



Partnerships in Polar Bear Conservation Research

[Home](#)

By Megan Owen and Ronald R. Swaisgood

The eyes of the world are focused to the far North as climate change has brought the frozen ocean that the polar bear calls home into the public consciousness. The devastating loss of sea ice, and precarious polar bear populations that absolutely depend on ice to "make a living," has been a call to action for the zoo community. Many zoos are joining forces, both with each other and with the larger conservation community, to address the sobering forces facing polar bears. Ours is the story of how we heeded this call to action and, along with our partners, are trying to address issues using the unique circumstances and resources available in the zoo community.



For our organization, the **San Diego Zoo's Institute for Conservation Research, Polar Bears International (PBI)**, a nonprofit organization devoted to research, stewardship and education has proved essential for instigating our research program, connecting us to scientists working in the field, and providing much of the funding to conduct our work with this species. In some cases, we apply our inter-disciplinary craft directly to conservation in the field, but in this case it made more sense to address some important information gaps, working in lockstep with field biologists.

Arctic Melting and the Impact of Human Disturbance

Sensory ecology – how organisms use their senses to survive and communicate – was poorly understood for this species and it quickly became apparent that this was a research program well-suited for zoo research, yet relevant to field conservation. Understanding how polar bears perceive their world will help wildlife managers to address the escalating impact that human disturbance is having on polar bears, as the arctic "opens up" (i.e., melts) and becomes more accessible.

Our story dates back to 2004, when we began a small project to begin to understand the reproductive physiology and behavior of polar bears. Although the sample size was small, this study made inroads into understanding some important aspects of reproduction, thus serving as a benchmark for understanding what is normal and abnormal for the species, whether the context is the wild or a zoo setting. At the same time, we were studying the impacts of noise disturbance on giant pandas. The confluence of these two studies made it natural for us to move on to a larger program addressing how noise might impact polar bears in an arctic predicted to become noisier by the day.

Petroleum Stores vs. Maternal Dens

Although climate change driven habitat loss is by far the gravest threat to polar bear populations, declines in body condition associated with lost hunting opportunities have left polar bears potentially more susceptible to the negative impacts of human disturbance. This threat is most germane to parturient females denning on the coastal plain of Alaska's North Slope. This region holds some of the largest petroleum stores in North America, and it is also where bears from the Southern Beaufort Sea excavate maternal dens in the fall, remaining in them throughout the winter.

Overlay the map of denning habitat with those of oil interests and one can readily see that there is the potential for biologically significant disturbance. What are the further impacts to these nutritionally stressed females, who each year find it harder to capture

seals without the sea ice platform they need to hunt and must swim further across the open waters than ever before to reach the denning sites? Noise disturbance in their den refugia may add insult to injury, and may extract a cost in the form of reduced cub survival.

Describing the Acoustic World of Polar Bears

In 2005, we joined forces with PBI again, drew in the bioacoustic expertise of our colleagues at Hubbs-Sea World Institute, and we began a research program designed to describe the acoustic world of denning polar bears: What can polar bears hear? How much noise from industrial and vehicular activities gets into the maternal den? What is impact of this noise on mother and cubs?

Generally speaking, the more sensitive a species' hearing is at a particular frequency, the more likely that noise emitted in that frequency will be disruptive. So, we spent the better part of two and a half years training (thank you polar bear keepers!), and running five polar bears through a behavioral assessment of their hearing. This collaborative research effort produced the first-ever comprehensive description of the hearing range of the polar bear. This study would not have been possible with free-ranging bears and is a great illustration of the contribution that zoo bears can make to conservation research.

The next question we are addressing: How much noise from industrial activity actually gets through the snow and ice into a polar bear den? There's not much snow and ice in San Diego, so we are headed to the North Slope of Alaska, where we will test how much and what kinds of noise will make it to a polar bear's ears inside a den – we dig our own dens, since we are not too keen about placing our instruments in an occupied den. We'll also map these results onto our findings for polar bear sensitivity to get the full "picture" of how polar bear mothers and cubs experience noise in their dens. Future studies will involve placement of video cameras in polar bear dens in many AZA zoos and, perhaps, the wild, providing critical insights into how noise may impact maternal care and communication.

Next - Scent Communication and Mating

This is just one of our research stories that we can share. We are concurrently working on other aspects of polar bear sensory ecology as well. We know, for example, that scent plays an important role in polar bear mate location and courtship, according to anecdotal information from the field. But we don't know what these scents mean to polar bears nor how a better understanding of scent communication might aid in their management. "Collaboration" has been the name of the game for this study: USGS and USFWS collect pedal scents from free-ranging bears and, so far, we have presented these scents (in systematic experimental fashion) to 24 bears residing in eight AZA institutions. Stay tuned for some interesting results.

The polar bear conservation crisis has prompted us to mobilize our resources, and, we hope, develop an efficient and applicable conservation research program that we can share with the public through our education and outreach programs. The San Diego Zoo's Institute for Conservation Research will continue to collaborate with PBI and the AZA to fulfill our responsibility to help conserve and protect polar bears.

Megan Owen is the Conservation Program Specialist at San Diego Zoo's Institute for Conservation Research. Ronald R. Swaisgood is Division Head at the San Diego Zoo's Institute for Conservation Research.