

Protection of the Arctic Marine Environment (PAME) (2019) Underwater noise in the Arctic: a state of knowledge report. PAME Secretariat, Akureyri⁶. Authored by William D. Halliday, Matthew K. Pine, and Stephen J. Insley.

What is the research about?

- Underwater noise is an important issue globally, and underwater noise from human activities causes a variety of negative impacts on marine life.
- Underwater noise has been increasing in temperate areas due to increased ship traffic, but no study has examined long-term trends in underwater noise across the Arctic.
- The Arctic is a unique acoustic environment due to the presence of sea ice and lower levels of human activity, so underwater noise may have different impacts on Arctic marine life.

What we did:

- We conducted a literature review of background ambient sound levels in the Arctic, sources of anthropogenic (human-caused) underwater noise, and the impacts of underwater noise on Arctic marine animals.

What we found:

- The Arctic has lower ambient sound levels than non-polar areas due to the presence of sea ice and decreased anthropogenic activity.
- When anthropogenic activity is present in the Arctic, it can be heard from very far away due to these low ambient sound levels.
- The majority of anthropogenic underwater noise in the Arctic is due to oil-and-gas exploration and extraction activities and ship traffic.
- Underwater noise may increase in the Arctic in the future as levels of ship traffic are projected to increase.
- Arctic marine mammals may be more sensitive to underwater noise than non-Arctic marine mammals. For example, beluga whales and narwhal react to noise sources that are nearly 50 km away.
- Arctic seals may be more tolerant to underwater noise than Arctic whales, but only a handful of studies have examined Arctic seals, often only incidentally.
- Only two studies examined the impact of ships (and indirectly, noise) on Arctic fish, and both found that the fish changed their movement behaviour in response to ships.
- No studies have examined the impact of underwater noise on Arctic marine invertebrates.
- There were many knowledge gaps, including entire geographic areas where we couldn't find any studies (Russian Arctic; much of the European Arctic), and many species with no information about how they react to underwater noise (walrus, bearded seals, most fish, all marine invertebrates).

Our recommendations:

- Fill knowledge gaps, either by making data/reports available or conducting new research.
- Use the precautionary approach in the Arctic before underwater noise increases as shipping increases.

⁶ <https://oaarchive.arctic-council.org/bitstream/handle/11374/2394/Underwater%20noise%20report.pdf?sequence=1&isAllowed=y>

Why is this research relevant to the Inuvialuit people?

- Marine mammals such as bowhead whales, beluga whales, bearded seals and ringed seals live in the region and use sound to communicate, find food, mates, and avoid predators. They are also a critical part of Inuvialuit food sovereignty and have been managed by Indigenous communities for millennia.
- Any increase in underwater noise has implications not only for the conservation of marine mammals, but all the Inuvialuit communities that depend on these mammals for nutrition, cultural, and spiritual values.
- It is important to understand the impacts of underwater noise and design appropriate mitigation for MPAs and other areas of importance. The combination of scientific research could be complementary to Inuvialuit long-term observations and experiences of marine mammal behaviour to co-create “rules” and educational materials for tourist vessels.

How was the community involved?

Not involved directly in this study. Data from research conducted out of Sachs Harbour were included in this literature review.

Where can I get more information about this project?

- William Halliday, Matt Pine, and Stephen Insley are scientists with Wildlife Conservation Society (WCS) Canada (wcsCanada.org). You can reach them at sinsley@wcs.org and whalliday@wcs.org.
- Other information:
 - www.arcticnoise.ca

