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lying at low altitude across rough sea ice, you want a good pilot who reacts quickly to the environment, as well as keeping an eye on the bear ahead of the helicopter,' Thea Bechshoft says. 'The sea ice is where the bears hunt, because that's where the seals come to the surface to breathe, so that's where we look for them,' she explains.

Once they've found their bear, Bechshoft's team fire a tranquilising dart to sedate the animal, and then land and approach it carefully. These giants of the ice weigh up to 500kg and can be ferocious if threatened. The sedated bear will provide valuable evidence to help Bechshoft. Monitoring polar bears is ever more vital as their numbers are in serious decline. In Canada's Western Hudson Bay, the population is down 30 per cent in 35 years and it's getting tougher for them to cope with their loss of habitat.

A recent study found that the rate of sea ice melt leaves polar bears with seven fewer weeks for hunting each year, compared with four decades ago. Research published by Harry Stern and Kristin Laidre this September found that, for all 19 polar bear subpopulations in the Arctic, the sea ice has been melting three to nine days earlier, and re-forming three to nine days later, every decade since 1979.

Bears hunt fat-rich seal off a platform of sea ice, and if the ice isn't there and they're stranded on land, they can't get enough calories to maintain a healthy weight.

Bechshoft and her colleagues assess the effects of climate change and toxic chemicals on polar bears. Specifically, she is studying how pollutants that have reached the Arctic are affecting the bears' hormonal systems. 'Bears are at the top of the food chain, so they get the bulk of contaminants through eating seal fat,' she says. 'Their bodies are unable to distinguish between the pollutant introduced via the

food chain and the natural hormones that they produce themselves, so we're looking at how that affects reproduction, cognition and general health.

'We put on a satellite collar to track their movements,' she says. 'We take a claw shaving, a hair sample, and we measure the bear. We look at the teeth and take biopsies for contaminants in their fat.' They can measure levels of 10 to 15 hormones by analysing bear hair.

So, what's it like flying across the sea ice, in search of bears? 'It's a privilege,' says Bechshoft, who is a marine mammal researcher at the University of Alberta. 'It's exciting when you see a bear, but when you're interacting with it, it's intense. You're so focused on the bear being OK through the ordeal of being tested.' The researcher clearly has a strong connection with these masters of the ice. 'They're amazing creatures. I have the utmost respect for them. It's their intelligence that is the most impressive. They're so adapted to living out on the sea ice and are perfectly made for their environment.' ■



Words: Celia Woolfrey. Photography: Alamy, Getty Images

Having rolled a sedated polar bear into a net that's hooked to a scale, the bear is weighed and has an ID number tattooed to the inside of its lip



DID YOU KNOW?

- **Polar bears** have black skin and transparent fur. They look white because each hair shaft has a hollow core that scatters and reflects visible light.
- **One ringed seal** provides enough energy for eight days. But the bears are always hungry because the shrinking Arctic sea ice means that seals are in short supply.
- **The bears** can swim for up to 10 days and cross areas of up to 600,000km sq to find food and mates.



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Polar bears are at the top of the food chain and have a vital role in the overall health of the marine environment. Many species depend on them, such as Arctic foxes who feed on the carcasses of bear-killed seals



Life on the edge

Always hungry and
desperately hunting for
food, the polar bear is
pushed to the brink by
melting sea ice