



THE OPENING OF THE NORTHERN SEA ROUTES: THE IMPLICATIONS FOR GLOBAL SHIPPING AND FOR CANADA'S RELATIONS WITH ASIA

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SUMMARY

All the excitement around the great possibilities that the opening of the Northwest Passage could offer the shipping industry – and Canada – could not last. Just a few years ago, as sea ice in the North seemed to be steadily melting away, observers were eagerly tallying up the savings in time, fuel and costs that a reliably ice-free route across the top of the planet would provide for shippers. A couple of trial runs only confirmed that for shipments from Asia to Europe or North America, or the other way around, the route could shave thousands of kilometres off each trip, compared to journeys through the Suez or Panama canals. Rapid growth in shipping traffic across the Northwest Passage and its sister route, the Northern Sea Route, seemed not just inevitable, but imminent.

Just a short while later, it now seems neither imminent nor inevitable. The retreat in sea ice may persist, but it is evident that due to regular fluctuations in ice coverage, the Northwest Passage will not be reliably ice-free for many, many years, if ever. Shipping may be more possible through the Northwest Passage than it was in the past, but it will not be consistently unobstructed. The challenges of ice combined with Arctic weather conditions may well mean that any shipping through the passage is slower than expected. Other complicating factors include uncharted or poorly charted sea lanes and the difficulty in securing insurance for Arctic shipping.

At the same time, the competition from alternate routes is only becoming more intense, with expansions in both the Suez and Panama Canals and the potential for a new canal across Nicaragua. Regarding the Northwest Passage, Canada lacks much of the infrastructure in the North that would make Arctic passage a strong competitor, including multiple ports enroute and sufficient icebreaking equipment.

There are still advantages that might draw some shipping away from traditional routes to the northern passages, particularly for the movement of western resources to growing Asian markets. But even moderate levels of shipping through the Northwest Passage do have the potential to change Canada's relationship with its Asian trading partners, especially China. The Canadian and Chinese governments share a number of priorities regarding the Arctic, including environmental protection, safer navigation and resource development. These will provide opportunities for more dialogue and engagement between the two countries. While the Northwest Passage may not become the important trans-shipment route to Asia once imagined by enthusiastic observers, the most meaningful impact that a more useful route may provide is to alter, and improve, the course of Canada's relations in the Asia-Pacific region.

This paper seeks to examine likely developments and trends in Arctic shipping given the shrinkage of the polar ice cap, and to situate these trends in the broader context of changing global maritime and trade realities with particular focus on their impact on trade with Asia. There are implications for Canada and its relations with Asia, especially China, that flow from these developments.

SHRINKAGE OF THE ICE CAP

In 2014, Lackenbauer and Lajeunesse published their study “On Uncertain Ice: The Future of Arctic Shipping and the Northwest Passage,”¹ concluding that, for a variety of reasons, it is unlikely that the Northwest Passage (NWP) will emerge as a viable trans-shipping route in the foreseeable future. Their paper serves as a response to the enthusiasm that has been generated, in part through the popular press, regarding the prospects for northern navigation brought about by the shrinking Arctic cap. Attention has been drawn to the possibilities of using the Northwest Passage as a trans-shipment route from the eastern Atlantic seaboard and Europe to Asia by the fact that the polar ice cap has receded by about 30 per cent since the 1980s² so that, in most summers, ice-free shipping lanes exist across the breadth of the Arctic. As early as 1969, the U.S. oil tanker *Manhattan* transited the Northwest Passage (accompanied by a self-appointed Canadian icebreaker). Beginning around the year 2000, several transits of the NWP started to take place annually, often by small yachts, and the frequency of such passages has increased significantly in recent years.³ This is especially happening in the NWP’s sister passage, the Northern Sea Route (NSR).⁴

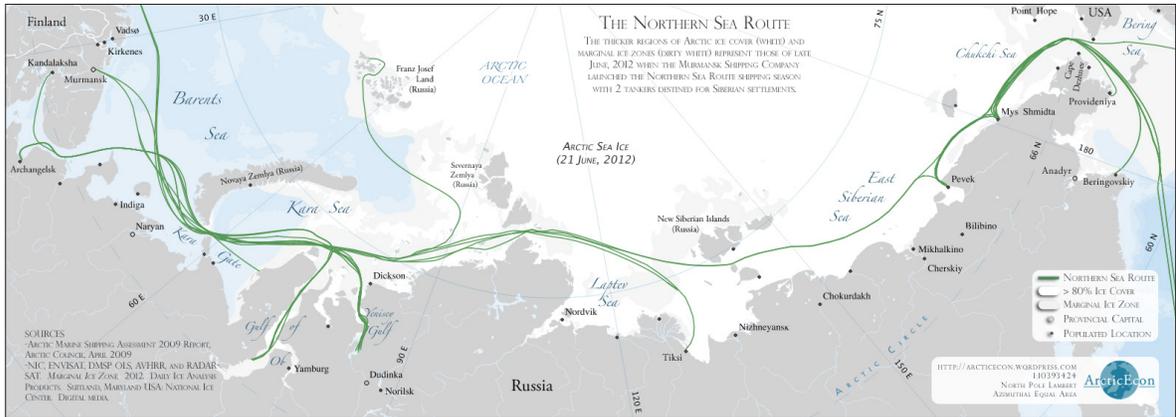
The term “Northern Sea Route” is today commonly used to refer to the sea route along the northern coast of Siberia. It is also at times referred to as the “Northeast Passage” in order to differentiate it from the Northwest Passage. Both the Northeast and Northwest passages represent a Eurocentric interpretation of the world, since they are, respectively, northeast and northwest of Western Europe. While the term Northeast Passage is used less frequently today, Northwest Passage remains the normal term used to designate the Arctic sea route connecting the Atlantic and Pacific oceans through the northern reaches of Canada.

¹ Whitney Lackenbauer and Adam Lajeunesse, “On Uncertain Ice: The Future of Arctic Shipping and the Northwest Passage” (Canadian Defence and Foreign Policy Institute, December 2014).

² There are various estimates of the extent of the receding icepack, although they all indicate a significant reduction over the past 35 years. A NASA report estimates that “multi-year” ice (i.e., ice that has made it through at least two summers) is receding by about 15 per cent per decade. See NASA, “NASA Finds Thickest Parts of Arctic Ice Cap Melting Faster,” February 29, 2012, <http://www.nasa.gov/topics/earth/features/thick-melt.html>. Another report puts the loss of sea-ice cover at as much as 40 per cent since measurement began in 1979. See Denise Chow, “Shrinking Arctic Ice Will Lead to Ice-Free Summers,” LiveScience, August 23, 2013, <http://www.livescience.com/39147-arctic-sea-ice-melting.html>. A more conservative estimate comes from the National Snow and Ice Data Center (NSIDC) based at the University of Colorado. The NSIDC reports that “February 2016 sea ice extent was the lowest in the satellite record at 14.22 million square kilometers (5.48 million square miles). The linear rate of decline for February is now 3.0 percent per decade.” Arctic Sea Ice News and Analysis, “Another record low for Arctic sea ice maximum winter extent,” <https://nsidc.org/arcticseaicenews/>. The discrepancies are in part explained by the fact that measurements are taken at different times of the year.

³ R.K. Headland, “Transits of the Northwest Passage to the End of the 2014 Navigation Season” (Scott Polar Research Institute, October 14, 2014), <http://www.americanpolar.org/wp-content/uploads/2014/10/NWP-2014-X-5-layout-for-PDF.pdf>.

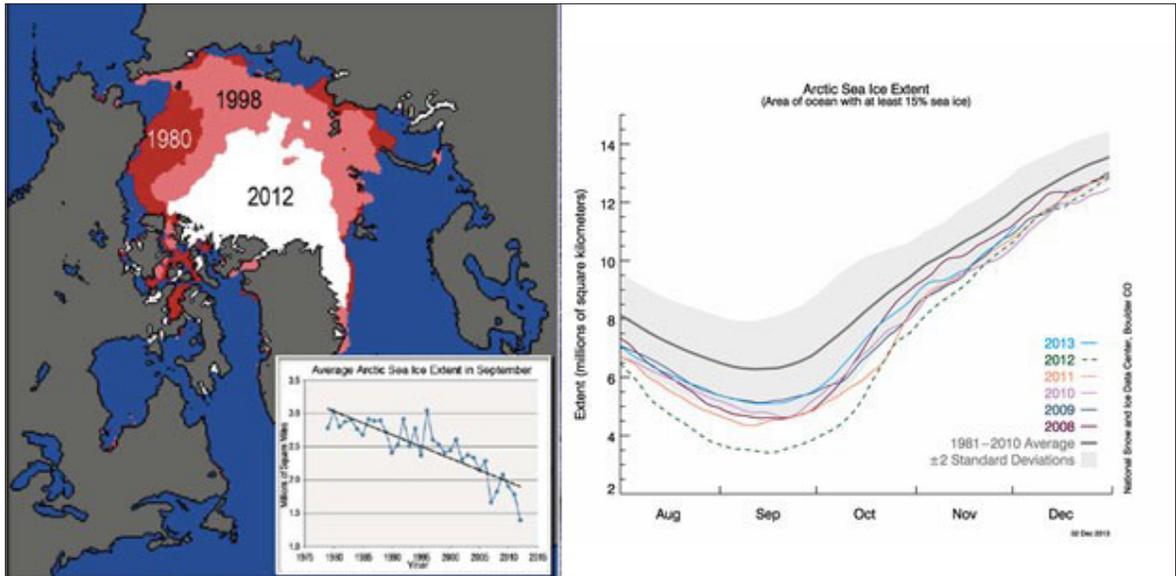
⁴ Northern Sea Route Information Office website, “Transit Statistics,” http://www.arctic-lio.com/nsr_transits.



Accessed at ArcticEcon: <https://arcticecon.wordpress.com/tag/northern-sea-route/>.

While the ice pack is receding in the Arctic, the shrinkage is not in a linear progression from more to less ice. While there is a steady downward *trend*, in any given year ice conditions can be more severe at particular times than in previous years. The overall record low for the ice pack was in 2012, closely followed by 2011 and 2007.⁵ Ice then increased in the two following years, with 2014 having more difficult ice conditions than a year earlier. The extent of the permanent sea ice declined again in 2015, although it was significantly greater than the record lows of other years. While it may be safe to suggest that Arctic routes are now more likely to be open than in the past, it is very difficult to predict exactly what shipping conditions will be from year to year, and at any time in any given month, although the general trend is for more navigation over longer periods of time.

ARCTIC-SEA-ICE PREDICTIONS



Accessed at Princeton University Forrestal Campus, Geophysical Fluid Dynamics Laboratory: <http://www.gfdl.noaa.gov/arctic-sea-ice-predictions>.

⁵ Arctic Sea Ice News and Analysis, “Another record low for Arctic sea ice maximum winter extent,” September 15, 2015, <http://nsidc.org/arcticeaicenews/>. In comparing which year had the record low ice pack, it depends on which month is being measured. The record low for September was in 2012; for October, it occurred in 2007.

SHORTER DISTANCES OF THE ARCTIC ROUTES

Several years ago, because of widespread reports of the shrinking ice cap and after oil tankers and bulk carriers made successful trial runs, popular imagination was aroused by the concept of using the northern passages as a shorter alternative to what were then pirate-infested waters off the coast of Somalia and as a way to bypass narrow straits that could potentially be closed in times of conflict, such as the Straits of Malacca. The distance comparisons with traditional routes are striking. For shipping between Asia and northern Europe, the distance savings are in the order of 7,635 kilometres from Yokohama to Rotterdam via the NSR as opposed to using the Suez Canal (12,982 versus 21,759 kilometres, or about 37 per cent in distance savings), and 4,650 kilometres from Shanghai to Rotterdam (14,901 versus 19,551 kilometres, or 24 per cent in distance savings)⁶. It is worth noting that as the point of departure moves further west, for example from Shanghai to Singapore, the advantages of the northern routes disappear. For the NWP, the distance savings for the Yokohama-Rotterdam route via the Canadian Arctic versus transiting through Panama are equally impressive, with a distance savings of over 7,500 kilometres (15,700 versus 23,300 kilometres). Using the NWP route produces a saving in distance of about 3,500 kilometres from Shanghai to Rotterdam and 3,850 kilometres from Shanghai to New York.⁷ The distance saved clearly depends on the port of embarkation and destination, but in almost all cases involving ports in north China, Japan and Korea, savings in distance and, in theory, time, are significant. One study estimates that the comparative distances from “East Asia” to “western Europe” are 21,000 kilometres via the Suez Route versus 12,800 on the NSR, and 24,000 kilometres via Panama versus 13,600 via the NWP.⁸

“IRRATIONAL EXUBERANCE” REGARDING EARLY EXPANSION OF ARCTIC ROUTES

Based on the propositions of less ice and shorter distances, the media and some experts have predicted rapid growth in using the northern routes for shipping to and from Asia. For example, in July 2011, *The Guardian* ran a story headlined “Thawing Arctic opens up new shipping routes on the roof of the world,” and quoted Viktor Basargin, Russia’s regional development minister, who predicted that cargo shipments on the NSR could rise from three million to thirty million tons “in the near future.”⁹ A tenfold increase was, to say the least, ambitious — but unrealistic, given that traffic in 2015 barely exceeded five million

⁶ Albert Buixadé Farré et al., “Commercial Arctic shipping through the Northeast Passage: routes, resources, governance, technology, and infrastructure,” *Polar Geography* 37, 4 (October 16, 2014): 5, <http://www.tandfonline.com/doi/pdf/10.1080/1088937X.2014.965769>. The distances in the reference document are in nautical miles and have been converted to kilometres for internal consistency.

⁷ Lackenbauer and Lajeunesse, “On Uncertain,” 6.

⁸ Jean-Paul Rodrigue, “The Geography of Transportation Systems,” Department of Global Studies and Geography, Hofstra University, <https://people.hofstra.edu/geotrans/eng/ch1en/conc1en/polarroutes.html>.

⁹ Terry Macalister, “Thawing Arctic opens up new shipping routes on the ‘roof of the world,’” *The Guardian*, July 5, 2011, <http://www.theguardian.com/environment/2011/jul/05/arctic-shipping-trade-routes>.

tons.¹⁰ A month later, in August 2011, the BBC enthused that “Arctic sea routes open as ice melts,” noting that “shipping companies are already enjoying the benefits these routes may bring if they remain open regularly.” The BBC quoted Peter Wadhams, an Arctic ice expert from the University of Cambridge speaking to the effect that the advent of summers when routes are routinely open “is not far away.”¹¹

These enthusiastic accounts were fed by reports of new developments in Arctic shipping. In 2011, the tanker *STI Heritage* left Murmansk on July 19 with 61,000 tons of gas condensate that was delivered to a port in Thailand on August 16, with an eight-day passage through the Northern Sea Route.¹² This was followed by the Vladimir Tikhonov a month later with a larger cargo, shaving a half-day off the passage.¹³ The enthusiasm was not limited to Europe. Two years later, The Globe and Mail reported that the melting Arctic offered a new world of shipping and resource opportunities. The Globe reprinted an article from the Financial Times that stated confidently “melting has cleared large ocean stretches of ice *for much of the year*. This is opening up new shipping lanes as well as prospects for resource exploitation in a part of the world that only years ago was deemed too inhospitable” (emphasis added).¹⁴

ASIAN INTEREST IN THE ARCTIC

Of all the Asian states, the one that has evinced the most interest and has the most active Arctic program is China. The 2012 voyage of the Chinese icebreaker *Xue Long* (Snow Dragon) to Iceland via the Northern Sea Route (returning via the Transpolar Sea Route)¹⁵ raised further expectations about regular use of the route. It was reported that, according to Chinese scenarios, five to 15 per cent of China’s international trade, mostly container traffic, would be using Arctic routes by 2020.¹⁶ In 2013, the 19,000-ton Chinese general cargo vessel *Yong Sheng* became the first container-carrying ship to traverse the NSR. COSCO, the ship’s owner, reported that the *Yong Sheng* made the transit from Taicang, China (near Shanghai) to Rotterdam in 27 days, travelling 7,800 nautical miles, which was nine days and 2,800 nautical miles shorter than the route through the Straits of Malacca

¹⁰ “Cargo traffic on Northern Sea Route goes up by 1.2 million tons in 2015,” *The Arctic*, December 8, 2015, <http://arctic.ru/infrastructure/20151208/251526.html>. Ambitious goals are still being put forward (see: “Russian PM orders plan to increase Northern Sea Route capacity by 20 times,” *Russia Today*, June 8, 2015, <https://www.rt.com/business/265756-northern-sea-route-medvedev/>).

¹¹ Richard Black, “Arctic sea routes open as ice melts,” BBC, August 25, 2011, <http://www.bbc.com/news/science-environment-14670433>.

¹² Willi Ostreng et al., *Shipping in Arctic Waters: A Comparison of the Northeast, Northwest and Trans Polar Passages* (New York: Springer-Praxis, 2013), 186.

¹³ “Tanker Vladimir Tikhonov Completes Successful Northern Sea Route Transit in a Week,” *The Maritime Executive*, September 1, 2011, <http://www.maritime-executive.com/article/tanker-vladimir-tikhonov-completes-successful-northern-sea-route-transit-in-a-week>.

¹⁴ “In the melting Arctic, a new world of shipping and resource opportunities,” *The Globe and Mail*, August 12, 2013, <http://www.theglobeandmail.com/report-on-business/international-business/in-the-melting-arctic-a-new-world-of-shipping-and-resource-opportunities/article13713662/>.

¹⁵ The Transpolar Sea Route is the shortest of all the northern routes, cutting across the polar ice cap rather than following either the coasts of Siberia or Canada. Because of the thickness of ice, it is the least used and least likely to become a viable commercial route, but is navigable at certain times of the year by heavy icebreakers such as the *Xue Long*.

¹⁶ “China starts commercial use of Northern Sea Route,” *Barents Observer*, March 14, 2013.

and the Suez Canal.¹⁷ The *Yong Sheng* made a second return trip in 2015 and COSCO has announced that it is “actively studying the feasibility of operating regular services on the northern route” with regular Asia to Europe sailings.¹⁸

Many of China’s activities are conducted by the Arctic and Antarctic Administration based in Beijing, affiliated with the State Oceanic Administration and the well-funded Chinese Polar Research Institute in Shanghai, which has maintained a High Arctic research station in Svalbard, Norway since 2004. In addition to the icebreaker *Xue Long*, acquired from Ukraine in 1993, China is building its own heavy icebreaker, which is expected to be in service in 2016. Furthermore, China signed a free-trade agreement with Iceland in 2013 and the same year achieved its goal of obtaining official observer status at the Arctic Council,¹⁹ along with several other Asian states. China’s Arctic strategy is multi-faceted, encompassing scientific research, particularly with respect to the impact on the environment of the melting Arctic ice cap, exploration and exploitation of resources, and shipping and trade routes.²⁰

Although China is not the only Asian state to have obtained observer status in the Arctic Council,²¹ it is the one that arouses the most interest and concern. China, as with the other states admitted as observers, agreed to follow a number of principles established by the permanent members²² such as recognizing the sovereignty, sovereign rights and jurisdiction in the Arctic of the Arctic states, and accepting the legal framework that applies to the Arctic Ocean, including the United Nations Convention on Law of the Sea (among others).²³ However, it would be disingenuous to pretend that China’s flexing of its Arctic muscles does not engender some anxiety, if only because of China’s size and global aspirations.²⁴ China (along with India) has taken the position that the Arctic belongs to all people and the region is part of the “common heritage of mankind.”²⁵

¹⁷ “COSCO Voyage Yong Sheng arrives in the Netherlands,” *Xinhuanet*, September 11, 2013, http://news.xinhuanet.com/english/photo/2013-09/11/c_132711222_2.htm.

¹⁸ Costas Paris and Joanne Chiu, “Chinese Shipping Group COSCO Planning Regular Trans-Arctic Sailings,” *The Wall Street Journal*, October 29, 2015, <http://www.wsj.com/articles/chinese-shipper-cosco-to-schedule-regular-trans-arctic-sailings-1446133485>.

¹⁹ The Arctic Council was established on September 19, 1996, with the signing of the Ottawa Declaration. The Ottawa Declaration lists the following countries as members of the Arctic Council: Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden and the United States. In addition, six organizations representing Arctic indigenous peoples have status as permanent participants. The Ottawa Declaration gives the Arctic Council a broad mandate to address issues of relevance to the Arctic region and its peoples. During its first 20 years, the Arctic Council focused much of its work on issues of sustainable development and environmental protection in the Arctic. Arctic Council website, <http://www.arctic-council.org/index.php/en/>.

²⁰ Bree Feng, “China Looks North: Carving Out a Role in the Arctic,” *Asia Pacific Foundation of Canada: Canada-Asia Agenda* (April 30, 2015), <https://www.asiapacific.ca/canada-asia-agenda/china-looks-north-carving-out-role-arctic>.

²¹ The others, also admitted in 2013, are Japan, Korea, India and Singapore.

²² The permanent members of the Arctic Council are those listed in the previously mentioned Ottawa Declaration: Russia, Canada, the U.S., Denmark, Iceland, Norway, Finland and Sweden.

²³ Arctic Council, “Criteria for Admitting Observers,” May 7, 2015, <http://www.arctic-council.org/index.php/en/about-us/arctic-council/observers>.

²⁴ P. Whitney Lackenbauer, “Canada and the Asian Observers to the Arctic Council: Anxiety and Opportunity,” National Bureau of Asian Research, *Asia Policy* 18 (July 2014), 22-29.

²⁵ Kathryn Keil, “A Potential Arctic Conflict II: Insiders vs Outsiders” The Arctic Institute (October 25, 2011), <http://www.thearcticinstitute.org/2011/10/2378-actual-arctic-conflict-arctic.html>.

Given its role on the world stage it would be surprising if China did not assert its interests in the Arctic, which it can easily justify by reference to the impact of climate change in the Arctic on the Chinese environment, among other considerations. Access to resources and shipping lanes are equally important.²⁶ China, as a major trading nation with blue-water naval ambitions, will not only want to play a role in determining the future of Arctic shipping lanes but will demonstrate its capacity to do so.

COMING BACK TO EARTH

If the media enthusiasm for Arctic shipping routes waxed in the period 2011–13 and earlier, it waned somewhat thereafter and the initial excitement began to be tempered with a dose of reality. Impressive savings in time and distance have been quoted for ships taking the northern routes, but time savings are dependent on the speed of steaming, which can be greatly reduced if ice or weather conditions are difficult. While the tanker *STI Heritage* apparently was able to maintain a speed of 14 knots through the NSR on its passage in 2011, other ships have traversed at speeds as slow as seven knots. Compared to the average speed of a container vessel of around 20 knots in open waters (although the fuel-saving “slow-steaming” phenomenon also has to be factored in)²⁷ it is apparent that shorter distances do not always mean faster passage. That said, although speed on any of the northern routes is unlikely to approach the average speeds maintained on southern routes, given the much shorter distances there is still the potential for meaningful fuel and time, and thus cost, savings, which cannot be ignored. The *Nordic Orion*, a Danish ice-class bulk carrier, saved \$200,000 and four days’ transit by shipping 15,000 metric tons of coal direct from Vancouver to Finland via the Northwest Passage in 2013 instead of proceeding via Panama,²⁸ although the voyage almost didn’t take place owing to the difficulty in arranging for marine insurance.

There are many reasons why the siren call of shorter distances can be offset by other negative factors and it is not surprising to see more balanced media coverage emerge as a result. The *Globe and Mail*, so enthusiastic in 2013, soon published a series entitled “A reality check on the Northwest Passage ‘boom.’”²⁹ As Lackenbauer and Lajeunesse have pointed out,³⁰ and has also been well documented in the definitive work on Arctic shipping by a team of researchers from the Ocean Futures Institute in Norway,³¹ difficulties in the Canadian Arctic are many: shifting ice due to winds and currents; variability in the extent

²⁶ Muhammed Makki, “China’s Quest for Arctic Access & Resources,” *Journal of Energy Security* (April 19, 2012), http://www.ensec.org/index.php?option=com_content&view=article&id=351:chinas-quest-for-arctic-access-aamp-resources&catid=123:content&Itemid=389.

²⁷ Hong Liang Lee, “The Economics of Slow Steaming,” *Seatrade Maritime News*, October 7, 2014, <http://www.seatrade-maritime.com/news/americas/the-economics-of-slow-steaming.html>.

²⁸ Wendy Stueck, “Ship crosses Northwest Passage, sails into history,” *The Globe and Mail*, September 25, 2013, <http://www.theglobeandmail.com/news/british-columbia/bulk-carrier-becomes-first-to-successfully-traverse-northwest-passage/article14516278/>.

²⁹ Paul Waldie, “A reality check on the Northwest Passage ‘boom,’” *The Globe and Mail*, January 7, 2014, <http://www.theglobeandmail.com/report-on-business/breakthrough/will-cold-dark-northwest-passage-see-more-ships/article16231502/>.

³⁰ Lackenbauer and Lajeunesse, “On Uncertain.”

³¹ Ostreng et al., *Shipping*.

of ice-free waters from one season to the next; uncharted or poorly charted sea lanes;³² and lack of port infrastructure and satisfactory icebreaking capacity. These drawbacks, combined with the shallow 10 metre draft on the southern Northwest Passage route,³³ all of which are reflected in insurance rates, make it unlikely that the NWP will be the first choice of those wishing to develop Arctic sea routes to and from Asia.³⁴ The history of the exploration of the Northwest Passage, from Hudson to Franklin, bears testament to the challenging conditions in the Canadian Arctic.

SHIPPING CHALLENGES ON THE NORTHERN ROUTES

Insurance and Risks

Insurance is a major, but difficult to quantify cost factor facing shipping on both Arctic routes. Today, even though many of the risks associated with shipping are well known and understood by insurers, there are still risks related to Arctic navigation that need to be identified.³⁵ Ostreng et al. point out that underwriters normally base their premiums on a historic loss record, and the frequency of accidents is a key element of risk. However, in the Arctic, a lack of empirical data and statistics makes it difficult for insurers to compose a risk assessment related to the probability of accidents on the various shipping routes.³⁶ As a result, the provision of insurance for Arctic shipping tends to be on a case-by-case basis, and expensive for both property and indemnity (P & I) and hull and machinery (H & M) policies.³⁷ This applies to both the Northern Sea Route and the Northwest Passage. At the very least, the best that can be said is that availability and cost of insurance is problematic and will remain so for some time to come. Barring some catastrophic developments affecting southern shipping routes, the risk profile of transiting the Arctic will always carry a premium compared to other routes.

Imbalanced Cargo Flows

One of the challenges hindering the growth of the northern routes is the difficulty in balancing cargo flows. In 2013, 71 vessels transited the NSR (an all-time high so far),

³² See, for example, E.J. Stewart and J. Dawson, "A Matter of Good Fortune? The Grounding of the *Clipper Adventurer* in the Northwest Passage, Arctic Canada," *Arctic* 64, 2 (June 2011), <http://pubs.aina.ucalgary.ca/arctic/Arctic64-2-263.pdf>.

³³ Some of the straits in the Northern Sea Route also have relatively shallow drafts. See ABS (American Bureau of Shipping), "Navigating the Northern Sea Route: Status and Guidance," http://ww2.eagle.org/content/dam/eagle/publications/2014/NSR_Advisory.pdf.

³⁴ Others are somewhat more optimistic. See, for example, Michael Byers, *Who Owns the Arctic?* (Vancouver, B.C.: Douglas and McIntyre, 2009), 40: "There is no doubt that ships will come. ... The deepwater route of the Northwest Passage could also accommodate super-tankers and container ships that are too large for the Panama Canal ... US Navy aircraft carriers are also too big for the Panama Canal and may be attracted to an ice free Northwest Passage."

³⁵ Anne Katrine Normann and Eirik Mikkelsen, "Navigating in ice in nothing new, but ... : The role of insurance for use of the Northern Sea Route. Preliminary results," Northern Research Institute, <http://www.arcticfrontiers.com/downloads/arctic-frontiers-2014/poster-presentations-3/part-iii-shiping-a-offshore-in-the-arctic-2/610-anne-normann-and-eirik-mikkelsen/file>.

³⁶ Ostreng et al., *Shipping*.

³⁷ Marsh Risk Management Research, "Arctic Shipping: Navigating the Risks and Opportunities" (August 2014), http://www.safety4sea.com/images/media/pdf/Arctic_Shipping_Lanes_MRMR_August_2014_US.pdf.

but a further analysis reveals factors that negatively impact the route's viability. Forty vessels travelled eastbound (Europe to Asia), carrying 895,000 tons of cargo and 6,000 tons of ballast, while the 31 westbound vessels carried only 468,000 tons of cargo with 500,000 tons of ballast. From these statistics it is evident that eastbound journeys on the NSR are more common, fuelled by natural resource products being shipped to Asia, with only limited cargo movement in the opposite direction. This cargo imbalance inevitably affects profitability. Moreover, the vast majority of transits originated in Russian ports (not being true Western Europe-to-Asia transits). At this point, statistics indicate that the NSR is primarily used as a domestic supply and export route for Russia and much less as an international transportation corridor.³⁸ In 2014, these volumes dropped significantly³⁹ with the total number of ships transiting being less than half that of the previous year.⁴⁰

Icebreaking Costs

While the Northern Sea Route has seen a much greater volume of traffic than the Northwest Passage, the decline in NSR traffic in 2014 indicates that many obstacles still remain before either route can become viable commercially. Ice conditions are generally easier on the NSR but they are still unpredictable, requiring icebreaker services⁴¹ and travel by convoy. Among the principal obstacles is the cost of icebreaking services in the Russian Arctic. The Russian icebreaking service is mandated to operate on a cost-recovery basis, which currently makes the fees prohibitive, more than offsetting the fuel costs and transit fees (e.g., on the Suez Canal) saved by avoiding competing southern routes. With regard to icebreaking fees, Ostreng et al. indicate a fee of \$31.70 per ton is charged for container cargo, and point out that each 24-ton container (TEU)⁴² would thus attract charges of \$760 for the NSR transit just for these fees alone. Since the current freight rate for Europe (at the time of publication) via Suez was \$800 per TEU, assuming a similar freight cost via the NSR and adding the icebreaking fees effectively doubles the cost.⁴³ The transit fees for using Suez have to be added into the cost comparison, but they amount only to about 10 per cent of the Russian icebreaking fees,⁴⁴ illustrating the challenge of making the NSR a viable alternative route.

Yet, at least Russia can provide the service; it has more than 40 modern icebreakers⁴⁵ and is building 14 more, including the world's largest nuclear-powered icebreaker due to enter service in 2019. Canada, by contrast, does not at present charge for icebreaking services, but infrastructure in the Canadian Arctic is even more basic. Icebreaking capacity is limited

³⁸ Malte Humpert, "Arctic Shipping: An Analysis of the 2013 Season," Arctic Institute (October 2014).

³⁹ Trude Pettersen, "Northern Sea Route Traffic Plummeted," *Barents Observer*, December 16, 2014, <http://barentsobserver.com/en/arctic/2014/12/northern-sea-route-traffic-plummeted-16-12>.

⁴⁰ Northern Sea Route Information Office, "Transits 2014," http://www.arctic-lio.com/nsr_transits.

⁴¹ Andrei Smirnov, "The need for icebreakers will increase after the year 2016," *Arctic Info*, October 18, 2012, <http://www.arctic-info.com/ExpertOpinion/18-10-2012/-the-need-for-icebreakers-will-increase-after-the-year-2016>.

⁴² TEU stands for Twenty-Foot Equivalent Unit, which can be used to measure a ship's cargo-carrying capacity. The dimensions of one TEU are roughly equal to that of a standard 20-foot shipping container

⁴³ Ostreng et al., *Shipping*, 223.

⁴⁴ *ibid.*

⁴⁵ Milosz Reterski, "Breaking the Ice," *Foreign Affairs*, December 11, 2014, <https://www.foreignaffairs.com/articles/united-states/2014-12-11/breaking-ice>.

(Canada has only two heavy icebreakers and is building one more,⁴⁶ which is not due to enter service before 2021, while the U.S. has only one heavy icebreaker in operation). To compound the challenge, ice and navigation conditions are considerably more challenging in the Northwest Passage than on the Northern Sea Route.

GLOBAL CHALLENGES

The challenges and opportunities discussed above regarding the future viability of Arctic sea routes must be examined in the broader context of developments in global maritime transport and world trade generally. Quite apart from the difficulties presented by the Arctic routes, which governments can mitigate to some extent (although they cannot control the weather!), the commercial future of these routes is affected by such factors as the competition from alternate routes; new infrastructure such as the widening of the Panama Canal, expansion of the Suez Canal and even, potentially, a new canal across Nicaragua; fuel costs; security issues; innovations in the shipping industry; and shifting patterns of global trade.

New Facilities at Suez and Panama

In August of 2015, Egypt celebrated the opening of the expanded Suez Canal. Suez, which handles eight per cent of global trade, saw 17,148 ships with a net tonnage of 963 million tons transit in 2014.⁴⁷ The new facilities have added a 35-kilometre channel that will allow ships of up to 18,000 TEU to proceed in both directions simultaneously, reducing waiting times by up to eight hours. Despite the publicity and Egyptian pride at opening the expansion two years early, serious questions remain about the utility of the expansion at this point, given the drop in world trade. Volumes at the canal are still 20 per cent below 2008 levels.⁴⁸

Panama, which last year handled 13,482 ships totaling 327 million tons (or two per cent of world trade), is scheduled to open its new canal facilities, which will widen the locks and provide a new lane of traffic in 2016. The capacity of the locks will expand from being able to handle 5,000-TEU container vessels to vessels of up to 13,000 TEUs.⁴⁹ However, despite the widening of the canal, the newer generation of container vessels, some with a capacity of up to 24,000 TEU, will not be able to use the Panama route.

⁴⁶ Canadian Coast Guard website, "Icebreaking Operations Services," www.ccg-gcc.ca/icebreaking/home.

⁴⁷ Suez Canal Authority website, "Traffic Statistics," <http://www.suezcanal.gov.eg/TRstat.aspx?reportId=3>.

⁴⁸ Ahmed Feteiha, "Egypt shows off \$8 billion Suez Canal expansion that the world may not need," *Bloomberg News*, August 4, 2015, <http://www.bloomberg.com/news/articles/2015-08-04/egypt-shows-off-8-billion-suez-canal-gift-world-may-not-need>.

⁴⁹ Canal de Panama website, "Panama Canal Expansion," <http://micanaldepanama.com/expansion/>. Suez, which has no locks, does not face such width limitations and can currently handle vessels up to 18,000 TEU. See, for example, Daniel Shea, "The New Suez Canal: Racing Against Time," *OnboardOnline*, January 26, 2015, <https://www.onboardonline.com/industry-article-index/shipping/the-new-suez-canal-racing-against-time/>.

Global Shipping Trends

Although world trade has slowed since the 2008 financial crisis, seaborne capacity has more than doubled since 1990, especially in the bulk- and container-carrier segments, and the size of container ships has grown. Over the past two decades, container ships have become the fastest-growing category in comparison with bulk carriers, tankers and general cargo ships. In the past 15 years they have grown on average about 100 metres in length with new ships having a length of 400 metres, width of 60 metres and 17-metre draft, with a TEU capacity of 18,000.⁵⁰ It is expected that 24,000-TEU-capacity ships will be travelling the major trading routes between Asia and Europe by 2020, but not via Suez or Panama owing to size limitations.⁵¹ Larger vessels reduce costs of shipping considerably; it is estimated that an increase of 2.5 times capacity drives cost savings in the vicinity of 30 per cent.⁵² Despite the current over-capacity, the major shipping lines cannot compete without moving to larger ships and all are ordering new, larger vessels.⁵³ This reality is driving substantial institutional and infrastructure changes in port handling facilities, and the major ports, if they want to stay in the game, are required to undertake costly infrastructure upgrades. Larger container vessels have other impacts on port operations as well, including quay utilization, yard space, and operation and labour costs, but larger ships do not necessarily mean more cargo.

According to the World Shipping Council, nine of the world's 10 busiest container ports are located in East Asia, with seven of them being in China.⁵⁴ The shift to container vessels, the trend to larger vessels and the current over-capacity in the industry makes the northern routes less attractive despite the considerable savings in distance (although none of the northern routes faces the size constraints of both Panama and Suez.)

Larger vessels also result in the “feederizing”⁵⁵ of smaller ports that do not have the capacity to handle the latest generation of container ships. Smaller ships operate from trans-shipment hubs to service lower capacity ports. To be economical, these smaller ships need

⁵⁰ William Kremer, “How much bigger can container ships get?,” *BBC News Magazine*, February 19, 2013, <http://www.bbc.com/news/magazine-21432226>.

⁵¹ North American west coast ports cannot handle the largest new container ships. Long Beach has recently upgraded to be able to handle 14,000-TEU ships. Port Metro Vancouver currently handles 11,000–12,000-TEU vessels but states that it is capable of handling 14,000-TEU ships. The proposed expansion at Roberts Bank will be able to accommodate up to 20,000-TEU vessels. (Correspondence with the author, November 24, 2015).

⁵² I am indebted to Bernard Mazuel, secretary general of the Union des Ports de France, Dr. Hyong-Mo Jeon, Korea Maritime Institute, and other participants in the seminar “Meeting the Increasing Demand for Maritime Trade,” held under the auspices of the Pacific Economic Cooperation Council (PECC), in Papeete, French Polynesia, October 19–20, 2015, for information on global shipping trends. See <http://www.pecc.org/resources/infrastructure-1/2283-major-changes-in-global-shipping-meeting-the-demand-implications-for-port-operators/file>.

⁵³ According to a 2015 post by APM Terminals, a global operator of port facilities, there are currently 29 vessels of 18,000-TEU capacity and above in service globally, with another 68 on order. APM Terminals, “Suez Canal Expansion,” news release, <http://www.apmterminals.com/en/news/press-releases/2015/suez-canal-expansion>.

⁵⁴ The top 10 container ports in 2013 were, in order of capacity handled: Shanghai, Singapore, Shenzhen, Hong Kong, Busan, Ningbo, Qingdao, Guangzhou, Dubai, and Tianjin. Shanghai handled 33.62 million TEUs. World Shipping Council website, “About the Industry,” <http://www.worldshipping.org/about-the-industry/global-trade/top-50-world-container-ports>. Port Metro Vancouver, Canada's largest port, handled 2.9 million TEUs in 2014. It ranks 47th on the World Shipping Council's list of the top 50 ports. Port Metro Vancouver, *Statistics Overview 2014*, <http://www.portmetrovancover.com/wp-content/uploads/2015/03/2014-statistics-overview.pdf>.

⁵⁵ “Feederization” refers to the bypassing of smaller ports as container vessels get larger, with smaller ports only served by trans-shipment hubs and feeder services.

regular ports of call, with cargo drop-off and pick-up opportunities en route, for revenue generation. Neither the NSR nor the NWP offer any meaningful ports that could develop into such hubs.

Global Trade Patterns

Finally there are changing global trading patterns to consider. A global slowdown in trade, combined with the growth of south-south trade,⁵⁶ makes a new Arctic shipping route between Asia and Europe, or between Asia and the eastern North American seaboard, less economically significant than in the past. Since 2008, the steady growth of global trade that had continued unabated for several decades has slowed considerably. As stated by the Bank of Canada, “Global trade has been disappointing following the 2007–09 financial crisis. After outpacing global GDP growth in the pre-crisis era, growth in global trade slowed and has barely matched the lackluster pace of overall economic activity since 2010. As a result, the global propensity to trade (i.e., the ratio of trade to global GDP) has stopped rising.”⁵⁷ The global economy is enormously dependent on seaborne trade — and the shipping industry is equally dependent on robust global growth — and this mutual dependence had escalated rapidly in recent years. Efforts to rejuvenate global trade are an important global priority, but with stasis at the WTO, Europe facing its own financial crisis compounded by a huge refugee influx, and the Chinese economy slowing, prospects are not good. There is growing acceptance that slower growth may be the “new normal.”⁵⁸

Resource Shipments

If cargo and particularly container shipping is unlikely to be a significant user of the Arctic sea routes owing both to the physical challenges of these routes as well as shifting global shipping trends, one area where there is likely to be better potential for increased use appears to lie primarily in bulk resource shipping, with some movement of oil and gas, directly from sources in the Arctic to markets in Asia. In addition, there is potential for growth in cruise ship traffic.⁵⁹ In September 2014, the *MV Nunavik*, operated by a Canadian company (Fednav), sailed unescorted from Deception Bay in northern Quebec direct to China via the NWP with a shipment of nickel concentrate.⁶⁰ Similar shipments have been taking place from Siberian ports to Asia, and the Yamal gas fields in Siberia are already being readied to serve the Chinese market within a few years.⁶¹ There are other mineral

⁵⁶ UNCTAD, “South-South trade continues to increase,” December 16, 2013, <http://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=673>.

⁵⁷ Michael Francis and Louis Morel, “The Slowdown in Global Trade,” *Bank of Canada Review* (Spring 2015), <http://www.bankofcanada.ca/wp-content/uploads/2015/05/boc-review-spring15-francis.pdf>.

⁵⁸ Barrie McKenna, “Slower growth new economic reality, Bank of Canada says,” *The Globe and Mail*, November 19, 2015, <http://www.theglobeandmail.com/report-on-business/economy/slower-growth-new-economic-reality-bank-of-canada-says/article27359179/>; Abeer Reza and Subrata Sarkar, “Is Slower Growth the New Normal in Advanced Economies?,” *Bank of Canada Review* (Autumn 2015), <http://www.bankofcanada.ca/wp-content/uploads/2015/11/boc-review-autumn15-reza.pdf>.

⁵⁹ Ostreng et al., *Shipping*, 133-141.

⁶⁰ Fednav, “First Arctic cargo shipped through the Northwest Passage,” news release, September 19, 2014, <http://www.fednav.com/en/media/first-arctic-cargo-shipped-through-northwest-passage-0>.

⁶¹ Maria Bennett, “China-Russia gas deal win for the Arctic,” *The Maritime Executive*, July 4, 2014.

exploitation sites in Canada, such as the Mary River iron ore mine on Baffin Island,⁶² that hold potential for shipping direct from the North through Arctic sea routes to Asia.⁶³

Resource exploitation in the Arctic is thus the most likely source for increases in (bulk and tanker) shipping through the northern sea routes. However, while it is estimated that the Arctic could hold up to 13 per cent of the world's conventional oil reserves and as much as 30 per cent of natural gas reserves,⁶⁴ climate change concerns along with low oil prices could see the more inaccessible Arctic reserves left unexploited. The recent decision by Shell to cease exploration in offshore Alaska waters for the foreseeable future is an example of the challenges faced by companies extracting resources in the Arctic.⁶⁵ Thus, one must exercise caution with respect to estimating the amount of bulk and tanker shipping on the northern sea routes that the resource sector will generate, although clearly in specific instances there are viable routes to be exploited.⁶⁶

IMPACT OF THE NORTHERN ROUTES ON ASIAN ECONOMIES AND TRADE WITH ASIA

The World Shipping Council estimated in 2013 that of the roughly 61 million TEUs of containerized shipping on the world's major trade routes, almost 37 million TEUs, or roughly 60 per cent, were accounted for by the routes between Asia and North America and Asia and North Europe, with about double the volume flowing from Asia to Europe and North America than the reverse.⁶⁷ It is worth considering how much of this traffic could conceivably be routed through the Arctic under the best of circumstances.

A recent study modelling the amount of bulk and container traffic "eligible" for shipment from Asia to northern Europe or North America through the Arctic pointed out that ports south and west of a line drawn roughly from Hong Kong to Sydney will have little or no distance advantage for shipping via the northern routes to Europe, and that only about seven per cent of the transport volume from Asian regions where the NSR has a distance advantage is shipped via Panama.⁶⁸ However, that still leaves considerable theoretical

⁶² Terrance Power and Pauline Power, *Canada's Arctic Sovereignty: Under Attack* (2014), 12.

⁶³ Baffinland's Mary River mine shipped its first ore to Europe in July 2015. Baffinland website, "Location and Project History," <http://www.baffinland.com/the-project/location-and-project-history/?lang=en>.

⁶⁴ Energy Information Administration, "Today in Energy," January 20, 2012, <https://www.eia.gov/todayinenergy/detail.cfm?id=4650>. This source is based on a study done by the U.S. Geological Survey (USGS) in 2008 that completed an assessment of undiscovered conventional oil and gas resources in all areas north of the Arctic Circle. Using a geology-based probabilistic methodology, the USGS estimated the occurrence of undiscovered oil and gas in 33 geologic provinces thought to be prospective for petroleum. The sum of the mean estimates for each province indicates that 90 billion barrels of oil, 1,669 trillion cubic feet of natural gas, and 44 billion barrels of natural gas liquids may remain to be found in the Arctic, of which approximately 84 per cent is expected to occur in offshore areas. Kenneth J. Bird et al., "Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle" (2008), <http://pubs.usgs.gov/fs/2008/3049/>.

⁶⁵ Shell website, "Shell updates on Alaska exploration," news release, September 28, 2015, <http://www.shell.com/global/aboutshell/investor/news-and-library/2015/shell-updates-on-alaska-exploration.html>.

⁶⁶ Teck's Red Dog lead and zinc mine in northwest Alaska is one example.

⁶⁷ World Shipping Council website, "Trade routes," <http://www.worldshipping.org/about-the-industry/global-trade/trade-routes>.

⁶⁸ Patrick Leypoldt, "The Capacity Potential of the Northern Sea Route by 2015," in *Northern Sea Route: A Comprehensive Analysis*, ed. Marcus Matthias Keupp (Berlin: Springer, 2015).

potential for shipping via either of the Arctic routes from northern China, Japan and Korea, based on distance savings.

Two Korean researchers conducted a study looking at the potential number of voyages for trans-shipment of Korean container cargo by size of ship under simplified assumptions that the NSR was fully navigable and economical enough for shipping and could substitute 1:1 for passages through the Suez Canal. Assuming that the NSR stayed ice-free for three months a year, they concluded that the number of voyages from Korea to the seven major European destinations⁶⁹ would range from a high of 682 for vessels of only 650-TEU capacity to 56 for 8,000-TEU-capacity vessels.⁷⁰ While this is a considerable increase from the maximum number of vessels that transited the NSR in its peak year, 2013 (71 vessels), it is important to note that these estimates do not take into account any of the obstacles inhibiting use of the northern sea routes, from ice conditions to economic viability. When these are factored in, despite the hyperbole about the likelihood of increased use of the NSR — and to a lesser extent the NWP — as an alternative freight route for Asian products to Europe and eastern North America, one is drawn to the conclusion that the prospect of a major shift in container cargo shipping patterns is slight.

China in particular will nonetheless continue to demonstrate an active interest in pursuing shipping options across the Arctic,⁷¹ but it is difficult to conceive that any of the northern passages will become major game-changers for Asian economies in terms of movement of freight in the foreseeable future (20 to 25 years or longer), even assuming continued melting of the permanent sea ice. For China, there are strategic and political reasons as well as economic factors leading it to continue to express interest in Arctic shipping, and China can be expected to continue to do so in part to justify its Arctic engagement.⁷²

However, while shipping of container freight via the northern sea routes may not have a major impact on Asian economies, both the NSR and NWP offer cost-efficient alternatives for the supply of resources directly from the Arctic to Asia, assuming market and climatic conditions allow for economic exploitation and recovery of oil, gas and other resources in these inhospitable regions. In sum, there is likely to be more rhetoric than reality in terms of these routes being viable alternatives for shipping cargo, especially containers, to and from the Asian market. Despite this reality, the opportunities for Canada to use its Arctic presence and the NWP to develop and strengthen its relations with Asia-Pacific economies, particularly China, should not be underestimated.

⁶⁹ Russia, Germany, Netherlands, the U.K., Belgium, Poland and France.

⁷⁰ Yeong-seok Ha and Jung-soo Seo, “The Northern Sea Routes and Korea’s Trade with Europe: Implications for Korea’s Shipping Industry,” *International Journal of e-Navigation and Maritime Economy* 1 (2014): 73-84, http://ac.els-cdn.com/S2405535214000084/1-s2.0-S2405535214000084-main.pdf?_tid=238b6de4-d75e-11e5-80a3-00000aab0f26&acdnat=1455923682_76d1fe8fb6a33931c31119067951288b.

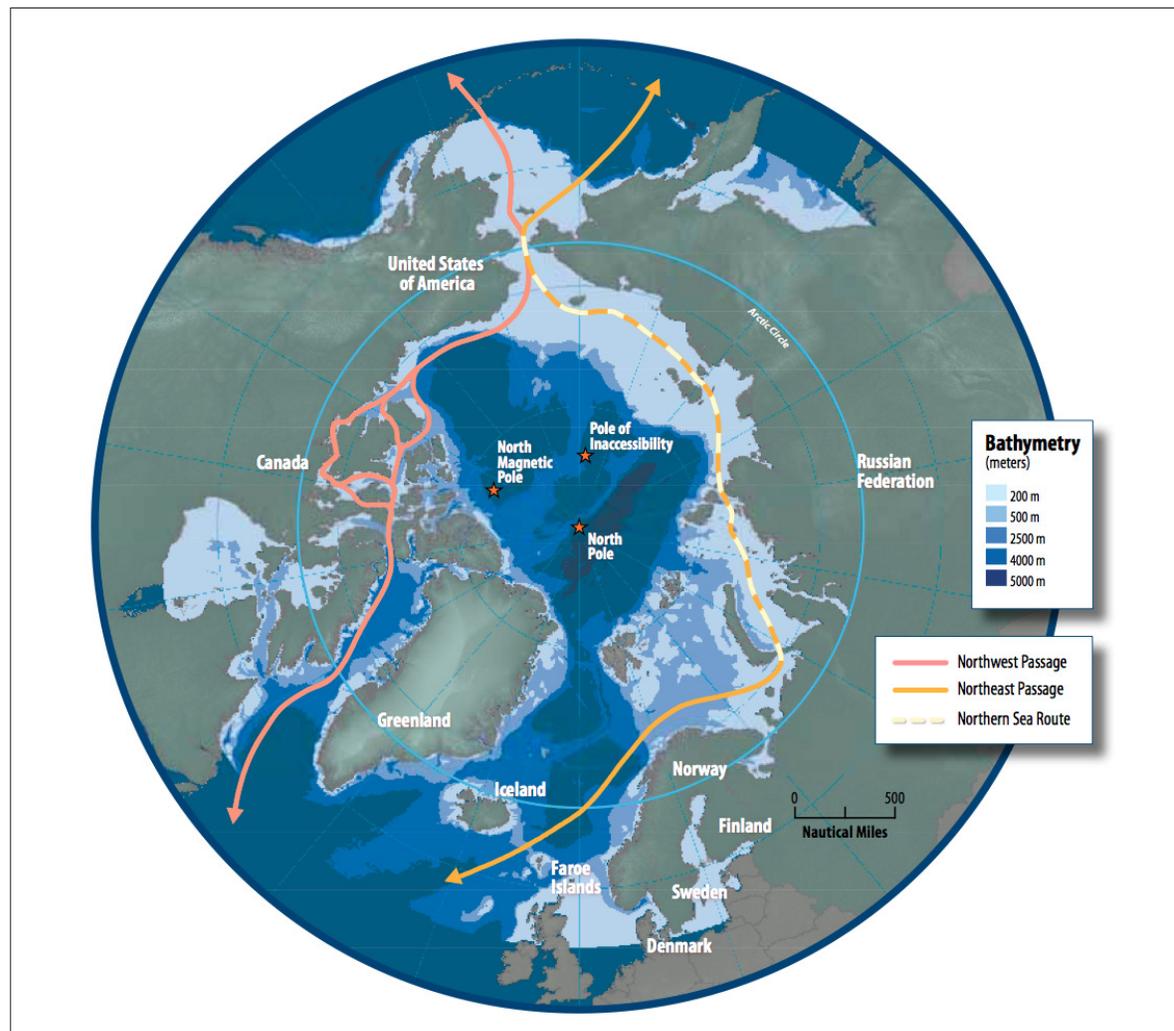
⁷¹ “COSCO announces Arctic shipping route to Europe,” *Japan Times*, October 27, 2015, <http://www.japantimes.co.jp/news/2015/10/27/asia-pacific/cosco-announces-arctic-shipping-route-europe/#.VIOGbFOFNh>.

⁷² See, for example, David Wright, “The Panda Readies to Meet the Polar Bear: China and Canada’s Arctic Sovereignty Challenge” (Calgary: Canadian Defence and Foreign Affairs Institute, March 2011).

IMPLICATIONS FOR CANADA

For Canada to play a meaningful role with Asia based on its Arctic presence, it will need to invest in building the infrastructure in the North that will allow it to exercise sovereignty through providing vital services like meteorological forecasting and search and rescue. So far there has been more talk than action⁷³ with regard to Canada's northern strategy, which was laid out in 2009.⁷⁴ Of the four pillars of the strategy (exercising sovereignty, promoting economic and social development, protecting the environment, and improving governance), all are potentially affected by even a modest growth in Arctic shipping. The 2013 transit of the *Nordic Orion* was encouraged by the Canadian government, which waived all icebreaking fees. Promises were made by the previous Conservative government to invest in and improve infrastructure. Commitments to new icebreakers have been scaled back, however, and little search and rescue capacity exists in the North.⁷⁵

NORDIC ORION TRANSIT



⁷³ Lackenbauer and Lajeunesse, "On Uncertain."

⁷⁴ Government of Canada, *Canada's Northern Strategy: Our North, Our Heritage, Our Future* (Ottawa, 2009).

⁷⁵ Emma Jarratt, "Canada Slow to deliver on Arctic commitments," *Barents Observer*, November 27, 2014, <http://barentsobserver.com/en/2014/11/canada-slow-deliver-arctic-commitments-27-11>.

For Canada to use its claimed ownership of the NWP to promote closer ties with Asia, a reasonable goal given Asian and particularly Chinese interest in Arctic shipping, it will need to up its game in terms of commitments to make that route a safe and viable navigational option. Canada cannot change the rate of sea-ice reduction or the weather, nor can it make the geography of the NWP more user-friendly, but it can make the necessary investments so that human infrastructure is in place to complement whatever changes nature may bring.

The question then arises as to what role *can* the Arctic play in Canada's relations with Asia? The Arctic Council is a forum where Canada has a permanent seat at the table, unlike in some Asia-Pacific fora where it is not present. As noted, five Asian countries have become observers to the council on the basis of their environmental, shipping, resource and strategic interests. As the new Liberal government seeks to recalibrate its relations with Asia, it will need to identify common interests that Canada shares with its Asian partners — and the Arctic offers an excellent vehicle to do this.

On the trade and investment file, Canada is likely to revive the Canada-China Complementarities Study, and move toward the negotiation of a free-trade or economic-partnership agreement with China. In 2014, Canada concluded the Canada-Korea Free Trade Agreement and is a participant in the just-concluded Trans-Pacific Partnership, of which both Japan and Singapore are members. Canada also continues to work on an economic-partnership agreement with India. To these closer economic ties Canada will want to add other elements to strengthen the fabric of bilateral relations. Among these will be security, cultural, educational and scientific linkages. The Arctic is an area where shared goals of environmental protection, safer navigation, and resource development offer opportunities for constructive dialogue and engagement. As Lackenbauer points out with respect to the new Asian observers to the Arctic Council, “Canada should seize the heightened interest in and expanded dialogue on Arctic affairs as a way to correct misperceptions about the region and promote Ottawa's vision of regional protection and sustainable development.”⁷⁶

China, while among the most active of the Asian players in the Arctic, is by no means the only one engaged in the region. Canada and Korea upgraded their bilateral relationship in 2014 to a “strategic partnership.” A strategic partnership indicates that two countries consider their bilateral relationship to be one of their key foreign engagements, and that they will give priority to developing and strengthening bilateral ties. Among the areas where Canada and Korea committed to develop closer relations was Arctic research and development, along with energy and natural resources, and science, technology and innovation.⁷⁷ Korea's Maritime Institute, for example, is currently undertaking research into Arctic issues in the following areas: 1) the establishment of Arctic master plans and follow-up policies; 2) Arctic governance, resource development and new policy demand-response capacity-building; 3) resource-linkage logistics systems throughout the Arctic Ocean; and

⁷⁶ Lackenbauer, “Canada and,” 29.

⁷⁷ Government of Canada, “Prime Minister Stephen Harper and Korean President Park Geun-hye Celebrate Signing of Historic Free Trade Agreement and Launch of Strategic Partnership,” news release, September 22, 2014, <http://www.canadainternational.gc.ca/korea-coree/highlights-faits/2014/FT-LE-2014.aspx?lang=eng>.

4) polar science and industry convergence.⁷⁸ That is a more-than-full menu for bilateral co-operation. Japan has its own National Institute of Polar Research⁷⁹ and, as noted above, China has an extremely active research program.

Resource exploration in the Canadian Arctic will require careful environmental stewardship and massive investment. Asian investment in Canada has not been without controversy, notably those investments made by Chinese state-owned enterprises. This was particularly pronounced during the Investment Canada review of the acquisition of the Canadian oil firm Nexen by the Chinese National Offshore Oil Corporation (CNOOC) in 2012. In 2014, the bilateral Foreign Investment Promotion and Protection Agreement (FIPA) with China came into effect, generating both praise and criticism. China and Korea are investors in the open-pit iron ore mine at Arcelor Mittal's Mary River site on Baffin Island,⁸⁰ and more Asian investment can be expected. Attitudes toward Asian investment polled by the Asia Pacific Foundation of Canada in its annual National Opinion Poll in 2014 showed growing apprehension about developing closer ties with Asia,⁸¹ but a redefinition of the poll questions in 2015 produced markedly different results, with attitudes toward Japanese investment scoring higher positive ratings among public opinion than even investment from the U.S.⁸² This indicates that, while there are concerns regarding concentration of foreign investment in Canada, particularly in the resource area, there is also an understanding of the need for such investment and the prosperity that it can bring. Moreover, public attitudes are not immutably fixed and are influenced by perceptions often unrelated to economic arguments. A positive engagement with Asia in the Arctic will help build popular acceptance of more Asian investment in Canada generally and in the Arctic specifically.

While environmental impact and investment considerations are important, control and de facto jurisdiction over the shipping lanes of the NWP is a key asset that Canada holds in its dealings with Asian countries. Although the likelihood of the NWP becoming an important trans-shipment route to Asia is remote, changing climatic conditions, market factors, and strategic considerations all require that Canada dedicate policy and financial resources to maintain and maximize the value of this asset as Russia has done with its development of the NSR. Canada needs to catch up, and in the process can give further substance to its claim to be an important and engaged player in the Asia-Pacific region.

⁷⁸ Korea Maritime Institute, Strategy Research Division (2015), 25.

⁷⁹ National Institute for Polar Research website, "About NIPR," <http://www.nipr.ac.jp/english/outline/index.html>.

⁸⁰ Power and Power, *Canada's Arctic*, 12.

⁸¹ Asia Pacific Foundation of Canada, 2014 National Opinion Poll (Vancouver, 2014), https://www.asiapacific.ca/sites/default/files/filefield/national_opinion_poll_2014_final_0.pdf.

⁸² Hugh Stephens, "Attitudes to Asian investment: It all depends on the context," *China-US Focus*, August 11, 2015, <http://www.chinausfocus.com/finance-economy/attitudes-to-asian-investment-it-all-depends-on-the-context/>.

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