Marine mammal avoidance in polar waters

Voyage planning is a key tool for protecting marine life in the arctic

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The IMO's International Code for Ships Operating in Polar Waters (Polar Code) has been in force since January 1 2017. As of 2018, it applies to existing ships as well as newbuilds. The Polar Code sets a mandatory baseline for the design, operation, and environmental measures for vessels traversing this often challenging environment. The timing of the Polar Code is excellent, as it seems every year a new polar voyage sets records, leading to excited headlines about new routes, longer shipping seasons, or earlier transits. The cruise ship *Crystal Serenity* carried almost 1,800 crew and passengers through the Northwest Passage during the summer of 2016. In the winter of the same year, *HHL Valparaiso* became the first vessel to sail open hatch through the Northern Sea Route.

It seems likely that many more vessels will follow suit. Potential scenarios developed by the US Committee on the Maritime Transportation System (CMTS) estimate that traffic through the Bering Strait may experience increases in traffic ranging from 100 to 500 percent by 2025, relative to 2013 levels. Yet in its guidelines to protect marine mammals from ship traffic, the Polar Code is not as clear or as strong as it could be.

Risk of ship strikes

The polar regions are home to a remarkable number of marine mammals. In the Arctic bowhead whales, belugas, narwhals, walruses and seals have all adapted to life under and on sea ice. Many other species, such as gray whales, humpback whales and killer whales may migrate in and out of the region during the same open ice seasons in which mariners are most likely to operate. This increases the risk of a negative interaction between these endemic species and visiting ships.

Bowhead whales, like their cousins the right whale, tend to be slow swimmers who do not react quickly to approaching ships. Ship strikes on these large animals poses a danger not only to the whale, but to vessels as well. In the past ship strikes have cracked hulls, damaged propellers, propeller shafts and rudders, damaged aft strut actuators, broken steering arms and ruptured seawater piping.

Vessel damage notwithstanding, the whale will likely come off the worse for wear in the exchange. Vessels can seriously impact the health of individual animals, or even entire populations, if care is not taken. Some bowhead whales in Alaska already exhibit scarring consistent with propellers or other ship strike damage. As with many threats, an ounce of prevention is worth a pounded hull. Voyage planning is a vital tool in minimising these interactions.

Striking sea ice habitat can often be just as devastating for seals or other mammals that haul onto the ice. When icebreakers carve a path through sea ice, seals will often mistake it for a natural polynya, or break in the ice, and will attempt to build their dens along the edges. These mothers and seal pups are then vulnerable to any ships following the path cut by the icebreaker. Strikes on these dens can cause pups to fall into icy water before their bodies can handle the shock. Whales that mistake these artificial polynya can become trapped when these channels refreeze. This risk could increase further as more shipping occurs in the fall.

Underwater noise impacts

The natural underwater soundscape experienced by marine mammals in the Arctic Ocean is different from that of temperate oceans, with seasonal variability of ice cover making it especially complex. Marine mammals use sound to navigate this environment. Bowheads sing to find mates, while belugas use clicks and whistles to hunt for prey. Ship noise may drown out or mask these calls. Especially for animals that have never heard vessels before, the sound may cause a change in behaviour. Belugas have fled from icebreakers from distances up to 50 kilometres away, and walruses may flee if a vessel gets within a kilometre of their haul out site.

The Polar Code addresses these concerns in Chapter 11, where it calls for Masters planning a route through polar waters to consider 'current information and measures to be taken when marine mammals are encountered relating to known areas with densities of marine mammals, including seasonal migration areas'.

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Risk to communities

In remote Arctic communities, quality of life and standard of living depend on shipping. It is an essential service. But through its impact on Arctic marine mammals, increasing vessel traffic also poses a risk to indigenous people. Communities in the northern Bering Sea and Bering Strait rely heavily on subsistence hunting and fishing. Marine mammals, seabirds, and fish and shellfish are among these communities' main sources of food. In the western Arctic, indigenous people have harvested subsistence resources from polar waters for millennia, and today have the opportunity to fish and crab commercially.

Arctic communities are increasingly concerned about the impact of shipping in polar waters (see www.kawerak.org for more information, among others). The Polar Code goes some way towards addressing this, establishing an international framework for protecting polar regions and the ancestral home and waters of Alaska Native people.

It is not only the frequency, but the size, of ships traversing these waters that is causing concern. Oil spills regularly happen, and activities that increase the likelihood of a major oil spill are too great a risk. In 2003, there was a fuel oil spill of 49 tonnes in the Russian White Sea near Onega Bay, near core habitat for the local population of beluga whales. In March 2018, the Bering Strait region saw its biggest oil spill to date – a 22,000 gallon fuel spill in the village of Savoonga. The Bering Strait, like many other Arctic regions, is not well prepared to address a major oil spill. Fuel oil spills can have a persistent and long-lasting impact, especially in polar environments. Were larger spills like the one near Savoonga to become more common, they could permanently damage key areas for many species.

Voyage planning resources

Including marine mammals in voyage planning is important if we are to reduce the impacts on wildlife, the environment and indigenous communities. The challenge has been developing best practices for mariners to use in order to protect all three.

Often the first challenge is simply learning where marine mammals are. Maps of habitat are slowly improving. There are also plenty of lessons to be learned from other areas where maritime traffic and marine mammals overlap. Nations like the United States and Canada often include marine mammal information in official Notices to Mariners, such as the timing of right whale migrations along the eastern coast of North America. Some dedicated risk assessment tools like Sea Sketch or Canadian Arctic Shipping Risk Assessment System (CASRAS) could offer a way for mariners to see layers of marine mammal habitat when carrying out initial voyage planning, then download these maps for offline use in the region.

Many conservation organisations have also produced materials that can assist mariners travelling through known critical areas. For example, in 2017 WWF-Canada produced the *Mariners' Guide for the Hudson Strait*, outlining guidelines for travelling through the Hudson Strait, a major corridor connecting the Hudson Bay with the Atlantic Ocean. The guide is made up of two large posters for a ship's bridge. The first is a chart that helps mariners identify whales, seals, polar bears and walruses, and provides operational guidance when encountering marine mammals up close or at a distance. The second is a set of maps showing marine mammal habitat in both summer and winter, along with an extensive list of contacts so mariners can report sightings and incidents at both the national and community level. A similar guide to Eastern waters, the Eastern Arctic Mariner's Guide, was released in May 2018.

Routing measures

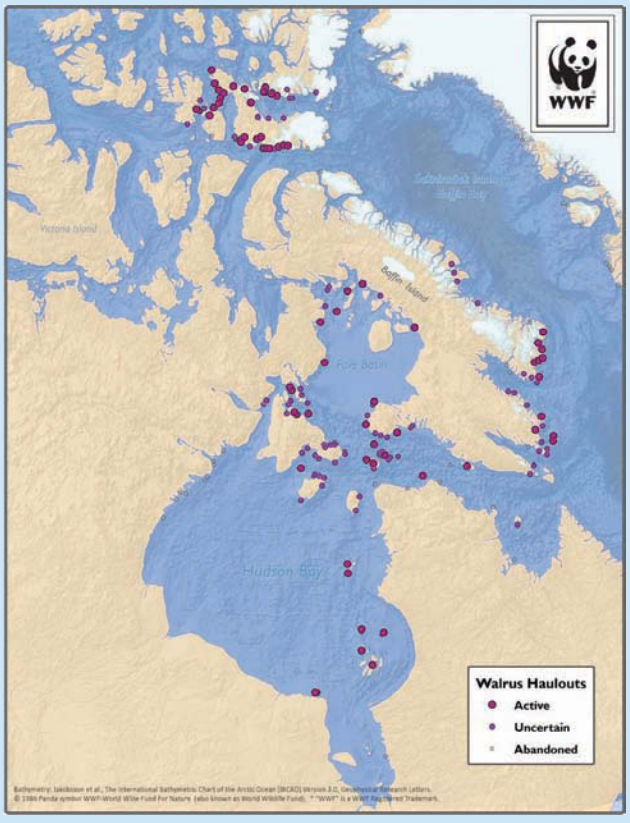
Should voluntary tools fail there are also official regulations through the IMO. Most recently, the United States and the Russian Federation proposed a routing measure, along with three American areas to be avoided for the Bering Sea. Domestically these routes incorporated feedback on marine mammal areas. While this is not a perfect solution, it offers an example of safer, more predictable shipping. In the future, as critical areas are identified, potential speed reductions or other routes could be implemented to reduce noise or the risk of a fatal ship strike. While the Polar Code is a 'one stop shop' for mariners looking for new information, the Arctic Council's new Best Practices Information Forum includes summaries and material for each chapter. In the long term marine mammal information could be nested here for voyage planning purposes.

The Polar Code remains a solid step forward towards safer and more environmentally friendly operations in polar waters, but it is vital that provisions like the principal of marine mammal avoidance are followed. The magic ingredient may be the mariners themselves, and we hope the readers of *Seaways* have their own ideas on how this provision can best be implemented, and what information they would find helpful as they plan their route.

Route planning in practice – watch out for walruses

Atlantic walruses play a major role in the Arctic marine ecosystem and are an important part of the traditional subsistence economy for the Inuit of Nunavut. Repeat disturbance of walrus haulout sites can lead to the abandonment of these critically important habitat areas, which is why caution should be exercised when traveling near a known haulout location, in accordance with the requirements of the Polar Code.

Shipping routes should be checked against known walrus haulout locations and any proposed shipping route should maintain a setback of five (5) km seaward of a walrus haulout throughout the year.



Walrus haulouts in the eastern Canadian Arctic: a database to assist in land use planning. Higdon, J. 2016.