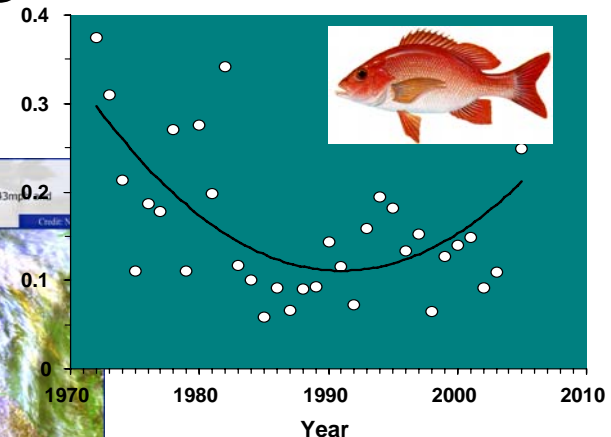
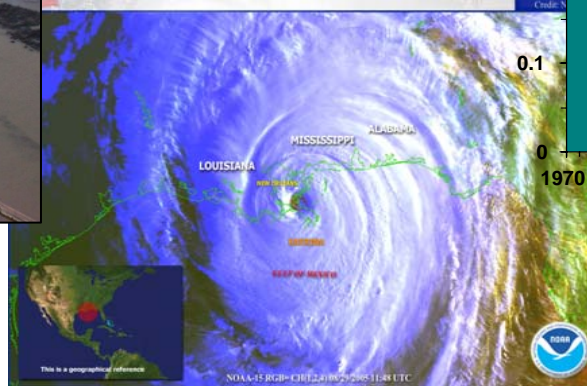




Hurricanes Katrina and Rita: NOAA's Next Steps in Response & Rebuilding



Hurricane KATRINA has hit land and is moving north at 15mph. It has max sustained winds of 143mph and gusts of 165mph.



Steven A. Murawski and Kristen C. Koch

NOAA Science Advisory Board Meeting, Washington, D.C.

March 9, 2006



Outline



- Purpose
- Issue
- Background
- NOAA's Support Activities
- Restoration and Rebuilding of Living Marine Resources
- Desired Outcome
- Next Steps



Purpose

- Highlight NOAA's intermediate response and long-term rebuilding activities after Hurricanes Katrina and Rita
- Identify challenge areas
- Describe next steps (including new administration initiatives)
- Engage SAB in discussion of NOAA's role in recovery and rebuilding, using appropriate science



Issues

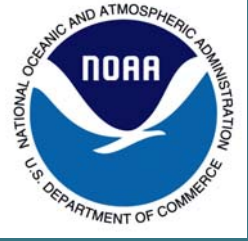


- Regional ecosystem, social, and economic impacts are on a scale unparalleled in decades
- NOAA's intermediate and long-term response and rebuilding in the Gulf of Mexico is ongoing
- Rebuilding Gulf fisheries is both a challenge and a new beginning, encompassing many ecological, social, and scientific dimensions



Background

Assessment Activities



- NOAA-wide Disaster Recovery Checklist complete
- NOAA-wide Review of Operations and Services during Hurricanes Katrina and Rita draft completed and under review
 - Reviewed activities before, during, and after events
 - Emphasized perspective of customers and partners
 - Focused on readiness, communication, coordination, continuity of operations, and recovery



Background

Setting the Context



NOAA is an operational service agency

Preparation

Outreach &
Education

Disaster
Preparedness

Hazard Assessment

Continuity of
Operations Planning

Timeframe: Ongoing

Forecasts & Warnings

Media, Federal,
State, and Local
Outreach &
Communication

Weather Monitoring

Hurricane
Forecasting

Pre-disaster
Readiness

*Timeframe: Starts at
identification of tropical
depressions*

Response

Spill Response and
Damage Assessment

Navigation Hazard
Surveys and Info
Distribution

Living Marine Resources
Assessment

NOAA Infrastructure
Assessment

*Timeframe: Event
through 1-2 months
following*

Rebuilding

Update
Management Plans
for Trust Resources

Support for
Community Rebuild

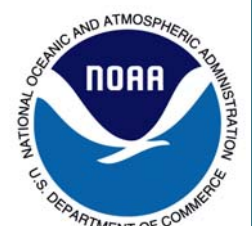
Repair Impacted
NOAA Facilities

*Timeframe:
Months to years*

Today's Focus: Intermediate Response and Rebuilding



Evaluating Hurricane Effects in an Ecosystem Context





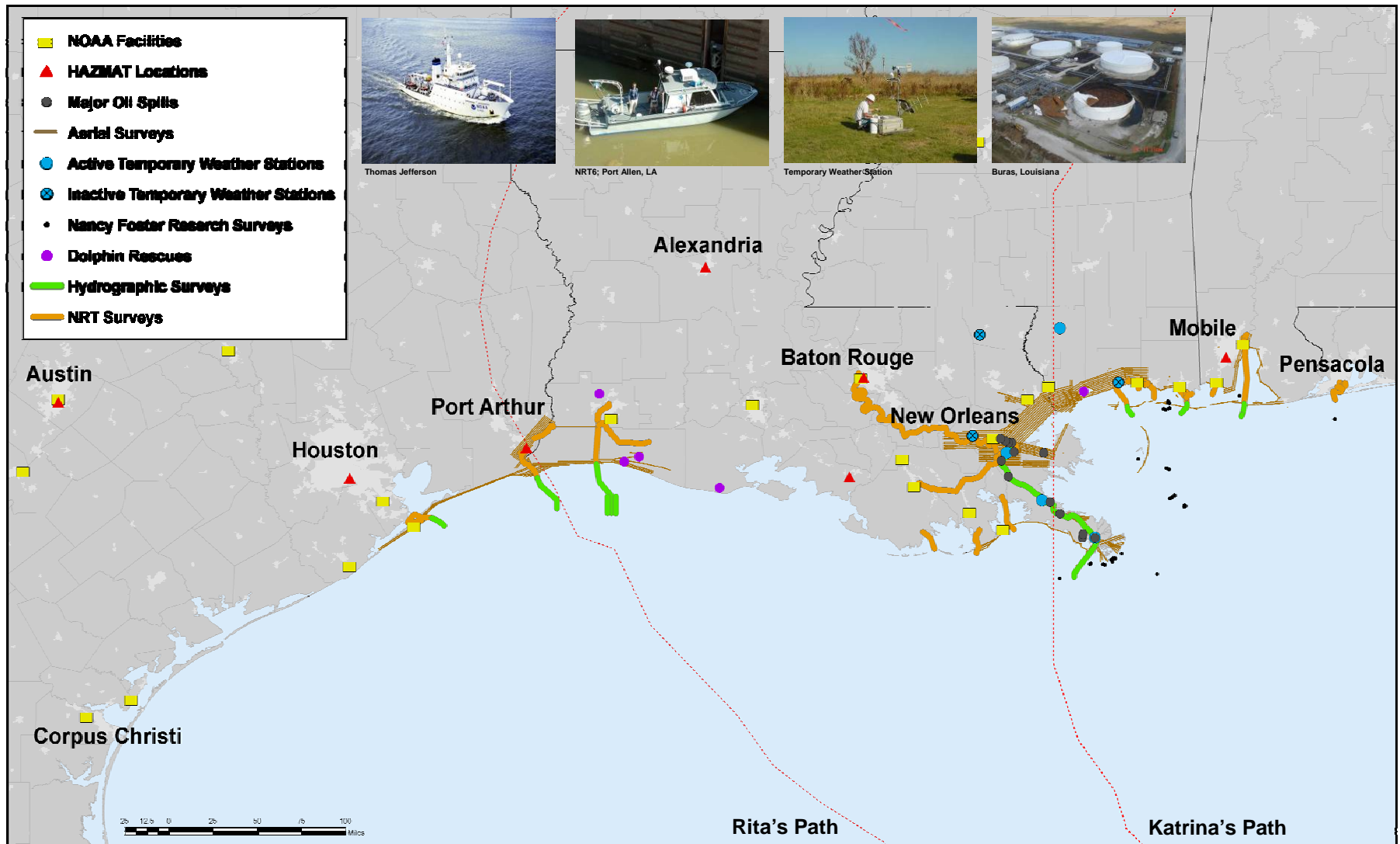
NOAA's Efforts: Theme Areas



- **NOAA's Response Support Activities**
- Restoration and Rebuilding of Living Marine Resources
- Next Steps



NOAA Response Activities





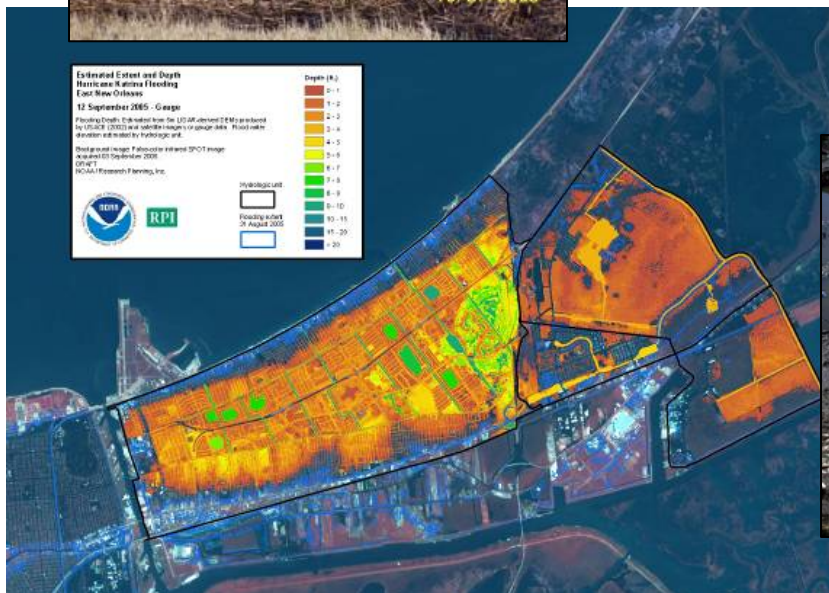
Debris Removal & Hazardous Materials



- Efforts to locate, characterize, and prioritize removal of thousands of potentially hazardous containers in marshes and shorelines complete



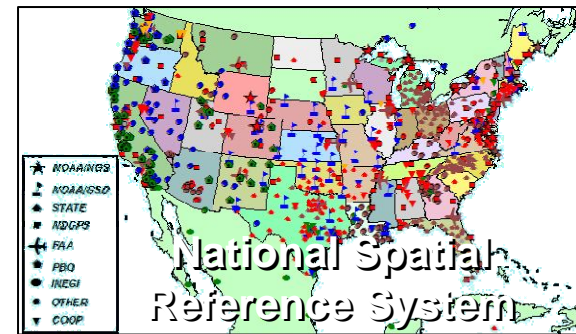
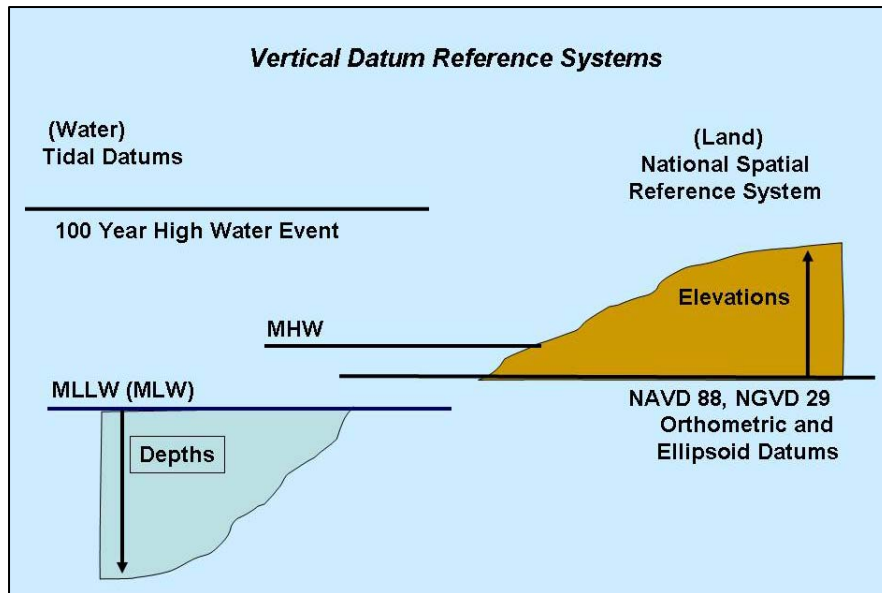
- Assessing marine debris impacts on human health, navigation, and essential fish habitat
- Working with industry to locate missing oil rigs
Addressed over 8 million gallons of oil spilled; now focused on 2 large spill areas



- Working with Natural Resource Trustees to assess impacts to natural resources at largest spills sites



Spatial Analysis: V-Datum



V-Datum is supporting multiple coastal rebuilding efforts





Levee Rebuilding Support



- NOAA is providing water level measurements and information critical to establishing baseline vertical reference systems
- Accurate Tidal and Geodetic Datums are essential to determining levee heights for performance assessment and future design.

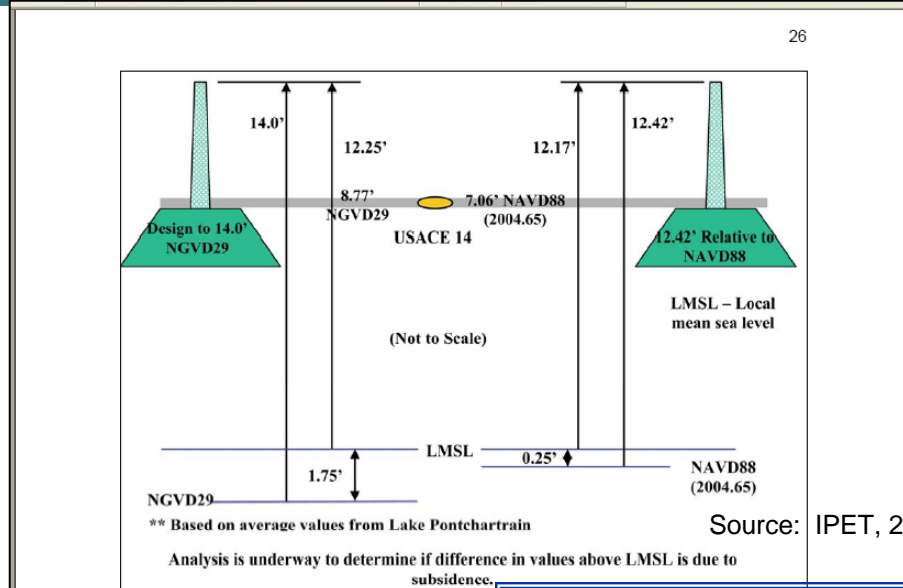


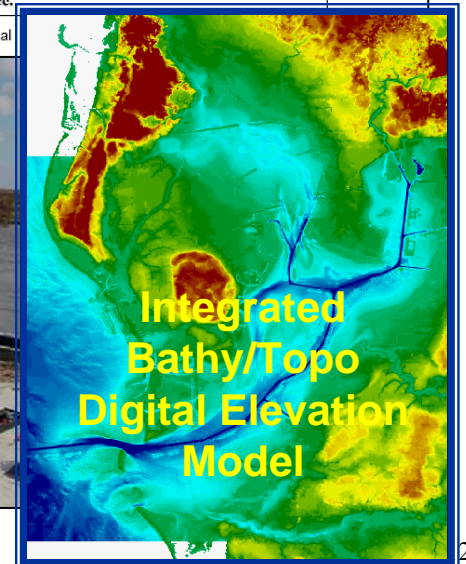
Figure 6. Example datum shift at the 17th Street Canal

Source: IPET, 2006



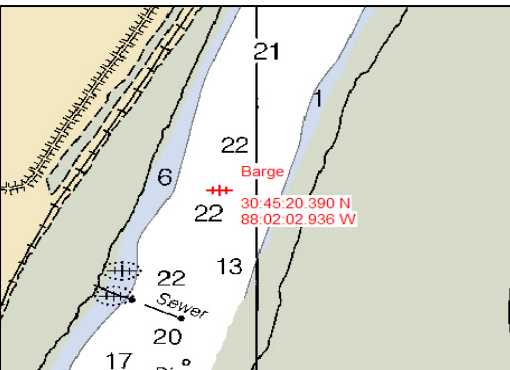
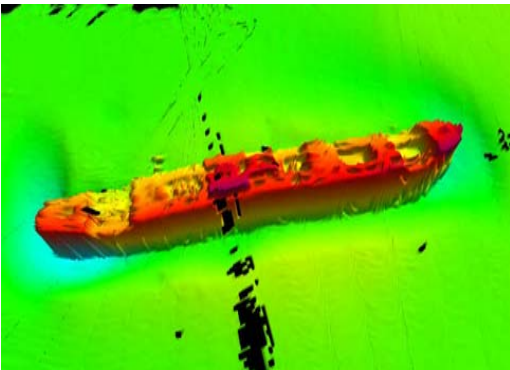
- U.S. Army Corps of Engineers to rebuild New Orleans levees by June 1

17th Street Canal Breach





Support Surveys



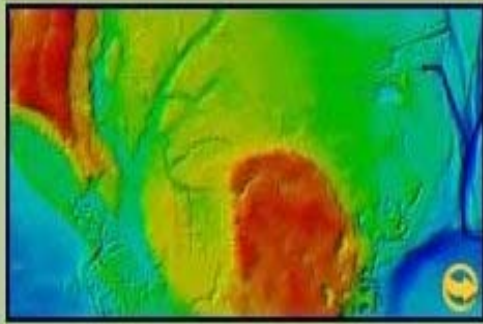
- NOAA Navigation Response Teams continue to survey in the region for wrecks, oil rigs, large debris and shoaling to keep commercial shipping lanes open; hydrographic contractor retasked to region
- Recent finds of 2 NRTs now tasked to Gulf:
 - Port of Lake Charles
 - Large hazard in Calcasieu Waterway closed channel to traffic for 3 days, leading to request to White House for potential opening of Strategic Petroleum Reserve
 - Survey results enabled channel to reopen in time for crude oil tankers to reach CITGO/CONOCO refineries
 - Port Fourchon
 - Two ship strikes of a hazard outside the port led to NRT discovery of large debris pile
 - FEMA funding should result in near-term removal



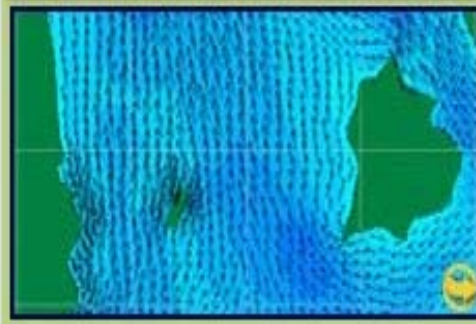
Storm Surge Mitigation



Data Collection and Observation



Modeling



Forecasting and Predictions



Socioeconomic Analysis



- Goal: Working with multiple partners to help Gulf of Mexico communities mitigate damages from storm surge and flooding impacts
- Examples of products being developed include:
 - Topo/Bathy data
 - Vertical Datum Transformation Tool
 - Evacuation Decision Support Tools
 - Storm surge forecast/warning systems



Long-Term Planning Support



- NOAA responded to a Mission Assignment from FEMA to support Emergency Support Function #14 – Long-term Community Recovery – in Louisiana
- Seven NOAA staff supported Louisiana Recovery Planning day on January 21st (across Louisiana and in 6 out-of-state cities with evacuee populations)
- Staff are coordinating with port interests in preparation for a Louisiana Portfields Pilot that will kick off May 23/24



- Staff are also coordinating with the Louisiana Recovery Authority and the U.S. Army Corps of Engineers regarding coastal protection and restoration planning



NOAA's Efforts: Theme Areas



- NOAA's Support Activities
- **Restoration and Rebuilding of Living Marine Resources**
- Next Steps

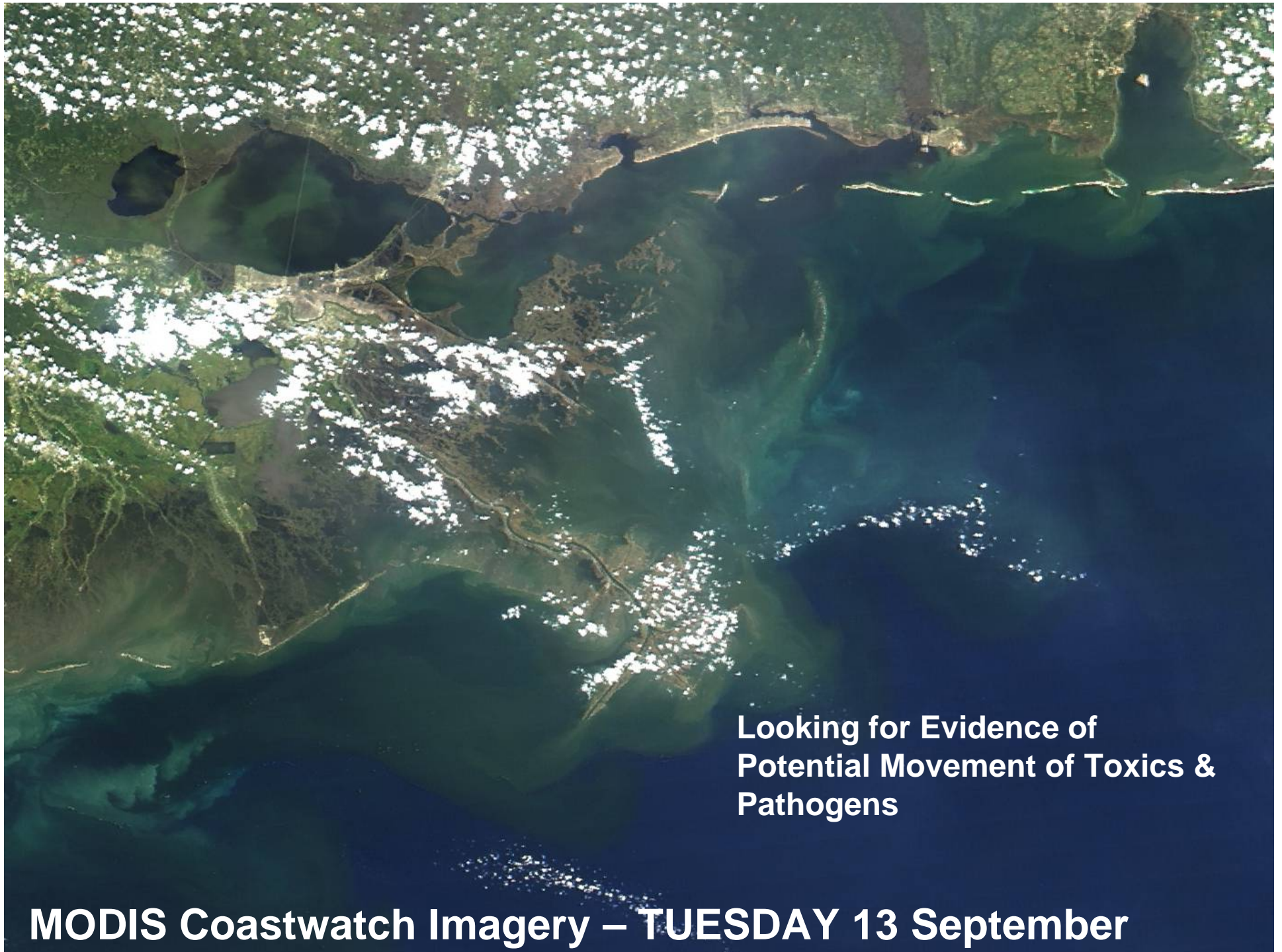


Rebuilding Fisheries, Communities and Habitat



- Response gathers critical information for Restoration/Recovery
- The long-term recovery of the Gulf region will require extensive coordination, and driven by state and local priorities for:
 - Assessments
 - Habitat Restoration and Stock Recovery
 - Rebuild/Economic Recovery



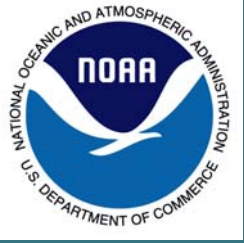


**Looking for Evidence of
Potential Movement of Toxics &
Pathogens**

MODIS Coastwatch Imagery – TUESDAY 13 September



Pollution Issues Subject to Sampling



- Hydrocarbon releases along the lower Mississippi River and from sunken vessels
- Toxics and pathogens from pumping out New Orleans
- Large numbers of sunken vessels inshore of Mississippi Sound
- Contents of storm surge waters
- Offshore releases



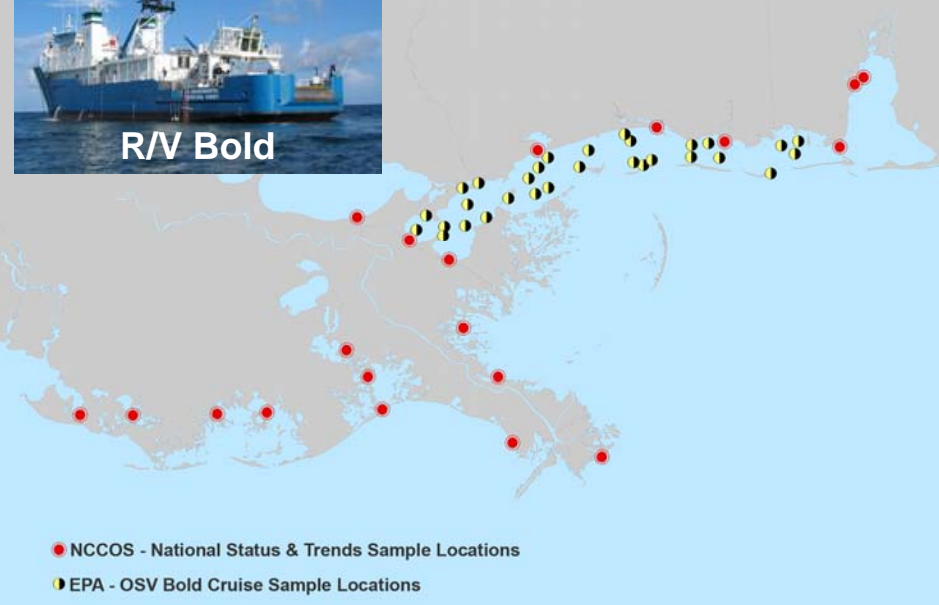
Joint EPA Cruise and Mussel Watch



Joint EPA - NOAA/NCCOS Post Katrina Assessment Sites



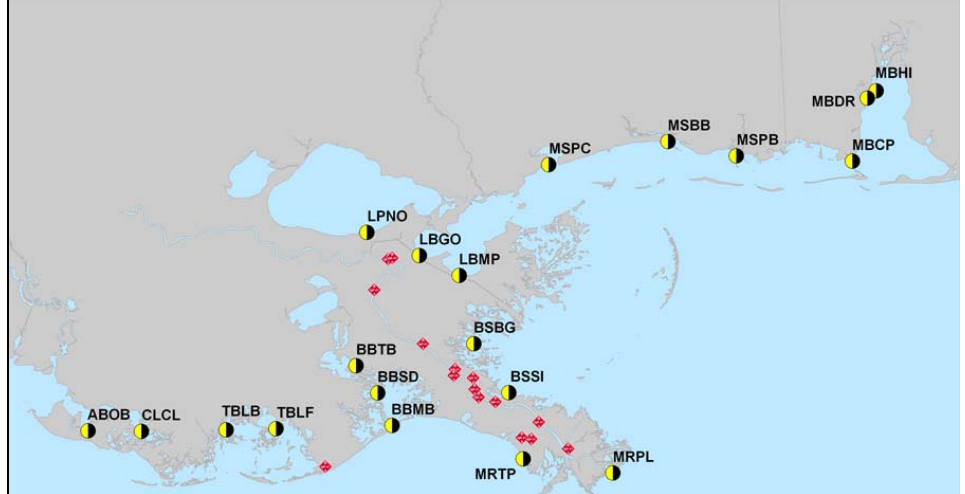
R/V Bold



NOAA National Status & Trends
Center for Coastal Monitoring and Assessment
National Centers for Coastal Ocean Science

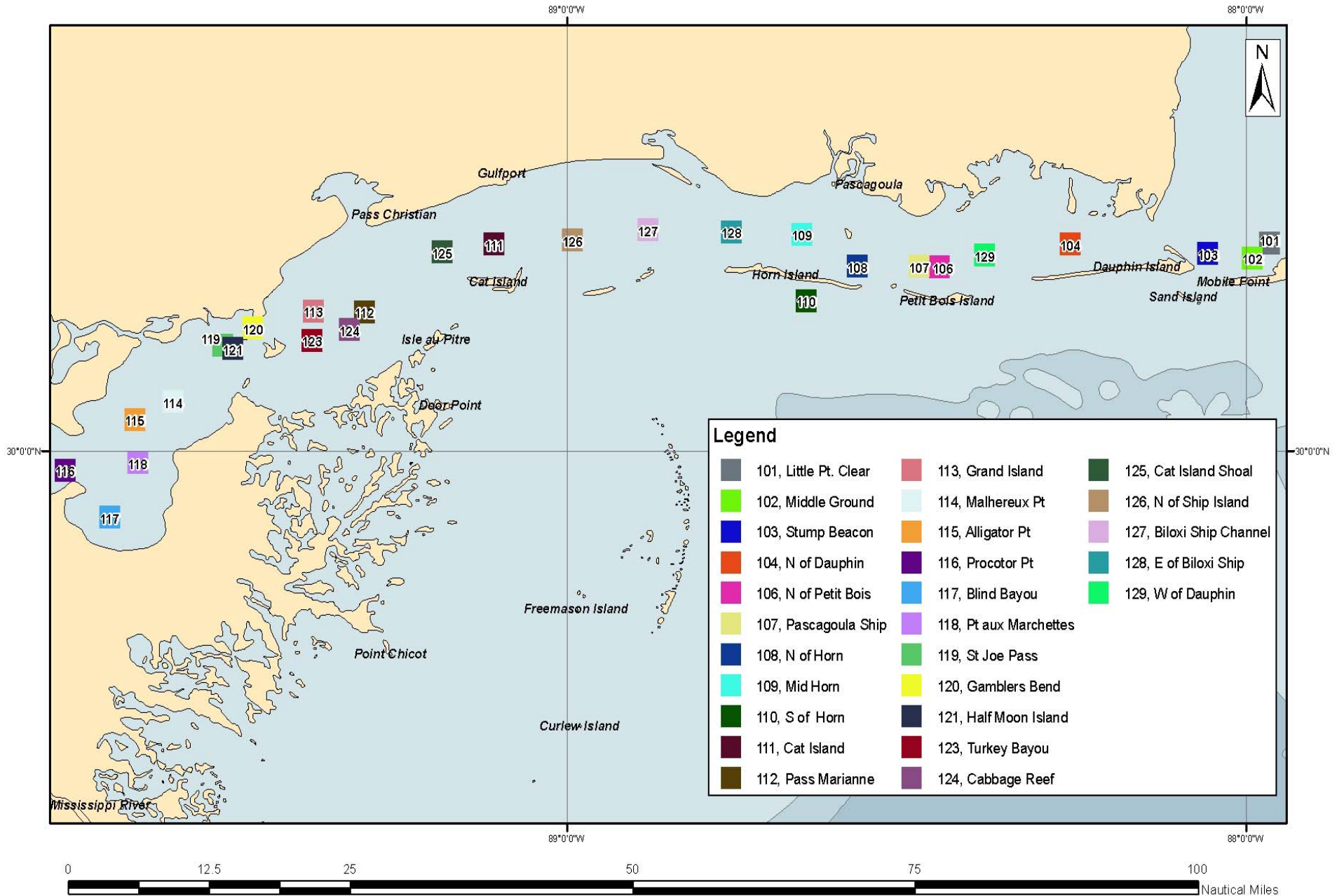
Post Hurricane Sampling
September 29 - October 8

MISSION
To conduct integrated monitoring, research, and assessment in pursuit of quantifying pollution and its effects on the environmental quality of US coastal and Great Lakes waters



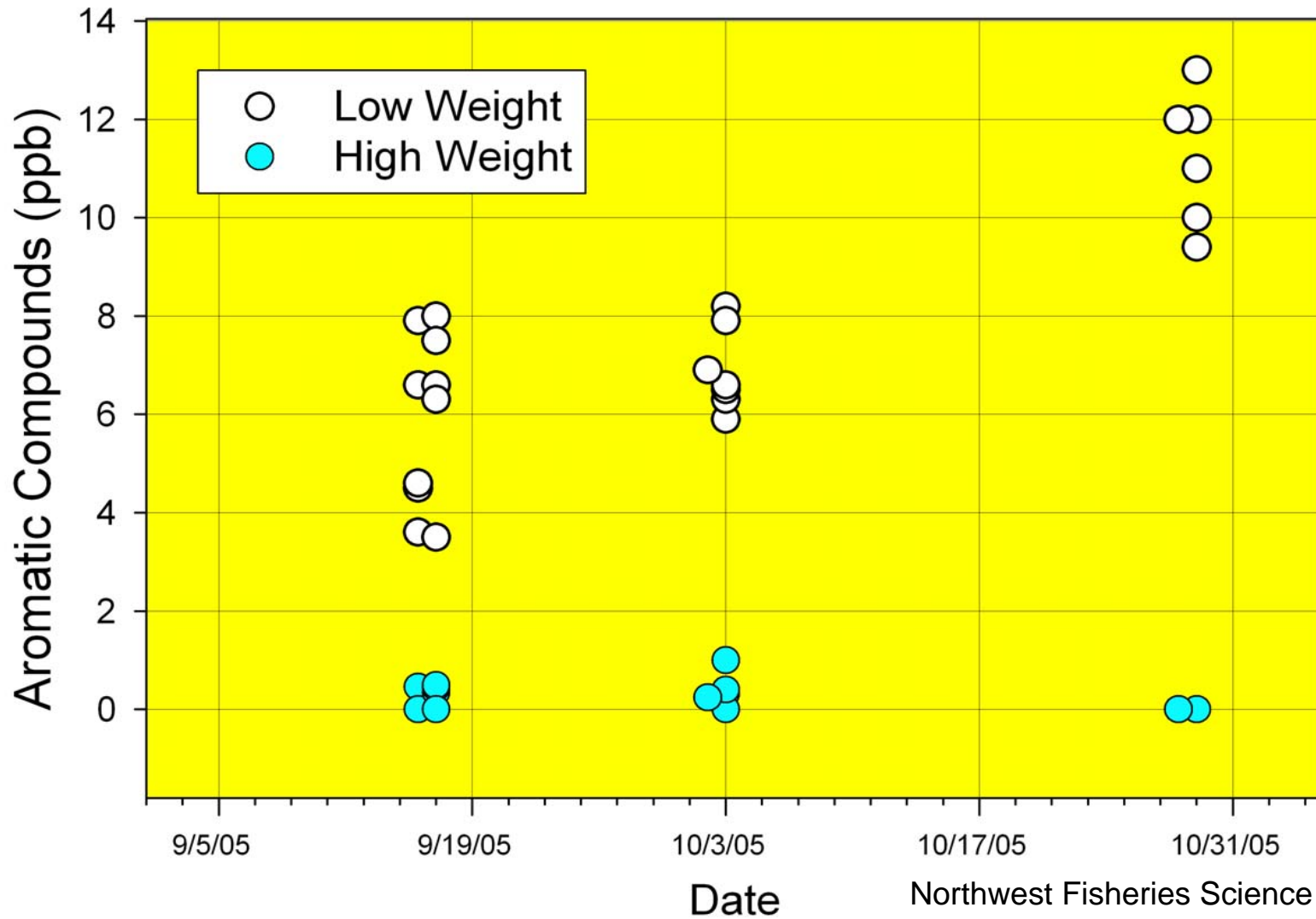
120 Contaminants measured in
American Oysters and Sediments

Katrina Response - Patricia Jean Stations 13-19 September 2005



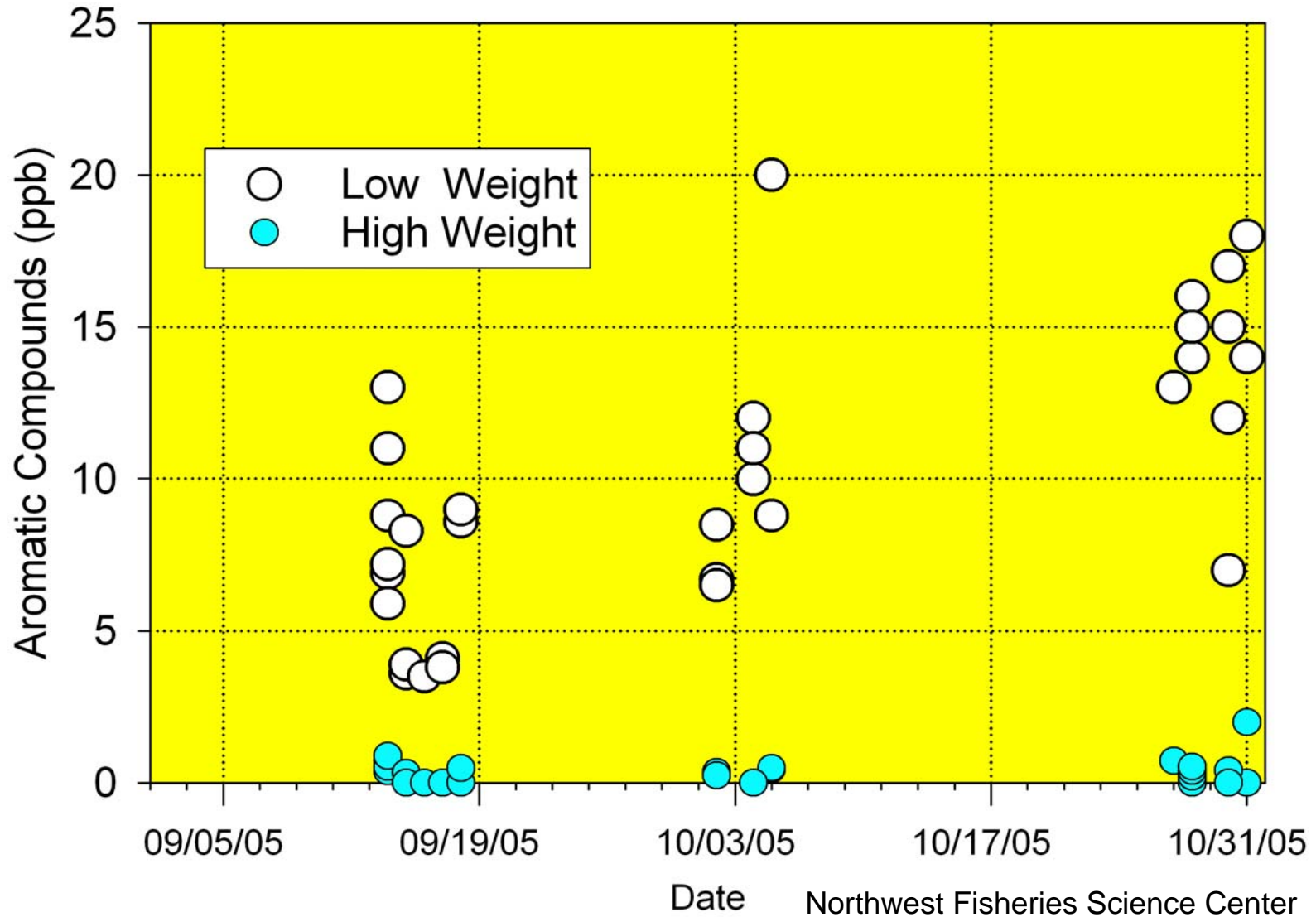


White Shrimp - Lake Borgne



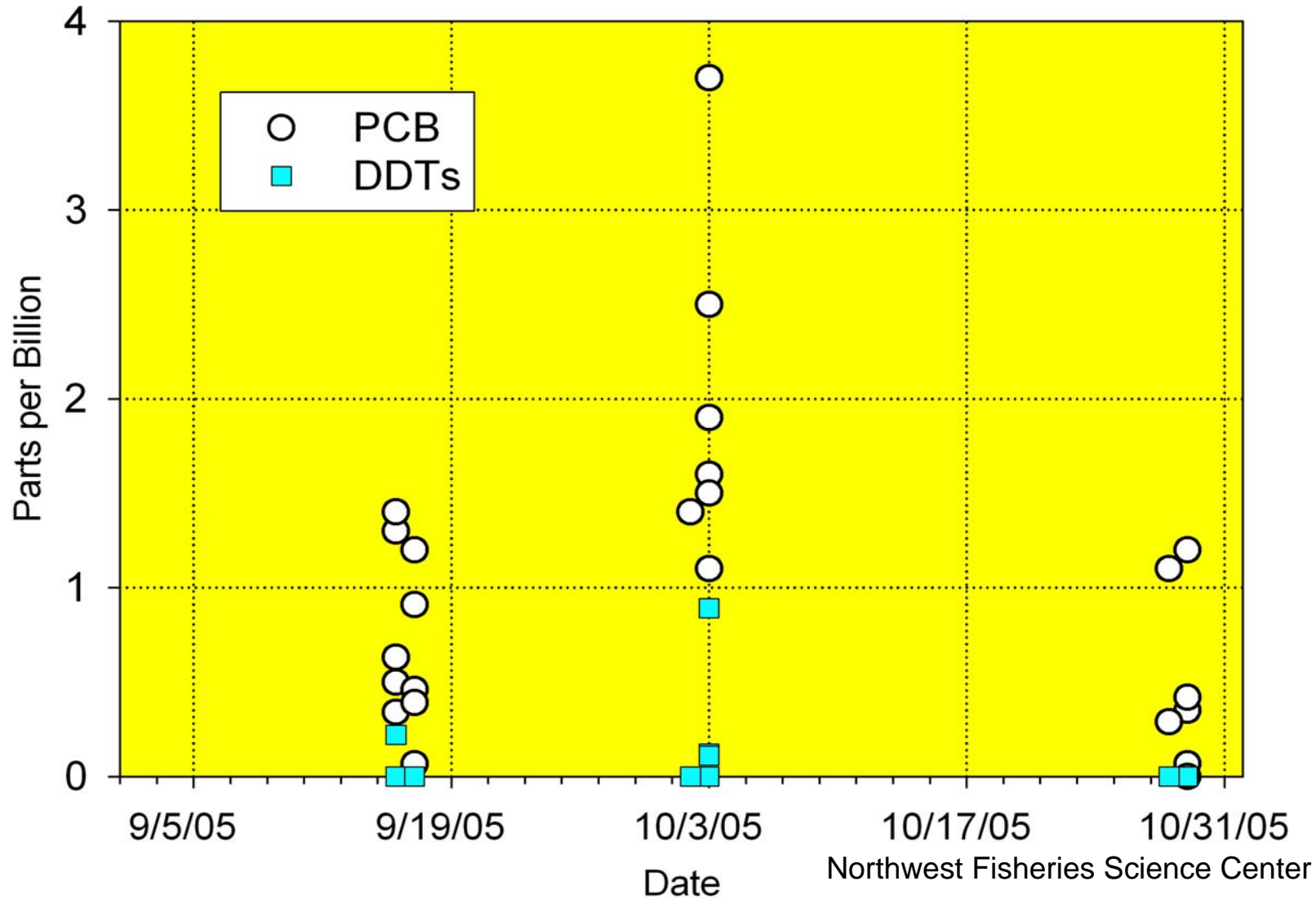


White Shrimp - Mississippi Sound



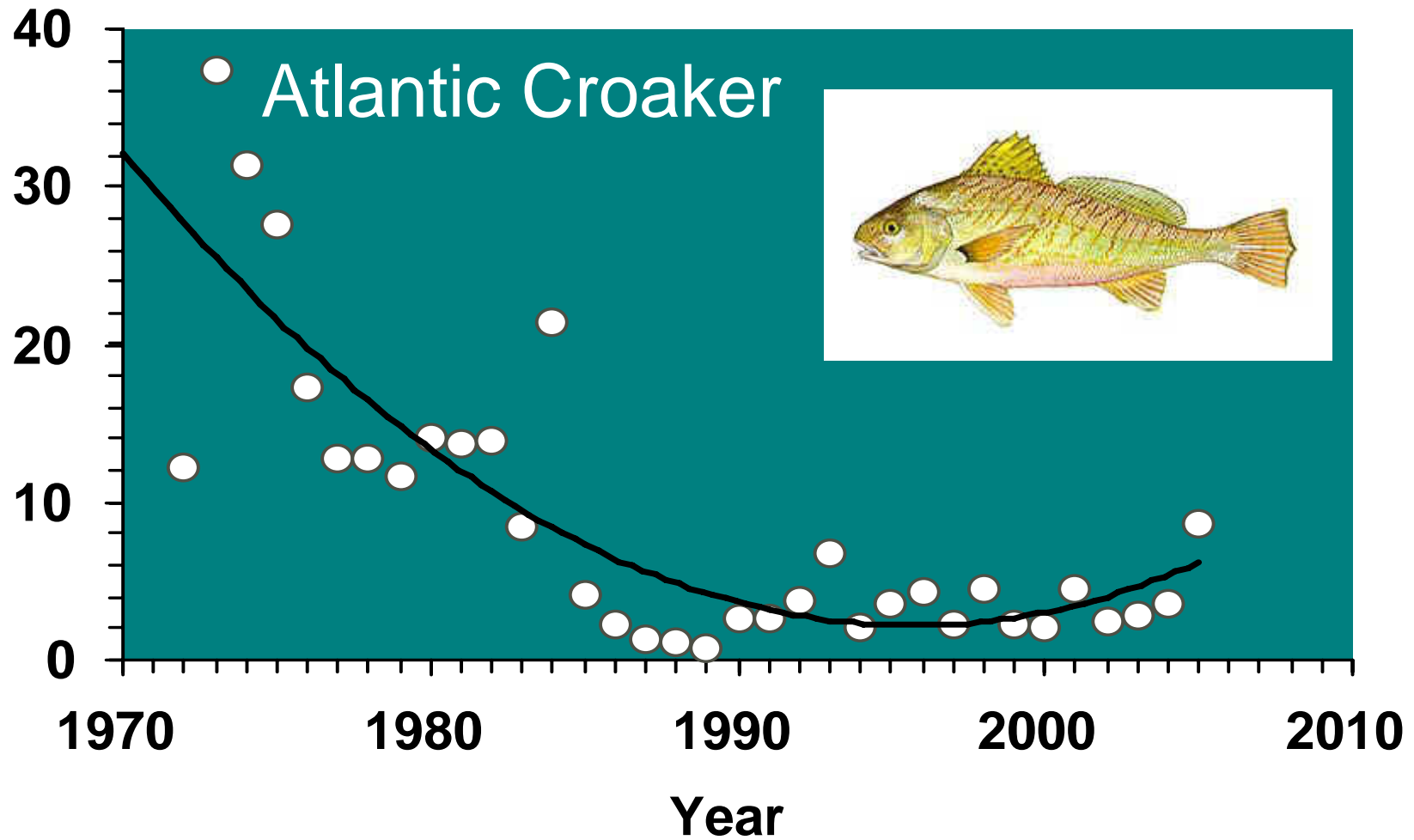


White Shrimp - Lake Borgne



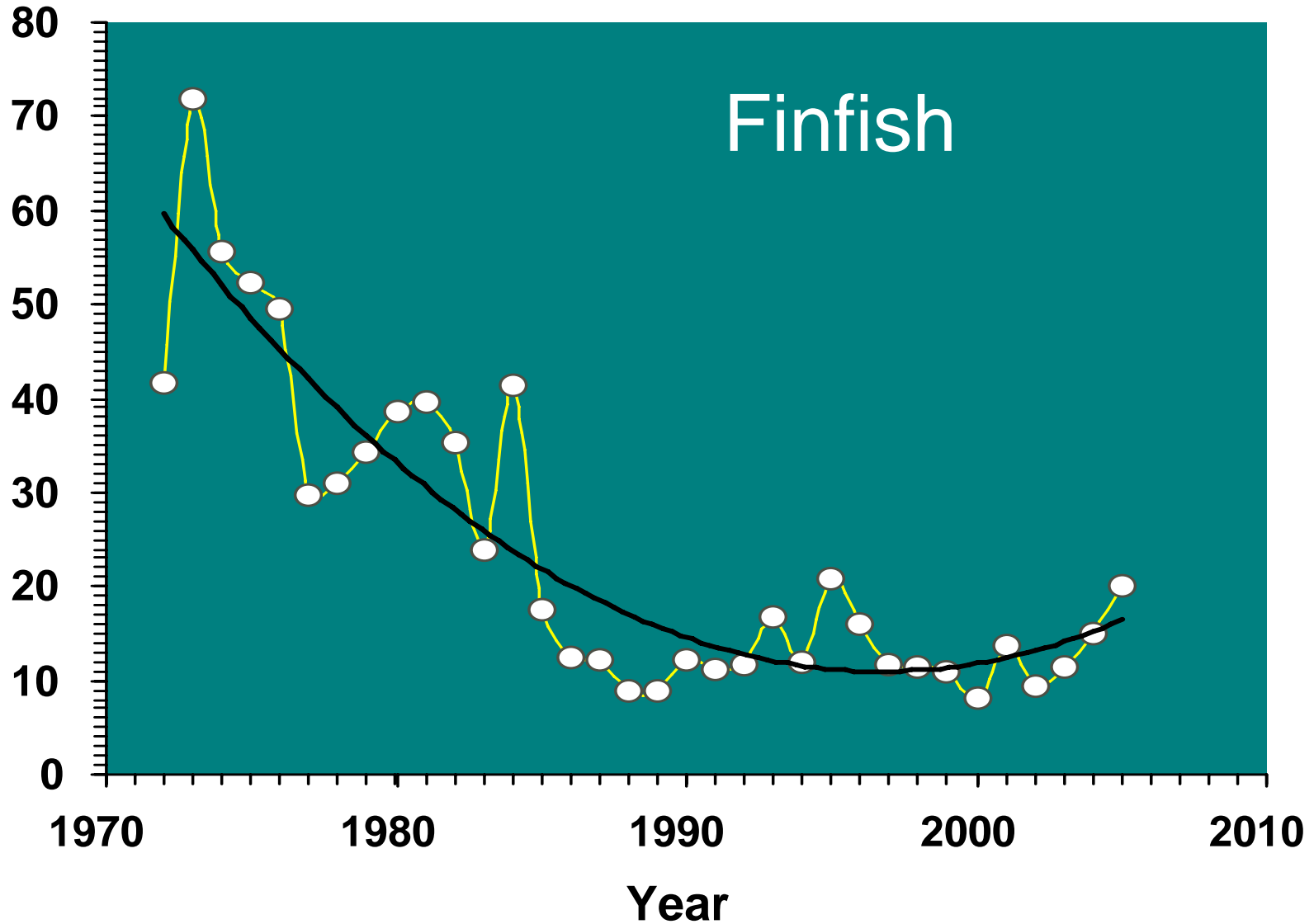


Gulf Coast Fishery Abundance



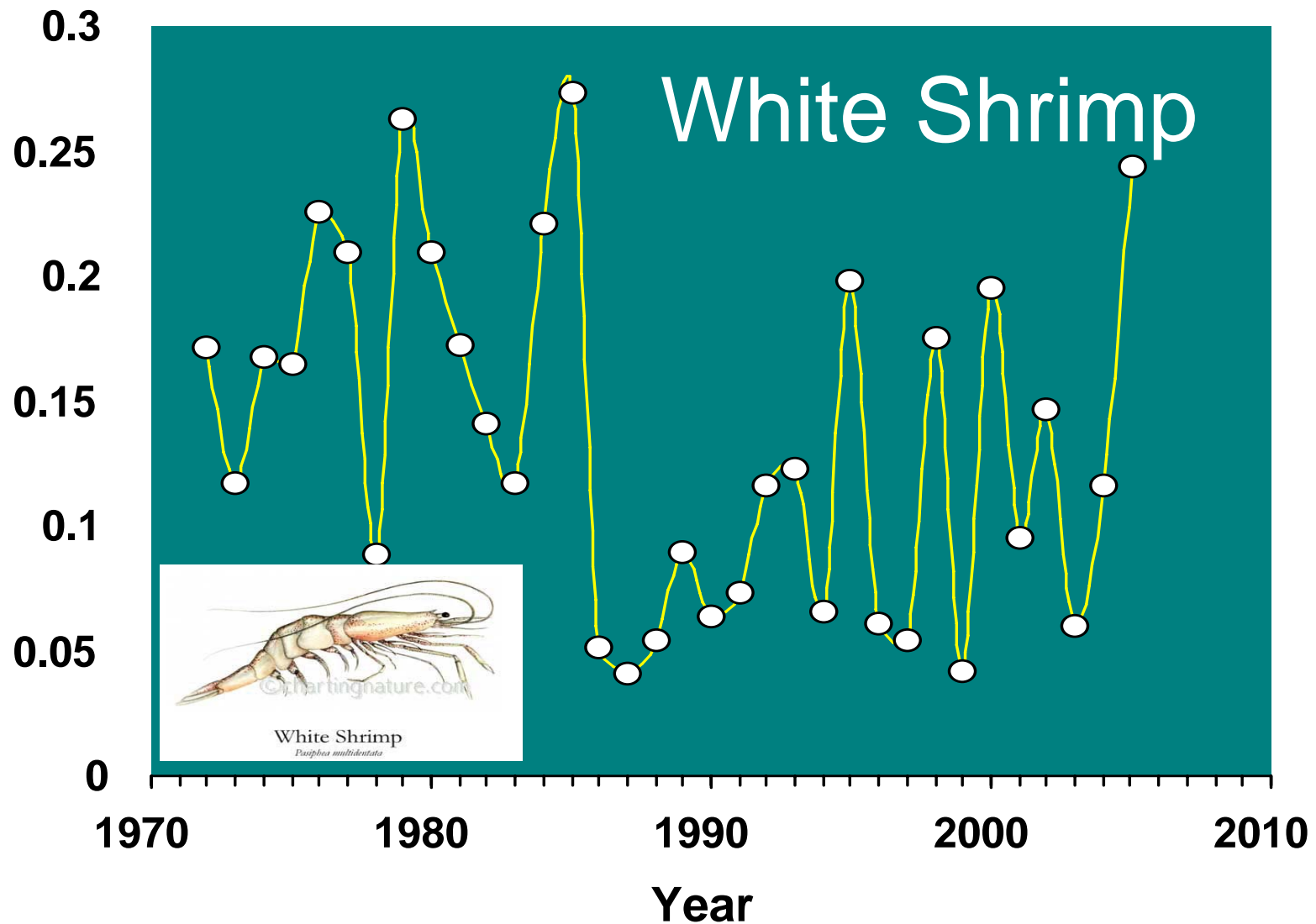


Gulf Coast Fishery Abundance



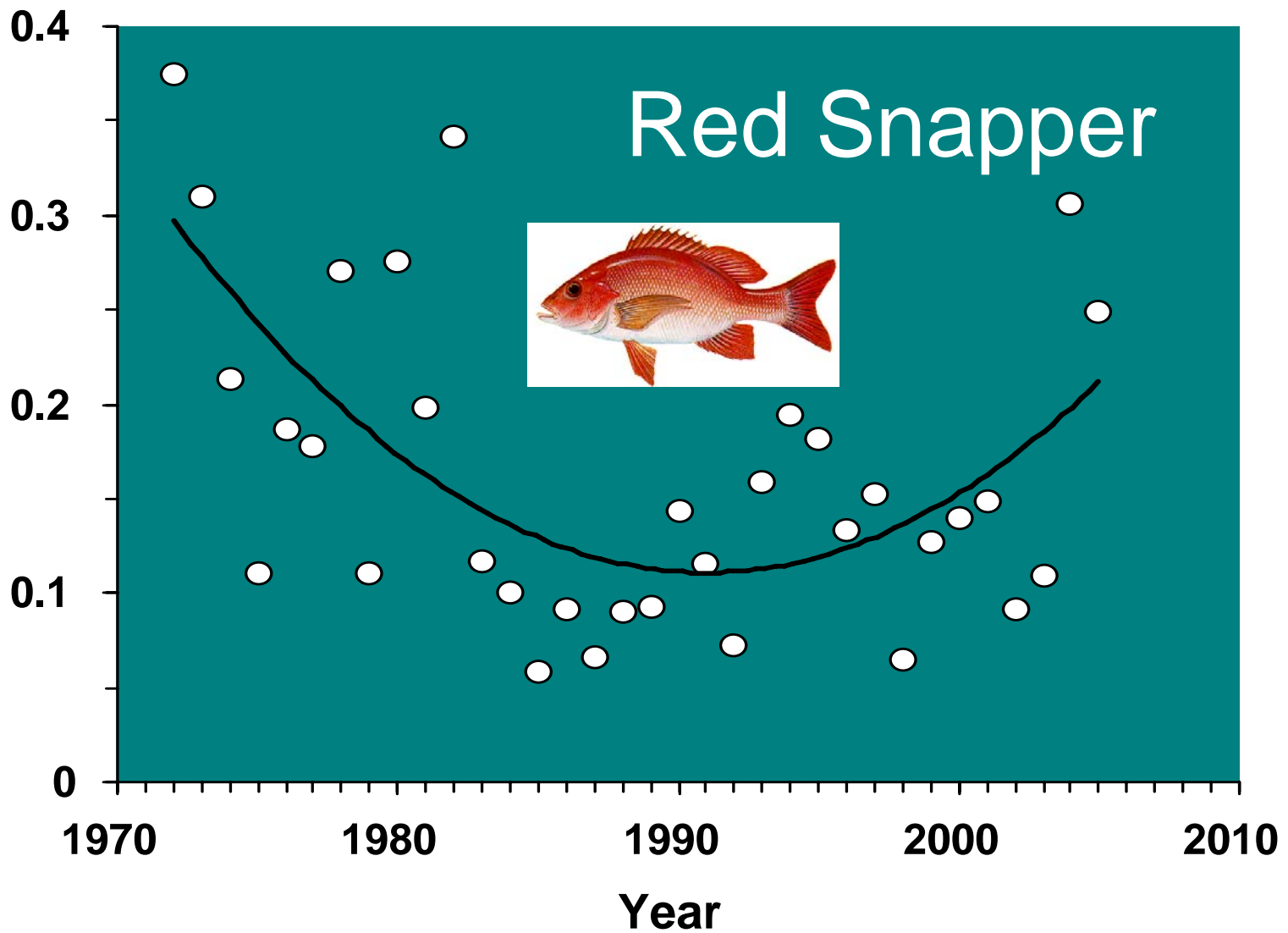


Gulf Coast Fishery Abundance





Gulf Coast Fishery Abundance

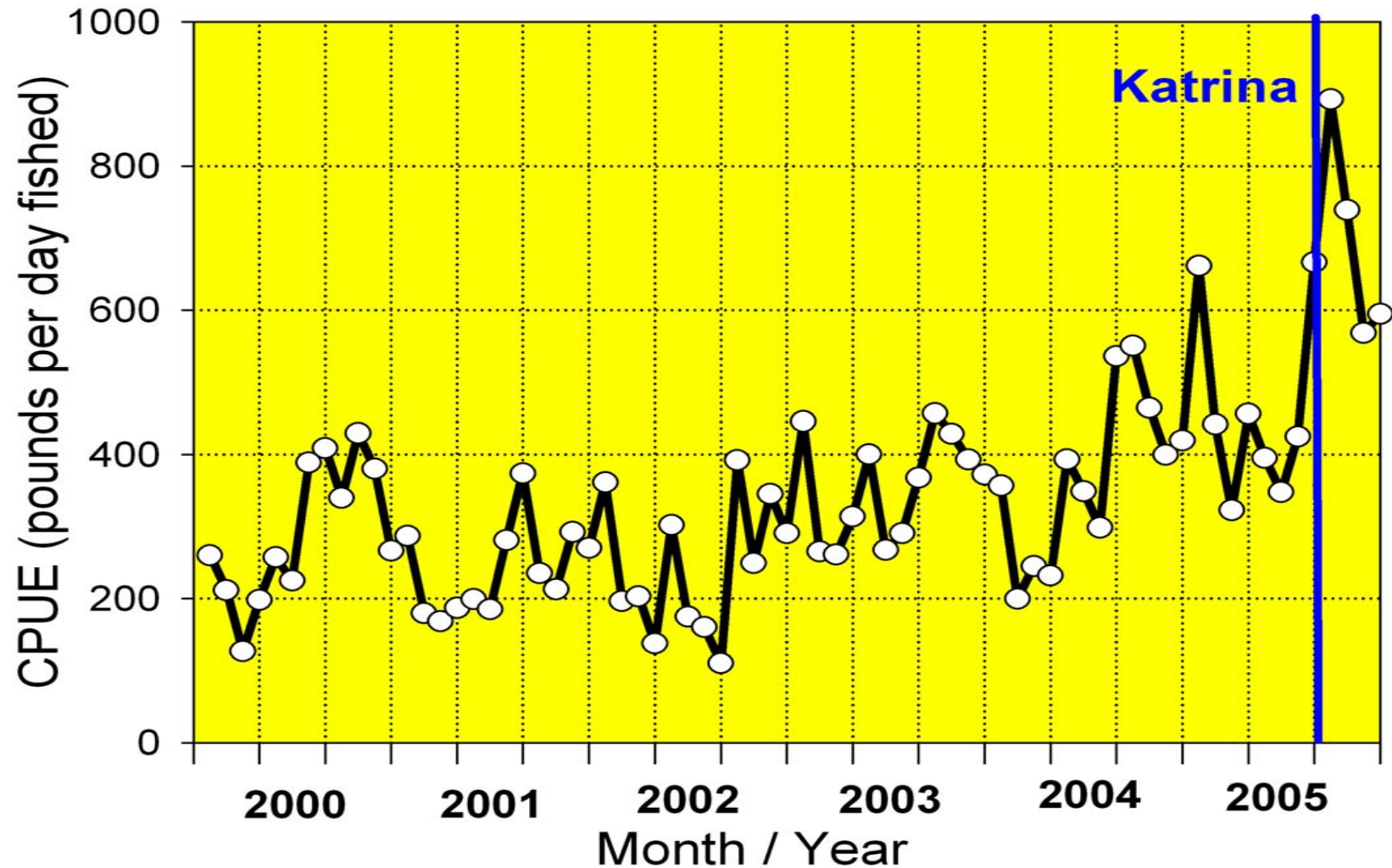




Shrimp Pounds per Day Fished



Louisiana, Mississippi, Alabama



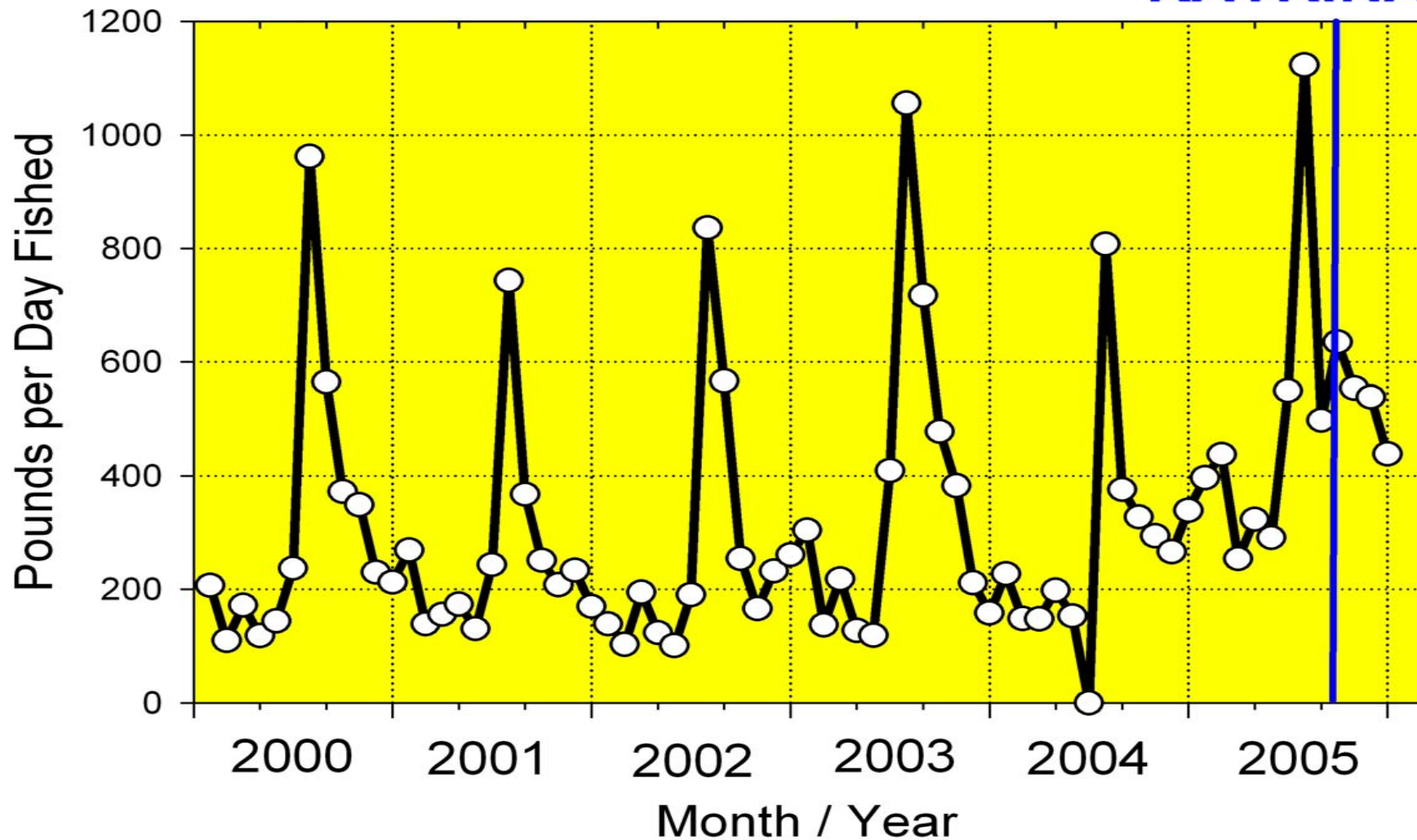


Shrimp Pounds per Day Fished



Texas Coast

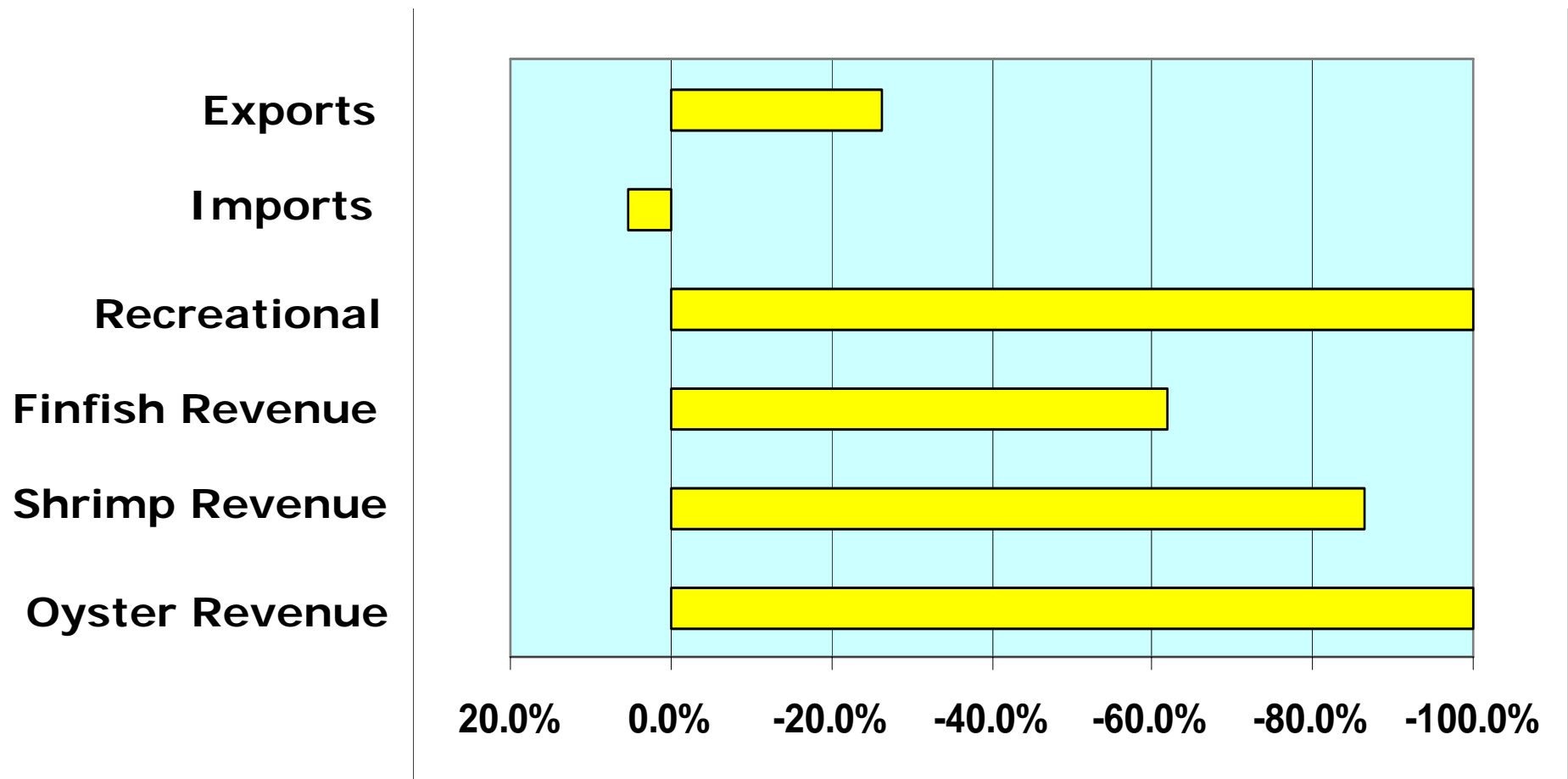
KATRINA





Fishery Landings

Mississippi October 2005 vs. 2004

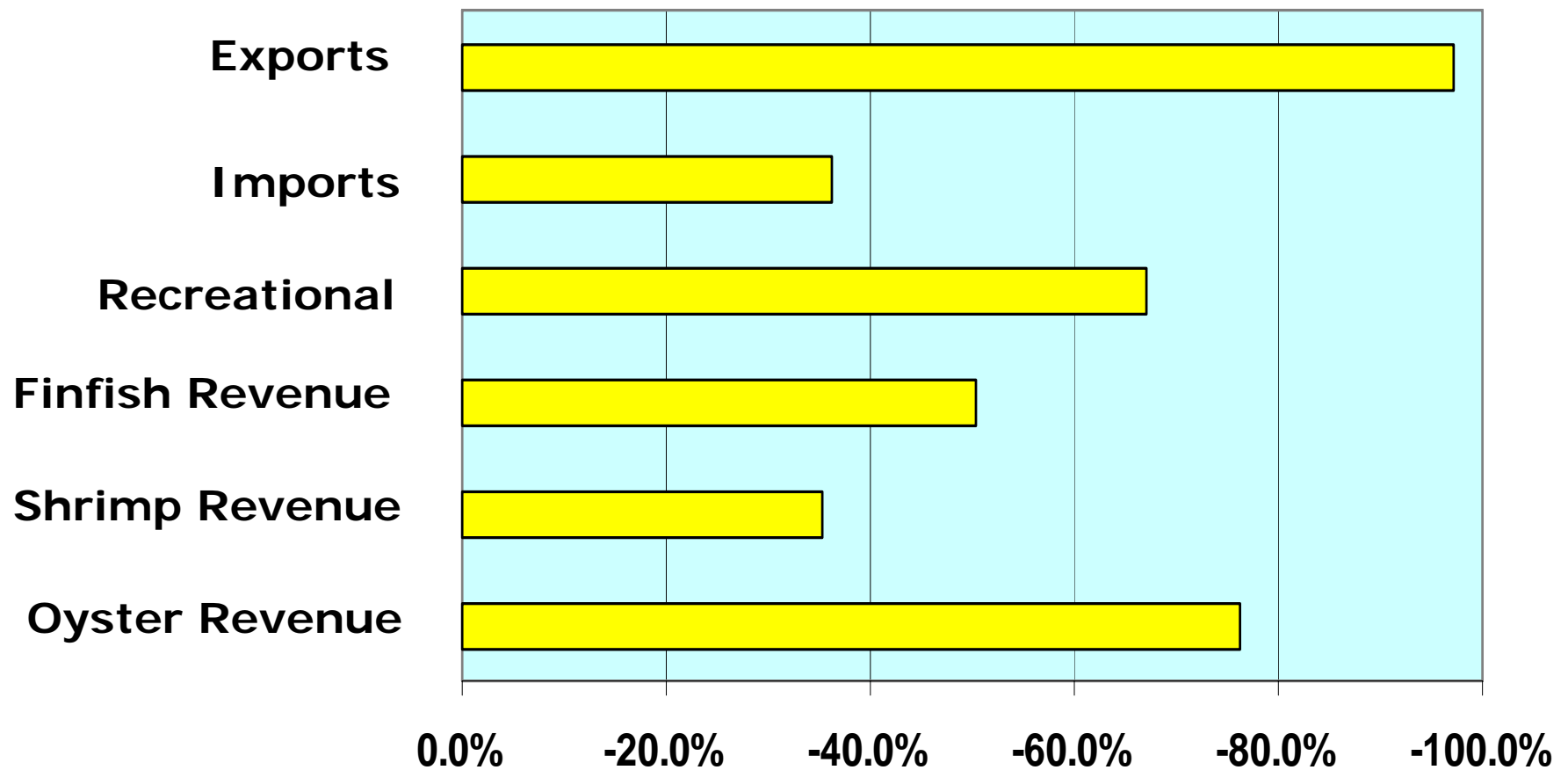




Fishery Landings

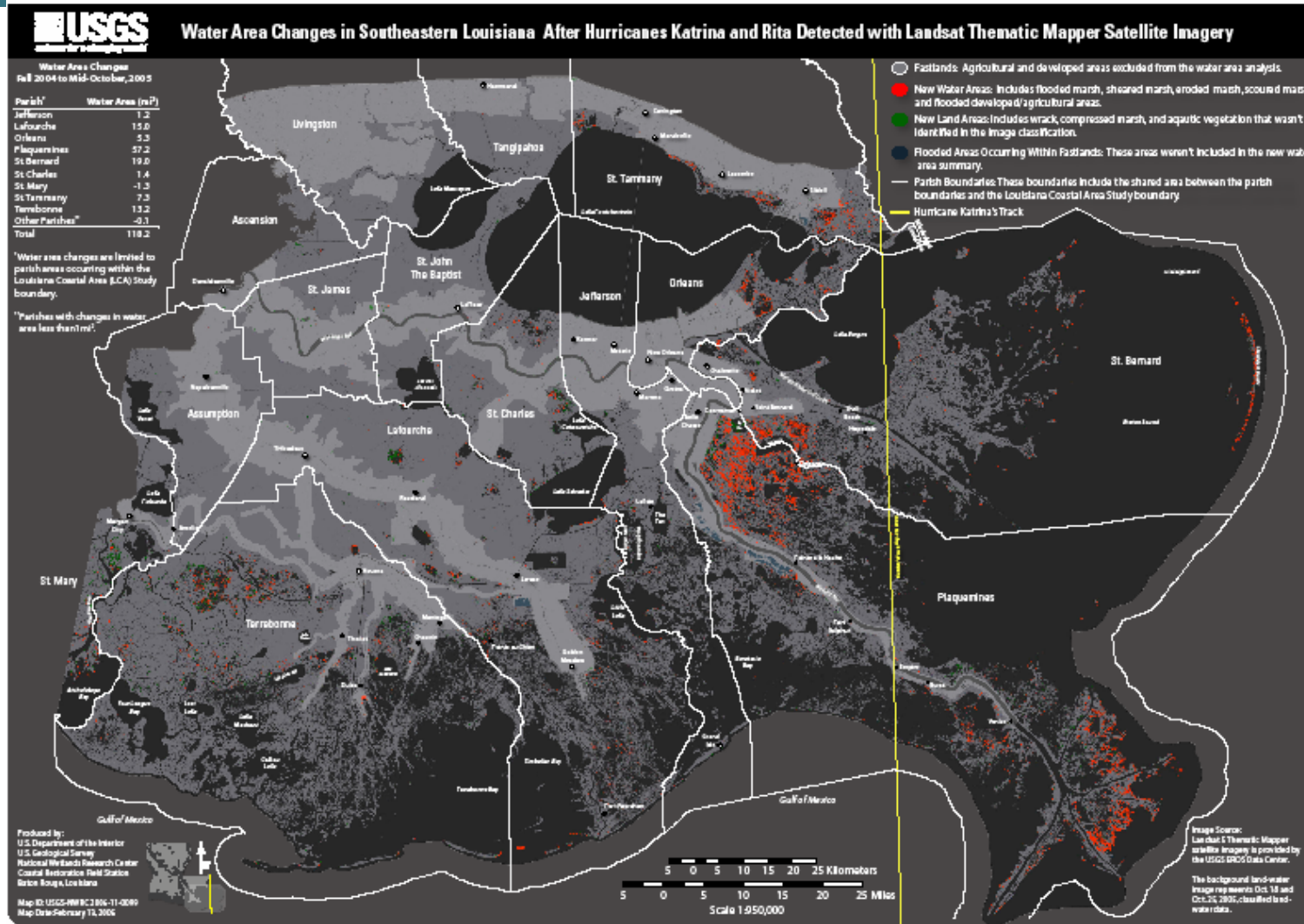
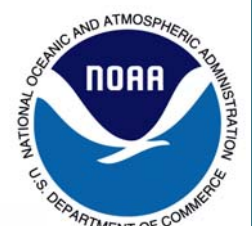


Louisiana October 2005 vs. 2004





Wetlands Inundation



USGS estimates 118 square miles of wetlands were lost due to Hurricane Katrina



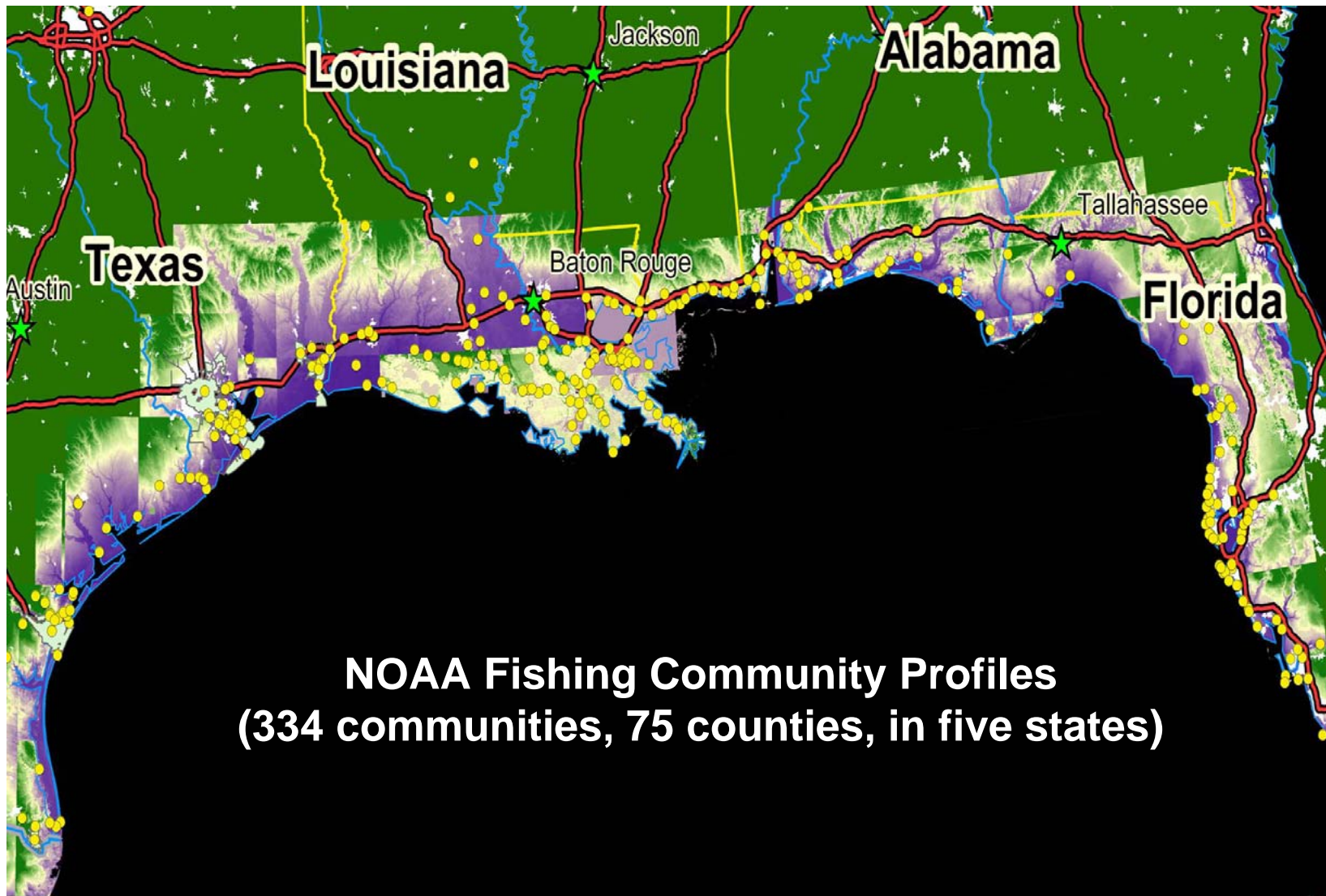
Pecan Island Terrace Project: Pre & Post 2005 Hurricanes



- Example of an ecosystem project to protect wetlands and shoreline in western LA.
- Terrace project reduces wave fetch and shoreline erosion. Additional benefits include: improved fish habitat & improved water quality.
- NOAA designed & managed the construction of 28 projects since 1995.
- To date NOAA analyzed 9 large-scale projects. All 9 projects performed as designed and 8 of the 9 projects suffered minimal damage.



Socio-Economics Survey

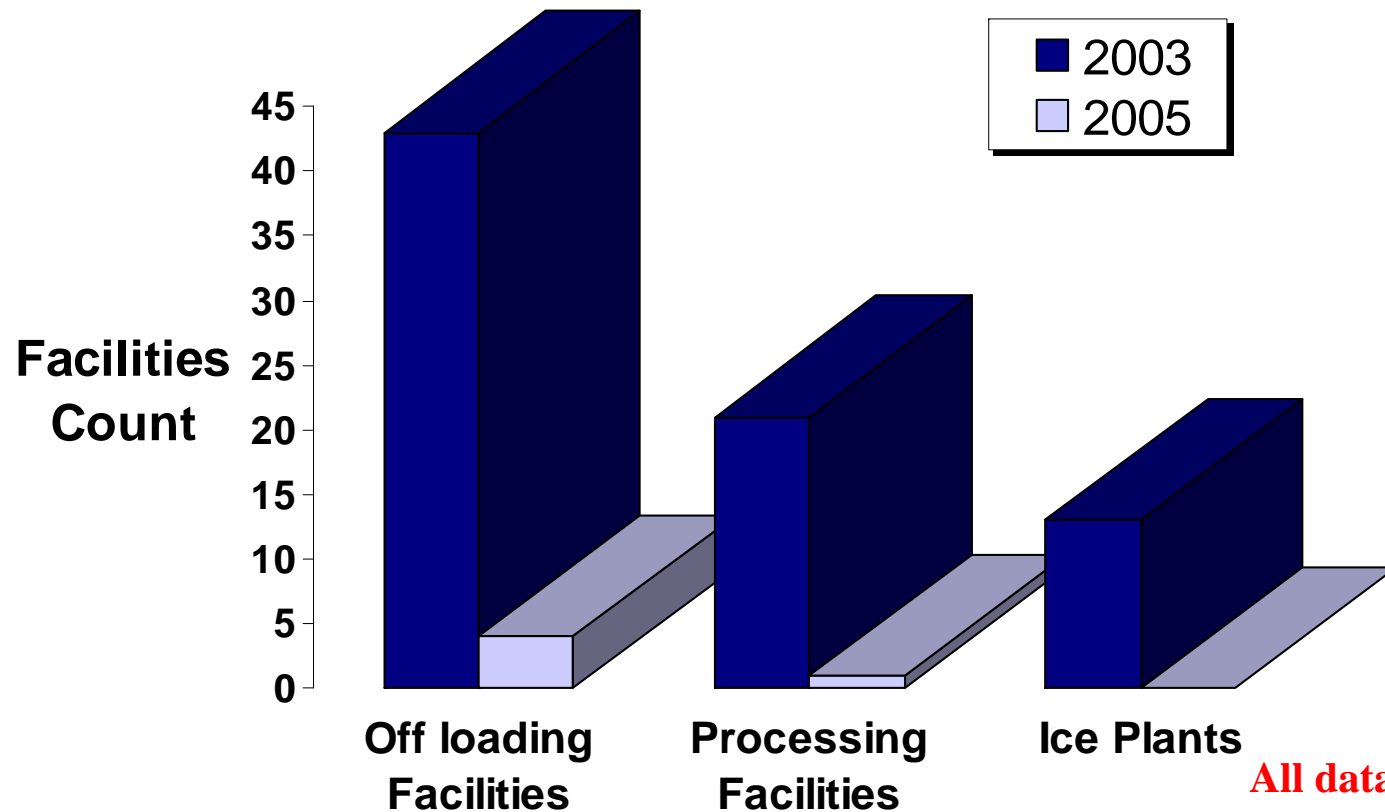




Socio-Economics Survey: Industry Facilities



Louisiana 2003 vs October 2005



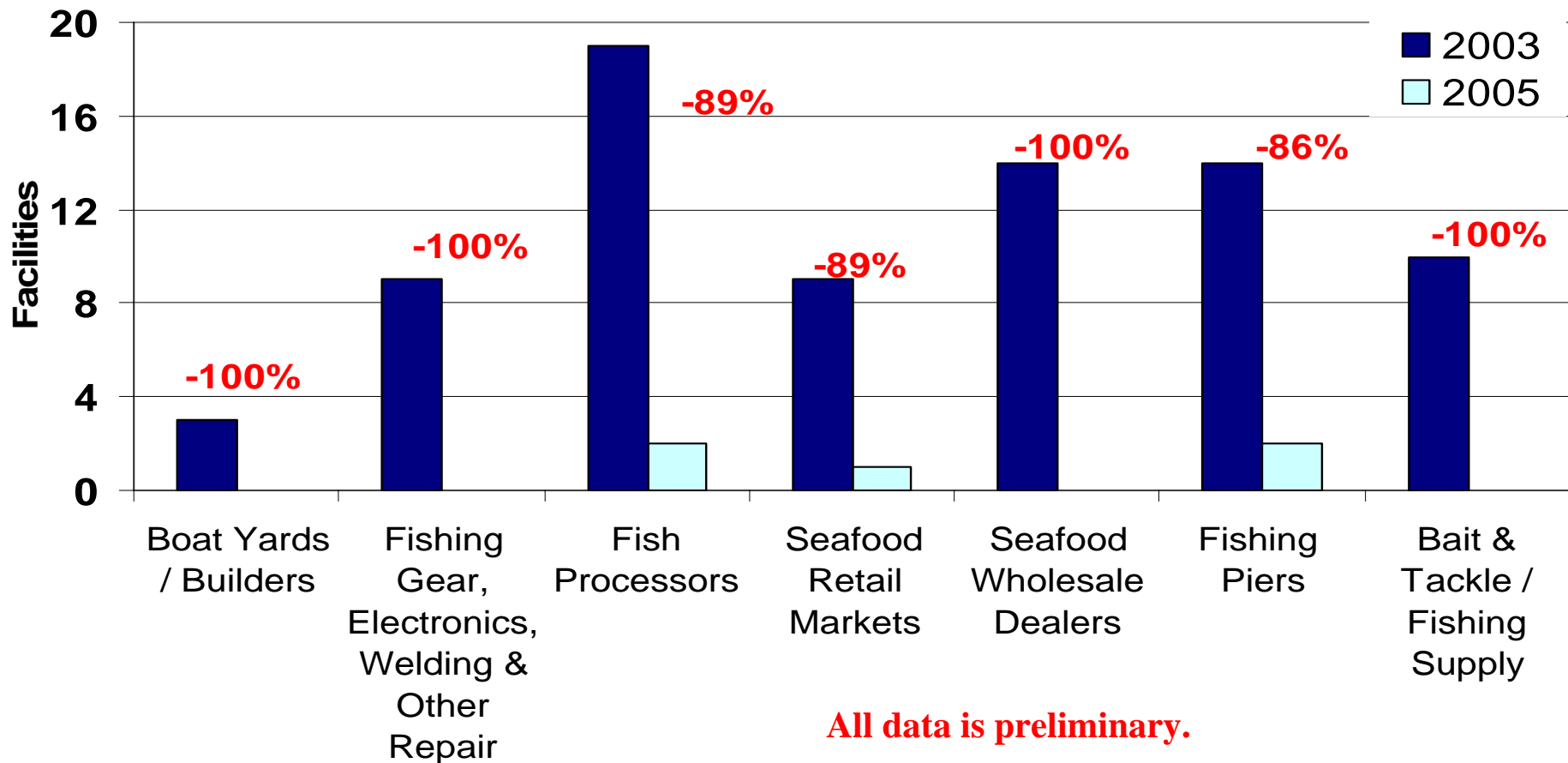
All data is preliminary.



Socio-Economics Survey: Industry Facilities



Biloxi & Pass Christian, MS 2003 vs November 2005





Ongoing Operations & Studies



- Weekly Reporting to the White House Gulf Restoration Working Group
- Sustained Operations for Contaminants Monitoring
- Monitoring of SEAWiFS and shipboard samples for potential HAB outbreaks
- Wetlands loss analysis and restoration activities being undertaken by NMFS and NOS
- Impacts on abundance and distribution of fishes, crabs and shrimps assessed
- Developing a regional information development and delivery system for the Gulf Coast
- Developing a Community Resiliency Index that will quantify hazard impacts and assess community resiliency
- Coordination of activities with USACE, USGS, EPA, NSF, state directors and others
- Website: www.noaa.gov – “Hurricane Katrina Environmental Impacts”



CONTINENTAL UNITED STATES LANDFALLING HURRICANES 1950-2004



NOAA'S NATIONAL CLIMATIC DATA CENTER, ASHEVILLE, NORTH CAROLINA

Protecting the Past... Revealing the Future





Desired Outcome



- Engage SAB in discussion of NOAA's role in assisting recovery and transitioning to a more resilient Gulf Coast
- Request guidance from SAB



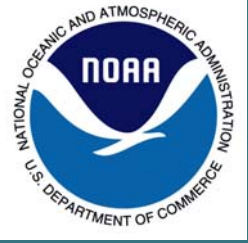
NOAA's Efforts: Theme Areas



- NOAA's Support Activities
- Restoration and Rebuilding of Living Marine Resources
- **Next Steps**



NOAA's Principles in Long-Term Gulf Fisheries Rebuilding



- Short-term financial assistance and clean up activities including mapping and removal of marine debris,
- Restoring infrastructure needed to sustain fisheries,
- Developing and funding capacity reduction and other measures to improve conservation management for sustainable Gulf fisheries,
- Recovering essential fisheries (wetlands) habitat and building more storm-resilient coastal communities



FY06 Supplemental Funding for NOAA



Status: OMB Submitted to Hill on Feb 17

NMFS Lab (Pascagoula):	\$11.8M
Fishing Effort Reduction and Market-Based Approaches to Mgmt:	\$8M
Mapping & Debris Removal :	\$8M
Assessment & Seafood Monitoring:	\$4M
Multi-hazard Risk Maps:	\$1M
Total Funding:	\$32M



Points for Discussion



- NOAA Fisheries' ability to assist rebuilding Gulf fisheries on a sustainable basis (many fisheries were overcapitalized before *Katrina and Rita*)
- Rebuilding fisheries must be done within existing regional institutions (Gulf States Marine Fishery Commission, Gulf of Mexico Fishery Management Council, State Agencies, other collaborative groups)
- NOAA seeks guidance from SAB on direction of limited resources to continue response and rebuild fisheries infrastructure