Study of the past suggests the future for narwhals is uncertain

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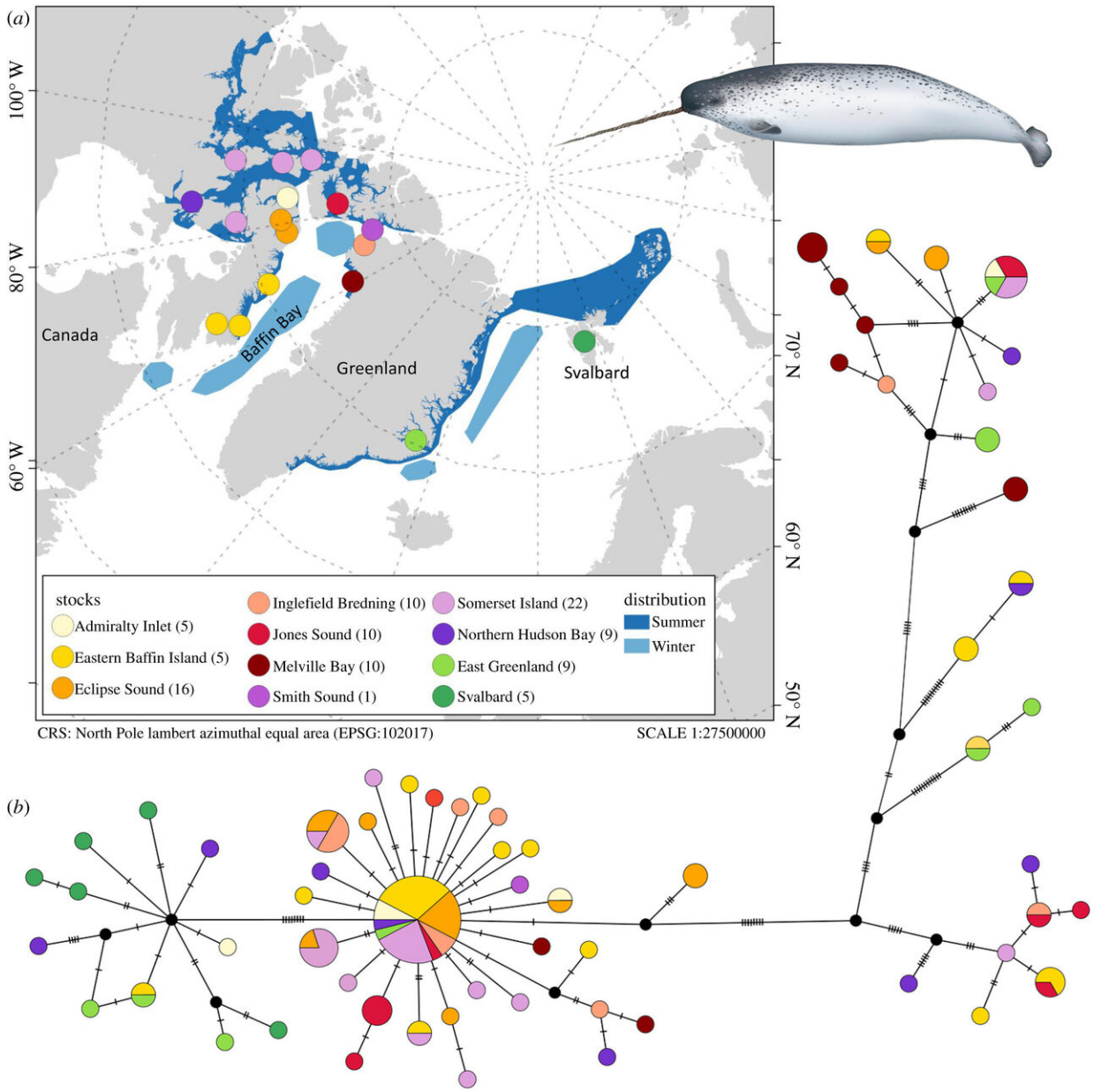

(a) Map of sampled narwhal stocks. Three stocks comprise several sample localities: Eastern Baffin Island, Eclipse Sound and Somerset Island [20]. The summer and winter distributions have been re-drawn from the latest NAMMCO report. Note that a recent study indicated that narwhals between North-East Greenland and Svalbard are present year-round (b) Median-joining haplotype network of the 64 haplotypes found within the 121 narwhal mitogenome sequences. Each circle represents a haplotype and is coloured in proportion of individuals from each stock, where the haplotype is found. Circle size is proportional to haplotype frequency. Black circles indicate intermediate haplotypes not found in our samples. Black dashes indicate mutation steps between haplotypes; of note, distances between haplotypes are not to scale. Narwhal illustration by Uko Gorter. Credit: *Proceedings of the Royal Society B: Biological Sciences* (2020). DOI: 10.1098/rspb.2019.2964

A team of researchers from Denmark, Germany, Norway, the U.K. and Canada has used DNA analysis to study the genetic history of narwhals, and report that their future is uncertain. In their paper published in *Proceedings of the Royal Society B: Biological Sciences*, the group describes their study of the sea creatures and what they learned about them.

narwhals are a unique species of whale—they are related to beluga whales, but differ in one major way—they have a long spiraled "tusk" protruding from the front of their head. The tusk is actually an extended tooth that pokes through their upper lip. The purpose of the tusk was not known until three years ago; researchers found it was used to stun prey before swallowing. In this new effort, the researchers sought to learn more about the history of the unique whales by studying their DNA.

The researchers worked with native Inuit who are allowed to kill and eat narwhals. They also collected samples from whales in Greenland and from archeological remains in Europe and Russia. Study of narwhal

DNA also allowed the researchers to create habitat models showing where the whales have lived in the past, and where they live now. They found that there are just three groups of narwhals, two of which live off the shores of Canada—the third lives off the coast of Greenland. All three groups are very closely related and are deep sea divers, and all three live in the Arctic Ocean. Also, they found all three groups to have among the lowest genetic diversity ever observed in a marine mammal.

The researchers also found evidence showing that the success of the narwhal has been heavily dependent on habitat availability—they require deep, cold water filled with squid, shrimp and a variety of fish. In the past, their range was wider, which suggested a larger population. But like many other marine creatures, their range was reduced after the last Ice Age.

The researchers also looked at climate models that show warming in the Arctic, and used that to predict the fate of the narwhal—they estimate the species will see a 25 percent decline in population by 2100, and that all three groups will have to move farther north to survive.

More information: Marie Louis et al. Influence of past climate change on phylogeography and demographic history of narwhals, Monodon monoceros, *Proceedings of the Royal Society B: Biological Sciences* (2020). DOI: 10.1098/rspb.2019.2964