

# ***MRGO Ecosystem Restoration***

***Overview of the Public Comment Period  
on the Draft Feasibility Study and  
Environmental Impact Statement***

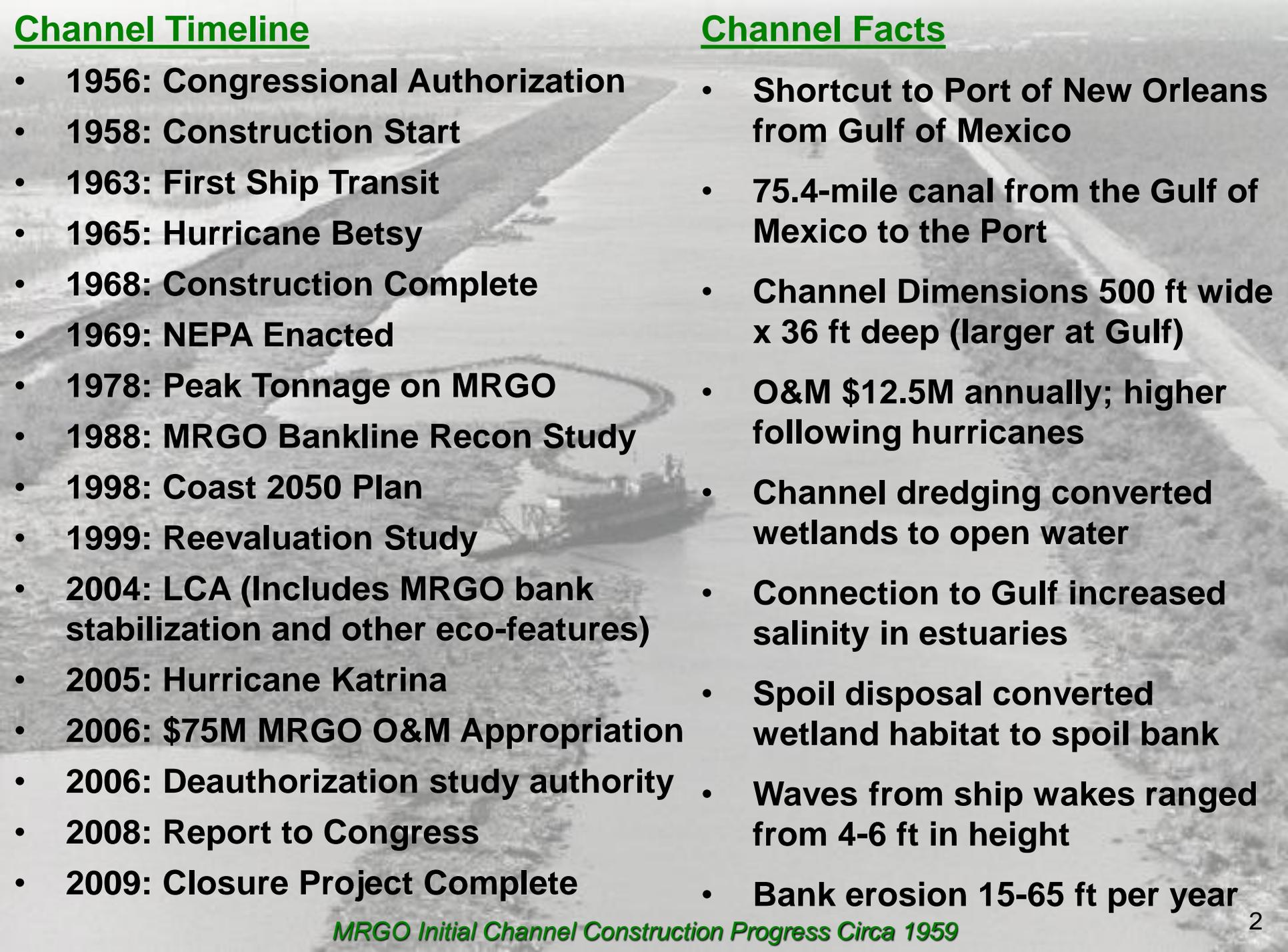
***Gregory Miller***

***Governor's Coastal Commission  
10 March 2011***



US Army Corps of Engineers  
**BUILDING STRONG<sup>®</sup>**





## Channel Timeline

- 1956: Congressional Authorization
- 1958: Construction Start
- 1963: First Ship Transit
- 1965: Hurricane Betsy
- 1968: Construction Complete
- 1969: NEPA Enacted
- 1978: Peak Tonnage on MRGO
- 1988: MRGO Bankline Recon Study
- 1998: Coast 2050 Plan
- 1999: Reevaluation Study
- 2004: LCA (Includes MRGO bank stabilization and other eco-features)
- 2005: Hurricane Katrina
- 2006: \$75M MRGO O&M Appropriation
- 2006: Deauthorization study authority
- 2008: Report to Congress
- 2009: Closure Project Complete

## Channel Facts

- Shortcut to Port of New Orleans from Gulf of Mexico
- 75.4-mile canal from the Gulf of Mexico to the Port
- Channel Dimensions 500 ft wide x 36 ft deep (larger at Gulf)
- O&M \$12.5M annually; higher following hurricanes
- Channel dredging converted wetlands to open water
- Connection to Gulf increased salinity in estuaries
- Spoil disposal converted wetland habitat to spoil bank
- Waves from ship wakes ranged from 4-6 ft in height
- Bank erosion 15-65 ft per year

# MRGO Channel Closure Complete



- **Used 350,000+ tons of stone**
- **Moved 125,000+ tons from nearby abandoned jetty to expedite work**
- **Remaining stone sourced from Arkansas quarry 700 miles upriver**
- **Job completed in seven months - finished two weeks ahead of schedule**
- **Construction 100% Federally funded, real estate provided by State of LA**
- **Salinity reduced 10 to 12 ppt immediately upstream of barrier**
- **Salinity levels in estuaries remain higher than historic conditions**



# Study Authority

WRDA 2007 Section 7013 (P.L. 110-114 effective Nov. 8, 2007)

INCLUSIONS — At a minimum, the report ... shall include—

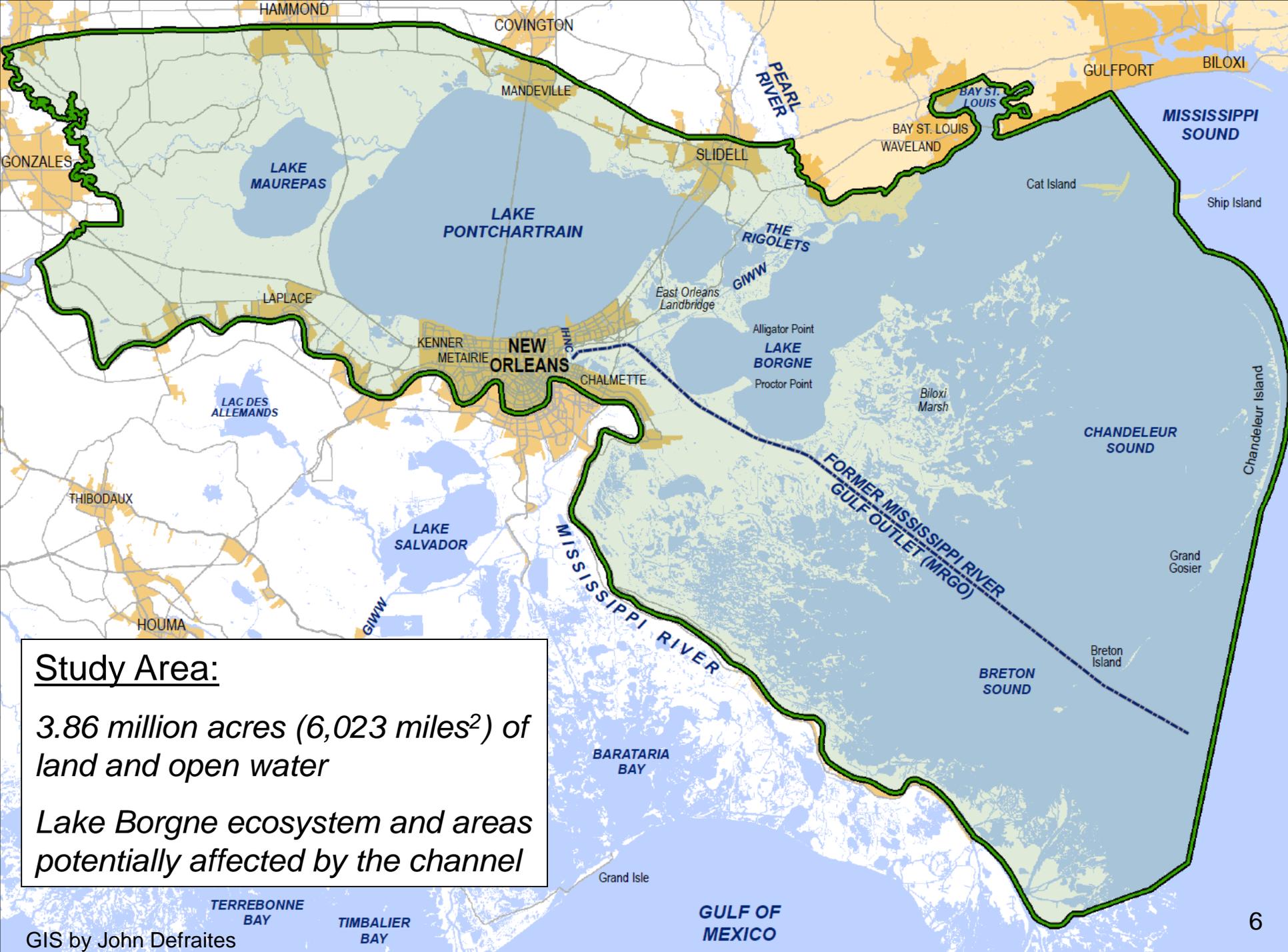
- ▶ a plan to physically modify the Mississippi River-Gulf Outlet and restore the areas affected by the navigation channel;
- ▶ a plan to restore natural features of the ecosystem that will reduce or prevent damage from storm surge;
- ▶ a plan to prevent the intrusion of saltwater into the waterway;
- ▶ efforts to integrate the recommendations of the report with the [LCA] ...and the [LACPR] analysis and design ...; and
- ▶ consideration of—
  - use of native vegetation; and
  - diversions of fresh water to restore the Lake Borgne ecosystem.



# *Study Purpose and Scope*

- Produce Feasibility Study and Environmental Impact Statement in support of future construction
- Develop comprehensive ecosystem restoration plan for Lake Borgne ecosystem & areas affected by MRGO
- Include measures to restore natural areas to reduce or prevent storm surge damage
- Address WRDA 2007 Sec. 7013 through supplement to MRGO Deep Draft De-authorization Report





**Study Area:**

*3.86 million acres (6,023 miles<sup>2</sup>) of land and open water*

*Lake Borgne ecosystem and areas potentially affected by the channel*

# *Study Goals*

- Achieve ecosystem sustainability to the greatest degree possible.
- Restore Lake Borgne ecosystem and the areas affected by the MRGO navigation channel.
- Restore natural features of the ecosystem that will reduce or prevent damage from storm surge.



# Study Objectives

1. Meet salinity targets identified by Chatry et al. 1983.
2. Increase cypress swamp habitat in the Central Wetlands by approximately 9,500 acres.
3. Increase fresh/intermediate marsh in the study area by approximately 6,800 acres.
4. Increase brackish marsh in the study area by approximately 18,100 acres.
5. Restore 3,900 acres of various marsh types adjacent to the channel lost to increased tides and salinity.
6. Restore ridge habitat along Bayou La Loutre.
7. Restore critical landscape features that provide hurricane and storm damage risk reduction in the study area (i.e. areas located in the Biloxi Marshes, the East Orleans Landbridge, and forested habitats).



# *Study Constraints*

- 1. Avoid or minimize negative impacts to threatened and endangered species to the extent practicable.**
- 2. Avoid or minimize impacts to critical habitat to the extent practicable.**
- 3. Do not diminish the level of protection provided by authorized flood risk reduction projects.**
- 4. Avoid actions negatively affecting the ability of authorized navigation projects to continue to fulfill their purpose to the extent practicable.**
- 5. Minimize impacts to commercial fisheries (such as oysters).**
- 6. Avoid or minimize contributions to low dissolved oxygen or conditions that could result in detrimental algal blooms.**



# Key Assumptions

- It is not a study objective to restore the study area to a pre-MRGO hydrologic condition.
- Lake Maurepas area assumed to be restored by authorized LCA projects.
- Plan performance will be evaluated considering three sea level rise rates: historic, accelerated medium, and accelerated high.
- The MsCIP effort & other USACE Mobile District projects will address vegetated habitat ecosystem restoration needs in Mississippi.
- Hurricane and storm damage risk reduction through the protection and restoration of natural features contributes to the need for the plan; however, the reduction of damages will not be quantified.



# Problem / Opportunity



SALTWATER INTRUSION



RIVER DIVERSION



HYDROLOGIC MODIFICATION



LANDLOSS



DREDGE AND PLACE



RIVER DIVERSION



SHORELINE STABILIZATION



VEGETATIVE PLANTINGS



DECREASED INPUTS



RIVER DIVERSION



DREDGE AND PLACE



VEGETATIVE PLANTINGS



SHORELINE EROSION



SHORELINE STABILIZATION



ARTIFICIAL OYSTER REEF



HERBIVORY



PREVENT HERBIVORY



INVASIVE SPECIES



PREVENT INVASIVES

# Problem / Opportunity



SUSCEPTIBLE TO STORM SURGE



REDUCE STORM SURGE



DREDGE AND PLACE



RIVER DIVERSION



SHORELINE STABILIZATION



VEGETATIVE PLANTINGS



HABITAT CHANGE



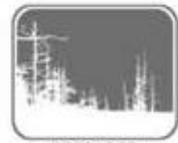
RIVER DIVERSION



DREDGE AND PLACE



VEGETATIVE PLANTINGS



DEGRADED RIDGE HABITAT



DREDGE AND PLACE



VEGETATIVE PLANTINGS



RETREATING BARRIER ISLANDS



DREDGE AND PLACE



ALTERED HYDROLOGY

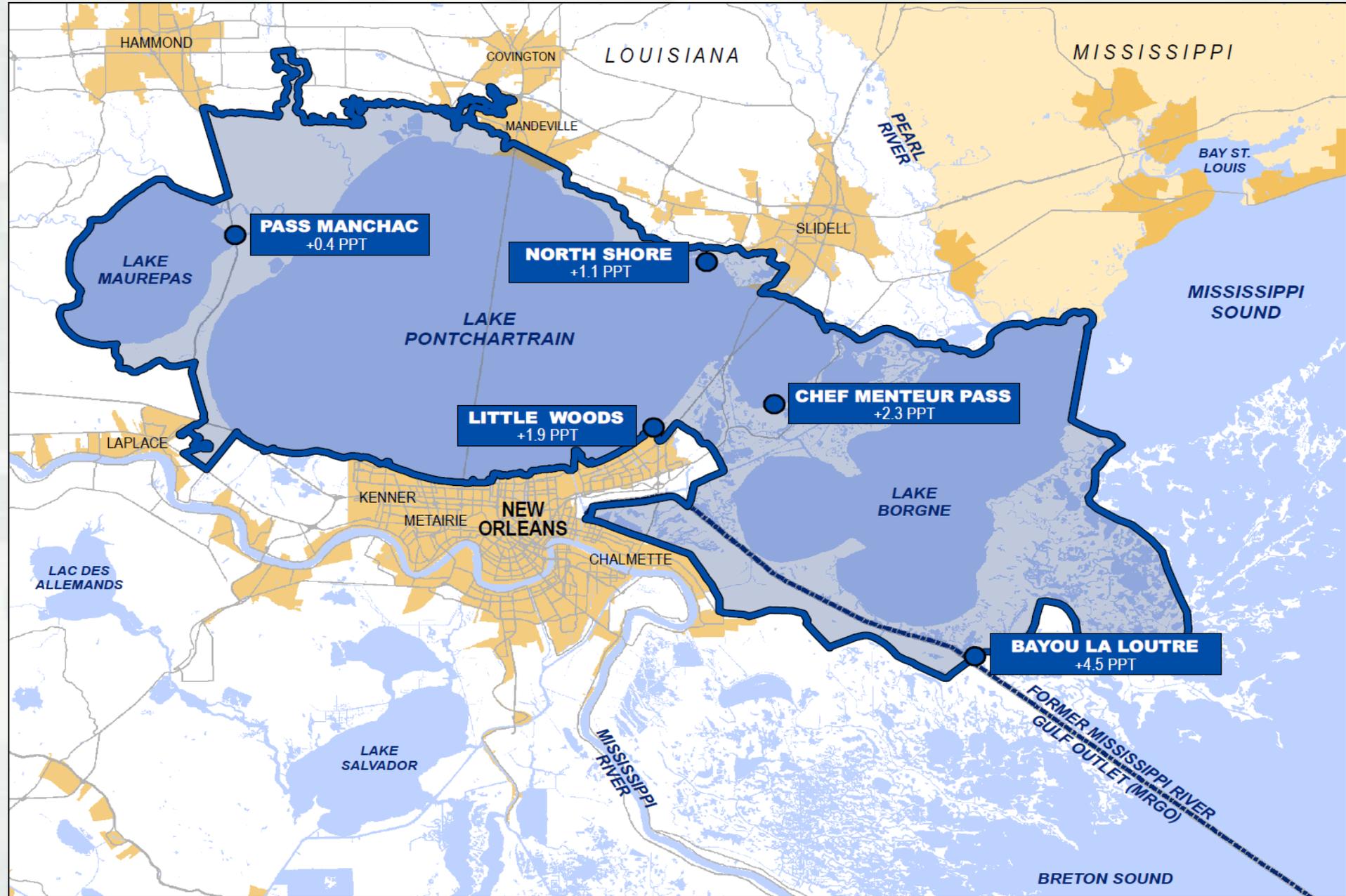


RIVER DIVERSION



HYDROLOGIC MODIFICATION

# Salinity Changes Post-MRGO Construction





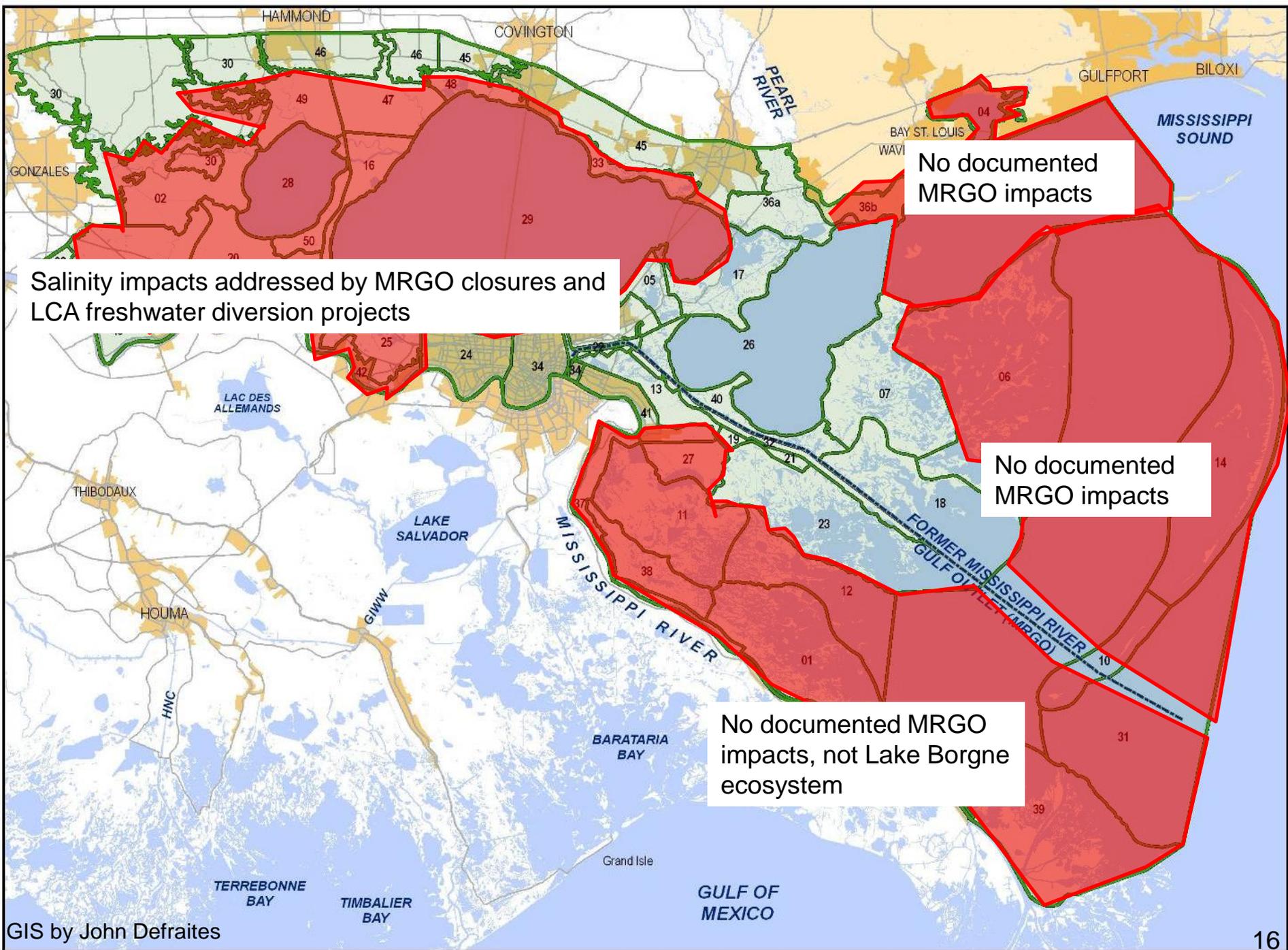
Average Annual Salinity 1959-1961  
(in parts per thousand)



Average Annual Salinity 1990-2008  
(in parts per thousand)



Average Annual Salinity Post-MRGO Closure  
(in parts per thousand)



# *MRGO Habitat Impacts*

- Direct impacts are due to construction and erosion.
- Indirect impacts are due to salinity or hydrologic changes attributable to MRGO.
- Habitat shifts were estimated using habitat composition data between 1956 and 1990.
- Deeper water aquatic habitat effects due to salinity increases are not quantified.
- Shallow water increases are difficult to quantify. Net gain of this habitat type is likely due to marsh loss.



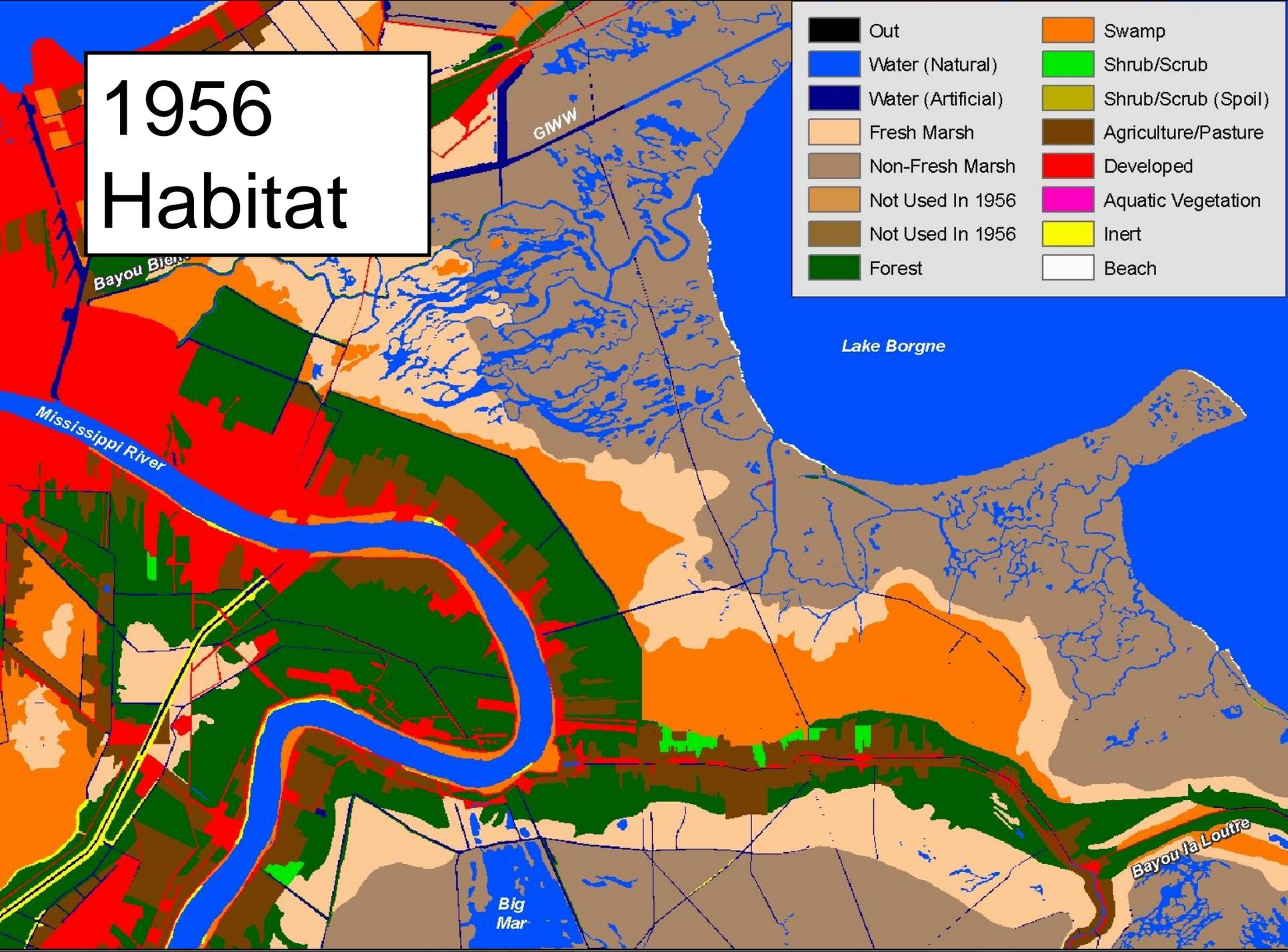
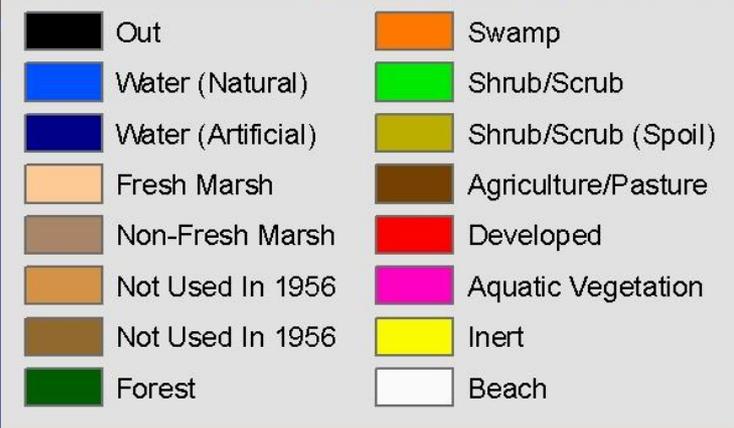
# Habitat Impacts

TYPE	DIRECT LOSS (-)	INDIRECT LOSS (-)	INDIRECT GAIN (+)	NET
FRESH / INTERMEDIATE	-3,400	-3,400		-6,800
BRACKISH	-10,300	-19,200	11,400	-18,100
SALINE	-4,200		19,200	+15,000
CYPRESS	-1,500	-8,000		-9,500
SHALLOWS	-4,800		4,800	0+
ADDITIONAL*	-500	-3,400		-3,900
<b>TOTAL</b>	<b>-24,700</b>	<b>-34,000</b>		<b>-23,300</b>

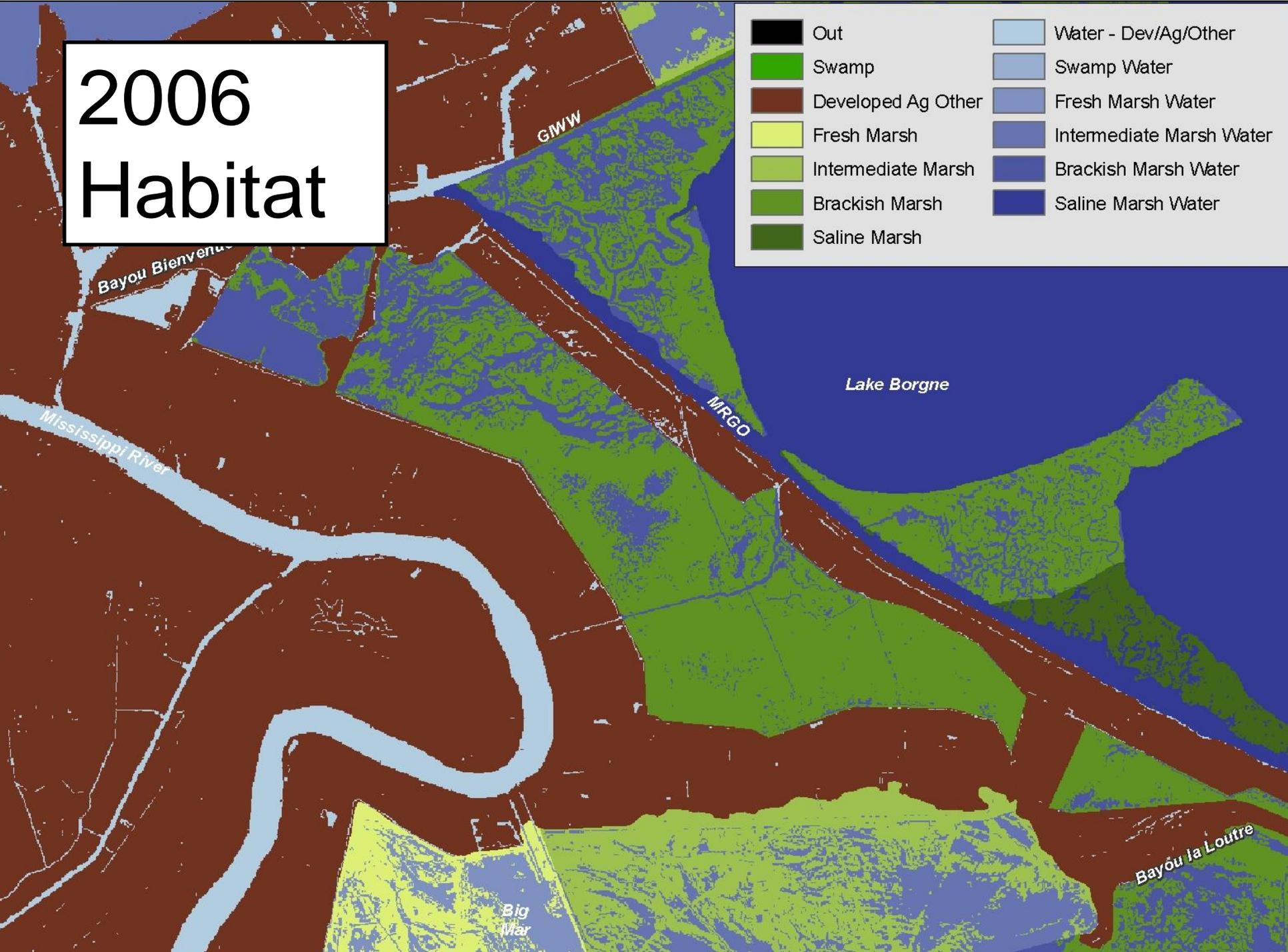
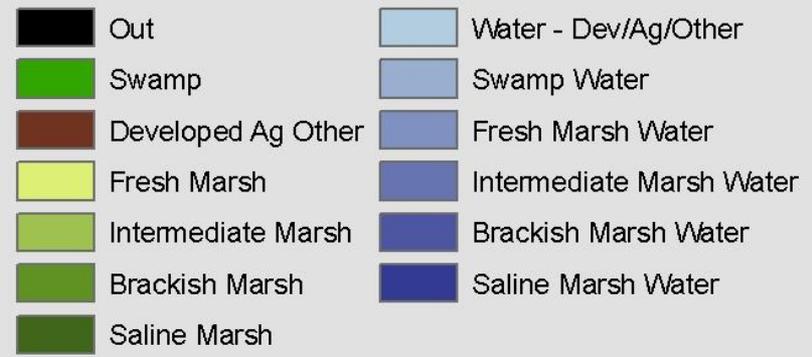
\*Direct impacts due to additional erosion between 1990 and 2008.  
Indirect impacts due to increased salinity.



# 1956 Habitat



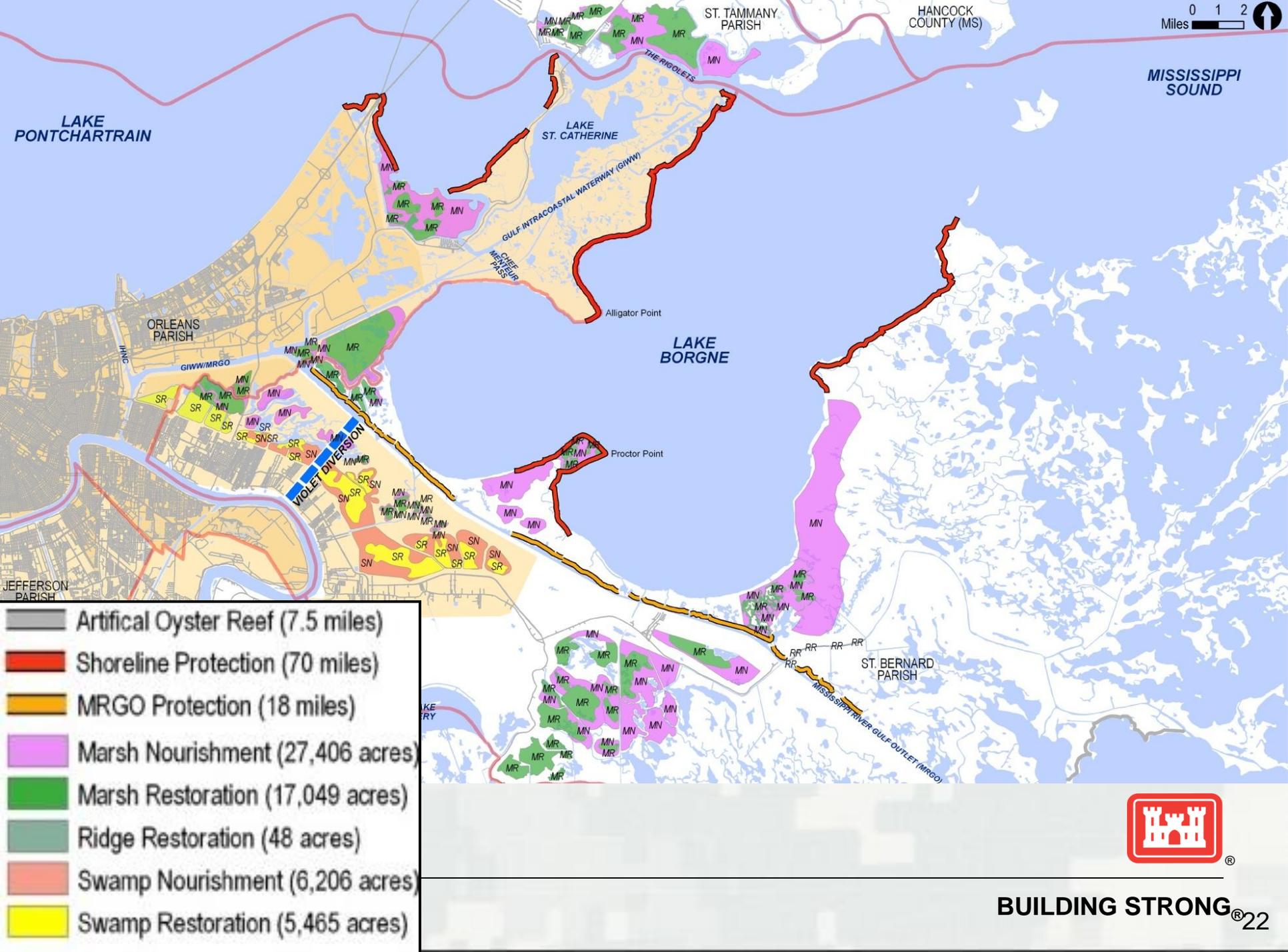
# 2006 Habitat



# Screening Summary

Management Measure Type	Measures Initially Evaluated	Measures Further Evaluated	Measures Retained for Detailed Study
<b>Riverine Diversions</b>	<b>43</b>	<b>8</b>	<b>1</b>
<b>Hydrologic Restoration</b>			
- Filling/Narrowing	<b>24</b>	<b>15</b>	<b>17</b>
- Water Control Structures	<b>26</b>	<b>4</b>	<b>0</b>
<b>Marsh Creation Using Dredged Material</b>	<b>56</b>	<b>49</b>	<b>33</b>
<b>Shore Protection</b>	<b>56</b>	<b>43</b>	<b>29</b>
<b>Restoration/Creation of Forested Habitat</b>			
- Vegetative Planting	<b>11</b>	<b>7</b>	<b>0</b>
- Swamp Restoration/Creation	<b>5</b>	<b>5</b>	<b>6</b>
<b>Ridge Restoration</b>	<b>55</b>	<b>16</b>	<b>2</b>
<b>Barrier Island Restoration</b>	<b>3</b>	<b>1</b>	<b>1</b>
<b>SAV Projects</b>	<b>2</b>	<b>2</b>	<b>1</b>
<b>Artificial Oyster Reefs in the Biloxi Marshes</b>	<b>1</b>	<b>0</b>	<b>0</b>
<b>Coastal Mississippi Ecosystem Restoration</b>	<b>1</b>	<b>0</b>	<b>0</b>
<b>TOTAL</b>	<b>283</b>	<b>150</b>	<b>90</b>





MISSISSIPPI SOUND

LAKE PONTCHARTRAIN

LAKE ST. CATHERINE

LAKE BORGNE

JEFFERSON PARISH

ORLEANS PARISH

ST. TAMMANY PARISH

HANCOCK COUNTY (MS)

ST. BERNARD PARISH

-  Artificial Oyster Reef (7.5 miles)
-  Shoreline Protection (70 miles)
-  MRGO Protection (18 miles)
-  Marsh Nourishment (27,406 acres)
-  Marsh Restoration (17,049 acres)
-  Ridge Restoration (48 acres)
-  Swamp Nourishment (6,206 acres)
-  Swamp Restoration (5,465 acres)



# ***Tentatively Selected Plan***

## Restore and Protect:

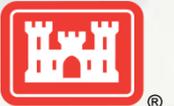
- 13,950 acres of fresh and intermediate marsh
- 33,966 acres of brackish marsh
- 466 acres of saline marsh
- 10,431 acres of cypress swamp
- 48 acres of ridge habitat

***TOTAL 58,861 ACRES***



# ***Tentatively Selected Plan Costs***

- Estimated construction cost is \$3 billion
- Preliminary estimate subject to feasibility detail development
- Does not include design, real estate and O&M costs



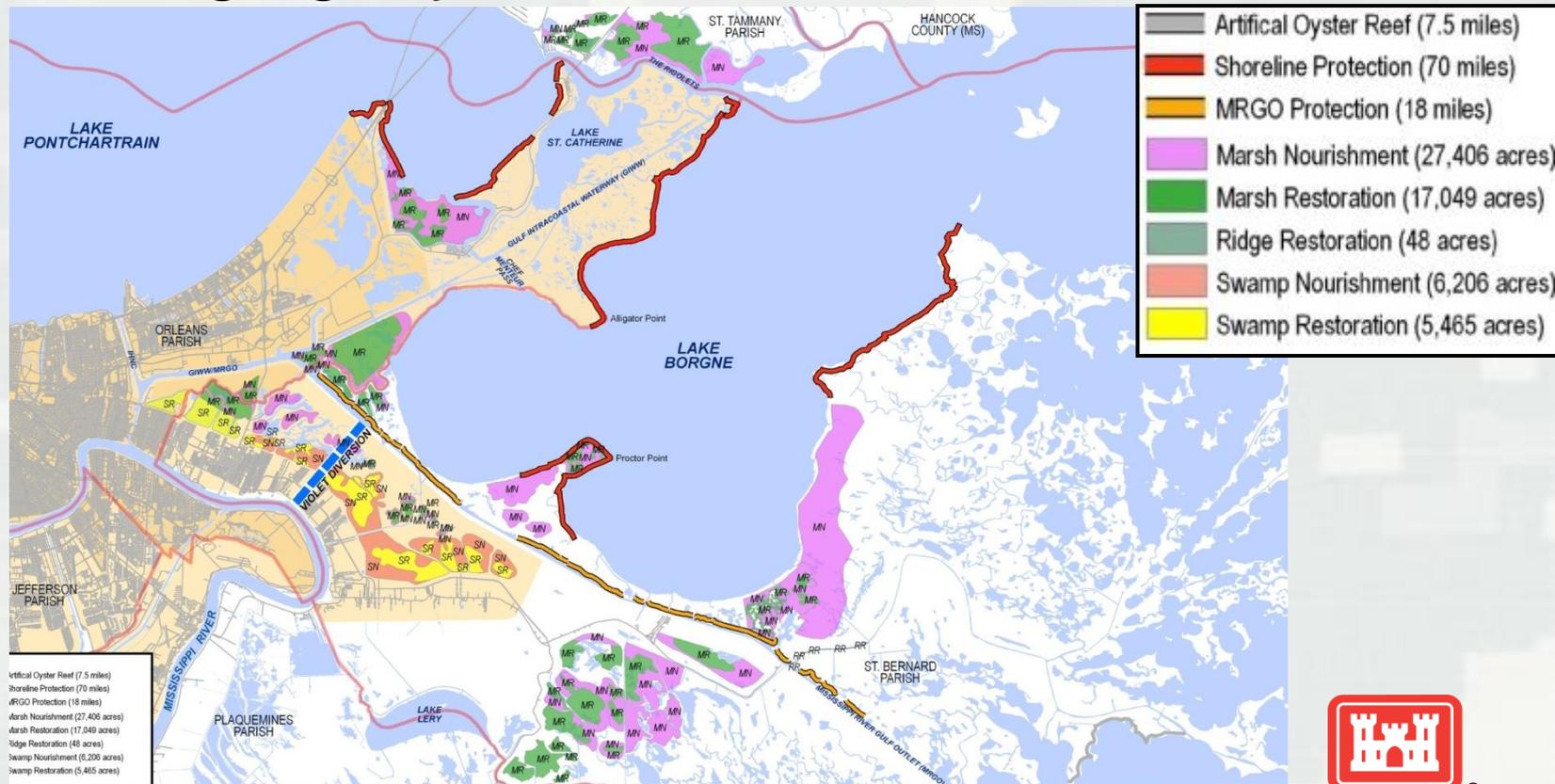
# *High Public Interest*

- Approximately 500 citizens participated in three public meetings.
- Six hours of verbal comments were received at the meetings.
- 20,000+ email comments.
- Hundreds of additional comment letters received by mail.



# General Public Sentiment

- Support for many features of the TSP.
- Specific comments about river diversion, dredging, oysters, and barrier islands.



# *Significant Public Comments*

- Proposed location of the freshwater diversion at Mereaux, preference for using the existing Violet Canal.
- Freshwater diversions opposed by some because of water quality, fisheries impacts, and habitat changes.
- Lake Borgne dredging for marsh creation material.
- Preference for dredging Mississippi River sediment for marsh and swamp restoration.
- Preference for the use of restored oyster reefs for shoreline protection features, rather than rock breakwaters.
- Need for restoration in the outer Biloxi Marsh and the Chandeleur Islands.



# Freshwater Diversion Location



- Some citizens, local government, & NGOs prefer using Violet Canal.

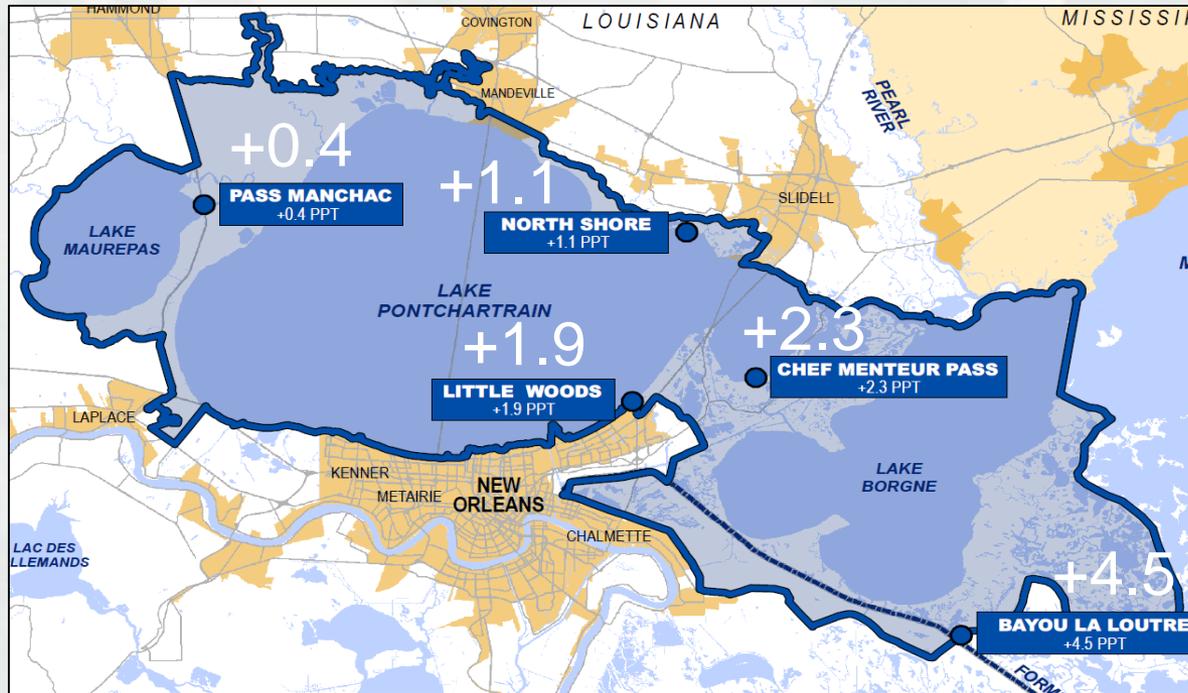
- Widespread opposition to TSP site.

- Additional engineering analyses being conducted to optimize Violet Canal alternatives.

- Changing the preferred site of the diversion would impact schedule and cost to complete the plan.



# Freshwater Diversion General Comments



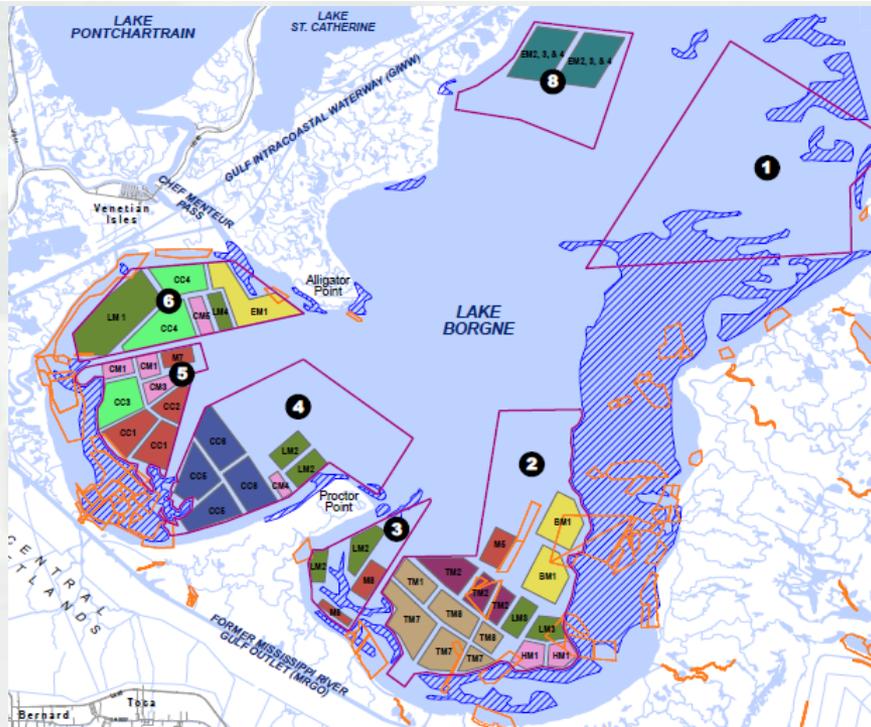
- Some opposition to restoring historic salinity regime.
- Comments regarding freshwater diversion and increased susceptibility of marsh to storm damage.
- Comments regarding changes to fisheries, including oyster leases in Lake Borgne.



over 10 years

34.3  
Louisiana  
Superdomes  
(1=4,577,825 cy.)

157,225,000 cubic yards  
of dredged and placed sediment



# Lake Borgne Dredging Volumes

- 157 million cubic yards of material.
- Public Comments related to:
  - Potential for increasing storm surge by deepening the lake.
  - Potential impacts to fisheries.
  - Objection to “internal borrow” i.e. not introducing new sediment.
  - Gulf sturgeon critical habitat.



# Mississippi River Sediment

Cost Comparison of Dredging and Piping Material from Different Borrow Sources		
Average Pumping Distance	Unit Cost of Dredging and Transporting via Pipeline	
	Lake Borgne	Mississippi River
20,000 lf	\$4.50	\$5.75
30,000 lf	\$5.80	\$6.75
40,000 lf	\$7.25	\$10.00
50,000 lf	\$9.75	\$10.25
60,000 lf	\$11.00	\$15.00

Notes: Very rough comparison of costs based on recent projects. Estimates for 5 million cubic yards of material. Assumes the same project from different sediment borrow sources with all other factors being equal.

- Preference for use of Mississippi River for sediment
- Not as cost-effective



# *Barrier Islands (Chandeleur Area)*

- Barrier island restoration screened from the TSP because:
  - insufficient nexus to MRGO effects
  - not part of the Lake Borgne ecosystem
  - no demonstrated storm surge damage risk reduction.
- TSP recommends further investigation of alternative barrier island restoration techniques to determine how to maximize benefits while minimizing risks to project performance.
- Deepwater Horizon oil spill sand berms contribute to the uncertainty of project area conditions, now and into the future.





# *Outer Biloxi Marsh*

- Insufficient link between the outer portion of the Biloxi Marsh and MRGO effects.
- Outer marsh is not part of the Lake Borgne ecosystem.
- Several measures were investigated in the Biloxi Marsh.
- Many measures did not perform well due to relatively low land loss rates and high construction costs.
- The team is evaluating potentially extending the proposed oyster reef restoration in the Biloxi Marsh.



# *Next Steps*

- **Refine draft plan**
- **Civil Works Review Board**
- **State and Agency Review**
- **Report of the Chief of Engineers**
- **ASA(CW) Review**
- **OMB Review**
- **Transmit report to Congress**



# Public Resources About the Project

**US Army Corps of Engineers**  
New Orleans District

## MRGO

MISSISSIPPI RIVER  
GULF OUTLET

ECOSYSTEM RESTORATION  
PLAN FEASIBILITY STUDY

Home Calendar Study Teams Study Products Reference Documents Data Viewer Document Search

### Proposed Projects

Roll over projects to see more data.

### MRGO Document Quick Links

- [MRGO History](#)
- [MRGO Fact Sheet](#)
- [MRGO De-Authorization Study](#)
- [MRGO Navigation Channel Closure](#)
- [MRGO Ecosystem Restoration Plan Feasibility Study](#)
- [MRGO Closure and Coastal Restoration Fact Sheet \(PDF; 2.92 MB\)](#)

### MRGO Ecosystem Restoration Plan Final Scoping Report

The "[MRGO Ecosystem Restoration Plan Final Scoping Report, May 2009](#)" prepared by the US Army Corps of Engineers, New Orleans District is available for review.

The Scoping Report outlines the project background and scoping process and summarizes the key issues identified by members of the public during the initial scoping period. Scoping was initiated on October 2, 2008. Comments received after November 20, 2008 are not included in this report.

MRGO Ecosystem Restoration Plan  
Final Scoping Report  
May 2009

A hard copy of the Final scoping report is available upon request. Please contact Ms. Sandra Stiles.; US Army Corps of Engineers; Regional Planning and Environmental Division South, New Orleans Environmental Branch; CERPDS-PDN-RS; P.O. Box 60267; New Orleans, Louisiana 70160-0267. Ms. Stiles may also be contacted at (504) 862-1583, by email to [Sandra.E.Stiles@usace.army.mil](mailto:Sandra.E.Stiles@usace.army.mil), or by fax to (504) 862-2088.

Click the play button (▶) below to view a short video about the Schematic Closure Design of the Mississippi River Gulf Outlet.

[www.mrgo.gov](http://www.mrgo.gov)



# Restoring a System

