Smart reforms key to global fish recovery, even with climate change

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New Research finds that climate change will cause dramatic impacts in the world's fisheries, but with effective management most fisheries could yield more fish and more prosperity, even with a changing climate.

Relative to today, this preliminary research illustrates that effective management reforms can lead, globally, to a nearly 90 percent increase in profits, a third more fish in the water and a more than 10 percent increase in harvest by 2100 in the face of climate change.

The research also shows the effect is even more pronounced compared to doing nothing: where implementing effective management can yield nearly triple the profits, lead to a more than 50 percent increase in the amount of fish in the water and over a third more fish for harvest.

Scientists and economists at the University of California Santa Barbara, Oregon State University and Environmental Defense Fund previewed their preliminary results from this new research at the American Association for the Advancement of Science (AAAS) meeting in Boston, Massachusetts.

"Climate change is going to have a dramatic impact on many global fish populations and the people who rely on them," said Christopher Costello, co-author and Professor of Environmental and Resource Economics at UC Santa Barbara. "But, these results show that, even in the face of climate change, we have an opportunity to build abundant and resilient fisheries for the future. Implementing effective fishery management is

the single best thing we can do today to ensure healthy ocean ecosystems for the future."

Effective management reforms that address the challenges posed by changing ocean temperatures include a combination of harvest policies that adapt based on current fish abundance, stronger international cooperation, as well as secure fishing rights. This research examined 780 species and 132 country-level stocks across the globe representing 4,424 fisheries from the Costello et al 2016 fishery database, accounting for 74% of the global yield. The researchers worked with a scenario that the global mean surface air temperature will rise by an average of 2.2°C by 2100.

By the turn of the century, the researchers find that more than one-third of the species studied will move completely out of at least one country's national fishing waters while the same amount are also expected to shift into at least one country's waters (exclusive economic zones).

The research suggests that areas closest to the equator with warmer waters are more likely to suffer a net loss of fish from their waters, while cooler locations are likely to see a net gain in the abundance of fish, by the turn of the next century. However, the research also shows that, even in warmer waters, improved management can increase fish and prosperity for many fisheries.

"Fish are becoming even more of a moving target in our oceans," said co-author Michael Harte, Professor, Oregon State University. "These changes will require greater multinational cooperation among nations to manage these resources effectively."

Off the New England coast, we are already seeing fish like iconic cod move north into Canadian waters. In Europe, recent spatial shifts of mackerel led to the "mackerel wars" where the movement of the stock

into new waters created conflict over the sharing of this catch and, ultimately, overfishing of the stock.

"These challenges are not just problems of the future, but problems we are facing today," said Jake Kritzer, Director of Diagnostics and Design for Environmental Defense Fund's Fishery Solutions Center. "If governments move quickly to implement adaptive reforms that account for the change in our oceans, fisheries can be sustained, and even grow, helping provide nutrition and income for the hundreds of millions of people that rely on them for their survival."

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