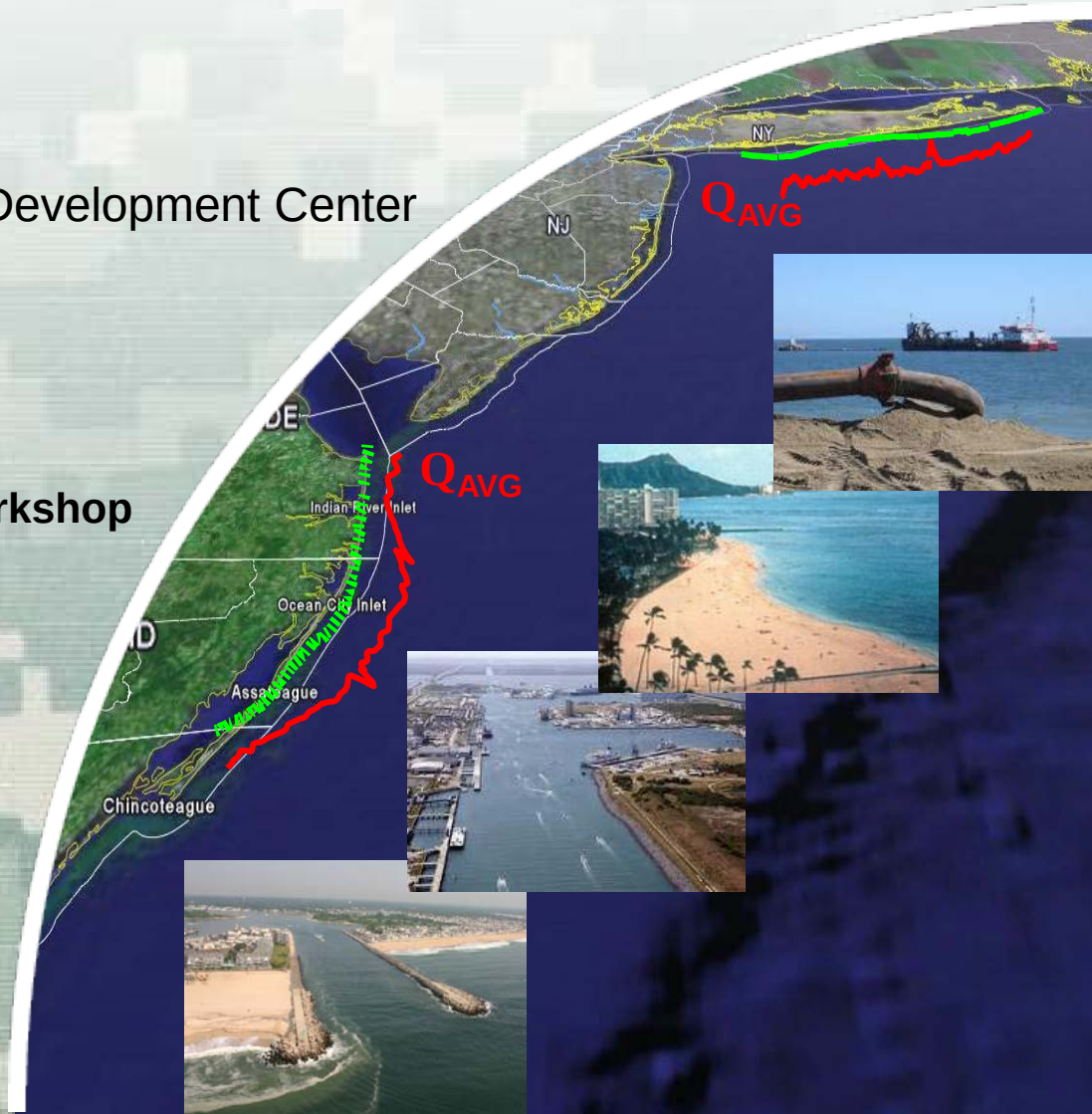
Regional Sediment Management

Linda S. Lillycrop
Program Manager
Regional Sediment Management

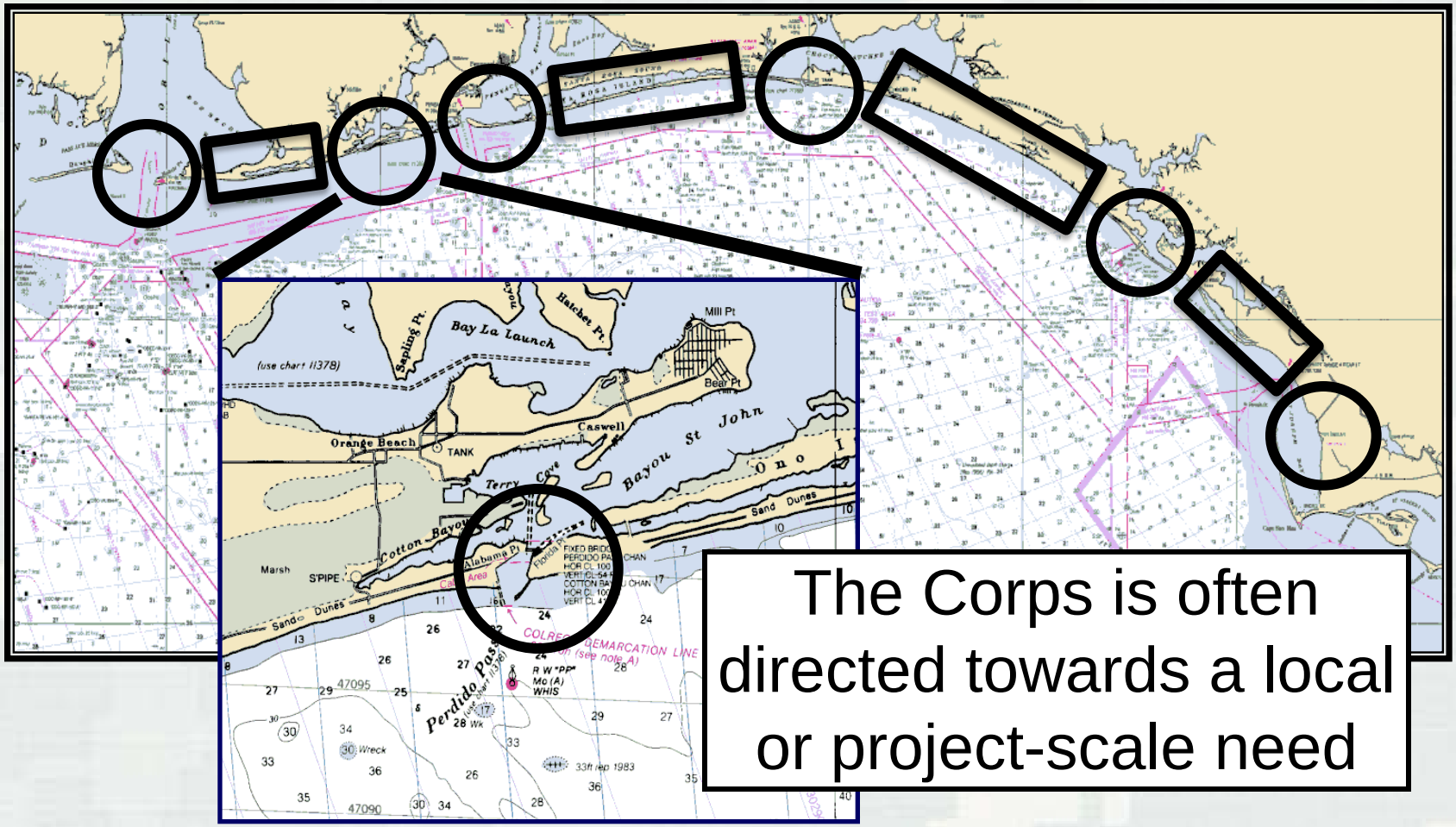
US Army Engineer Research and Development Center
Coastal and Hydraulics Laboratory



Beneficial Use of Dredged Material Workshop
30 August 2011
Galveston, TX

US Army Corps of Engineers
BUILDING STRONG®

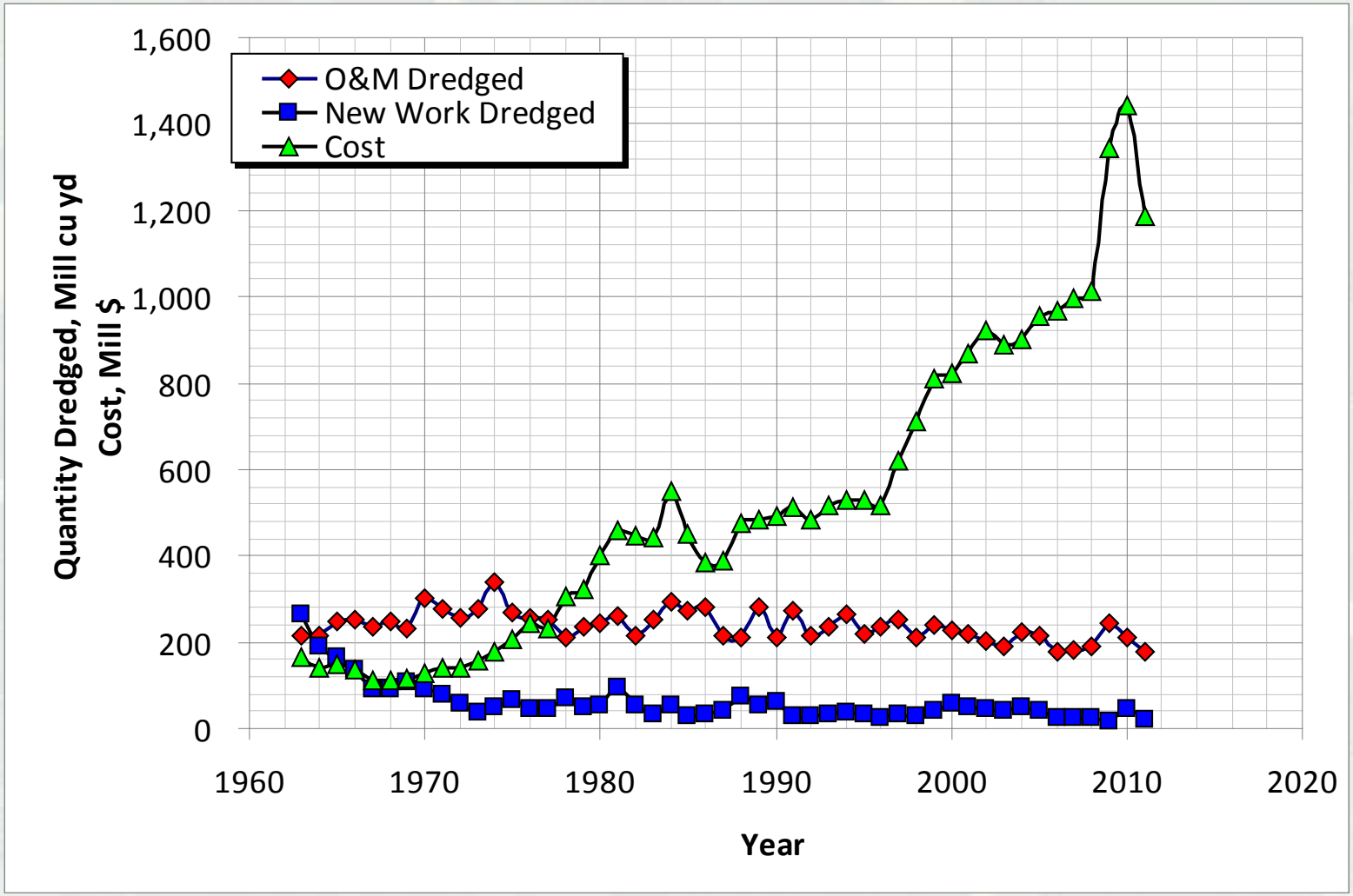
Why RSM?



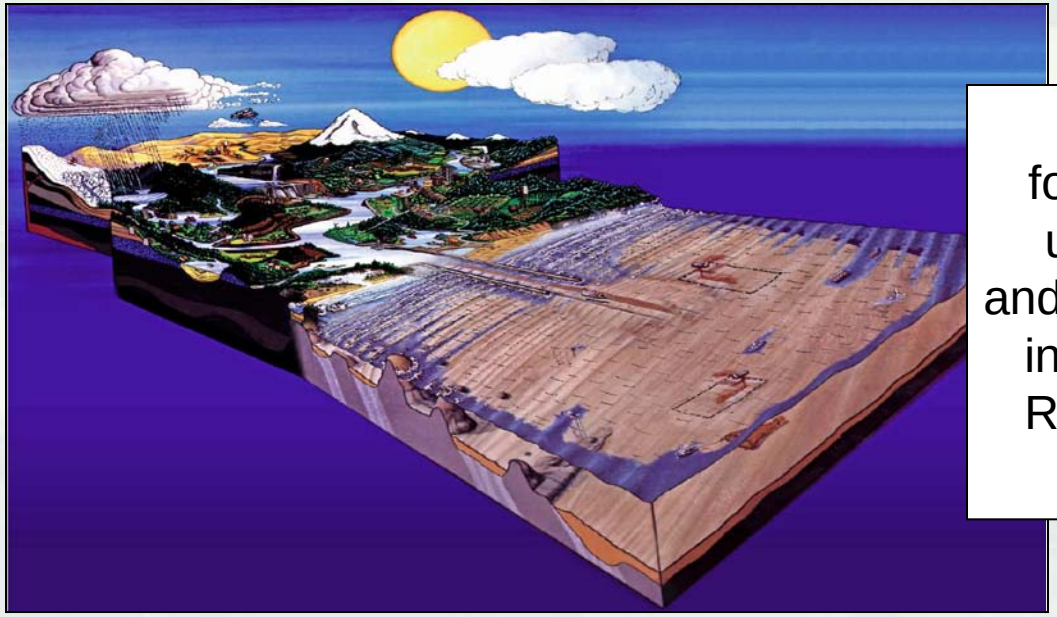
The Corps is often directed towards a local or project-scale need

US Navigation Channels

O&M (Maintenance) and New Work Volumes and Cost



Regional Sediment Management



A systems approach
for efficient and effective
utilization of sediments
and management of projects
in our Coastal, Estuarine,
Riverine, and Watershed
environments

- Manage local sediments and projects within the regional context
- Consider sediments as a regional resource
- Support sustainable solutions for USACE missions:
  - Navigation
  - Flood Risk Management
  - Environmental Restoration
- Communicate and collaborate – USACE, Stakeholders, Partners

Optimize Use of Sediments Within a Region

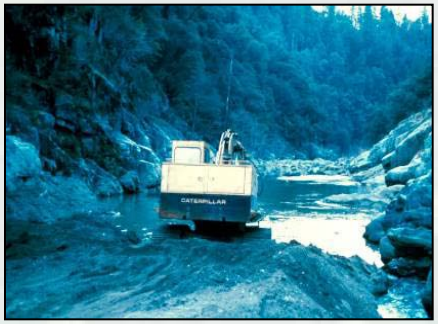
RSM Strategies

Reduce Offshore Placement

Nearshore/Beach Placement

Bypass
Optimize Placement

Reduce CDF Placement
Utilize to improve system

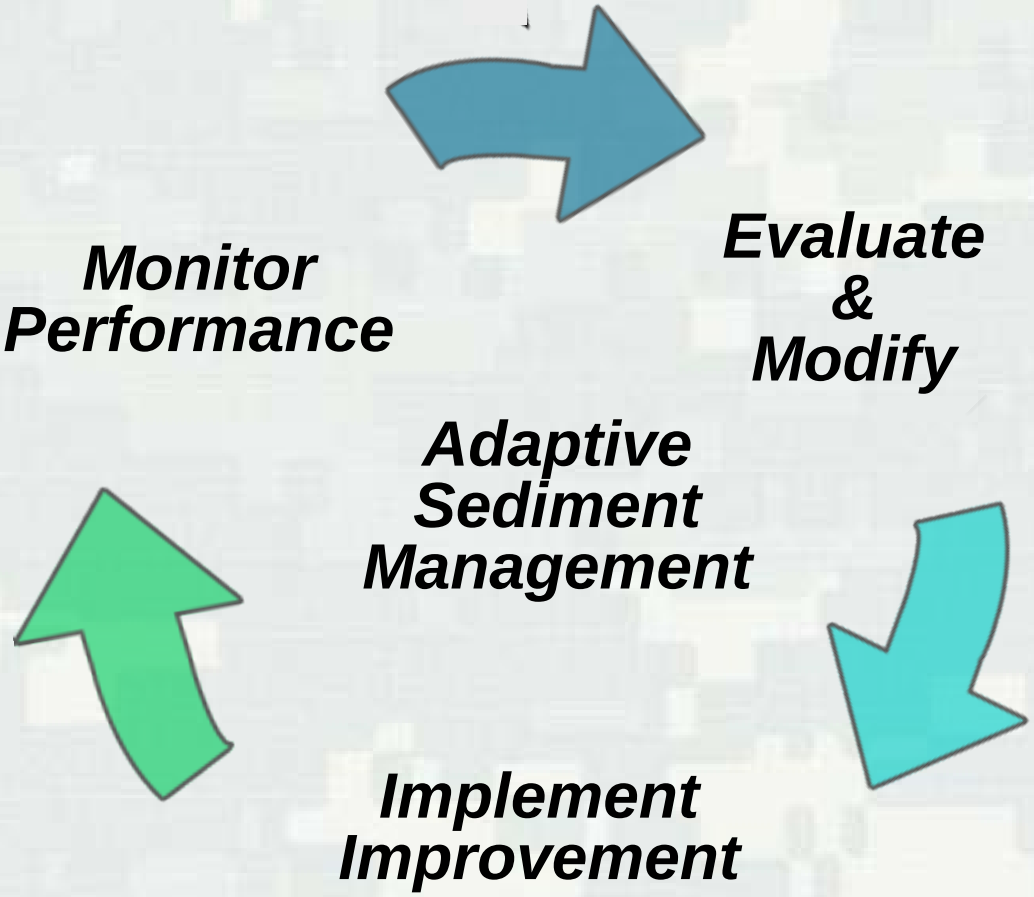


Reduce Sediments
at the Source

Ecosystem Restoration
w/partners

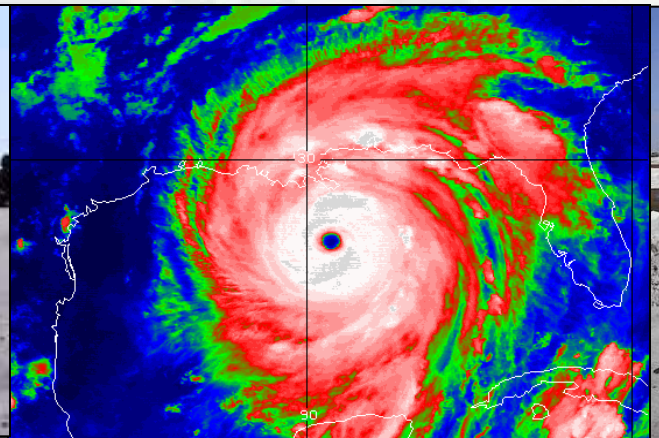
- **Keep sediment in the littoral system**
- **Enhance natural sediment processes**
- **Reduce sedimentation**

Regional Sediment Management Approach



Why RSM is Important to Civil Works:

- Regional vs project approaches
- Practice ‘Adaptive Management’
- Link projects, leverage funding, reduce timelines
- Improve channel availability
- Reduce dredging requirements
- Storm damage reduction
- Environmental stewardship
- Improve partnerships and collaboration
- Collaboratively Identify & Create healthy system



RSM Team

(Opportunities, Actions, Messaging)

PM: Cycles OP, PD, EN

Operations Division:

- Chief, Technical Support Branch, Navigation Section
- Chief, Coastal Branch
- Chief, Spatial Data Branch
- Beneficial Uses Project Manager
- Dredging Project Manager
- Area Office Representative, Coastal
- Area Office Representative, Inland

Engineering Division:

- Chief, Hydrology & Hydraulics Branch
- Coastal Engineer

Planning Division:

- Physical Scientist, Coastal
- Physical Scientist, Coastal
- Inland Environment Team Leader
- Biologist, Inland

Office of Counsel

Others…..

Stakeholder/Partner Collaboration

Working Together To:

- Identify Opportunities and Solutions
- Make Decisions
- Overcome Obstacles
- Take Action
- Everyone Contributes to Make It Happen

RSM FY00-FY11 Participation

MCNP
CFDC
NCDB

RSM Across the USACE

Collaboration Fed/State/Local
All Districts

RSM PgMP, PMP, District Guidance
NAE, NAN, NAP, NAO, NAB, SAW, SAJ, SAM, MVN, SWG, SPL, NAP, NWP, NWS, NWO, POH

RSM Strategies/Alternatives
NAE, NAN, NAP, NAO, NAB, SAW, SAC, SAJ, SAM, MVN, SWG, SPL, SPN, NWP, LRB, POH, NWO

Sediment Budgets/Regional Modeling
NAE, NAN, NAP, NAO, NAB, SAW, SAC, SAJ, SAM, MVN, SWG, SPL, SPN, NWP, LRB, POH, NWO

Model/Tool Develop/tech transfer
NAE, NAN, SAW, SAJ, SAM, MVN, SPN, POH, NWP

Monitoring/Data collection
NAE, NAN, NAO, SAW, SAJ, SAM, SWG, NWP

Data Management/eGIS
All Coastal, expanding inland

CDF Mining/Capacity
SAM, POH

River Sand for Coast
SAJ, SAM

Sand Bypassing-Reduce Offshore Nearshore placement
NAN, NAP, SAJ, SAM, NWP, SPL

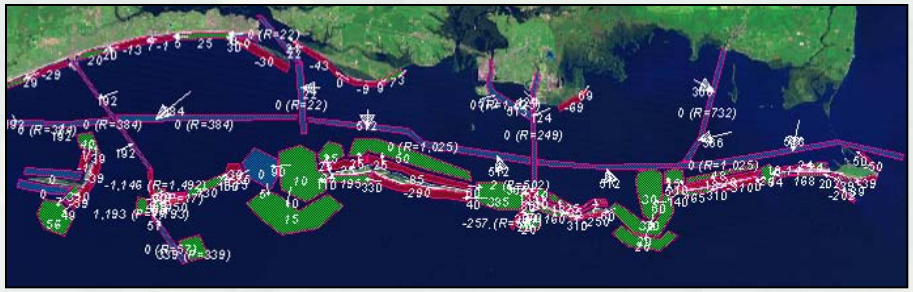
Habitat Restoration
NAN, NAP, SAJ, SAM

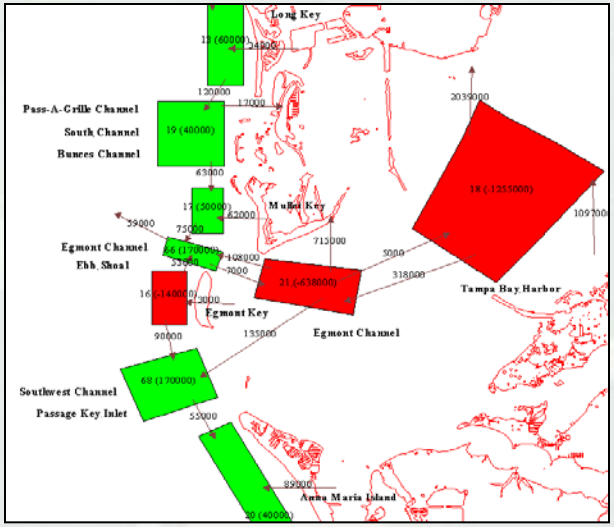
Watershed
NAP - Darby Cobbs, Delaware Estuary
SAM - Mobile Bay Watershed
SPL - Santa Ana River
NWS - Howard Hansen Dam
NWO - Upper MO River
NWK - MO River at Kansas City

RSM Tools

Regional Sediment Budgets

Sediment Budget Analysis System (SBAS)



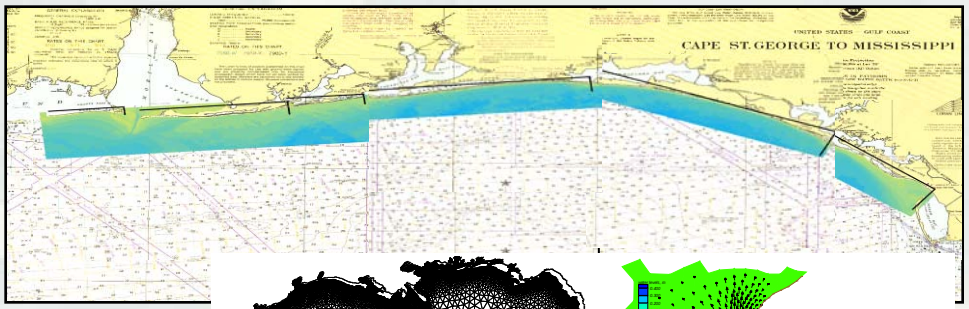


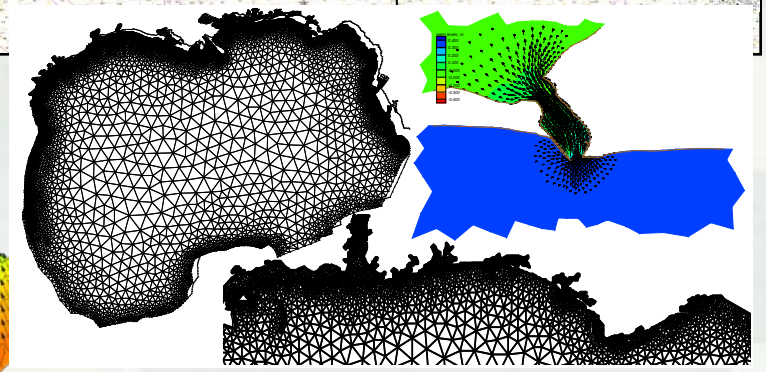
Numerical Models

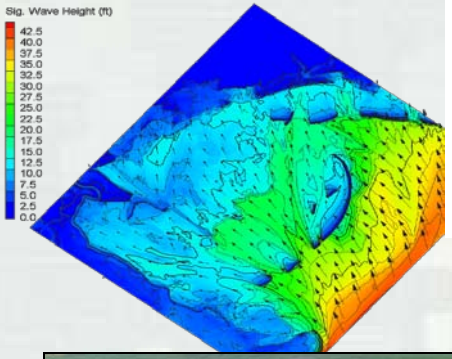
Waves, Circulation, Water levels, Sediment Transport, Shoreline Change

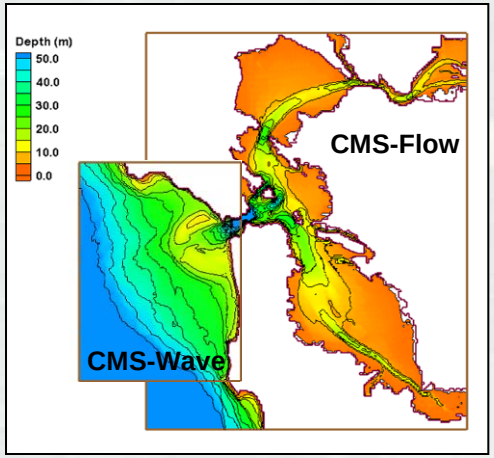
<u>Complex to Decision Support</u>

- Regional processes and trends
- Sediment sources & sinks
- Multiple interacting projects
- Connect beaches & inlets
- Navigation channel maintenance
- Evaluate local/regional Strategies



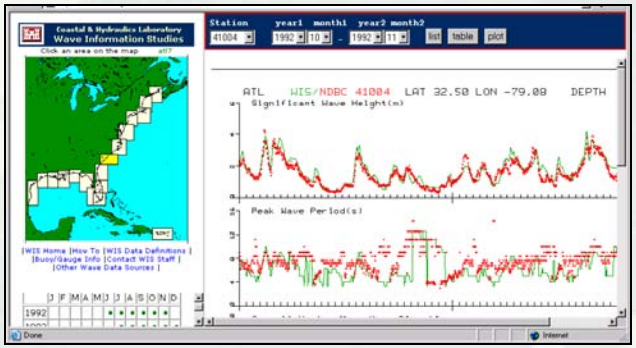






National Waves, Currents, Water-Levels

Coastal Field Data Collection Program



Wave Information Study

TIDES & CURRENTS

National Oceanic and Atmospheric Administration's
National Data Buoy Center
Center of Excellence in Marine Technology

CDIP
SCRIPPS Institution of Oceanography
COASTAL DATA INFORMATION PROGRAM
Monitoring and Prediction of Waves and Shoreline Change
USACE CDBW

NATIONAL CENTERS FOR ENVIRONMENTAL PREDICTION
NCEP

USGS
science for a changing world

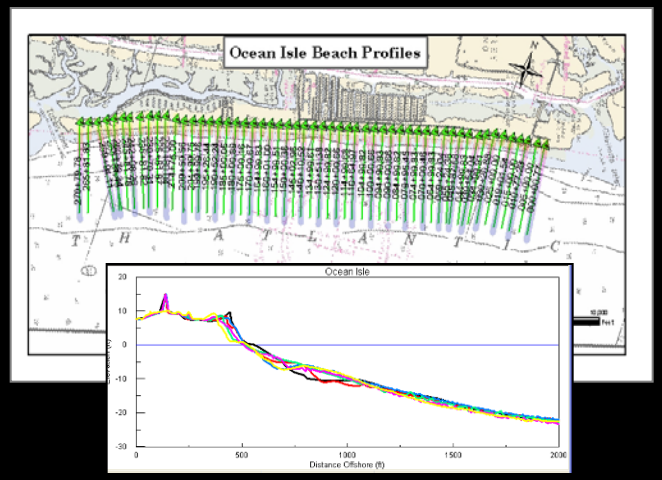
IOOS®
INTEGRATED OCEAN OBSERVING SYSTEM

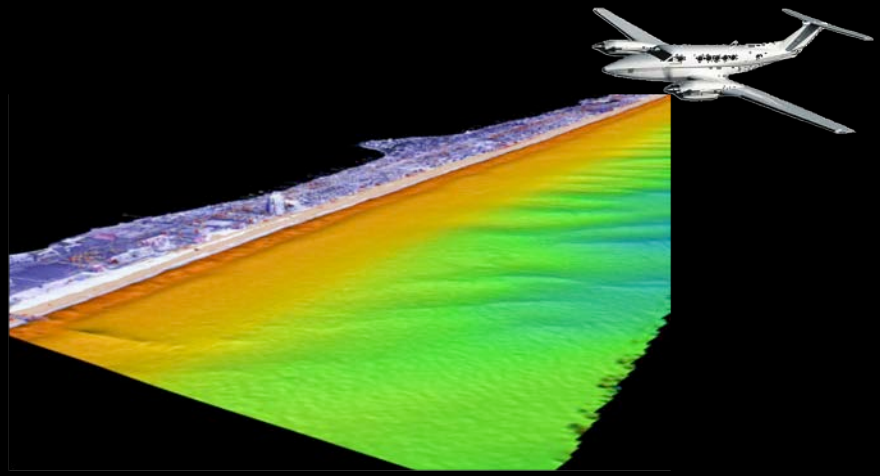
RSM

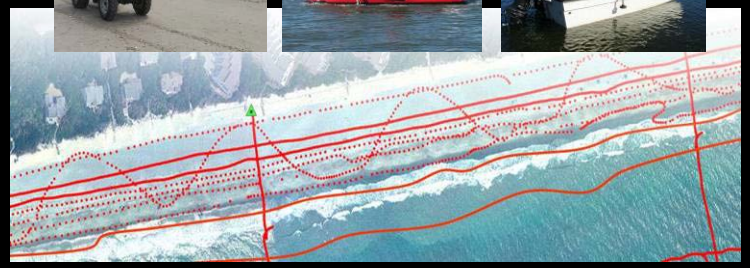
®

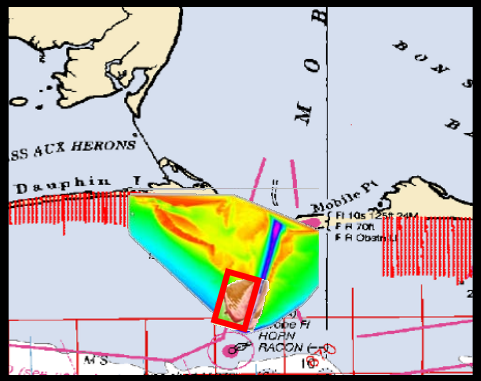
Mapping Data - Bathymetry/Topography/Shoreline/Imagery

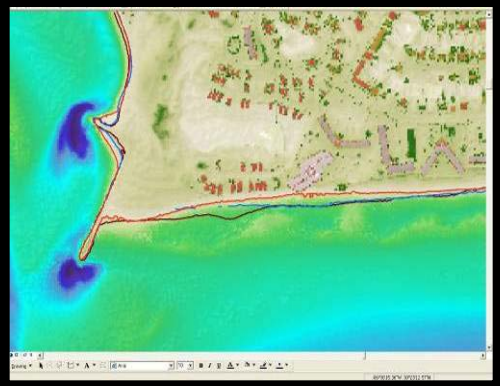
Regional/Long-Term/Pre-Post-Storm

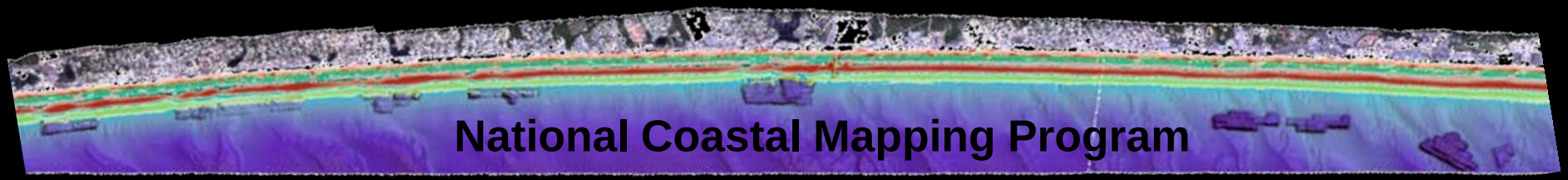






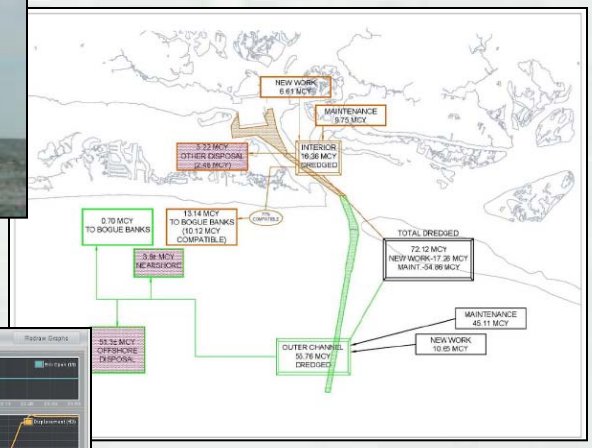


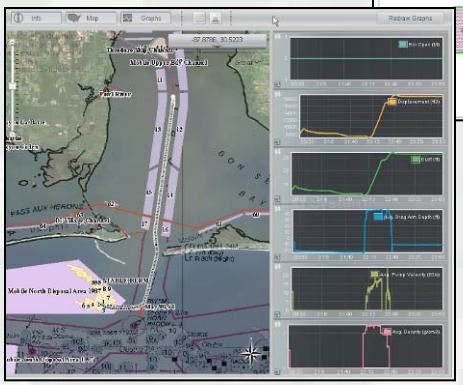




National Coastal Mapping Program

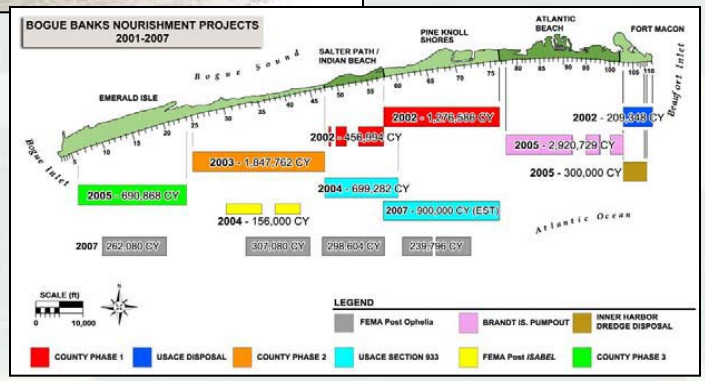
Dredging information:



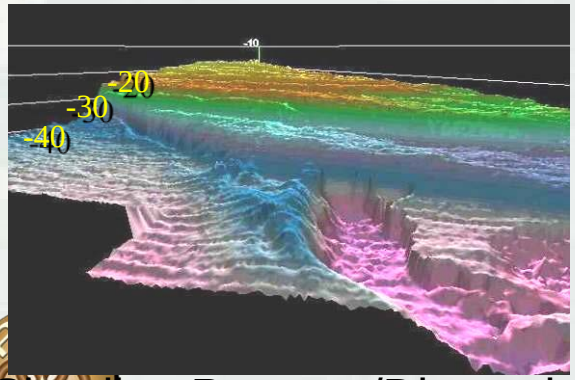


Navigation Channels
Borrow Areas

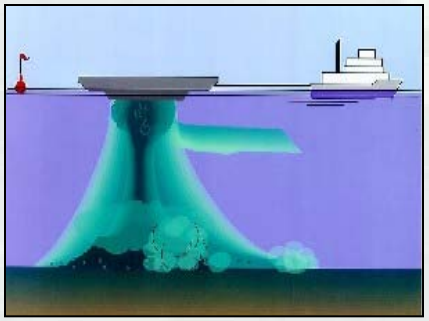
Beach
Nourishment



FATE Models



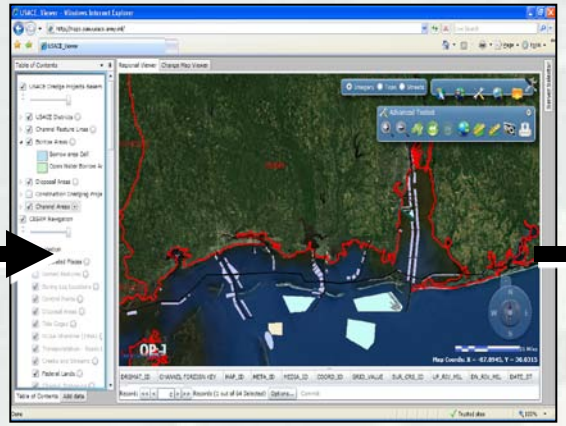
Shoaling Patterns/Dispersion

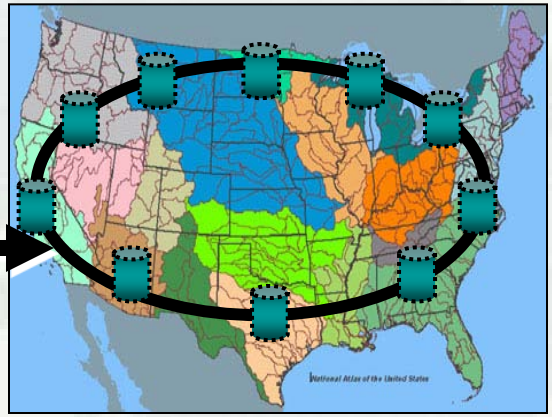


Sediment
Characteristics

Data Management & GIS

- Data management, visualization, & analysis
- Regional sediment budgets
- Facilitate sharing data & tools
- Protect our investments
- Retain Institutional knowledge





Jacksonville District

Duval and St Johns Counties

-Link Projects
(CG, O&M)

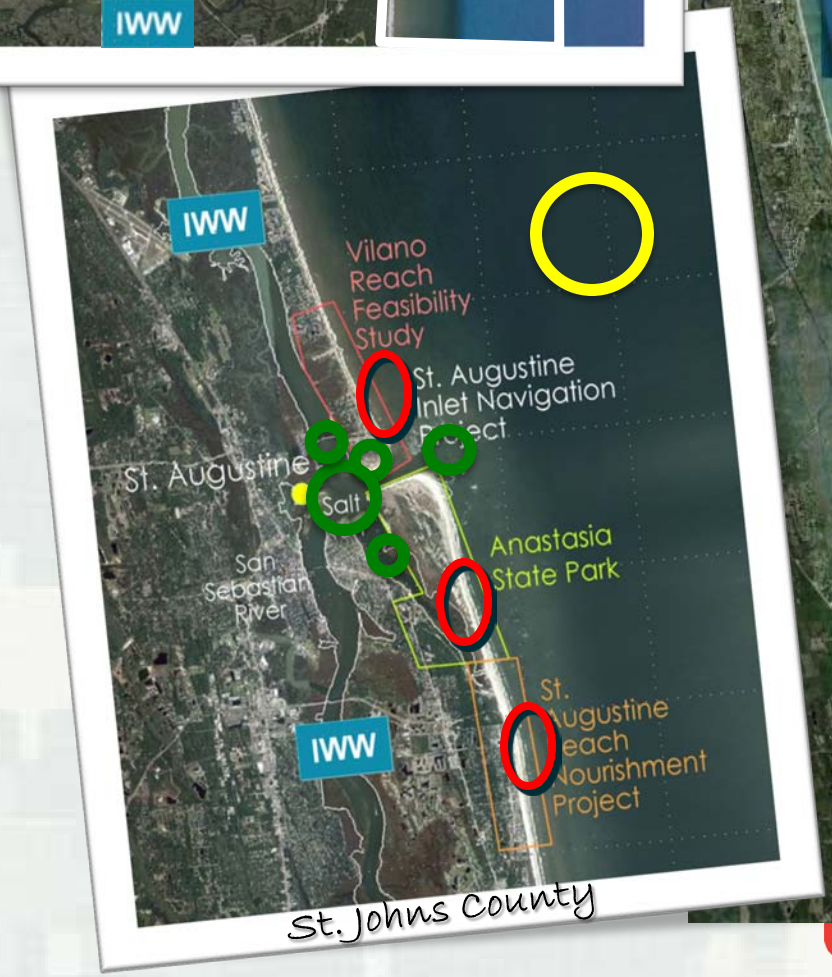
-Improve Sediment
Management

-Leverage:
Models, Tools,
Data Collection, resources

-Taking action

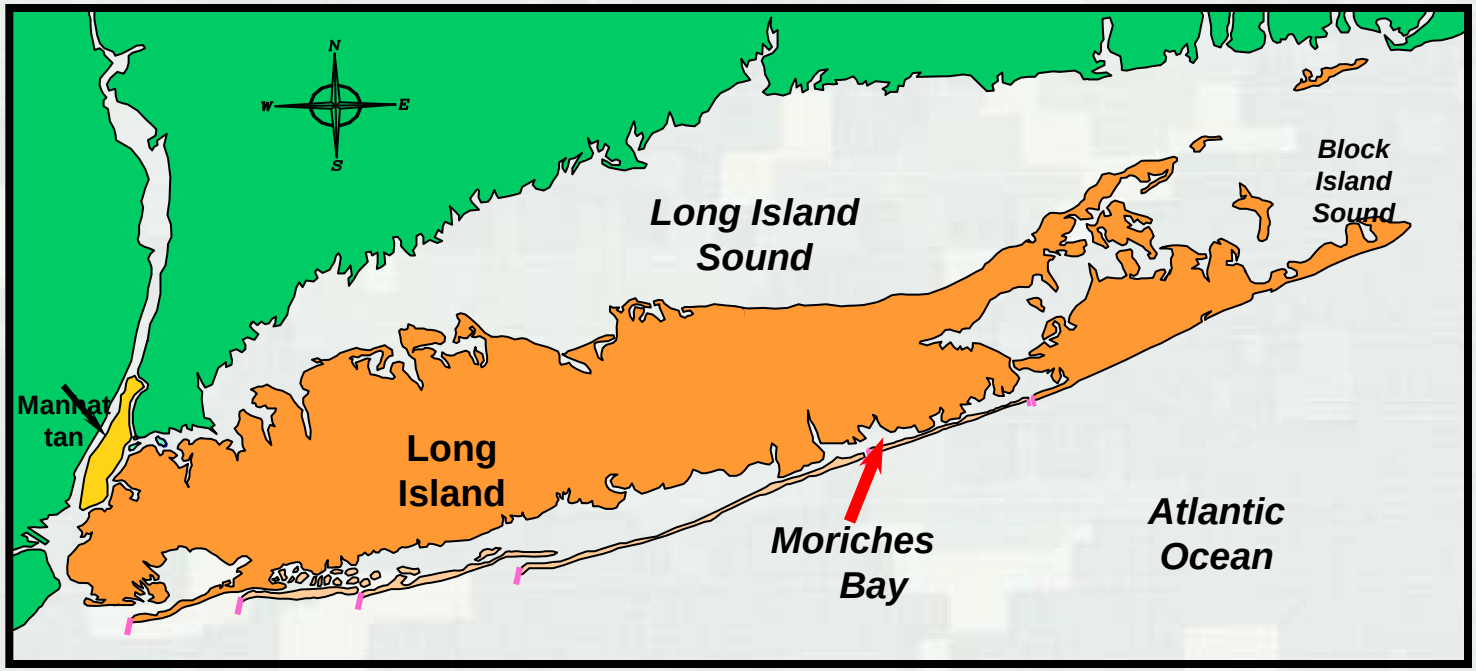
-District Team & stakeholders

$5-7M Mob/Demob cost savings
Reduced dredging
& environmental impacts
Combined permits
Emergency sand sources



Long Island, NY

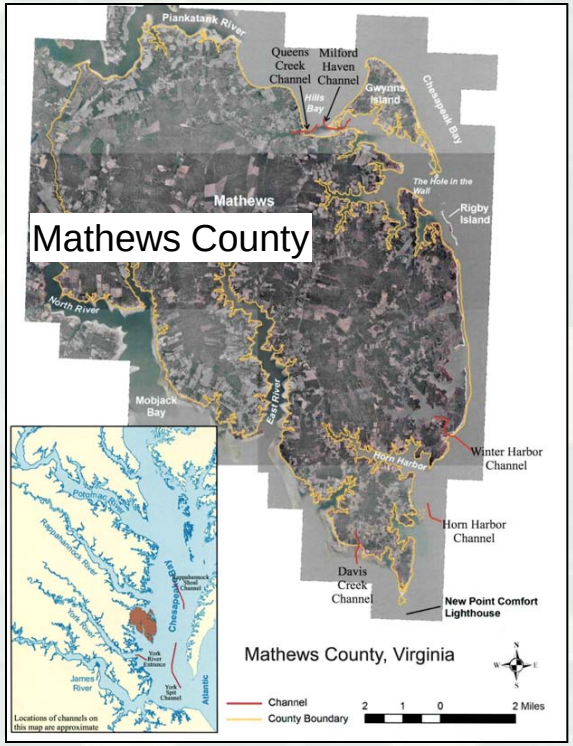
(Navigation, Shore Protection, and Beach Recreation)
Endangered Shorebird Habitat



East Inlet Island

NAO Mathews County, VA RSM

RSM Region:
Western Shore Chesapeake Bay (200-mi shoreline)



Challenges

- 6 Federal navigation channels managed independently
- Long-term placement sites reaching capacity
- Acquiring new placements sites not possible on project-by-project basis
- Most severely eroding shorelines on Chesapeake Bay

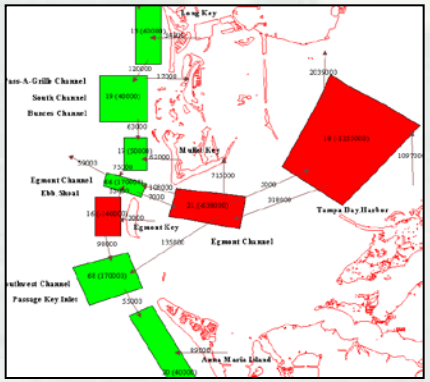
Goals

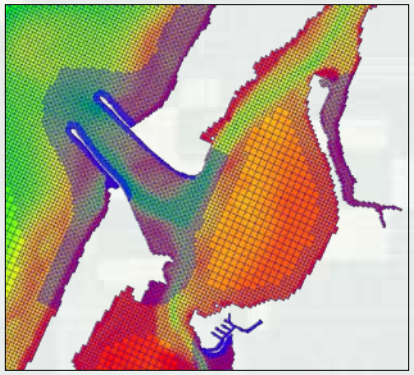
- Achieve regional, cross-mission benefits (navigation, shoreline erosion, ecosystem restoration)
- Extend maintenance cycles
- Reduce long-term O&M dredging costs per project
- Reduce shoreline erosion

Find solution or abandon maintenance of Federal Projects

RSM 2015

- Meeting needs of Navigation Mission
- Optimize and Move Sediment
- Max benefits/min costs: adaptive management
- Leveraging and supplementing (Corps/Partners)
- Share lessons learned local & national perspectives
- Stakeholder/community involvement

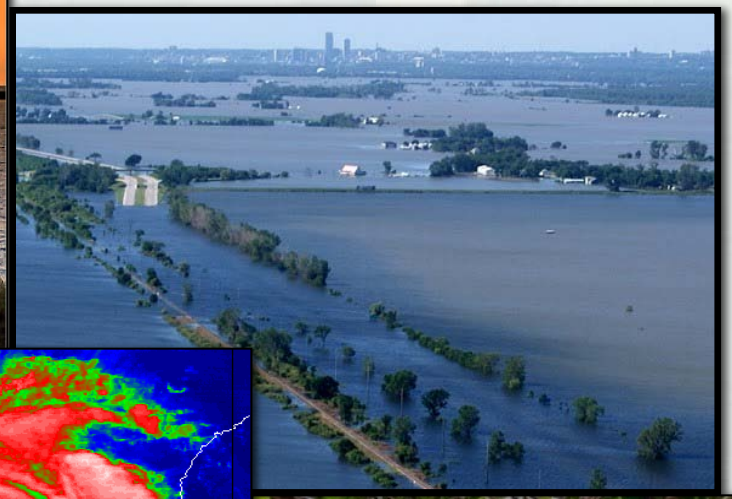


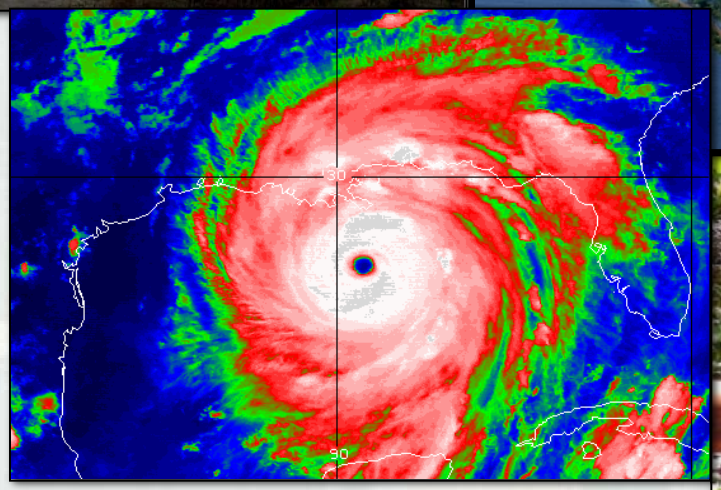


Engineering with Nature

- Working with Nature (PIANC)
- Regional Sediment Management
- Beneficial Uses of Dredged Material

Thank You





Regional Sediment Management

RSM Program Funding Process

Presidents Budget O&M (Base)	Congressional Adds O&M
Request for Proposals (**12 Aug 2011**)	RSM PM Assigns ERDC PI Develop PMP (District, PI)
Proposal and PMP Submittal:	District Chief, Operations MSC RSM POC MSC Chief, Operations HQ, Navigation PM & RSM PM
Review Team:	4-Districts; CWG Lead; IWR RSM Technical lead; R&D PMs
RSM PM:	Program & Budget Formulation Recommendations to: ERDC TD Navigation/FRM HQ Navigation BLM
Proposal & PMP POC:	Qtr Progress Report, Fact Sheets Technical Transfer In-Progress-Review

RSM FY12 Proposal Criteria

- Takes action to move sediment in a manner that optimizes use.

- Reduces lifecycle costs in the Navigation, Flood Risk Management, and Environmental Restoration missions.

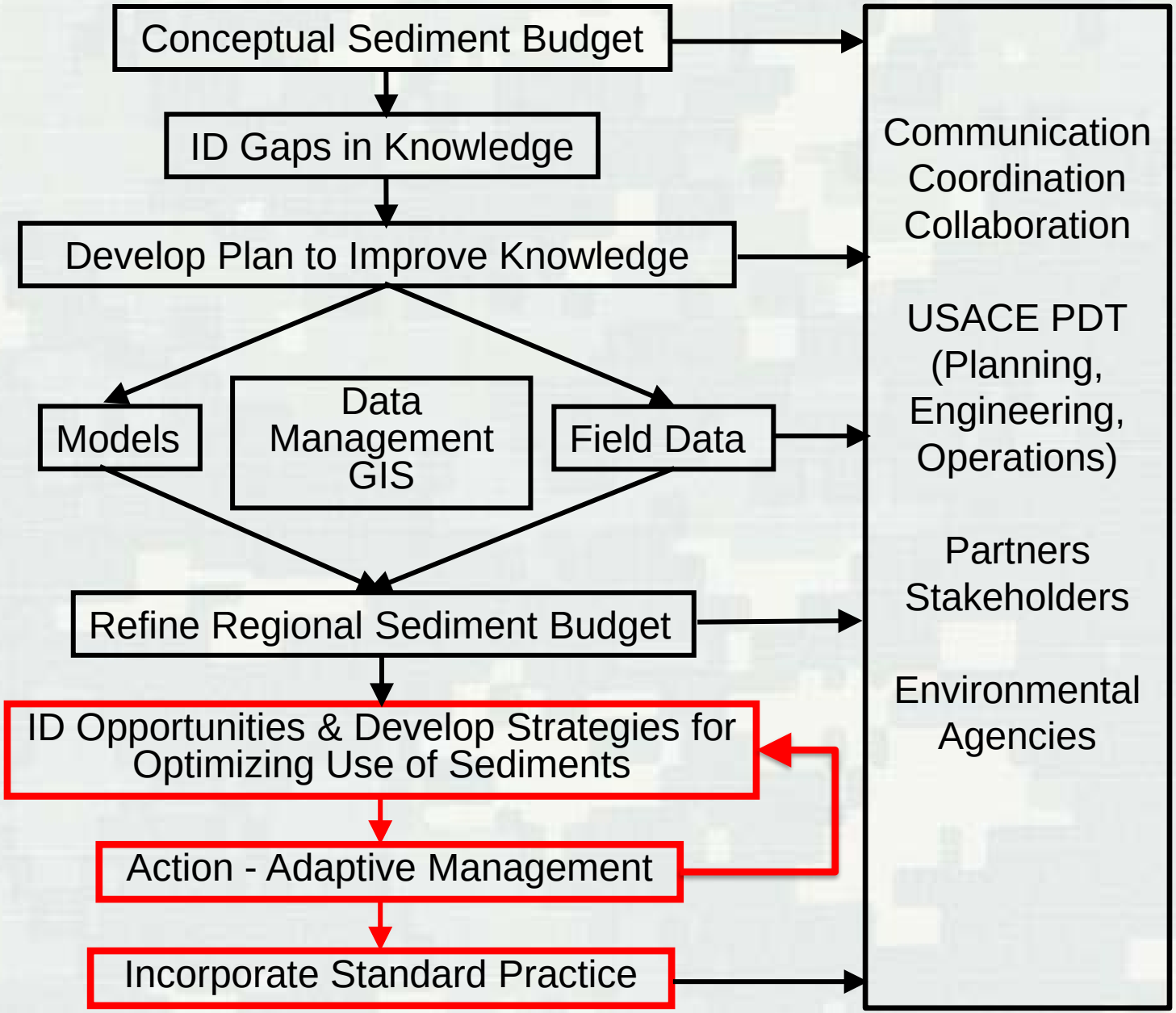
- Produces innovative solutions such as: links multiple projects and leverages across business lines, leverages other federal and non-federal projects and programs, or develops new adaptive management capabilities or techniques.

- Utilizes existing or enhances Corps tools, databases, capabilities, and uses or builds Corps technical expertise.

- Adds value to the nation such as:
  Transferable products, shared knowledge, develop or enhance tools, benefit commercial use projects, cost savings.

- Technical Transfer:
  Communicate lessons learned and best management practices, publish results, demonstrate the benefit of actions, and participation in the RSM In-Progress-Review and workshop.

RSM Process


Conceptual Sediment Budget
ID Gaps in Knowledge
Develop Plan to Improve Knowledge
Models
Data Management GIS
Field Data
Refine Regional Sediment Budget
ID Opportunities & Develop Strategies for Optimizing Use of Sediments
Action - Adaptive Management
Incorporate Standard Practice
Communication
Coordination
Collaboration
USACE PDT (Planning, Engineering, Operations)
Partners
Stakeholders
Environmental Agencies