Dredged Material Placement Practices for Creating River Island Habitat and Effective Waterways Management

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US Army Corps of Engineers
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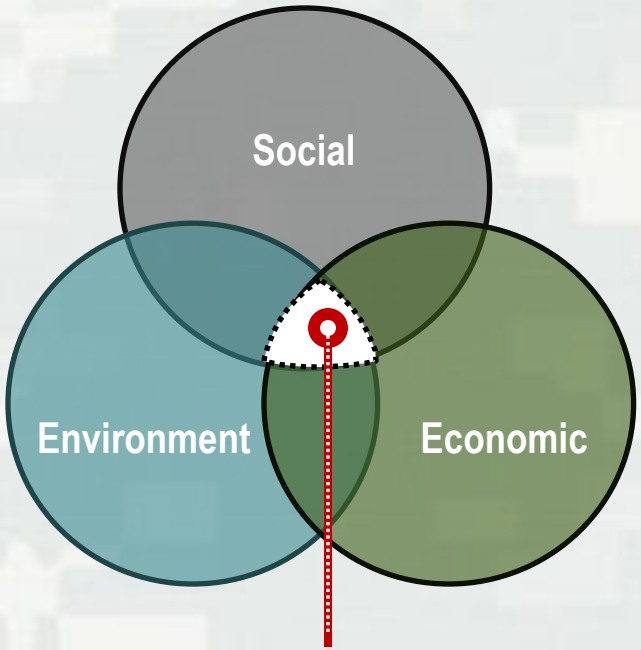
What is Engineering with Nature?

- USACE navigation program introduced EWN initiative in 2010
- Attempt to understand and deliberately work with natural processes to accomplish engineering goals
- Expands environmental, social, & economic benefits from USACE projects
- Focuses on collaboration and communication with a variety of stakeholders throughout the life of a project

What is the Intent of the EWN Initiative?

- Improve resilience and sustainability of projects in coastal systems
- Identify and implement cost-effective, efficient engineering practices
- Realize “other” benefits for USACE projects
- Gain credibility and respect of stakeholders
- http://el.erdc.usace.army.mil/ewn/

Project Benefits

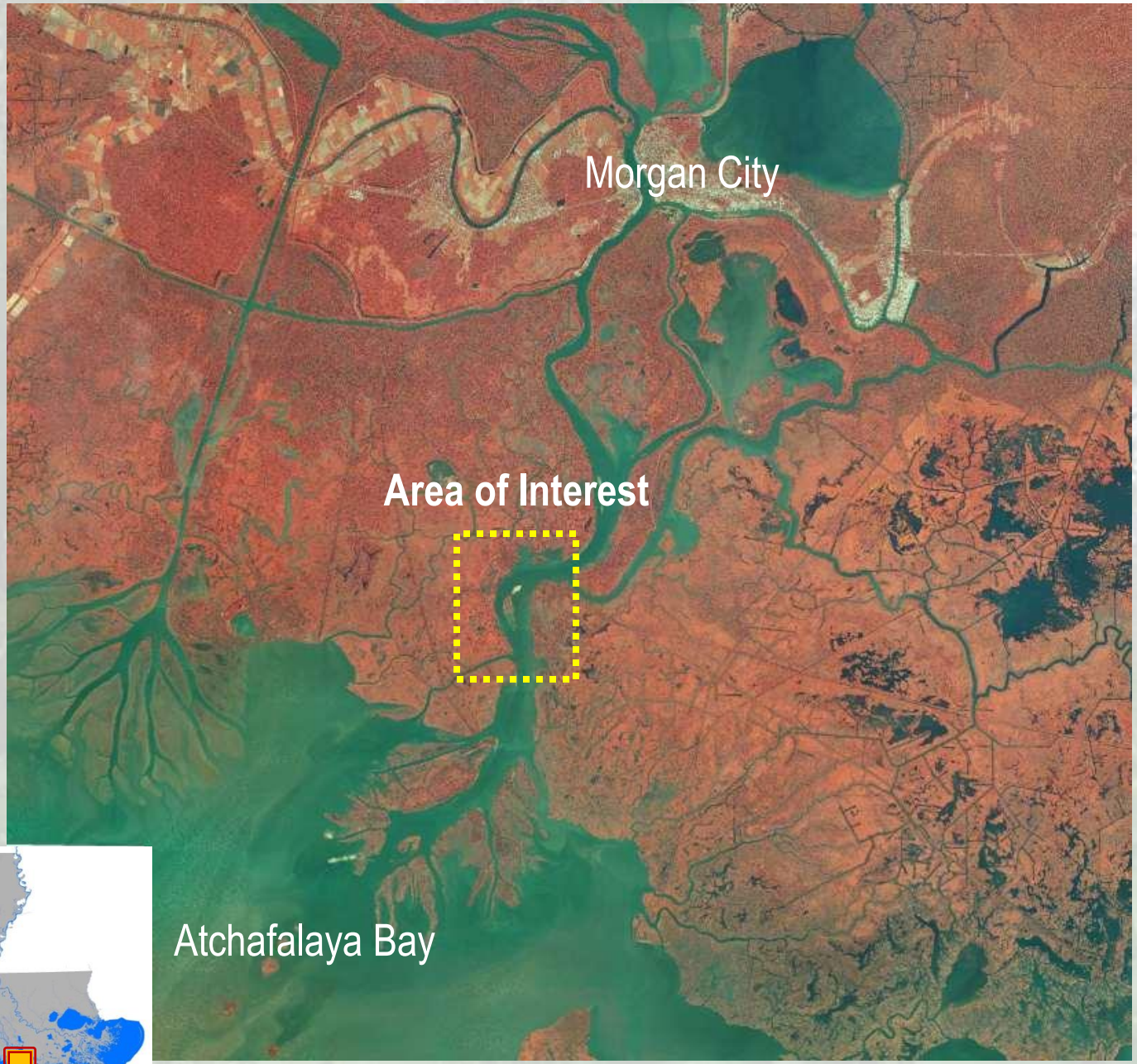


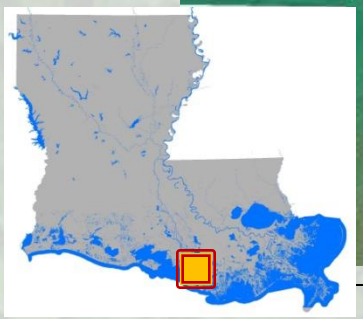
the *EWN Trifecta*!

USACE Case Study

Atchafalaya River
Federal Navigation Channel

Multiple Benefits Derived from a
Novel Dredged Material Placement Practice
at Horseshoe Bend





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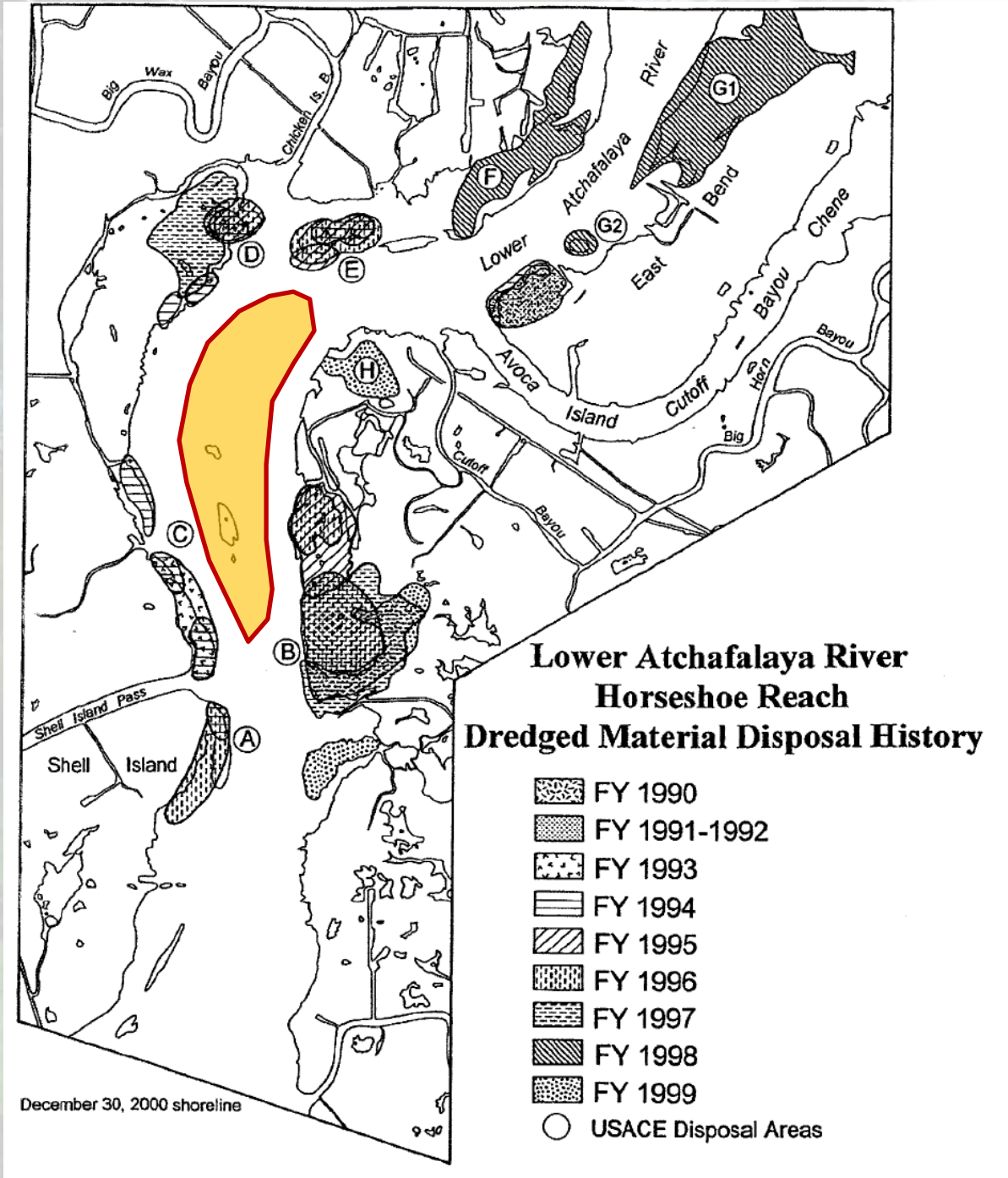


Problem

Capacity of Bankline Disposal Areas Exhausted

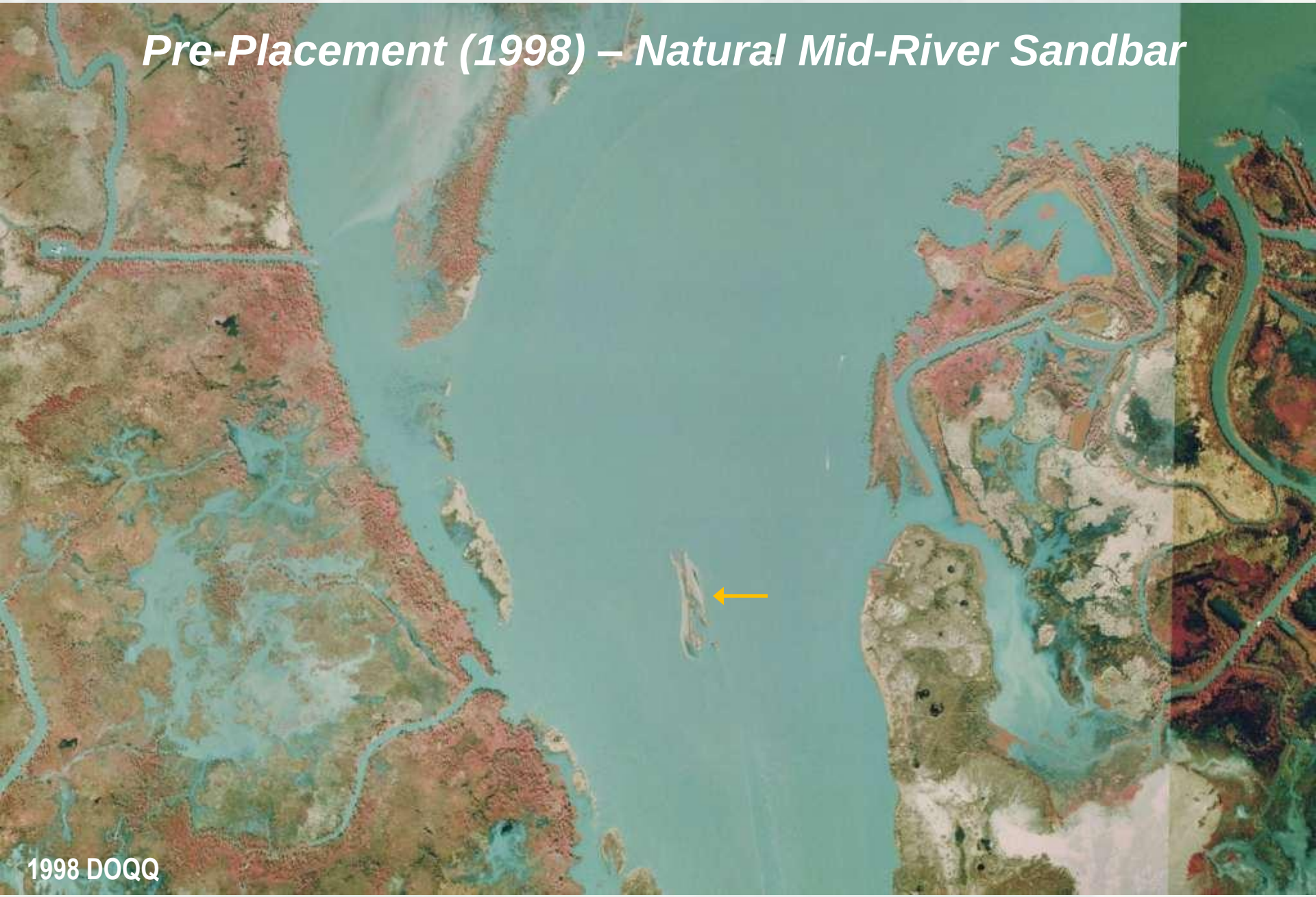
Alternatives

~~Conversion of Wetland Disposal Areas into Upland~~

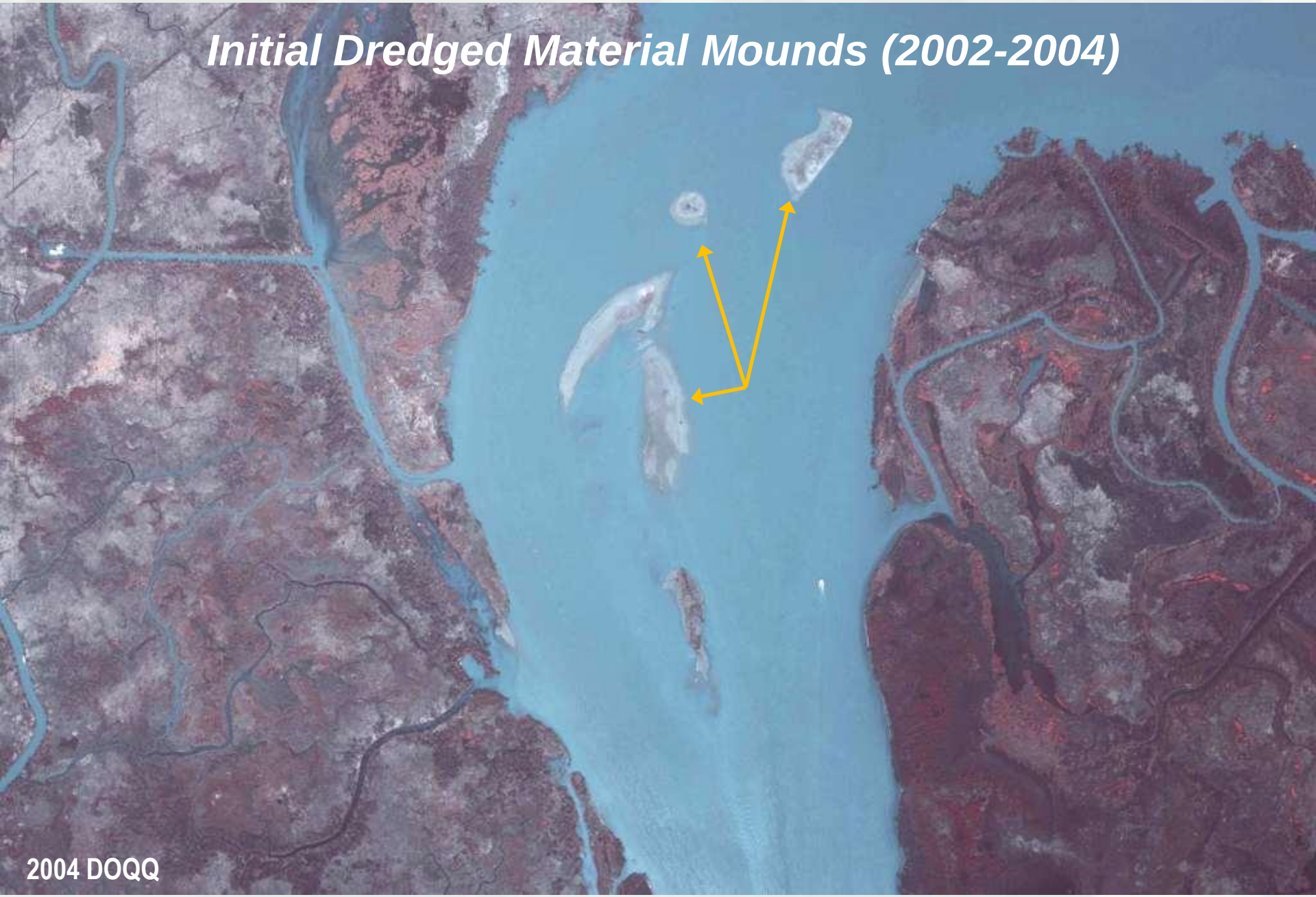
~~Open Water Disposal in Atchafalaya Bay~~

Mid-River Mounding of Dredged Material

Pre-Placement (1998) – Natural Mid-River Sandbar



Initial Dredged Material Mounds (2002-2004)

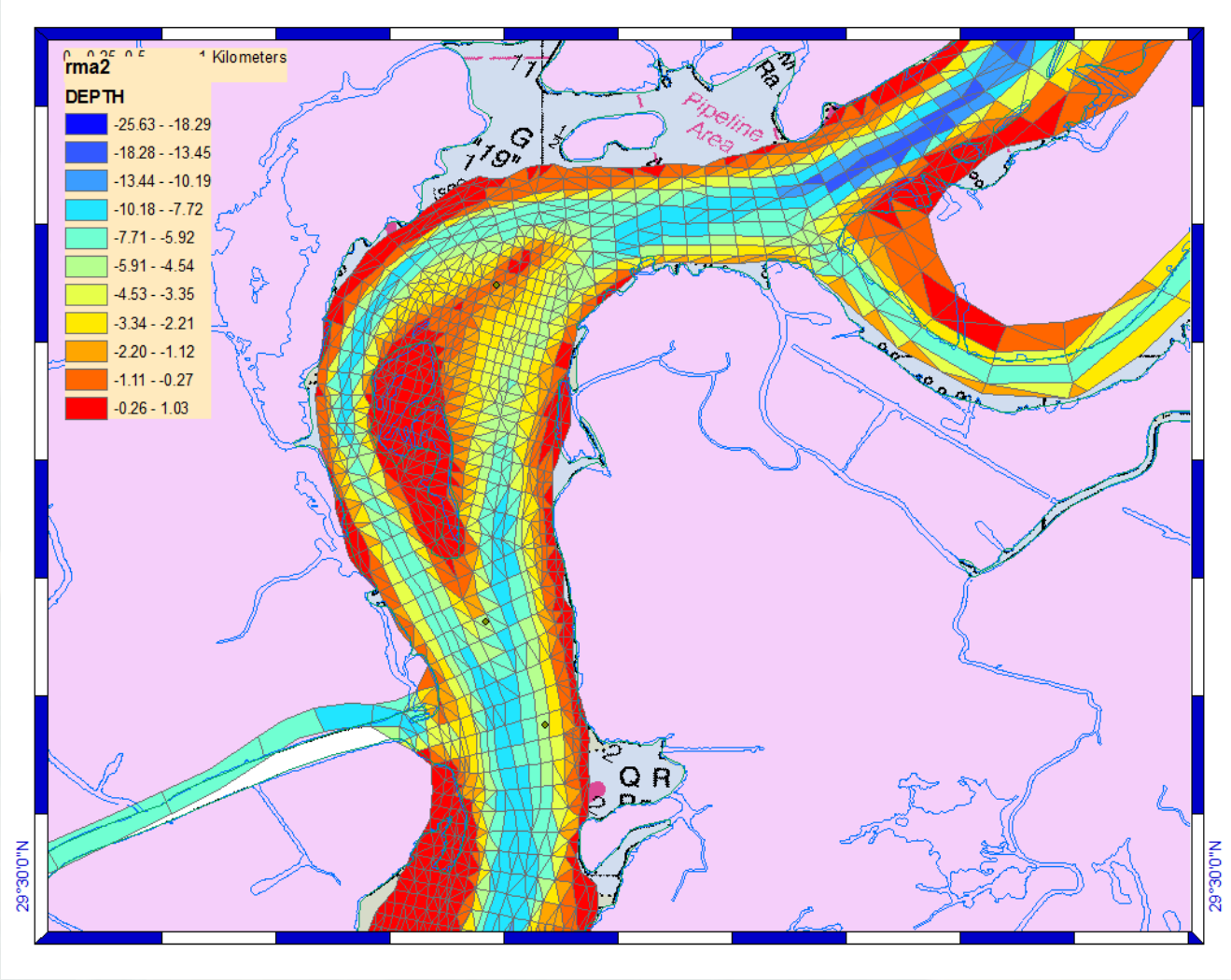


Developed Island with Upriver Feeder Mounds (2010)

2010 BUMP

Modeling

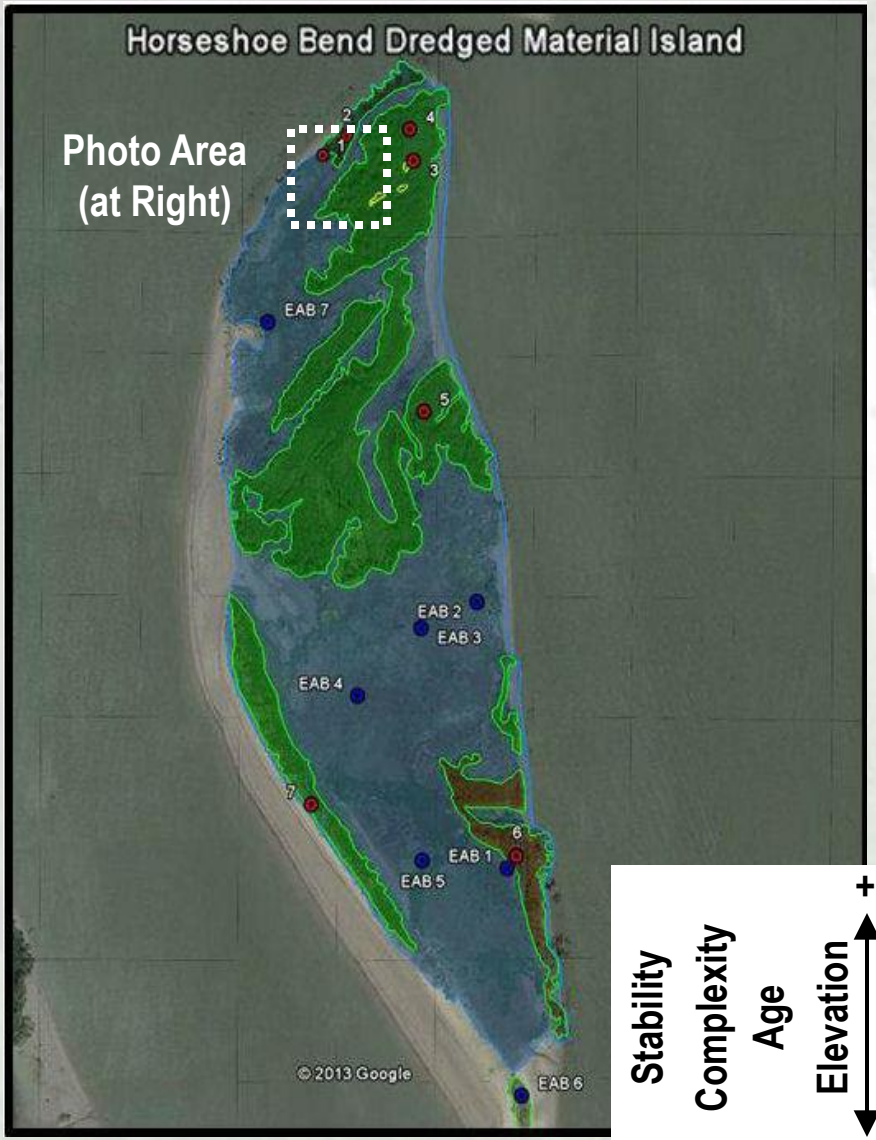
- Phase 1: perform literature survey of existing models and obtain baseline data
- Phase 2 generate grid and implement bathymetry from available sources
- Phase 3: implement LTFATE to characterize study area hydrodynamics



Quantification of Environmental Benefits

- Identify and classify distinct habitat types
- Catalogue plants and animals
- Evaluate soil horizons

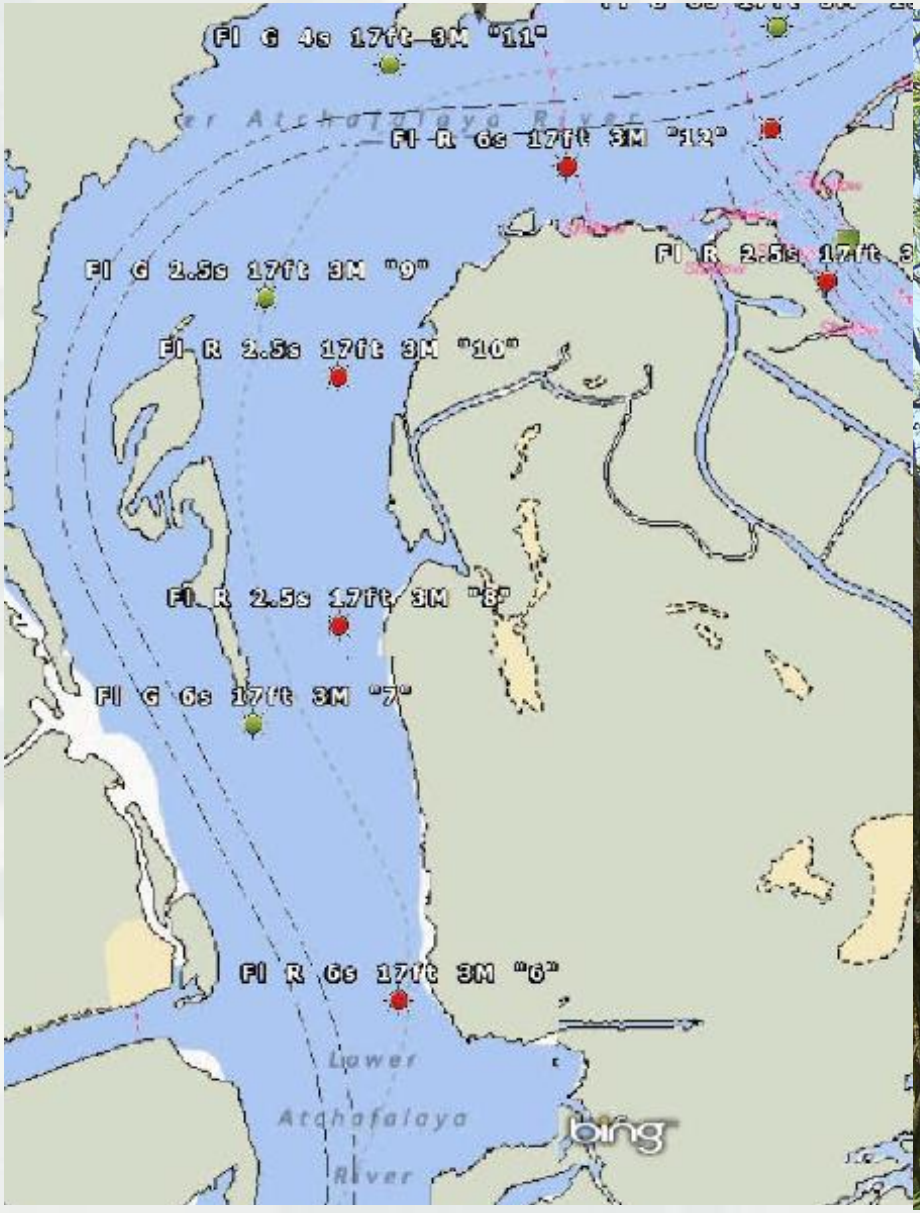
Habitat Classification



Stability
Complexity
Age
Elevation
+
–

- Mature Forested & Scrub-Shrub Wetlands
- Young Forested & Scrub-Shrub Wetlands
- Emergent Wetland Transition Zone
- Aquatic Bed Features

Navigation Benefit



Environmental Benefit

USCG Crewboat Cut Realignment

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20” Soil Plugs Evaluated for Zonation, Color, Texture & Redox Features

Social Benefit

Summary of Benefits

- Four distinct wetland habitats on 100 acres supporting larger than expected variety of plants & animals
- 81 plant species observed on island compared to 53 plant species on natural wetlands along the lower river
- Island performing as natural wetland taking a short 5-10 years to develop
- Soils are active, function to cycle nutrients and sequester carbon
- Island growth contributing formation of well defined channel to the east reducing maintenance dredging over 1 million cubic yards per year
- Recreational hunting

Current Activities

- Continue scientific and engineering research (hydrology & environment)
- Document positive / negative channel maintenance impacts
- Communicate findings widely (publications, conferences, press releases, EWN web site, etc.)
- Seek other applications for this novel strategic placement practice
- Identify and quantify multiple realized benefits

Take Away Points

- Effective waterways management practices are being implemented as part of maintenance dredging projects
- Many such practices are relatively unknown/not widely disseminated or publicized
- Communication essential to promote these good practices
- Lessons learned so innovative approaches can be more broadly applied
- Utilize nature's energy