

Increased sea ice drift puts polar bears on faster-moving treadmill

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Polar Bear (*Ursus maritimus*) near Kaktovik, Barter Island, Alaska. Credit: Alan Wilson/Wikipedia.

A new study led by the U.S. Geological Survey (USGS) and the University of Wyoming found that increased westward ice drift in the Beaufort and Chukchi seas requires polar bears to expend more energy walking eastward on a faster-moving "treadmill" of sea ice.

These findings represent the first assessment of the consequences of changing drift rates for [polar bears](#), one of several previously unexplored effects of [sea ice loss](#).

"Increased sea ice drift rates likely exacerbate the physiological stress due to reduced foraging opportunity already experienced by many polar bears in the warming Arctic," says George Durner, research ecologist with the USGS and lead author of the report, "adding yet another 'straw to the camel's back.'"

The results were derived from radio-tracking data of collared adult female polar bears in the Beaufort and Chukchi seas, coupled with sea ice drift data from the National Snow and Ice Data Center (NSIDC). The data, composed of over 77,000 bear locations and matching [ice drift](#) values, were collected during two periods with different sea ice characteristics, 1987-98 and 1999-2013.

"These were very intensive analyses requiring advanced computational capabilities," says Shannon Albeke, a spatial ecologist with UW's Wyoming Geographic Information Science Center. "It was probably the most complicated analysis of my career."

"This study demonstrates the unparalleled value of long-term uninterrupted data collection," says Professor Merav Ben-David of UW's Department of Zoology and Physiology. "Without access to the ice data from NSIDC, and the interagency and international cooperation, we could not have conducted this project."

The study estimates that polar bears must catch and consume one to three more seals per year (a 2-6 percent increase) in order to compensate for the higher expenditure of living on faster-drifting ice. This elevated energy expenditure is concurrent with a diminished availability of sea ice suitable for hunting seals, due to early ice melt in spring and expansive

ice melt during summer.

The need to travel longer distances coincides with deterioration of the ice surface, on which polar bears walk, creating a complex and difficult environment to traverse. The study showed that, during the recent period, a solitary adult female polar bear required between 2.8 million and 3.2 million kilocalories annually. This was 51,000-107,000 kilocalories more than during the early period and is 3.5-4 times greater than total energy requirements of a moderately active adult human female.

More information: George M. Durner et al. Increased Arctic sea ice drift alters adult female polar bear movements and energetics, *Global Change Biology* (2017). [DOI: 10.1111/gcb.13746](https://doi.org/10.1111/gcb.13746)

Provided by University of Wyoming

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