

Climate Change and the IWC – an update.

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Background

The marine environment is experiencing climate-related changes including increased sea surface temperature (SST), decreasing ice cover, rising sea levels and changes in ocean circulation, salinity, rainfall patterns, storm frequency, wind speed, wave conditions and climate patterns. Alongside these factors, an increase in the amount of CO₂ being absorbed by the ocean is also lowering the pH of the seawater, leading to ocean acidification, which amplifies the adverse effects of global warming. Deoxygenation is another associated stressor and, globally, the world's oceans have lost about 2% of their oxygen, although in some areas, oxygen levels have reduced by as much as 33% since the 1960s. Understanding the mechanisms through which climate change will impact any given species is now a significant challenge facing those working to conserve and manage wildlife, including cetaceans.

Increases in sea surface temperature (SST) and other climate-related alterations to ocean conditions in many regions are already influencing cetacean habitat use and prey availability. Some species in some localities seem to be exhibiting an ability to adapt, at least to some extent in the short-term, whilst others, such as the bowhead whale, may have only a limited ability to find alternative habitat. Climate-driven changes act synergistically with other stressors and threats putting further pressure on individual cetacean welfare and the conservation status of populations. Threats may increase in some regions as humans change their behaviour in response to climate change, for example through increased shipping in areas that were previously inaccessible due to sea ice cover.

The distribution of marine mammals is controlled by a combination of demographic, ecological, evolutionary, habitat-related and man-made factors and the strong associations between cetacean distributions and those of water bodies, boundaries and temperature regimes have long been recognized. For example, some cetacean species are only found in Arctic waters and it has been recently reported that bowhead whale (*Balaena mysticetus*) movements in West Greenland were closely associated with SST, noting that this species typically only experienced very limited temperature variations (means: -1.6 oC to 2.7oC). They also leave the highly productive waters in Baffin Bay before the peak zooplankton bloom, suggesting that their movements are not related to prey availability but, rather, to remaining in cooler waters. High temperatures, such as summer temperatures in Disko Bay which reach 9oC, could cause hyperthermia for bowheads which have limited ability for heat exchange.

The impacts of climate change on cetaceans can be direct, such as changes in water temperature causing physiological stress, or indirect, such as changes in prey availability. Subsequent results can include changes in distribution, abundance and migration patterns, presence of competitors and/or predators, community structure, timing of breeding, reproductive success and survival. Other potential outcomes of climate change could be more dramatic such as the appearance of epizootics leading, initially, to population crashes and followed by longer term problems.

Further detail: Nunny, L. & Simmonds, M. (2019). Climate Change and Cetaceans - an update (Paper submitted to last Scientific Committee). Available here:

https://www.researchgate.net/publication/333448762_Climate_Change_and_Cetaceans_-_an_update

Action at the International Whaling Commission

The IWC first considered the implications of climate change in the early 1990s and has since held four workshops related to climate change: the first in 1996, the second in 2010 in response to the 4th Assessment Report from the Intergovernmental Panel for Climate Change. The third, in 2011, focused on potential impacts to small cetaceans, and a fourth in 2014 assessed the impacts of increased marine activities on cetaceans in the Arctic. Long term goals, identified through these workshops, included improving predictive modelling techniques, maintenance of long-term datasets and collaboration with other relevant international organisations, including the Arctic Council, CCAMLR, and IUCN.

IWC Work in this field, particularly the 2011 and 2014 workshops, has also sought to identify cetacean populations likely to be at higher risk from the impact of climate change. The small cetacean populations living in restricted habitats such as estuaries, rivers and shallow waters were identified as likely to find it more difficult to adapt to changing circumstances, as well as cetaceans in Arctic waters.

There is considerable research ongoing all around the world looking at how climate change may be affecting cetaceans and improved predictive ability to help underpin future projections.

At its last meeting the IWC Scientific Committee

“concluded that the approach to managing the effects needed to be swifter and more precautionary. For example, some marine protected areas (MPAs) designated to protect cetaceans took one or two decades to be implemented. Potential shift of animals during this time should be taken into consideration for the adaptation of the planned MPAs. Concern for ice-dependent species and those where habitats are limited, is growing. Climate change continues to be an overarching issue that may interact with almost all the stressors of concern to the Committee and it **looks forward** to receiving more information in future”.

Additionally, the Scientific Committee has an intersessional working group which is tasked with ‘developing appropriate intersessional activities and suggestions for future engagement including potentially a workshop or pre-meeting (SC/68b)’. (The current membership is Simmonds (Convenor), Donovan, Frey, Kitakado, Leaper, Parsons, Suydam, Williams, Ferriss, Smith.) However, there is no funding allocated to this at this time, so a pre-meet or workshop is unlikely in the coming year.

Suggested considerations:

- Is another workshop a good idea and could this be jointly between the SC and CC? (Certainly, there are an increasing number of publications showing associated changes as well as dealing with predictions.)
- Should the workshop focus on a region or other facet of climate change?

- Can the IWC better define its role on this issue and show leadership in establishing how significant climate change may be as well as helping to develop key research?