

Climate change affects whales

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Researchers at the University of St Andrews believe that fin and humpbacked whales have changed the timing of their seasonal migration in response to global warming.

A long-term study conducted between 1984 and 2010, now published in scientific journal *PLoS ONE*, has documented for the first time how whales have adapted to increases in [sea surface temperature](#) over recent

decades.

The research, conducted with Canadian research body the Mingan Island Cetacean Study, has found that over the 27-year period the whales arrived at feeding grounds on average one day earlier each year, suggesting a remarkable ability to react to small fluctuations in sea temperature.

The research also raises concerns as to whether the species can continue to time their arrival at the feeding grounds with the occurrence of zooplankton and schooling fish.

Dr Christian Ramp, a lead author of the study, said:

"Whether this pattern can continue as [ocean temperatures](#) increase is an open question, and the implications for these two species in the region are uncertain but could be profound.

"The continuing rise in ocean temperatures could eventually cause problems for long-distance migrating [humpback whales](#) to time their arrival in the feeding grounds with the occurrence of their main prey."

Fins and humpbacks spend part of the summer feeding in the Gulf of St Lawrence in the North Atlantic. Fin whales arrive earlier from wintering grounds believed to be in Nova Scotia, and depart before the humpbacks arrive. During the period of the study researchers were surprised to find that, despite following separate migration routes, the two species synchronised their arrival times each year to avoid competing with each other for food.

Fin and humpback whales have existed for millions of years, surviving glacial and interglacial periods including the Dansgaard-Oeschger cycles which saw temperature across Greenland rise by 8C - 15C in the span of

a few decades. Now, for the first time, scientists have some insight into how such long-lived species may have adapted to past climate changes and have been successful in evolutionary terms.

Dr Ramp continued:

"To our knowledge this is the first study showing how such long-lived species adapt to climate change.

"A one-month shift over 30 years in the arrival time at a feeding ground has not yet been observed in any species. However the sheer pace of the adaptations by [baleen whales](#) leads to questions such as how much further can they push it?"

For the study 450 [fin whales](#) and 270 humpbacks were identified and recorded. The scientists observed many of the same individuals at the beginning and the end of the study period, giving no evidence that animals left the study area and moved pole-ward, as some studies have previously predicted.

As the winter sea ice coverage decreases in the Gulf of St Lawrence, so may the need for fin whales to migrate. If the patterns observed for fin whales in the Gulf of St Lawrence continue, and noting that they show flexibility regarding where they give birth, researchers speculate that continuing warming could lead to a discrete year-round population of fin whales in the Gulf of St Lawrence if parts of it become ice-free in winter.

Meanwhile the continuing rise in ocean temperatures could have more severe implications for long distance migrating humpback whales.

What is needed now, scientists conclude, are further studies to test for effects of climate change on population dynamics and health.

More information: "Adapting to a Warmer Ocean—Seasonal Shift of Baleen Whale Movements over Three Decades." [DOI: 10.1371/journal.pone.0121374](https://doi.org/10.1371/journal.pone.0121374)

Provided by University of St Andrews

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