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Discovery Porthole

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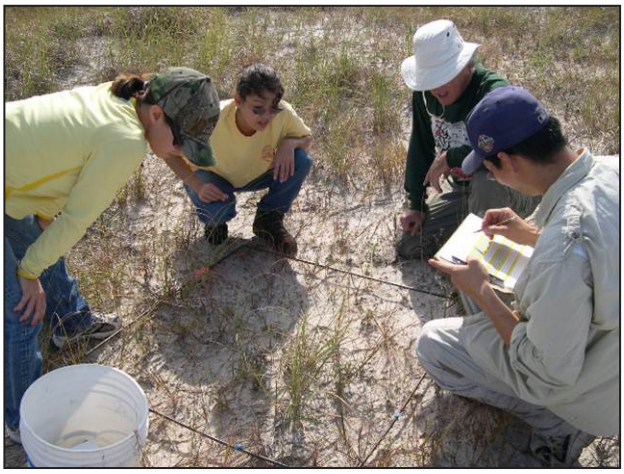
Gulf of Mexico Beaches and Dunes: oil spill impacts

Shortly after the explosion of the Deepwater Horizon rig, oil began washing ashore on many Gulf coast beaches. Over time, because of wind and waves, oil was buried below the beach surface. The impact of oil on sandy habitats, beach dwelling animals and water quality has not been well studied; therefore, scientists at Florida State University are researching what effect the buried oil is having on the beach and dune environments that have been impacted across the northern Gulf of Mexico.



Researchers count and identify dune plants on St. George Island, FL. Photo credit: Miller FSU

Sandy beaches, dunes and associated environments dominate the coastal land habitat of the northern Gulf of Mexico. They provide refuge and nesting ground for many species of marine and land animals as well as provide areas for human recreation. Additionally, sandy shores protect inland areas from disturbances like hurricanes by buffering wind and wave energy. ***Beach cleanup***, but not necessarily protection, was of high priority following the oil spill. This was because the presence of tar balls had a direct influence on the presence of tourists and associated revenue. Since it was assumed that oil would be easier to clean from beaches and dunes, protection, in the form of ***boom***, was focused on harder to clean areas like saltmarshes and oyster reefs. FSU scientists, including Drs. Markus Huettel and Thomas Miller, fear these decisions were made without enough information on the effects of oil in beach and dune communities.

Oil layer uncovered on Pensacola Beach, FL. Photo credit: Huettel FSU

FSU researchers have conducted a detailed coastal dune plant study on St. George Island Florida for more than 12 years. With this information, they have been able to show that a large amount of variation in ***dune plant communities*** is due to changes in climate from year to year. Long term data like this helps connect the changes scientists are seeing in the dunes to their true causes. In previous spills, oil was found in greater concentrations in higher and drier areas of the dunes as opposed to the lower and wetter beaches. Scientists found that oil in these areas took longer to break down and probably had more negative effects on animals. Declines in ***beach invertebrates*** (crabs, clams, snails, worms, etc.,) and birds followed an oil spill in Mexico but, without long term data, scientists were unable to conclude if the changes were due to oil exposure, normal seasonal changes or tropical storms that soon followed. The goal for one of their most recent studies is to use the long term data, and data gathered from five additional study areas, to determine how much oil is in the beach sand and how is it affecting plant and animal communities. They are also investigating what factors determine the amount of time it takes oil to degrade buried in the sand. The information FSU has collected will allow them to make predictions about future changes, including those caused by the oil spill. Understanding the impact of oil on dune plants, animals and microbes is critical for developing strategies for decontamination once a spill has occurred.

Education Extension

Key Terms: *beach, dune, maritime forest, habitat, barrier island*

Classroom Activity: Barrier Islands

Barrier islands are dynamic habitats that support many uniquely adapted plants and animals. In this lesson, students will learn about the characteristics of beaches, dunes and other barrier island habitats, the forces that drive them and how they were made vulnerable during the oil spill.

Ocean Literacy Principles: 1. The Earth has one big ocean with many features, 5. The ocean supports a great diversity of life and ecosystems

National Science Standards: A. Science as Inquiry: Abilities necessary to do scientific inquiry; C. Life Science: Populations and ecosystems

Supplies: *computers, plants, magazines, pictures, poster board*

Directions: 1) Discuss barrier islands, how they can form and the different habitats associated with them (beaches, dunes, maritime forests, freshwater ponds, and salt marshes). 2) Ask students to choose one of the habitats discussed to do further research. 3) Students can create a model, either digitally or physically (mixed-media), of that habitat they chose to share their findings with the class. 4) Students should discuss how their habitats were, or could have been, impacted by the Gulf of Mexico oil spill and what measures were taken to protect them. If they were impacted, discuss clean-up methods used.

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...

Beach cleanup of tar balls during the Deepwater Horizon oil spill was done by hand and with heavy machinery. The large machines scooped sand and sifted out tar balls and other oily debris.

Boom was a common sight along sensitive coastal habitats during the oil spill. Several types of boom were used including containment, sorbent and snare.

Dune plant communities are made up of a narrow range of grasses, vines and shrubs that can withstand the extreme conditions of the beach environment. Dune plants grow in loose, dry, nutrient poor soils and must withstand exposure to wind, salt spray and intense light.

Beach invertebrates are common in the sand yet not highly visible. Many come out at night, like ghost crabs, or some, like clams and mole crabs, come out only briefly when the waves come in then quickly bury themselves as they wash back out. Additionally there are countless microscopic animals including worms and crustaceans and also bacteria.

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