

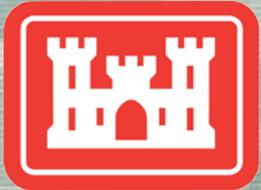
# Horseshoe Bend

## An Engineering with Nature Case Study

Jeff Corbino

Operations Division

New Orleans District



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US Army Corps of Engineers

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# ***OVERVIEW***

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What is the Engineering with Nature Initiative?

**EWN Case Study – Horseshoe Bend:**

Origin of Disposal Area I

Habitat Classification

Floral & Faunal Surveys

Soil Characterization



# ***What is Engineering with Nature?***

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- \* USACE Navigation Program Introduced EWN Initiative in 2010
- \* Attempt to Understand & Deliberately Work with Natural Processes to Accomplish Engineering Goals
- \* Expands Environmental, Social, & Economic Benefits from USACE Projects
- \* Focuses on Collaboration & Communication with a Variety of Stakeholders throughout the Life of a Project

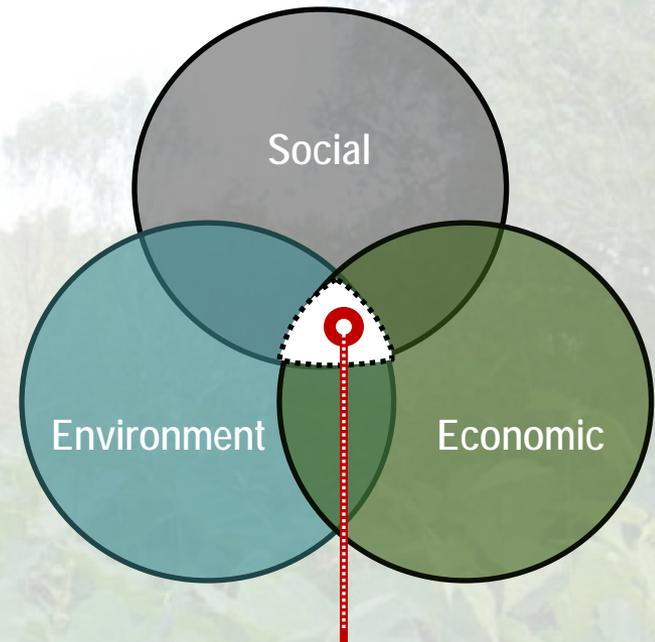


# ***What is the Intent of this Initiative?***

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- \* Improve Resilience & Sustainability of Projects in Coastal Systems
- \* Identify & Implement Cost-Effective, Efficient Engineering Practices
- \* Realize "Other" Benefits for USACE Projects
- \* Gain Credibility & Respect of Stakeholders

## **Venn Diagram of Project Benefits**



***the EWN Trifecta!***



# ***Initial Step – Look within USACE for Case Studies***

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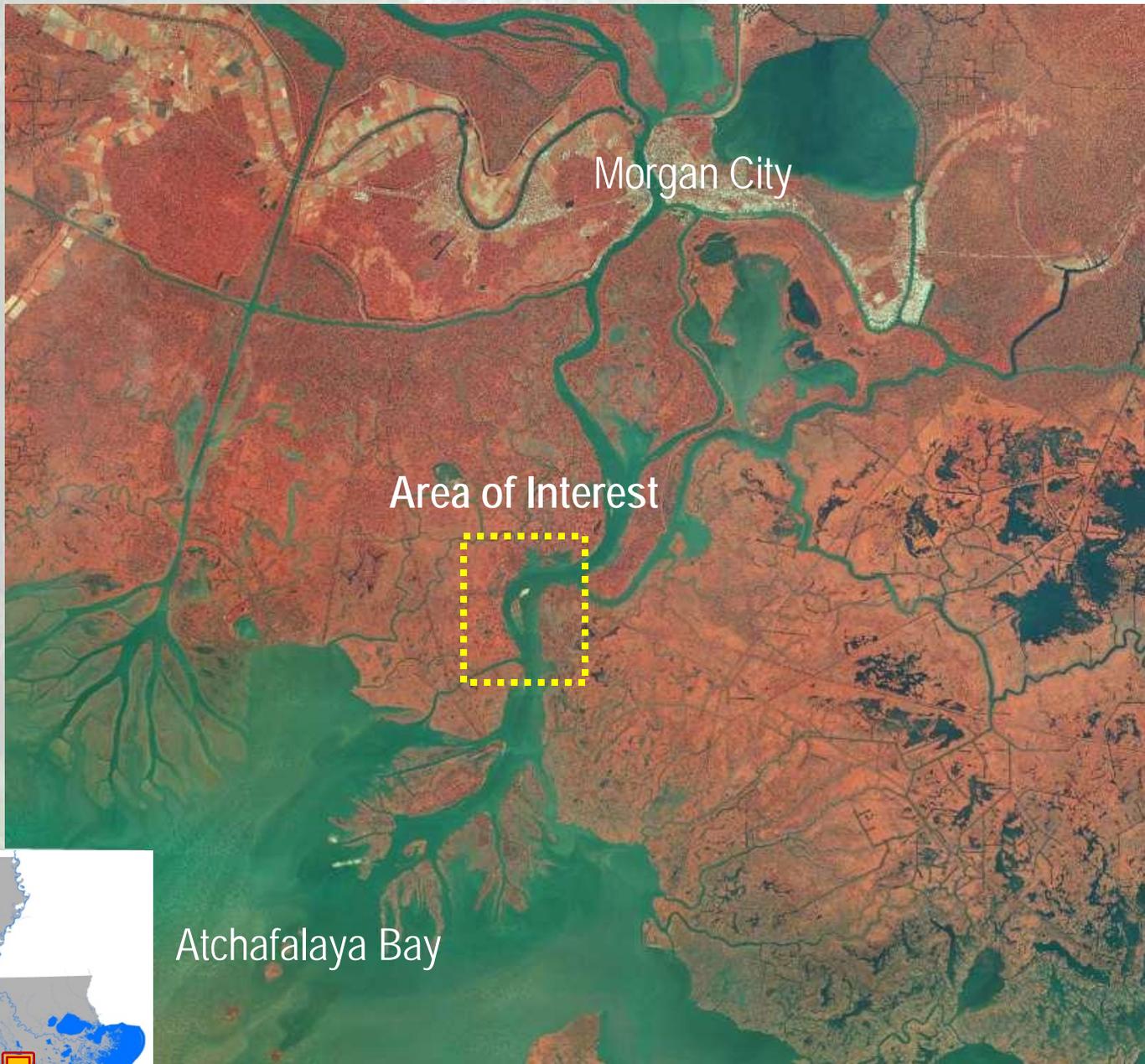
Atchafalaya River & Bayous Chene, Boeuf, & Black  
Federal Navigation Channel

Environmental Benefits Derived from a  
Novel Dredged Material Disposal Practice  
at Horseshoe Bend



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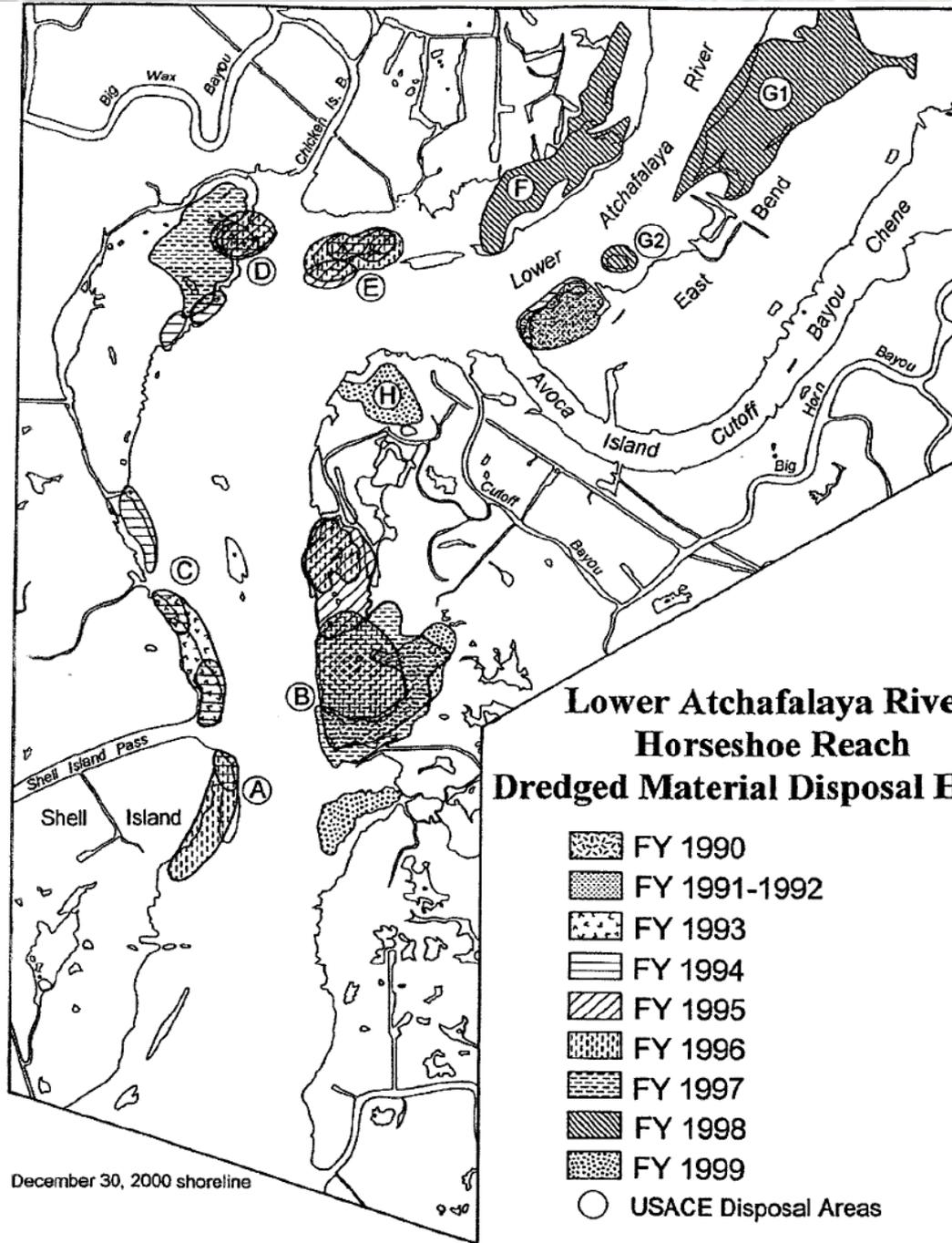
Morgan City

Area of Interest

Atchafalaya Bay



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## ***Problem***

Capacity of Bankline Disposal Areas Exhausted

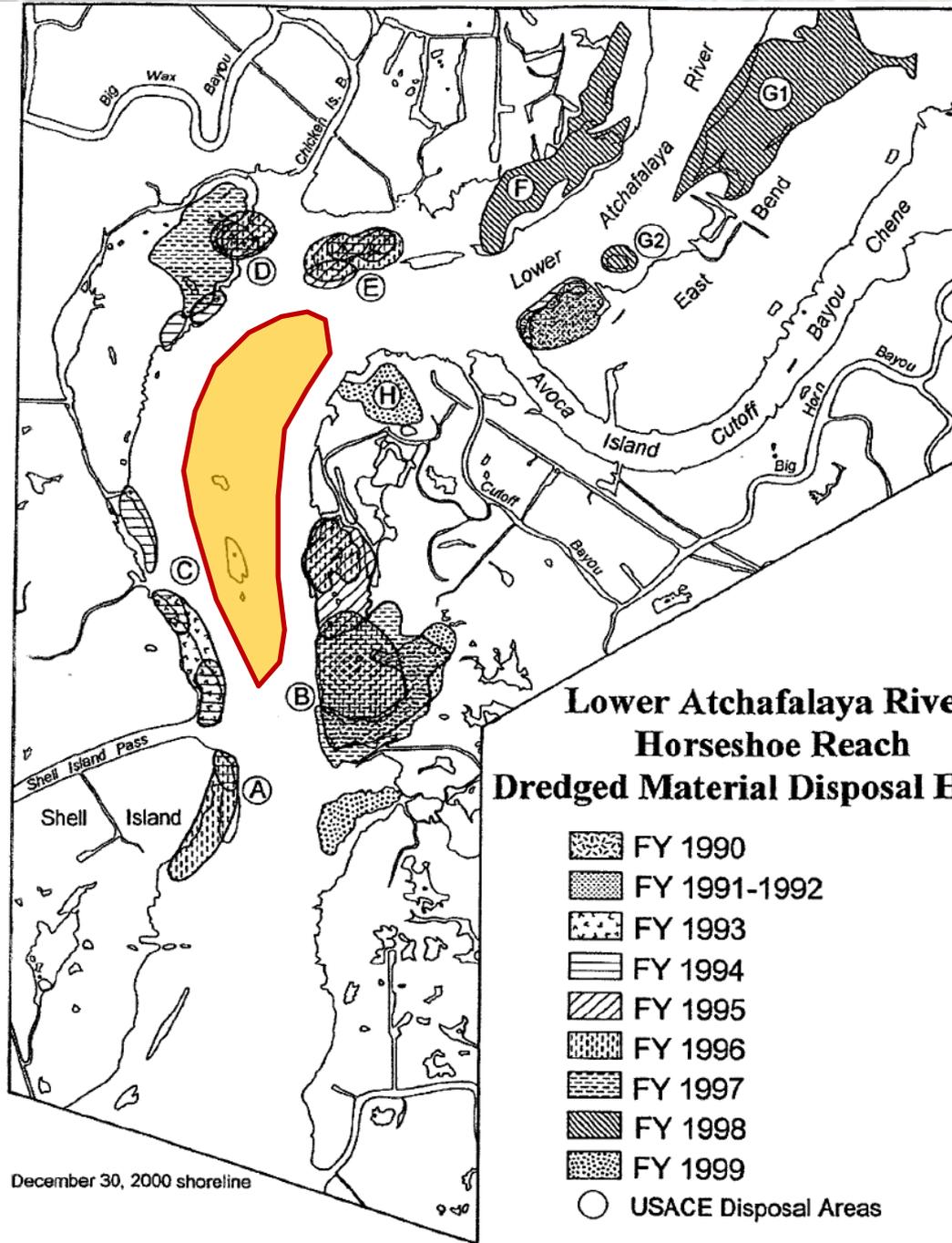
## ***Alternatives***

Conversion of Wetland Disposal Areas into Upland

Open Water Disposal in Atchafalaya Bay



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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



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# *Pre-Disposal (1998) – Natural Mid-River Sandbar*



1998 DOQQ



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# *Initial Dredged Material Mounds (2002-2004)*

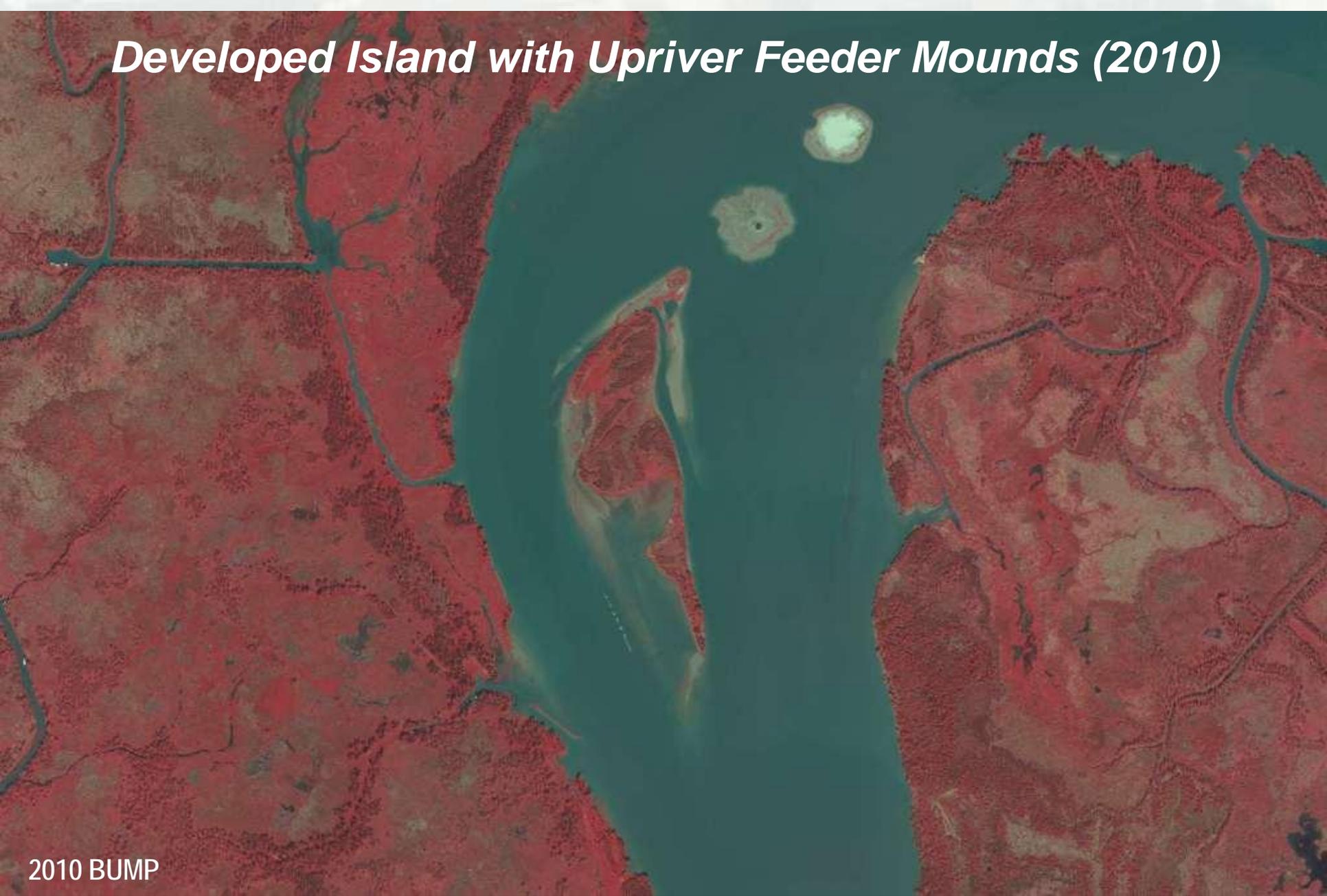


2004 DOQQ



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# *Developed Island with Upriver Feeder Mounds (2010)*



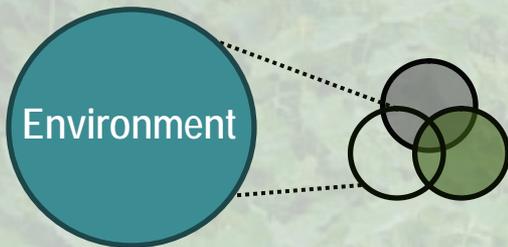
2010 BUMP



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# Quantification of the Environmental Benefit

- \* Identify & Classify Distinct Habitat Types
- \* Catalogue Plants & Animals
- \* Evaluate Soil Horizons



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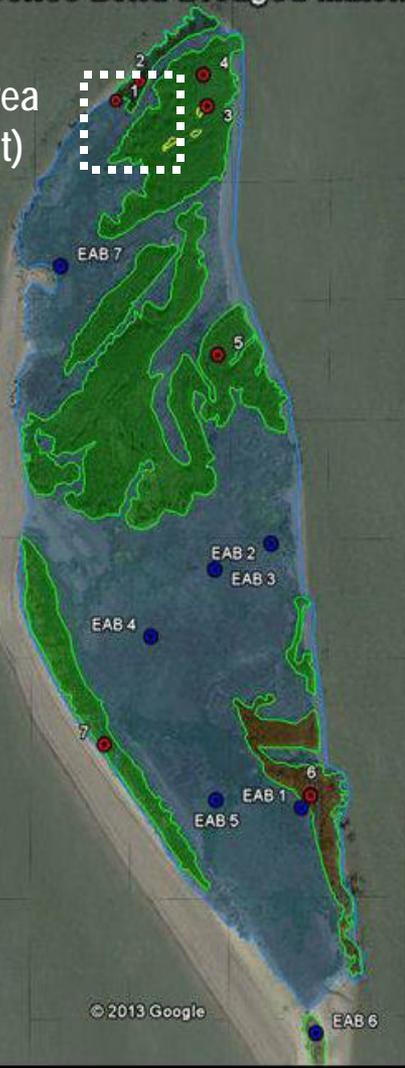


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# Habitat Classification

Horseshoe Bend Dredged Material Island

Photo Area  
(at Right)



Stability  
Complexity  
Age  
Elevation

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



# Example of Classification Metrics: Stem Thickness & Density



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## Stability of each Habitat & Flood Duration / Frequency as Drivers of Plant Diversity



# Feedback from Plant Type on Animals within Each Habitat



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



# ***Summary of Environmental Benefits***

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- \* Four Distinct Wetland Habitats within a Small Area (35 ha), Support a Larger than Expected Variety of Plants & Animals
- \* 81 Plant Species Observed on Island, Compared to 53 Plant Species Noted for Natural Wetlands along the Lower River
- \* Island Performs Like a Natural Wetland, Traditional Dredge & Fill Wetlands take 5-10 Years to Develop
- \* Soils are Active, Function to Cycle Nutrients & Sequester Carbon



# *What Happens Next?*

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- \* Continue Scientific Research  
(Hydrology & Environment)
- \* Document Positive / Negative  
Channel Maintenance Impacts
- \* Communicate Findings Widely  
(Publications, Conferences,  
Press Releases)
- \* Seek other Applications for this  
Novel Disposal Practice



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# *...and the Social Benefit???*



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***...Questions?***

