



U.S. ARMY

# NATIONAL REGIONAL SEDIMENT MANAGEMENT PROGRAM AND BENEFICIAL USE OF DREDGED MATERIAL

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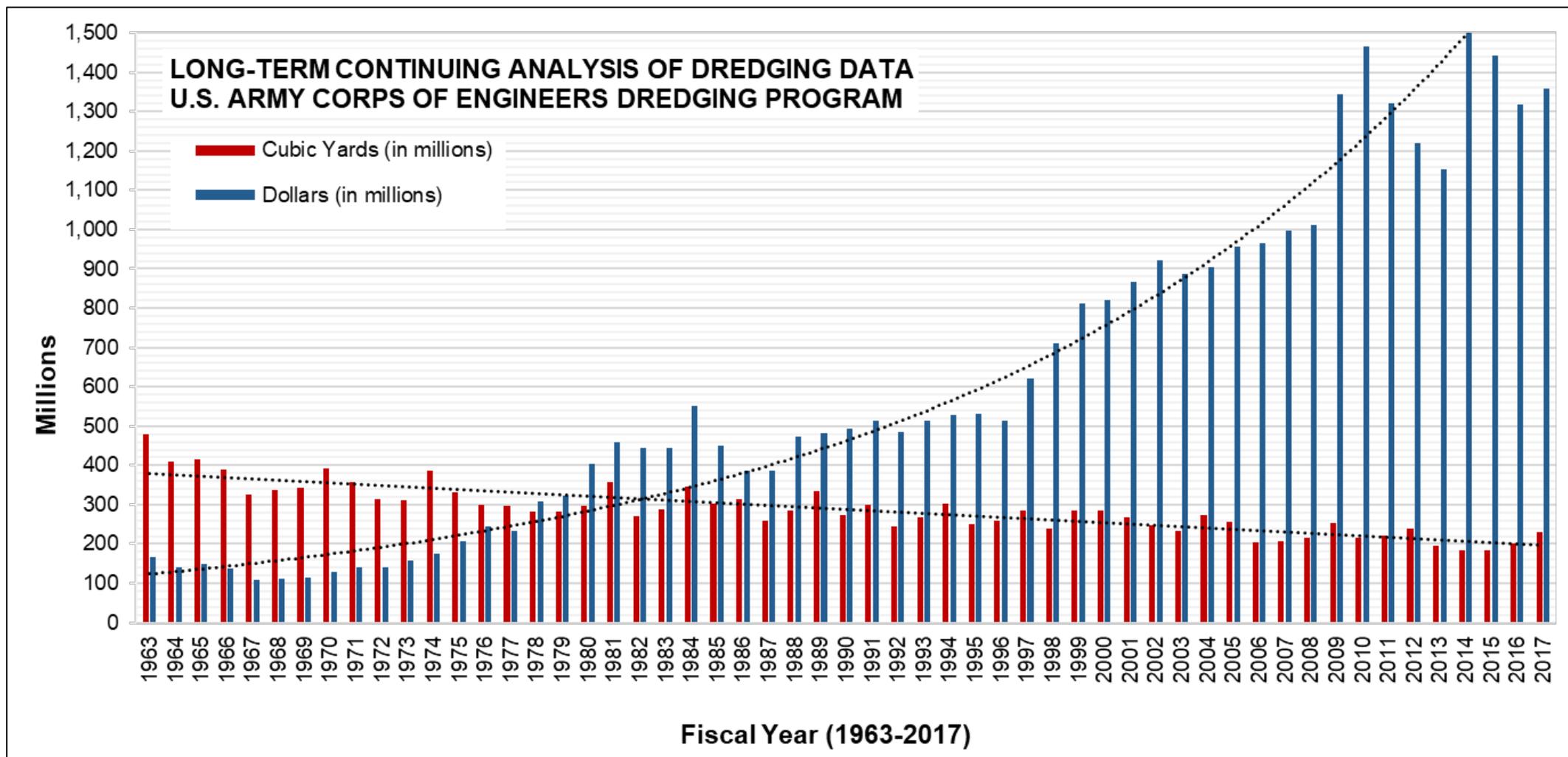
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US Army Corps of Engineers



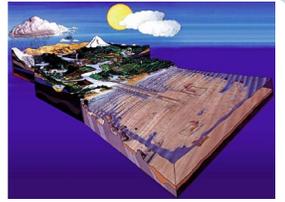
# The Corps moves 200 million cu yds of sediment annually...



...at a cost of more than \$1 billion per year

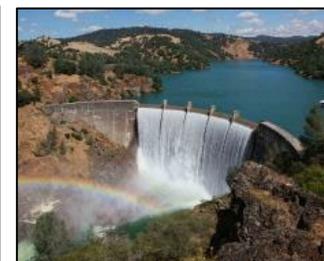
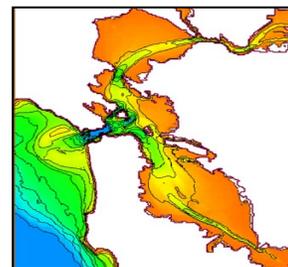
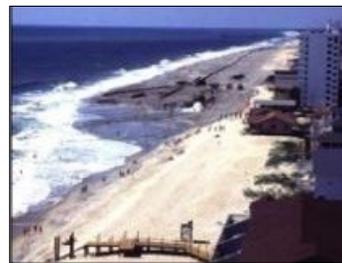
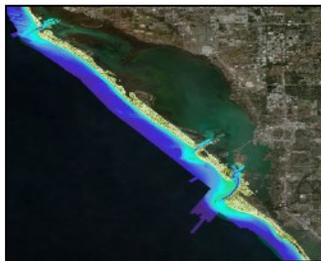
# Regional Sediment Management Program

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



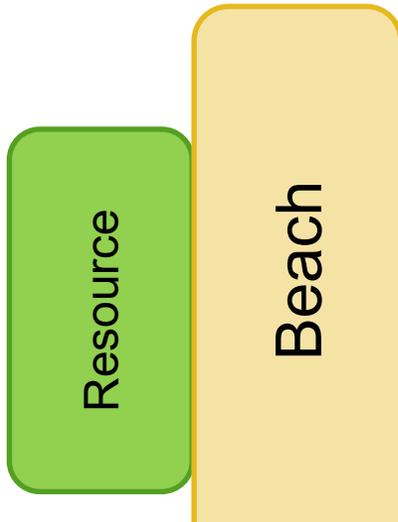
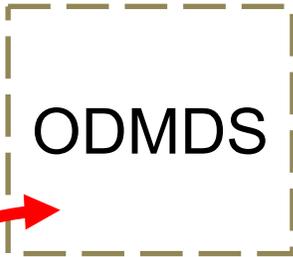
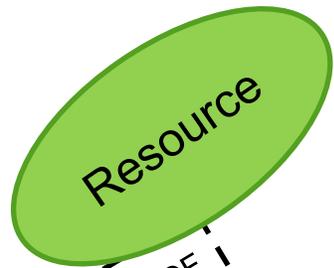
Ecosystem  
Habitat  
Restoration



Stabilize  
Structures



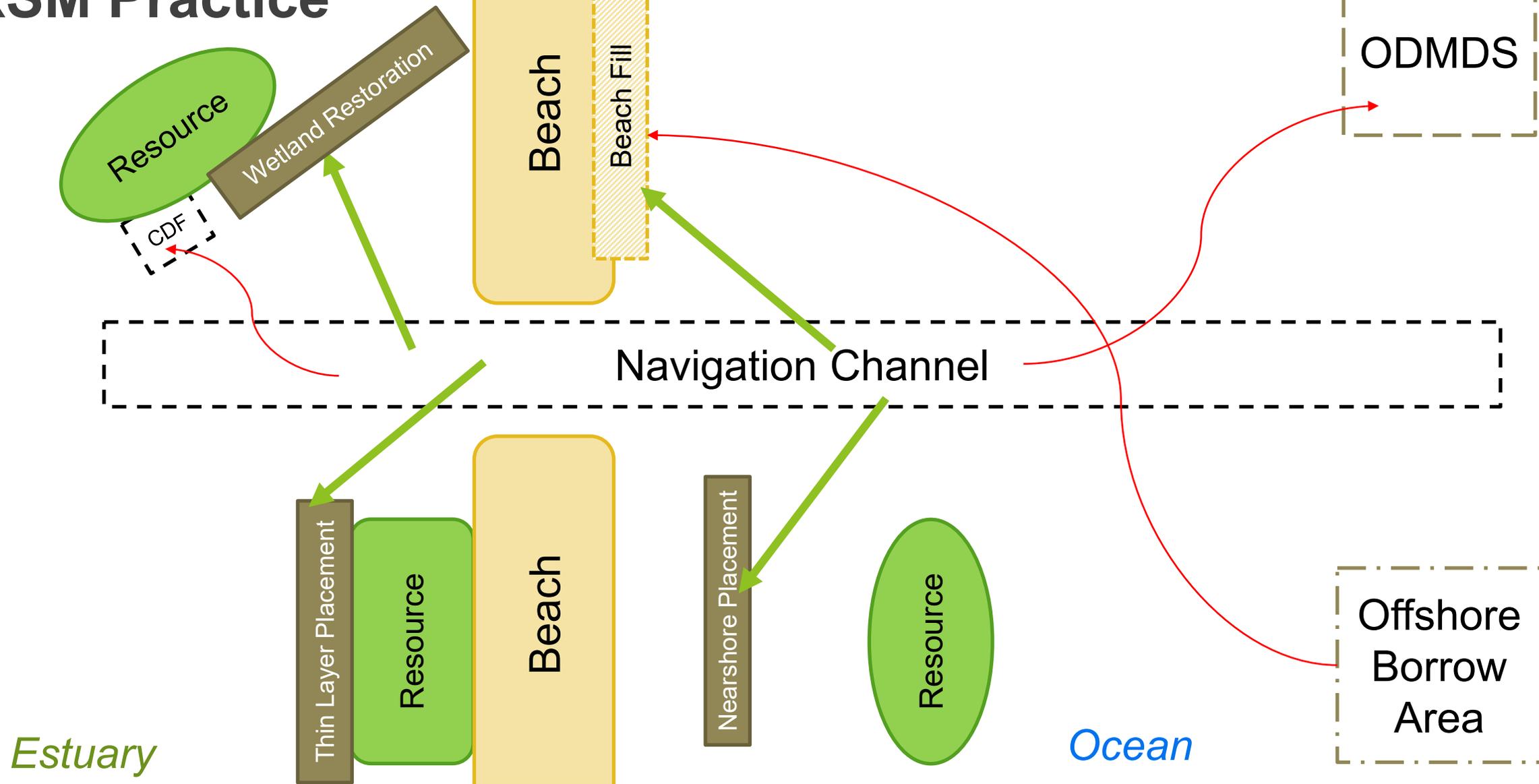
# Non-RSM Practice



*Estuary*

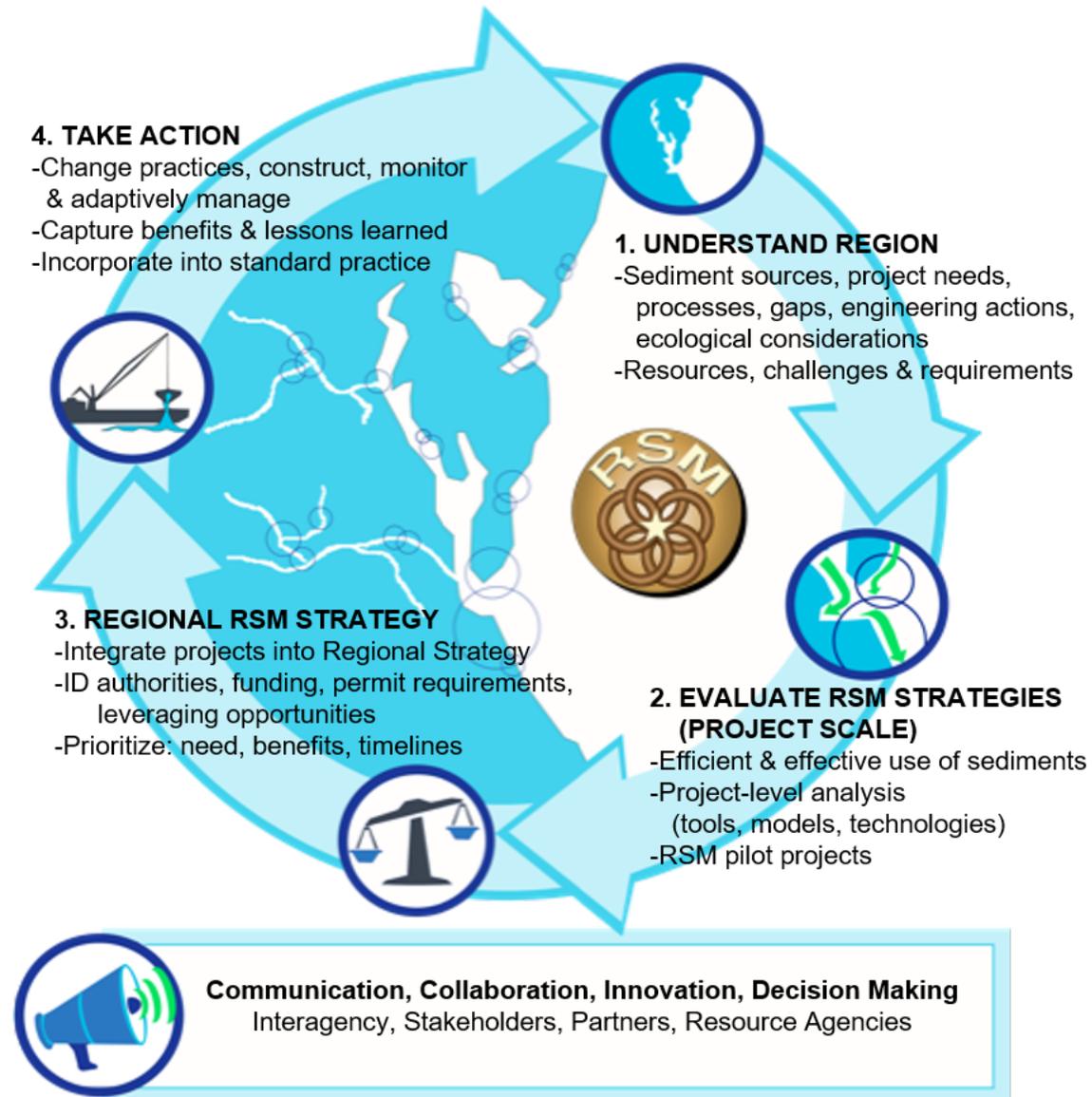
*Ocean*

# RSM Practice





# RSM Process



# What is Beneficial Use of Dredged Material?

**Beneficial uses are defined as “productive and positive uses of dredged material, which cover broad use categories ranging from fish and wildlife habitat development, to human recreation, to industrial/commercial uses” (USACE Beneficial Uses of Dredged Material, Engineer Manual 1110-2-5026, 2015).**

- Land creation
- Land improvement
- Berm creation
- Shore protection
- Replacement fill
- Beach nourishment
- Capping
- Construction materials
- Aquaculture
- Topsoil
- Wildlife habitats
- Fisheries improvement
- Wetland restoration
- Others



# How are we increasing BU in the USACE?

- **Enterprise-wide goal to more than double environmentally acceptable beneficial use that delivers safe, reliable, cost efficient, sustainable, and resilient projects.**
  - Currently USACE beneficially reuses approximately 30% of dredged material
  - Established a tiger team to increase beneficial use
- **Quantify and document current beneficial use practices in Navigation projects to showcase success and highlight potential opportunities to increase BU**
  - Continued updates to the RSM BU Database that uses dredging data to visualize and quantify how navigation dredged material is placed at each of our projects
- **Develop innovative solutions and partnerships for beneficial use**
  - Advancing research and development related to regional sediment management and beneficial use through National Regional Sediment Management Program, Engineering with Nature, and other R&D Initiatives
  - “Innovation in Sediment Management” is one of 5 research and development Strategic Focus Areas
  - Intent to increase stakeholder engagement to identify BU opportunities in all business lines and improve perspective to see dredged material as a resource
- **Examine and update our existing policies to support beneficial use**
  - WRDA 2020 Section 125 states that it is the policy of USACE to maximize the beneficial use of dredged material; requires us to consider the economic and environmental benefits of dredged material for all projects with dredged material, and to include our calculations of economic and environmental benefits in a report to Congress.
    - USACE is working to complete the implementation guidance for this provision that will provide direction to the field to achieve its intent and complete the reporting requirements.
  - Continuing to implement and learn from beneficial use pilot projects required by WRDA 2016 Section 1122

# WRDA 2020 section 125

This section renews the Congressional commitment to beneficial use (BU) of dredged material by:

- (a)** establishing a national policy to maximize the beneficial use of material obtained from Corps projects; requiring the Corps to calculate the economic and environmental benefits of the beneficial use of dredged material when calculating the Federal Standard,
- (b)** amending section 204(d) of WRDA 1992 to direct that other-than-least-cost placements of dredged material for certain purposes be funded using appropriations available for construction or operation and maintenance of the water resources development project producing the dredged material
- (c)** increasing the number of beneficial use of dredged material demonstration projects to 35 projects,
- (d)** directing the Corps to develop five-year regional dredged material management plans, and
- (e)** emphasizing greater coordination across the Corps' dredging contracts.

# Common Roadblocks to BUDM and RSM

- Risk aversion
- Fear of the unknown
  - “We’ve been doing it like this for 30 years, why change?”
- Timing
  - Lining up dredging with a receiving site
  - Environmental windows
  - Partner consensus difficult
- Cost
  - Increased pump/placement distance
  - Increased monitoring

*\*R&D needs are inherent in many of these roadblocks!*



# 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**



# 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 practices for sampling during the dredging process
- Quantify changes in sediment sorting through the dredging process

## Approach

- Complete conceptual model/literature review on sediment sorting through the dredging process
- Laboratory testing of weir sampling methods
- Field study on dredge to identify loss points and quantify sediment sorting





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### App

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**87% of fines removed**

- 70% - overflow
- 30% - beach outwash



# 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

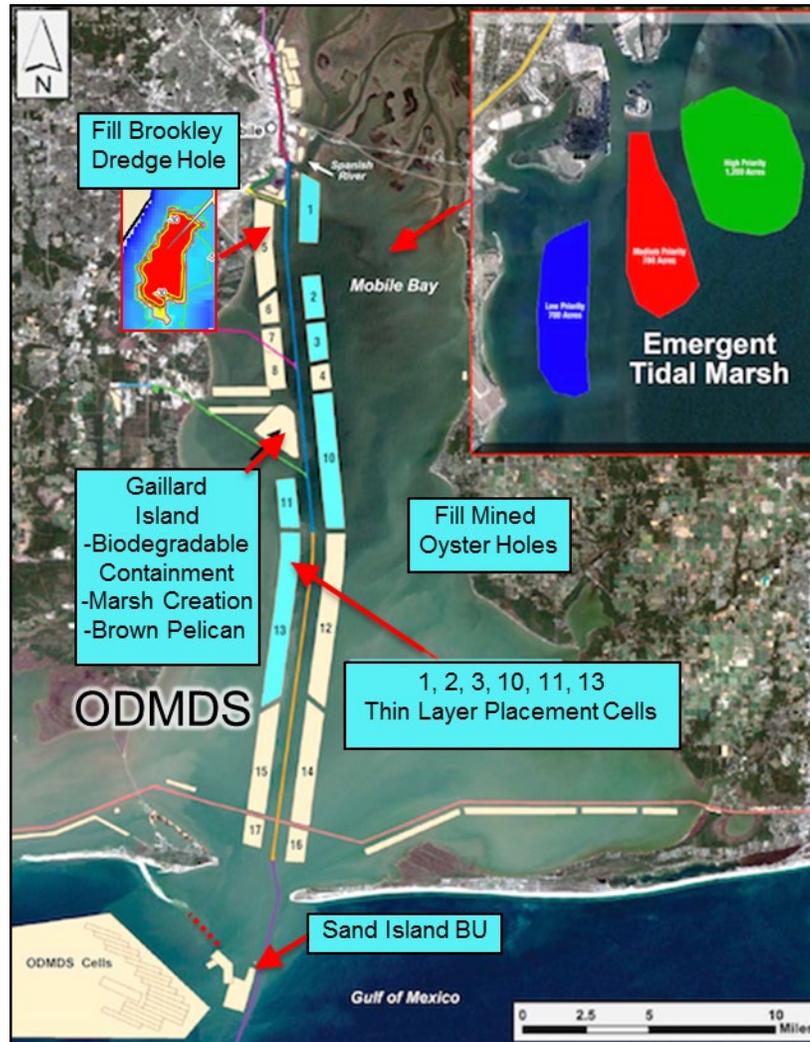
Site 2 is the most promising for implementation:

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





# RSM Example: Mobile Bay, AL



## \$6 Million in Annual Value

- Fill Brookley Dredge Hole
- Gaillard Island
  - Marsh creation
  - Biodegradable 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



# MVK/CHL, Victoria Bend Comprehensive Assessment, Keaton Jones and Viviana Berrios-Williamson

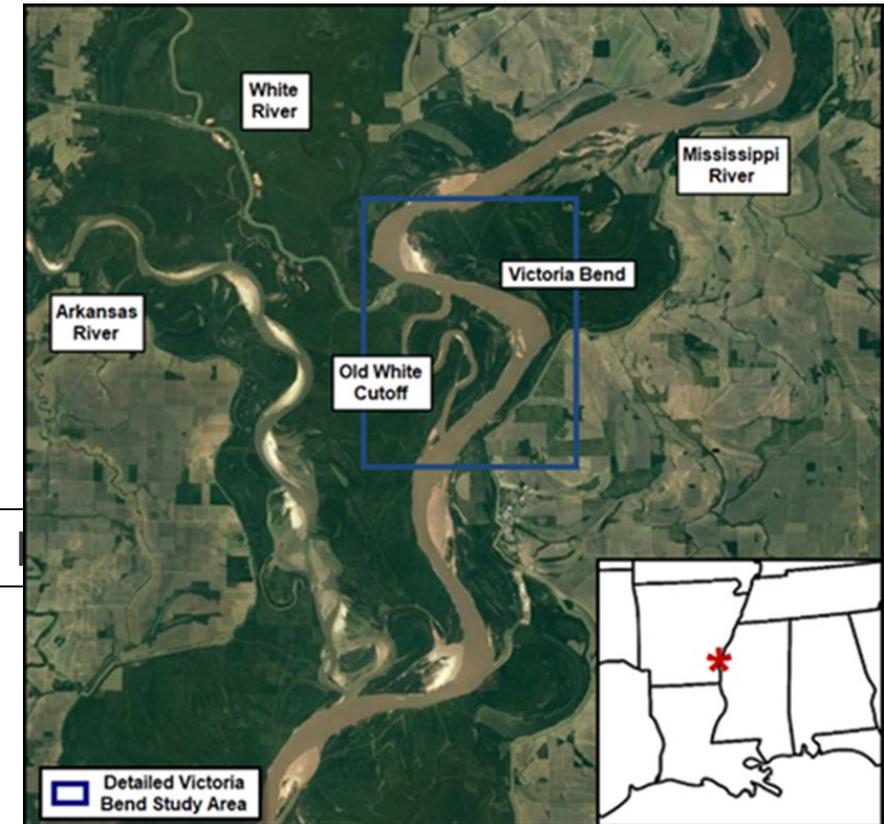
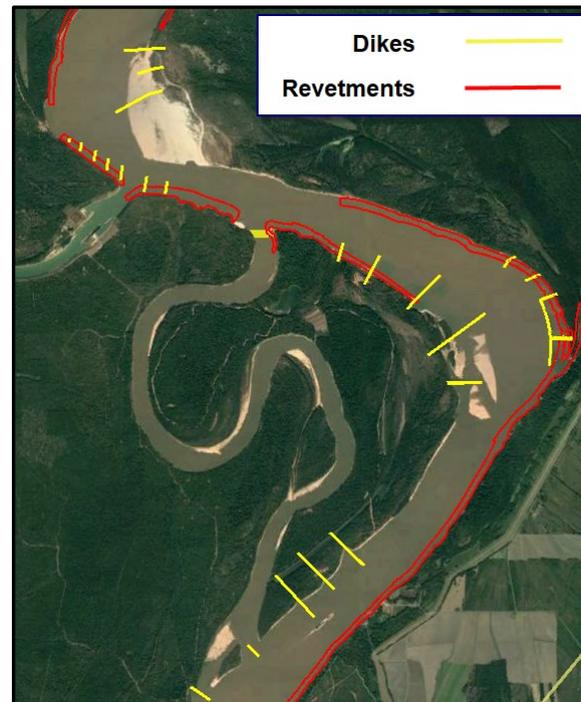
**BLUF:** Multidisciplinary project balancing USACE's navigation and environmental mission. Focused on managing sediment to reduce channel maintenance and improve navigation while maintaining quality habitat.

## Challenge/Objectives

- Historically complex reach and heavily engineered
- Still requires routine dredging
- Tight bend, difficult navigation
- Major flow split
- Federally endangered species

## Approach

- Geomorphic Assessment
- Environmental Assessment
- Numerical Modeling
- River Engineering





## Iao Sediment Continuity

Stanford Gibson (HEC), Jessica Brunty (POH), Nani Shimabuku (POH),  
Travis Dahl (CHL), Jake Helminiak (NAP), Autumn Murray (CHL)

**BLUF:** Can we reduce debris basin deposition and FRM channel erosion by keeping sediment in the system?

**Objective:** This examines the feasibility of alternate debris basin designs to restore sediment continuity, reduce maintenance costs in the debris basin and, potentially, reduce scour downstream...without introducing failure modes (more costly or controversial maintenance issues elsewhere).

### Approach

1. Debris Basin Design Lit Review
2. Sediment Budget
3. Load-Frequency Relationship
4. Channel Capacity Analysis
  - HEC-RAS 1D,2D
5. Debris Basin Model
  - HEC-RAS 2D Sed



$d_{max}$  of Debris Basin Deposition



# RSM Example: Mouth of the Columbia River

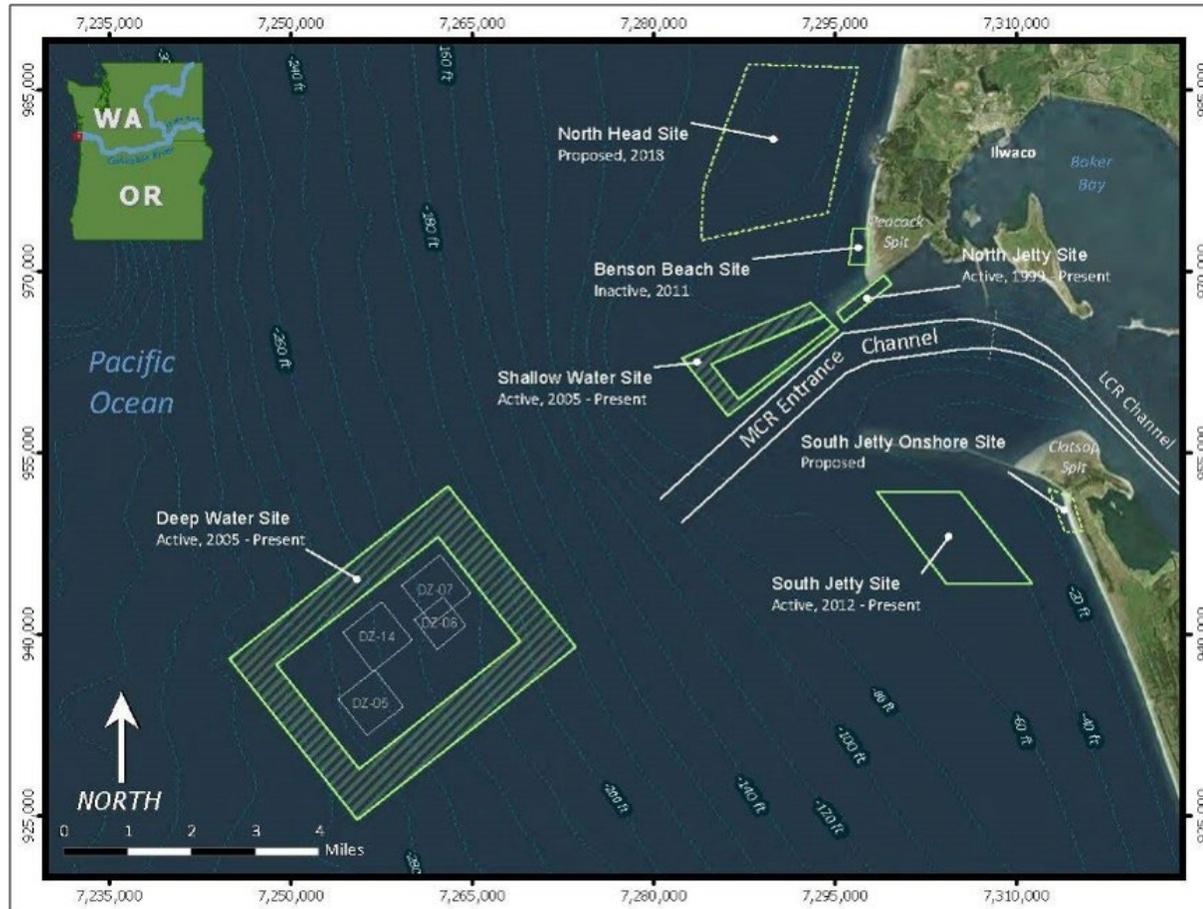
## Challenge

- Prevent “wasting” sediment to the DWS
- Protecting public investment (Jetty)
- Shoreline erosion
- Protect benthic habitat

## Goals

Implement NWP RSM Strategy

- Keep sediment in the littoral cell (BU)
- Obtain/place new nearshore sites
- Protect South Jetty Root
- Dune Building: Sand Fencing
- Lower Maintenance Dredging Costs/Cycle Time
- Increased Habitat Opportunities for Benthics
- Stakeholder collaboration
- \$110,000 cost savings/season South Jetty Site
- Additional Cost Savings/Environmental Benefits TBD

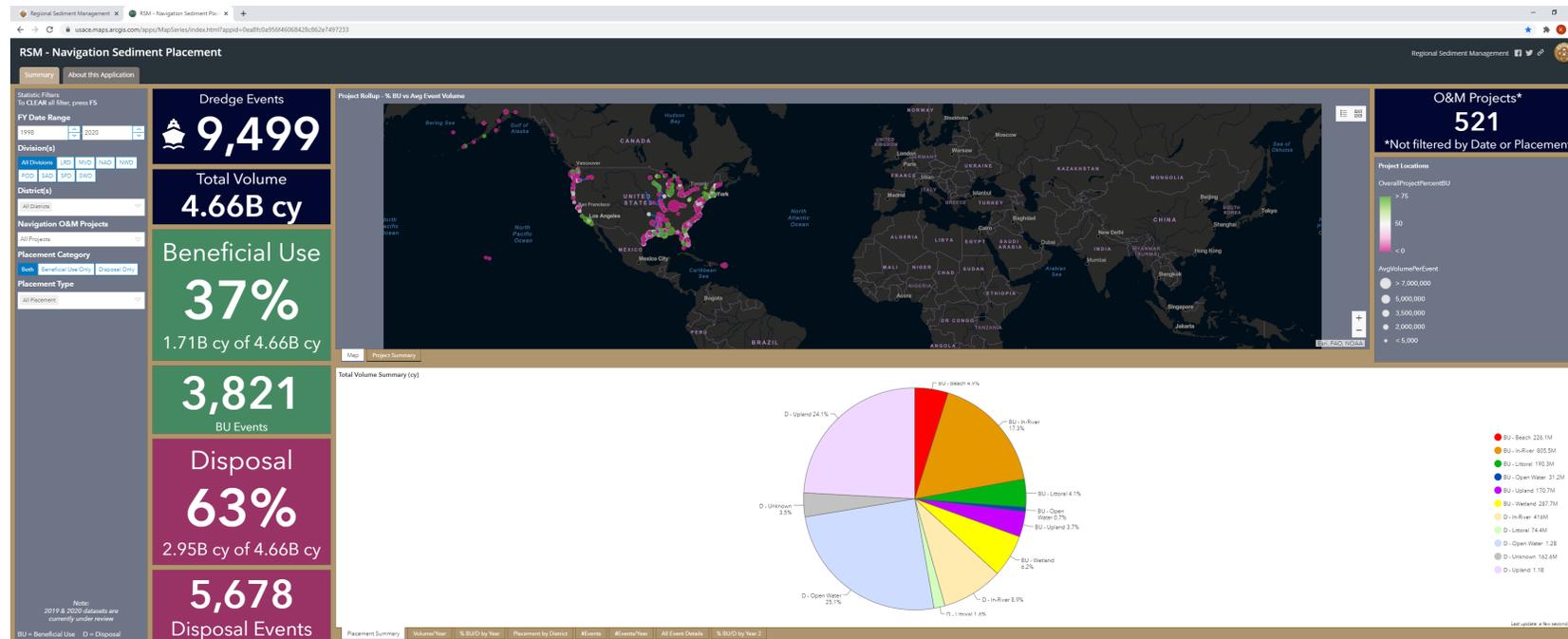


Courtesy USACE Portland District



# Beneficial Use Database

- **Goal: Illustrate trends in Beneficial Use across the USACE**
  - **Historic navigation dredging data using DIS**
    - ▶ Where/when/how do we place data dredged from our Federal Navigation Channels?
    - ▶ Where can we improve?
  - **QA/QC'ed with District input**
  - **Currently updated through FY20**
    - ▶ **FY21 still need QA/QC'ing**



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Nicole Elko

Coastal Protection  
Engineering:  
Quin Robertson  
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# DEMONSTRATION



# 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

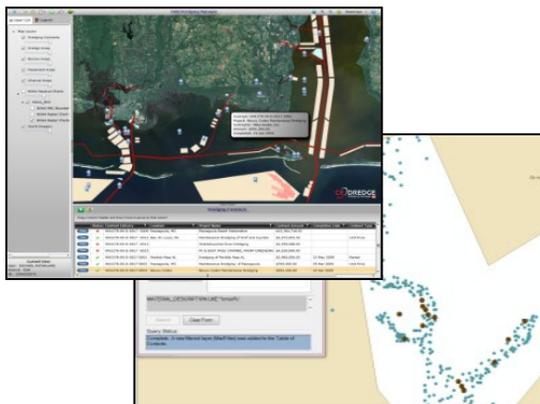


# Regional Sediment Management = Resilient Healthy Systems

RSM@usace.army.mil



Regional Sediment Budgets  
Local Actions=Regional Benefits



Data Management and Access



ODMDS  
Regional Strategies



Improved Relationships  
Outreach & Training



Riverine & Reservoir Mgmt



Ecosystem/Aquatic Habitat