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Study: UBC research finds climate change might be making fish smaller

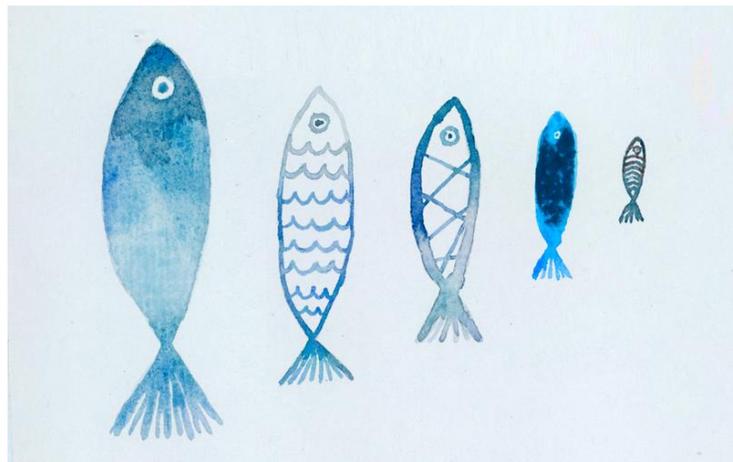
By Alexandra Valahu Sept. 12, 2017



Fish are expected to shrink in body size as climate change causes ocean temperatures to increase, according to a study from UBC's Institute for the Oceans and Fisheries (IOF).

Since fish are cold-blooded organisms, their body temperature is related to the temperature of their environment. In warmer waters, their metabolic activity increases and they require more oxygen.

The amount of oxygen that fish can get is limited by the surface area of their gills, explained [Dr. William Cheung](#), associate professor at the IOF. As fish get bigger, “the growth of the area of the gills cannot keep up with the growth of the body,” he said.



Eventually, fish cannot get enough oxygen and will stop growing.

[Ocean deoxygenation](#) — the loss of oxygen from the ocean as a consequence of manmade greenhouse gases — makes it even more difficult for fish to absorb oxygen from the water. This exacerbates the problem.



These findings are not new though. In 2013, Cheung and [Dr. Daniel Pauly](#) published a [study](#) on the effects of climate change on the body size of fish. Using a qualitative model, they looked at over 600 species and found that from 2000 to 2050 the maximum body weight of fish was expected to shrink by 14-24 per cent globally.

Earlier this year, colleagues in Europe [criticized their study](#), arguing that their mathematical models could be improved. Pauly and Cheung took their advice and clarified that their mathematical model is based on “Gill Oxygen Limitation Theory,” which hypothesizes that the rate of oxygen supplied by the gills of fish constrains their activities and performance.

In a [new study](#) recently published in the Global Change Biology journal, Pauly and Cheung used more realistic information and actually found that they had underestimated the severity of the problem.

In fact, fish like tunas “will maybe have a decrease in body size that is relatively higher compared to other smaller or slow-moving fish,” said Cheung. Tuna is a very active fish and requires a lot of oxygen, so it may be more vulnerable to ocean warming.

Empirical observations show that “fish are moving to deeper waters, and also to high latitude regions where the water is cooler,” Cheung said. He explained that we will have a band of area in the ocean where we notice a decrease in the diversity of fish.

Fish moving away will disrupt the structure of the ecosystem.

“Big fish eat small fish,” said Cheung. “So when the body size of the fish changes, it really disrupts the interaction between different species and ultimately affects ecosystem structure.”

Link: <https://www.ubyssey.ca/science/climate-change-making-fish-smaller/>