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ARCTIC SHIPPING: AVOIDING CATASTROPHE

Managing the risks of more marine traffic in Canada's Arctic waters

The Arctic is changing

Until recently, marine traffic in Canada's Arctic has been minimal: a few dozen cargo ships supplying coastal communities, a handful of cruise ships and some fishing vessels. That picture is about to change. According to experts, trips in Arctic waters could quadruple over the next 20 years.

One of the drivers is the growing demand for raw materials from emerging economies like China and India. The Conference Board of Canada predicts a 91 per cent increase in metal and mineral output from Canada's Arctic between 2011 and 2020. Ships carrying construction materials will head north to support new operations, while others head south, bringing the iron ore, nickel and copper to markets.

The Arctic is also home to nearly a third of the world's untapped oil and gas reserves. As we run out of easy-to-reach resources, we can expect a surge of interest in exploration and development in the North.

At the same time, melting ice has created the potential for shorter shipping routes. In September 2013, the Nordic Orion became the first bulk cargo ship to traverse the Northwest Passage, transporting a shipment of coal from Vancouver to Finland. The 1,850 km voyage took four days less than via the Panama Canal. However, a number of Arctic shipping companies have noted the Passage is too shallow and poorly charted to serve as a significant commercial route.



Without question, these developments have the potential to drive prosperity in the North and contribute to Canada's economy as a whole. But as shipping increases, so do the risks associated with operating in this remote and fragile environment. Potential oil spills and pollution could spell disaster for sensitive habitats already under significant pressure from climate change. And hazardous Arctic conditions increase the risk of accidents in a region where help may be 1,500 km away.

To manage those risks, government, industry, Northern communities, and environmental stakeholders need to work together. By establishing best practices and putting protection measures in place, we can ensure that development doesn't come at a steep environmental cost. The time for action is now, before shipping traffic increases further.

Shipping numbers on the rise

Arctic waters are poised to get busier. In 2012, WWF commissioned The Mariport Group to forecast how shipping will change in the region over the next two decades. The table, left, lays out the results: a significant jump in marine traffic from mining, along with modest growth in tourism and community supply ships. The impact of oil and gas developments is harder to predict, but full-scale production—if it occurs—is unlikely to begin before 2030.

What's less certain is how much transit shipping to expect via the Northwest Passage. Trans-Arctic shipping offers a shorter—and therefore potentially cheaper—route between Asia and Europe than via the Panama or Suez Canals. However, industry experts caution that the use of the Northwest Passage will be limited despite summer sea ice declines. That's because the Passage has a number of drawbacks that worry shipping companies and their insurance underwriters alike: it's poorly charted, search and rescue capability is limited, weather can be severe, many channels are shallow, and there are significant ice hazards and risks of delay even during the so-called open water season.

Although the Nordic Orion's 2013 transit made headlines, the Northwest Passage will never rival the Panama Canal's 13,000 transits per year. However, even a very modest growth in shipping through the Northwest Passage will increase the impacts and risks of Arctic shipping.

What is clear is the bottom line: although the growth in shipping won't be dramatic or sudden, it will increase steadily over the coming decades.



Types of Shipping	Transits 2010	2020	2030
<p>Supply ships for Arctic communities</p> <p>There are currently 43 marine communities in the Canadian Arctic. As Northern populations grow and local economies pick up steam, the volume of dry cargo and fuel shipments is expected to increase modestly.</p>	30 for dry cargo 26 for fuel	32 for dry cargo 21–26 for fuel	32 for dry cargo 25–35 for fuel
<p>Mining</p> <p>There are currently two mines operating in the Canadian Arctic and a dozen more at different stages of development.</p>	7 for dry cargo 2 for fuel	23 for inbound dry cargo 14 for inbound fuel 85 outbound	34–36 for inbound dry cargo 14–17 for inbound fuel 234–305 outbound
<p>Oil and gas</p> <p>Although the federal government has awarded a number of offshore oil and gas exploration licences and seismic testing is underway, industry doesn't expect to begin exploratory drilling in the Canadian Arctic until 2019–2021. If and when oil and gas development gets underway, however, it will bring an armada of support ships.</p>	0	0	2 for inbound dry cargo 2 for inbound fuel 2 outbound
<p>Tourism</p> <p>The Canadian Arctic is not a mass-market tourism destination; it currently supports 11 small cruise ships.</p>	18	21	23
<p>Wheat</p> <p>Churchill currently serves as a port for Canadian wheat exports. However, the demise of the Canadian Wheat Marketing Board coupled with high operating costs put the port at risk of closure.</p>	22	15–20 at best	15–20 at best, if the port is still open
<p>Northwest Passage through-traffic</p> <p>Although trans-Arctic shipping routes are expected to see more traffic, Russia's Northern Sea Route can offer better infrastructure than Canada's Northwest Passage.</p>	0	No significant traffic	No significant traffic
Total	105	212–222	375–468

“With increased shipping, mining, and tourism in the Arctic comes new economic opportunities. We want to be alongside our customers, supporting them in taking advantage of those opportunities in a responsible way. It’s critical we understand the insurance and environmental impacts of shipping in the Arctic and use our skills, knowledge and expertise to influence best practice and mitigate risk wherever possible.”

Martin Thompson, SVP of Global Specialty Lines, RSA

Source: The Mariport Group Ltd. *Arctic Shipping Developments for World Wildlife Fund Canada*. August 2012.

Note: This data does not include fishing boats, pleasure craft, government vessels or research vessels.

The number of ships doesn't change dramatically over the years because of expectations that companies will bring in newer, larger ships, rather than more small ships.



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2012 shipping traffic in the Northern Canada Vessel Traffic Services Zone

Sector	Number of active vessels	Number of voyages (entry into, activity within, and exiting from the zone)
Pleasure craft	51	53
Fishing	23	122
Tugs/Barges	19	35
Bulkers	18	33
Government	20	31
Research Vessels	12	28
Tankers	11	25
Cargo	11	24
Cruise Ships	6	10
Other	1	1

International regulations and standards

There are currently major differences between regulatory regimes, standards and governance capacity across Arctic states. Canadian regulations—especially the Arctic Waters Pollution Prevention Act—are among the strongest.

Source: Bartlett, P. and J. Henry. *MSOC East Report 2013-003: 2012 Arctic Shipping Statistics*. Marine Security Operation Centre, December 2012.



More ships, greater risks

Safety

Conditions in the Arctic are harsh and hazardous. The risk of accidents is high, raising significant concerns within the insurance industry, while the capacity to respond is extremely limited. Should an accident occur, salvage operations would be extraordinarily difficult and expensive.

Key safety concerns include:

Ice hazards — Although summers in the Canadian Arctic are becoming increasingly ice-free, icebergs and smaller chunks of ice will continue to create unpredictable hazards for shipping.

Lack of seabed charting — According to the World Economic Forum, less than 10 per cent of the Arctic Ocean is charted to international navigation standards. In 2010, the cruise ship *Clipper Adventure* ran aground near Kugluktuk, Nunavut after hitting an uncharted rock shelf. The same year, the fuel tanker *Nanny* ran aground on a charted but poorly communicated sandbank near Nunavut's Gjoa Haven.

Limited support infrastructure — None of Canada's 43 coastal Arctic communities have deep-water ports where large vessels can take refuge or perform repairs. Icebreakers and rescue helicopters are few and far between, while telecommunications infrastructure is limited.

Lack of search and rescue capacity — In this remote region, where communities are often hundreds of kilometres apart, it can take many hours for search and rescue teams to reach the site of an accident. In frigid Arctic waters, that delay can be deadly. For example, although everyone on board the Coast Guard helicopter that crashed in the Northwest Passage in September 2013 was wearing survival suits, they froze to death before an icebreaker could reach them.

Navigational challenges — Navigating in high latitudes brings special challenges. The coastlines are low and masked in ice. Atmospheric refraction creates mirages and false horizons. Strong magnetic fields make compasses erratic, while satellite-based communication and navigation equipment are less reliable due to poor signals and ionospheric interference. There are few beacons or other navigation aids, and no designated shipping lanes. In winter, long hours of darkness add a further challenge.

Extreme weather — Icing and freezing spray can affect equipment and make vessels dangerously top-heavy. Climate change is making Arctic weather more unpredictable, while inadequate weather monitoring and forecasting in this region exacerbate the problem.

For all these reasons, Arctic voyages require appropriate ship construction and experienced ice navigators. However, the boom in Arctic development and declining sea ice may lure shipping companies without the necessary equipment and experience. A leading Arctic marine carrier has noted that some 90 per cent of the world's shipping companies know nothing about guiding a ship through ice, making regulations critical.

Environment

An increase in shipping also poses many risks to Arctic wildlife and the habitat they depend on:

Noise — Shipping noise drowns out the whistles, clicks and moans that whales use to communicate, navigate, find food, and avoid predators. Higher noise levels also increase their stress levels. Bowhead whales, for example, avoid continuous noise louder than 120 dB. The average ship produces at least 137 dB when it travels at 10 knots, while icebreakers regularly generate more than 200 dB.

Collisions with wildlife — In the summer, wildlife congregate in Arctic waters in large numbers to feed, mate and raise their young. When ships collide with those marine species, the result is often fatal.

Invasive species — The ballast water that ships unload when they take on new cargo can contain invasive species. While new international rules require ballast water to be treated, those regulations haven't yet come into effect and don't include Arctic-specific measures.

Pollutants — Ships generate air pollutants such as NO_x, SO_x, greenhouse gases and black carbon, as well as waste that can become pollutants if not properly managed, such as garbage, sewage, grey water, and oily waste. These substances can create both immediate and long-term environmental damage. Few communities in Canada's Arctic have facilities to deal with this waste, increasing the risk of accidental or illegal release.

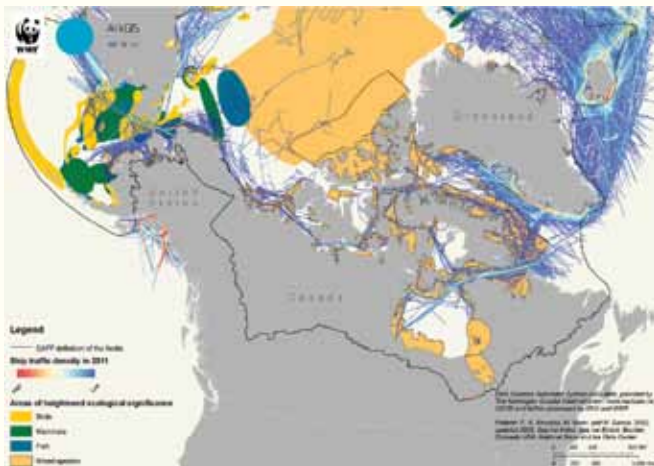
Ice destruction — Icebreakers disrupt the habitat that seals and walrus need for pupping, foraging, moulting and nesting, and that polar bears need to hunt and travel.

Dangerous cargo — Incorrectly loaded or improperly secured deck cargo can be swept overboard in stormy weather.

Oil spills — According to the Arctic Council's landmark *Arctic Marine Shipping Assessment 2009 Report*, the single biggest environmental risk posed by Arctic shipping is oil spills. Groundings, shipwrecks, accidents or fires could release oil into remote locations where the nearest clean-up equipment and crews may be hundreds of kilometres away. When they do arrive, they have only a narrow window of time to contain spills and salvage the ship before winter darkness and freeze-up set in. On top of that, hydrocarbons don't break down quickly in cold temperatures, creating an ongoing danger to wildlife.

Although the amount of marine traffic expected in the coming decades may be low compared to other regions of the world, any additional stress could have a significant impact. Arctic ecosystems are particularly vulnerable to damage for several reasons:

- In the brief Arctic summers, feeding, mating, breeding, and raising young all has to happen within a brief window of opportunity, and anything that interferes with those activities can have serious consequences.
- Short Arctic food chains mean that species have few alternatives if one source of food disappears or is compromised.
- Arctic ecosystems are already under enormous stress from climate change. With temperatures rising at twice the average global rate, sea ice is rapidly disappearing, and with it the foundation of Arctic marine life.



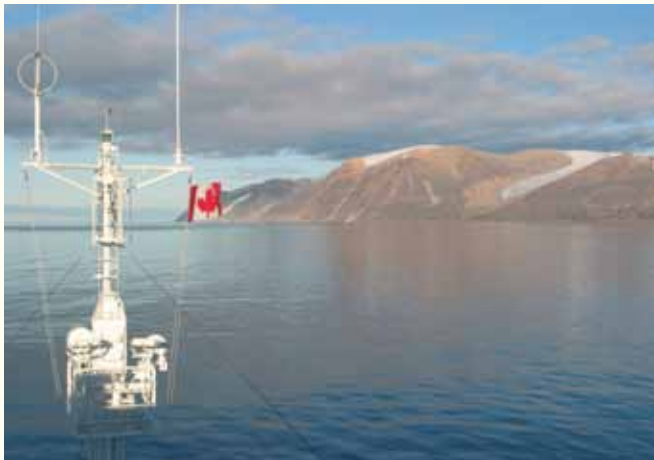
Recommendations for managing the risks

Experts—including those from leading marine insurer, RSA Group—agree that these risks can be managed with the right information, best practices, and latest technology. The key is to implement these measures today, while shipping traffic in the Canadian Arctic is still relatively low.

The federal government is taking steps. Canada's Northern Strategy, announced in 2009, includes a number of initiatives to improve Canada's marine infrastructure in the Arctic, such as:

- Providing \$720 million to procure a new Polar Class icebreaker
- Procuring new Arctic patrol boats
- Providing strategic meteorological and navigational data in key zones
- Contributing up to \$100 million to establish a deep-water port at Nanisivik, Nunavut

To date, however, those promises are unfilled. Nor are they sufficient. The shipping industry wants a clear, fair, predictable regulatory framework. Insurance companies want to set a high bar for risk management. Arctic communities want to preserve the ecosystems that sustain them. And no one wants to see a human tragedy or environmental catastrophe occur in Arctic waters.



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Setting the bar high: the role of the insurance industry

Federal transport minister Lisa Raitt acknowledges that when it comes to Canada's Northwest Passage, it's the insurance industry that will determine which ships make the trip. Andrew Teasdale is the risk management consultant at RSA Insurance who underwrote the Nordic Orion's historic 2013 voyage through the Passage. According to Teasdale, his company's aim was to impose high risk-management standards that go beyond the International Maritime Organization's proposed Polar Code and set an example that other insurance companies can follow. "It's incumbent on us to do so," he explained. "We can't just let this turn into a sort of Klondike rush, because the consequences of environmental damage are just too great."



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Arctic shipping best practices

In 2012, WWF and Arctic ship owner Fednav worked together to identify best practices for safe and sustainable Arctic shipping. The recommendations covered everything from voyage planning to avoid sensitive wildlife habitat to using slower vessel speeds to reduce emissions.

To mitigate the risks and manage the impact of Arctic shipping, the following actions are crucial:

1. *The International Maritime Organization should finalize the international Polar Code for Arctic shipping* it is currently developing. To be effective, the code must:
 - be mandatory
 - include all ships navigating in Arctic waters
 - require ice-strengthened hulls
 - require qualified on-board ice navigators
 - require measures to avoid harm to Arctic ecosystems and species
 - require capacity to participate in search and rescue and spill response operations
2. *The federal and territorial governments, in collaboration with industry, should ensure Canada has adequate search and rescue capacity and world-class onboard ship technology and infrastructure to respond to spills and other issues that may arise in Canadian Arctic waters.*
3. *In consultation with stakeholders, the federal government should develop and implement integrated Ocean Use Plans to avoid conflicts between sectors—including fishing, oil and gas, shipping, and traditional use—and account for the cumulative environmental impacts created by shipping and industrial development.*
4. *The shipping industry should commit to best environmental practices in the Arctic.* These could include:
 - reducing speed and re-routing ships around ecologically and biologically significant areas
 - reducing or eliminating the use of heavy fuel oil



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Conclusions

Growth in shipping traffic in the Arctic won't be dramatic or sudden, but it will happen. Shipping brings environmental impacts like noise, pollution and the risks of oil spills, as well as a slew of safety concerns. However, good standards and practices, if implemented today, will protect the environment and benefit Arctic communities—and Canada as a whole—for decades to come.

Today, Canada has an opportunity to advance the goals of safe shipping, responsible resource development, and sustainable Arctic communities. By acting now, we can ensure that economic growth and conservation go hand in hand.



Special thanks RSA Insurance for supporting WWF-Canada's Arctic shipping work.

For more information, please visit wwf.ca/arcticshipping or contact us at arcticshipping@wwfcanada.org.



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