



## THE TOWN OF OAK ISLAND, NORTH CAROLINA



# PLANNING ANALYSIS, ENGINEERING DESIGN AND ENVIRONMENTAL INVESTIGATIONS

in Support of a Comprehensive Shoreline Management Plan

Town Council Presentation – June 3, 2016



# Agenda

## Items To Cover

- **Overall Beach Plan**
  - Provide Equivalent Level of Protection to Upland Property
  - Protect Local, State and Federal Tax Base and Local Economy
  - Qualify for and Maintain Static-line Exception or Development Line to Lessen Number of Non-Conforming Structures/Lots
  - Qualify for and Maintain FEMA Engineered Beach for Disaster Recovery
- **Davis Creek Area Enhancement Plan**
  - Investigate Potential for Dredging for Navigation and Water Quality Benefits
- **Lockwoods Folly Inlet Management Plan**
  - Maximize Navigational and Recreational Uses of Lockwoods Folly Inlet, AIWW Crossing & Bend Widener, and Eastern Channel
  - Utilize Beneficial Use of Dredged Material as Much as Possible

# Agenda

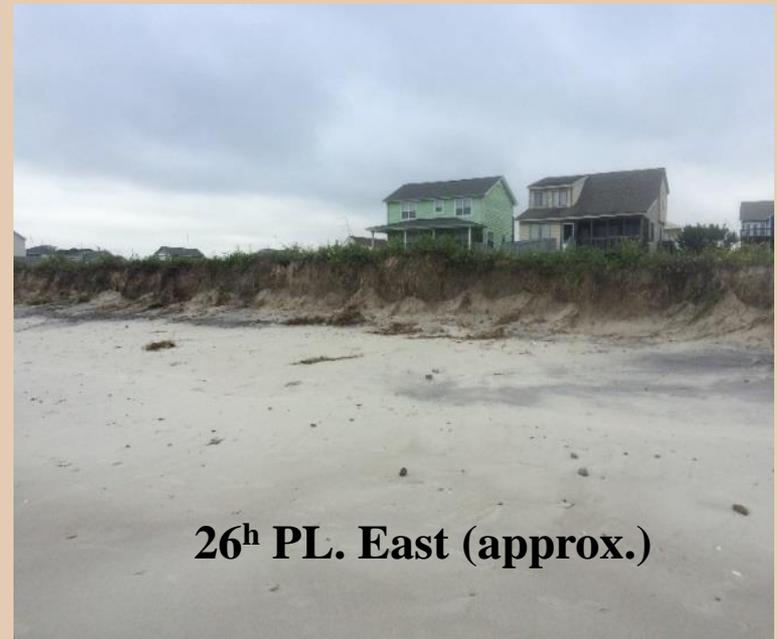
## Items To Cover

- **Open-End Coastal Engineering Contract**
  - Review of Holden Beach Terminal Groin Project/EIS
  - Work with USACE to Add Eastern Channel Mouth Dredging to AIWW Crossing/Bend Widener for Cost-Effective Sand Placement (Interface with Holden Beach)
  - Assist Kilpatrick Stockton with Discussion of Upcoming Wilmington Harbor Project/Location of Beach Placement & Potential Upcoming Changes to Sand Management Plan
- **Open End Stormwater Contract**
  - Work with Town Planning and Public Works Staff to Develop Concept Plans for Selected Problem Flooding Spots
- **Annual Shoreline Mapping/Surveying Contract**
  - Track Beach Shoreline and Volume Changes to Aid in Future Master Planning, Maintenance Compliance of Eastern Channel Project, Development Line Compliance and Maintenance of Engineered Beach

# Why Is an Overall Beach Plan Needed?

## Project Need

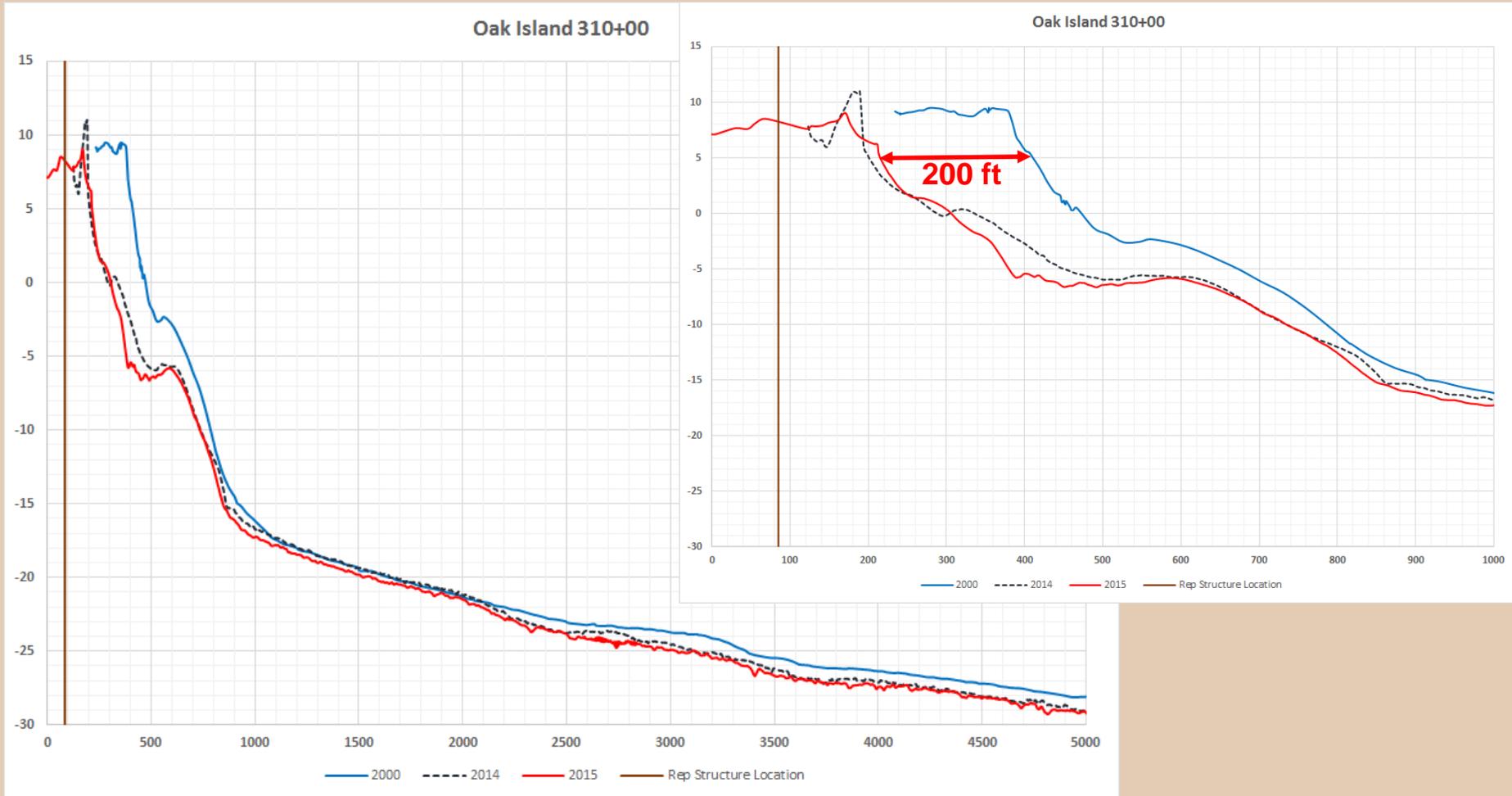
- **Historical Reliance on USACE Projects**
  - Harbor Deepening, Turtle Habitat Restoration Project, Harbor Maintenance
  - Long-term Study for 50-yr CSDR Project
- **USACE Funding and Projects Are Uncertain**
- **Existing Dune and Berm System Is Eroded In Many Areas**



# Why Is an Overall Beach Plan Needed?

## Project Need

- Existing Dune and Berm System Is Eroded In Many Areas



# Why Is an Overall Beach Plan Needed?

## Project Need

- **Without Intervention, Recreational Beach Width Will Be Lost and Infrastructure Will Be At Risk** (Photos Courtesy of Carteret County – 1990s)



# Why Is an Overall Beach Plan Needed?

## Project Need

- **Without Intervention, Recreational Beach Width Will Be Lost and Infrastructure Will Be At Risk**



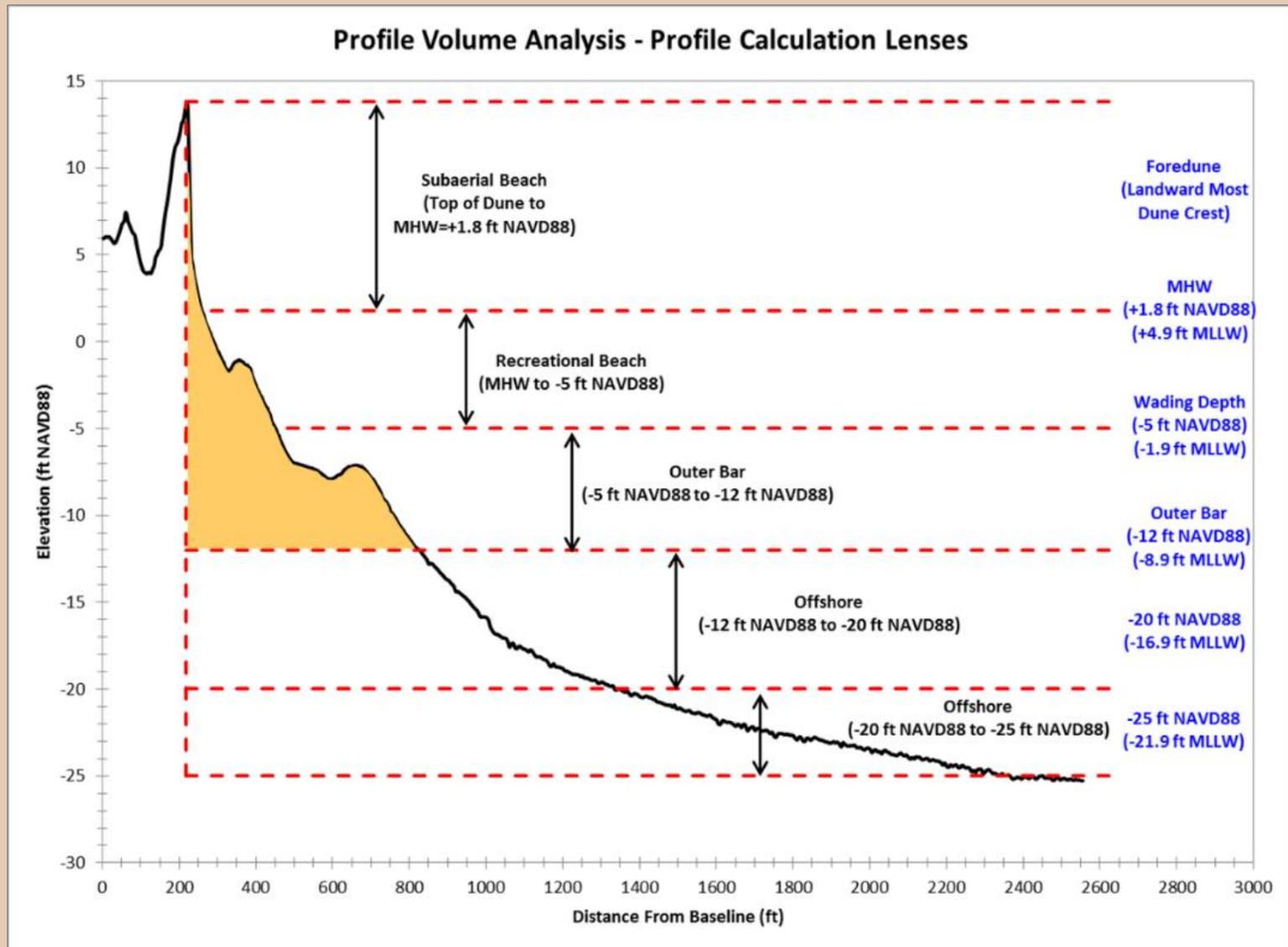
# Why Is an Overall Beach Plan Needed?

## Project Need

- **Static Vegetation Line and Setback**
  - Non-conforming Lots Are a Real Concern in Many Areas on Island
- **Proposed Development Line May Offer Relief – BUT In Order to Be Effective the Current Line of Vegetation MUST Be Maintained – If Event Happens, the Current Vegetation Line Will Be Used for Setbacks Along with Development Line**

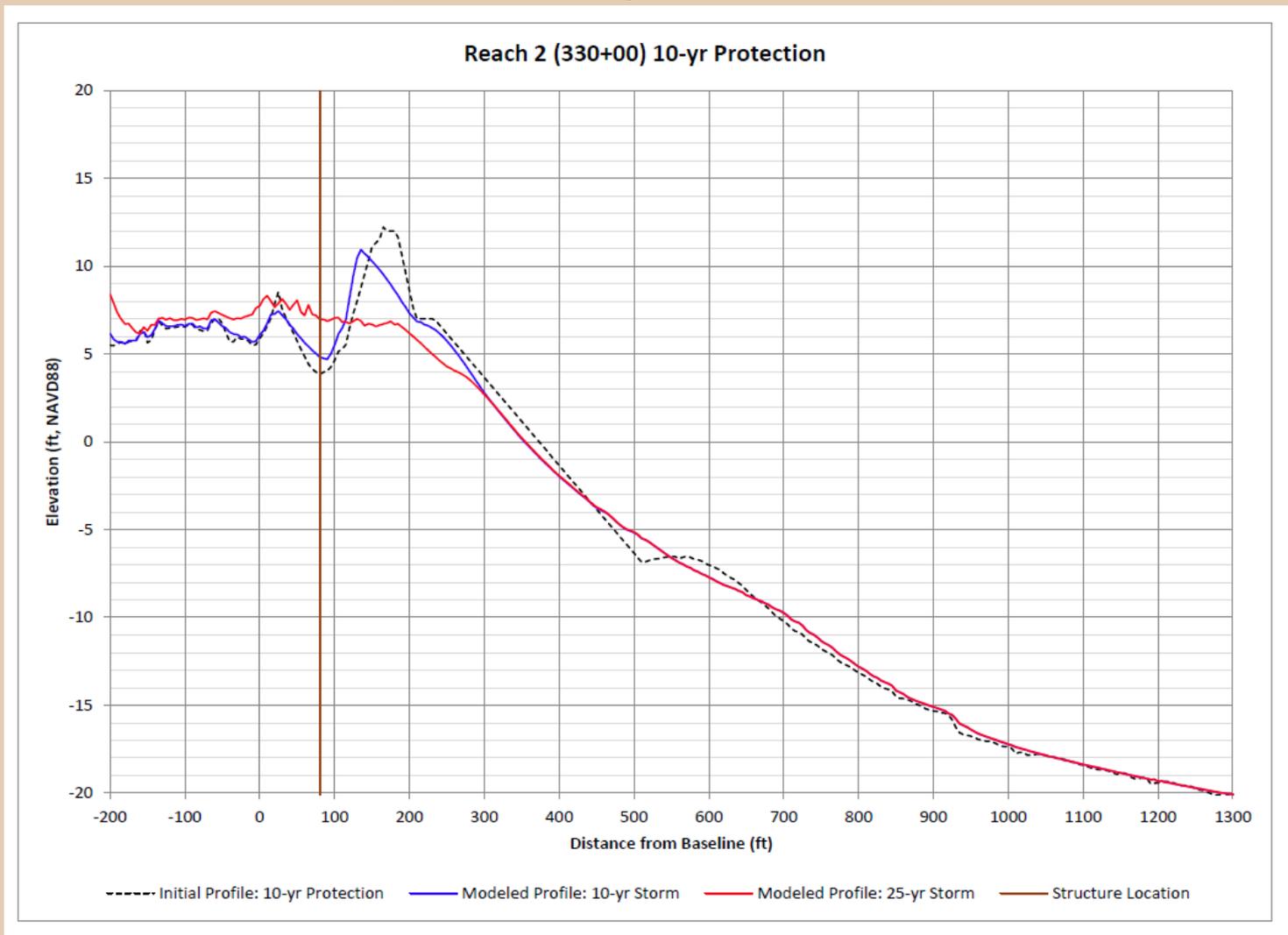


# Level of Protection Tied to Sand Volume



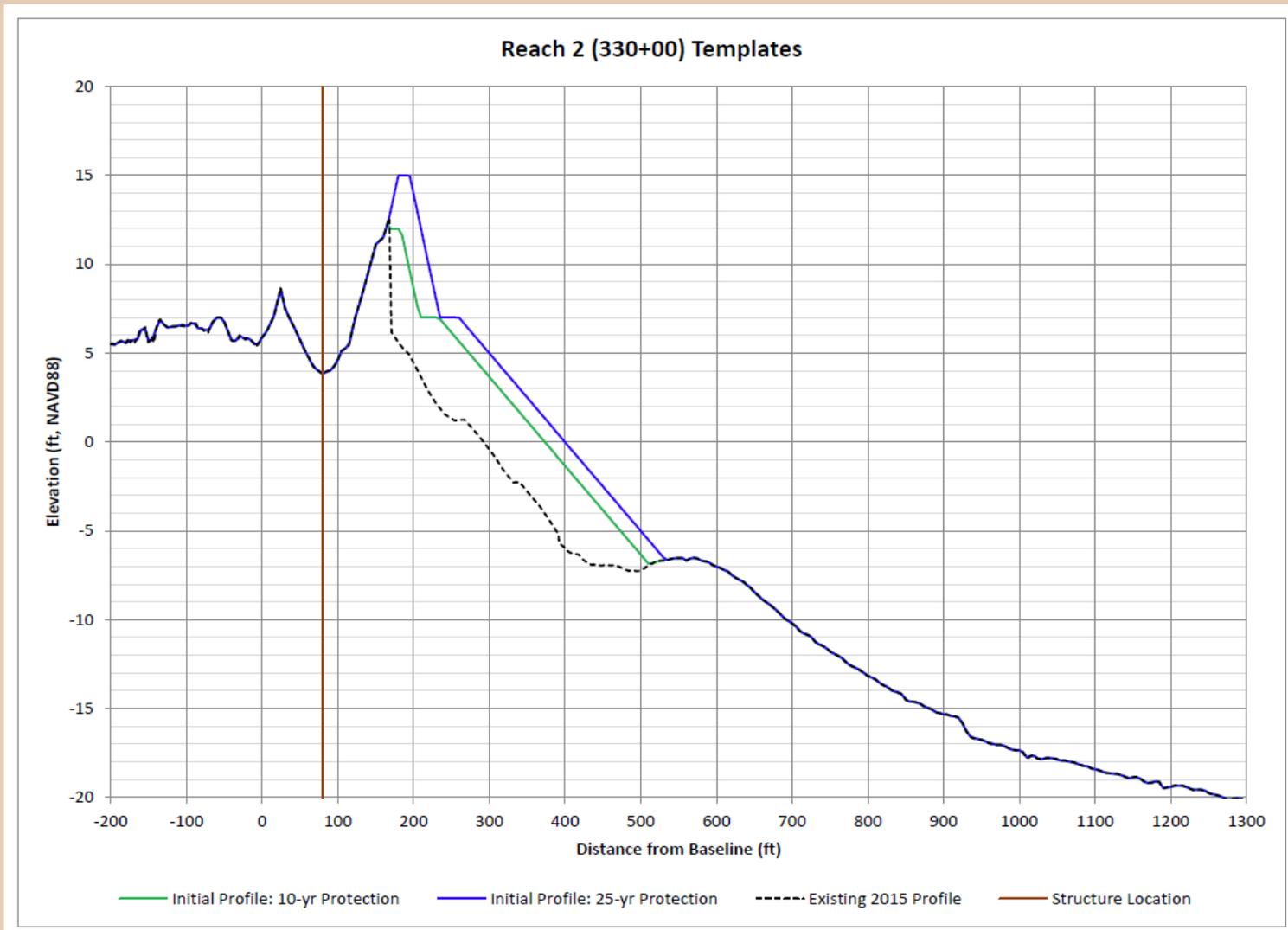
# Level of Protection Analysis for Initial Project

- Preliminary Determination of Initial Project Sand Need – Engineered Beach
  - SBEACH 10-yr Storm Results



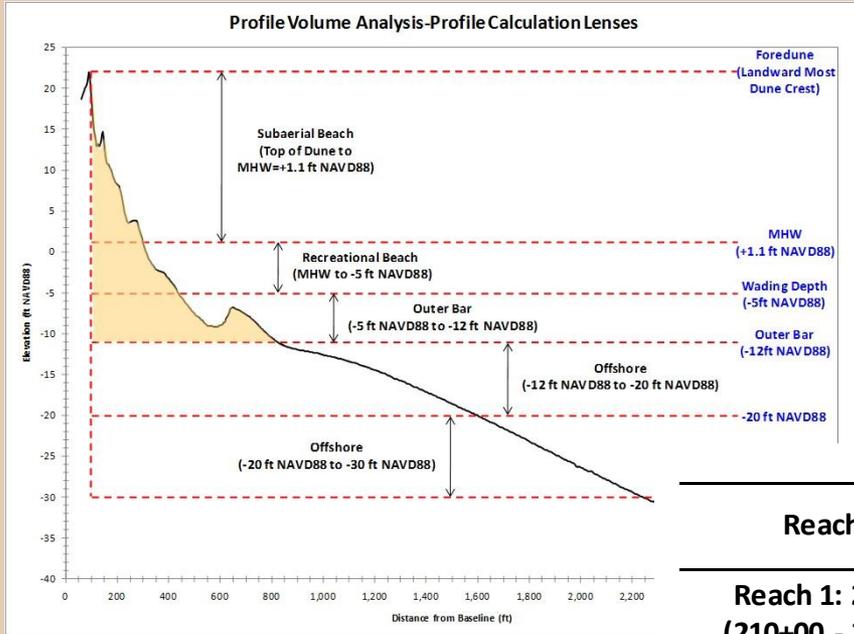
# Level of Protection Analysis for Initial Project

- Preliminary Determination of Initial Project Sand Need – Engineered Beach
  - Template Need for Various Storm Events



# Level of Protection Determination for Initial Project

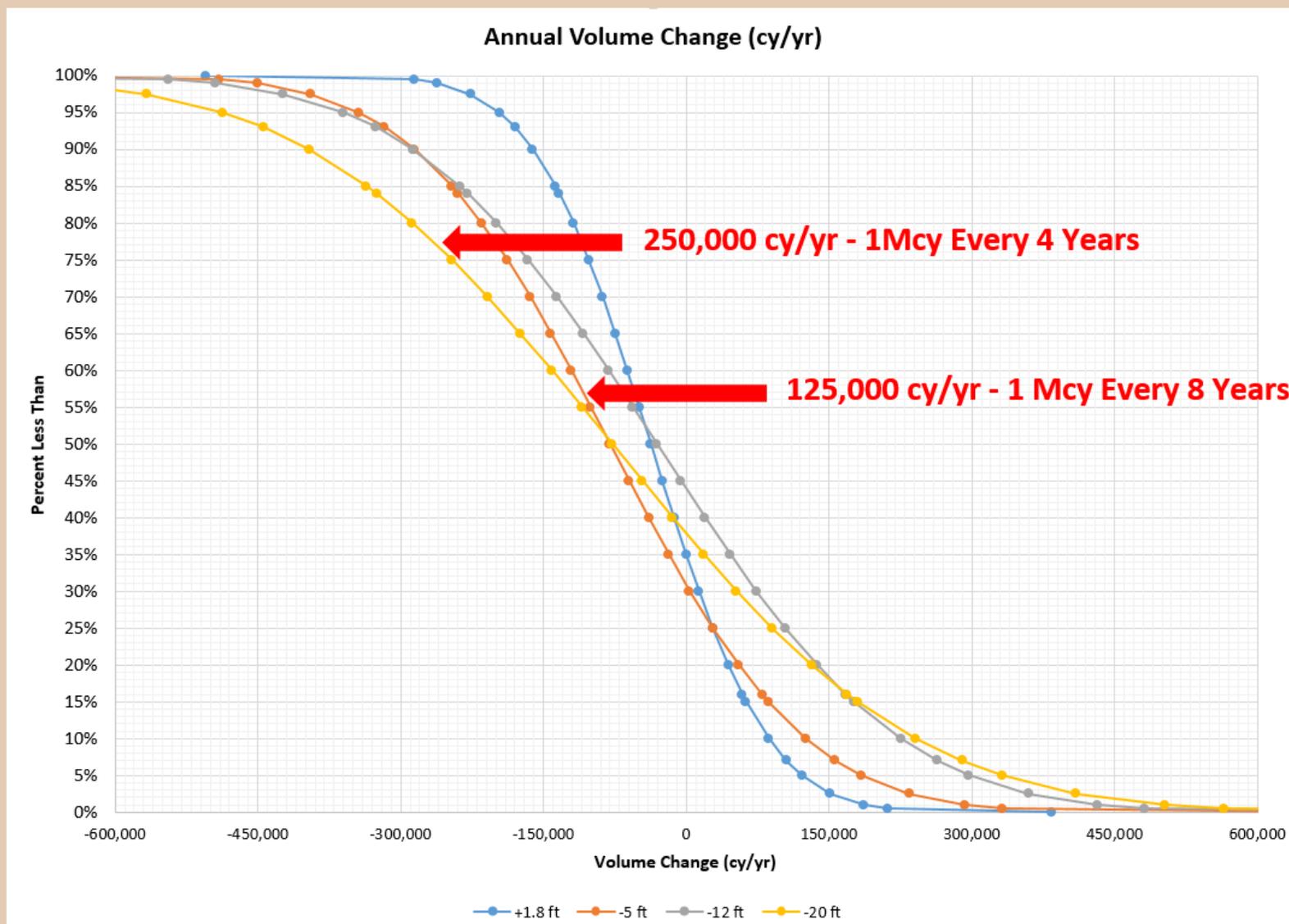
- Preliminary Triggers for Engineered Beach – (TO BE FURTHER REFINED AT NEXT PROJECT STAGE)**



Reaches	2015 Volume (cy)	10-yr, -12 ft Trigger (cy)	25-yr, -12 ft Trigger (cy)	50-yr, -12 ft Trigger (cy)
<b>Reach 1: 210+00 (210+00 - 270+00)</b>	<b>191.3</b>	191.3	228.9	255.3
<b>Reach 2: 330+00 (290+00 - 410+00)</b>	<b>158.5</b>	207.5	229.3	256.6
<b>Reach 3: 470+00 (430+00 - 480+00)</b>	<b>186.3</b>	219.1	231.1	257.7
<b>Reach 4: 540+00 (500+00 - 580+00)</b>	<b>176.0</b>	223.0	223.0	273.1
<b>Reach 5: 600+00 (600+00 - 690+00)</b>	<b>168.6</b>	214.0	214.0	285.6

# Determination of Long-Term Maintenance Need

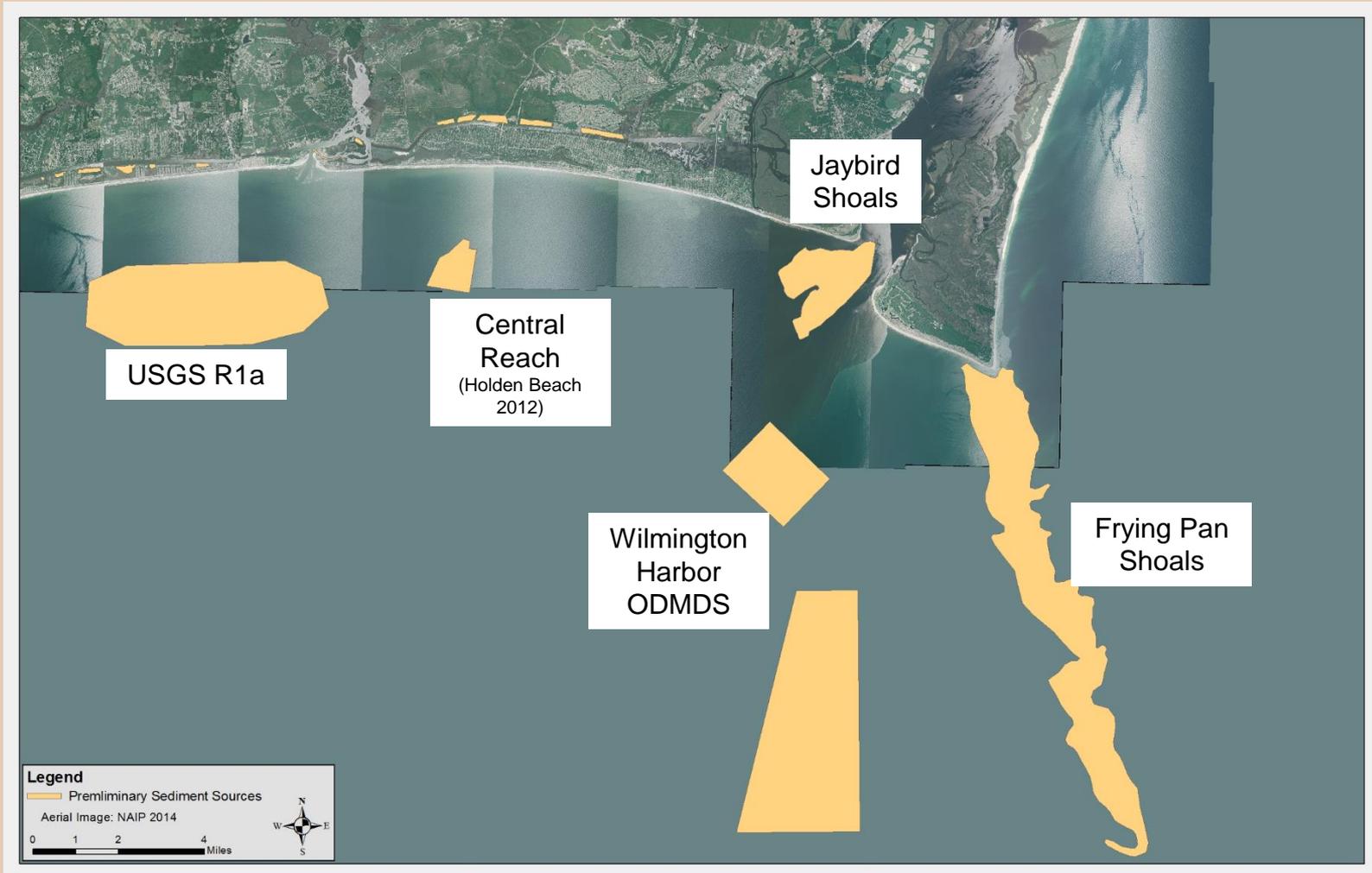
- Preliminary Determination of Annual Sand Need – Monte Carlo Simulation



# Available Sand Resources

## Preliminary Off Shore Sediment Resources

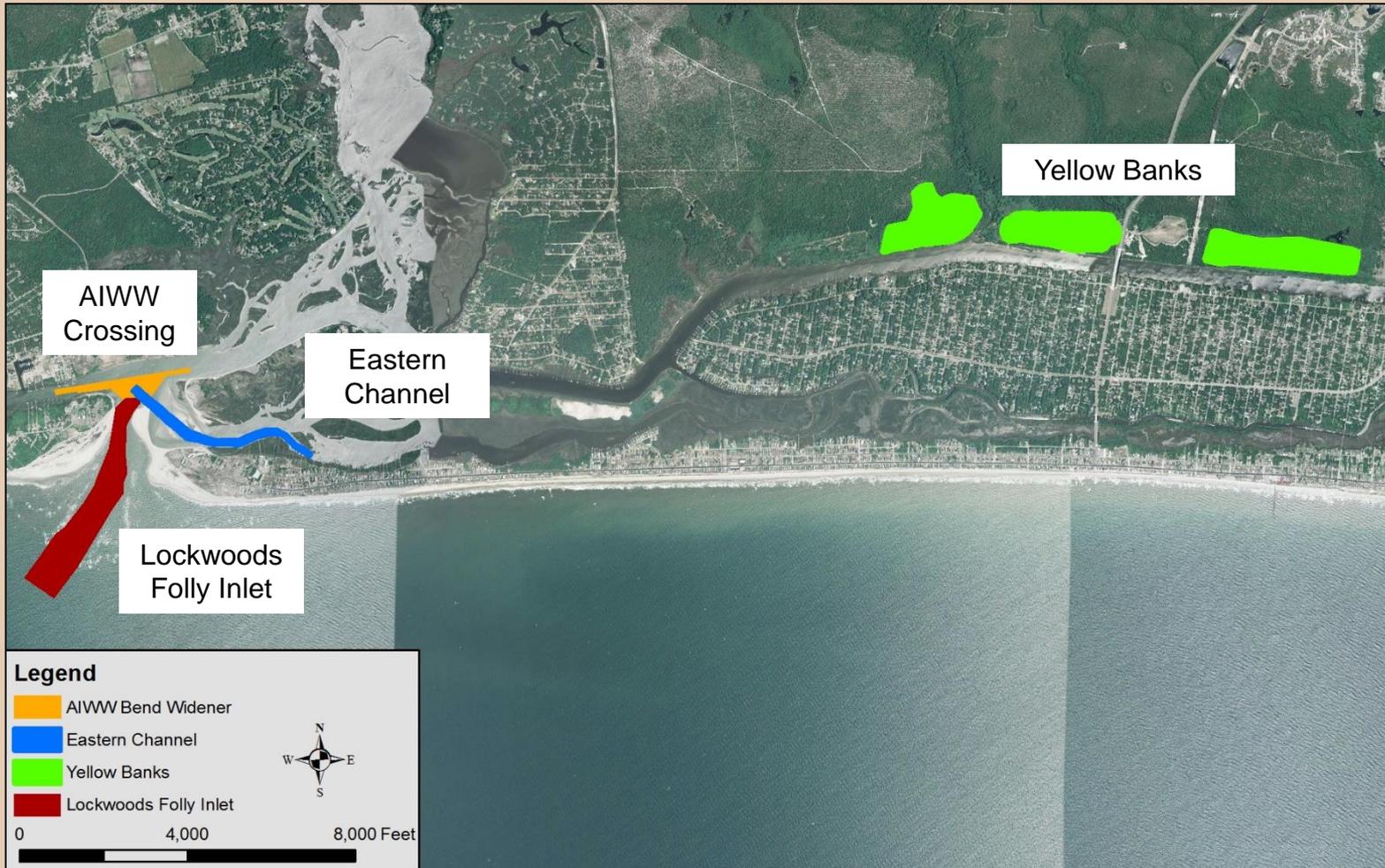
- Based on NCBIMP, USACE and NCGS Datasets



# Available Sand Resources

## Preliminary Upland & Nearshore Sediment Resources

- Based on NCBIMP, USACE and NCGS Datasets



# Range of Costs Depend On LoP and Sand Sources Used

## Preliminary Costs – Dependent on Borrow Source & Renourishment Interval

<b>Individual Storm Event Level of Protection</b>	<b>Initial Project Volume Needed</b>	<b>Initial Project Cost Range<sup>b</sup></b>	<b>Annual Maintenance Project Cost Range<sup>c</sup></b>
<b>5-yr Event (Est.)<sup>a</sup></b>	<b>1.8 Mcy</b>	<b>\$24M - \$34M</b>	<b>\$2.5M - \$4.75M</b>
<b>10-yr Event</b>	<b>2.35 Mcy</b>	<b>\$29M - \$42M</b>	<b>\$2.5M - \$4.75M</b>
<b>25-yr Event</b>	<b>3.0 Mcy</b>	<b>\$36M - \$52M</b>	<b>\$2.5M - \$4.75M</b>
<b>50-yr Event</b>	<b>4.75 Mcy</b>	<b>\$46M - \$67M</b>	<b>\$2.5M - \$4.75M</b>

<sup>a</sup> 5-yr Event Results Extrapolated from 10-yr, 25-yr and 50-yr Event Results

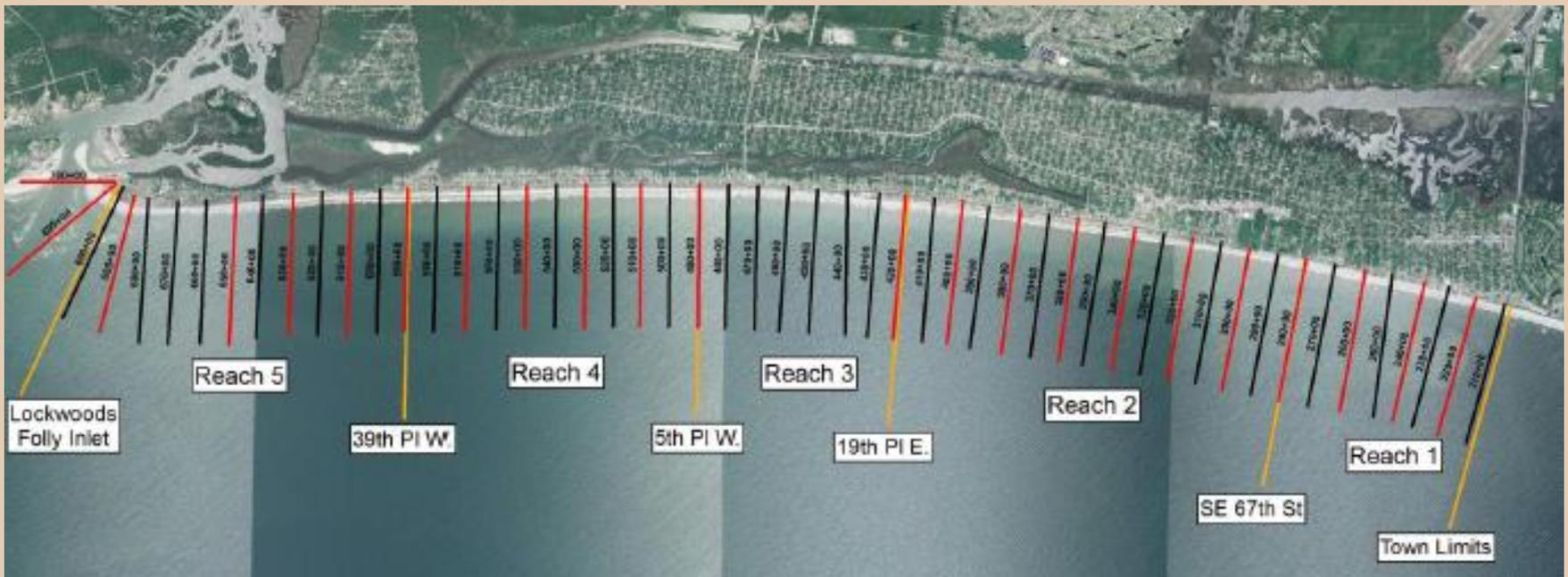
<sup>b</sup> Initial Project Cost Range Dependent on Borrow Source (Low Cost-Yellow Banks, High Cost - Frying Pan Shoals)

<sup>c</sup> Annual Maintenance Project Cost Range Dependent on Borrow Source (Low Cost-Yellow Banks, High Cost - Frying Pan Shoals) as well as Expected Renourishment Interval for 1.0 Mcy Project (Low - Maintenance Project Every 8 years, High - Maintenance Project Every 4 Years)

# What's Next for the Overall Beach Plan?

- **Potential Next Steps**

- **Begin Annual Monitoring Program** to Track Beach Shoreline and Volume Changes to Aid in Future Master Planning, Maintenance Compliance of Eastern Channel Project, Development Line Compliance and Maintenance of Engineered Beach
  - Year 1 = \$76,895 – Going To \$69k-73.5k Annually – Additional Profiles Needed
  - Also Includes Surveying of Eastern Channel and Sections Across Lockwoods Folly Inlet



# What's Next for the Overall Beach Plan?

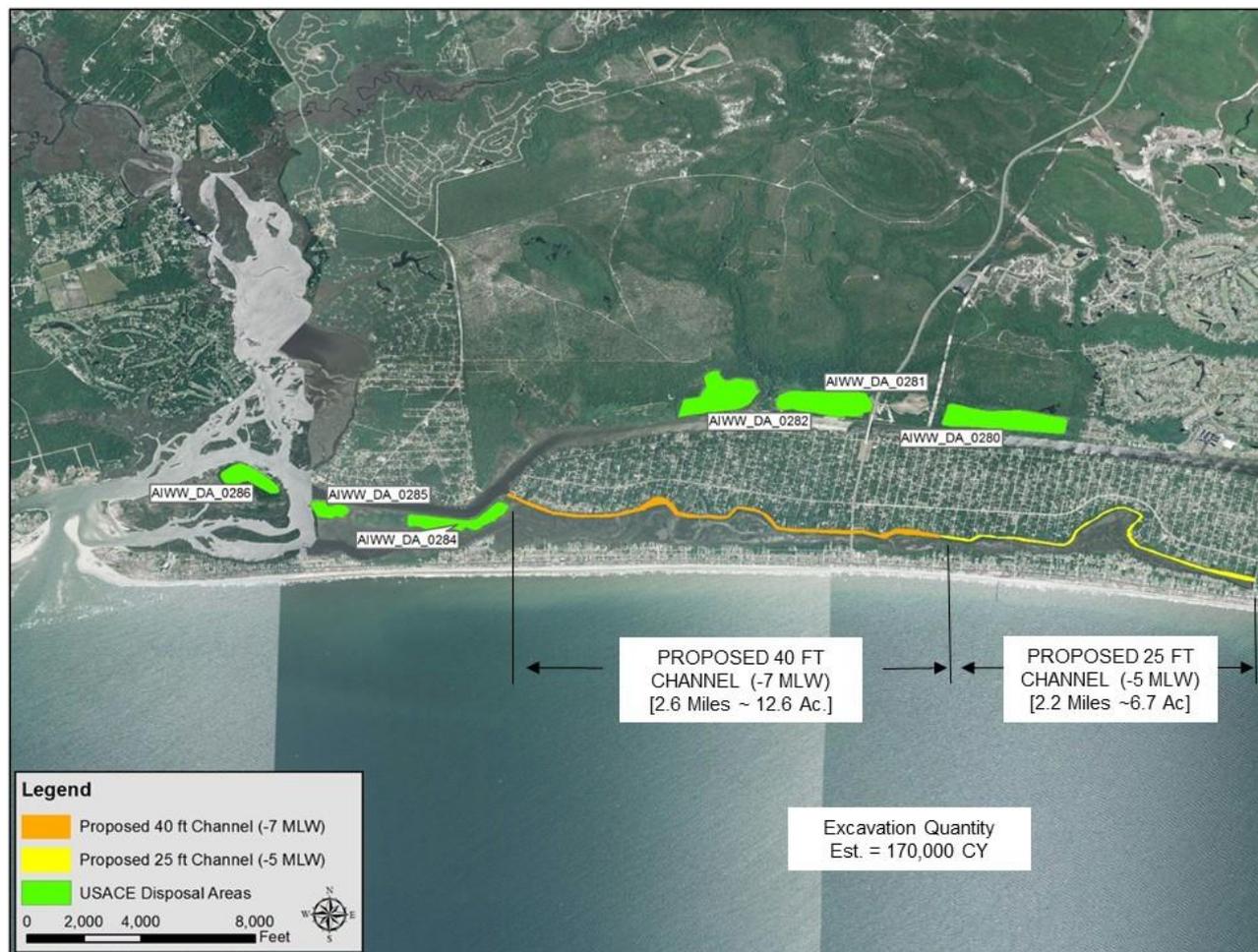
- **Potential Next Steps**

- **Decision on Funding Plan** to Determine Level of Protection Desired for Initial Project and Begin Detailed Master Planning Effort (Engineering/Geotechnical/Permitting)
  - Board May Decide To At Least Develop a Funding Stream for Master Plan Development (\$2-3 Million – Mostly Geotechnical Investigations) so that More Definitive Estimates of Project Costs Can Be Developed Before Full Implementation of Funding Plan
  - **Important to Recognize That M&N Will Be Assisting the Town at Each Step and Will Work to Control Costs – Proven During the Eastern Channel Project**
- **Begin Master Plan Effort** to Develop Detailed Engineered Beach Plan, Conduct Geotechnical Field Investigations, and Develop EA/EIS and Permits As Required

# Davis Canal Management Plan

## Preliminary Plan

- Provide Navigation and Water Quality Benefits by Improving Tidal Flushing
  - Budgetary Estimate = **\$6-6.5M** for Mob/Demob, Booster Pumps, USACE Fees and Likely Disposal Area Improvements



# Davis Canal Management Plan

## Permitting Approach for Davis Canal Management Plan

- Environmental Assessment or General Permit 291
- Major CAMA permit – Coastal Resources Commission Variance Process
- 2 – 3 year timeframe
- USACE Consent Agreement for CDF
- USFWS and NMFS Section 7 informal consultation
- **SIGNIFICANT AGENCY CONCERNS – PERMITS WILL BE DIFFICULT IF NOT IMPOSSIBLE TO ATTAIN & M&N DOES NOT RECOMMEND PURSUING FURTHER AT THIS TIME**

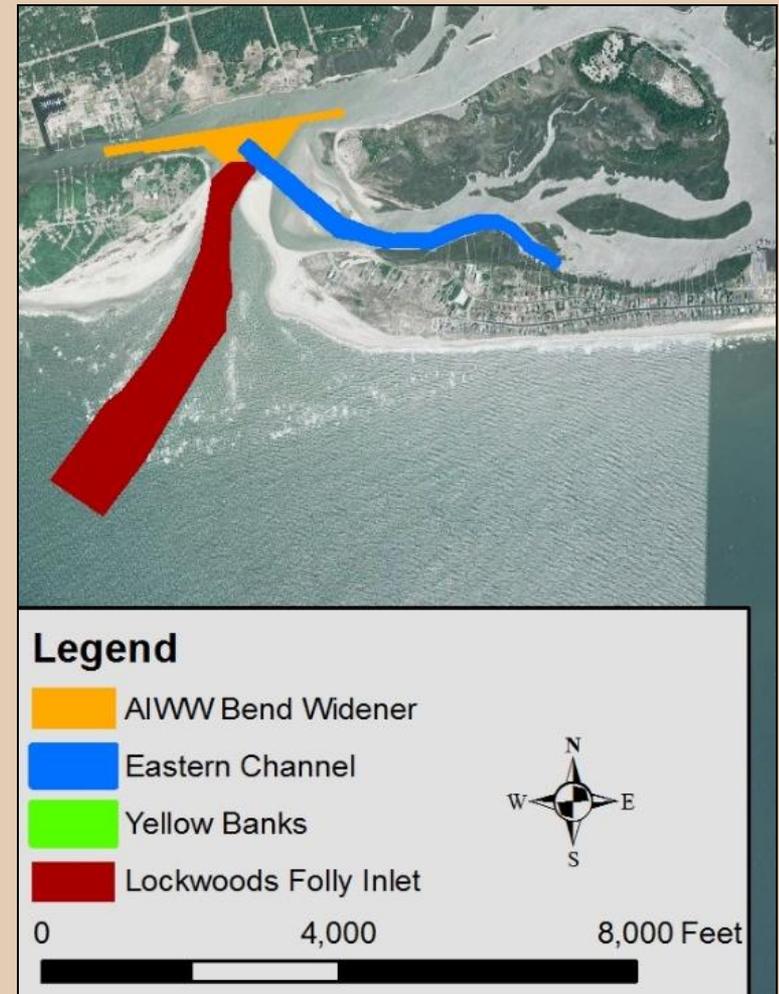
## Environmental Factors

- Primary Nursery Area – update benthic substrate map
- Salt marsh and potential oyster reef impacts
- Upland disposal area capacity
- Sufficiency of baseline water quality data
- Required mitigation (no standard ratio)

# Lockwoods Folly Inlet Management

## Lockwoods Folly Management Plan

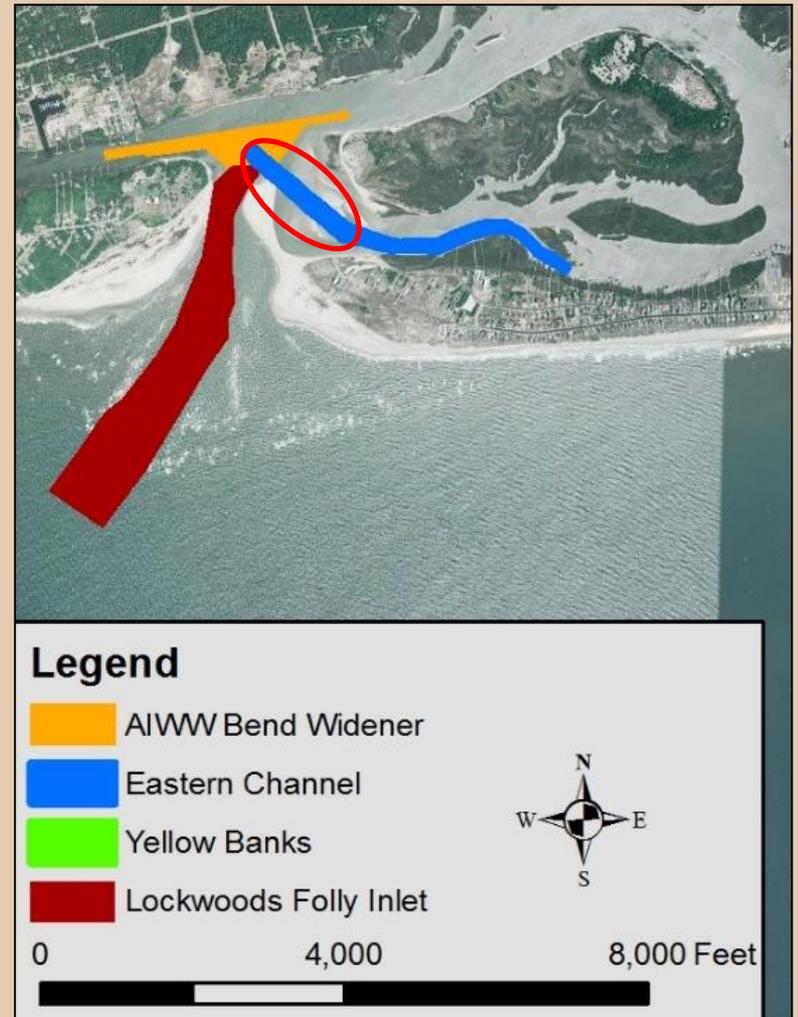
- **O'Brien & Gere Contract**
  - Allows the Town of Oak Island to be a Separate Permit Holder for Current Authorized Dimensions
- **Possible Next Step Is To Investigate Permit Modification (Wider & Deeper)**
  - Part of Overall Beach Plan – Tap Into State Navigation Fund – Work with Holden Beach
- **Begin Cost Sharing with Holden Beach for Sidecasting & Shallow Hopper Nearshore Placement**
  - Nearshore Placement off the West End Would Provide Benefit



# Lockwoods Folly Inlet Management

## Lockwoods Folly/Eastern Channel Management Plan

- Develop Plan with USACE/Holden Beach for Lockwoods Folly Inlet/Eastern Channel Maintenance to Better Utilize this Material for Everyone's Benefit
  - Small Hopper Nearshore Placement for Lockwoods Folly Inlet and Piggyback AIWW Bend Widener and Eastern Channel Mouth Dredging
  - May Provide Up to 70k cy/yr with Placements Every 2-3 Years



# Open-End Coastal Engineering Contract

- **Current Ongoing Effort**

- Review of Holden Beach Terminal Groin Project/EIS
- Work with USACE to Add Eastern Channel Mouth Dredging to AIWW Crossing/Bend Widener for Cost-Effective Sand Placement (Interface with Holden Beach)
- Assist Kilpatrick Stockton with Discussion of Upcoming Wilmington Harbor Project/Location of Beach Placement & Potential Upcoming Changes to Sand Management Plan



# Open-End Stormwater Contract

- **Current Ongoing Effort**

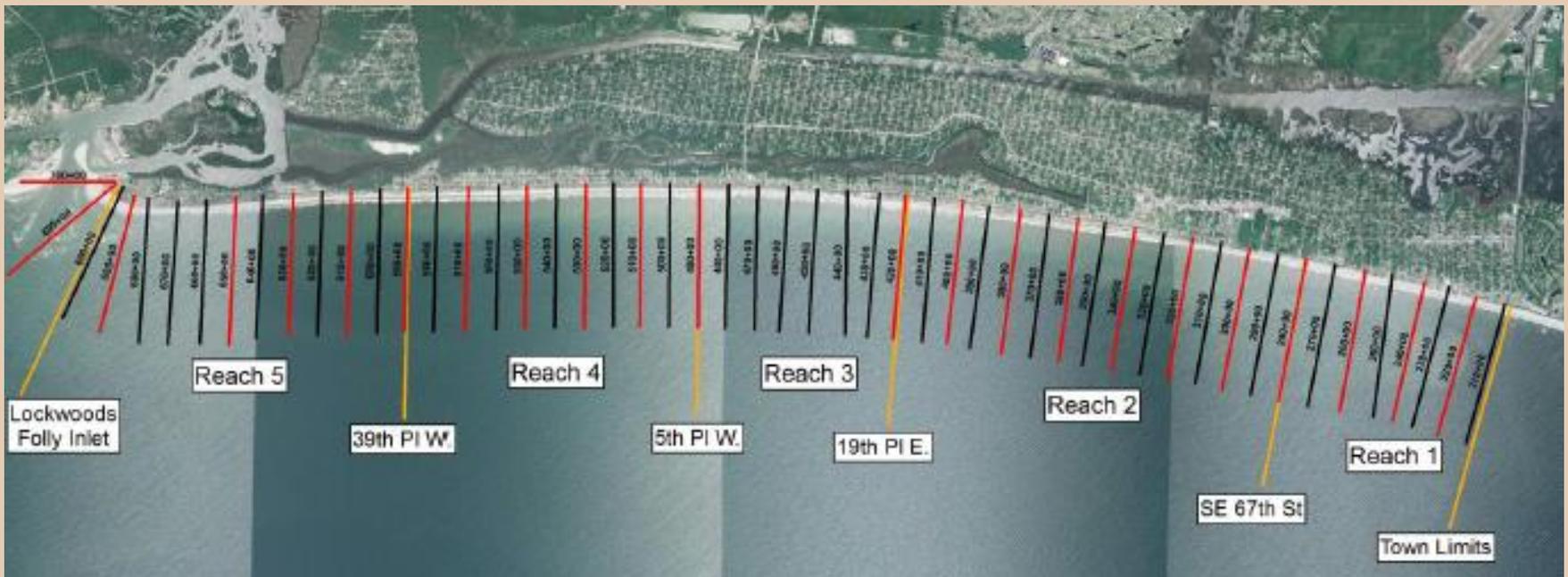
- **Open-End Contract for Stormwater Services** to Work With Town Planning and Public Works Staff to Develop Conceptual Plans for Selected Problem Flooding Spots
  - Current Coastal Clients Include Town of Emerald Isle, Currituck County, City of Wilmington



# Annual Shoreline Mapping/Surveying Contract

- **Potential Action Item**

- **Authorize Year 1 of Annual Monitoring Program** to Track Beach Shoreline and Volume Changes to Aid in Future Master Planning, Maintenance Compliance of Eastern Channel Project, Development Line Compliance and Maintenance of Engineered Beach
  - Year 1 = \$76,895 – Going To \$69k-73.5k Annually
  - Also Includes Surveying of Eastern Channel and Sections Across Lockwoods Folly Inlet



# Discussion

## Thank You!

