

CANADA'S NARWHAL WHALE

A Species On The Edge



A report on the status of the narwhal whale in Canada, the commercial trade in narwhal tusks and the need for scientific studies to ensure the survival of the whale populations.

*Narwhal whales like these were
killed for their ivory tusks.*



*Humpback whale pendants carved
from narwhal tusk ivory.
\$145 each*

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REPORT *prepared for the* CANADIAN MARINE ENVIRONMENT PROTECTION SOCIETY

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The views and information presented in this report are not necessarily those of the people who provided photographs, illustrations or information.

Introduction

Whales have given rise to countless myths and legends over the ages. Existing as they do at the intersection of our own air-breathing world and the domain beneath the waves, they have fascinated prophets, philosophers and storytellers since the dawn of history – and none more than the narwhal. The earliest recorded reference to the species dates back 3,600 years, to a largely forgotten Chinese scholar. The chin-lin, he wrote, “roams in a dignified manner and cannot be caught.” Few familiar with one of the ocean’s most intriguing creatures would disagree with the first half of the assessment. But as with so many assumptions about marine life, the second half of the phrase has proven false.

The ancient Chinese may have been drawing on reports passed on from the first people to settle the northernmost regions of the planet. The predecessors of today’s Inuit probably lacked the tools and techniques needed to successfully hunt the narwhal when they first came across the animal some 4,000 years ago, but in time they acquired

both. Their skills gave them access to the narwhal’s tusks, which were subsequently traded to European explorers, who used the delicate spiral teeth to keep alive the fable of the unicorn. Today, the narwhal is part of the Inuit diet in both Canada and Greenland, where it is known respectively as *qilalugat tugaliit* (“the tusked whale”) and *qilalugaq qernetag* (“the one that is good at curving itself to the sky”). Between those first encounters and the early 21st century, researchers replaced the countless myths and legends with biological descriptions and population survey data. In some cases, what we have learned is reassuring, but in others the news is troubling. The narwhal’s habitat is changing, and not for the better. Scientists have reported a dramatic decline in one population. There are still no official caps on the number that can be hunted. Consensus on how we should treat the tusked whale remains elusive, but evidence is growing that unless those charged with protecting its fate can find common ground, the narwhal could drift back into the realm of legend.

UNICORN OF THE SEA

Taxonomists divide all whales into two groups: the baleen whales, or mysticetes, and the toothed whales, or odontocetes. Within the second group, narwhals and belugas belong to the monodontidae family, but only the narwhal lives up to that name, thanks to the male’s single canine tooth, which erupts to form a spiral tusk up to three metres in length. Occasionally both canines can erupt, but the left tooth is almost always longer. Females are also known to exhibit tusks, although they tend to be rare, shorter and less robust than those of the males. Several authorities suspect that the tusk is responsible for the myth of the unicorn, following the narwhal’s discovery by Vikings early in the first millennium. At the very least, the

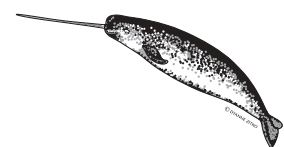
introduction of a long, white tusk to Europe gave credence to tales of a supernatural horse with single horn. A subsequent mistranslation of the Hebrew word for wild ox into the Greek

The true function of the narwhal tusk is more prosaic, probably linked to hierarchical displays among males, who occasionally bear scars attesting to violent encounters. The scientific literature also contains a single report of a female narwhal that was impaled by another whale and subsequently died.

Sources: Berta, Annalisa, and James L. Sumich, 1999. *Marine Mammals: Evolutionary Biology*. Academic Press. pp. 310-312; Cawardine, Mark. 1995. *Whales, Dolphins and Porpoises: The visual guide to all the world’s cetaceans*. Stoddart. p. 96; Rosing, 1999.



“monokeros” in early English versions of the Bible likely led to the notion that the unicorn originated in the Garden of Eden, endowing the tusk with magical, healing properties.





NARWHAL WHALE (*Monodon Monoceros*)

Males max. length: 5 metres
excluding the tusk, 7 to 8 metres
including the tusk

Males max. weight: 1,200 kg (*tusk: 9 kg*)

Females max. length: 4 metres
excluding the tusk, 5 to 6 metres
including the tusk

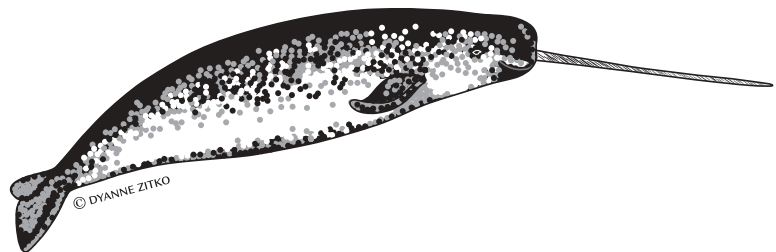
Females max. weight: 600 kg

Life span: Over 52 years
(*as investigated by tusk sectioning*)

Prey year-round: fish, squid
and shrimp

Prey in spring: Arctic cod

Prey in winter: Greenland halibut,
polar cod, crustaceans, and
cephalopods, including squid
and octopus



THE RANGE OF THE NARWHAL IN CANADA

The narwhal is a migratory cetacean found in Canada's eastern Arctic, with the largest concentrations in Lancaster Sound and off the coast of north-eastern Baffin Island. A secondary centre of abundance is in the Repulse Bay area and around northern Southampton Island. During the winter fast-ice period, the narwhal vacates most of its Canadian range. The majority of narwhals winter in the heavy pack ice of Baffin Bay and northern Davis Strait, and some swim into the mouth of Hudson Strait. From March to May, narwhals migrate north through Baffin Bay, following the receding pack ice off the west coast of Greenland as far south as the Thule area. In June and July, some narwhals travel north into Smith Sound, but most of the whales turn west and southwest to Jones and Lancaster sounds. A small number of narwhals move from the wintering area through Hudson Strait to northern Hudson Bay and Foxe Basin. In the fall, the narwhal migration generally retraces the spring and early summer movements.

Missing Information

The main challenge of modern whaling management is the lack of baseline data – how many whales were there before the modern whaling era began? The advent of steam-powered vessels and modern weaponry gave human whaling parties a distinct advantage over their cetacean prey, even in the hostile arctic environment of shifting pack ice and gale-force storms. The whalers rendered hundreds of thousands of animals into oil and corsets over the past 400 years, and just what that harvest means in an ecological sense is far from clear.

Using DNA analysis, for example, Harvard University biologists Joe Roman and Stephen Palumbi recently revisited estimates of pre-whaling era populations for several species of whales, and found them wanting. They calculated that the original population of humpback whales (*Megaptera novaeangliae*) could have been as much as 10 times higher than the previous estimates, which were largely based on whalers' catch records. "Such discrepancies suggest the need for a quantitative re-evaluation of historical whale populations and a fundamental revision in our conception of the natural state of the oceans," they wrote in the journal *Science* last year.

Our understanding of the prehistoric impact of aboriginal whaling is similarly hobbled by a lack of reliable techniques for estimating catch rates. A recent study on the ecological impact of early Inuit communities suggests that their activities left measurable changes on High Arctic lakes and ponds, and their presumed disastrous effect on many species of terrestrial "megafauna" is well known, if still politically contentious. For the most part, however, paleolithic peoples are rarely blamed for contributing to the extinction or extirpation of a single population of whales. In the case of the narwhal (*Monodon monoceros*), they proved so hard to land with Stone Age equipment that they enjoyed "virtual protection from overexploitation," according to one researcher.

Because the narwhal was never pursued as aggressively, we have even fewer data at our disposal than the meticulous but often misleading whaling records associated with the hunts for humpbacks and other larger cetaceans. After the Vikings of the 11th century returned to Scandinavia with

stories of the unicorn of the sea and its magical horn, a high-end market evolved in Europe for powdered narwhal tusk, or "alicorn," which was considered an aphrodisiac and base for therapeutic tonics. European commercial whalers looking for the much-prized bowhead whale (*Balaena mysticetus*) in the 18th century occasionally took narwhals when the opportunity arose, but most tusks and the odd hide that found their way into the market were bartered from the Inuit, who hunted the whales for food and had no records to offer. A dearth of useful historic data, compounded with a lack of information on the life history of the species, made scientific management of the narwhal hunts nearly impossible. The situation is unlikely to improve any time soon, thanks to the narwhal's ecological niche.

As is common among marine mammals, the number of distinct populations of narwhal is unclear. Most references include three, but there may be five or more, all in waters surrounding Canada and Greenland, although tiny, relict populations have been reported in Iceland, Norway (Svalbard), the United States (Alaska), and Russia.

None of the populations is close to the environments in which most biologists prefer to conduct their research. It is no mystery why cold-water species are the least studied of the cetaceans. Arctic science is extraordinarily expensive, the field season short, the daylight required for visual surveys in short supply for half the year, the climate unforgiving, and the distances from urban centres extreme.

Past chronic under-reporting of narwhal mortality in both Canada and Greenland has only made matters worse. The IUCN – The World Conservation Union places narwhals in the "Data Deficient" category, which implies that our understanding of the global population is not sufficient to assess whether it is at risk. It was no surprise to find that of approximately 800 abstracts presented to the 14th Biennial Conference on the Biology of Marine Mammals in Vancouver in 2001, only one specifically dealt with narwhals. At the 15th meeting of the world's marine mammalogists, held two years later in Greensboro, N.C., the only mention of narwhals came in a workshop devoted to whale watching (see *The Solitary Narwhal* sidebar).

Cause For Optimism?

Science is not completely ignorant on the subject, of course. The three most commonly identified populations include one in Baffin Bay between Canada's Baffin Island and western Greenland; another in northern Hudson Bay; and a smaller one in the Greenland Sea and eastward to the Barents Sea. Of the three, only the Baffin Bay population is considered healthy, with the latest estimate exceeding 50,000, according to Pierre Richard, a narwhal biologist with Fisheries and Oceans Canada (DFO). By comparison, Hudson Bay is home to perhaps 1,500 and the East Greenland population numbers in the low hundreds.

This past spring, Richard presented his findings, based on aerial surveys of the High Arctic in the summers of 2002 and 2003, to a joint scientific working group of the Canada-Greenland Joint Commission on Conservation and Management of Narwhal and Beluga (JCNCB), and the North Atlantic Marine Mammal Commission (NAMMCO), an international body for cooperation on the conservation, management and study of marine mammals. Richard cautions that the numbers are still preliminary, as the surveys are continuing in 2004. He adds that NAMMCO was "unsatisfied" with an initial report, due to the large confidence intervals. Richard's revised report, delivered in April 2004, concludes that Canada's narwhal population is "very large," numbering "in the tens of thousands." He notes that "substantial numbers of narwhals are found along the previously unsurveyed east Baffin coast."

The bottom line is that according to the DFO, Canada's narwhals appear to be doing well. Regardless of the actual numbers – confidence intervals are relatively large due to problems counting a highly migratory animal visible from the air only a fraction of the time – the trends are reassuring. Compared with surveys over the past few decades, says Richard, "We didn't find any evidence of decline." In addition, DFO records indicate that harvest rates among the Inuit of Canada's Nunavut territory have not changed significantly for several years, hovering in the low to mid-hundreds, well within sustainable levels. Concerns have been expressed over the introduction of some community-managed hunts in Nunavut, but the number of cases of communities exceeding their harvest limits, and the degree of the overharvest, appear to be declining (see *Lessons in Local Control* sidebar).



Baby Narwhal Whale

But at least one veteran of High Arctic narwhal research, Canadian marine biologist Kerry Finley, questions the DFO's numbers. Like belugas, he says, narwhals occupy restricted summering habitat in the High Arctic Islands and intensive surveys of these areas "have not yielded anywhere near the 20 thousand whales" that were first estimated from a combination of shore-based and aerial surveys during spring migration through Lancaster Sound (the Northwest Passage). "The assumptions used in these estimates were very questionable," he says.

In addition, he points to the high proportion of narwhals that have been scarred from bullet wounds. "Examine practically any aerial photo of narwhals and you can easily see the white slashes across the back of their heads," says Finley. In one study, over a three year period, he found that 35 per cent of the landed catch of adult narwhals had bullet scars (see photos on *Page 5*). "What this indicates is that a high proportion of the population has been contacted by hunters – too high for a population of 30 or 50 thousand."

Whether the wounded whales are a representative sample have yet to be subject to scientific scrutiny, but at the very least, it suggests more and better surveys are in order.



A hunting encounter at the Pond Inlet ice-edge involving three hunters and a group of eleven male narwhals. The angle was too low and the nearest (25 m) animal received wounds across the back. The photograph was taken at the moment the shots were fired and spray obscures the victim; within moments all other narwhals had disappeared.

Bullet scarring on two adult male narwhals. The animal shown in the photo on the right was probably struck simultaneously by two hunters standing close together, while the widely-divergent orientation of the scars in the animal on the left suggests that it was struck on separate occasions.



Community-Managed Narwhal Hunts: LESSONS IN LOCAL CONTROL

In 1999, a “community-based management” system replaced narwhal quotas for selected communities in Nunavut, following complaints from Inuit hunters that the quotas imposed by Fisheries and Oceans Canada (DFO) were unnecessarily low. The pilot project got off to a rough start. Almost immediately, narwhal takes in some communities rose dramatically,

drawing the attention of biologists concerned about the long-term sustainability of the hunts. Three years into the trial, which was part of an attempt to transfer responsibility for such activities to the Nunavut government, the territory’s Wildlife Management Board reintroduced what it called “temporary harvest limits” with DFO approval.

Those limits will be reviewed as population data become available. The review is behind schedule, and some hunters are reportedly worried about not being consulted.* As the table shows, however, total mortality has fallen in most communities in the past two years, suggesting that community-based management may be beginning to work.

EDITOR’S NOTE: It is unclear whether these lower hunting mortality rates indicate that the whalers chose to take less narwhals or that they found less animals, especially around Pond Inlet where whaling operations in the fjords may have driven narwhals away. Every year, five communities (3,600 people) in Nunavut kill almost 500 male narwhals, Greenlanders kill an average of 660 narwhals. Inuit people sell the tusks and eat the muqtuk (blubber) utilizing 8-10% of a 1,200 kg whale. The rest of the whale is discarded because narwhal meat is too lean to even feed it to the dogs.

NARWHAL HUNTS CHART

Community	Year	Quota/ Harvest Limit	Landed	Wounded & Escaped	Sunk & Lost	Hunting Mortality
Pond Inlet (Mittimatalik)	1999	NQ	130	14	16	146-160
	2000	NQ	166	21	10	176-197
	2001	NQ	63	5	27	90-95
	2002	108	92	1	13	105-106
	2003	130	67	0	6	76
Oikiqtarjuaq	1999	NQ	81	30	25	106-136
	2000	NQ	137	79	40	177-256
	2001	NQ	89	8	9	98-106
	2002	81	81	40	16	97-137
	2003	90	90	0	1	91
Repulse Bay	1999	NQ	156	68	30	186-254
	2000	NQ	49	9	5	54-63
	2001	NQ	100	38	21	121-159
	2002	72	57	0	8	65
	2003	72	30	0	5	35
Arctic Bay	1999	100	101	-	-	101
	2000	NQ	100	-	-	100
	2001	NQ	134	20	4	138-158
	2002	101	77	5	0	77-82
	2003	130	129	14	22	151-165
Kugaaruk (Pelly Bay)	1999	10	Nr	-	-	nr
	2000	10	30	0	0	30
	2001	NQ	41	18	8	49-67
	2002	19	17	0	0	17
	2003	25	24	4	2	26-30

Table 1. Catch Statistics (1999-2003) for Narwhal in Eastern Canadian Arctic Communities with Community Based Management.
NQ - no quota; nr - no record of harvest was reported to DFO.

Source: Ditz, K.L. Catch Statistics (1999-2003) for Narwhal and Beluga in Selected Communities in the Eastern Canadian Arctic. A report to Joint Meeting of the NAMMCO Scientific Committee Working Group on the Population Status of Narwhal and Beluga in the North Atlantic and the Canada/Greenland Joint Commission on Conservation and Management of Narwhal and Beluga Scientific Working Group, Feb. 3-6, 2004.

* Kovic, Ben 2002. The chairman of the Nunavut Wildlife Management Board, on CBC North Radio, April 23, 2002.

Troubling Signs

Across Baffin Bay in Greenland, however, all is not well. Population estimates are falling, and the latest studies suggest the declines may be accelerating. Interest in narwhals as more than just a source of protein and lamp oil has always been strong in Greenland. Hundreds of years before European whalers began trading industrial goods for narwhal tusks with Inuit, the Vikings were doing the same with the people they called Skraellings. That trade introduced the narwhal to Europe and lent it the modern common name, although its etymological origins are uncertain. Some authorities link the Norse word for cadaver, “naar,” to the animal’s blotchy grey appearance. Others suspect it comes from Norse for corkscrew, “nafaar,” referring to the tusk’s spiral design. Whatever the meaning, it was the tusk, and tales of a real-life unicorn, that attracted attention (see *Anatomy of a Treaty* sidebar). Like that of many exotic animals, the tusk was reputed to have healing powers, a belief that survives even today, despite any scientific basis for its medicinal use. Demand for narwhal tusk from traditional Chinese medicine practitioners keeps prices high. In a 2004 report to the animals committee of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Whale and Dolphin Conservation Society (WDCS) revealed the results of an e-mail questionnaire of 40 Chinese medicine shops in Japan:

“Of the eight shops who responded to the survey, none acknowledged offering medicine derived from narwhal tusks, but three explained that tonic containing ground narwhal tusk is used to treat fever, toxicity, pleurisy, measles, pain and venereal disease. A researcher visited all the shops that had responded to the survey. One (one of a chain of 10 stores) offered tonic containing ground narwhal tusk and was told that a large volume of one brand (Great Emperor) was sold annually, mainly to male customers in their 50s and 60s. ... Another brand, which was not seen (Kotengen Seiryokuge), was said to be sold at ¥1.8 million (US\$17,000) for 50g and ¥3 million (US\$28,454) for 100g.”

WDCS researchers also surveyed tourist shops in Greenland last year. Their team came across narwhal tusks for sale for the equivalent of US\$2,300, more than double the going price six years earlier. Those kind of prices can prove most tempting for the typical Inuit hunter in communities where the average household income is a fraction of what urban Canadians or Greenlanders make. And that’s just the legal trade. In November 2002, an ad in the classifieds section of the *Nunatsiaq News*, a Nunavut weekly newspaper based in Iqaluit, offered a mounted



“Narwhal skull with twin tusks. One tusk is 254 cm or 8’4” in length while the other one is 233 cm or 7’4” long. Base approx. 50 cm or 20” height. Very rare!”

— ARCTIC ART SALES WEBSITE

double-tusked narwhal head for sale for \$60,000. Asked by researchers of the Canadian Marine Environment Protection Society (CMEPS) about permits and licenses required by Environment Canada, the Clyde River hunter who placed the ad said he was not interested in paperwork of any kind, although he was still willing to make the sale. Whalers are supposed to tag each tusk to prove the whale was legally taken, and obtain a Marine Mammal Export Permit to ship the tusks outside Nunavut. A CITES permit is required to ship the tusks outside Canada.

While the market details may come as a surprise to some, conservation concerns for narwhal are nothing new. Canada’s narwhals were added to CITES Appendix III, the lowest level of concern, in 1975, and Greenland’s were added two years later. (See *Anatomy of a Treaty* sidebar for a full explanation of CITES protocols). By 1979, however, CITES uplisted the entire species to Appendix II, meaning that Canada and Denmark, which governs Greenland’s foreign affairs, were required to make science-based “non-detriment findings” before allowing any exports. Exactly how those findings are made is up to each country, but the most common regulatory tool is a quota based on population surveys. And getting those numbers has not proven easy.

The task of monitoring the vast majority of the world’s narwhals falls to the Canada-Greenland Joint Commission on Conservation and Management of Narwhal and Beluga, a body that has been warning since at least 1992 that the current state of affairs is untenable. The commission issued a press release that year stating that Greenland’s share of the Baffin Bay population would be depleted by 1999

unless better management was in place. By 1995, word was spreading of a potential problem. A report from the Canadian Arctic Resources Committee noted that “a large harvest of High Arctic beluga and narwhal stocks by Greenlanders compounds the management/conservation problem.” In 1999, the Greenland government finally began drafting regulations for narwhals and belugas. The new rules would set national and regional quotas and ban the killing of females and juveniles, as well as the use of nets. They have yet to come into force. At least part of the reason could be a lack of information, or at least, enough solid data on which to base a politically unpopular decision. That same year, the North Atlantic Marine Mammal Commission asked its scientific committee “to identify the information needed to assess the level of sustainable utilization of the West Greenland Narwhal.” The committee replied that without a considerable increase in resources, there was no way it could meet that demand. In other words, it did not even have the funding to determine which studies it needed to carry out. But in the past five years, the numbers have begun to trickle in.

If anyone is qualified to supply the missing information, marine biologist Mads Peter Heide-Jørgensen is the most likely candidate. A veteran narwhal researcher, he has just published what may be the most important study of Greenland narwhal numbers to date. Using a pair of digital large-format cameras to conduct an aerial survey of northwest Greenland, he recorded fewer animals than expected, when compared against a 1980 survey. If his

methodology is sound, narwhals in the region visible on the surface have declined by 10 per cent in “recent years.”

The consequences for the overall numbers may be much worse. Heide-Jørgensen told *National Geographic* that the narwhal population has shrunk by 6 per cent each year over the past 17 years. That drop may be enough to light the fire under regulatory authorities. Heide-Jørgensen’s study appeared in the peer-reviewed journal *Marine Mammal Science* just in time for the 13th meeting of the North Atlantic Marine Mammal Commission. The conference’s concluding press release employs unusually strong language: “Grave concern was expressed over the preliminary conclusions on the status of the West Greenland narwhal, where substantial reductions in harvesting will be required to reduce the decline of this stock.” The conference also heard that West Greenland’s narwhal population may be as low as 1,500 animals. As a result, Lars Witting, a researcher at the Greenland Institute of Natural Resources, and other scientists are recommending an annual quota of just 135, which is less than 25 per cent of typical annual catches. Whether Greenland acts on the recommendations and implements its regulations remains to be seen. The home rule government recently passed legislation allowing it to set quotas, but there are hints the limits won’t be as low as the scientists have suggested. A government official reportedly told the *Nunatsiaq News* that Heide-Jørgensen’s estimates may need to be verified and that the quotas may be set higher.

ANATOMY OF A TREATY

Few international treaties enjoy widespread support and at least some degree of success, but one that does both is the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Established in 1975 after several years of negotiation under the auspices of the United Nations, CITES is essentially a trade treaty with precaution written into its mandate. The name is slightly misleading, as the species it regulates are not necessarily endangered – some are at risk of extinction, others are at lower levels of risk but are given protection before they become endangered as a result of unsustainable trade. As of May 2004, there were 166 member nations and more than 30,000 listed species of plants and animals.

The degree of regulation afforded a species depends on which of three Appendices it is listed. Appendix I is reserved for the most threatened species. With some exceptions such as trading species for scientific programs, all commercial trade is banned. Appendix II lists species facing pressures that may lead to extinction if controls are not introduced. International trade is permitted, but exports are allowed only from member countries that make “non-detriment” findings proving the trade will not harm wild populations. Narwhals are on Appendix II. The third appendix is reserved for local populations of species that individual countries require assistance protecting. While species are added to Appendix I or Appendix II only after approval of

two-thirds of the member countries, any member can add its local populations to Appendix III.

In 1995, CITES’ scientific committee for animals reviewed the status of the narwhal and the impacts of trade upon the species. The committee made a series of recommendations to Canada and Greenland, the most important being to conduct up-to-date surveys. When the CITES Animals Committee reviewed progress in implementing these recommendations in April 2004, it concluded that they had not all been fulfilled and set a new deadline of July 31, 2004 for compliance.

Convention on International Trade in Endangered Species of Wild Fauna and Flora: www.cites.org

More Trouble Ahead

In the long term, however, hunting may prove the least of the narwhal's worries. As the experience in Nunavut shows, it is possible to reduce harvest rates, even among those who rely on the animal for food.

Other, more powerful, forces are not so easy to control. The most immediate pressure comes from commercial fishers. Heide-Jørgensen suggests that the recent decline he and his colleagues have documented in West Greenland waters may be due to the overfishing of halibut and other fish species on which narwhal prey. In effect, humans are competing for the narwhal's food supply. Already, he notes, the Greenland halibut fishing fleet is expanding into deeper waters, further threatening the narwhal's place in the ecosystem.

More insidious is the threat posed by chemical contaminants that have been linked first to cancer and now to hormonal, developmental and neurological abnormalities. Since the 1964 publication of Rachel Carson's *Silent Spring*, concerns about the environmental effects of organochlorine pollution have remained high around the world, at both the public and political level. Much of the research on contamination of marine mammals has focused on the effects of human consumption. Most top predators in the Arctic, including polar bears, belugas and narwhals, are contaminated to some degree, thanks to the ocean and air currents that bring southern toxins north, where they increase in concentration as they move up the food chain.

What is often not made explicit is the fact that, while eating contaminated meat is dangerous for humans, the effect on whales may be at least as serious. A study of narwhal blubber and liver samples taken in the early 1980s in northern Baffin Island came to some surprising conclusions. Although the level of exposure to such chemicals as DDT, chlordane, polychlorinated biphenyls (PCBs) and other similar compounds was less than in southern waters, the level of tissue contamination was not correspondingly lower. The researchers wrote that "the pattern of organochlorines in narwhal tissues suggests they are exposed to proportionally more volatile compounds, and may have less capacity to metabolize some of these compounds, relative to odontocetes living nearer sources of these contaminants."

More than a decade later, scientists are still making "first reported discoveries" of toxins in arctic marine mammals. For example, the first report of polychlorinated naphthalenes – a class of chemicals once widely used in cable insulators and wood preservatives but phased out in the 1970s – in Eastern Arctic belugas was published just three years ago.

The other potential nail in the proverbial coffin is climate change. While much of the ice cap that covers the northern polar regions has been thinning and melting due to increased global temperatures over the past 150 years, climatologists don't expect the same trends to hold in all locations. In fact, nearly 10 years of global climate models have predicted that Baffin Bay will see increased ice cover as part of a localized cooling effect, at least in the short term. How fast, to what extent, and for how long the increased ice cover will last before it is overtaken by the global trend toward warmer conditions, are unknown. But it is unlikely that the world's largest population of narwhals will have an easy time adapting to the new conditions. A new study of narwhal migratory behaviour using satellite tracking technology, again led by Heide-Jørgensen, concludes that if the predicted changes in the Eastern Arctic climate come to pass, the species is in trouble: "It must be feared that narwhals, owing to their restricted habitat preference, high site fidelity, low genetic diversity, and dependence on open water during their six-month stay on the winter feeding grounds, have limited options for alternative strategies relative to changes in their habitat in Baffin Bay."

Narwhals have evolved to take advantage of a world dominated by ice. In summer they can be found close to land, in fiords and bays. In winter, they prefer the more remote regions dominated by the ice pack. They spend a significant amount of time beneath the ice, but need to surface regularly, making them vulnerable to "ice entrapment events caused by restricted access to open water or changes in buildup of heavy pack ice." The unanswered question is, can narwhals learn to adapt to new ice conditions, or will they go the way of countless other species driven to extinction due to changes to their environment?

BROTHER BELUGA

The beluga and the narwhal belong to the same family of toothed whales, monodontidae. Other than the absence of a tusk on the male and a white colouring at maturity, the belugas, or “white whales” share many of the biological and ecological characteristics that define narwhals. They are about the same size, found in similar regions, eat similar prey and are hunted by the same predators: humans. Their body tissues are contaminated with the same toxic chemicals, and some local populations of each species are facing extirpation.

With the narwhal, the west coast of Greenland sees the worst cases of hunt management. In Canada, the belugas found in eastern Hudson and Ungava bays are most at risk. Inuit whalers in Nunavik (northern Quebec) have reportedly driven local populations to the brink of

extinction. Quotas set by the federal government in the past few years have been slashed and whalers have been offered as much as \$50,000 in compensation for the restrictions. Even then, the local beluga could be



Echo, one of the solitary belugas

gone by 2017, according to one federal biologist.

Greenland’s beluga could be gone even sooner. One veteran of narwhal research told a recent conference of

marine biologists that the island’s beluga population is currently a quarter of its 1954 size. “Current catch levels are unsustainable and the continuation of such a trend represents a high probability that the population will become extinct in 20 years,” he reported.

Sources: George, Jane. 2002. Reduce beluga hunt or else, biologist says. *Nunatsiaq News*. March 1, 2002; and Alvarez-Flores, C. and M.P. Heide-Jørgensen. 2001. A risk assessment of the sustainability of the harvest of the beluga (*Delphinapterus leucas*) in West Greenland with consideration of random environmental effects.

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THE SOLITARY NARWHAL

By Annelise Sorg, Canadian Marine Environment Protection Society

In December 2003, Dr. Toni Frohoff of TerraMar Research and Cathy Kinsman of the Whale Stewardship Project submitted to the marine mammal viewing workshop at the 15th Biennial Conference on the Biology of Marine Mammals, a scientific paper mentioning a solitary narwhal. The paper references the occurrence of solitary belugas, as well as a solitary narwhal found off the coast of Newfoundland in the summer of 2003.

Except in the case of one beluga found far outside his usual range, who was originally in the company of two other juvenile belugas before the two died, there is no explanation for the occurrence of these lone whales. One of the primary questions that must be considered is how and why

these mostly juvenile whales, become separated from their pod members. Since no humans are there to observe the moment of separation, one can only speculate using information available on the areas these whales are normally found. For example, a recent study shows that the St. Lawrence River belugas are having difficulty communicating because of anthropogenic noise in the river environment. Could this be the reason why young and inexperienced belugas become separated from their pod and swim far away from their home range? No one really knows.

“In terms of the rare appearance of a young narwhal in Newfoundland, so far from his home range in the Arctic,” says Cathy Kinsman who has

studied solitary belugas for over a decade, “one possibility for the cause of separation could be hunting.” This might also provide a plausible explanation for solitary belugas that belong to Arctic whale populations. Whalers target adult belugas and narwhals, so it is certainly possible that young individual whales could become separated from their pods during the hunt, or even remain the sole survivors if all the adult whales are killed. That survivor now alone, might be too disoriented and inexperienced to find his way back to a location where other whales can be found, resulting in the lone animal “wandering” way off course simply in search of food and other whales.

The Trade In Narwhal Tusks

Like many of the smaller cetaceans, narwhals are only now beginning to receive the level of attention long afforded the larger whales. Significant strides have been made by national and international management authorities over the past year.

Greenland introduced hunting quotas for narwhals in June, following the release of studies showing serious declines throughout the arctic island's waters, a situation described by the North Atlantic Marine Mammal Commission (NAMMCO) as "grave." Originally set at 300 (100 for Qaanaaq and 200 for the rest of Greenland), the quota represented a halving of recently reported annual landings, although it was more than twice the scientific recommendation of 135. The following month the Scientific Committee of the International Whaling Commission (IWC) warned that existing hunting rates "may result in the extinction of West Greenland narwhals in the near future." Soon after, Greenland eliminated Qaanaaq's quota, reducing the total to 200. Gauging the effect of the new regulations will be difficult, however, thanks to imprecise export data provided by governments to the Convention on International Trade in Endangered Species of Fauna and Flora (CITES).

Although tusks are still highly prized, particularly in German and Asian markets, both Greenlandic and Canadian exports of what are described as narwhal tusks appear to be on the decline, but the number of narwhal-derived carvings is growing. The trade data rarely record whether carvings are made from teeth or tusks, or report the size or weight of carvings, making it impossible to determine how many animals are represented in the carving trade. Without more detailed information, no useful conclusions can be made about trends in the contents of the trade.

What we do know is that it is a lucrative international commercial trade. A Nunavut hunter reportedly sold a rare double-tusked skull for \$90,000 earlier this year – several times the average annual income of many residents of the territory – and similar items are regularly available on Internet auctions (see *Has Head Hunting Become An Aboriginal Right?* sidebar).



Like other wildlife products, pressure on threatened species may not ease without a corresponding drop in demand. International outrage over the slaughter of elephants for their ivory tusks led to the 1989 inclusion of elephants in CITES. This protection led to an immediate drop in the market for elephant ivory. But what was good for the elephant, was bad for the narwhal. Without any protection from trade, the whale's tusk has simply replaced the elephant's tusk in the ivory market.

The good news is that the international community is showing increased interest in regulating the trade in threatened marine species. In October, CITES listed the great white shark and the humphead wrasse on Appendix II of the treaty, requiring all member countries to ensure their exports are sustainable. CITES also up-listed the Irrawaddy dolphin to Appendix I to protect threatened populations from live-capture by the aquarium industry.

This growing interest in protecting marinelife fortunately, includes the narwhal. The international community now considers the trade in narwhal tusks a commercial enterprise and no longer a by-product of a sustainable aboriginal hunt. That must come as no surprise to Patrice Simon, the DFO official representing Canada at the IWC, who back in 2000 warned narwhal hunters through the media that "tusks are a by-product. It's not supposed to be the end result. If that happens, there could be serious international implications."

HAS HEAD HUNTING BECOME AN ABORIGINAL RIGHT?

By Annelise Sorg, Canadian Marine Environment Protection Society

What would the Canadian public think if they knew it was perfectly legal, even encouraged by the government, for citizens to hunt rare species of animals, with the prospect that if they bagged a specimen, they could auction parts of the animal to the highest bidder on the internet?

Unfortunately, this is the case with the narwhal. The skull of a whale with two tusks can fetch up to \$90,000 in the global ivory market. Fueled by the prospects of "hitting the big jackpot", narwhals are being hunted in a frantic search for the rare double tusk.

A northern rangers program provides ammunition to every person who is willing to sign up. Along the floe edge of North Baffin Island, hunters shoot thousands and thousands of rounds at the whales day and night for months. They all know that it only takes one of these two-tusked whales to be an instant winner in this lottery.

Media reports in July 2004 trumpeted that Tom Naqitarvik, an 18-year-old Inuit hunter, "had hit the jackpot - with his rifle." He shot a five-metre male with two very large tusks. "That's where the money's at," Naqitarvik said. He should know, his father has shot three double-tusked narwhals.



Photo: Narwhal tusks ranging in size from 210 cm – 242 cm, or 82" – 95"

THE ELEPHANT AND THE NARWHAL

International outrage over the slaughter of elephants for their ivory tusks led to the 1989 inclusion of elephants in CITES. This protection led to an immediate drop in the market for elephant tusks.

But what was good for the elephant, was bad for the narwhal. Without any protection from trade, the whale tusk has simply replaced the elephant tusk in the global ivory market.



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