

# For polar bears, it's survival of the fattest

March 19 2013

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An adult female polar bear wearing a GPS-satellite linked collar with her two 10-month-old cubs waits for the sea ice to re-form onshore in western Hudson Bay, Manitoba, Canada. Credit: Copyright Andrew Derocher, Univeristy of Alberta.

One of the most southerly populations of polar bears in the world – and the best studied – is struggling to cope with climate-induced changes to sea ice, new research reveals. Based on over 10 years' data the study, published in the British Ecological Society's *Journal of Animal Ecology*, sheds new light on how sea ice conditions drive polar bears' annual

migration on and off the ice.

Lead by Dr Seth Cherry of the University of Alberta, the team studied [polar bears](#) in western Hudson Bay, where sea ice melts completely each summer and typically re-freezes from late November to early December. "This poses an interesting challenge for a species that has evolved as a highly efficient [predator](#) of ice-associated seals," he explains. "Because although polar bears are excellent swimmers compared with other bear species, they use the sea ice to travel, hunt, mate and rest."

Polar bears have adapted to the annual loss of sea ice by migrating onto land each summer. While there, they cannot hunt seals and must rely on fat reserves to see them through until the ice returns.

Dr Cherry and colleagues wanted to discover how earlier thawing and later freezing of sea ice affects the bears' migration. "At first glance, sea ice may look like a barren, uniform environment, but in reality, it's remarkably complex and polar bears manage to cope, and even thrive, in a habitat that moves beneath their feet and even disappears for part of the year. This is an extraordinary biological feat and biologist still don't fully understand it," he says.



This is a subadult polar bear on a lake on the shores of Hudson Bay in Manitoba, Canada in November waiting for the sea ice to re-form. Credit: Copyright Andrew Derocher, University of Alberta.

From 1991-97 and 2004-09, they monitored movements of 109 female polar bears fitted with satellite tracking collars. They tagged only [females](#) because males' necks are wider than their heads, so they cannot wear a collar. During the same period, the team also monitored the position and concentration of sea ice using [satellite images](#).

"Defining precisely what aspects of sea ice break-up and freeze-up affect polar bear migration, and when these conditions occur, is a vital part of monitoring how potential climate-induced changes to sea ice freeze-thaw cycles may affect the bears," he says.

The results reveal the timing of polar bears' migration can be predicted by how fast the sea ice melts and freezes, and by when specific sea ice

concentrations occur within a given area of Hudson Bay.

According to Dr Cherry: "The data suggest that in recent years, polar bears are arriving on shore earlier in the summer and leaving later in the autumn. These are precisely the kind of changes one would expect to see as a result of a warming climate and may help explain some other studies that are showing declines in body condition and cub production."

Recent estimates put the western Hudson Bay polar bear population at around 900 individuals. The population has declined since the 1990s, as has the bears' body condition and the number of cubs surviving to adulthood.

Because polar bears' main food source is seals, and these are hunted almost exclusively on sea ice, the longer bears spend on land, the longer they must go without energy-rich [seals](#). "Climate-induced changes that cause sea ice to melt earlier, form later, or both, likely affect the overall health of polar bears in the area. Ultimately, for polar bears, it's survival of the fittest," says Dr Cherry.

He hopes the results will enable other scientists and wildlife managers to predict how potential climate-induced changes to [sea ice](#) freeze-thaw cycles will affect the ecology, particularly the [migration](#) patterns, of this iconic species.

**More information:** Seth Cherry et al (2013). 'Migration phenology and seasonal fidelity of an Arctic marine predator in relation to sea ice dynamics', [doi: 10.1111/1365-2656.12050](https://doi.org/10.1111/1365-2656.12050), is published in the Journal of Animal Ecology on Wednesday 20 March 2013.

Provided by Wiley

Citation: For polar bears, it's survival of the fittest (2013, March 19) retrieved 26 April 2024 from <https://phys.org/news/2013-03-polar-survival-fittest.html>

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