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Discovery Porthole

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Deep-Sea Red Crabs

Many of us are familiar with coastal habitats, like salt marshes and seagrass beds, the services they provide, and the seafood they produce. Unfortunately, the deep sea doesn't have this type of exposure and is often misunderstood. Scientists from the University of Southern Mississippi (USM) are hoping to change that. They are studying this foreign land, and the animals that inhabit it, to determine the short- and long-term ecological impacts of the Deepwater Horizon oil spill.

It is a common misconception that the *deep sea* is a barren, desert-like wasteland, supporting only a few bizarre creatures. This could not be further from the truth. The deep sea contains many features similar to those found on land including mountains, deep canyons and plains. It is also home to many uniquely adapted fish and invertebrate species that include crabs, corals, anemones, brittle stars and tube worms. One common deep sea inhabitant is the *red crab*, *Chaceon quinque-dens*. In the Gulf of Mexico, these crabs are found in water from 2,000 feet to over a mile deep along the outer edge of the continental shelf and slope. There they serve important ecological roles as both predators and scavengers. Harriet Perry of the USM Gulf Coast Research Laboratory has been studying the biology and ecology of red crabs since the 1980's and hopes to compare recent findings with data collected over the years.



Live deep-sea red crab collected by Dr. Harriet Perry to study effects of the oil spill. Photo: Belinda Serata/NWF

Soon after the oil spill began, Perry collected crabs from a trapping station 12 miles north of the *Deepwater Horizon site*. Her initial catch observations revealed reduced numbers of red crabs compared with historic samples from that area. Many of the captured were in poor condition and some died before reaching the surface. Additionally, some of the sampling locations did not result in any crabs caught. Of particular interest to Perry, was that instead of catching red crabs, they were catching high numbers of a deep-sea roly-poly, or isopod. It appears that the *giant isopods* have replaced the red crabs in some areas. More research is needed to determine what is happening to the crabs and specimens are being analyzed to look for oil or dispersant.



Bathynomus giganteus, a giant isopod found living in the deep sea. Photo: Belinda Serata/NWF

In addition to deep-sea crabs, Perry has spent much of her career studying the blue crab, *Callinectes sapidus*. Blue crabs are a species of swimming crab, common to the shallow bays and estuaries of the northern Gulf of Mexico. Like the red crabs, blue crabs have been in the spotlight since the oil spill with scientists trying to determine what impact, if any, the oil spill has had on them. This is important because blue crabs play a critical role in the coastal food chain, as both predators and scavengers, but also in the local economy. They are harvested commercially for the seafood industry and in large numbers by recreational fishermen.

Education Extension

Key Terms: *deep sea, benthic, communities, chemosynthesis*

Classroom Activity: Exploring the Deep Sea

The deep sea is home to fascinating, yet largely unexplored communities of organisms. As a result, the importance of these ecosystems is relatively unknown. In this lesson, students will learn about deep-sea habitats, the organisms that live there and what adaptations allow them to survive in such extreme conditions.

Supplies: *computers with internet access*

Directions: Visit the website <http://oceanexplorer.noaa.gov> for a variety of lesson ideas for all ages. For ideas related specifically to the Gulf of Mexico, look at *Lessons from the Deep: Exploring the Gulf of Mexico's Deep-Sea Ecosystems Educators Guide*. The lessons and hands-on activities explore the zones of the deep sea, the animals that inhabit them and the advanced technologies used to explore them. Younger students may enjoy *Entering the Twilight Zone*, while more advanced groups may choose to learn about ROVs and the discoveries made by them in *Through Robot Eyes*.

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, Understanding about scientific inquiry; B. Physical Science: Transfer of energy; C. Life Science: Structure and function in living systems, Populations and ecosystems, Diversity and adaptations of organisms

Did You Know...

The *deep sea* is home to a variety of unique communities, including coral reefs, mud-bottom flats and methane seeps. These communities have only recently been explored by scientist using submarines and remotely operated vehicles.

Red crabs, and the many other deep-sea creatures that are red in color, have an advantage. Red light does not penetrate into the deep ocean and therefore red animals appear black and are essentially camouflaged.

The *Deepwater Horizon site* and surrounding areas continue to be explored by university scientists and federal agencies like the National Oceanic and Atmospheric Administration (NOAA). They are studying deep-sea habitats and documenting signs of oil exposure.

Giant isopods, although relatively not well known, are not a new discovery. They were first described in 1879, and according to the fossil record, have been around for more than 160 million years! They are important scavengers of the deep, feeding on dead whales, fish, and squid, and will also consume slow-moving prey.

Project Contact Information

Harriet Perry
Center for Fisheries Research and Development
Gulf Coast Research Lab
University of Southern Mississippi
703 East Beach Dr.
Ocean Springs, MS 39564
(228) 872-4218
harriet.perry@usm.edu



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Northern Gulf Institute Program Office

Building 1103, Room 233
Stennis Space Center, MS 39529
Phone: (228) 688-4218 Fax: 228-688-7100
www.NorthernGulfInstitute.org

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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