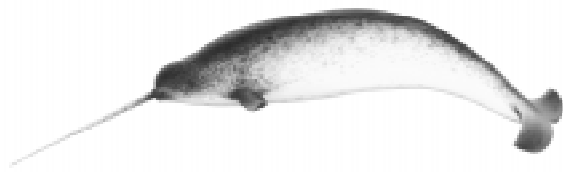


Central and Arctic Region

Stock Status Report E5-44 (1998)



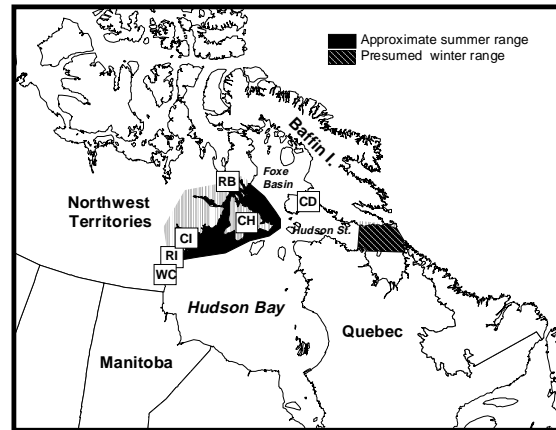
Hudson Bay Narwhal

Background

The summer range of Northern Hudson Bay narwhals includes the waters surrounding Southampton Island, with the largest aggregations in Repulse Bay, Frozen Strait, Western Foxe Channel and Lyon Inlet (see summer range on map; Richard 1991). Most are assumed to winter in eastern Hudson Strait while some occur in open leads and polynyas of Northern Hudson Bay and western Hudson Strait.

Hudson Bay narwhals are hunted under a quota system in 6 communities. Repulse Bay is the main hunting community. The skin, or maqtaq, is highly prized by the Inuit for food and is consumed locally or traded to other Inuit communities. Meat may also be consumed as food. The tusk of males is a valuable economic commodity. The hunt itself and the sharing of its proceeds are of great social and cultural significance for many communities in the region.

The hunt is co-managed by the Nunavut Wildlife Management Board and the Canada Department of Fisheries and Oceans (DFO). Hunting regulations are implemented under the Fisheries Act and the Narwhal Protection Regulations by DFO. Narwhal quotas were originally set through negotiation with communities based on their historic harvest levels (Strong 1988). For many years, the hunters in these communities have been requesting changes to the management system of narwhal. A review of the stock was undertaken to anticipate the consideration of new management options for this species.



Range map of Hudson Bay narwhals (boxed letters show the locations of communities named in the table below)

The Hunt

Community	(quota)	Catch				
		93-94	94-95	95-96	96-97	97-98
RB-Repulse Bay	(25)	13	5	4	10	35
CI-Chesterfield In.	(5)	0	0	0	0	0
CH-Coral Harbour	(10)	1	0	10	10	9
RI-Rankin Inlet	(10)	0	0	6*	7*	0
WC-Whale Cove	(5)	0	0	0	0	1
CD-Cape Dorset	(10)	0	1	0	0	0
Total	(55)	14	6	20	27	45

* caught in Repulse Bay by Rankin Inlet hunters.

Narwhals in Hudson Bay are hunted mostly in summer. Cape Dorset hunters see narwhals in spring and fall. The total landed catch from this stock in the last five years ranged from 6 to 45 (mean 22) per year. The last year is exceptional because killer whales were causing narwhals to beach themselves near the town of Repulse Bay and they were easy prey for hunters (D. Alagalak, Keewatin Wildlife Federation, pers. comm.). The mean catch of the previous four years is 17 narwhals per year.

The landed catches are only part of the total number killed by the narwhal hunts. Some narwhals are killed but lost. Loss rates have not been estimated in Hudson Bay. Most hunts in Hudson Bay are in open water. Open water hunt losses were assessed in North Baffin between 1982 and 1989. During open water hunts, for

every 10 killed there were between one and five narwhals lost (Weaver and Walker 1988; Roberge and Dunn 1990). It is not clear if these North Baffin studies can be used to approximate the Hudson Bay losses.

Resource Status

Stock Delineation

The summer range of Northern Hudson Bay narwhals covers the waters surrounding Southampton Island, with the largest aggregations in Repulse Bay, Frozen Strait, Western Foxe Channel and Lyon Inlet (Richard 1991). The eastern boundary of their summer range is not known but narwhals are rarely seen in Cape Dorset until fall. Narwhals seen in northwestern Foxe Basin are thought to belong to the Baffin Bay stock. These narwhals are reported to move through Fury and Hecla Strait in the Inuk season Auja (mid-July to Early September) (Stewart *et al.* 1995). Narwhals are occasionally seen along the Keewatin coast as far south as Arviat. A large portion of the stock is assumed to winter in eastern Hudson Strait (Richard 1991) where hundreds of narwhals were estimated from surveys in March 1981 (McLaren and Davis 1982, Richard 1991). Some narwhals are also reported to occur in open leads and polynyas of Northern Hudson Bay and western Hudson Strait in winter (Sutton and Hamilton 1932, Richard 1991). One such polynya is known to occur north of the Ottawa Islands (D. Alagalak, Keewatin Wildlife Federation, pers. comm.).

Stock Size

Estimates of numbers of narwhals in Hudson Bay only account for those narwhals that were in the areas surveyed, which include Repulse Bay, Frozen Strait, Gore Bay and Lyon Inlet. There may have been some narwhals in other parts of the stock's summer range. These estimates also do not include animals that were hidden in ice or below the surface. Ice was present only in a small part of the surveyed areas. The summer aggregation of Northern Hudson Bay has been estimated at 1355 surface narwhals (90% C.L.: 1000-1900) based on aerial photographic surveys conducted in July 1984 (Richard 1991). Corrections for diving narwhals could more than double this estimate (Heide-Jørgensen and Dietz 1995).

Stock trend

There is no information to measure changes in stock size over time. There have been no surveys other than

the ones conducted in the early 1980's. No hunter knowledge studies have been conducted in Hudson Bay narwhal hunting communities.

Sustainable Hunting Rate

Studies of the reproductive biology of narwhals in North Baffin and Greenland have concluded that mature female narwhals first calve at age 5 to 12 years and every 3 years on average after that (Hay 1984, Kingsley 1989, Neve 1995). Based on those studies and reasonable assumptions about natural mortality (i.e. mortality due to injury, sickness, starvation, or predation by killer whale or other non-human predators), the maximum population growth and consequently maximum sustainable hunting rate have been estimated at no more than 3-4% per year (Kingsley 1989). This is based on the assumption that an equal proportion of males and females are taken. A larger catch of females would probably reduce this sustainable hunting rate while a greater catch of males would increase it. A more precautionary hunting rate would be 2% given the uncertainties and the fact that growth rate may be reduced by density dependent effects in all but small size populations (Fowler 1981; Taylor and DeMaster 1993; Wade 1998). There is at present no published information on the sex composition of hunts in Hudson Bay. Data from hunt monitoring studies in the two largest Baffin Bay narwhal hunting communities (Weaver and Walker 1988, Roberge and Dunn 1990) show that hunts, in the 1980s in Pond Inlet and Arctic Bay, were biased towards males (2:1 and 3:1 respectively). If the Hudson Bay catches are also male-biased, both the maximum sustainable hunting rate and the precautionary hunting rate would be higher than those mentioned above, which assume an equal ratio of both sexes in the catch.

In hunter knowledge studies conducted in North Baffin communities, most hunters thought that narwhal females gave birth more frequently: every one or two years (Remnant and Thomas 1992; Thomsen 1993, Stewart *et al.* 1995). Hunters said that they often see females with a small and a large calf. There is therefore disagreement as to the exact sustainable hunting rate. There have been no hunter knowledge studies in Hudson Bay narwhal-hunting communities.

Other Considerations

There are no data to indicate that the following factors are presently negatively affecting narwhal populations but they are listed here as potential impacts. Narwhals

could become entangled and drown in lost fishing gear. Narwhals respond to ship noise (Cosens 1995) but it is difficult to determine whether there are long-term, population effects. Noise may be more disruptive to narwhals in hunting areas than in non-hunting areas.

Outlook

The NHB population is a small population but catches are also relatively small (i.e. less than 1% of the survey estimate) and can be considered to be sustainable. Their deep-water habits and inaccessibility to hunters for a part of the year make them less susceptible to overexploitation than other species.

Management Considerations

The apparent small size of the stock and the uncertainties in stock delineation, stock size, growth rate and hunt losses are reasons for caution in introducing management changes. It is advisable to maintain catches close to present levels unless it can be shown that the stock can sustain a higher catch. Every effort to reduce losses to a minimum should be exercised.

For more Information:

Contact: Pierre Richard
 Fisheries & Oceans
 501 University Crescent
 Winnipeg, MB, R3T 2N6

Tel: 204-983-5130
 Fax: 204-984-2402
 E-Mail: richardp@dfo-mpo.gc.ca

References

- Cosens, S. 1995. The impact of ship noise and disturbance on the behaviour of narwhals and belugas. SWG/WP95-10.
- Fowler, C.W. 1981. Comparative population dynamics in large mammals. In: Fowler, C.W. and T.D. Smith (eds). Dynamics of Large Populations. John Wiley & Sons. New York. xviii + 477 p.
- Hay, K.A. 1984. The life history of the Narwhal (*Monodon monoceros*, L.) in the Eastern Canadian Arctic. PhD dissertation. McGill University. xvi + 255 p.
- Heide-Jørgensen, M. P. and R. Dietz. 1995. Some characteristics of narwhal (*Monodon monoceros*) diving behaviour in Baffin Bay. Can. J. Zool. 73:2120-2132.
- Kingsley, M. 1989. Population dynamics of the narwhal *Monodon monoceros*: an initial assessment (Odontoceti: Monodontidae). J. Zool., Lond. 219:201-208.
- McLaren, P.L., and R.A. Davis. 1982. Winter distribution of arctic marine mammals in ice-covered waters of eastern North America. report by LGL Ltd. to the Offshore Labrador Biological Program. 151 p.
- Neve, P. B. 1995. Narwhal (*Monodon monoceros* L.) in West Greenland. Specialeafhandling ved Københavns Universitat.
- Remnant, R. A. and M. L. Thomas. 1992. Inuit traditional knowledge of the distribution and biology of high Arctic narwhal and beluga. North-South Consultants, Inc., Winnipeg; for the Canada/Greenland Joint Commission on the Conservation and Management of Narwhal and Beluga. vii + 96 pp.
- Richard, P.R. 1991. Abundance and distribution of narwhals (*Monodon monoceros*) in northern Hudson Bay. Can. J. Fish. Aquat. Sci. 48:276-283.
- Remnant, R. A. and M. L. Thomas. 1992. Inuit traditional knowledge of the distribution and biology of high Arctic narwhal and beluga. North-South Consultants, Inc., Winnipeg; for the Canada/Greenland Joint Commission on the Conservation and Management of Narwhal and Beluga. vii + 96 pp.
- Richard, P., P. Weaver, L. Dueck and D. Barber. 1994. Distribution and relative abundance of Canadian High Arctic narwhals (*Monodon monoceros*) in August 1984. Meddr Grønland, Biosci. 39: 41-50.
- Roberge, M. M. and J. B. Dunn. 1990. Assessment of the subsistence harvest and biology of narwhal (*Monodon monoceros* L.) from Admiralty Inlet, Baffin Island, N.W.T., 1983 and 1986-89. Can. Tech. Rep. Fish. Aquat. Sci. No. 1747, 32 pp.

- Stewart, D.B., A. Akeegok, R. Amarualik, S. Panipakutsuk and A. Taqtu. 1995. Local knowledge of beluga and narwhal from four communities in Arctic Canada. Can. Tech. Rep. Fish. Aquat. Sci. 2065: viii+ 48 p. + appen.
- Sutton, G.M. and W.J. Hamilton. 1932. The Mammals of Southampton Island. Part II, Section 1. p. 3-110 In: The Exploration of Southampton Island, Hudson Bay. Mem. Carnegie Mus 12.
- Strong, J. T. 1988. Status of the narwhal (*Monodon monoceros*) in Canada. Can. Field-Nat. 102: 391-398.
- Taylor, B.L. and D.P. DeMaster. 1993. Implications of non-linear density dependence. Marine Mammal Science. 9:360-371.
- Thomsen, M. L. 1993. Local knowledge of the distribution, biology and hunting of beluga and narwhal. A survey among Inuit hunters in West and North Greenland. SWG/WP93-08
- Wade, P.R. 1998. Calculating limits to the allowable human-caused mortality of cetaceans and pinnipeds. Marine Mammal Science 14:1-37.
- Weaver, P.A. and R.S. Walker. 1988. The narwhal (*Monodon monoceros* L.) harvest in Pond Inlet, Northwest Territories: hunt documentation and biological sampling, 1982-1983.

This report is available:
Stock Assessment Regional Office
c/o Susan Cosens
Central & Arctic Region
501 University Crescent,
Winnipeg, Manitoba, R3T 2N6
Tel: (204) 983-8838
Fax: (204) 984-2403
cosenss@dfo-mpo.gc.ca
www.dfo-mpo.gc.ca/csas

ISSN 1480-4913 (for English series)
ISSN 1480-4921 (for French series)

*La version française est disponible à
l'adresse ci-dessus.*

