



## Northern Low Impact Shipping Corridors Recommendations from Wildlife Conservation Society Canada

July 2019

### Context

The Government of Canada is working in partnership with Indigenous communities and organizations and Arctic stakeholders to establish Low Impact Shipping Corridors through Arctic waters. The shipping routes established through this initiative will provide the infrastructure, navigational support and emergency response services needed for safer marine navigation, while respecting the environment and local ecology and cultures. The initiative is jointly led by Transport Canada and the Canadian Coast Guard, and is currently seeking information and advice from knowledgeable experts. With this submission WCS Canada is commenting on a question that we have particular expertise in: ***Are there any marine priority geographic areas that warrant special consideration and why?*** In particular, we show how a slight northward shift of the current corridor would minimize impacts in the beluga and bowhead core use areas in the western Canadian Arctic, and would establish a potential noise buffer between the corridors and the *Anguniaqvia Nqiqyuam* Marine Protected Area (ANMPA), as well as increase the buffer around the *Tarium Niryutait* Marine Protected Area (TNMPA).

### About WCS Canada

WCS Canada's mission is to conserve wildlife and wild places in Canada through science, conservation action, and inspiring people to value nature. We carry out species- and landscape-conservation programs in northern Ontario, Yukon, British Columbia, Alberta, and across the western Arctic (<https://canada.wcs.org/>). Our trademark is "muddy boots" biology, which we do by conducting the necessary field-based research to fill key information gaps on Canada's fish, wildlife, and ecosystems. Our work is often carried out in direct partnership with others including government, Indigenous communities and organizations, and other stakeholders. Our research and recommendations are provided to decision-makers including Indigenous communities, industry and other conservation groups to improve conservation outcomes.

WCS Canada is a national affiliate of the Wildlife Conservation Society, which has been working in the Arctic since 2002. Our efforts in the western Canadian Arctic have been ongoing since 2014. In addition to our community-based seal health monitoring program, we focus on applying passive acoustic monitoring in Arctic marine environments to gather information on the activities of marine mammals, fish, and ships. This involves modeling and measuring the

impact of ship traffic and underwater noise on the behaviour of the wildlife, and using that knowledge to assess and recommend mitigation and protection measures. Figure 1 below shows the location of our current and planned future monitoring locations.

Dr. Stephen Insley and Dr. William Halliday are both Associate Conservation Scientists with WCS Canada with formal ties to the University of Victoria (Adjunct Professor and Visiting Scientist, respectively). Dr. Insley has been working on marine mammals in Arctic and sub-Arctic regions for more than 25 years. Dr. Halliday has been leading WCS Canada’s analysis efforts on underwater acoustics since 2016, and has eight years of experience working in remote field locations in the Arctic. Dr. Insley started collecting underwater acoustic data in the Inuvialuit Settlement Region (ISR) of the western Canadian Arctic in 2014, and was joined by Dr. Halliday in 2016. They have a strong record of publications describing detections of Arctic marine mammals using acoustic methods, assessing underwater noise levels from shipping, acoustic modeling, and assessing management strategies for reducing the risk of ships to Arctic marine life (see list of publications and plain language summaries at [www.arcticnoise.ca/publications](http://www.arcticnoise.ca/publications)).

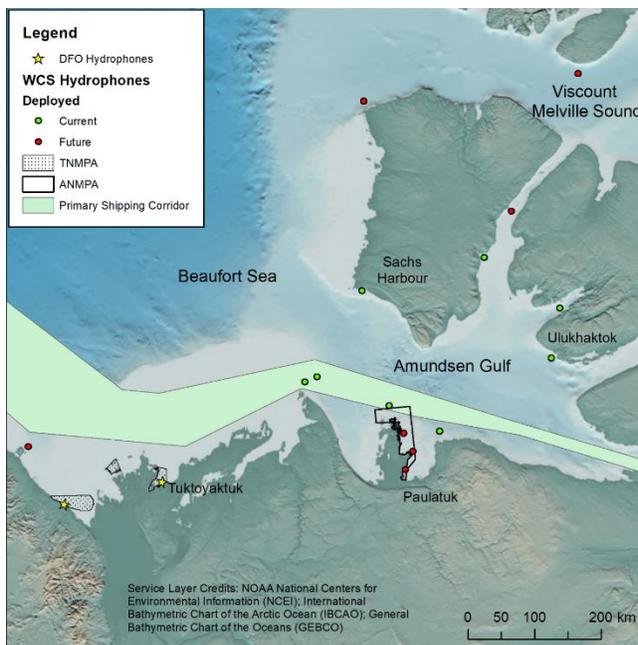


Fig. 1: The location of current and planned WCS hydrophones, as well as DFO hydrophones, in relation to the *Anguniaqvia Niqiqyuam* and *Tarium Niryutait* Marine Protected Areas, as well as the current Canadian Coast Guard shipping corridor.

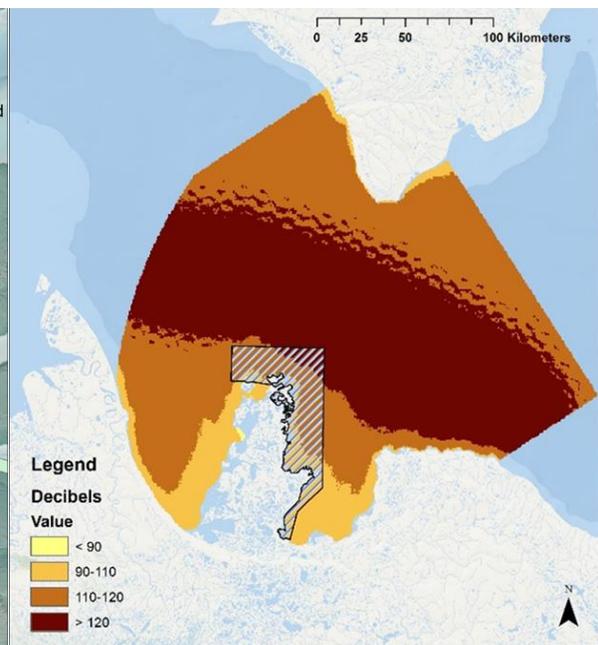


Fig. 2: Detailed ship noise propagation modelling results for a vessel transiting along the center of the current corridor indicates substantial noise intrusion into the ANMPA. (For more details see text and Halliday et al. 2017)

### Priority geographic areas in the western Arctic

In addition to the two MPAs in the region, core use areas (congregation areas, high density areas) for both beluga whales and bowhead whales have been delineated in the eastern

Beaufort Sea and Amundsen Gulf based on satellite telemetry, aerial surveys, and traditional knowledge. Here, we'll just reference the satellite telemetry studies.

Beluga whales, especially females and calves, congregate in the Mackenzie River estuary and Mackenzie shelf (Hauser et al. 2014). Males also move offshore into the Beaufort Sea, throughout the Amundsen Gulf, and into Viscount Melville Sound (Richard et al. 2001; Hauser et al. 2014). Bowhead whales mostly use upwelling sites just north of the Tuktoyaktuk Peninsula, Cape Bathurst, and Cape Parry (Citta et al. 2015; Harwood et al. 2017). Belugas remain in the western Canadian Arctic in July and August, and then migrate back towards the Bering Sea in September (Richard et al. 2001; Hauser et al. 2014). Bowheads remain in the eastern Beaufort Sea and Amundsen Gulf in July through September, and migrate back to the Bering Sea in October (Citta et al. 2015). The Audubon Ecological Atlas of the Bering, Chukchi, and Beaufort Seas<sup>1</sup> provides nice displays of how these species use the region seasonally, including areas of high density (Smith et al. 2017). These areas are shown in Figures 3 and 4 below.

### **Shipping impacts in priority geographic areas**

In its current configuration, the southern boundary of the Low Impact Shipping Corridor runs through the northern tip of the *Anguniaqvia Nqiqyuam* Marine Protected Area (ANMPA), the newly designated MPA in Darnley Bay that extends to Cape Parry, NT. We completed a detailed set of acoustical models using local background noise data, available oceanographic and bathymetric data, and several known ship source levels, in order to quantify ship noise levels in the region and its impacts on the current corridor (Figure 2). We found that some source levels (e.g., from a loud freighter or ice breaker) were high and would be audible to marine mammals throughout the majority of the ANMPA. These ships also exceeded NOAA's noise disturbance criteria (received levels of >120 dB re. 1  $\mu$ Pa) in the northern corner of the ANMPA.

Other sensitive areas include beluga and bowhead whale aggregation areas. In its current configuration, the shipping corridor directs ships through these areas when whales are actively using the area. Consequently, whales will be exposed to greater levels of underwater noise and subject to possible ship strikes (see Figure 3). However, as shown in Figure 4, a slight northward shift in the current corridor, in addition to seasonal speed restrictions throughout the area as a whole, would allow ships to move through the area with reduced impacts on the region's belugas and bowhead whales (Halliday et al. 2018).

---

<sup>1</sup> <https://ak.audubon.org/conservation/ecological-atlas-bering-chukchi-and-beaufort-seas>

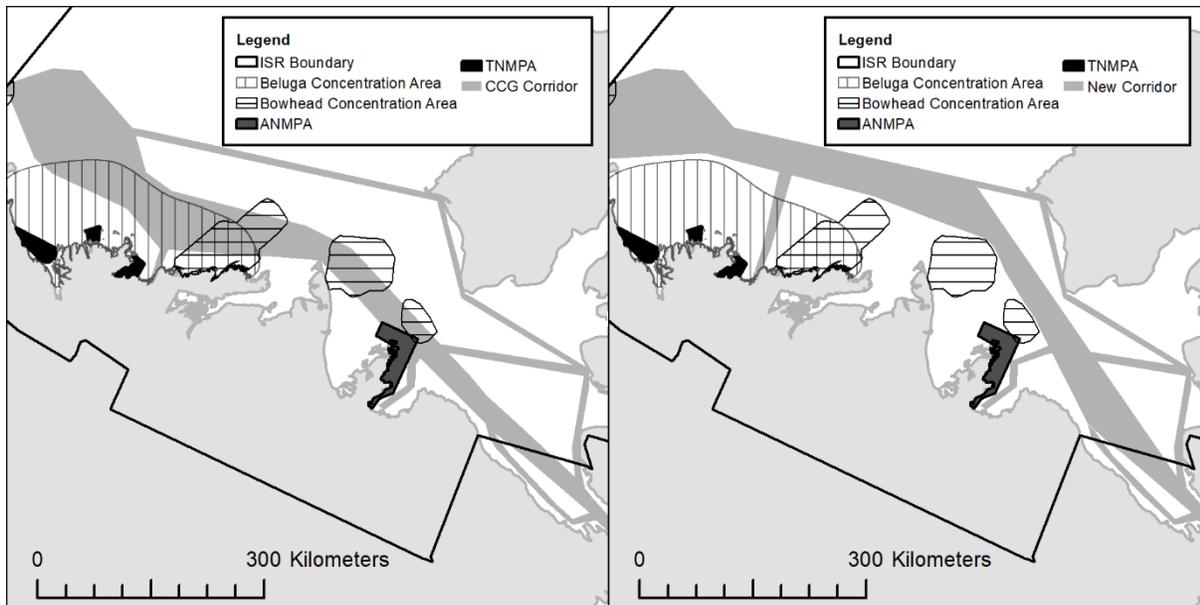


Fig. 3: Current shipping corridor in relation to MPAs and beluga & bowhead core use areas

Fig. 4: Recommended new alignment of the proposed corridor to minimize impact on marine mammals

### Recommendation

A slight northward shift of the current corridor would avoid beluga and bowhead concentration areas, and would establish a noise buffer between the corridors and the *Anguniaqvia Nqiqyuam* Marine Protected Area, as well as increase the buffer around the *Tarium Niryutait* Marine Protected Area.

### References

- Citta JJ, Quakenbush LT, Okkonen SR, Druckenmiller ML, Maslowski W, Clement-Kinney J, George JC, Brower H, Small RJ, Ashjian CJ, Harwppd LA, Heide-Jorgensen MP (2015) Ecological characteristics of core-use areas used by Bering-Chukchi-Beaufort (BCB) bowhead whales, 2006-2012. *Progress in Oceanography* 136: 201-222.
- Halliday WD, Insley SJ, Hilliard RC, de Jong T, Pine MK (2017) Potential impacts of shipping noise on marine mammals in the western Canadian Arctic. *Marine Pollution Bulletin* 123: 73-82.
- Halliday WD, Têtu P-L, Dawson J, Insley SJ, Hilliard RC (2018) Tourist vessel traffic in important whale areas in the western Canadian Arctic: risks and possible management solutions. *Marine Policy* 97: 72-81.
- Harwood LA, Quakenbush LT, Small RJ, George JC, Okiak J, Pokiak C, Heide-Jorgensen MP, Lea EV, Brower H (2017) Movements and inferred foraging by bowhead whales in the Canadian Beaufort Sea during August and September 2006-12. *Arctic* 70: 161-176.
- Hauser DDW, Laidre KL, Suydam RS, Richard PR (2014) Population-specific home ranges and migration timing of Pacific Arctic beluga whales (*Delphinapterus leucas*). *Polar Biology* 37: 1171-1183.
- Richard PR, Martin AR, Orr JR (2001) Summer and autumn movements of belugas of the Eastern Beaufort Sea stock. *Arctic* 54: 223-236.
- Smith MA, Goldman MS, Knight EJ, Warrenchuk JJ (2017) *Ecological Atlas of the Bering, Chukchi, and Beaufort Seas*, 2nd Edition. Audobon Alaska, Anchorage, Alaska.