Health defects found in fish exposed to Deepwater Horizon oil spill

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Three years after the Deepwater Horizon oil spill in the Gulf of Mexico, crude oil toxicity continues to sicken a sentinel Gulf Coast fish species, according to new findings from a research team that includes a University of California, Davis, scientist.

With researchers from Louisiana and South Carolina, the scientists found that Gulf killifish embryos exposed to sediments from oiled locations show developmental abnormalities, including heart defects, delayed hatching and reduced hatching success. The killifish is an environmental indicator species, or a "canary in the coal mine," used to predict broader exposures and health risks.

The findings, posted online in advance of publication in the journal *Environmental Science and Technology*, are part of an ongoing collaborative effort to track the impacts of the Deepwater Horizon oil spill on Gulf killifish populations in areas of Louisiana that received heavy amounts of oil.

Other species that share similar habitats with the Gulf killifish, such as redfish, speckled trout, flounder, blue crabs, shrimp and oysters—may be at risk of similar effects.

"These effects are characteristic of crude oil toxicity," said co-author Andrew Whitehead, an assistant professor of environmental toxicology at UC Davis. "It's important that we observe it in the context of the Deepwater Horizon spill because it tells us it is far too early to say the

effects of the oil spill are known and inconsequential. By definition, effects on reproduction and development—effects that could impact populations—can take time to emerge."

Killifish are abundant in the coastal marsh habitats along the Gulf Coast. Though not fished commercially, they are an important forage fish and a key member of the ecological community. Because they are nonmigratory, measurements of their health are indicative of their local environment, making them an ideal subject for study.

The researchers collected Gulf killifish from an oiled site at Isle Grande Terre, La., and monitored them for measures of exposure to crude oil. They also exposed killifish embryos in the lab to sediment collected from oiled sites at Isle Grande Terre within Barataria Bay in Louisiana.

Whitehead said the report's findings may predict longer-term impacts to killifish populations. However, oil from the Deepwater Horizon spill showed up in patches, rather than coating the coastline. That means some killifish could have been hit hard by the spill while others were less impacted.

Whitehead said it is possible that some of the healthier, less impacted killifish could buffer the effects of the spill for the population as a whole.

The research was supported by grants from the National Science Foundation, the Gulf of Mexico Research Initiative and the National Institutes of Health.

The other researchers in the study are lead author Benjamin Dubansky, who recently earned his Ph.D. from Louisiana State University; Fernando Galvez, associate professor of biological sciences at LSU; and Charles D. Rice, professor of biological sciences at Clemson University

in Clemson, South Carolina. The researchers have tracked the impact of the oil on killifish since the Deepwater Horizon spill occurred in April 2010.

More information: Multi-tissue molecular, genomic, and developmental effects of the Deepwater Horizon oil spill on resident Gulf killifish (Fundulus grandis). pubs.acs.org/doi/abs/10.1021/e … p?journalCode=esthag

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