

# Leaving more big fish in the sea reduces CO<sub>2</sub> emissions

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Leaving more big fish in the sea--especially where fishing is not economically profitable in the Central Pacific, South Atlantic, and North Indian Oceans --reduces the amount of carbon dioxide (CO<sub>2</sub>) released into the Earth's atmosphere. Credit: Enric Sala.

An international team of scientists has found leaving more big fish in the

sea reduces the amount of carbon dioxide (CO<sub>2</sub>) released into the Earth's atmosphere.

When a [fish](#) dies in the ocean it sinks to the depths, sequestering all the carbon it contains with it. This is a form of 'blue carbon'—carbon captured and stored by the world's ocean and coastal ecosystems.

"But when a fish is caught, the carbon it contains is partly emitted into the atmosphere as CO<sub>2</sub> a few days or weeks after," said Gaël Mariani, a Ph.D. student at the University of Montpellier in France.

Mr Mariani led a world-first study showing how ocean fisheries have released at least 730 million metric tons of CO<sub>2</sub> into the atmosphere since 1950. An estimated 20.4 metric tons of CO<sub>2</sub> was emitted in 2014—equivalent to the annual emissions of 4.5 million cars.

Co-author Professor David Mouillot from the ARC Centre of Excellence for Coral Reef Studies at James Cook University (CoralCoE at JCU) and the University of Montpellier said the carbon footprint of fisheries is 25 percent higher than previous industry estimates.

"Fishing boats produce greenhouse gases by consuming fuel," Prof Mouillot said. "And now we know that extracting fish releases additional CO<sub>2</sub> that would otherwise remain captive in the ocean."

Large fish such as tuna, sharks, mackerel and swordfish are about 10 to 15 percent carbon.

"When these fish die, they sink rapidly," Prof Mouillot said. "As a result, most of the carbon they contain is sequestered at the bottom of the sea for thousands or even millions of years. They are therefore [carbon sinks](#)—the size of which has never been estimated before."

He says this [natural phenomenon](#)—a blue carbon pump—has been increasingly and greatly disrupted by industrial fishing.

The authors also say the phenomenon has not only been overlooked until now, but it happens in areas where fishing is not economically profitable: in the Central Pacific, South Atlantic, and North Indian Oceans.

"Fishing boats sometimes go to very [remote areas](#)—with enormous fuel consumption—even though the fish caught in these areas are not profitable and fishing is only viable thanks to subsidies," Mr Mariani said.

For the authors of the study, the new data strongly supports more reasoned fishing.

"The annihilation of the [blue carbon](#) pump represented by large fish suggests new protection and management measures must be put in place, so that more large fish can remain a [carbon](#) sink and no longer become an additional CO<sub>2</sub> source," Mr Mariani said. "And in doing so we further reduce CO<sub>2</sub> emissions by burning less fuel."

"We need to fish better," Prof Mouillot said.

The study is published in *Science Advances*.

**More information:** "Let more big fish sink: Fisheries prevent blue carbon sequestration—half in unprofitable areas" *Science Advances*, [advances.sciencemag.org/lookup...1126/sciadv.abb4848](https://advances.sciencemag.org/lookup?...1126/sciadv.abb4848)

Provided by ARC Centre of Excellence for Coral Reef Studies

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