



The Collier County Beach Management Program Over Two Decades

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Acknowledgments

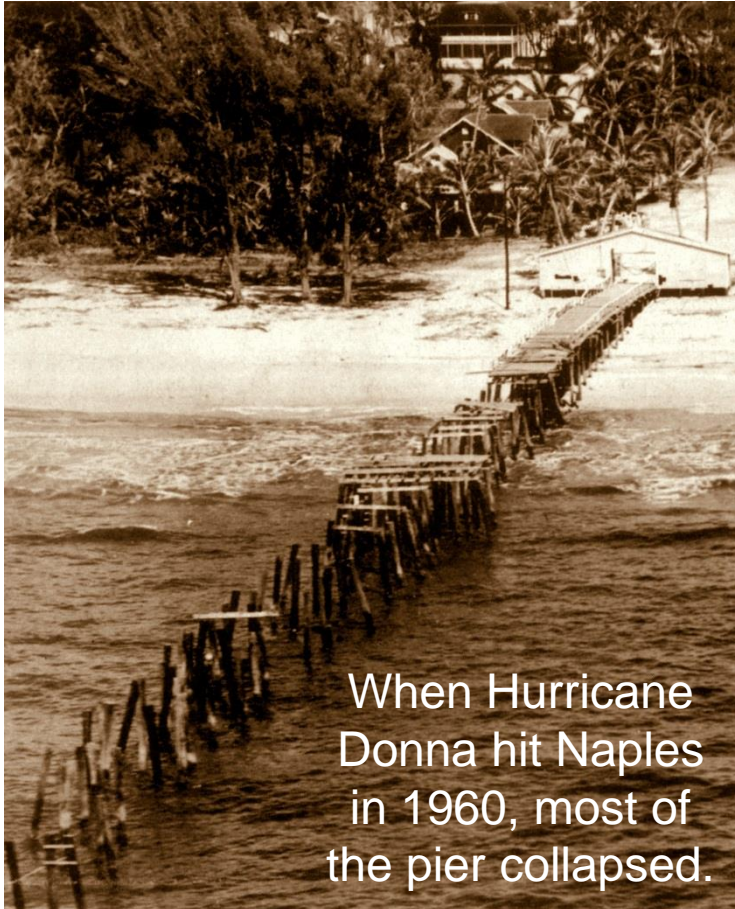
Stephen Keehn P.E., Tara Brenner P.G., Lauren Floyd (CB&I)



Naples Daily News

naplesnews.com

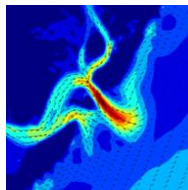
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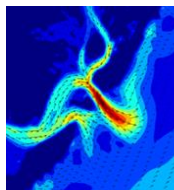
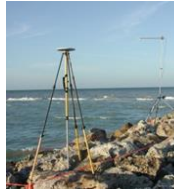
When Hurricane Donna hit Naples in 1960, most of the pier collapsed.

- First constructed in 1888:
 - Pier Street (12th Avenue S.)
 - Passengers and freight
 - Fishing
 - Post Office
- Hurricanes:
 - 1910: rebuilt and extended 100'
 - 1926: severe damage
 - 1935: "Labor Day" hurricane
 - 1944: complete rebuild
 - 1960: Hurricane Donna
- Renovated most recently in 2015

Sources: <http://archive.naplesnews.com>, Posted by Nancy Webster, Naples Historical Society Docent, Nov. 06, 2008.
<http://longform.naplesnews.com/naplespier>, History of the Naples Pier, By Patrick J. Riley, patrick.riley@naplesnews.com



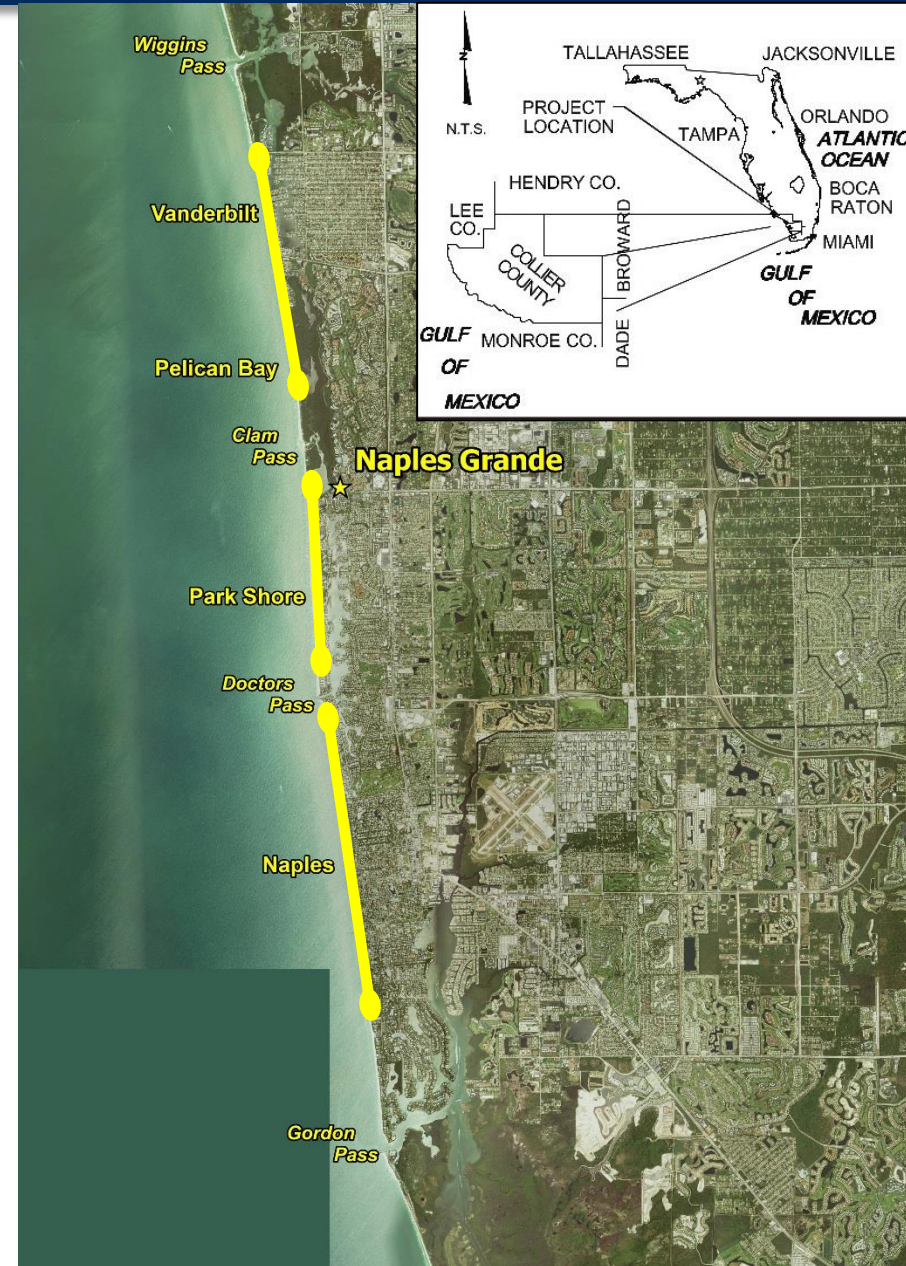
- Characteristics that shape the beach management program:
 - Beach community
 - Generally narrow and low elevation
 - Small (or no) vegetated dunes
 - Shallow waters extend far offshore
 - Miles of nearshore hardbottom
 - Challenging offshore sand sources
 - Low longshore sand transport rates





Park Shore – April 2004

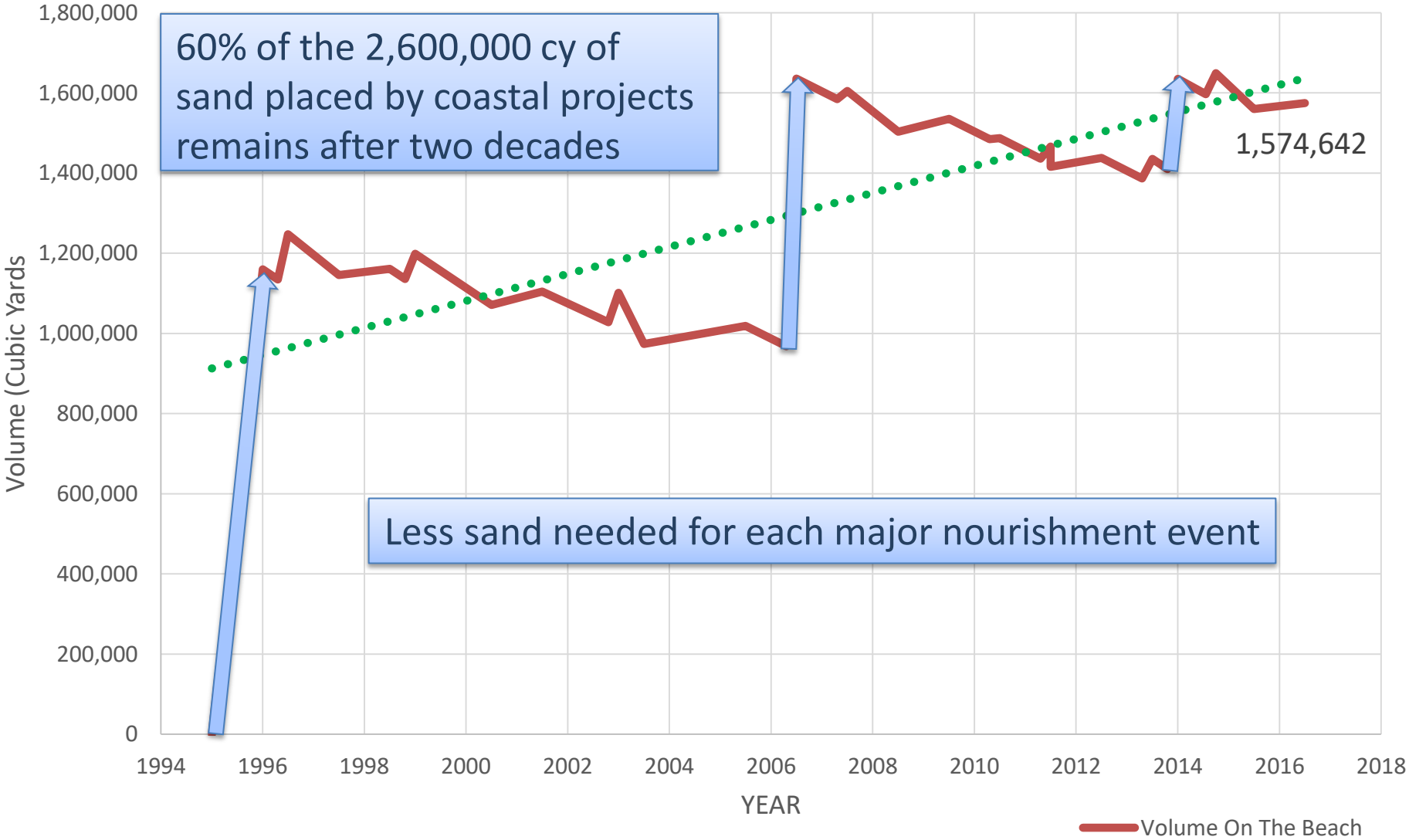
- **1996 – Initial Project**
 - 1.2 M cy
 - Borrow Areas NBII A+B, BA 6 (cutterhead and scow)
 - Vanderbilt, Park Shore, Naples
- **2006 – Renourishment**
 - 670,000 cy
 - Borrow Area T1 (hopper)
 - 3 extended segments
 - 1.09 ac artificial reef
 - Biological monitoring
- **2013-14 – Renourishment**
 - 235,000 cy (truck haul) + 40,000 cy Doctors Pass (dredge disposal)
 - Truck haul (Immokalee Mine)
 - Placement areas based on need
 - Biological monitoring



- Cutterhead Dredge and Scow (1996)
- Hopper Dredge with Screening (2006)
- Truck Haul (2013-14)
- Truck Haul / Fluidization (2016)



Collier County Beach Nourishment Project (North County)



60% of the 2,600,000 cy of sand placed by coastal projects remains after two decades

Less sand needed for each major nourishment event

1,574,642

Volume On The Beach

- Collier Creek
 - Navigation dredging

- Hideaway Beach
 - Big Marco Pass
 - Collier Creek

- Tigertail Beach
 - Natural Park Area

- Central Marco
 - Beach Grading

- South Marco
 - Caxambas Pass
 - 2016 Truck Haul



- 2006 Project Considerations:
 - Structures & outfalls
 - Event driven processes
 - Nearshore hardbottom
 - New sand source
 - Shallow offshore waters
 - Artificial reef

Naples Beach R-59 Groin/Outfall



Park Shore

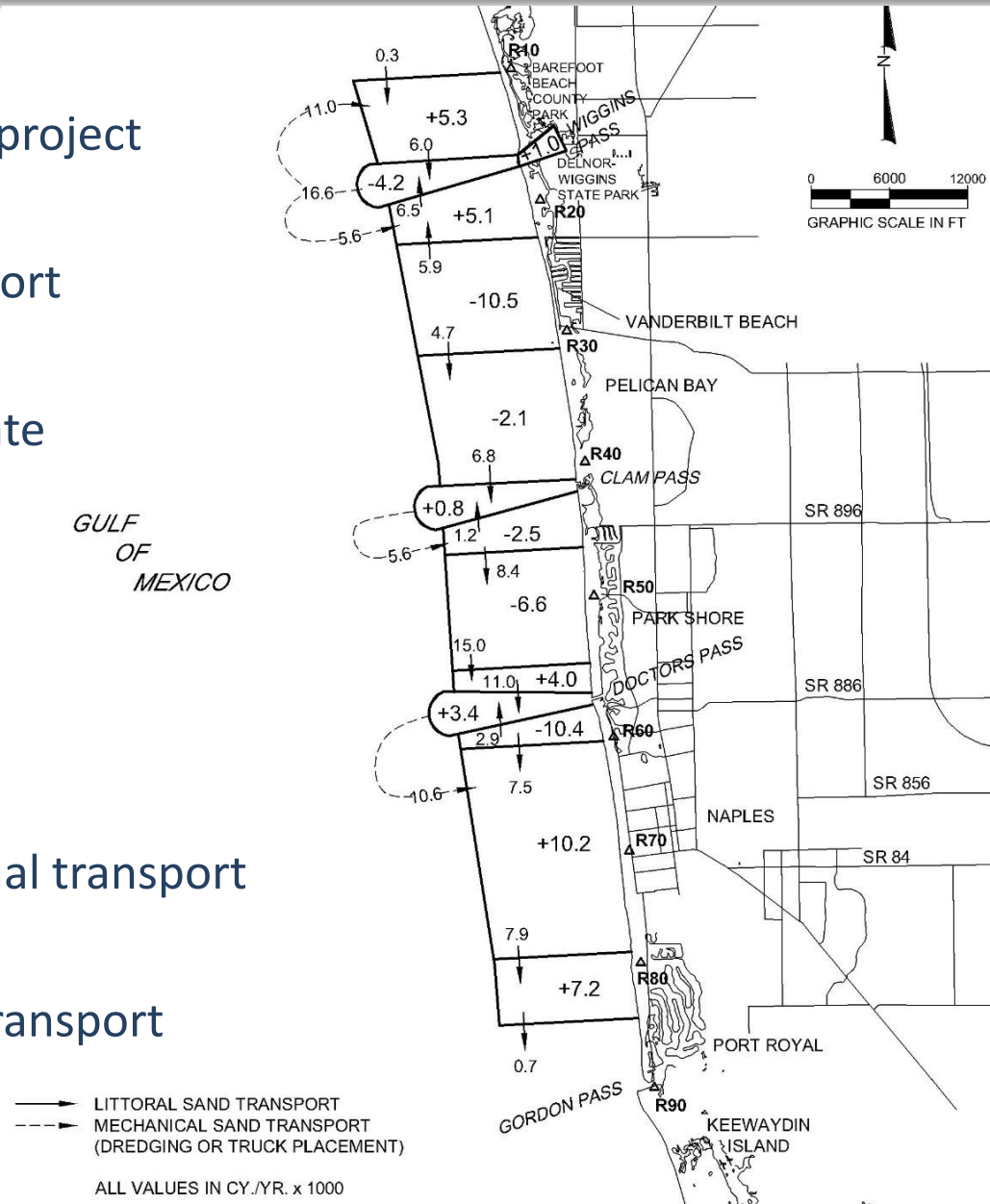


Groins in Southern Naples

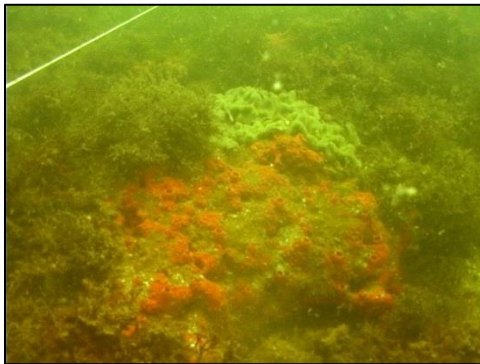


Photographs of Collier County Beaches from 2003
7-Years after Initial Construction

- Preliminary engineering for 2006 project
- 2011 Conceptual Engineering Report
- 2006-2009 sediment budget update
- Inlet effects tend to dominate
- Seasonal gross transport varies
- Storms can move more than annual transport
- Small southerly directed annual transport



- Over 500 acres of nearshore hardbottom
- Approximately 500 – 1,000 feet from shoreline
- Water depths 11 - 18 feet
- Low relief (1 ft average to 3 ft maximum)
- Sidescan and diver delineated edge

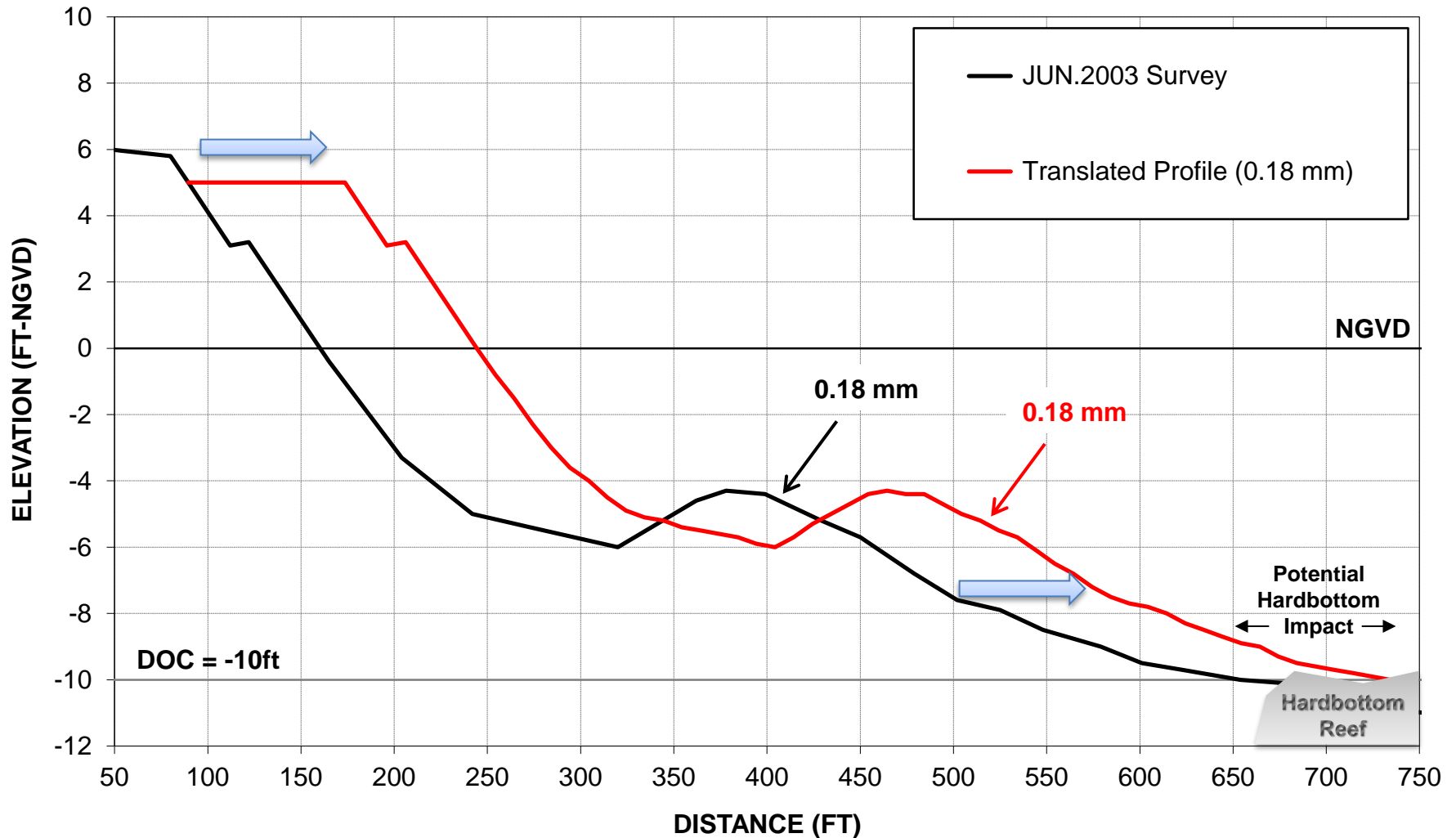


HARDBOTTOM

— 2015 DIVER DELINEATED HARDBOTTOM

— 2013 DIVER DELINEATED HARDBOTTOM

PARK SHORE BEACH PROFILE R-52 Translated Profile Equilibration

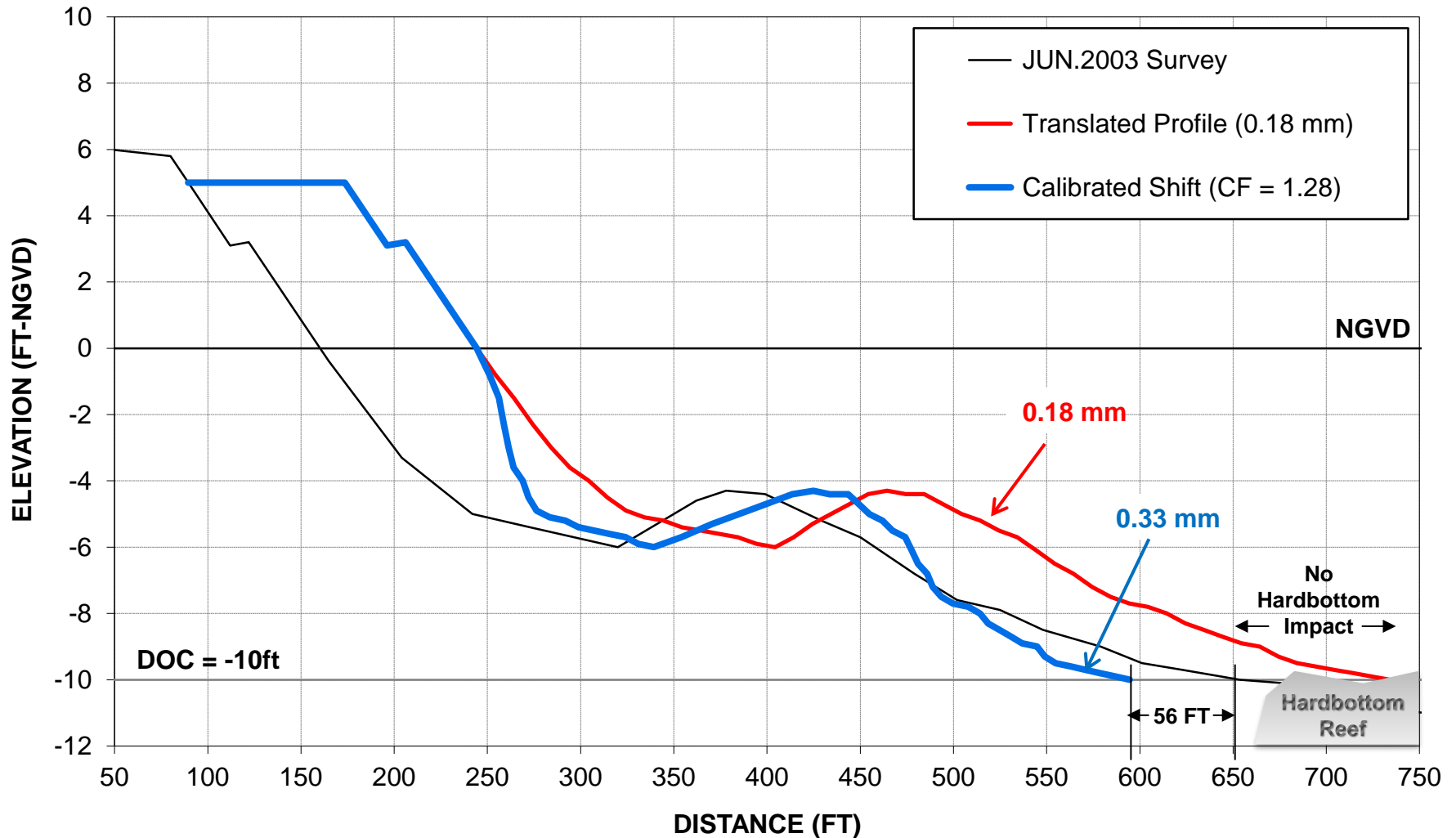


Based on CEM (2000) Method: Equation V-4-5, EM 1110-2-1100, Part V, Chapter 4 - BEACH FILL DESIGN, pg. V-4-35.

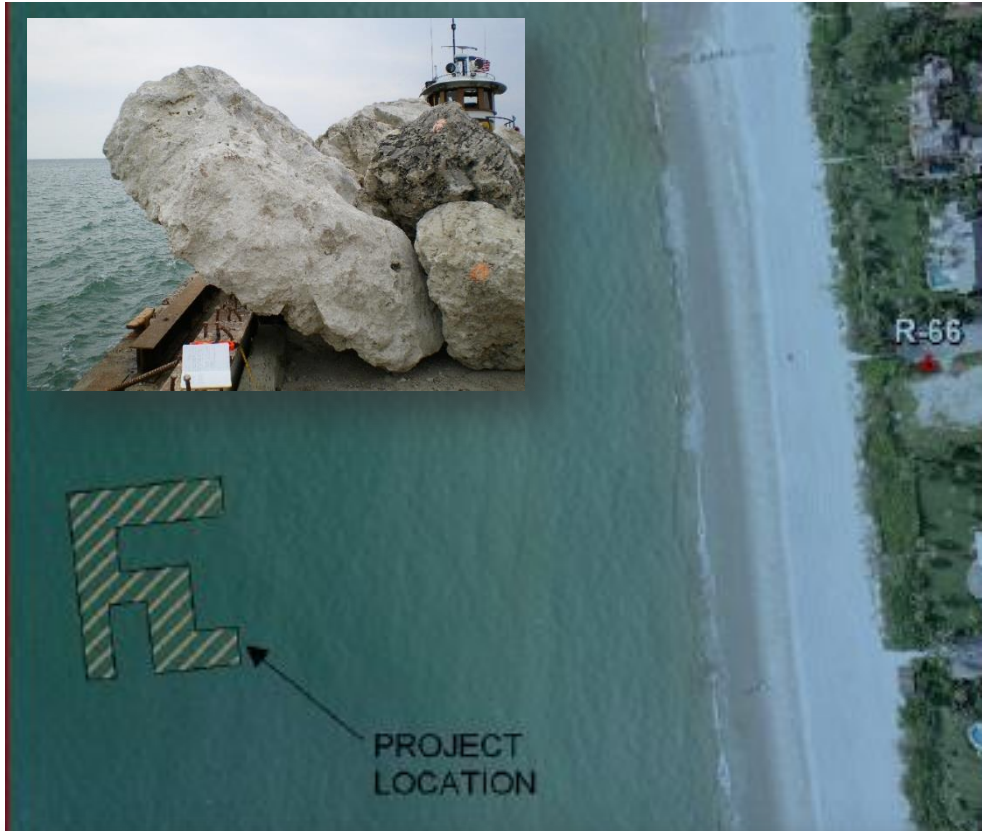
- Borrow Area T1
- Over 30 miles away
- MMS lease
- High quality material (0.33 mm)
- Screening on hopper dredges



PARK SHORE BEACH PROFILE R-52 Predicted Profile Equilibration



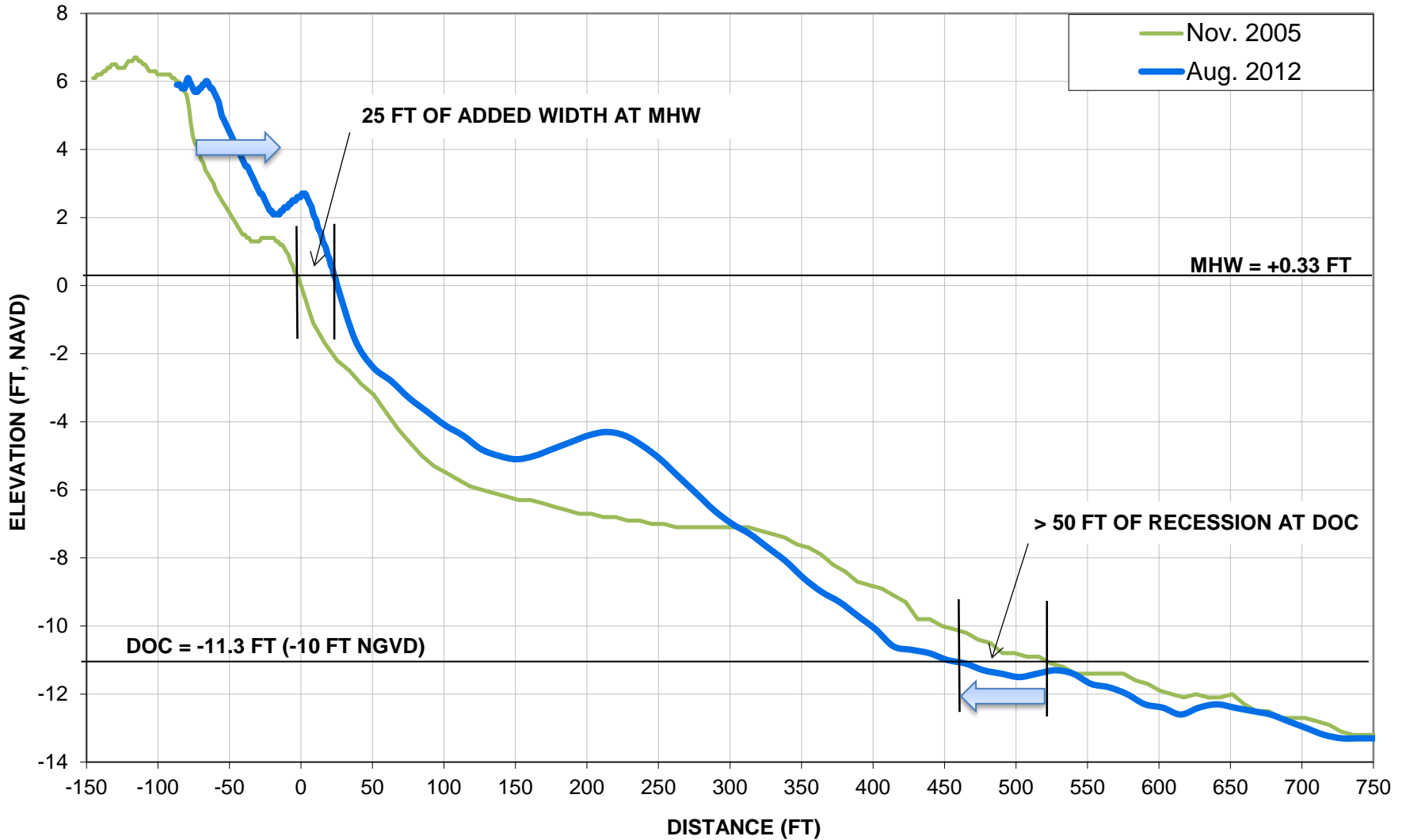
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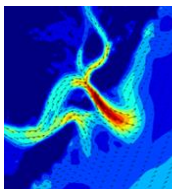
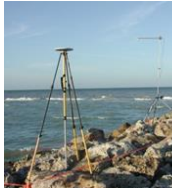
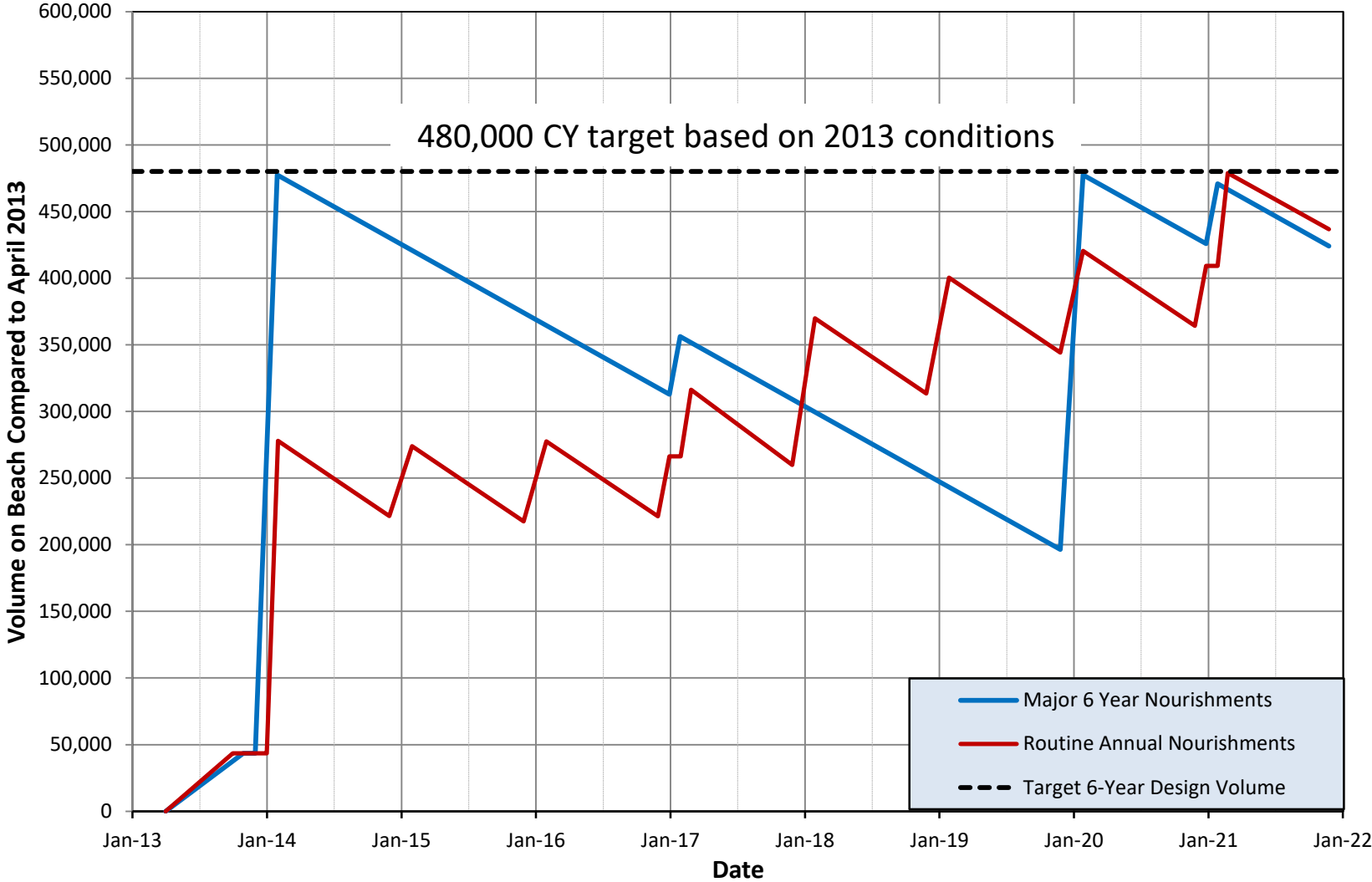
- 1.09 acre artificial reef required for potential impacts to hardbottom
- Built in Feb./March 2007
- 3-4 ft limestone boulders
- Located 1000 ft from shoreline
- Between 3rd and 4th Ave N. in Naples
- Water depths 10 to 14 ft
- Biological monitoring demonstrated mitigation success within 2 years
- **Biological monitoring also confirmed no impacts to nearshore hardbottom**



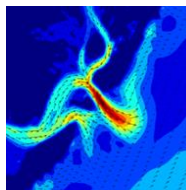
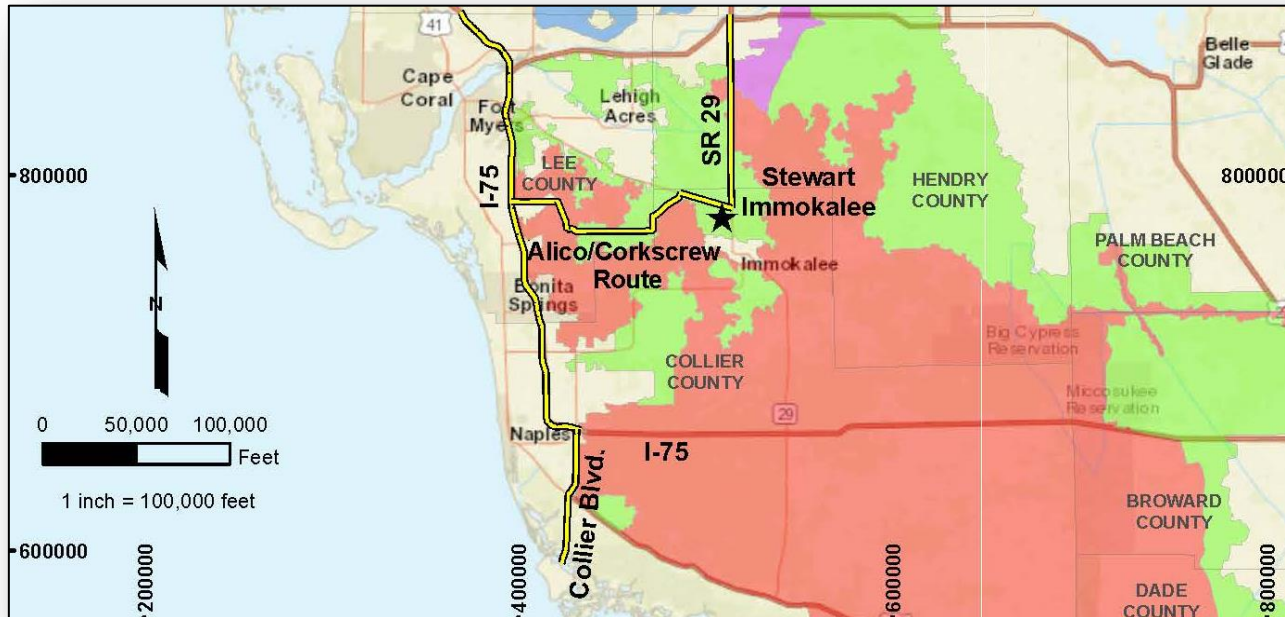
PARK SHORE AVERAGE PROFILES R-50 TO R-53



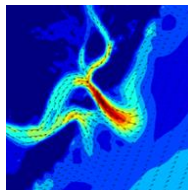
Fill Protocol Comparison Routine Annual Nourishments vs Major 6-Year Nourishment Plans



- County procured sand in advance from Stewart Mine in Immokalee
- Truck haul to multiple offloading points
- Two bid options for beach transport: Trucking & Fluidization
- County controlling survey work and tracking sand delivery
- Restrictions on schedule: no Sundays and no holidays
- Working outside of sea turtle nesting season
- Trucking restricted to daylight on roadways in Panther “Focus Areas”



- Sand staying in the system and decreasing renourishment needs
- No additional mitigation
- Monitor and address needs with annual maintenance program
- Flexibility in approach
- Cost considerations for dredging vs. truck haul
- Public safety is paramount





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