

# Waiting for

## Gulf oil spill threatens fragile coast with unseen devastation as disaster's effects remain unknown

It's hard to imagine that 46 days after the Deepwater Horizon rig went down, oil is still gushing from the sea floor with the potential to devastate the ecosystems of the Gulf of Mexico from the marshes and beaches to the deep sea ecosystems.

Standing on the shores of Gulf Isle and visiting the marshes near Venice this week gave me a glimpse of the damage the oil can cause, but many of the effects aren't immediately visible from the shore and will remain unknown for some time. The deployment of boom will hopefully help protect the fragile wetlands and marshes. The oil has already affected over 200 km of coastline in Louisiana, Alabama and Mississippi, but no amount of boom will prevent the effects of the oil and the chemical dispersants on deep sea and open ocean communities.

Millions of gallons of oil have already spilled into the Gulf; estimates range from 28 million gallons to 110 million gallons. The oil is still flowing, and the entire Gulf region and the East Coast of the United States could be affected depending on currents. In addition, as part of the disaster-relief effort, BP has already pumped as much as one million gallons of toxic chemical dispersants into the Gulf, further increasing the toxic load on this body of water.



While these dispersants may lessen the immediate visible impact of the oil on the marshes and estuaries of the Gulf Coast, they add toxic chemicals into the open ocean system, making a bad situation far worse.

BP is using a dispersant called Corexit 9500, which when ingested is known to rupture red blood cells and cause internal bleeding. The dispersant combines with the oil to create small toxic globules that forage fish, like herring, mistake for food and ingest.



**Gaelin Rosenwaks/QMI Agency**  
The horizon off of Gulf Isle, La., is lined with oil rigs.

When a larger predatory fish eats these fish, the toxins make their way up the food chain. If the fish don't die, the toxins can eventually end up on our dinner plates in very high concentrations. This process of bioaccumulation has been well-documented with other toxins like DDT, which became a banned substance. Corexit is currently banned in British waters.

While oil would normally float on water, the addition of the dispersants at the well head breaks the oil down into smaller globules that can remain suspended in solution and form enormous subsurface plumes. A research team from the University of Georgia is currently out in the Gulf and has identified a series of massive subsurface plumes at depths of 800-1,300 metres. These plumes are 16-35 km long and 3-10 km wide. Their exact composition is not yet known but could be mostly oil, gas or a combination of oil and dispersant. The combination of oil and toxic chemicals could spell disaster for the fragile ecosystems on the sea floor as they break down and the residues settle there.

Gaelin Rosenwaks has a master's degree in Coastal Environmental Management from Duke University and is in the Gulf reporting for QMI Agency. You can read Gaelin's blog at [globaloceanexploration.com](http://globaloceanexploration.com).

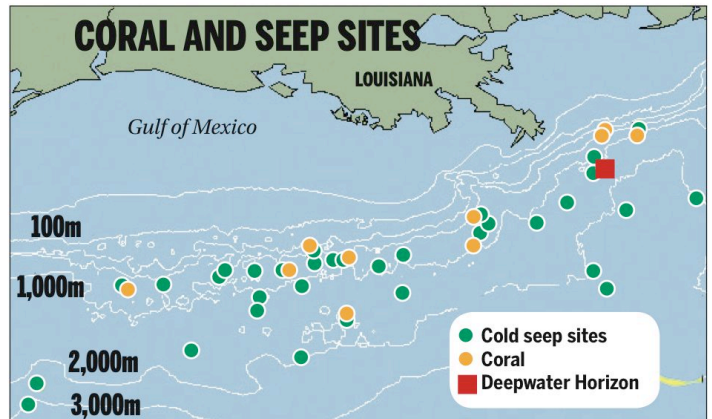
### The Deep Sea: Corals and cold seeps

Deep below the surface in the Gulf of Mexico, below even the Deepwater Horizon leak, delicate ecosystems with fascinating creatures abound. These long-lived and fragile communities are made up of reef-building corals, invertebrates, fish, tubeworms and many other creatures carefully adapted to live in the harsh environment of the deep sea. Because a spill of this magnitude has never occurred at these depths and near these delicate ecosystems, the impacts are largely uncertain.

"There are known and carefully mapped lush deep sea coral and cold seep communities at all depths in the Gulf from almost two miles deep up to the surface waters, but since we don't yet know the extent or

paths of the deep oil plumes, we do not know how these delicate communities will be impacted, but the damage has the potential to be severe," said Dr. Chuck Fisher of Pennsylvania State University.

The cold seep communities of the Gulf are some of the most studied deep sea communities in the world. There are more than 90 known cold seep communities filled with mussel and tubeworms specially adapted to survive in harsh environments at extreme depths. Because these sites have been well-documented, they will serve as good indicators of the effects of the oil on the delicate systems.



MAP COURTESY OF JAY LUNDEN/TEMPLE UNIVERSITY

# the worst

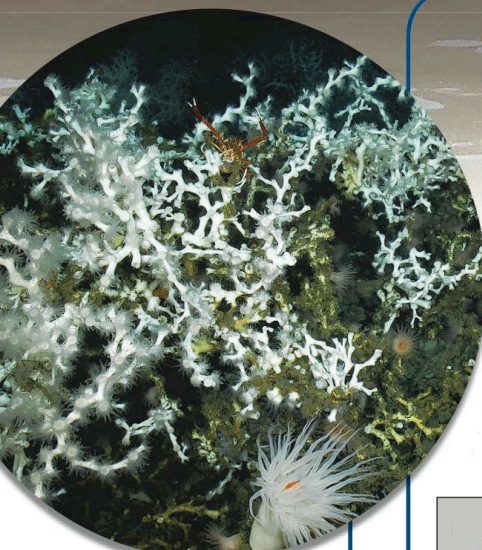


IMAGE COURTESY OF IAN MACDONALD/LOPHELIA II 2009: DEEPWATER CORAL EXPEDITION: REEFS, RIGS AND WRECKS.

Deep sea corals, such as the Lophelia shown here, form delicate reefs and complex ecosystems in the depths of the Gulf of Mexico. It is not known how the oil spill will affect these systems.

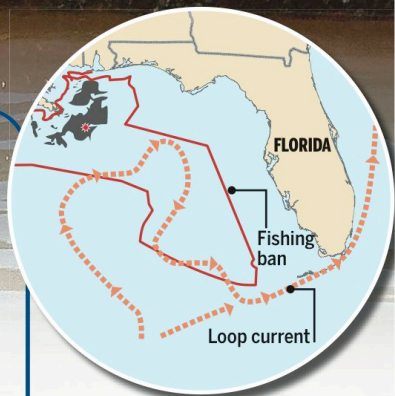
## The Surface Waters: Atlantic bluefin tuna and other pelagic species

The surface oil slick now with a radius upwards of 320 km will surely affect the animals near the surface and 1,000 metres below. From the tiny plankton at the base of the food chain in the Gulf to the large predatory fish, the oil, both in its original state and the tiny globules formed when mixed with dispersant, will impact the open ocean systems of the Gulf where the majority of both commercial and recreational fishing occurs.

The spill couldn't have come at a worse time for highly migratory species like the Atlantic bluefin tuna which are now entering the Gulf to spawn. The Gulf is the nursery to many pelagic fish and spring and early summer are the seasons when the fish enter to spawn expecting warm, clean water. Scientists don't know

what the effects of the oil will be on the larvae of these animals, but larvae float on the surface while they're developing — a surface which is now covered in oil.

"The spill in the Gulf of Mexico is in one of our nation's most important nursery areas for pelagic fish, such as tunas, marlin and swordfish," said Dr. Barbara Block of Stanford University. "The fisheries extend from Canada to Mexico. Thus the spill here affects three nations. These regions and the fisheries they support are some of the most critical habitat for fish like the Atlantic bluefin. Their populations are at an all-time low and the spill has occurred on the eastern portion of their spawning grounds at the peak of spawning. We need to do all we can to learn how the oil has affected the larvae, the adolescents and adults."



## The Future

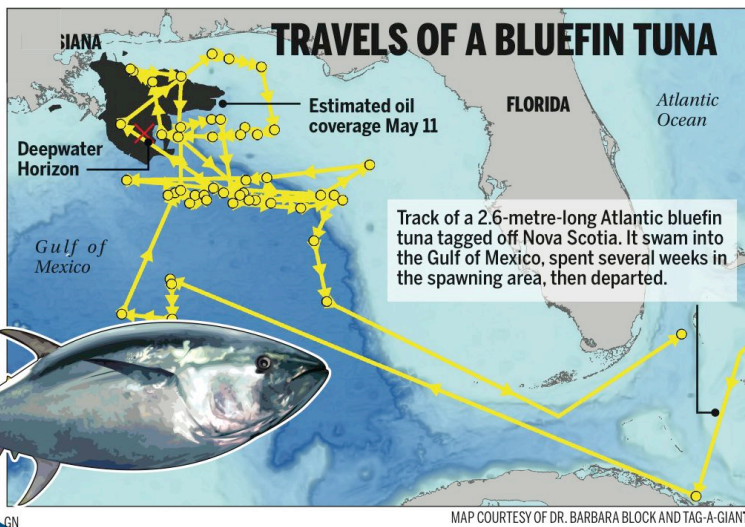
Atlantic bluefin tuna, like many other migratory fish, follow the Loop Current into the Gulf of Mexico. This current is vital to the transport of nutrients, larvae and many creatures into and out of the Gulf of Mexico.

During the spring and summer months, the Loop Current inches closer to the coastline and into the area where the oil is located. Some preliminary findings indicate the oil has in fact entered this current, which could spell disaster for a much larger region than just the Gulf of Mexico.

The Loop Current does just what its name implies. It enters the Gulf, loops around, and exits the Gulf taking with it whatever is in its path. In the past, this water contained nutrients and larvae of the spawning fish, but now the current will carry oil as well. The current leaves the Gulf of Mexico and joins up with the Gulf Stream, which has the potential to carry the oil up the East Coast of the United States and into the Central Atlantic. New models indicate this will happen, but we don't know how much oil is entering the current at this time.

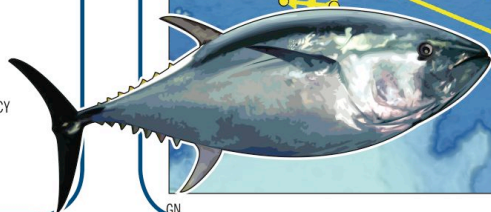
At the end of the day, the Deepwater Horizon leak will go down as the worst environmental catastrophe ever to hit the United States, but the impacts — because of the location and timing of the spill — will likely be global.

More research is needed to know exactly what those impacts will be.



Track of a 2.6-metre-long Atlantic bluefin tuna tagged off Nova Scotia. It swam into the Gulf of Mexico, spent several weeks in the spawning area, then departed.

MAP COURTESY OF DR. BARBARA BLOCK AND TAG-A-GIANT



GAELEN ROSENWAKS/QMI AGENCY

MAIN PHOTO: A boom covered in oil in a marsh near Venice, La.