Marine mammals

What is the issue?

Climate change might be expected to directly impact upon marine mammals as continued decline in Arctic sea ice leads to a loss of habitat for ice-dependant species (polar bears, seals, pinnepeds) (ACIA, 2005; IPCC, 2007b; Evans *et al.,* 2008). As higher predators, marine mammals might also be expected to be indirectly impacted by climate change through shifts in prey availability.

What has happened and how confident?

Most species of marine mammals would be expected to exhibit a degree of resilience to climate change, being warm blooded vertebrates that can cope with large changes to their external environment. The impacts of climate change on marine mammals remain poorly understood and as a result, there has been a great deal of speculation but without very much substantive evidence (Evans *et al.,* 2008). (ICES, 2007 and 2008b) concluded that analyses of climate change impacts on marine mammals in the OSPAR maritime area are hampered by a lack of data on distribution, abundance and condition of marine mammals. Studying small populations of marine mammals is difficult and many published reports on trends in abundance and distribution are inconclusive with regard to the causal role of climate change. Apparent range shifts observed in a number of toothed cetacean species could be linked to changing water temperature but may simply reflect changes of regional food resources (ICES, 2008a).

Some marine mammal scientists are more confident than others that we are witnessing ecological effects of climate change as opposed to responses of individuals and local populations to local environmental variability. However, the statistical power to discriminate between the two remains low (Evans *et al.,* 2008).

Loss of habitat for mammals dependent on sea-ice is already thought to be affecting ringed seals (which need sea ice to support breeding, moulting and resting, and feed on ice amphipods and cod) (IPCC, 2007b) and their main predator, the polar bear, in the Arctic (Evans *et al.,* 2008).

What might happen?

The greatest impacts from climate change are expected to result from loss of habitat for mammals dependant on sea ice, especially ice breeding pinnepeds (Evans *et al.,* 2008). The early melting of sea ice may lead to an increasing mismatch in timing between sea-ice organisms and secondary production that could severely affect populations of marine mammals (ACIA, 2005).

Other potential impacts of climate change are mainly associated with changes in the abundance and distribution of marine mammal prey (zooplankton, fish and cephalopods), although the relative importance of these and their likelihood of occurrence remains unknown (Evans *et al.,* 2008).

Are there any OSPAR regional differences?

As stated in the preceding *'What might happen section'*, the greatest impacts are expected at the ice edge of the Arctic in OSPAR Region I through loss of habitat. Away from the ice edge sea temperature changes could impact on the availability of prey species.

➥ *Go to the full QSR assessment report on impacts of climate change (publication number 463/2009)*

References

ACIA, 2005. Arctic Climate Impact Assessment. Cambridge University Press, 1042p.

Evans, P.G.H., Boyd, I.L. and MacLeod, C.D., 2008. Marine Mammals in Marine Climate Change Impacts Annual Report Card 2007–2008. (Eds. Baxter, J.M., Buckley, P.J. and Wallace, C.J.), Scientific review, 12pp. http://www.mccip.org.uk/arc/2007/PDF/Marine-Mammals.pdf

ICES, 2007. Report of the Working Group on Marine Mammal Ecology (WGMME), 27–30 March 2007, Vilm,Germany. ICES CM 2007/ACE:03. 61 pp.

ICES, 2008a. Advice on the changes in the distribution and abundance of marine species in the OSPAR maritime area in relation to changes in hydrodynamics and sea temperature. ICES advice 2008 book 1, section 1.5.5.1 32 pp.

ICES, 2008b. Report of the Working Group on Marine Mammal Ecology (WGMME). ICES CM 2008/ACOM:44.

IPCC, 2007b. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, [Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden, P.J., Hanson, C.E. (eds.)], Cambridge University Press, Cambridge, UK, 976pp