

# Opening Windows Through Science-Informed Negotiation

**Dr. Todd S. Bridges**

**Senior Research Scientist, Environmental Science  
Engineer Research and Development Center**

**2 June 2015**

**todd.s.bridges@usace.army.mil**



**US Army Corps of Engineers  
BUILDING STRONG®**



# Operational Restrictions

- The majority of our projects are restricted in terms of:
  - ▶ When we operate
    - i.e., dredging windows
  - ▶ The equipment we use
    - i.e., dredge type, barge size, etc.
  - ▶ How we operate the equipment
    - i.e., disposal site selection, overflow, decanting, discharge rates, etc.
- These restrictions increase operational costs and constrain execution



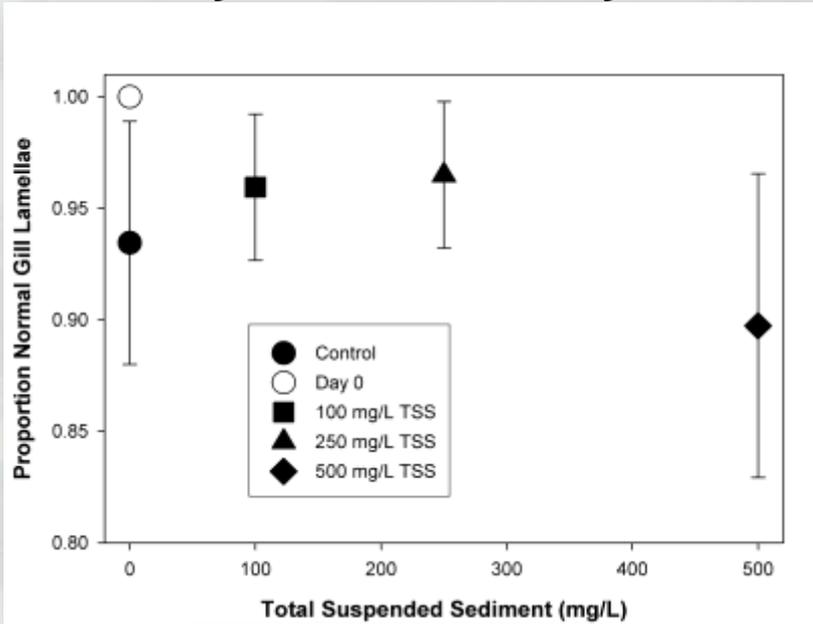
# Resolution Through Strategic Negotiation

- Two-pronged approach:
  - ▶ Develop science-based evidence supporting relaxed restrictions
    - Restriction frequently imposed in the absence of evidence of harm (i.e., precautionary approach)
  - ▶ Pursue opportunities to create environmental value through navigation dredging
    - Over the short-term: provide motivation to cooperate in advancing the project
    - Over the long-term: create positive perceptions and attitudes about dredging

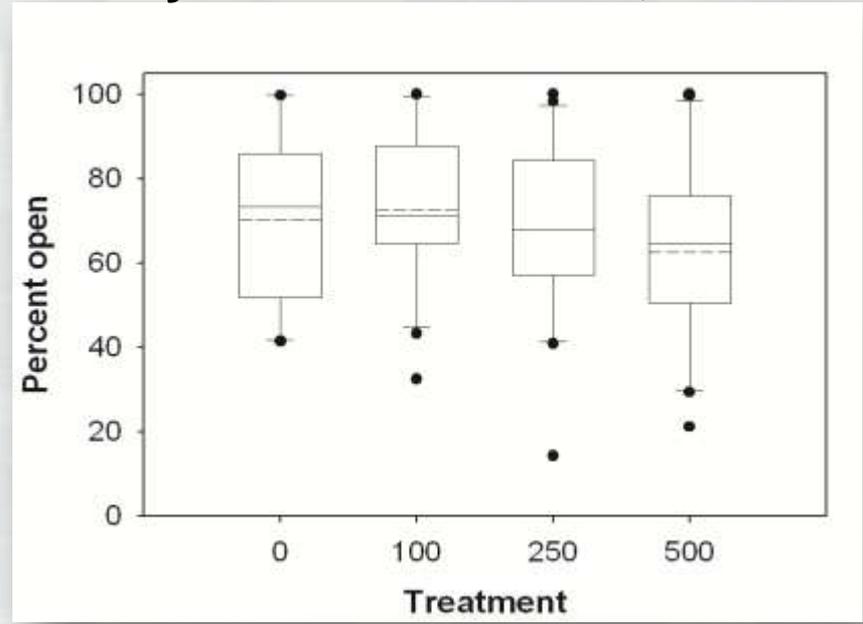


# Scientific / Technical Evidence

## Walleye: Maumee Bay, OH



## Oyster: James River, VA



BUILDING STRONG®

**ERDC**

*Innovative solutions for a safer, better world*

# Tools for Effective Negotiations

- Webinars
  - ▶ Field data collections and modeling applications
- Collaborations with other agencies
  - ▶ Ohio DNR (walleye); USFWS (sturgeon)
- Collaborations with universities
  - ▶ VIMS, Auburn, ULM (oysters)
- Journal papers
  - ▶ JGLR (walleye); MEPS (oysters); JAI (sturgeon)
- Agency and stakeholder meetings
- ERDC Technical Notes and reports
  - ▶ ERDC TN-DOER-E32



Atlantic Sturgeon



# Overcoming the Perception that Dredging is “Bad” for the Environment

- The perception has been institutionalized
  - ▶ Must recognize that there is a historical basis for the perception
    - The “half-life” of bad news about dredging is much longer than that for good news
- Changing the institutionalized perception will require coordinated effort and:
  - ▶ Persistence
    - More than “preaching to the choir”
  - ▶ Taking full advantage of opportunities to highlight and document the benefits others value



# Hurricane Sandy

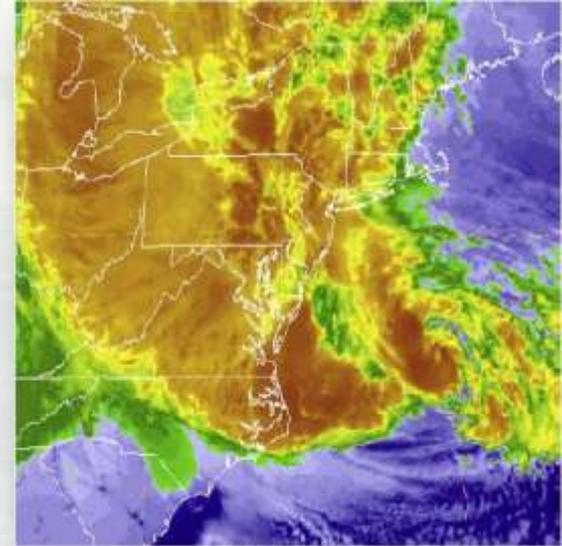
## Storm Impacts and Damages:

### ► Human

- 286 people killed (159 in the US)
- 500,000 people affected by mandatory evacuations
- 20,000 people required temporary shelter
- Extensive community dislocations – continuing today in some areas

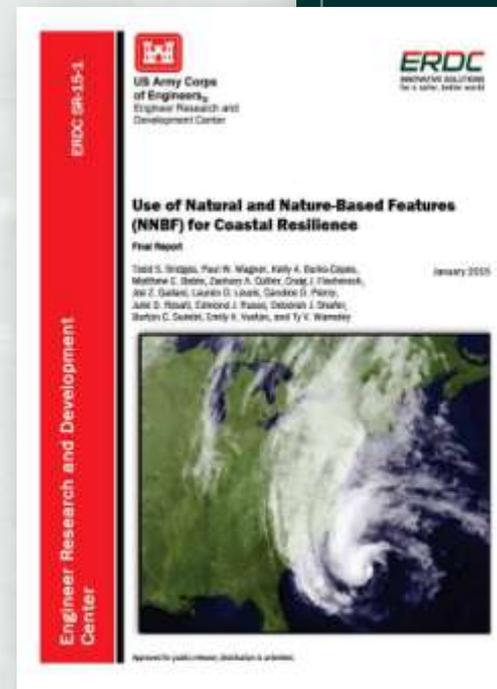
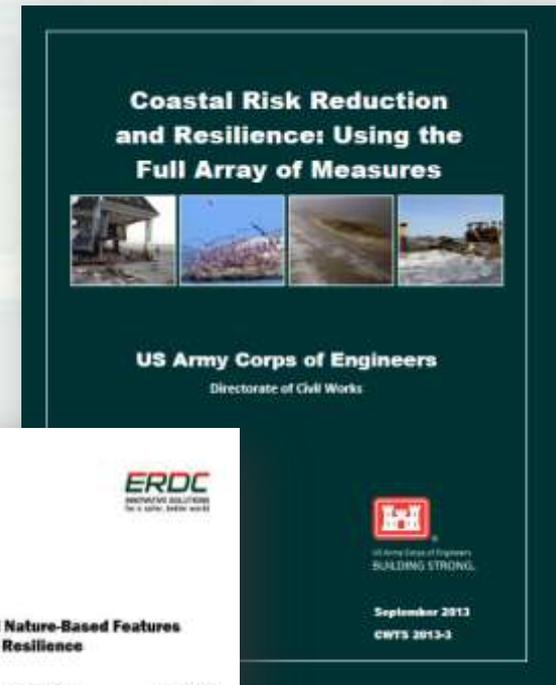
### ► Economic

- \$65B in damages in the U.S.
- 26 states affected (10 states and D.C are in the NACCS study area)
- 650,000 houses damaged or destroyed



# Coastal Resilience Through Natural and Nature-Based Feature

*“The USACE planning approach supports an **integrated approach** to reducing coastal risks and increasing human and ecosystem community resilience through a combination of **natural, nature-based, non-structural and structural measures**. This approach considers the engineering attributes of the component features and the dependencies and interactions among these features over both the short- and long-term. It also considers the **full range of environmental and social benefits** produced by the component features.”*



## Natural and Nature-Based Infrastructure at a Glance

GENERAL COASTAL RISK REDUCTION PERFORMANCE FACTORS:  
STORM INTENSITY, TRACK, AND FORWARD SPEED, AND SURROUNDING LOCAL BATHYMETRY AND TOPOGRAPHY



### Dunes and Beaches

#### Benefits/Processes

- Break offshore waves
- Attenuate wave energy
- Slow inland water transfer

#### Performance Factors

- Berm height and width
- Beach Slope
- Sediment grain size and supply
- Dune height, crest, width
- Presence of vegetation



### Vegetated Features:

### Salt Marshes, Wetlands, Submerged Aquatic Vegetation (SAV)

#### Benefits/Processes

- Break offshore waves
- Attenuate wave energy
- Slow inland water transfer
- Increase infiltration

#### Performance Factors

- Marsh, wetland, or SAV elevation and continuity
- Vegetation type and density



### Oyster and Coral Reefs

#### Benefits/Processes

- Break offshore waves
- Attenuate wave energy
- Slow inland water transfer

#### Performance Factors

- Reef width, elevation and roughness



### Barrier Islands

#### Benefits/Processes

- Wave attenuation and/or dissipation
- Sediment stabilization

#### Performance Factors

- Island elevation, length, and width
- Land cover
- Breach susceptibility
- Proximity to mainland shore



### Maritime Forests/Shrub Communities

#### Benefits/Processes

- Wave attenuation and/or dissipation
- Shoreline erosion stabilization
- Soil retention

#### Performance Factors

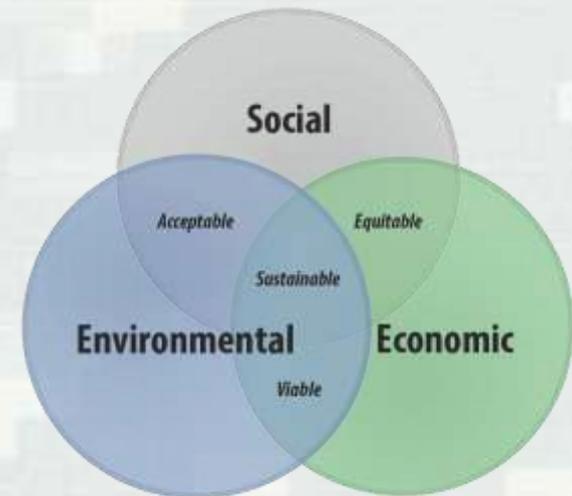
- Vegetation height and density
- Forest dimension
- Sediment composition
- Platform elevation

# Engineering With Nature...

*...the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaborative processes.*

## Key Elements:

- Science and engineering that produces operational efficiencies
- Using natural process to maximum benefit
- Broaden and extend the benefits provided by projects
- Science-based collaborative processes to organize and focus interests, stakeholders, and partners



[www.engineeringwithnature.org](http://www.engineeringwithnature.org)



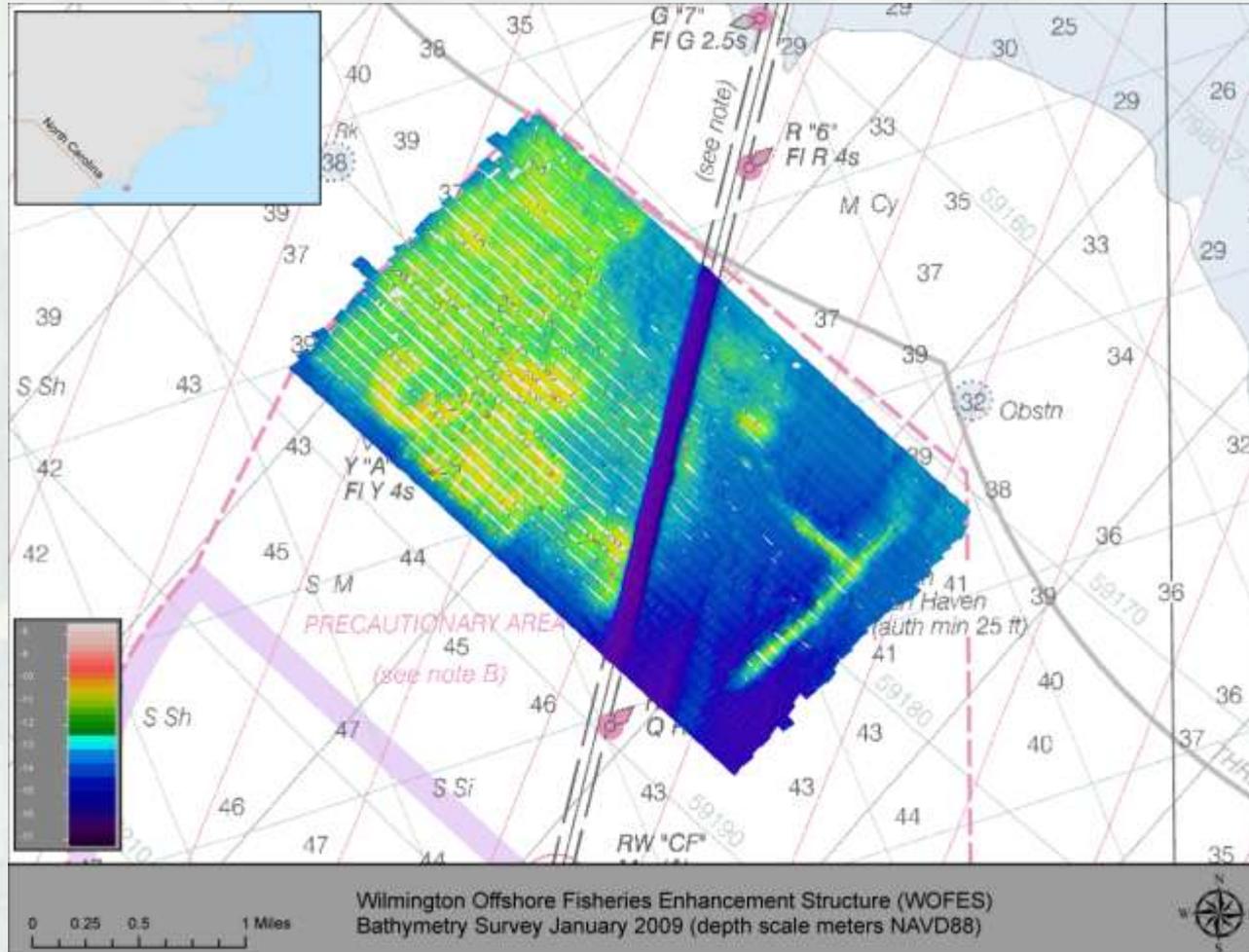
BUILDING STRONG®



**ERDC**

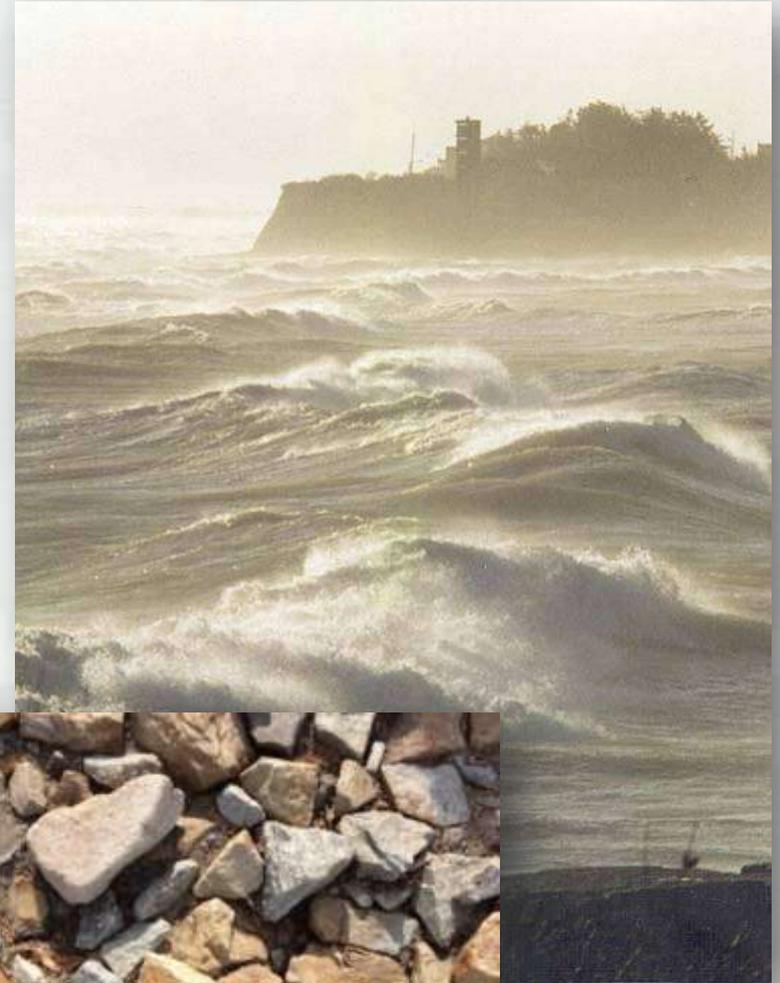
*Innovative solutions for a safer, better world*

# Wilmington Offshore Fisheries Enhancement Structure



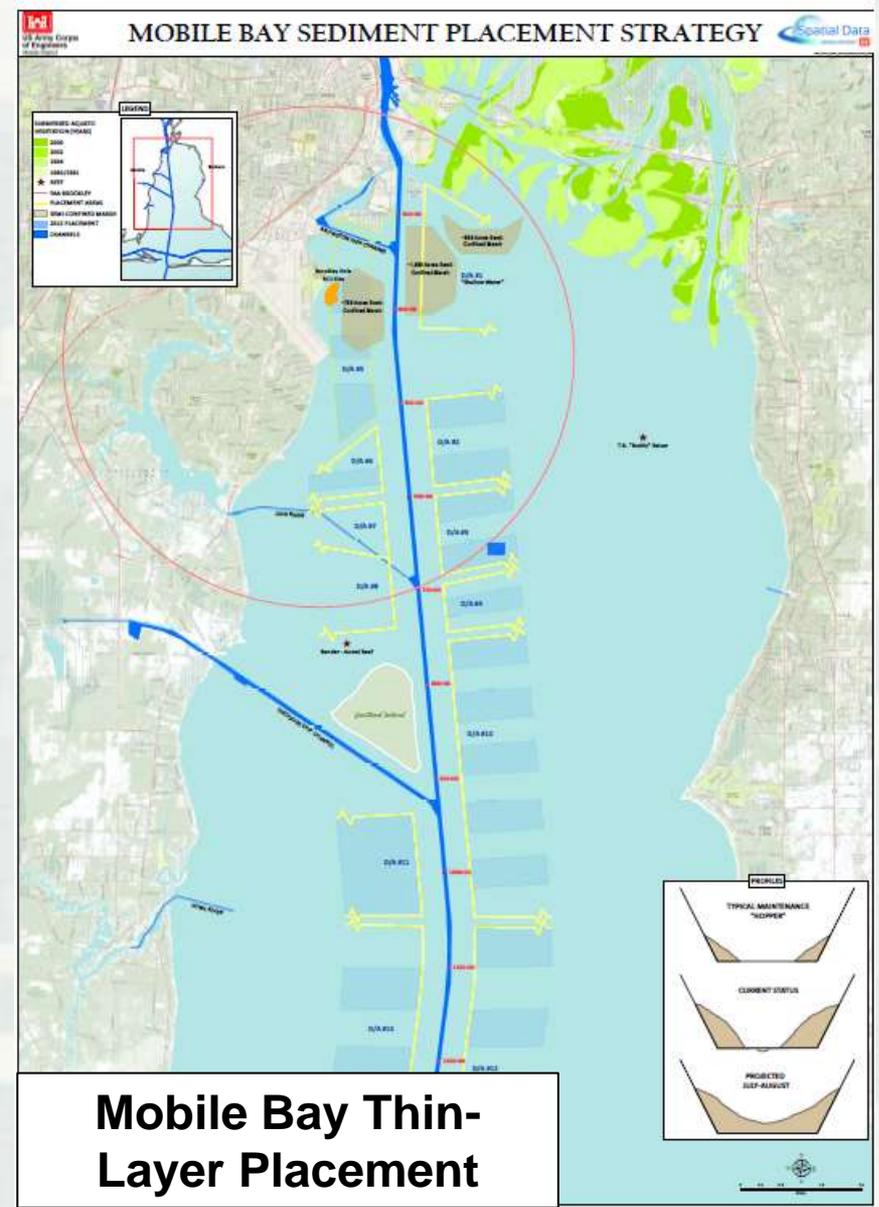
# *Deepening of Boston Harbor*

- Project anticipates generating 10+ MCY of clay/till and 0.5 to 1 MCY of rock
- Evaluating potential beneficial use:
  - Capping of offshore radioactive waste disposal site
  - Nearshore placement of rock to create reefs and berms to attenuate waves and support habitat development



# Strategic Sediment Placement in Mobile Bay

- 25 years ago, in-bay disposal of dredged material was banned
  - Shoreline erosion and loss of habitat followed
- Thin-layer placement was demonstrated on full-scale to restore sediment processes
- Many opportunities for in-water beneficial use
- Ecosystem benefits being documented



# Philadelphia District: Coastal NJ



Mordecai Island



Stone Harbor



Avalon



BUILDING STRONG®



*Innovative solutions for a safer, better world*

# Philadelphia District: Coastal NJ



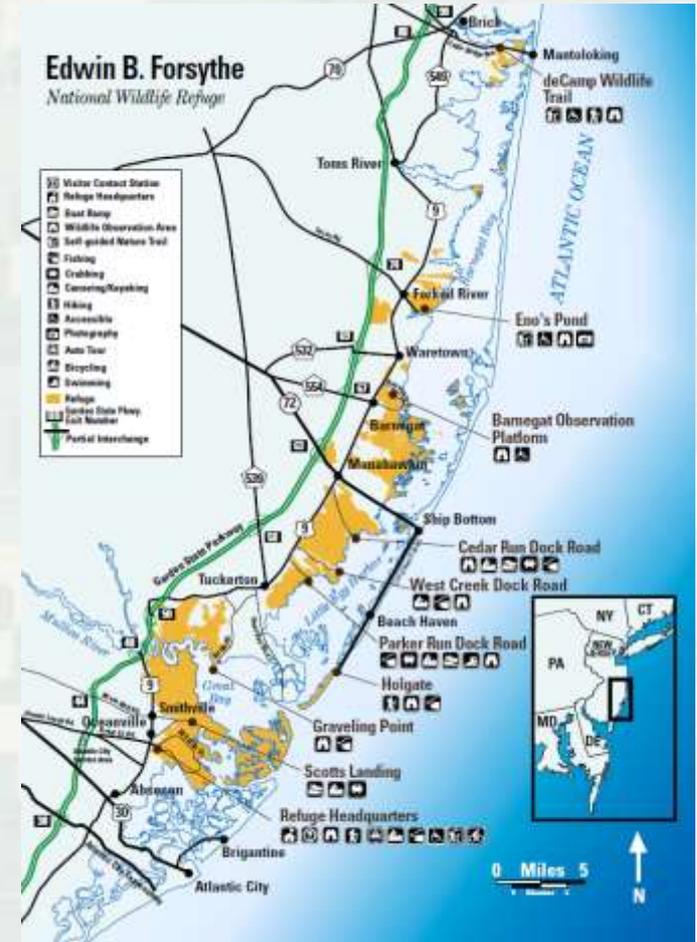
**BUILDING STRONG®**

**ERDC**

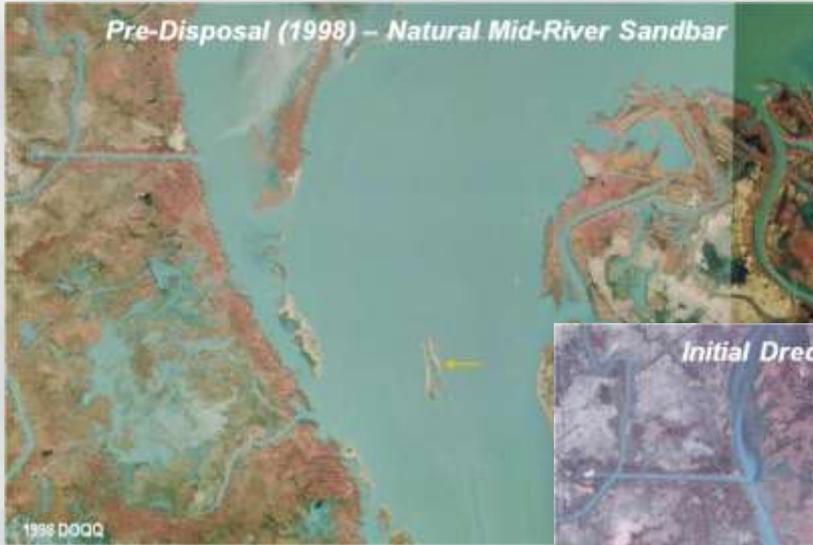
*Innovative solutions for a safer, better world*

# Forsythe National Wildlife Refuge

- Forsythe NWR: >40,000 acres of wetlands and other habitat in coastal NJ
- Objective: Enhance ecosystem resilience through engineering and restoration
- Means: Apply EWN principles and practices



# Atchafalaya River, Horseshoe Bend



# Habitat Development



100 acres of diverse wetland habitat  
>80 plant species



Stability  
Complexity  
Age  
Elevation



Mature Forested & Scrub-Shrub Wetlands



Young Forested & Scrub-Shrub Wetlands



Emergent Wetland Transition Zone



Aquatic Bed Features

**ERDC**



**Snowy Egret**



**Tri-colored  
Heron**



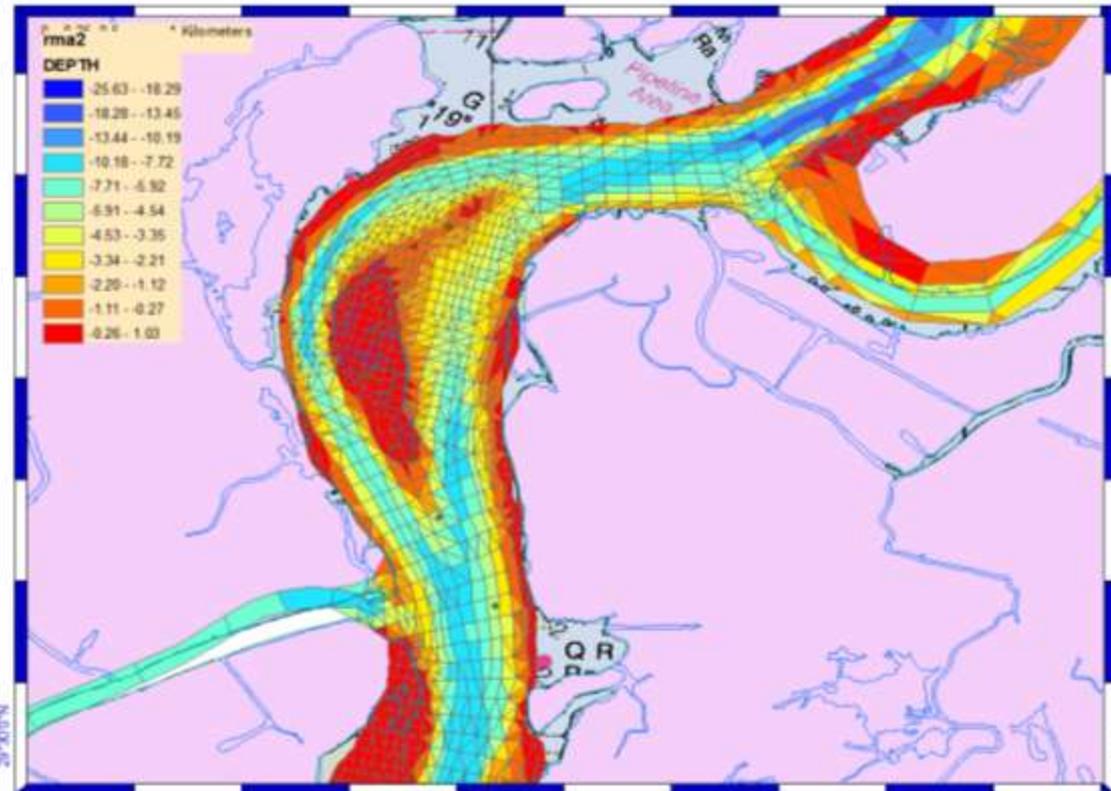
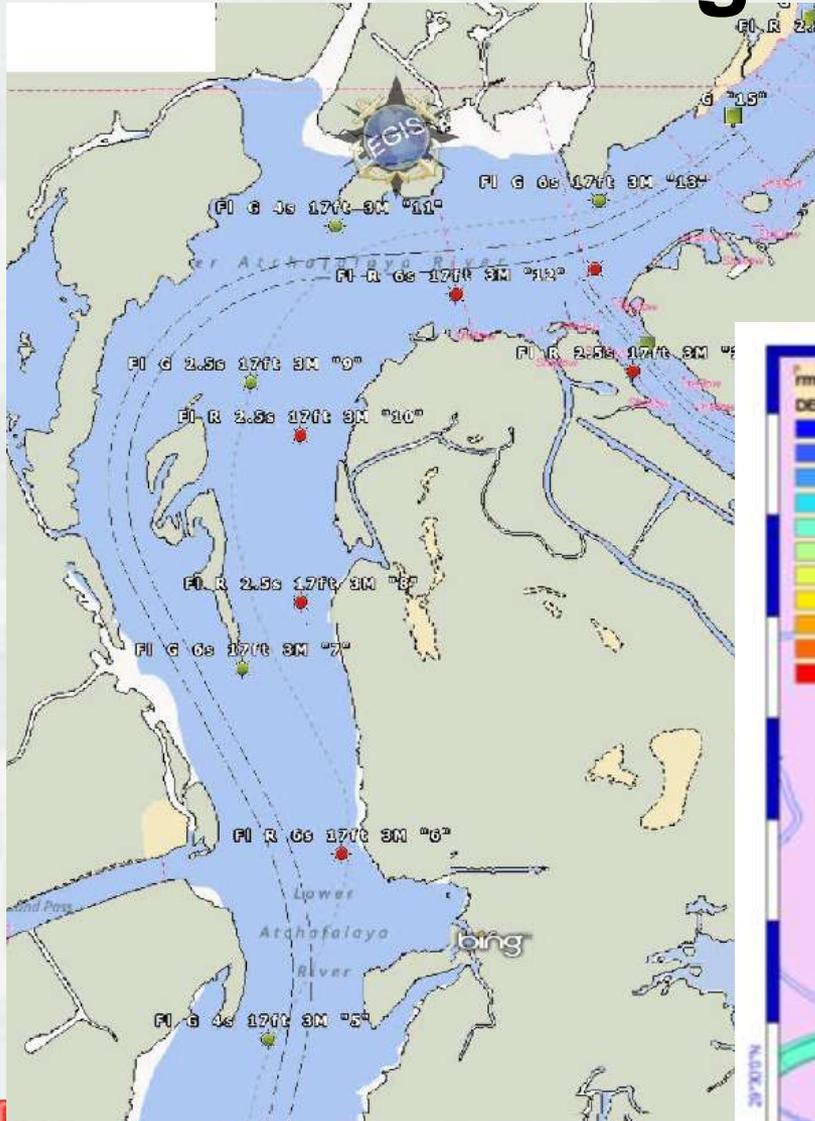
**Glossy Ibis**

## **Bird community**

- 9 species of wading birds
- >78% juveniles
- 0.27 birds/ transect m in rookery
- Island design favorable to rookery establishment

# Navigation Benefit

Modeling: Implement LTFATE to characterize study area hydrodynamics



# The “Operational” Value of Environmental Benefits for T&E Species

- Natural resources pose significant constraints
  - ▶ USACE spends \$300M per year on ESA compliance
- The creation of value for natural resources is essential component of strategy to reduce ESA constraints
  - ▶ ESA 7(a)(1) authority combined with EWN approach
  - ▶ Actions underway in SAD with USFWS Region 4 following collaboration workshop in Sept 2014
  - ▶ NOAA engagement underway



# Strategic Negotiation: Science + Value Creation

- Science-informed risk management
  - ▶ There is a difference between “no risk”, “negligible risk”, and “acceptable risk”
- Diversified project benefits to motivate cooperation and build the base of support for projects
  - ▶ Project benefits are the counterbalance that leads to accepting risks
  - ▶ Invest in developing allies

