

Published online 5 November 2010 | Nature | doi:10.1038/news.2010.589

News

# Oil spill cruise finds field of dead coral

**Scientific expedition assesses deep-sea damage in the Gulf of Mexico.**

Mark Schroppe

A team of researchers surveying the depths of the Gulf of Mexico have found a large area of dead or dying corals and associated animals. Though the scientists caution that they cannot say definitively what caused the damage, they believe the limited evidence available points to the Deepwater Horizon oil spill as the culprit.

"It was immediately obvious when we pulled up to this site that almost all of the corals were in bad shape," says Charles Fisher from Pennsylvania State University in University Park, the expedition's chief scientist. "It wasn't subtle: they were covered with brown material."

The group's two-leg 'Lophelia II' expedition began 14 October when they cleared the narrow port at Pensacola, Florida, aboard the National Oceanic and Atmospheric Administration (NOAA) flagship research vessel *Ronald H. Brown*. Aboard were researchers from a variety of institutions, including a team from the Woods Hole Oceanographic Institution in Massachusetts who brought the remotely operated submersible *Jason*.

Watching camera feeds from *Jason* in the vehicle control room mounted on the ship's deck, the team first saw damaged hard coral, and then a large field of gorgonian soft corals, or sea fans, nearly all of which appeared heavily damaged. Some were covered in brown material; others were losing their tissue or stripped to their hard skeletons. The brittle sea stars that commonly intertwine these soft corals, which are normally seen waving their arms, were discoloured and immobile.

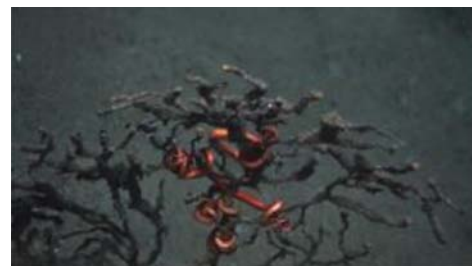
"Those images are straight out of my nightmares," says Edith Widder, a deep-sea biologist and president of the Ocean Research & Conservation Association in Fort Pierce, Florida (see [slideshow](#)). Widder, who was not involved in the research cruise, had been relieved by previous reports from the expedition that other deep sites in the vicinity of the spill looked healthy. "It's just nauseating to see that kind of devastation," she adds.

## Slapped in the face

Fisher does not believe the brown material on the corals contains oil, although he admits it's possible. Instead, he suggests that it is detritus from the water that simply accumulated on the corals as they died. The researchers will be analysing samples of the brown material, as well as sediment samples and tissues from the coral and other animals, to look for significant levels of oil or dispersant.

**"It's just  
nauseating to see  
that kind of  
devastation."**

The work was part of a multi-year project funded by NOAA's Office of Ocean Exploration and Research and the Bureau of Ocean Energy Management, Regulation and Enforcement, through the private contractor TDI-Brooks International. For several years, the researchers have been studying the often spectacular coral reefs and natural methane and oil seep sites scattered throughout the Gulf at depths from a few hundred to over one thousand meters.



One of the affected corals with attached brittle sea star.

*Courtesy of the BOEMRE and NOAA  
OER Lophelia II expedition*

After the Deepwater Horizon spill began in April, the group expanded its efforts to include exploration of sites near

the wellhead. They also agreed to take more samples for later analysis as part of the ongoing and legally mandated Natural Resource Damage Assessment process.

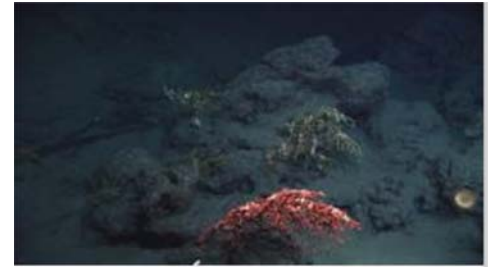
The coral discovery came on 2 November as the team was exploring a site roughly 11 kilometres southwest of the spill, at a depth of roughly 1,400 metres. The site was in the path of the deep-water plume of diffuse oil that scientists discovered in May, and lay below heavy surface oil during the spill. "Honestly, we went out there expecting to find subtle effects," says Fisher. "I don't think any of us really expected to be slapped in the face with it like this."

Using *Jason* and other vehicles, the team has spent hundreds of hours exploring more than 30 deep coral and seep sites in the Gulf. Erik Cordes, from Temple University, Philadelphia, Pennsylvania, chief scientist on the expedition's first leg, says the damage is unlikely to be associated with a natural oil or gas seep because it is far more severe than any previous examples they have seen, although he says that this cause cannot be ruled out.

The scientists say they can only be sure that the coral colonies were exposed to something toxic. The exposure was also relatively recent, because the dead corals have not yet been overgrown by other animals. Even if the damage was caused by oil or dispersant, enough of these may not have accumulated in the animals or surrounding sediment to allow definitive detection.

However, given the novelty of the find, its location and its timing, the team believes there is a strong circumstantial case that the spill caused the damage. "I think when you take all that together you have a pretty compelling smoking gun," says Fisher. Besides oil and dispersant, oxygen depletion from microbial breakdown of oil leading to hotspots of extremely depleted oxygen is another possible cause, although no published results have yet revealed oxygen levels that low during the spill.

The team will return to the Gulf in December to use Woods Hole's *Alvin* submersible to revisit the damaged site, and to explore other new sites in the region. ■



Coral communities within the area: some with no apparent tissue, some with wilting or a loss of tissue, and some with exposed skeleton.

*Courtesy of the BOEMRE and NOAA OER Lophelia II expedition*

ADVERTISEMENT

download  
**Origins and Endings**

Scientific American's  
new special edition  
for iPad™

Available on the  
App Store

SCIENTIFIC  
AMERICAN

## Comments

If you find something abusive or inappropriate or which does not otherwise comply with our [Terms](#) or [Community Guidelines](#), please select the relevant 'Report this comment' link.

Comments on this thread are vetted after posting.

because oil flots i would not be so quick to blame the dead coral on the oil. i feel that the millions of gallons despersent that was dumped would be the lickly cause. making us the cause of the dead coral

#15527

[Report this comment](#)

Posted by: **robert phelps** | 2010-11-07 08:48:40 AM

Robert,

Although oil typically floats on water because of its lower density, large quantities of dispersants were used during the BP Deep Horizon spill directly on the sea floor. Thus, the dispersants caused the oil to break up into small droplets that formed the massive underwater plumes that had brief coverage in the media. As these droplets suspended in the water column slowly broke down, they also sank onto the sea floor. We will likely learn the cause of dead for these corals in the near future. Perhaps it will be a combination and cumulative effect of multiple stressors including the dispersants and the oil spill. #15535

[Report this comment](#)

Posted by: **Jeremy Cherson** | 2010-11-08 01:07:42 AM

The depths of the oceans are a different type of environment, if only due to the high pressures down there. We should not assume that the rules which apply near the surface (such as that oil rises to the surface and does so promptly) necessarily apply in the deep. It is not unreasonable to hypothesize that some of the oil may be entered into an oil-water solution down there, and the use of disperwants may have facilitated this. #15545

[Report this comment](#)

Posted by: **Edward Schaefer** | 2010-11-08 12:47:04 PM

## Add your own comment

This is a public forum. Please keep to our [Community Guidelines](#). You can be controversial, but please don't get personal or offensive and do keep it brief. Remember our threads are for feedback and discussion - not for publishing papers, press releases or advertisements.

You need to be registered with Nature to leave a comment. Please log in or register as a new user. You will be re-directed back to this page.

[Log in / register](#)

*Nature* ISSN 0028-0836 EISSN 1476-4687

[About NPG](#)  
[Contact NPG](#)  
[RSS web feeds](#)  
[Help](#)

[Privacy policy](#)  
[Legal notice](#)  
[Accessibility statement](#)  
[Terms](#)

[Nature News](#)  
[Naturejobs](#)  
[Nature Asia](#)  
[Nature Education](#)

[About Nature News](#)  
[Nature News Sitemap](#)

Search:



© 2011 Nature Publishing Group, a division of Macmillan Publishers Limited. All Rights Reserved.  
 partner of AGORA, HINARI, OARE, INASP, CrossRef and COUNTER