

## Media Release

### Chiefs of Staff, News Directors

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## Warning signs for fish in warming seas

Ever-increasing water temperatures could be catastrophic for global fish populations, and heatwave incidents could prove fatal for some species, the latest research shows.

University of Tasmania Senior Research Fellow, Doctor Timothy Clark, is part of a Swedish-led research project associated with the University of Gothenburg, using fish from the experimental 'Biotest' lake in the Baltic Sea.

The research shows while fish can adapt their resting physiological functions to slowly rising temperatures, their maximum physiological functions are much less flexible.

"The fish can increase their lethal temperature by a certain amount, but they can't keep up with the current rate of global water temperature increases," Dr Clark said.

For more than 30 years, European perch have been subjected to elevated water temperatures in the man-made Biotest lake – between five and 10 degrees warmer than the surrounding Baltic Sea – using water heated by the nearby Forsmark nuclear power plant.

In 2012 and 2013, the researchers conducted testing on fish from the experimental population, and compared the results with 'reference' perch from outside the lake.

"When we warmed the reference perch quickly, their resting metabolic rate rose dramatically, whereas the Biotest fishes' resting metabolic rates were significantly lower at the same temperature, showing they've adjusted to temperature increases over time," Dr Clark said.

However, the maximum capacity for oxygen uptake did not differ between the two cohorts, showing the fish had a limited ability to adapt their maximum metabolic rate to the environmental conditions, regardless of the timeframe.

The ramifications of these findings are significant in light of forecasts for global ocean temperature rises, Dr Clark said.

“There’s been a lot of speculation about what fish populations will look like in 100 years, but this is the best evidence to date that fish are not going to be able to adjust indefinitely – which is why we have to manage greenhouse gas emissions and try to limit global temperature increases,” he said.

“A lot of the world’s population relies on fish for protein, for example the Pacific Island nations, so if we do start losing fish populations, it will impact on humans quite dramatically.”

More frequent heatwave events where temperatures rise rapidly are also of concern, Dr Clark said.

“So this research doesn’t just speak to wild fish populations, it is also relevant to aquaculture, which is a huge industry here in Tasmania.”

The research appears in the latest issue of international journal *Nature Communications*, released today.

Dr Clark will return to Sweden next year to conduct further testing with the two perch populations.

**Information released by:**

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