

Southern Resident Killer Whales

Update on Recent Research Results | June 2007

Background

The Southern Resident killer whales that reside in the Puget Sound region experienced a rapid decline in the mid-1990s, and were listed as Endangered under the ESA in 2005. In 2003, Congress started funding NOAA's Northwest Fisheries Science Center (NWFSC) to support research to address key questions that must be answered to successfully conserve these whales. Here we briefly summarize some of our latest research results on the whales' winter habitat, prey preferences, contaminant burdens, and reactions to whale watching boats and other vessels.

Winter habitat

Knowing where the whales are when they are not in Washington's inland waters is a critical uncertainty. In collaboration with the University of Washington and the Center for Whale Research, we have used a mixture of land-based sighting networks, coastal cruises, and passive acoustic monitoring to greatly expand our efforts in observing the whales on the outer coast. Recently, these efforts have paid off, with the total number of detections increasing from 14 to 32 over the last five years. In the last two years, the passive acoustic listening devices have been particularly successful, and we are planning on expanding our use of these cutting-edge devices next year.

Prey preferences

Prey abundance has been suggested to be a significant factor affecting the whales. Previous research suggested that the whales preferred to eat Chinook salmon, but these studies were limited by small sample sizes and other potential biases. By following whale feeding events, we have expanded the sample size of prey remains to greater than 100 prey items analyzed over the last three years. In addition, we initiated a project to analyze whale feces as another way to identify what the whales are eating. Our results from both approaches confirmed the whales' strong preference for Chinook salmon, although other salmon species and some groundfish are also part of their diet. Together with new calculations of the whales' daily energy requirements, these results indicate that Chinook salmon abundance is likely to be critical to the survival of the whales.



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Interactions with vessels

Boat traffic has increased considerably in the whales' summer core range, and may have detrimental effects on the whales' foraging success and ultimately survival. In collaboration with university and non-governmental organization (NGO) partners, we have conducted and funded several studies to examine how the whales react to vessels. Results of these studies indicate that the whales change their behavior when vessels are nearby. However, the relationships between whale behavior and vessel presence are complex. Several factors are involved, including the number of boats present, the distance between the boats and the whales, and the method of travel of the boats in relation to the whales (i.e. paralleling the whales' course or leapfrogging). These studies have shown that killer whales may demonstrate avoidance behaviors or modify social behaviors when a greater number of vessels are present or if vessels are in close proximity (<100-400m) to the whales.

We have also been measuring ambient sound levels and noise generated by various vessels in the core summer habitat of the whales. These studies have shown that their core habitat has high noise levels of which vessels are a significant contributor. Through these efforts and through modeling sound propagation in that environment we expect to determine if anthropogenic noise is interfering with communication or foraging.

Cumulative risk analysis

Understanding the relative contributions of different risk factors is essential for developing a sound recovery strategy. To start to evaluate the relative importance of different risks, we have initiated a project to use statistical approaches to examine the relationship between the whales' survival and birth rates and a range of risk factors, including salmon abundance, the ocean environment, vessel interactions, and exposure to contaminants. Preliminary results suggest that the whales' birth rates are more strongly correlated with Chinook salmon abundance than they are with any of the other factors analyzed.



For more information on the Center's killer whale research, please contact Dr. Michael Ford (Mike.Ford@noaa.gov) or visit our website at http://www.nwfsc.noaa.gov/research/divisions/cbd/marine_mammal/marinemammal.cfm

