



BOEM
BUREAU OF OCEAN ENERGY MANAGEMENT

Environmental Studies Program

Science for Informed Decisions

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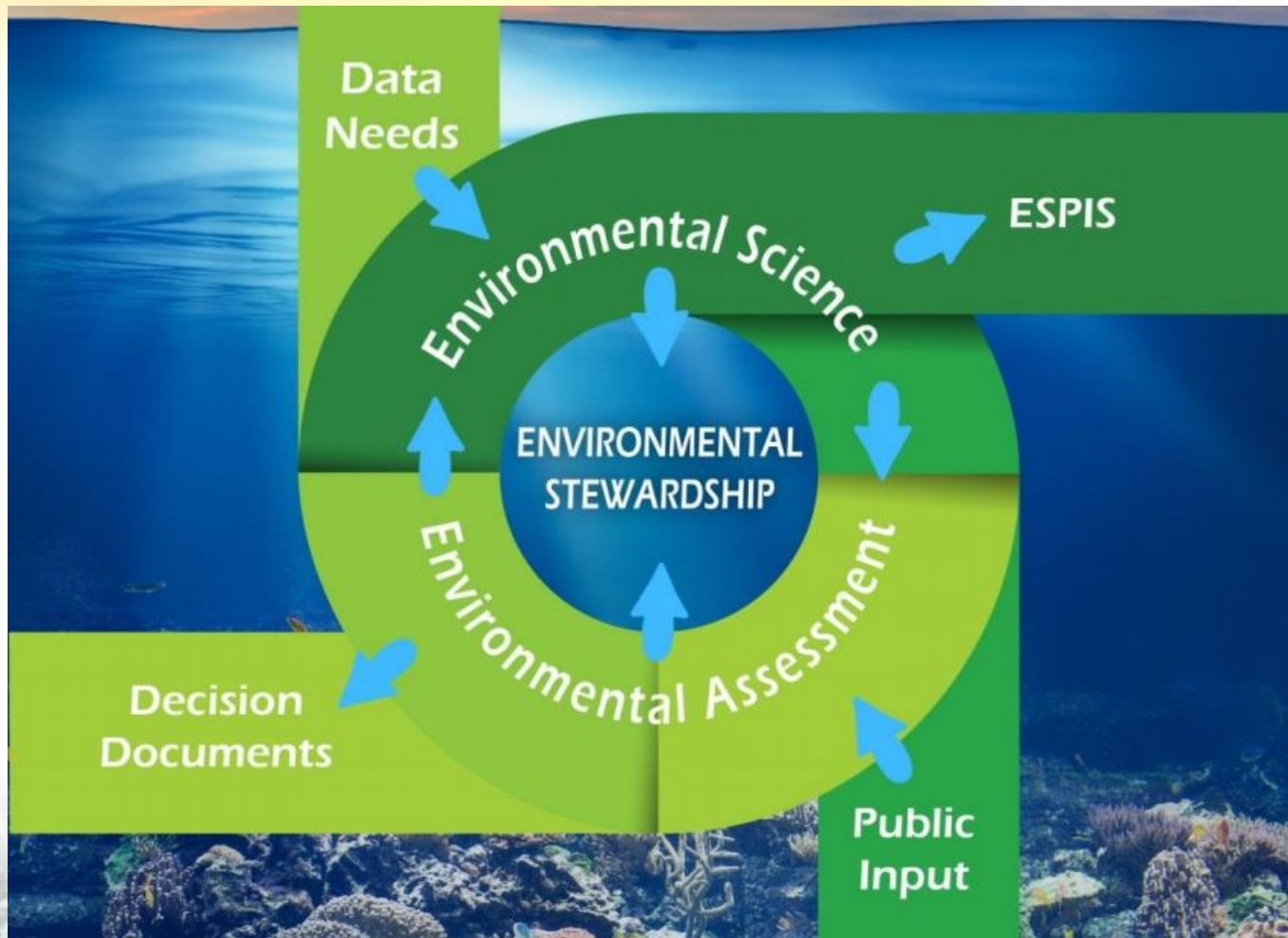
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What Information Does BOEM Need?


1. Effects of Impacting Activities
2. Affected Resources
3. Monitoring
4. Cumulative Impacts
5. Compliance





How Environmental Sciences and Environmental Assessment Work Mutually



Scientific Research Questions Arise from Information Needed for OCS Lease Sale Plans and Permit Reviews



**2017—2022 Outer Continental Shelf Oil and Gas Leasing
Proposed Final Program**
November 2016






www.boem.gov/Five-Year-Program-2017-2022/

What Additional Information is Needed to Address Scientific Questions?

Bureau of Ocean Energy Management | Environmental Studies Program

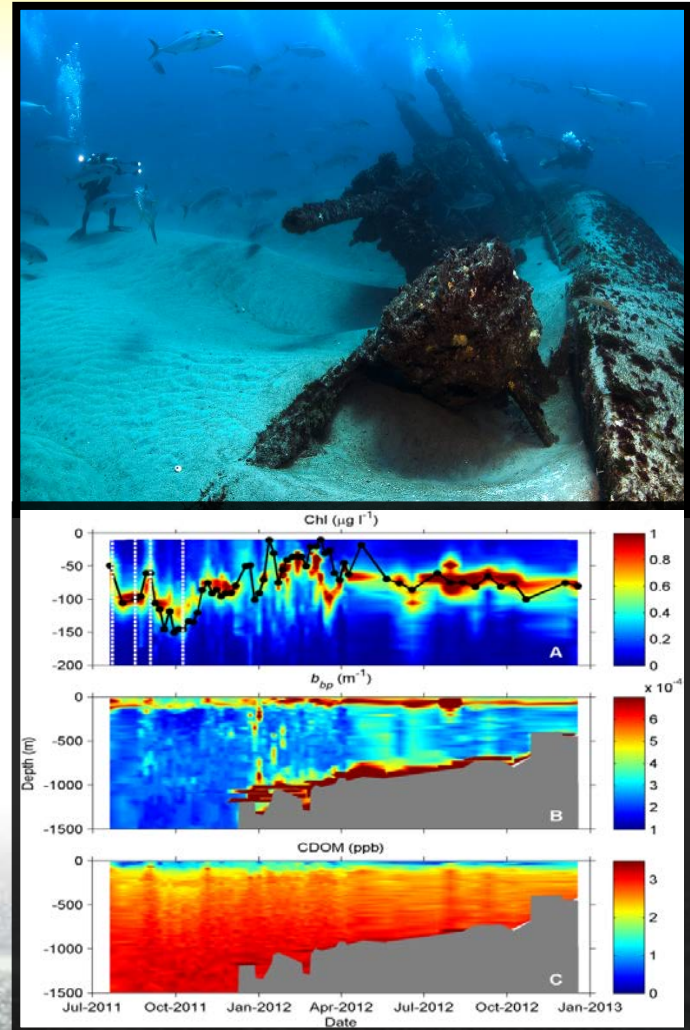
Studies Development Plan 2018–2020



June 2017

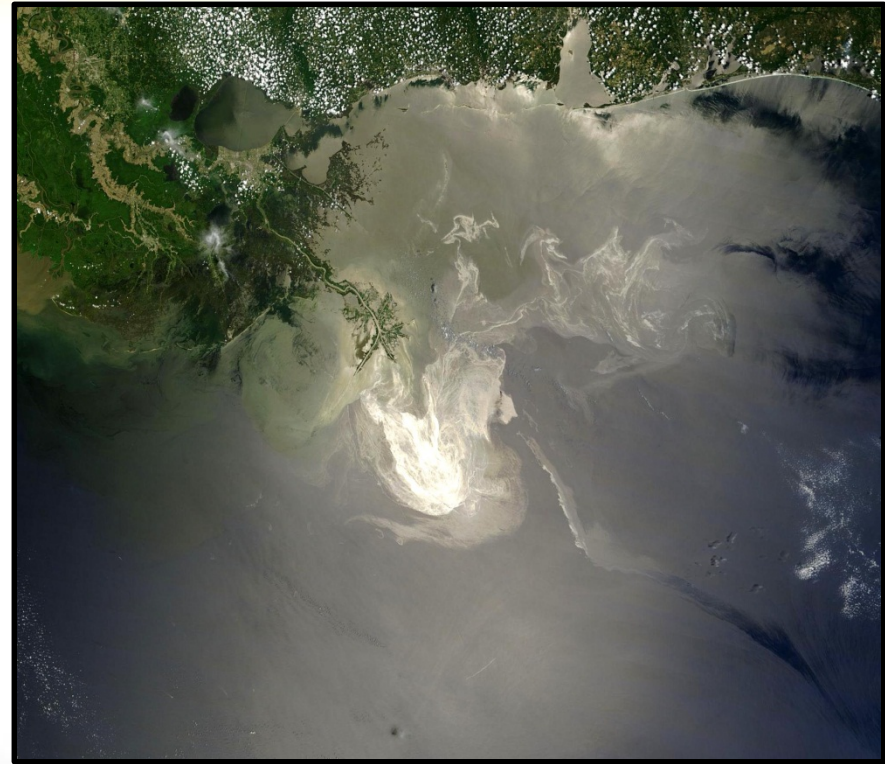
Environmental Studies in the Gulf of Mexico

- Biological, physical, and social science research in the Gulf of Mexico
- OCS Lands Act specifies monitoring the environment to provide time-series for identifying changes in environmental quality
- Coordinating on *post-Deepwater Horizon* studies for monitoring/ocean observing



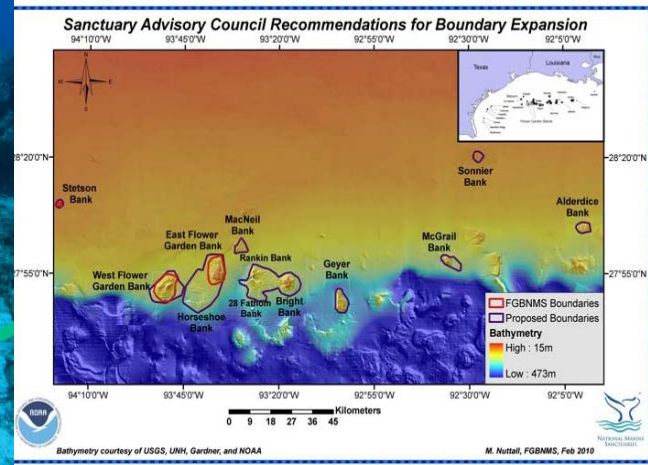
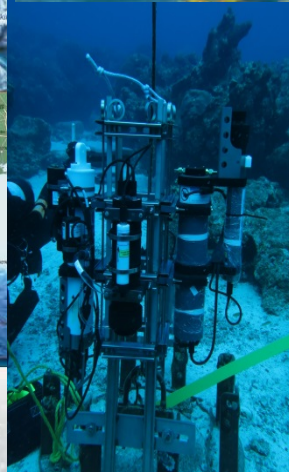
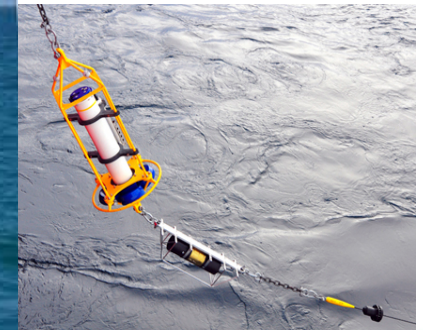
Post – *DeepWater Horizon* Studies Planning

- National Academy of Sciences- Gulf Research Program
- Gulf of Mexico Research Initiative
- The RESTORE Act

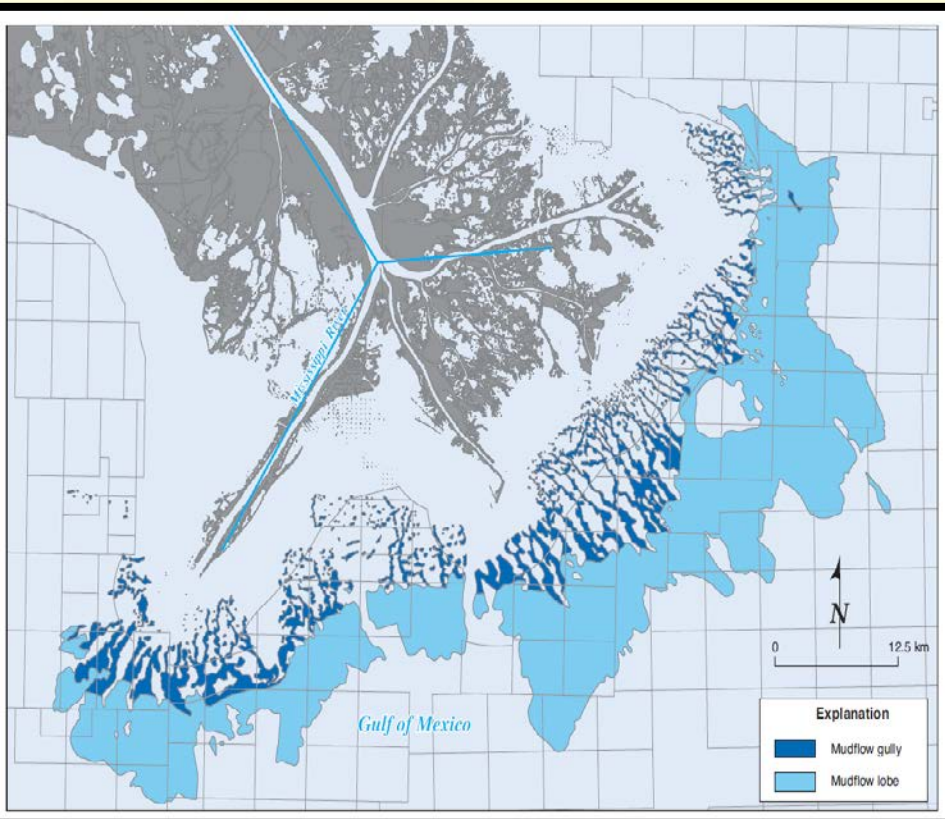


Flower Garden Banks Long-Term Monitoring

Opportunities for Partnering



Mississippi Delta Baseline Mudflow Hazard Map

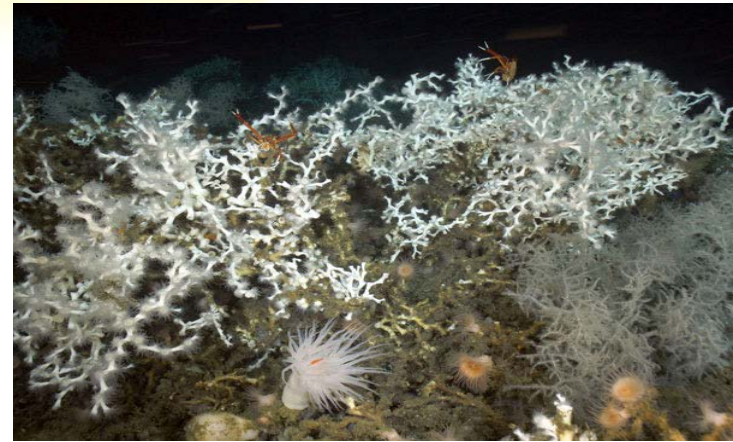


History of Deepwater Studies

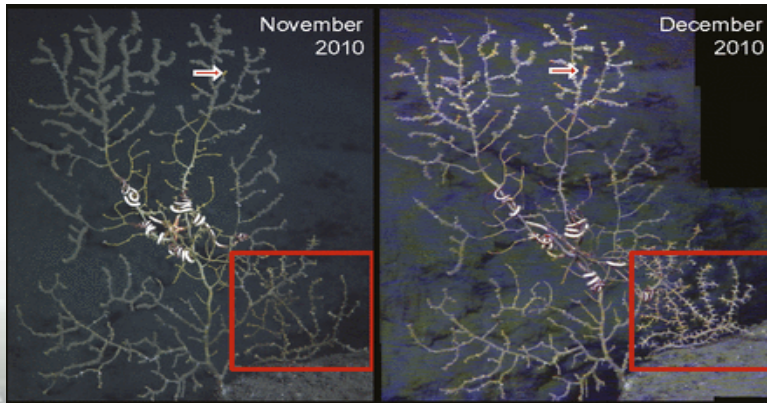
Chemosynthetic Ecosystems (1984)



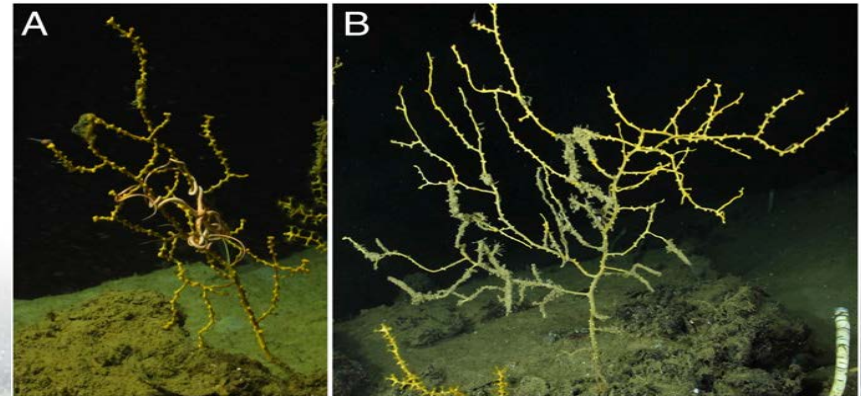
Deepwater Hard Bottoms (2005, 2007, 2012)



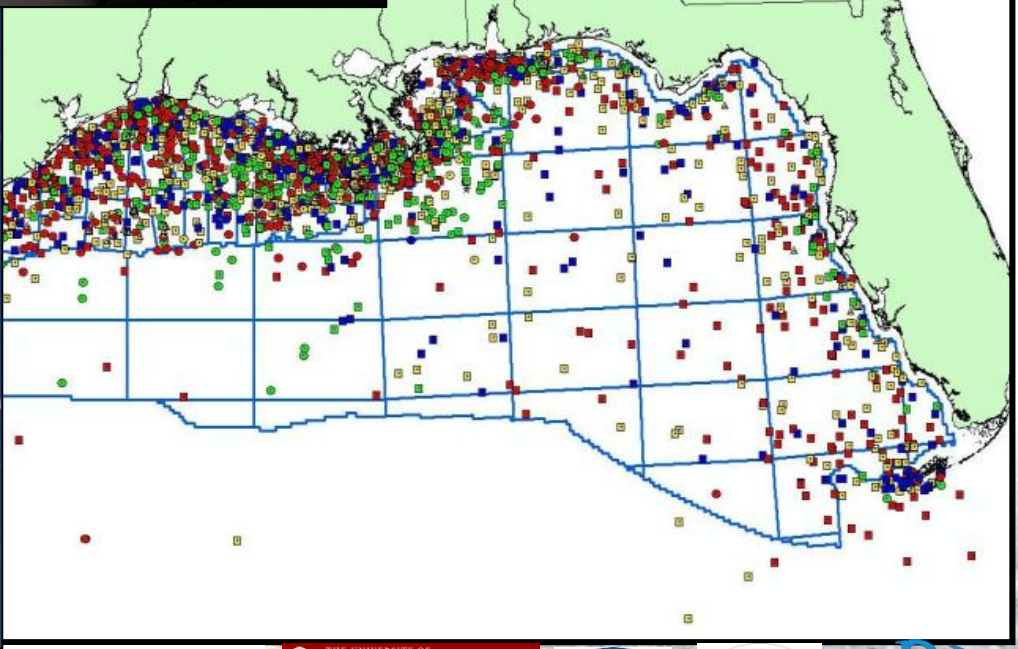
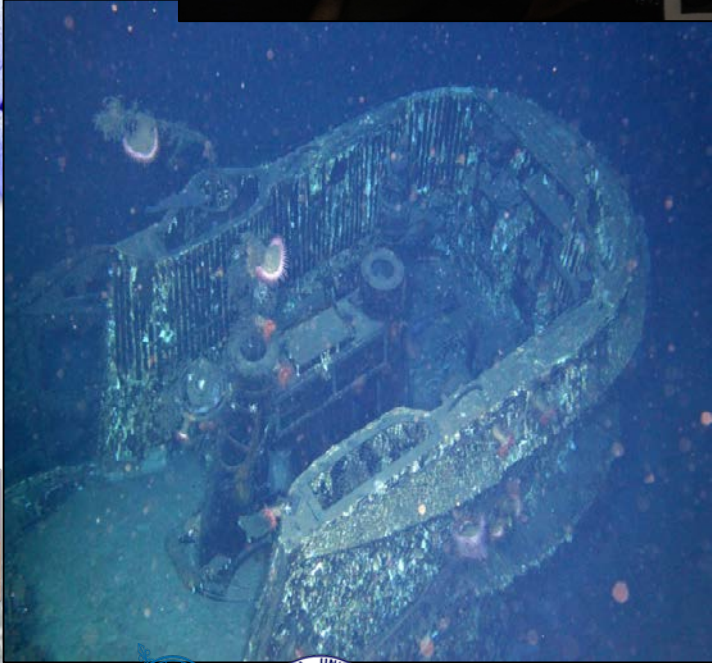
Deepwater Horizon Impacts (2012)



Deepwater Horizon Impacts (2014)



Gulf of Mexico Shipwreck Corrosion, Hydrocarbon Exposure, Microbiology, and Archaeology (GOM-SCHEMA)



Protected Species Observations

Explosive Removal of Structures and G&G Activities

- BSEE permits all decommissioning activities on the OCS
- NMFS collects data on marine protected species at explosive removals and provides to BSEE
- Multiple anthropogenic acoustic inputs
- Data from the 2002-2008 Protected Species Observer (PSO) Sightings analyzed in a BOEM study (BOEM 2012-015)
- Further need for future Passive Acoustic Oceans Observing System (PAOOS) or regional Passive Acoustic Monitoring (PAM) Program



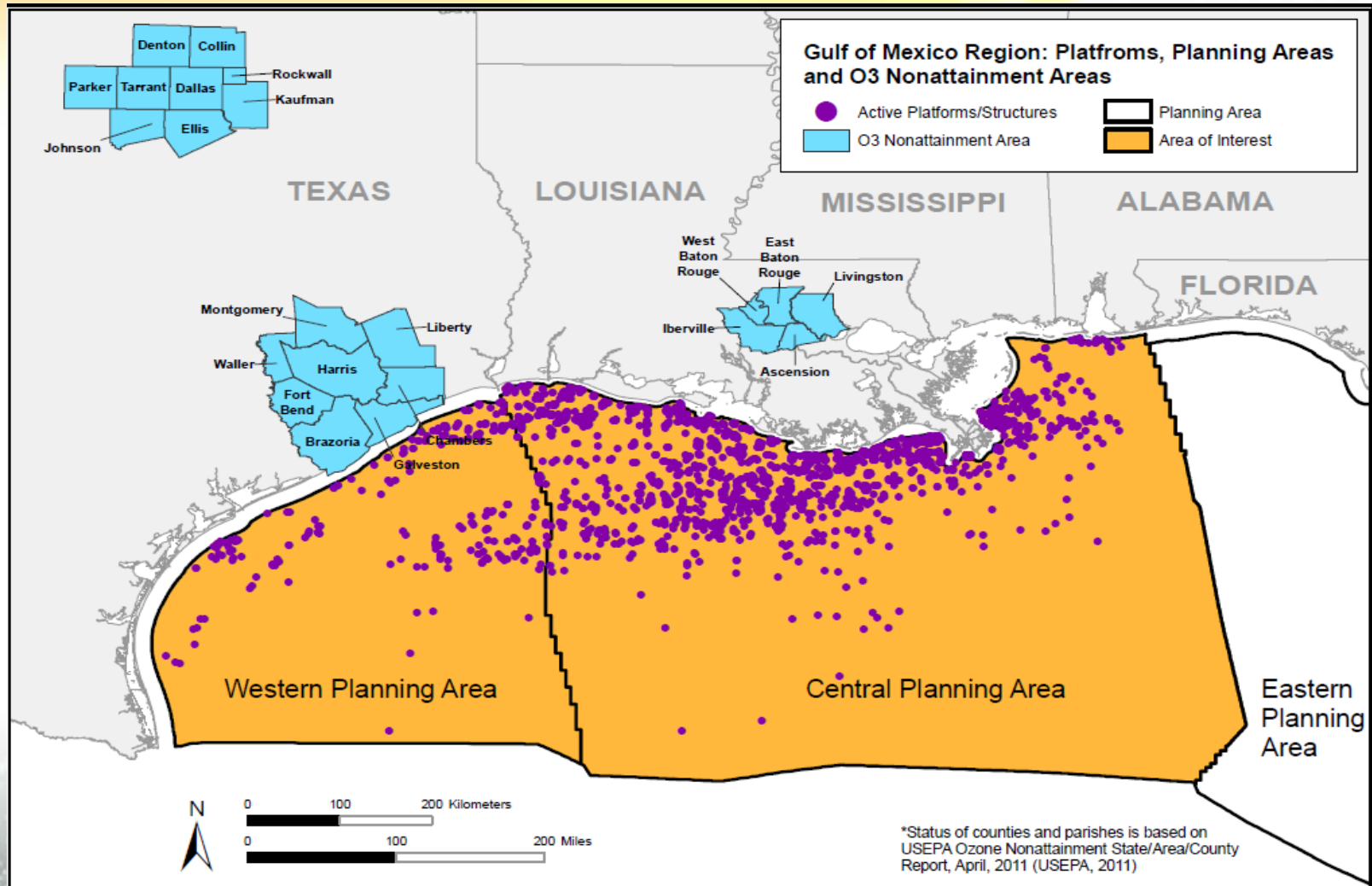
Protected Species Observations

Assessing Broad-Scale Abundance and Distribution
of Marine Mammals, Sea Turtles, and Seabirds
in the Gulf of Mexico:
The GoMMAPPS Field Program



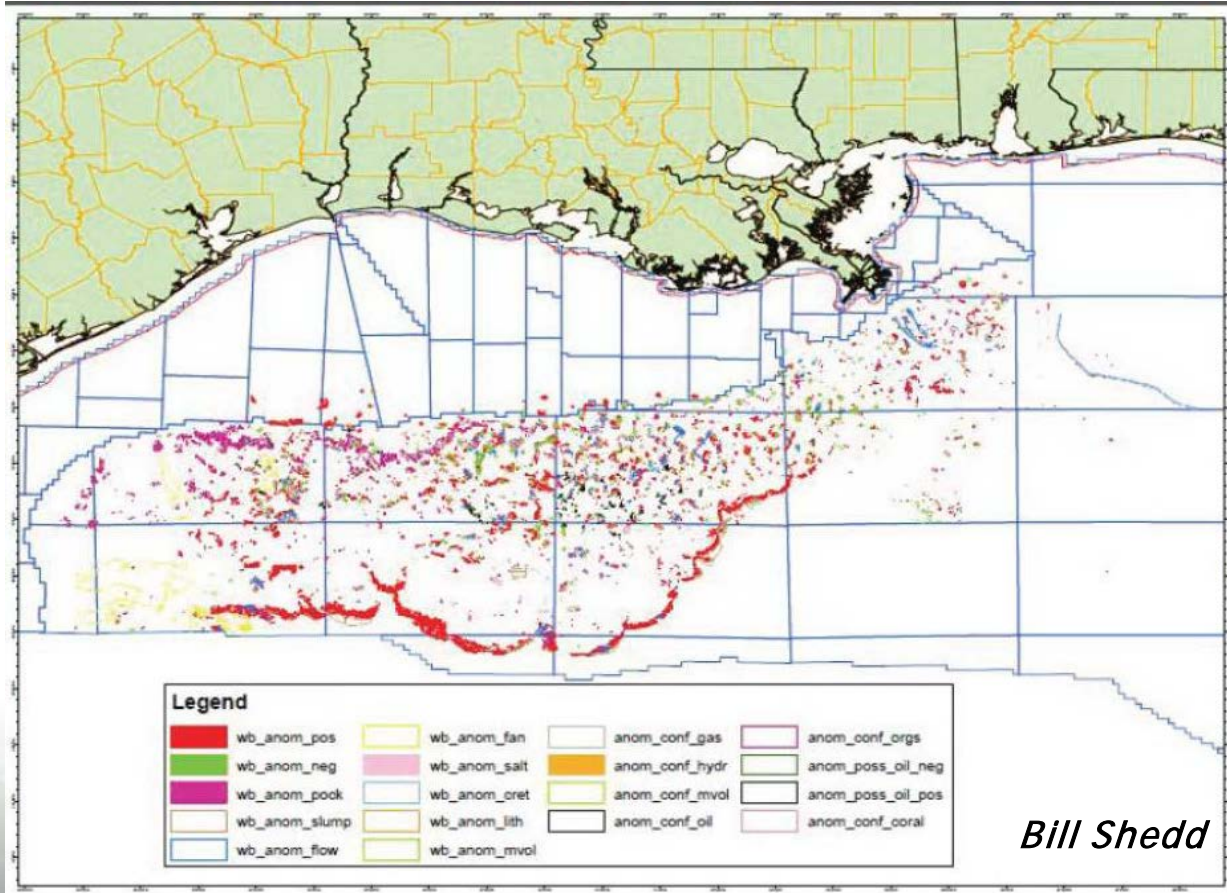
**Gulf of Mexico Marine Assessment Program
for Protected Species**

Atmospheric Pollutant Transport and Dynamic Monitoring and Modeling

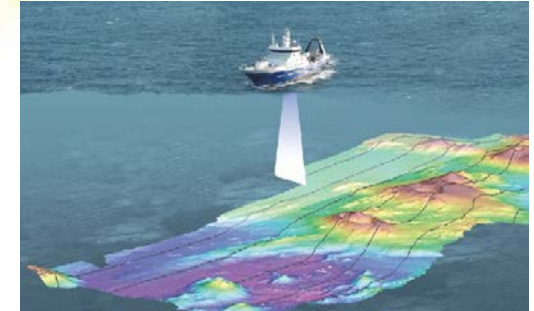


Seafloor Habitat Mapping

Use of BOEM Permitted 3-D Seismic Data To Predict Chemosynthetic & Deepwater Coral Distributions



Bill Shedd



Multibeam Sonar



Sidescan Sonar

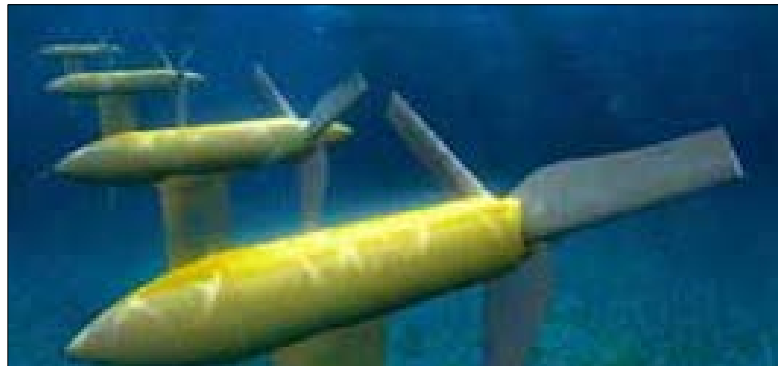


DSV, AUV, ROVs

Emerging Strategic Science Question: Offshore Alternative Energy



Wind Energy





Hydrokinetic Energy



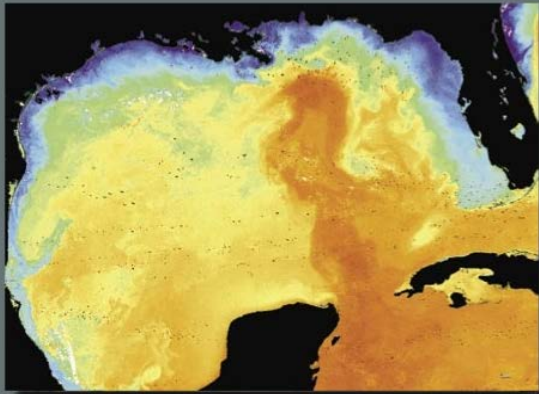
Wave Energy

 **NREL**
NATIONAL RENEWABLE ENERGY LABORATORY

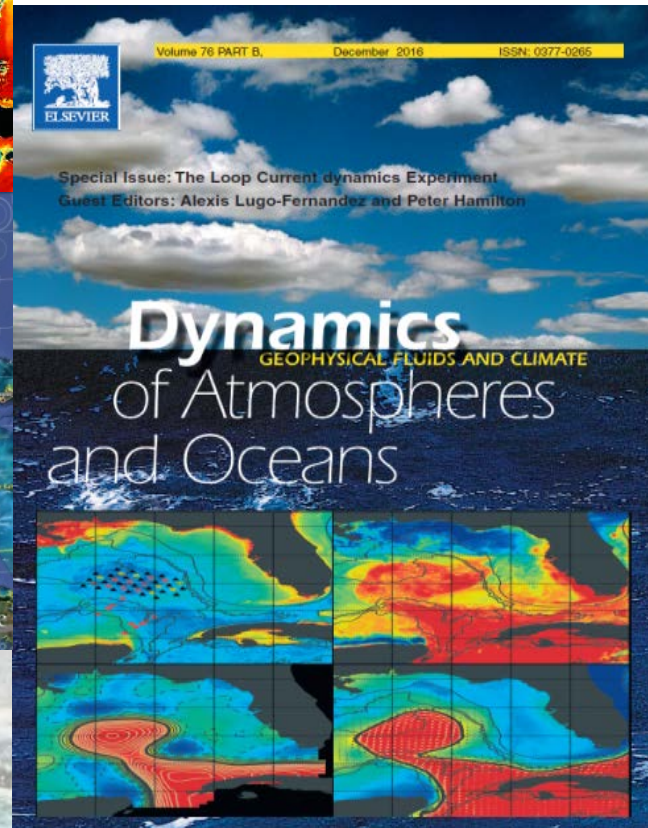
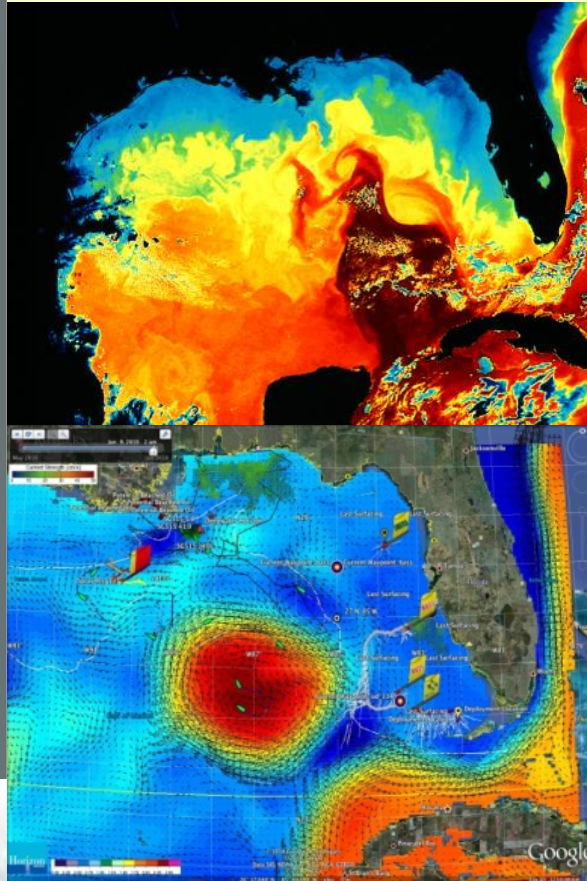
 U.S. DEPARTMENT OF
ENERGY
 **BOEM**
BUREAU OF OCEAN ENERGY MANAGEMENT

Oceanographic Monitoring Loop Current Circulation Program - Dedicated Issues

Circulation in the Gulf of Mexico *Observations and Models*



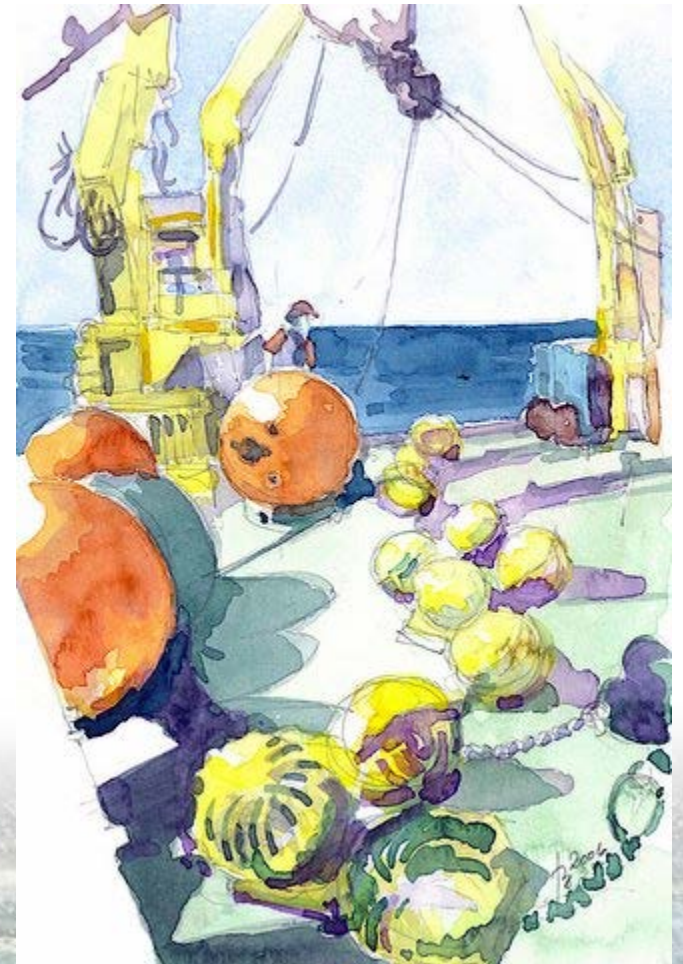
Wilton Sturges, Alexis Lugo-Fernandez,
Editors



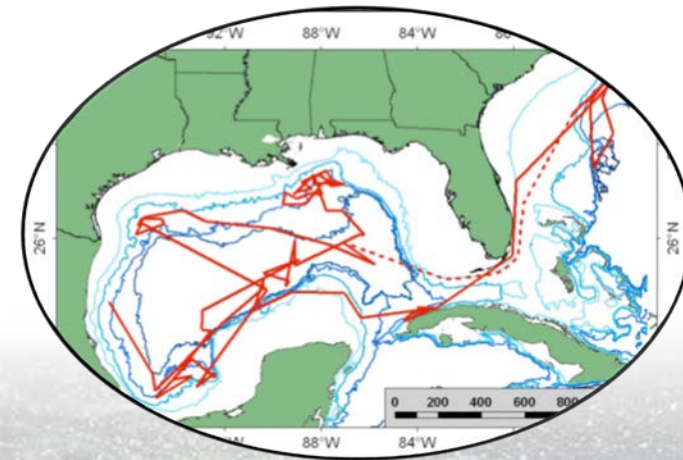
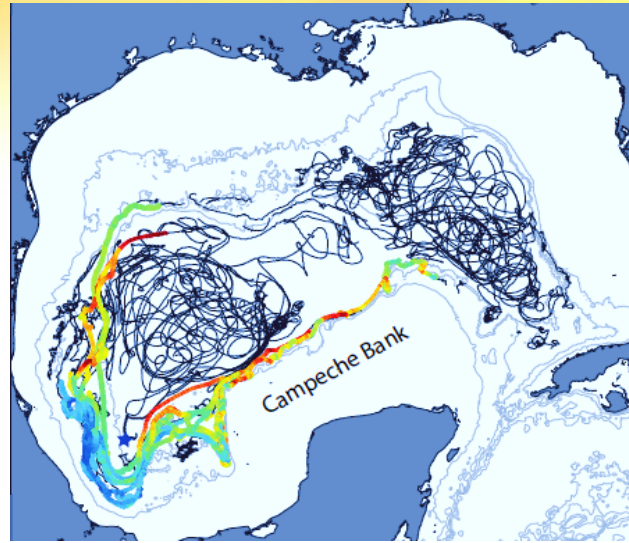
History of Joint Physical Oceanography with Mexico

*Mooring on UNAM's R/V Justo Sierra
Watercolor by Antoine Badan.*

- Deepwater Current Measurements at 25°N 90°W in Mexican Waters
- Direct Observations of Ocean Currents over the Western Slope in the Gulf
- Current Measurements in the Yucatan-Campeche Area in Support of Dynamics of Loop Currents Study
- Lagrangian Study of Deepwater Currents



ONE Gulf: International Collaborative Research



Past Collaborative Awards for the Gulf of Mexico Region

Sperm Whale Seismic Study

2004 DOI Cooperative Conservation Award

WWII Shipwrecks and the Artificial Reef Effects

2006 DOI Cooperative Conservation Award
2007 NOPP Excellence in Partnering Award

Investigations of Chemosynthetic Communities on the Lower Continental Slope of the Gulf of Mexico

2006 & 2007 NOAA OE Signature Expeditions,
Expeditions to the Deep Slope
2007 DOI Cooperative Conservation Award

Flower Garden Banks Long-Term Monitoring

2009 DOI Partners in Conservation Award

Battle of the Atlantic Expedition

2009 DOI Partners in Conservation Award

History of the Offshore Oil & Gas Industry in Southern Louisiana

2010 DOI Partners in Conservation Award



Archaeological Analysis of Submerged Sites on the GOM Outer Continental Shelf

2011 DOI Partners in Conservation Award

Exploration and Research of Northern GOM of Deepwater Natural and Artificial Hard Bottom Habitats with Emphasis on Coral Communities: Reefs, Rigs, and Wrecks

2011 NOPP Excellence in Partnering Award
2011 DOI Partners in Conservation Award

EcoSpatial Information Database (ESID)

2012 American Council of Engineering Companies
Engineering Excellence Grand Award

Developing Environmental Protocols & Monitoring to Support Ocean Renewable Energy & Stewardship

2013 DOI Partners in Conservation Award

Ocean Renewable Energy Stewardship Partnership

2014 DOI Partners in Conservation Award

Atlantic Canyons: Pathways to the Abyss

2013 DOI Partners in Conservation Award
2015 NOPP Excellence in Partnering Award





Environmental Studies Program

- Build partnerships among academic, State, Federal, and nongovernmental organizations
- Focus on applied science as a priority for decision-making
- Outreach to broaden awareness of the ESP in the scientific community and partners
- Continued recognition as leaders in applied ocean science



Subcommittee on Ocean Science and Technology Interagency Working Group on Ocean Partnerships

