

Researchers find impact of oil spill in marsh fish species

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A research team led by LSU Associate Professors of Biological Sciences Fernando Galvez and Andrew Whitehead has published the results of a combined field and laboratory study showing the effects of the Deepwater Horizon oil spill on fish living in Louisiana marshes.

The study, funded in part by the National Science Foundation, or NSF, and the Gulf of Mexico Research Initiative is being published in the journal [Proceedings of the National Academy of Sciences](#), or *PNAS*. Their study shows that, despite very low to non-detectable concentrations of oil constituents in the water and in [fish](#) tissues, biological effects in fish indicate dramatic responses that are indicative of exposures to the toxic components of oil.

That is, the biological responses of the fish were much more sensitive indicators of exposures and effects from the contaminating oil than the environmental chemistry was.

"Though the fish may be 'safe to eat' based on low chemical burdens in their tissues, that doesn't mean that the fish are healthy or that the fish are capable of reproducing normally," said Whitehead.

Genome expression responses detected in liver tissues were predictive of the types of responses associated with developmental abnormalities and death observed in previous studies by Galvez and Whitehead. Furthermore, responses were predictive of impairment of fish reproduction, meaning that the probability of impact on populations is

significant.

Additionally, gill tissues, which are important for maintaining critical body functions, appeared damaged and had altered [protein expression](#) coincident with oil exposure, and these effects persisted for long after the visible oil disappeared from the marsh surface. Controlled exposures in laboratory settings of developing embryos to field-collected waters induced similar cellular responses.

"This is of concern because early life-stages of many organisms are particularly sensitive to the toxic effects of oil and because marsh contamination occurred during the spawning season of many important species," Whitehead.

A major take-home message of the more than two decades of research following the Exxon Valdez oil spill in Alaska was that sub-lethal biological effects, especially those associated with reproduction, were most predictive of the long-term population-level impacts still apparent in many species such as herring and salmon. The current LSU study shows that early signals of similar kinds of sub-lethal effects are starting to emerge in an ecologically-important species following the Deepwater Horizon oil spill.

The LSU research group is currently following up with studies examining more direct effects of [oil](#) exposure on reproduction, development and growth.

More information: Whitehead, A. et al. *Proc. Natl Acad. Sci.* advance online publication [dx.doi.org/10.1073/pnas.1109545108](https://doi.org/10.1073/pnas.1109545108) (2011).

Provided by Louisiana State University

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