

New study identifies five distinct humpback whale populations in North Pacific

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Humpback whales are shown feeding. Credit: Photo by Jan Straley, National Oceanic and Atmospheric Administration

The first comprehensive genetic study of humpback whale populations in the North Pacific Ocean has identified five distinct populations – at the same time a proposal to designate North Pacific humpbacks as a single "distinct population segment" is being considered under the Endangered Species Act.

Results of the study are being published this week in the journal *Marine Ecology – Progress Series*. It was supported by the National Fisheries and Wildlife Foundation, the Office of Naval Research, and the Marine Mammal Endowment at Oregon State University.

The scientists examined nearly 2,200 tissue biopsy samples collected from humpback whales in 10 feeding regions and eight winter breeding regions during a three-year international study, known as SPLASH (Structure of Populations, Levels of Abundance and Status of Humpbacks). They used sequences of maternally inherited mitochondrial DNA and "microsatellite genotypes," or DNA profiles, to both describe the genetic differences and outline migratory connections between both breeding and feeding grounds.

"Though humpback whales are found in all oceans of the world, the North Pacific humpback whales should probably be considered a sub-species at an ocean-basin level – based on genetic isolation of these populations on an evolutionary time scale," said Scott Baker, associate director of the Marine Mammal Institute at Oregon State University's Hatfield Marine Science Center and lead author on the paper.

"Within this North Pacific sub-species, however, our results support the recognition of multiple distinct populations," Baker added. "They differ based on geographic distribution and with genetic differentiations as well, and they have strong fidelity to their own breeding and feeding areas."

Humpback whales are listed as endangered in the United States under the Endangered Species Act, but had recently been downlisted by the International Union for the Conservation of Nature (IUCN) on a global level. However, two [population](#) segments recently were added as endangered by the IUCN – one in the Sea of Arabia, the other in Oceania – and it is likely that one or more of the newly identified

populations in the North Pacific may be considered endangered, Baker said.

How management authorities respond to the study identifying the distinct North Pacific humpback populations remains to be seen, Baker said, but the situation "underscores the complexity of studying and managing marine mammals on a global scale."

The five populations identified in the study are: Okinawa and the Philippines; a second West Pacific population with unknown breeding grounds; Hawaii, Mexico and Central America.

"Even within these five populations there are nuances," noted Baker, who frequently serves as a member of the scientific committee of the International Whaling Commission. "The Mexico population, for example, has 'discrete' sub-populations off the mainland and near the Revillagigedo Islands, but because their genetic differentiation is not that strong, these are not considered 'distinct' populations."

The SPLASH program has used photo identification records to estimate [humpback whale](#) populations. The researchers estimate that there are approximately 22,000 humpbacks throughout the North Pacific – about the same as before whaling reduced their numbers. Although recovery strategies have been successful on a broad scale, recovery is variable among different populations.

"Each of the five distinct populations has its own history of exploitation and recovery that would need to be part of an assessment of its status," said Baker, who is a professor of fisheries and wildlife at OSU. "Unlike most terrestrial species, populations of whales within oceans are not isolated by geographic barriers. Instead, migration routes, feeding grounds and breeding areas are thought to be passed down from mother to calf, persisting throughout a lifetime and from one generation to the

next.

"We think this fidelity to migratory destinations is cultural, not genetic," he added. "It is this culture that isolates whales, leading to genetic differentiation – and ultimately, the five distinct populations identified in the North Pacific."

Provided by Oregon State University

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