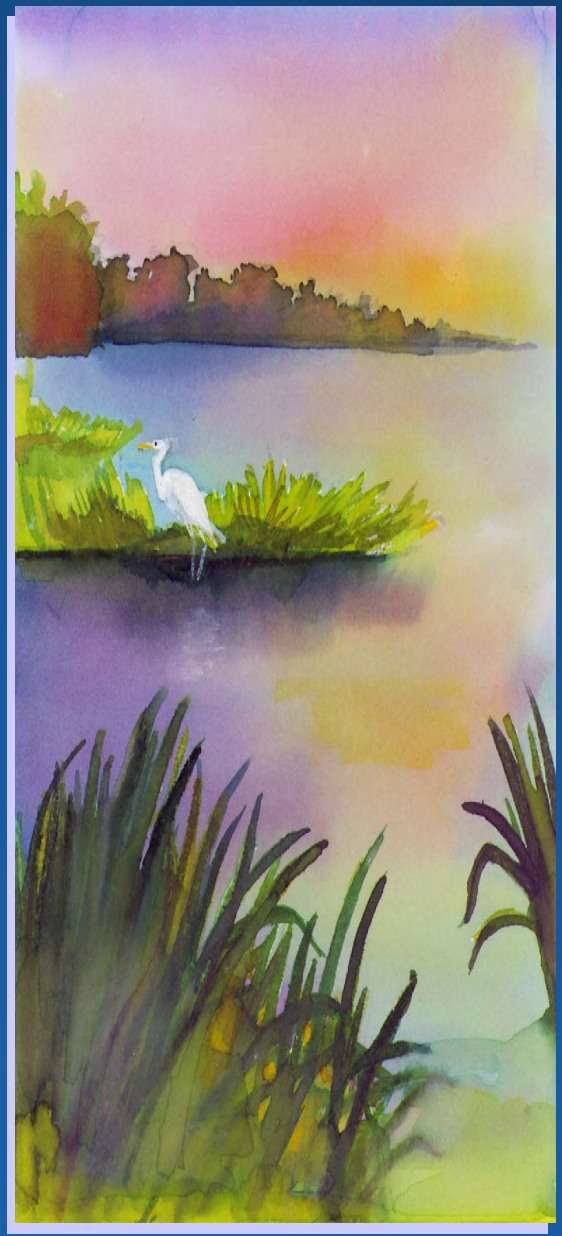

Resurrection of the Bayou People, 2006 A.D.: Wetlands, Hurricanes, and Restoration

Kerry St. Pé

Barrataria-Terrebonne National Estuary Program

BTNEP
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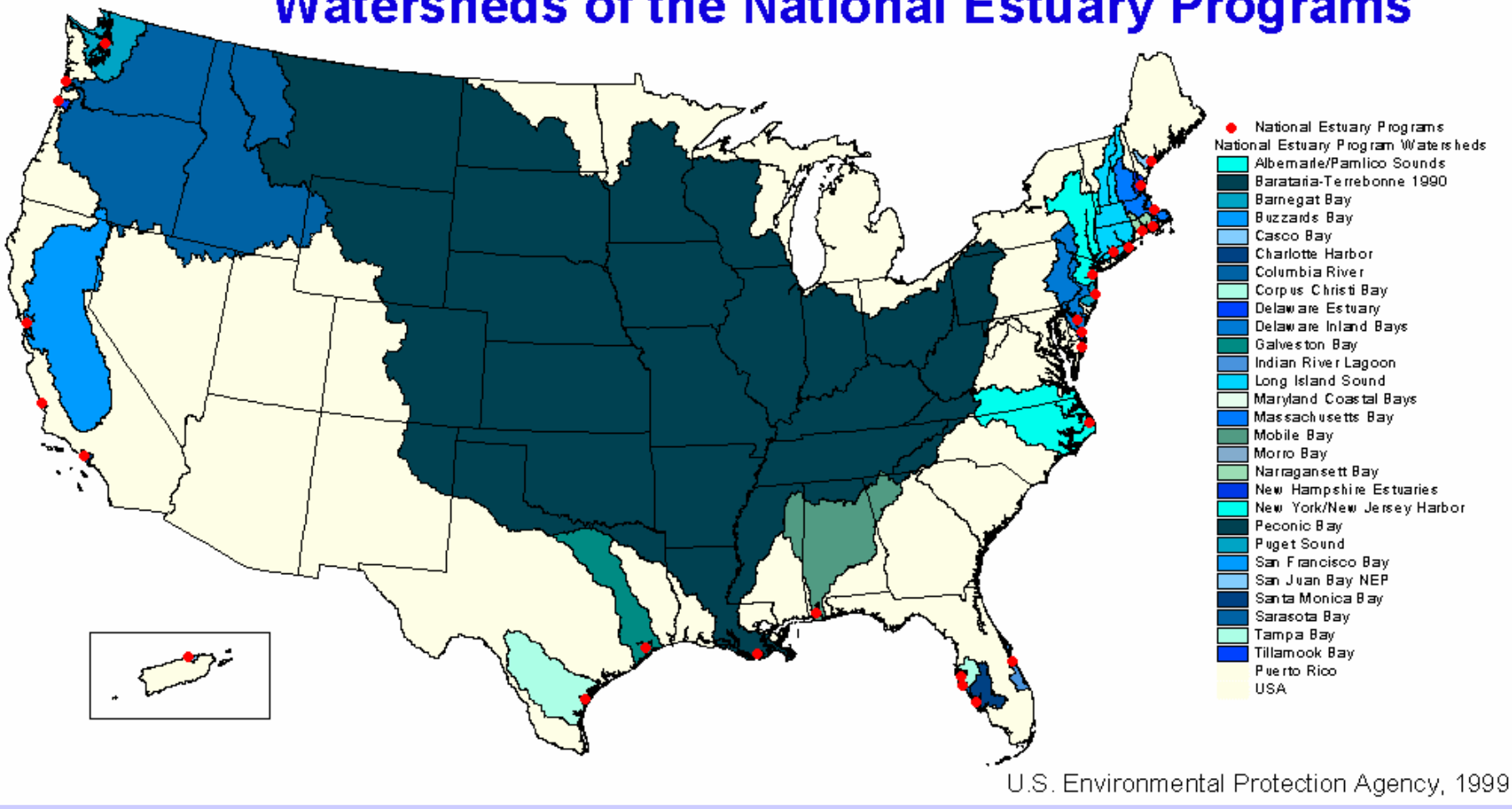
Watersheds of the National Estuary Programs



U.S. Environmental Protection Agency, 1999

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Barataria-Terrebonne National Estuary

www.btnep.org

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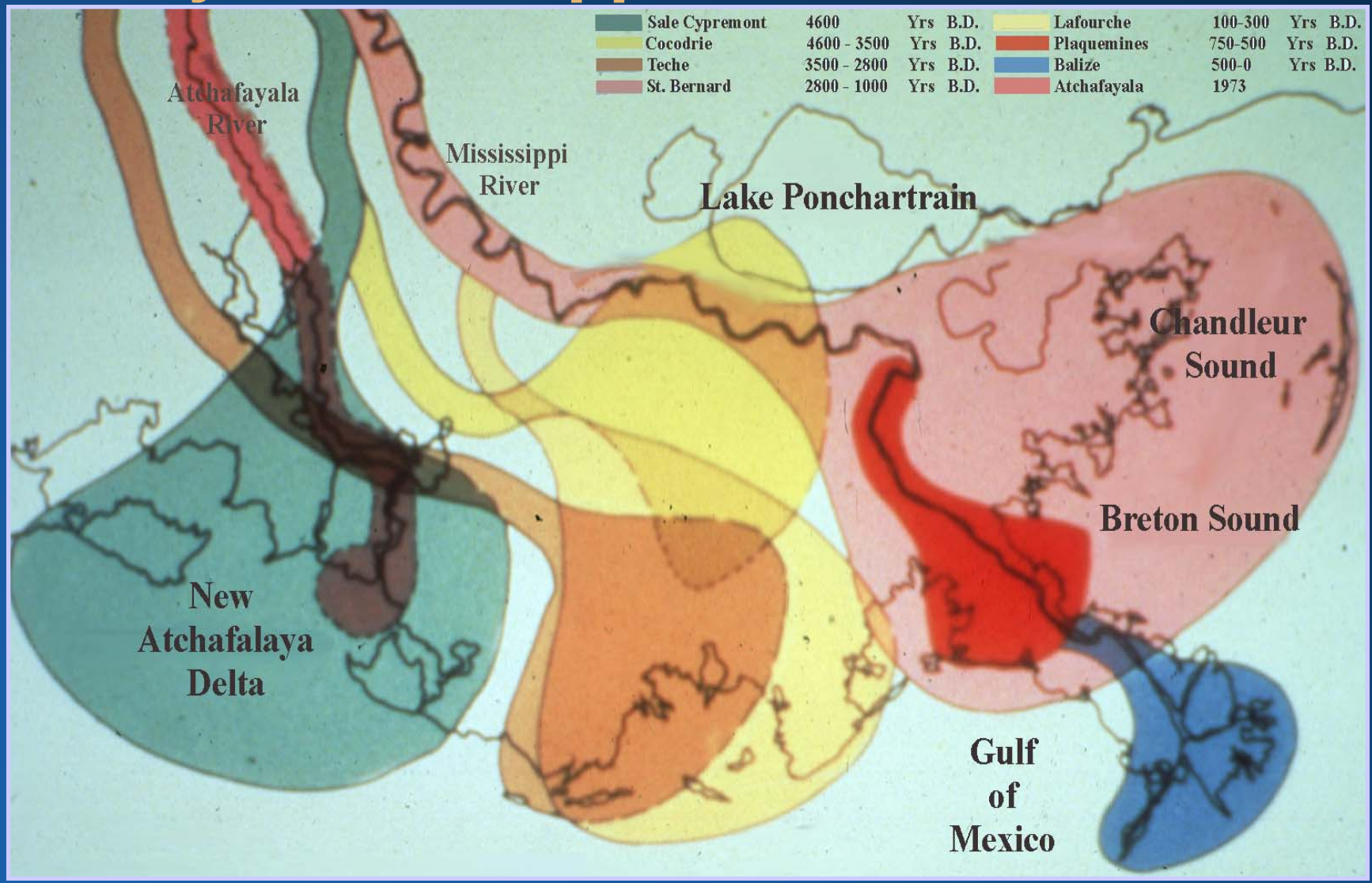
NATIONAL ESTUARY PROGRAM

Major Mississippi River Delta Lobes



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Habitat Types of the Barataria-Terrebonne Basins

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Habitat Types of the Barataria-Terrebonne Basins

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NATIONAL ESTUARY PROGRAM

Habitat Types of the Barataria-Terrebonne Basins

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Habitat Types of the Barataria-Terrebonne Basins

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Habitat Types of the Barataria-Terrebonne Basins

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Habitat Types of the Barataria-Terrebonne Basins

Chenier (French for “oak”) ridges have been designated as critically-imperiled habitats in the BTNEP, particularly for neo-tropical migrant birds.

The BTNEP nomination document (in 1989) identified seven priority issues affecting the region:

Wetland Loss Issues
- Hydrologic Modification
- Reduced Sediment Inflow
- Habitat Loss / Modification

Water Quality Issues
- Eutrophication
- Pathogen Contamination
- Toxic Substances

Wildlife Issues
- Changes in Living Resources

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Hydrologic Modification

Man-made changes in the way water moves through the system

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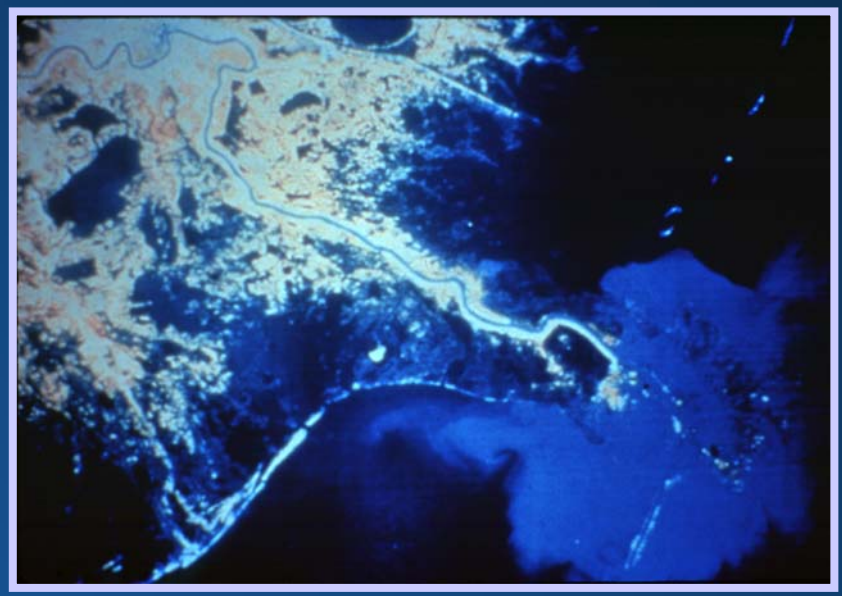
Reduction in Sediment



Silt deposition in wetlands no longer offsets subsidence.

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Since 1850, the suspended sediment load in the Mississippi River has declined by 80% !

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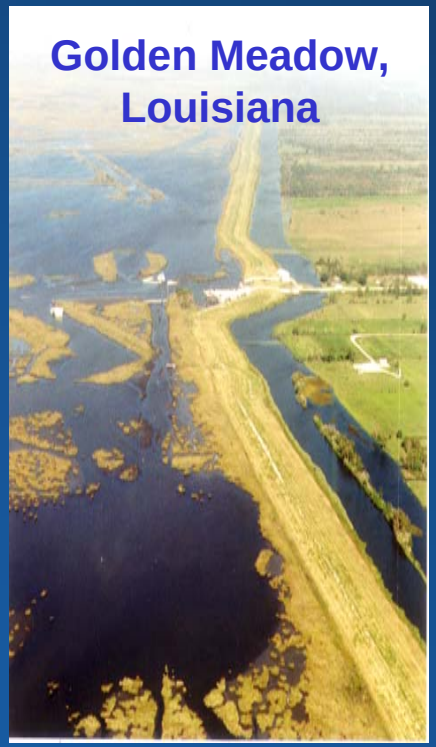
Habitat Loss



Barataria-Terrebonne is disappearing faster than any other area in the world.

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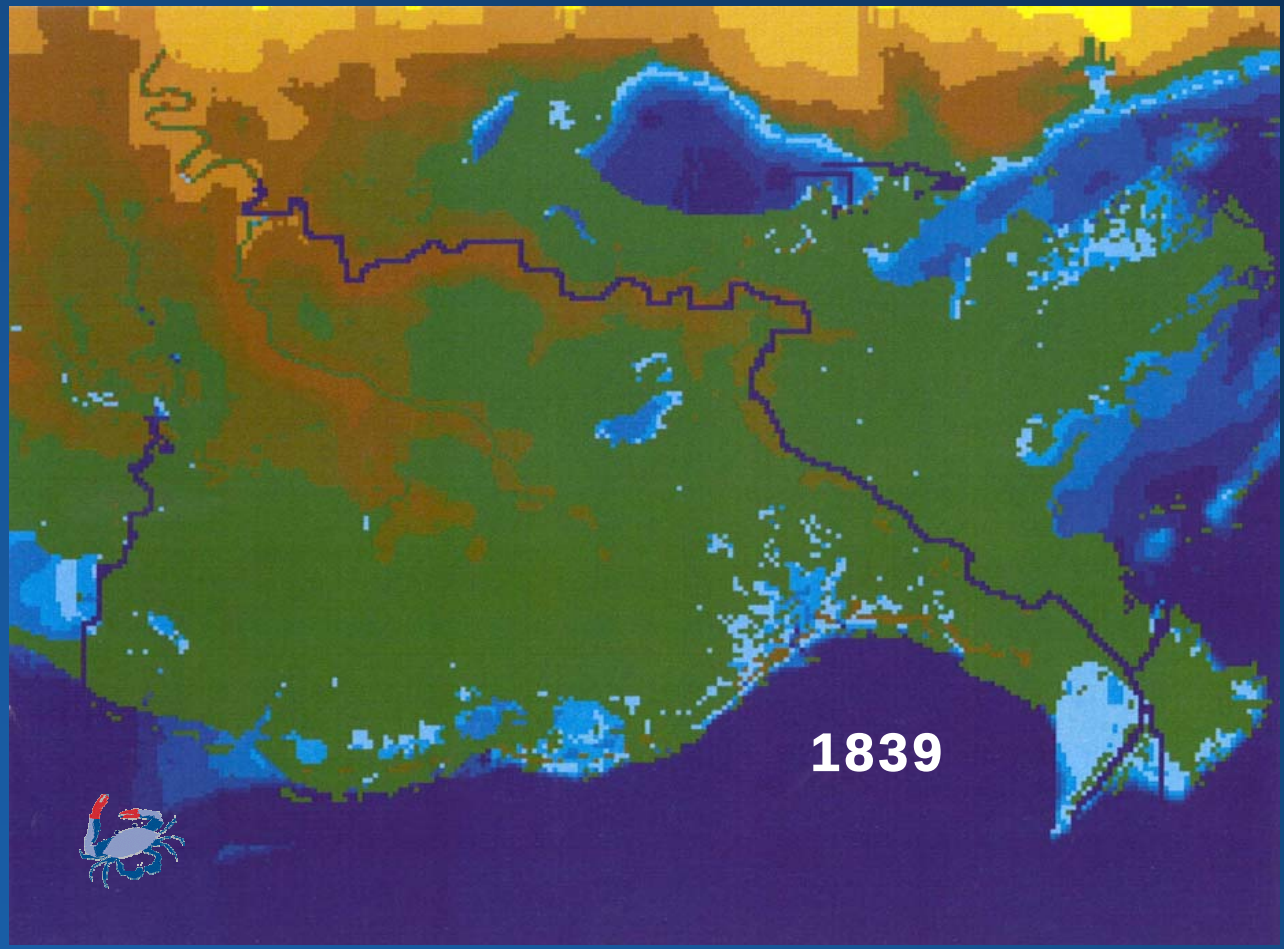
Past and Projected Wetland Loss in the BTNEP (1839 to 2020)



BTNEP
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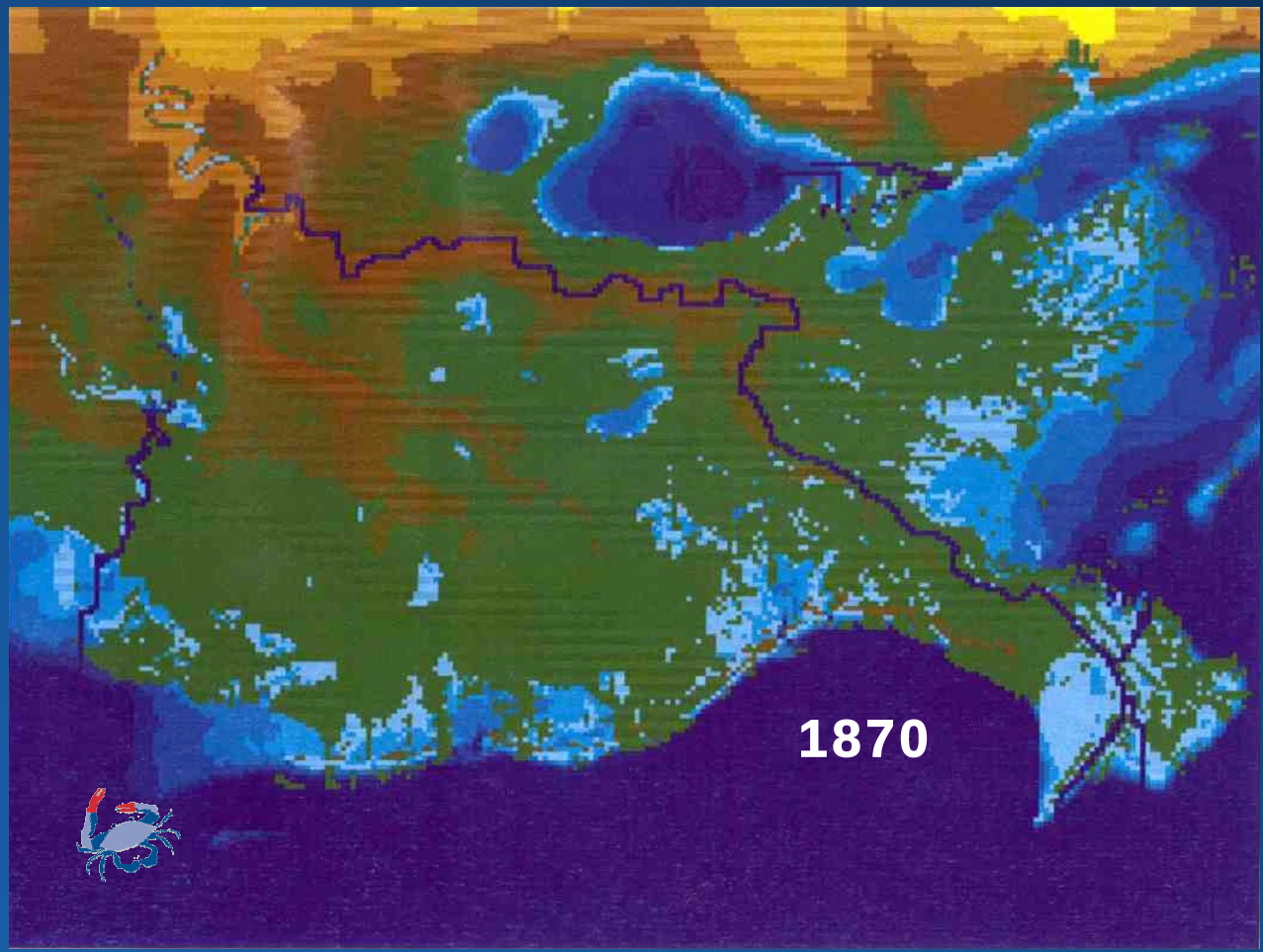
Past and Projected Wetland Loss in the BTNEP (1839 to 2020)



BTNEP
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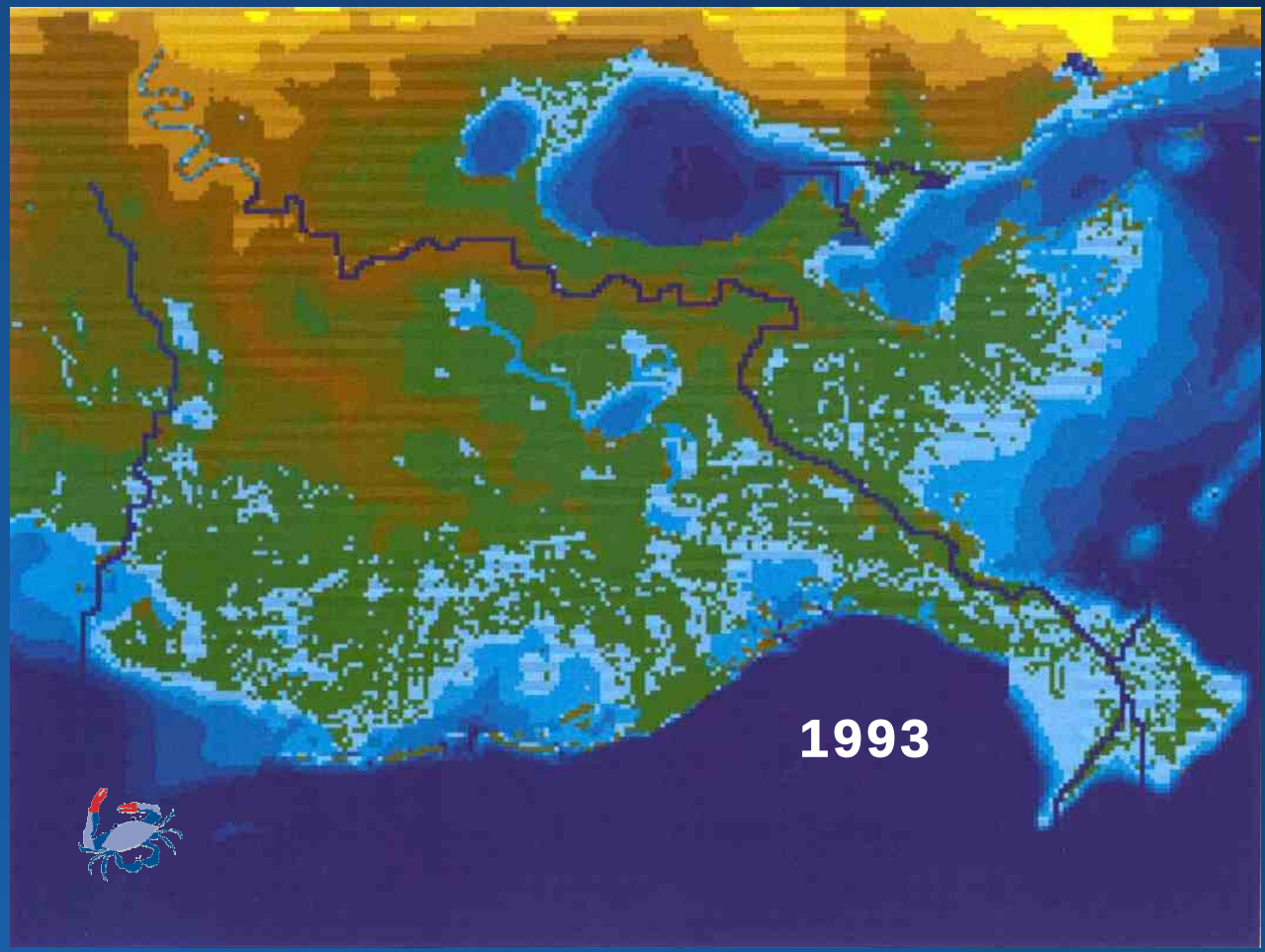
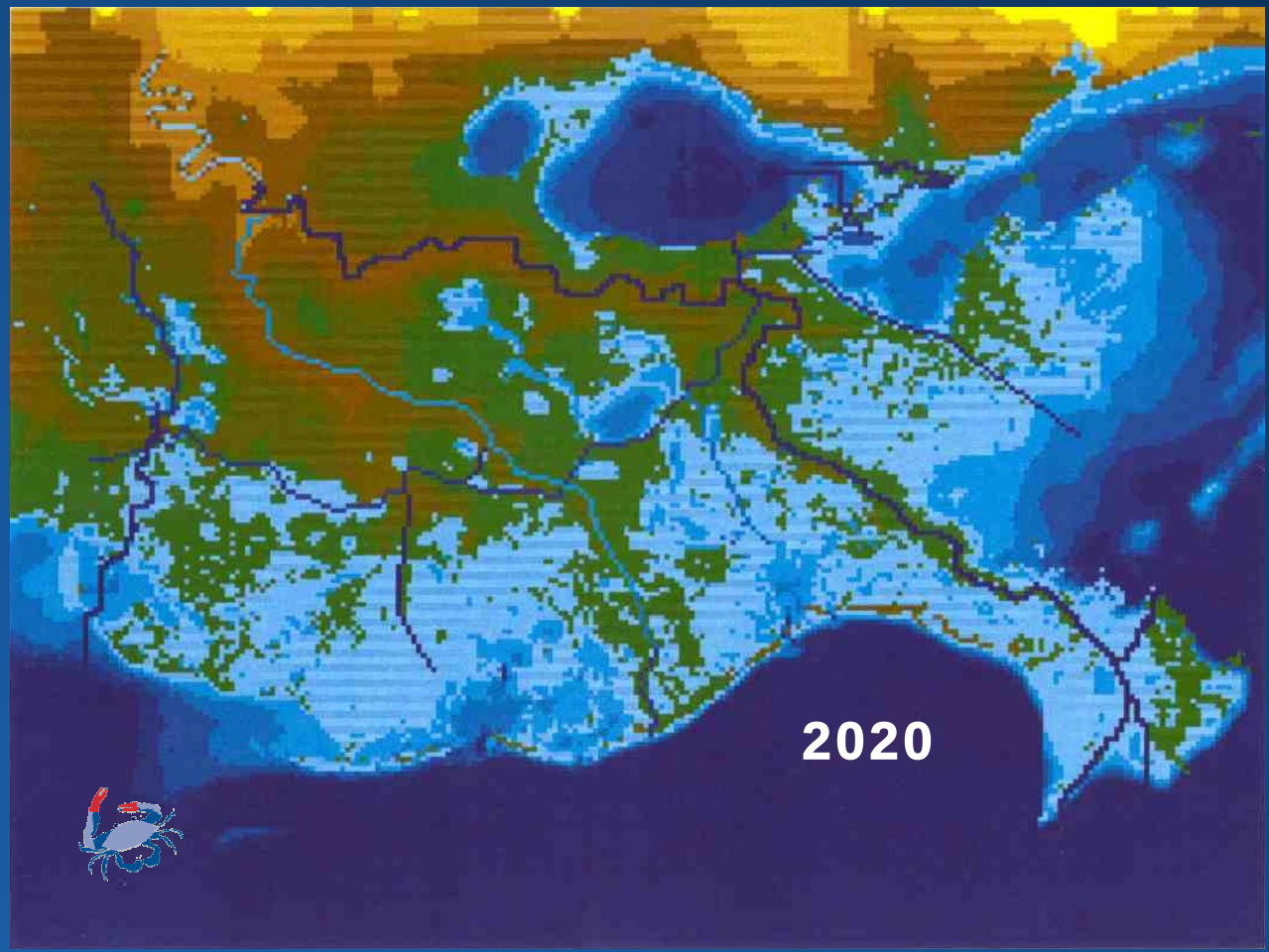
NATIONAL ESTUARY PROGRAM

Past and Projected Wetland Loss in the BTNEP (1839 to 2020)



BTNEP
BARATARIA-TERREBONNE
NATIONAL ESTUARY PROGRAM

Past and Projected Wetland Loss in the BTNEP (1839 to 2020)



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Bayou Lafourche – Use as a Domestic Water Supply – Threatened

The Courier, Houma; 11 December 2006, 12:12PM

Lafourche Parish Council to decide about saltwater-control structure

Daily Comet, Thibodaux, Editorial; 10 November 2006, 11:20AM

Drinking-water safety should be a priority

Daily Comet, Thibodaux; 09 November 2006, 1:11PM

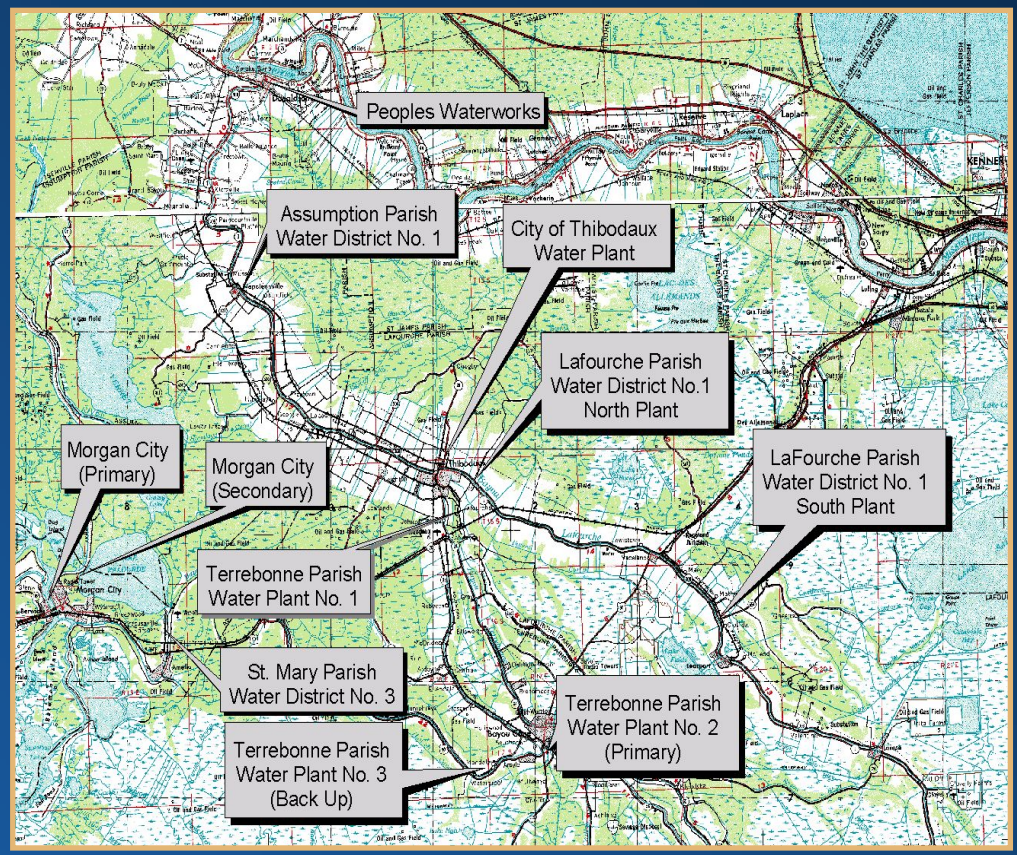
Salt in water exceeds federal standards

The Courier, Houma; 03 November 2006, 1:02PM

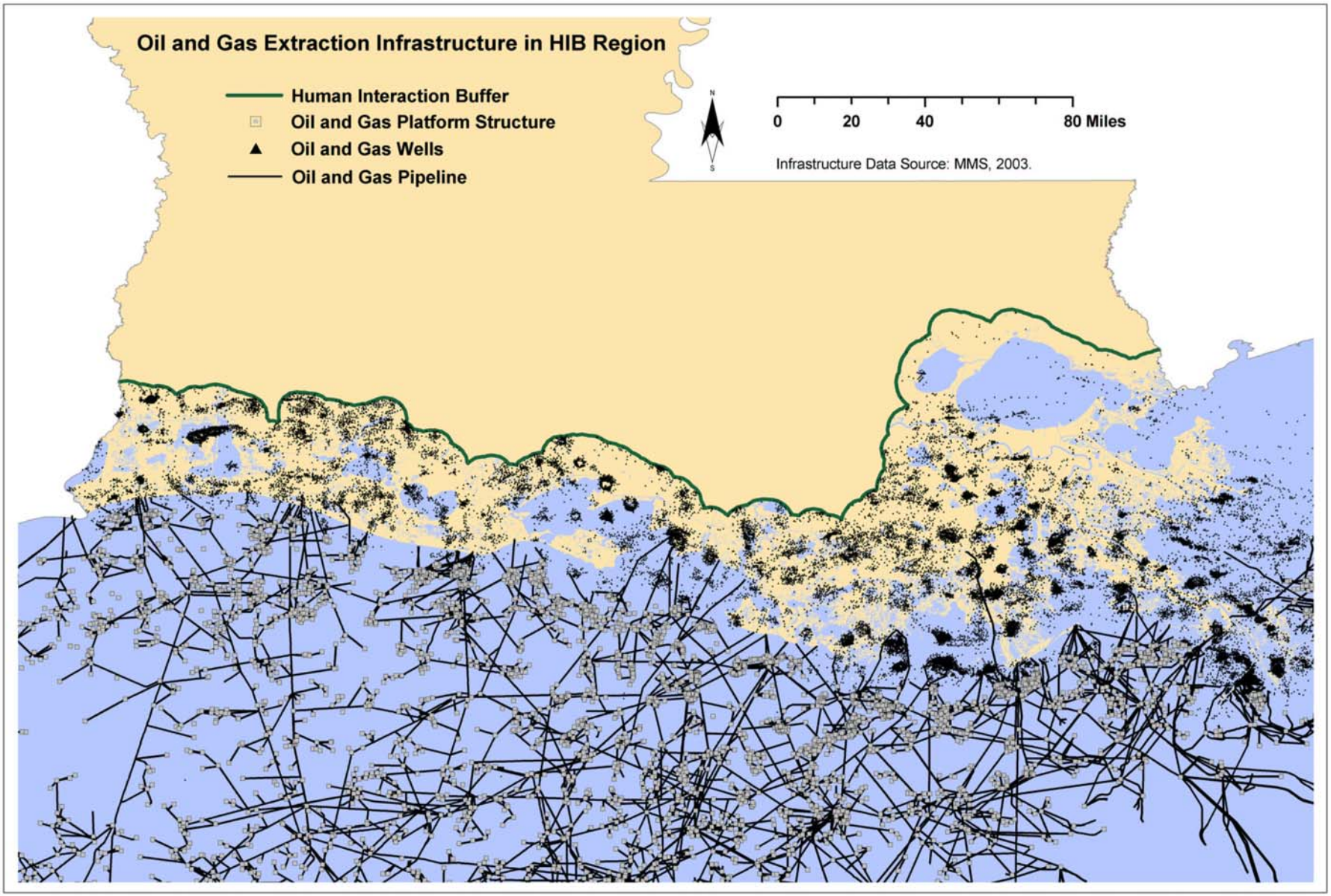
Gulf salt increasingly threatens water supply

Daily Comet, Thibodaux; 19 October 2006

Flooding yields salty water in parts of Lafourche



BTNEP
BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM



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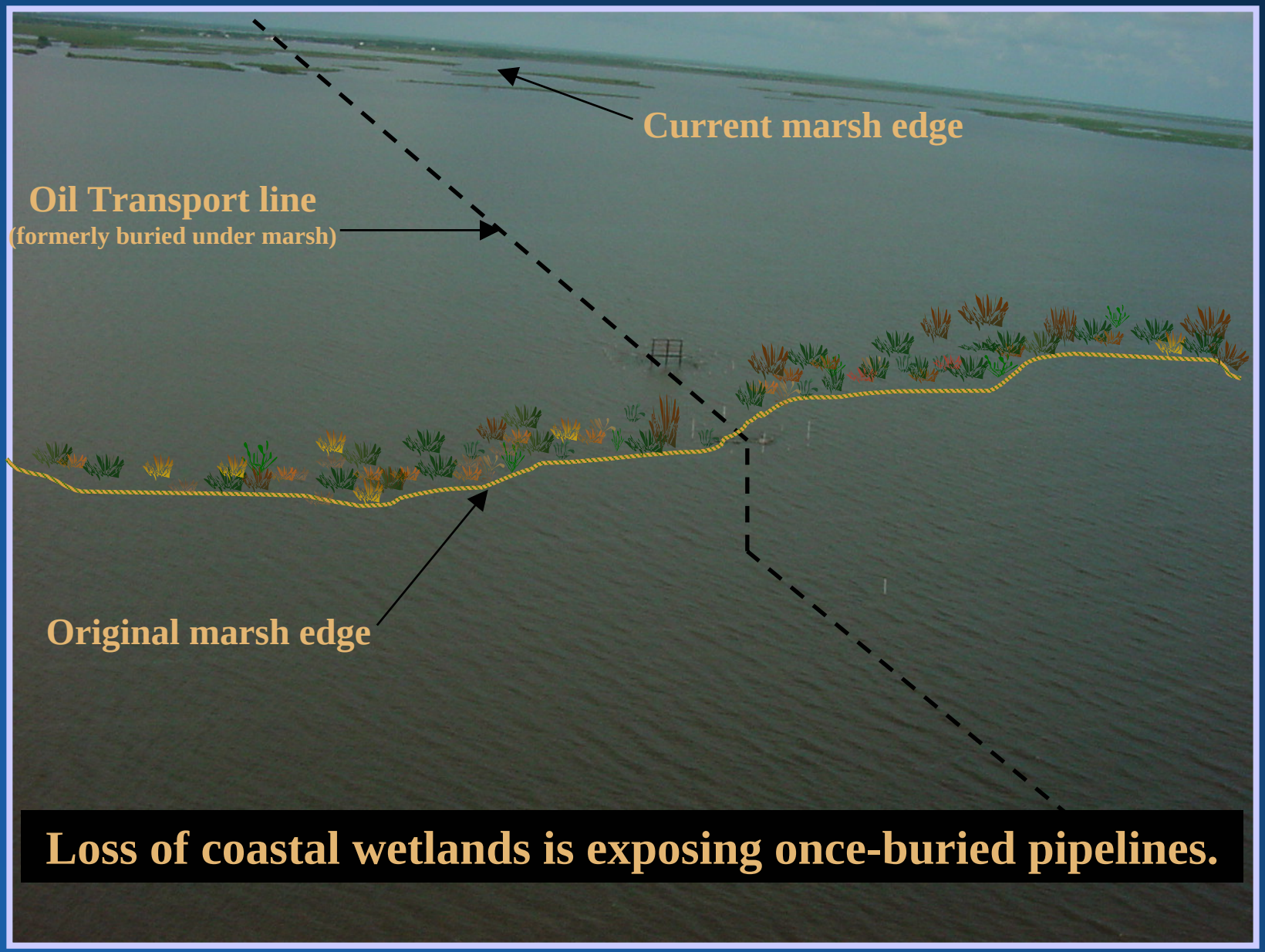

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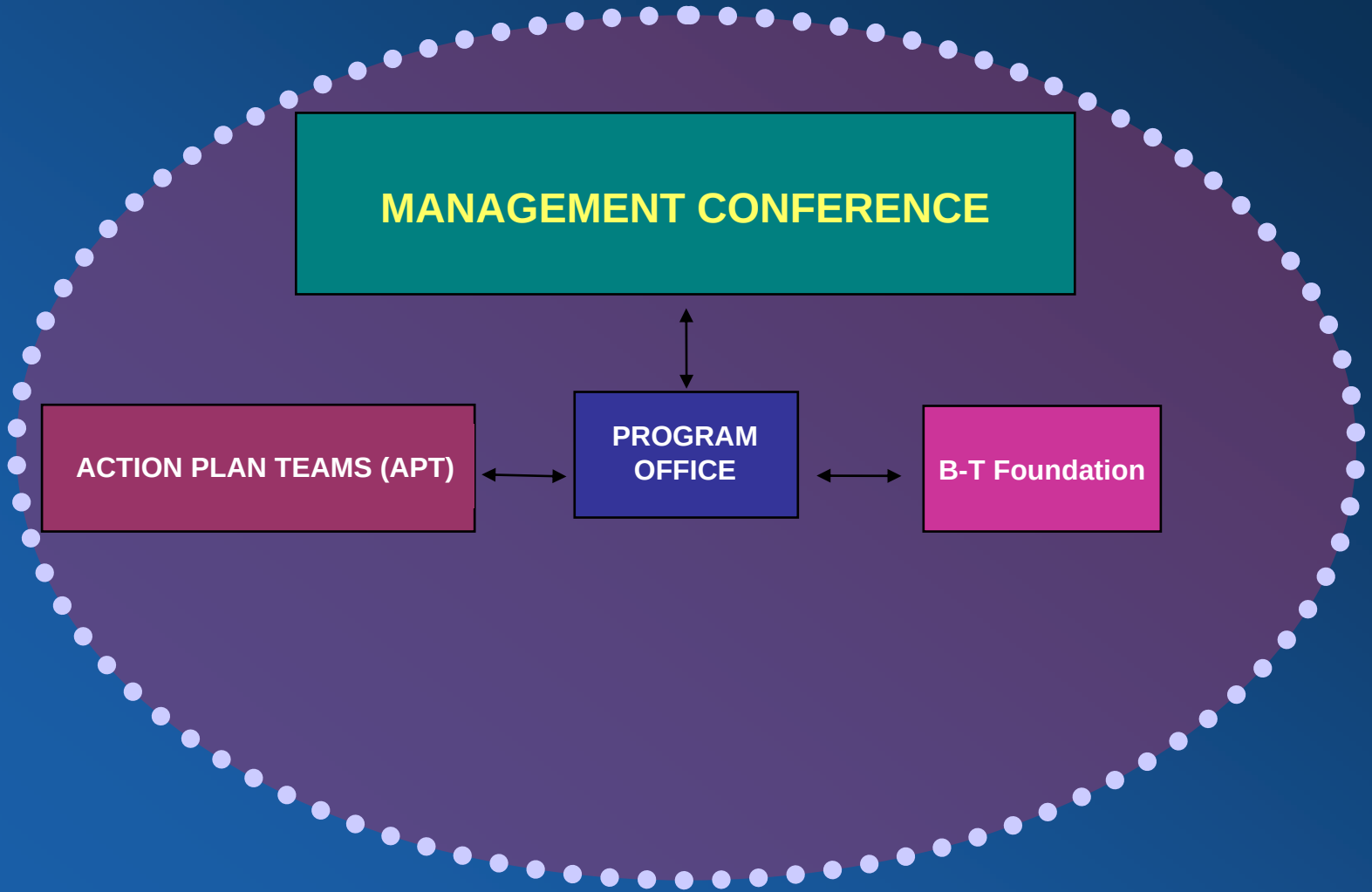
Implementation Phase Structure



The B-T Management Conference

Natural Resources Conservation Service
Greater Lafourche Port Commission
La Dept. of Environmental Quality
La Dept of Economic Development
Coalition to Restore Coastal La
The Nature Conservancy
National Park Service
La Assoc. of Levee Boards
US Geological Survey
Plaquemines Parish
LSU Ag Center
US Coast Guard
Jefferson Parish
La Science Teachers Assoc.
South La Economic Council
La Dept of Natural Resources
American Sugar Cane League
American Waterways Operators
La Independent Oil and Gas Assoc.
La Assoc. of Conservation Districts
US National Marine Fisheries Service

La Dept of Culture, Recreation and Tourism
US Environmental Protection Agency
La Dept of Health and Hospitals
Gov. Office of Coastal Activities
La Mid Continent O & G Assoc
US Army Corp. of Engineers
US Fish & Wildlife Service
La Wildlife Federation
Nicholls State Univ.
Assumption Parish
Lafourche Parish
St Charles Parish
Land Owners. Assoc.
La Dept of Education
Terrebonne Parish
La Oil Spill Coordinators Office
La Dept. of Wildlife & Fisheries
La Seafood Management Council
Coastal Conservation Assoc of La
La Dept of Agriculture & Forestry
Bayou Lafourche Freshwater District
La Universities Marine Consortium
South Central Planing & Development Com.

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A Conceptual Model for the BTNEP Approach to System Restoration

"Most people are concerned about the environment but feel overwhelmed by the complexity and scale of the problems." – Maurice Strong, Chairman of the Earth Council, 2001.

Question:

Given the overwhelming complexity and scale of our problems, what factors need to be considered in a restoration plan?

Answer:

Any and all factors that result in a holistic, consensus driven *agreement*.

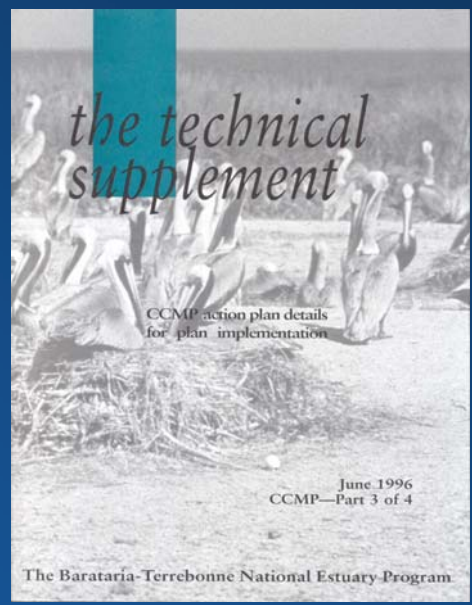
Barataria-Terrebonne National Estuary Program Comprehensive Conservation and Management Plan

51 Action Plans address living resources, habitat, and water quality issues.

PLUS ...

Cultural Heritage, Education, National Recognition, Economic Development, and Coordinated Planning

This broader, holistic approach is the greatest strength of the NEPs and can be used to effect positive change among program partners.



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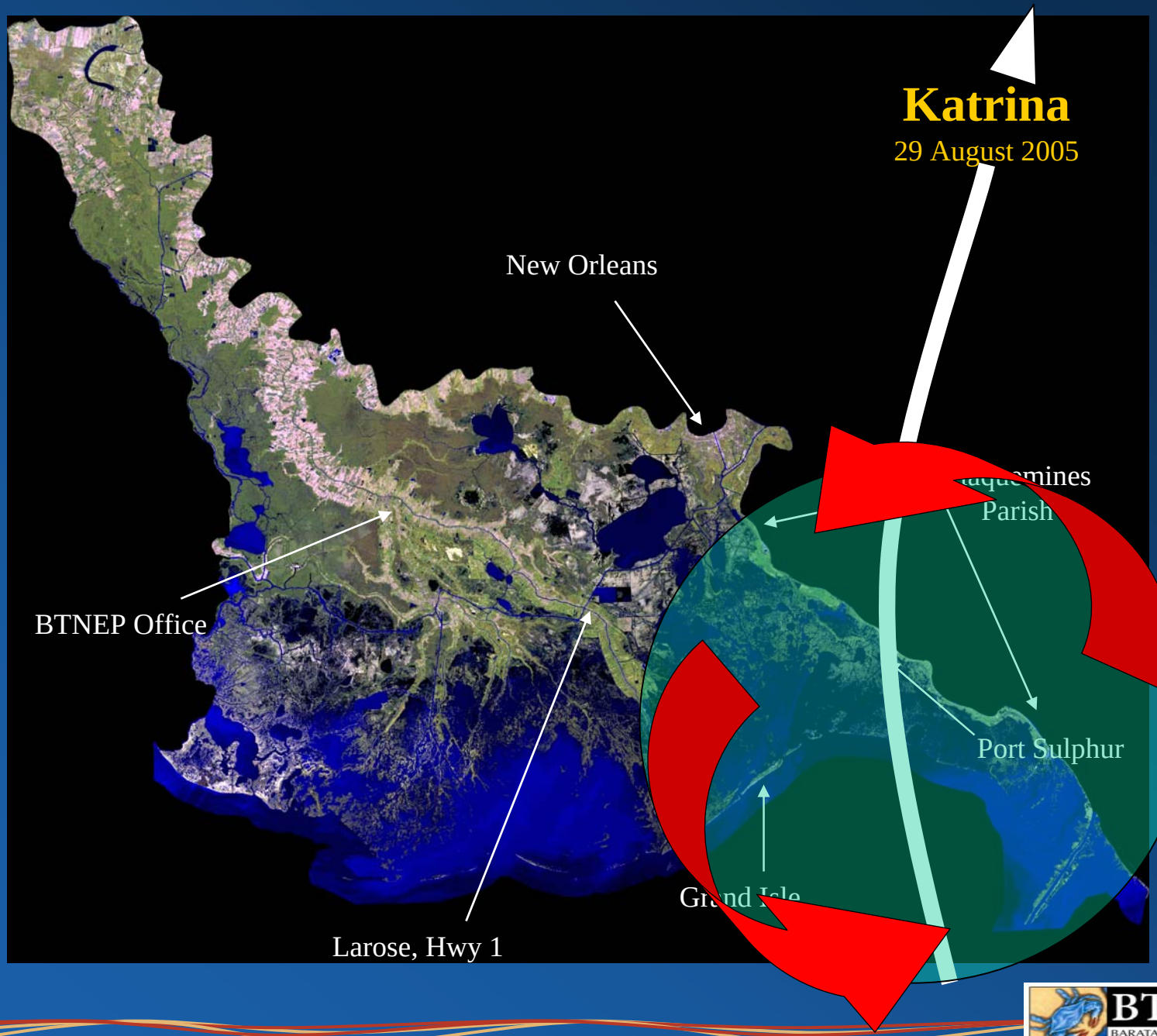
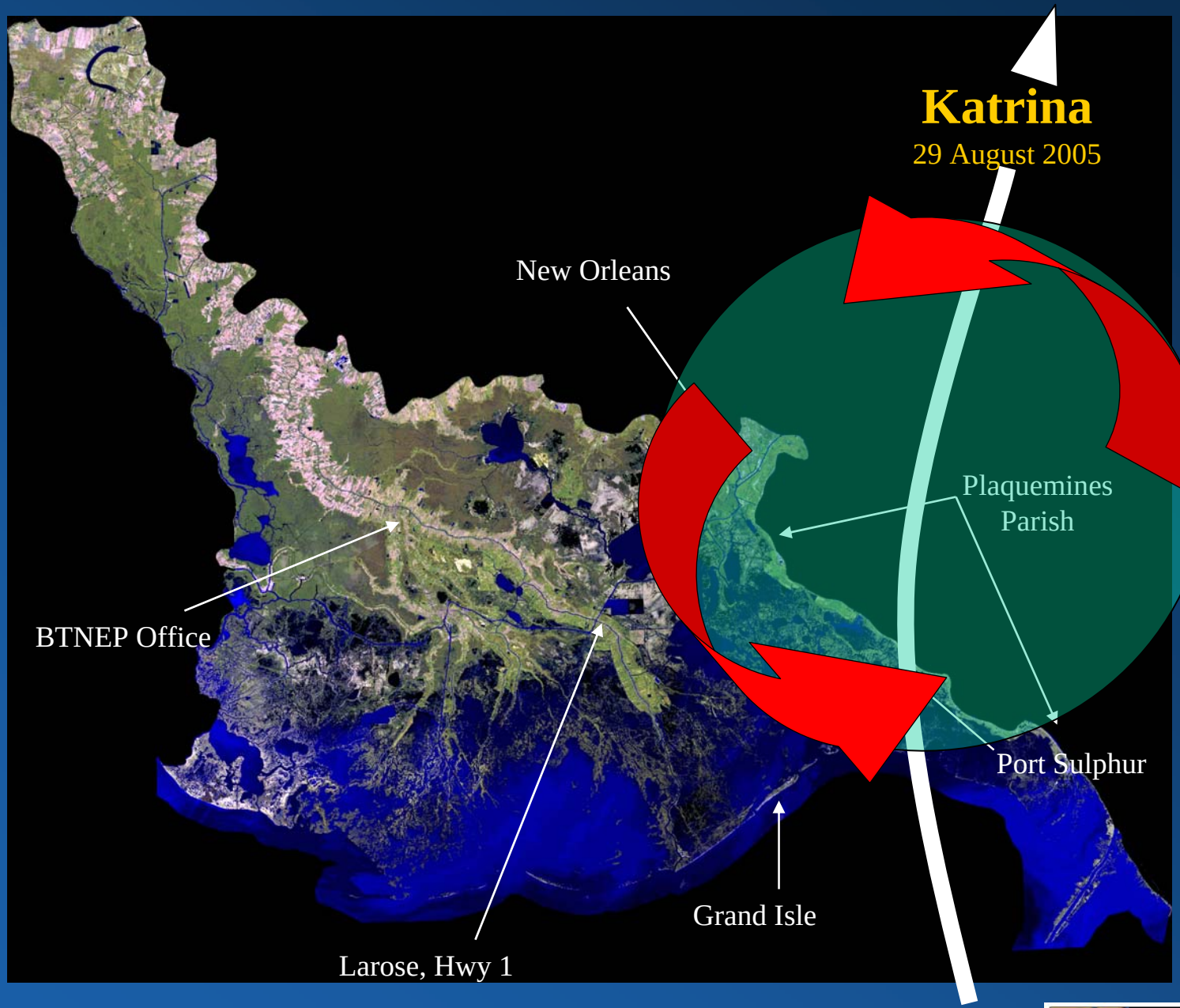
Hurricane Katrina

29 August 2005

BTNEP
BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM


Katrina
29 August 2005
New Orleans
BTNEP Office
Larose, Hwy 1
Parish
Port Sulphur



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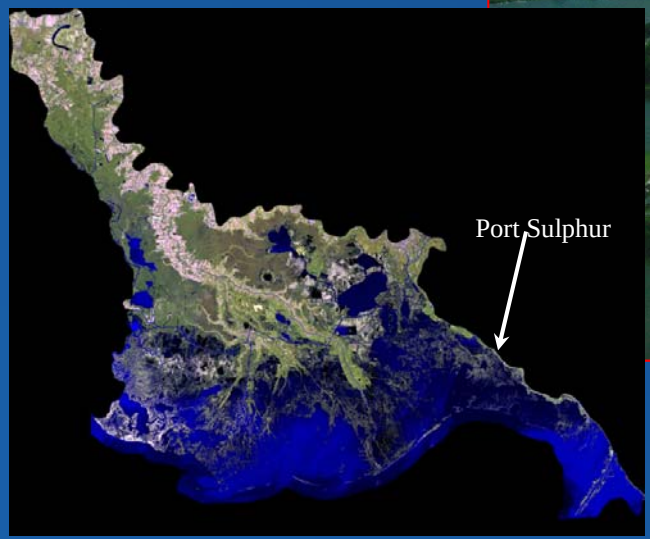
Port Sulphur, Louisiana

Plaquemines Parish



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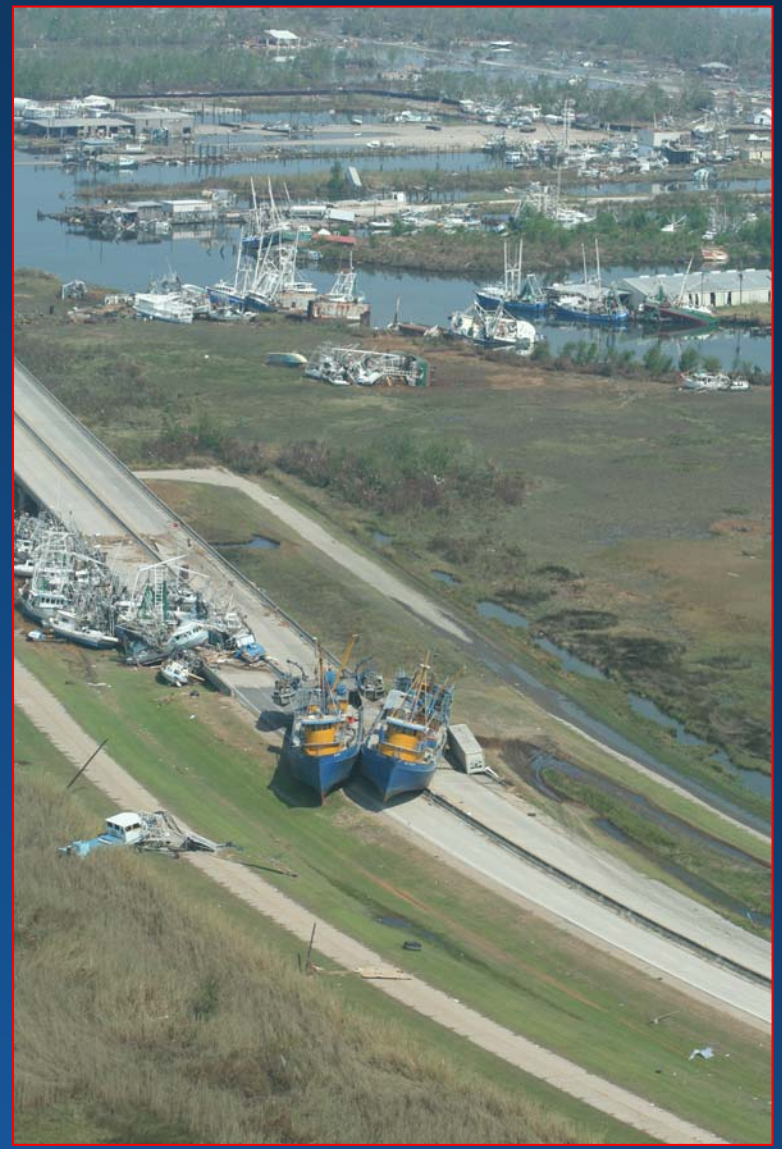
Empire, Louisiana – Post-Katrina



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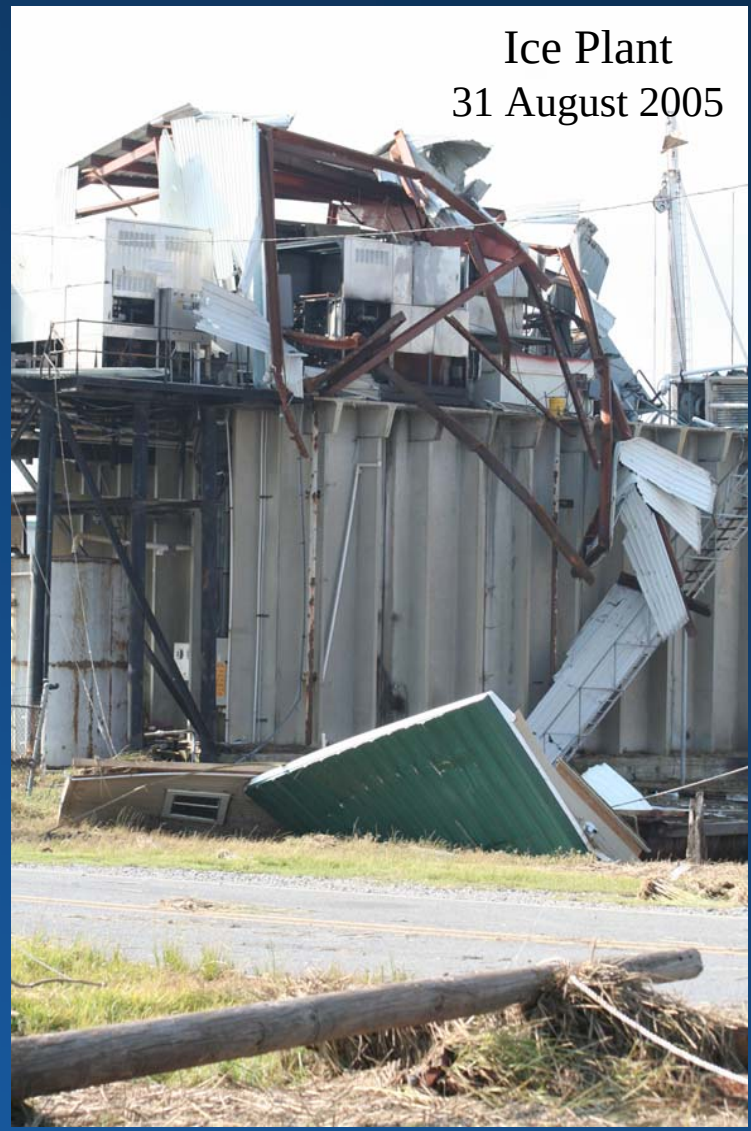
Port Fourchon, Louisiana, 31 August 2005



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Oak, Maritime Forest, Grand Isle, Louisiana

31 August 2005

Katrina surge from this direction

Live-Oak, Maritime Forests

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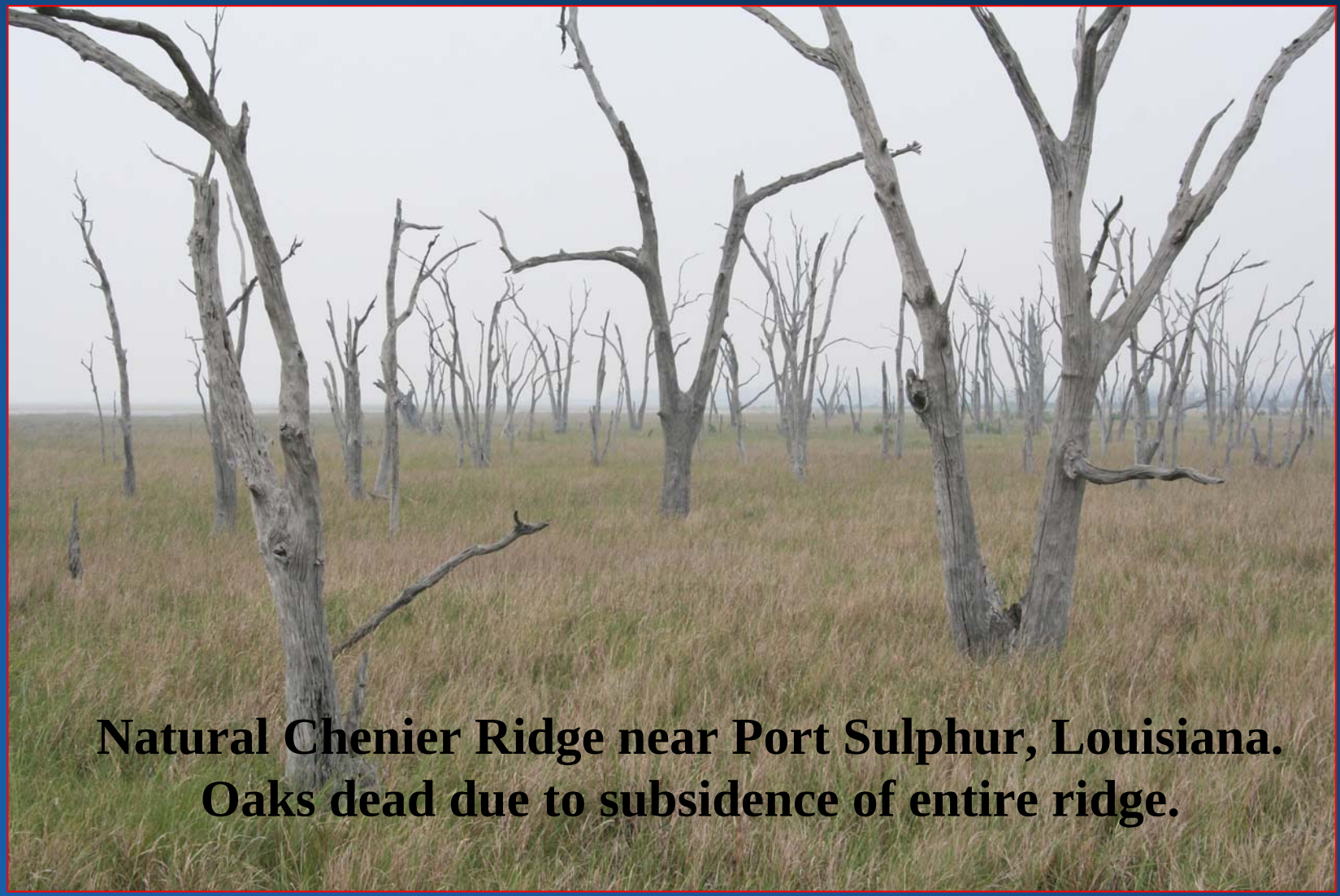

Natural Chenier Ridge near Port Sulphur, Louisiana. Oaks dead due to subsidence of entire ridge.

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Oil Storage tank farm, Plaquemines Parish, Louisiana

10,000 Barrels crude … vaporized

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Gulf accounts for 23% of U.S. domestic natural gas and 30% of U.S. oil!

Katrina interrupted 95% of Gulf oil production and 88% of OCS gas!

By 31 August 2005 …

- Crude oil up $2.61 to $69.81 – record high
- Gasoline up 41.39 cents to $2.4745 per gallon – record high
- Heating oil up 16.71 cents to $2.0759 per gallon – record high
- Natural gas up 52 cents to $11.659 per million BTUs – record high

Sources: Bloomberg News, MMS, and Shell E & P

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Hurricane Rita

24 September 2005

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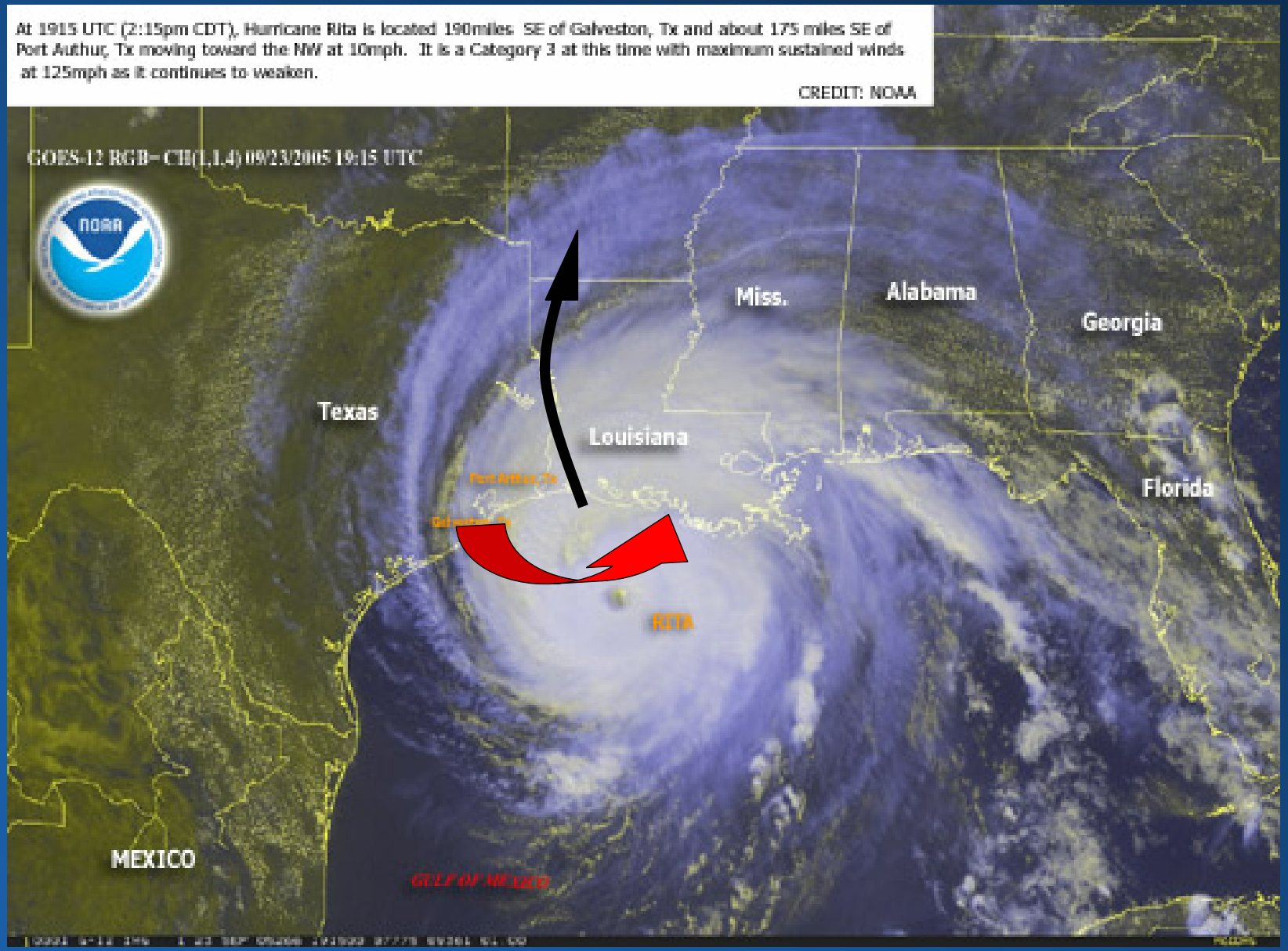
At 1915 UTC (2:15pm CDT), Hurricane Rita is located 190miles SE of Galveston, Tx and about 175 miles SE of Port Authur, Tx moving toward the NW at 10mph. It is a Category 3 at this time with maximum sustained winds at 125mph as it continues to weaken.
CREDIT: NOAA
GOES-12 RGB= CH(1,1,4) 09/23/2005 19:15 UTC
NOAA
Texas
Louisiana
Miss.
Alabama
Georgia
Florida
MEXICO
GULF OF MEXICO
RITA

Levee Breach at Montegut, Terrebonne Parish, Louisiana

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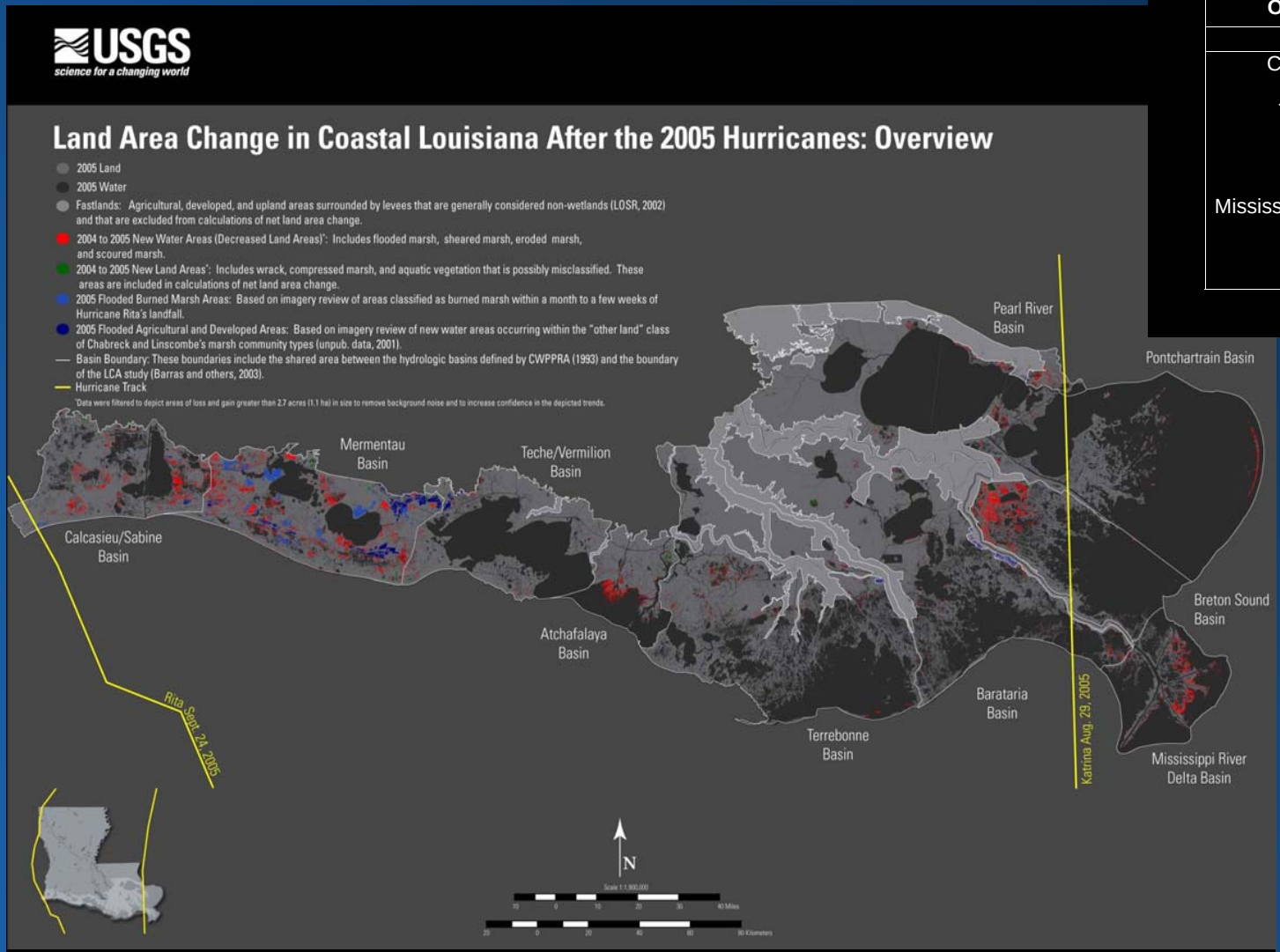
Land Area Changes October 2004 to October 2005	
Basin	**Land area (mi^2)**
Calcasieu/Sabine	-22
Mermentau	-62
Teche/Vermilion	-5
Atchafalaya	-9
Terrebonne	-19
Barataria	-18
Mississippi River Delta	-18
Breton Sound	-41
Pontchartrain	-19
Pearl River	-4
Total	-217



Data Source:
Barras, John A., 2006, Land area change in coastal Louisiana after the 2005 hurricanes—a series of three maps: U.S. Geological Survey Open-File Report 06-1274

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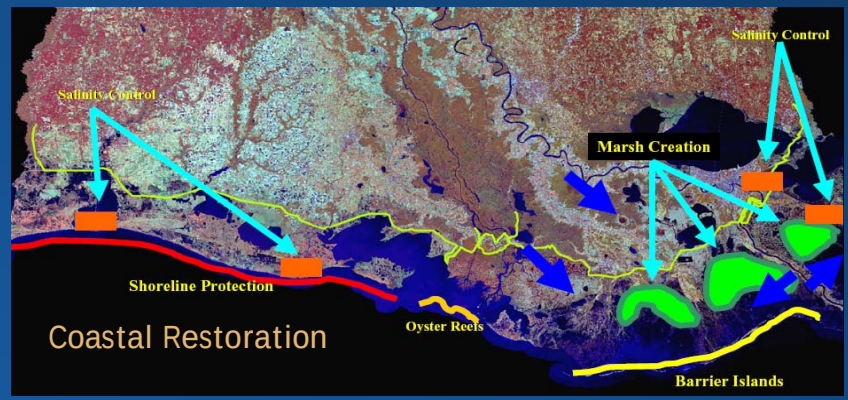
Levee Alignments Being Considered by the U.S. Army Corps of Engineers



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So, how do we fix it?

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If we are to be successful in our coastal restoration efforts, we must retain some level of current socio-economic patterns.

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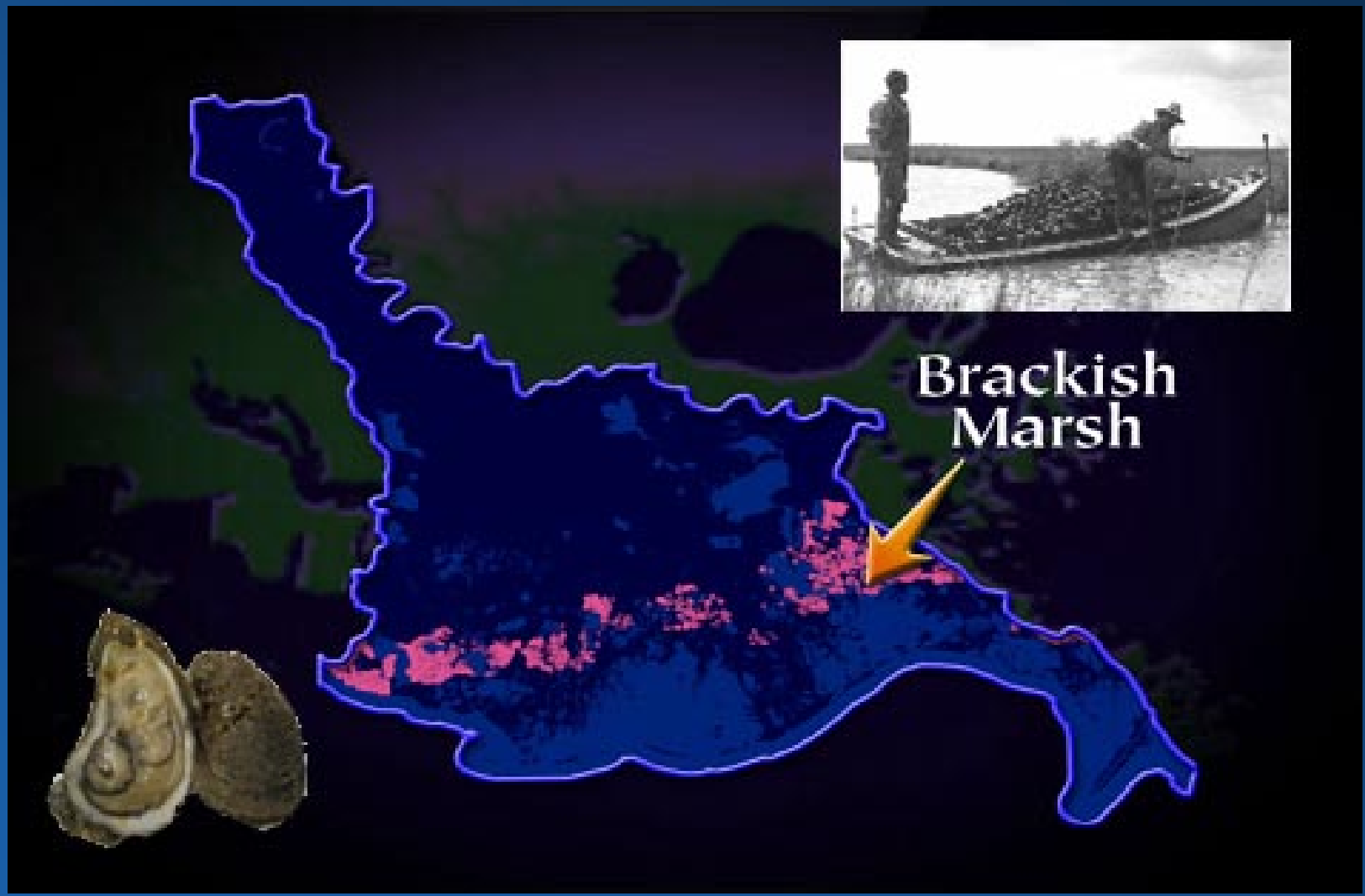
Brackish
Marsh

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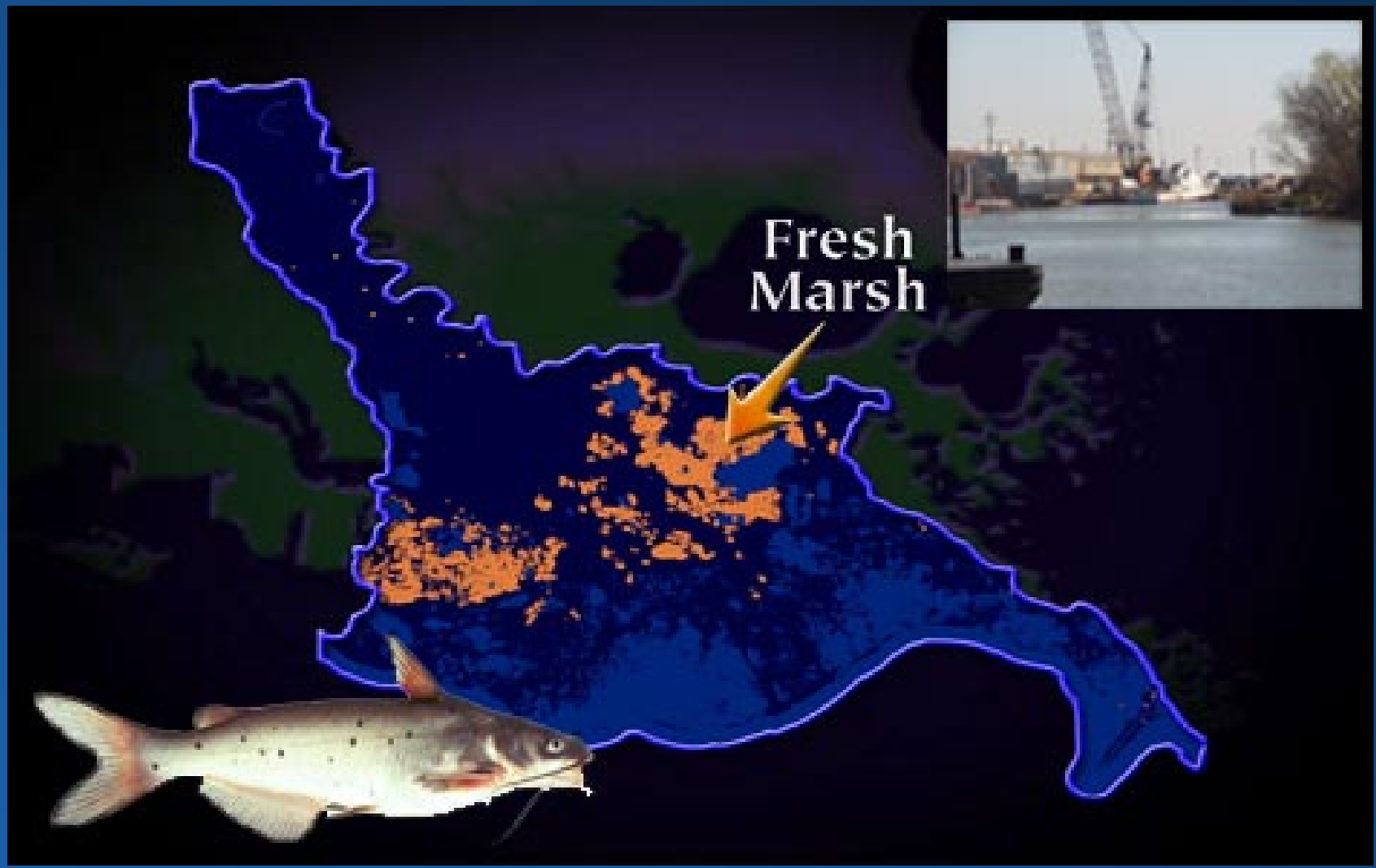

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Davis Pond Freshwater Diversion

- Largest diversion to date in the Barataria Basin
- Completed in 2002
- Cost = $119.6 million
- 10,650 cubic feet per second (max)

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Sediment Delivery from Mississippi and Atchafalaya River Bottoms

- Need? Obviously, we need sediments (barrier islands, marshes, ridges, etc.).
- Public Support? Get needed sediment with little water, so publicly acceptable!
- Is this possible? … We've been doing it for decades!

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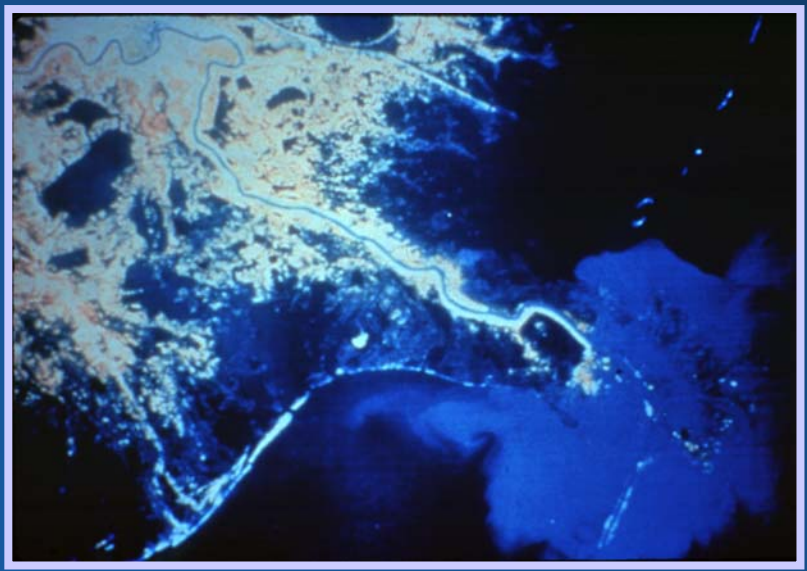

- Mississippi and Atchafalaya convey over 180 million cubic yards of sediment annually
- Corps N.O. District alone dredges 70 million cubic yards annually

- The amount dredged from the Mississippi and Atchafalaya exceeds the amount needed for restoration (ACOE)
- 100 million metric tons annually wasted over continental shelf

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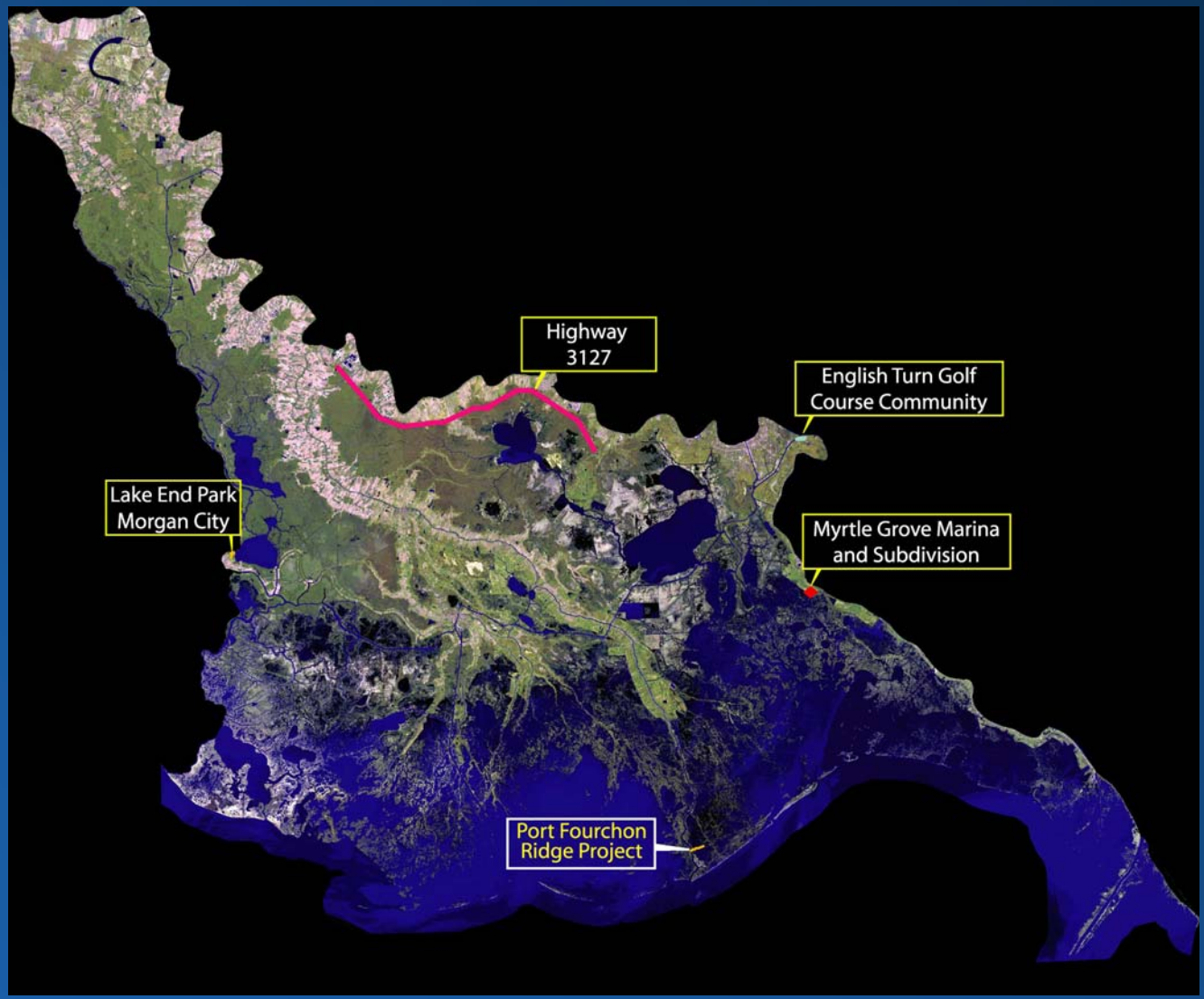
Sediment Slurry Projects Built within BTES from Pumped River Materials



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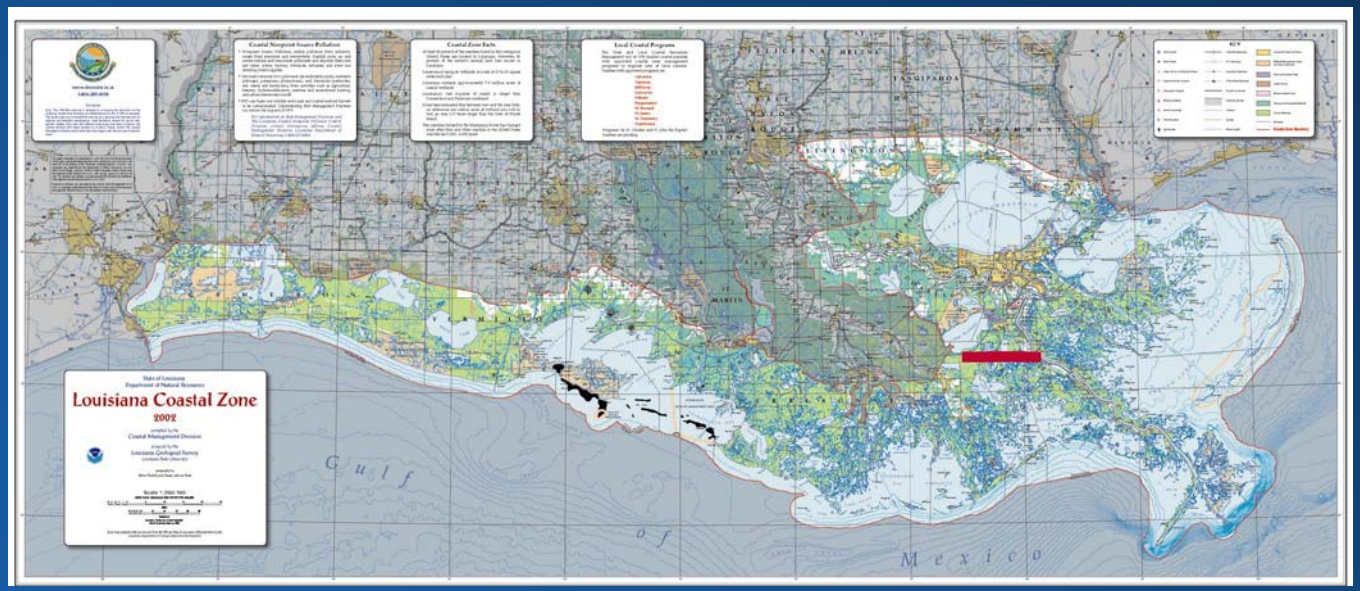
Distances Possible with Existing Slurry Technology



White Rock Lake – Sediment Slurry – Dallas, Texas.....19.7 miles

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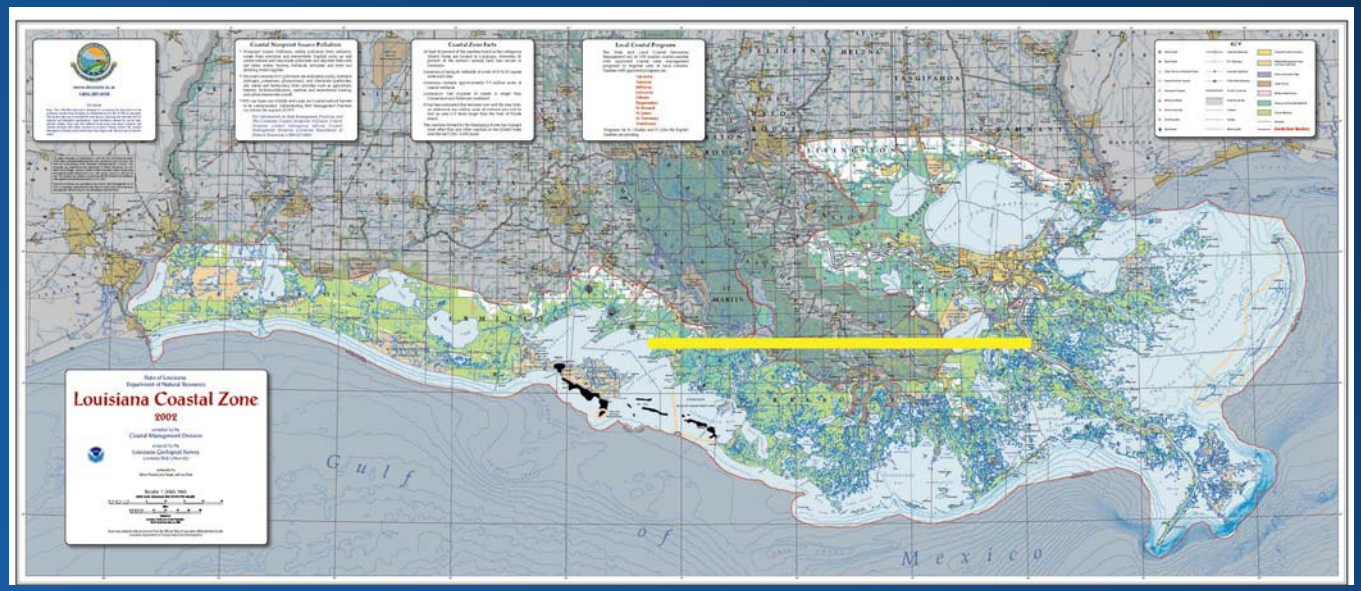
Distances Possible with Existing Slurry Technology



Betuwe Route Project – Sediment Slurry – The Netherlands……..100 miles

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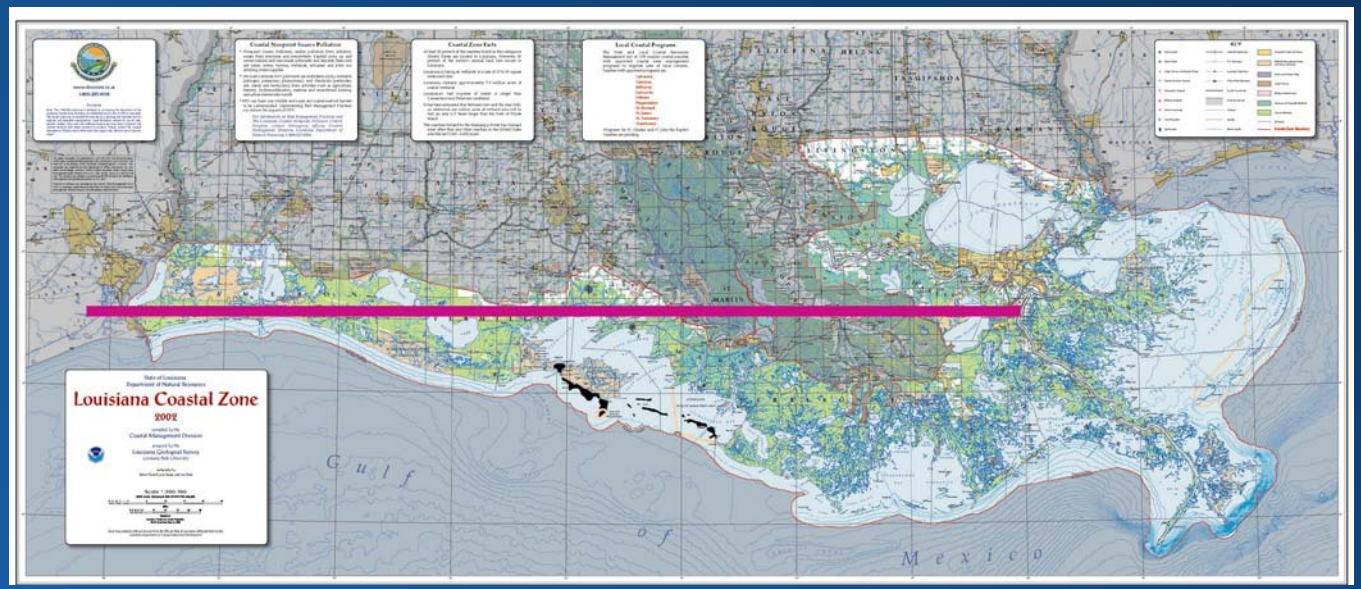
Distances Possible with Existing Slurry Technology



Samarco – Iron Concentrate Slurry – Samarco, Brazil……245 miles

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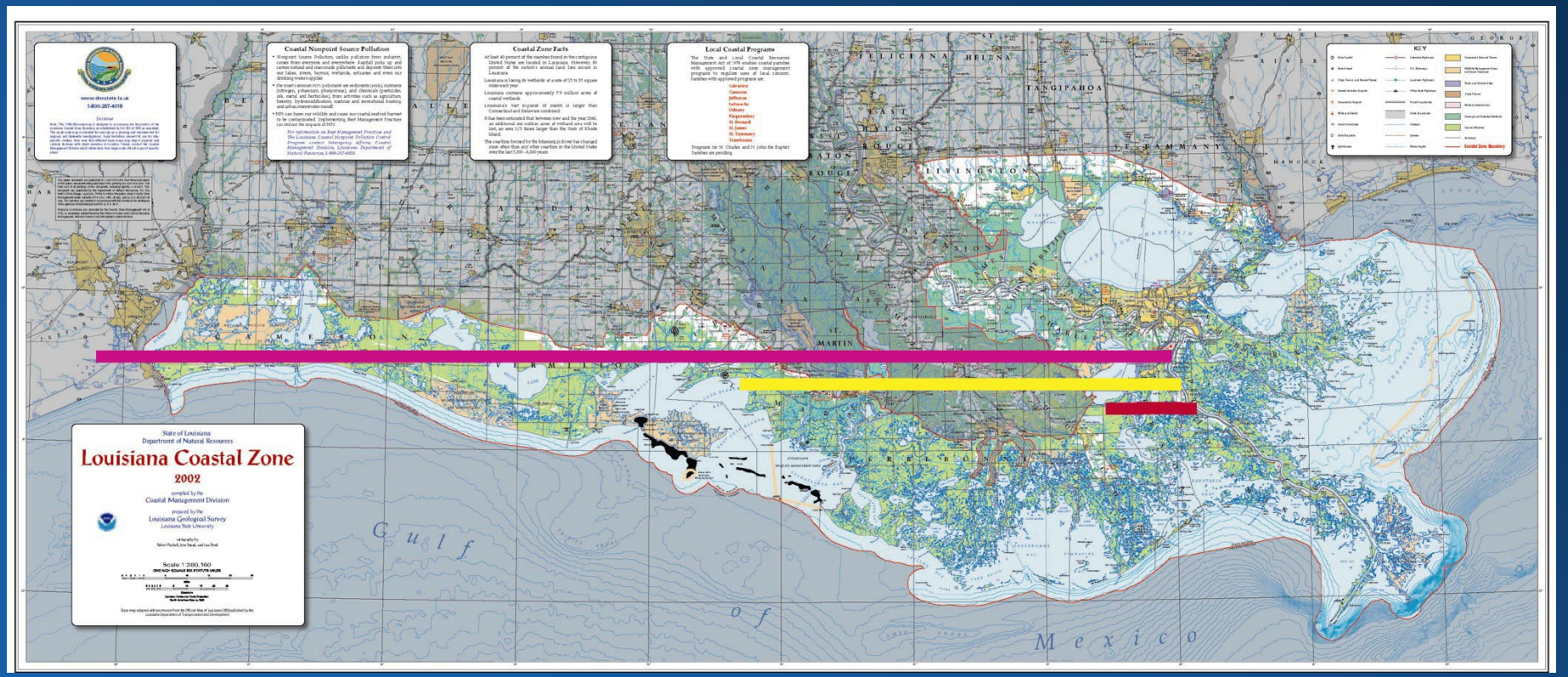
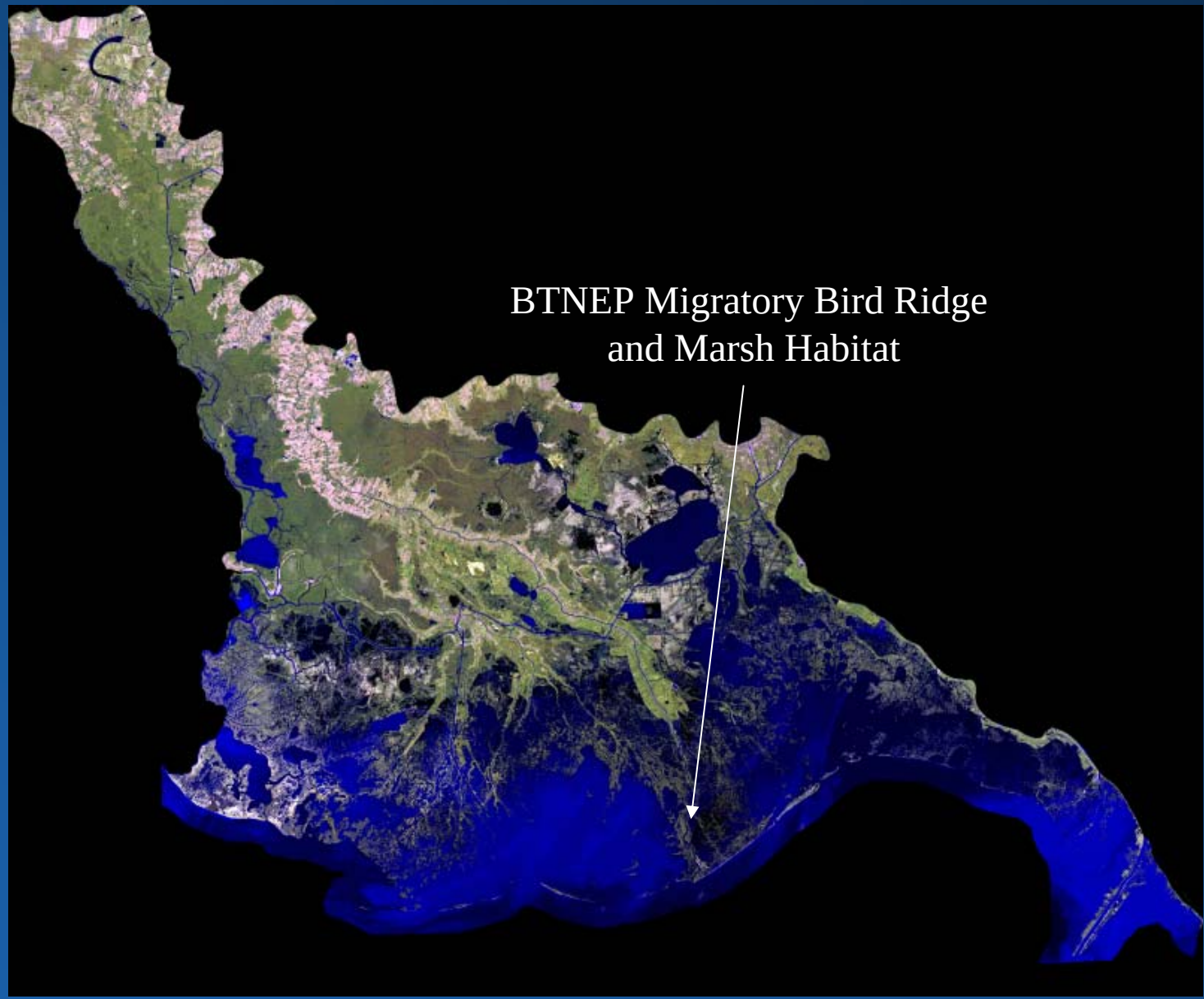
Distances Possible with Existing Slurry Technology



BTNEP
BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM



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BTNEP Ridge Project … Post-Katrina

Wetlands and ridges can be restored from sediments transported through pipelines with minimal amounts of water.

BTNEP
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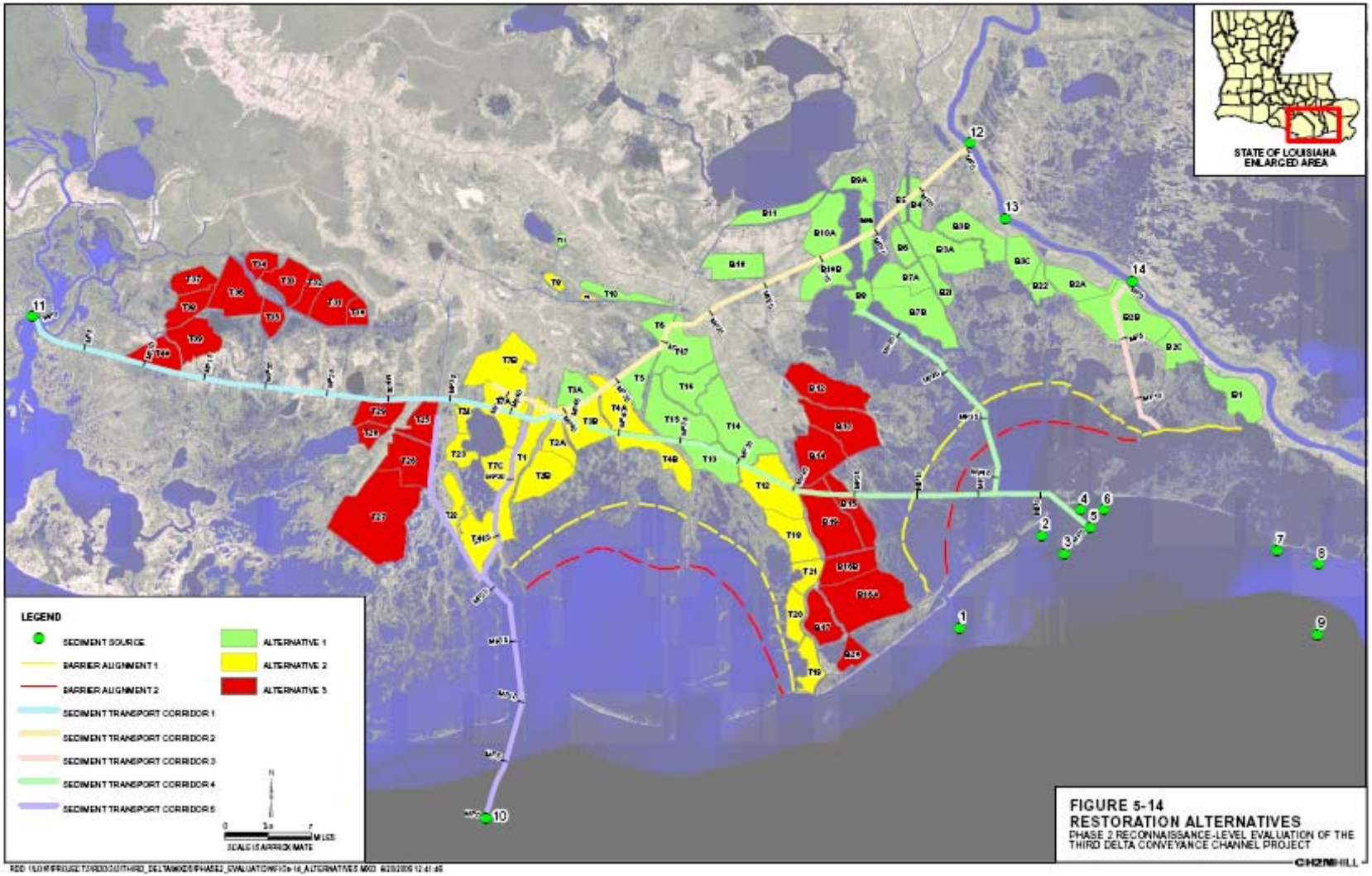
STATE OF LOUISIANA
ENLARGED AREA
LEGEND
SEDIMENT SOURCE
BARRIER ALIGNMENT 1
BARRIER ALIGNMENT 2
SEDIMENT TRANSPORT CORRIDOR 1
SEDIMENT TRANSPORT CORRIDOR 2
SEDIMENT TRANSPORT CORRIDOR 3
SEDIMENT TRANSPORT CORRIDOR 4
SEDIMENT TRANSPORT CORRIDOR 5
ALTERNATIVE 1
ALTERNATIVE 2
ALTERNATIVE 3
SCALE IS APPROXIMATE
FIGURE 5-14
RESTORATION ALTERNATIVES
PHASE 2 RECONNAISSANCE-LEVEL EVALUATION OF THE THIRD DELTA CONVEYANCE CHANNEL PROJECT
CH2MHILL

Summary of Planning-level Project Costs
Phase 2 Reconnaissance-level Evaluation of the Third Delta Conveyance Channel Project

Restoration Project	* Cost (billion $)	Cost per Acre vs. Future with No Action (at 2060 $)
Third Delta Conveyance Channel	8.7	535,000
Pipeline Conveyance Alternative 1	9.4	72,000
Pipeline Conveyance Alternative 2	21.1	94,000
Pipeline Conveyance Alternative 3	31.7	116,000

* Costs are for 50-year period.

Annualized costs for Pipeline Conveyance

Alternative 1……$180 million per year
Alternative 2……$422 million per year
Alternative 3……$634 million per year

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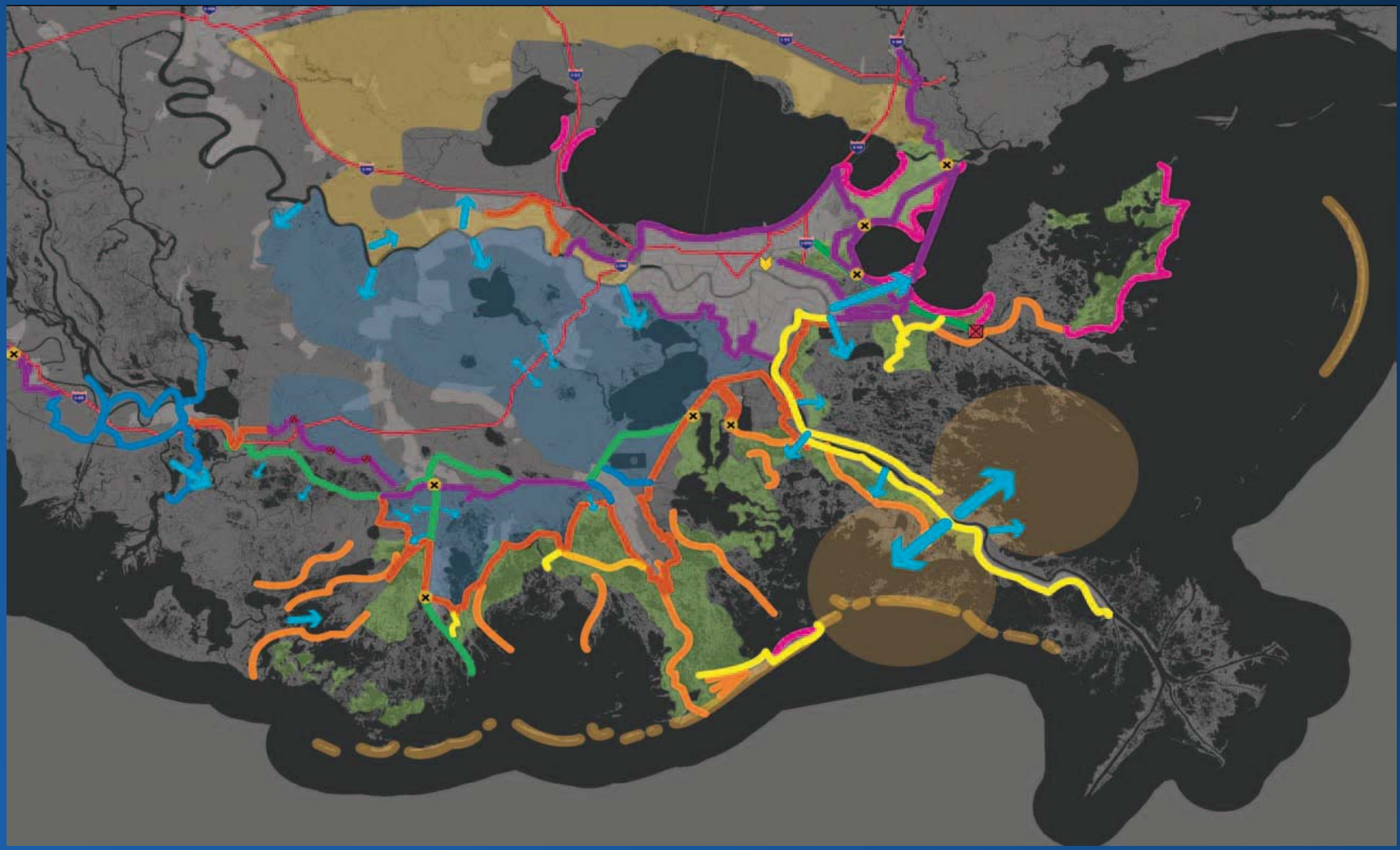
Summary of Comprehensive Protection and Restoration Authority (CPRA) Strategies in the Very Recently Released State Restoration Plan



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Resurrection

But when the rain comes,
resurrection fern
springs up in a green mass
of strong backs and arched fronds
making leaf out of water
and the reservoirs of hope
hidden in their wiry roots …
If you listen you can hear them singing
the gospel of life's stubborn return.

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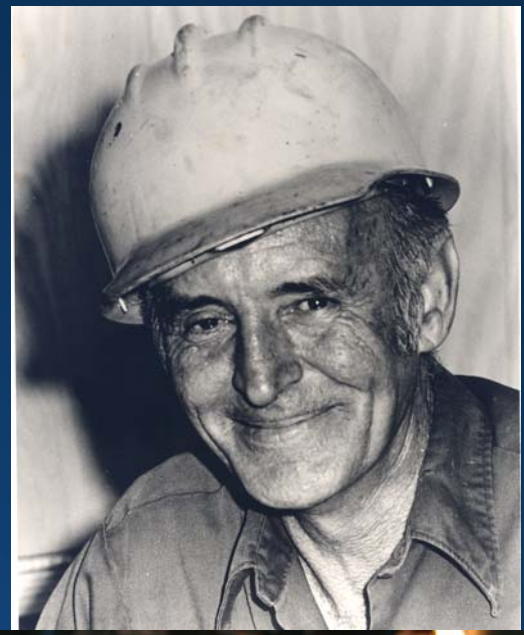

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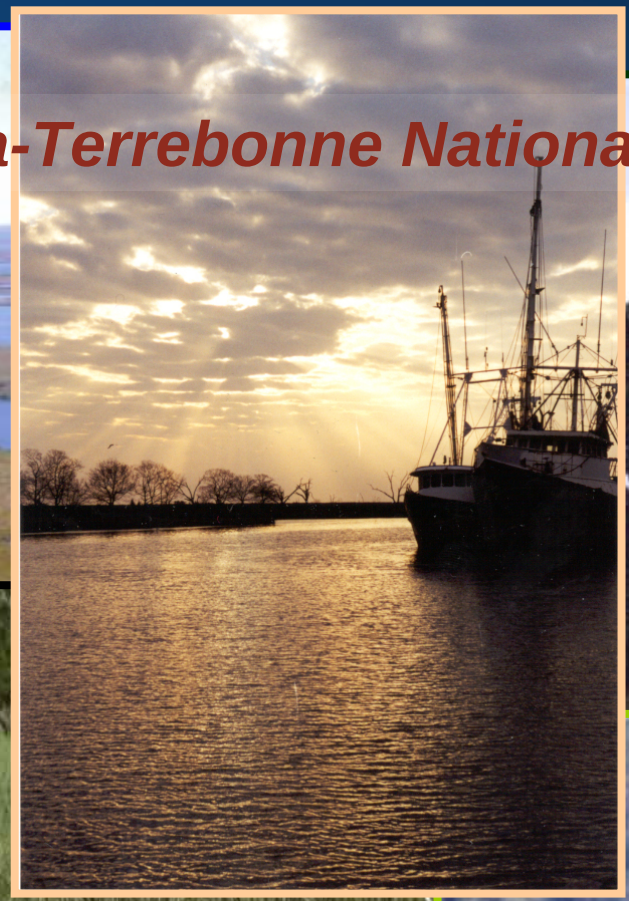
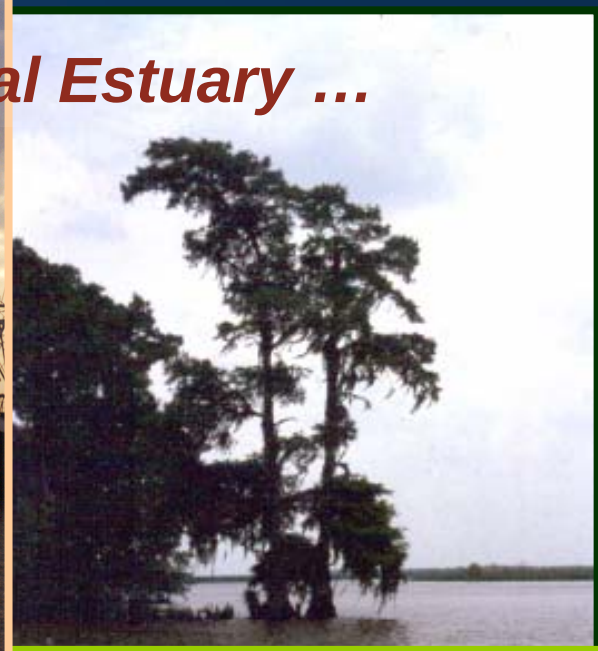
The Barataria-Terrebonne National Estuary …





Like No Other Place on Earth

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