**Louisiana Universities Marine Consortium**
**Abstract**

The Louisiana Universities Marine Consortium proposal "**The Effects of the Macondo Oil Spill on Coastal Ecosystems**' will address the fundamental objective identified in the RFP of determining the impacts of the oil, dispersed oil, and dispersant on the ecosystems of the Gulf of Mexico within a broad context of improving fundamental understanding of the dynamics of such events and the associated environmental stresses. Our fundamental goal is to improve society's ability to understand respond to, and mitigate, the impacts of petroleum pollution and related stressors of the marine and coastal ecosystems, with an emphasis on the coastal and continental shelf Gulf of Mexico region.

Our focus is on GRI Themes 2 (chemical evolution and biological degradation) and 3 (environmental effects). We ask these questions with this proposal, while recognizing that the answers may not be fully revealed by us, or with others within this funding cycle:

•Where is the oil now and how has it changed since 2010?
•What are its impacts and how have these impacts evolved since 2010?
•Have parts of the ecosystem been resilient, recovered or been compromised?
•How do the spill-related stressors interact with other stressors?
•What indicators of stress and recovery can be developed to manage future stressors?
•What data or tools or perspectives need to be applied or developed to improve our understanding?
•How has the use of the ecosystem been modified by these stressors and have ecosystems recovered?

We are 25 Principle Investigators with 500+ years of research experience in coastal systems from 13 institutions. We will be assisted by 16 post docs, 6 Research Associates, 7 graduate students and dozens of undergraduates. Half of the PIs have successful administrative experience with several multi-year collaborative grants @ >$1KK/y, and all publish in the best journals *and with our students*. Half the PIs are involved in the multi-agency funding (NSF, NGI, BP funded University Initiatives, and Sea Grant) from which this proposal evolved. The PIs coordinated three large-scale sampling efforts in Louisiana coastal marshes in Breton Sound, Barataria Bay and Terrebonne Bay, including a May 2010 field effort took place just before the landfall of oil. The evolution of data, tests and analysis lead to the present proposal for quantifying the effects of stressors – e.g., hydrocarbons, dispersants, freshwater diversion, and other remediation-related human activities -- with two primary objectives: 1) to investigate the potential impacts of the DWH oil spill now, before the signal:noise ratio diminishes, and, 2) to use our extensive pre-spill and 2010 sampling to the best advantage, and in a way that builds long-term data sets that benefit many other purposes.

We propose measuring the effects of stressors on aquatic and wetland soils, marsh plants, insects/spiders, fish, birds, commercial fisheries, and selected mollusk species found in the marsh and pelagic characteristics of adjacent open waters. We will also measure changes in the quantity and quality of hydrocarbons as they degrade, alter soil stability, and enter food webs via primary consumers, if marsh erosion is enhanced, indices of avian communities change, and benthic organisms adaptation. Integrative measures of oil-induced changes in benthic communities and surrogate measures like oxygen concentrations will be quantified. Our goal is to provide a benchmark study in ecosystem change analysis, to identify precursors to ecosystem trajectories before alternative states are realized, and to address societal concerns about wetland stability, and how the oil spill may have affected oxygen concentrations and planktonic and benthic communities.

The Lead Administrative unit is the **Louisiana Universities Marine Consortium for Research and Education (LUMCON**). The Executive Director, Nancy Rabalais, is the Project Director for our research. There will be a **Steering Committee** of 9 out of 25 investigators to guide the overall sampling strategy and incorporation of the multidisciplinary aspects of the research plan. The Steering Committee is led by 3 executive members who were integral in the development of the overall research plan and includes key staff for Public Outreach and Education, Data Management, and development and sourcing of the project's web site. We have assembled a **Science Advisory Committee** of outstanding experts on the study of coastal and marine ecosystems.