melting point

ARCTIC TERN BRENDAN RYAN (2)

Polar bears become nest predators

Evocative images of polar bears balanced precariously on rapidly melting chunks of ice floating in a vast ocean have become emblematic of climate change. This is perhaps appropriate, as warming is happening significantly faster in the Arctic than at lower latitudes and is driving profound changes in ecosystems where many animals are dependent on the seasonal presence of vast expanses of ice.

A paper published in March 2015 highlights just one of the ecological consequences of climate change for birds breeding at high northern latitudes, and how these impacts stretch far beyond the Arctic. Polar bears are critically dependent on sea ice for hunting seals, and it has long been suspected that longer ice-free seasons force the bears to seek alternative food sources on land.

The authors examined historical data on bear encounters on the island of Spitsbergen (Svalbard) and a site in eastern Greenland. Their analysis revealed that the presence of bears, quantified as both the probability of encounters and the number of days on which bears were present, has increased significantly since the 1970s and 1980s. That these changes in the bears' behaviour are directly linked to reductions in sea ice is strongly suggested by a negative relationship between bear presence and the length of each sea ice season. Moreover, the average date on which bears first appeared on land advanced by 30 days over the same period.

One food source that is drawing the polar bears onto land is the eggs of colonially nesting seabirds. Observations between 2004 and 2014 revealed regular foraging by the bears in breeding colonies of Barnacle Geese *Branta leucopsis*, Common Eiders *Somateria mollissima* and Glaucous Gulls *Larus hyperboreus*. The bears are formidable nest predators and can have devastating impacts on breeding success. In years when the bears arrived early, before hatching, up to 90 per cent of nests were lost. Among Barnacle Geese breeding at the main study colony, there was only one year between 2009 and 2014 in which less than 60 per cent of nests fell victim to polar bears.

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Increasing nest predation pressure on breeding birds as a result of changes in the feeding ecology of polar bears has consequences far beyond Arctic latitudes. Several shorebirds that winter in sub-Saharan Africa, including Common Ringed Plover *Charadrius hiaticula*, Ruddy Turnstone *Arenaria interpres* and Sanderling *Calidris alba* are tundra breeders. Another species that is very likely being affected by the changes in polar bear foraging behaviour is the Arctic Tern *Sterna paradisaea*, the archetypal long-distance migrant that may travel more than 80 000 kilometres each year as it traverses the globe between its Arctic breeding grounds and Antarctic wintering quarters.

This study provides yet another example of the myriad complex ways in which birds are affected by global warming, and how rising temperatures can trigger consequential ecological disruptions. The authors also point out, however, that the increasing presence of polar bears in their study areas may amount to a recolonisation of areas where populations were decimated by hunting in past centuries. But that does not change the fact that the bears are increasingly relying on terrestrial food sources that are not part of their usual diet, with potentially serious consequences for breeding birds.

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Reference: *Prop, J. et al. 2015. 'Climate change and the increasing impact of polar bears on bird populations.'* Frontiers in Ecology and Evolution *3: 33.*