

The Deepwater Horizon Oil Spill: Response and Recovery of Coastal Marshes

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The Macondo 252 oil spill resulting from the blowout of the Deepwater Horizon (DWH) drilling platform on April 20, 2010 released a government-estimated 4.9 million barrels of crude oil into the Gulf of Mexico. Some of this oil reached coastal marshes within the Mississippi River Delta Ecosystem, which comprises almost 40% of all coastal wetlands in the 48 conterminous United States. These wetlands are of particular concern because of the suite of ecologically and economically important services they provide, not only to the northern Gulf of Mexico, but also to the nation. For more than 3 years, we have assessed oil impacts to coastal salt marshes and their subsequent recovery of ecological structure and function. In the salt marshes of northern Barataria Bay, one of the most heavily oiled regions, we established replicated field stations that received heavy, moderate and no oiling. Total petroleum hydrocarbon (TPH) concentrations were significantly higher in heavily oiled marshes initially and decreased with time for both heavily and moderately oiled marshes. Dominant marsh plant species in moderately oiled marshes recovered two years after the oil impact. However, plant recovery was muted in heavily oiled marshes three years after the spill. Soil shear strength was significantly weaker in the heavily oiled marshes than in reference marshes. Bacterial communities were significantly altered by the petroleum contamination; however, bacterial communities recovered with time, with a faster speed of recovery in moderately oiled sites. Relative to infauna, heavy oiling strongly reduced meiofaunal species diversity and density in samples taken 18 months after the Deepwater Horizon oil spill. However, moderately oiled sites recovered quickly. The size of the macro-invertebrate snail, *Littoraria irrorata*, was smaller in heavily oiled marshes compared to reference and moderately oiled marshes. Further study on the long-term recovery and sustainability of DWH oil spill impacted marshes is underway.