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Contact: Vicky Krikelas
(206) 860-3263

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NOAA, Canadian Scientists and Collaborators Reveal New Insights into Contaminant Levels and Diet of Endangered Southern Resident Killer Whales

NOAA Fisheries scientists, together with their peers from Fisheries and Oceans Canada and Cascadia Research, have revealed new information about contaminant levels in Southern Resident killer whales.

Southern Resident killer whales spend the warmer months in Washington's Puget Sound and have been listed as endangered under the federal Endangered Species Act since 2005.

In a study published today, the scientists made three key findings:

- Levels of the "legacy" pollutant PCBs, banned since the 1970s, appear to have decreased in the killer whales over the last decade, but these whales remain contaminated with PCBs and are still at risk for adverse health effects.
- Levels of contaminants that are characteristic of urban areas and have been introduced to the environment relatively recently, like the fire retardant polybrominated diphenyl ethers (PBDEs), were found in the highest concentrations in one of the youngest male killer whales sampled. The presence of PBDEs suggests that this whale had spent a great deal of time in the Puget Sound/Georgia Basin or other areas where PBDE levels are high in the fish it eats.
- One of the killer whales' subpopulations, known as L pod, shares the same range in the warmer months as another subpopulation, called J pod. Although L-pod whales consume fish that feed on roughly the same things as the J-pod whales, differences in the chemical signatures between these two pods suggest that in the winter these two groups spend time in different places. In fact, there have been several sightings of L-pod whales off the California coast; J pod generally remains in the Puget Sound/Georgia Basin area all winter.

"The most unexpected finding from the study was that, among whales sampled, the highest levels of three toxic contaminant groups -- the flame retardant and two pesticides -- came from a three-year-old male," said Dr. Peggy Krahn, lead author of the paper and senior scientist with NOAA Fisheries' Northwest Fisheries Science Center in Seattle.

"These results are of particular concern because the biological systems of juvenile animals like this three-year-old are still developing and may be especially vulnerable to effects of toxic contaminants," Krahn said.

In the study, tiny plugs of skin and blubber – about the diameter of a pencil eraser, were taken from about 9 killer whales in 2004 and 2006, in a process known as biopsy sampling.

“Although this initial study has proven the value of biopsy sampling, we’ll need additional samples to get a more complete picture of contaminant exposure in these animals,” Krahn added.

The groundbreaking study stemmed from an international collaboration between the U.S. and Canada, involving the use of shared biopsy samples and analytical schemes to determine contaminant loads in killer whales that share the two nations’ waters.

"The endangered Southern Resident killer whales that ply the transboundary waters of British Columbia and Washington State are iconic symbols of this special part of the world, and we owe it to them to protect their habitat and their food supply from our chemical legacy," said Dr. Peter Ross, a co-author of the paper and research scientist with DFO-Canada. "This challenge is a daunting one, but lies within grasp if we work together."

In the mid-1990s, killer whales that reside in the Puget Sound region experienced a rapid decline in population. In response, Congress began funding the NOAA Fisheries’ NWFSC in 2003 to support research into the possible causes of this decline, including reduced prey quality and availability, vessel interactions, winter habitat distribution and contamination.

The study, titled “Persistent organic pollutants and stable isotopes in biopsy samples (2004/2006) from Southern Resident killer whales,” was published today in *Marine Pollution Bulletin* and authored by Margaret Krahn, Bradley Hanson, Robin Baird, Richard Boyer, Douglas Burrows, Candice Emmons, John Ford, Linda Jones, Dawn Noren, Peter Ross, Gregory Schorr and Tracy Collier. The authors are from NOAA Fisheries, except Ross and Ford, who are from Fisheries and Oceans Canada, and Baird and Schorr, who are from Cascadia Research, a non-governmental organization based in Olympia, Wash.

Copies of the paper can be found at <http://www.sciencedirect.com/science/journal/0025326X>

The NWFSC conducts research to help conserve and manage living marine resources and their ecosystems in the Northeast Pacific Ocean. The center’s research assists resource managers in making sound decisions that build sustainable fisheries, recover endangered and threatened species, sustain healthy ecosystems and reduce human health risks.

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