

PAME I-2019: Agenda 6.5(a)

Title: Underwater Noise in the Arctic – Understanding Impacts and Defining Management Solutions

Draft Project Proposal Submitted by Canada and WWF – January 7, 2019

Background and Project Summary

Sound levels in the Arctic are generally lower than in non-polar regions, however, levels are projected to rise in the coming decades. Declines in sea ice extent and duration, and increases in human activity – in particular shipping, oil & gas exploration and development, construction and other industrial activities – will contribute to a louder, busier Arctic. In absolute terms, the Arctic is likely to remain quieter than many regions around the world where activity is particularly intense, but the relative change may be dramatic.

The Arctic is a special case for underwater noise:

- 1) Any introduction of noise in the Arctic is likely to have a greater impact than in a region where the levels are already high. Indeed, Arctic wildlife are not acclimated to noisy environments and therefore may be disproportionately affected by even modest noise increases;
- 2) There are noise sources that are particular to the Arctic such as ice formation and break-up as well as current anthropogenic noises associated with ice breaking activity;
- 3) Sound travels differently in Arctic waters over much greater distances at shallower depths than in non-Arctic waters; and
- 4) Most importantly, the culture and livelihoods of Indigenous peoples in the Arctic depend on the continued health of marine mammals, more so than in other regions of the world. Noise impacts affecting the behaviour of these mammals will be immediately felt in these communities.

Internationally, work is currently underway in numerous fora to better understand the impacts and identify ways to mitigate the effects of underwater noise, including at the International Maritime Organization (IMO), the International Whaling Commission (IWC) and at the United Nations (UN) more generally. Accordingly, given its mandate to address marine policy measures, PAME has a valuable role to play in providing insight and information to these and other fora.

The *Underwater Noise in the Arctic – Understanding Impacts and Defining Management Solutions* workplan proposal for 2019-2021 is designed as an adaptable and multi-phased project, with a scope that will focus on coordinating and collaborating with other Arctic Council working groups (e.g., CAFF) to assemble and integrate existing information about shipping patterns in the global Arctic, estimating and mapping vessel noise levels and hotspots, and identifying potential options to reduce the impact of underwater noise on the marine environment.

Key Objectives

Phase One

Using information from the PAME Arctic Ship Tracking Data (ASTD) project, and in collaboration with CAFF as appropriate:

- Obtain a better understanding of, and estimate the current underwater noise emissions) or 'noiseprint') from shipping in the Arctic.
- Identify hotspots of overlap between underwater noise from shipping and ecologically and culturally significant habitats.
- Based on the results obtained, and recognizing the limitations inherent to high-level analyses, define and communicate (including to international regulators) possible management options to reduce the impact of underwater noise from shipping in the Arctic. Expert input and traditional knowledge will be used to inform any such options.

Phase Two (for consideration during 2021-2023)

- Consider the impacts to marine biodiversity from underwater noise in the Arctic *outside the shipping sector* and identify potential management options to reduce those impacts.

Scope and Arctic Council Goals

These projects will follow on and utilize information from, *inter alia*, PAME's Arctic Marine Shipping Assessment (2009), AMAP/CAFF/SDWG's report to identify Arctic marine areas of heightened ecological and cultural significance (2013), and PAME's state of knowledge report on the impacts of underwater noise to Arctic biodiversity (in review, 2019).

Geographically, the project will encompass the CAFF defined Arctic and focus, in phase one, on noise generated by ships. The project will involve PPs, observers and member states of PAME and CAFF; recognized experts, especially those involved with the ASTD project and local Indigenous knowledge holders; and international academics and those following IMO, United Nations, European Commission and International Whaling Commission-relevant processes.

Note: See below linkages to all four goals of the Arctic Council's Arctic Marine Strategic Plan (2015-2025) and AMSP strategic actions.

Main Components and Implementation

Note: Individual components/projects to be done in order and to be completed as time/resources allow.

Phase One

Project 1, 2019-2021: Noise emissions from shipping

Focusing on the shipping sector, project leads will convene interested PAME and CAFF participants along with ASTD leads to develop a report on determining, cataloging, and potentially mapping estimated noise emissions of vessels in the Arctic. Through a series of webinars, and one in person meeting on the margins of either a CAFF or PAME regular working group meeting, participants with (if deemed necessary) the help of a contractor to lead and manage the project, and to produce noise heat maps for ships in the CAFF defined Arctic based on available data.

Methods:

- Ship tracks mapped through the PAME ASTD project.
- Noise outputs estimated using existing knowledge on ship noise emissions complemented as needed by other data sources available through the ASTD project (e.g. IHS Fairplay, Shipinfo, DNV-GL, etc).

Outputs:

- A catalogue of heat maps throughout the Arctic Region, where maps spatially and temporally depict and quantify estimated underwater noise from shipping. More discrete areas of the Arctic Region could be prioritized based on workload and resource availability.
- A high-level 'snapshot' of ship-produced underwater noise levels across the Arctic.

Project 2, 2019-2021: Hotspots

This work item utilizes previous Arctic Council work^{1,2,3} with an aim to understand the spatial and temporal intersection of underwater ship noise with areas of heightened ecological and cultural significance and sensitivity in the Arctic.

Methods:

- Define cultural and ecological sensitivity of marine areas to underwater noise. Use existing Arctic Council reports.
- Identify hotspots of overlap between areas of increased noise due to shipping and areas of ecological and /or cultural significance in the Arctic Region.

Outputs:

- Hotspot maps produced by overlaying heat noise maps with existing information on marine areas of heightened ecological and cultural significance.

Project 3, 2019-2021; Assessing Measures and Defining Management Solutions

Methods:

- Develop a matrix of existing guidelines and protocols pertaining to mitigating underwater noise impacts. A comprehensive matrix would include guidelines or recommendations developed by intergovernmental agencies (e.g. IMO, IWC, UNCLOS), national jurisdictions, Indigenous communities, scientific or environmental organizations and shipping industry associations.
- Assess guidelines and protocols and their degree of uptake as well as, if possible, their efficacy. Consider employing user surveys and draw on case studies of specific regions where marine mammals have been closely studied before and during the implementation of noise limitation or marine mammal avoidance guidelines.
- Convene an experts' workshop or Delphi process to rate or assess the guidelines for their pertinence in Arctic waters. The end product will be management solutions for the Arctic Council to communicate to regulators and state authorities of potential approaches to mitigate underwater noise in the global Arctic.

Outputs:

¹ AMAP/CAFF/SDWG, 2013. Identification of Arctic marine areas of heightened ecological and cultural significance: Arctic Marine Shipping Assessment (AMSA) IIc. Arctic Monitoring and Assessment Programme (AMAP), Oslo. 114 pp.

² Arctic Council Arctic Marine Shipping Assessment 2009 Report.
www.pame.is/images/stories/PDF_Files/AMSA_2009_Report_2nd_print.pdf

³ PAME, 2019. Underwater noise in the Arctic: A state of knowledge review. In prep.

- Potential approaches for the Arctic Council to communicate to regulators and state authorities to mitigate underwater noise across the Arctic.

Phase Two

TBD, potentially 2021-2023 PAME workplan

Budget:

Consistent with the overall Arctic Council approach, the development of this project will be financed through voluntary contributions and in-kind support from member governments, though will leverage wherever possible information from existing Arctic Council reports, and outputs from the recently created ASTD system.

The proposed stepwise or 'project-based' approach is designed to be conservative and to take into consideration financial and resource limitations. This notwithstanding, financial contributions will be sought to supplement in-kind work from other sources as well, including the Nordic Council of Ministers.

Main Outcomes:

- The production of heat maps for shipping in the CAFF defined Arctic region, overlaid with ecologically and culturally significant habitats;
- Based on case studies, expert and Indigenous knowledge, and user surveys, PAME will define management solutions for the Arctic Council to communicate to regulators and state authorities for potential approaches to mitigate UWN from shipping in the global Arctic.

Project Team Structure/Lead Countries:

Canada, WWF, Others TBD

Proposed Timeline:

Note: While projects below are generally designed to follow in chronological order, the exact year of completion will be subject to resource availability.

Year 1:

Project 1: Heat maps produced. 'Snapshot' of estimated noise levels estimated for all or parts of the Arctic Region as agreed upon by Project Team.

Project 2: Sensitivity of marine areas to shipping reviewed and updated, sensitivity of marine areas to other sources of noise completed.

Project 3: Existing guidelines on mitigation of ship noise impacts reviewed.

Year 2:

Project 2: Noise heat maps overlaid with existing information on marine areas of heightened ecological and cultural significance. Map reviewed and updated as needed.

Project 3: Management options defined for mitigating impacts of underwater noise from shipping in the Arctic.

-
- The proposal will advance the implementation of all 4 goals of the Arctic Council's Arctic Marine Strategic Plan (2015-2025); more precisely it will contribute to implementing the following AMSP strategic actions:
(http://www.pame.is/images/03_Projects/AMSP/AMSP_implementation_Final.pdf)
 - 7.1.2 Improve, synthesize, and respond to emerging knowledge across all disciplines and sectors to include government, academic and industry information, and traditional and local knowledge
 - 7.1.3 Improve the understanding of cumulative impacts on marine ecosystems from multiple human activity-induced stressors such as climate change, ocean acidification, local and long range transported pollution (land and sea-based), marine litter, noise, eutrophication, biomass overharvesting, invasive alien species and other threats
 - 7.1.8 Improve awareness of Arctic shipping activity and its impacts, promote expanded information sharing of ship traffic data among Arctic states and, as appropriate, other stakeholders, and update selected parts of the 2009 Arctic Marine Shipping Assessment (AMSA) Report, including those pertaining to the volume, composition and destination of Arctic shipping, shipping impacts, and key infrastructure needs such as hydrographic surveying and nautical charting.
 - 7.1.11 Support continued development of circumpolar indicators of changes and stressors across the Arctic marine environment, as well as metrics for monitoring biodiversity. [not sure]
 - 7.2.1 Promote the implementation of the ecosystem approach to management in the Arctic through synthesis and application of the results of relevant work by the Arctic Council and associated efforts by relevant organizations.
 - 7.2.2 Identify and assess threats and impacts to areas of heightened ecological and cultural significance and how such areas may be influenced in the future by climate change and other human induced changes and activities.
 - 7.2.3 Identify and develop tools and methodologies for assessing cumulative impacts and risks for Arctic marine ecosystems and areas of heightened ecological and cultural significance with the aim of using them for integrated assessments.
 - 7.2.4 Encourage the Arctic states to implement appropriate measures, – or to pursue such measures at relevant international organizations to protect Arctic marine Areas of Heightened Ecological and Cultural Significance. Focus should be on species and ecosystems particularly at risk from climate change and cumulative impacts, including areas of refuge for ice-associated species that are, or are expected to become particularly important to Arctic marine biodiversity under future climate conditions.
 - 7.2.7 Promote cooperation among Arctic and non-Arctic states to address threats to the staging and wintering grounds and migrating corridors of migratory species using the marine environment.
 - 7.2.10 Develop a pan-Arctic network of marine protected areas, based on the best available knowledge, to strengthen marine ecosystem resilience and contribute to human wellbeing, including traditional ways of life.
 - 7.3.1 Advance EBM as an overarching framework for conservation and sustainable use of living and non-living resources in the Arctic marine environment, taking into

account cumulative impacts on the Arctic and the need for adaptation to climate change.

- 7.3.2 Improve the understanding of risks and risk reducing measures related to Arctic shipping and oil and gas exploration and development activities, including gap analysis and sharing of best practices related to oil spill prevention, preparedness and response to emergencies in the Arctic
- 7.3.5 Develop recommendations for consideration by Arctic states to promote maritime safety and environmental protection with the objective of reducing risks related to international shipping activities in Arctic waters.
- 7.3.6 Advance continuous improvement of safety and environment protection performance and the use of best and most appropriate practices and technology for all marine activities.
- 7.3.8 Promote the management of human activities in the circumpolar Arctic in accordance with Ecosystem Based Management and international law to ensure long term sustainability of stocks and ecosystems.
- 7.3.12 Strengthen the dialogue with relevant business, industry and environmental stakeholders and Arctic inhabitants in order to foster conservation and sustainable use of the Arctic marine environment.
- 7.3.13 Strengthen the dialogue with industry (including through the Arctic Economic Council) in order to foster sustainable development in the Arctic.
- 7.4.1 Improve meaningful engagement of Arctic indigenous peoples and other Arctic inhabitants in relevant decisions, including through the consideration and use of traditional and local knowledge (TLK) in avoiding or mitigating negative environmental, subsistence, and cultural impacts, as well as in maintaining or increasing wellbeing and socioeconomic opportunities.
- 7.4.2 Facilitate coastal community exchanges between Arctic states to improve sharing of knowledge and experiences and to strengthen the dialog with relevant business and industry in the Arctic in order to foster the conservation and sustainable use of the Arctic marine environment.
- 7.4.4 In cooperation with the Permanent Participants, encourage engagement, as appropriate, with indigenous peoples organizations and bodies, that have specialized in traditional knowledge and that can inform the work of the Arctic Council in the protection of the marine environment and in enhance the well-being and the capacity of Arctic inhabitants, including Arctic indigenous peoples to deal with a changing Arctic and increased activity.
- The proposal will also support the implementation of recommendations from the Arctic Marine Shipping Assessment:
 - IIG. Addressing Impacts on Marine Mammals: That the Arctic states decide to engage with relevant international organizations to further assess the effects on marine mammals due to ship noise, disturbance and strikes in Arctic waters; and consider, where needed, to work with the IMO in developing and implementing mitigation strategies.
- The proposal will also advance the implementation of the following CAFF Actions for Arctic Biodiversity:
 - Advance ecosystem-system based management recommendations approved in the Kiruna Declaration (including Actions 3.1 to 3.4).

- Strengthen and develop new strategic partnerships, particularly with industry, to seek innovative solutions and expand responsibility for taking care of biodiversity (Action 4.1).
- Provide information, expertise, and recommendations on conservation of Arctic ecosystems to policymakers (action 4.5).
- 16.7. Assess the effects on marine mammals of ship noise, disturbance and strikes in Arctic marine waters and, where needed, develop and mitigation strategies (AMSA IIG).

DRAFT