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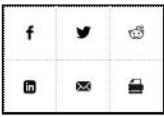
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Genetic Analysis Revises Tally of Past Whale Populations

By Dennis Watkins on July 25, 2003




Credit: NOAA

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How do Whales and Dolphins

Whales can be difficult creatures to track. To determine how many of the animals lived in the ocean before commercial whaling brought the population to the brink of extinction, conservationists rely on hunting logbooks dating from as far back as the 17th century. This method has produced historical estimates of approximately 20,000 humpback and between 30,000 to 50,000 fin whales in the North Atlantic. A report published today in the journal *Science*, however, indicates that there may have once been 10 times this number of leviathans.

Joe Roman of Harvard University and Stephen Palumbi now at Stanford University first collected samples of mitochondria DNA (mtDNA) from 510 individual humpback, fin and minke whales. The particular segment of mtDNA used has no known function, so mutations in that region are not weeded out by natural selection, and alterations accumulate quickly. The study authors conclude that only a large population of whales could have

produced what they call the "surprisingly high" number of different mutations present in today's whales. Indeed, they estimate the totals reached 240,000 humpback whales, 360,000 fin whales and 265,000 minke whales. Palumbi says he never expected to find such a large discrepancy between their analysis and the logbook records. "To be completely honest," he remarks, "what took the most time was for us to believe it."

The new analysis only gives a long-term population; essentially, it shows that at some point there must have been enough whales to account for the genetic diversity seen today. "One of the limitations is that we can't say that in 1600 there were 240,000 whales," Roman points out, and adds, "We don't see evidence that they went through a population bottleneck any time recently." In fact, he and Palumbi checked their results with specialists in ecological computer modeling at the University of British Columbia. Those models suggest that even in 1950, the first year when data is available, the oceans had sufficient resources to support these vast numbers of whales. "There's food enough," says Villy Christensen, one of the scientists who conducted that study.

A high historic whale population could have an impact on how scientists presently view the status of whales as an endangered species. The current humpback whale population of around 10,000 is roughly 50 percent of the pre-industrial whaling numbers determined from logbook records. Using the genetic analysis, however, the current population is only 4 percent of what it once was. Palumbi says that with the revised historical estimates, it could be "on the order of 50 to 100 years" before whales can again be hunted.

Link: <https://www.scientificamerican.com/article/genetic-analysis-revises/>