# Polar Exposure: Environmental Threats to Arctic Marine Life and Communities

**Various forms of environmental degradation of the Arctic—some visible to local inhabitants, most ignored by the international community—threaten the people and wildlife of the Arctic region. These threats are too subtle and dispersed for the public to notice ... except in retrospect.**

Swiss Coalition for the Protection of Whales • Global Survival Network

Katherine A. Hanly

*Greenland, 1997*

Contents



*front cover: Uummannaq, Greenland*
*back cover: Upernavik, Greenland*

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Two marine mammal species—the beluga whale and the narwhal—are indicators of the myriad threats facing life in the Arctic marine environment today[1]. These two cousin cetacean species—toothed whales belonging to the smaller cetacean species—are wanderers of the Arctic marine environment. Each species number several separate and distinct stocks around Greenland, Russia, Canada and the United States. Within these areas, the whales have traditionally coexisted with, and have been sustainably consumed by native peoples.

The beluga and narwhal are now under pressure from hunting, environmental degradation, and atmospheric change. Moreover, both species are part of international trade—narwhals for their ivory tusks, and belugas for the entertainment industry. These factors, along with aboriginal hunting in most ranges of the species, may endanger the very existence of these whales.

Arctic communities are also threatened. Health problems have arisen among indigenous peoples as a result of increased contamination of the marine environment and marine mammals—contamination originating in the more southern and industrialized world. By consuming meat and blubber from marine mammals, a significant portion of the Arctic people are unwittingly exposing themselves to second-hand pollution spread from sources far away.

Arctic people have coexisted with and consumed whales for centuries. Factors beyond their region and beyond their control threaten to destroy that balance. The South Greenland beluga whale is extinct[2] and others may follow. The St. Lawrence Estuary population of beluga whales is suffering from environmental degradation.

This changing relationship between humans and whales, and the damaging health effects on both, should not be analyzed in the context of who should, or who should not, exploit the Arctic's natural resources. Inuits have been affected socially, culturally, and economically after Norway, Iceland, Canada and Russia depleted the whale stocks on which they subsisted. The subsequent and necessary protection of the great whales has perpetuated a steady decline in small cetacean stocks, as native hunters have been forced to rely primarily on small cetaceans such as beluga and narwhal.

The destruction of the Arctic is an international crisis that demands international action.

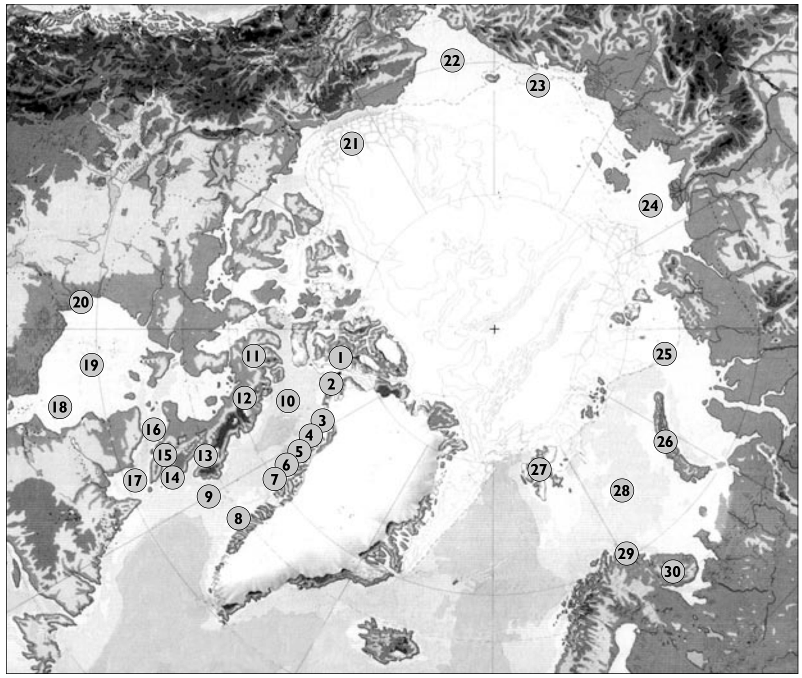
## Narwhals

Male—and some female—narwhals grow a uniquely distinguishing tusk of ivory protruding from their upper jaw. This tusk can grow up to two meters long, while the full body length of an adult narwhal can reach 4.5 meters. The narwhal's tusk is used for combative interaction with other males and to stir up the ocean bottom for prey. A male narwhal may weigh up to 1,350 kilos and a female 900 kilos. The animals feed on Arctic cod fish, squid, and crustaceans.

## Range and Population

Of beluga and narwhal, the narwhal has the most limited geographic range of the two species. Three distinct populations of narwhal have been provisionally recognized: Baffin Bay and Davis Strait (called the Baffin Bay stock), Northern Hudson Bay, and East Greenland. In 1991, the International Whaling Commission's (IWC) Scientific Committee expressed concern about narwhal catch levels in Greenland and Canada. In 1992 the IWC made it clear that neither country had reduced this concern[3]. In fact, during its meeting in 1992, the Joint Commission on the Conservation of the Beluga and Narwhal (JCCBN), a Greenland-Canada bilateral body comprised of Arctic researchers and community members, acknowledged that harvests of narwhal from the Baffin Bay stock was not sustainable and that management action should be taken[4].

The **Baffin Bay narwhal population** migrates between the Canadian High Arctic and the West-North/West Coast of Greenland. Inuit communities on each coast of the Baffin Bay hunt these narwhals. It is difficult to say how many animals are taken in the combined hunt. There are inadequate or nonexistent reporting schemes in both Canada and Greenland, though most apparent in the West Greenland area where the reporting system broke down completely in the 1980s[5]. The Joint Commission's Scientific Working Group in 1995 accepted that all reported catches of narwhal within the Baffin Bay stock are under-reported. Furthermore the Commission could not assign population status to narwhal due to uncertainties in stock identity, abundance, rate of increase and mortality[2].




*The Arctic*

1. *Thule*
2. *Melville Bay*
3. *Upernavik*
4. *Maarmorilik mine*
5. *Nunavik*
6. *Uummannaq*
7. *Ilulissat*
8. *Nuuk*
9. *Davis Strait*
10. *Baffin Bay*
11. *Arctic Bay*
12. *Baffin Island*
13. *Cumberland Sound*
14. *Iqaluit*
15. *Lake Harbour*
16. *Hudson Strait*
17. *Ungava Bay*
18. *Sanikiluaq*
19. *Hudson Bay*
20. *Churchill River*
21. *Beaufort Sea*
22. *Chukchi Sea*
23. *East Siberian Sea*
24. *Laptev Sea*
25. *Kara Sea*
26. *Novaya Zemlya*
27. *Svalbard*
28. *Barents Sea*
29. *Murmansk*
30. *Kola Peninsula*

In 1991 scientists estimated that the narwhal **stock of Northern Hudson Bay** totaled 1,300 animals, a conservatively low number since submerged animals were not counted[3]. Scientists further maintained that the stock is a discreet one and that it should be managed accordingly. A maximum of 40 narwhals have been hunted annually from this stock between 1974 to 1987, and in more recent years, 14 narwhals were killed between 1993 and 1996[6].

DNA sampling has concluded that the **East Greenland population** of narwhals is also discreet, and that in its migration, the stock wanders north to Svalbard and the Barents Sea region of the Russian Arctic[3]. Very little is known about the status and distribution of this stock; there is no population estimate of these animals. It is known, however, that the hunt for narwhals on the east coast of Greenland has ranged between 40 and 60 animals annually, while in 1989 and 1990 the catch was an estimated 70-80 animals[7]. It is presumed that the struck and loss rate of animals, especially on open water, is high.

As mentioned, narwhal groups are found in the Barents, White, Kara, Laptev, East Siberia and the Chukchi Seas with no known or reliable data on harvest of the species. Reports of narwhals in the Eurasian Arctic Ocean have registered the animals as far as 85° North and straying to the Bering Sea[8, 64]. Records and sighting of


Randall R. Reeves

*Narwhal*

narwhal from Alaskan waters are extremely rare and the presence of the species here is considered exceptional[9]. There are no data to suggest that narwhals are being hunted off Alaska.

## Hunting

Narwhal are hunted for meat, blubber, skin and ivory. All of these parts are bartered and commercially traded locally. Narwhal ivory is sold to tourists in Canada and Greenland; some is exported primarily to Europe and Asia. Most records of narwhal hunting in Greenland are incomplete or nonexistent. Some data are derived from the amount of ivory tusks registered as exports, but these do not reflect females hunted which do not carry tusks[10].

Methods used to hunt narwhals have changed considerably. The majority of both Greenland and Canadian hunters have replaced their highly effective and traditional kayaks and hand-held harpoons, with using motorboats and rifles. This modern and preferred method results in a higher number of whales landed, but is also more wasteful. Many whales are struck but lost during hunts. For the most part, these potential casualties and/or wounded whales are not calculated into a final mortality estimate, although the government of Canada has acknowledged struck and lost rates from seven percent to 70 percent from the Baffin Bay narwhal stock[11].

Canadian Inuits operate under a quota system when hunting narwhal, while Greenland has no such restrictions. In addition to the potential over-exploitation of the stock, the current lack of a credible quota system in Greenland is disconcerting, especially when one takes into account deficient and inadequate reporting of actual catches. Since 1990 no hunting statistics have been available from Greenland's Avanersuaq District north of Upernavik. Danish scientists report that in Greenland's Uummannaq District, south of Upernavik, 400-500 narwhals were killed in 1989 but only 275 animals were actually reported. To illustrate the impossibility of relying on dependable trends in, or data from, the Greenland hunt, a recorded 1,019 narwhals were killed in Uummannaq in 1990, while the assumed total from only two months of that year was 1,046 animals[12]. Greenlanders are able to catch beluga and narwhal approximately seven months out of the year. The JCCMNB estimated that the average total annual kill between Canada and Greenland is 820 for the years 1983-1993, not counting 1991, when there were no numbers from Greenland at all. This does not include numbers from Avernersuaq where there are no records kept, but where the JCCMNB estimated the number of kills to be around 150-200 annually[2]. None of these numbers assume that there is mortality as a result of struck but lost animals.

In 1992, the IWC Scientific Committee affirmed that apparent inconsistencies in correlation between narwhal catches and documented mattak sales in villages of northwestern Greenland meant that the true average annual catch was, or is, probably twice as large. The IWC Scientific Committee expressed serious concern in 1992 that the status of the narwhal had been declining[3].

Canada also concedes that much of the actual harvest data pertaining to beluga and narwhal kills are incomplete in the regions where the whales are hunted. Reporting schemes depend heavily on government officials being present when hunting occurs, which is not always the case[6].

Narwhal hunts typically experience a significant struck and loss rate, meaning that some animals are not counted among total mortality if they are known to have sunk or escaped with wounds after being struck. Particular concern about struck and lost rates is voiced by scientists regarding the hunts around the west coast of Greenland. However, in a report by the Canadian based Arctic Fisheries Scientific Advisory Committee (AFSAC) it was found that struck and lost rates in the Canadian hunt ranged from 42-56 percent. The AFSAC declared this unsustainable for the narwhal population[13].

## Trade

The narwhal's ivory tusk has historically been linked to mythical and magical imaginations of unicorns, and to beliefs in the ivory's powers as an aphrodisiac. Whole narwhal tusks, as well as smaller carvings, continue to be sought for their aesthetic value. Greenland is rich with a history of carving from narwhal tusks, while Canadian Inuits have traditionally done very little carving. However, as a result of substantial demand for these products by tourists, hunting communities have started carving[14].

International trade in narwhal tusks began in the seventeenth century, mostly from Canada and Greenland into Asia and Europe. Since then, the narwhal has been one of the most important animals in the Inuit hunt. There is significant economic value in tusk ivory, and mattak and meat remain traded internally with price fluctuations determining the level of exploitation by hunters[15]. Present day trade involves whole tusks as well as carvings from Canada and Greenland. CITES lists the narwhal on Appendix II and thereby mandates that export permits be issued for all narwhal products leaving Greenland and Canada. In 1984, the European Union (EU) banned import of narwhal products into EU member countries (EU Reg. 3626/82, later replaced by EU Reg. 338/97). However, Greenland successfully campaigned for a continuous exemption under these rules, thus making it possible for Greenland as the only territory to export narwhal products to European Union countries. After the new EU regulation came into force in 1984, prices for narwhal ivory first crashed and since bounced back to full pre-regulation market prices[16].

Furthermore, narwhal tusks and carvings can be exported to EU countries if they are traded not for commercial purposes, but rather as "personal effects." According to CITES records, of 23 tusks entering France in 1991, 17 were imported under this "personal effects" label and the rest for commercial use[16].

Selling carvings is easier and more profitable than selling whole tusks. However, whole tusks have been shown to be more obviously discernible to the CITES permit system and thus to controls and true monitoring of trade activity. The export of narwhal products has not slowed since regulations aimed at curbing trade came into force[17]. On the contrary, demand by tourists by importing countries is increasing. Registered exports of ivory carvings from Greenland has increased from 306 pieces in 1991, to 714 pieces in 1995[10]. Prices for narwhal products approximately doubled between 1975 and 1990[16]. Since 1990, prices have remained fairly stable[17]. Greenland sees significant exports of narwhal carvings mostly by tourists, although some pieces are sent directly to importing countries. Most tourists shops, travel agencies, airports and specialty art shops in Greenland sell ivory carvings. In Greenland's capital, Nuuk, one two-meter intact ivory tusk (approximately six kilos) cost 8,000 Danish kroner, ($1,100 USD) in the summer of 1997. Calculating with roughly 75 percent of a tusk remaining as carvings after the actual carving process, potential net gain from one tusk can reach Dkr. 9,000 ($1,285) considering that one small 25 gram pendant costs Dkr. 300 ($43)[17].

Greenland's domestic regulations on the exportation of ivory products are consistent with other countries' rules. Responsibility lies with the exporter to



*Hunters with narwhal (circa 1920)*

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*Greenland, 1997*

obtain the mandatory permits in order to bring the wares out of the country, in this case narwhal products. However, Greenland's authorities have made almost no effort to warn visitors about the necessity of registering exports. Furthermore, Greenland authorities have failed to set up adequate controls at key international exit points. Current custom regulation leaflets available at the main police station and in some airports in Greenland do not mention the export of native animal products, such as narwhal and walrus carvings. The carvings are bought by tourists who receive no information from vendors as to export permits or regulations, and are thus exported without CITES permits[17]. Since 1988, when about 100 tusks were exported with permits from Greenland, the number of narwhal ivory exports has doubled, and in some years tripled[18].

This increase in legal trade in narwhal products, along with apparent illegal exports by unwitting tourists, raises questions about the actual status of the narwhal population and the future of the stock. Also, there is concern that tusk-carrying male narwhals are predominantly targeted in certain areas because of the extra incentive for hunters to sell ivory. In Arctic Bay, Canada, studies have shown that reported catches of narwhals have been strongly biased toward adult males who yield the biggest tusks[16]. Concern for narwhal stocks should not, however, focus on whether tusks are traded commercially as a byproduct of the aboriginal subsistence hunt, but rather on whether commerce in ivory itself is a major motivating factor of the hunt.

Financial incentive to supply a growing demand for narwhal ivory by an increasing number of tourists to Greenland and Canada, and by certain foreign markets, should not be underestimated. Moreover, unlike Canada, Greenland sets no limit as to the amount of tusks, or carvings from tusks, that can be taken out of the country with CITES permits. Although the official number of certificates issued for tusk export during any one year in Canada by no means reflect the true number of tusks taken from narwhals, it does point to the fact that the species from which the product originates can become threatened by trade pressures.

While EU member countries are no longer legal ports of entry for narwhal products, some non-EU destinations serve as entrepots for the narwhal ivory trade. Switzerland has become a significant importer of narwhal ivory and teeth; Swiss merchants then reexport the products to traditional import markets, such as Japan and other European countries[19]. In 1984, when the European Union banned the import of ivory, Canada claimed that it had no domestic market in which to sell ivory[20]. However, less than half the tusks obtained from narwhal hunts between 1975 and 1990 were exported with CITES permits which would then mean either that there was in fact a significant domestic market, tusks were stockpiled, or a significant amount of ivory was exported illegally[14].

As with most other commercially interesting species, management is a necessary component of the harvest of natural resources[14].

## International Whaling Commission

The IWC Scientific Committee has recommended that narwhals be included in the Schedule of the IWC and thus be given status as a stock to be managed by the IWC. However, this proposal has not been accepted, and neither Canada nor Greenland are accepting intervention of any kind from the IWC to facilitate conservation of narwhal or beluga populations. Canada left the IWC in 1982 and Greenland continues to reject discussions concerning all small cetaceans in the IWC. This lack of international cooperation makes scientific progress and

Steve Leatherwood

*Belugas, Alaska*

adequate monitoring of stocks very difficult. In 1992, the IWC Scientific Committee recommended that both Canada and Greenland improve their reporting systems. In 1997, still nothing has been done by either Canada or Greenland to implement improved systems which would facilitate better science and monitoring of a sensitive narwhal population.

### CITES

In 1985, Germany proposed that narwhals be placed on CITES Appendix I in order to prevent over-exploitation as a result of excessive trade. Both Canada and Greenland mounted considerable campaigns against this proposal and it was defeated. Since then, prices for narwhal ivory have increased in Canada and have remained high in Greenland[14].

### Beluga Range and Population

There are seven Canadian beluga populations: The high Arctic stock (thought to be shared with Greenland), the east and west Hudson Bay stock, the Beaufort Sea stock, the south-east Baffin Island stock, the Ungava Bay stock and the St. Lawrence stock.

There are five Alaskan beluga populations: Cook Inlet, Bristol Bay, Norton Sound (probably shared with Russia), Beaufort Sea (shared with Canada), and eastern Chukchi Sea (most likely also shared with Russia).

Greenland has a western and an eastern population of beluga whales, the western thought to be shared with Canada as mentioned above. Russian stocks of beluga whales are present in the Barents Sea, Kara Sea, and the White Sea. Limited information is available from these areas.

In the case of most of ranges outlined above, scientists have not yet been able to draw precise boundaries of the animals[2].

### Greenland and Canada

The **Baffin Bay/Davis Strait population** of belugas has experienced a significant decrease in its population. The stock is thought to be shared between Greenland and Canada, exactly as with the narwhal population of the same area. A survey of belugas from 1981 resulted in an estimate for this stock of up to 26,800 whales. An identical aerial survey in 1991


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ended with a revised estimate of belugas, which showed a 30 percent decline in the population[3, 4]. In its 1994 report, the JCCMNB warned that harvest of belugas cannot be sustained. In its 1995 report it concluded that the Baffin Bay belugas numbered between 4,000 and 8,000 whales and that the annual catch rate is between eight percent and 32 percent. The abundance estimate was based on the assumption that there is only one stock in the Baffin Bay area[2].

Thus a 1996 report updating scientific estimation of the plight of the Baffin Bay/Davis Strait beluga whales concluded that this beluga stock size has suffered a significant decline in the last 13 years, possibly up to 62 percent[21]. Since then, neither Canada nor Greenland have reacted to these grave warnings from scientists. As far as can be ascertained, annual harvests have not decreased on either side of Baffin Bay.

According to the JCCMNB (1995), the West Greenland hunters have a tendency to kill predominantly young animals and females in their hunt, which disrupts gender ratios and maximum potential growth of the population. The JCCMNB forecasted that if the hunt continues at 1990s levels, the West Greenland portion of the Baffin Bay population of belugas will be depleted. However, since the JCCMNB operates with the understanding that the Baffin Bay population is shared with Canada, this prediction means potential depletion and/or grave consequences for the entire range, not only West Greenland.

Based on these findings, the IWC's Scientific Committee once again expressed concern over the Canadian and Greenland hunts and recommended, as it had during its 1991 meeting, that the kill rate for belugas in this area be reduced below 1992 levels and that monitoring of the species continue.

The **East Greenland** population of belugas are thought to occur from the east Greenland coast to Svalbard, Norway. The belugas of this range have been subject to extensive commercial whaling by Russian and Norwegian hunters during the 19th century. Norway has since protected these whales from commercial hunting. Still, it is clear that some whales have been killed as Norwegian scientists refer to whales caught in the last 30 years, some of which have been killed for dog food[22].

## Canada

The St. Lawrence River population of beluga whales is threatened with extinction and has remained at a constant low level since the early 1970s when true monitoring of the population began. The stock is depleted from what is thought to have been a historical size of about 5,000 animals before the advent of commercial whaling of these animals in the 1700s, to only 500 animals today[23]. According to beluga scientists working in the St. Lawrence, the whales have not shown signs of recuperation, partly because they have been caught in a genetic bottleneck. The animals are experiencing genetic inbreeding, immune depression, increased risk of disease, stunted growth and reproductive failures[24].

The animals are now protected from hunting, but have as top predators in the food chain fallen victim to the industrial world's dangerous pollutants. Scientists believe that the beluga whale population of the St. Lawrence is failing to rebound because of their long term exposure to a highly toxic and complex mixture of chemicals derived from industrial outputs from both local sources and from industries far away whose pollutants gravitate toward the Arctic. Beluga whales of the St. Lawrence are stricken with ailments related to mercury, lead, PCBs (polychlorobiphenyls), DDT and Mirex (pesticides, or organohalogen) contamination. All of these pollutants affect the immune system. They have also been found to cause cancerous growths in 40 percent of 73 dead belugas examined during the last 15 years[23]. Other ailments include a variety of bacterial infections, respiratory problems, ulcers and failure of reproductive organs[25]. Offspring contain much higher levels of contaminants as a result of the direct transfer of toxic compounds through nursing, and possibly also from the mother's womb[23].

Belugas carry the heaviest loads of organohalogens of all marine mammals tested in the St. Lawrence. According to Canadian researchers, belugas of the St. Lawrence are showing 100 times greater concentrations of PCBs than other whale species and seals studied in the same area. The animals studied contained more than 50 parts per million (ppm) of PCBs, which under Canadian regulations classifies parts of the whales as toxic[23].

Belugas are bottom-grubbing animals which makes them especially susceptible to contaminated invertebrates living in sediment. Belugas seem particularly susceptible to illness when carrying contaminants. Cancer among the St. Lawrence belugas ranks twice as high as that in humans overall and is exceeded only by cases of Australia and New Zealand sheep which feed on pastures treated with carcinogenic herbicides[23].

During the winter, four nonresident populations of beluga whales migrate to the Canadian **Hudson Strait** where they join one residential stock of belugas. The nonresident populations spend the summer in **Ungava Bay**, **Southeastern Baffin Island/Cumberland Sound** and **East Hudson Bay**. The Ungava Bay and Eastern Hudson Bay groups are classified as depleted stocks, but are still being hunted by local Inuit communities.

The IWC has reiterated its concern from previous meetings over these Canadian populations still being targeted despite their status as highly vulnerable[3]. The Southeastern Baffin Island/Hudson Strait group is similarly classified as depleted, and is also still being hunted.

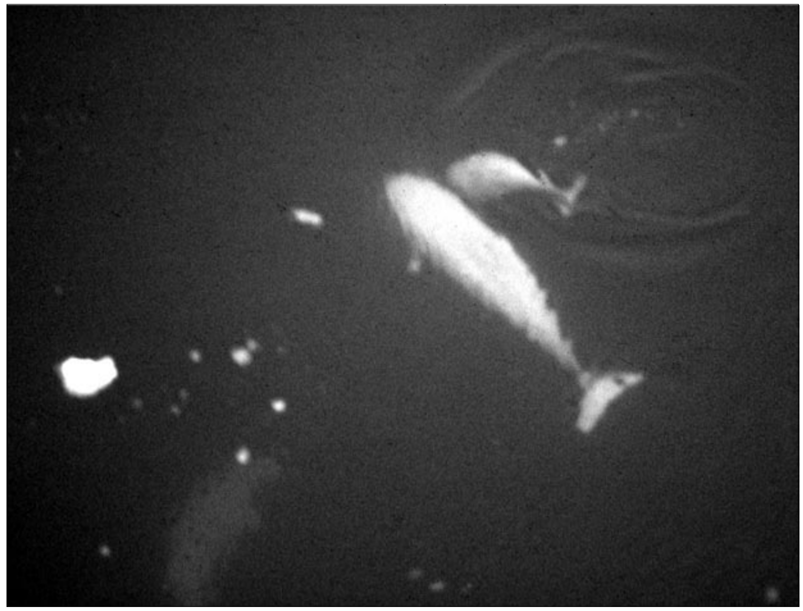
## Alaska

**The Beaufort Sea/Western Arctic** stock is shared between Alaska and Canada and is estimated at 39,039-42,566 animals[26]. The U.S. National Marine Fisheries Service (NMFS) suggests that this population is stable and may be increasing. NMFS has determined that the maximum number of animals that can be removed from this stock is 781 animals annually. According to NMFS, Canadian Inuit whalers have taken an average of 110 whales a year between 1990 and 1994, and Alaskan whalers have taken an average of 58 animals in a three year period from 1992 to 1994. Thus the two hunts do not together exceed the annual 781 recommended as maximum allowable catch for this population.

However, the numbers quoted from the Alaskan and Canadian hunts do not include possible incidental removals, nor do they reflect any struck but lost records. Nor do they reflect potential gaps in information from hunters who do not respond to monitoring surveys[26].

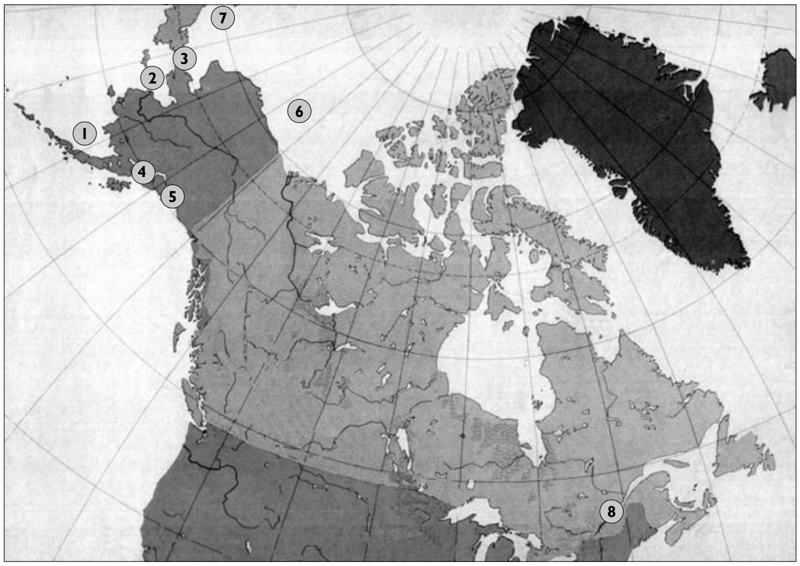
The United States recognizes another four stocks of belugas as belonging to the Alaskan sphere. **The Eastern Chukchi Sea** population of belugas was estimated at 3,710 individuals in 1996. However, this is said to be a minimum figure as some areas where belugas are known to occur within the eastern Chukchi had not been included in the latest survey. Scientists are not able to determine what the optimal sustainable population level is, thus leaving the scientific community and hunters alike in the dark as to the true health of the population.

U.S. scientists estimate that the Chukchi Sea population may sustain a hunt of 74 beluga whales annually. However, this does not take into



Steve Leatherwood

*Beluga mother and calf, Chukchi Sea*




*The North American Arctic*

1. *Bristol Bay*
2. *Norton Sound*
3. *Bering Strait*
4. *Cook Inlet*
5. *Prince William Sound*
6. *Beaufort Sea*
7. *Chukchi Sea*
8. *St. Lawrence River*

consideration the number of animals killed by other means. While large commercial fisheries operate in this range of belugas, no incidental deaths in fishing gear have been reported by observers in the period 1990-1994. No data are available from ships' logbooks from 1993 to 1997. Alaskan natives have been hunting an average of 63 whales a year from the eastern Chukchi stock of belugas[26]. This number does not include the potential addition of animals struck but lost in the hunt. The landed number of 63 animals is therefore not far from the Potential Biological Removal (PBR) figure of 74 set by scientists as maximum annual kill.

It is unclear whether this stock is shared between both Alaskan and Russian hunters[27]. The Russians are providing very little information about the status of their beluga population, hunting, or disturbance of the belugas' habitat. Russian scientists have experienced immense economical and technological problems since the collapse of the Soviet Union. Those scientists in the forefront of beluga science during the old regime are currently struggling to maintain laboratories, connections to foreign institutions, budgets for field operations, etc. Limited funding has also prevented Russian marine mammal scientists from passing on their science and institutional know-how to a new generation of Russian biology students, as the general lack of funding affects the entire scientific community.

**The Norton Sound stock** of belugas is calculated at 7,986 animals with a minimum estimate of 6,439. According to U.S. scientists, the maximum annual removal rate should be no more than 129 animals. During 1993, native hunters of Alaska killed 136 belugas, and in 1994 they took 116. From 1995, the U.S. Government estimates that a total of 74 whales were killed. However, reports from local areas are insufficient to properly determine the actual number of belugas killed annually. Several villages were not surveyed, assumptions are made as to how many whales these villages have taken based on past years, and struck but lost rates are unknown[26]. Moreover, NMFS and other scientific bodies question whether the animals killed in Norton Sound may belong to other stocks, or whether they are shared with Russian hunters.

As is the case with the eastern Chukchi Sea beluga population, there are extensive fishery operations in the Norton Sound area. However, there are no reports of incidental mortality and no log reports available to determine whether there in fact have been deadly fisheries interactions since 1993[26].

**The Bristol Bay population** of belugas was estimated at 1,526-1,555 animals in 1994. Maximum recommended biological removal from this population is 31 individuals annually. Native Alaskan hunters caught an average of 20 animals between 1993 and 1995. There are no reliable data on struck but lost animals in this hunt, although of nine belugas killed in the 1995 hunt, three were struck and lost—a third of the total kill. Thus the actual kill figure could be as high as 26, close to the maximum allowable removal. This still does not include potential incidental bycatches from fishing operations.

Bristol Bay has a large salmon gillnet fishery and a large drift gillnet fishery which, combined, number 2,600 vessels. Records from vessels show that up to 12 beluga whales were incidentally caught in fishing gear in 1983, while one beluga whale was killed in 1990 and one in 1991 in the fishery. These records may be negatively biased and may not reflect the true amount of incidental kills in this fishery[26].

The **Cook Inlet stock** of beluga whales faces a similar situation. The population is estimated at 981 animals, although other results from surveys have showed a lower number of 881. Nevertheless, NMFS is using 981 animals to derive a maximum allowable catch number of 20 animals annually. However, native hunters of Alaska take an estimated 40 animals a year from this stock. 1995 is the only year where struck but lost rates have been reported. During this year, of 72 animals taken, 22 (30.5 percent) were struck but lost. A mass stranding (probably unrelated to human activities) of 60 belugas occurred in the summer of 1996, leaving four animals reported dead[26].

The Cook Inlet hunt of belugas is cause for great concern: the actual annual take exceeds the maximum allowable catch, is subject to extensive struck and lost rates, and there are no reliable estimates on the level of incidental takes in fisheries (there are 1,304 gillnetting vessels in the area). Finally, it is not known how many Cook Inlet belugas are killed by residents outside the community. Since 1992, the Cook Inlet Marine Mammal Council (CIMMC) has been working on a formal community-based agreement for struck and lost rates of belugas in Cook Inlet, and the Alaska Beluga Whale Committee (ABWC) has drafted a management plan. Neither the management plan nor the agreement among hunters to address struck and loss rates have been finalized[28].

## Russia

As mentioned earlier, Russian marine mammal scientists have suffered greatly from the post-Soviet economic transition. Very little work has been done in what is presently thought to be the Russian range of beluga whales; the Barents, Kara, and White Seas. A 1996 report on belugas from the **White Sea** concluded that the resident population of belugas in the White Sea number no more than 900 animals. There is no information as to how many whales are currently killed here.

Belugas of the White Sea feed for a stretch of 100-150 kilometer coastline in the southern area of the sea in the months of July and August, which is also where and when they breed. The Russian scientists involved in White Sea research are concerned about several threats to the beluga: excessive shipping traffic off the coastal area, overfishing, contamination, and hunting by Inuit. Provided funding is available, Russian scientists will in the future attempt to assess the damage to the animals from these threats as well as from ongoing stress contributed by human activities. Russian scientists also suggest that whaling by Inuit communities has negative effect on the small size of the population[29], while it is unclear how many whales are taken from this population annually.

Scientific research in the **Barents** and **Kara Seas** is limited by financial constraints. Belugas have been targeted in commercial whaling operations in the Barents and Kara Seas area for decades. In the years 1954 to 1966, a total of about 23,000 belugas were killed. In recent years, annual catches have been around 400, though since 1990 belugas have been increasingly scarce[30].

Since the end of the Soviet Union, the Inuit of northern Russia have been largely left to their own economic devices and have suffered immensely during this time. Some Russian policy makers and scientists propose reestablishing and increasing quotas for certain cetacean species (beluga, bowhead and gray whales) in order to alleviate economic

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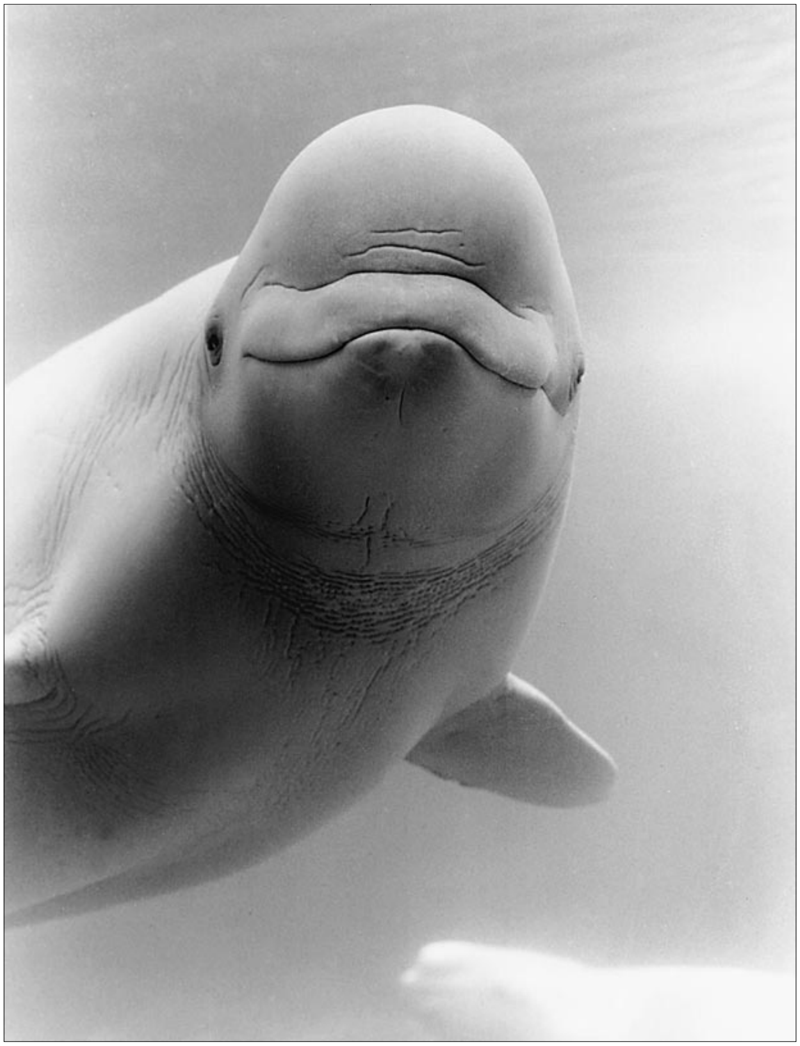
*Greenland, 1997*



Simonne Holm

*Beluga, Bronx Zoo, New York, 1995*

hardships experienced by isolated northern communities. However, with the limited knowledge existing on the beluga whales of the Russian Arctic, it is highly inadvisable to consider further directed hunts of these species. Moreover, the Russian government has a responsibility both to its citizens and to the environment to see to it that outlying communities receive support from their government in the form of alternatives to beluga whale hunting.

## Hunting

Inuits still hunt and kill some belugas and narwhal the traditional way—with hand held harpoons or spears from kayaks. However, most Inuits now hunt the whales with modern technology including motorized boats and rifles. Inuits in Greenland have also been using large fishing cutters of 50 tons or more with mounted harpoons to target belugas. This method of hunting is not only very wasteful as many whales are lost by sinking on the open ocean[3], but the method is also illegal according to domestic regulations. The Greenland Home Rule dictates that no dynamite, harpoons, or shotguns may be used in the hunt for narwhal and beluga[31].

## Trade and Captivity

No trade data are available pertaining to the capture and export of belugas for the entertainment industry from 1993 to the present. In the nine year period from 1984 till 1993, Canada caught and exported 31 live beluga whales to the United States and Japan. Between 1991 and 1993 Russia captured six animals for export to Japan and Israel[32]. These records do not necessarily reflect true removal. At present, there are approximately 70 belugas in captivity in the United States and an unknown number of animals in Japan, Europe and other locations[33].

Zoological parks and aquaria which import belugas with the intent of breeding these whales in captivity argue that captive breeding will help conserve a viable population. However, success with such programs has been limited. Records show that between 1981 and 1994, there were five successful beluga births in aquaria throughout the United States, and an additional six births where the baby died[34]. This information is not necessarily complete since some institutions did not participate in the Zoological Society of London's survey.

Canada's Churchill River Estuary is part of the range of the Hudson Bay population of beluga whales; among the healthiest of all the Canadian beluga populations. However, the data pertaining to the health of belugas from the Churchill River placed in aquaria have not been encouraging. Forty-four percent (30 animals) of the 68 animals captured here have died in aquaria. The captivity programs have clearly demonstrated that beluga whales are better off in their natural environment.

## Threats to the Arctic Environment

In addition to severe pressure from hunting, beluga and narwhal are faced with highly exploitative commercial fisheries in all their ranges, contamination from dumping, long-range atmospheric transfer of pollutants, noise pollution, oil and mineral exploitation, climate and sea temperature changes, ozone depletion, increased vessel traffic, and other such factors which directly or indirectly affect the whales' abilities to survive. In light of the proven decline in both narwhal and beluga populations in recent years, it is vital to assess these factors.

## Ozone depletion

Atmospheric ozone protects living organisms on earth from harmful solar ultraviolet (UV) radiation. Ozone depleting chemicals such as chlorofloucarbons (CFCs) which take from 50 to 100 years to break down, are reducing ozone levels at alarming rates in the Arctic and Antarctic. The destruction of ozone by CFCs allow for greater amounts of DNA-damaging UV-B radiation to reach the earth's surface and penetrate the ocean where sensitive phytoplankton communities confined to near-surface waters are harmed by irradiance. This in turn alters the dynamics of the marine ecosystem.

The destruction of certain life forms in the upper layers of the ocean may alter patterns of predation, competition, diversity and trophic dynamics among all living marine organisms[35]. Data from the Arctic show a 5-10 percent decrease in the protective ozone layer between 1979 and 1992 around 60° N[36].

In 1997, U.S. scientists discovered several holes devoid of ozone over and near the Arctic. One such hole is a few hundred kilometers wide and considered small, another is larger and spans over a thousand kilometers over the Arctic vortex. Other holes over the Arctic have been documented as increasing in frequency and severity. The scientists are warning that the documented increases of UV during winter and spring are adversely affecting ecosystems and human health in the Arctic[37].

Beluga and narwhal are especially susceptible to increased solar radiation in that they have less skin pigmentation than most other cetaceans, and have no fur or feathers to protect their skin and eyes from the low-lying Arctic sun. Furthermore, they live mostly near the ocean's surface[36].

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*Greenland waste dump, 1997*

## Global warming

Scientists warn of catastrophic consequences if human-induced changes to the delicate balance of the atmosphere are not reversed[38].

Carbon dioxide creating the greenhouse effect may result in an annual rise in global temperature of about 2° C by 2100 and a 10 centimeter rise in sea level. In some Arctic areas temperatures have already varied up to 10° C beyond previous records[36].

Cetaceans are affected by global warming in several ways: decreased primary marine productivity and food-web stability; sea level changes which may alter physical oceanography and thus migration of cetaceans; meteorological patterns which may be causing increased coastal precipitation; and changes in salinity levels which could lead to negative impacts upon fish resources[39]. Scientists warn that species which are sensitive to changes in global temperatures will face greater competition in the marine ecosystem[36].

People of the Arctic, who are dependent upon stable climates, crops, and fisheries for survival, are also threatened by global warming. Researchers predict that even if present outputs of CFCs can be stopped and their adverse effects mitigated, climate change is likely to disrupt culturally important hunting and fishing activities for years to come[40].

## Dumping, radioactive materials

Arctic countries are gravely concerned about the contamination of the Arctic waters from radioactive sources. The United States has ordered

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*Glacier, Greenland, 1997*

several government agencies, including the Energy Department, the Environmental Protection Agency, and the Central Intelligence Agency to analyze sources of air- and water-borne radiation and potential and real damage to the environment. In 1992, the CIA raised concerns about radioactive contamination of the Arctic, when Director Robert Gates identified known and forecasted leaks of radioactivity—mostly from Russian sources—as one of the most pressing threats facing the Arctic environment. Radioactive waste dumped at Russian military installations has contaminated lakes, streams, groundwater and the ocean. Some Russian scientists have acknowledged fatal consequences for the people of the North[41]. The Russian government, on the other hand, has been less inclined to address this problem, as evidenced by the arrest and incarceration of Alexander Nikitin, a former naval officer who publicly reported radioactive leakage from Russian submarines.

In addition to waste dumping, the CIA concluded that extensive Soviet nuclear and atmospheric testing has been the greatest contributor to radioactive contamination of Alaska and northern Canada. Since the 1963 Limited Test Ban Treaty came into force, these tests were reduced while others began increasing, such as underground nuclear weapons testing and explosions for mining, seismic sounding, or other blasting[42].

Norwegian researchers have found considerable levels of radioactive cesium in the Barents Sea, which they attribute largely to Russian dumping as well as the Chernobyl nuclear accident of 1986. In 1992, Norway's Prime Minister Gro Harlem Brundtland declared that dumping represented a "security risk to people and to the natural biology of northern waters"[43].

Russia is planning to install a floating nuclear power plant in the Arctic. The facility would be transported from the site in the east Siberian Sea/ Bering Strait to the port of Murmansk in the Barents Sea for repairs and fuel reloading. According to Russian officials, the plans have been approved by the International Atomic Energy Agency and construction of the plant is scheduled to begin in 1999[44].

The Greenland Home Rule is currently discussing the possibility of using Greenland as a repository for as much as 400 tons of decommissioned nuclear warheads from both the United States and Russia. According to a U.S. report, Greenland may be used for future nuclear storage, since the world's biggest island is strategically situated 2,400 miles from both Washington and Moscow. Its geographic remoteness, in theory, provides a barrier to terrorists, as well as radioactive and political fallout[45].

## Local waste disposal

Much Arctic sewage disposal and waste burning is not adequately controlled and is contaminating the immediate environment[40]. Greenland has no sewage treatment facilities. Untreated sewage goes into the sea via sewers or septic tanks. In less populated areas the sewage is collected in plastic bags and burned. It is not known to what extent raw sewage is affecting the immediate coastal areas of the Arctic, if at all. However, it is known that burning waste results in the discharge of contaminating heavy metals contained within the waste[36].

## Vessel traffic

Increasing ship traffic, created primarily by oil and gas vessels as well as major fishing fleets, have become life threatening competition to the whales[29]. In the Barents Sea of the Russian Arctic, scientists are currently documenting beluga whales and their altered behavior in relation to predation, communication and breeding. Scientists are observing behavioral changes and attribute them to increased interaction between vessels and whales in the whales' traditional habitats.

## Overfishing

The most important fish species in the diet of belugas and narwhals are halibut and Arctic cod, respectively. Both fish species are being overexploited, with Greenland's halibut in danger of depletion from overfishing. Scientists warn that several fish species need management under quotas. The percentage of smaller and immature fish caught is increasing each year and has now reached up to 77 percent of the catch in the Ilulissat area, 69 percent in Upernavik, and 62 percent around Uummannaq[46].

## Oil and gas exploration

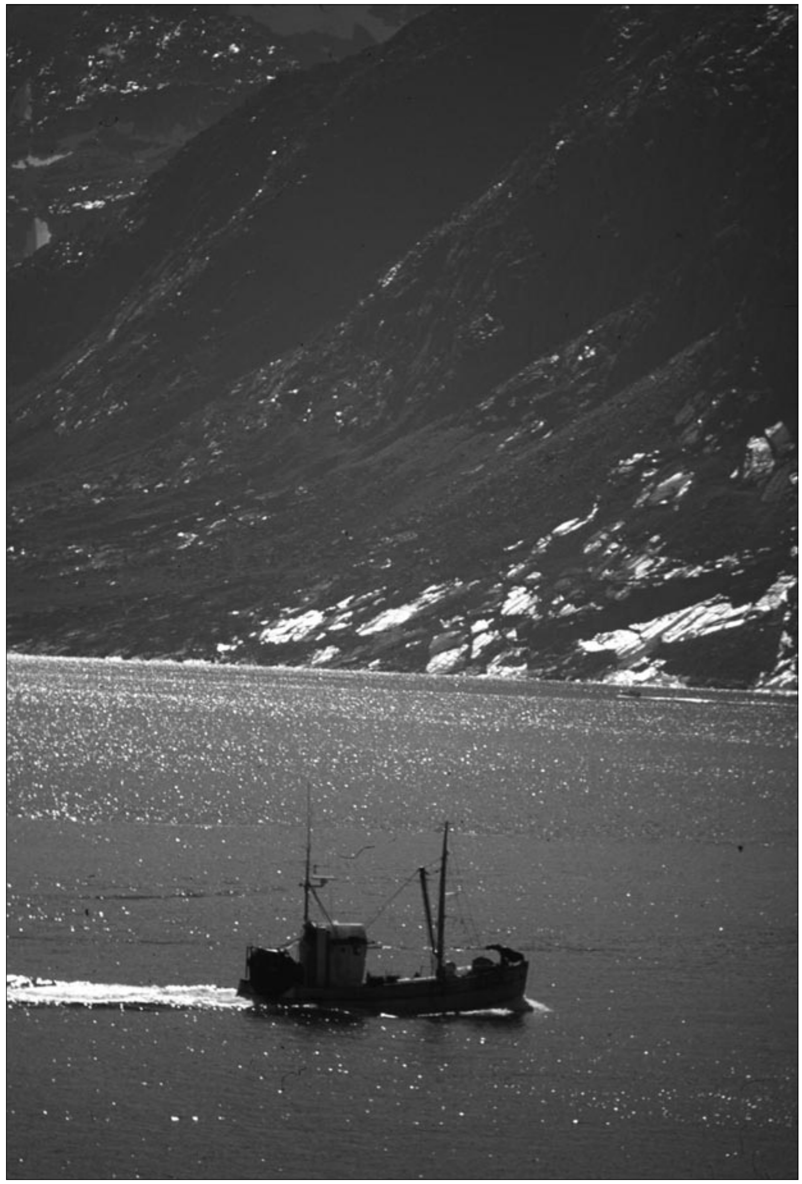
Oil has become an integral part of life in the Arctic. Fishing fleets in the Barents Sea burn enormous amounts of diesel oil[47]. The increasing number of vessels carrying more fuel represent a growing risk to the Arctic environment, as does the exploration for that oil.

In the Davis Strait and off the west coast of Greenland, oil exploration dates back to the late 1970s. The first discovery of oil in this area was made in 1993 along Greenland's west coast where beluga whales and narwhal migrate. Since then, Greenland authorities have invited international companies to apply for exploratory drilling permits[36].

The Barents Sea has also become a major oil and gas territory. The Norwegians have drilled over 50 wells there, and the Russians have drilled 40 more to the east since the 1980s. Russia is planning to place a large gas field off Nova Zemlya, which straddles the Barents Sea, primary habitat of the beluga. Associated threats to the marine environment from oil and gas exploration include noise pollution (as a result of underwater testing detonations), water dispersal in the drilling phase, and the actual drilling process which can release oil and chemicals into the water[36].

A Northstar Project proposed for the Alaskan Beaufort Sea has targeted commercially viable quantities of oil. The project site would be located no more than two to eight miles off shore where belugas are dependent upon habitat and food sources. Scientists have analyzed this project, as well as a nearby large scale oil and gas lease that has the potential of spilling up to 29,000 barrels of oil in Yakutat Bay, Alaska. The scientists have recommended that there be consideration of the close relationship between hunters, consumers of whale products and whales in these areas, and that impact assessments should include analysis of potential mortality in the event of spills, damage to food production-related changes in marine mammal distribution, movements, and abundance, as well as how Inuits may be affected by exposure to contaminants in whales from the oil industry[48].

The retrieval and transportation of oil and gas can lead to disastrous accidents, such as the *Exxon Valdez* spill in Prince William Sound, Alaska, the



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*Fishing boat with mounted harpoon, Greenland, 1997*

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*Greenland, 1997*

most famous of many spills in recent decades. Although no Arctic accidents have compared to the magnitude of the *Exxon Valdez* spill, such potential catastrophes involving the release of oil and gas will increase as more operations commence exploration and drilling, especially in the waters off Greenland and the Barents Sea.

The Arctic marine environment is extremely sensitive to spills as ice cover makes cleanup difficult or impossible. Also, fauna are susceptible since oil degrades especially slowly in cold climates. Spilled oil enters marine animals' breathing holes, and poses a direct and lethal threat to marine life as well as birds that tend to land on slick-looking surfaces[49].

### Noise pollution

Both belugas and narwhals are dependent upon sound to communicate, navigate and find food. Human-made noise can severely disrupt the vital functions of whales that have previously been undisturbed in their feeding, breeding, resting, and migration.

Interference with any of these functions could result in starvation, reproductive failure, predation and disease from crowding, over-exploitation of food sources, and involuntary avoidance of preferred habitats. Negative effects upon marine mammals from industrial noise—emanating from vessels, industry, aircraft, seismic maneuvers—differ greatly depending on the sounds the whales make to communicate[48].

Some whales use very low frequencies and are thus more likely to be affected by even the slightest foreign noise when communicating. Belugas and narwhal depend on passive listening to low-level, low-frequency ambient sounds of moving and solid ice to obtain information which is critical to their navigation and survival in ice-covered waters. Increased background noise could interfere with this listening process and result in diminished navigational and hunting capabilities, leading to physiological stress and reduced health of a population[50].

Belugas in the St. Lawrence River have been documented to respond to outboard motor and ferry noise; they have distinctly altered their vocalization patterns when approached. Scientists conclude that when noise instigates a change in whale communication patterns, the whales may experience a reduction in their efficiency of communication, which may further inhibit their instinctual strategies of overcoming stressful or dangerous situations[51].

Both beluga and narwhal have been extensively documented to become displaced by noise caused by ships as far as 49 kilometers away[52]. Other observations of noise impact on belugas include:

- Diving immediately when helicopter flew over at 305 meters
- Lowflying aircraft have prevented belugas from entering Eschiltz Bay Alaska on several occasions
- Swimming away from drilling noise from 50 to 500 meters away
- Avoiding vessels up to 80 kilometers away, with the pod splitting up and not rejoining for several hours.

### Mining

A mine in Greenland, which has now been closed, is a perfect example of what kinds of damage unsafe industry in the Arctic can do to its local environment. The Maarmorilik lead and zinc mine in northwest Greenland operated next to important fishing and hunting communities and nearby fjords. Over more than a decade the mine discharged over 35,000 tons of waste a month into the fjords, which led to the destruction or abandonment of most marine and aviary resources in the area near the mine.

Thirty toxic substances were deliberately discharged into the environment, including lead, zinc, cyanide and cadmium. The result was extermination of all animal life in the Affarlikavisa Fjord. In the nearby

Qaumarujuik Fjord no more seals are to be found. Belugas have historically been found and hunted in the areas around the mine, but no longer. Hunters believe that noise pollution from the mine forced the whales to seek a different migration pattern. The hunters also blame contamination, traffic, and shipping to and from the mine for the collapse of fisheries and the many negative changes in the local marine environment. By the time the mine closed in July of 1990, scientists warned that the surrounding areas would remain contaminated for another hundred years[49]. A Greenland company is currently awaiting approval to establish a zinc mine in the north eastern part of the country[53].

## Contamination of the Arctic Environment

The Arctic is a natural storage reservoir for atmospheric and water pollution. The Arctic Ocean, 1.2 percent of the Earth's total ocean water mass, receives an estimated 10 percent of all the world's riverine discharge. The Arctic has very limited outflows to other oceans, making it more vulnerable to industrial, urban, and agricultural pollutants than any other ocean[54]. The Arctic stores the Earth's pollutants arriving by ocean and air currents from as far away as India; its ice formations are repositories for pollutants.

The people of the Arctic have been recorded carrying pollutant levels 10 to 20 times higher than in most temperate regions[40]. There are numerous substances and ways in which air- and water-borne pollutants arrive in the Arctic where they proceed to penetrate the food web. Of heavy metals and persistent organic pollutants (POPs), mercury, PCBs and DDTs, respectively, are by far the most widely registered in people and animals and most often attributed to negative health effects when consumed in high doses.

Some naturally occurring trace metals are essential for human life and marine life. Substances such as PCBs, DDT, mercury, lead and cadmium derived from industrial operations are definitely not in this category, since even the smallest dose can be toxic to the biological system[55]. Industrial mercury and the persistent organic pollutants, of which PCBs and DDTs are the most prevalent, are very easy to accumulate in the body, but very difficult to metabolize.

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*Nuuk whale meat market, Greenland, 1997*

Although no illnesses have yet been reported to be a direct result of contaminants in the Arctic, researchers note that not enough time or effort has been spent to reach definitive conclusions. However, developmental problems related to contamination in children have been proven to exist. More research is needed to determine to what extent a person's exposure to pollutants in the Arctic has on their physical health[40].

Epidemiological analysis requires a significant sample size of the population to be studied, that the sample size is fairly homogeneous economically, socially and culturally, that there is easy access to communities by researchers, and that the effects of contaminants are known[40]. These are difficult requirements for medical researchers working on Arctic health projects.

## PCB Contamination

Health and environmental assessments carried out in Arctic Greenland have concluded that the presence of persistent organic pollutants and accumulation of these in the biosphere is the biggest environmental and health related threat to Arctic people today[47].

PCBs (polychlorinated biphenyls) are a group of closely related organic chemicals used in the plastics and electronics industries. In most parts of the world, PCBs are no longer being used, although they are present in products still in use, or in waste which may not be

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of pollutants from womb to fetuses, and from mothers' milk to babies, record heavy contaminant loads being transferred to highly susceptible embryos and newborns. Mothers' milk fat can contain more parts per million of PCBs than beluga whale blubber[43], and all over the Arctic, newborns have higher concentrations than the allowable daily intake for adults[56].

Researchers have found an increase in infectious disease among those children exposed to contaminated breast milk. Canadian Iniut women's breast milk contains more than five times the amount of PCBs than in women in urban Quebec[57]. One Inuit child out of every four has chronic hearing loss due to infections in the Canadian Arctic communities surveyed[43]. Blubber from the narwhal was found to be the main source of mothers' exposure in the Canadian Inuit study[57].

Medical researchers have identified narwhal and ringed seals from Baffin Bay as being the primary contributors of the transfer of PCBs to the native populations of the Baffin Bay area. While some fatty marine foods do have components such as vitamins considered healthy to people, researchers express special concern for pregnant and lactating women considering the fact that narwhal and seal blubber contribute 94 percent of the combined PCB exposure from foods[58].

adequately secured[36]. PCBs don't disintegrate for years, decades, and possibly even centuries.

The highest levels of PCBs have been recorded in Arctic communities, reflecting the Arctic people's diet of marine foods[40]. Women of Northwest Greenland have PCB levels as high as 14.8 micrograms per liter of blood, and women from the Nunavik area carry 10 micrograms per liter of blood. Neurobehavioral problems have been known to occur in children whose mothers carry 10 micrograms per liter of blood[36]. Arctic women are in a high risk category.

Breast feeding mothers are able to rid themselves of a significant amount of stored and contaminated fats from their milk, but are in turn unwittingly transferring these to their infants. Scientists having researched the transfer

Studies on the effects of carcinogenic substances on beluga whales in the St. Lawrence have yielded conclusions disturbingly similar to those of researchers examining the effects of industrial pollutants on people living in Arctic areas. Female beluga whales of the St. Lawrence are known to carry up to 10 ppm of PCBs in fat contained in their nursing milk. Fat makes up 35 percent of the milk. Anything containing more than 2ppm of PCBs is considered unsuitable for human consumption[23].

### DDT Contamination

Nordic countries banned DDT in the 1970s, but the pesticide is still used throughout much of the world. DDT, part of the group of organic chemicals which attack the immune system, is translated to DDE once absorbed by the animal or human system[40]. Neither PCBs nor DDT break down in the Arctic environment.

Instead they bind themselves to sediments and marine organisms, which travel through the food chain to whales and people where the DDT accumulates in fatty tissue[36].

The highest levels of DDT in Arctic mothers are recorded in the Northwest Territories, Canada, and Northwest Greenland (4.6 and 4.0 micrograms per liter blood respectively). Overall, Greenlanders hold the world record for the highest levels of DDT[47]. In the 1960s Canadian Inuit women's breast milk contained three times the level of DDT than that of urban women in southern Quebec. Today, Inuit women of northern Quebec have four to five times higher concentrations of DDE than southern Quebec women. This DDT contamination stems from exposure through the food chain. Reproductive effects and increased risk of cancer, especially breast cancer, may be related to the DDT levels, although the potential links have not been proven[40]

## Mercury Contamination

Blood mercury concentrations in birthgiving mothers in Greenland exceed World Health Organization (WHO) limits for tolerable intake. These data have been collected in communities where people's diet is primarily made up of local food, and compared with people from more urban communities. A direct correlation has been made between the excessive amounts of mercury in hunting communities and low levels of mercury found in people in urban areas where the population is more accustomed to western-style foods[59].

Mothers in Northern Quebec/ Nunavik, Canada, and Northwest Greenland have the highest levels of mercury in their systems in the Arctic. In a health project conducted in the Canadian Arctic, 57 percent of Inuit had blood mercury levels above acceptable limits set by the World Health Organization. In Greenland, 16 percent of the population's blood mercury levels exceed levels which could have toxic effects on people. The toxic effects from such exposure would be difficult to detect, and easily overlooked[40].

Recent examinations in the Faroe Islands, North Atlantic, illustrate the direct effects of industrial mercury on people eating whale meat laden with the heavy metal. Tests have revealed that exposure to mercury from consuming pilot whale meat significantly affects cognitive function in children[60]. In fact, in a sample of more than 1,000 Faroese children prenatally exposed to mercury, most bore signs of some sort of stunted neurological development related mainly to contaminated pilot whale meat[61].

Faroese and international researchers have recorded decreased brain function in children resulting in difficulties with language, memory, attention span, and other developmental problems. The connection between mercury concentrations and the contamination with which the children are confronted during their mothers' pregnancy has been shown in children of about seven years old. Doctors recommend that the consumption of whale meat be restricted; current recommendations are from 1989 and outdated. Doctors suggest that a grown person should not eat more than one meal a week of whale meat. Stricter guidelines are recommended, but the government has yet to act[62].

People in Greenland hunting communities consume an average of 1.6 meals a day of traditional foods[65].

## Health Policy and Risk Management

The people and wildlife of the Arctic are paying a high price for the industrialized world's use of pesticides, PCBs, mercury, nuclear energy, and certain technologies. Any attempts to mitigate a potential health crisis among people in the Arctic and their environment should begin with public notification of the various potential threats.

Arctic communities have a right to know what threats they may be facing. Local governments, along with international organizations, bear the responsibility of empowering isolated communities and individuals to make informed decisions about their own lives and health. Simultaneously, these same bodies must attempt to reduce the dangers currently facing beluga and narwhal populations from pollutants, environmental degradation and over-utilization.

*Arctic communities have a right to know what threats they may be facing. Local governments, along with international organizations, bear the responsibility of empowering isolated communities and individuals to make informed decisions about their own lives and health.*

## Recommendations

1. Belugas and narwhals are the only whales of importance to many Arctic hunting districts, but they receive limited or no protection. They also receive no protection from the International Whaling Commission. **Belugas and narwhals should be included in the IWC Schedule** in order that they may be managed within an international convention.

2. The IWC Scientific Committee should convene an **Arctic Marine Environment and Cetacean Health Workshop** and invite scientists with relevant expertise to address environmental threats to the Arctic marine ecosystem, and seek to complete health assessments of Arctic cetaceans.

3. Simultaneously, the Commission itself should initiate an **agenda item on Implications of the Consumption of Cetacean Products on Human Health** and seek to better understand the changing relationship between humans and whales.

4. Finally, the medical and health research community should be encouraged through the FAO, WHO, UN and other international organizations, to **engage in further studies on health** effects in the Arctic from marine contamination in order to help stave off human health problems derived from a deteriorating Arctic environment.

5. Considering the significant population decline recorded for the Baffin Bay beluga, Greenland should prevent further damage to this population by **establishing catch limits and a new mandatory reporting system.**

6. **Improved controls of the narwhal trade** in Canada and Greenland are needed to halt the increase in exports of narwhal products and eliminate loopholes in present local enforcement regulations.

7. **The Government of Canada should begin participating constructively at the IWC**; it is vital that both scientists and policy makers of all Arctic beluga and narwhal ranges join in management-related discussions outside regional agreements.

8. IWC member countries should make it a priority to **support the IWC Small Cetacean Fund** and encourage technical, financial, and scientific support of Russian efforts to protect beluga and narwhal.

*Greenland, 1997*

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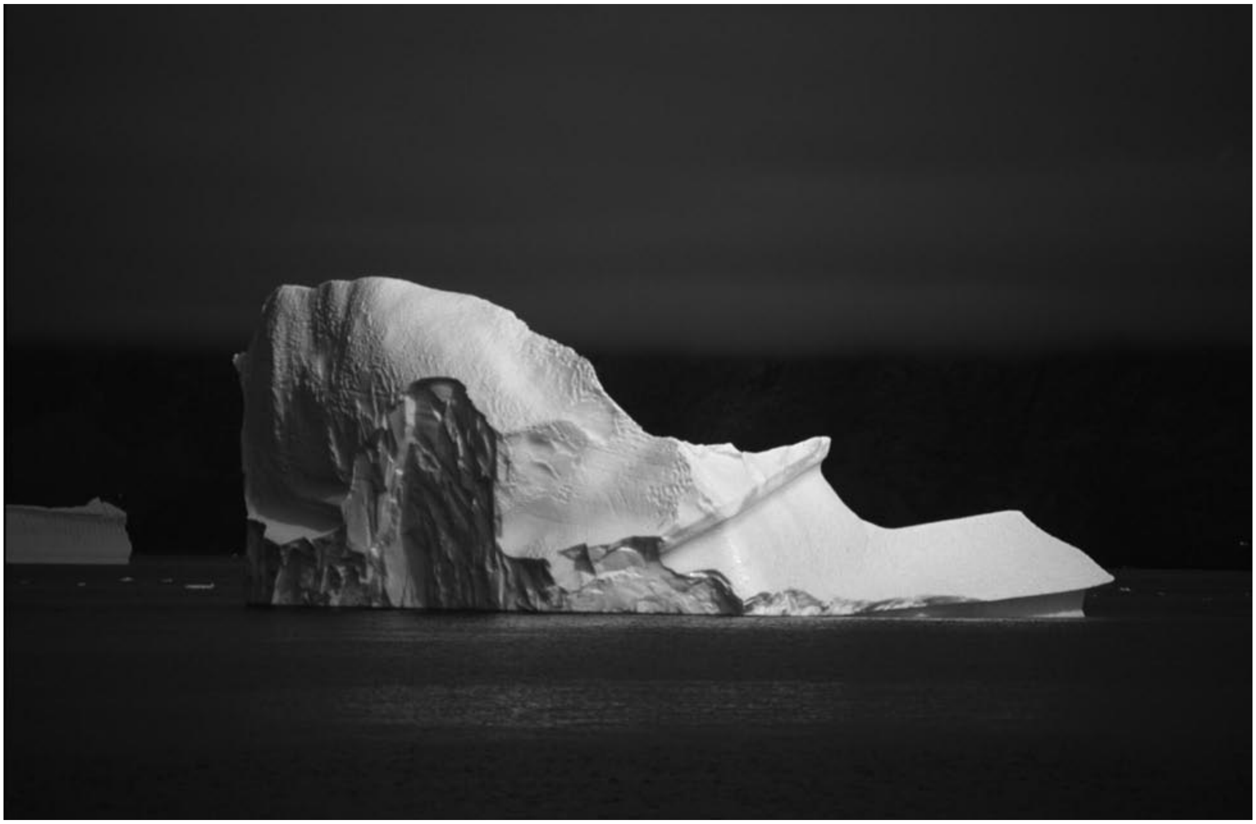

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