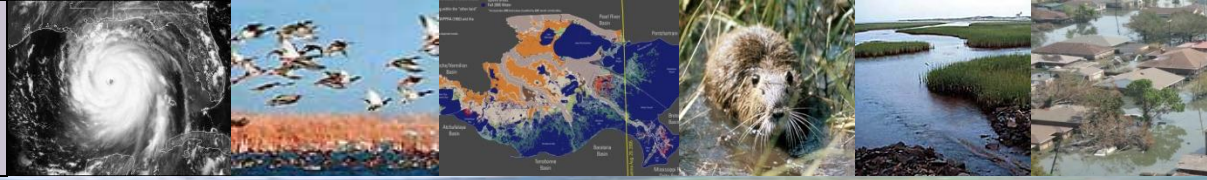**GULF COAST LONG-TERM RESTORATION**

SUPPORTING GULF OF MEXICO RESTORATION: ISSUES, CHALLENGES, AND SOLUTIONS IDENTIFIED BY THE GULF COAST ECOSYSTEM RESTORATION TASK FORCE SCIENCE COORDINATION TEAM

Dr. Alyssa Dausman, USGS
INTECOL 9: Large Scale Ecosystems
June 6, 2012

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&
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NOAA

Science Coordination Team

FEDERAL

- Bureau of Ocean Energy Management
- National Aeronautics and Space Administration
- National Oceanographic and Atmospheric Administration
- National Park Service
- U.S. Army Corps of Engineers
- U.S. Department of Agriculture
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S Geological Survey
- The White House Office of Science and Technology

STATES

- Texas
- Louisiana
- Mississippi
- Alabaman
- Florida

What makes the Gulf of Mexico Unique?

▪~ 1/3 of seafood production in US

▪~ 90% of the nation's oil/gas

▪Billions of $$ to economy through tourism and commercial/ recreational fishing

▪Dynamic ecosystems spanning 600,000 square miles, thousands of miles of shoreline, bayous, and bays

Deepwater Horizon Spill

- ~ 4.9 M barrels
- ~ 1.8 M gallons of dispersant
- ~ 80,000 square miles of Gulf closed to fishing

**one of many….
Catastrophic
and
Debilitating events in the Gulf**

Examples of Chronic Stressors for the Gulf of Mexico
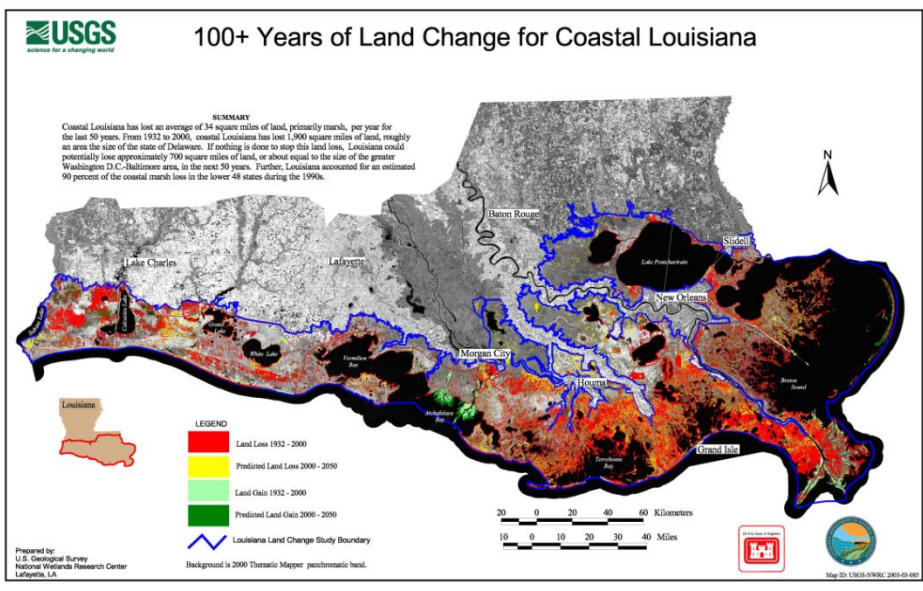
- Sediment input (or lack thereof)
- Land/habitat loss
- Relative sea-level rise
- Freshwater input (or lack thereof)
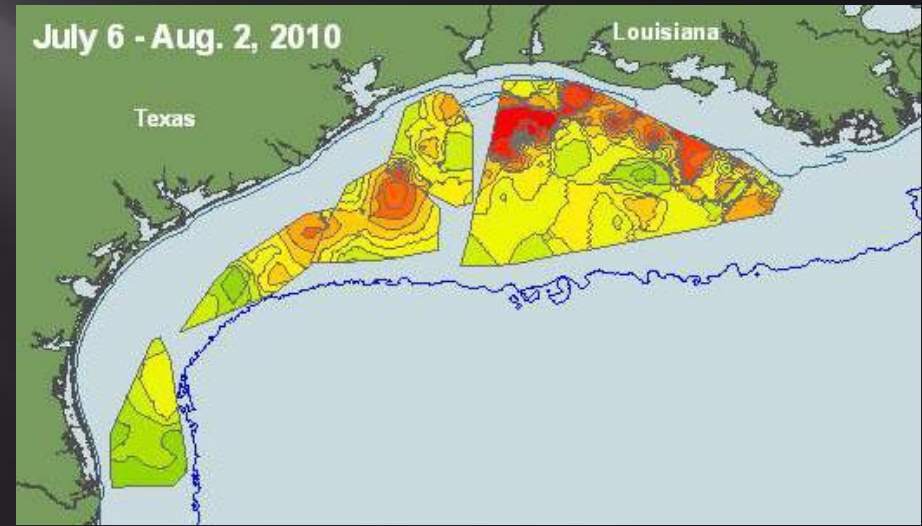
- Excess nutrient input and impaired water quality

COASTAL VULNERABILITY
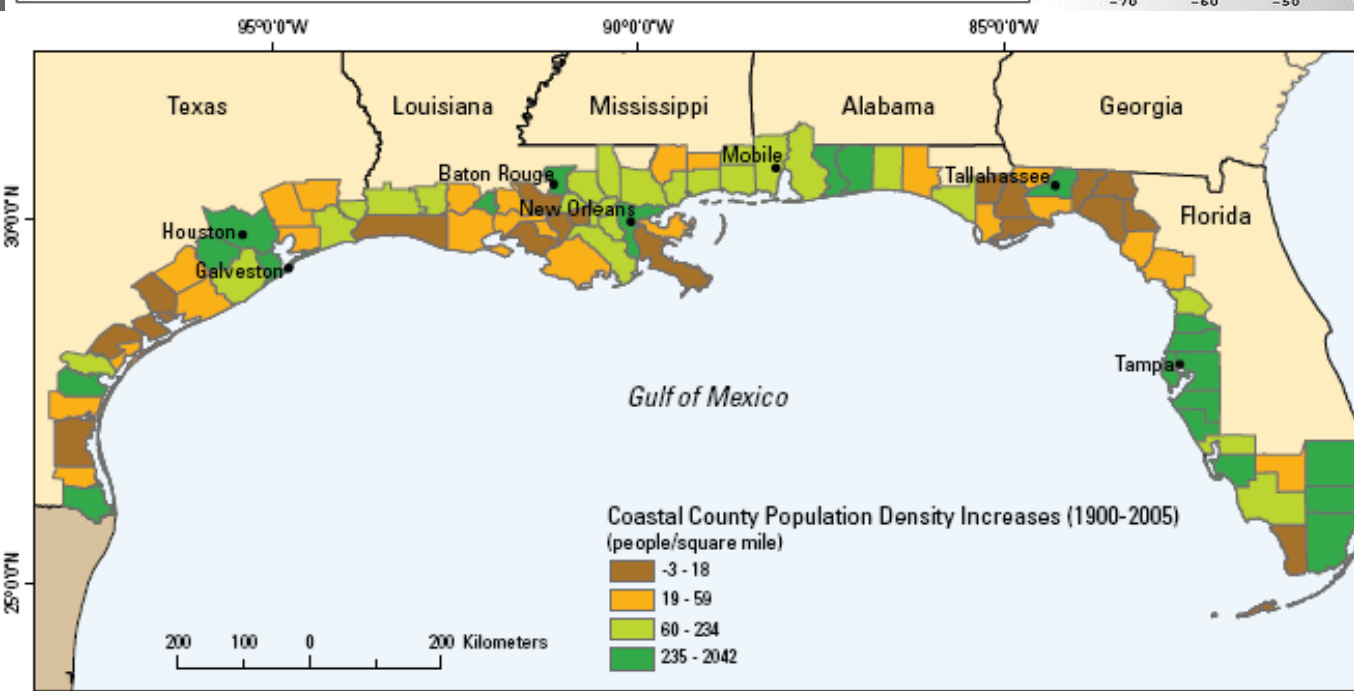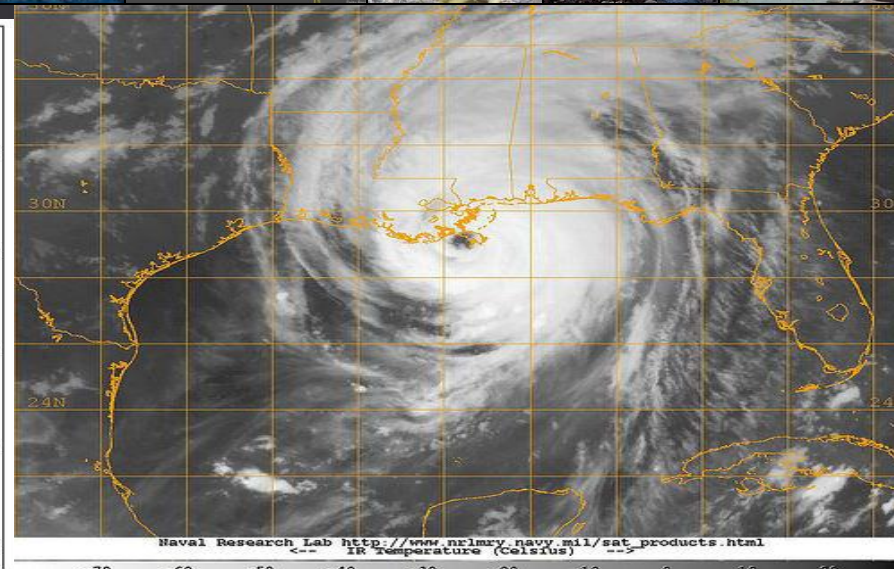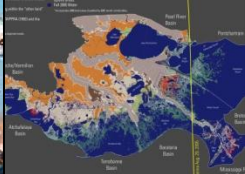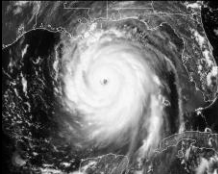
Stronger storms

More people

The Gulf Coast is more vulnerable and less resilient today, than yesterday

Evidence of the need for a....

HOLISTIC RESTORATION STRATEGY

Overview of Gulf Coast Ecosystem Restoration Task Force

- Recommended by the Mabus Report "America's Gulf Coast": **Long-term restoration and recovery beyond the oil spill**
- *Executive Order on October 5, 2010*
- Chair: Lisa Jackson, EPA
- Executive Director: John Hankinson, EPA
- Federal membership: Agriculture, Commerce, Interior, Justice, Transportation, EPA, USACE, OMB, CEQ, OSTP, the Domestic Policy Council
- State membership: 5 state representatives

- *Develop Restoration Strategy*

- Coordinate intergovernmental effort

- Support the Natural Resource Damage Assessment (NRDA) process (refer actions to Trustee Council)

- Engage stakeholders

- *Coordinate science in support of ecosystem restoration*

- Coordinate to encourage health and economic benefits of ecosystem restoration

In the Executive Order

- *__Coordinate__ science in support of ecosystem restoration*

  - *__Identify__ monitoring, research and scientific assessments to support ecosystem restoration*

  - *Consider __existing__ research and ecosystem restoration efforts*

Coordinating Scientists
is like
Herding Cats

SCIENCE COORDINATION TEAM

Working with GCERTF Staff in D.C.
&
Coordinating over 70 scientists around the Gulf

When I die, I hope it's in a meeting or a conference call. The transition from life to death will be barely perceptible.

-Dawn Lavoie

Gulf of Mexico Regional Ecosystem Restoration Strategy
&
Gulf of Mexico Science Assessment and Needs

Gulf of Mexico Regional Ecosystem Restoration Strategy
Gulf Coast Ecosystem Restoration Task Force
December 2011

Gulf of Mexico Ecosystem Science Assessment and Needs

Edited by Dr. Shelby Walker, Dr. Alyssa Dausman, and Dr. Dawn Lavoie

A product of the Gulf Coast Ecosystem Restoration Task Force Science Coordination Team

April 2012

http://www.epa.gov/ gulfcoasttaskforce/

Strategy has 4 main goals:
(with recommended actions)

- Restore and Conserve Habitat
- Restore Water Quality
- Replenish and Protect Living Coastal and Marine Resources
- Enhance Community Resilience

*with science-based adaptive management
&
science to support restoration*

Gulf Coast Ecosystem Restoration Task Force Structure

Science Coordination Team
Gulf of Mexico Ecosystem Science Assessment and Needs

Coastal Habitats

Living Marine Resources

Coastal Communities

Storm Buffers

Inland Habitats and Watersheds

Offshore Environments

Science-based Adaptive Management

Gulf of Mexico Regional Ecosystem Restoration Strategy

Enhance Community Resilience

Restore and Conserve Habitat

Restore Water Quality

Replenish and Protect Living Coastal and Marine Resources

Science-Based Adaptive Management

Science to Support Restoration

TWO DOCUMENTS
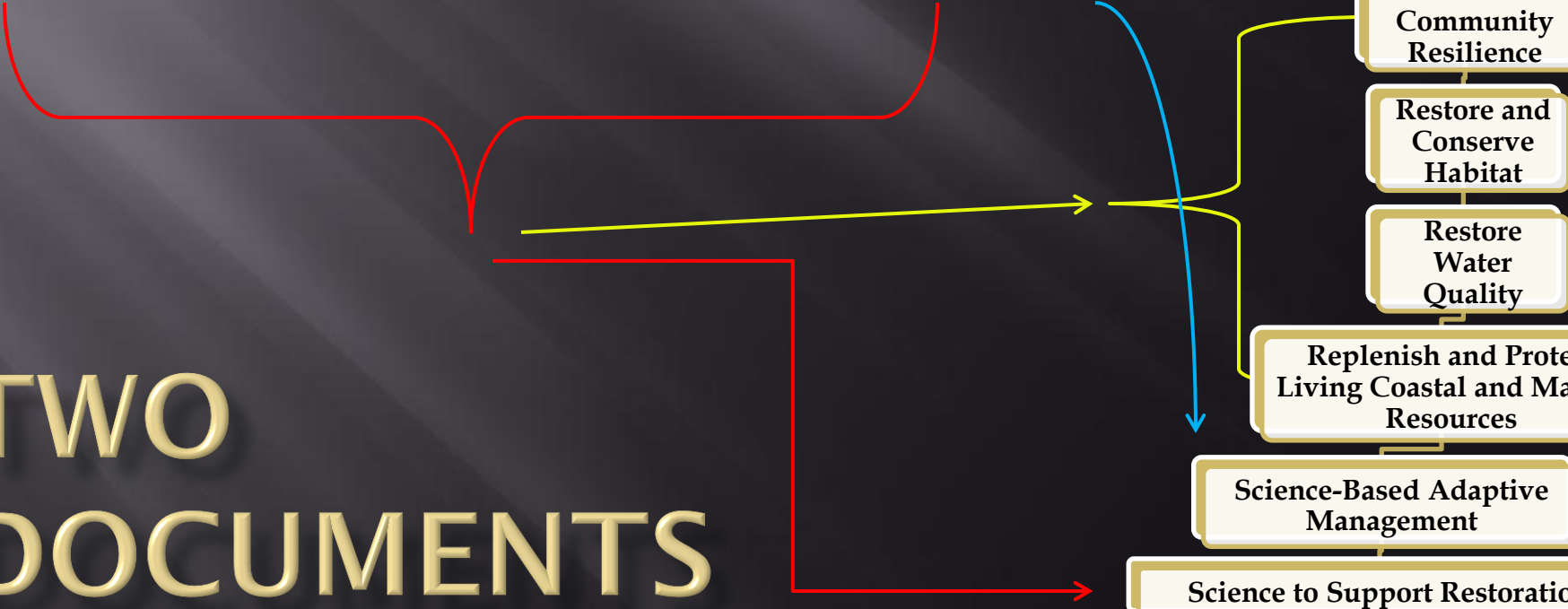
Science ->Strategy

GULF OF MEXICO SCIENCE ASSESSMENT AND NEEDS

- Scientific background and details to support the Strategy
- Current conditions
  - State by State
  - Habitat
  - Watershed to deep blue waters

Science ->Strategy

GULF OF MEXICO SCIENCE ASSESSMENT AND NEEDS

- Building upon existing resources
- High level activities
- Performance indicators

Science ->Strategy

GULF OF MEXICO SCIENCE ASSESSMENT AND NEEDS

- **Identifying** Needs:
  - Monitoring
  - Modeling
  - Research
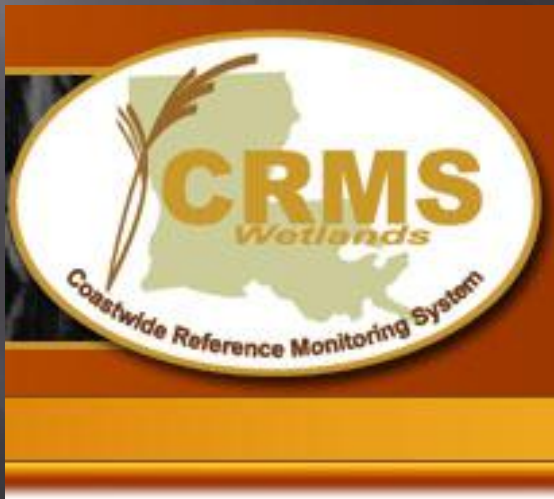- Foundational Elements for Implementation
- Science Plan
  - Adaptive Management

Table 1. Specific Data Acquisition Needs	Habitats (coastal)	Habitats (inland) and watersheds	Living coastal and marine resources and offshore environments	Coastal communities (including storm buffers)
Physical				
Sediment, nutrient, pollutant loads, and freshwater flow rates	x	x	x	x
Land:water ratios	x	x	x	x
Topography/bathymetry	x	x	x	x
Shoreline position and form and dimensions of beaches and dunes and barrier islands	x		x	x
Erosion and accretion rates	x			x
Seafloor change	x	x		
Hydrology (water surface elevation, current velocity, wave characteristics, salinity, temperature)	x	x	x	x
Meteorology	x		x	
Air quality		x	x	
Marsh elevation (accretion, subsidence, sediment elevation table)	x		x	x
Relative sea-level rise rates (subsidence and global sea-level rise)	x	x	x	x
Geodetic vertical datum	x	x		
Biological				
Invasive species	x		x	
Fisheries composition/abundance/diversity/productivity/tissue contaminants	x		x	
Fisheries landings			x	x
Wildlife and living marine resources abundance/diversity and distribution (including sentinel species)	x	x	x	
Plant community composition/abundance/diversity/productivity	x	x	x	
Benthic macroinvertebrates or key benthic assemblages	x		x	
Phytoplankton, harmful algae species occurrence, toxin production	x	x	x	
Zooplankton	x		x	
Pathogens	x	x	x	
Microbial ecology		x	x	
Chemical				
Water quality (nutrients, ammonia, silica, turbidty, total suspended solids, water clarity, contaminants [e.g. PAHs, PCBs], metals, dissolved oxygen, salinity, temperature, depth, conductivity, secchi depth, photosynthetically active radiation, pH, chlorophyll a, carbon)	x	x	x	
Coastal, nearshore and offshore seafloor sediment characteristics (sediment composition, bulk density, organic matter, total carbon, total nitrogen, phosphorous, grain size, total organic carbon, sediment toxicity)	x	x	x	

Science Plan: Adaptive Management Elements

- Establish goals and objectives: Based on GCERTF
- Conceptual Models
- Performance Measures
- Uncertainties
- Research
- Monitoring
- Modeling
- Assessment
- Data Management
- Policies
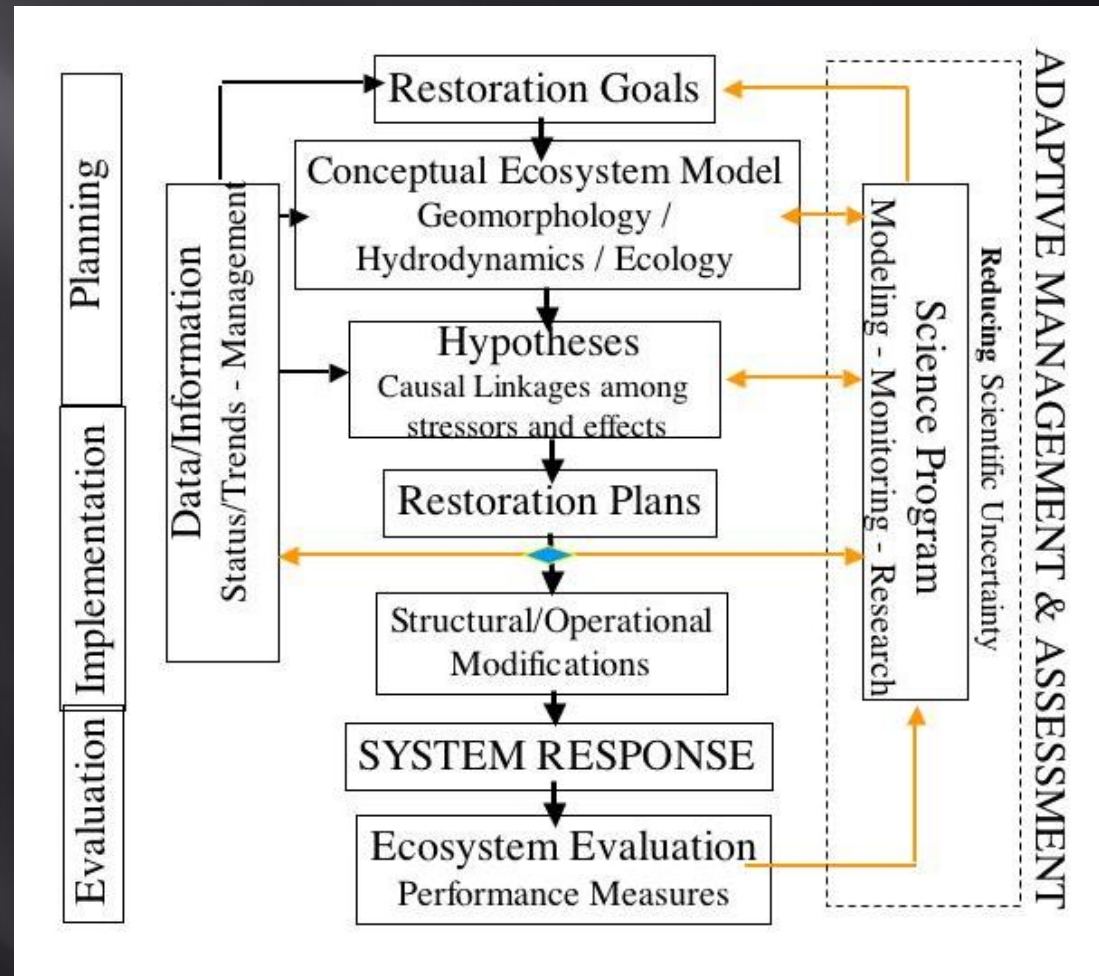
SOLUTION:
GoM ecosystem continues to suffer from extensive degradation, action is necessary

- Develop/update Gulf-wide sediment budget
- Reduce nutrient/pollutant inputs in upper watersheds to prevent their delivery to the Gulf of Mexico. Reduce effects of hypoxia by improving detection, tracking, and forecasting ability
- Assess current operational and research modeling efforts within the Gulf to support offshore ecosystem protection and preservation efforts
- Provide uniform storm surge and wave evaluations for the entirety of Gulf
- Enhance communication of risk to promote resilience to coastal hazards
- Assess the value of ecosystem services to communities
- Education and outreach for coastal decision makers to link ecosystem restoration to ecosystem service
- Implement science plan with robust adaptive management framework
- Develop a comprehensive, holistic, long-term monitoring program to facilitate adaptive management
- Create independent Science Advisory Board