



Water quality monitoring of Barataria Bay and Lake Pontchartrain Louisiana

Louisiana State University (LSU) researchers are intimately familiar with the estuaries that surround them. Since 1994, they have studied the water quality of Breton Sound, Barataria Bay and surrounding coastal waters. River flow into these two drainage basins has been drastically altered and both are now fed primarily by man-made diversions and channels. The Deepwater Horizon oil spill has led LSU scientists to extend and increase their sampling efforts in these environmentally sensitive areas.

In 2010, much of the long-term *water quality monitoring* of Louisiana's estuaries was coming to an end, due to a lack of funding. The oil spill, however, put a spotlight on the critical coastal habitats of Louisiana, as well as the other Gulf states, and money was once again available for monitoring. LSU's Dr. Eugene Turner has focused his attention on assessing physical, chemical and biological water quality characteristics (salinity, oxygen, water clarity, temperature, nitrogen, phosphorous and chlorophyll) in Lake Pontchartrain and Barataria Bay. He is comparing long-term data with that collected after the oil spill to look for any changes in *nutrients, phytoplankton* and *microbial communities*. Monitoring these three critical components of the environment can give scientists like Turner a measure of how healthy an ecosystem is. He is also monitoring for the presence of oil and, through laboratory techniques, will determine if the oil is from the Macondo well (spill site) or another source, like a natural seep.



A researcher collects a water sample to assess water quality in Breton Sound, LA. Photo: Gene Turner



An osprey (clutching his next meal) is dependent on the water for its source of food and therefore can be impacted by poor water quality. Photo: Gene Turner

Early results of this study show the amount of oil in the tested waters to be small. This relatively low amount of oil appears to have had minimal impacts on the water quality. One of the most influential events of the oil spill appears to be the opening of the Davis Pond and other fresh water diversions. This was done across Louisiana to prevent oil from entering the sensitive estuaries. The surge of fresh water had significant effects on salinity and water quality in the Barataria estuary. Another component of Turner's oil spill study, the assessment of changes in the microbial community, is still being reviewed. The impact of the oil on microbes is of great importance as they are a vital component of the marine food web. This study, as well as others from the Northern Gulf Institute, has highlighted the importance of long-term ecosystem monitoring. LSU's fifteen-year data collection has allowed them to compare data collected after the oil spill to samples obtained long before the spill.

Education Extension

Key Terms: *water quality, monitoring, habitat, pollution*

Classroom Activity: Water Quality

Water quality is monitored by measuring physical, chemical and biological characteristics of a body of water. In this activity, students will visit a nearby water body to investigate how healthy it is by taking scientific measurements and making observations.

Supplies: *water quality test kit, paper, pencils*

Directions: 1) Visit a body of water, like a creek, stream or pond, near your school or home to monitor its health. 2) Draw the water body and surrounding habitat. Make general observations and note them in the drawing - plants, animals, urban development, litter/pollution, etc. 3) Take measurements using a basic water quality monitoring kit. Temperature, salinity, dissolved oxygen, pH, and turbidity (clarity) are examples of parameters that can be easily measured. 4) Sample aquatic fauna using dip nets, seine nets and/or plankton nets. This activity can be repeated weekly, monthly, seasonally or at the least annually to detect changes in the health of the habitat.

Visit <http://dhp.disl.org/resources.html> for lesson plans and additional marine-related activities.

**Use the key terms above to search for additional lesson plans on the web!*

Ocean Literacy Principles: 1. The Earth has one big ocean with many features, 5. The ocean supports a great diversity of life and ecosystems, 6. The ocean and humans are inextricably interconnected, 7. The ocean is largely unexplored

National Science Standards: A. Science as Inquiry: Abilities necessary to do scientific inquiry; C. Life Science: Populations and ecosystems; G. History and Nature of Science: Science as a human endeavor

Did You Know...

Water quality monitoring data can be used to detect changes in an environment and also to predict changes using patterns documented over time.

The **nutrients** nitrogen and phosphorus are essential for phytoplankton growth. They are naturally found in low concentrations in the ocean but fertilizers from lawns and farm land can run off the land and end up in the ocean.

Phytoplankton can develop rapidly when lots of nutrients are available, causing an algal bloom. Phytoplankton blooms can drastically alter the water quality and overall health of a habitat.

Microbial communities regularly undergo changes due to seasons and minor disturbances, without disrupting the balance of an entire ecosystem. Potentially catastrophic events, like the oil spill, could result in enough change to cause long lasting impacts on individual species or the ecosystem as a whole.

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The Northern Gulf Institute (NGI) is a National Oceanic and Atmospheric Administration (NOAA) Cooperative Institute addressing the research needs of the northern Gulf of Mexico. Mississippi State University leads this collaboration of the University of Southern Mississippi, Louisiana State University, Florida State University, Alabama's Dauphin Island Sea Lab, and NOAA scientists at laboratories and operational centers.

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