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# STOCK DEFINITION OF BELUGAS AND NARWHALS IN NUNAVUT

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*Narwhal by R. Phillips.*

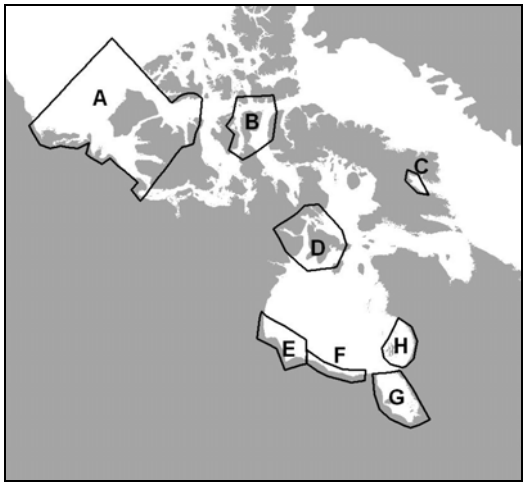


*Figure 1: Summer aggregations of Nunavut beluga whales (A: Eastern Beaufort Sea; B: Eastern High Arctic-Baffin Bay; C: Cumberland Sound; E-D-F: Western-Northern-Southern Hudson Bay (Western Hudson Bay population); G: James Bay; H: Eastern Hudson Bay).*

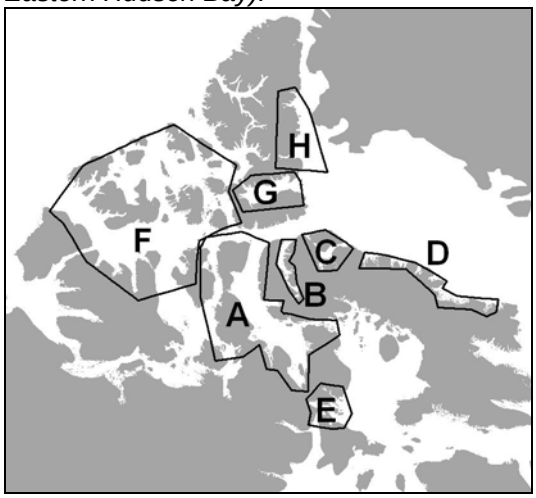


*Figure 2: Summer aggregations of Nunavut narwhals (A: Somerset Island; B: Admiralty Inlet; C: Eclipse Sound; D: East Baffin Island; E: Northern Hudson Bay F: Parry Channel; G: Jones Sound; H: Smith Sound).*

**Context :**

*The Nunavut Wildlife Management Board (NWMB), in its review of advice provided by DFO Science on Total Allowable Harvest (TAH) for Nunavut beluga and narwhal stocks, has asked DFO to provide clarification on its rationale for providing science advice on the basis of known summering stock aggregations rather than at the population level. The NWMB also asked for clarification about various terms used (e.g., population, stock, sub-stock, management unit) and for an update on the current stock identity of belugas harvested by hunters from Iqaluit and Kimmirut.*

*In response to the request from the NWMB, this document provides the rationale to support previous science advice for harvest levels based on summering stock aggregations. It also provides information relevant to the definition of stocks of belugas and narwhals in Nunavut.*

## SUMMARY


- There is good evidence that Nunavut belugas are segregated geographically on a seasonal basis and, in many cases, year-round. There is also good evidence of genetic, contaminant and morphological differences between many of these beluga stocks.
- Six stocks of belugas potentially occur in Nunavut waters: Eastern Beaufort Sea, Eastern High Arctic-Baffin Bay, Cumberland Sound, Western-Northern-Southern Hudson Bay, James Bay and Eastern Hudson Bay.
- Evidence for narwhal segregation between stocks is largely based on tracking data, although some genetic and contaminant analyses also suggest some degree of geographical partitioning.
- Five stocks of narwhals occur in Nunavut waters: Somerset Island, Admiralty Inlet, Eclipse Sound, East Baffin Island, Northern Hudson Bay
- Managing harvest based on stocks reduces the potential for local depletions.
- Using current stock information is an appropriate and precautionary approach to co-management particularly for hunting communities that rely on a predictable seasonal occurrence of animals for their subsistence harvest.


## INTRODUCTION

The term “stock” generally refers to a resource unit: a group of animals that are subject to hunting. The biological definition of a population is a reproductively-isolated group of animals. Stocks defined here may or may not be populations in that sense but they are geographically segregated groups subject to hunting. The term “sub-stock” was used by the Scientific Working Group of the Joint Commission on Conservation and Management of Narwhal and Beluga (JCNB) and the North Atlantic Marine Mammal Commission (NAMMCO) to subdivide the previously known “Baffin Bay Narwhal” stock into smaller management units to reflect information on the “sub-stocks” seasonal segregation. It essentially means “stock”. This analysis refers only to management “stocks”, keeping in mind that some of these stocks may or may not be “populations” in the biological sense.

Factors such as demographic and life history variability, habitat patchiness, environmental change, genetic sub-structuring and adaptability may result in temporally- or spatially-structured populations. It is possible to have localized depletions or extinctions if these factors are not considered when harvesting occurs. It is important to choose the definition of stock to suit the management goal. In this case, avoiding local depletion is one such goal, particularly for hunting

communities that rely on a predictable seasonal occurrence of animals for their subsistence. This goal also promotes the conservation of genetic diversity which may result from adaptation to local conditions. An example of the depletion of a local beluga stock is the Ungava Bay stock, which has been severely depleted, perhaps eradicated, by commercial whaling.

# ANALYSIS

## Methods

Stock definition of beluga and narwhal populations in Nunavut (Richard 2009) was derived from various sources of information:

1) studies of the seasonal range of the species in Nunavut and adjacent waters by documenting local and written reports of their occurrence,
2) appearance and behavioural differences of animals from different areas of Nunavut and adjacent waters,
3) studies of genetic and contaminant differences among animals from different parts of Nunavut and adjacent waters, and
4) tracking animals, using satellite-linked transmitters, to estimate their seasonal range and delimit areas of aggregations.

## Results

### Beluga Stocks

The combination of the above-mentioned data sources has allowed the identification of six beluga stocks (Fig. 1 A: Eastern Beaufort Sea; B: Eastern High Arctic-Baffin Bay; C: Cumberland Sound; E-D-F: Western-Northern-Southern Hudson Bay[1]; G: James Bay; H: Eastern Hudson Bay) in Nunavut.

The stock harvested by hunters from Iqaluit is not known for certain but is thought to be the Western-Northern-Southern (WNS) Hudson Bay beluga stock (Fig.1 E-D-F), to whom they are most similar genetically. This stock is very large (~63,000 animals) and winters in Hudson and Davis Straits. Most belugas caught around Kimmirut are taken in the autumn when the WNS Hudson Bay stock has moved into Hudson Strait (Smith 2008). Belugas found in Frobisher Bay and hunted by Iqaluit residents in summer are thought to be strays from this large stock.

### Narwhal Stocks

Stock definition in Nunavut narwhals is not as clear as it is for belugas. Tracking results offer the best indication of geographic segregation in summer and, in the case of the Northern Hudson Bay stock, year-round. There is also some evidence from genetics and contaminants of stock partitioning in High Arctic narwhals. On that basis, five Nunavut narwhal stocks are identified (Fig. 2 A: Somerset Island; B: Admiralty Inlet; C: Eclipse Sound; D: East Baffin Island; E: Northern Hudson Bay) and three more (Fig. 2 F: Parry Channel; G: Jones Sound; H: Smith Sound) are hypothesized to exist based on the fact that narwhals have been sighted or hunted

[1] This corresponds to the Western Hudson Bay population of belugas assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

in these areas in summer and also because other stocks are sedentary during the same season.

## Sources of Uncertainty

The stock definitions are provisional since they are based on an incomplete state of knowledge, particularly for narwhal stocks, for which information is equivocal in some cases and all but absent in others. There is uncertainty about the beluga stock present in Frobisher Bay during the summer months. These stock definitions can be altered if any new information changes these conclusions.

# CONCLUSIONS AND ADVICE

The use of summering stocks as management units as we have done here is considered precautionary. As mentioned above, it is possible to have localized depletions or extinctions if this consideration is not taken into account when harvesting occurs. Even with information that is preliminary and based on small samples, by adopting as many stock units as are suggested by this information, co-managers reduce the risk of over-exploitation. For example, over-exploitation could occur if smaller stocks are assumed to be part of a larger- and wider-ranging stock, when in fact they are segregated for all or part of the year and have some annual site fidelity to specific areas.

# SOURCES OF INFORMATION

Richard, P.R. 2010. Stock definition of belugas and narwhals in Nunavut. DFO Can. Sci. Advis. Sec. Res. Doc. 2010/022. iv + 14 p.

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