Scientists use DNA to identify species killed during early whaling days

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(Phys.org) —For more than a hundred years, piles of whale bones have littered the beaches of South Georgia Island in the South Atlantic Ocean – remnants of a vast and deadly whaling industry in the early 20th century that reduced many populations of Southern Hemisphere whales to near-extinction.

This week, scientists announced they have used DNA from the bones to identify the species of whales killed at South Georgia, and to link the collection to a likely time period in the catch records. Their findings are being published in the journal *Marine Mammal Science*.

The study represents the most comprehensive investigation of historic genetic diversity in whales from around the Antarctic region prior to commercial whaling. The researchers attempted to extract DNA from 281 whale bones and were successful in 82 percent of the cases.

Of the 231 samples they identified, the majority (158) were humpback whales. They also documented 51 fin whales, 18 blue whales, two sei whales, and one southern right whale. One of the bones turned out to be from an elephant seal.

"From a preliminary look at the DNA sequences, it appears that there was a high level of genetic diversity in these whales, which is what we'd expect from pre-exploitation samples," said Angela Sremba, a doctoral student in the Department of Fisheries and Wildlife at Oregon State University and lead author on the study.

"The DNA from the bones has been surprisingly well-preserved, but it is important to capture this information now because the bones are susceptible to further degradation and contamination with age."

The first commercial whaling station was established on South Georgia in 1904 and more than 175,000 whales were killed during the ensuing 60 years. During the first 10 years of whaling on the island, floating factories – large converted ships anchored in the harbors – were used to process the whales and workers discarded the carcasses into harbors. Many of the bones drifted ashore and remain there today.

Beginning in 1913, the processing of whales caught from the surrounding area shifted primarily to land and became so efficient that even the bones were destroyed. Sremba believes most of the whale bones in the study are from the early period of whaling on the island, from 1904-13.

"The species composition of the bone collection is quite similar to catch records during that time," she said.

Scott Baker, associate director of Oregon State's Marine Mammal Institute and co-author on the paper, said whale populations still have not recovered in the Southern Ocean despite an abundance of food.

"The waters around South Georgia Island were productive feeding grounds for great whales before whaling," Baker said, "yet they have not returned here in any numbers despite nearly 50 years of protection. That suggests the possibility that the local population was extirpated, resulting in the loss of some cultural knowledge about the habitat."

Sremba, who is based at OSU's Hatfield Marine Science Center in Newport with Baker, said knowledge of the whales' genetic diversity captured from these bones is invaluable.

"This unique resource will allow us to compare historical genetic diversity to contemporary populations to assess the potential impact of the 20th-century commercial whaling industry," she said.

Provided by Oregon State University