

# BELUGA WHALES AND CLIMATE CHANGE



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## Summary

- Beluga whales live in Arctic and sub-Arctic waters and are sociable and vocal animals. They are hunted by indigenous Arctic people for food and are captured alive on a relatively small scale in eastern Russia to supply the live animal display industry throughout the world.
- Climate change is likely to affect Belugas both directly through ecological interactions and indirectly through its effects on human activity.
- Among the ecological factors that may affect Belugas are changes in populations of their prey, changes in ice conditions (more ice entrapment is a possibility), greater competition with co-predators, more frequent predation by killer whales and exposure to novel pathogens.
- As Arctic ice cover rapidly declines and the passages across northern landmasses become more navigable, humans will gain easier access to formerly pristine areas that have long served as refuges for Belugas and other marine mammals.
- Belugas are increasingly at risk from vessel and industrial noise, ship strikes and toxin exposure.

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## BELUGA WHALES AND CLIMATE CHANGE

The scientific name for the Beluga Whale (*Delphinapterus leucas*) means “white dolphin without wings”. Adult Belugas are entirely white and their common name comes from the Russian word *belukha* or “white one”.

Belugas are toothed whales that measure up to 4 (females) or 5.5 metres (males). Unlike most other whales and dolphins, they lack a dorsal fin.

Belugas are extremely vocal, producing whistles, squeals, chirps and clicks, prompting their nickname, “sea canaries”. They use some of their sounds to communicate and others to locate objects. Some of their sounds can be heard from above the water.

Belugas were historically an important food resource for many indigenous Arctic communities and they were hunted by commercial whalers for oil and hides. Today they are hunted only by Inuit, primarily for their skin, which is considered a delicacy.

### What do we know about Belugas?

Belugas live mainly in Arctic and sub-Arctic waters. Some populations (for example, the Cook Inlet and the St Lawrence River populations) are geographically isolated and live in those locations all year round. Other groups of Belugas inhabit fairly well-defined areas in the summer but may mix with other populations in the winter.

In spring and summer months Belugas are typically found in fjords, bays and estuaries where feeding opportunities are good and water temperatures are favourable for calves. As autumn progresses into winter these habitats usually freeze over, and the whales are forced into offshore waters, though their exact winter movements are not well known. Belugas are well adapted to living in ice-infested waters and are likely to benefit from the fact that Killer Whales, their main predators, are not.

Belugas are social animals and are usually found in groups known as “pods” of a few to a few tens of individuals. Pods generally consist either only of males, or only of females and young whales. Pods of Belugas often form large aggregations of numerous pods totalling hundreds of animals.

Mating takes place between late winter and early spring, and a single calf is born approximately 14 months later. Young Belugas depend on their mothers’ milk for close to two years. Mature females generally reproduce once every three years.

Belugas rub and scrape against coarse sand and rocks, apparently to enhance the shedding of old skin. They return each year to favourite skin-shedding places, typically in shallow estuaries, and calves presumably learn the locations of these sites from their mothers.

Belugas’ ages are estimated by counting the number of layers of dentine in their teeth. There has been considerable debate about how many layers are laid down per year and until recently, scientists calculated Beluga age assuming that two layers were laid down per

year. But new evidence suggests that only one dentine layer is laid down per year, and as a result, estimates of Beluga longevity have at least doubled to 60 years or more, with significant implications for population growth projections.



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Belugas feed on a large variety of fish species including Arctic cod, polar cod, saffron cod, salmon and smelt, as well as invertebrates such as shrimp, crabs, octopuses and marine worms. Belugas themselves are preyed upon by Killer Whales and Polar Bears, the latter at cracks in sea ice where the whales become particularly vulnerable.

### How is climate change affecting Belugas?

The most serious impacts of climate change on Belugas may not come directly from the effects of weather conditions, but rather indirectly from the role that regional warming and reduced sea ice play in changing human activities.

Extensive ice cover and extreme winter conditions (including both darkness and cold) have always limited human activities in the Arctic, and many regions have remained inaccessible to ships and other vessels. As Arctic ice cover declines and the passages between northern landmasses become more navigable, humans will gain easier access to formerly pristine areas that have long served as refuges for Belugas.

#### *Ship strikes and noise:*

The number of vessels sailing through the Arctic for gas and oil exploration/extraction, commercial shipping (for both transportation and tourism), and fishing has

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already increased. Further reductions in sea ice are likely to accelerate this trend in coming decades. With the increase in ship traffic, ship strikes are likely to become an increasingly significant cause of Beluga injury and death.

Belugas detect and respond to the presence of ice-breaking ships over great distances (up to 50 km). Industrial noise, for example from ships, seismic surveys and offshore drilling, likely disrupts Beluga behaviour and may impair their ability to communicate, forage efficiently and generally sense their environment. Noise-producing activities are already ongoing or planned in many areas used by large populations of Belugas, including the Beaufort and Chukchi seas, West Greenland and Hudson Bay.

### *Chemical pollution:*

Some toxic contaminants become concentrated as they move up the food chain. Because Belugas and other cetaceans are at or near the top of the food chain and have long life spans, they accumulate relatively high concentrations of certain toxins in their blubber and other organs. These may contribute to a range of health problems in the animals themselves and are also of concern to the people who hunt Belugas for food. Industrialization and urbanization of the Arctic are bound to exacerbate the problem of pollution.

### *Changing prey availability:*

Loss of sea ice and increased ocean temperatures will affect the distribution, composition and productivity of prey communities and in turn influence the ability of Belugas to find and catch suitable prey. Given the great uncertainties about how Arctic and sub-Arctic ecosystems function and about how Belugas will respond, it is impossible to make confident predictions of impacts.

### *Unreliable ice refuges:*

As weather patterns become more unpredictable and extreme due to climate change, it is possible that Belugas and other Arctic whales will become more susceptible to ice entrapment. Such unfortunate events have always occurred and they are considered to contribute to natural mortality in most Beluga populations. However, it is feared that the frequency and scale of the mortality from ice entrapment will increase as the climate changes.

### *Competition and predation:*

As Arctic waters become warmer and patterns of circulation, salinity and nutrient input change, species that previously were not present in the Arctic will be able to move further north and remain there for longer. This could have two major types of effects on Belugas. Firstly, species such as Minke and Humpback whales as well

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as seals and other predators may directly compete with Belugas for food resources. Secondly, species such as Killer Whales may have more opportunities to prey on Belugas. Both of these factors could negatively affect Beluga populations.

### Can Belugas adapt to climate change?

Although the total number of Belugas throughout their range (well over 100,000) is fairly large, it is important to recognize that there are many fewer now than there were as recently as 100 years ago. Declines in some areas have been drastic, mainly due to overhunting but almost certainly exacerbated by habitat degradation from human activities.

Although we know very little about the ability of Belugas and other Arctic animals to adapt to changing environmental conditions, it is important to recognize that their resilience has already been compromised by the historical reductions in population sizes and ranges. Therefore, until we have evidence to the contrary, it is sensible and prudent to assume that the rapid changes associated with climate change will put their survival at ever-greater risk.

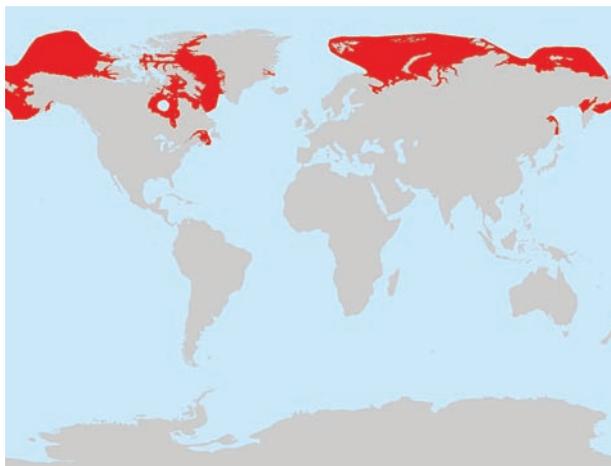
### Other threats

In some parts of the species' range, particularly in Canada and Greenland, intensive hunting represents an ongoing threat to Belugas. In a few instances this is compounded by the less direct and less easily quantified threats of disturbance by vessel traffic (e.g. St. Lawrence estuary, river mouths in eastern Hudson Bay), habitat modification (e.g. large hydroelectric dams in rivers flowing into Hudson Bay and James Bay), contaminants (e.g. St. Lawrence estuary), and possibly incidental catch in fisheries (wherever entangling gear overlaps the animals' range).

### Contact

#### Randall Reeves

Chairperson: IUCN SSC Cetacean Specialist Group  
Okapi Wildlife Associates, Canada  
rrreeves@okapis.ca



Beluga Whale geographical range  
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*"Climate change could prove to be catastrophic for Belugas (and Narwhals and Bowhead Whales) but the catastrophe could be either dramatic and rapid or very prolonged and subtle. At the same time, it is possible that some species of cetaceans, perhaps even one of these Arctic species, will adapt to some degree and persist and even flourish, at least locally or regionally."*

**- Randall Reeves**  
Chairperson: IUCN SSC Cetacean Specialist Group