

New survey techniques improve narwhal population estimates

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Improvements in aerial survey methods have led to increased estimates of narwhal populations in the eastern Arctic, according to a paper published *Arctic*, the journal of the University of Calgary's Arctic Institute of North America.

Previous estimates of narwhals were based on surface counts and covered part of their eastern Arctic summering range. They placed populations between 20,000 and 30,000. New estimates increase that number to over 60,000, says Pierre Richard, lead author and research scientist with the Canada's Department of Fisheries and Oceans.

Counting [marine animals](#) is notoriously difficult. "It's not like you're counting your cows as they are going through the gate," says Richard, who developed the survey techniques with a team of scientists from Canada, the U.S. and Greenland.

Not only are observers traveling in aircraft flying at 180 kilometers an hour, they also have to contend with inclement weather conditions which can hinder visibility. "The weather can turn on a dime and you are often waiting for the sweet spot between foggy conditions and high winds," he says.

In addition, many animals are submerged. Narwhals are renowned for their deep diving abilities. In the winter, they dive to depths of two kilometers and they can remain submerged for up to 25 minutes. "Only one-third of their time is spent at the surface," says Richard.

There is also the problem of narwhal sighting distance. "The further the animal is away from the observer, the less likely you are to observe it," says Richard. At other times, whale sightings are coming "so fast and furious" it is difficult to count them accurately.

Richard and his colleagues developed two new approaches to correct for some of these biases. Using dive data acquired from instrumented animals, they developed a method for estimating how many narwhals are submerged. They also created a process to estimate the proportion of animals that observers might have missed, even if they were at the surface.

The surveys, which were conducted in August between 2002 and 2004, also covered new territory. Narwhals summer in the High Arctic archipelago and northern Hudson Bay and winter in Baffin Bay and Davis Strait. Previous surveys had not covered all of their summering range. Richard and his colleagues extended data collection into the Gulf of Boothia and the east coast of Baffin Island. They were planning to fly over other areas, but were stopped by weather.

An accurate picture of narwhal populations is needed to set sustainable hunting quotas. Richard says that while his survey results show the narwhal population is larger than previously thought, management of the population should be exercised with caution. Survey results can be imprecise and there appear to be local stocks of narwhals that return each summer to specific areas within their range. This site fidelity suggests that stocks of narwhal occupying different summering areas should be managed separately, and that management of a stock should be based on the summer estimate of narwhals for that area only.

Richard's team will be waiting out weather again in 2010 to conduct further studies. This time, they hope to conduct newly designed surveys of Admiralty Inlet - if weather permits. During previous surveys, the

area had been beleaguered by bad weather and sampling problems that put the accuracy of the area's narwhal estimate in question.

Provided by Arctic Institute of North America

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