

Oil in the Ocean: Dead Zones and Microbial Response to Oil

Deepwater Horizon, 2010

Principle Investigator: [Ben Van Mooy](#)

Early media reports from the Gulf after the flow of oil began warned of massive patches of low-oxygen water forming in areas where microbes were thriving, consuming dissolved oxygen in the process. This posed potentially serious threats to Gulf fisheries, but WHOI chemist Ben Van Mooy, realizing the significance of these predictions, quickly mobilized with his colleagues to investigate.

With support from NSF's Rapid Response Program, Van Mooy set out to assess the response of the microbes in the Gulf to the oil spill, by tracking the oxygen consumed by microbes in the course of degrading the oil. He initially planned to look for signs of microbial respiration in the surface oil slick, but because he was sharing space on the cruise with colleagues who were studying the spread of oil in the underwater plume, he expanded his search there, as well.

He also took great pains to ensure the accuracy of his analysis by employing a time-consuming but proven method for measuring oxygen in the water known as a Winkler titration. He found that, contrary to expectations, oxygen levels underwater were not abnormally low, allowing fishermen and Gulf residents to focus on other concerns. In the surface waters, he found that the microbes were consuming oil at an amazing rate, and that microbial degradation was therefore a process with the potential to remove a significant fraction from the spill.



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WHOI chemist Ben Van Mooy adds chemical reagents to water samples in preparation for an oxygen assay called the Winkler titration. The samples were taken from within and outside of the plume of oil from the ruptured wellhead at the Deepwater Horizon oil rig in the Gulf of Mexico. The Winkler method was developed in 1888 and is still the "gold standard" for determining oxygen concentrations in liquid samples. (Photo by Dana Yoerger, Woods Hole Oceanographic Institution)

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WHOI's Response to the Deepwater Horizon Oil Spill

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Mail: Woods Hole Oceanographic Institution, 266 Woods Hole Road, Woods Hole, MA 02543, USA.

E-Contact: info@whoi.edu; press relations: media@whoi.edu, tel. (508) 457-2000

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