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## Study suggests fish waste helping neutralize carbon dioxide levels in oceans

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The world's oceans are getting help controlling harmful acid levels from an unseemly source, according to a new study that found fish waste plays a key role in neutralizing carbon dioxide in the marine environment.

Canadian scientists discovered that when fish drink seawater they excrete calcium as calcium carbonate - a chalky substance that can make seawater more alkaline and diminish the carbon dioxide in the water.

The unusual finding is helping researchers understand the marine carbon cycle and how nature works to reduce CO2 levels that can raise sea temperatures and harm sea life.

"It's going be critical that we understand how much carbon dioxide the oceans can absorb," said Pat Walsh, a University of Ottawa marine biologist who co-wrote the study that appears in the journal Science on Friday.

"What we've done is taken another step forward in understanding another piece of that oceanographic puzzle and how the oceans can absorb CO2."

The teams of researchers from Ontario, British Columbia, the United States and the U.K. discovered that the bulk of the world's fish species, excluding sharks and rays, produced the carbonate to counter the salt they ingested in seawater.

The carbonate binds to the salt and is expelled as pellets, which then dissolve in the ocean.

Walsh said they knew before that something in the water was producing carbonate, but believed it came from other sources such as microscopic marine plankton near the bottom of the food chain.

But they didn't understand why they were seeing so much of the carbonate at shallower depths.

Walsh said the discovery helps explain that phenomenon and has given them a clearer idea as to how much carbonate fish are producing.

"Our most conservative estimates suggest three to 15 per cent of the oceans' carbonates come from fish, but this range could be up to three times higher," said lead author Rod Wilson of the University of Exeter.

That could mean that fish are playing a much bigger role in combatting the effects of rising CO<sub>2</sub>, which can acidify the ocean and imperil corals, plankton and other sea life after it is absorbed from the atmosphere.

The researchers, some of whom spent three years working on the project, also came up with the first estimate of the total number of bony fish, which comprise about 90 per cent of the marine species.

Villy Christensen, a fisheries professor at the University of British Columbia, said they used two models to determine that there are between 812 million and 2,050 million tonnes of fish in the oceans.

From that they found that the fish produce 110 million tonnes of carbonate a year.

Christensen said the implications for climate change and the warming of the world's oceans could be far-reaching if more fish are caught and stripped of their ability to help maintain the delicate acid balance in the watery environs.

"It's really important that we keep fish in the ocean," he said. "If we have more fish it's going to buffer climate change and if we have more fish it's going to give us more food in the long run."

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