

# Europe's most valuable marine species to be "reduced to a fraction" of their current population size by 2100

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European Hake - Mercato Orientale - Genoa, Italy. Credit: Daderot Creative Commons CC0 1.0 Universal Public Domain Dedication.

Over one quarter of Europe's 20 most highly-fished marine species will be under extreme pressure by 2100 if nothing is done to simultaneously halt climate change, overfishing, and mercury pollution, according to a

new UBC study.

"If [carbon emissions](#) continue to increase at their current rate the resilience to [climate change](#) of seafood species that are mainstays of the EU market, such as great Atlantic scallop, red mullet, and common octopus, will be weakened by the combined onslaught of overfishing, ocean warming, and [mercury pollution](#)," said lead author Dr. Ibrahim Issifu, a postdoctoral fellow at UBC's Institute for the Oceans and Fisheries (IOF). "The population of these species will be reduced to a fraction of their present size by the end of the century."

The study is one of the first to examine the combined effects of rising temperatures, overfishing, and mercury pollution on fish in EU waters. The research team selected 20 European fish species that have the highest average annual total catch and landed value, and they determined the temperature tolerance range for each of these species, using previous estimates of their preferred temperatures. The authors then compared this range with previously projected temperature increases in EU waters over the course of the century under both high and low carbon emission scenarios. Finally, differing levels of mercury concentrations, as well as unsustainable degrees of fishing, were built into the model.

The results showed that impacts to Europe's fish stocks will vary widely depending on each species' average temperature tolerance, with seafood staples such as Norway lobster, common sole, great Atlantic scallop, red mullet, and European hake projected to decline both in abundance and in distribution as water temperatures reach lethal levels.

In addition, some larger, longer-lived species such as swordfish would likely be contaminated with up to 50 per cent more mercury relative to present day concentrations, rendering them unsafe to eat and causing health problems such as reproductive issues that will diminish [fish populations](#) further.

"The combination of these factors is working synergistically to create an unfavorable environment for fish, just as reducing fishing efforts, minimizing pollution, and cutting down carbon emissions would work together to help fish survival," said Dr. Vicky Lam, one of the study's co-authors and a research associate at IOF. "The most overfished and highly exploited species are severely impacted by both climate change and high mercury concentrations. It is a critical situation."

Both climate change and overfishing have the potential to amplify the amount of mercury consumed by fish higher up the food web, such as bluefin tuna and sharks, said co-author Dr. Juan Jose Alava, a research associate at the IOF and principal investigator of UBC's Ocean Pollution Research Unit.

"Cumulatively human-caused stressors, mercury pollution, [ocean warming](#) plus overfishing conspire together to debilitate fisheries' resilience," Dr. Alava said. "A binding international agreement to reduce both carbon dioxide and [mercury](#) emissions from coal burning and fossil fuel-consuming industries and anthropogenic activities is of paramount importance to prevent the worst outcomes from warming oceans. This international effort should be fostered hand in hand with the elimination of harmful fisheries subsidies to eradicate overfishing."

For society to come to grips with the combined effects of the multiple stressors impacting the ocean identified in this study, governments and societies have to learn to be more proactive than reactive in dealing with the crippling effects of climate change, [overfishing](#) and marine pollution, said Dr. Rashid Sumaila, co-author and professor at IOF and the School of Public Policy and Global Affairs. "A way to be proactive is to listen to scientists and community members who normally sound alarms about looming dangers well beforehand".

The study was published in the journal *Frontiers in Marine Science*.

**More information:** Vicky Lam et al, Impact of Ocean Warming, Overfishing and Mercury on European Fisheries: A Risk Assessment and Policy Solution Framework, *Frontiers in Marine Science* (2022).  
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