

# Sustaining the MTS through RSM & EWN

**Ms. Linda Lillycrop**

USACE RSM Program Manager  
Engineer Research and Development Center  
Coastal and Hydraulics Laboratory

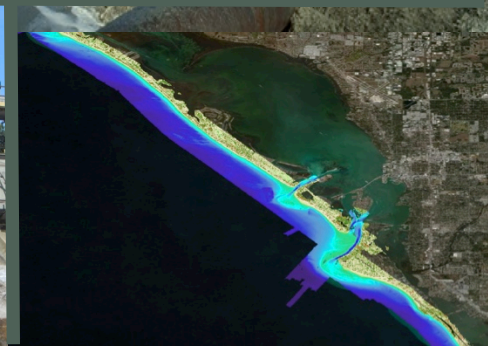
**Dr. Todd Bridges**

Senior Research Scientist  
EWN Program Manager  
Engineer Research and Development Center  
Environmental Laboratory

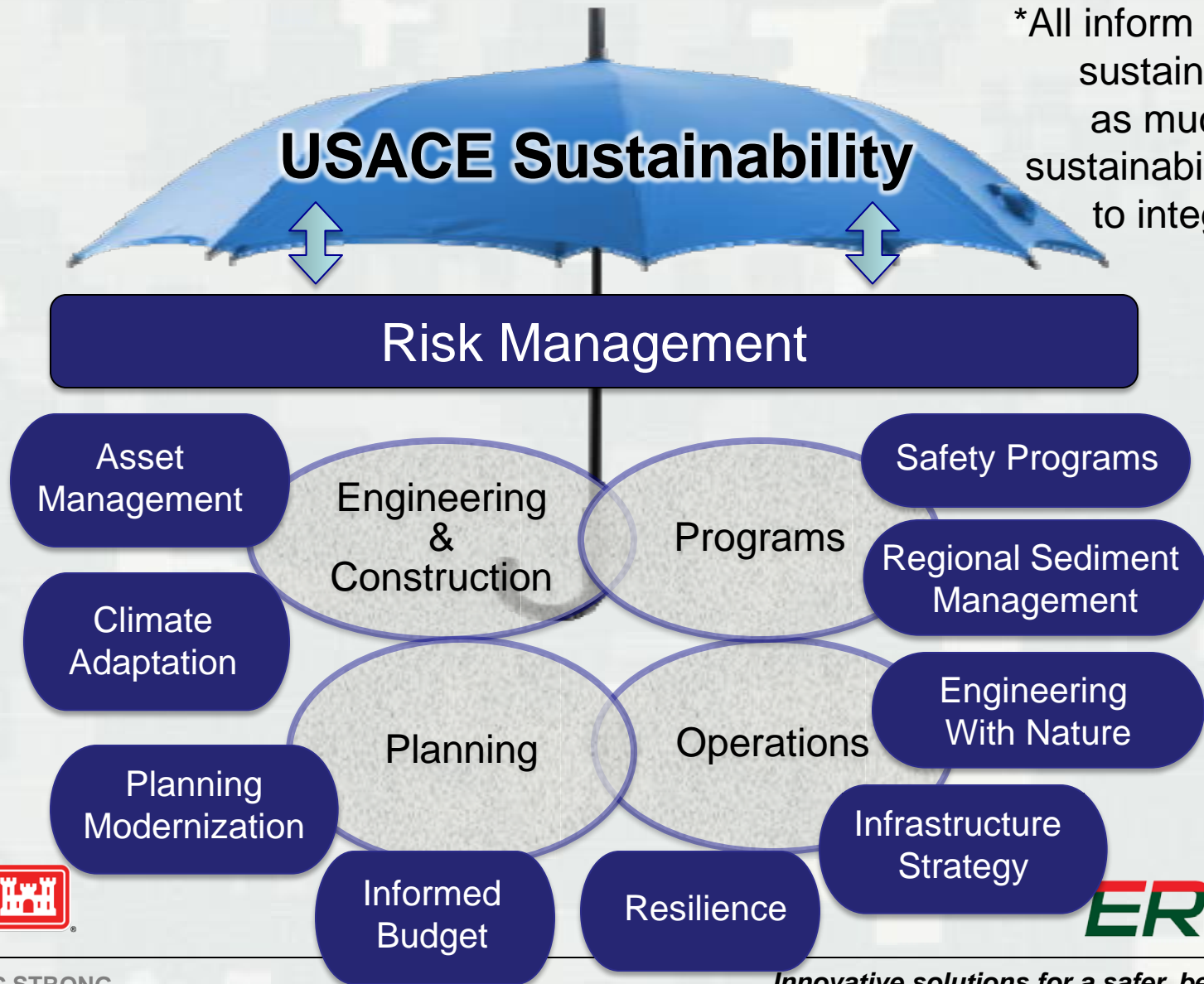
4<sup>th</sup> Biennial TRB-CMTS R&D Conference  
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US Army Corps of Engineers  
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# New Era of Water Resource Management



\*All inform long term sustainability as much as sustainability helps to integrate



# Corps Navigation Mission

.....Each year the Corps moves  
**200** Million cu yd of sediment



...At a cost of more than  
**\$700 Million** per year



**ERDC**



# Regional Sediment Management...

***...a systems approach to deliberately manage sediments in a manner that maximizes natural and economic efficiencies to contribute to sustainable water resource projects, environments, and communities = Healthy Systems.***

- O&M, FRM, Ecosystem, Emergency Mgmt:
  - Short and long-term sustainable, resilient solutions
  - Coastal and Inland
- Recognizes sediment as a valuable regional resource
- Work across multiple projects, authorities, business lines
- Tools and technologies for regional approaches
- Relationship building, decision making, implementation

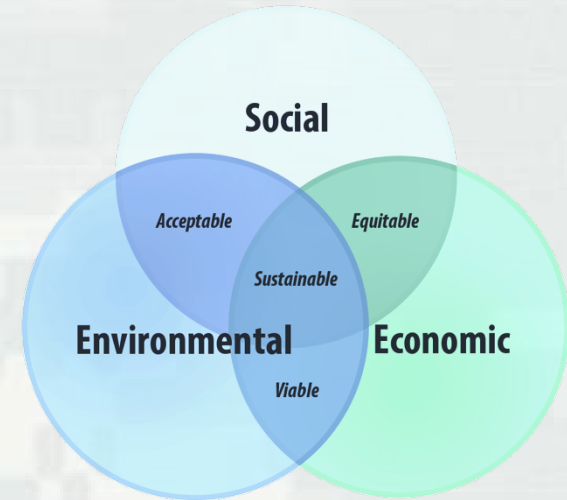


# Engineering With Nature...

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

## Key Elements:

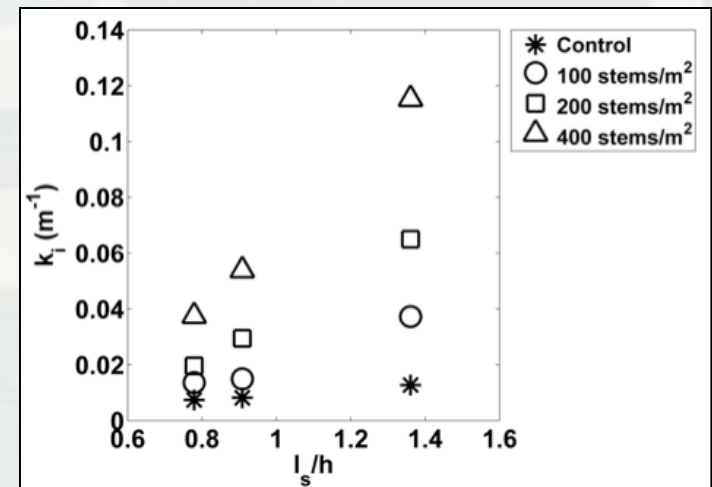
- Science and engineering that produces operational efficiencies
- Using natural process to maximum benefit
- Broaden and extend the benefits provided by projects
- Science-based collaborative processes to organize and focus interests, stakeholders, and partners



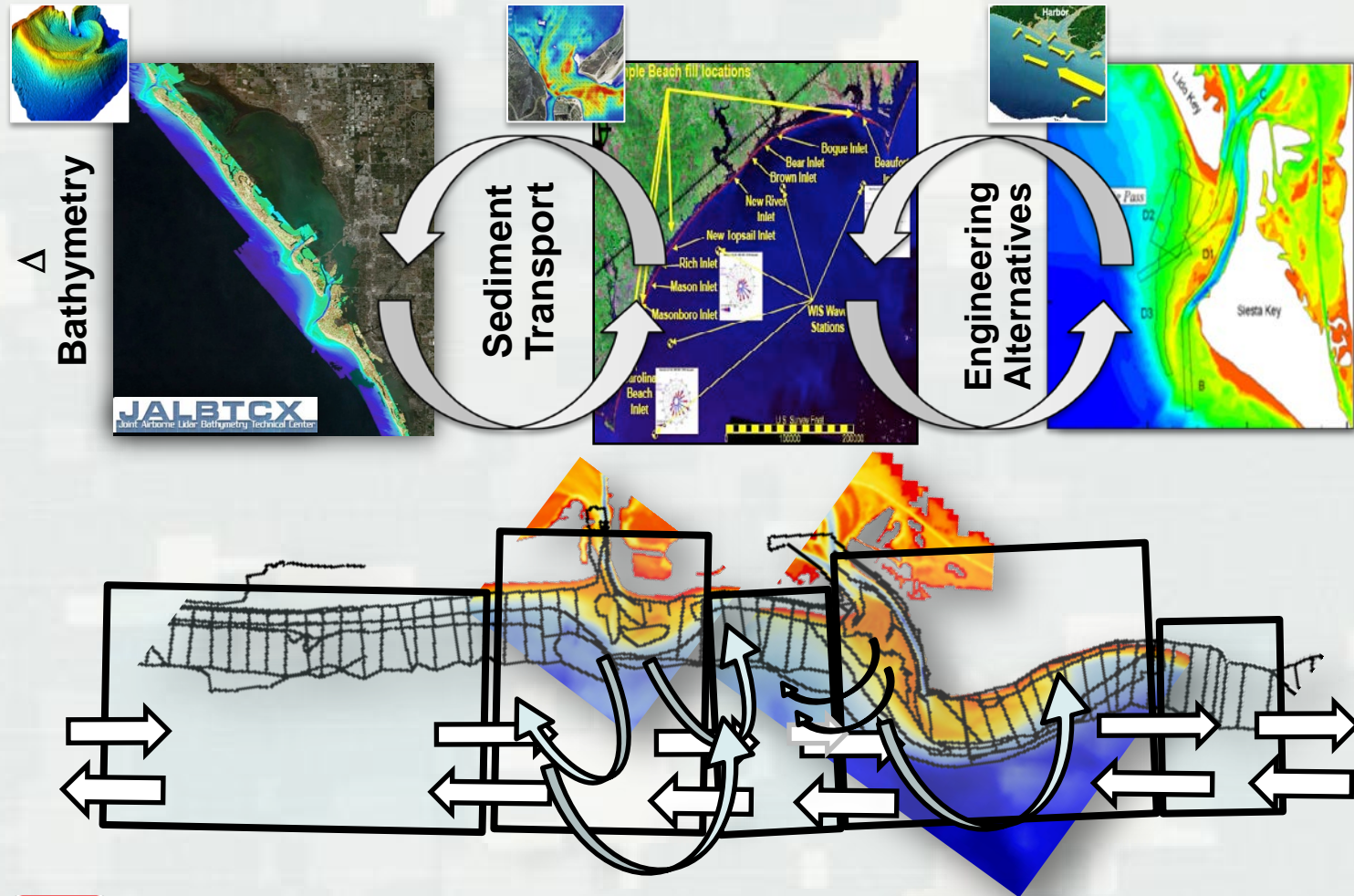
# R&D Example: Wave Dissipation by Vegetation

What are the engineering benefits of wetlands with respect to waves?

- Flume studies
  - Complemented by examination of sediment processes & field studies
- Wave attenuation:
  - increases with stem density
  - increases w/submergence ratio
  - slight increase with incident wave height
- Results used to enhance STWAVE nearshore wave model



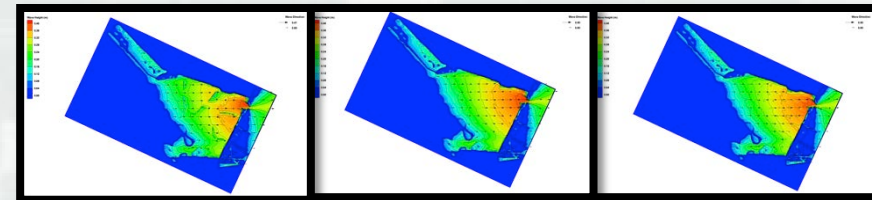
# Tools: Understanding the Region Influence of Opportunities





# Hamilton Wetland, San Pablo Bay

- Beneficial use of dredged material to restore army air field to wetlands
- Dredged material placed directly to contour wetland
- ERDC monitoring of new wetland:
  - Quantify waves
  - Other physical processes
  - Accretion
- ERDC modeling:
  - Wave generation and dissipation
  - Testing different shapes for barriers
- Plants will volunteer in tidal areas as sufficient accretion occurs



Linear Berms (As-Built)

No Berms (Control)

Mounds (ala Sears Pt.)





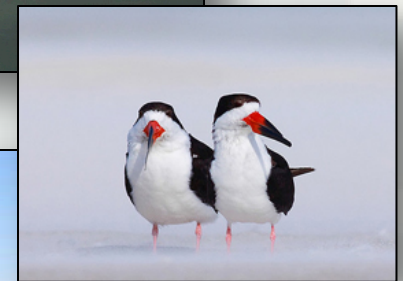
# Coastal NJ, Philadelphia District



December 2014



Stone Harbor



Avalon



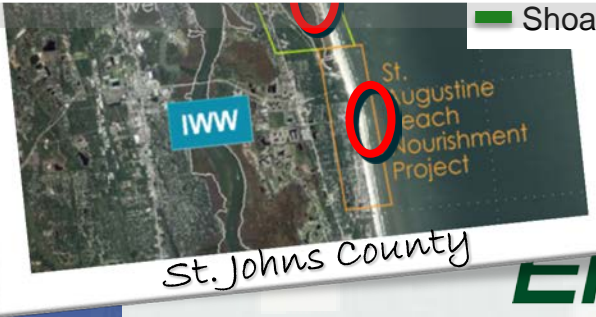
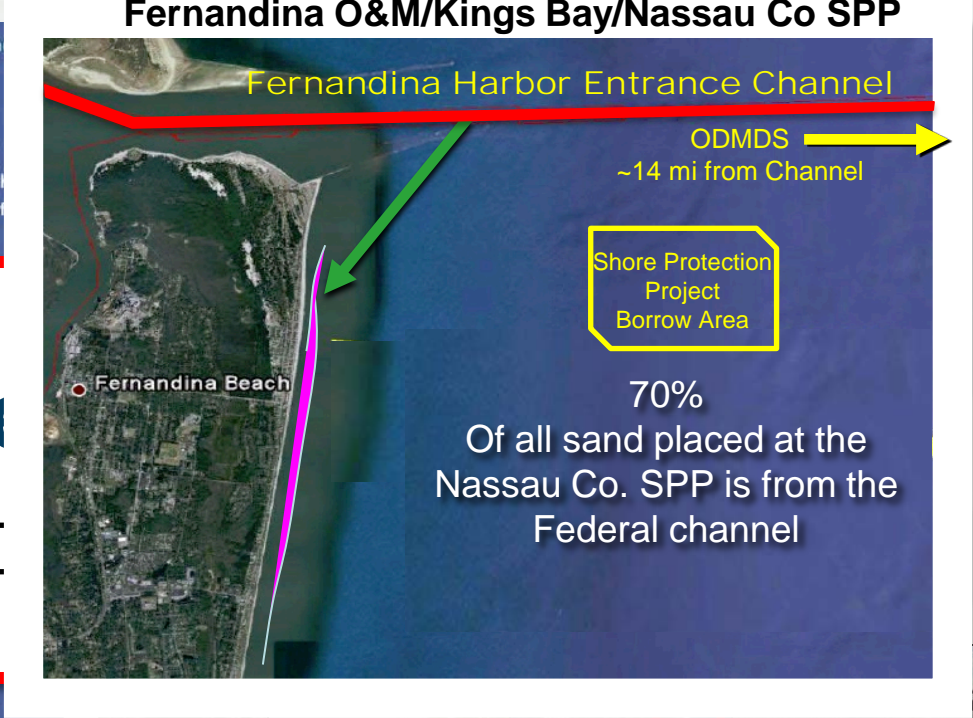
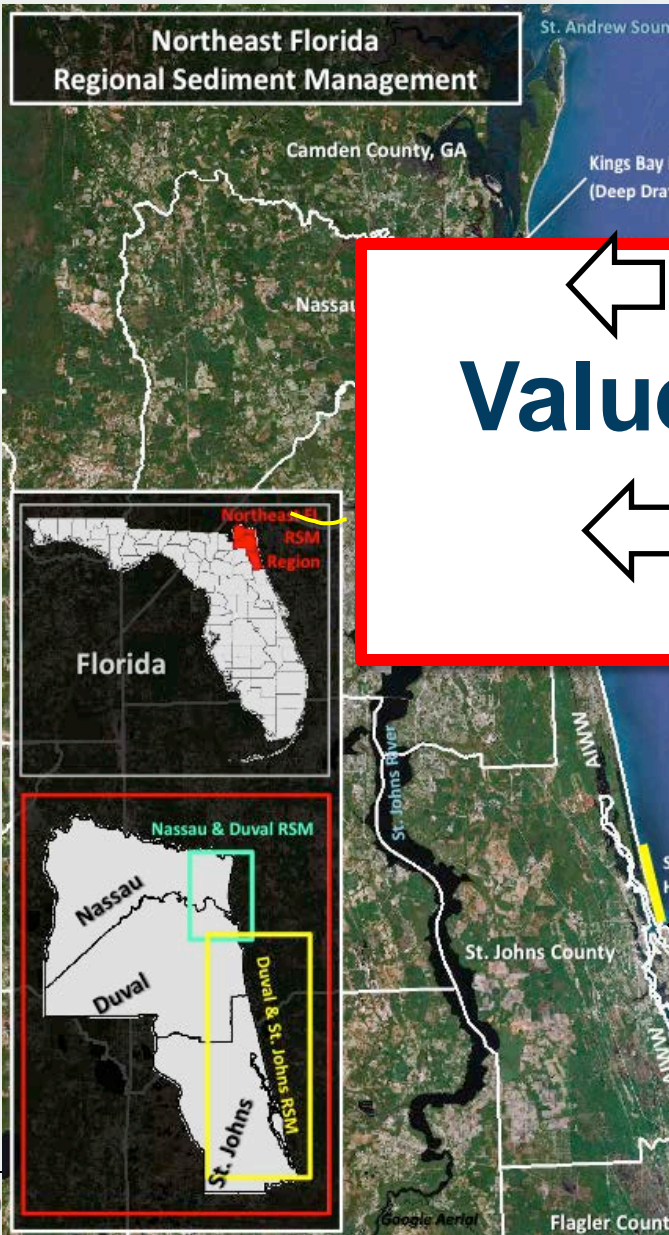
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# Jacksonville District - St Johns, Duval, Nassau Counties



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# Science, Engineering, Technology Research Targets

- Fundamental processes
  - ▶ Sediment transport through and around NNBF
  - ▶ Long-term engineering/environmental performance of features
  - ▶ Environmental Services provided by engineered features and structures
  - ▶ Processes contributing to system-scale resilience
- Modeling systems that support broad-scale application
  - ▶ Planners, stakeholders and decision-makers
  - ▶ Engineering design
  - ▶ Operations and maintenance
- Reliable, cost-efficient monitoring technologies
  - ▶ Measuring system evolution
  - ▶ Infrastructure/feature performance
- Demonstration/pilot projects to innovate, evaluate, and learn at relevant field scales
  - ▶ Facilitate necessary collaboration
  - ▶ Evolve organizational culture and practice
  - ▶ Produce credible evidence of success
  - ▶ Fuel the “power of the story”



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# Concluding Thoughts

- Address technical and business processes to maximize success
- Communicate concepts and successes of advancing technologies and practice
- Accelerate progress through collaboration





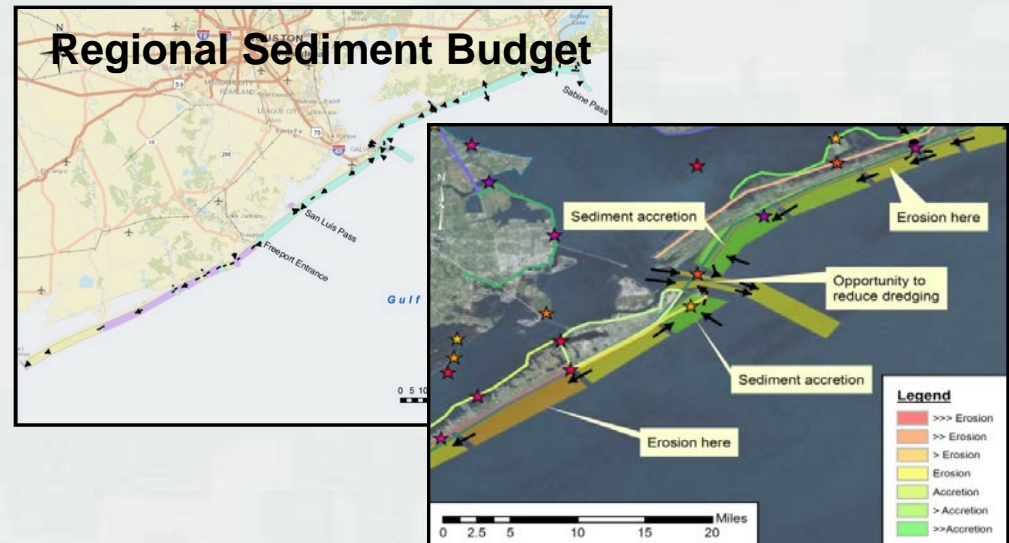
# Tools

## Understand System – ID/Evaluate Opportunities

### Sediment Budget Analysis System

#### Regional/Local Sediment Budgets

- Sediment sources and sinks
- Sediment transport patterns
- Share information
- Decision Making



### GenCade Numerical Model

- Regional shoreline response to actions
- Multiple interacting projects
- Multiple sources & sinks
- Regional trends
- Navigation channel maintenance
- Evaluate regional strategies

