

CANADA'S ARCTIC MARINE ATLAS



*This Atlas is funded in part by the
Gordon and Betty Moore Foundation.*



Suggested Citation:

Oceans North Conservation Society, World Wildlife Fund Canada, and Ducks Unlimited Canada.
(2018). *Canada's Arctic Marine Atlas*. Ottawa, Ontario: Oceans North Conservation Society.

Cover image: *Shaded Relief Map of Canada's Arctic* by Jeremy Davies

Inside cover: Topographic relief of the Canadian Arctic



This work is licensed under the Creative Commons Attribution-NonCommercial 4.0 International License.
To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc/4.0> or send a letter to
Creative Commons, PO Box 1866, Mountain View, CA 94042, USA.

All photographs © by the photographers

ISBN: 978-1-7752749-0-2 (print version)

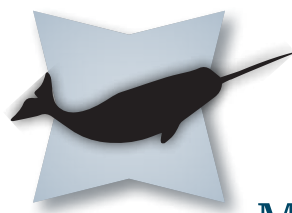
ISBN: 978-1-7752749-1-9 (digital version)

Library and Archives Canada

Printed in Canada, February 2018

100% Carbon Neutral Print by Hemlock Printers





MARINE MAMMALS OF THE ARCTIC

MARINE MAMMALS

- Baleen Whales
- Toothed Whales
- Pinnipeds
- Carnivores

Introduction

Currently there are 21 species of marine mammals made up of six pinnipeds (seals and Walrus) and 15 cetaceans (whales, porpoises, and dolphins) that are regularly seen or have been known on occasion to enter Canadian Arctic waters. Of these, eight commonly reside in the Canadian Arctic year-round. These species are Ringed Seal (*Pusa hispida*), Bearded Seal (*Erignathus barbatus*), Hooded Seal (*Crystophora cristata*), Harp Seal (*Pagophilus groenlandicus*), Harbour Seal (*Phoca vitulina*), Walrus (*Odobenus rosmarus*), Beluga Whale (*Delphinapterus leucas*), Narwhal (*Monodon monoceros*), and Bowhead Whale (*Balaena mysticetus*).

Ecological significance

Arctic marine mammals play a significant role in the northern marine environment at all levels of the food chain. They feed both as top predators at the apex of the food chain on other marine mammals (Killer Whales consuming Belugas, for example) and large fish (Narwhals eating Greenland Halibut, *Reinhardtius hippoglossoides*) as well as on much lower trophic levels (Bowhead eating copepods). It is unknown what effect changes in numbers of marine mammals or the introduction of new species into the Arctic will have on the ecosystem.

Cultural significance

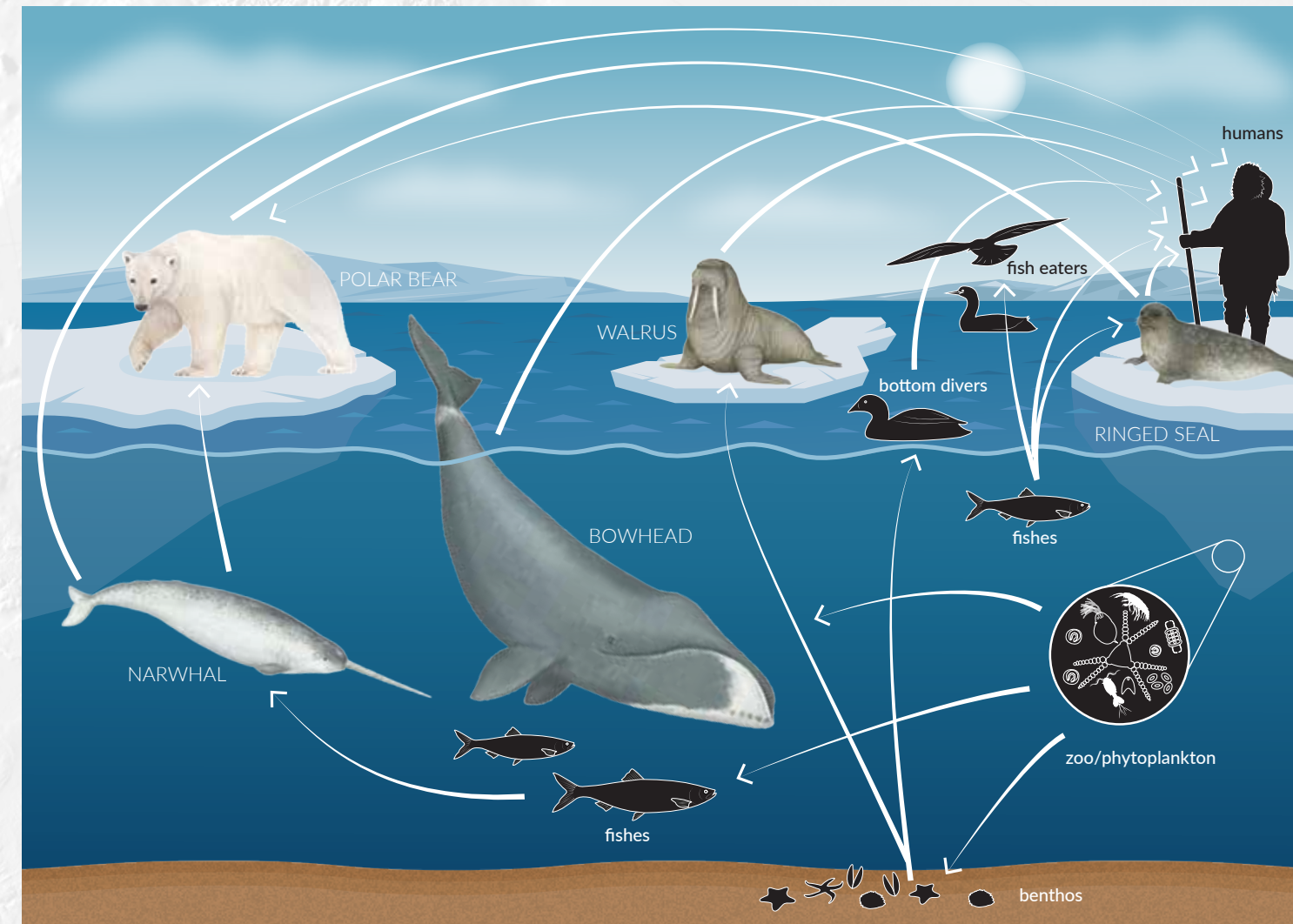
Marine mammals have historically been and continue to be significant culturally and economically to the North. Harvested in all seasons, they are an important part of a traditional subsistence diet that provides nutritional food sources as well as materials used in daily life, such as skin and furs. In addition to personal and community use, products made from marine mammals, such as Walrus or Narwhal tusk carvings, are sold commercially and contribute to the local economy; however, the economic value of whales to northern communities remains chiefly as a local food source. Harvesting quotas exist for some species by region, which are managed by federal and local governments in collaboration with hunters and trappers organizations.

Conservation concerns

Loss of sea ice will reduce habitats for some marine mammals, create new habitats for others, and likely alter patterns of productivity, resulting in changes to the food web structure. The continued exploitation of non-renewable resources in the North will create economic opportunity but also environmental disturbance through noise, pollution, and the potential for accidents. Marine mammals are iconic species and often indicators of ecosystem health, reflected both in their abundance and in concentrations of environmental pollutants in their bodies. Loss of sea ice resulting in changes in habitat and the subsequent accessibility of the North to humans will arguably be the largest threat to Arctic marine mammals in the near future.

Bowhead whale near Bylot Island, Sirmilik National Park, Nunavut.
(photo: blickwinkel)

ARCTIC MARINE MAMMALS SIMPLIFIED FOOD WEB



This simplified food web shows the movement of energy through key Arctic marine mammal species. The overlapping network of food chains shows how each species is interconnected.

Gaps in current knowledge

There is little data on the presence or absence of many marine mammal species in much of the Canadian Arctic, and the abundance, trends, and ecological interactions of most species are poorly understood, but knowledge is improving. Research in the Arctic is limited due to the cost of conducting research and the inaccessibility of marine mammals in large portions of their range. Specific research gaps are addressed for each species in the individual species pages that follow.

Rationale for selected species

Six species are highlighted in this section due to availability of distribution data and their cultural and economic significance to the North: Bowhead, Beluga, Narwhal, Ringed Seal, Walrus, and Polar Bear.

For further reading, see page 111.



Muktuk (whale skin and blubber) of Bowhead, Beluga, and Narwhal (left to right).
(photos: Vicki Beaver, Louise Murray, Yvette Cardozo [left to right])

Marine Mammal Concentration Areas

Areas where one or more marine mammal species, including whales, Polar Bears, Walrus, and seals, are known to occur in high densities.



Norwhal



DATA SOURCES
- Known Marine Mammals Concentration Areas: Brown, L. and H. Fost. 2012. An overview of important ecological and biological marine features in Nunavut based on local knowledge. Can. MS Rep. Fish. Aquat. Sci. 2976: vi + 54 p. Moshenko, R.W., S.E. Cosens and T.A. Thomas. 2003. Conservation Strategy for Bowhead Whales (Balaena mysticetus) in the Eastern Canadian Arctic. National Recovery Plan No. 24. Recovery of Nationally Endangered Wildlife (RENEW). Ottawa, Ontario. 51 pp.; Paulic et al. 2012. Ecosystem Overview Report for the Darnley Bay Area of Interest (AOI). CSAS Research Document 2011/062. Quakenbush, L.T., R.J. Small, and J.J. Citta. 2013. Satellite tracking of bowhead whales: movements and analysis from 2006 to 2012. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Alaska Outer Continental Shelf Region, Anchorage, AK. OCS Study BOEM 2013-0110. 60 pp + appendices; Stephenson, S.A., and L. Hartwig. 2010. The Arctic Marine Workshop: Freshwater Institute Winnipeg, Manitoba, February 16-17, 2010. Can. Manuscript Rep. Fish. Aquat. Sci. 2934:vi+67p.
- Basemap Data: Atlas of Canada 1:1M, ESRI, Flanders Marine Institute, Natural Earth.

Legend

Known Marine Mammal Concentration Areas



BALEEN WHALES

MARINE MAMMALS

➔ Baleen Whales

- Toothed Whales
- Pinnipeds
- Carnivores

Bowhead Whale

Natural history

The Bowhead Whales (*Balaena mysticetus*) is the longest-living mammal on Earth and many are believed to live longer than a century, with one documented animal estimated to be 211 years old. Adult Bowheads have an average length of 15 to 18 m—the females are larger than males—and can weigh up to 100,000 kg. The Bowhead Whale has a large head taking up about a third of its body, it has no dorsal fin, and it has the thickest blubber of any animal species, which helps it survive in cold waters. With its strong body and big head, the Bowhead can break through ice more than 20 cm thick to form a breathing hole, and can dive under water for 30 minutes at a time. Bowheads have strong acoustic abilities that help them communicate with one another and navigate through extensive ice.

Bowhead Whales become sexually mature around 25 years of age. Females give birth approximately once every three years, with a gestation period of 12–16 months. Their calves are born a brownish-black in colour, changing to black as adults with white areas near the chin and tail. Bowheads eat by swimming forward with their large mouths open. Their diet consists mainly of zooplankton that they filter through hair-like material in their mouths called baleen.

Distribution

Bowhead Whales stay in the Arctic year-round, preferring straits, bays, and estuaries. Bowheads tend to be found at the edge of the ice much of the year, migrating north and south as the ice expands and retracts throughout the seasons. They are primarily found in Canadian, American, Russian, and Greenland waters. In Canada, Bowheads inhabit Baffin Bay, the Arctic Archipelago, and the Beaufort Sea.

Importance to Inuit

Traditionally, the Bowhead was an important animal for Inuit. A successful harvest would benefit the entire community with food, tools, and a source of light and heat from the oil in the blubber. Intense commercial whaling significantly reduced the Bowhead population. It has taken many decades for the population of the Bowhead to improve. In recent years, Inuit hunting has become much more sporadic, with a few taken per year in Nunavut on a rotating basis among communities.

Conservation concerns

The Bowhead Whale is a legally protected species in Canada's Arctic waters. In 2009, Canada also created the world's first Bowhead Whale sanctuary, Niginganiq, in Nunavut's waters near the community of Clyde River (Kangiqtugaapik). An international moratorium to stop commercial hunting of the Bowhead signed in 1966 has helped the population recover over the last several decades.

Facing Page: Bowhead whale breaching in the Northwest Territories. (photo: Kelvin Aitken)

Right: Bowhead Whale jaw bone, Kekerten Historic Park, Qikiqtaaluk Region, Nunavut. (photo: Trevor Taylor)



Gaps in current knowledge

Bowheads are largely solitary animals who sometimes travel in small pods. Much information has been gathered from ice-based observations, satellite transmitters, aerial surveys, and sampling from hunted animals. Inuit knowledge has provided a great deal of information about local migration patterns, behaviours, and changes over time. Better technology, such as aerial drone surveys, will help give researchers more information on the Bowhead's movements, better tracking of individual whales, and a deeper understanding of the conservation needs for this largest year-round resident of the Arctic.

DATA SOURCES

– General Range and Areas of Concentration: Brown, L. and H. Fast. 2012. An overview of important ecological and biological marine features in Nunavut based on local knowledge. Can. MS Rep. Fish. Aquat. Sci. 2976: vi + 54p.; Moshenko, R.W., S.E. Cosens and T.A. Thomas 2003. Conservation Strategy for Bowhead Whales (*Balaena mysticetus*) in the Eastern Canadian Arctic. National Recovery Plan No. 24. Recovery of Nationally Endangered Wildlife (RENEW). Ottawa, Ontario. 51 pp.; Paulic et al. 2012. Ecosystem Overview Report for the Darnley Bay Area of Interest (AOI). DFO Can. Sci. Adv. Sec. Res. Doc. 2011/062. vi + 63 p.; Quakenbush, L.T., R.J. Small, and J.J. Citta. 2013. Satellite tracking of bowhead whales: movements and analysis from 2006 to 2012. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Alaska Outer Continental Shelf Region, Anchorage, AK. OCS Study BOEM 2013-01110. 60 pp + appendices. Stephenson, S.A., and L. Hartwig. 2010. The Arctic Marine Workshop: Freshwater Institute Winnipeg, Manitoba, February 16-17, 2010. Can. Manuscript Rep. Fish. Aquat. Sci. 2934: vi+67p. – Basemap Data: Atlas of Canada 1:1M, ESRI, Flanders Marine Institute, Natural Earth.





TOOTHED WHALES-1

MARINE MAMMALS

- Baleen Whales
- ➔ **Toothed Whales**
- Pinnipeds
- Carnivores

Beluga Whale

Natural history

The Beluga Whale (*Delphinapterus leucas*) is a medium-sized toothed whale measuring up to 5 m in length and weighting up to 1,500 kg. A long-lived and slow-reproducing species, Belugas are thought to have a lifespan of 60–70 years and give birth to a single calf every two to three years. Belugas are born pink or brown, turn dark grey within a few weeks, and gradually turn white as they reach maturity. They are considered generalist feeders and have a varied diet of small fish and crustaceans such as Arctic Cod (*Boreogadus saida*), capelin (*Mallotus villosus*), and shrimp (*Pandalus borealis*). Migrating seasonally, Belugas select both shallow water and deepwater habitat and have been recorded diving over 1,000 m in search of prey. Belugas use sound and echolocation to communicate, navigate, and search for food. As an ice-associated species, Belugas are considered to be highly sensitive to climatic changes and changing ice conditions due to their preference for dense pack ice in winter. The most recent global population estimate is near 200,000.

Distribution

Belugas have a circumpolar Arctic and sub-Arctic distribution and occur in high densities in the western and eastern Canadian Arctic. There are seven stocks identified in Canadian waters totalling an estimated 142,000 animals, with more than half of these residing in Hudson Bay in the summer. Migration occurs seasonally with animals generally moving toward estuaries and open water in summer, foraging grounds in fall, and mobile pack ice for the winter.

Importance to Inuit

Harvested in summer and during spring and fall migration, Belugas are important to the culture, economy, and food security of Inuit communities in Nunavut, Nunavik, and the Inuvialuit Settlement Region. Muktuk, or skin and blubber, is a favourite traditional food item across the North.

Conservation concerns

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses Beluga health by population. Current conservation status ranges across populations from “not at risk” (eastern Beaufort Sea) to “threatened” (Cumberland Sound) to “endangered” (Ungava Bay). Threats to Beluga populations include habitat degradation, contaminants, hydroelectric development, hunting pressures, and anthropogenic disturbance such as noise pollution and vessel traffic.

Gaps in current knowledge

Many gaps exist in our understanding of basic Beluga biology as well as population dynamics and habitat requirements. For example, Belugas in the High Arctic and in Hudson Bay occupy shallow waters and estuaries in the summer, but the definitive reason for this is still

Facing Page: Beluga whale rubbing its skin in the shallows near Somerset Island, Nunavut. (photo: Art Wolfe)

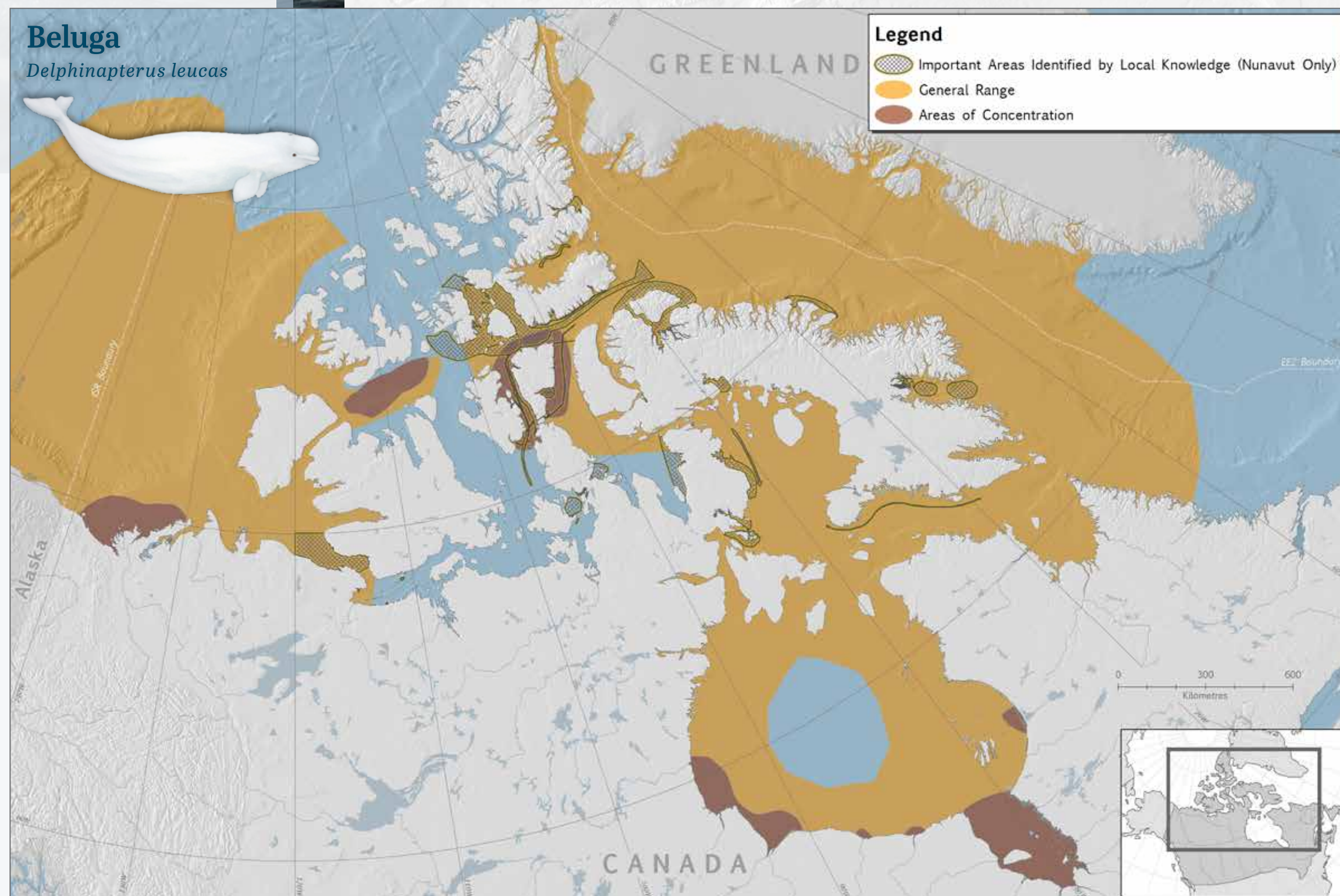
Right: Aerial view of Beluga travelling up a lead, Lancaster Sound, Nunavut, (photo: Doug Allan)



unclear. It is also unknown if some populations overlap seasonally, which is especially important to understand in relation to mating season and harvests. Belugas, like other Arctic marine mammals, are difficult to study due to their remote habitat and the lack of daylight in their winter habitat. Recent aerial surveys and satellite telemetry work in the Beaufort Sea, High Arctic, and Hudson Bay will aid in our understand of habitat needs as it relates to conservation.

DATA SOURCES

- Important Areas Identified by Local Knowledge in Nunavut: Brown, L. and H. Fast. 2012. An overview of important ecological and biological marine features in Nunavut based on local knowledge. Can. MS Rep. Fish. Aquat. Sci. 2976: vi + 54p.
- General Range and Areas of Concentration: Stephenson, S.A., and L. Hartwig. 2010. The Arctic Marine Workshop: Freshwater Institute Winnipeg, Manitoba, February 16-17, 2010. Can. Manuscript Rep. Fish. Aquat. Sci. 2934: vi+67p.; IUCN (International Union for Conservation of Nature) 2012. *Delphinapterus leucas*. The IUCN Red List of Threatened Species. Version 2017-1. Downloaded July 2016; Paull, et al. 2012. Ecosystem Overview Report for the Darnley Bay Area of Interest (AOI). DFO Can. Sci. Advis. Sec. Res. Doc. 2011/062. vi + 63 p.
- Basemap Data: Atlas of Canada 1:1M, ESRI, Flanders Marine Institute, Natural Earth.





TOOTHED WHALES-2

MARINE MAMMALS

- Baleen Whales
- ➔ **Toothed Whales**
- Pinnipeds
- Carnivores

Narwhal

Natural history

The Narwhal (*Monodon monoceros*) is a medium-sized toothed whale measuring up to 5 m in length, excluding the tusk. Males weigh an average of 1,600 kg and females an average of 900 kg. The characteristic tusk, an erupted tooth that can reach 3 m in length, is found mainly in males but can occur in females. Similar to Belugas, Narwhals are long-lived species, thought to have a lifespan of up to 90 years, and give birth to a single calf every two to three years. Animals are born dark grey and turn black and white as they age with a black and white mottled pattern on their backs and white on the underside. They consume a small variety of fish and invertebrates including halibut, Arctic Cod, and shrimp.

Narwhals are a deep diving species that migrate seasonally and prefer deep water in summer and winter. They have been recorded diving to depths in excess of 1,500 m, and like their closest relative, the Beluga, use sound and echolocation to communicate, navigate, and search for food. The global population estimate is near 160,000, with close to 90% summering in Canadian waters.

Distribution

Narwhals are found mainly in eastern Canadian and western Greenland waters, with some in the North Atlantic as far east as Svalbard and possibly Russia. There are two stocks identified in Canadian waters totalling an estimated 142,000 animals, with the majority of these residing off the coast of north Baffin Island in the summer. Migration occurs seasonally, with animals moving into the deep waters and mobile pack ice of Baffin Bay and Davis Strait for the winter.

Importance to Inuit

Narwhals are important to the culture, economy, and food security of Inuit communities in Nunavut. Animals are mainly harvested in spring at the floe edge off north Baffin Island, and in the summer in northern Hudson Bay and off the coast of north Baffin Island. Muktuk, or skin and blubber from a harvested whale, is a traditional food item across the North.

Conservation concerns

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) considers the conservation status of Narwhal to be "of special concern." Reasons for concern include uncertainty about population numbers and trends due to limited data, levels of sustainable hunting, and potential effects of climactic changes on a highly ice-associated species with a narrow range in prey species. Anthropogenic disturbance in the Arctic, including shipping and seismic work, may also be threats to a species that, like other many other cetacean species, is dependent on sound for communication and locating prey.

Facing Page: Narwhals surfacing near Baffin Island, Nunavut. (photo: Eric Baccega)

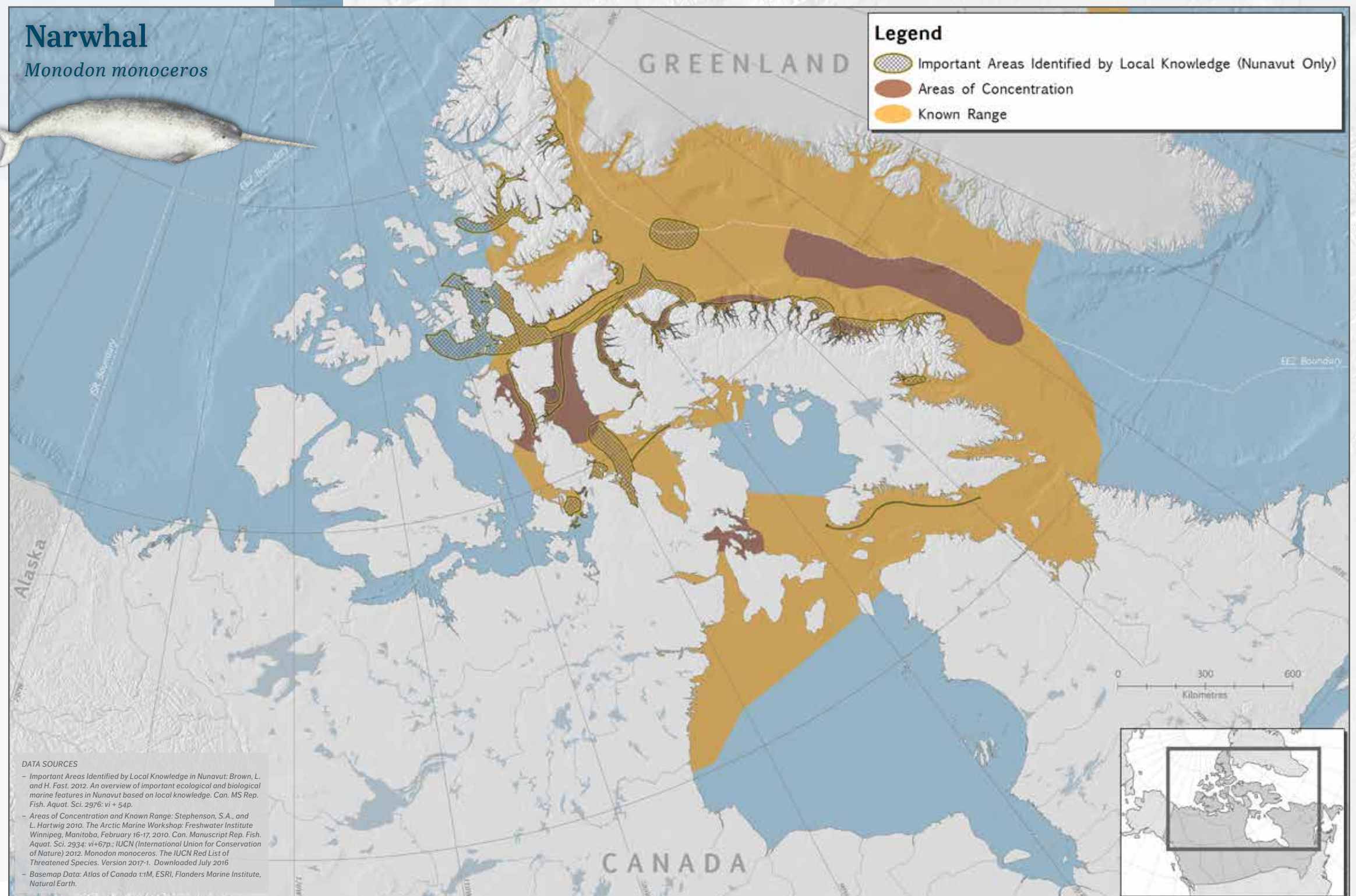
Right: Narwhal pod swimming near the surface, Pond Inlet, Lancaster Sound. (photo: Oceans North)



Gaps in current knowledge

Many gaps exist in our understanding of Narwhal populations, their habitat, and their prey, due to the difficulty in accessing many sites in summer and winter. For example, Narwhal prey data is mainly gathered from the stomach samples of seasonally harvested animals as well as inferred from the depths they have been recorded diving to in the winter. It is also unknown if animals summering off the north coast

of Baffin Island are distinct sub-populations that return to the same fjords each year and winter in distinct areas or if considerable mixing is taking place, which is important for establishing harvest quotas. Recent aerial surveys and population estimates have been undertaken in both summering regions; however, due to incomplete aerial survey coverage in some years and few surveys in total, reliable trends are not possible without further years of data.





PINNIPEDS-1

MARINE MAMMALS

- Baleen Whales
- Toothed Whales
- ➔ Pinnipeds
- Carnivores

Walrus

Natural history

The Walrus (*Odobenus rosmarus*) is a large brown pinniped recognizable by its tusks, white vibrissae or whiskers, and size. Adult males measure up to 3.6 m and 1,400 kg and females up to 3.1 m and 800 kg. Tusks are upper teeth that develop in males and females and can reach just under half a meter in length. Walruses are considered mature between the ages of 5 and 12 years and give birth to a single pup approximately every three years. They consume mainly clams but are also known to eat Arctic Cod (*Boreogadus saida*) and invertebrates. Their main predators are Polar Bears and humans.

Distribution

Atlantic Walruses (*O. r. rosmarus*) are found in the eastern Canadian Arctic and Greenland. Pacific Walruses (*O. r. divergens*) occur in the Bering and Chukchi Seas and occasionally in the Beaufort Sea. Five populations are recognized in Canada for management purposes based on geographical distributions and genetics.

Walruses are most often found at ice edges in winter and on pack ice or island or coastal habitats, called haul-out sites, in summer. They prefer shallow waters for access to preferred prey and are often found in areas shallower than 100 m.

Importance to Inuit

In areas where Walruses exist in the Canadian Arctic, they have been an important food source for Inuit. In the past, groups of Inuit used to survive on Walrus. Walruses are still harvested as an important source of country food. One way of preparing Walrus meat is to allow it to ferment in a burrow in the permafrost for up to two years. The ivory tusks of the Walrus have been reported to be used to make hunting tools and weapons by Inuvialuit, Inuit of Igloolik, Baffin Island, and Labrador.

Conservation concerns

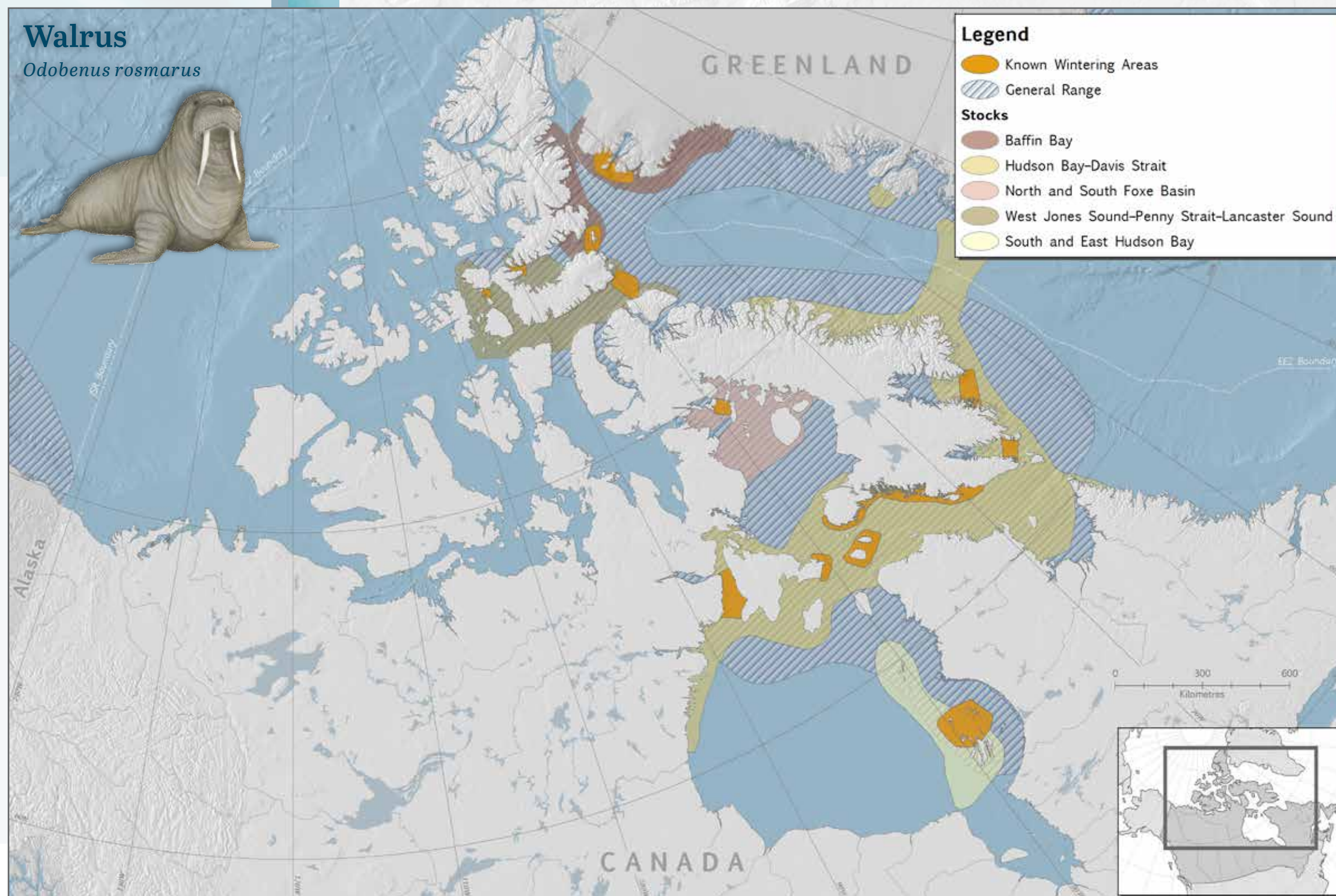
The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designated Walrus as "of special concern." Knowledge of population size and structure, hunting pressures, and vulnerability to disturbance are reasons for the conservation designation.

Gaps in current knowledge

Little is known about population numbers of the Walrus at this time, and populations may be threatened by hunting, noise disturbance, and industrial activities. The Walrus survival rate, sustainable harvest rate, or rate of removal are also unknown for the currently defined populations. The effects of climate change and reductions in sea ice on Walrus populations are also unknown.

Walrus

Odobenus rosmarus



Facing Page: Underwater view of Walrus and sea ice in Frozen Strait, Nunavut. (photo: WorldFoto)

Right: Walrus meat laid out on the beach after a hunt, Igloolik, Nunavut. (photo: Louise Murray)

DATA SOURCES

- Stocks: Stewart, R.E.A., Hamilton, J.W., and J.B. Dunn. 2013. Results of Foxe Basin walrus (*Odobenus rosmarus rosmarus*) surveys: 2010-2011. DFO Can. Sci. Advis. Sec. Res. Doc. 2013/017. iv + 12 p. (Erratum: February 2014).
- Known Wintering Areas: Stephenson, S.A., and L. Hartwig. 2010. The Arctic Marine Workshop: Freshwater Institute Winnipeg, Manitoba, February 16-17, 2010. Can. Manuscript Rep. Fish. Aquat. Sci. 2934: vi+67p.
- General Range: Lowry, L. 2016. *Odobenus rosmarus*. The IUCN Red List of Threatened Species 2016: e.T15106A45228501. Downloaded 13 July 2016.
- Basemap Data: Atlas of Canada 1:1M, ESRI, Flanders Marine Institute, Natural Earth.





PINNIPEDS-2

MARINE MAMMALS

- Baleen Whales
- Toothed Whales
- ➔ Pinnipeds
- Carnivores

Ringed Seal

Natural history

The Ringed Seal (*Pusa hispida*) is a small seal averaging 1.5 m in length and weighing between 50 and 70 kg. Born white, Ringed Seals turn grey with age. Adult Ringed Seals are dark grey with light rings on the dorsal side and silver on the ventral side, or underside. Ringed Seals are considered mature between the ages of five and seven years and give birth to a single pup in March or April, although timing of pupping varies across the Arctic. They consume a variety of fish and invertebrates including Arctic Cod, sculpins, mysids, and shrimp. Ringed Seals are thought to have a lifespan of 25 to 30 years. Their main predators are Polar Bears and humans.

Distribution

Ringed Seals have a circumpolar distribution occurring in all parts of the Arctic Ocean. They are an ice-associated species, maintaining breathing holes in the ice, unlike other seal species, and creating lairs under the snow on the ice surface for giving birth and nursing young. Ringed Seals use shore-fast ice or stable pack ice in winter and are thought to disperse to forage during the open-water season.

Importance to Inuit

Ringed Seals are an important part of diet in the Arctic and are harvested year-round. Part of a traditional food source, all parts of the seal are consumed and pelts are used to make boots and clothing.

Conservation concerns

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designated Ringed Seals "not at risk." Changes in the marine environment and increases in shipping and development in the North, however, may be cause for concern.

Gaps in current knowledge

Population numbers of Ringed Seals are largely unknown and difficult to assess due to their small size, large range, and habitat preference. Population size has been inferred in some areas based on Polar Bear density, as well as the number of breathing holes within a portion of seal habitat. Without reasonable population estimates it is difficult to assess the species's response to loss of seasonal sea ice and increased ship traffic as sea ice declines.

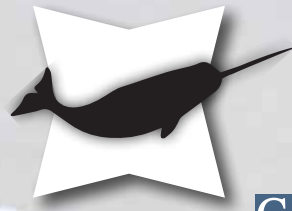
Facing Page: Ringed Seal basking in midday sun on an ice floe in Hudson Bay. (photo: Mike Macri, macriphoto.ca)

Right: Ringed Seal skins drying, Pond Inlet, Lancaster Sound. (photo: Oceans North)

DATA SOURCES

- Core Range: Stephenson, S.A., and L. Hartwig, 2010. The Arctic Marine Workshop: Freshwater Institute Winnipeg, Manitoba, February 16-17, 2010. Can. Manuscript Rep. Fish. Aquat. Sci. 2934: vi+67p.
- Basemap Data: Atlas of Canada 1:1M, ESRI, Flanders Marine Institute, Natural Earth.





CARNIVORES

MARINE MAMMALS

- Baleen Whales
- Toothed Whales
- Pinnipeds
- ➔ Carnivores

Polar Bear

Natural history

The Polar Bear (*Ursus maritimus*) is the largest four-legged carnivore in the world. Females weigh an average of 400 kg and male bears can weigh up to 800 kg. Females reach reproductive maturity at four to six years old and on average give birth to two cubs every three years. Adult Polar Bears have a very high survival rate and adults can live to the age of 25. Polar Bears are adapted to the Arctic environment with dense, water-repellent white fur, a thick layer of fat, and a streamlined body and large front paws for swimming. The Polar Bear's diet consists primarily of Ringed Seals, and they occasionally kill Bearded Seals, Walruses, Beluga Whales, and Narwhals. When on land in summer, especially in the southern portions of their range, Polar Bears will consume fish, eggs, kelp, lemmings, carrion, and berries. The global population estimate is approximately 26,000 bears, with about two-thirds living in Canada.

Distribution

In Canada, Polar Bears are found primarily in coastal regions from Yukon to Newfoundland, and from James Bay to the islands of the Canadian Arctic Archipelago. Seasonal movements of Polar Bears depend on the areas where they and their prey reside. Because of their close relationship with seals, their movements tend to follow the same patterns as seals' movements; the bears follow the seals northward in mid-winter and through the springtime along the land-fast ice and floe edge.

Importance to Inuit

Polar Bear is an important resource for the Inuit, playing a role spiritually, as part of a subsistence diet, and in the local economy. Polar Bears are hunted for their pelts and meat in parts of the Arctic. The meat is usually baked or boiled in a soup or stew. The sale of a Polar Bear pelt as well as guided sport hunting can be a source of income for Inuit families.

Conservation concerns

The Polar Bear is vulnerable to changing sea ice conditions associated with climate change. This is the main reason the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designated the Polar Bear as "of special concern" in 1986. Melting sea ice is a major and long-term threat to Polar Bears. It affects them directly by loss of ice habitat, and indirectly by changing prey availability, reducing access to historical habitat, and exposing them to more human activity, including industrial development and shipping.

Polar Bear

Ursus maritimus



Facing Page: A Polar bear on annual ice, Cape Churchill, Manitoba. (photo: Sergey Uryadnikov)

Right: Polar Bear swimming near Harbour Islands, Repulse Bay, Nunavut. (photo: Paul Souders)

Gaps in current knowledge

Canada expects to have up-to-date estimates for all its Polar Bear populations and sub-populations by 2018. Although Polar Bears are well studied and monitored in many areas of the Arctic, gaps in knowledge persist with respect to the likely impact of multiple stressors on Polar Bear populations. The cumulative effects and the interaction between stressors, including climate change, contaminants, disease, and increasing human activities, have not been well studied, and the likely impact to Polar Bears remains unknown.

DATA SOURCES
- Stocks: IUCN Polar Bear Specialist Group. 2015. Summary of polar bear population status per 2014. Retrieved from: <http://pbsg.npolar.no/en/status/status-table.html>
- Mapped Denning Areas: Stephenson, S.A., and L. Hartwig. 2010. The Arctic Marine Workshop: Freshwater Institute Winnipeg, Manitoba, February 16-17, 2010. Can. Manuscript Rep. Fish. Aquat. Sci. 2934: vi+67p.
- Basemap Data: Atlas of Canada 1:1M, ESRI, Flanders Marine Institute, Natural Earth.

FURTHER READING

MARINE MAMMALS

Ferguson, S. H., L. L. Loseto, and M. L. Mallory. 2010. *A Little Less Arctic: Top Predators in the World's Largest Northern Inland Sea, Hudson Bay*. Dordrecht: New York: Springer.

Fisheries and Oceans Canada. 2016. "Impacts of Climate Change on Marine Mammals."

———. 2016. "High Arctic Cetacean Survey."

Laidre, K. L., I. Stirling, L. F. Lowry, O. Wiig, M. P. Heide-Jørgensen, and S. H. Ferguson. 2008. "Quantifying the Sensitivity of Arctic Marine Mammals to Climate-Induced Habitat Change." *Ecological Applications* 18: S97–S125.

North Atlantic Marine Mammal Commission. 2016. "Marine Mammals."

Reeves, R. R., P. J. Ewins, S. Agbayani, M. P. Heide-Jørgensen, K. M. Kovacs, C. Lydersen, R. Suydam, et al. 2014. "Distribution of Endemic Cetaceans in Relation to Hydrocarbon Development and Commercial Shipping in a Warming Arctic." *Marine Policy* 44: 375–389.

Richard, P. 2001. *Marine Mammals of Nunavut*. Nunavut: Qikiqtani School Operations, Dept. of Education.

Stephenson, S.A., and L. Hartwig. 2010. The Arctic Marine Workshop: Freshwater Institute Winnipeg, Manitoba, February 16-17, 2010. Canadian Manuscript Report of Fisheries and Aquatic Sciences 2934.

Whales

Allen, B. M., and R. P. Angliss. 2012. "Western Arctic Bowhead Whale." *Alaska Marine Mammal Stock Assessments 2012*: 202–211.

COSEWIC. 2004. *COSEWIC Assessment and Update Status Report on the Narwhal Monodon monoceros in Canada*. Ottawa: Committee on the Status of Endangered Wildlife in Canada.

———. 2009. *COSEWIC Assessment and Update Report on the Bowhead Whale Balaena mysticetus Bering-Chukchi-Beaufort Population Eastern Canada-West Greenland Population*. Ottawa: Committee on the Status of Endangered Wildlife in Canada.

Ferguson, S. H., L. Dueck, L. L. Loseto, S. P. Luque. 2010. "Bowhead Whale *Balaena mysticetus* Seasonal Selection of Sea Ice." *Marine Ecology Progress Series* 411: 285–297.

Fisheries and Oceans Canada. 2015. "Abundance Estimates of Narwhal Stocks in the Canadian High Arctic in 2013." *DFO Canadian Science Advisory Secretariat Science Advisory Report* 2015/046.

———. 2016. "Bowhead Whale (Bering-Chukchi-Beaufort Sea population)."

———. 2016. "Bowhead Whale (Eastern Canada-West Greenland population)."

———. 2016. "Bowhead Whale."

———. 2017. "Beluga Whale."

———. 2017. "Narwhal."

Innes, S., M. P. Heide-Jørgensen, J. L. Laake, K. L. Laidre, H. J. Cleator, P. Richard, and R. E. A. Stewart. 2002. "Surveys of Belugas and Narwhals in the Canadian High Arctic in 1996." *NAMMCO Scientific Publications* 4: 169–190.

Laidre, K. L., and M. P. Heide-Jørgensen. 2005. "Arctic Sea Ice Trends and Narwhal Vulnerability." *Biological Conservation* 121: 509–517.

———, H. Stern, K.M. Kovacs, L. Lowry, S.E. Moore, E.V. Regehr, S.H. Ferguson, et al. 2015. "Arctic Marine Mammal Population Status, Sea Ice Habitat Loss, and Conservation Recommendations for the 21st Century." *Conservation Biology* 29, no. 3: 724–37.

NAMMCO. n.d. "The Beluga Whale [1992-2002 Data]." *Status of Marine Mammals in the North Atlantic*.

NOAA. 2016. "Beluga Whale (*Delphinapterus leucas*)."

Reeves, R., E. Mitchell, A. Mansfield, and M. McLaughlin. 1983. "Distribution and Migration of the Bowhead Whale, *Balaena mysticetus*, in the Eastern North American Arctic." *Arctic* 36, no. 1 (January): 5–64.

Richard, P., M. Heide-Jørgensen, J. Orr, R. Dietz, and T. Smith. 2001. "Summer and Autumn Movements and Habitat Use by Belugas in the Canadian High Arctic and Adjacent Areas." *Arctic* 54: 207–222.

Smith, T. G., M. O. Hammill, D. I. Burrage, and G. A. Sleno. 1985. "Distribution and Abundance of Belugas, *Delphinapterus leucas*, and Narwhals, *Monodon monoceros*, in the Canadian High Arctic." *Canadian Journal of Fisheries and Aquatic Sciences* 42: 674–484.

World Wildlife Federation. 2017. "Bowhead Whale."

Ringed Seal

Fisheries and Oceans Canada 2016. "Ringed Seal."

———. 2016. "The Importance of the Seal Harvest."

———. 2016. "Seal species."

Harwood, L. A., T. G. Smith, and H. Melling, 2000. "Variation in Reproduction and Body Condition of the Ringed Seal (*Phoca hispida*) in Western Prince Albert Sound, NT, Canada, as Assessed through a Harvest-Based Sampling Program." *Arctic* 53: 422–431.

Heide-Jørgensen, M. P., and C. Lydersen (eds). 1998. "Ringed Seals in the North Atlantic." *NAMMCO Scientific Publications* 1.

Reeves, R. R. 1998. "Distribution, Abundance and Biology of Ringed Seals (*Phoca hispida*): An overview." *NAMMCO Scientific Publications* 1: 9–45.

Smith, T. G. 1975. "Ringed Seals in James Bay and Hudson Bay: Population Estimates and Catch Statistics." *Arctic* 28, no. 3: 170–182.

Richard, P. 2001. "Ringed Seal." In *Marine Mammals of Nunavut*. Nunavut: Qikiqtani School Operations, Dept. of Education.

Walrus

Born, E. W., I. Gjertz, and R. R. Reeves. 1995. Population Assessment of Atlantic Walrus. Norsk Polarinstitutt. Meddel 138.

Canada's First Peoples. 2007. "The Inuit."

COSEWIC. 2006. *COSEWIC Assessment and Update Status Report on the Atlantic Walrus Odobenus rosmarus rosmarus in Canada*. Ottawa: Committee on the Status of Endangered Wildlife in Canada.

Fisheries and Oceans Canada. 2017. "Impacts of Flexible Quota System on Walrus (*Odobenus rosmarus rosmarus*) Harvesting." *DFO Canadian Science Advisory Secretariat Science Advisory Report* 2017/040.

Kuhnlein, H. V., and M. M. Humphries. 2017. "Walrus." Traditional Animal Foods of Indigenous Peoples of Northern North America. McGill University.

Richard, P. 2001. "Walrus." In *Marine Mammals of Nunavut*. Nunavut: Qikiqtani School Operations, Dept. of Education.

Stewart, Robert E.A. 2008. "Redefining Walrus Stocks in Canada." *Arctic* 61(3): 292–308.

Polar Bear

COSEWIC. 2008. *COSEWIC Assessment and Update Status Report on the Polar Bear Ursus maritimus in Canada*. Ottawa: Committee on the Status of Endangered Wildlife in Canada.

Environment Canada. 2011. "National Polar Bear Conservation Strategy for Canada."

Inuit Tapiriit Kanatami (ITK). n.d. "Arctic Wildlife."

IUCN/SSC Polar Bear Specialist Group. 2017. "Summary of Polar Bear Population Status 2017."

Species at Risk Public Registry. 2016. "Species Profile: Polar Bear."

Stern, H. L., and K. L. Laidre. 2016. "Sea-Ice Indicators of Polar Bear Habitat." *The Cryosphere* 10: 2027–2041.

Unger, Z. 2012. "The Truth about Polar Bears." *Canadian Geographic*.

York, J., M. Dowsley, A. Cornwell, M. Kuc, and M. Taylor. 2016. "Demographic and Traditional Knowledge Perspectives on the Current Status of Canadian Polar Bear Subpopulations." *Ecology and Evolution* 6, no. 9: 2897–2924.