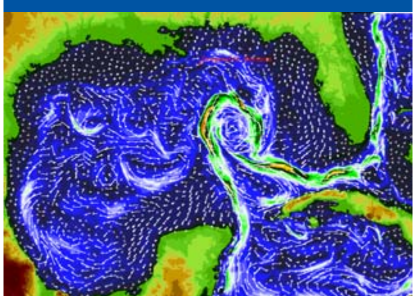
# What Have We Learned?

## About the 2010 Deepwater Horizon Gulf of Mexico Oil Spill



*The Deepwater Horizon oil spill began with an explosion and subsequent fire on the Deepwater Horizon drilling rig on April 20, 2010, in the northeastern Gulf of Mexico, approximately 41 miles from the coast of Louisiana and 133 miles from Pensacola, Florida. The spill lasted nearly three months until the wellhead was capped on July 15, 2010. The estimated total volume of the spill is approximately 4.9 million barrels, which makes it the largest accidental oil spill in history.*

*In the fall of 2011, an interdisciplinary group of scientists from 10 institutions in the USA and Norway was awarded a grant through the Gulf of Mexico Research Initiative to form the Deep-C Consortium and study the effects of the spill on deep sea to coastal communities. The following are highlights of some of their research results as of spring 2013.*

### *Current oil detection methods are insufficient.*

To determine the extent of oil spills, scientists collect samples from spill sites and use laboratory equipment to analyze the chemical components of the samples. However, recent research has shown that the standard lab tests that are typically practiced fail to detect some chemicals, which can hinder our understanding of the size of a spill, our accounting for "missing" oil, and our ability to protect marine organisms that may be sensitive to specific chemicals.

**Read more:** Standard oil spill tests might miss important class of chemicals (*Chemical & Engineering News*, 1/30/13)

### *A large amount of oil mixed with sediments and plankton and was dragged down to the bottom of the Gulf in a "dirty bathtub/dirty blizzard" effect.*

Some portion of oil from the spill combined with sediments and plankton, creating a "dirty bathtub" layer more than 1,000 meters beneath the surface. The oil caused particulates to clump together and caused a "dirty blizzard" that sent contaminated sediments to the sea floor at 10 times the normal rate. This helps explain why some water closer to the surface was unusually clear during the spill. DNA analysis showed the presence of diatoms in the sediment consistent with its rapid delivery to the seafloor.

**Read more:** Dirty blizzard buried Deepwater Horizon oil (*Nature News*, 1/26/13)

### *We cannot rely on oil-eating microbes alone to clean up oil spills.*

Some bacteria and fungi (called *microbes*) regularly biodegrade or "eat" compounds found in the oil that is naturally present on the Gulf floor. Within months after the Deepwater Horizon spill, these microbes are thought to have eaten a large portion of the oil. However, the population of these microbes is proportional to the supply

of oil. When an oil spill occurs, there are not normally enough microbes present to degrade the oil before it causes ecological damage. While the population of microbes may eventually increase in response to a spill, other methods, such as immediate containment or physical removal of oil, are important defenses.
**Read more:** FAQ: Microbes and oil spills (*American Society for Microbiology*, 2/11)

## *Some carbon released from the oil spill entered the food web through bacterial consumption of methane.*

Approximately a third of the carbon released during the Deepwater Horizon oil spill was methane (better known as natural gas). Certain bacteria (methanotrophic) which are exceptionally good at absorbing or consuming methane are, in turn, eaten by plankton and other aquatic organisms. Using stable isotopes and radiocarbon tracers, scientists have been able to confirm this occurred during the 2010 oil spill. However, methane is non-toxic and does not represent a safety risk.
**Read more:** Radiocarbon evidence that carbon from the Deepwater Horizon spill entered the planktonic food web of the Gulf of Mexico (*Environmental Research Letters*, doi:10.1088/1748-9326/7/4/045303)

## *Biodiversity of fish and invertebrates is high in the deep sea, while oil impact on life history patterns remains unclear.*

The thousands of fish and invertebrates collected at depths ranging from 200 to 2600 meters help scientists uncover new species, define deep-sea community structure, and understand life history traits of animals that are otherwise actually or virtually unknown to science. What we know is that both biological diversity and biomass decreases with depth. We also know that animals collected nearer the Macondo well blowout site experienced greater exposure to oil and metabolized it at a higher rate than those collected further away. Yet the level of oil residuals in their tissues is relatively low. This begs the question, *"How does oil exposure affect growth, reproduction, and general health of deep sea animals?"* Knowing the answer to this question improves our understanding of the long-term effects of these pollutants on large bony and cartilaginous fish.
**Read more:** Marine life after the BP oil spill (*FSU National High Magnetic Field Laboratory Science Café Lecture Series*, www.magnet.fsu.edu)

The Deep-C Consortium is a long-term, interdisciplinary study of deep sea to coast connectivity in the northeastern Gulf of Mexico.

**Deep-C.org**

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### *DEEP-C MEMBER INSTITUTIONS*

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