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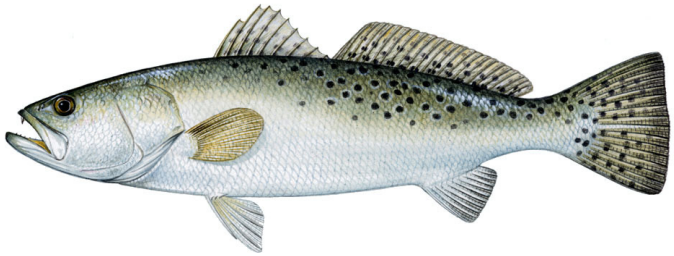
Discovery Porthole

Sharing Research with Educators and the Public

# Impacts of oil on Spotted Seatrout

**Call them spotted seatrout, speckled trout, or even specks; whatever name you choose to call them, know they are important fish, both to the environment and the economy. Spotted seatrout live in coastal estuaries of the northern Gulf of Mexico. They, along with other estuarine species, were exposed to varying amounts of oil soon after the Deepwater Horizon disaster. Since the spill, researchers at the University of Southern Mississippi's Gulf Coast Research Lab (GCRL) Toxicology Research Center have been trying to better understand what physical effects the oil and chemical dispersants may have had on these important fish.**



Contrary to what their name implies, these fish are not members of the trout family at all. Known scientifically as *Cynoscion nebulosus*, they belong in the drum family, along with spot, croaker and red drum. They are caught commercially but are harvested in greater numbers by recreational fishermen. When they are young they feed mainly on shrimp and other crustaceans. As they grow into adults, they begin to feed on other fish, including anchovies, pinfish and even mullet and snapper. They are often recognized by their two large incisors (teeth) and the spots that give them their name.

One important aspect of the spotted seatrout is that it can serve as an indicator species for the health of an estuary. This is because they are mid-way up the food chain, spend the majority of their life in near-shore, estuarine waters and because their size is closely linked to certain environmental conditions. For these reasons, Dr. Joe Griffitt and master's student Rachel Brewton have conducted laboratory experiments on larval and juvenile seatrout raised at GCRL's hatchery. The young fish were exposed to ***crude oil***, ***dispersant (Corexit 9500)***, and an oil and dispersant mixture. A control group was also maintained for examination. Both the oil and dispersant used in this experiment were obtained from BP.

They used a laboratory technique known as ***qPCR*** to look for a gene that is expressed by the liver and a known biologic indicator of contaminants. High levels of this gene are an indication that the body is in the process of breaking down toxins. All of the fish that were exposed to oil and dispersant in this study showed signs of this process occurring. The ***endocrine system*** which regulates growth, reproduction and development was also evaluated by qPCR. Griffitt looked for changes in proteins expressed by the liver that are associated with the hormone estrogen and egg production. Although it is known that ***hydrocarbons*** can disrupt the endocrine system, no disruption was observed in this brief exposure experiment. Griffitt also found that growth was affected in both the larval and juvenile fish by exposure to oil and dispersant. A reduction in growth rate was observed in the oil and dispersant mix treatment and the dispersant alone treatments for the larval fish. While Griffitt's research is limited to a single species of fish, his experiments provide one small window into the potential effects of the oil spill.

*Oil and water mixture used in exposure experiment on larval and juvenile spotted seatrout. Photo/Griffitt USM*

## *Education Extension*

**Key Terms:** *otolith, fisheries, fisheries management*

**Classroom Activity: How old is that fish?**

Did you know scientists can tell how old a fish is by looking at its otoliths or "earstones" and counting the rings? Similar to tree rings, fish otoliths have layers that can be counted to determine age. In this activity, students will learn what otoliths are, why they are important to a fish and how scientists can study them to learn more about the life of a fish. Students can also play an interactive game to examine otoliths and age fish.

***Ocean Literacy Principles:*** 5. The ocean supports a great diversity of life and ecosystems, 6. The ocean and humans are inextricably interconnected

***National Science Standards:*** A. Science as Inquiry: Abilities necessary to do scientific inquiry; C. Life Science: Populations and ecosystems; E. Science and Technology: Understandings about science and technology, G. History and Nature of Science: Science as a human endeavor

**Supplies:** *computers with internet access*

**Directions:** 1) Review the basic anatomy of a fish, including otoliths. 2) Explore the different types of information scientists can collect from an otolith, or a collection of otoliths, including age, growth rate and, discuss how they can be used for life history and population analyses. 3) Visit the Alaska Fisheries Science Center (NOAA) web page **http://www.afsc.noaa.gov** for images of otoliths and to test students' knowledge and abilities with an interactive fish aging game.

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...*

***Crude oil*** that leaked from the Macondo well was Louisiana light sweet crude. Light crude has a high percentage of volatile compounds and very low levels of sulfur compounds. These characteristics allow it to weather and break down in the environment more quickly than other heavier oils.

***Dispersants*** are chemicals used to speed up the breakdown of oil. Corexit 9500 was applied both near the well head and sprayed at the surface from airplanes.

***qPCR*** stands for quantitative real time polymerase chain reaction. The technique is used to amplify and count targeted DNA.

The ***endocrine system*** is composed of all hormone secreting glands. Hormones in fish and other marine animals regulate various biological processes including molting, growth, reproduction and development.

***Hydrocarbons*** are molecules found naturally in crude oil as a result of decomposed organic matter.

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