

# Recycling of Surplus Sand to Extend the Time Between Beach Fill Episodes

Cape May County, New Jersey



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Coastal Research Center





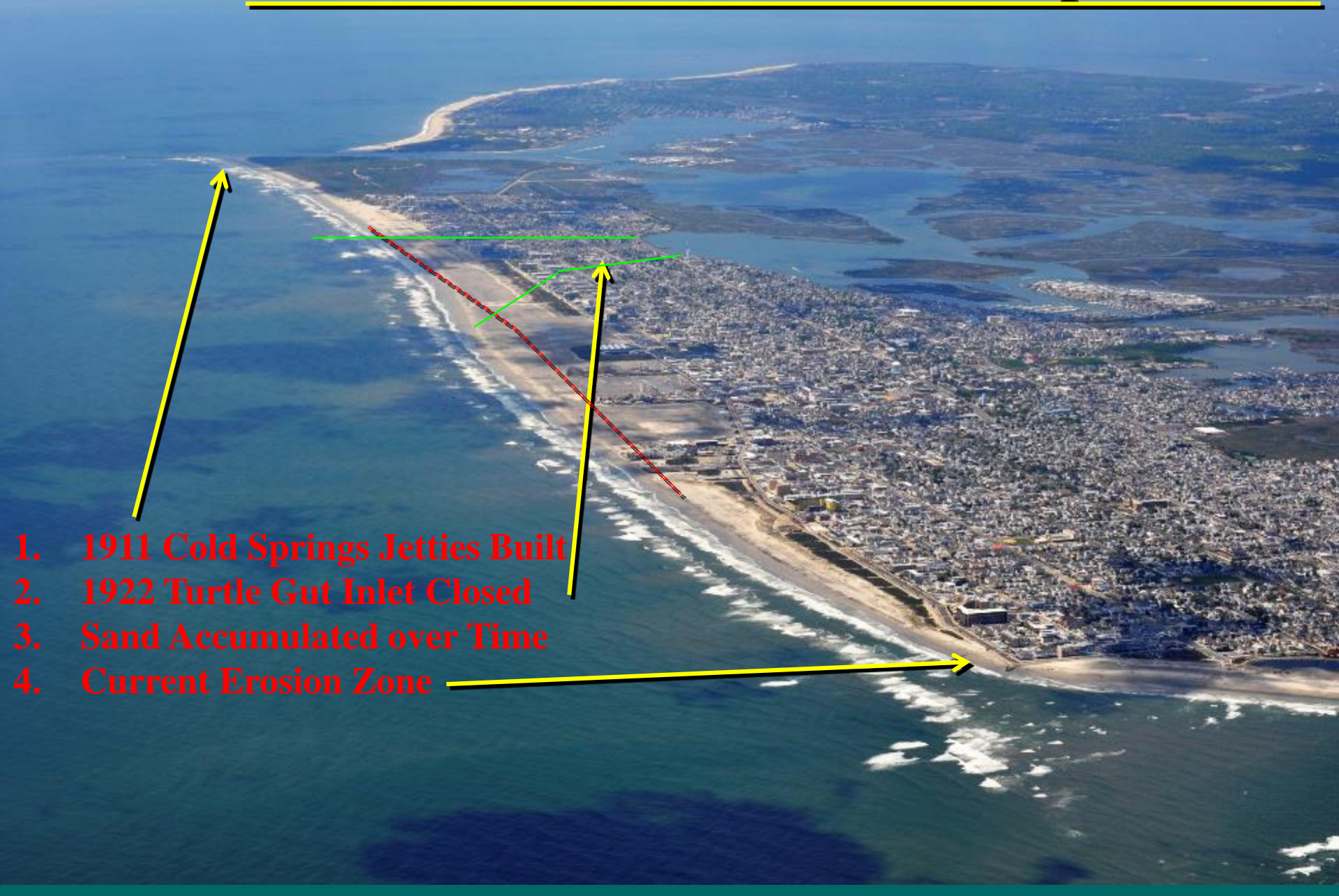
# 1795 Franklin Map Shows Inlets

*Inlet Morphology has Remained Fairly Constant*





# The Wildwoods – An Island with Surplus Sand



1. 1911 Cold Springs Jetties Built
2. 1922 Turtle Gut Inlet Closed
3. Sand Accumulated over Time
4. Current Erosion Zone

# ACOE Map of the Wildwoods Showing Zones of Sand Loss vs. Gain

March 26, 2008

Sediment imbalance between northern and southern portions of project area



0 875 1,750 3,500 5,250 7,000 Feet



# **Ocean City, NJ has a Vast Deposit Centrally Located on the Island**

*20<sup>th</sup> Street Beach has Advanced 500 ft. Seaward*

**Since 1992 Over 8,000,000 cy  
of Sand has been Placed on  
This Island, Concentrating in  
The mid-Section**





# Brigantine, NJ has a Sand Repository

*“Absecon Inlet’s North Jetty has built up a 6 million cy reserve”*



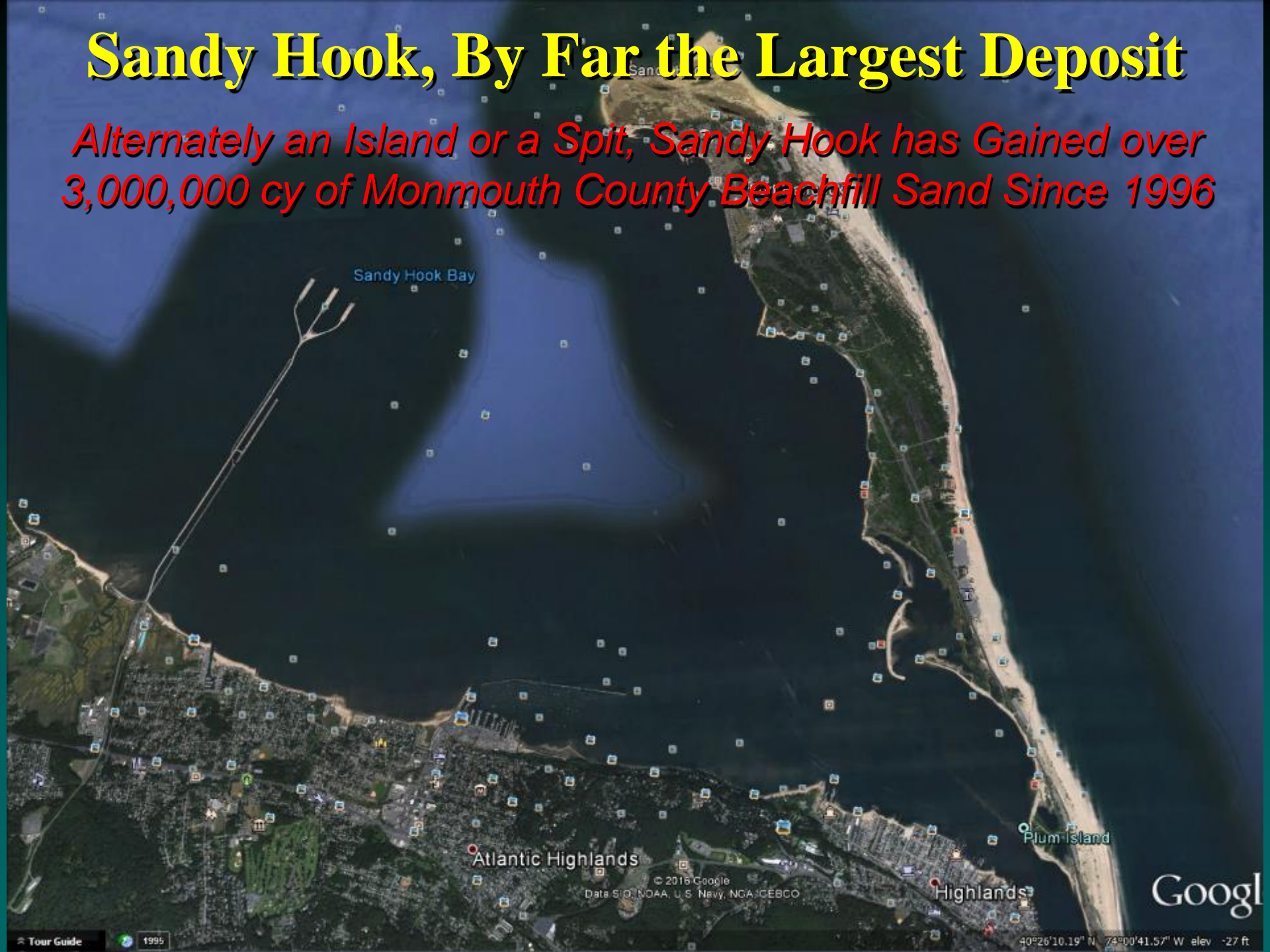
**“Absecon Inlet”**

Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
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# Sandy Hook, By Far the Largest Deposit

*Alternately an Island or a Spit, Sandy Hook has Gained over 3,000,000 cy of Monmouth County Beachfill Sand Since 1996*





# Sand Backpassing The Recycling Concept

- **A chronic pattern of sand movement is required**
- **The supply beach must be accessible from the depositional beach area.**
- **Probably not the primary means of providing shoreline stability**
- **THE COST is very low in comparison to finding new sand**
- **Tried four times in Avalon 2006, 2012, 2014 & 2016 (229,063 cy)**
- **Mobilization cost about 8% of that for a dredge in the inlet**
- **Sand moving cost about \$6 - \$7.00 per cubic yard up to 3 miles**
- **Excellent means to maintain a large Federal project to extend the time between major maintenance efforts**
- **The sand has been shown repeatedly over two decades to be arriving between 32<sup>nd</sup> and 70<sup>th</sup> Streets faster than it could be hauled back to the north AND it is guaranteed to return.**



# **Sand Backpassing The Recycling Concept**

**North Wildwood Used Sand Backpassing Following Hurricane Irene in 2012 using Wildwood Crest Beach as Source (93,000 cy)  
Thirteen High Capacity Trucks Made 1,700 Trips Between March and May 2012**

**North Wildwood Employed Sand Backpassing in 2016 to move 171,000 cy from the City of Wildwood following an Early 2016 Northeast Storm**

**The Army Corps of Engineers has this Concept as the Design Option for the Hereford Inlet to Cold Springs Inlet Shore Protection Project now in final Feasibility Review**

**Brigantine has Considered Moving Sand from Absecon Inlet back to the Northern Erosion Zone Between Corps Dredge Projects**

# 2006 Back Pass

Loading 25 cy Trucks

53,000 cu yds. placed



21<sup>st</sup> Street Deposit

Loading in the  
southern borrow  
area beach





# The 2012 Avalon Mid-Beach Sand Back-Passing Operation

- a. Southern & northern borrow areas
- b. An exclusion zone between the borrow sites
- c. Limit was between the mid-tide line and the toe of the dunes
- d. Excavation to 1.5 feet below existing surface
- e. Work complete by March 15, 2012
- f. Deposition area between 14<sup>th</sup> & 25<sup>th</sup> Streets



# 2012 pre- to post fill Borrow Sites



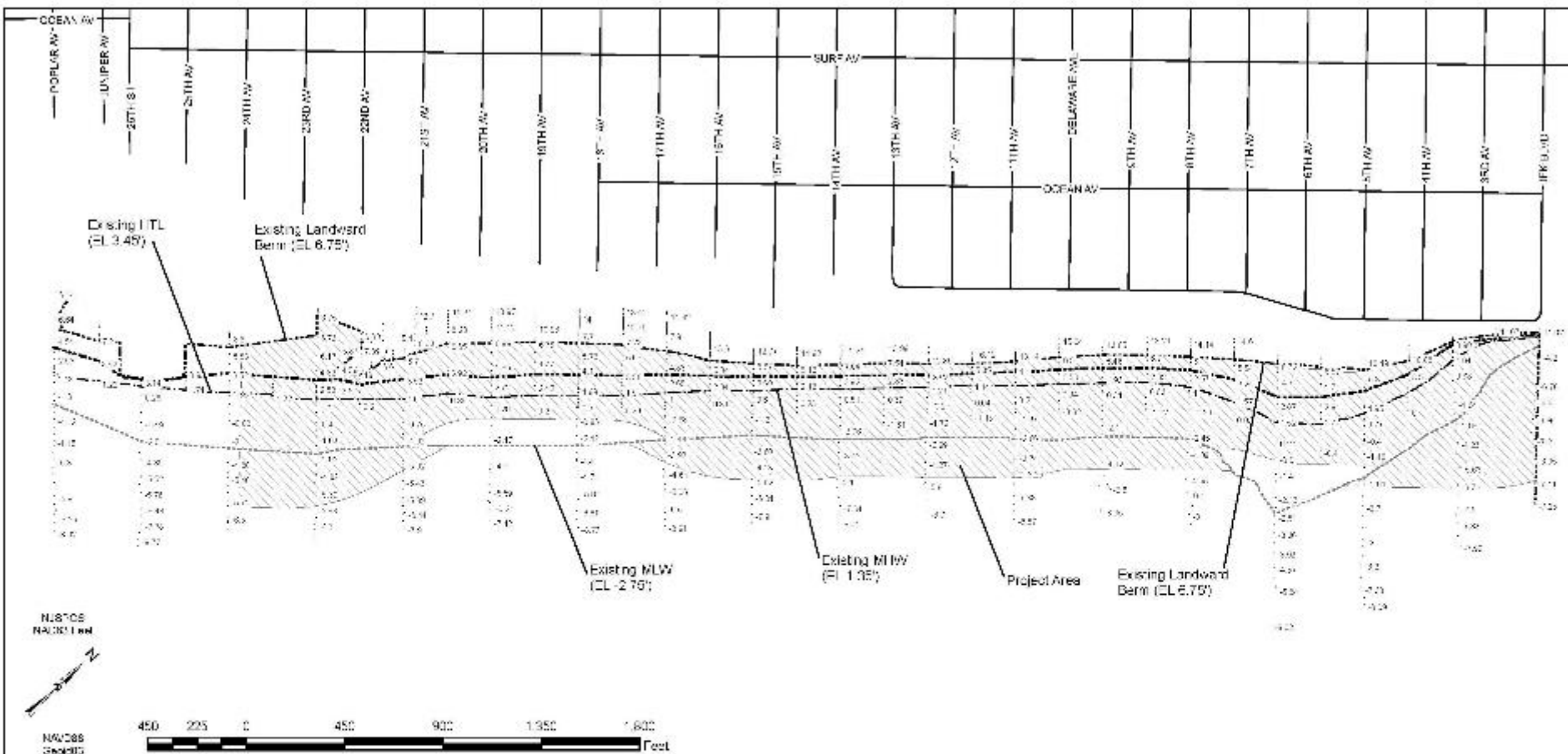


# **North Wildwood Sand Piles Hauled in from Wildwood City**





# 2016 Design Plan for North Wildwood



**STOCKTON UNIVERSITY**  
**COASTAL RESEARCH CENTER**  
 30 WILSON AVE., PORT REPUBLIC, NJ 08241

**North Wildwood, New Jersey**  
**Overview of Beach Nourishment - Proposed**

DRAWN BY: A.J. Ferenc

SHEET 1 of 1

CHECKED BY:

SCALE: 1" = 450'

DATE: 04/28/2016

"This plan is not intended for construction use"

Definitions and elevations of recommended fill were provided by Dr. Nicholas Georgiades, Coastal Fellow, Ph.D. at the Stockton Coastal Research Center.

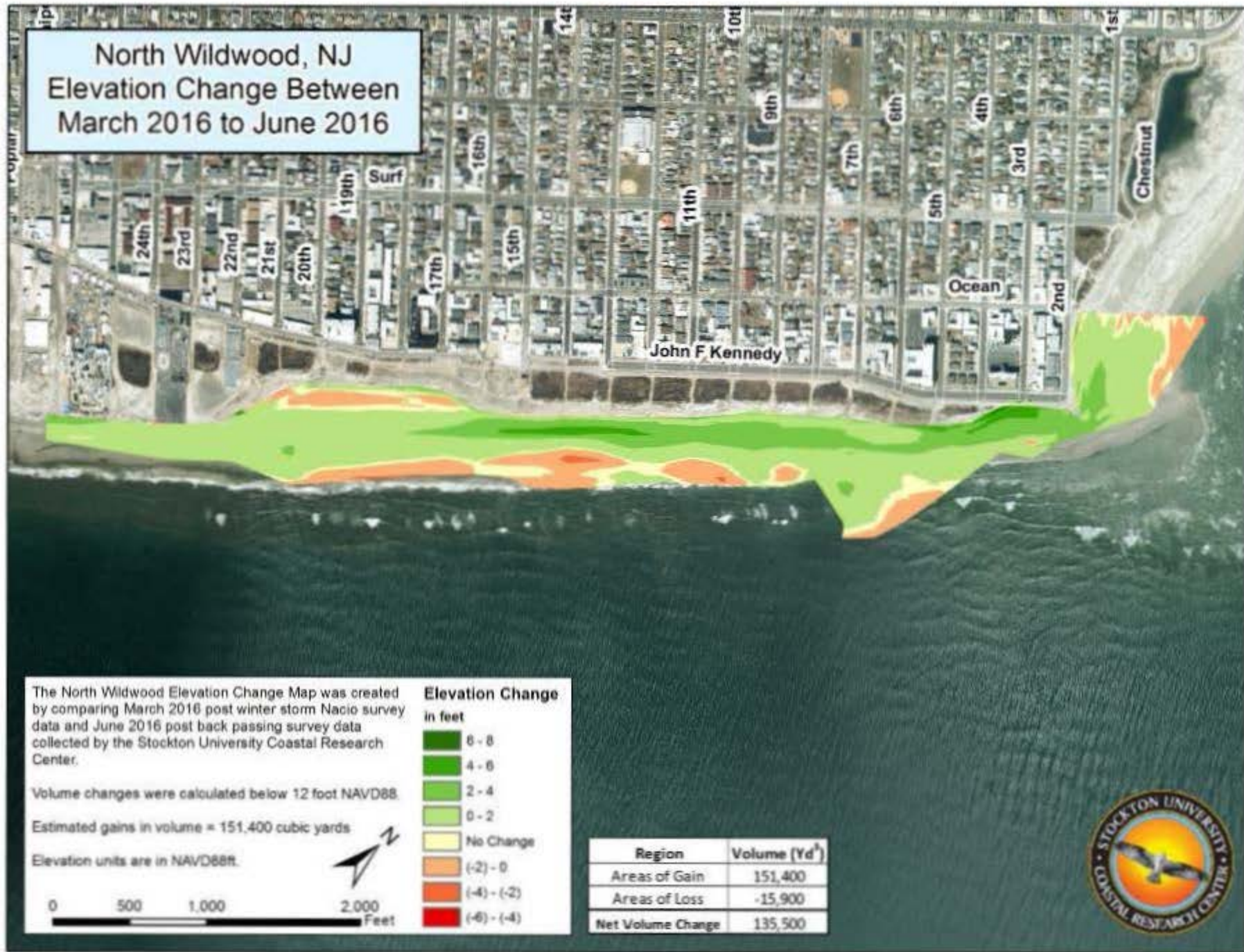
This map was created using January, 2015 survey data (post winter storm James), by the Stockton University's Coast of Protection Center. This data was used to derive the existing Mean Low Water (MLW) and Mean High Water (MHW).

All Vertical Linkages in NAVD83

Total Project Area: 71.20 acres

Area within Project	[Acres]	Max Disturbance
Above HTL	12.52	
Between HTL and MHW	10.91	
<b>Total Area Above MHW</b>	<b>22.92</b>	
Between MHW and MLW	28.11	
Below MLW	20.17	
<b>Total Area Below MHW</b>	<b>48.28</b>	
<b>Total Project Area</b>	<b>71.20</b>	

# North Wildwood, NJ Elevation Change Between March 2016 to June 2016



The North Wildwood Elevation Change Map was created by comparing March 2016 post winter storm Nacio survey data and June 2016 post back passing survey data collected by the Stockton University Coastal Research Center.

Volume changes were calculated below 12 foot NAVD88.

Estimated gains in volume = 151,400 cubic yards

Elevation units are in NAVD88ft.

0 500 1,000 2,000 Feet

## Elevation Change in feet



Region	Volume (Yd <sup>3</sup> )
Areas of Gain	151,400
Areas of Loss	-15,900
Net Volume Change	135,500





**No. Wildwood During Project 2<sup>nd</sup> & Kennedy Blvd.**

# Critical Elements for Large Scale Backpass Projects

- Must have a substantial accretional zone that adds 100,000 cy/year
- Permit requirements limit excavation depths & add exclusion zones
- Recovery to pre-project sand volumes required prior to next project start
- Wildlife issues can include biological surveys of sand foraging responses
- Trucking on the beach much preferred to hauling over roads
- Sand placement can involve stockpiling if seasonal restrictions are in place
- Equipment and crew experience in New Jersey is growing
- Project expenses eligible for NJDEP 75% - 25% cost sharing
- The ACOE *might be amenable to project credit* within their Shore Protection efforts if recycling can extend time between hydraulic maintenance efforts.



A dramatic sunset over the ocean. The sky is filled with large, golden, streaky clouds that catch the low light of the sun. The sun is visible as a bright orange glow on the horizon, reflecting on the calm water below. The overall color palette is dominated by deep blues, oranges, and yellows.

***Thank You***