Goose eggs may help polar bears weather climate change

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May switch to eggs: sub-adult male polar bear near Churhchill, Manitoba, Canada. Credit: Patricia Rockwell

As polar bears adapt to a warming Arctic—a frozen seascape that cleaves earlier each spring—they may find relief in an unlikely source: snow goose eggs. New calculations show that changes in the timing of sea-ice breakup and of snow goose nesting near the western Hudson Bay could provide at least some polar bears with an alternative source of food. This new analysis appears in *Polar Biology*.

"Over 40 years, six subadult male bears were seen among snow goose nests, and four of them were sighted after the year 2000," says Robert Rockwell, a research associate in Ornithology at the American Museum of Natural History and a Professor of Biology at City College at City University of New York. "I've seen a subadult male eat eider duck eggs

whole or press its nose against the shell, break it, and eat the contents. This is similar to a different research group's observations of polar bears eating Barnacle Goose eggs on Svalbard, an island near Norway."

Polar bears, *Ursus maritimus*, are listed as a threatened species under the United States' Endangered Species Act and are classified as "vulnerable with declining populations" under IUCN's Red List. Polar bears' habitat rings the Arctic south of 88° latitude. Most of this area is sea ice from which bears hunt seals, although the breakup of sea ice over the summer forces some bears to move north, to pack ice, or onto land. More often, it is subadult males that are pushed to these less ideal conditions, where they live, in part, off stored fat reserves.

When bears switch to the tundra in some areas, they may enter the nesting grounds of snow geese. Goose eggs and developing embryos are a highly nutritious source of food to opportunistic foragers. Although geese populations were in decline in the early 1900s, the population rebounded and expanded. There are now too many geese for the Arctic to support in the summer, mainly because their over-wintering habitat has increased to cover the northern plains, where they eat waste corn and forage in rice fields.

Polar bear and snow geese populations come into contact in the Hudson Bay. Here, some bears routinely live on land for 4-5 months of the year, subsisting on fat reserves. The new research shows that the effects of climate change will bring additional sources of food as the movement of both populations begins earlier each spring. Rockwell and his graduate student, Linda Gormezano, calculated that the rate of change in ice breakup is, on average, 0.72 days earlier each year, and that hatching time is also moving forward by 0.16 days each year. Current trends indicate that the arrival of polar bears will overlap the mean hatching period in 3.6 years, and egg consumption could become a routine, reliable option. At this point, a bear would need to consume the eggs of

43 nests to replace the energy gained from the average day of hunting seals. But within a decade, because timing changes would put bears in contact with even more nests with younger embryos (younger embryos are more nutritious), a bear would only need to consume the eggs of 34 nests to get the same amount of energy.

"Polar bears went through the Eemian 125,000 years ago, when sea level was 4-6 meters higher than it is now and trees lived above the Arctic Circle. They've been through warming before," says Rockwell. "I just read a piece in *Natural History* with a quote from Ilkoo Angutikjuak that sums this up: 'If the changes continue…the animals will adapt. I've heard that because they depend on sea ice, polar bears will go extinct, but I don't believe it…Polar bears might get skinnier and some might die, but I don't think they will go extinct.'"

Source: American Museum of Natural History