

An aerial photograph of the Sandy Hook Federal Navigation Channel. The image shows a large, light-colored sandbar in the foreground, partially submerged in the water. In the background, a long, narrow pier or breakwater extends into the water, with a ship docked at its end. Another ship is visible further out in the channel. The water is a deep blue color.

Sandy Hook Federal Navigation Channel Regional Sediment Management

18 June 2015

Study Area

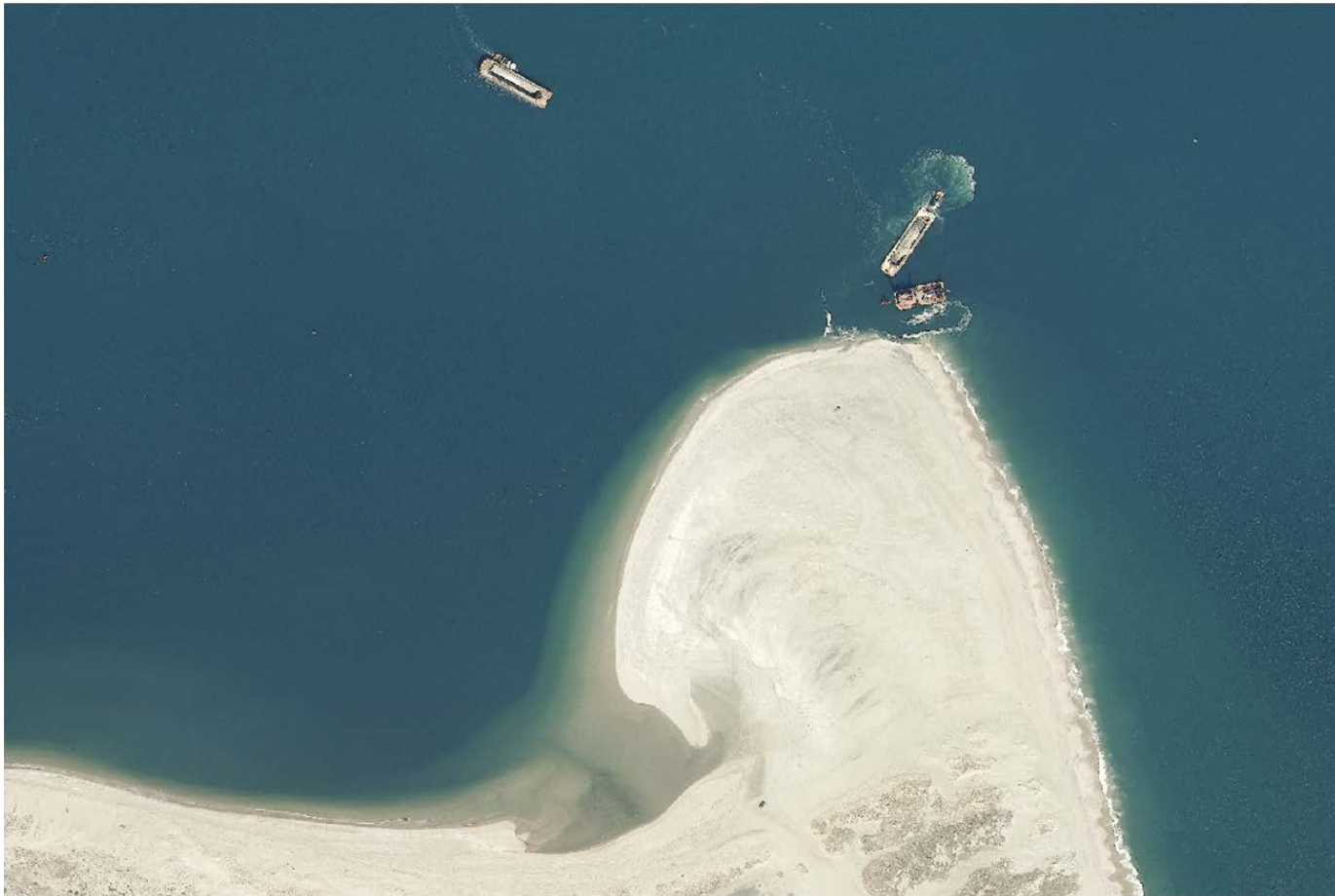


Study Area

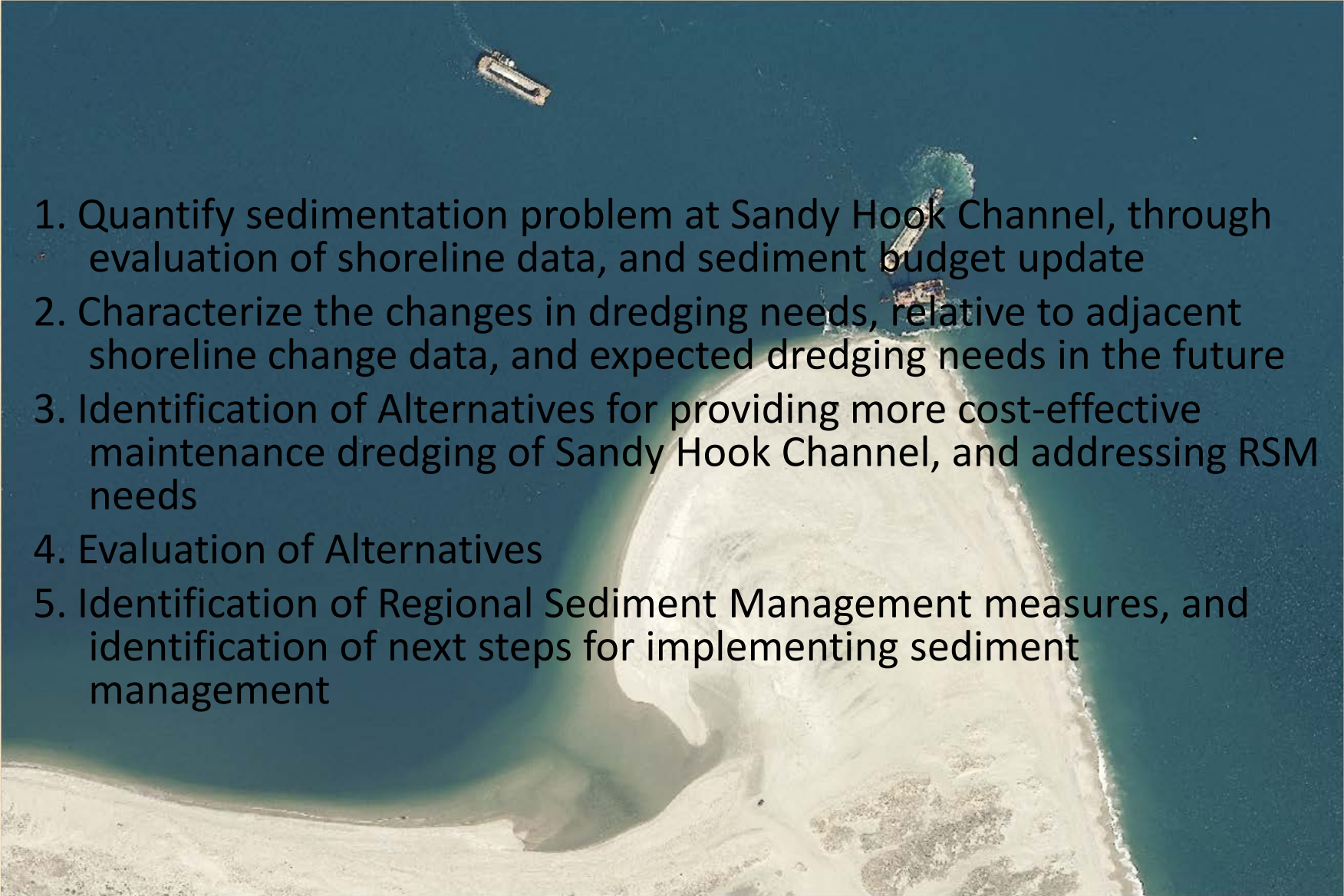


Problem Statement

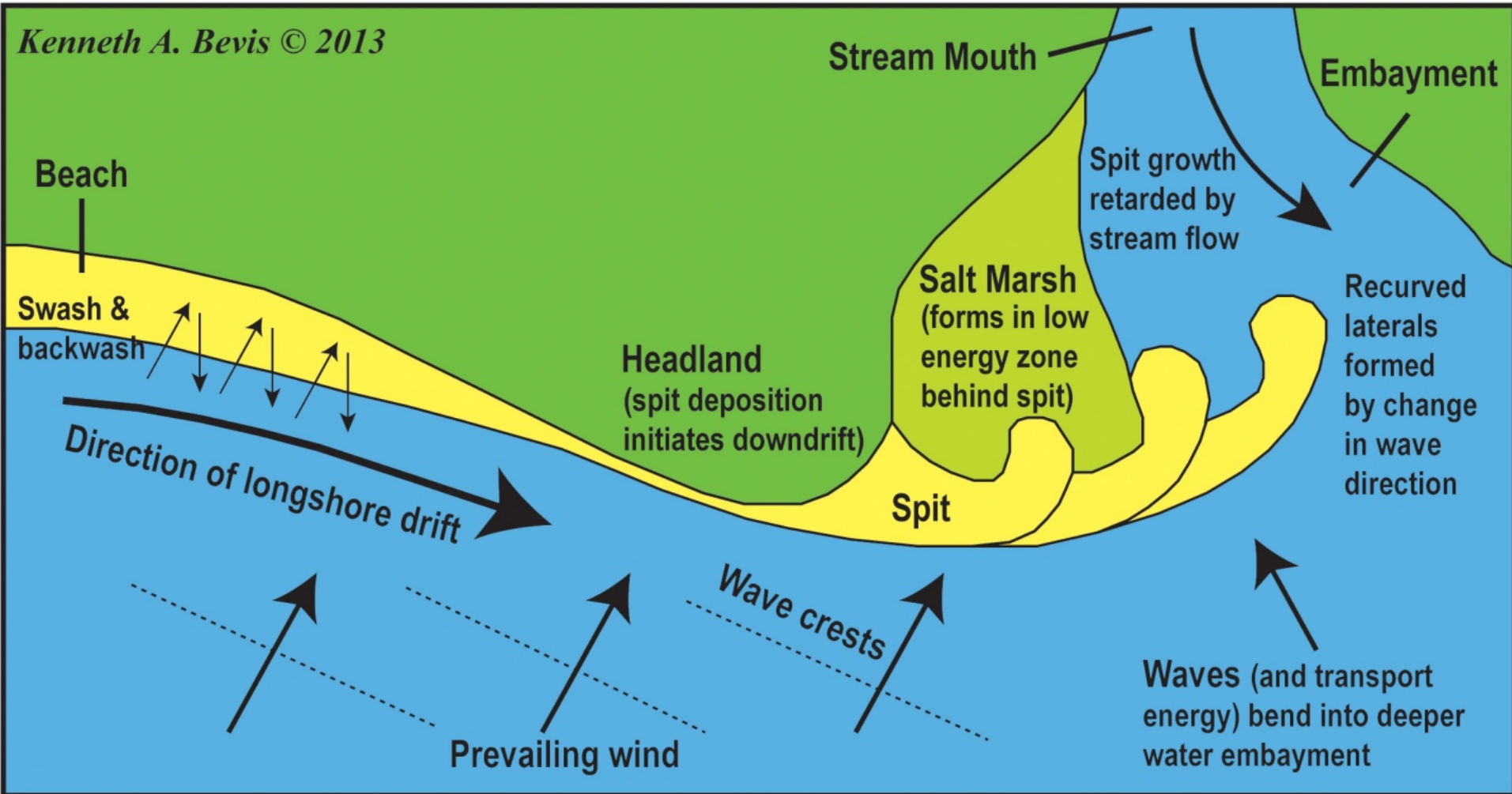
- 1) Characterize problems impacting Sandy Hook Channel
- 2) Identify solutions to address shoaling problem
- 3) Identify other regional areas that can benefit from excess material



Tasks

- 
- An aerial photograph of a coastal area. The top half of the image shows a dark blue body of water. A small, light-colored boat is visible in the upper left quadrant. The bottom half of the image shows a sandy beach and a large, light-colored area that appears to be a sandbar or a large pile of sediment. The text of the tasks is overlaid on the water and sand areas.
1. Quantify sedimentation problem at Sandy Hook Channel, through evaluation of shoreline data, and sediment budget update
 2. Characterize the changes in dredging needs, relative to adjacent shoreline change data, and expected dredging needs in the future
 3. Identification of Alternatives for providing more cost-effective maintenance dredging of Sandy Hook Channel, and addressing RSM needs
 4. Evaluation of Alternatives
 5. Identification of Regional Sediment Management measures, and identification of next steps for implementing sediment management

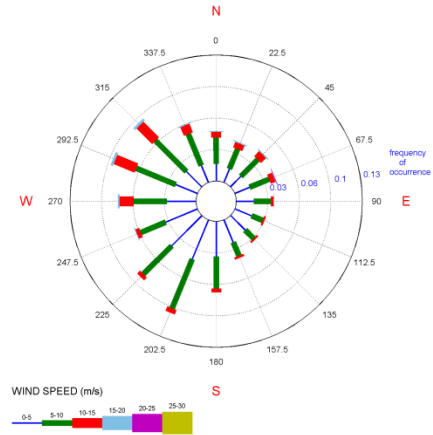
Typical Spit Growth



WIS Wind & Wave Roses



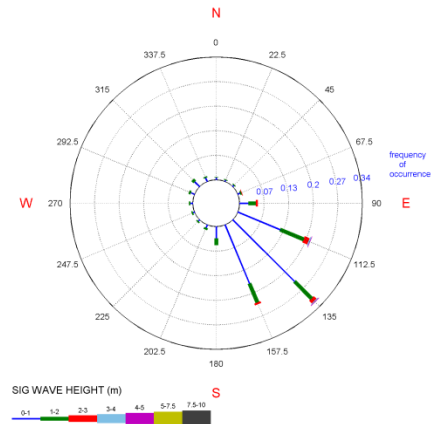
Atlantic WIS Station 63126
 01-Jan-1980 thru 31-Dec-2012
 Long: -73.83° Lat: 40.42° Depth: 21 m
 Total Obs : 289295
WIND ROSE



Wind Rose

ERDC US Army Engineer Research & Development Center 8160126_v03

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WAVE ROSE



Wave Rose

ERDC US Army Engineer Research & Development Center 8160126_v03

Growth of Sandy Hook

1995



2007

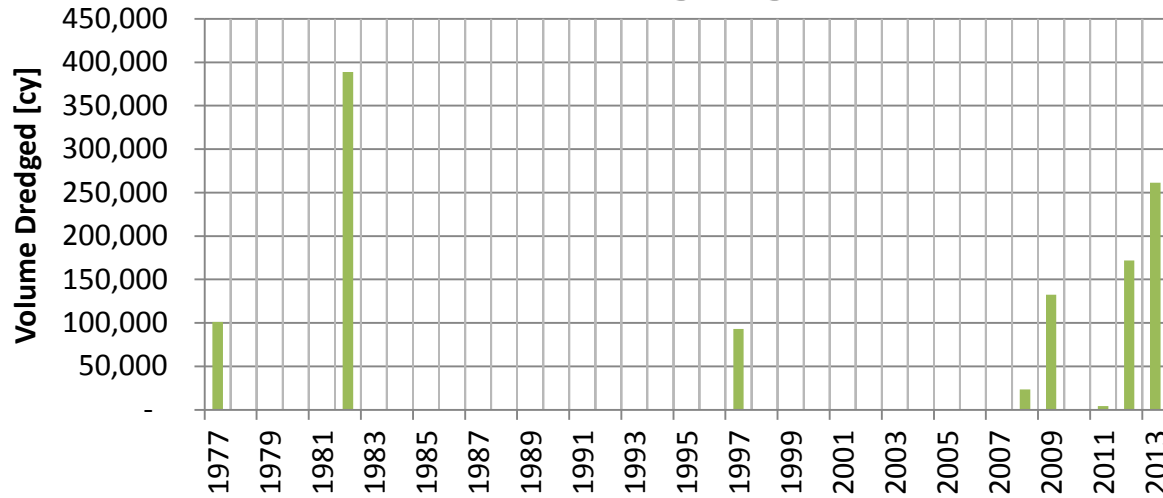


2014

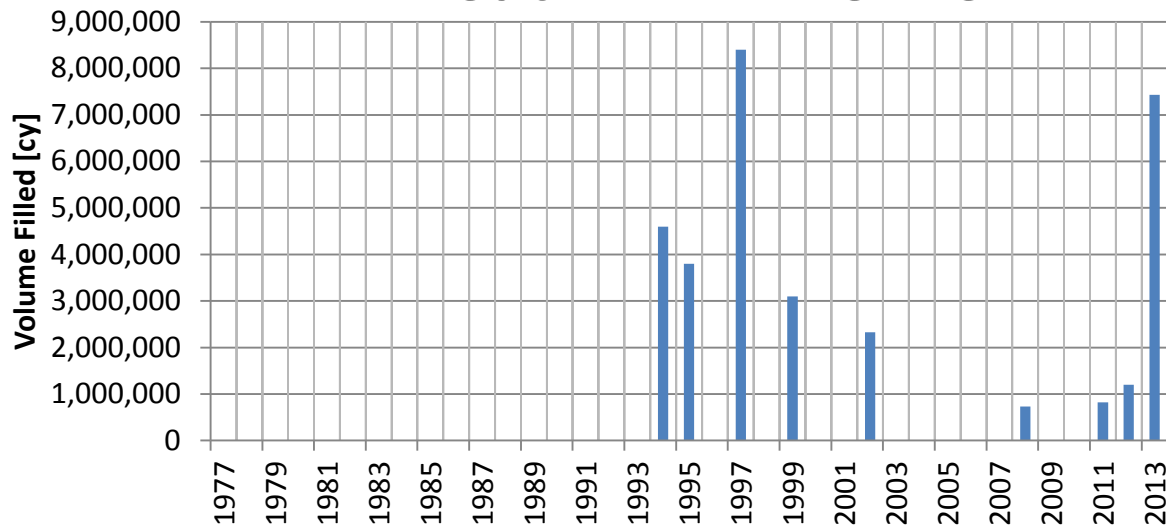


Channel Dredging Vs. Beach Fill

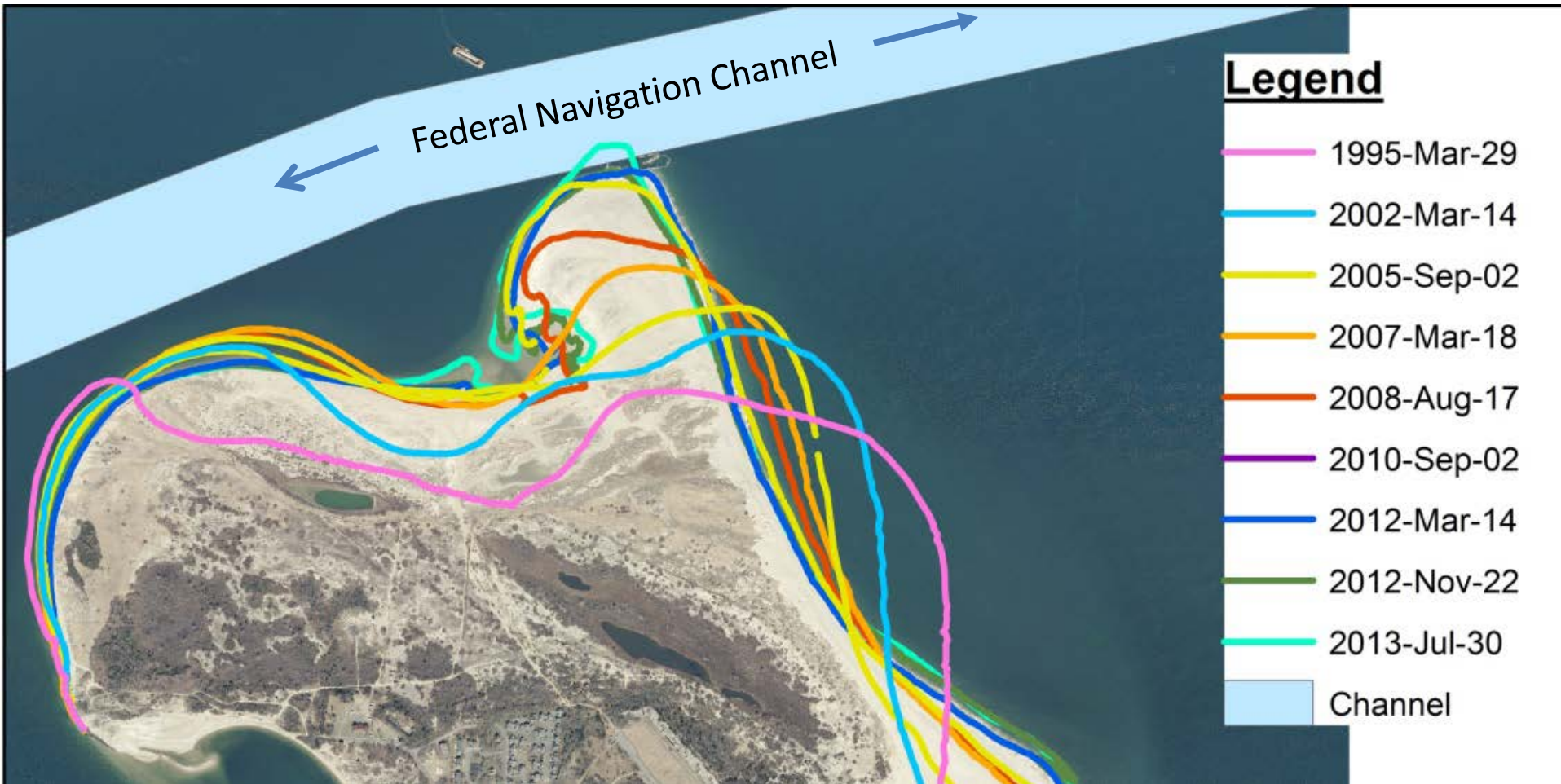
Channel Dredging Timeline



Beach Fill Timeline



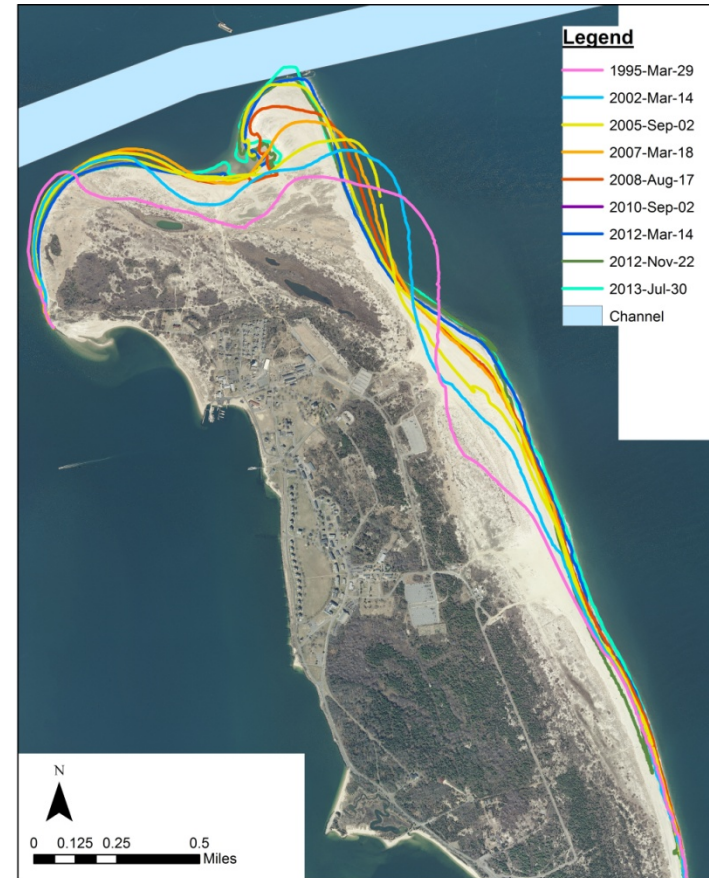
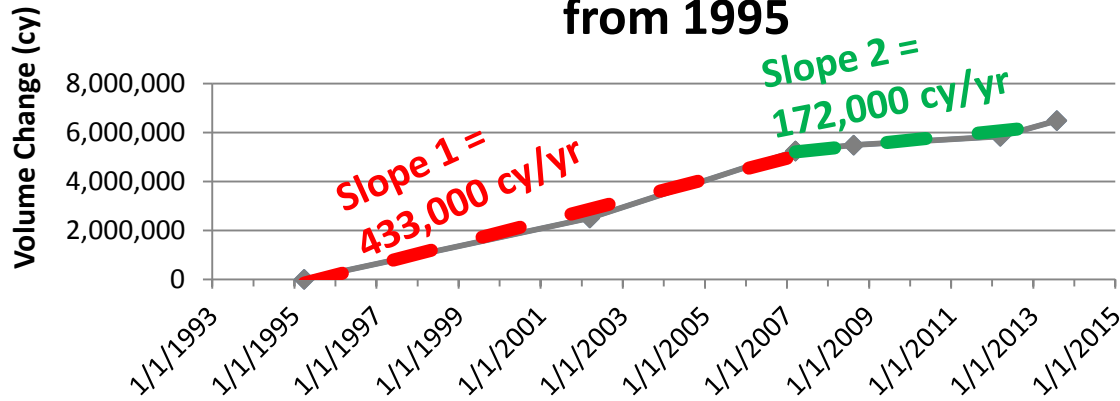
Shoreline Change Analysis



Sandy Hook Shorelines from 1995 to 2013

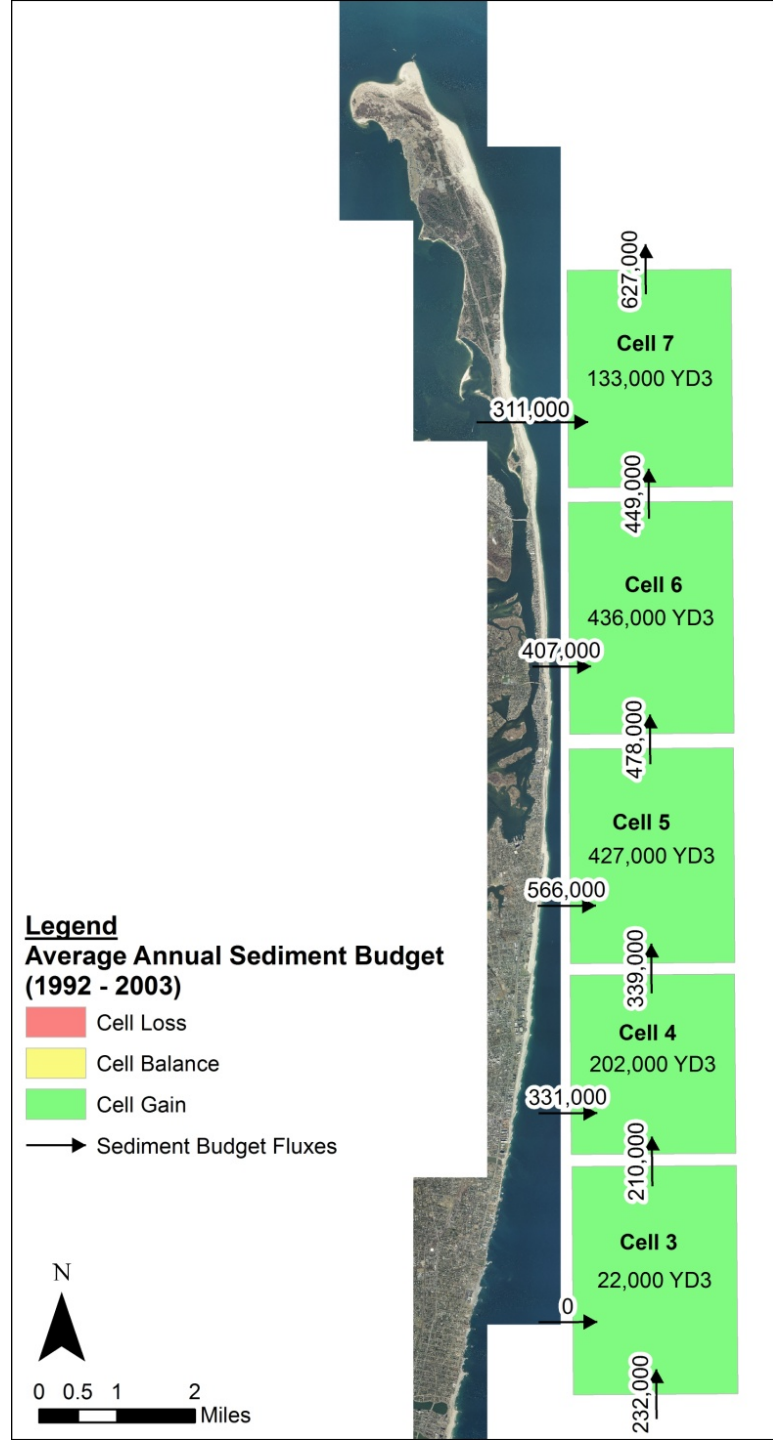
Growth of Sandy Hook Spit

Sandy Hook Cumulative Volume Change from 1995



REGIONAL SEDIMENT BUDGET 1992 - 2003

- Sediment budget for New Jersey Coast provided by NAN
- Period from 1992 to 2003
- Deal Lake to Sandy Hook
- Need to update
- Include tip of Sandy Hook
- Used SBAS to draw sediment budget in GIS



REGIONAL SEDIMENT BUDGET BUDGET 2007 - 2013

- Updated sediment budget for New Jersey Coast
- DSAS to calculate shoreline change
- Period from 2007 to 2013
- Cells 6 & 7 erosive
- Cell 8 (Sandy Hook) growing
- 650,000 cy potentially entering channel

Beach Fill Volumes between 2007 - 2013

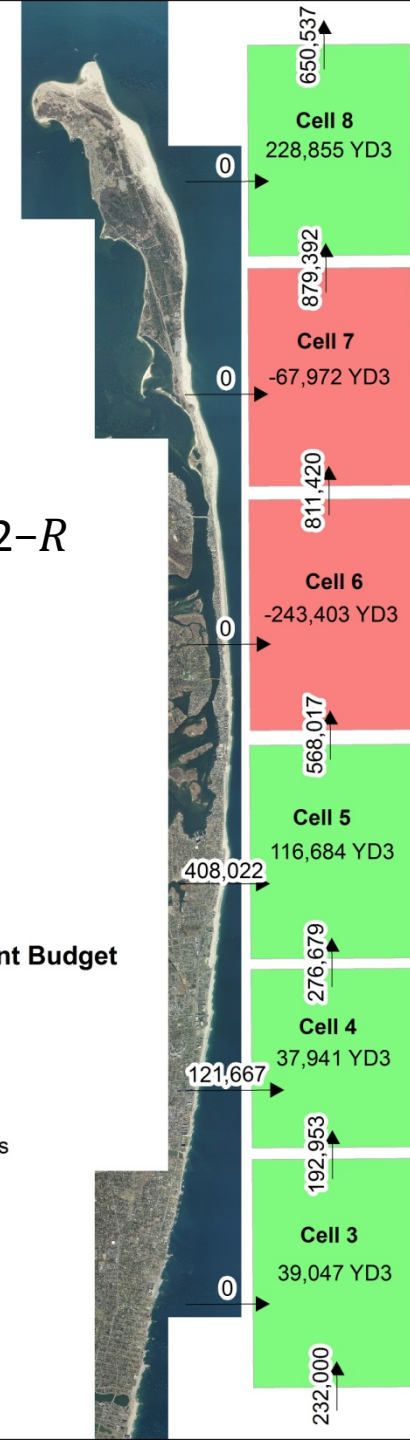
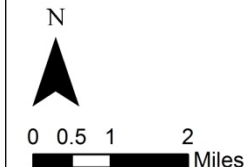
Cell Number	Dates of Fill	Fill Volume (cy)	Total Fill Volume (cy)	Average Annual Fill Volume (cy/y)
4	Nov 2008-Jan 2009	730,000	730,000	121,667
5	Nov 2011-Jan 2012	820,000	2,448,132	408,022
	Nov 2012-Jan 2013	1,201,415		

$$dV = P + Q1 - Q2 - R$$

Legend

Average Annual Sediment Budget (2007 - 2013)

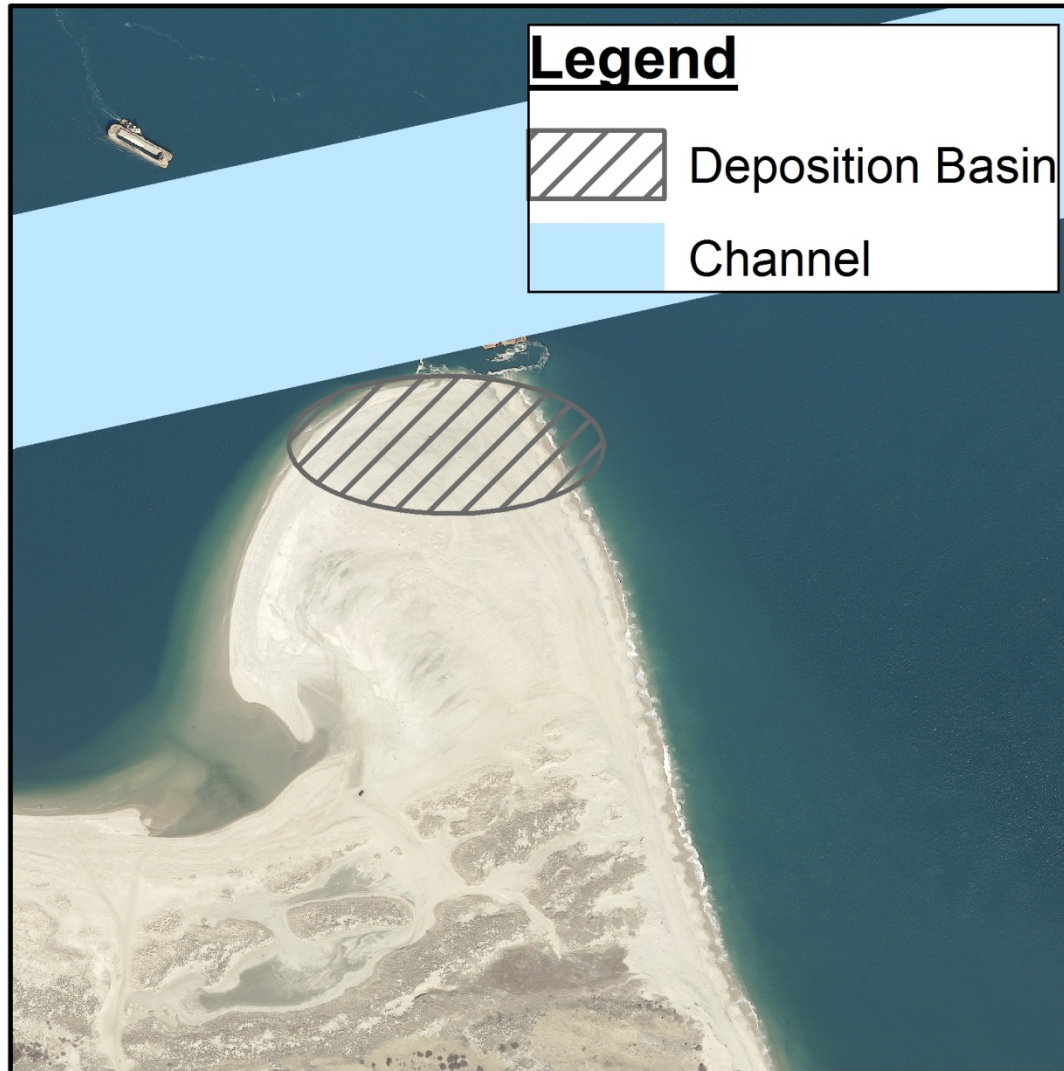
- Cell Loss
- Cell Balance
- Cell Gain
- ➔ Sediment Budget Fluxes



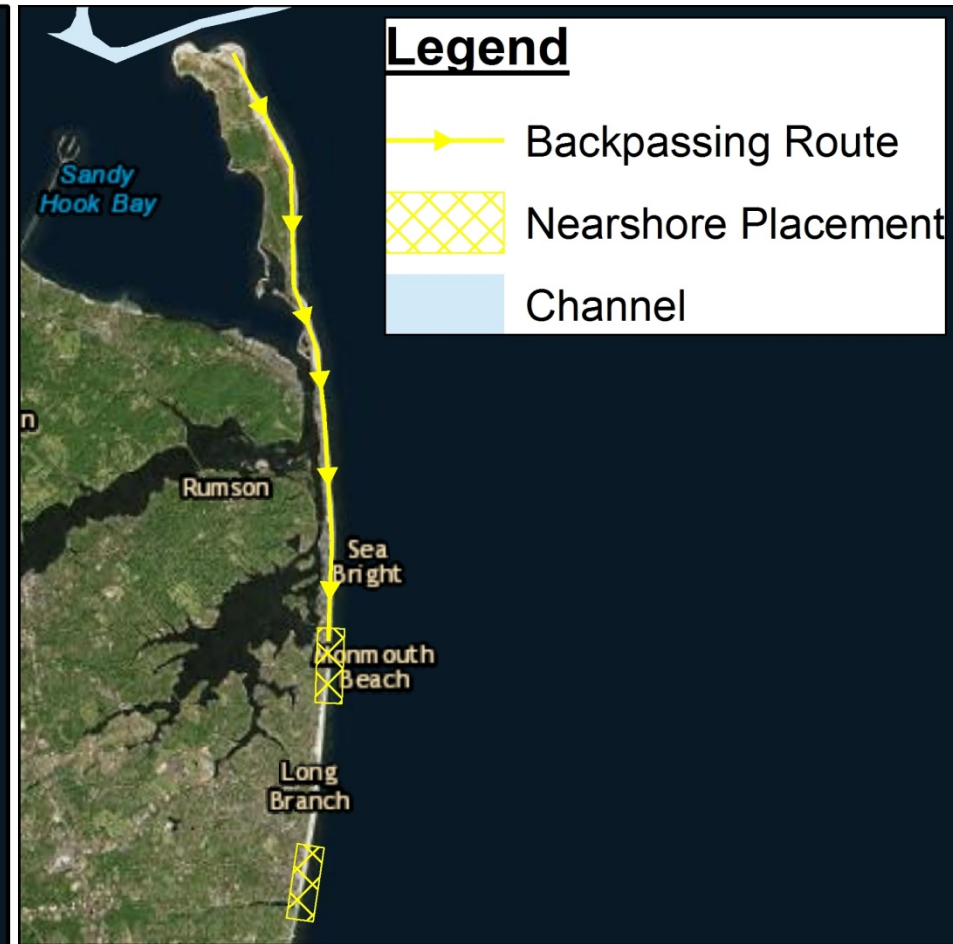
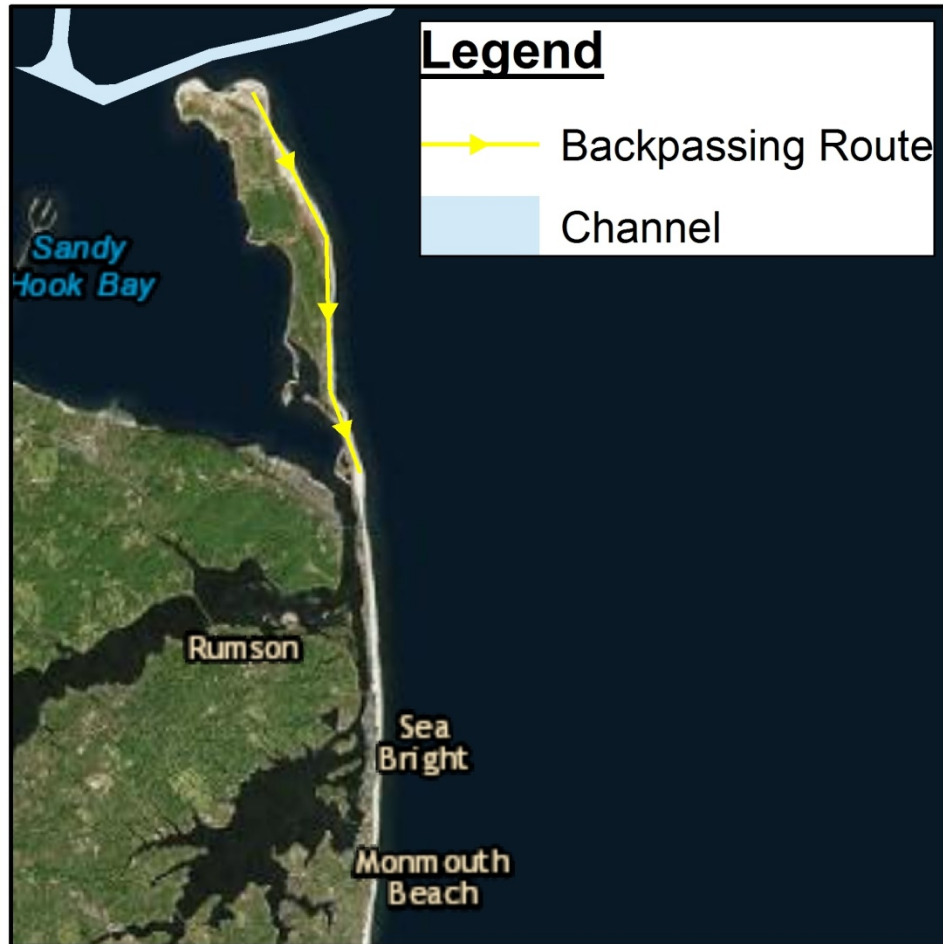
Results of Shoreline Change Analysis

- Growth of Sandy Hook is inevitable
- Beach fill and renourishment adding to available sand supply
- Shoaling rates have increased, may continue to increase
- Approximately 200,000 cy entering channel each year
- Potential to increase to 600,000 cy/yr

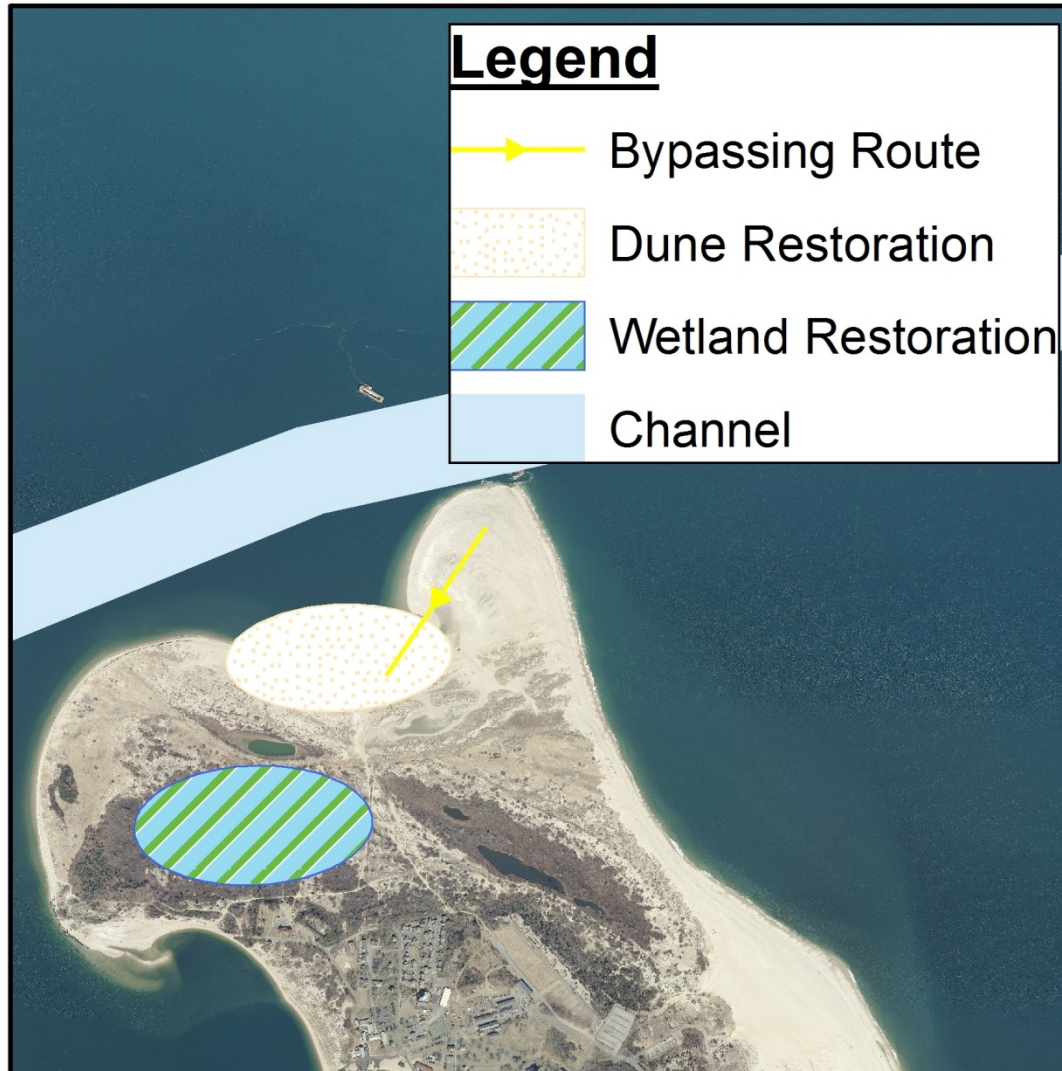
ALTERNATIVE: Deposition Basin



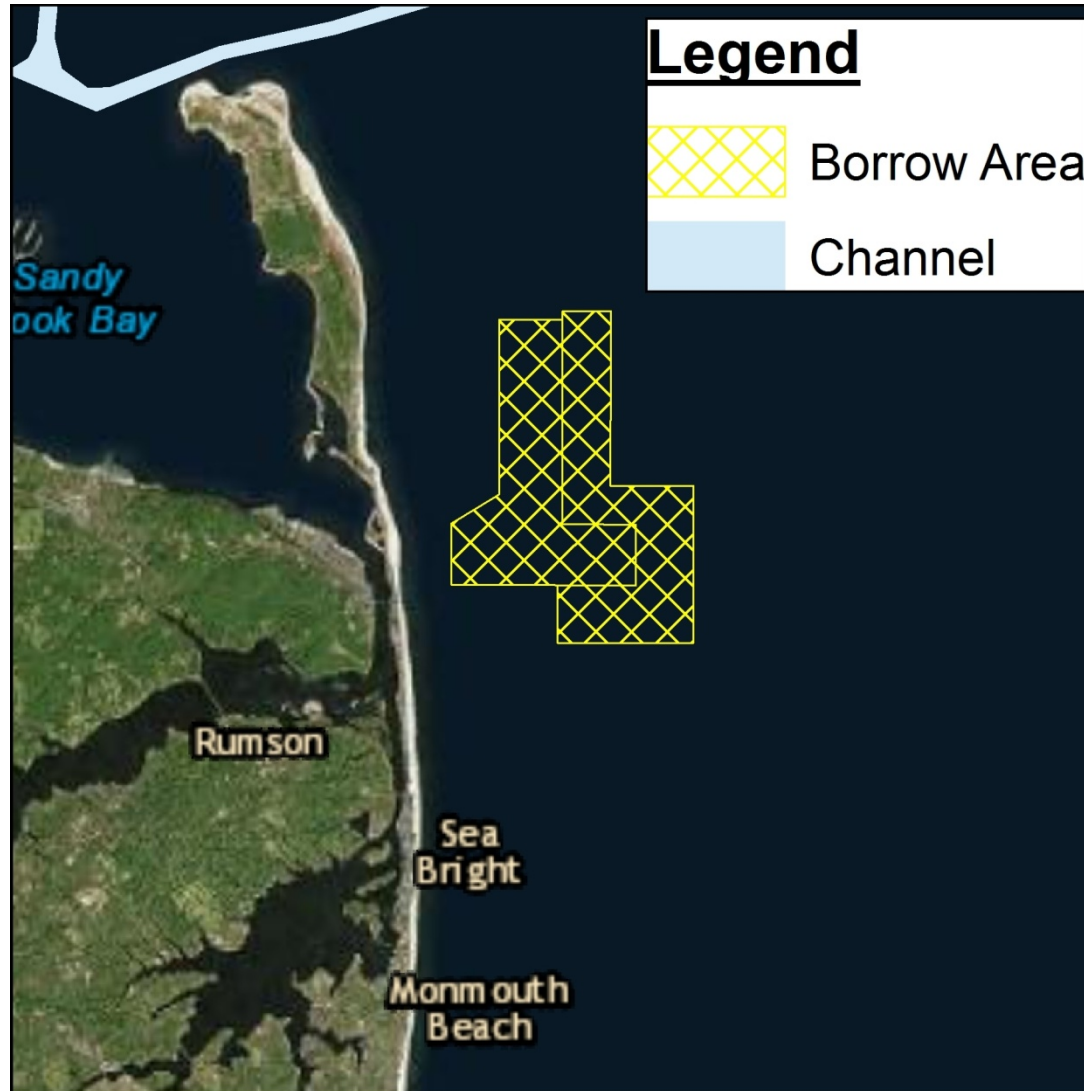
ALTERNATIVE: Backpassing



ALTERNATIVE: Bypassing



ALTERNATIVE: Stockpile in Borrow Area



NEXT STEPS

•PROGRAMMATIC

- IDENTIFY APPLICABLE AUTHORITIES
- IDENTIFY FUNDING SOURCES
- COORDINATE STAKEHOLDER INVOLVEMENT

•TECHNICAL

- CONDUCT ADDITIONAL SEDIMENT SAMPLING
- DETERMINE REQUIRED DESIGN CRITERIA

•ECONOMICS

- DETERMINE FUTURE WITHOUT PROJECT CONDITION
- CALCULATE LIFE-CYCLE COST SAVINGS

•ENVIRONMENTAL

- DEVELOP BEST MANAGEMENT PRACTICES
- IDENTIFY REQUIRED ENVIRONMENTAL PERMITS

Thank You