

Killer Whales Face Dire PCBs Threat

Concentrations of the toxins are very high, lingering in the orcas' blubber, and are passed from mother to calf.



A killer whale off the coast of northern Norway. PCBs absorbed by smaller animals get progressively more concentrated as they move up the food chain, making killer whales the most contaminated in industrialized areas. Credit Credit Audun Rikardsen, www.audunrikardsen.com

By Karen Weintraub

Most people thought the problem of polychlorinated biphenyls — known as PCBs — had been solved. Some countries began banning the toxic chemicals in the 1970s and 1980s, and worldwide production was ended with the 2001 [Stockholm Convention](#).

But a new study based on modeling shows that they're lingering in the blubber of killer whales — and they may end up wiping out half the world's population of killer whales in coming decades.

"It certainly is alarming," said Jean-Pierre Desforges, a post-doctoral researcher at Aarhus University in Denmark and the lead author on the new study published Thursday in the journal [Science](#).

Whales sit at the top of their food chain. Chemicals like PCBs are taken up by plankton at the base of the food chain, then eaten by herring and other small fish, which are themselves eaten by larger fish, and so on. At each step in this chain, PCBs get more and more concentrated. The most at-risk killer whales are those that eat seals and other animals that are themselves fairly high on the food chain and quite contaminated, Dr. Desforges said.

Killer whale populations in Alaska, Norway, Antarctica and the Arctic among other places, where

chemical levels are lower, will probably continue to grow and thrive, the study found. But animals living in more industrialized areas, off the coasts of the United Kingdom, Brazil, Hawaii and Japan, and in the Strait of Gibraltar are at high risk of population collapse from just the PCBs alone — not counting other threats.

Dave Duffus, who directs the whale research lab at the University of Victoria in Canada and was not involved in the new research, said its conclusions are "shocking, but I don't doubt them."

Whales near him in the Pacific Northwest are surrounded by contaminants, face changes in their food supply and are continually bombarded with noise. "You can see [the downtrend in their population](#)," Dr. Duffus said.



Researchers estimate that roughly half the world's killer whale populations will stop expanding and eventually shrink in coming decades. Credit Audun Rikardsen, www.audunrikardsen.com

Also known as orcas, killer whales are intelligent, social animals that pass survival information from grandmother to mother to daughter, Dr. Desforges said. [Different populations have distinct dialects](#).

The researchers used blubber samples to estimate the amount of PCB contamination in killer whales around the world. They also developed a model to forecast the amount of PCBs passed on to calves through the placenta and breast milk as well as from eating prey. Researchers then compared these concentrations to the known damage that can come from different amounts of PCBs.

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According to their calculations, roughly half of the killer whale populations in the world will stop expanding and then will shrink in coming decades. Dr. Desforbes said he could not be certain how long it would take for these populations to collapse, but his team estimated the impact of contamination over a century — and the clock started ticking about 40 years ago when PCB exposure levels were at their highest, he said. PCB exposures declined with the bans, but levels have stopped falling in long-lived marine predators like killer whales, he said. The whales only very slowly metabolize the PCBs during a life span of 50 to 80 years in the wild, Dr. Desforbes said.

PCBs remain the highest chemical contaminant in the whales' blubber, and are known to disrupt the whales' reproductive, endocrine, thyroid and immune systems, harm their brains and trigger cancer. Other chemicals are also present, but in lower concentrations and with far less known about their potential hazards, he said.

"We're looking at one contaminant among many, and this is one risk factor among many," Dr. Desforbes said.

Despite the depressing results, Dr. Desforbes said he remained hopeful about the future of killer whales.

"It's not a dead-end story. There's still lots we can do about this," Dr. Desforbes said. Many countries are not living up to their commitments to dispose of old, PCB-contaminated equipment appropriately by 2028, he said, so more could be done to keep new PCBs from entering the oceans.

He said he hoped that policy makers would do more to help protect them, with the study helping to persuade them as well as the substantial appeal orcas have with the public.

"If killer whales can't do it in the water, like pandas on terrestrial sites, I don't know who will," he said.