



Science Needs in the
Northern Gulf of Mexico
Can We Partner?

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Louisiana: The Problem

“What had been a crisis has now turned into a bona fide emergency: extreme rates of land loss compounded with inadequate hurricane protection measures now threaten the viability of south Louisiana’s communities and infrastructure.”

(2007, the State’s Master Plan)

40+ Years of Coastal Restoration in Louisiana

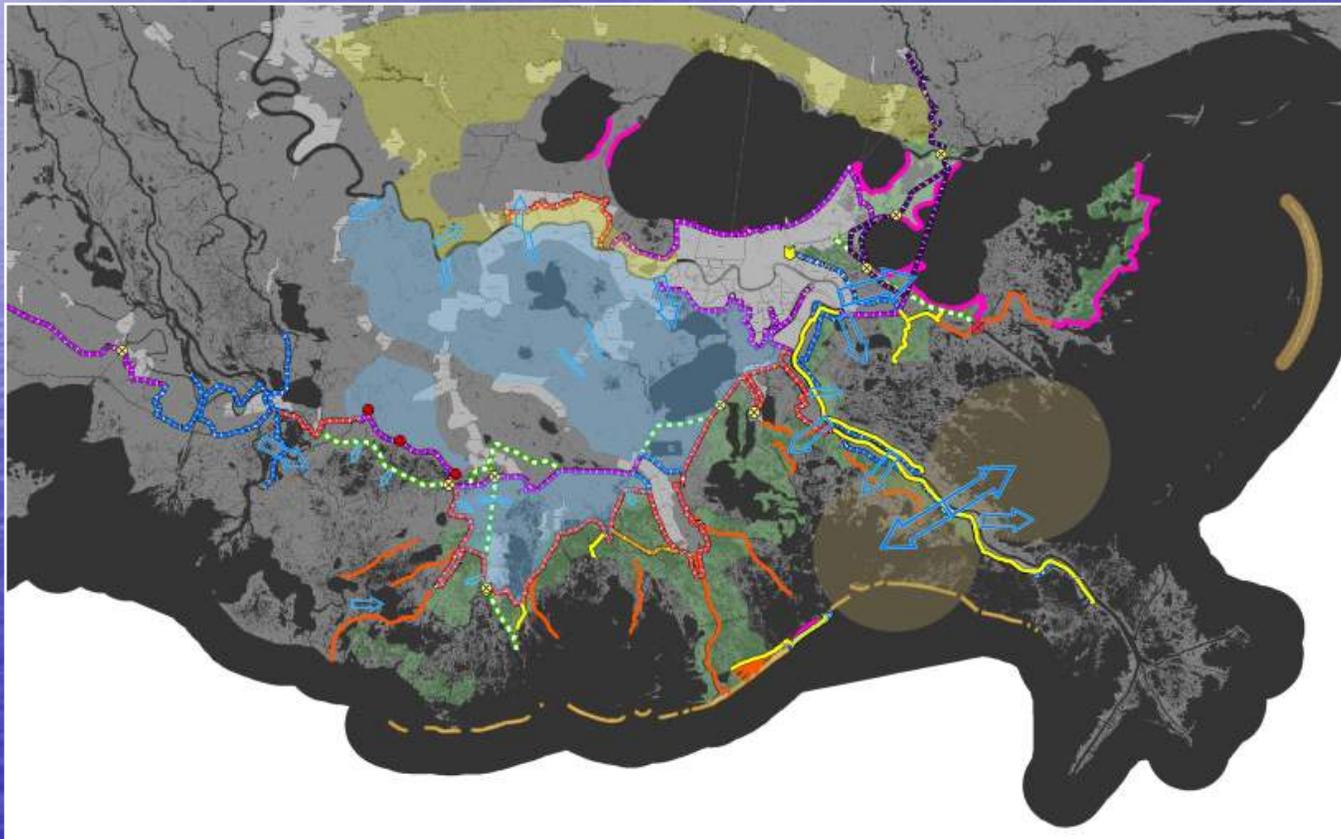
- 1965 Mississippi Delta Region Authorization (Davis Pond and Caernarvon)
- 1967 Louisiana Coastal Area, LA Authorization
- 1989 Passage of Act 6 creating LaDNR Coastal Restoration Division, Wetland Conservation & Restoration Authority, and Wetland Trust Fund
- 1990 Coastal Wetland Planning, Protection and Restoration Act (Breux Act) Authorized - first federal funding
- 1998 Coast 2050: Toward a Sustainable Coastal Louisiana – identified regional strategies

40+ Years of Coastal Restoration in Louisiana

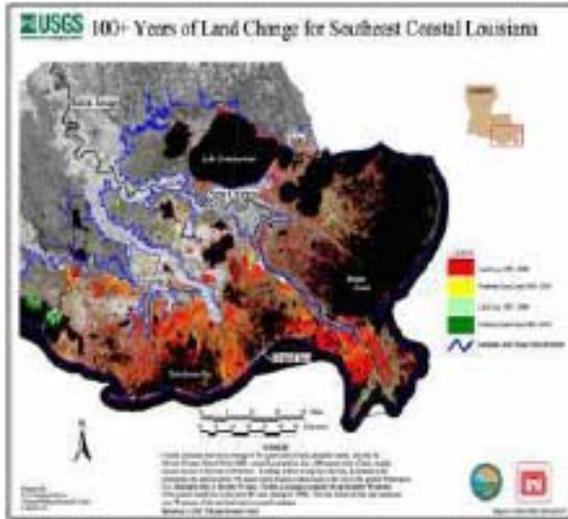
- **2004 Louisiana Comprehensive Area (LCA) Ecosystem Restoration Called for S&T Program and an independent Science Board**
 - USGS stood up Science Board in 2006
 - USACE interim S&T Office in place, selection of Director underway
- **2005 Hurricanes Katrina and Rita necessitate the marriage of coastal restoration with hurricane protection in both federal and state legislation**
- **2006/07 LACPR (Louisiana Coastal Protection and Restoration)– USACE document due to Congress in December 2007 (draft just available)**
- **2007 State’s Master Plan for a Sustainable Coast– Louisiana’s “vision” for restoration and hurricane protection presented to Louisiana legislature**
April 30, 2007

State: "To achieve sustainability, we must reestablish and harness natural processes."

"Get the sediment right!"



LACPR (USACE) - must implement the State's vision



Coastal landscape change



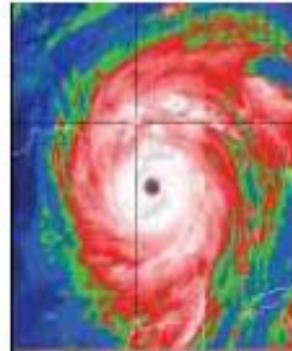
Interconnected levee and wetland systems



Pointe A La Hache River levee
Community recovery timelines



Difficult engineering conditions



Battling nature's most powerful storms



Innovative technologies

Solutions: Types of Projects

- River diversions
- Marsh creation
- Barrier restoration and shoreline protection
- Hydrologic restoration



Caernarvon Freshwater Diversion
Structure

S&T Identified Science Needs for Louisiana Restoration and Hurricane Protection

Immediate:

Adaptive management

Develop and maintain data management system

Summary reports that synthesize state of understanding: e.g.,

Relative sea level rise

Develop information on vertical datum

Subsidence processes

Longer-Term:

Evaluation of pass closure alternatives: (large diversions & Birdsfoot abandonment)

Wetland assimilation, alteration and function

Influence of wetlands on storm surge levels and wave patterns

Source and characteristics of sediments in Regional Sediment Model

System-wide restoration priorities

Refinement of desktop models

High-fidelity landscape evolution and ecological model system

Restoration project interactions with endangered species

Role of wetland vegetation in erosion control

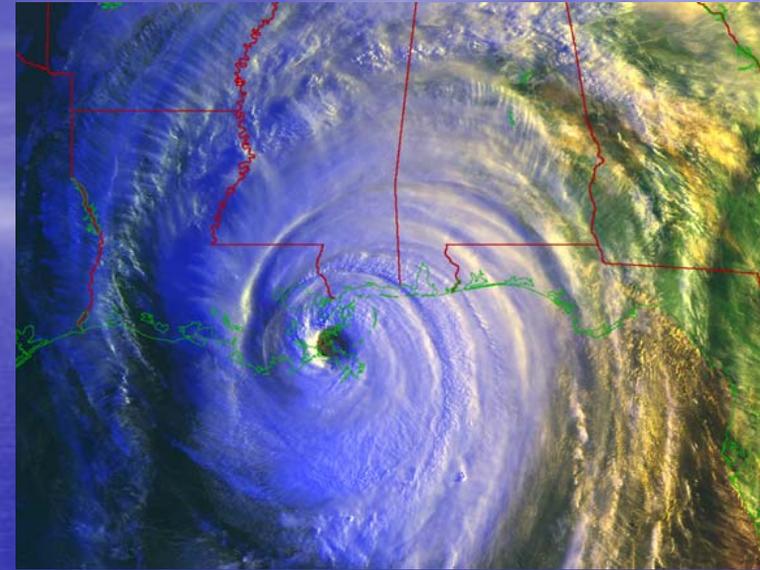
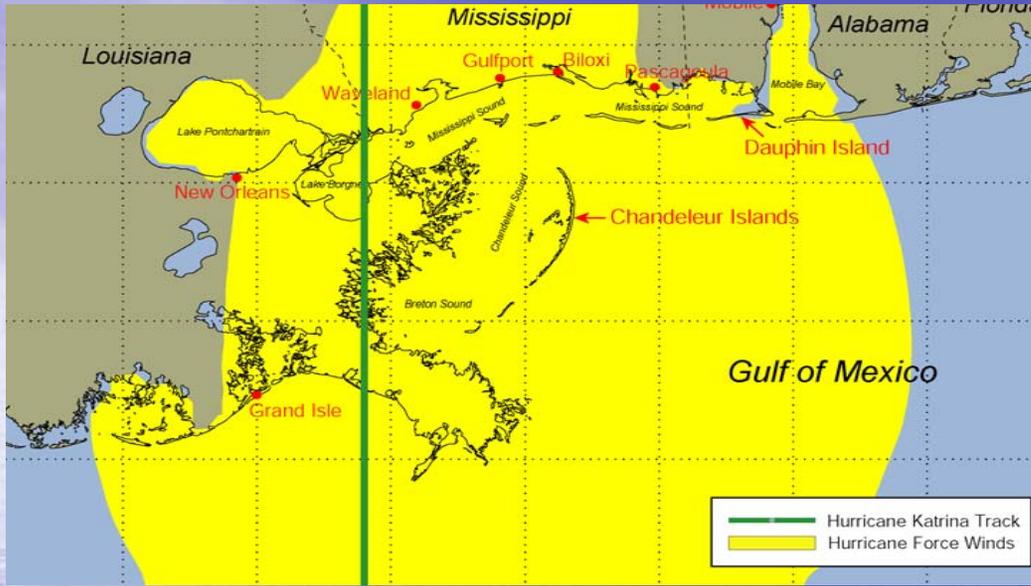
Sediment trapping - Pipeline conveyance

Geotechnical engineering of settlement rates

Beneficial use of dredge materials

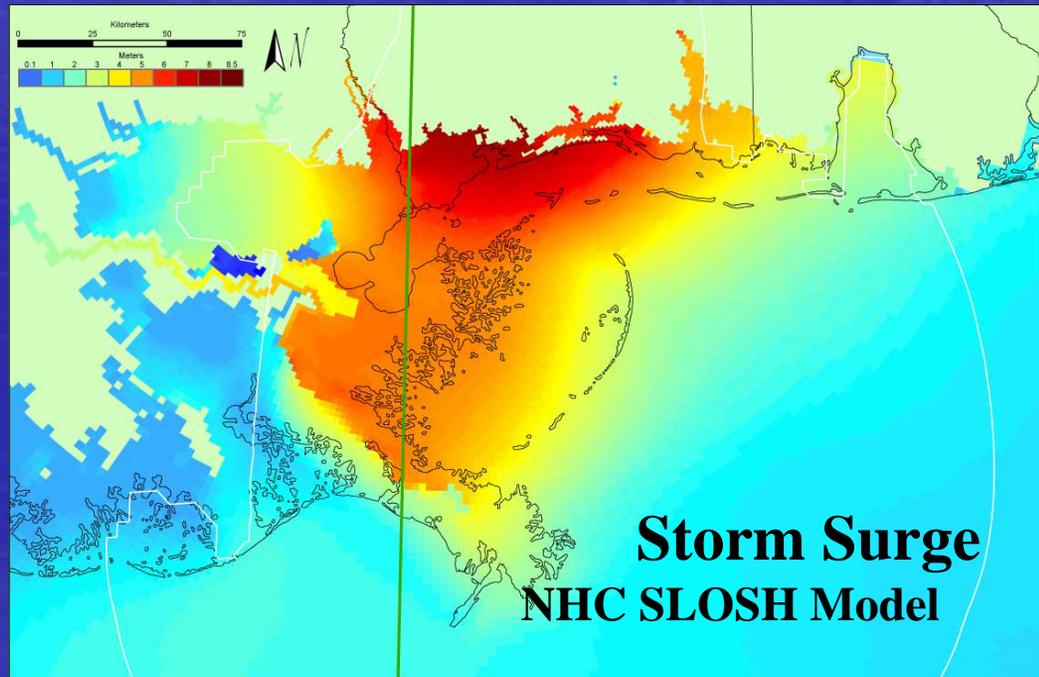
Barrier island assessment

Mississippi: The Problem was Katrina



Hurricane-force winds

Data from NOAA
Hurricane Research
Division





The Governor's Solution

Mississippi's 7 Point Plan for Rebuilding

- **Implementation of breakwater structures for surge protection**
- **Deer Island restoration to pre-1900 footprint (underway)**
- **Barrier island restoration to pre-Camille conditions (limiting factor will be sand resource)**
- **Restoration of 10,000 acres of coastal marshes, beaches, and forests**
- **Restoration of historical water flow to coastal watersheds, including diverting freshwater from Louisiana (an issue for LA)**
- **Submerged aquatic vegetation restoration.**
- **Oyster reef restoration and enhancement.**

Yellow indicates areas most impacted by H. Katrina

Mississippi Coastal Improvements Program (MsCIP - USACE)

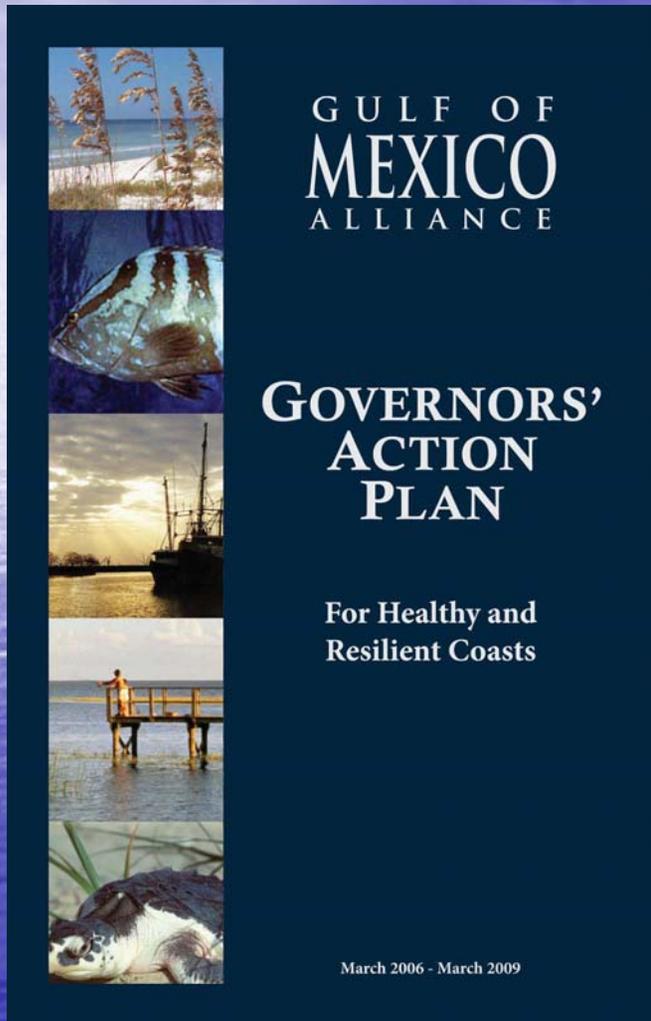


MsCIP will address:

- Hurricane and Storm Damage Reduction
- Salt Water Intrusion
- Shoreline Erosion
- Fish and Wildlife Preservation
- Other Water Related Resource Projects



Gulf Wide: Gulf of Mexico Alliance



- Water quality for healthy beaches and shellfish beds
- Wetland and coastal conservation and restoration
- Environmental education
- Identification and characterization of Gulf habitats
- Reductions in nutrient inputs to coastal ecosystems

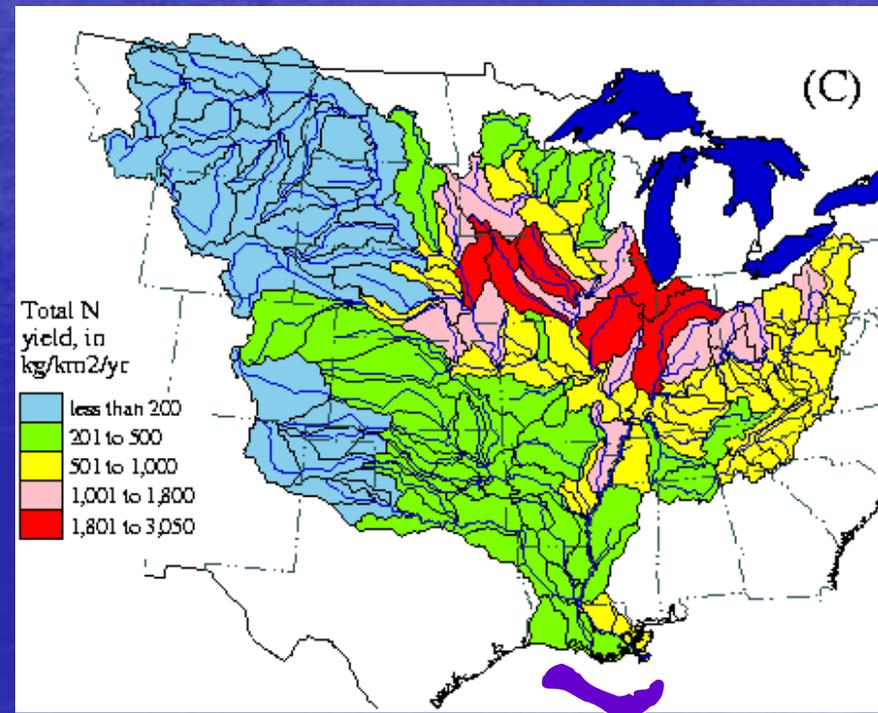
Action Items requested by the 5 Gulf States

Water quality for healthy beaches and shellfish beds

- WQ-1: Improve harmful algal bloom detection and forecasting in the U.S. and Mexican Gulf States
- WQ-2: Improve beach water quality management
- **WQ-3: Improve government efficiency in water quality monitoring**

Reduction of nutrient inputs to coastal ecosystems

- **N-1: Increase regional coordination in the development of nutrient criteria**
- N-2: Implement nutrient reduction activities during Gulf recovery and rebuilding
- N-3: Assert an aligned five Gulf State position on the need to address Gulf of Mexico hypoxia



Area of recurrent hypoxia

CENR, 2000; Goolsby et al 2000

Environmental education

- ED-1: Galvanize local communities to protect the Gulf of Mexico through targeted education
- ED-2: Conduct a public awareness campaign for the Gulf of Mexico

Identification and characterization of Gulf habitats

- ID-1: Create and provide access to interactive habitat maps for priority Gulf of Mexico habitats (USGS, NOAA, USACE created PHINS)

Wetland and coastal conservation and restoration

- R-1: Streamline coastal restoration and conservation efforts
Regional Sediment Management Master Plan (USACE, USGS, and others)
- R-2: Increase the safety of Gulf communities by better understanding the risks of localized sea level rise, storm surge and subsidence (need relevant science contributions)

USGS Program: Long-term Research Themes

Coastal ecosystems, habitats and wildlife species

- Understand and quantify habitat conversion, land area change and habitat change interrelationships

Coastal landscape including the shoreline, barrier islands and submerged resources

- Understand the dynamics of coastal systems
- Anticipate future responses to system drivers

River transport and surface-water hydrology including nutrient and contaminant inputs

- Understand transport of sediments, nutrients and other contaminants from NGOM basins
- Understand relevant estuarine and marine processes

Social systems, and the role science plays in decision making

- Land Use / Cover / Change / Trends/Data Management, Vulnerability / Resilience / Science Translation / Relevance

Potential partners?

**You are representing 15 bureaus, agencies,
universities and contracting companies
today – what can we do together?**