

# Breakthrough: Polar Bear Witness

[MUSIC PLAYING]

KAREN RODE: When you're flying over the sea ice in a helicopter, you see sea ice for miles and miles. It's just this white, stark landscape. It is really hard to believe that animals live here. You have one chance to get out and see the bears every year and get your data and find out how they're doing.

I think it is a marvel of evolution. The polar bears are adapted to this environment and can make a living out there. It's funny, I knew very little about bears when I was growing up. In fact, I never saw a bear until I went to graduate school.

My earliest studies on bears were addressing how important vegetation may be in the diet of grizzly or brown bears. When I came to study polar bears, it was coming at a time when we needed to be able to understand more about polar bears. In part because of sea ice loss.

My name is Karen Rode, and I'm a wildlife biologist for the United States Geological Survey, and I study polar bears in the Chukchi Sea. My research, a lot of it is about nutrition. Are they getting enough to eat? Are they producing enough cubs to maintain the population? And how they'll respond to climate change.

Polar bears range throughout the Arctic. And they occur actually in 19 recognized populations. Polar bears have to travel a huge range. They live out the majority of their annual life cycle on the sea ice. They have to have the sea ice to hunt their prey, ring seal, which is the most abundant.

They also eat bearded seals. They evolved to feed on these high fat marine mammals. They've become the largest of all the bear species. And so, as the sea ice retreats in the summertime, that's really the challenge that a bear faces when they come onshore.

In the summertime, a big bear cannot forage long enough in a day to meet their caloric requirements on vegetation. Even bird eggs and birds are nothing like capturing a seal out on the sea ice. Here in the Chukchi Sea and in the Beaufort Sea, they have very different ecological conditions.

In the Beaufort Sea, as the sea ice retreats in the summertime, it quickly moves into these really deep waters. But in the Chukchi Sea, it's very shallow, which makes it a more productive habitat. There's habitat for bearded seal throughout that whole range, and there's also much more walrus in the Chukchi Sea. So much of my work focuses on trying to understand differences between these two populations.

[MUSIC PLAYING]

Obviously, we're in a pretty unique place that's very remote. This is where we have our helicopter that can take us out to the sea ice and where the polar bears are. You check the weather a lot, and also ice maps, trying to strategize the best you can. Every year you're going out to the ice and trying to find bears, not knowing where they may be.

I remember the first time I went out and thinking, wow, it's really hard to imagine how they are navigating out there. It's challenging flying for sure, because you're trying to follow their tracks in a helicopter. I see some tracks.

SPEAKER 2: Yeah.

KAREN RODE: Yeah. The best conditions for finding a bear is a fresh set of snow. So that all the tracks that you find are new. Sometimes it's really easy, you find a lot of bears. But we have days every year where we never find a bear.

SPEAKER 2: Yep, bear's in a good position. You'll see it right in front of us there.

KAREN RODE: I do.

SPEAKER 2: OK. I'll come back on it pretty quick.

KAREN RODE: OK. Got it?

SPEAKER 2: Good stuff.

KAREN RODE: It's always exciting when you see a bear. Once we see a bear, we evaluate the surroundings and determine a safe location. We don't want a bear being darted around water. And then go in for what's called a dart run.

We usually come in right up on top of the bear and try to shoot straight down and hit the shoulder. And then if all goes well, within about five minutes the bear has laid down and is sedated. And then we can land the helicopter and begin our sample collection.

When it is your responsibility for these animals, certainly you want to make sure the bear's safe. And so, the very first thing we do is protect the bear and keep it comfortable. We check their temperature and their vital rate.

Then one of the first things we do, is check to see if it's a bear we've caught before. So each bear gets a lip tattoo that has a unique number, and that's really critical information. Because the way that we determine survival rates of bears is based on capture and recapture.

And then we weigh the bear. We get the length of the bear, and we take skull width measurements. We collect hair, blood, usually a fecal sample, and a small fat biopsy.

So we do collect a small vestigial tooth. So a tooth that's not actually used. The rings on a tooth can be used like tree rings to age a bear.

We only put collars on adult females. That provides really important information on where these animals go, what types of habitat they use. Are they coming on land, and how long they're coming on land.

After we're done, we pack up our gear and make sure that the bear is in a comfortable position and is starting to rouse, and then we lift off. So we catch somewhere between 50 to 75 bears each year. But my research, a lot of it has been based on studies using polar bears in zoos.

We've used activity sensors that are on collars. We can watch what their behavior is and we can relate that to the data that we collect from a wild bear, and try to have an idea of what the various behavior was out on the sea ice. We've also used polar bears in zoos to feed them known diets, and understand how the animal metabolizes it, and how it ultimately ends up in the tissue.

Primarily, I use hair to estimate polar bear diets. If ring seals feed in the water column, and bearded seals feed on the ocean floor, because the prey differ in what they eat, the carbon and nitrogen isotopes, naturally occurring variations of an element, also vary in those two species, and then can be detected in the tissues of the bear

What a bear eats also gets incorporated into their blood. And different components of the blood actually represent different time frames. You can get a window on what they eat up to four months ago.

The part that I become most excited about, is when I have the data to finally answer the questions that are important. There's a lot of key differences in those populations that are going to determine whether they're affected by sea ice levels. We know in the Beaufort Sea that bears are declining in body condition.

Their cub's survival is declining. And we found that the population is in decline in the Beaufort Sea. And some of the reasons is because they're getting less to eat than they have in the past.

In the Chukchi Sea, one of the most interesting findings is that, even though there's been substantial sea ice loss between the 1980's and the current data we've collected since 2008, polar bears haven't shown declines in condition or cub survival. We know that in the springtime, that they are feeding more often here. We assume the food resources are richer here.

It isn't simple that sea ice loss is a direct linear relation to population decline. If, for whatever reason, the prey population isn't doing well, they can have lots of sea ice, but still not fair well as a population. They can't just have sea ice, they have to have prey.

But there's no doubt that if you have a substantial reduction in sea ice, that they have lost the area over which they can hunt. The Arctic is changing faster than anywhere else in the world. Polar bears are a really good indicator species for the Arctic, because their health depends on the health of the ecosystem below them in a dynamic food web.

I think in the past 10 years, we've learned a lot about polar bears. And I think we're on the cusp of learning a lot more. I think it's just a question of how quickly will we have a complete picture. Scientific information is really, really important for making decisions about our world. I take a lot of pride in trying to do the very best, most objective science I can, and letting people make decisions based on that.

[MUSIC PLAYING]

*Copyright © 2017 Science Friday Initiative. All rights reserved. Science Friday transcripts are produced on a tight deadline by 3Play Media. Fidelity to the original aired/published audio or video file might vary, and text might be updated or amended in the future. For the authoritative record of Science Friday's programming, please visit the original aired/published recording. For terms of use and more information, visit our policies pages at <http://www.sciencefriday.com/about/policies/>*