

# **TECHNICAL MEETING 2008 FIRE ISLAND NOURISHMENT PROJECTS**

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# Topics

- Purpose: Discuss and refine issues and facts central to the development of the Environmental Assessment
- Framework
- Proposed 2008 Project & Need
- Past Performance
- Pertinent Issues
  - Address Technical Concerns
  - Address Environmental Concerns
- Construction



# Other Purpose

- Show why concerns do not rise to the level of impairment and the 2003 restriction should be loosened.
- Determine what is policy.



# Pertinent & Applicable Facts?

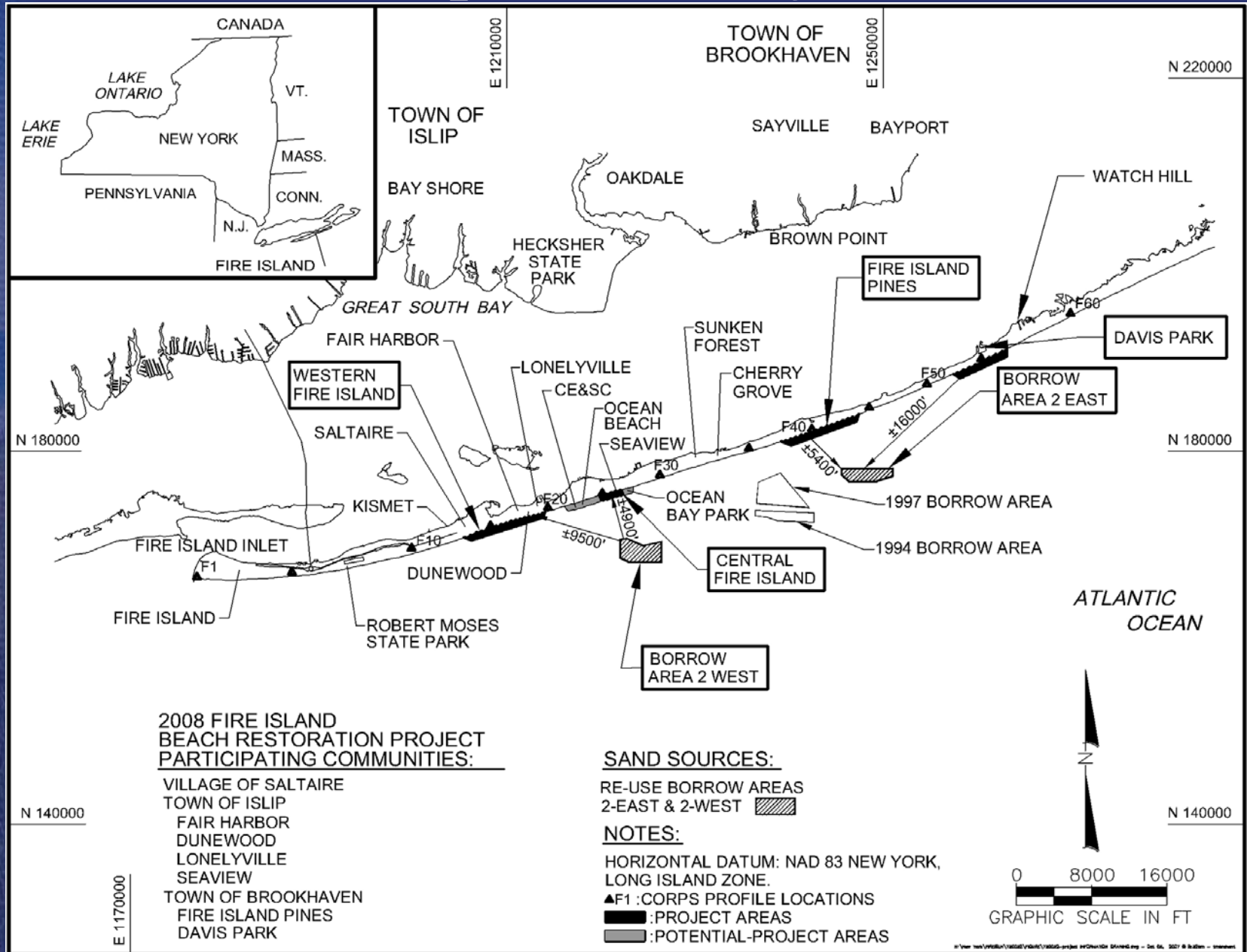
## A

- Geologic Origins
  - Millennium
- Long Island at Large
- Significant
- Fact - General
- Dyer & Huntley 1999 -
  - Create
  - Post-glacial sea level rise
- Resolution - Poor

## B

- Present Day
  - Decade
- Western Fire Island
- Insignificant (Trace)
- Specific
- Sand Movement
  - Maintain
  - Hydrodynamic
- Good

# Cooperative Project





# Fire Island Project Summary

<u>Reach</u>	<u>Length (ft)</u>	<u>Volume (cy)</u>
Western	7,280	500,000
Central	7,580	570,000
Fire Island Pines	6,380	500,000
Davis Park	4,140	305,000
	25,380	1,875,000





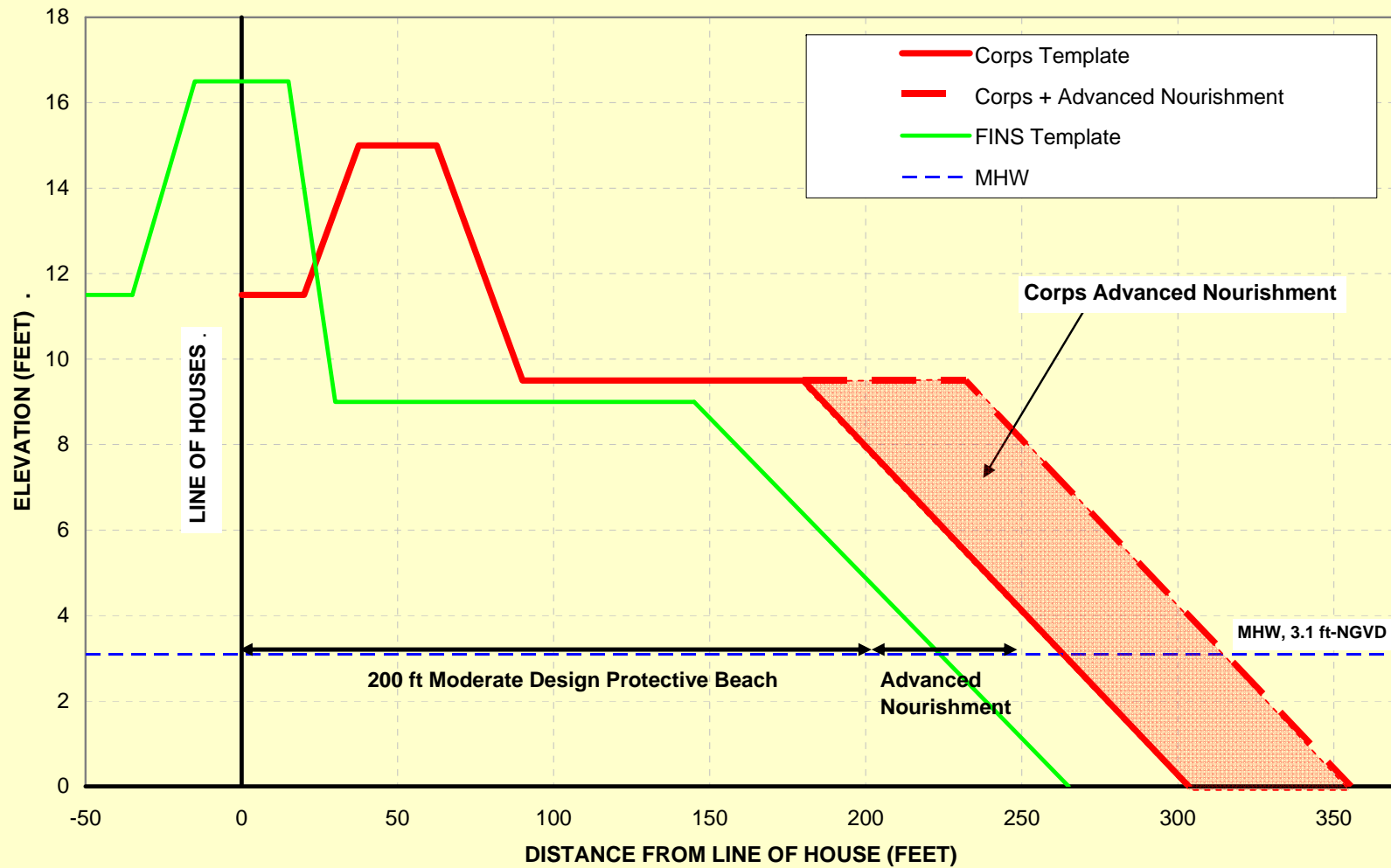
# Design Features

- Exceed 2003 template at a few points
  - Advanced Nourishment
  - Fill gap in dune
  - Volume very similar
- 500 foot Tapers
  - Reduce excessive losses
  - Fill placed in other Federal Park
- Moderately deeper borrow area
  - Within 2003 borders
  - Insignificant impact
- Earlier construction start
  - Shorter construction time
  - Permit process delays start





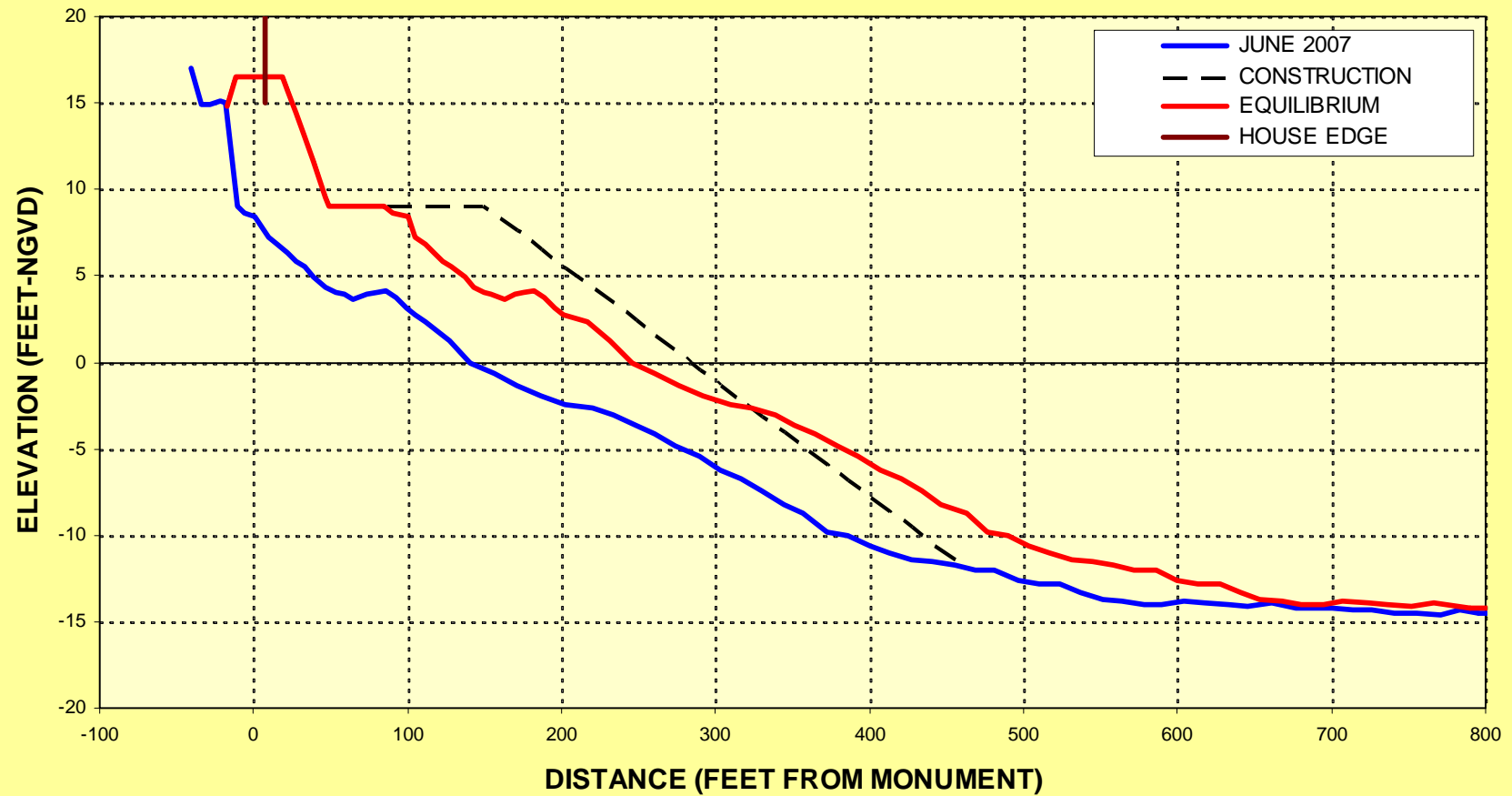
## FIRE ISLAND, NEW YORK, USACE vs. FINS TEMPLATE



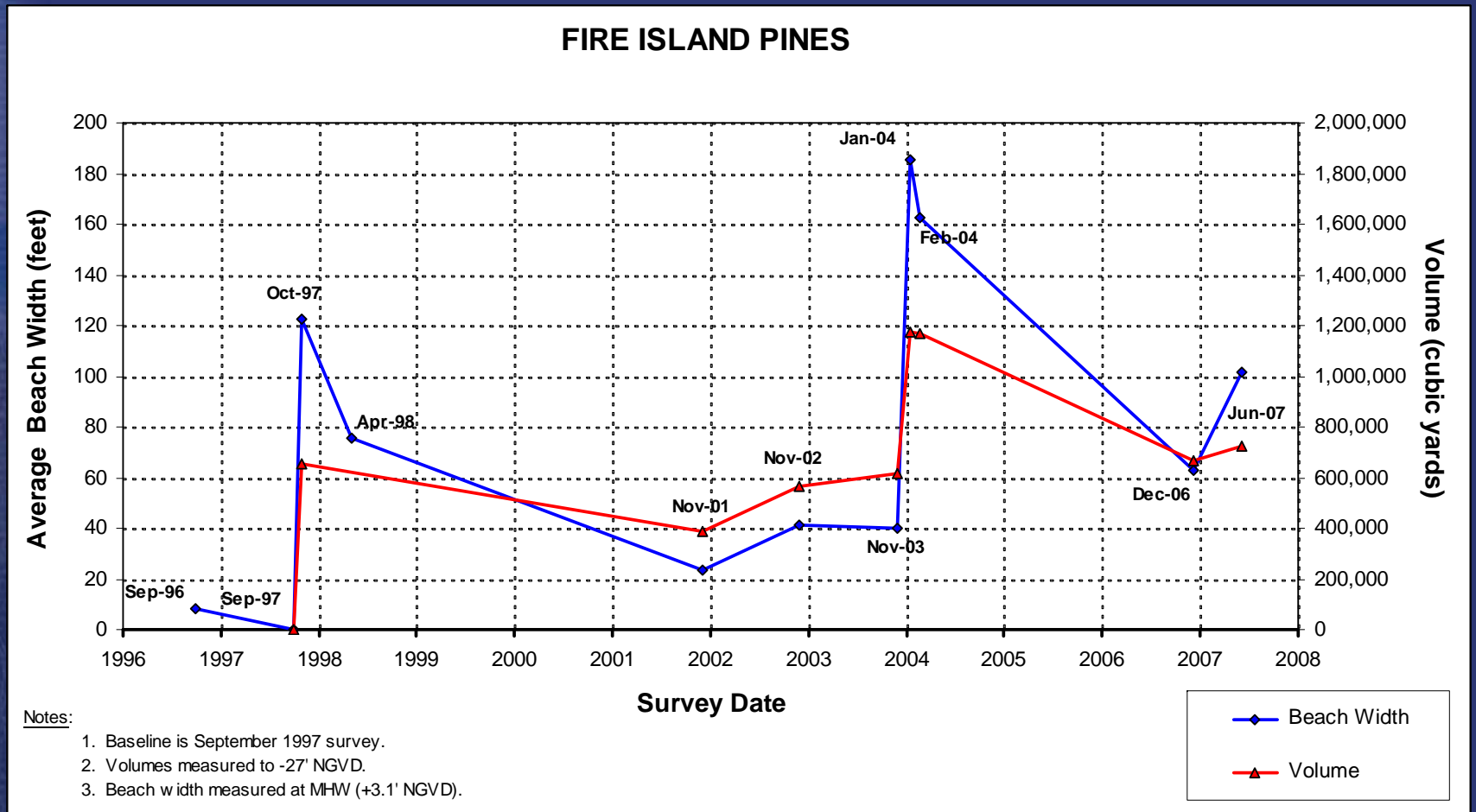
Smaller Than The Corp Design



**TYPICAL BEACH PROFILE  
WESTERN HOT SPOT REGION (DP-3)  
DAVIS PARK 2008 BEACH NOURISHMENT PROJECT**



# FIP Performance, 1996-2006



Can Be Improved



# Need

- All four reaches communities have **erosion** in the last 8 years or more.
- The need in Western and Fire Island Pines reaches is to renourishment before they become critical eroded again, a state that exists in Davis Park.
- The Central Reach has less than the level of protection provided by the FINS template.





Davis Park,  
December 2004



Davis Park,  
April 2007





Need project  
width able to  
absorb most or  
all of this type  
of impact.

Fair Harbor after  
the early 1990s storm.



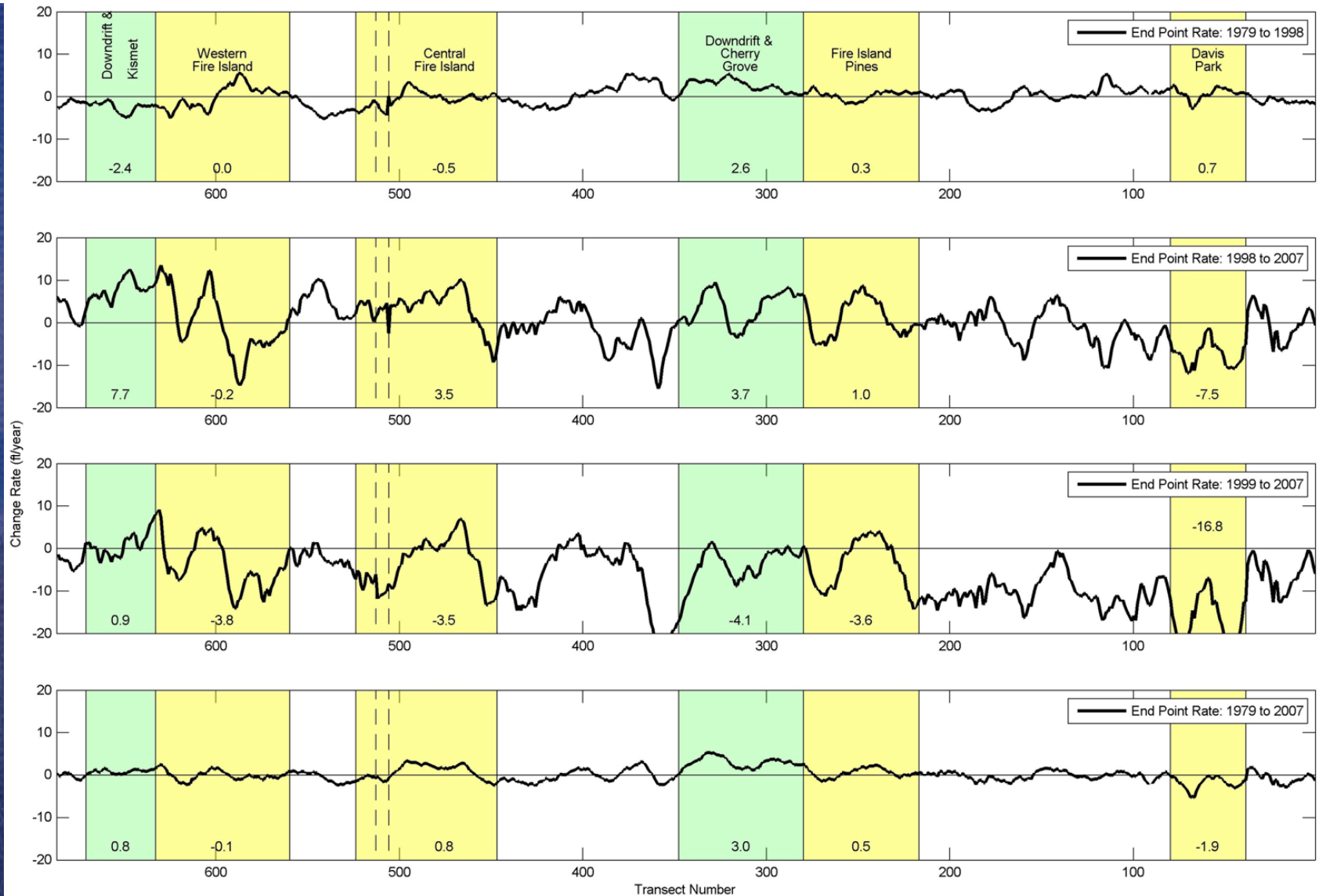
# FINS Issues

- No Erosion – No Need
- Large Beach/Dune advances shoreline
- Tapers
- Onshore Sand Movement Impacts
- Endangered-Threatened Species Impacts
- Man Induced Erosion Qualifies
- Segmentation
- Impairment
- GMP/Federal-State Agreement/Legal

Communities will address these issues or are willing to assist FINS in doing so.







## Shoreline Change from Lidar Data

1979-98 and 1998-2007 curves show an average gain of 0.3 ft/yr.

After adjustment for fill added, there was an actual loss of 100,000 cy /yr.

Sand fill shows up down drift in 1998-2007 period





# Beach Size Limitations

- Is it FINS Policy to Encourage Overwash and Breaching, if it is not the historic natural process for an are?
- The developed community region has a recent history of low overwash and almost no breaching, except Davis Park.



# Rationale For Beach/Dune Size Limitations

- Inhibits Overwash and Breaching
- Prevents keeping pace with retreat of adjacent beach and dunes
- Prevents creation of optimal habitat
- Comprehensive Project



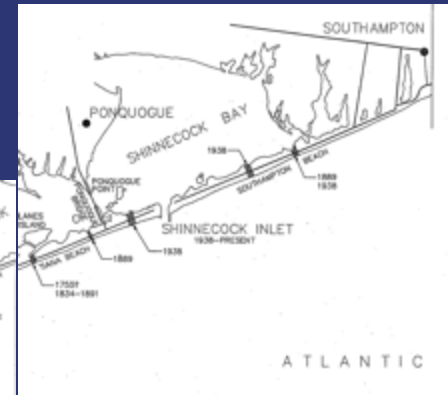
# Characteristic of Developed Community Reach

However, the rate at which the barriers migrate varies along the south shore when one considers shorter time scales on the order of centuries. Geologic evidence indicates that the central portion of Fire Island between Ocean Beach and Watch Hill has not migrated for the last 750 to 1,300 years. This section of the island has experienced erosion on the ocean and bay shorelines, but the position of the island has remained in the same location. Interestingly, there is no evidence of historic inlets in this area over the last several centuries (Tanski 2007)



# Historic Breach Locations

(USACE Breach/Overwash  
Position Paper)





# Onshore Sand Movement not Significant

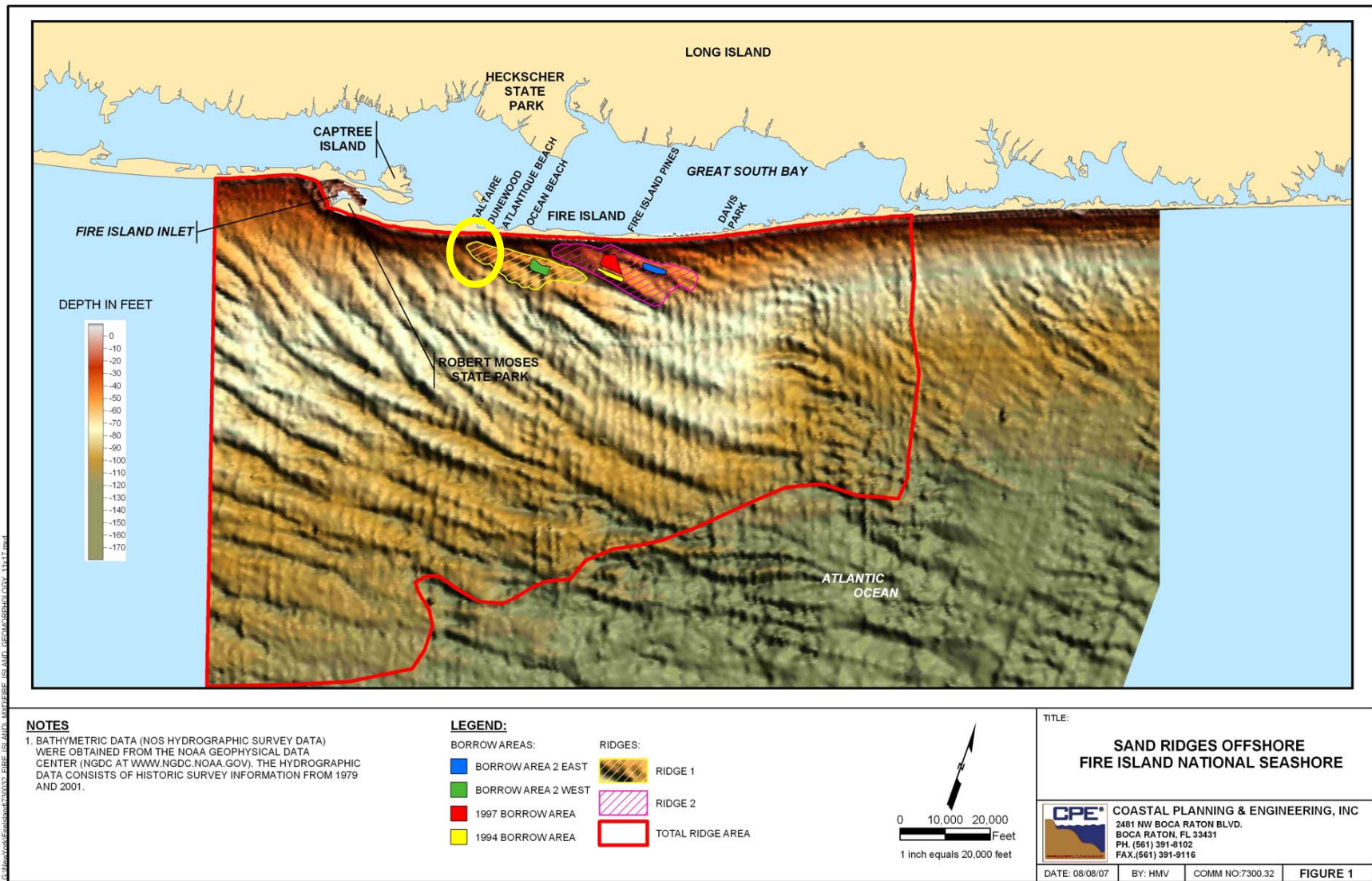
- Ridges move largely laterally
- No ridges visible out to -27 feet
- Transport is offshore to -27 feet
- Sediment Budget indicate offshore loss.



# Tracers Less than they seem

- Inner shelf may act as a significant offshore sediment source: Taney(1961a), Williams (1976), Williams and Meisburger (1987), and Schwab *et al.* (2000) – **When**
- Glauconite shows inner shelf is an important source to Long Island barrier island systems -**Far West & ID**
- Strong similarities in textures of quartz grains between beach and offshore samples suggest offshore sediment sources. Euhedral quartz grains on western Fire Island match glacial outwash lobes offshore (Williams and Morgan, 1988) -**What Direction**

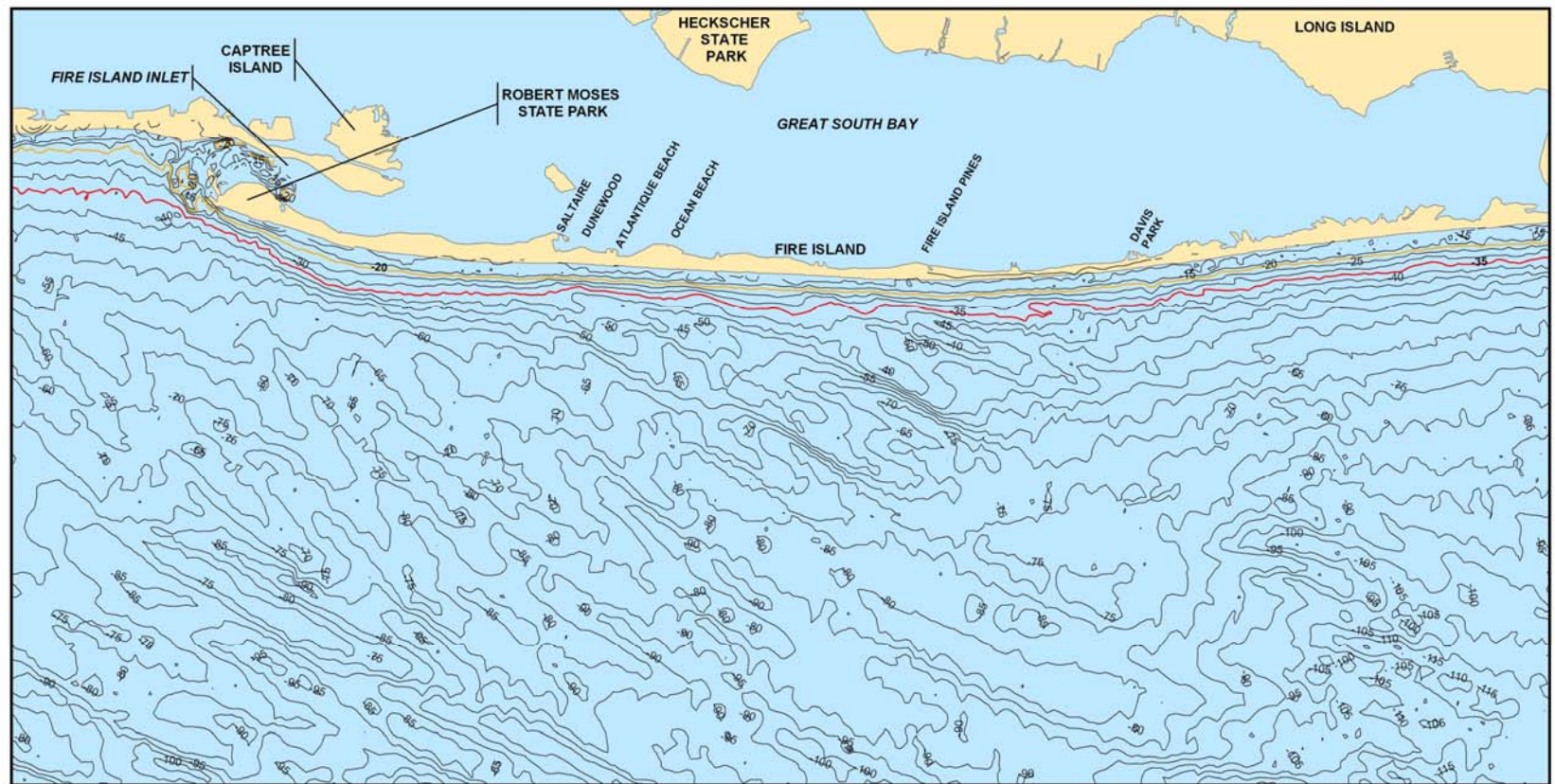




Cumulative Sand Needs Small Compared to Sand Resources  
 Two Ridges contain 135,000 mcy  
 Ridges moving laterally





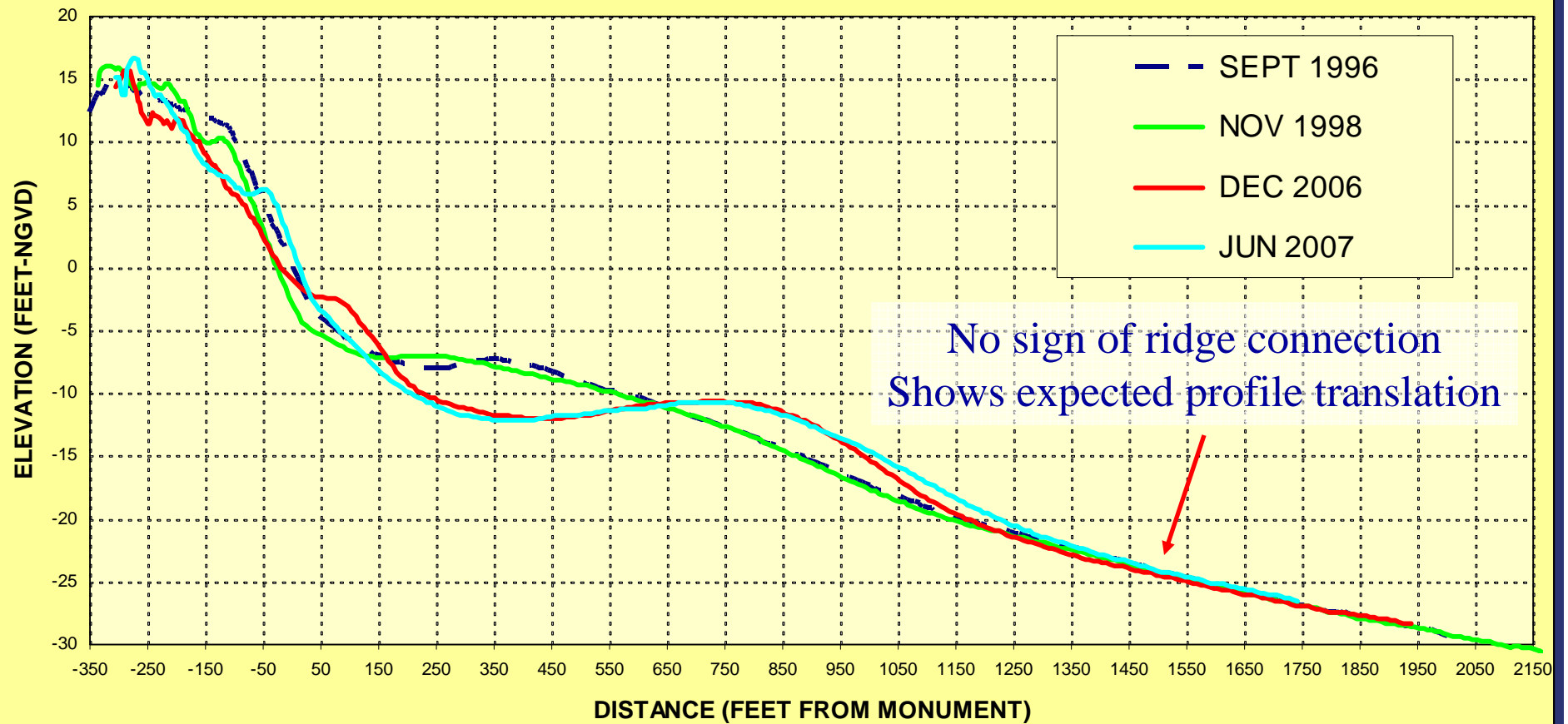


20 and 35 foot depth contours  
Transition from wave to current dominated





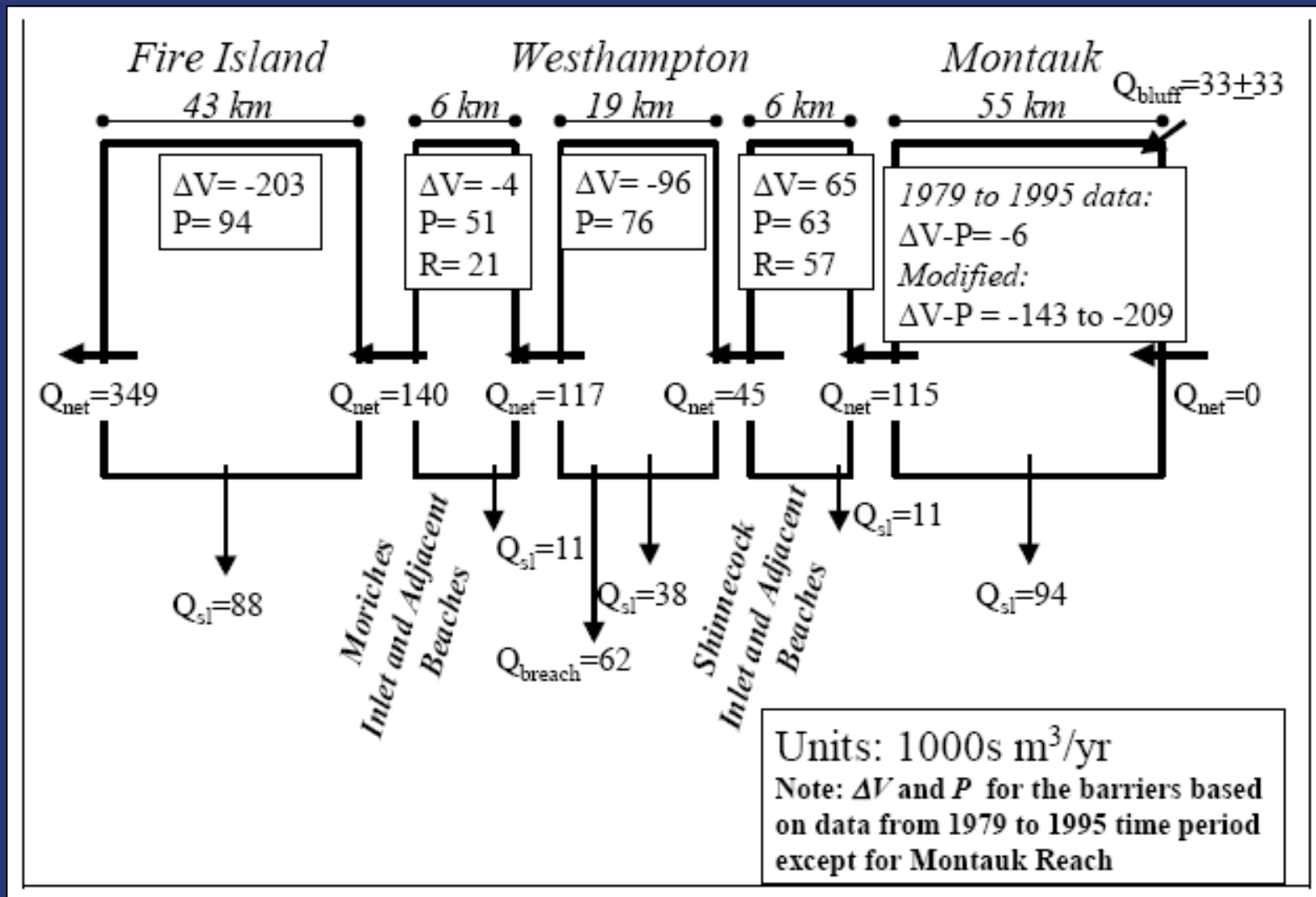
1996 - 2007  
AVERAGE PROFILE COMPARISON  
WESTERN FIRE ISLAND PROJECT AREA, NY



# On Shore Sand Movement

- On close read of previous reports, less certain
- Sand Quantity Small Compared to Availability
- Transport Direction Beyond DOC is Current Driven
- No Sign of Ridge Connection in Monitoring
- Higher Resolution Sediments Budgets don't need offshore sand for balance





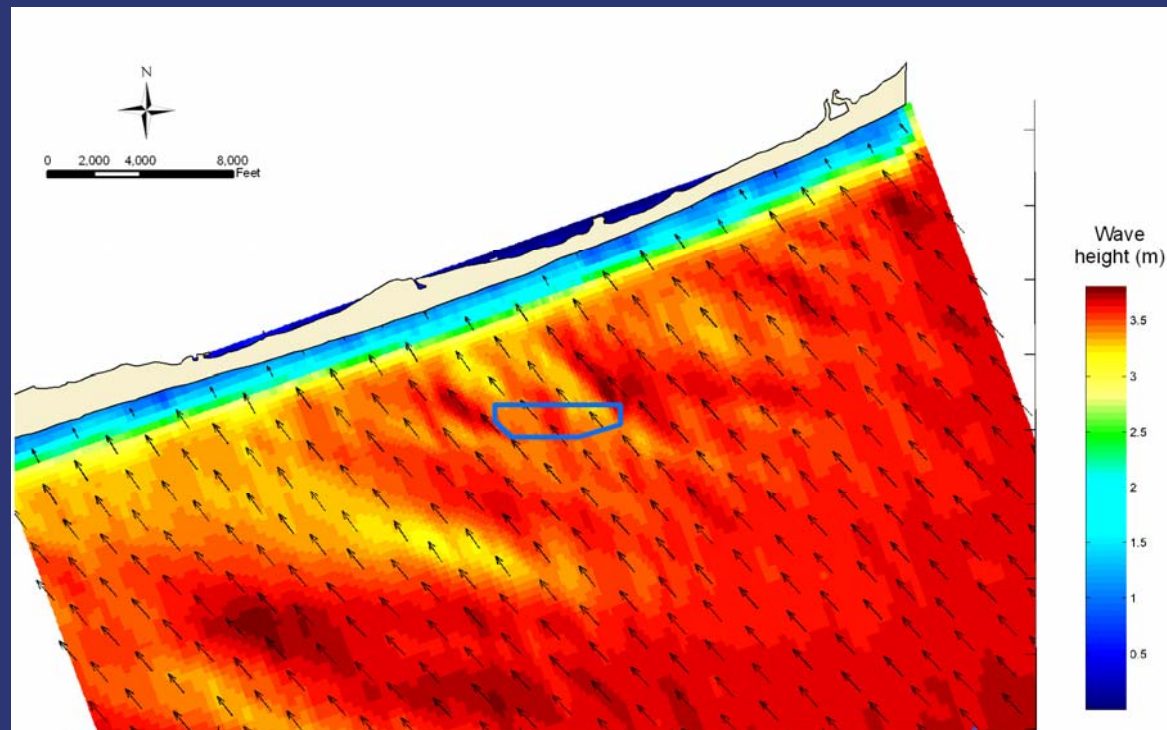




Case 2.  $H_{sig} = 12.2 \text{ ft}$

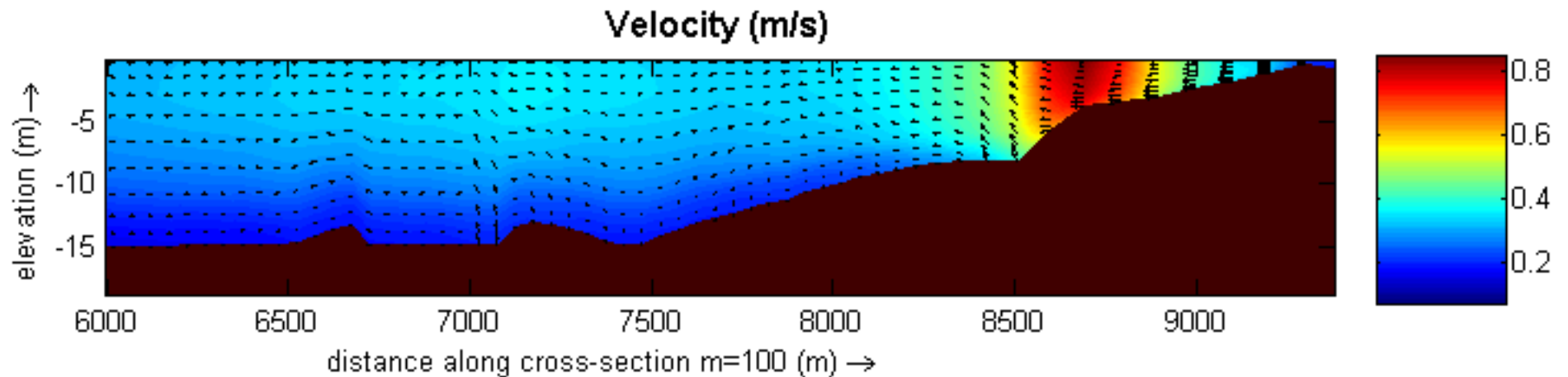
$T_p = 8.84 \text{ s}$

$Dir = 137^{\circ}$





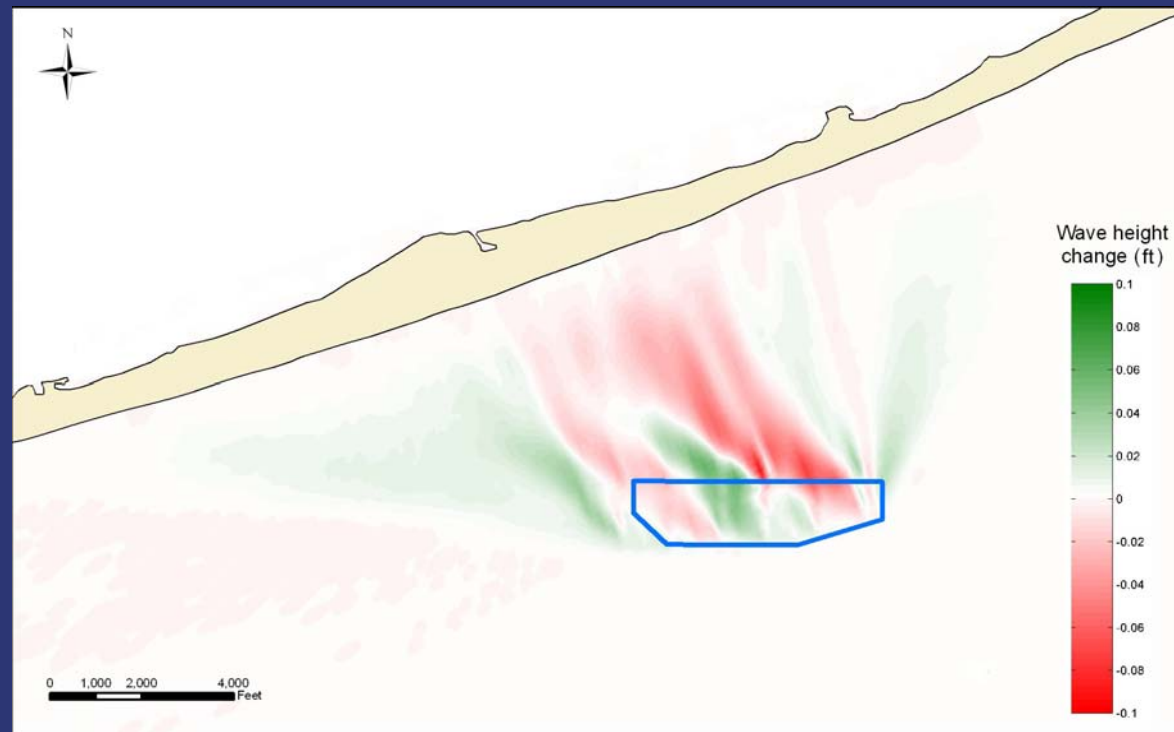
# Borrow Area 2-East

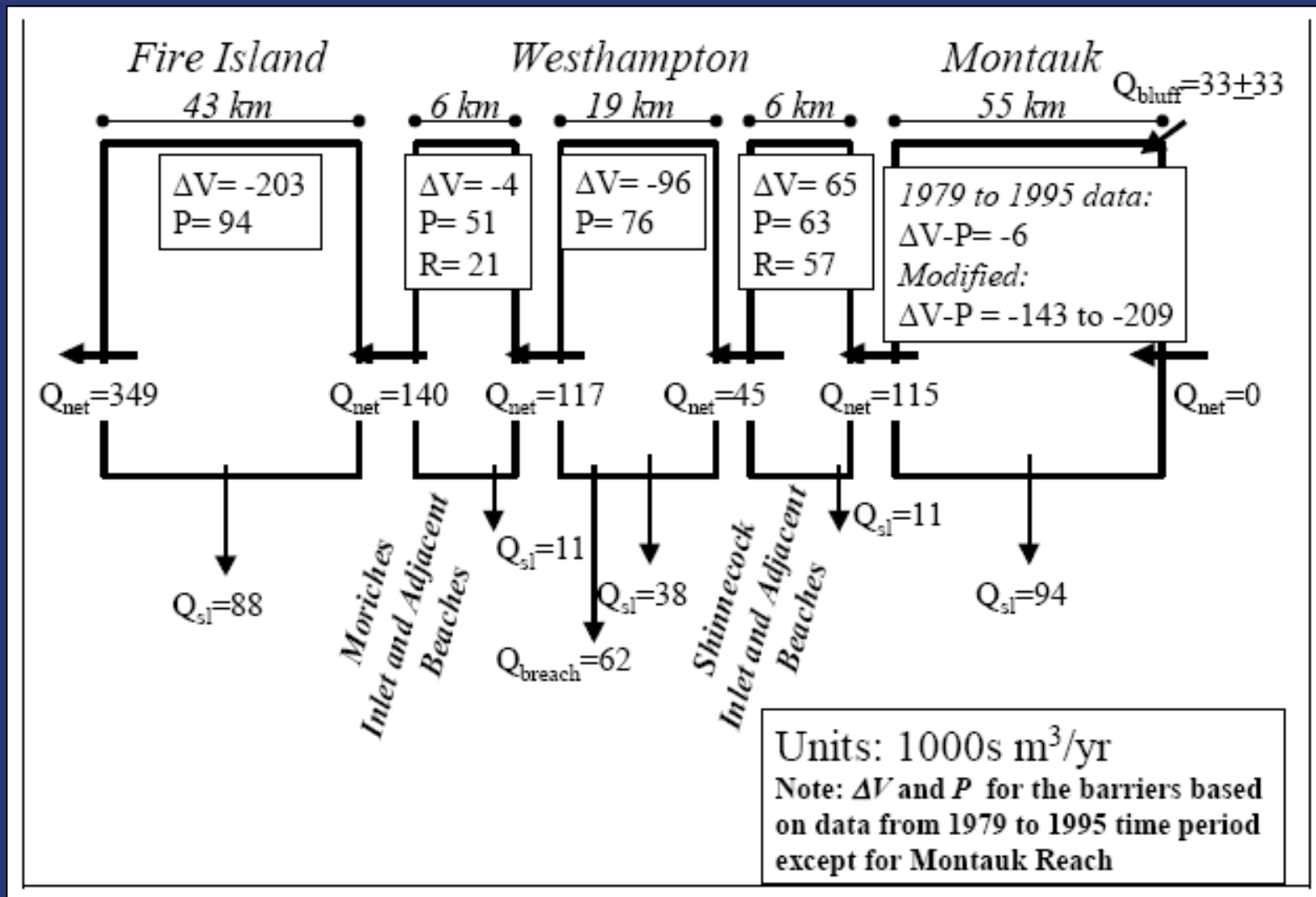


Bottom Currents enough for circulation  
but not significant sediment transport.



Relative wave height change between existing and proposed borrows area cuts for wave case 2. Maximum changes are within less than 2.6% of the input wave height.



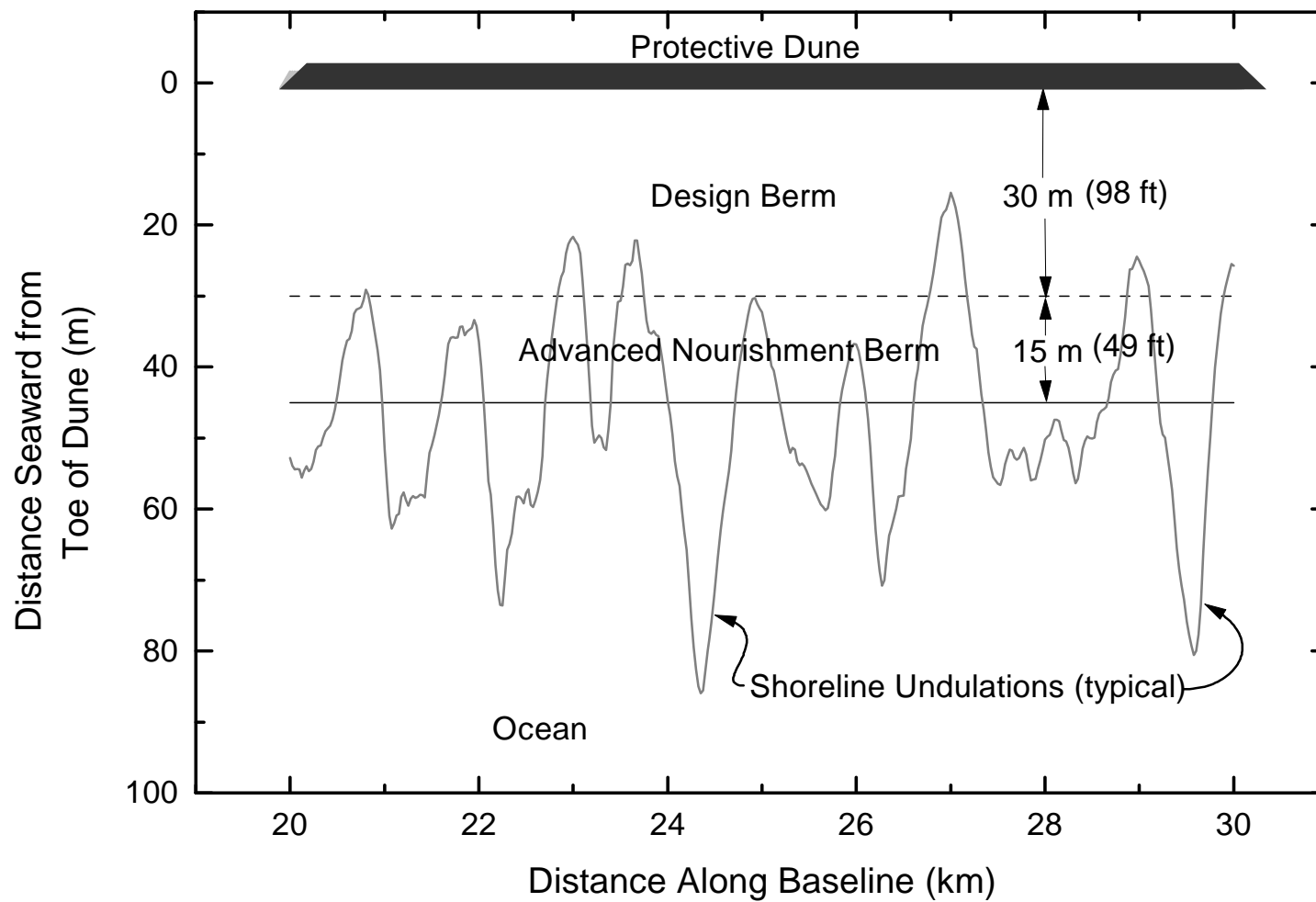


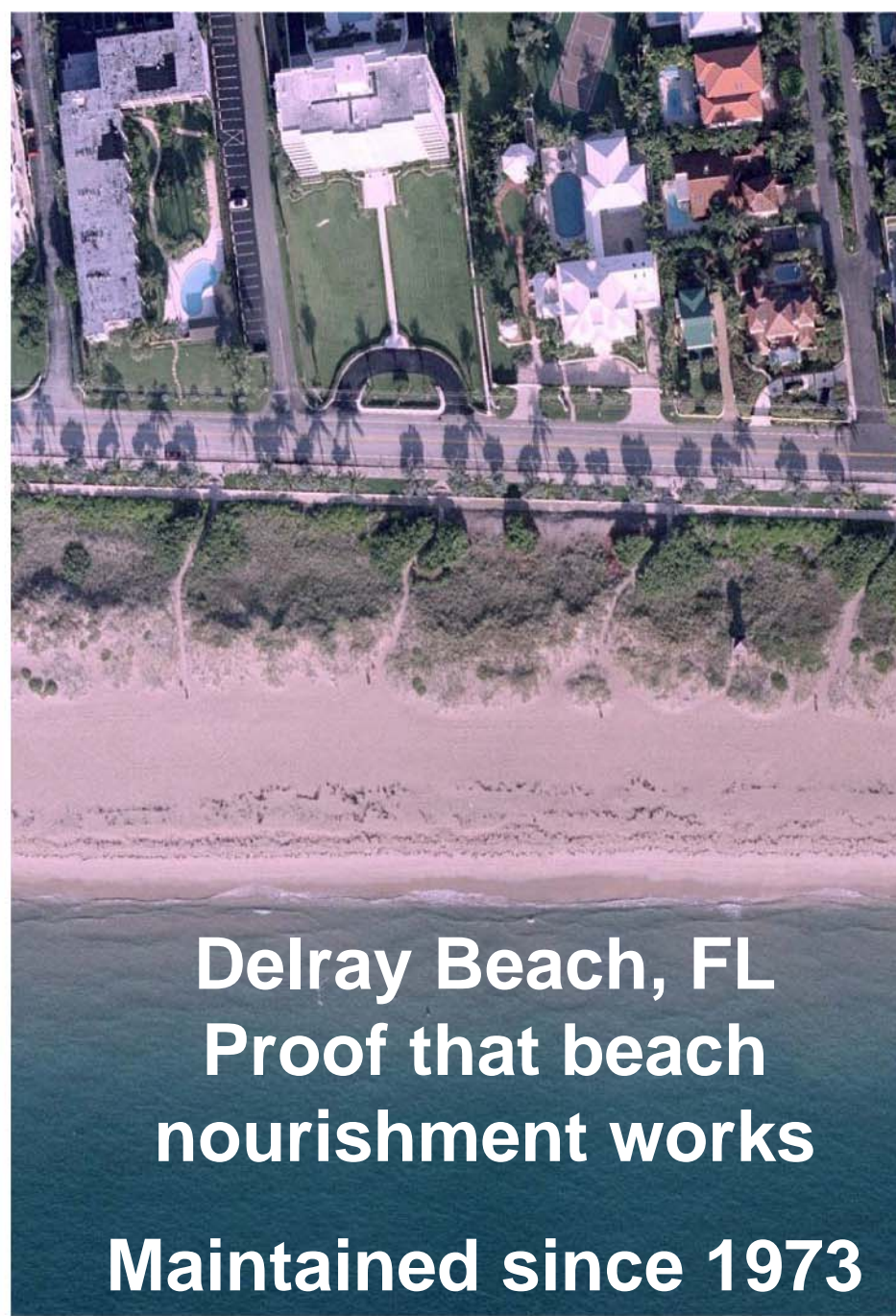
# Scraping

- Beach scraping probably has minimal adverse (Tanski 2007)
- Beach Scraping uses 2 cy/lf, which is only 4% of the natural alongshore variability of 50 ft/yr (Gravens 1999).
- We will evaluate Scraping Impacts using the % Lidar data sets between 1998 and 2007.











# Moriches Inlet Impacts Due To Opening & Stabilization Since 1933

160,000 cy/yr

2.8 ft/yr

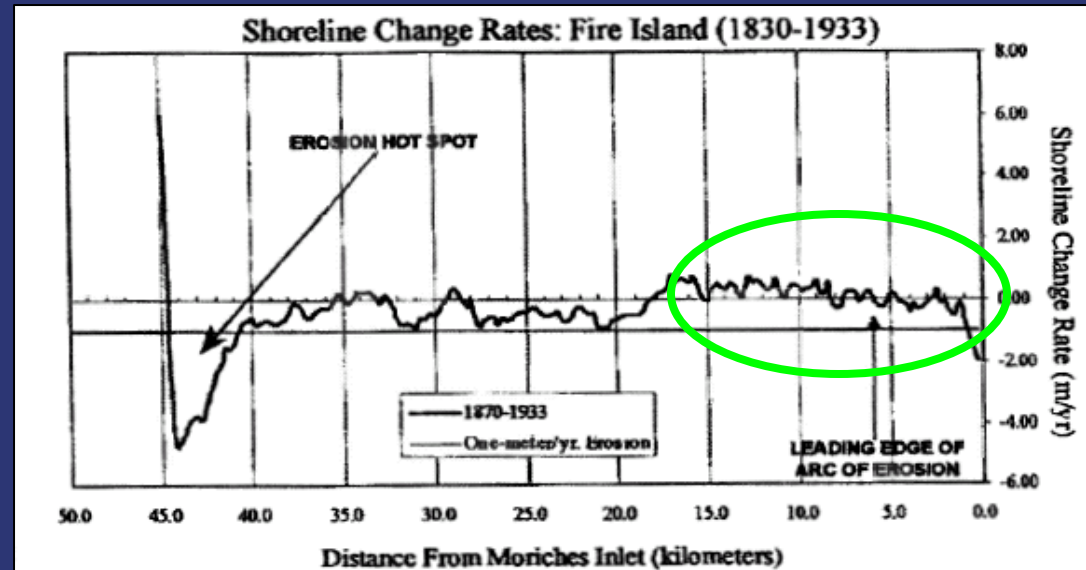
10 mcy

Move 1377 ft/yr

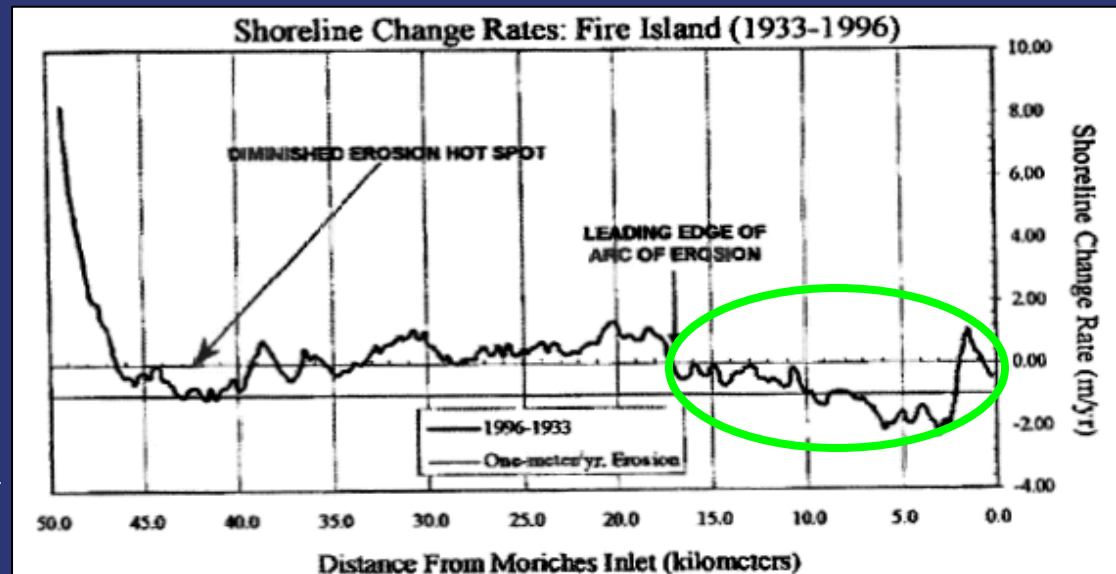
May be reaching  
developed  
communities now



Historic Shoreline Change Rate, 1830-1933



Historic Shoreline Change Rate, 1933-1996



# Construction

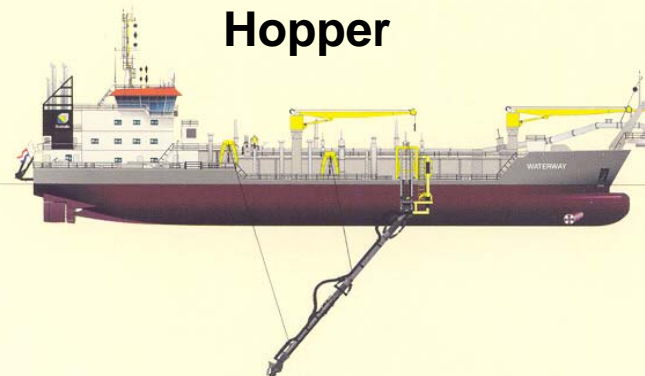




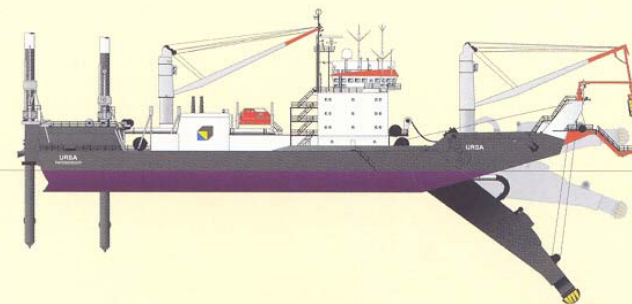
# Dredges



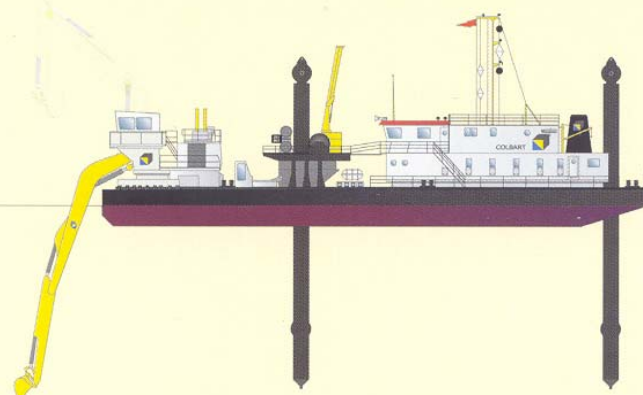
**Hopper**



**Cutterhead**



**Clamshell**



# Findings

- Beaches are loosing sand to offshore
- Overwash and breaching are not natural to the project region
- The largest threat is occurring updrift of the project area-inlet impact
- Erosion is occurring in project area







**THANK YOU**

