

Global fish stocks can't rebuild if nothing done to halt climate change and overfishing, new study suggests

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Global fish stocks will not be able to recover to sustainable levels without strong actions to mitigate climate change, a new study has

projected.

Researchers at UBC, the Stanford Center for Ocean Solutions and University of Bern projected the impact that different global temperature increases and ranges of fishing activity would have on biomass, or the amount of [fish](#) by weight in a given area, from 1950 to 2100. Their simulations suggest that climate change has reduced [fish stocks](#) in 103 of 226 marine regions studied, including Canada, from their historical levels. These stocks will struggle to rebuild their numbers under projected global warming levels in the 21st century.

"More conservation-oriented fisheries management is essential to rebuild over-exploited fish stocks under climate change. However, that alone is not enough," says lead author Dr. William Cheung, professor in the Institute for the Oceans and Fisheries (IOF). "Climate mitigation is important for our fish [stock](#) rebuilding plans to be effective"

The research team, including co- author Dr. Colette Wabnitz of Stanford Centre for Ocean Solutions, used computer models to find out the climate change levels at which over-exploited fish stocks cannot rebuild. Currently, the world is on track to exceed 1.5 degrees of warming relative to preindustrial levels and approach two degrees in the next few decades, says Dr. Cheung.

The study projected that, on average, when [fisheries management](#) focuses on the highest sustainable catch per year, the additional climate impacts on fish at 1.8 degrees Celsius warming would see fish stocks unable to rebuild themselves.

If people around the world fished only three quarters of the annual highest sustainable catch, fish stocks would be unable to rebuild at a higher degree of warming, 4.5 degrees.

"Tropical ecoregions in Asia, the Pacific, South America and Africa are experiencing declining [fish populations](#) as species both move further north to cooler waters and are also unable to recover due to fishing demands," said Dr. Cheung. "These regions are the ones that feel the [effects of global warming](#) first and our study shows that even a slight increase of 1.5 degrees Celsius could have a catastrophic effect on tropical nations that are dependent on fisheries for food and nutrition security, revenue, and employment."

In a [worst-case scenario](#), where nothing is done to mitigate [global warming](#), including meeting internationally agreed targets, and where overfishing beyond sustainable targets occurs, fish stocks globally would drop to 36 percent of current levels, the study projects.

"To rebuild fish stocks, climate change must be fully considered," said co-author Dr. Juliano Palacios-Abrantes, IOF postdoctoral fellow. "We live in a globalized world, where situations are interconnected. We are seeing this most significantly in [tropical regions](#), but also in the Arctic, where many exploited species are slow to mature, or Ireland, Canada and the U.S., with high fishing mortality rates. These climate effects, even when we looked at conservation-focused scenarios, are making it too difficult for fish stocks to bounce back."

Dr. Cheung says that due to climate change, the world is unlikely to return to historical levels of fish stocks. "We are at a turning point. What we need is a coordinated global effort to develop practical and equitable marine conservation measures to support effective biomass rebuilding under climate change," he added. "These need to recognize the ways that marine biodiversity contributes to livelihood and economies, particularly in tropical marine ecoregions, as well as requiring more stringent limits on fishing activities to achieve greater biomass rebuilding potential."

The paper "Rebuilding fish biomass for the world's marine ecoregions

under [climate change](#)" was published today in *Global Change Biology*.

More information: Rebuilding fish biomass for the world's marine ecoregions under climate change, *Global Change Biology* (2022). [DOI: 10.1111/gcb.16368](#)

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