

# Marine fish are responding to ocean warming by relocating towards the poles

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The majority of fish populations in the sea are responding to global warming by relocating towards colder waters nearer the north and south poles, according to the latest research on the impact of climate change

on our oceans.

Analyzing the breadth of current world-wide data on [marine fish](#) changes in recent years, researchers from the University of Glasgow have revealed how [fish populations](#) across the Earth's oceans are responding to rising sea temperatures.

The latest study has identified that, in response to ocean warming, many marine fish populations are shifting toward the Earth's poles or are moving to [deeper waters](#)—all in a bid to stay cool.

For [marine life](#) such as fish, the temperature of the surrounding water affects critical functions such as metabolism, growth and reproduction. Moreover, [marine species](#) often have a very narrow livable temperature range making even small differences in the water impossible to cope with. As a result, marine life changes caused by [global warming](#) have been up to seven-fold faster than animal responses on land.

Over the last century, global warming has had substantial impacts on marine ecosystems, with [fish species](#) disappearing altogether from some locations. In some cases, marine fish may be able to adapt and change aspects of their biology in order to adapt to warmer conditions. In many cases, however, a change in the geographical range may be the only means of coping with rapid warming.

As the current effects of global warming on [marine ecosystems](#) are predicted to increase—and with sea temperatures forecast to continue rising—our ability to predict fish relocation will be vital to protect global ecosystems and maintain food security.

This latest study examined data on 115 species spanning all major oceanic regions, totaling 595 marine fish population responses to rising [sea temperatures](#)—the first time such a comprehensive global analysis

has been undertaken.

Carolyn Dahms, lead author on the study, said, "We observed a striking trend [where] species living in areas that are warming faster are also showing the most rapid shifts in their geographical distributions."

"It's possible that rate of warming in some regions may be too fast for fish to adapt, and so relocating may be their best coping strategy. At the same time we see that their ability to do so is also impacted by other factors such as fishing, with commercially exploited species moving more slowly."

Professor Shaun Killen, senior author of the study, said, "While relocation to cooler water may allow these species to persist in the short-term, it remains to be seen how food-webs and ecosystems will be affected by these changes."

"If the prey of these species don't also move, or if these species become an invasive disturbance in their new location, there could be serious consequences down the road."

Moreover, the study found that how we measure and report these climate responses also matters. While current literature is biased towards northern, commercially important species, in the future more research from some of the most rapidly changing ecosystems such as in the Global South will be needed to improve our understanding of how our oceans will change.

The paper, "Temperature change effects on marine fish range shifts: a meta-analysis of ecological and methodological predictors," is published in *Global Change Biology*.

**More information:** Carolyn Dahms et al, Temperature change effects

on marine fish range shifts: a meta-analysis of ecological and methodological predictors, *Global Change Biology* (2023).  
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