

PAME II-2015 Agenda Item 4.8

AMSA Recommendation II(E)

**Summary of Aquatic Invasive Species
Within Canadian Arctic Marine Waters**

A. Nature of Aquatic Invasive Species (AIS):

- A combination of global warming and resource exploitation (along with the associated increase in shipping activity) is expected to increase the risk of non-native species introduction, spread and establishment in Canadian Arctic marine waters.
- With projected changes in global warming, it is anticipated that the warmer, less saline, ocean conditions would favour spread and establishment of a broader range of non-native species to Canadian Arctic marine waters.
- The projected changes in resources exploitation, resulting in an increase in shipping to the area, is expected to increase the connectivity between Arctic and international ports. This greater connectivity via new shipping routes will provide more opportunity for new species to arrive through ships, allowing more propagule pressure of introductions and increasing the likelihood of establishment.

B. Extent of AIS:

- Only one known non-native species is found in Canadian Arctic marine waters. This species, a benthic alga (*Dumontia contorta*), is found in James Bay and Ellesmere-Baffin Island. It was thought to have originated from Europe, and was first observed in the western North Atlantic at the beginning of the 20th century. The pathway of introduction is unknown.
- There are no reported ship-mediated, non-native species in the Arctic marine waters of Canada.
- Although few ballast water discharges occur in the Arctic, resulting in a relatively low annual risk, the risk posed by individual discharges of international transoceanic vessels in the Arctic is comparatively high. This risk will increase in the future with expected growth of commercial shipping activities due to longer ice-free seasons and northern development.
- Therefore, risk assessments were conducted by Fisheries and Oceans Canada to better understand the relative risk of shipping vectors (hull fouling and ballast water) to Canadian Arctic marine waters. Some of the key findings were:

- Canadian Arctic ports are utilized by international and domestic ships, resulting in potential for species transfers between connected ports via hull fouling and ballast water discharge vectors.
- Looking at the risk posed by ship-mediated introduction of non-native species, the following Canadian Arctic ports (in order of importance) would have the highest relative risk (relative to all Canadian Arctic ports) of environmental consequences due to the introduction of non-native species via hull fouling: Churchill, MB, Iqaluit, NU, and Erebus Bay/Beechey Island, NU. Churchill, MB was identified as the Arctic port with the highest relative risk of environmental consequences due to introduction of non-native species via ballast water discharge.
- The risk posed by domestic ships in the Arctic is relatively low and it is unlikely that the Arctic would act as a source population for non-native species to other areas in Canada.
- An assessment and recommendation of locations of voluntary Arctic Ballast Water Exchange Zones (ABWEZ) has been completed (http://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2015/2015_019-eng.pdf). It was also noted that under present ice conditions combined with the water depths and ecologically sensitive area constraints, there are presently no feasible ABWEZ sites in the Canadian waters of the Beaufort Sea.
- Identification of high risk benthic species in the ship-mediated pathway and identification of suitable habitat for those highest risk benthic species in Canadian Arctic waters is underway.
- Research to examine the efficacy of ballast treatment technologies in the Arctic – work is underway to examine operational efficacy of various ballast treatment processes when used in cold environments – lab trials have been completed and analyses of the results are underway.
- Work is also underway to better understand the risk posed by hull fouling on ships entering the Canadian Arctic.

C. Impact of AIS:

- None currently known.

D. Issues:

- Lack of baseline data and taxonomic information on the present native marine communities makes identification of non-native species difficult.
- Many new records of species in Canadian Arctic marine waters are the result of increased field surveys or are cryptogenic species, not AIS.
- Conducting baseline and early detection surveys in Canadian Arctic marine waters is extremely challenging due to complex logistics, lack of taxonomic expertise, and high resource requirements; ongoing monitoring is difficult to sustain.

- High quality environmental layers are difficult to obtain for Canadian Arctic waters for environmental modelling and prediction for better refinement in assessing AIS risk.

E. Possible Future Actions:

- Port surveys using effective, user-friendly monitoring methods.
- Engagement of northern communities in sample collection for monitoring.
- Literature reviews and development of comprehensive native species databases for lower trophic levels underway – to provide a baseline understanding.