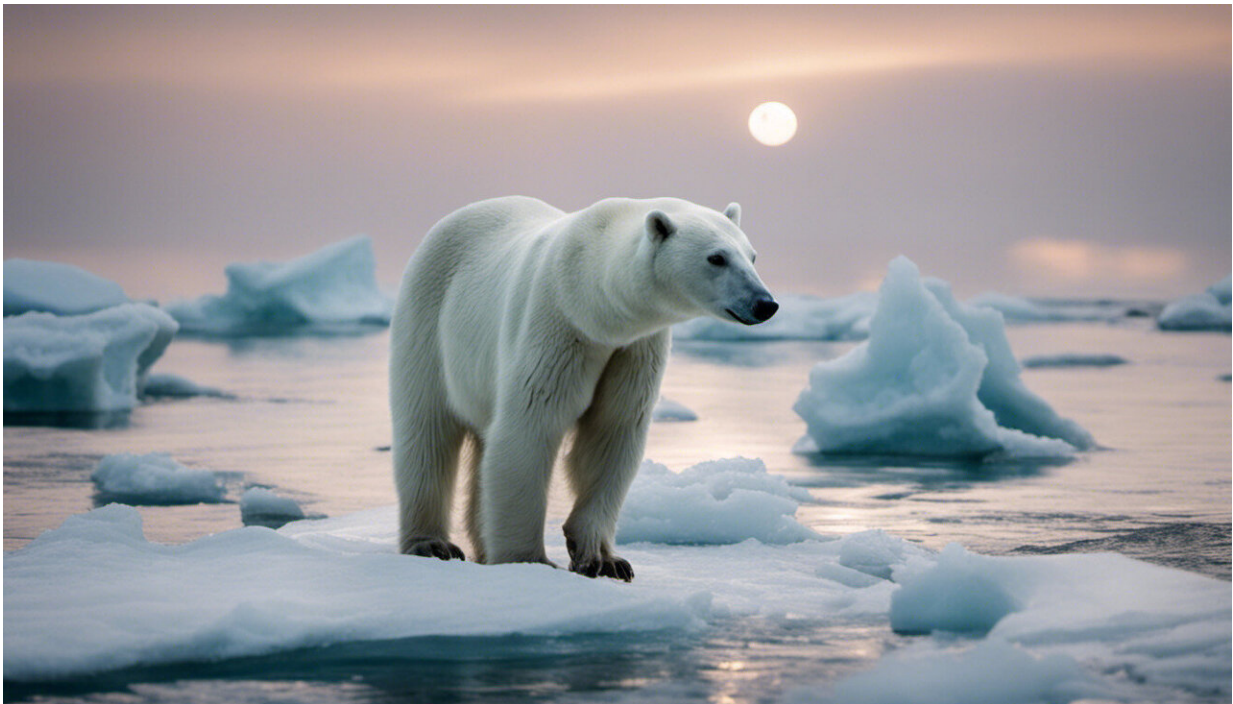


Polar bears may struggle to produce milk for their cubs as climate change melts sea ice

October 6 2023, by Louise Archer



Credit: AI-generated image ([disclaimer](#))

When sea ice melts, polar bears must move onto land for several months without access to food. This fasting period is challenging for all bears, but particularly for polar bear mothers who are nursing cubs.

Our research, published in *Marine Ecology Progress Series*, found that

polar bear lactation is [negatively affected by increased time spent on land when sea ice melts](#).

Impaired lactation has likely played a role in the recent decline of several polar bear populations. This research also indicates how polar bear families might be impacted in the future by continued sea-ice loss caused by [climate warming](#).

Challenges of rearing cubs

While sea ice might appear as a vast and perhaps vacant ecosystem, the frozen Arctic waters provide an essential platform for polar [bears](#) to hunt energy-rich seals—the bread and butter of their diet.

Sea ice is a dynamic environment that can vary through time and in different regions of the Arctic. Polar bears in Canada's [western Hudson Bay area experience seasonal sea ice](#), which melts in the warmer summer months, forcing the polar bears to move onto land until cooler winter temperatures cause the sea ice to refreeze.

While on shore, hunting opportunities are rare and polar bears generally spend their time in a [fasting state](#). Polar bears rely on their immense body fat stores to fuel them during these leaner months, with some individuals measuring [almost 50 percent body fat](#) when they come onshore in [early summer](#).

While on land, polar bears can lose around [a kilogram of body mass per day](#), so making it to the end of the ice-free season requires them to carefully manage their energy. For most polar bears, this means reducing activity levels and conserving energy until the sea ice returns and seal hunting can resume.

Females with cubs must also factor in the additional burden of lactation.

Polar bears produce high-energy milk, which—[at up to 35 percent fat](#)—is like whipping cream. This high-fat milk allows cubs to grow quickly, increasing from just 600 grams at birth to well over 100 kilograms by the time they are around two-and-a-half years old and leave their mothers to become independent.

During the onshore fasting period, polar bear mothers face a difficult trade-off: Stop lactating and risk the health of her growing cubs or continue nursing and risk her own survival as her energy reserves are depleted.

Moderating lactation

Although lactation is important to both mothers and cubs, studies on polar bear lactation are relatively rare.

To better understand how [females](#) manage their lactation investment, our research team revisited a data set of polar bear milk samples collected in the late 1980s and early 1990s from polar bears on land during the ice-free period.

We estimated how long each polar bear mom had been fasting based on annual sea-ice breakup dates and found that the energy content of their milk declined the more days spent onshore. Some bears had stopped producing milk entirely. Both milk energy content and lactation probability were negatively related to the mother's body condition, meaning females in poor body condition had to prioritize their own energetic needs over their cubs.

The bears who reduced their investment in lactation benefited by using up less of their body reserves, meaning they could fast for longer. Yet the cubs who received lower energy milk grew more slowly than offspring of females that maintained their [lactation](#) effort. In the long

term, this may reduce cub survival and, ultimately, negatively affect population dynamics.

Climate change and population declines

After around three months on land, the probability of a female with cubs lactating was 53 percent. This dropped to 35 percent for a female with yearlings (older cubs from the previous year).

The data in our study were collected around three decades ago. Since then, climate warming has meant that the ice-free season in western Hudson Bay has been extending by [around seven days per decade](#). Polar bears are now regularly forced to spend more than four months on land.

As the ice-free season has increased and polar bears must go for longer without food, [their average body condition has declined](#). The ability of female [polar bears](#) to nurse their cubs has probably also become increasingly impaired.

This may have contributed to the [50 percent decline](#) in the population size of the western Hudson Bay population over the last four decades, and is likely to contribute to [further declines if climate warming and sea-ice declines continue as projected without mitigation](#).

This research adds another piece to our understanding of polar bear resilience to [climate change](#). Without action to halt climate warming and sea-ice loss, survival of cubs will be at risk across the Arctic.

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