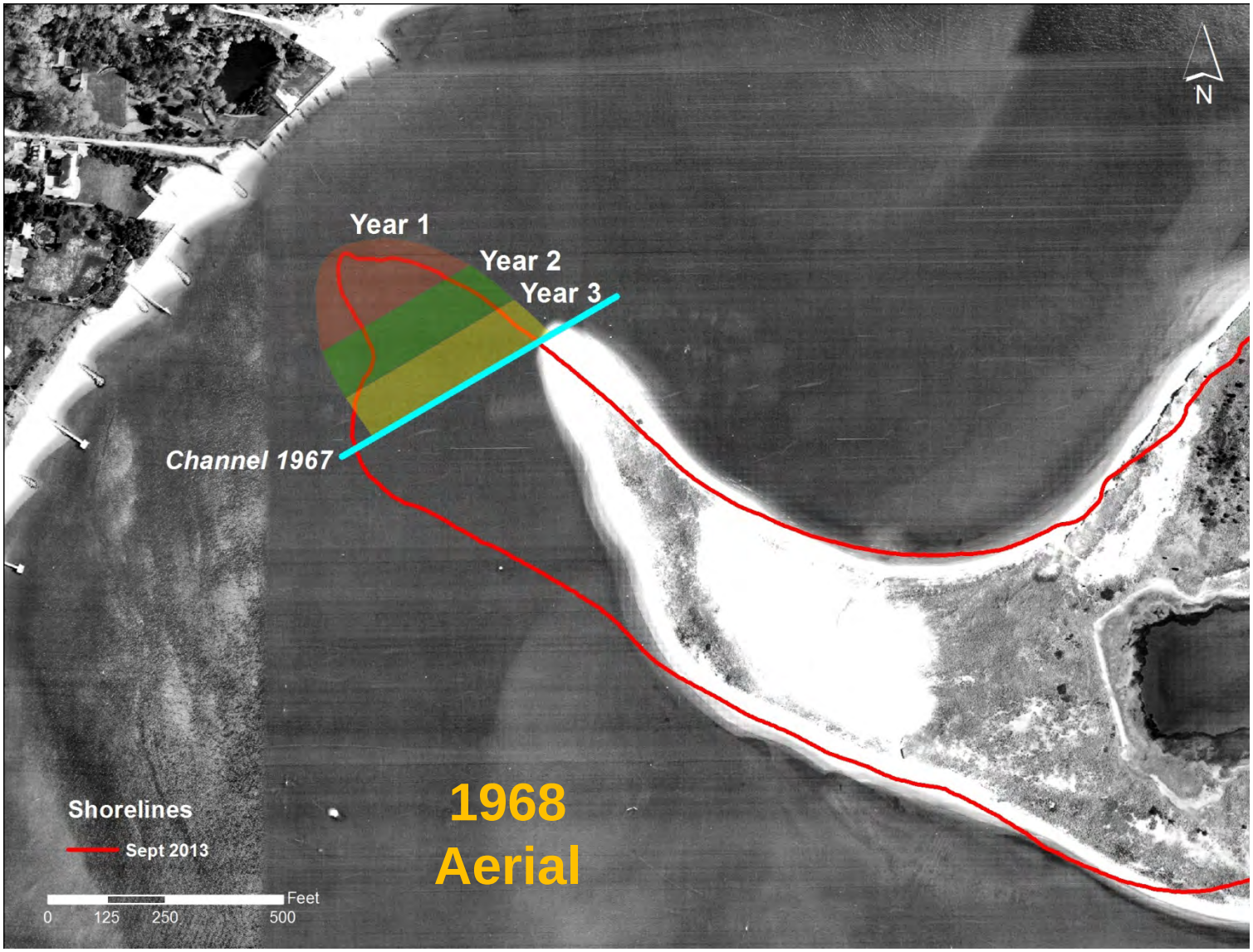
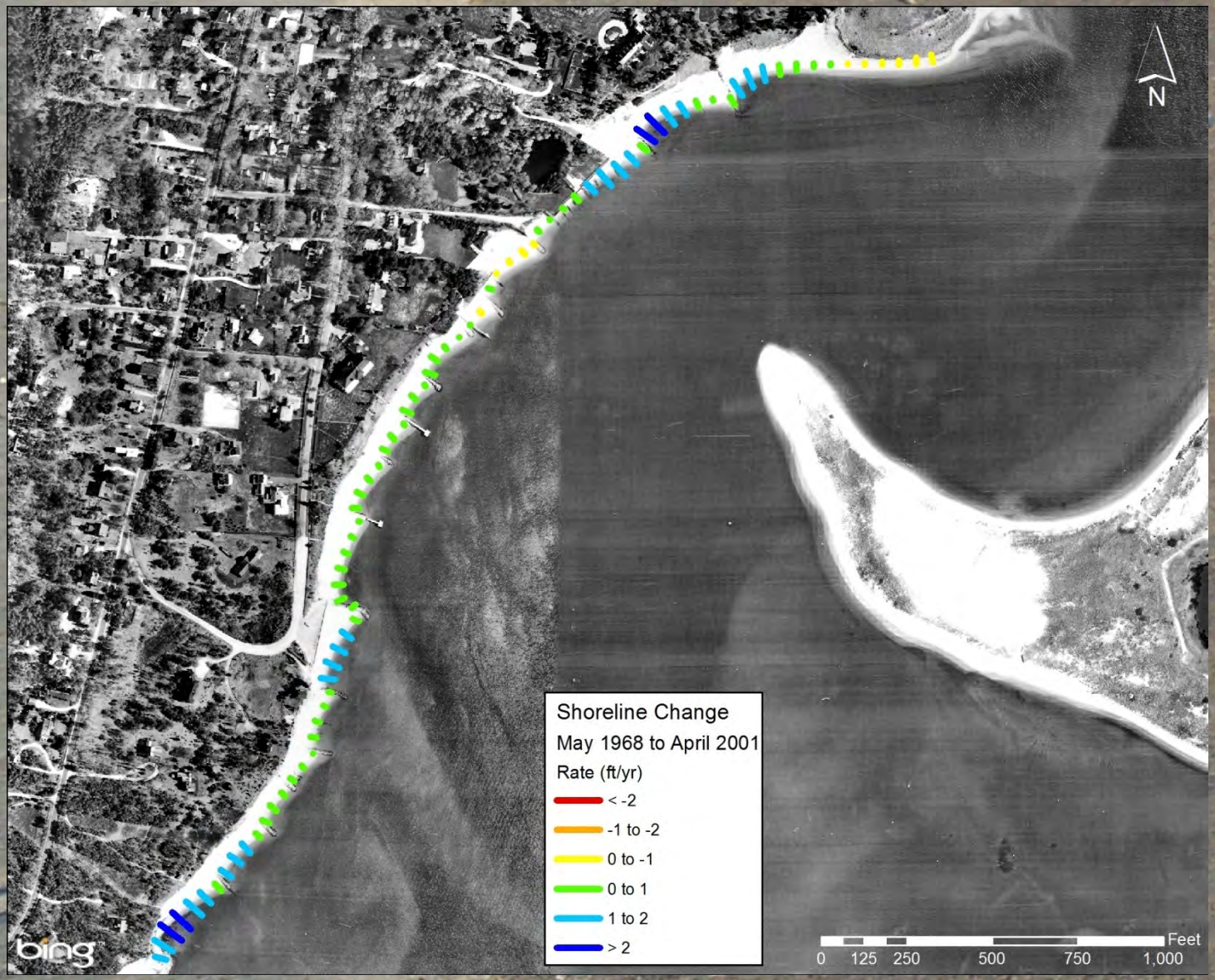
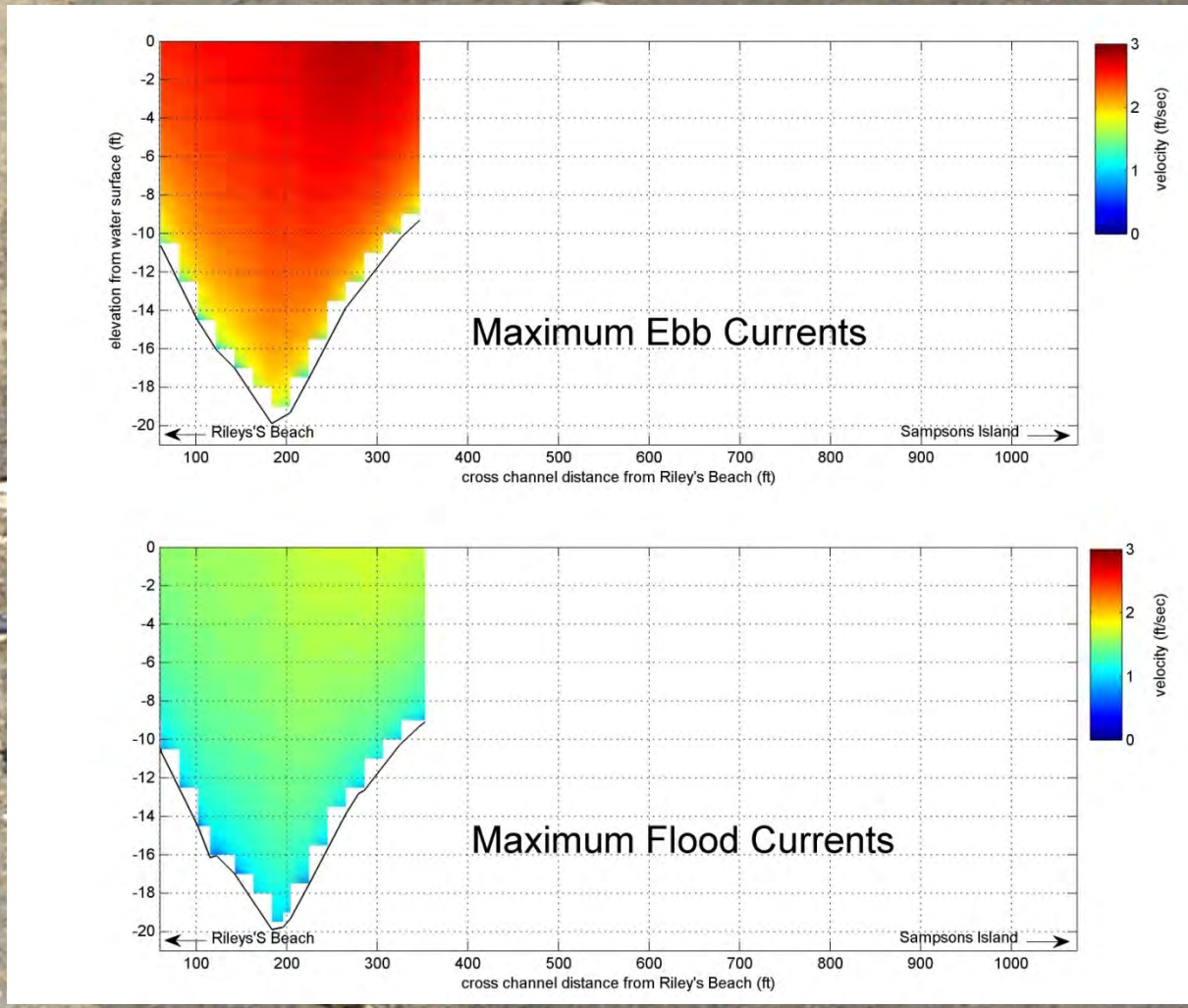


Historical Shoreline Change (1968-2001)

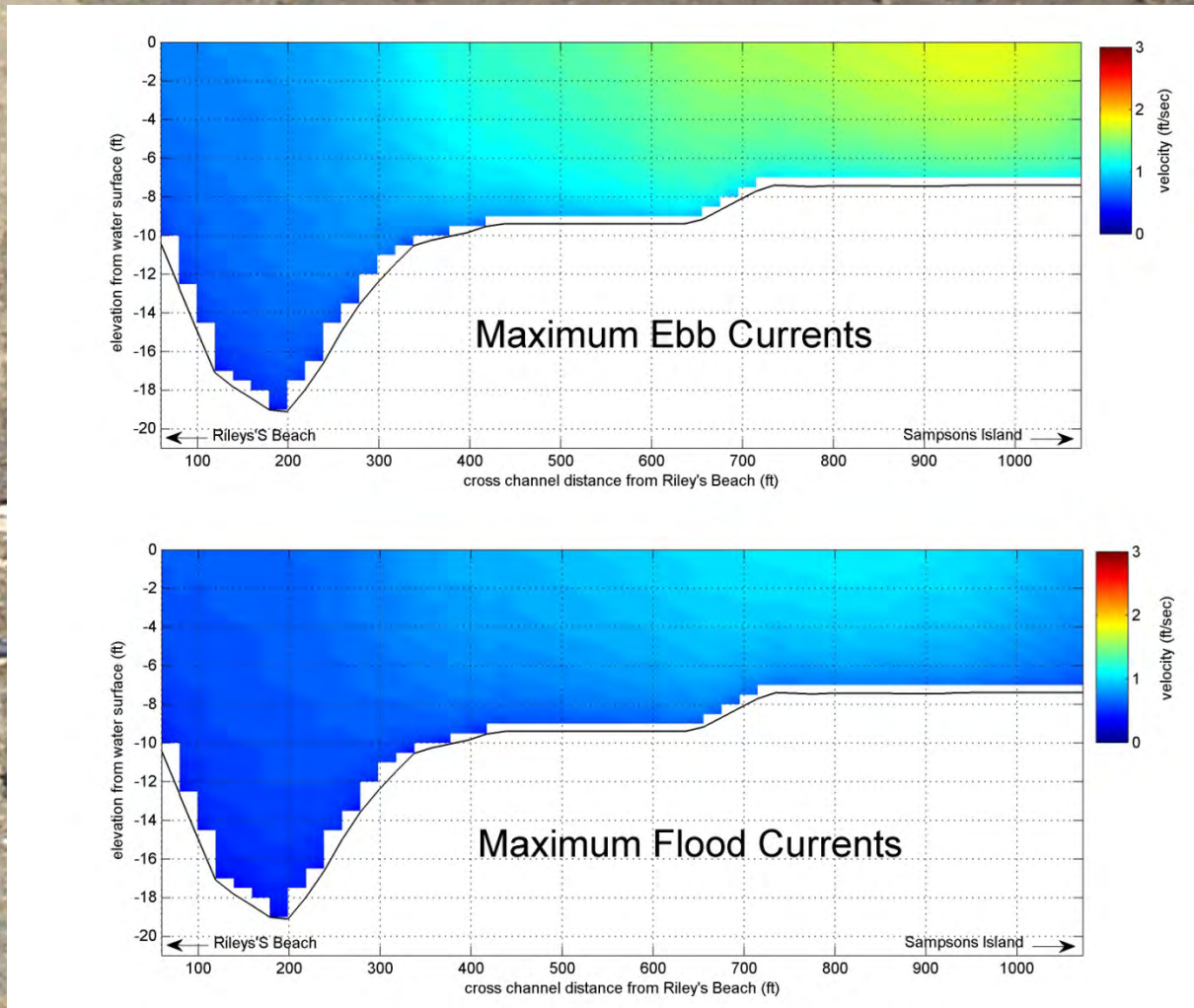


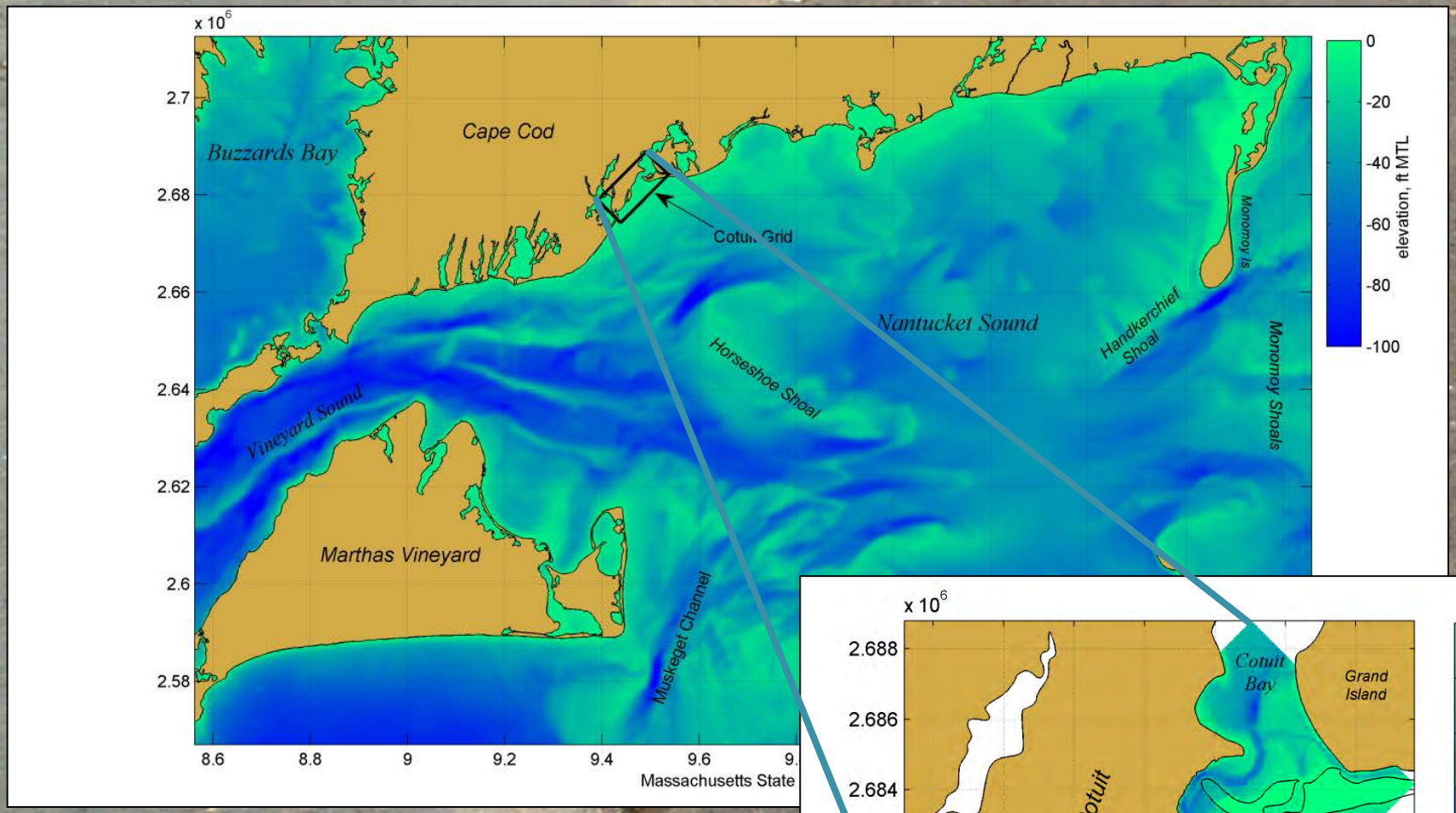
Historical Shoreline Change (2001-2011)

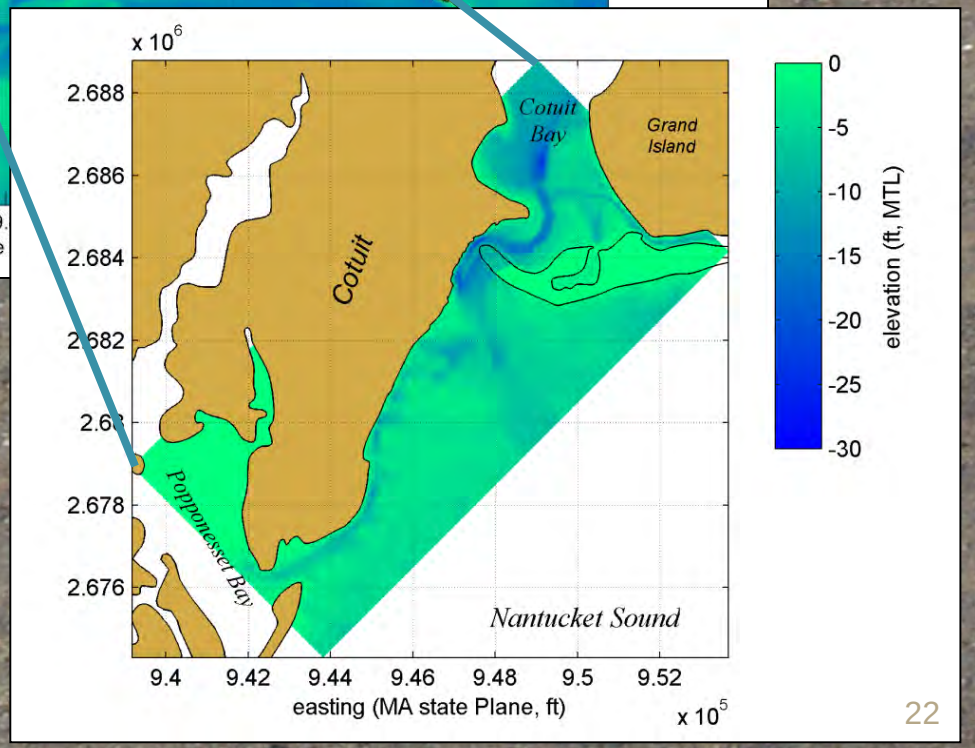
Influence of channel width on currents



Influence of channel width on currents







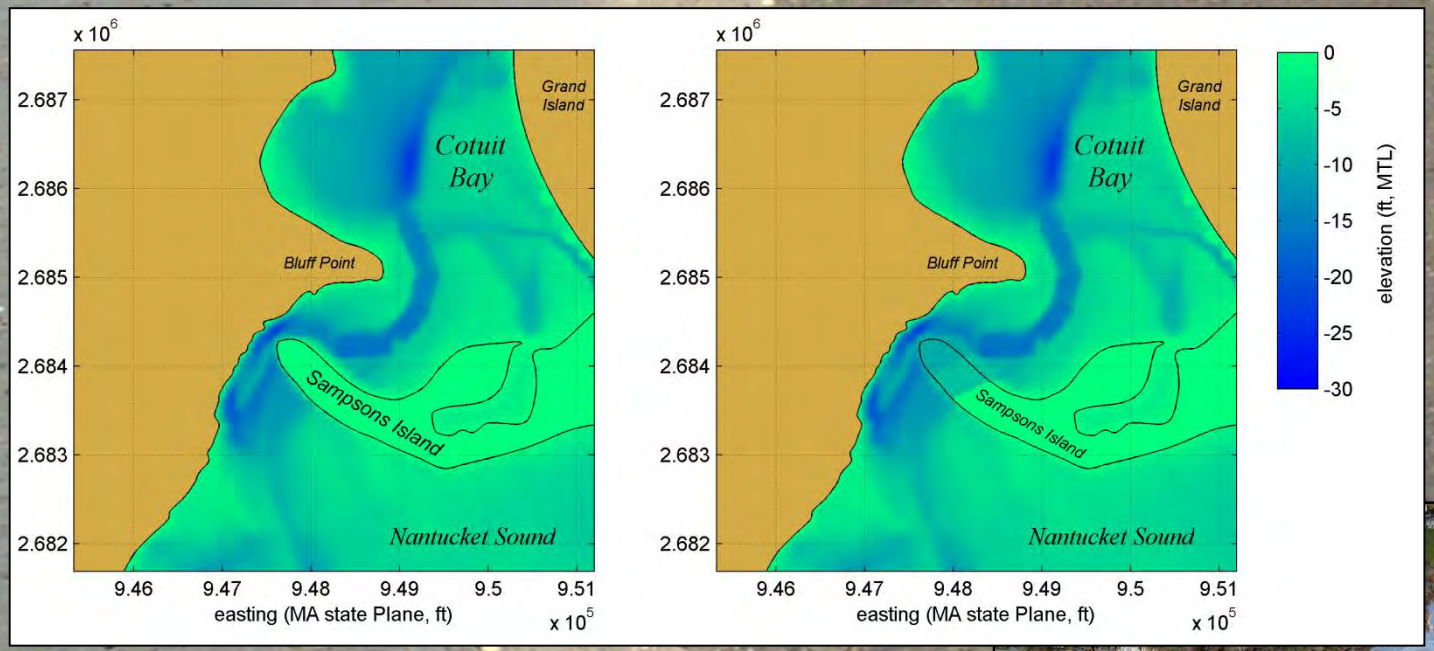
Wave Modeling Grids

Coarse

Fine

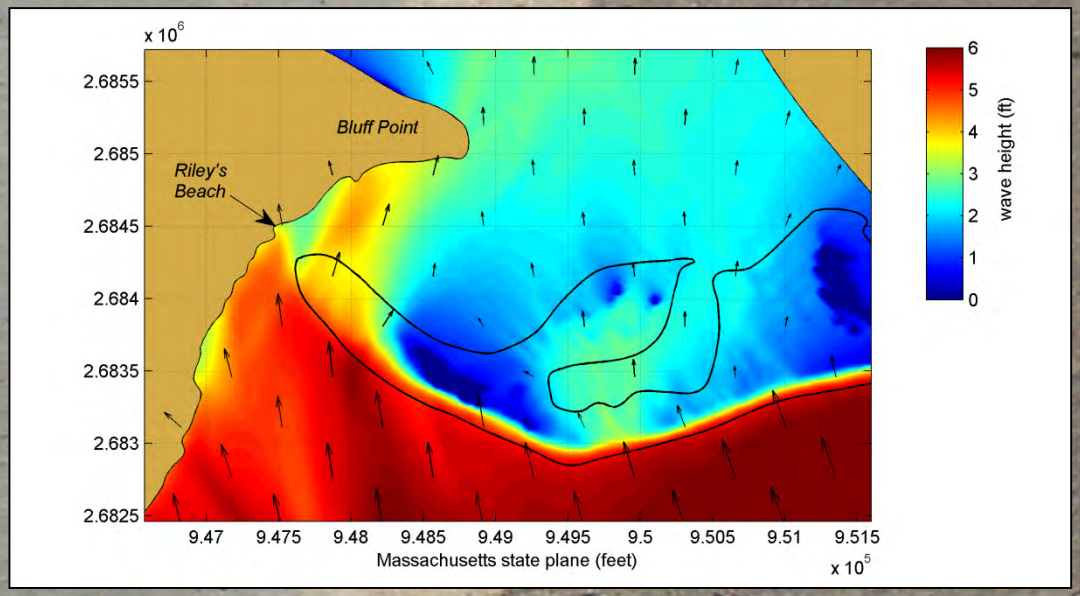
Existing and 800-ft Spit Removal

Modeled 25, 50, and 100-year Storm Events

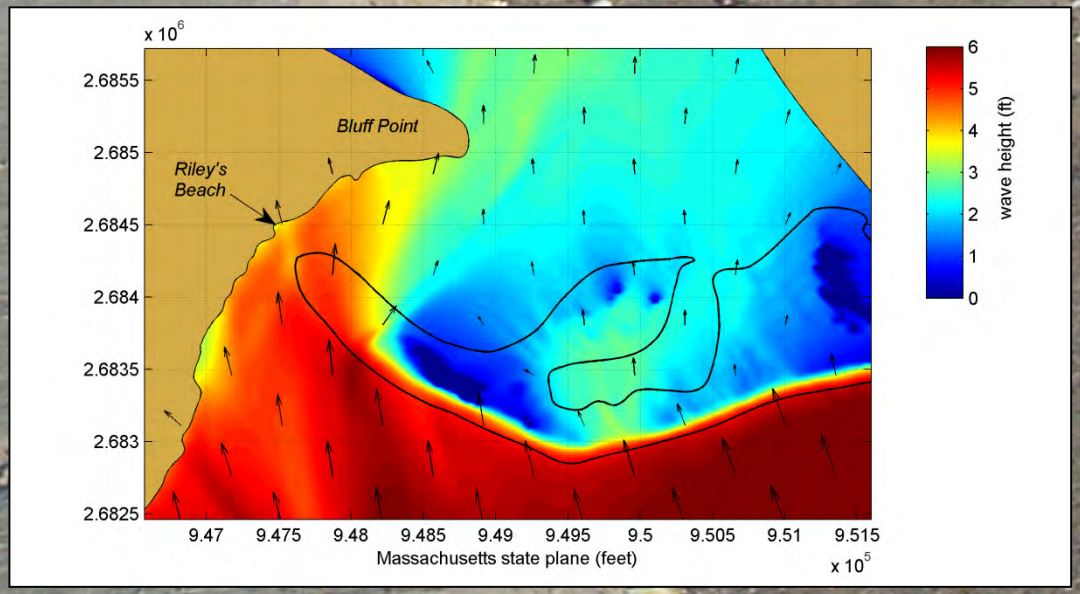


Fine Grid Model (10 m Cells)

100-year Storm from South



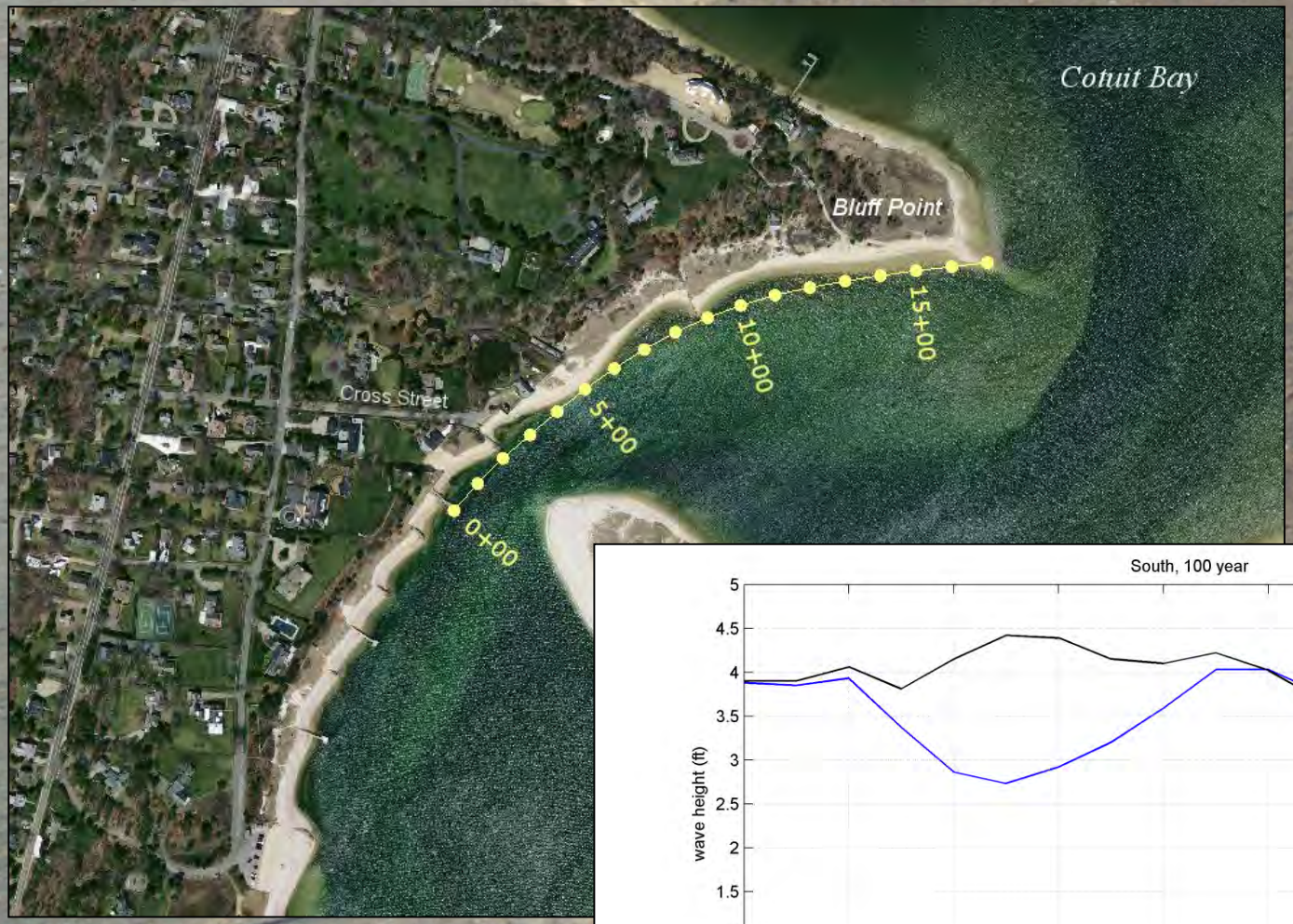
Existing Conditions

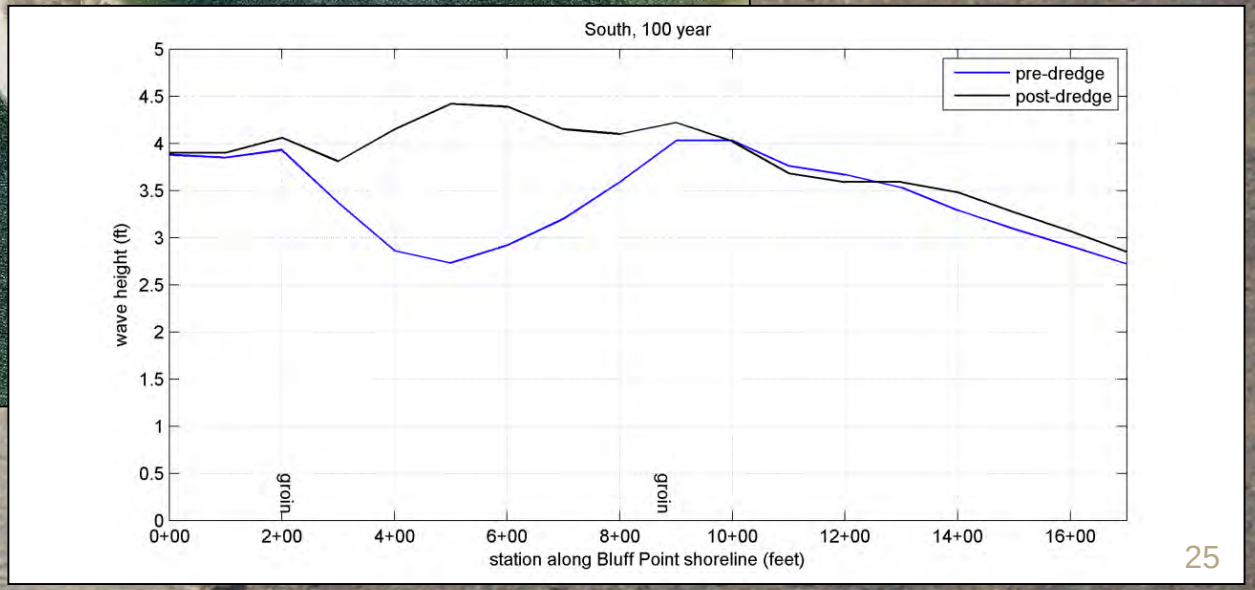


800-ft Spit Removal

Wave Height Difference

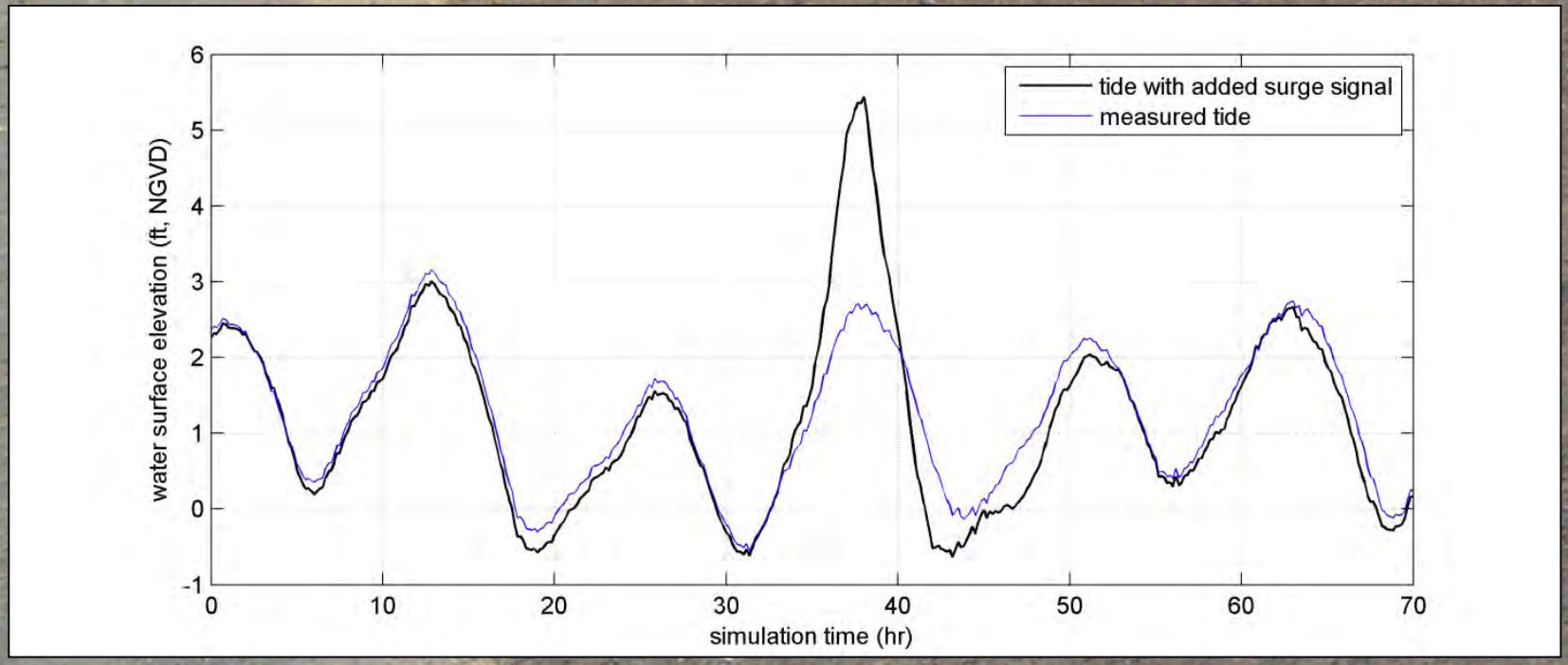
100-year Storm from South





Storm Surge - Hydrodynamic Analysis

10-year Storm Surge – Similar to Hurricane Bob



Low Elevation of the Spit

Hurricane Irene 2011 ~ 4 Year Return Period Water Level

Hydrodynamic Analysis – Existing Conditions

10-year Storm Surge – Similar to Hurricane Bob

Green > 2ft/sec and Red > 3 ft/sec

Existing Conditions
Flood Tide

800-ft Spit Removal
Flood Tide

Hydrodynamic Analysis – Existing Conditions

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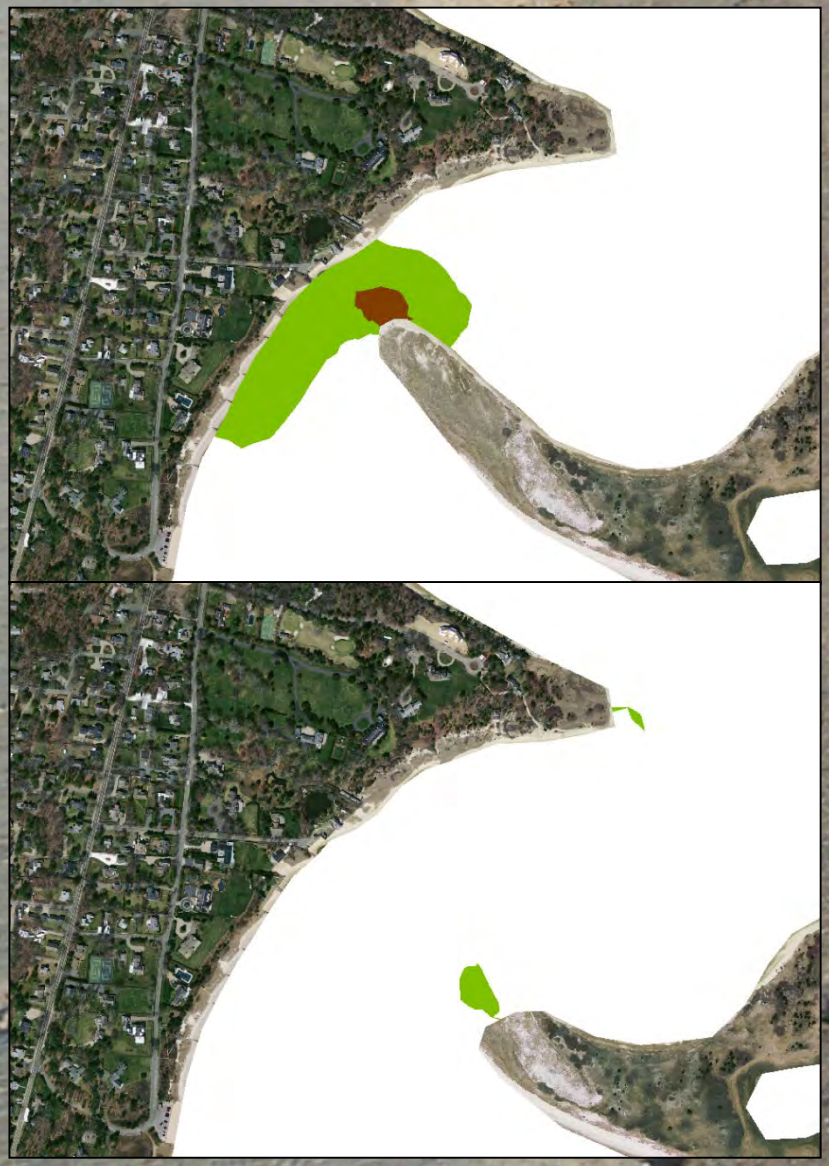

Existing Conditions
Ebb Tide

800-ft Spit Removal
Ebb Tide

Effects of the 100-Year Event

1944 Hurricane

FALL IN COTUIT. This photograph, taken before the 1944 hurricane, shows a tranquil scene of the town dock, Congressman Charles L. Gifford's district office (with the three windows), the Whites' beach cottage, and the Crawfords' summer house. (Courtesy of the Cotuit Library.)

AFTER THE 1944 HURRICANE. This photograph shows the same area after 100-mile-per-hour winds tore across Cotuit. All that remains of the congressman's office is the chimney. The beach cottages are washed into heaps of debris, topped with beached boats such as *Spindrift*. German prisoners of war came from Camp Edwards to clear trees from the blocked roads. (Courtesy of the Cotuit Library.)

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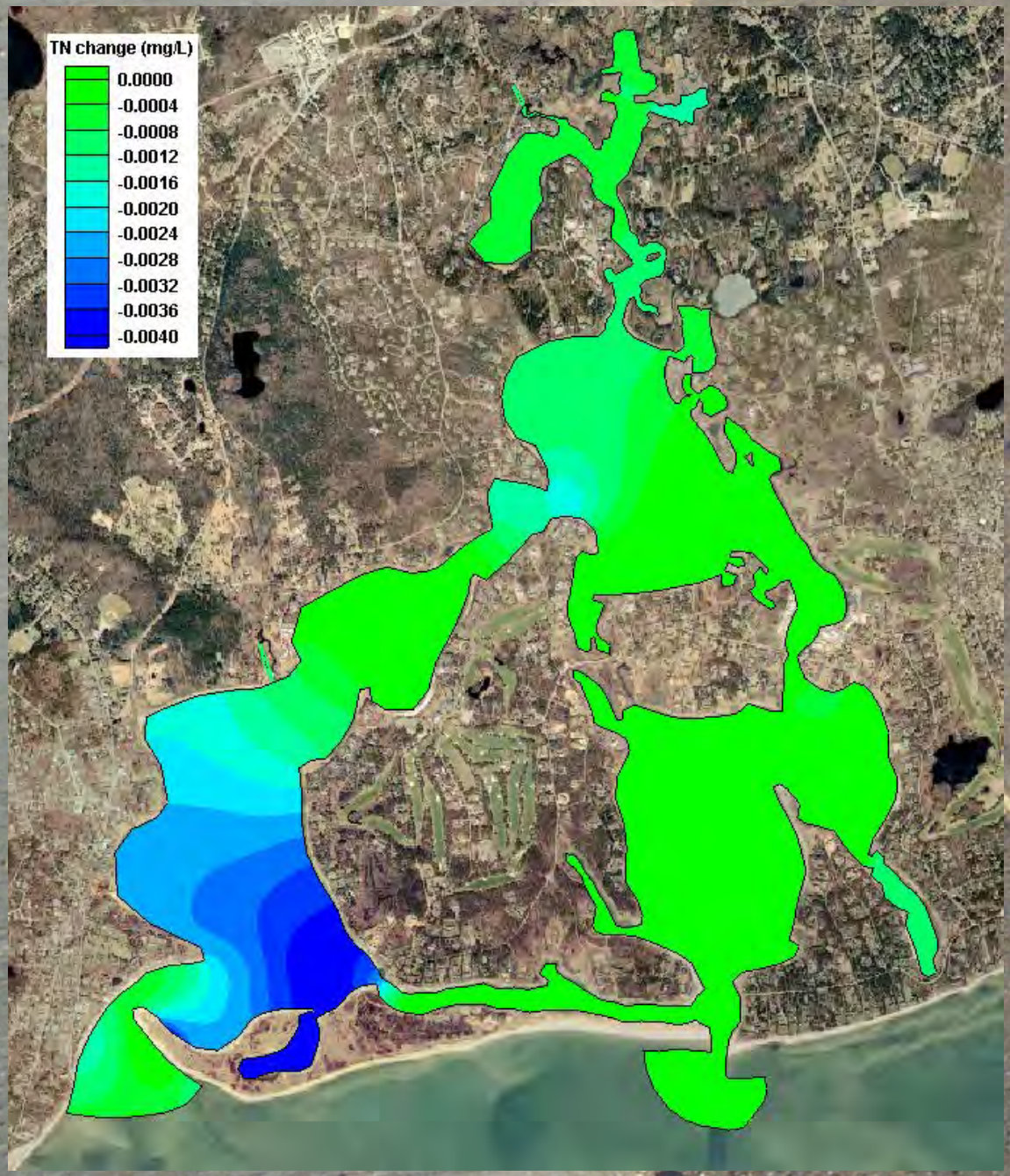


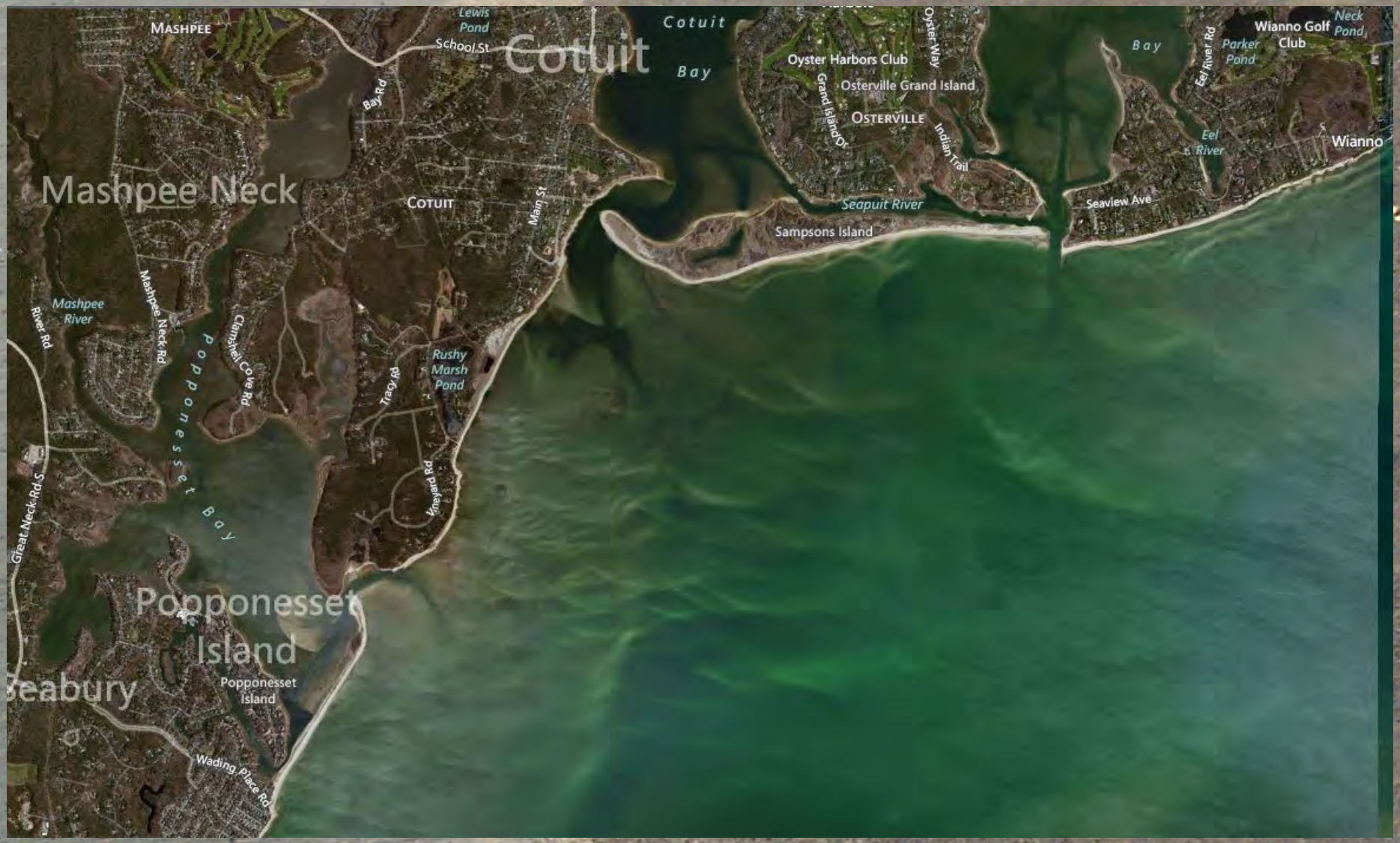
Effects of the Proposed Year 1 and 2 Project on Water Quality

Maximum Improvement Lowering TN Levels by ~8% in Lower Cotuit Bay

Challenges + Lessons Learned

- *"Large-Scale" Nourishment Not Common in MA*
- *"Mitigating for Mitigation"*
- *Backpassing as Part of Inlet Sediment Management also Not Common in MA*

Questions


Mashpee
Lewis Pond
School St
Cotuit
Cotuit Bay
Bay Rd
Oyster Harbors Club
Oyster Way
Osterville Grand Island
Grand Island Dr
Osterville
Indian Trail
Bay
Eel River Rd
Parker Pond
Wianno Golf Club
Neck Pond
Eel River
Wianno
Mashpee Neck
Cotuit
Main St
Seapuit River
Seaview Ave
Sampsons Island
Mashpee River
River Rd
Mashpee Neck Rd
Clamshell Cove Rd
Popponesset Bay
Tracy Rd
Rushy Marsh Pond
Vineyard Rd
Great Neck Rd S
Popponesset Island
Seabury
Popponesset Island
Wading Place Rd