# A Comprehensive Review of the Environmental Risks of Shipping in the Canadian Arctic and the Implications for Inuit

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## Types of Shipping and Drivers of Increased Activity

**Trans-Arctic Shipping**
Occurs when vessels pass between the Pacific and the Atlantic Ocean through the Canadian Arctic Archipelago without stopping at any ports. It is expected to that as sea-ice melts and the Northwest Passage opens, trans-Arctic shipping will increase as a result of the time and cost savings of taking the shorter route.

**Sealift and Community Resupply**
Many communities in the Canadian Arctic receive one annual shipment of goods – from food to fuel to building supplies. As the population of communities and the amount of northern development increases, it is likely that the number of resupply trips will increase in response to the rising demand.

**Mineral and Oil & Gas Exploration and Extraction**
The largest increase in shipping in the Canada's North will likely be associated with mining projects. Oil and gas exploration and extraction are also expected to increase, but not as quickly. These developments depend largely on commodity prices, environment assessments, and reliable, cost-effective technologies.

**Tourism**
Marine-based tourism in the Arctic has been increasing in interest, and depending on ice conditions, the world economy, and the capacity of local and national governments, it is likely that this trend will continue. Activities include cruises, boating, hunting and fishing, and experiencing and learning about local Inuit culture.

**Fishing**
Melting sea ice will open areas for fisheries, but the fate of fish stocks is uncertain; oceanic changes (temperature, currents, food webs) may cause some species to suffer, while others may thrive. Southern companies currently run commercial fisheries, while artisanal and traditional fisheries are important to Northern people.

## Environmental Risks from Greater Vessel Traffic

**Noise**
Marine animals use sounds to communicate and navigate. Noises from shipping activities can interfere with the animals' sounds, to which they may respond by trying to overcome the noise or by falling silent. Noise can also cause organ or tissue damage, including hearing loss. Animals may respond by avoiding an area where the noise is present.

**Discharges**
Potentially harmful discharges include bilge water, tank washings, grey water, sewage (black water), ballast water, garbage, and accidental discharges of cargo. Emissions into the air can also have an impact, such as greenhouse gases, aerosols, nitrogen and sulfur oxides, carbon monoxide and black carbon.

**Garbage**
Animals can ingest garbage, which can cause them to choke, or can become lodged in their digestive tract. Animals can also become entangled in marine debris, which can slow movement, strangle, and/or drown the animal. Garbage can also impact shoreline and benthic communities.

**Oil**
Short-term impacts include oiling feathers and fur, ingestion, nutrient enrichment, and increased water toxicity; the long-term effects are poorly understood. The operating conditions in the Arctic increase the risk of an accident and impede responses; thus the fragile environment is even more at risk for being impacted by an oil spill.

**Collisions**
Vessel strikes with marine mammals are a global problem, and one that is expected to be increasing as vessels become larger and travel at greater speeds. Collisions typically occur between a vessel and a calf, juvenile, or a mother with a newborn, having population-level impacts.

**Wakes**
Vessels produce wakes, increasing nearshore wave energy, which can change the morphology of the shoreline through increased accretion and erosion. Changing energy levels in the marine environment can also alter the distribution of species living in the intertidal zone.

**Invasive Species**
Invasive species can be introduced through ballast water, garbage, or they can be transported on ships' surfaces. They impact an ecosystem by effecting the balance in a food web, competing for space and resources with the native species, or becoming an alternative source of prey.

**Icebreaking**
Icebreakers leave open water trails behind them, which can interrupt wildlife migration patterns across the sea ice. It can also confuse marine mammals that use natural open water trails (leads) to navigate; when the trail refreezes, the animals can be left trapped with no access to air.

## Potential Implications for Northerners from Greater Vessel Traffic

**More Ships, More Transits**
More ships making more transits North will require more infrastructure and services, such as ports, or emergency response capability, which can benefit nearby communities. Greater vessel traffic will also mean more icebreaking. People use the sea ice to access traditional hunting and fishing areas, as well as other communities; if an icebreaker drives an open water trail through their route, then this access is interrupted.

More vessels traveling north means the sealift service could be augmented. The majority of communities in the Canadian Arctic receive one shipment of goods a year by ship, leading to high costs and low supplies of perishable goods. If more western foods become available, though, there may be a shift in diet away from traditional foods; a change which has already occurred and has led to a higher prevalence of health issues such as diabetes and cardiovascular diseases. A shift away from traditional foods would also indicate a shift away from traditional practices, which can lead to culture loss and disconnect, and great problems within households, families, and communities. These impacts, particularly on mental health, are being studied.

Shifts away from traditional foods and towards western lifestyles may not be choice; if the environment upon which the people depend is impacted to a large enough degree, their traditional foods may not be available due to relocation or declining population sizes .

**More People**
If more people travel to the Arctic then more money may be spent within communities, which would be an economic benefit; there could be more opportunities to generate income and the standard of living could increase. However, if there is more emphasis on the wage economy, then in theory there would be less emphasis on the traditional subsistence economy, leading to issues of culture loss and disconnect (see left).

A stronger interest in the wage economy would also cause money to hold greater importance within a community, which could lead to a new social imbalance based on income. More non-northerners entering communities would also introduce cultural imbalances, causing social tensions and potentially conflicts.

An example of an impact of the quickly changing northern society is the documented feelings of low personal value. People are trying to be engaged in the wage economy, but do not have the training or education to fully participate. However, because some people are spending their time in the wage economy, they are not spending as much time in the traditional economy, and therefore they are not fully engaged in that either, so people are left in limbo, unsure of where exactly they fit.


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Photograph taken by Leah Beveridge, 01/2011