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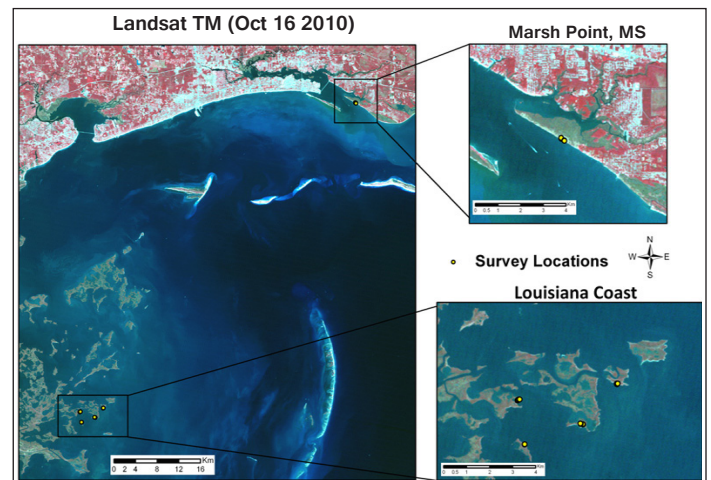
Discovery Porthole

Sharing Research with Educators and the Public

Gulf coast salt marshes: oil spill impacts

The Deepwater Horizon oil spill put hundreds of miles of the northern Gulf of Mexico coastline in harm's way. Salt marshes in Louisiana, Mississippi and Alabama received varied amounts of oil during the summer of 2010, ranging from light sheen and tarballs in the east to patchy, heavy oiling in the west and along barrier islands. Dr. Deepak Mishra, along with colleagues at Mississippi State University, is working with NGI to address the large scale disturbances of these fragile gulf coast salt marshes.

While many studies of *salt marshes* after the spill will be limited to habitat descriptions and documentation of change in area, MSU scientists are hoping their research will provide more detailed information about the impact oil has had on salt marshes. Dr. Mishra and his colleagues are addressing the large scale disturbances of the northern Gulf of Mexico *wetland ecosystem* structure and function with a detailed assessment of marsh health before, during and after the spill. They will identify 'hotspots' of marsh damage as a result of the spill and determine the level of recovery. Marsh characteristics, like chlorophyll content and green biomass, will be evaluated and field data will be combined with satellite imagery to analyze biological and physical characteristics in salt marshes before and after the spill.



Satellite image of 2010 sampling locations along Louisiana and Mississippi coast. Image credit: MSU

The specific questions researchers hope to answer include: which wetland locations are most damaged due to the spill; which salt marsh species are most vulnerable to oil exposure; what is the degree of damage and the extent of recovery in spill impacted marshes; and is there a high probability of *marsh fire* due to spill related grass damage or browning? The overall goal of the research is to evaluate and map the ecological impact of the oil spill on the photosynthetic activity, health and growth of coastal salt marshes.



Researchers gather biophysical and geochemical data from oil impacted salt marshes in coastal Louisiana. Image credit: MSU

Dr. Mishra's research develops scientific products that can be used to assess marshes over large areas. Evaluating marsh health is essential to understanding the short-term oil spill impacts and will aid restoration and conservation decision-making. The maps and tools produced by this study will be helpful to the coastal managers across Louisiana, Mississippi and Alabama to evaluate and prioritize the massive *marsh restoration* effort that is likely going to take place because of the spill.

Education Extension

Key Terms: *photosynthesis, respiration, chlorophyll, environment*

Classroom Activity: Photosynthesis

Photosynthesis, the process by which plants take carbon dioxide from the atmosphere, add water, and use the energy from sunlight to produce sugar, can be divided into two major reaction types: light-dependent and light-independent. This activity demonstrates both, and can lead to further discussions and experiments of factors in the environment that can affect the rate of photosynthesis.

Supplies: *Elodea (or similar aquatic plant), beaker, test tube, baking soda, lamp*

Directions: 1) Remove several leaves from around the cut end of a stem of Elodea. Slice off stem tip at an angle. 2) Place the sprig (cut side up) in a test tube with water and a pinch of baking soda. 3) Place the test tube in a beaker filled with water and place a lamp next to the beaker. 4) Turn on the lamp and as soon as you see bubbles coming from the cut end, count and time the reaction for 10 minutes. 5) Calculate the net photosynthesis in bubbles/min. 6) Repeat without the lamp to calculate the rate without direct light. 7) Discuss with students what the bubbles were, why the rate changed when repeated and other factors that could affect the rate.

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

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!*

Did You Know...

Salt marshes are found in the intertidal zone (the coastal area exposed at low tide) and are home to a narrow range of plants and animals. Salinity and temperature changes are common and few are able to tolerate such harsh extremes.

A **wetland ecosystem** is an area of land that stays wet at least some portion of the year, because of surface or ground water, and can be salty, fresh or brackish. Wetlands, categorized by the plants found in them, range from grassy salt marshes to wooded swamps and bogs covered in mosses and ferns.

Marsh fires, occasionally ignited by lightning strikes, can result in very little to extreme damage of the salt marsh habitat. This depends on whether the above ground leaves or additionally, the below ground root system and peat have been affected.

Marsh restoration is the process of returning an area that was once marsh land back to its original state and is achieved when the plants, animals and physical and chemical processes are fully restored.

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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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