

Toxins threaten orcas' survival

Puget Sound killer whales scarf down 100 to 300 pounds of food daily and, like many people in this area, they prefer salmon. But with local runs greatly diminished, UW graduate student Stefanie Hawks-Johnson suspects there aren't enough salmon to fill the whales' bellies. It's possible the orcas fill that void with tainted fish. By affixing a sonar device to the bottom of the catamaran, Hawks-Johnson is trying to find out whether the orcas dine on bottom-feeding fish, which tend to contain higher levels of toxins than salmon do. The whales' very survival may be at stake.

This summer, researchers announced that another seven whales had gone missing in the past few months and were presumed dead. That dropped the total population in the San Juan pods to 78 orcas, after a recent high of nearly 100 whales in the mid-1990s. Last month, the National Marine Fisheries Service initiated a review to determine why the population is shrinking and whether the local killer whales need protection under the Endangered Species Act. "The population of whales is going to continue to decrease," said Ken Balcomb, founder of the Center for Whale Research in Friday Harbor. He blamed the decline on high levels of polychlorinated biphenyls, or PCBs, that accumulate in the orcas' blubber and can reduce fertility, damage the immune system and cause neurological problems. "The PCBs are the major impact on the whales," said Balcomb, who has been studying the Puget Sound orcas since 1976.

Enter the spies. From the swim step on the stern of a commercial whale-watching boat, Hawks-Johnson struggled to maintain her footing in the rolling swells. She and her assistant, UW undergraduate Grayson Eudy, raced to launch the cumbersome catamaran so it could intercept a group of a half-dozen orcas swimming along San Juan Island. Again and again the orcas surfaced and dove like undulating horses circling a merry-go-round. Their sleek black and white backs gleamed in the sunlight as their peaked dorsal fins sliced the water. The little unmanned boat bobbed toward the whales, and the two women scrambled to the third-floor deck of the ship for a better view. From this vantage, Eudy guided the catamaran by remote control. Another undergraduate, Autumn Miller, videotaped the orcas for identification and behavior analysis.

The catamaran, named the Auto Boat, was built by a local team consisting of a UW electrical engineering graduate student, a computer scientist and a kayaker. Inside a bright yellow waterproof case strapped on top of the catamaran is a laptop computer that records the sonar readings. The whole setup is worth almost \$5,000.

The sonar device measures water depth and also makes scans, 600 to 1,200 feet long, that fan from the water's surface to the sea bottom. Fish and orcas show up as little colored blips on the laptop screen. By looking at the depth at which the orcas are eating, Hawks-Johnson should be able to tell whether the orcas are consuming the deep-dwelling bottom-fish or the salmon that swim at more shallow depths. But that's only if things go right. "It's not as easy as it looks," Hawks-Johnson said. "There are so many logistical things that pop up." Hawks-Johnson began her data collection in June. Every day since, she or her assistants have been out on the water. Yet she guessed that she has about 20 days of good data so far. Weather can hinder the research efforts. Fog obscures the whales, and too much glare from the sun or choppy waves make the research nearly impossible. And the whales can be elusive.

Hawks-Johnson works on a commercial whale-watching boat in the Mosquito Fleet, which donates space to the researchers. The owner, Mike Bennett, subscribes to a whale-spotting service that sends messages via pagers when whales are spotted and commercial operators share sightings with each other. Bennett said they find orcas about 80 percent of the time. On days they don't, eight hours of research time are wasted. Then there are the technical hurdles. Even on a good day, the little catamaran has a top speed of only 4 knots -- while the orcas can swim twice that fast. Despite working well most of the summer, on an outing last week the remote control for the Auto Boat went on the fritz. In minutes, the killer whales had left the catamaran in their wake. The researchers were unable to record the depth at which the orcas were eating, but they did videotape their actions for later analysis. The killer whales would disappear under water, then reappear in a "roll" -- the term for surfacing and taking a breath. Occasionally an orca, which is technically a dolphin, would breach, rising most of the way out of the water and then tipping over and splashing back down.

Hawks-Johnson will tabulate the number of rolls, tail slaps and breaches and study foraging behavior, which is characterized by swimming in random directions and suddenly lunging for fish. She will identify the whales, which belong to one of three local resident pods that have been named and numbered. They are recognizable by the distinctive curves and notching of their dorsal fins. There's also a white patch called a saddle just behind the fin that has a unique shape on each orca. She doesn't yet have the data to back it up, but Hawks-Johnson believes that the orcas' behavior has changed since she began watching. For four years she worked as a naturalist on a boat with the Mosquito Fleet, educating passengers about the orcas. She said their behavior has become more erratic, mixing eating and swimming together. Their behavior has been well-characterized over the years, and comparisons should be relatively easy. But proving that the orcas' diet has changed will be challenging because little data exists. The

degree of PCB contamination in the bottom-feeding fish and salmon that the orcas are eating is also unclear. PCBs are oily, colorless liquids used in the United States from 1930 to 1975 before being banned in the late '70s. They don't burn easily and once made good lubricants and insulators for items such as transformers and electric motors. They don't go away. "They (scientists) found that once it got into the environment it was incredibly persistent," said Mike Gallagher, coordinator for the persistent bioaccumulative toxins program with the state Department of Ecology. The PCBs sink, getting trapped in sediment where bottom-feeding fish eat. The fish, which include halibut and rockfish, are long-lived so they build up toxins. When the orcas eat the toxic fish, they store the PCBs in their fat. When the food supply is short, the orcas burn up their blubber and the toxins are liberated into their bloodstreams. Local killer whales, including transient populations that do not belong to the resident pods, have PCB levels that are "some of the highest, if not the highest, of any animal out there," said John Stein, director of the National Marine Fisheries Service's environment conservation division in Seattle. "There is a lot of interest about whether or not their food habits ... have changed," Stein said. The state Ecology Department already is looking at ways to mitigate the effects of toxins, and efforts are under way statewide to bolster diminished salmon runs.

No one knows whether the changes will come soon enough to save the orcas. And the whales might not wait around for conditions to improve. Already the local killer whales are making trips farther down the Pacific Coast, perhaps looking for more plentiful sources of food. In April 2000, there was an unprecedented sighting of some of the local whales in Monterey Bay in northern California. Balcomb wondered whether the orcas might eventually pack their bags permanently for sunny California. "They don't have to live here," Balcomb said. Hawks-Johnson is encouraged that the orcas are modifying their behavior in ways that could save them. In the meantime, she'll keep sending out her catamaran, trying to better understand what is happening to one of the Northwest's most beloved icons.

"I'm trying my best to do what I can to help them," she said.

P-I reporter Lisa Stiffler