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## Satellites Show Harvest of Mud That Trawlers Leave Behind

By [CORNELIA DEAN](#)

Scientists have known for years that when fishing trawlers drag nets and gear across the ocean bottom they trap or kill almost all the fish, mollusks and other creatures they encounter. And the dragging destroys underwater features like reefs, turning the bottom to mud.

Now, scientists have used satellite images to show fleets of trawlers leaving plumes of mud behind them like contrails. They hope the images will focus wider attention on trawling damage, and on the possible uses of satellites to monitor fishing.

One of the researchers, Kyle Van Houtan, who earned his doctorate in environmental science in December at Duke, began the work when he was studying the nesting success of sea turtles and wanted to check the influence of shrimpers, who trawl the bottom for their catch. He turned for guidance to Daniel Pauly, director of the fisheries center at the University of British Columbia, which maintains an elaborate global database on fishing.

Looking at satellite photos of boats at work, "I kept seeing lines on the images," Dr. Van Houtan said in a telephone interview. "My first thought was they looked like contrails from aircraft." Instead, he and Dr. Pauly dubbed them "mudtrails."

Churning up mud does immense harm, Dr. Pauly said in a telephone interview. Fish cannot see in water that is murky with suspended sediment. The mud can also clog their gills and set off algae blooms, which, in turn, lead to vast increases in bacteria. Ultimately, the result is a dead zone.

Even if that worst case does not materialize, trawling can change a vibrant ocean bottom into, in effect, a shrimp farm. The mud of repeatedly trawled areas is congenial to shrimp, Dr. Van Houtan said, "but anything else you might like to eat, like tuna, is gone."

"It was one of those eureka moments," he said of his realization that mudtrails were visible from space. When he looked at images of prime fishing areas, "we saw an amazing density of boats," he said. "You can see the birds following the boats to get the discarded bycatch."

The good news, Dr. Pauly said, is that trawlers and their mudtrails can be seen so clearly that it would in theory be possible to monitor fishing by satellite. Even if captains of individual boats do not want to cooperate in such efforts, Dr. Pauly said, "we can see what they do."

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