

Re-Establishment of In-Bay Placement Mobile Harbor

Nathan D. Lovelace P.E.
Operations Division
U.S. Army Corps of Engineers
Mobile District
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US Army Corps of Engineers
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NATURAL PROGRESSION

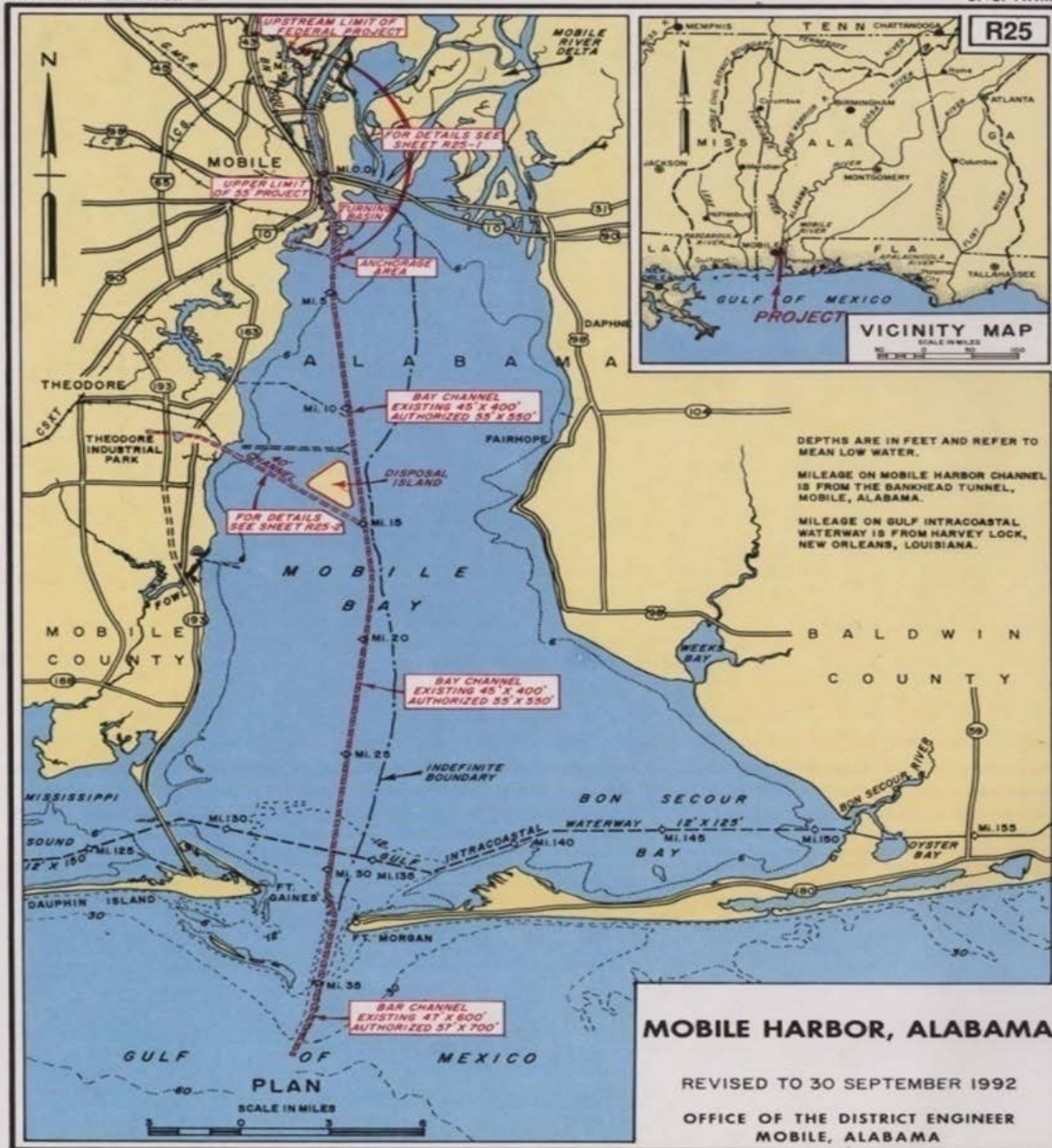


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- Introduction to Mobile Harbor
- Problem Statement
- Establishment of IWG
- In-Bay Placement
- Impact to Navigation
- Culture Shift



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Mobile Harbor



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- Ranked in the top 10 Leading U.S. Port
- 65 Million Tons Domestic/Foreign
- 40 Miles of Main Channel
 - ▶ 4.5 Miles to -40 ft
 - ▶ 35.5 Mile to -45 ft
- Fed by the 4th Largest Watershed in U.S.
- Annual Shoaling Rate Approx 6.5 MCY
 - ▶ 1.2 MCY River
 - ▶ 4 MCY Bay
 - ▶ 1 MCY Theodore
 - ▶ 0.3 MCY Bar



Problem Statement



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- Lack of disposal areas within the Bay system
- Backlog of maintenance material leading to depth/width restrictions
- WRDA 1986
 - ▶ Authorization for widening and deepening
 - ▶ Dredged material from Mobile Channel shall be disposed of in open water in the Gulf of Mexico
- WRDA 1996
 - ▶ May consider alternatives to disposal of dredged material in the Gulf of Mexico, including environmental acceptable alternatives for beneficial uses of dredged material and environmental restoration



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Establishment of the IWG



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- Built on existing RSM relationships and principles
- Presented the watershed study/sediment budget
- Challenged the team to look at the evidence and decide for themselves **“Is it smart to continue removing 4 MCY from the Bay and hauling it to the Ocean?”**
- IWG initiated several studies/demo projects to better understand the capabilities of fine grain sediments
 - ▶ Filling of Brookley Hole using channel material
 - ▶ Burlap Tubes demo for potential use in large BU site



Mobile Bay Interagency Working Group (IWG)



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- Alabama State Port Authority (ASPA)
- USACE, Mobile District
- USACE, Engineering Research and Development Center (ERDC)
- Alabama Dept. of Conservation and Natural Resources (ADCNR), State Lands Division
- ADCNR, Marine Resources Division (MRD)
- ADCNR, Wildlife and Freshwater Fisheries Division (WAFF)
- Alabama Dept. of Environmental Management (ADEM)
- Geological Survey of Alabama (GSA)
- U.S. Fish and Wildlife Service (FWS)
- National Marine Fisheries Service (NMFS), Habitat Conservation Division
- Mobile Bay National Estuary Program (NEP)
- Environmental Protection Agency (EPA)
- Dauphin Island Sea Lab (DISL)
- The Nature Conservancy (TNC)
- Mobile County Environmental Department
- Mobile Bay Keeper

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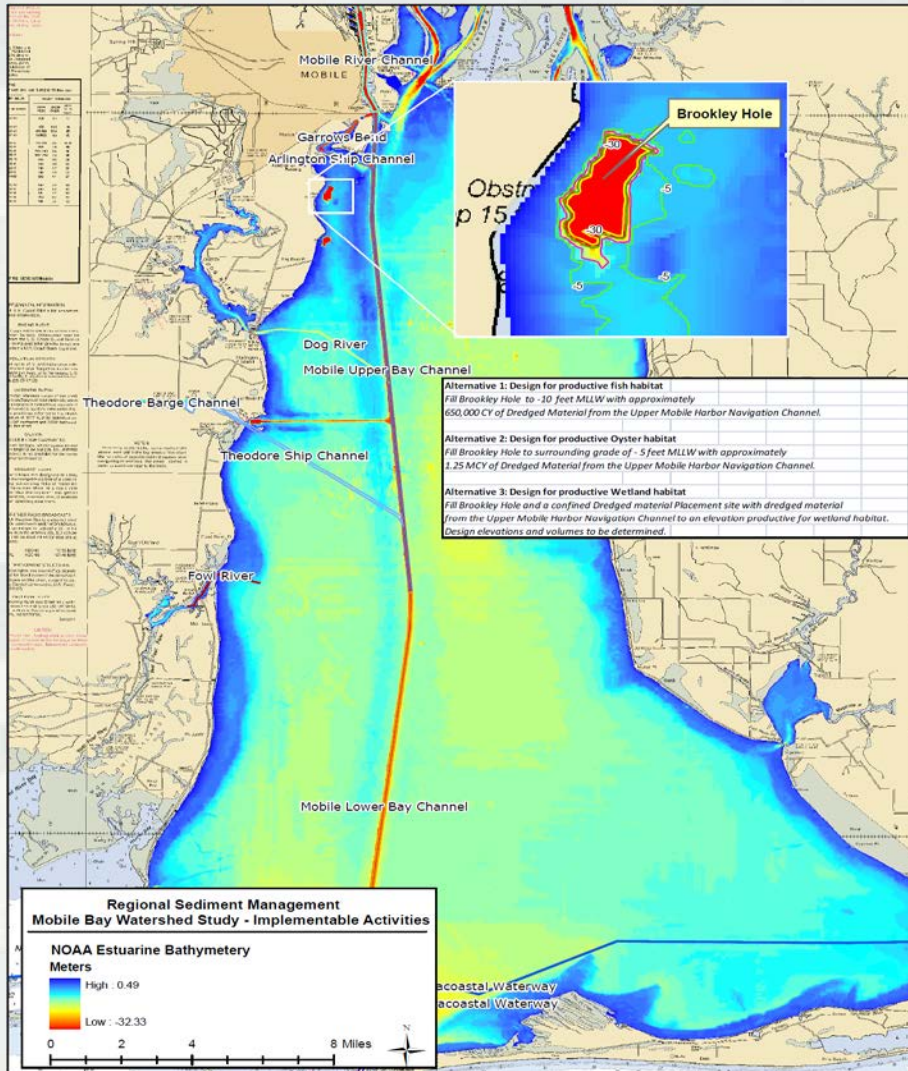


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BU of Dredged Material to Fill Brookley Hole



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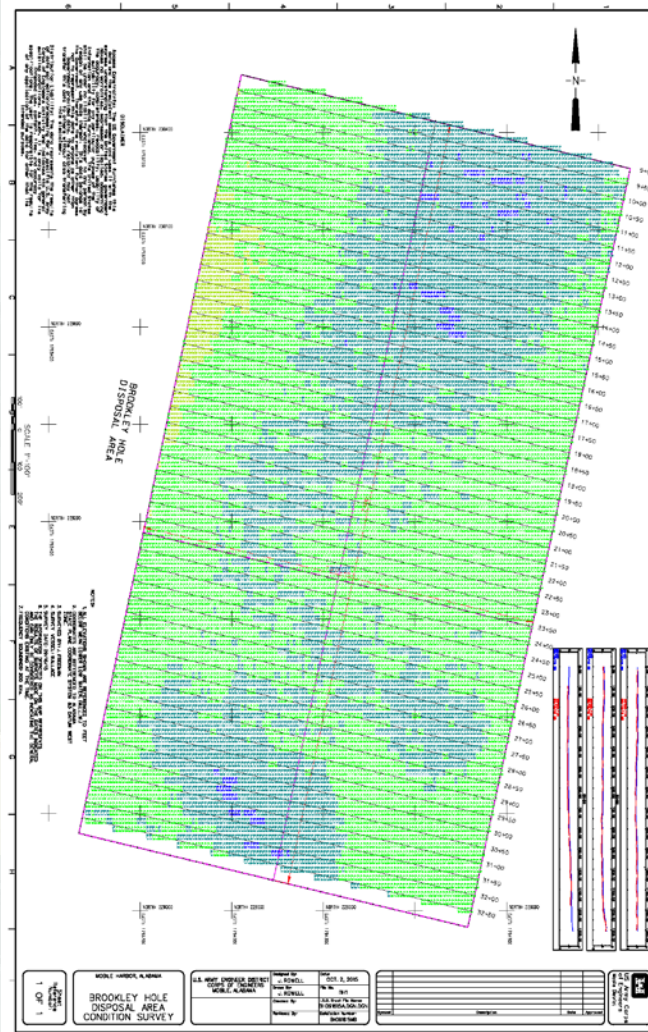
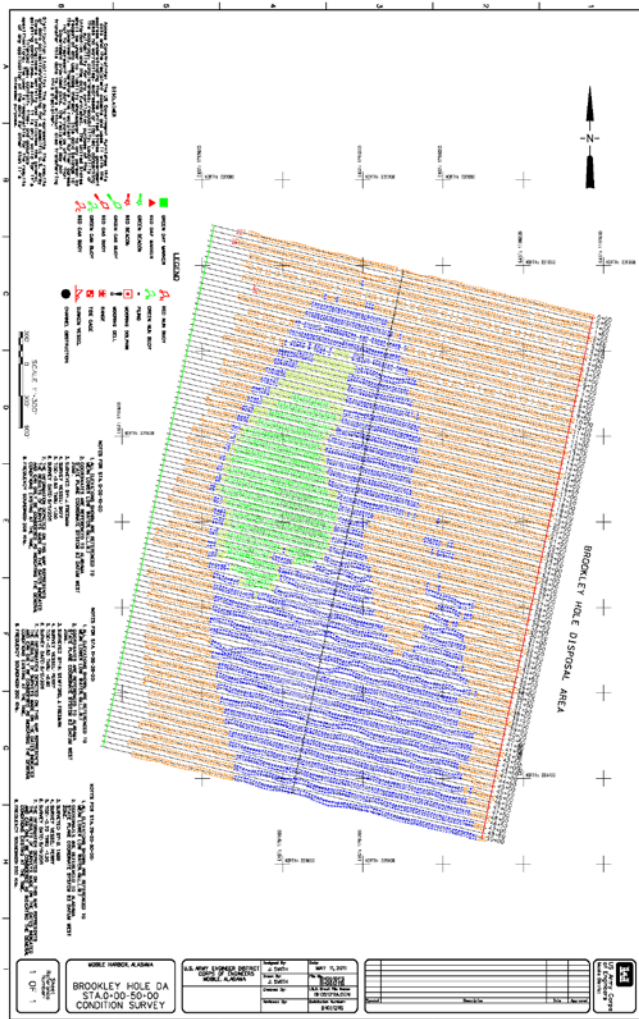
- Recommendation to pursue permitting processes to implement BU action
- Fill Options
 - Fill to some level of productivity
 - Fill to surrounding grade through successive dredging cycles
 - Combination of emergent feature w/ marsh vegetation grading into shallow submerged environment
- 1.2 MCY of initial fill from upper Mobile Bay Channel
- Monitoring results used to determine desired level of restoration
- Initial fill completed September 2012
- Leveraging other research programs (DOER)
 - Conducted baseline characterizations
 - Continued post-fill monitoring



BU of Dredged Material to Brookley Hole



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Establishment of the IWG



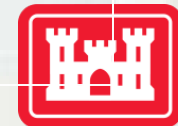
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- IWG agreed to consider In-Bay placement with the Corps commitment to a thin-layer demo and constant pursuit of other BU opportunities (i.e. large BU site)
- Corps spent = \$1M to model thin-layer demo
 - ▶ Sediment Profiling – SedFlume – Push Cores
- Results were amazingly informative and positive
- IWG had successfully fostered the efforts that would ultimately prevent approx. 2-3 MCY annually from leaving the Mobile Bay system.
- IWG team established their identity by shifting the culture of managing fine grain channel material.

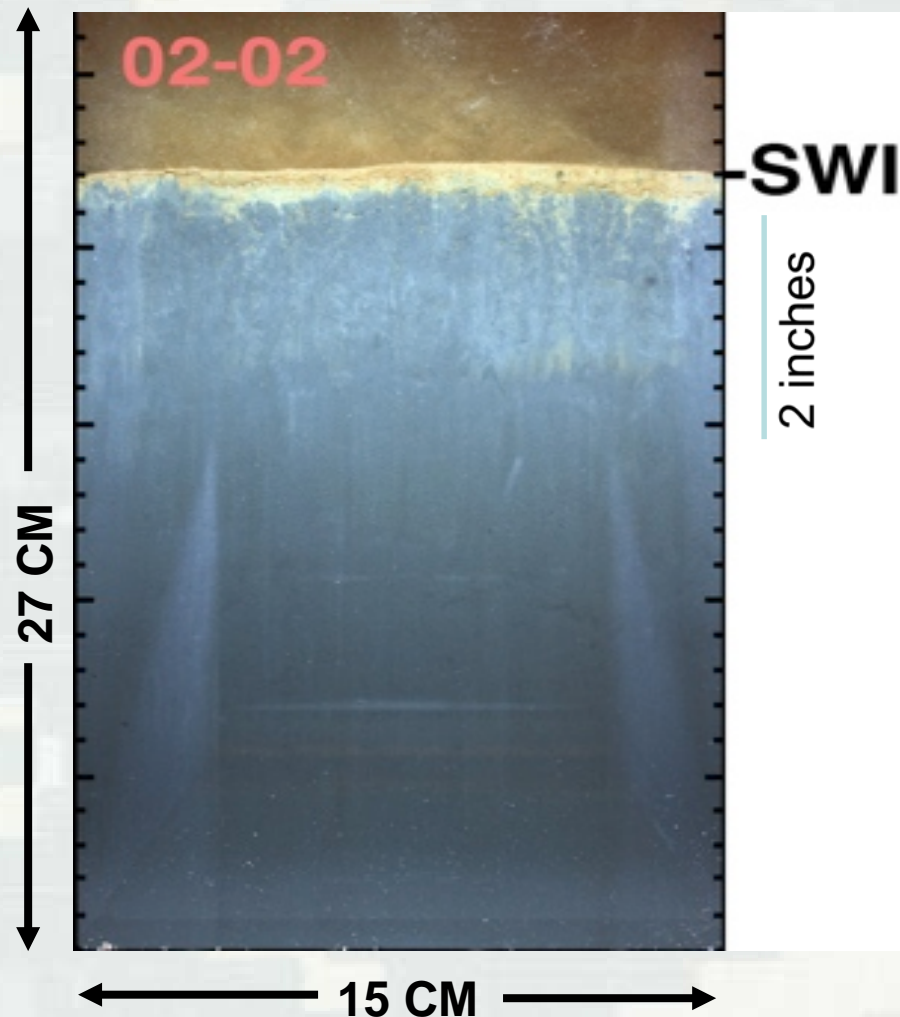
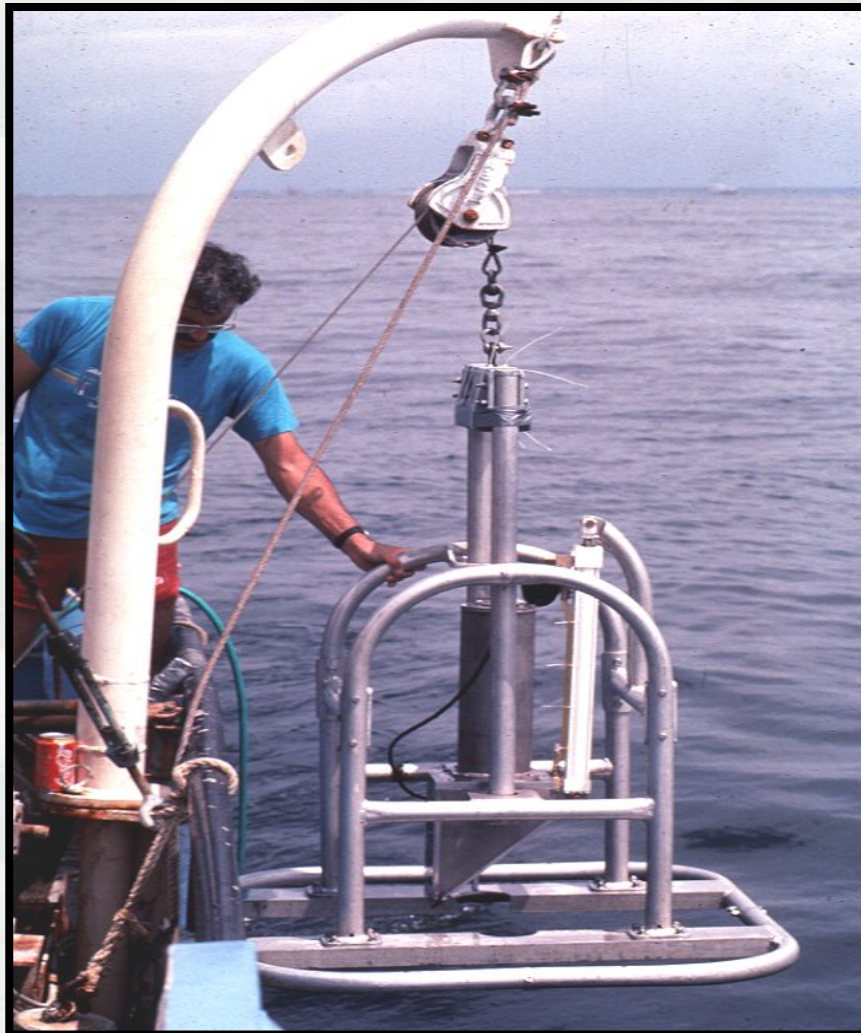


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Sediment Profiling Imagery



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OLDER DREDGED MATERIAL SPI IMAGED 09/26/2012



02-09

Oxygenated Surface Layer
Reworked by
Currents or
Wave action

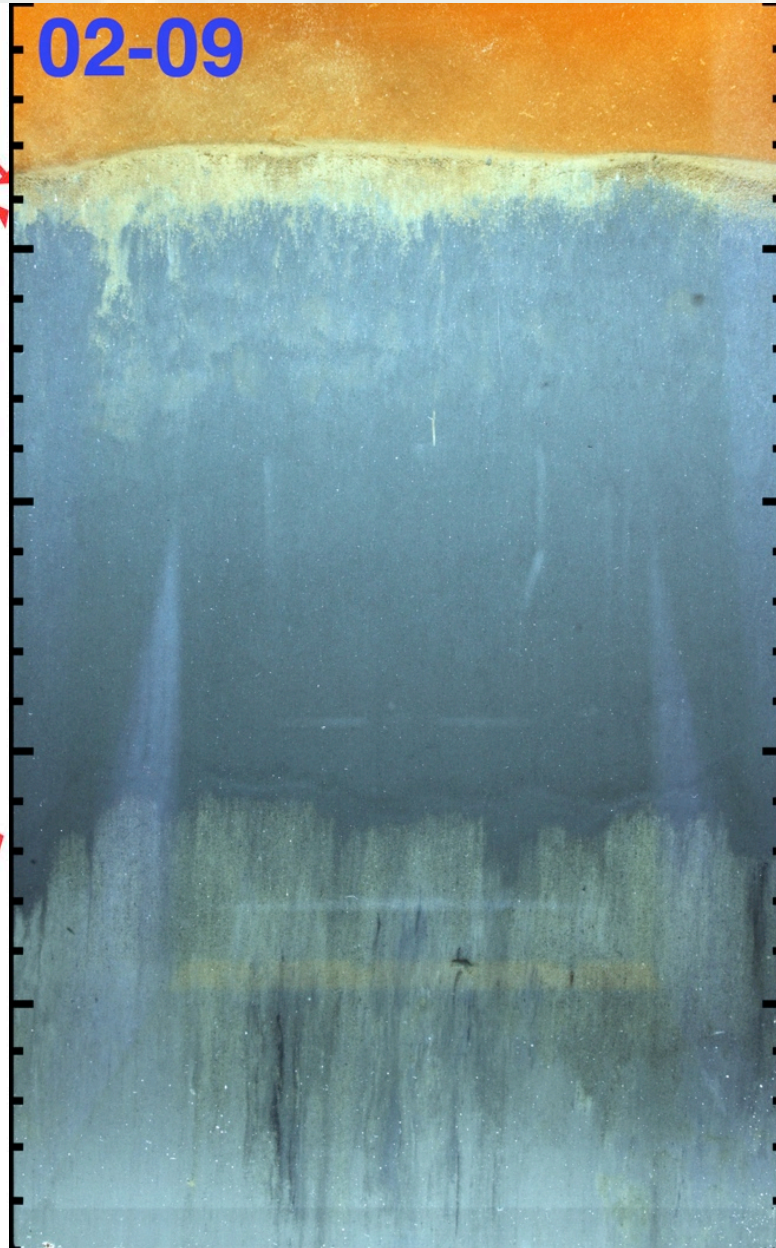
Sediment-water
Interface

2 inches

Dredged
Material
Layer

Buried
Native Bed

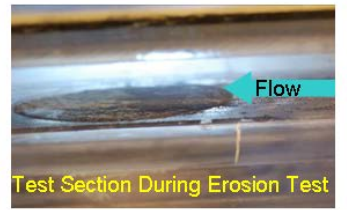
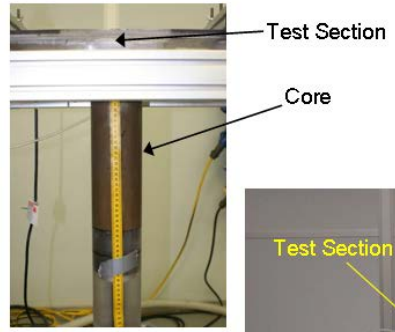
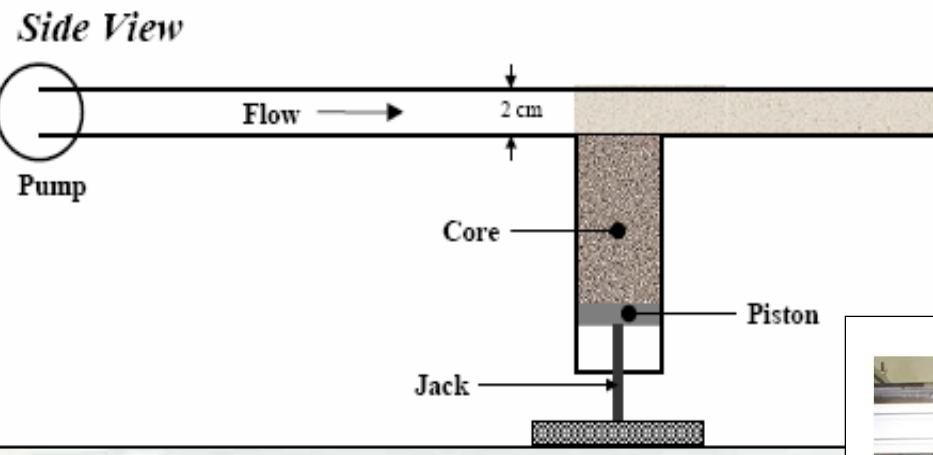
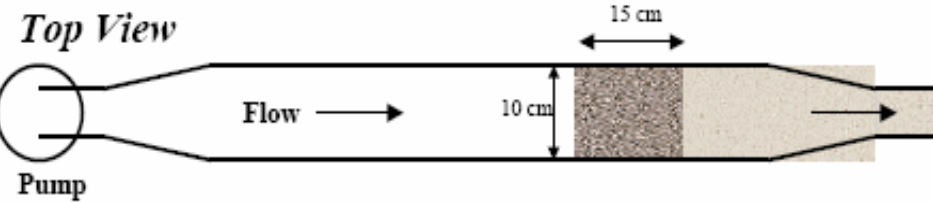
Scale in cm



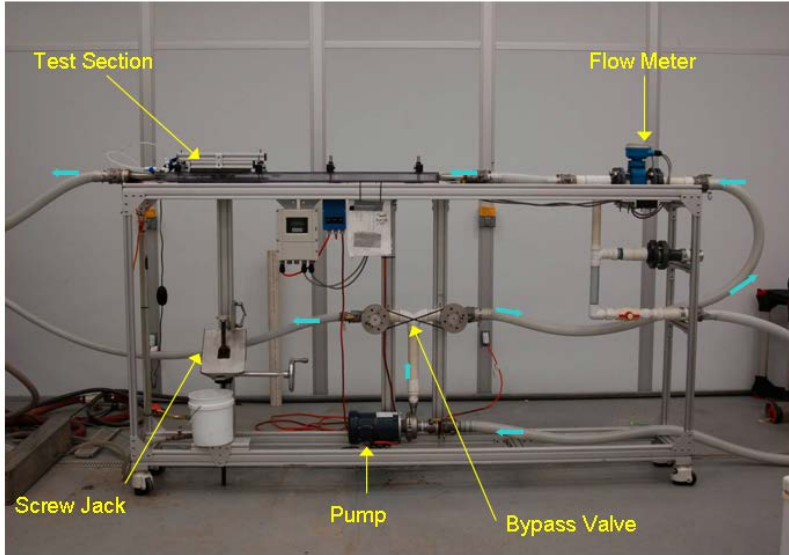


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SEDFLUME



Shear stress t (Pa)	Flow Rate (GPM)
0.1	6.1
0.2	9.1
0.4	13.5
0.6	17.0
0.8	20.1
1.2	25.3
1.6	29.8
2.4	37.4
3.2	44.0
4	49.9
5	56.6
6.4	65.0
8	73.7
10	83.5
12	92.5
13	96.7
14	100.8



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Modeling Conclusions



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- Approximately 35% of the sediment that erodes from the designated disposal areas is transported and deposits in the navigation channel.
- The remaining 65% is widely dispersed throughout the bay by wind-, river-, and tide-driven currents.
- The dredge material placed in thin-layers is less erodible (~ 45%) than native sediment.
- Sediment becomes remobilized into Bay's natural sediment system (Not transported along the bottom)



In-Bay Placement



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- June 30, 2014 Received CZM and WQC for thin-layer placement in Mobile Bay
- In-Bay placement fulfilled WRDA 96 standards “*environmental acceptable alternatives for beneficial uses of dredged material and environmental restoration*”



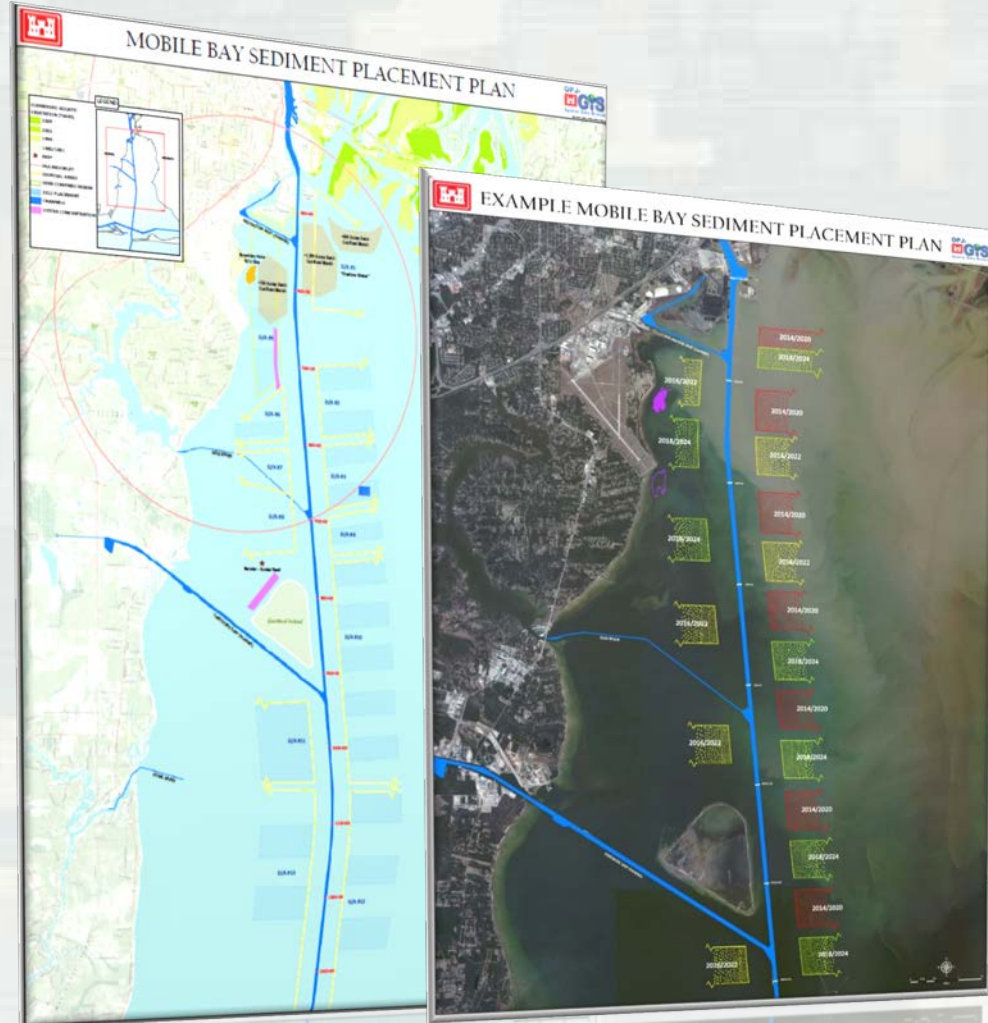


In-Bay Placement



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- Alternating Site Use
- GPS Tracking System
- Material Placement on a 6 year cycle





Placement Barge



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Impact to Navigation



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- \$5-7/CY prior thin-layer permit
- \$2-3/CY with thin-layer permit
- Reduced budget request approx. \$6M/YR
- Gain flexibility to shop the dredge market
- Greater channel reliability
- Consistent customer relations



Culture Shift



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- **IWG proved that inherited perspectives need to be replaced with scientific facts**
- **Saving dredging dollars doesn't always come at the expense of environmental stewardship**



Keeping Our Commitments



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- Submitted BU Site to RESTORE Federal Council
 - Bucket 2 Funded Priority List -- \$2.5M
- RSM study to explore filling of Oyster Holes in Bay

