

AFET Committee of the European Parliament: Hearing on the Arctic: a new arena of  
geostrategic importance and great powers rivalry

➤ **Testimony concerning: Shipping through the Arctic - Freedom of navigation, new commercial routes and civil security issues in the Arctic**

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Summary: Arctic warming has drawn attention to emerging shipping routes through the Arctic Ocean. These routes offer potential time and fuel savings on shipping between some northern ports in Asia, Europe, and North America. Of the three major routes—the Northwest Passage, the Transpolar Route, and the Northern Sea Route—only the NSR is currently of commercial interest. However, significant challenges to safe shipping are present around the Arctic basin. These include sea ice hazards, changing weather, lack of infrastructure, distant rescue services, communication problems, and more.

## **Section 1. Shipping Routes in the Arctic Ocean**

### *The Northwest Passage*

The Northwest Passage traverses Canada’s northern coastline. Several different routes may be used to travel between the northern Atlantic and northern Pacific. From the Bering Strait, ships travel east through the Chukchi and Beaufort Seas, and then may take the Amundsen Gulf or McClure Strait. Several routes are possible through the islands of the Canadian Arctic archipelago.<sup>2</sup> Some of the channels, in particular Simpson Strait, have draft restrictions, others have complex currents. Ice conditions vary and may block travel through these routes. Traveling eastwards, ships will exit the Northwest Passage through either Baffin Bay and the Hudson Strait, or Hudson Strait and the Labrador Sea, ending up in the Atlantic Ocean southeastwards of Greenland. (See attached map.)

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<sup>1</sup> This document reflects my personal opinions and is not a statement of the official position of the US Naval War College or the Department of Defense.

<sup>2</sup> R. K. Headland et al, “Transits of the Northwest Passage to end of the 2019 navigation season.” Scott Polar Research Institute, University of Cambridge, UK. March 17, 2020.

According to Transport Canada, shipping in the Northwest Passage may become more dangerous as a result of climate change. The breakup of thick, multiyear sea ice means that pieces of this thick, strong ice can flow into shipping lanes, posing “serious navigational challenges”.<sup>3</sup>

In 1985, Canada drew straight baselines around the outer edge of the Canadian Arctic archipelago, declaring that all of the waters within the archipelago are Canada’s historic internal waters.<sup>4</sup>

The Government of Canada is focused on protecting the environment of the Northwest Passage, and recognizes the importance of environmental protection to Arctic and northern peoples. Canada’s *Arctic and Northern Framework* acknowledges that vessel traffic through the Northwest Passage may be “increasingly feasible at certain times of the year” due to climate change, but notes that “extremely variable ice conditions continue to make navigation difficult and hazardous.”<sup>5</sup> The *Framework* states that “Canada will continue to manage vessel traffic within our national waters to ensure that navigation is conducted in accordance with our rigorous safety and environmental protection standards.”

### *Transpolar Route*

The Transpolar Route (sometimes referred to as the Transpolar Sea Route, TSR) is, at present, a notional shipping route directly across the Arctic Ocean. As a more direct route, without the depth restrictions found in parts of the Northwest Passage and Northern Sea Route, the Transpolar Route would offer the greatest potential shipping efficiencies. However, the Transpolar Route is remote from land and does not offer intermediate stopping points for transshipping. Charting and emergency services are not yet developed, and insurance regimes unclear. It is not yet clear if demand for this route will emerge.<sup>6</sup>

Use of the Transpolar Route would require significant reductions in Arctic sea ice below present conditions. The Arctic Ocean is expected to be “ice-free” by midcentury, with “ice-free” usually defined as <1 million square kilometers. Modeling and observation-based predictions of when this will occur reflect lack of consensus, with estimates ranging between 2030 and 2060: recent research indicates the 2030s are more likely.<sup>7</sup> However, it is important to recall that ice-free conditions will not persist for longer than a few weeks in September before autumn cooling begins. Longer periods of ice-free conditions that would permit a shipping season are unlikely

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<sup>3</sup> Transport Canada. “Climate change and its impacts on shipping.” <https://tc.canada.ca/en/marine-transportation/arctic-shipping/climate-change-its-impacts-shipping>.

<sup>4</sup> Suzanne Lalonde, “The debate over the legal status of the Northwest Passage.” Brief submitted to Senate of Canada, Special Committee on the Arctic, October 17, 2018.

<sup>5</sup> Government of Canada, “Canada’s Arctic and Northern Policy Framework.” 2019. <https://www.rcaanc-cirnac.gc.ca/eng/1560523306861/1560523330587>.

<sup>6</sup> For more, see Mia Bennet, et al, “Climate change and the opening of the Transpolar Sea Route: logistics, governance, and wider geo-economic, societal and environmental impacts. In *The Arctic and World Order*, Kristina Spohr and Daniel S. Hamilton, eds. <https://transatlanticrelations.org/publications/the-arctic-and-world-order/>.

<sup>7</sup> See, for example: James E. Overland and Muyin Wang, “When will the summer Arctic be nearly sea ice free?” *Geophysical Research Letters*, Vol 40: 2097-2102, 2013; Ge Peng, et al, “What do global climate models tell us about future Arctic sea ice coverage changes?” *Climate*, Vol 8(1): 15, 2020.

before the end of the century. In addition, the future of Arctic sea ice, particularly at longer time horizons, will depend on the efforts of the global community to control emissions of CO<sub>2</sub> and other greenhouse gases.

### *Northern Sea Route*

The Northern Sea Route (technically, this term refers to a portion of the Northeast Passage, which has been designated as the Northern Sea Route by the Government of Russia; however, Northern Sea Route is in common usage) traverses Russia's northern coastline. From the Bering Strait, ships travel west through the East Siberian Sea, across the Laptev Sea, the Kara Sea, and then either north of Novaya Zemlya through Cape Zhelaniya or south through the Kara Gate into the Barents Sea.<sup>8</sup> Ships may stay close to the shore or travel around the New Siberian Islands and Severnaya Zemlya.

While shipping speeds vary with operational conditions, the NSR offers significantly shorter trips between some ports: Japan-Rotterdam is 11,000km via Suez, but only about 7,600 via the NSR. In addition, because the Government of Russia is actively developing the NSR as well as natural resource projects along its route, there are opportunities for intermediate stops and transshipment.

The Government of Russia has stated its intention to develop the NSR into a "globally competitive national transport corridor" and President Putin has called for shipping in the NSR to reach 80 million tons by 2024.<sup>9</sup> In 2020, shipping volume was nearly 33 million tons, and 31.5 million tons in 2019.<sup>10</sup> Major development of oil, gas, coal, and other resources along the NSR is anticipated to spur shipping to the desired levels. In order to develop the NSR, the Government of Russia offers long-term tax incentives and a free customs zone.<sup>11</sup> In addition, icebreakers and other support vessels are planned, as well as regional airports, railways, and seaports.<sup>12</sup>

Arctic warming has already led to reductions in sea ice along portions of the NSR. The American Bureau of Shipping (ABS) notes that "enormous variability is inherent" along the NSR, and that ships can expect "strong winds, low air temperatures," fog, darkness, snow, and storms.<sup>13</sup> Hazards include whiteout conditions when the horizon can be lost, optical haze, and ice blink. High winds and currents can drive ice quickly, creating dangerous situations. Studies have

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<sup>8</sup> See "Northern Sea Route Shipping Statistics," PAME Working Group of the Arctic Council.

<https://pame.is/projects/arctic-marine-shipping/older-projects/northern-sea-route-shipping-statistics>.

<sup>9</sup> Ekaterina Klimenko, "Russia's new Arctic policy document signals continuity rather than change," Stockholm International Peace Research Institute, April 6, 2020. <https://www.sipri.org/commentary/essay/2020/russias-new-arctic-policy-document-signals-continuity-rather-change>.

<sup>10</sup> Atle Staalesen, "Overfulfilling the Arctic plan," The Barents Observer, January 12, 2021.

<https://thebarentsobserver.com/en/arctic-Ing/2021/01/plan-overfulfilled-northern-sea-route>.

<sup>11</sup> TASS, "Deputy PM: Russia interested in foreign investment in Northern Sea Route," July 6, 2020.

<https://tass.com/economy/1175343>.

<sup>12</sup> Atle Staalesen, "Moscow adopts 15-year grand plan for Northern Sea Route," The Barents Observer, December 31, 2019. <https://thebarentsobserver.com/en/arctic/2019/12/moscow-adopts-15-year-grand-plan-northern-sea-route>.

<sup>13</sup> American Bureau of Shipping, "Navigating the Northern Sea Route: Status and Guidance," 2014.

[https://ww2.eagle.org/content/dam/eagle/advisories-and-debriefs/ABS\\_NSR\\_Advisory.pdf](https://ww2.eagle.org/content/dam/eagle/advisories-and-debriefs/ABS_NSR_Advisory.pdf).

explored the relationship between ice conditions, ice strengthening of vessels, and the likelihood of hazard.<sup>14</sup>

In 1998, the Government of Russia drew straight baselines around its coastline, including the seas and straits “which have historically belonged to the Russia Federation” and described the NSR as “the historical national unified transport line of communication of the Russian Federation.”<sup>15</sup> The regulatory regime for the NSR was further developed in 2013, and again revised in 2017.

## **Section 2. Freedom of navigation in the Arctic Ocean**

In the Arctic Ocean, the UN Convention on the Law of the Sea (UNCLOS) lays out maritime zones, rights, and responsibilities. This includes the regime of internal waters, territorial seas, exclusive economic zones, and high seas. While the US is not yet a party to UNCLOS, the 2008 Ilulissat Declaration, signed by the five coastal Arctic states including the US, stated that UNCLOS provides “a solid foundation” for Arctic management and that the signatory states would “remain committed to” UNCLOS and “see no need to develop a new comprehensive international legal regime”.<sup>16</sup>

UNCLOS does contain a specific provision relevant to the Arctic: Article 234 gives coastal states the right to adopt and enforce non-discriminatory laws and regulations against marine pollution in ice-covered areas, “where particularly severe climatic conditions and the presence of ice covering such areas for most of the year create obstructions or exceptional hazards” and where “pollution could cause major harm to or irreversible disturbance of the ecological balance.”<sup>17</sup>

Freedom of navigation has long been a priority for the United States. Since 1979, the US government has carried out a freedom of navigation program intended to counter excessive maritime claims around the world. By strongly defending freedom of navigation, the US defends “the rights, freedoms, and uses of the sea and airspace guaranteed to all States under international law.”<sup>18</sup> The US program is an active program, and through actively countering excessive maritime claims, the US prevents those claims from becoming accepted in

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<sup>14</sup> For example, see: Jarno Vanhatalo, et al, “Probability of a ship becoming beset in ice along the Northern Sea Route – a Bayesian analysis of real-life data,” *Cold Regions Science and Technology*, Vol 184, April 2021. <https://doi.org/10.1016/j.coldregions.2021.103238>; Lauri Kuuliala, et al, “Estimating operability of ships in ridged ice fields,” *Cold Regions Science and Technology*, Vol 135, March 2017. <https://doi.org/10.1016/j.coldregions.2016.12.003>.

<sup>15</sup> Russian Duma, “Federal Act on the international maritime waters, territorial sea and contiguous zone of the Russian Federation,” adopted by the Duma July 16, 1998 and Federation Council July 17, 1998. Articles 1 and 14. Deposited with the UN Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs. <https://www.un.org/Depts/los/LEGISLATIONANDTREATIES/>.

<sup>16</sup> The Ilulissat Declaration, May 2008. <https://arcticportal.org/images/stories/pdf/Ilulissat-declaration.pdf>.

<sup>17</sup> UN Convention on the Law of the Sea, Part XII, Section 8, Article 234.

<sup>18</sup> US Department of Defense, “Freedom of Navigation Program,” February 28, 2017.

international law.<sup>19</sup> The US program consists of both diplomatic efforts as well as operations by US military forces, or freedom of navigation operations (FONOPs).<sup>20</sup>

Each year, the US DoD conducts FONOPs. In 2020, 19 countries' maritime claims were challenged, some repeatedly.<sup>21</sup> In 2019, the claims of 22 countries were challenged<sup>22</sup>; in 2018, the claims of 26 countries were challenged.<sup>23</sup>

In the Arctic Ocean, the US considers both the claims of Canada and Russia to be excessive maritime claims.

The differences between the US and Canada and Russia are longstanding. The US has disputed the status of the NSR before the passage of UNCLOS. While Russia maintains that the Vilkitsky, Shokalsky, Sannikov, and Laptev Straits are historic internal waters and therefore subject to the close regulation accorded internal waters; the US argues that these are international straits and therefore transit passage rights apply.

During the early days of the Cold War, U.S. Coast Guard icebreakers conducted several scientific missions to demonstrate freedom of navigation through straits claimed by the Soviet Union—although these missions occurred before the days of the U.N. Convention on the Law of the Sea (UNCLOS). In 1965 and 1967, however, the Soviets successfully forced the icebreakers to turn back rather than transit through Vilkitsky Strait, which connects the Kara and Laptev seas through the Severnaya Zemlya archipelago. Using Soviet Navy ships and planes, as well as strong diplomatic pressure, Moscow succeeded in getting Washington to back down at the last moment. Since then, the United States has not conducted surface FONOPs through the NSR.<sup>24</sup>

In 2015, the US delivered a diplomatic note to Russia objecting to aspects of the NSR regulatory scheme. In particular, the note flagged the requirement to request permission to enter the NSR, the labeling of the NSR straits (mentioned above) as internal waters, and the lack of an exemption for warships.<sup>25</sup> Transit requirements on the NSR have become more stringent in recent years. While the 2013 regulatory regime reflected Russia's interest in developing the NSR internationally, the 2018 regulations are more restrictive: for example, shipping of hydrocarbons in the NSR is limited to Russian-flagged ships, as is cabotage and other coastal services like salvage.<sup>26</sup> In 2019, new regulations required 45-day advance notification for warship transit of

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<sup>19</sup> Department of Defense, "Annual Freedom of Navigation Report, Fiscal Year 2020," <https://policy.defense.gov/Portals/11/Documents/FY20%20DoD%20FON%20Report%20FINAL.pdf>.

<sup>20</sup> DoD, "Freedom of Navigation Program."

<sup>21</sup> Department of Defense, "Annual Freedom of Navigation Report, Fiscal Year 2020."

<sup>22</sup> Department of Defense, "Annual Freedom of Navigation Report, Fiscal Year 2019."

<sup>23</sup> Department of Defense, "Annual Freedom of Navigation Report, Fiscal Year 2018."

<sup>24</sup> Rebecca Pincus, "Rushing Navy Ships into the Arctic for a FONOP is dangerous," Proceedings, Vol 145, January 2019. <https://www.usni.org/magazines/proceedings/2019/january/rushing-navy-ships-arctic-fonop-dangerous>.

<sup>25</sup> For more, see J. Ashley Roach, "Freedom of the Seas in the Arctic Region," in *The Arctic and World Order*, Kristina Spohr and Daniel S. Hamilton, eds. <https://transatlanticrelations.org/publications/the-arctic-and-world-order/>.

<sup>26</sup> Arild Moe, "A new Russian policy for the Northern sea route? State interests, key stakeholders and economic opportunities in changing times," *The Polar Journal*, Vol 10(2), 2020.

the NSR, and also required a Russian pilot.<sup>27</sup> The advance notification requirement, and lack of a carve-out for warships, appears to break the terms of a 1989 agreement between the US and the Soviet Union regarding innocent passage for warships.<sup>28</sup>

Similarly, the US disputes Canada's characterization of the straits in the Northwest Passage as internal waters. The US maintains that these are international straits. In 1985, the transit of the US icebreaker *Polar Star* through the Northwest Passage triggered a diplomatic storm between the US and Canada.<sup>29</sup> In 1988, the two states signed an Agreement on Arctic Cooperation that established a neutral solution: "The Government of the United States pledges that all navigation by US icebreakers within waters claimed by Canada to be internal will be undertaken with the consent of the Government of Canada."<sup>30</sup>

This agreement has enabled relations between the US and Canada over the Northwest Passage to remain cooperative. In 2018, the US Coast Guard cutter *Maple* transited the Northwest Passage escorted by the Canadian icebreaker *Sir Wilfrid Laurier* and others.<sup>31</sup> In the summer of 2021, the US Coast Guard icebreaker *Healy* will conduct a transit of the Northwest Passage in cooperation with Canada; a Coast Guard representative underlined the cooperative nature of the joint operation: "definitely not a FONOP."<sup>32</sup>

### Section 3. Civil security issues in the Arctic

Strong regional differences exist around the Arctic Ocean. What is common is extreme weather, uncertainty associated with climate change, and problems with situational awareness, communications, specialized equipment, and availability of services.<sup>33</sup> There is consensus among the Arctic states on the importance of human safety and environmental protection, and recognition that cooperation on search and rescue (SAR), maritime environmental response, and similar civil security issues is of great importance.

In the North American Arctic, including Canada and Alaska (US), first responders are hampered by lack of infrastructure, adverse weather, and communication challenges. While the

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<sup>27</sup> The Maritime Executive, "Russia Tightens Control Over Northern Sea Route," March 8, 2019.

<https://www.maritime-executive.com/article/russia-tightens-control-over-northern-sea-route>.

<sup>28</sup> Andrey Todorov, "Where does the Northern Sea Route lead to?" Russian International Affairs Council,

<https://russiancouncil.ru/en/analytics-and-comments/analytics/where-does-the-northern-sea-route-lead-to/>.

<sup>29</sup> Janet Cawley, "US, Canada in Cold War Over Who Rules the Arctic Waters," Chicago Tribune, August 18, 1985.

<https://www.chicagotribune.com/news/ct-xpm-1985-08-18-8502230914-story.html>.

<sup>30</sup> Government of Canada, "Agreement Between the Government of Canada and the Government of the United States of America on Arctic Cooperation." 1989.

<sup>31</sup> Robert Woolsey, "USCG Maple's 'tense' voyage through icy NW Passage," KCAW, February 1, 2018.

<https://www.kcaw.org/2018/02/01/uscg-maples-tense-voyage-icy-nw-passage/>.

<sup>32</sup> Melody Schreiber,

"US Coast Guard announces plans to transit the Northwest Passage this summer," Arctic Today, March 13, 2021.

<https://nunatsiaq.com/stories/article/u-s-coast-guard-announces-plans-to-transit-the-northwest-passage-this-summer/>.

<sup>33</sup> Finnish Red Cross, "Red Cross Arctic Disaster Management Study," Finnish Border Guard, 2018.

Governments of Canada and the United States are building capacity for human and environmental security, the sheer size and remoteness of the region will remain a challenge. In particular, growing marine tourism and larger cruise ships pose a risk to human and environmental security in the region.<sup>34</sup>

Russia faces similar challenges in developing adequate civil security capacity across the NSR. While the western portion of the NSR has much more developed response capacity, particularly in the Kola area, the eastern portion of the NSR has gaps. The Government of Russia has stated its intention of building out response capacity along the NSR, including both a large new fleet of rescue vessels and onshore rescue coordination centers in Sabetta, Dikson, Tiksi, and Pevek. This is an important step, given the significant increases in industrial and resource-based activity in the region, which carry risk to human and environmental security. At the same time, Russia is building out its military capacity along the NSR, not only around the “bastion” of the Kola peninsula but eastwards as well. New military infrastructure and capabilities in the NSR include early warning sensors, air defense systems, and airfields, as well as new vessels and other platforms.<sup>35</sup>

Multiple actors are involved in the provision of human and environmental security in Russia’s Arctic, which can result in slow progress and uncertain responsibility.<sup>36</sup> Russia’s Coast Guard is a department of the FSB’s Border Guard Service. Its missions include: protecting living marine resources and enforcing fishing in transboundary and highly migratory species, coordinating enforcement and border control of maritime borders, inland waters, territorial seas, EEZ, and continental shelf areas, participating in combatting maritime crime, and participating in maritime search and rescue.<sup>37</sup> At the federal level where this analysis is focused, three ministries are involved in the missions of SAR and spill response: the Ministry of Defense (for emergencies relating to the armed forces), the Ministry of Emergencies (EMERCOM), and the Ministry of Transport.<sup>38</sup> The Ministry of Transport oversees Maritime Rescue Coordination Centers (MRCC) and Subcenters (MRCS), and EMERCOM oversees regional crisis management centers. In addition, the Northern Fleet maintains a Search and Rescue Administration, and the Northern Expeditionary Unit of rescue and salvage operations. Maritime SAR is the responsibility of the Maritime Rescue Service (Morspassluzhba) of the Federal Marine and River Transport Agency (Rosmorrechflot), within the Ministry of Transport. The Northern Expeditionary Unit is a federal

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<sup>34</sup> See, for example, “Changes in the Arctic: Background and Issues for Congress,” Congressional Research Service, R41153, February 1, 2021.

<sup>35</sup> Matheiu Boulegue, “Russia’s Military Posture in the Arctic,” Chatham House, June 28, 2019. <https://www.chathamhouse.org/2019/06/russias-military-posture-arctic/2-perimeter-control-around-bastion>.

<sup>36</sup> Atle Staalesen, “Government wrangles over Arctic search and rescue,” The Barents Observer, December 9, 2020. <https://thebarentsobserver.com/en/2020/12/government-hassles-over-arctic-search-and-rescue>.

<sup>37</sup> Arctic Coast Guard Forum, Russia page. <https://www.arcticcoastguardforum.com/member-country/russia>.

<sup>38</sup> Ingvill Moe Elgsaas. The Arctic in Russia’s Emergency Preparedness System. *Arctic Review on Law and Politics*, December 2018. DOI: [10.23865/arctic.v9.1131](https://doi.org/10.23865/arctic.v9.1131).

state institution with missions of ensuring safety and performing SAR for the fishing fleet in the north.<sup>39</sup>

In the Scandinavian Arctic, infrastructure is well-developed and sea ice presents less of a hazard. It is therefore the region with the greatest capacity for human and environmental security, although difficulties persist. Tourism is also growing in this region, posing a challenge for first responders.

The Arctic Council has a Working Group on Emergency Prevention, Preparedness and Response (EPPR), which works to address the risk of emergencies, accidents, and search and rescue incidents to both human and environmental security.<sup>40</sup> EPPR maintains the operational guidelines for two of the legally binding agreements in the Arctic, the Search and Rescue Agreement and the Marine Oil Pollution Preparedness and Response Agreement.<sup>41</sup>

In 2015, the Arctic Coast Guard Forum (ACGF) was established. It is an operationally-focused, consensus-based organization that builds coordination among the coast guards of the eight Arctic nations. The ACGF conducts regular live and tabletop exercises to develop coordination. In April 2021, the ACGF and the EPPR will hold a joint online emergency response exercise, hosted by Iceland, to improve Arctic nations' capability to respond to maritime incidents requiring joint search and rescue and marine environmental response operations.<sup>42</sup> The exercise, called Arctic Guardian 2021, will feature a scenario in which an oil tanker and an expeditionary cruise vessel collide off the north coast of Iceland.

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<sup>39</sup> Svetlana Kuznetsova, Alexander Suslov, Ivan Saveliev, Dmitry Kocheharov, Maxim Zadorin, "Russia's Preparedness Capacities, Challenges and Need for Cooperation," in *Maritime Emergency Preparedness Resources in the Arctic-Capacity Challenges and the Benefits of Cross-Border Cooperation between Norway, Russia, Iceland and Greenland*. MARPART Project Report 4, eds. Natalia Andreassen, Odd Jarl Borch, Johannes Schmied. 2018.

<sup>40</sup> Arctic Council, "Emergency Prevention, Preparedness and Response." <https://arctic-council.org/en/about/working-groups/eppr/>.

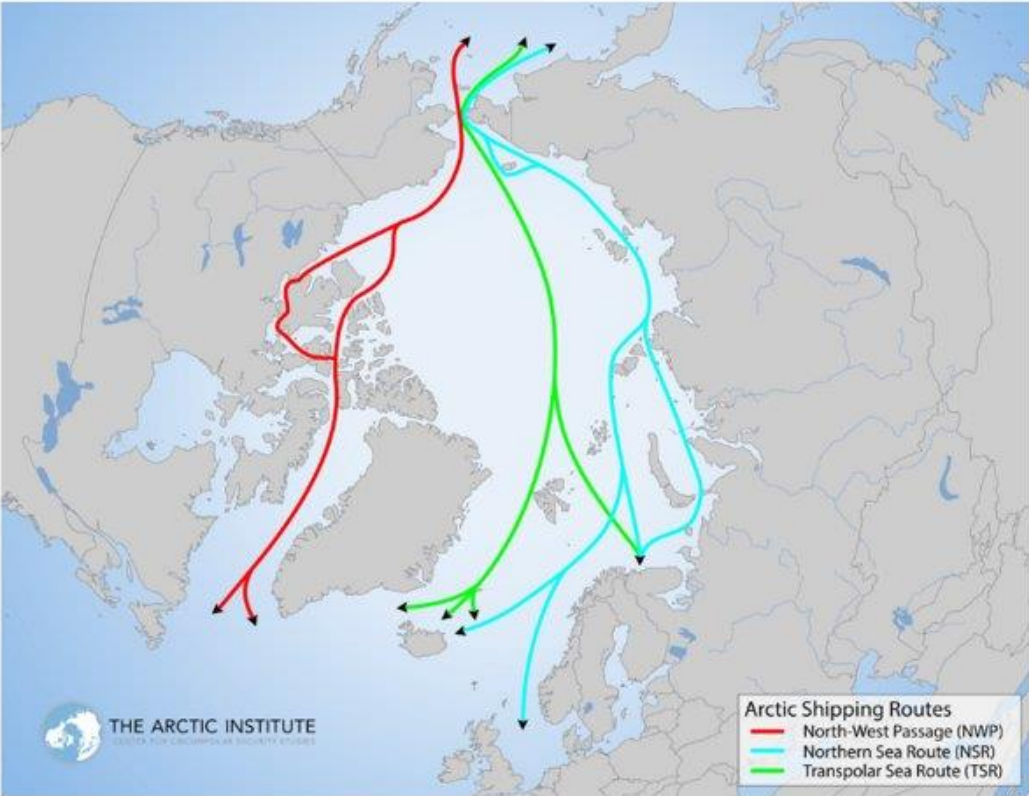
<sup>41</sup> Ibid.

<sup>42</sup> Arctic Council, "EPPR and Arctic Coast Guard Forum Hold Joint Exercise to Improve Arctic Maritime Emergency Response," <https://arctic-council.org/en/news/eppr-arctic-coast-guard-forum-joint-exercise-arctic-maritime-emergency-response/>.



# Charts of Arctic Shipping Routes

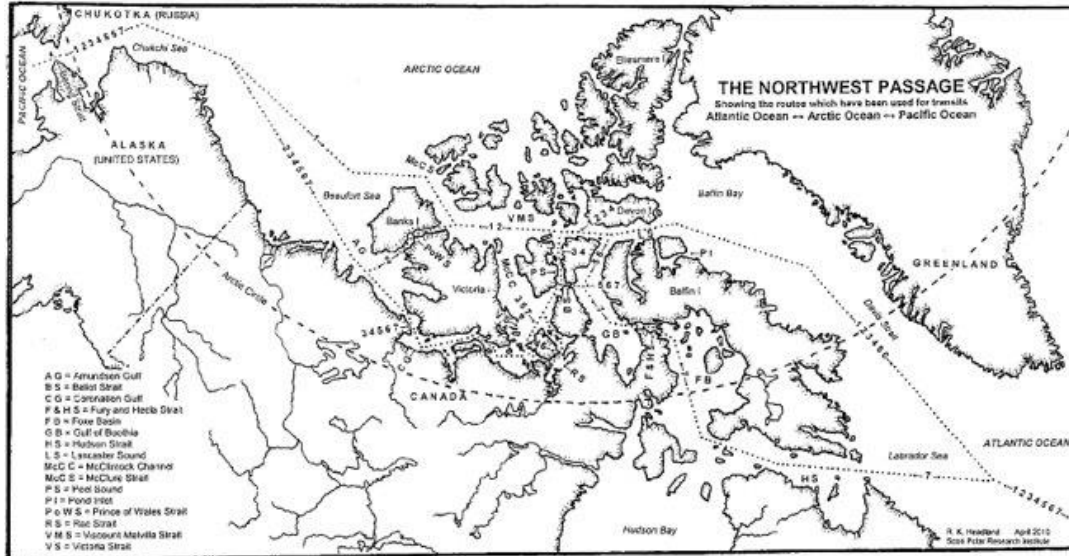
## 1. Three major shipping routes



## 2. Potential savings compared to current shipping lanes



### 3. The Northwest Passage



The seven routes which have been used for transits of the Northwest Passage are:

- 1: Davis Strait, Lancaster Sound, Barrow Strait, Viscount Melville Sound, McClure Strait, Beaufort Sea, Chukchi Sea, Bering Strait
- 2: Davis Strait, Lancaster Sound, Barrow Strait, Viscount Melville Sound, Prince of Wales Strait, Amundsen Gulf, Beaufort Sea, Chukchi Sea, Bering Strait
- 3: Davis Strait, Lancaster Sound, Barrow Strait, Peel Sound, Franklin Strait, Victoria Strait, Coronation Gulf, Amundsen Gulf, Beaufort Sea, Chukchi Sea, Bering Strait
- 4: Davis Strait, Lancaster Sound, Barrow Strait, Peel Sound, Rae Strait, Simpson Strait, Coronation Gulf, Amundsen Gulf, Beaufort Sea, Chukchi Sea, Bering Strait
- 5: Davis Strait, Lancaster Sound, Prince Regent Inlet, Bellot Strait, Franklin Strait, Victoria Strait, Coronation Gulf, Amundsen Gulf, Beaufort Sea, Chukchi Sea, Bering Strait
- 6: Davis Strait, Lancaster Sound, Prince Regent Inlet, Bellot Strait, Rae Strait, Simpson Strait, Coronation Gulf, Amundsen Gulf, Beaufort Sea, Chukchi Sea, Bering Strait
- 7: Hudson Strait, Foxe Basin, Fury and Hecla Strait, Bellot Strait, Franklin Strait, Victoria Strait, Coronation Gulf, Amundsen Gulf, Beaufort Sea, Chukchi Sea, Bering Strait

