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Killer Whales Are Most Toxic Arctic Animals, Study Reports

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The Arctic's killer whales are highly contaminated with man-made chemicals and are now considered to be the region's most toxic creatures, a new study reports.

The marine mammals carry distressingly high levels of polychlorinated biphenyls (PCBs), pesticides, and brominated flame-retardants.

"This new killer whale research reconfirms that the Arctic is now a toxic sink," said Brettania Walker, toxics officer with the World Wildlife Fund (WWF) International Arctic Programme.

"Chemicals in everyday products are contaminating Arctic wildlife."

WWF helped fund Hans Wolkers, a toxicologist with the Norwegian Polar Institute (NPI), who sampled blubber from killer whales, or orcas *(Orcinus orca),* in Tysfjord, Norway.

Wolkers hunted the elusive whales and darted them with a special gun that removes a sample of tissue to test the level of toxins retained in their blubber.

"It's difficult to get close, and we had some problems with the equipment, because it was not designed for these huge beasts," he reported. "It was designed for dolphins, and these killer whales are as big as elephants."

Polluted Predators

Wolkers found that the whales retained even more toxins than polar bears, which had been believed to be the region's most toxic animals.

The finding raises the question: How did one of the planet's most untrammeled corners become a repository for these toxins?

"Most of these chemicals are not produced or widely used in the Arctic," WWF's Walker said. "But air and ocean currents are going [predominately] northward.

"So the final destination of these pollutants, which are used in developed and increasingly in developing countries, is the Arctic."

Once in the north, the chemicals break down slowly due to the relative absence of sunlight and warm temperatures.

"Killer whales can be regarded as indicators of the health of our marine environment," Wolkers said. "The high levels of contaminants are very alarming.

"They clearly show that the Arctic seas are not as clean as they should be, which in particular affects animals at the top of the food chain."

When animals ingest chemicals such as PCBs, the toxins are not broken down in the body but are instead stored in fatty tissue. Such chemicals are known as persistent organic pollutants.

Through a process called bioaccumulation, animals higher up in the food chain ingest and store higher concentrations of these chemicals. Because the toxins bind themselves to fat, blubber-packing Arctic animals are particularly susceptible.

Killer whales—known as the wolves of the sea—are top Arctic predators, eating prey that includes fatty animals like walruses, seals, sea lions, and even other whales.

In addition, fat-loving toxins may have a direct impact on the next generation of whales through mothers' milk. Marine mammals produce milk that is 30 to 70 percent fat.

"When they use those fat reserves for nursing their young, those toxins are in the breast milk, and it exposes the young to high concentrations at the critical time when they are developing," WWF's Walker noted.

No Quick Fix

The effects of these toxins have not been studied in the whales, and Wolkers of the Norwegian Polar Institute plans to begin such a study next year.

But in other large Arctic animals, such as polar bears and seals, these toxins are known to cause serious health problems.

"A lot of the chemicals, like PCBs, affect the hormonal system and some of them affect reproduction, so we're concerned about [the whales'] pregnancy and about calf survival," Walker explained.

Walker also reported that studies show the toxins have impacts on hormones that control metabolism, and also on the immune system's ability to protect animals from disease.

Meanwhile, experts warn that there is no immediate solution to reducing the amount of toxins in the Arctic. For example, some of PCBs revealed in the killer whale study were widely phased out in the 1980s.

"We don't know how long some of these chemicals are going to persist in the environment," said Walker, who urged governments to ban hazardous chemicals whenever possible.

PCBs and many harmful pesticides are already banned under the Stockholm Convention on Persistent Organic Pollutants, which came into effect in 2004. Many had been phased out for two decades prior to the convention.

But most brominated flame-retardants, used on products from rugs to computers, are not banned and are still heavily employed.

Helen Bjørnøy, the Norwegian Minister of Environment, said in a statement that she'd like to see that change.

"The toxic contamination of killer whales clearly shows the result of an unsustainable use of chemicals internationally," Bjørnøy said.

"This is one of the greatest global environmental threats. The EU ministers now have the possibility to strengthen the chemicals legislation in Europe, and I urge them to use it."

Walker commented that although many chemicals are long-lasting, the positive effects of reduced use begin much sooner.

"The good news is that if you look at those [toxins] that have been banned under the Stockholm Convention, their levels are dropping in the environment," she said.

"Just because a toxin has been banned you don't get rid of it immediately—but we do see a difference. The sooner we stop using them the better."