Regional Sediment Management
South Atlantic Division Optimization Pilot

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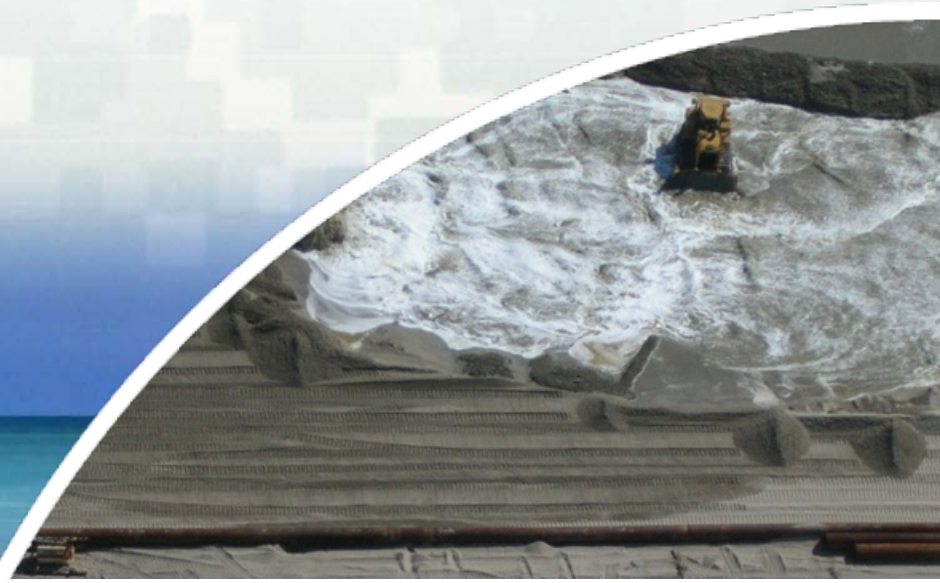
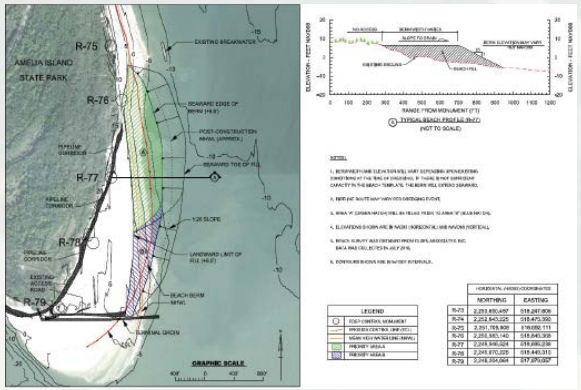


What is RSM?

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.



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Navigation and Resiliency

- Dredging practices often removes sediment from active sediment systems
  - Loss of sediment in riverine/estuarine systems
    - Drowning of coastal marshes, loss of buffering capacity, erosion of estuarine shorelines
  - Loss of sediment in coastal systems
    - Erosion of downdrift beaches, loss of shoreline protection

- **GOAL: MAINTAIN NAVIGATION CHANNELS AND MAXIMIZE COASTAL RESILIENCY BY KEEPING SEDIMENT IN SYSTEM.**

RSM Optimization: Bottom Line Up Front

- Practical implementation and achievement of Integrated Water Resource Management
  - Cross business lines approach (Navigation, Flood Risk Management, Environmental)

- Benefits include:
  - tangible sustainability results for projects, people, and processes
  - saving millions of appropriated dollars
  - maintenance of low-use projects
  - local & regional benefit at no cost to the federal government

- Proof of concept and a tool to quantify RSM value so that it can be understood, recognized in the budget, tracked & communicated

RSM Optimization Pilot – SAD

What does maximum efficiency look like in the budget?

- Federal: FRM, NAV, Eco (Federal Standard)
- Non-Federal

What are Districts doing well? Where are opportunities?

Identify challenges (R&D, policy, environmental)

Maximize use of existing data/tools and provide for:

- Transparent and defendable value dashboard & tool
- Knowledge management

Methods

Consult with District Experts

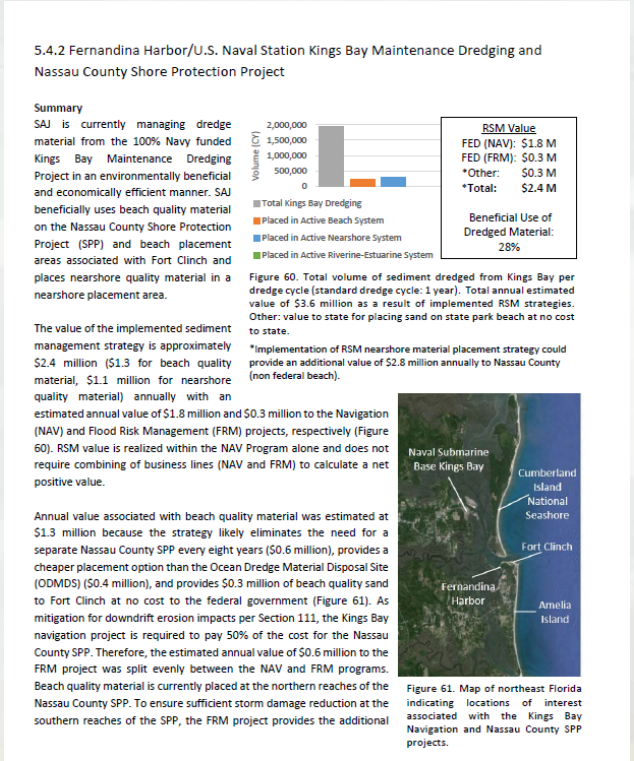
Define all reasonable dredging/placement options and beneficial uses

- Determine total project costs: USACE labor, Contract Cost (mob/demob, dredge volume x per CY cost)
- Lifecycle benefits of placement for FRM projects
- Unquantified value: cost of developing/maintaining upland/offshore placement areas, wetland creation (environmental value)

Calculate total costs and value for identified placement options

Products: Report

- Fact sheets for all projects:
  - Summary statistics
  - Summary data of projects
  - Dredging information: dredge intervals, volume estimates, placement options
  - Identified RSM projects, opportunities, value
- Division and District Roll-Up Fact Sheets
  - Summary Statistics
  - Identified areas of successes and opportunities
  - Identified policy and process hurdles



5.4.2 Fernandina Harbor/U.S. Naval Station Kings Bay Maintenance Dredging and Nassau County Shore Protection Project

Summary

SAJ is currently managing dredge material from the 100% Navy funded Kings Bay Maintenance Dredging Project in an environmentally beneficial and economically efficient manner. SAJ beneficially uses beach quality material on the Nassau County Shore Protection Project (SPP) and beach placement areas associated with Fort Clinch and places nearshore quality material in a nearshore placement area.

Figure 60. Total volume of sediment dredged from Kings Bay per dredge cycle (standard dredge cycle: 1 year). Total annual estimated value of $3.6 million as a result of implemented RSM strategies. Other: value to state for placing sand on state park beach at no cost to state.

*Implementation of RSM nearshore material placement strategy could provide an additional value of $2.8 million annually to Nassau County (non federal beach).

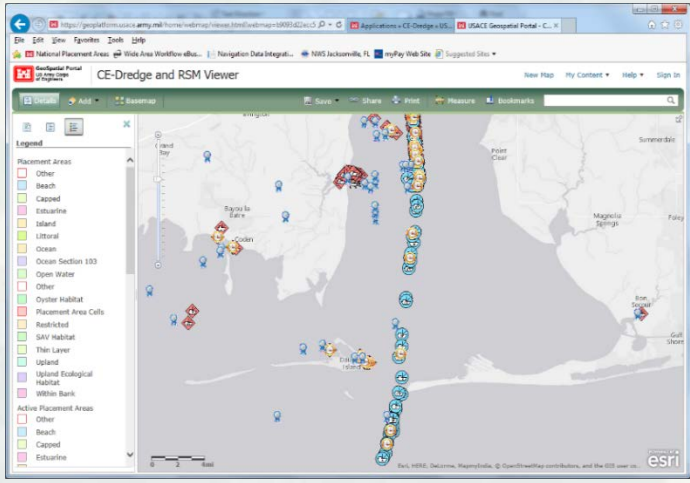
The value of the implemented sediment management strategy is approximately $2.4 million ($1.3 for beach quality material, $1.1 million for nearshore quality material) annually with an estimated annual value of $1.8 million and $0.3 million to the Navigation (NAV) and Flood Risk Management (FRM) projects, respectively (Figure 60). RSM value is realized within the NAV Program alone and does not require combining of business lines (NAV and FRM) to calculate a net positive value.

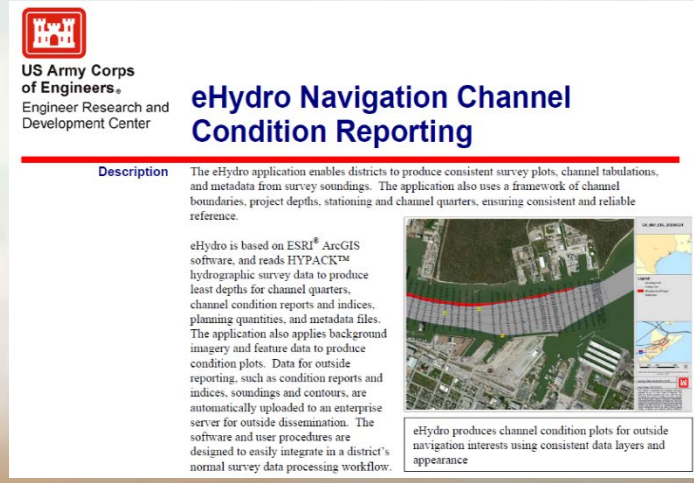
Annual value associated with beach quality material was estimated at $1.3 million because the strategy likely eliminates the need for a separate Nassau County SPP every eight years ($0.6 million), provides a cheaper placement option than the Ocean Dredge Material Disposal Site (ODMDS) ($0.4 million), and provides $0.3 million of beach quality sand to Fort Clinch at no cost to the federal government (Figure 61). As mitigation for downdrift erosion impacts per Section 111, the Kings Bay navigation project is required to pay 50% of the cost for the Nassau County SPP. Therefore, the estimated annual value of $0.6 million to the FRM project was split evenly between the NAV and FRM programs. Beach quality material is currently placed at the northern reaches of the Nassau County SPP. To ensure sufficient storm damage reduction at the southern reaches of the SPP, the FRM project provides the additional

Figure 61. Map of northeast Florida indicating locations of interest associated with the Kings Bay Navigation and Nassau County SPP projects.

Products: Web Application

- Web service that leverages and enhances existing USACE tools.
- Navigation Integration Framework
  - Integrated with CE Dredge
  - Potential to integrate eHydro planning quantities and CSAT (Corps Shoaling Analysis Tool) for out year budgeting projections
  - Updating, expanding National Placement Areas database
- Provides transparency and knowledge management
- Collaboration with USACE Partners
  - Mobile District Spatial Data Branch, ERDC Coastal Hydraulics Lab, RSM funded R&D
  - Agency and Non-federal partners

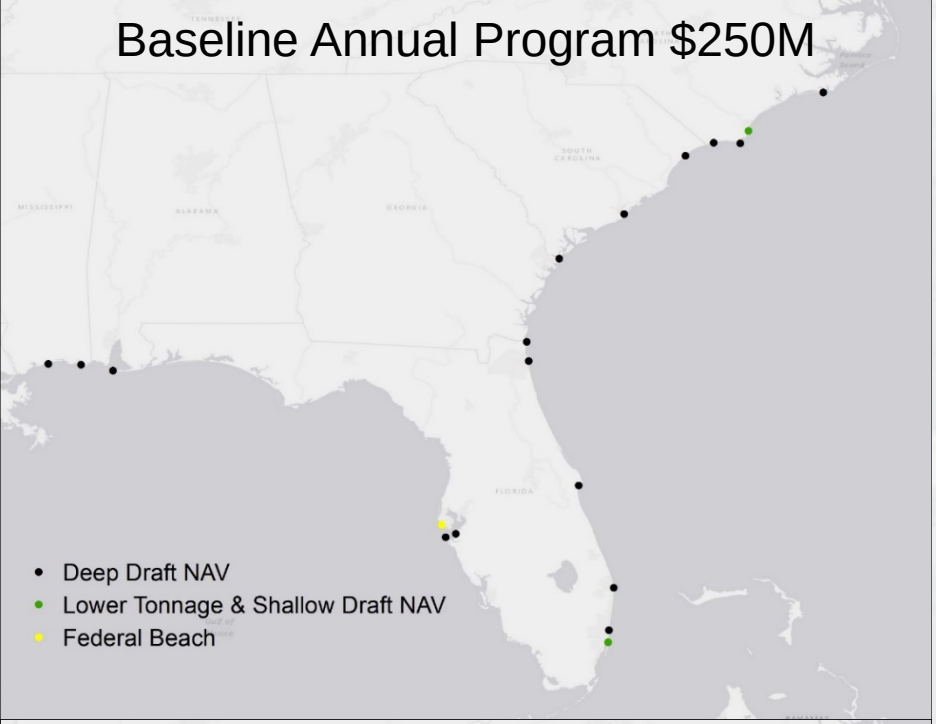


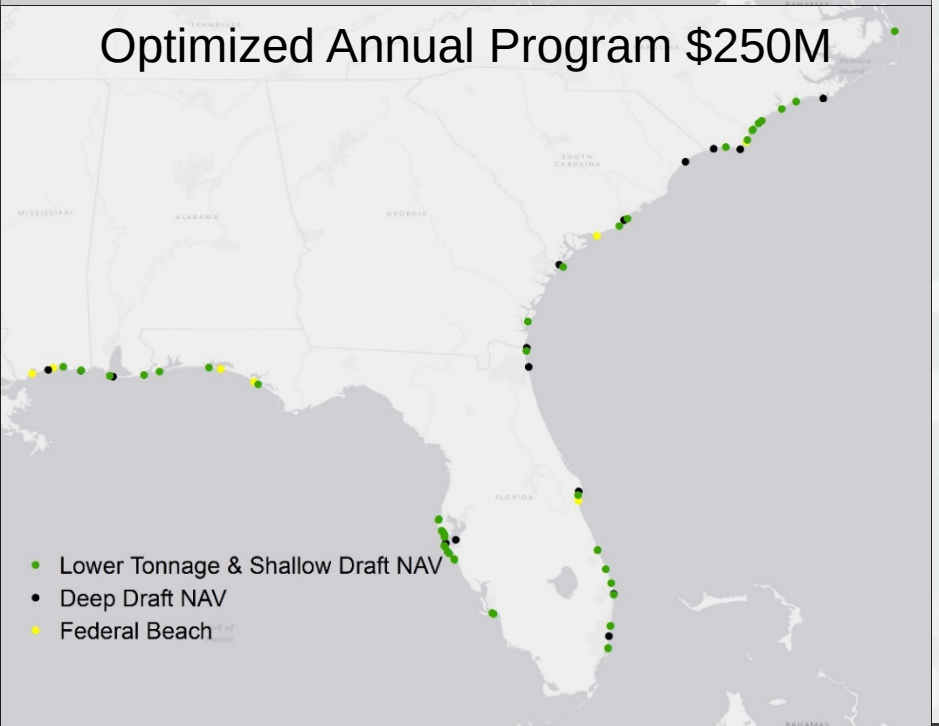


SAD RSM Optimization: Results

- Annual SAD Dredging
  - 100+ Dredging Projects, 35.5 MCY/yr
  - Cost: $220M(NAV)+$30M(FRM)=$250M

- Through RSM Efficiency/Value
  - Creating **$97M in Total value**
  - Increasing Federal project execution by:
    - **Total USACE: $80M or 32%**
    - **NAV ONLY: $65M or 30%**
    - **FRM ONLY: $16M or 53%**
    - **Non USACE (regional/local): >$17M**
  - Regional contracts can increase savings by $25M/yr





What Optimization Looks Like

- Efficiencies are there for the taking
- Reduce long term DMMA/ODMDS costs

<u>Much more left on the table</u>

- 4 deepenings in SAD
  - **98 MCY, $2.3 B**
  - Charleston, Savannah, Jacksonville, Port Everglades

It's time for a dramatic shift in how we budget for projects

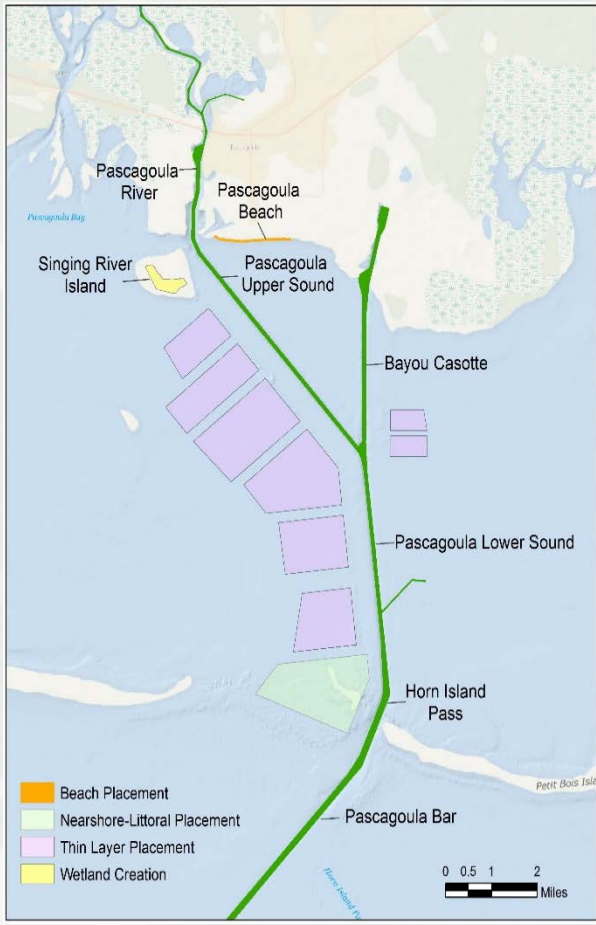
Total Dredge Volume and Value of RSM Implemented SAD NAV-FRM Projects

District	*Total Dredge Volume (CY)	% Managed by RSM Strategies	Annual RSM Value ($ M)
SAD Total	**62,421,600**	**49%**	**$97.3**
Charleston	17,726,100	58%	$38.9
Jacksonville	10,027,000	53%	$27.6
Mobile	18,996,500	56%	$18.3
Savannah	6,572,000	4%	$0.0
Wilmington	9,100,000	48%	$12.5

*Total dredge volume calculated as the sum of all material dredged from NAV projects per dredge cycle.

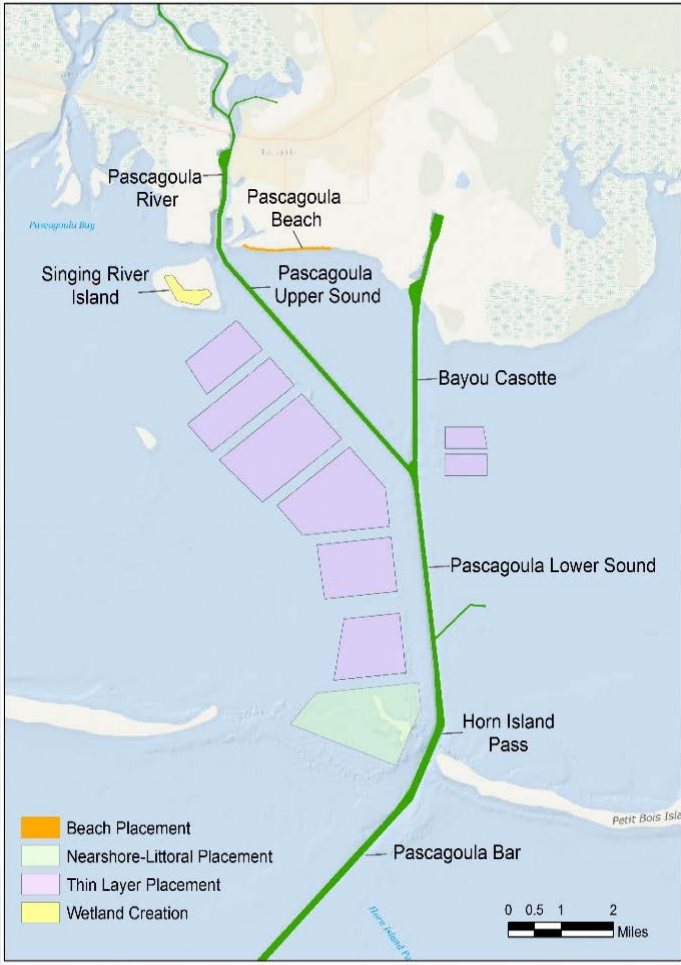
SAD Projects with $2+ Million in Annual RSM Value

Project	Material RSMed	Annual RSM Value ($ M)	Primary Benefactor
Charleston Harbor	57%	$37.6	NAV
Mobile Harbor	51%	$11.9	NAV
Tampa Harbor	70%	$4.5	Other
Pinellas Shallow Draft	100%	$4.4	FRM
St. Aug - St. Johns	100%	$4.2	NAV
Wilmington Harbor	29%	$3.8	Other
Morehead City	42%	$2.8	Other
Fort Myers	100%	$2.5	FRM-NAV
Pascagoula Harbor	65%	$2.5	NAV
Kings Bay - Nassau Co	28%	$2.4	NAV
Baker's Haulover-Miami Harbor	100%	$2.2	FRM



Pascagoula Harbor

- 4 Coastal Resiliency/Beneficial Use Strategies ($2.5 million annual value)
  - Shore Protection (Pascagoula Beach)
  - Wetland Creation (Singing River Island)
  - Littoral Zone Placement
  - Thin Layer Placement (Upper/Lower Sound)



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Charleston Harbor

- Cooper River Rediversion Project ($37.6 million annual value)
  - Rediverts flow to Santee River and makes Charleston Harbor Project economically viable
    - Sediment to Cape Romaine National Wildlife Refuge (USFWS), Santee Coastal Reserve
  - Benefits: Navigation, Flood Risk Management, Hydropower, Fish and Wildlife, Recreation
  - Partnerships with NOAA, USFWS, SCDNR, Santee Cooper
  - 80% project land designated as wildlife management area

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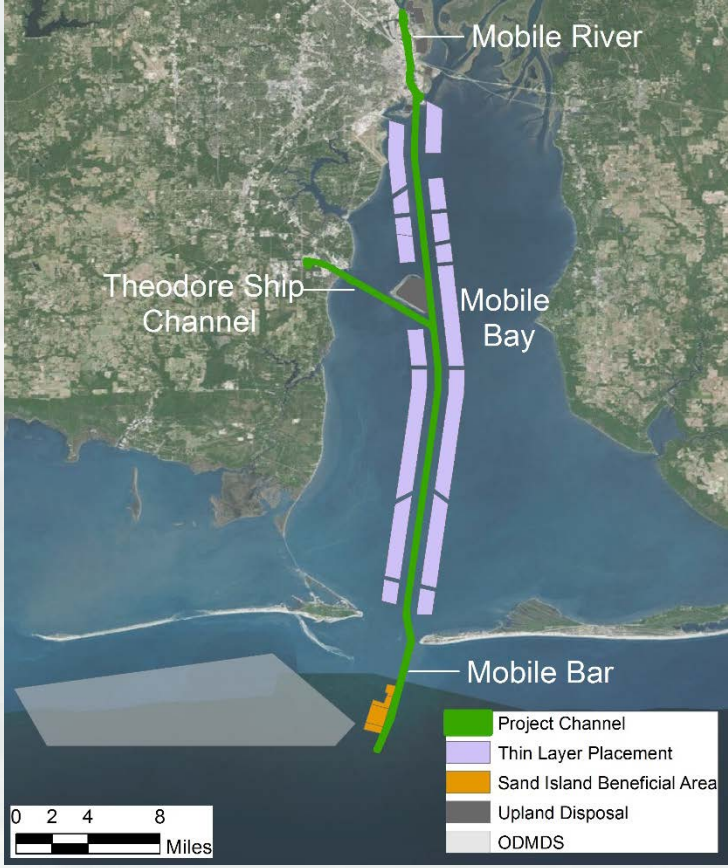
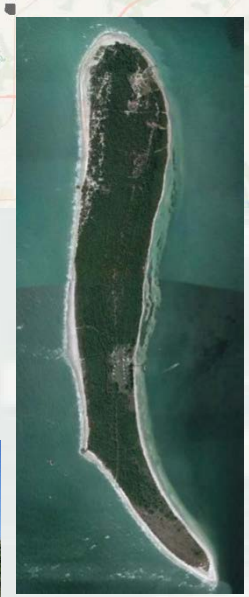
Mobile Harbor

- 2 Coastal Resiliency/Beneficial Use Strategies ($11.9 million annual value)
  - Sand Island Beneficial Use Area (SIBUA)
    - Downdrift benefits to Dauphin Island
  - Thin Layer Placement (TLP)
    - 2.8 million of 4.0 million CY/year in Mobile Bay
    - Developing strategies in Mobile River



Tampa Harbor

- Beneficial Use Strategy at Egmont Key ($4.5 million annual value)
  - Wildlife Refuge: Shore birds, sea turtles
  - National Register of Historic Places
  - Lighthouse (1858)
  - Used in Seminole War, Civil War, Spanish-American War
  - Managed by US Fish and Wildlife Service, Florida State Parks, Coast Guard



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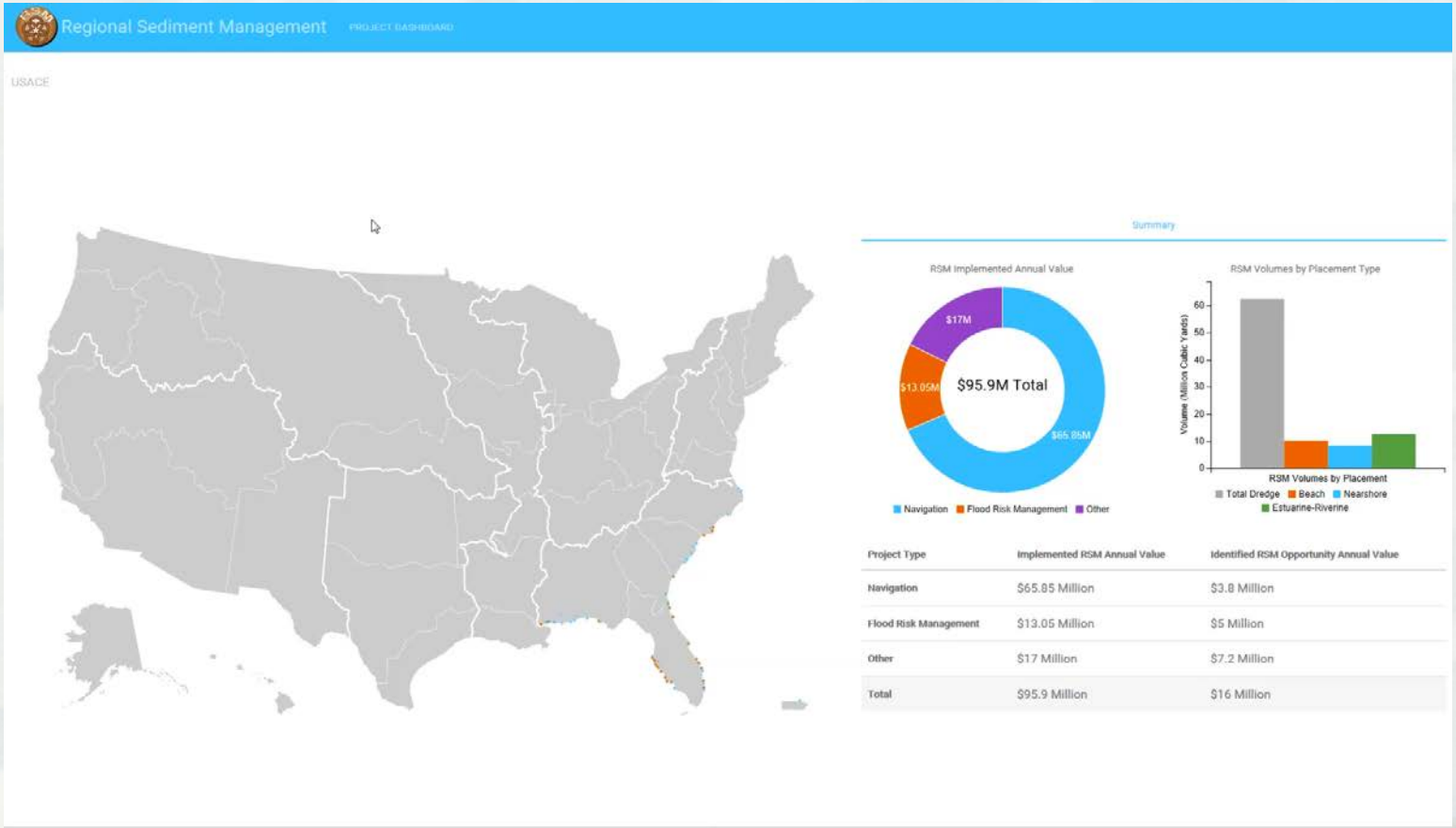
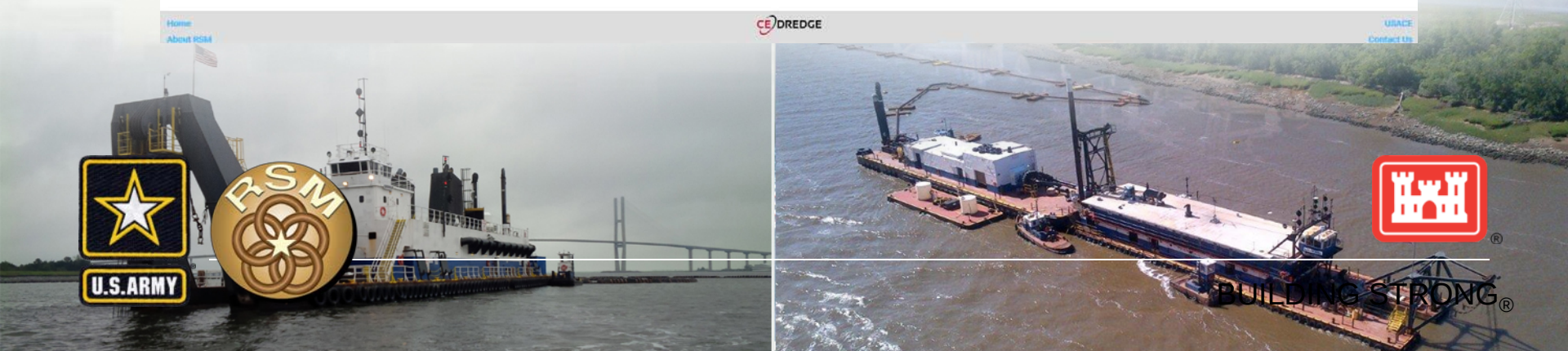
WEB APPLICATION DEMONSTRATION

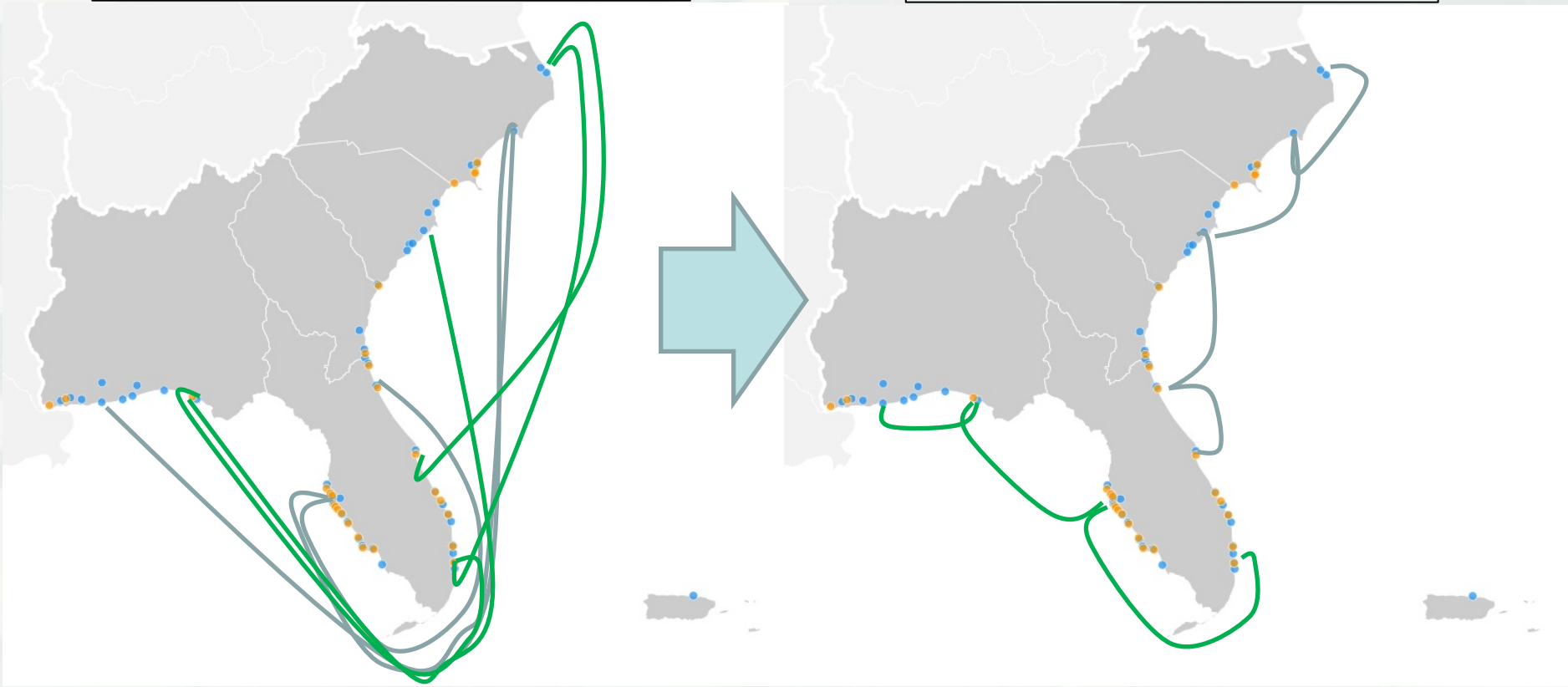




Scheduling Optimization Concept

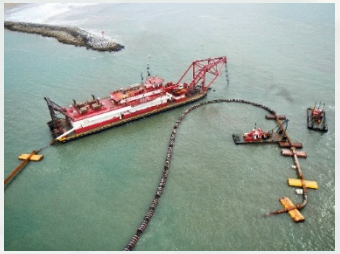
- Schedules are uncoordinated
- Potential for inefficient dredge plant itineraries over course of dredging year
- Results in higher dredge mobilization costs

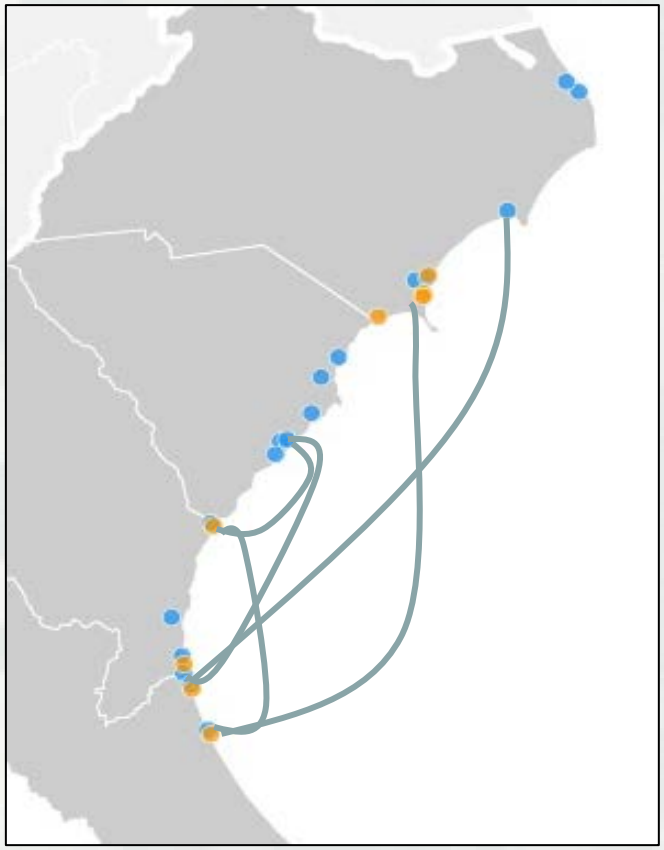
- While accounting for Project-level requirements and environmental work windows, schedule dredging so as to minimize mobilization costs.



Dr. Ned Mitchell, USACE-ERDC

Implications of Results





- Fleet scheduling model provides a quantitative way to evaluate the relative cost-effectiveness of various approaches to O&M dredging program execution.
- It also serves as a starting point for exploring the most promising candidate groups of projects for regional contracting.

Next Steps:

- Tool available for FY17 SAD workplan/FY18 budget build in SAD
- Provide similar capability to other Divisions/Districts: North Atlantic Division Rollout in FY17
- Incorporate long term maintenance costs and ecosystem value
- Continue to communicate the value of RSM and assist in implementation throughout USACE and beyond
- Conduct studies to assess supplemental benefits of RSM

Thank You!

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