# Strategies for Implementing Regional Sediment Management: Using a Collaborative Approach to Implementing RSM Principles in Alabama

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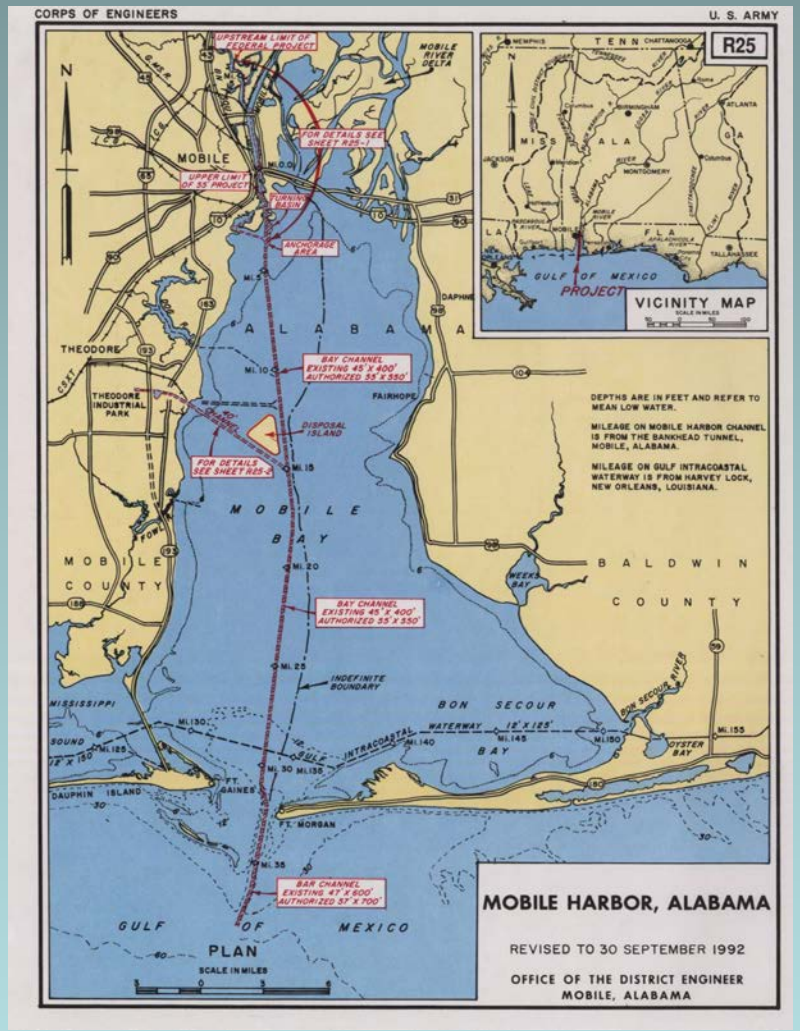
# Mobile Harbor Navigation Project Description & Challenges

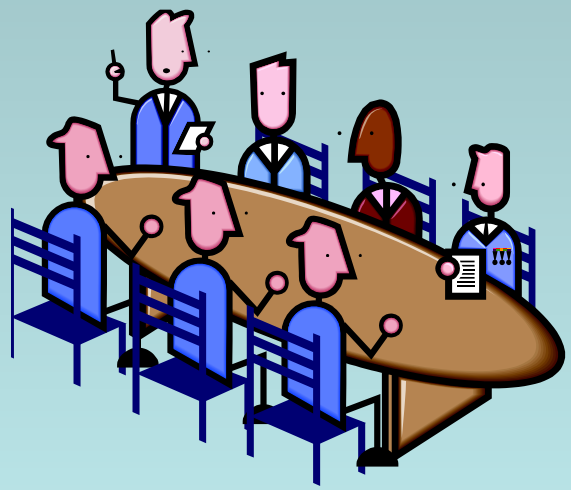



- Approximately 4 MCY of material removed from Mobile Bay Channel annually at a cost of $12 million.
- Restricted to using hopper dredges, required travelling up to 40 miles for disposal in the Mobile-North ODMDS.
- Historically channel was dredged utilizing cutterhead dredges with material side-casted into open-water disposal sites along channel.
- Hopper dredges were not able to keep up with sedimentation.
- Hopper dredge requirement limited the Corps' access to dredging fleet.
- Placement in ODMDS removed sediment from bay system.

# Solution: Formation of the Mobile Bay Interagency Working Group (IWG)

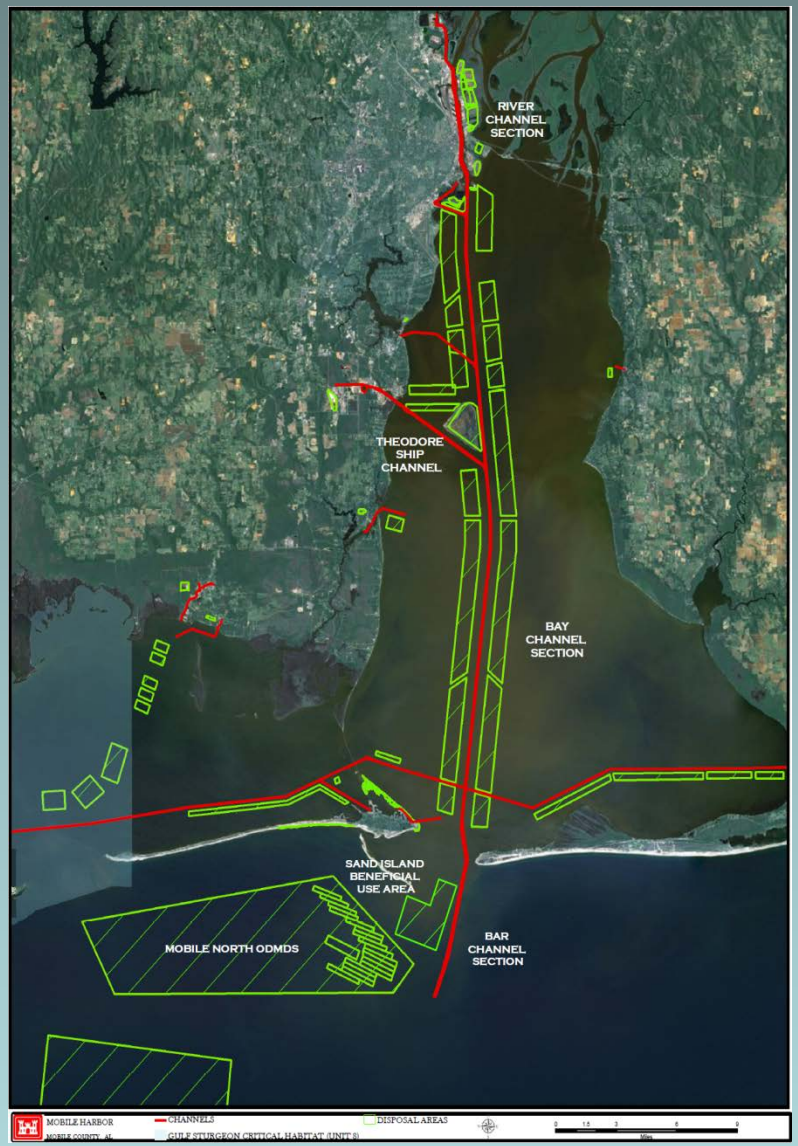
**Establish and engaged an IWG to help identify and implement environmentally acceptable disposal options.**

- **Alabama State Port Authority**
- **Alabama Department of Conservation and Natural, State Lands & Marine Resources Divisions**
- **Alabama Department of Environmental Management**
- **U.S. Fish and Wildlife Service**
- **NOAA, National Marine Fisheries Service**
- **Alabama/Mississippi Sea Grant**
- **Mobile Bay NEP**
- **The Nature Conservancy (TNC)**
- **Dauphin Island Sea Lab**
- **Others**



# Goals and Objectives

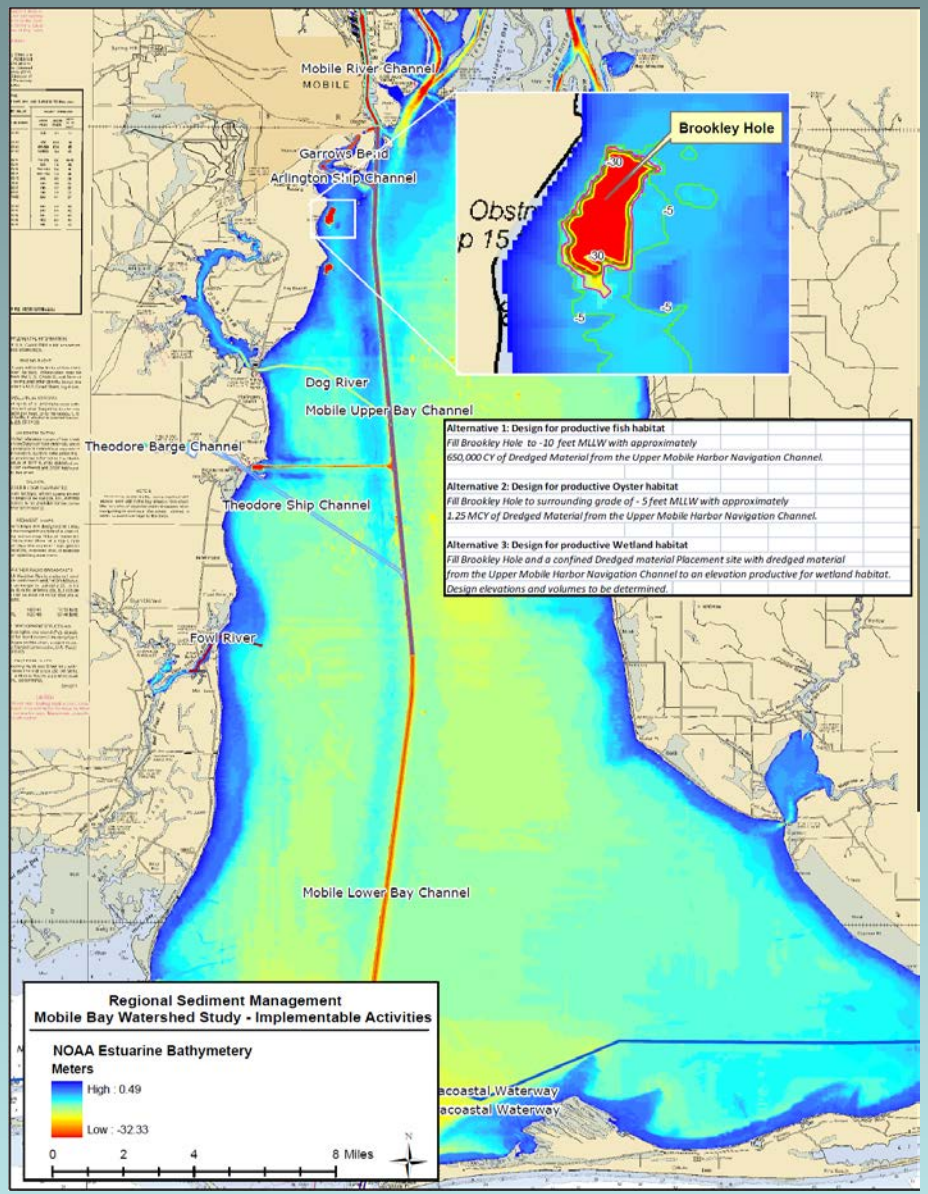
- Develop environmentally acceptable alternatives disposal for dredged material.
- Investigate opportunities to resume in-bay disposal practice options for Mobile Bay navigation channel.
- Demonstrate open water disposal with monitoring and predicting movement of sediment associated with in-bay disposal areas.
- Develop other BU opportunities.



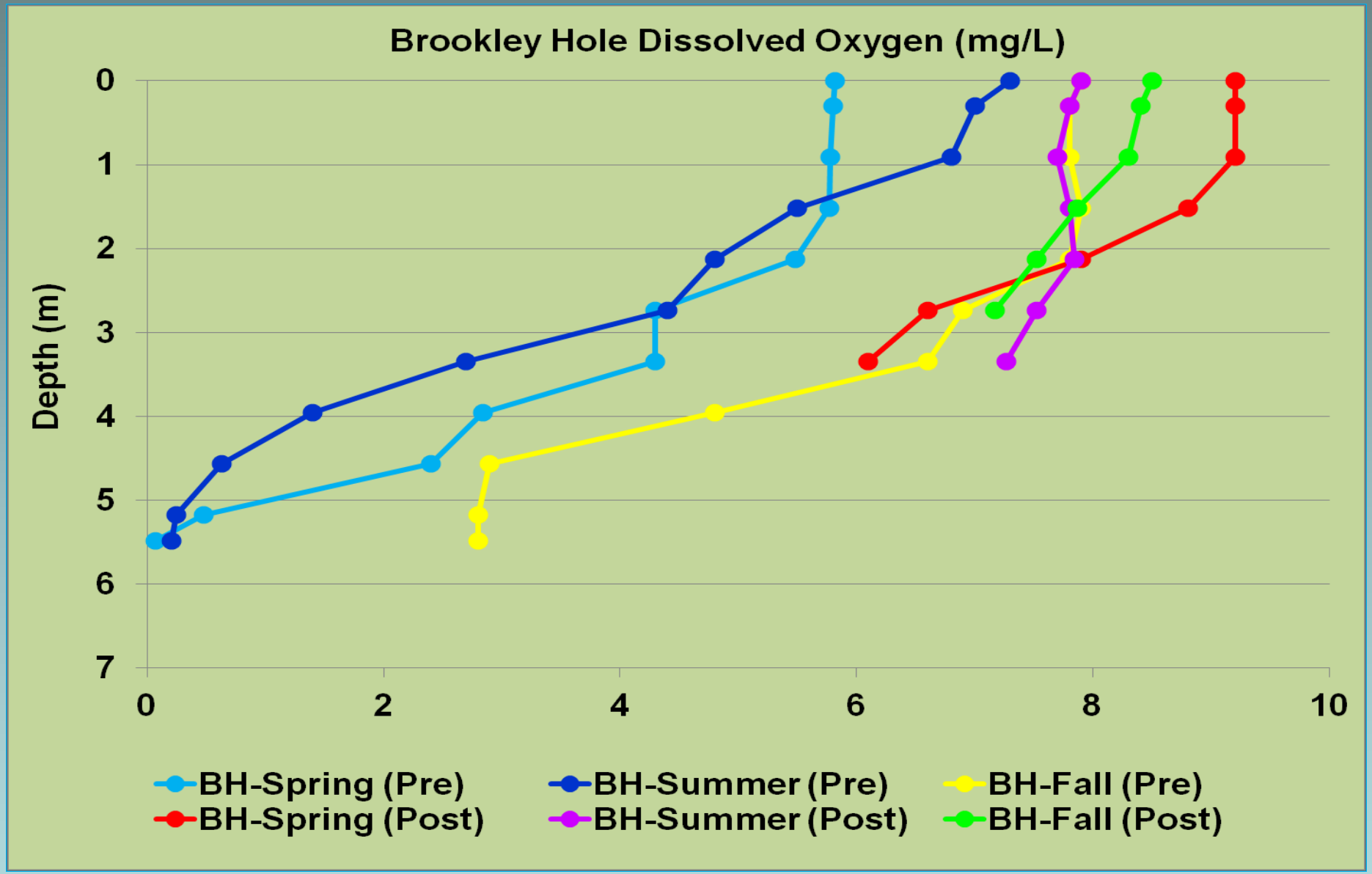
# Initial IWG Meeting February 2012
## Proposed Implementation of Three Projects:

- Filling of Brookley Hole
  - A large, deep (~32’ vs. 3-6’ adjacent bay bottoms) man-made hole.
  - Fill hole and monitor outcomes.
- Resume In-Bay Thin-Layer Disposal
  - Utilize modern thin-layer techniques.
  - Keep sediment in the system.
  - Monitor results to determine outcomes.
- Tidal marsh creation in upper Bay
  - Develop long term beneficial use marsh cells.
  - Initiate planning phases.

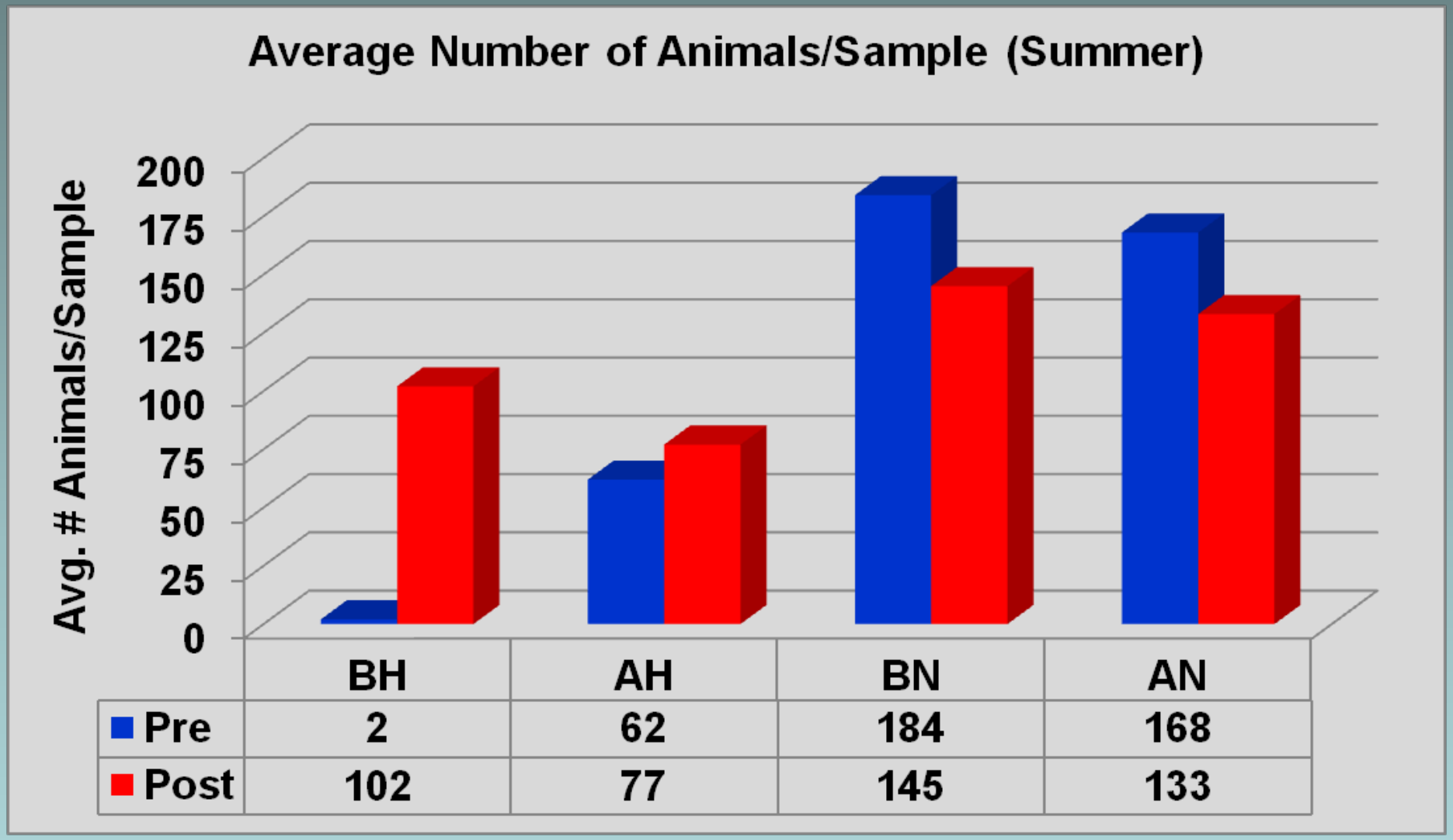
# Brookley Hole




- Old borrow source for creation of Brookley Air Field runway Extension.
- Baseline surveys revealed hypoxic/anoxic conditions resulting in degraded ecological productivity.
- Filling of hole proposed in February 2012 IWG meeting.
- Public Notice and Formal Agency Coordination took place in May 2012.
- Placement of material started in July 2012.
- **1.2 MCY** of sediment from upper Mobile Bay Channel placed in the hole.
- Post-filling monitoring has revealed no hypoxia and a **5,044%** increase in benthic community density.

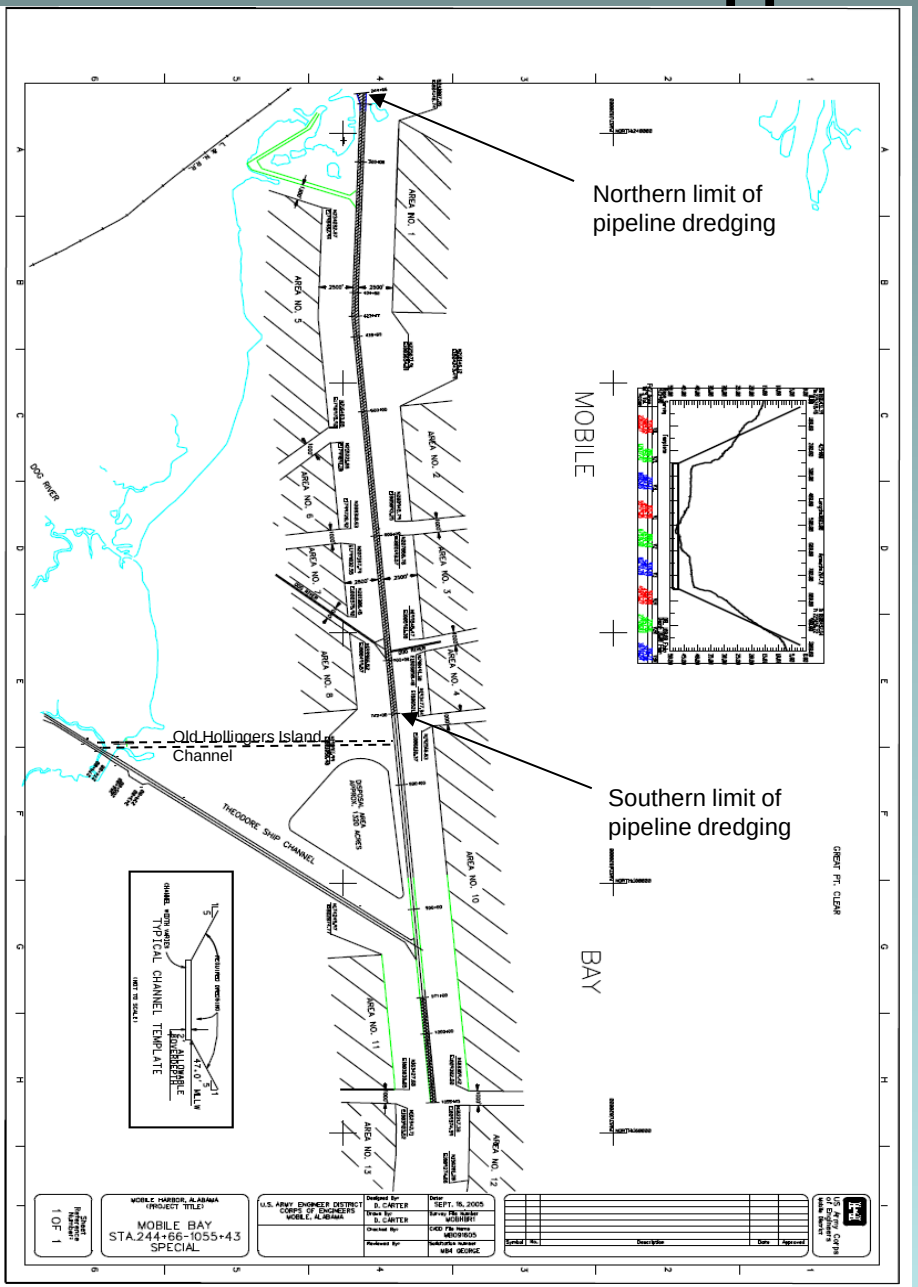



DO (mg/l) concentrations during pre- and post-restoration sampling within Brookley Hole. (Note: Seasonal results are averaged across five stations occupied within the borrow pit.)




During the summer sampling, the number of animals per sample increased significantly ($p < 0.05$) from 2 (pre) to 102 (post-restoration) per sample, resulting in an increase in density from 45 animals/$m^2$ to 2,315 animals/$m^2$, a percentage change of +5,044%.

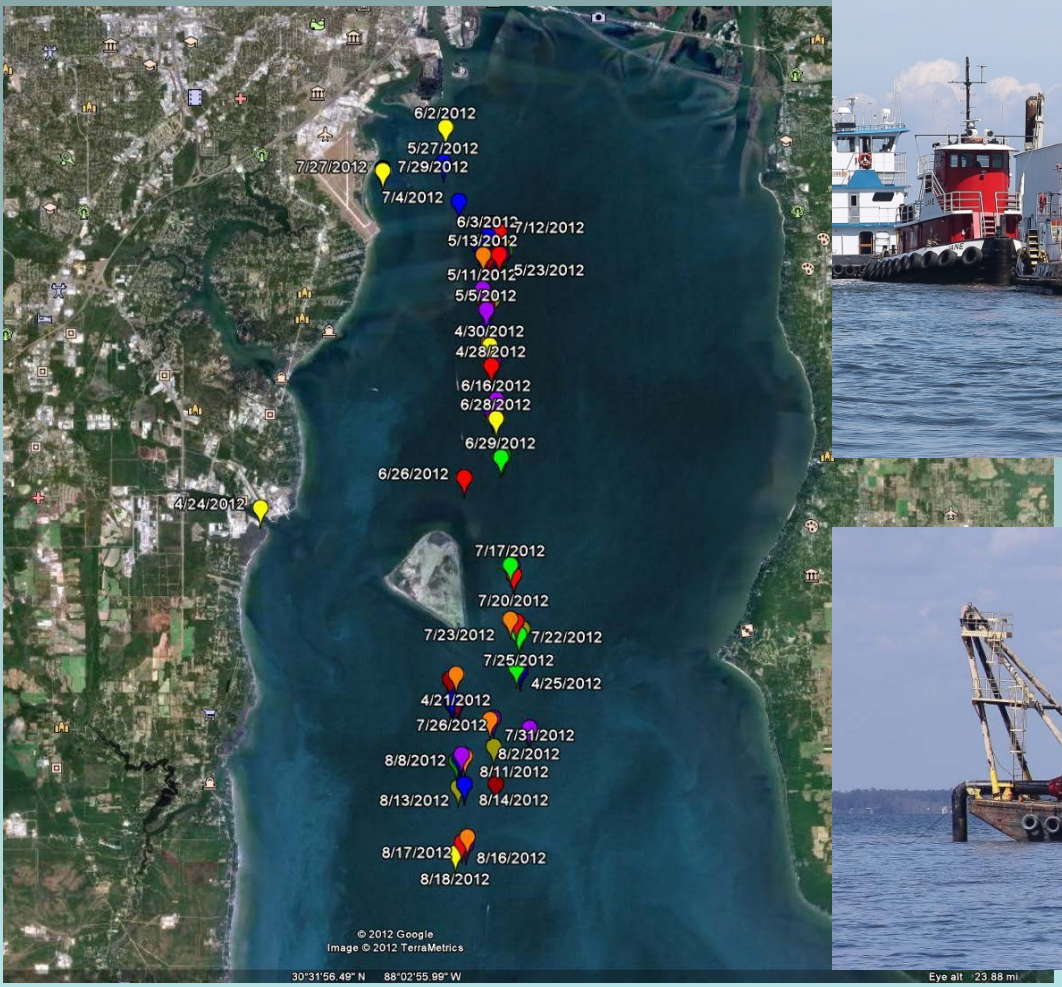
# Thin-Layer Open Placement (TLP) /Bay Disposal in Upper Mobile Bay



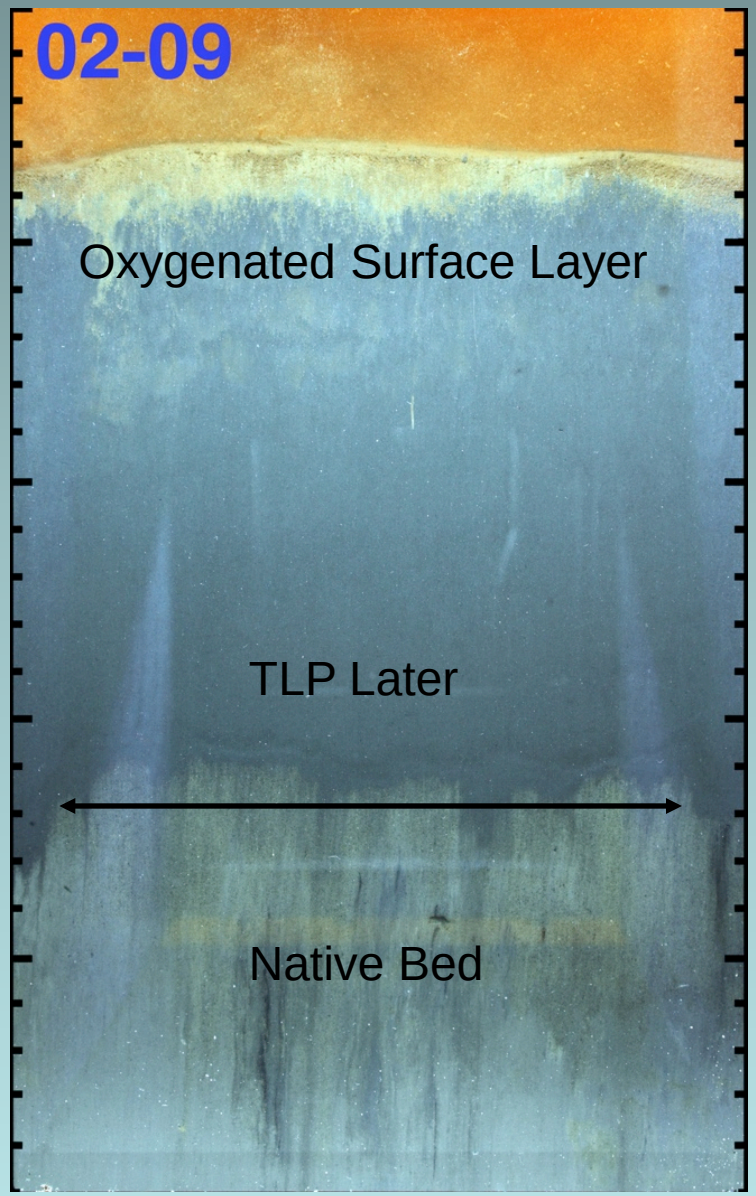

- Hopper dredges were not able to keep up with shoaling rates in upper bay channel.
- A critical need to return channel to full operational dimensions developed.
- Open-Bay Disposal Plan was developed:
  - Utilize hydraulic cutterhead dredges to dredge 9 MCY from channel.
  - Utilize thin-layer disposal techniques in pre-established historical disposal areas.
  - Partnered with other USACE programs to conduct monitoring and modeling (ERDC – EL & CHL.
  - Significant savings in dredging costs realized.

# Thin-Layer Open Placement (TLP) /Bay Disposal in Upper Mobile Bay

- **Initial TLP on April 21, 2012**
- **Final TLP monitoring on September 28, 2012**

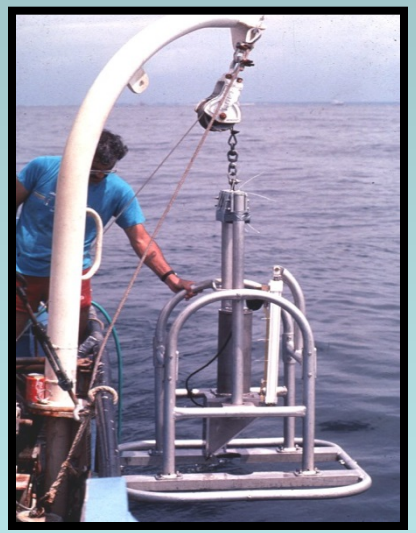



# Open Bay Disposal in Upper Mobile




## Monitoring Results

- Monitoring indicates that the materials is consolidating.
- Benthic community is recovering quickly as expected.
- Modeling of dredged sediments in a sediment flume indicate that consolidated sediments are less erodible than adjacent bay bottom surface sediments.

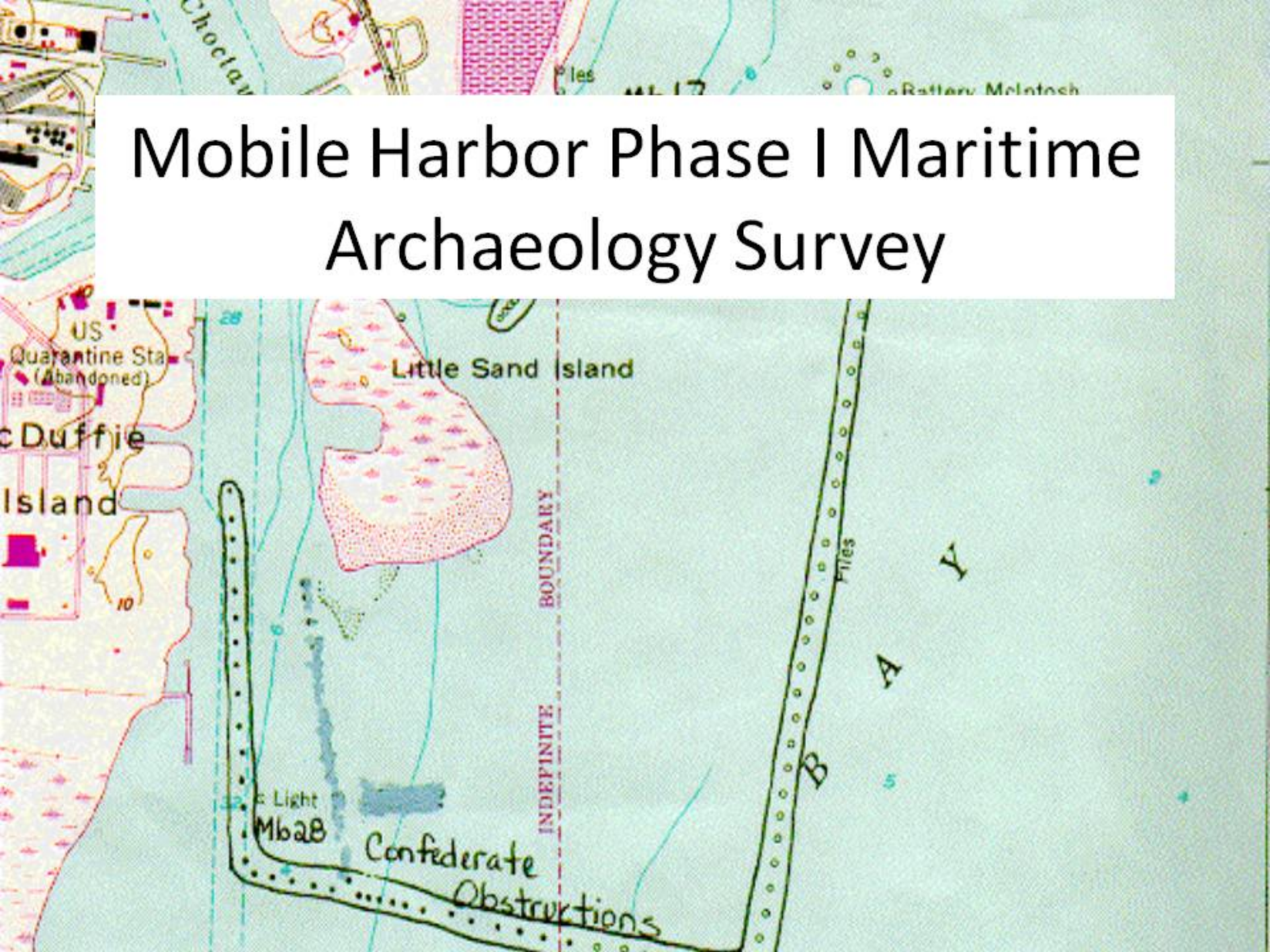


# Establishment of Long Term BU Site in Upper Mobile Bay

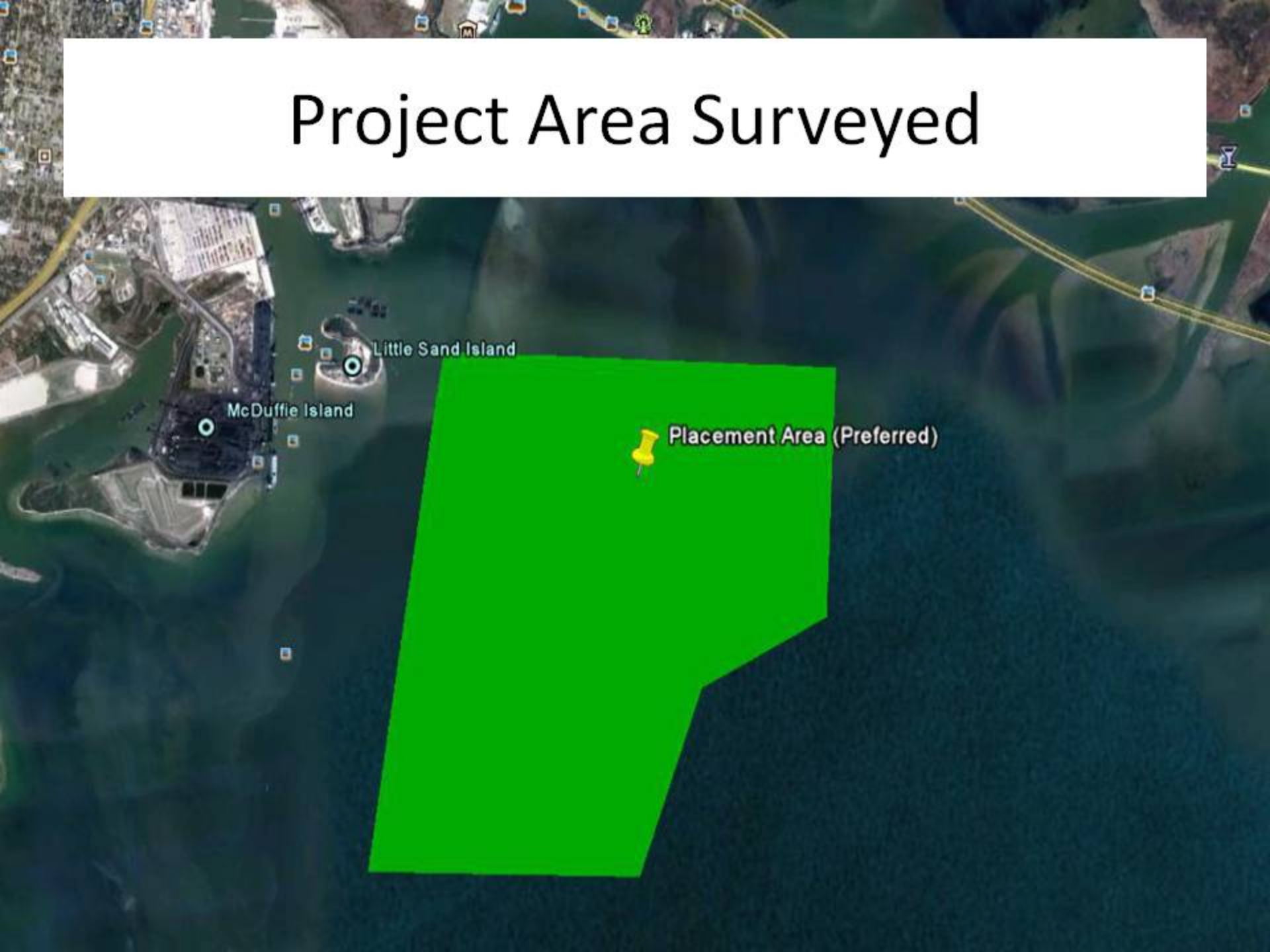
Potential Long Term Beneficial Use Sites in Upper Mobile Bay

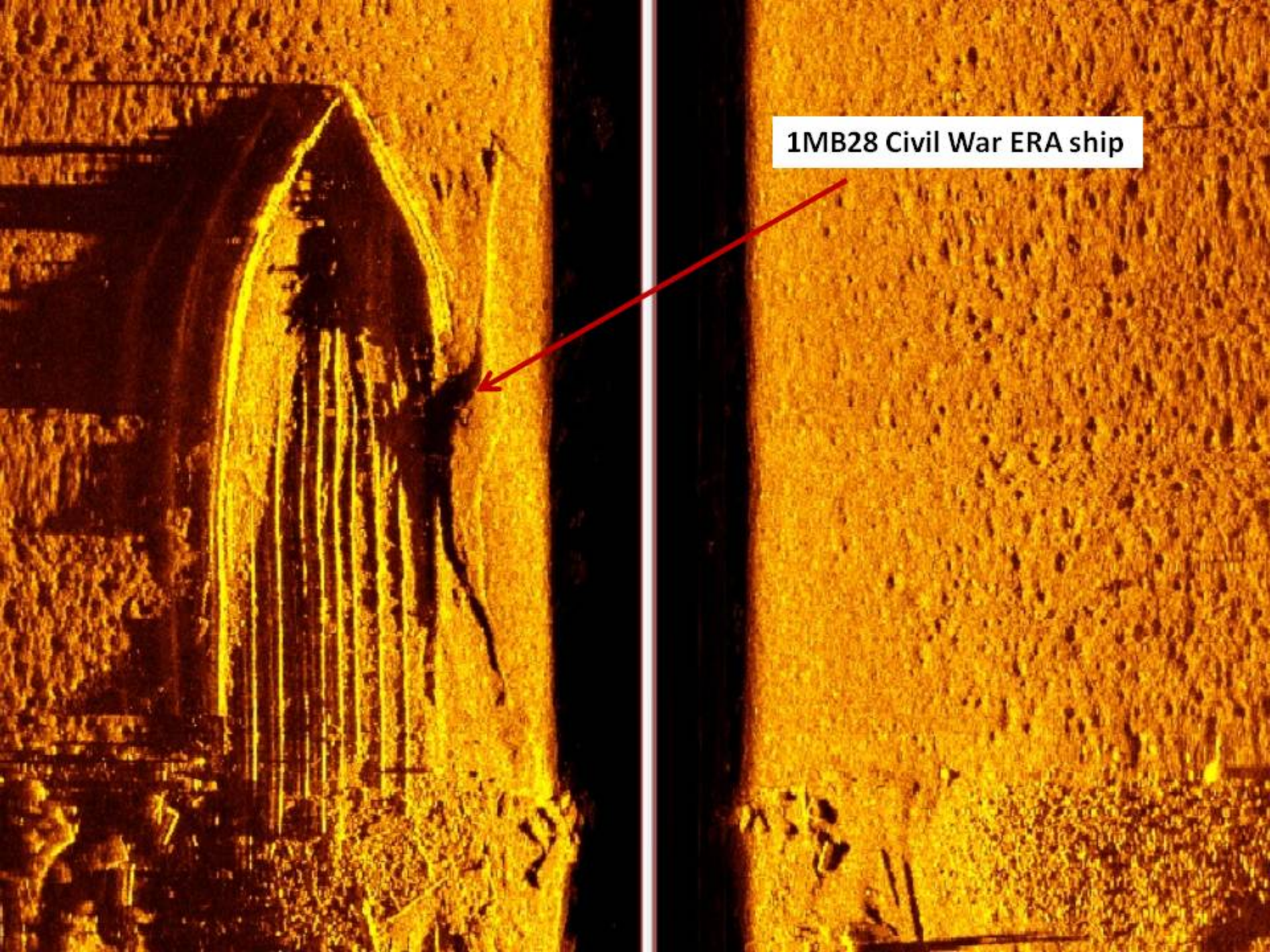

BU sites as refined and prioritized from the April 12 Meeting

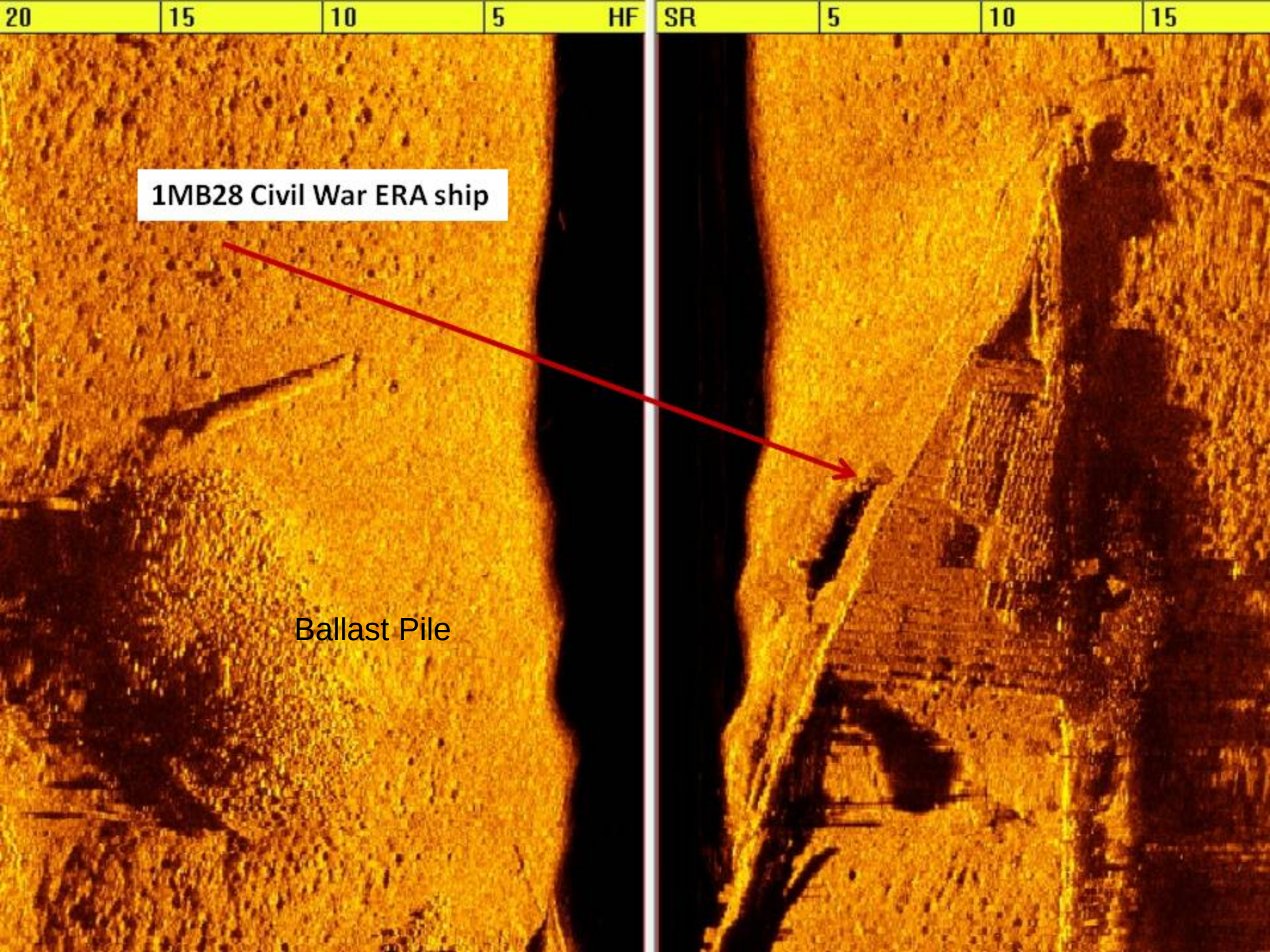
- Engaged IWG to help prioritize, plan and implement large scale semi-contained open water disposal area in upper Mobile Bay
- Builds on requests of Alabama State Port Authority (ASPA) to partner in implementation of more effective sediment management associated with maintaining Mobile Harbor
- Leverage various funding sources
- Develop feasibility level BU design
- ASPA will take lead on the final design, NEPA coordination, and permitting actions.
- Cultural Assessment was a major priority given the quantity of Civil War sites in the upper bay.

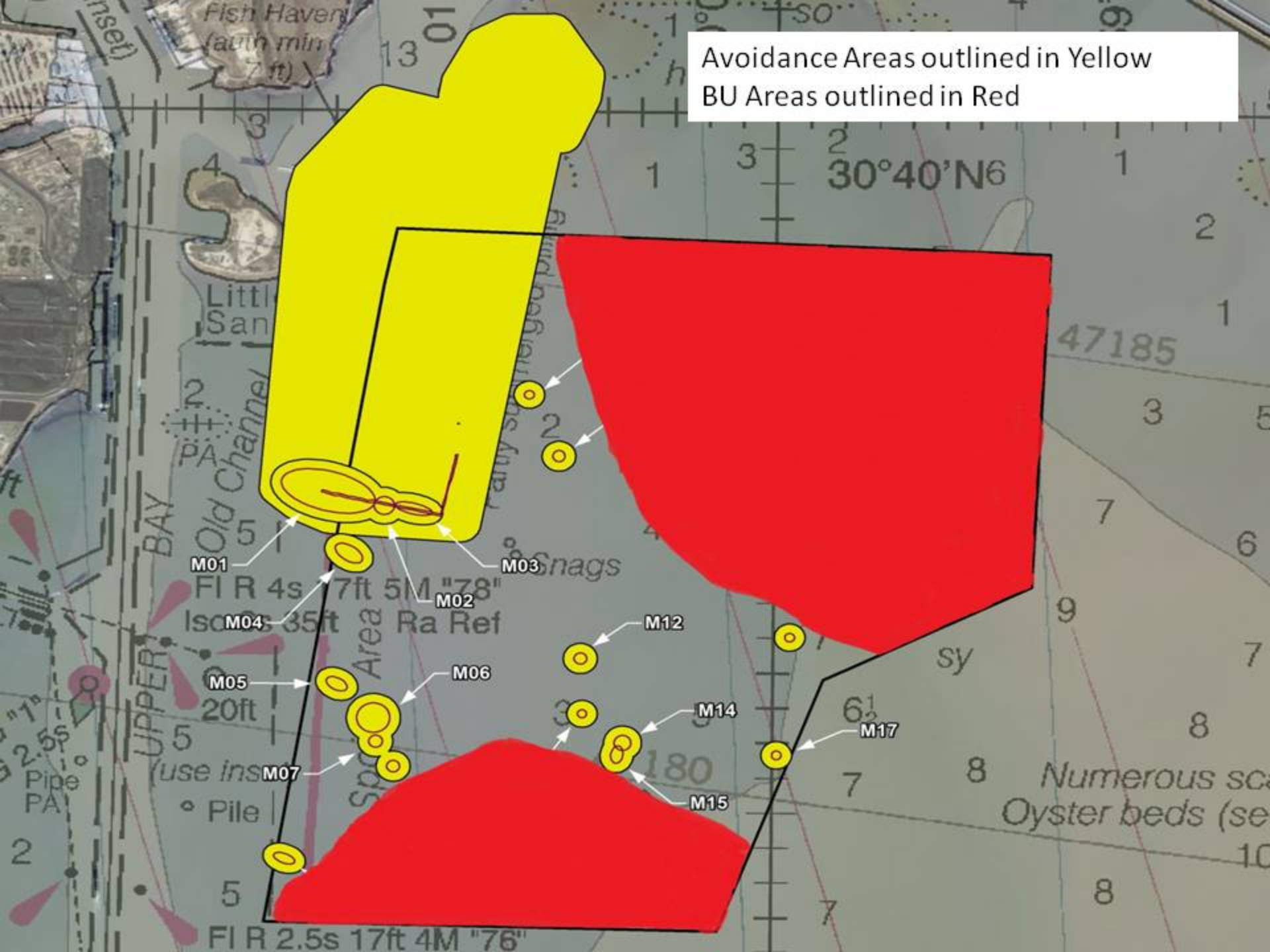

Mobile Harbor Phase I Maritime Archaeology Survey
US Quarantine Sta (Abandoned)
Little Sand Island
Duffie Island
INDEFINITE BOUNDARY
Piles
Light
Mb28
Confederate Obstructions
Battery McIntosh

# Project Area Surveyed




1MB28 Civil War ERA ship


20
15
10
5
HF
SR
5
10
15
1MB28 Civil War ERA ship
Ballast Pile

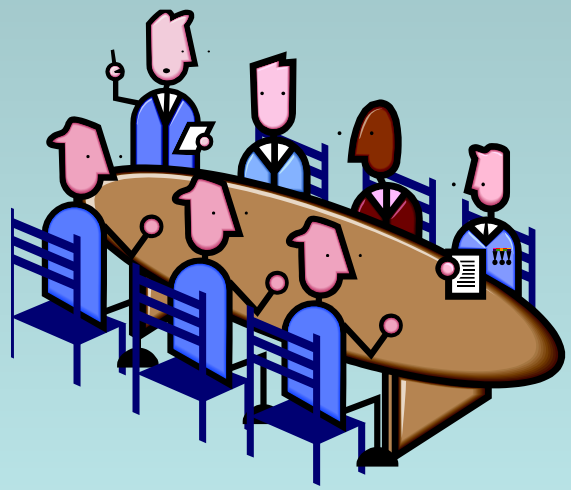

Avoidance Areas outlined in Yellow
BU Areas outlined in Red
M01
M02
M03
M04
M05
M06
M07
M12
M14
M15
M17
30°40'N
Fl R 4s 17ft 5M "78"
Fl R 2.5s 17ft 4M "76"
Snags
Pile
Numerous sca
Oyster beds (se

# Path Forward:
# March 18, 2014 IWG Meeting

- Reviewed Monitoring Results for:
  - Brookley Hole
  - Thin Layer Placement
- Reviewed Upper Bay BU Site Archeological Study.
- IWG recommended development of a Strategic Sediment Management Plan with a 4-Pronged Approach:
  - Placement of additional material in the Brookley Hole (started on 07/14/2014, ~750,000 CY).
  - Develop a Thin-layer Disposal Plan and implement it as an environmentally acceptable alternative (CZM & WQ Certification received on 07/01/2014).
  - Pursue the filling of Airport Hole.
  - Investigate filling of historic shell dredging holes.
  - Initiate next steps for the Upper Bay BU site, including geo-technical investigations and funding for engineering & design.

# The Collaborative Approach
# or
# How we did all this in <u>less than 2 Years</u>:

- IWG was a collaborative effort from Day 1.
- Corps and State Port Authority came to the group with a problem and asked for our help with developing the solutions.
- Excellent IWG participation at all meetings.
- Members spoke up and made concerns/needs clear.
- Didn’t always agree but we reached consensus.
- Kept moving forward.



# Thanks!
# Questions?

Acknowledgements:
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ERDC-USACE
All members of the Mobile Harbor IWG