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Alaska Science Center
Publication Brief

Rapid Environmental Change Drives Increased Land Use by Polar Bears in Alaska

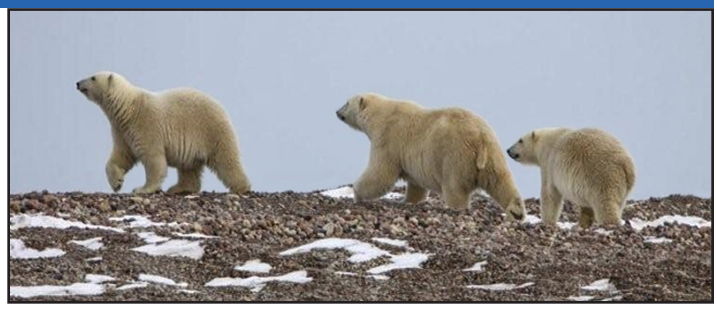
The preferred foraging habitat for polar bears is sea ice that occurs over shallow waters. However, that biologically productive habitat is declining due to a warming climate, which is driving the displacement of some bears from sea ice to land. In the Arctic Ocean's Beaufort and Chukchi seas, the length of the open-water season (i.e., period between sea ice break-up in summer and freeze-up in fall) has increased substantially since the late 1990s. Historically, polar bears from this region have mostly remained on the sea ice year-round, but recent changes in the availability of sea ice have coincided with reports that use of terrestrial habitat has increased.

In several studies, scientists from the U.S. Geological Survey and the U.S. Fish and Wildlife Survey documented a recent increase in land use by adult female polar bears from Alaska's southern Beaufort Sea and Chukchi Sea populations. Research findings indicated that the proportion of bears on land between August and October has increased substantially over the last four decades.

Scientists analyzed data collected from radiocollared adult female polar bears from the mid-1980's to 2014 to quantify the extent to which bears used land during the open-water season and for denning in the winter. Since the mid-1980's, the proportion of adult female bears on land between August and October has increased from 5% to 21% and 20% to 39% for the Beaufort Sea and Chukchi Sea populations, respectively. The average length of stay on land during summer increased by approximately 30 days, and was influenced by the lengthening open-water season. Land denning in winter increased from 34% in 1985-1995 to 55% in 2007-2013.

Since the late 1990s, the duration of the open-water season in the region has increased by an average of 36 days, while time spent on land has increased by 4 weeks. There were clear trends of bears arriving on land earlier and departing to the sea ice later over time. These findings provide important evidence of the relationship between the timing of sea ice availability and use of terrestrial habitat by polar bears.

These studies suggest that polar bears from Alaska have become more reliant on terrestrial habitat. The estimated proportions of bears coming ashore have increased substantially and the behavior should no longer be considered trivial. This important change in polar bear ecology has relevance for the management of human-related activities (e.g., resource extraction) and the potential to impact polar bear population status by mediating exposure to risk factors associated with terrestrial ecosystems.



Polar bear family group observed on a barrier island near Kaktovik, Alaska, September 2009. USGS photo (public domain).

MANAGEMENT IMPLICATIONS

- Periodic assessments of factors that can influence animal and population health are crucial for informing decisions to support effective resource management.
- The declining spatio-temporal availability of sea ice habitat is likely to result in a growing reliance on terrestrial habitat in summer and fall, which has the potential to lead to greater human-polar bear interaction and conflict.
- Monitoring the timing and rate of seasonal ice disappearance may be an effective, logistically tractable way for managers and industry to prepare for the annual arrival of bears on shore and to concentrate resources aimed towards mitigating human-polar bear interactions.

THIS BRIEF REFERS TO:

Rode K.D., R.R. Wilson, E.V. Regehr, M. St. Martin, D.C. Douglas, and J. Olson, 2015, Increased land use by Chukchi Sea polar bears in relation to changing sea ice conditions: PLoS ONE vol. 10, no. 11, e0142213. doi:10.1371/journal.pone.0142213.

Atwood T.C., E. Peacock, M. McKinney, K. Lillie, R.R. Wilson, D.C. Douglas, S. Miller, and P. Terletzky, 2016, Rapid environmental change drives increased land use by an Arctic marine predator: PLoS ONE vol. 11, no. 6, e0155932. doi:10.1371/journal.pone.0155932.

Olson J., K.D. Rode, D. Eggett, T.S. Smith, R.R. Wilson, G.M. Durner, A. Fischbach, T.C. Atwood, and D.C. Douglas, 2017, Collar temperature sensor data reveal long-term patterns in southern Beaufort Sea polar bear den distribution on pack ice and land: Marine Ecology Progress Series vol. 564 p. 211-224. doi: 10.3354/meps12000.

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