

Paternity testing helps fill in family tree for Puget Sound's killer whales

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In a study published online this month in the *Journal of Heredity*, NOAA researchers and others, using DNA testing to fill in a missing link in the lives of killer whales that seasonally visit Washington's Puget Sound, have discovered that some of the progeny they studied were the result of matings within the same social subgroups, or pods, that are part of the overall population.

One implication of this inbreeding behavior is a significant reduction in the genetic diversity of what is already a perilously small population of animals, formally known as Southern Resident killer whales. That [population numbers](#) only about 85 animals and was listed as endangered under the [federal Endangered Species Act](#) in 2005.

Southern resident killer whales, which also visit the waters of British Columbia and are occasionally found as far south as [Monterey Bay](#), Calif., consist of three pods called J, K and L pod. Inter-pod mating has never been detected in studies of Northern Resident killer whales, which range from Washington to southern Alaska, and until now researchers assumed that Southern Residents exhibited similar mating patterns. The two populations are distinct and do not socialize with each other.

The study, titled "Inferred paternity and male reproductive success in a killer whale (*Orcinus orca*) population," involved researchers from NOAA's [Fisheries Service](#), the University of Washington, Cascadia Research Collective and the Center for Whale Research.

"We were surprised that, in many cases, the father was from the same pod as the mother. Based on earlier studies, we didn't think killer whales mated within their own pod," said Dr. Michael Ford, lead author of the study and a scientist with NOAA's Northwest Fisheries Science Center in Seattle.

"This behavior may be unique to the Southern Resident population, perhaps related to the population's small size," Ford added.

The researchers analyzed 78 individuals for 26 different genetic markers, or DNA fingerprints, and inferred the paternity for 15 mother-calf pairs. The study found no evidence that Southern Residents mate outside their population, but clear evidence that they do sometimes mate with members of their own pod.

"Even though some of the fathers were in the same pod as the mothers, none of them were really closely related to each other. Our results suggest that Southern Residents avoid mating with their siblings or parents, but we aren't really sure of the social process that results in this avoidance," Ford said.

Compared to many mammalian species, males within the Southern Resident community were also found to have a relatively low variance of reproductive success, meaning several males are responsible for offspring production in the population rather than just one or two. This contrasts with some other marine mammals like elephant seals, where a handful of males completely dominate the breeding and may reflect the difficulty male [killer whales](#) have in controlling other males' access to females.

However, the study also revealed that the older and larger males appeared to be responsible for most of the successful matings, indicating that females may choose to mate only with older males, or possibly that

older males may prevent the younger males from breeding successfully.

Ford said he and his colleagues are particularly worried about the group's lack of genetic diversity, which he characterized as a "bottleneck."

"Since this population remains isolated from other killer whale populations, mating within pods puts Southern Residents at risk of genetically deteriorating further from a potential increase in inbreeding or harmful mutations," he said.

More information: jhered.oxfordjournals.org/content/58/1/067.full.pdf+html

Provided by NOAA

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