

# Carbon emissions threaten fish populations

July 7 2010

---

Humanity's rising CO<sub>2</sub> emissions could have a significant impact on the world's fish populations according to groundbreaking new research carried out in Australia.

Baby fish may become easy meat for predators as the world's oceans become more acidic due to CO<sub>2</sub> fallout from human activity, an international team of researchers has discovered.

In a series of experiments reported in the latest issue of the [Proceedings of the National Academy of Sciences](#) (*PNAS*), the team found that as carbon levels rise and ocean water acidifies, the behaviour of baby fish changes dramatically - in ways that decrease their chances of survival by 50 to 80 per cent.

"As CO<sub>2</sub> increases in the atmosphere and dissolves into the oceans, the water becomes slightly more acidic. Eventually this reaches a point where it significantly changes the sense of smell and behaviour of larval fish," says team leader Professor Philip Munday of the Australian Research Council's Centre of Excellence for Coral Reef Studies (CoECRS) at James Cook University.

"Instead of avoiding predators, they become attracted to them. They appear to lose their natural caution and start taking big risks, such as swimming out in the open - with lethal consequences."

Dr Mark Meekan from the Australian Institute of Marine Science, a co-author on the paper, says the change in fish behaviour could have serious

implications for the sustainability of [fish populations](#) because fewer baby fish will survive to replenish adult populations.

"Every time we start a car or turn on the light part of the resulting CO<sub>2</sub> is absorbed by the oceans, turning them slightly more acidic. Ocean pH has already declined by 0.1 unit and could fall a further 0.3-0.4 of a unit if we continue to emit CO<sub>2</sub> at our present increasing rate.

"We already know this will have an adverse effect on corals, shellfish, plankton and other organisms with calcified skeletons. Now we are starting to find it could affect other marine life, such as fish."

Earlier research by Professor Munday and colleagues found that baby 'Nemo' clownfish were unable to find their way back to their home reef under more acidic conditions. The latest experiments cover a wider range of fish species and show that acidified sea water produces dangerous changes in fish behaviour.

"If humanity keeps on burning coal and oil at current rates, atmospheric CO<sub>2</sub> levels will be 750-1000 parts per million by the end of the century. This will acidify the seas much faster than has happened at any stage in the last 650,000 years.

"In our experiments we created the kind of sea water we will have in the latter part of this century if we do nothing to reduce emissions. We exposed baby fish to it, in an aquarium and then returned some to the sea to see how they behaved.

"When we released them on the reef, we found that they swam further away from shelter and their mortality rates were five to eight times higher than those of normal baby fish," Professor Munday says.

He adds it should be clearly understood that this impact is likely to

happen independent of global warming, and is a direct consequence of human carbon emissions.

The research team concludes "Our results demonstrate that additional CO<sub>2</sub> absorbed into the ocean will reduce recruitment success and have far-reaching consequences for the sustainability of fish populations."

Professor Munday adds "In its 2008 report on the state of the world's fisheries the UN Food and Agriculture Organization said "the maximum wild capture fisheries potential from the world's oceans has probably been reached". If you add the impact of [ocean](#) acidification and other climate change impacts to this, it means there are grounds for serious concern about the future state of world fish stocks and the amount of food we will be able to obtain from the sea."

**More information:** The article "Replenishment of fish populations is threatened by ocean acidification" by Philip L. Munday, Danielle L. Dixon, Mark I. McCormick, Mark Meekan, Maud C.O. Ferrari and Douglas P. Chivers appears in the latest issue of *PNAS*.

Provided by ARC Centre of Excellence in Coral Reef Studies

Citation: Carbon emissions threaten fish populations (2010, July 7) retrieved 23 April 2024 from <https://phys.org/news/2010-07-carbon-emissions-threaten-fish-populations.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.