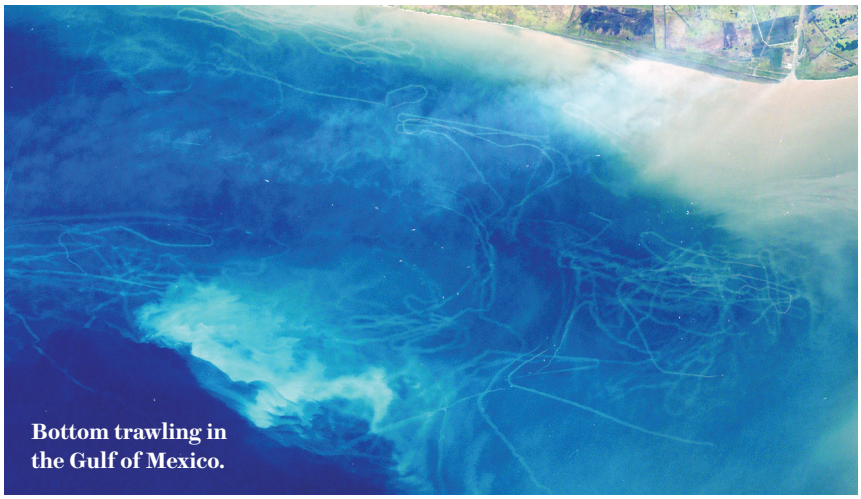

Bottom trawling in the Gulf of Mexico.

BIODIVERSITY

Hitting Rock Bottom

Deep-sea trawling harms biodiversity and disrupts carbon storage

Fishing boats have dragged nets across the seafloor in pursuit of bottom-feeding fish and crustaceans since the Middle Ages. In recent decades, motorized fishing fleets, powered by government subsidies, have taken heavier nets deeper and farther offshore. The annual haul from international waters in 2010 was reported to be worth more than $600 million.

To see how bottom trawling is changing the ocean's bottom, ecologist Antonio Pusceddu of the Marche Polytechnic University in Ancona, Italy, and his team took seafloor sediment samples at trawled and untouched sites off Spain's northeastern coast between 500 and 2,000 meters below the surface. They then counted the number of individuals and species in those samples and measured the amount of carbon in the sediment.

The final tally was grim. Trawling cut biodiversity by 50 percent and organic matter by 52 percent when compared with untouched sites. Meanwhile it slowed carbon cycling by 37 percent. Instead of settling on the seafloor, that stray carbon may acidify seawater or escape into the atmosphere. The team reported its results in June in the *Proceedings of the National Academy of Sciences USA.*

Despite images from early submersible expeditions of ghostly white dust settling onto a sandy floor, the deep sea is not a desert, Pusceddu says. Even parts of the sea that lack impressive corals or craggy seamounts can host important, if tiny, lifeforms. Some such creatures feed shrimp, the main target species for trawlers at Pusceddu's study site. Others consume carbon and trap it in the seafloor.

Bottom-feeding fish off the British Isles alone trap the equivalent of one million metric tons of carbon dioxide every year, according to a study published in June in the *Proceedings of the Royal Society B.* If kept intact, such biological processing could help countries offset carbon emissions, the authors write.

Better care is urgent: more powerful trawlers now reach deeper waters, oil drilling is moving ever downward, and Papua New Guinea just signed the first commercial sea-mining agreement. Plus, other work has found that the deepest-sea dwellers are among the longest-lived and slowest to recover from the effects of bottom trawling. The European Union may take the lead on this issue. Its newly elected parliament is reviewing draft legislation to limit the scope of deep-sea trawling. Chief scientist Elliott Norse of the Marine Conservation Institute in Seattle says the recent findings show decision makers that "they need to find ways to make fishing less harmful environmentally."

—Lucas Laursen

COURTESY OF NASA; IMAGE CREATED BY JESSE ALLEN, USING DATA OBTAINED FROM UNIVERSITY OF MARYLAND'S GLOBAL LAND COVER FACILITY

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