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## Climate change could make fish shrink by up to 30%

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BY ROBERT SCOTT ON 25 AUGUST 2017

SCIENCE

Every NFL game.

If your Friday night dinner is always fish and chips, you may want to prepare yourself for shrinking portion sizes.

A new study suggests that fish could shrink in size by 20 to 30 per cent if ocean temperatures rise by just 2°C (3.6°F) – approximately what is expected to occur around the world by the mid-21st century.

The researchers claim that smaller fish will have an impact on fishery production as well as the interaction between organisms in the ecosystems.

**Warming waters will leave fish gasping for air and shrinking in size**

**Fish gills work like a sieve, extracting oxygen from the water**

WATER → OXYGEN DEPLETED WATER

**AS OCEAN TEMPERATURES INCREASE** →

**Climate change will lead to deoxygenation of oceans. Fish need more oxygen in warmer water to maintain body functions**

**20-30% decrease in body size**

Pauly D, Cheung WWL. Sound physiological knowledge and principles in modeling shrinking of fishes under climate change. *Glob Change Biol.* 2017;00: 1-12. <https://doi.org/10.1111/gcb.13831>

Design by Lindsay Lafreniere

While previous studies have suggested that fish are shrinking because of rising temperatures, none have been able to explain why.

But a new study by researchers at the University of British Columbia provides a deeper explanation of why fish are expected to decline in size.

Dr William Cheung, one of the author of the study, said: 'Fish, as cold-blooded animals, cannot regulate their own body temperatures.

'When their waters get warmer, their metabolism accelerates and they need more oxygen to sustain their body functions.

'There is a point where the gills cannot supply enough oxygen for a larger body, so the fish just stops growing larger.'

As fish grow into adulthood, their demand for oxygen increases because their body mass becomes larger, according to the Dr Daniel Pauly, lead author of the study.

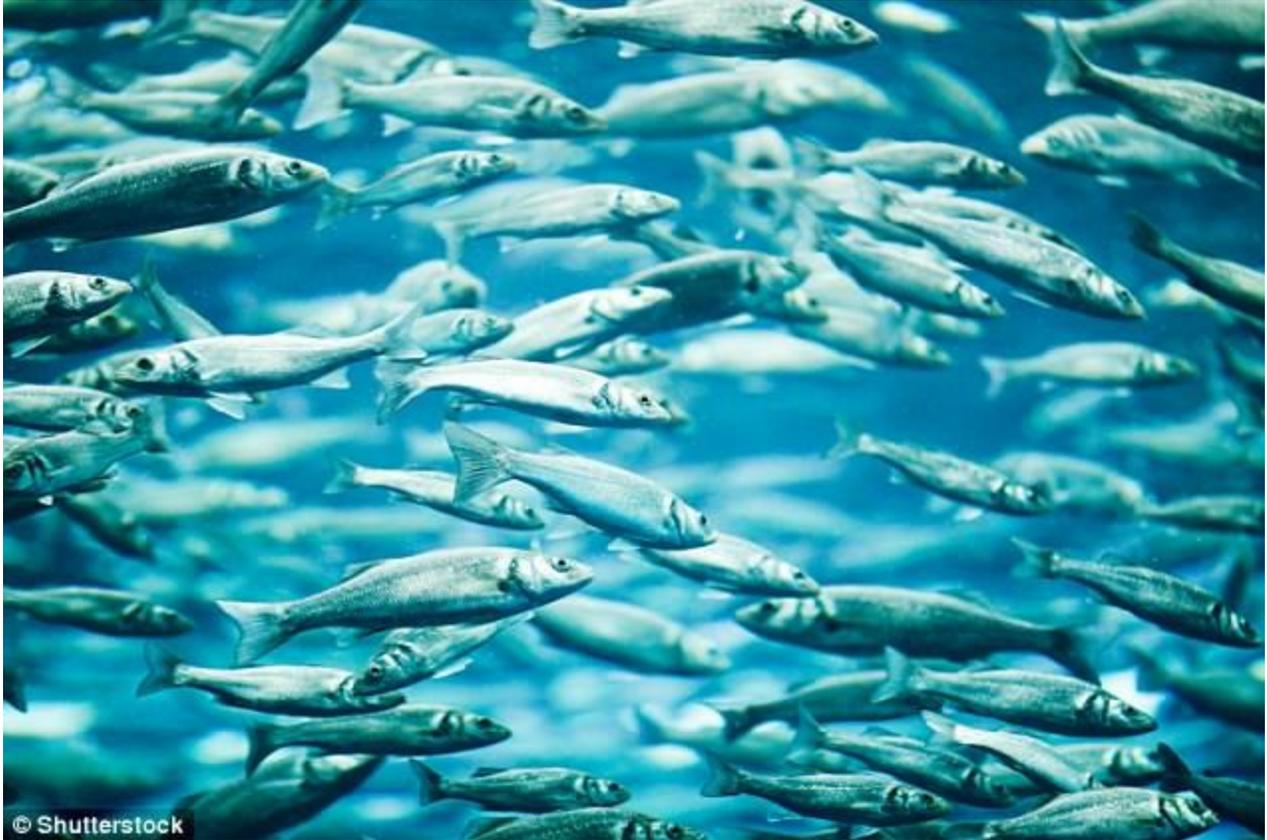
But the surface area of the gills – where oxygen is obtained – doesn't grow at the same pace as the rest of the body.

Dr Pauly calls this set of principles the 'gill-oxygen limitation theory.'

For example, as cod increase their weight by 100 per cent, their gills only grow by 80 per cent or less.

And in the context of climate change, this biological rule reinforces the prediction that fish will shrink and will be even smaller than thought in previous studies.

Warmer waters increase fish's need for oxygen but climate change will result in less oxygen in the oceans.



This means that gills have less oxygen to supply to a body that already grows faster than them.

The researchers say this forces fish to stop growing at a smaller size to be able to fulfil their needs with the little oxygen available to them.

Certain species are likely to be more affected by this combination of factors, according to the team.

For a 2°C (3.6°F) increase in water temperature, tunas such as the Atlantic bluefin tuna will potentially decrease in body size by 30 per cent.

And sharks, many of which are already threatened with extinction, are also predicted to decrease in size – especially larger species.

As well as disrupting the ocean ecosystem, shrinking fish will also have an impact on fisheries production, according to the researchers.



The researchers believe that the most effective way to prevent these problems from occurring is to reduce carbon dioxide emissions.

Speaking to Seekr, Dr Cheung said: 'Our model projections show that the lower the emissions and thus warming, the smaller is the change in body size.

'Also, overfishing is reducing fish body size, so eliminating overfishing can help to reduce the extent of fish shrinkages.'

Link: <http://gearsofbiz.com/climate-change-could-make-fish-shrink-by-up-to-30/28409>