GULF COAST REGIONAL SEDIMENT MANAGEMENT

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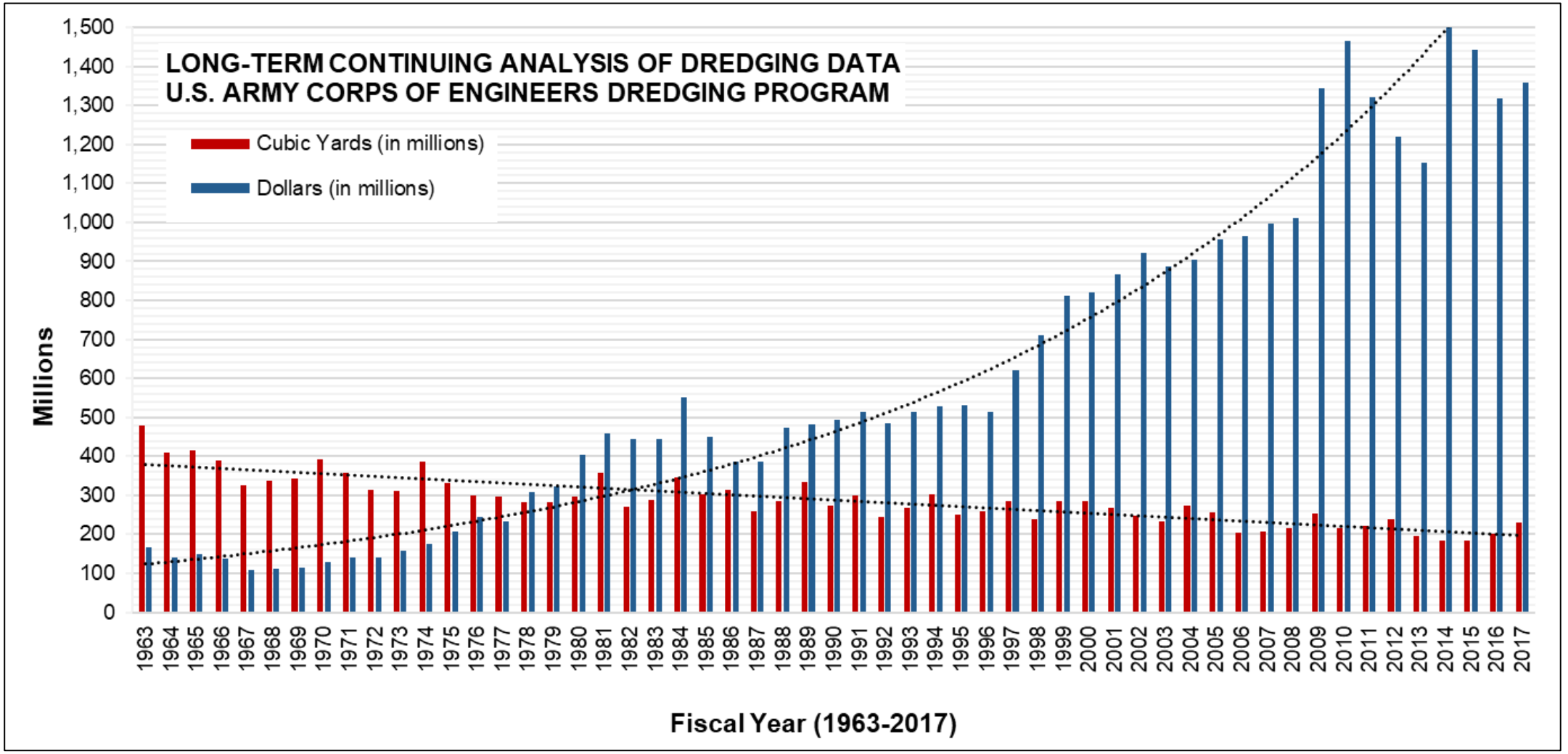
US Army Corps of Engineers

ERDC ENGINEER RESEARCH & DEVELOPMENT CENTER

DISCOVER | DEVELOP | DELIVER

The Corps moves 200 million cu yds of sediment annually…



…at a cost of more than $1 billion per year

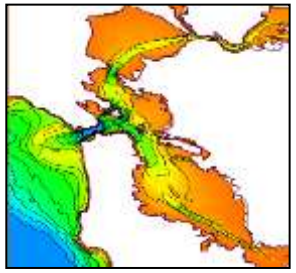
Regional Sediment Management

Established 1999, CERB Charge

"A systems approach using best management practices for more efficient and effective use of sediments in coastal, estuarine, and inland environments for healthier and more resilient systems."

- **Recognizes sediment as a valuable *resource***
- ***Work across business lines, projects, and authorities*** **to create short and long-term economically viable and environmentally sustainable solutions**
- ***Improve*** **operational efficiencies and natural exchange of sediments**
- ***Consider*** **regional implications of project scale actions and benefits**
- ***Apply/Enhance*** **tools and technologies for regional approaches**
- ***Share*** **lessons learned, information, data, tools, and technologies**
- ***Communicate and collaborate***




RSM Goals and Strategies

Reduce Upland/CDF Disposal

Bypass Backpass Sediments

Reduce Erosion

- **Keep sediments in the system**
- **Mimic natural sediment processes**
- **Reduce unwanted sedimentation**
- **Environmental enhancement**
- **Maintain & protect infrastructure**

Save Capacity

Reduce Channel Shoaling

Reduce Runoff

Stabilize Structures

Ecosystem Habitat Restoration

National RSM Program Participation (2000-2019)
>230 Projects

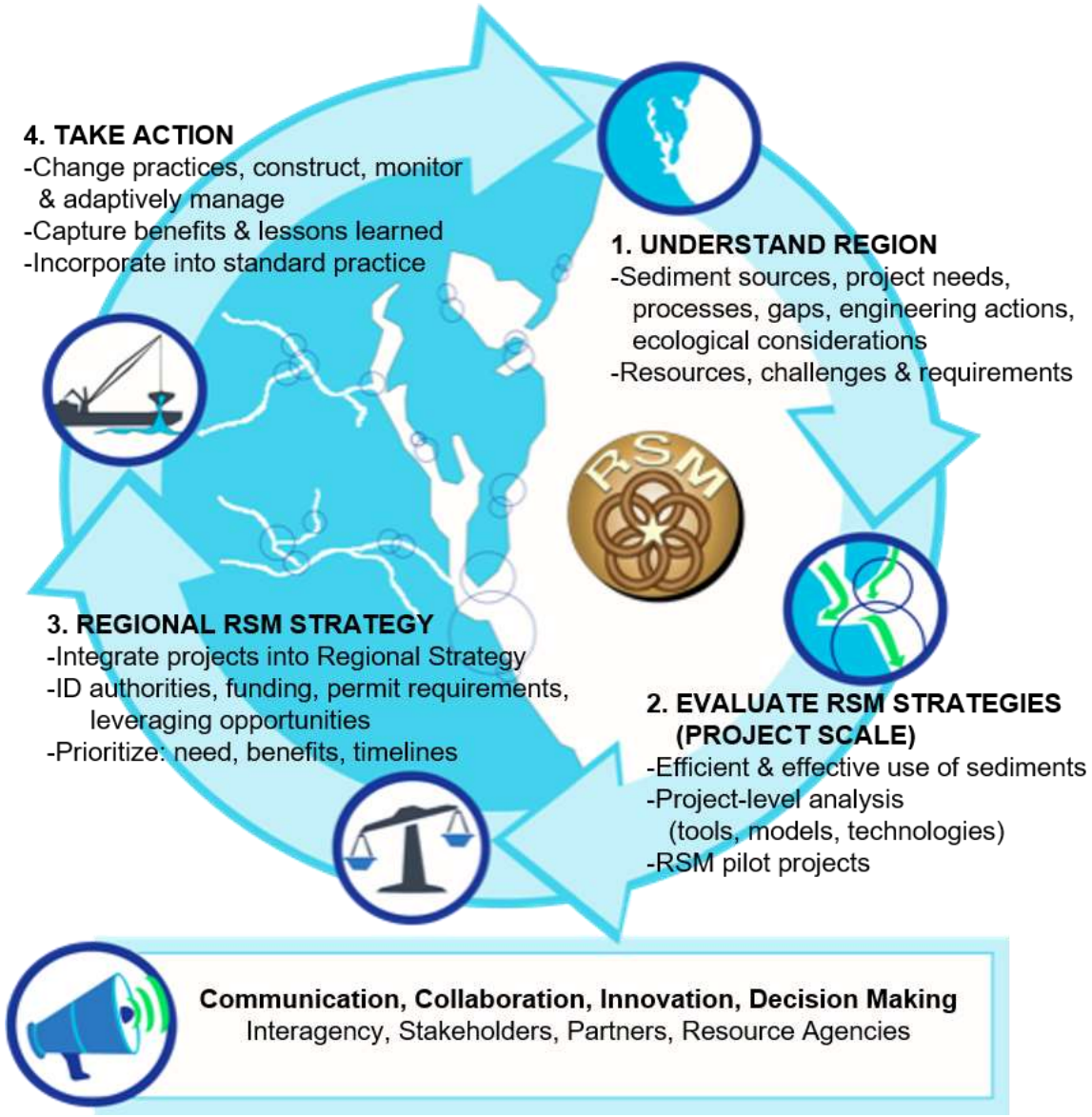
Collaboration

29 Districts
ERDC, IWR, HEC

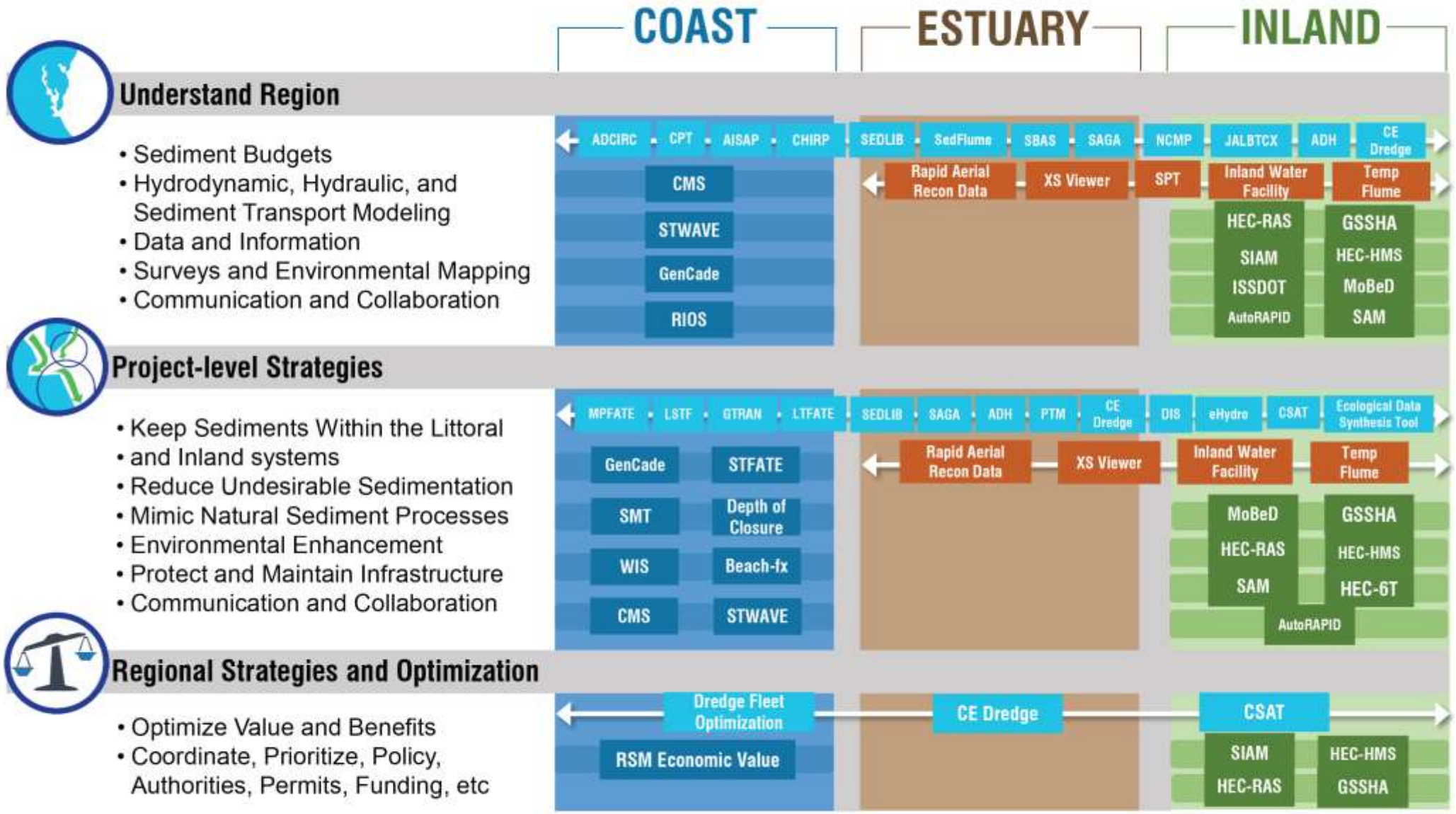
Tools & Technologies

RSM Collaboration: National and Regional Teams

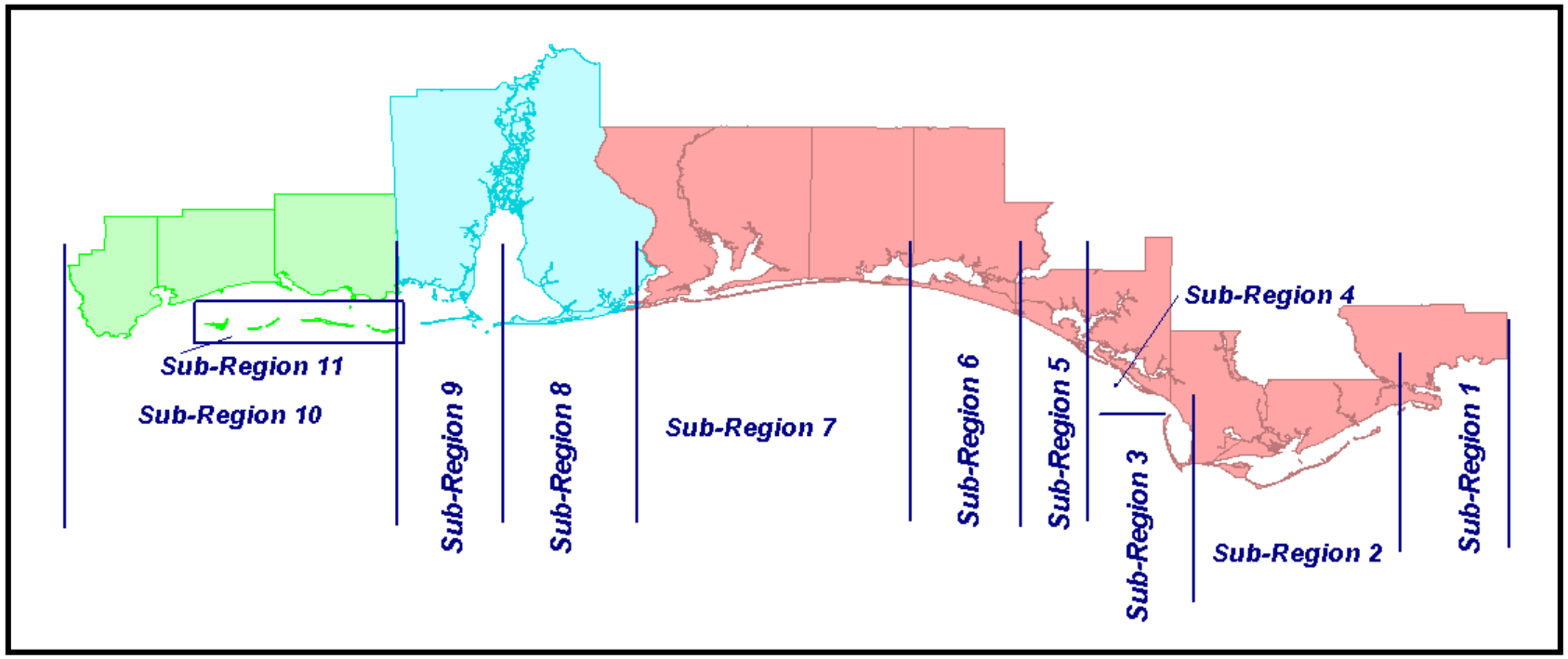
RSM Process



Commonly Used Tools for RSM



Mobile District RSM Domain



375-miles of Shoreline
21 Federal Projects
8 State Parks
7 Military Installations

Gulf Islands National Seashore
Harrison County Beach Fill
Panama City Beach Fill
Local Projects

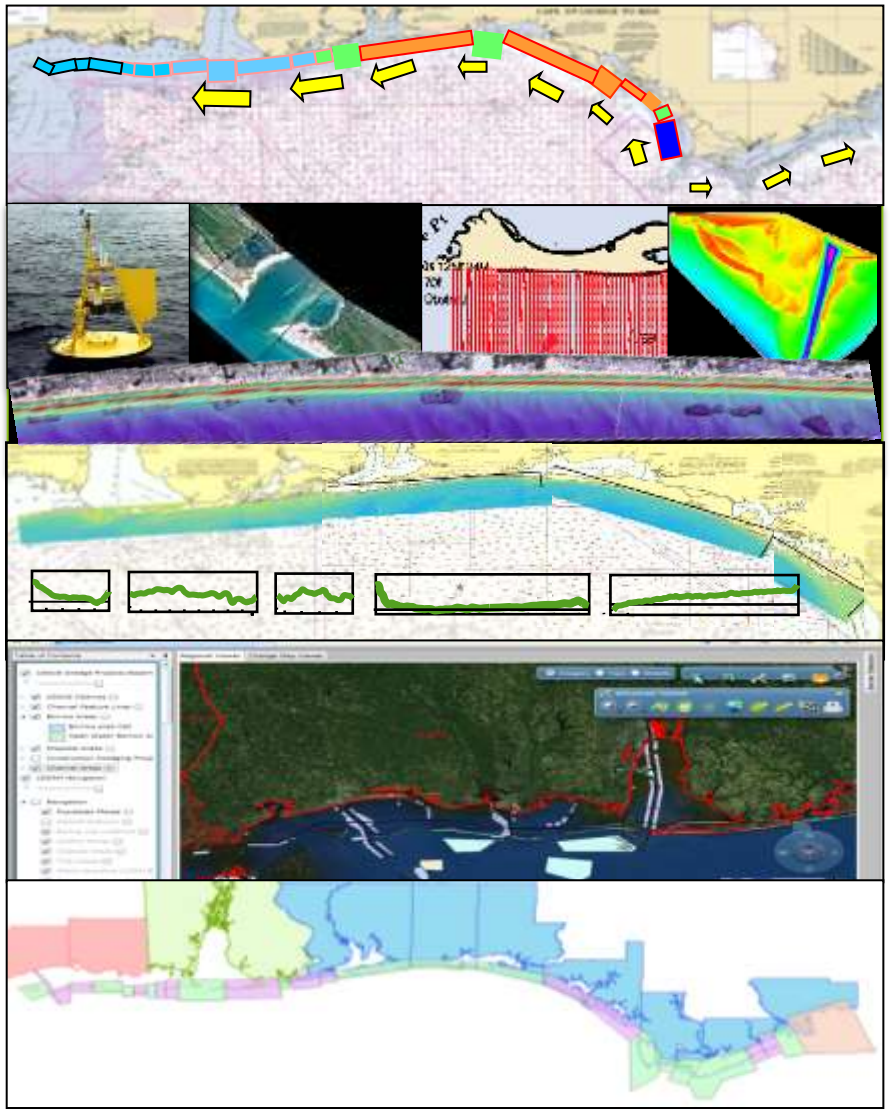
WRDA86:

Place all dredged sediments in ODMDS
- 4.0 Mcy/yr, Hopper Dredge, 20-Miles
- Tripled maintenance costs

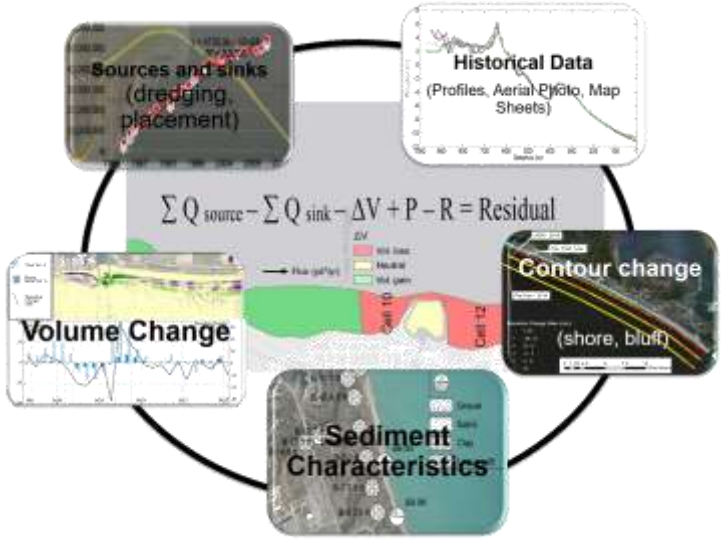
2014 Decision reversed
- ERDC Tools and Technologies
- RSM Interagency Work Group

Understanding the Region

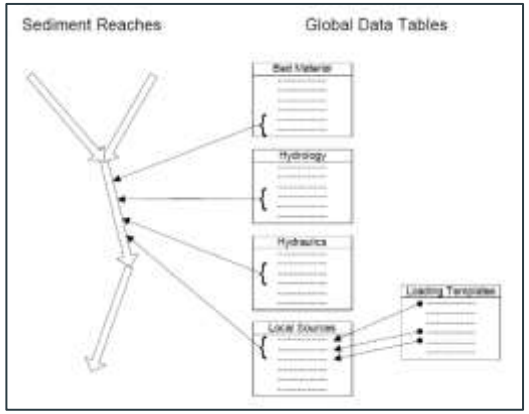
Mobile District Sediment Budget



Sediment Budget Analysis System (SBAS)



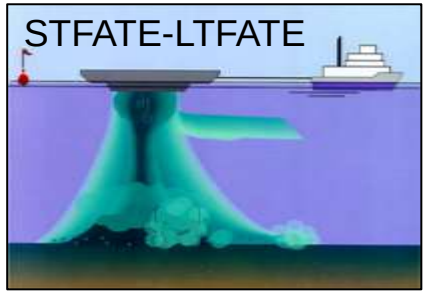
Sediment Impact Analysis Methods (SIAM)

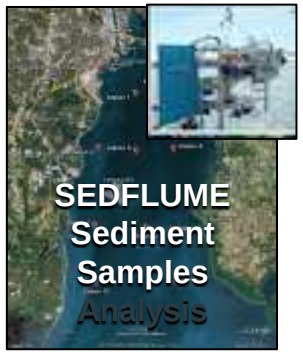


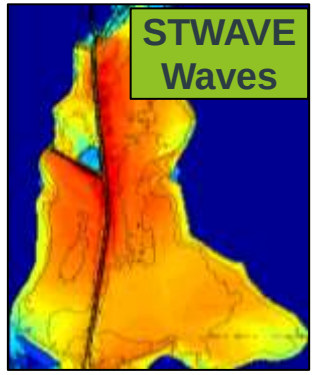
Evaluating RSM Strategies

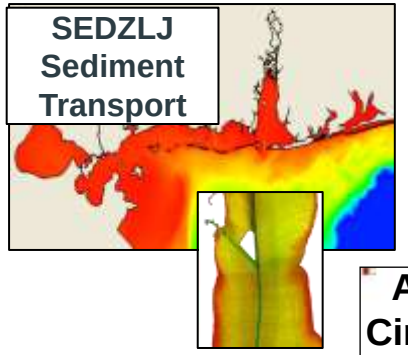
Mobile Bay O&M Dredged Material BU Alternatives

- Upper-bay
  - In-bay placement
  - Thin layer placement
- Lower Bay
  - ODMDS
- Various ERDC tools and technologies used to evaluate each alternative

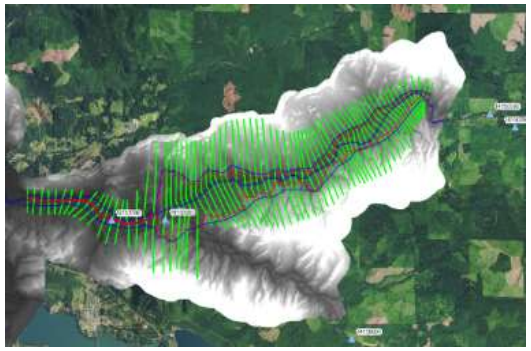




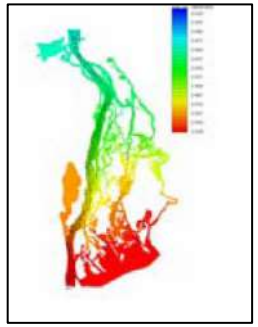


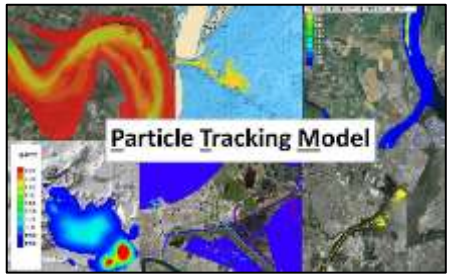


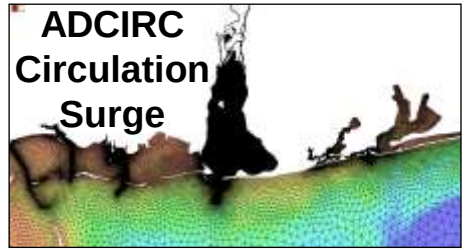
HEC-RAS: River Analysis



ADH: Watershed Analysis

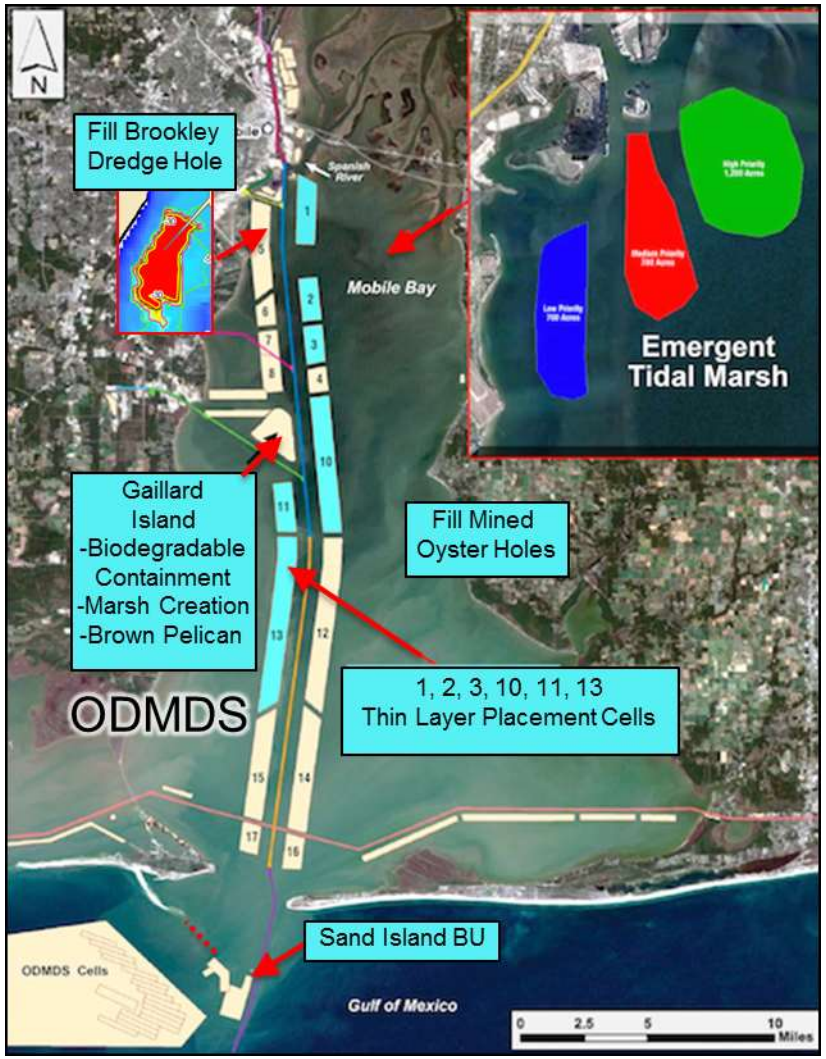






Regional RSM Strategy and Construction

Mobile Bay RSM Strategy



$6 Million in Annual Value

- Fill Brookley Dredge Hole
- Gaillard Island
  - Marsh creation
  - Biogradable containment of sediment
- In-bay thin layer placement
- Fill mined Oyster Holes
- Sand Island Beneficial Use
  - No ODMDS Placement
  - Dredged material from upper end used to help reduce erosion along the island

Communicate and Collaborate

Mobile District Interagency RSM Team

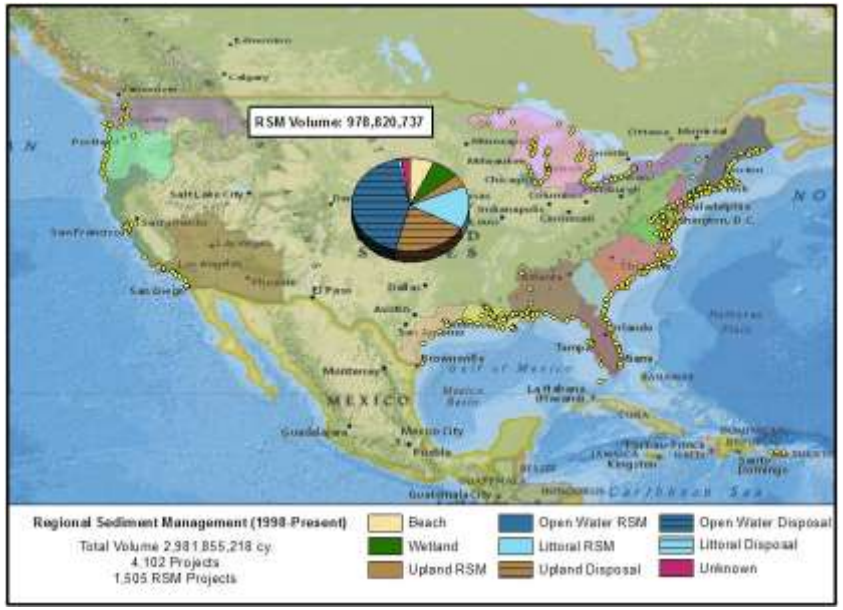
- Alabama Department of Conservation and Natural Resources (ADCNR), State Lands Division
- ADCNR, Marine Resources Division
- Alabama Department of Environmental Management (ADEM)
- Alabama State Port Authority
- U.S. Fish and Wildlife Service
- NOAA, National Marine Fisheries Service
- Alabama/Mississippi Sea Grant
- Mobile Bay National Estuarine Program
- Mobile District
- ERDC

RSM Program Project Types

- Research and Development
  - Tool Enhancement/Development
  - New RSM Strategy Demos
  - Evaluating BU Hurdles
  - Quantification of BU in the USACE
- RSM Implementation Projects
  - Sediment Budgets
  - Evaluating Innovative RSM Alternatives (Project Specific)
  - Creating Regional RSM Strategies
  - Optimization
  - Stakeholder and Resource Agency Workshops
- RSM University
- Others
  - Great Lakes Coastal Resiliency Study Scope
  - WRDA 2016 Section 1122 Pilot Projects

Historical Navigation Sediment Utilization:

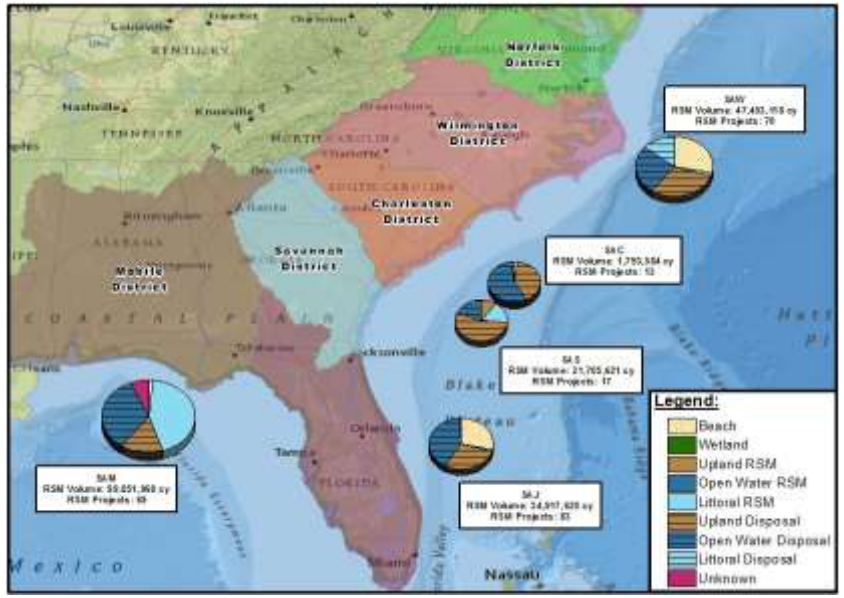
Where, when, volume of sediments placed beneficially? Where can we improve?



District Data 1998-2018

<u>Coastal/Inland Navigation Projects</u>

- 210 Mcy/yr Total
- 38% placed beneficially
- 10 Mcy/yr placed on beaches
- 2.5 Mcy/yr Unknown



Sediment Sorting during the Dredging and Placement Process

BLUF: The objective of this study is to quantify sediment sorting and the corresponding changes in sediment characteristics during dredging and placement operations. These objectives are motivated by a desire to better inform sediment compatibility analyses and subsequent management of sediment resources.

Challenge/Objectives

- Perform extensive literature review of previous studies
- Determine best pra
  the dredging proces
- Quantify changes in
  the dredging proces

App

- Complete concep
  review on sedim
  dredging process
- Laboratory testing of weir sampling methods
- Field study on dredge to identify loss points and quantify sediment sorting

87% of fines removed

- 70% - overflow
- 30% - beach outwash

Galveston Entrance Channel RSM

Tricia Campbell, Ashley Frey, Andy Morang

Challenge

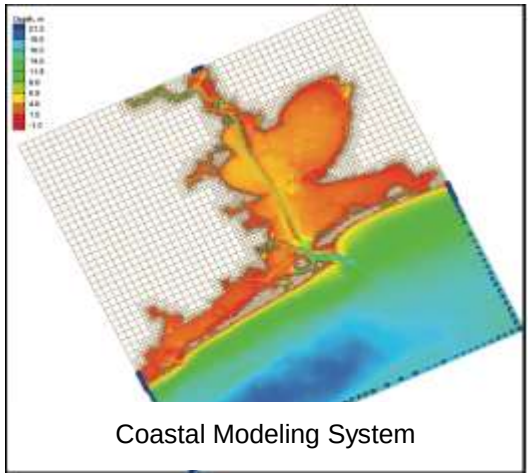
- Funding challenge to maintain Galveston Entrance Channel and upland PAs
- Dredge 1.5-2MCY every 18-24 months, $6-8M

Objectives

- Solutions to reduce channel sedimentation & dredging requirements
- Allow more flexibility to manage overall project
- Coordinate w/PAS Galveston Park Board of Trustees Galveston Island study 50 yr mgmt plan

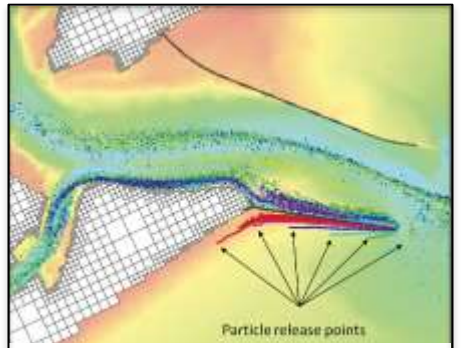
Maximum Sediment Saved by Implementing Each Alternative Individually

- Sand-tighten jetties: 113,000 CY/YR
- Prevention of wind-blown sand: 21,000 CY/YR
- Back-passing plant with spur dikes 150,000 CY/YR
- Close boat cut in North Jetty: 160,000 CY/YR
- Place PA A material on beach: 300,000 CY/YR



Coastal Modeling System

Sediment Budget Analysis System



Particle Tracking Model

MAXIMUM POSSIBLE SAVINGS OF ALL ALTERNATIVES:

690,000 CY/YR* ~ $2.8M/YR (based on $4/CY)

Park Board Adopted Sand Management Plan 2015

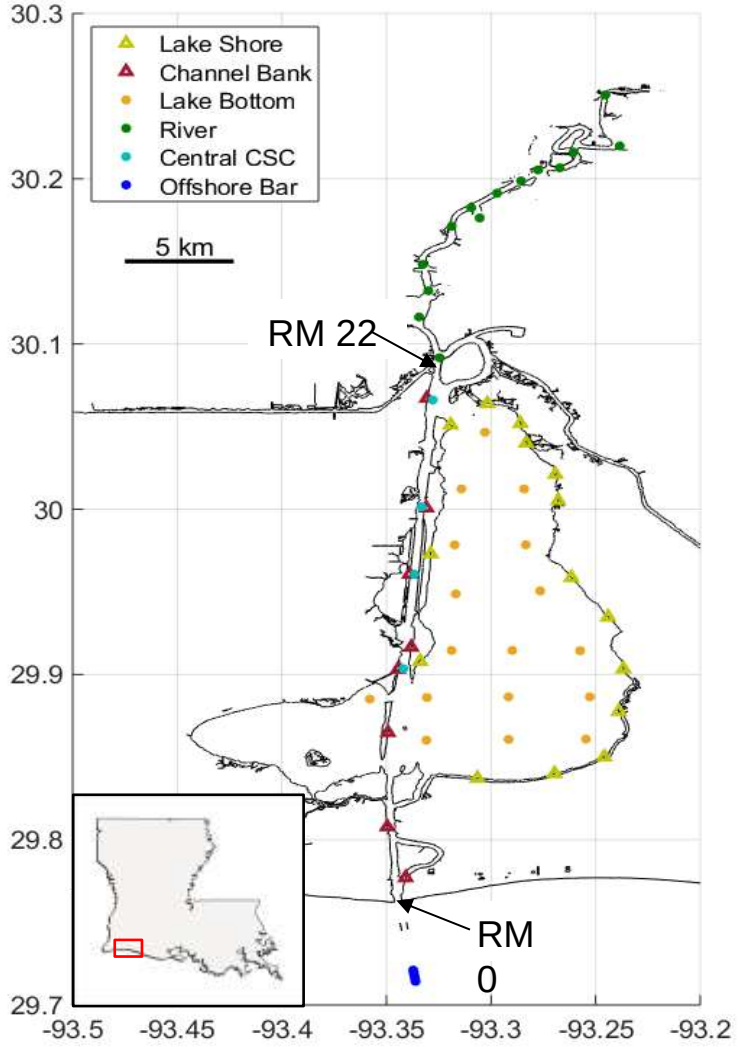
Investigation of Sources of Sediment Associated with Deposition in the Calcasieu Ship Channel

- *To develop potential engineering solutions for reducing annual dredging volumes within the CSC, MVN is seeking innovative and cost effective methods to identify and characterize primary sources to channel shoaling.*

Challenge/Objectives

- Identify likely sources of shoaling sediment
- Determine methods to asses contribution of sources & validate results
- Develop strategies to reduce dredging

- **Final analysis completed 8/2019**
  - CSC sediments cluster together, but differently from lake sediments
  - Stable isotopes show mixing of offshore & inshore sediments within CSC group
  - Lake Calcasieu does not appear to be major sediment source to CSC



SWG – Channel to Victoria BU Utilization Investigation
POC: Steve Howard

Develop/implement alternative approach for managing dredged material on the Lower Reach of the GIWW, CTV Project

Benefits to the Navigation Project:

- Reduce quantity of material dredged (-15% average)
- Reduce cost to dredge (-28% average)

Additional Benefits:

- Habitat creation/enhancement
- Potentially reduce dredging frequency
- Safer navigation
- Additional capacity for the Project
- Additional placement areas available for emergency dredging

Leverage:

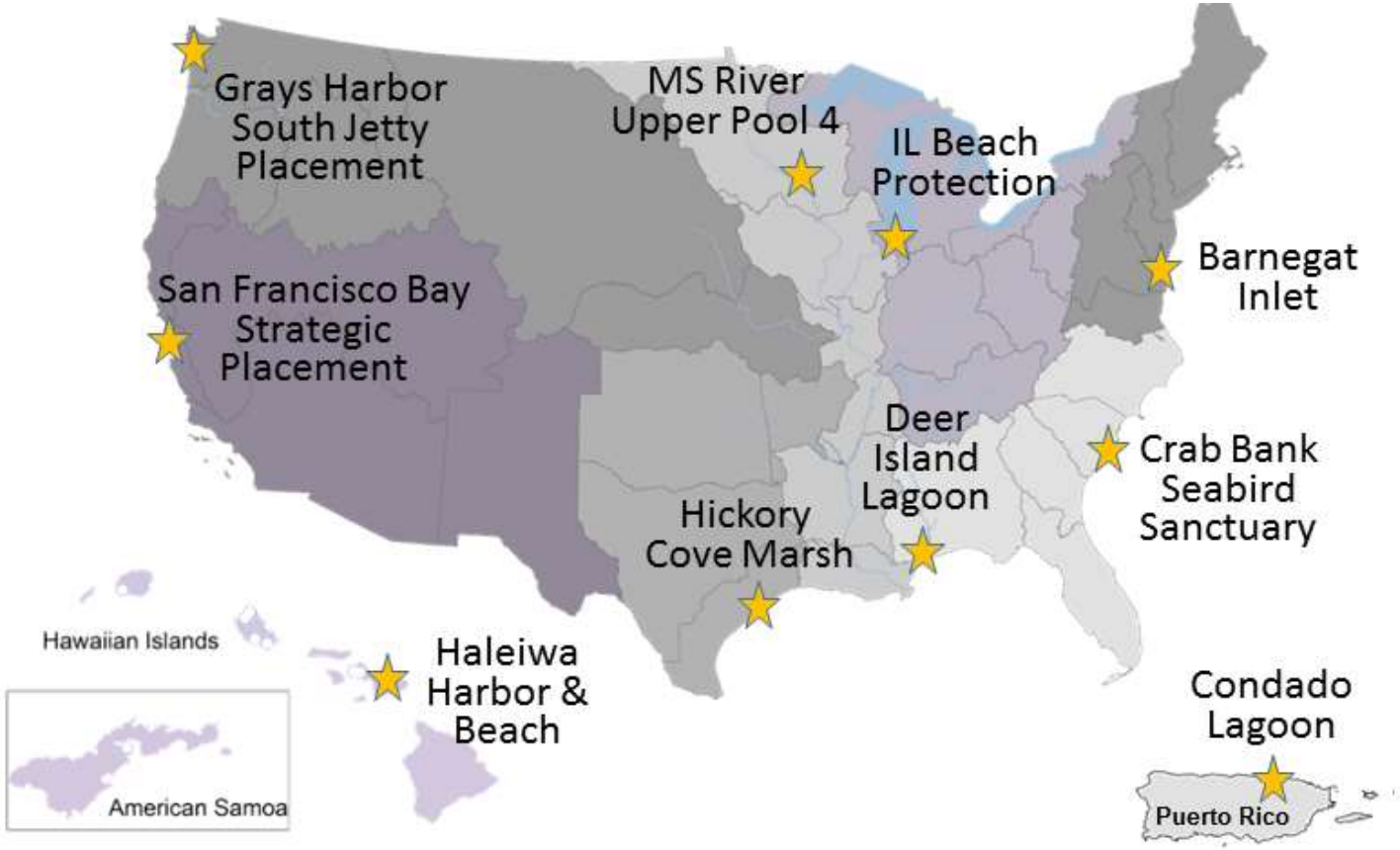
- Existing NEPA coordinated sites
- O&M funds
  - Reduced cost to dredge
  - No negative impacts to the project

Site 2 is the most promising for implementation:

- No/minimal costs prior to use
- Greatest improvement to bird habitat

WRDA 2016 Section 1122 BU Pilot Projects

- Section 1122 of WRDA of 2016 requires the USACE to establish a pilot program to carry out ten projects for the beneficial use of dredged material
- RSM is currently funding the Project Implementation Plan phase



Project List and Estimated Timeline

State	MSC	Project Name	Estimated Timeline
		Proposed for Recommendation	
CA	SPD	Restoring San Francisco Bay's Natural Infrastructure with Dredged Sediment: Strategic Placement	FY22
HI	POD	Haleiwa Small Boat Harbor Maintenance Dredging and Beach Restoration	FY22
IL	LRD	Public Beach Protection Pilot in Four Illinois Coastal Communities	FY21Q3
MS	SAD	Deer Island Lagoon Project - COMPLETED	FY19
NJ	NAD	Beneficial Use Placement Opportunities in the State of New Jersey Using Navigation Channel Sediments: Barnegat Inlet	FY20Q1
PR	SAD	Condado Lagoon	FY21
SC	SAD	Crab Bank Seabird Sanctuary	FY20Q1
TX	SWD	Hickory Cove Marsh Restoration and Living Shoreline	FY21
WA	NWD	Grays Harbor South Jetty Sand Placement Pilot Project	FY22
WI	MVD	Mississippi River Upper Pool 4, Pierce County Islands and Head of Lake Pepin Backwater Complex - Beneficial Use of Dredged Material	FY21Q3

Future Program Goals

- Continue District support to determine best RSM alternatives for projects
- Ongoing effort to quantify BU in USACE
  - Connect Dredging Information System directly to database
- Quantify cost savings/value due to RSM
  - Quantification of benefits not necessarily related to money (i.e. what is the value of a wetland?)
- R&D on innovative RSM solutions
  - Thin layer placements
  - CDF sediment usage
  - Adding more science to regulations (e.g. allowable percentage of fine sediment)
- Make RSM SOP in District and Division project planning

How do I get involved?

- **Work with your District on creating proposals that might help you manage your sediment more efficiently**
- **Join an Interagency RSM Team in your District**
- **Participate in stakeholder/resource agency workshops**

What is the value of RSM?

- More Efficient Project Execution
  - Reduced lifecycle costs
  - More project execution (low use)

- Utilizing Sediment Resources for Healthy Systems
  - More sustainable and resilient coastal and riverine shorelines, ecosystem and aquatic habitats

- Build Institutional Knowledge
  - Improved post-storm recovery
  - Better data, tools, models available

- Relationship Building
  - Across USACE
  - Nationwide engagements across business lines and communities of practice
  - Stakeholder/Resource Agency Communication and Participation

Regional Sediment Management = Resilient Healthy Systems

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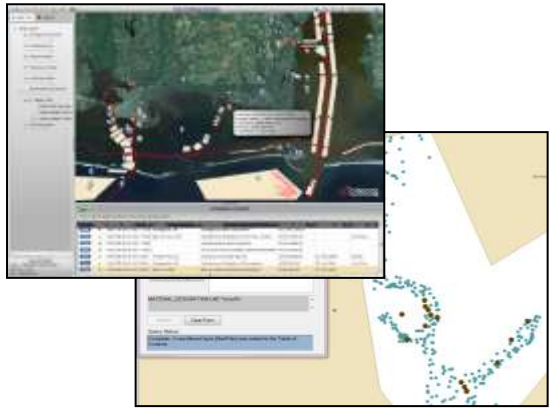
Regional Sediment Budgets
Local Actions=Regional Benefits

ODMDS
Regional Strategies

Riverine &
Reservoir Mgmt



Data Management and Access

Improved Relationships
Outreach & Training

Ecosystem/Aquatic
Habitat