

The Dietary Specialization of Killer Whales (411)

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What is a “resident” killer whale? Three forms of killer whales, termed “resident,” “transient,” and “offshore” have been identified in the coastal waters of the Northeast Pacific Ocean. These terms originally described where the whales most frequently appeared. “Residents” are generally in inland waters all summer and feed on fish. “Transients” only appear occasionally and feed on marine mammals like seal lions, seals and sea otters. “Offshore” whales were seen only in outer coast waters and were thought to feed on fish but there are not enough observations of them feeding to confirm this, and they might eat marine mammals as well.

What about killer whales in other Alaskan ecosystems? In the Aleutian Islands and Bering Sea less is known about Killer whales dietary preferences. Observations in Southeast Alaska as well as in other locations indicate offshore type killer whales prey on fish, but it is unknown whether their diet includes other types of prey. Studies are needed to help better describe the prey of resident type killer whales in this region. In the National Marine Mammal Lab surveys greater than 80% of the whales have been identified genetically as fish-eating specialists. Preliminary results indicate about 5-10% of the killer whales are mammal-eating specialist in the central and eastern Aleutians and along the south side of the Alaska Peninsula.



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Killer whales in the Aleutian Islands and Bering Sea have been suggested as a force behind declines in some fish, Steller sea lion, otter, and Harbor seal populations over the past twenty years. It is therefore important to learn what the killer whales in the Aleutian Islands and Bering Sea are feeding on. Studies conducted since the 1980's have confirmed that mammal-eating and fish-eating specialists occur in the Prince William Sound/Kenai Fjords region. Observations from recent surveys in the Aleutians along with other reports from the region, strongly suggest the same specialization occurs there.

What are the researchers studying and what is an isotope? Isotopes are naturally occurring elements whose content in plants and animals change based on the diet of the animal. Researchers measure these changes in tissue samples to help identify what organisms have been eating. Scientists investigate the dietary specialization of killer whales in the Aleutian Island Bering Sea region through the use of stable isotope and fatty acid analysis. Field research provides killer whale tissue samples from animals in areas of the Bering Sea that are poorly represented.

What have we found? Preliminary data suggest that the density of marine mammal eating killer whales was not higher in areas where Steller sea lions have declined most rapidly; in fact, killer whale density was highest in the one area where the Steller sea lion population increased from 1991 to 2004. Though sample sizes are limited, stable isotope results suggest that Aleutian Islands and Gulf of Alaska transients could not have a diet that was exclusively composed of Steller sea lions or harbor seals.