The Ditchley Foundation

THE ARCTIC REGION AT A CROSSROADS

2017 Biennial Canadian Ditchley Conference

A Discussion Paper

by

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"This framework (the Law of the Sea) provides a solid foundation for responsible management by the five coastal States and other users of this Ocean through national implementation and application of relevant provisions. We therefore see no need to develop a new comprehensive international legal regime to govern the Arctic Ocean."

The Ilulissat Declaration, May 2008

The year 2017 will mark the 150th anniversary of the Canadian Confederation, a country with the second largest Arctic expanse and coastal line on the rim of the Arctic Ocean. Twenty years ago in Ottawa, the eight Arctic states – Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden and the United States – established the Arctic Council with the Declaration of Establishment of the Arctic Council.[1] The Arctic Council has since become the most comprehensive international organization in the Arctic region. Drawing on the experience gained from the adoption of the Ottawa Declaration, the 2017 Biennial Canadian Ditchley Conference will focus on the stewardship of the Arctic region in the future taking into account the main forces and factors affecting it, together with the consequences they trigger.

The Conference comes at an inflection point in the governance of the Arctic. Since its creation, countries holding the chairmanship of the Arctic Council have shaped the agenda for their two-year term. Held successively by Canada and the United States since 2013, the chairmanship of the Arctic Council will rotate to Finland in May 2017. With Europeans at the helm for the next twelve years at a time when the effects of climate change are imposing a myriad of new environmental, human and economic challenges and opportunities to the Arctic, they are bound to impart another perspective on the policy agenda. The objective conditions that exist in the European Arctic and Siberia differ on several dimensions from those characterizing the North American and Western Arctic. In addition, given the increased strategic importance of the region, the European Union ("EU") should be expected to exert a growing influence on the orientation of Arctic policies regardless of its status before the Arctic Council. On several issues such as fishery, shipping and many others, the EU is the competent authority, not the individual member countries, and the European Commission is the main actor for EU representation in international institutions.[2]

The Conference also comes at a time of growing international interest in the region. Climate change in the Arctic, at a pace nearly twice the rate of the rest of the planet and technological advances are making large areas of the Arctic Ocean and its hinterland more accessible, thus unlocking the Arctic's economic potential. This stimulates a large increase in interest by major economies and commercial interests that stand to gain from its opening. The campaigns undertaken by Asian countries, including China, Japan, South Korea, India and Singapore, and by the European Union to obtain observer status at the Arctic Council are cases in point. Once again, the Arctic becomes a region of geopolitical significance. The participation of non-Arctic countries in the formulation of policies and their involvement in the region affects the nature of Arctic politics. For instance, Canada, Russia and the United States being the gateways to the Asia-Pacific, they are better positioned to reap the benefits from a closer integration with East Asian economies brought about by new transportation infrastructure and capabilities. Combined, these profound changes in the physical, social, economic and geopolitical environment give rise to situations that could easily become problematic.

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[1] The Declaration was signed on 16 September 1996. For detailed account of the origins and making of the Arctic Council, see John English *Ice and Water: Politics, Peoples and the Arctic Council*, Penguin Canada Books, 2013.

[2] Conversely, although three EU member states are also members of the Arctic Council (Denmark, Finland, and Sweden), they only represent themselves, and not the EU. Nor is the EU represented by its six member states that are accredited observers to the Arctic Council (the United Kingdom, France, Germany, Poland, Italy, and the Netherlands).

Recognizing the increasingly acute repercussions of climate change and their consequences for Arctic ecosystems, communities and people as well as for the rest of the world, and the challenges posed by the Arctic's gradual integration in the world economy, participants will be asked to give particular consideration to the following three questions: What institutional mechanisms should be strengthened or established to ensure that the sovereignty and territorial rights of Arctic nations is exercised for the benefit of all and that cooperation, not conflict, prevails over the long term? How best to balance the active involvement of non-Arctic "user" countries in the governance of the region with the legitimate concerns, objectives, priorities and responsibilities of the Arctic countries regional and national governments that are the stewards of the region? And how should the objectives of Arctic residents who consider responsible development of the region vital to improve their economic and social livelihood be supported and reconciled with those of individuals and public and private organizations – mostly from outside the region who want to limit development out of concern that it may cause environmental degradation and accelerate climate change – to achieve a fair balance between various competing interests: native vs. non-native, global vs. national vs. regional and public vs. private?

THE GENERAL CONTEXT

The geographical limits of the Arctic are unclear. Several definitions are used, even within the Arctic Council. The most commonly used definitions are (i) the area north of the Arctic Circle (latitude 66º 33' North); (ii) the area north of the tree line; and, (iii) the area north of the 10ºC isotherm (the area in which the mean summer temperature does not exceed ten degrees Celsius). It is generally accepted that the Arctic region consists of the territory of the eight adjacent states north of the Arctic Circle and the Arctic Ocean. A roughly circular basin of about 14 million square kilometers, the Arctic Ocean's coastline extends for 46,000 kilometers, the same as the Mediterranean Sea. Nearly landlocked, the Arctic Ocean is connected to the Pacific Ocean by the Bering Strait and to the Atlantic Ocean through the Barents Sea and the Fram Strait. Beset by long periods of darkness, the Arctic region comprises some of the most rugged terrain and harsh climate on the planet. It is home to about four million people, half of whom are Russian.

The region is well endowed in hydrocarbons, minerals, fish and other natural resources. Climate change is opening up opportunities for the economic development of the region. The magnitude of potential resources exerts a definite attraction on Arctic and non-Arctic economies seeking resources to meet their financial or development needs[3] with concomitant increases in risks to the fragile Arctic ecosystems and the potential for disruptive impacts from a human as well as geopolitical perspective.

The Arctic Council is now the preeminent multilateral forum for addressing issues related to the Arctic region. It operates on the basis of consensus. Its objectives are defined as follows: (a) promote cooperation between the eight Arctic countries; (b) recognize the unique contribution of indigenous peoples to the Arctic; (c) advance Arctic interests; and (d) review, support and complement existing international Arctic initiatives. Its charter explicitly excludes military security. The Council includes as permanent participants six Arctic indigenous people's organizations – the Inuit Circumpolar Conference (ICC), the Saami Council, the Russian Association of Indigenous Peoples of the North (RAIPON), the Aleut International Association (AIA), the Arctic Athabaskan Council (AAC) and the Gwich'in Council International (CGI). The inclusion of northern indigenous peoples as permanent participants in the Arctic Council is an institutional innovation that has proved farsighted.

The work of the Council is carried out in six expert working groups and by ad hoc task forces established from time to time to address specific issues. The working groups are: (i) the Arctic Contaminants Action Program Working Group (ACAP), that provides information on remedial and preventive actions relating to contaminants; (ii) the Arctic Monitoring and Assessment Programme Working Group (AMAP), focused on monitoring, assessing and preventing pollution in the Arctic; (iii) the Conservation of Arctic Flora and Fauna Working Group (CAFF), focused on biodiversity conservation and sustainability; (iv) the Emergency Prevention, Preparedness, and Response Working Group (EPPR), focused on prevention, preparedness and response to environmental emergencies: (v) the Protection of the Arctic Marine Environment Working Group (PAME), focused on policy and pollution prevention

[3] The agreement between China National Offshore Oil Corporation and Iceland's Eykon Energy to explore off Iceland's Southeast coast, the financing of Greenland's Isua iron-ore project by Sichan Xinue Mining and the deal between Rosneft of Russia and China National Petrochemical Corporation to drill in the Pechora and Barents Seas are cases in point.

and control measures related to the protection of the Arctic marine environment, and (vi) the Sustainable Development Working Group (SDWG), focused on the living conditions of Arctic inhabitants. Since 2011, the Council has a permanent secretariat in Tromsø, Norway.

Geography is determinative of the status of the Arctic region. Unlike Antarctica, a continent surrounded by oceans, the Arctic is predominantly an ocean surrounded by continents. Five Arctic states girdle the Arctic Ocean enabling them to acquire extended continental shelf rights in this ocean in accordance with the United Nations Convention on the Law of the Sea (UNCLOS).[4] The Convention provides that all coastal states have extensive regulatory powers over shipping and have sovereign rights over marine and seabed resources over a territorial area extending twelve nautical miles from the shore. Between twelve and 200 nautical miles, in the Exclusive Economic Zone ("EEZ"), coastal states retain their sovereign rights over marine and seabed resources but have lesser powers over shipping. Beyond 200 nautical miles, coastal states lose their powers over fish but may have rights over seabed resources to an offshore distance of 350 nautical miles, sometimes even beyond the extended limits if they can demonstrate scientifically that the shelf is a natural prolongation of its land territory. Therefore, the vast majority of the Arctic region is actually within the exclusive sovereignty or sovereign rights of the Arctic states.

In this context, the suggestion of the European Parliament, of some China officials,[5] academics and NGOs that the governance of the Arctic should be subject to "an international treaty for the protection of the Arctic, having as its inspiration the Antarctic Treaty, as supplemented by the [Environmental] Protocol signed in 1991",[6] in the main, runs counter to well established international law. For sure, Article 136 of UNCLOS provides that no state can claim or exercise sovereignty or sovereign rights over any part of an "Area" beyond its national jurisdiction nor the resources located therein which fall under the general purview of the International Seabed Authority. The small portion of the Arctic lying north of the five Arctic EEZs is considered high seas and outside national jurisdictions; this "marine commons" represents about 20 percent of the Arctic marine area and is likely to remain inaccessible to human activities until mid-century. The stewardship of the Arctic Ocean is confronted with the fact that the fundamental changes that affect its ecosystems - loss of sea ice, ocean acidification, transboundary pollutants and other significant stressors – are driven by human activities and emissions from non-Arctic regions; their impact on the Arctic ecosystem is bound to persist – even accelerate – in the foreseeable future.

Another major factor that shapes the governance of the Arctic region is that nearly 90 percent of the Arctic land territory is within the boundaries of three countries with a constitutional federal system – Canada, Russia and the United States. The immediate interest of their infra-national government to improve the living conditions and secure the well-being of their people has led them to play an increasingly active role in the sustainable development of their economies and adopt a more assertive attitude on social-economic policy issues.

THE ARCTIC SPRING

The Arctic is the theatre of profound transformations evidenced by the shrinking extent and volume of sea ice, the melting of the snow cover on the ice sheets and the retreating of glaciers, the changes in ocean and air flow circulation, the thawing of permafrost, and changes of marine and land ecosystems. While global climate change is a trigger that set these transformations in motion they, in turn, give rise to numerous Arctic climate feedbacks amplifying climate warming and its effects in the Arctic and throughout the world. In effect, the Arctic region is changing from being a "taker" of the consequences of climate change to being a "maker" of climate change impacts.

– Amplifying feedbacks with worrisome consequences

The reduction in the coverage and thickness of the sea ice is the main factor driving the transformations observed in the Arctic physical landscape and its biosphere. The long-term decline in the areal extent of the Arctic sea ice has been documented by satellite mapping since 1979. On 24 March 2016, Arctic sea ice was at a record low maximum

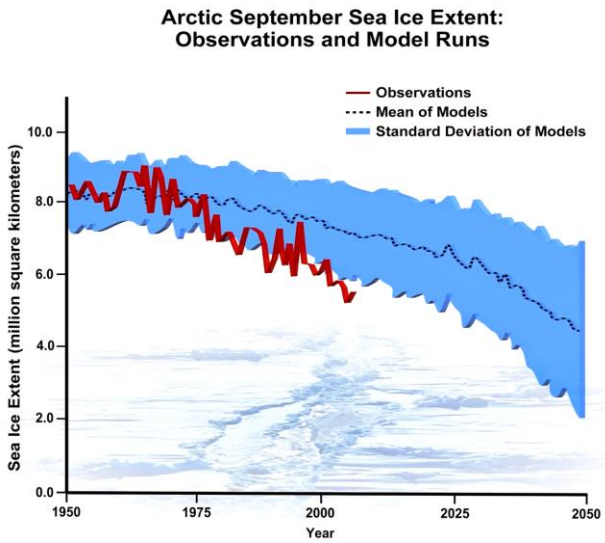
[4] The Arctic Coastal states are Canada, Denmark (Greenland), Norway, Russia and the United States.

[5] Rear Admiral Yin Zhuo in March 2010: *"The Arctic belongs to all the people around the world, as no nation has sovereignty over it. ... China must play an indispensable role in Arctic exploration as we have one-fifth of the world's population."* Technically, Yin was not speaking on behalf of the Chinese government. However, the fact that his remarks were carried by the official China News Service leaves little doubt that his views are shared by other senior officials.

[6] European Parliament, *Resolution of 9 October 2008 on Arctic Governance*, 2008.

extent for the second straight year.[7] Although natural weather variation from year to year have caused random fluctuations in the summer extent of sea ice over the years, such as shown in Figure 1, the trend is undeniable. Ice cover in September 2016 had the second lowest extent on record. The volume and mass of sea ice is disappearing at an even greater pace than the Arctic sea ice extent. The volume reduction is largely due to the fact that the average thickness of the ice covering the Arctic Ocean in the summer has shrinked by about half in recent decades and that much of the remaining ice is younger and thinner compared to the thick multi-year sea ice that dominated in the past.[8]

FIGURE 1 SEA ICE EXTENT



Source: NASA-supported National Snow and Ice Data Center (NSIDC), University of Colorado

As the sea ice retreats in the summer, it exposes an ever-expanding area of open water to solar radiation which is accentuated by the "midnight sun". Black objects get hotter in the sun than white objects. Thick ice covered with snow reflects most of the sun's energy back into the atmosphere, absorbing only 10 to 20 percent of the sunlight as heat. Sea ice covered with snow absorbs little solar energy thus, its surface remains cooler and less prone to melt. In contrast, the dark sea water reflects less (it has a low albedo); consequently, it absorbs over 90 percent of solar energy as heat, which causes the loss of sea ice to be self-compounding, leading to faster climate warming both locally and globally.

In addition to this ice-albedo feedback effect, sea ice retreat has other consequences. The receding spurs powerful storms and hurricanes, strong winds that form only over open water. No longer protected by sea ice, buffeted by bigger waves, shorelines become much more vulnerable to coastal erosion from the action of the ocean, creating damages, even forcing evacuations of coastal settlements. Open water instead of ice also means feeding, breeding and survival challenges for Arctic marine mammals, especially seals, walruses and polar bears and their concomitant impact on subsistence hunting and the social consequences it entails for indigenous peoples. It is also being observed that rising water temperatures and the amount of open water in the summer affect planktonic production and is leading to changes in species composition. There also exists evidence that the spatial distribution of Arctic marine fish and shellfish is influenced by changes in climate and sea ice cover and that the population of certain species, as is the case for Arctic killer whales, might benefit from the changes in the ecosystem, but at the expense of other species.

Warmer temperatures also cause oceans to warm and ice sheets and glaciers to melt. Both phenomena cause sea level to rise, the first because when water heats-up, it expands and the second by the addition of runoff meltwater in

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[7] U.S. National Snow and Ice Data Center (NSIDC), *The Arctic sets yet another record low maximum extent*, Press release, 29 March 2016.

[8] The volume is the size of the area covered multiplied by the thickness, the measure of how much ice there is left of it. Kwok and Rothrock have found that the mean thickness of Arctic ice has declined from 3.64 meters in 1980 to 1.89 meters in 2008. See Kwok R., and D.A. Rothrock, *Decline in Arctic sea ice thickness from submarine and ICES at records: 1958-2008*, Geophysical Research Letters 36: L15501, 2009.

the ocean. The consequences of rising sea levels across the globe are not difficult to fathom. There is increasing evidence that the process is accelerating in the Arctic, in part because the temperature is rising at a faster rate in the region than elsewhere and because of the albedo effect of the darkening surface on the ice sheets and glaciers. For instance, it is observed that the rate of glacier mass loss in the Canadian High Arctic has increased since 2000 and that these melting may contribute as much freshwater to the Arctic Basin as the Greenland ice sheet, with significant implications for ocean circulation and global climate.

On land, the reduction of snow-cover duration, mainly due to earlier spring melt, reduces the land surface albedo. Arctic land surface temperatures have warmed since the mid-20th century and the phenomenon is accelerating. This has spurred an increase in tundra greenness, in tall Arctic shrubs and grasses and the migration of invasive botanical and animal species. Since deciduous shrubs are taller and their darker surfaces overshadow the white snow, less of the sun's radiation is reflected back into the atmosphere, accelerating the warming of the soil. Shrubs also cause permafrost to break-up and become permeable to water running down because shrubs roots penetrate deeper into the soil than those of the grass and lichen they displace.

The substitution in vegetation has serious implications for Arctic communities: reindeers and caribou do not feed as much on shrubs, especially in the fall and winter. The impact of higher temperatures on the boreal (taïga) forest is no less severe. Trees killed by insect infestations previously unheard in the area, tinder-dry forests and more lighting, lead to more and larger wildfires. Forest fires destroy valuable timber and wildlife habitat, create massive smoke pollution and convert vegetation into large quantities of CO_2 released to the atmosphere. Additional CO_2 and methane is produced from soil organic material exposed to a greater rate of permafrost thawing and heat-accelerated microbial action.

A recent study by a team of scientists reveals that the amount of methane escaping from the Arctic region is much higher than estimated by current carbon cycle models.[9] This "positive feedback" mechanism is particularly worrisome because the estimated amount of carbon imprisoned in permafrost is huge and methane is a major driver of atmospheric warming. Moreover, as permafrost thaws, decomposition of its organic matter also releases mercury which can bioaccumulate in aquatic ecosystems and eventually in humans relying upon fish or shellfish for food.

– **Expectations of a promising future**

Hydrocarbons are likely to be the most valuable Arctic commodities. StatoilHydro of Norway believes that the Arctic hold as much as 25% of the world's undiscovered oil and gas deposits. This assessment is supported by the US Geological Survey, which estimates that the technically recoverable oil and gas reserves beneath the Arctic Ocean represent about 13% of unproven oil reserves and 30% of unproven gas reserves, respectively.[10] It is estimated that natural gas is more abundant on the Eurasian side of the Arctic while the North-American side is more oil-prone.[11] Mineral deposits also appear to be abundant. For example, the Arctic region can boast having the world's largest zinc mine (Red Dog, Alaska), the world's leading nickel and palladium producer and one of the largest copper producers (Norilsk Nickel, Siberia), and one of the largest iron-ore deposit (Baffin Island, Canada). In a very short time, Canada has moved from being a non-diamond producer to being the third largest producer in the world based on the strength of its mines in the Far North. Reduced ice also means greater access to fishery and for Arctic tours.

Often missing from the enumeration of the resources lying in the Arctic (and the Far North) is its huge potential for clean energy in the form of hydro, wind, geothermal and tidal electricity.[12] Five of the 10 largest hydroelectricity producing countries in the world are Arctic states. In Canada, the massive James Bay and Churchill Falls hydroelectric complexes, with a combined installed generating capacity of 21,955 MW, are cases in point. But, to a

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[9] IPCC 2013 assessment assumes that Far North wetlands are the major source of methane emissions. Contrary to prevailing assumptions, recent evidence shows that methane emissions are much larger from higher and dry tundra than wetlands and that a substantial amount of emissions occurs in the cold period following the summer season and not only in the summer season. NASA, *Methane emissions in Arctic cold seasons higher than expected, December 2015.*

[10] Gautier et al., "Assessment of Undiscovered Oil and Gas in the Arctic", Science, 329, May 2009.

[11] *Arctic Oil and Natural Gas Potential,* U.S. WIA website; http://www.eia.doe.gov/oiaf/analysispaper/arctic/footnote.html.

[12] The Canadian eastern Arctic, in particular, is characterized by very high tides.

considerable extent, the potential of these "clean" resources which are necessary to transform the energy system in the direction needed to achieve significant reductions in GHG emissions remains relatively untapped.[13]

….but not so fast!

Climate change facilitates the discovery of, and access to, resources throughout the Arctic but it does not guarantee their exploitation nor that such will occur at a rapid pace. The viability of extraction and harvesting of these resources is conditioned by a host of technological challenges, the high costs of operating in the harsh Arctic environment, especially for off-shore operations, the volatility of oil and gas and of other commodities prices, the lack of transport infrastructure, particularly in the North American Arctic, the long distance between the Far North and large population centers, the costs to deliver the mineral resources to market and reputational risks.

Despite the estimates of huge hydrocarbon deposits in various areas of the Arctic Ocean, its safe and viable extraction within a mid-term horizon is not a foregone conclusion. The obstacles to offshore operations in the inhospitable conditions that prevail, coupled with the strict regulations imposed by some Arctic littoral states, make them high cost endeavors. The grounding of the coast of Alaska in late 2012 of Shell's drilling rig, *Kulluk*, after it broke free of its tow ship in rough seas and drifted out of control amid very high winds, provides a vivid illustration of the riskiness of these offshore operations. Oil and gas prices now prevailing are well below what is required to justify the exploration investments in the many parts of the Arctic Ocean, nor can they be sure of findings accessible and exploitable reservoirs with sufficient resources. The recent decision by Shell to abandon its Chukchi Sea play in the Alaskan Arctic despite having already spent about $7 billion in drilling and exploratory shows the seriousness of the Arctic challenges.

In the longer term, consideration must be given to the impact of the shale oil and gas revolution and that of the pledges made by the international community to limit carbon emissions. The latter can only be achieved through a decarbonization of the global economy which inevitably translates into a reduction of the demand for oil, severely undermining the economic viability of high-cost projects. The commitments made by Arctic littoral states under the Paris Agreement on Climate Change, which entered into force on 4 November 2016, changes the calculus as these governments take into account the factors at play in the inevitable tension between the development of offshore oil and gas reserves and preservation of the fragile environment given the significant risks of an oil spill and the limited ability to clean it up in the harsh conditions that prevail in the region. The Obama Administration's decision of 20 December 2016 to prohibit oil and gas drilling in large portions of federally owned land in the Chukchi and Beaufort seas and the parallel decision by the Canadian government to impose a five-year moratorium on the issuance of new offshore oil and gas licensing in the Arctic waters are cases in point.

THE TRANSPORTATION CONUNDRUM

Significant economic development in the Arctic region depends on access to an efficient and cost competitive transportation infrastructure which, at present, is sparse, hindered by vast distances, thin markets, few back-haul opportunities and seasonal shutdowns. The challenges for land transportation are compounded by the fact that rising temperatures reduce the longevity of ice roads built to supply heavy and bulky goods by land during the winter months. Thawing of the permafrost puts existing infrastructure at risk and makes the construction of land infrastructures, including port facilities, very difficult from an engineering point-of-view and generally financially prohibitive. This militates in favor of shared multi-use corridors – including roads, pipelines, transmission lines, and fiber-optic networks – to link and transport people, goods and merchandise, extracted resources, power and information but, to date, meagre resources have been deployed to build such common infrastructure.[14] This deficit, unlikely to be compensated within a reasonable time horizon, leaves marine transportation as the backbone of the system for Far North communities and economic development. Seasonal sealift is not without problems. It means that if cargo misses the sailing date, a construction project or other development can be delayed for several months or forced to use expensive air transport. Moreover, even though ice has been disappearing in some waterways during summer months, ice will continue to present difficult engineering challenges for the construction and the

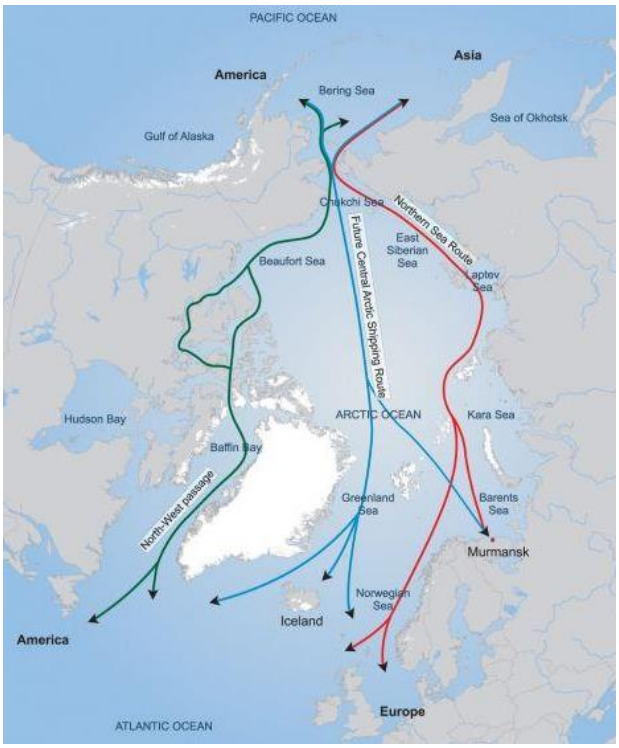
[13] For instance, the hydro power potential of the McKenzie River in the Canadian Northwest Territories is estimated at 11.2 Gw.

[14] A Northern Corridor right-of-way concept to link Canada east, west, north and south, was recently proposed. Andrei Sulzendo and G. Kent, Fellows, *Planning for infrastructure to realize Canada's potential: The corridor concept*, The School of Public Policy, University of Calgary, and CIRANO, SPP Research Papers, Volume 9, Issue 22, May 2016.

maintenance of infrastructures in the Arctic region, in general, and Northern Oceans, in particular.[15] Looking to the future, it may be that a new generation of transport airships will bring an eco-friendly logistical solution to several transportation needs, but this has yet to be demonstrated on an operational scale.

– **Circumpolar shipping**

At the international level much hope rests on the opening-up of transpolar maritime navigation. The attraction of circumpolar navigation stems from the fact that the sailing distances between major ports on the Atlantic and Pacific are considerably shortened. The substantial costs and time savings achieved by international airlines flying the polar route is looked at with envy.



The three Arctic maritime paths expected to connect the Pacific and Atlantic Oceans are (i) the Northwest Passage, a system of gulfs, straits, sounds and channels in the Canadian Arctic Archipelago, which connects the Beaufort Sea in the west with Baffin Bay in the east; (ii) the Northern Sea Route along the coast of Siberia, including the Northeast Passage in the Barents Sea, which connects the Atlantic Ocean to Murmansk, Russian's Arctic largest port; and (iii) the Transpolar Sea Route that crosses the Arctic through the North Pole.[16] Table 1 shows the reductions in distance that Arctic Ocean routes can achieve over the traditional Shanghai to Rotterdam and Shanghai to New York routes.

TABLE 1: SHANGHAI – ROTTERDAM AND – NEW YORK DISTANCES FOR DIFFERENT ROUTES

	Route	Distance	Difference	
		nm	nm	%
Shanghai to Rotterdam	*Suez Canal*	*10,525*		
	Polar Passage	7,300	-3,225	-31%
	Northern Sea Route	8,200	-2,325	-22%
	North West Passage	8,900	-1,625	-15%
	Cape of Good Hope	14,500	3,975	38%
Shanghai to New York	*Panama Canal*	*10,582*		
	Polar Passage	9,800	-782	-7%
	North West Passage	9,450	-1,132	-11%
	Suez Canal	12,370	1,788	17%
	Cape of Good Hope	14,468	3,886	37%
	Cape Horn	16,746	6,164	58%

Source: Macklin, L., Meisen, A., *The Global North 2050*, Alberta Innovates Technology Futures, November 2011, p. 47.

Similarly, the distance between Rotterdam and Yokohama would be reduced by more than 40% from 11,200 nautical miles via the current route through the Suez Canal to only 6,500 nautical miles. Circumpolar shipping holds the promise of great fuel economy, avoidance of Panama and Suez canals transit costs, shortened navigation time and, in time, better economics from the use of larger vessels than those permitted by the dimension of the Canals. Geopolitical and security considerations also enter in the calculation. Transpolar navigation would provide commercial vessels an alternative to politically unstable areas such as the Suez Canal which cuts directly through the

[15] For an overview of the challenges see Croasdale, K., Robert Frederking, Ian Jordaan and Peter Noble, *Engineering in Canada's Northern Oceans, Research and Strategies for Development*, Canadian Academy of Engineering, August 2015.

[16] A fourth potential route, the Arctic Bridge, would link Churchill (Canada) to Murmansk (Russia). The route would cross the northern Atlantic Ocean around southern Greenland.

heart of a volatile region counting a number of "failed" states, the pirate-infested South China Sea and Bay of Bengal and other shipping chokepoints such as Bab-el-Mandeb, the Strait of Hormuz and the Strait of Malacca. COSCO's announcement in October 2015 that its subsidiary COSCO Container Lines will operate regular services with its ice-strengthened container vessel M.V. Yong Sheng between China and European ports through the «cost-friendly» Northeast Passage reflects these three levels of consideration. Longer term, Arctic Routes represent a new passage between European and Asian markets at a time when the Panama and Suez Canals may be approaching their transit capacity.

– **…..and the harsh realities**

Despite all the hype about the advantages of circumpolar shipping, use of these waterways must cope with major constraints which are unlikely to be removed within the next two decades. In a recent study of its impact on projected geophysical changes in sea ice and Arctic ship navigation, Smith and Stephenson conclude that "changing sea ice conditions will enable expanded September navigability for common open-water ships crossing the Arctic along the Northern Sea Route, robust new routes for moderately ice-strengthened (Polar Class 6) ships over the North Pole, and new routes through the Northwest Passage for both vessel classes" but not before midcentury (2040-2059).[17]


Photo courtesy of FEDNAV

The Transpolar route holds the promise to become the most economical and constraint-free route. However, it is likely to remain mostly unused until mid-century because the journey will require advanced icebreaking capabilities to cut through the remaining layer of permanent ice that will survive summer seasons and the lack of support services, insufficient communication, navigation aid and Search and Rescue (SAR) infrastructure.

In October 2013, the Danish bulk carrier *Nordic Orion* completed the first ever commercial transit of the Northwest Passage.[18] The *Nordic Orion* sailed under icebreakers escort from Vancouver, en route to Finland. The following year, Fednav's *Nunavik*, a Polar Class 4 cargo ship carrying nickel ore, completed the route without icebreaker escort. Clearly, these are exceptional occurrences. Current shipping activity in the Northwest Passage consists of icebreakers, supply ships and cruise liners moving in and out of the Canadian Arctic Archipelago and this will remain unchanged for the foreseeable future. Measurements taken in April 2015 of ice thickness in the possible routes through the Passage show that the average thickness was between two and three meters with a "large number of thick ice features with thicknesses of more than 4 meters over distances of more than 100 meters that have the largest probability to survive

The MV Nunavik. Photo courtesy of FEDNAV

[17] Smith, Laurence C., Scott R. Stephenson, *New Trans-Arctic shipping routes navigable by mid-century*, Proceedings of the National Academies of Science, volume 110, no. 13 (2013).

[18] The first commercial ship to cross the Northwest Passage was the U.S. flag vessel *S.S. Manhattan* in 1969. Loaded in Prudhoe Bay with a single barrel of crude oil, the voyage was intended to establish whether transportation by icebreaker supertankers would be a superior option to the building of the Trans-Alaska Pipeline System to Valdez.

through the summers." Moreover, conditions in the Northwest Passage are known to be highly variable, clear channels suddenly becoming clogged by sea ice drifting under the combined actions of winds and currents.

The hazardous conditions prevailing in the Passage are partly due to its geographic location. Coastal and surface ocean currents are driven by winds. Through the influence of an average high pressure system that generates wind over the Beaufort Sea and the Coriolis effect, the Beaufort Gyre drives ice in a clockwise circulation pattern. Therefore, sea ice that forms or becomes trapped in the Beaufort Sea is thicker and, as result of ice floes bumping into each other or with ice carried by the Transpolar Drift Stream, it compresses and deforms into ridges, resulting in the thickest ice in the Arctic. In contrast to the Beaufort Gyre, the Transpolar Drift Stream, the other primary component of the Arctic ice flow circulation, moves the ice from the Siberian coast across the Arctic basin to its exit into the North Atlantic through the Fram Strait.

This explains why the morphology of the sea ice in the Canadian High Arctic is significantly different from the sea ice in the Baltic. For all of the above reasons, "it is unlikely that the Northwest Passage will emerge as a viable trans-shipping route in the foreseeable future"[19] despite the fact that this route would reduce by about 25% the sailing time between the Pacific Northwest Seaboard and European ports.

The Northern Sea Route ("NSR") is likely to become the first transpolar route because of the prevailing ocean currents and its "open water" characteristics. The NSR is characterized by the presence of thin first-year drifting ice and has been ice-free for several weeks during recent summers. In the summer months, the sea ice recedes faster than in the Northwest Passage because of low successive records of ice age, thickness and extension. Moreover, the Barents Sea segment of the route remains ice-free due to the Gulf Stream feeding into the North Atlantic. In 2010, four vessels sailed through the NSR; this number increased to 46 in 2012 and 71 in 2013. The number of crossings decreased to 53 in 2014 and 18 in 2015 mainly because of lower fuel prices, the global collapse in commodity prices and the economic sanctions imposed on Russia following the annexation of the Crimea and its involvement in Eastern Ukraine. Mid-term, other factors may limit the attractiveness of the NSR. Ships that are too large to pass through the Panama and the Suez Canal, such as most Very Large Crude Carriers (VLCC), Ultra Large Crude Carriers (ULCC) and Capesize container ships, are also too large to travel the NSR due to a number of narrow and shallow straits in the Kara and Laptev seas, eliminating the NSR as a sea route contender for a growing portion of the trans-oceanic merchant fleet.

The prospects for circumpolar shipping are also severely hindered by economic considerations centered on the triad of liability, viability and reliability. Transit time can easily negate the advantage of shorter distance. The more ice along the Arctic navigation route, the slower the ship's speed. Highly variable ice conditions, unpredictable ice flows and weather conditions and thick fog, prevent a vessel from maintaining high speed and course, wreaking havoc on the planning calendar, predictability and punctuality that are essential to global maritime operations. As the sea ice retreats, ships plying Arctic waters will increasingly be confronted with extreme weather events and hurricane-strength winds associated with marine cold air outbreaks, such as polar lows that form over open waters.[20] Additionally, critical factors such as the lack of services and infrastructure, high insurance and icebreaker escort fees, limited availability of navigation charts and hydrographic surveys, unreliability of magnetic compasses and reduced coverage of navigation aids such as GPA and GALILEO, and other socioeconomic considerations, remain significant impediments to maritime activity in the region.

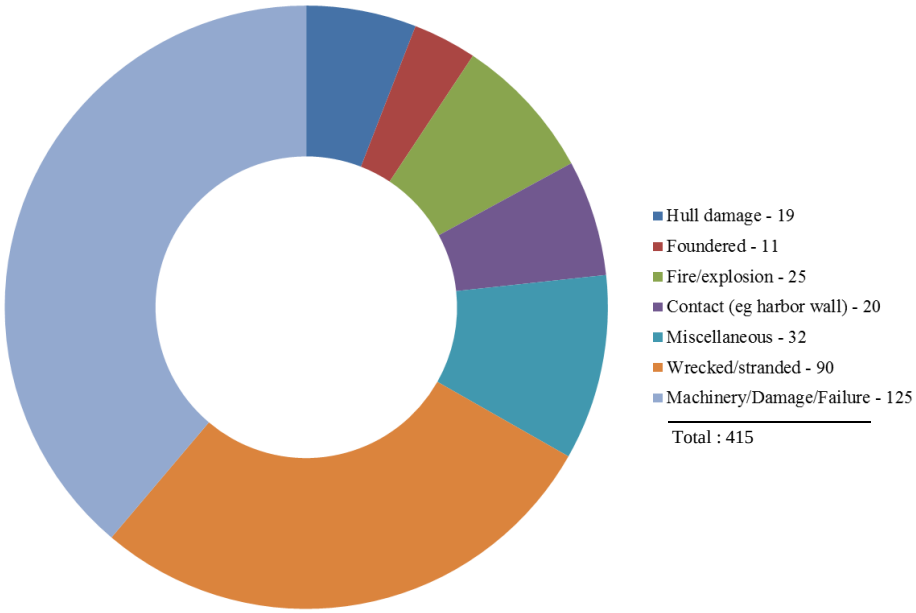
The concerns expressed by marine insurers (hull protection and indemnity) reflect the magnitude of the safety and navigational risks of sailing in extreme climate and weather conditions. During the 2006-2015 period, there have been 415 casualties involving ships of 100 gross tons or more in Arctic waters, including 19 total losses (Figure 2). About 41 percent of these incidents result from machinery damages and failures caused by the polar temperature and harsh conditions prevailing in those waters. 2015 saw the largest number of ship casualties, with an increase of 30 percent over 2014. The risks in Arctic Circle waters are compounded by the unique hazards that plague Arctic navigation – floating ice, thick fog and violent storms – which proliferate in the Arctic waterways, and the

[19] Whitney Lackenbauer, Adam Lajeunesse, *On Uncertain Ice : The Future of Arctic Shipping and the Northwest Passage*, Canadian Defence & Foreign Affairs Institute and The School of Public Policy, University of Calgary, December 2014.

[20] E.W. Kolstad, *Extreme small-scale wind episodes over the Barents Sea: When, where and why?*, Climate Dynamics, Vol. 45, 2015.

difficulties and costs to mitigate or repair the damages resulting from an incident or an accident.[21] Oil spills are difficult to locate and handle since oil is less responsive to chemical dispersants in cold temperatures and is likely to get trapped under or within ice. Similarly, salvage operations and wreck removal[22] hindered by the lack of equipment and SAR capabilities present challenges of inordinate proportions.

FIGURE 2: SHIP CASUALTIES INCLUDING TOTAL LOSSES IN ARCTIC CIRCLE WATERS, 2006 – 2015
(ships of 100 gross tons or more)



Source : Allianz Global Corporate & Specialty, Safety and Shipping Review, 2016

For the foreseeable future, marine transport in the Arctic will mostly consist of point-to-point (cabotage) trips and seasonal destination shipping for community re-supply, fishing, marine tourism, scientific exploration and moving energy and mineral production to markets.

Increasing demand for Arctic cruises and growing fishing and bulk mineral fleets will place heavy demands on search and rescue capabilities. Since 2006, almost 30 percent of ship incidents in Arctic waters involved fishing vessels. For the short term, a tourist vessel in distress is the biggest nightmare scenario for coast guards and other SAR units. It is also a major concern for leaders of the Arctic shipping industry who know that treacherous conditions can suddenly occur despite having ships specially designed for Arctic operations manned by experienced crew members at all ranks because of the reverberations of a catastrophe in Arctic waters.[23]

SOVEREIGNTY, GOVERNANCE AND SECURITY

The Arctic is administered according to the domestic laws and regulations of each Arctic state but also subject to bilateral, regional, and international agreements. The Arctic Council is the principal international forum for regional

[21] Marsh Risk Management Research, *Arctic Shipping: Navigating The Risks and Opportunities*, August 2014.

[22] Since 2015, the Nairobi Convention imposes on vessel operators the obligation to remove wrecks.

[23] In 2010, the MV Clipper Adventurer grounded itself on a shoal near Kugluktuk, Nunavut, during a 14-day Arctic cruise. It took the nearest Coast Guard icebreaker nearly two days to travel the 500 km necessary to reach the stricken ship and evacuate its 128 passengers. Notwithstanding all the precautionary measures taken by Crystal Cruises, it remains that the luxury liner Crystal Serenity carried on-board over 1,000 passengers and about 630 crew members when it set sails for its 32-day Northwest Passage journey which it completed successfully when it arrived on 16 September 2016 in New York City. The Company is planning to repeat the same Arctic cruise in 2017..

collaboration and the U.N. Convention on the Law of the Sea (UNCLOS) is considered the bedrock of Arctic governance.[24] In 2008, the five Arctic Ocean coastal countries reaffirmed their commitment to UNCLOS in the Arctic with the Ilulissat Declaration.

The rights granted to coastal states with respect to their territorial sea and EEZ are bound to lead to border disagreements between neighboring states. Worldwide, most of the marine boundary cases have been resolved through negotiation. The Arctic is no exception: the boundary between Canada and Greenland was agreed with Denmark in 1973; in 1990, the United States and the Soviet Union agreed on the delimitation of the boundary in the Bering Sea, Bering Strait, and Chukchi Sea[25] and Denmark and Norway agreed on the boundary between Greenland and the archipelago of Svalbard in 2006. The most impressive agreement was the 2010 treaty concluded between Norway and Russia. The two countries agreed to equally divide an area of the Barents Sea and its seabed of around 175,000 square kilometers rich in fish and oil and gas reserves, to maintain the existing fisheries management system and create a joint management regime for straddling oil and gas deposits.[26] The agreement between Norway and Iceland regarding the joint management and development of the Dreki field is another case in point.

The determination of the boundaries of a country's continental shelf is subject to a more exacting process. Under the terms of the UNCLOS, a state must scientifically establish the limits of its continental shelf within 10 years of ratifying the convention, if it wants to claim its continental shelf beyond the 200-nautical-mile minimum guaranteed by Article 76 of UNCLOS. Once it has done so, it must submit the specifics of its claim to an international panel – the United Nations Commission on the Limits of the Continental Shelf (UNCLCS) – for scientific review. When this process is completed, and if there are no counterclaims from neighboring states, the commission is expected to endorse a given country's claim and recommend that the outer limits of that country's extended continental shelf be determined according to the claim submitted. Norway ratified the convention in 1996, Russia ratified it in 1997, Canada did so in 2003 and Denmark in 2004. The United States is the only Arctic littoral state not to have ratified or acceded to the convention, which is a concern.[27]

Arctic coastal countries have mapped their part of the extended continental shelf and submitted their claim by the required date (a first submission by Russia was returned with a request for improvement). Norway made its submission to UNCLCS regarding the limits of the continental shelf in the Barents Seas and the Arctic Ocean in 2006. UNCLCS has issued its recommendations that effectively endorse the boundaries proposed by Norway for those areas.

To date, this process appears to be proceeding orderly. Notwithstanding the fact that it has not ratified UNCLOS, the United States has nevertheless undertaken the mapping of its continental shelf. Several countries have undertaken cooperative data collection efforts. However, there remain unsolved issues that are bound to become more pressing as economic activities expand. For example, all Arctic coastal states are involved in bilateral boundary issues. The main areas in contention include the Canada-USA dispute over their maritime boundary in the Beaufort Sea; the Norway-Russia dispute over the continental shelf around the Svalbard archipelago and disagreement on several aspects of the Svalbard Treaty; and the Canada-Denmark disagreements over the Nunavut and Greenland boundary in the Lincoln Sea and with respect to Hans Island. Absent the consent of the parties, UNCLS is precluded from considering a submission in an area embroiled in a land or maritime dispute. If the countries in disagreement cannot negotiate a settlement, they have the option of submitting the dispute for settlement before the International Court of Justice, the International Tribunal for the Law of the Sea (ITLOS), the Permanent Court of Arbitration, or an ad-hoc tribunal appointed to deal with the issue.[28]

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[24] UNCLOS imposes regional cooperation obligations in the following domains: (i) merchant shipping; (ii) marine environmental protection; (iii) conservation and management of marine living resources; (iv) enclosed or semi-enclosed seas; (v) marine scientific research; (vi) search and rescue. The Arctic Council has proven to be an effective mechanism to assume these responsibilities in several areas, notably in scientific research, monitoring and assessment.

[25] Known as the Baker-Shevardnadze line, the Agreement was approved for ratification by the U.S. Senate in 1991 but as yet to be approved by the Duma. The U.S. has been enforcing the boundary line since signature of the deal.

[26] On receiving the news of this major agreement, Canadian Foreign Minister Lawrence Cannon suggested that a settlement of Canada's disputes with the United States over the Beaufort Sea was long overdue and should receive priority. Also outstanding is the maritime boundary dispute between Canada and Denmark in Baffin Bay.

[27] Since 1994, all U.S. Administrations have sought Senate advice and consent to accede to the Convention on the grounds that it would strongly serve U.S. military, economic and commercial, and environmental interests. After careful review of the concerns expressed against the Convention, the Bush Administration sought authorization to accede to the Convention stating that U.S. objectives "could not be achieved through other means, for example, through reliance on customary international law alone." John B. Bellinger III, Testimony before the Senate Foreign Relations Committee, 2012.

[28] Michael Byers, *International Law and the Arctic*, Cambridge University Press, 2013, p. 122.

With respect to freedom of navigation rights, the European Union, the United States and others maintain that the Northwest Passage is an international strait with free navigation rights, while Canada asserts that it is an inland waterway over which it maintains exclusive jurisdiction. A case can be made that the first priority for Canada is not to obtain confirmation of its legal claim but to put in place the infrastructure and the regulatory regime that would ensure safe destination and transit shipping in the Northwest Passage.[29] In this regard, Canada was well within its rights under UNCLOS to extend the application of the Arctic Waters Pollution Prevention Act to 200 nautical miles in 2009 and, since July 2010, to require vessels entering and operating within Canadian Arctic waters to report.[30]

– **The Arctic Council**

The Arctic Council has no treaty basis; it is neither a legal entity nor an international organization. Non-Arctic states cannot join. This arrangement has long been considered by external parties and observers as a structural defect that confines the role of the Council to policy-shaping when the gradual integration of the Arctic region, principally of the Arctic Ocean, into the global economy would benefit from a policy-making institution. Calls to establish the Council as an internationally treaty-based organization has, heretofore, been rejected by the member states.

Despite these alleged failings, the Council is a success story. The Arctic is a region of peaceful cooperation. The growing stature of the Arctic Council is confirmed by the number and importance of non-Arctic countries seeking *observer state* status before the Council. As of 2016, twelve non-Arctic countries have been admitted.[31] A multilateral audit of the Arctic Council concludes that it has "contributed to enhance cooperation, governance and scientific knowledge".[32] An assessment of the Council by Greenpeace observes that "the number of completed Arctic Council projects, initiatives and assessments is not only impressive, it is overwhelming."[33] Through its working groups and important contributions from the indigenous permanent participants, it has issued technical assessments of the highest quality on a wide range of subjects, as exemplified by the Arctic Climate Impact Assessment.[34] Strengthened by its inclusiveness in representation and policy positions grounded on solid scientific evidence, the Arctic Council has reached a status where it is recognized as the preeminent and most encompassing forum to address issues related to the Arctic[35] with the gravitas to act as the geopolitical agent for the region. The Arctic Migratory Birds Initiative developed by the Arctic Council with Arctic and non-Arctic countries to protect migratory birds along key flight paths exemplifies its growing influence, this time with regard to the important matter of long-term biodiversity conservation.

The effectiveness of the Arctic Council relies on an approach that builds on productive interplays with existing international institutions. In some areas, the Council can prompt member states to ratify international treaties by documenting issues of serious consequences for the Arctic through its scientific assessments. Protecting Arctic waters from invasive species released with ballast water discharges is a case in point. The IMO International Convention for the Control and Management of Ships Ballast Water and Sediments gives coastal countries the power to adopt and enforce international discharge standards. These regulations are already in force in the North Sea, the Baltic Sea and in U.S. waters.

In several other areas, the Arctic Council has the ability to bring about a regulatory regime adapted to the special circumstances that exist in the Arctic by either prompting international organizations that have jurisdiction over a certain domain to adopt an appropriate regulatory regime or by making good use of the powers and flexibility accorded to signatories of relevant international treaties. The influence of the Council (and member states) in these forums is exemplified by the new International Code of Safety for Ships Operating in Polar Waters (the Polar Code)

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[29] Whitney Lackenbauer, Adam Lajeunesse, op. cit.

[30] UNCLOS, op.cit, Article 234, provides that: …"non-discriminatory laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered areas within the limits of the exclusive economic zone, where particularly severe climatic conditions and the presence of the ice covering such areas for most of the year create obstructions or exceptional hazards to navigation, and pollution of the marine environment could cause major harm to or irreversible disturbance of the ecological balance."

[31] The twelve non-Arctic countries admitted as observers to the Arctic Council are France, Germany, The Netherlands, Poland, Spain, United Kingdom, People's Republic of China, Italian Republic, Japan, Republic of Korea, Republic of Singapore and the Republic of India. The European Union has also applied but failed to obtain a consensus agreement at the 2015 Kiruna Ministerial meeting.

[32] The multilateral audit of the Arctic Council of the Supreme Audit Institutions of Denmark, Norway, Russia, Sweden and the US. Discussion paper for SAO-meeting, Washington, June 2015.

[33] Terry Fenge and Bernard Funston, *The Practice and Promise of the Arctic Council*, Greenpeace, April 2015.

[34] *Impacts of a Warming Arctic : Arctic Climate Impact Assessment*, Cambridge: Cambridge University Press, 2004, available at http://www.acia.uaf.edu/.

[35] Other organizations with regional Arctic interests include the Barents Euro-Arctic Council, the Inuit Circumpolar Council, NATO and the Nordic Council.

adopted in May 2015 by the International Maritime Organization (IMO). The new Code introduces a risk based approach to assess the safety and environmental performance of marine transport by taking into account the capabilities of the ship with respect to the hazards relevant for the type of operation, the ship's location and the season of operation. The Polar Code entered into force and became mandatory on 1 January 2017 through amendments to the Safety Of Life At Sea (SOLAS) and the International Convention for the Prevention of Pollution from Ships (MARPOL) Conventions. Another example is the decisive role played by the Council in the negotiations of the 2001 Stockholm Convention on Persistent Organic Pollutants.

The Council has found an elegant way to overcome its structural "infirmity" as evidenced by the treaty on Arctic Search and Rescue, the first legally binding treaty negotiated under the auspices of the Arctic Council. Member states established a task force that worked independently from the Arctic Council. Since non-Arctic countries can join task forces, they could participate as full members without affecting the architecture of the Arctic Council. Once the member states had endorsed the agreement,[36] the treaty was signed by the member states rather than adopted by the Council. In 2013, it was followed by another treaty, the Agreement of Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic, to prepare and coordinate a response to potential spills from oil and gas exploration. The Agreement draws on the authority vested in coastal countries by the 1982 UN Convention on the Law of the Sea, the 1969 International Convention Relation to Intervention on the High Seas in Case of Oil Pollution Casualties and the 1990 International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC). In particular, the OPRC promotes the development of multilateral agreements for oil pollution preparedness and response on a regional basis which is precisely the object of the Arctic Council agreement.[37]

Building on its ongoing scientific work in the area, the Council adopted in April 2015 a framework to reduce "black carbon" (soot) and short-lived climate forcers like methane, which have a greater warming impact than carbon dioxide emissions in the near term as well as specific impacts in terms of public health of Arctic population. Although the framework is not yet binding, member states are committed to sign a treaty, fulfill reporting requirements to determine the sources of emissions affecting the Arctic, and to report on what they are doing to reduce those emissions.

FACING UP TO AN UNCERTAIN FUTURE

Disproportionately affected by the impact of climate change, the Arctic is the theatre of profound transformations that should lead to increased human activities on land and water. The rapid changes in the Arctic carry with them both risks and potentially large benefits.

To date, the Arctic Council has generally adopted an ecosystem-based approach informed by high quality scientific research, technical assessments and traditional knowledge in the formulation of Arctic policies. The international standing of the Council and its influence in shaping domestic and international regulations have been strengthened by the quality and breath of its assessments. The pervasive impact of climate change requires ongoing scientific efforts and observation systems informed by traditional knowledge to measure and understand the phenomena and provide data on key variables of Arctic meteorology, climatology, oceanography, ecosystems, flora and fauna, and pollution at various scales to support preventive and corrective actions. These efforts often need significant intellectual, financial and highly qualified personnel resources beyond those the Arctic states are willing to commit to the task.[38] Many Asian and European countries, including at the European Community level, have undertaken polar research programs. In keeping with their observer status, both China and Japan have committed to strengthen their research capabilities on climate change and its impact on the Arctic region and to enter into collaborative agreements with research centers in Arctic states. Augmenting the scope and extent of such contributions to the scientific Arctic research efforts would seem to be in everyone's best interest.[39]

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[36] Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic, 12 May 2011, available at: http://www.arctic-council.org/index.php/en/about/documents/category/20-main-documents-from-nuuk.

[37] Key elements of the Agreement include commitments to: provide mutual assistance in the event that an oil spill exceeds one nation's capacity to respond; undertake appropriate monitoring activities to identify oil spills in areas within a member state national jurisdiction; promote cooperation and coordination amongst the member states by endeavouring to carry out joint exercises and training; promote the exchange of information that could improve the effectiveness of response operations; and, conduct a joint review of activities undertaken during a coordinated response operation.

[38] The Globe and Mail, *Plan to monitor Baffin Bay proposed: Extensive observation of marine environment would involve Canada, Denmark and other nations*, 13 February 2016.

[39] The Globe and Mail, *Chinese scientists look to Canadian Arctic for research outpost*, 19 March 2015.

– **Indigenous peoples**

Seven of the eight Arctic states have indigenous populations.[40] They comprise diverse cultures and speak dozens of different languages. Spread over vast territories, they coalesce in sparsely populated remote communities, isolated from each other and the urban conurbations by the lack of roads, efficient means of communication and the sheer distance. Airports are far and few between.

Beyond the changes in the physical landscape, a profound transformation has been happening at the political level with the constitution of regional self-governing institutions. This development demonstrates recognition in national capitals that the time was long overdue for Arctic residents to govern their own affairs and participate in the economic transformation of their region. This paradigm shift in the appreciation of the role and status of the Arctic indigenous peoples was translated into various forms.

At the international level, the first concrete manifestation was the establishment, in the Ottawa Declaration, of the category of Permanent Participation "to provide for active participation and full consultation with the Arctic indigenous representatives within the Arctic Council".[41] In April 2009, the Inuit Circumpolar Council issued the Circumpolar Inuit Declaration on Sovereignty in the Arctic[42] which clearly establishes the position of Inuit as full partners in the development and conduct of policies concerning the Arctic. This was followed in 2011 by the "Circumpolar Inuit Declaration on Resource Development Principles in Inuit Nunaat"[43] which spells out the terms and conditions to govern future Arctic development projects.

At the national level, the popularly elected Saami Parliament in Norway, Sweden and Finland enjoy a substantial degree of self-government autonomy, including the management of funds for Saami education and language programs. In the United States, the U.S. Congress adopted in 1971 the Alaska Native Claims Settlement Act, which gave the indigenous peoples of the state significant financial resources and surface and mineral rights as well as a certain degree of self-government authority. In Canada, self-government structures have been emerging in tandem with the settlement of comprehensive Aboriginal land claims treaties covering territories from the Inuvialuit in Yukon and Northwest Territories, the Inuit lands in Nunavik, Northern Quebec, to Nunatsiavut in Labrador. In the High Arctic, Nunavut - which includes all the islands of Hudson Bay - was created as a Territory, joining Yukon and the Northwest Territories, under Canada's federal constitutional structure. The culmination of this process was the November 2008 referendum in Greenland which put the Danish province on the way towards a formal sovereign Arctic state with a strong majority of Inuit population. In Russia, the march towards self-government is hesitant, hindered by the fact that indigenous groups (such as the Siberia Yupik) constitute a minority of the Arctic population.

The modernization of Arctic's political economy brings promises that empowerment of the indigenous people of the region will stimulate the creation of new solutions to alleviate the endemic socio-economic problems afflicting a large proportion of Arctic communities. It also feeds concerns that the sentiments that led to the devolution process will arrest development. It is undeniable that U.N. Declarations and the evolution of international law towards greater recognition of the rights of indigenous peoples, coupled with the establishment of self-government institutions in Arctic countries, are effectively giving indigenous communities increased influence over development projects, leading in some cases to advanced co-management arrangements (i.e. with Parks Canada for selected sites). Also, in Canada, legally binding "Impacts and Benefits Agreements" have become a requirement in some jurisdictions to spell out, on a case by case basis, the compensation and other advantages that will accrue to communities affected by a given project. Hence, the question: will projects be kept in abeyance, caught in a vise between "modernists" and "traditionalists" in an elusive pursuit for a social license to operate? Or will the future approach be "built on principles of respect, recognition and responsibility" with a focus on delivering "faster decisions about development that are in the interest of both industry and residents"?[44] Delays - be it for regulatory

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[40] For example, the Northwest Territories with over 500,000 square miles – larger than France, Germany and the United Kingdom combined - has a population of less than 45,000 compared to a total of 212.6 million in the three European countries.

[41] Declaration on the Establishment of the Arctic Council, op.cit, Article 2.

[42] "*A Circumpolar Inuit Declaration on Sovereignty in the Arctic*", http://www.inuitcircumpolar.com/sovereignty-in-the-arctic.html.

[43] "*A Circumpolar Inuit Declaration on Resource Development Principles in Inuit Nunaat*", http://www.inuitcircumpolar.com/resource-development-principles-in-inuit-nunaat.html

[44] Rob McLeod, Premier of the Northwest Territories, *Remarks at the Energy Council Conference*, Washington, D.C., (2005).

or other causes – raise costs, a fact that needs to be given considered weight given that the development of projects in the Arctic is highly dependent on a small pool of investors comfortable enough with Far North risks.

These issues are bound to play differently across Arctic countries due to the composition of their circumpolar populations. In Canada, indigenous people represent more than 50 percent of the Arctic population whereas they account for about 20 percent of the Alaskan population, 4 percent in Russia and more or less 4 percent in Scandinavia. In Greenland, they constitute the absolute majority with around 80 percent of total population.

While empowerment gives the opportunity (and responsibility) to directly address, mitigate and attempt to resolve the socio-economic issues that are endemic to most of the region, it does not automatically provide the financial and human resources to do so. The challenges faced by the new government entities are enormous. Except for the Saami of the Nordic countries that have benefited from their long integration in the economy, education systems and political institutions of Norway, Sweden and Finland and, to some extent the Inuit of Greenland, the socio-economic conditions of indigenous populations elsewhere are poor and climate change is exacerbating their predicaments.

Food security and public health issues are becoming more intense and complex. The nutrition transition from a nutrient-rich traditional food towards market food carries with it economic costs and gives rise to food insecurity with serious health implications.[45] Diseases such as tuberculosis persist in some northern communities, in spite of its steady decline in southern developed countries, due to cramped living conditions and a lack of primary health care. Contaminants such as mercury and other heavy metals, PCBs and dioxins, are found at remote sited difficult to remediate. These pollutants have infiltrated the supply of food and water in the Arctic; safe and reliable potable water treatment and adequate sanitation systems are often unavailable. The spread of diseases that have so far been kept in check by cold temperatures or by climatic conditions that prevented disease-carrying animals (including birds and fish) from migrating northward may well be the scariest phenomenon affecting the Arctic. The increase in harmful algae blooms whose biotoxins can be a serious health hazard and the increasing rates of infection of avian cholera and other cholera-like disease (i.e. in oysters), the highly contagious phocine distemper virus among marine mammals populations, rabies and food borne parasites are of great concern, not only because of their deleterious effects on wildlife but, more worryingly, their effects on food security and the basic nutrition of local populations. They also have serious economic consequences. The food easily obtained locally from hunting and fishing is an absolute necessity because it is the only way to overcome the excessively high price of food imported from the "south" and meet their nutritional needs. The threats to physical health are exacerbated by poor housing conditions, the high cost of energy, food and household supplies, and the societal stress which, for example, manifests itself by above-average suicide rates, particularly among the young generation.

The prosperity of the Arctic indigenous people will be determined by many factors. To take full advantage of the developments occurring in their areas, greater emphasis will need to be placed on the human capital dimension (education, health care, etc.).[46] To be effective, this requires, amongst many other things, access to broadband fiber optic telecommunication networks to bring affordable high speed internet to Arctic populations, which is necessary to participate in the digital economy and take advantage of new applications such as e-learning and telemedicine. In the short term, the installation of the Quintillion Networks will enable the first broadband internet service for Alaskan Arctic communities ranging from Nome to Prudhoe Bay starting in 2017. Thereafter, the deployment of these new "essential" technologies could be achieved across the Canadian Arctic (and Greenland) by piggybacking on future fiber optic cables linking Asia (Tokyo) to Europe (London) through the Northwest Passage. The opening of the passage during summer months can provide a window for a cable-laying

[45] Canadian Council of Academies, *Aboriginal Food Security in Northern Canada: An Assessment of the State of Knowledge*, March 2014.
[46] The Conference Board of Canada, *Building a Resilient and Prosperous North*, Centre for the North, April 2015.

ship to deploy the cables. Although the main factor driving investments in telecommunication links between Asia and Europe are the gains in the speed of data transmission due to a much shorter route than is otherwise possible, the potential to be harnessed through offshoot connections in the Arctic is considerable; a game changer for many communities and resource development projects.

Another major policy challenge is to determine how to harness existing and emerging technologies to create sustainable economic well-being in Arctic communities. The creation of the Arctic Economic Council in 2014 is a reflection of that concern but it cannot be expected to advance the growth of sustainable Arctic communities by itself. A successful development strategy needs to be much more holistic in its approach and marshal substantial private and public resources. For example, at present, most of the power generated in Canada's Far North and in Alaska is produced by high cost carbon-intensive diesel generators. It is estimated that 99.94 percent of the power generated in Nunavut is produced by diesel generators; in the United States; Alaska ranks second for the proportion of electricity generated from hydrocarbons. To improve energy affordability, Arctic communities (and regional governments) should be encouraged (and assisted) to draw on proven renewable energy technologies such as modular micro-grid systems and advanced off-grid and hybrid windmill power generation technology, such as the one developed and installed by Tugliq Energy,[47] a Canadian company, at the Raglan Mine, a large nickel mining complex in the Nunavik region of northern Quebec.

To facilitate investments in new technology and modern power, water treatment, telecommunications and other key infrastructure and services, the Arctic Council should consider establishing the Development Bank of the Arctic (DBA), modeled on the existing global network of multilateral development banks, as a tool to raise large amounts of capital at relatively low cost in order to finance sustainable development projects in the Arctic region, make new investments in critical infrastructure and co-invest with public and private partners on a wide range of projects that would bring social and economic benefits to Arctic communities.[48] The DBA could also play a constructive role in helping finance the Joint Barents Transport Plan recently proposed by the Barents Euro-Arctic Council (Norway, Sweden, Finland and Russia). It could be a catalyst for regional development in the Western Arctic by supporting the creation of a Beaufort Basin Council involving Canada, the United States and Russia, with the participation of regional governments (Alaska, Northwest Territories, Nunavut and Yukon).

– **Fisheries**

Large commercial fisheries already exist in the Arctic, including in the Barents and Norwegian Seas north of Europe, the Central North Atlantic off Greenland and Iceland, the Bering Sea off Russia and the United States (Alaska), and the Newfoundland and Labrador Seas off northeastern Canada.[49] As the Arctic Ocean opens up and its fish stocks are becoming increasingly within reach, fishery management strategies must be developed before damage is done to the stock. Significant information gaps persist on the resilience of Arctic marine fisheries to harvesting pressures. A precautionary approach[50] would suggest limiting use of newly accessible fishing grounds until further progress has been made in scientific assessments of their ecosystems and their vulnerability to climate change.

This was the impetus that led the United States to close off more than 150,000 square nautical miles of U.S. Arctic waters (north of Bering Strait in the Chukchi and Beaufort seas) to commercial fishing in October 2009. This action followed a joint resolution adopted by the U.S. Congress in 2008 enjoining the United States to "take necessary steps with other Arctic nations to negotiate an agreement or agreements for managing migratory, transboundary and straddling fish stocks in the Arctic Ocean and establishing a new international fisheries management organization or organizations for the region." On July 16, 2015, the five Arctic Ocean coastal states signed a declaration to prevent

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[47] http://www.mineraglan.ca/EN/Pages/default.aspx

[48] Alan Gill, David Sévigny, *Sustainable Northern Development: The case for an Arctic Development Bank*, Centre for International Governance Innovation, 2015. The DBA would bring substantial additional resources, complement the activities and broaden and extend the reach of regional development organizations such as Alaska Industrial Development and Export Authority.

[49] Erik J. Molenaar, Robert Corell, *Arctic Fisheries*, Arctic Transform, February 9, 2009; available at http://arctic-transform.org/download/FishBP.pdf.

[50] Principle 15 of the 1992 Rio Declaration (Earth Summit): "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainly shall be not used as a reason for postponing cost-effective measures to prevent environmental degradation." This is one basis for the precautionary principle invoked in the context of environmental policy guidance and law-making for a large number of countries and international bodies.

unregulated commercial fishing in the high seas portion of the central Arctic Ocean as a precautionary measure until there is sufficient scientific evidence to inform a sustainable approach to commercial fishing in the area.

The time may have come for the Arctic Council to spearhead the establishment of a regional fisheries management organization (RFMO) for the Central Arctic Ocean that would operate within the framework of the UN Agreement on Straddling and Highly Migratory Fish Stocks.[51] The Agreement would allow the RFMO to manage the stocks by setting quotas and by other means. However, any such organization must be open, on a non-discriminatory basis, to states from outside the region. Any state wanting to fish within the region must join the organization but on doing so it is able to participate fully, and this includes participating in the setting of quotas. Including the long-range fishing jurisdictions – China, the European Union, Japan, Korea – as partners in fisheries negotiations under the umbrella of the Arctic Council would ensure that the Arctic Ocean Fisheries Organization gathers broad support.

– **Marine Protected Areas**

In April 2015, member states of the Arctic Council agreed to develop a network of Arctic Marine Protected and Important Areas (MPA) based on a scientific understanding of marine ecosystems and features, taking into account the importance of fish and marine mammals that inhabit these waters for neighboring indigenous communities. Several Arctic countries already have some MPAs, in particular Russia who already has quite a number.

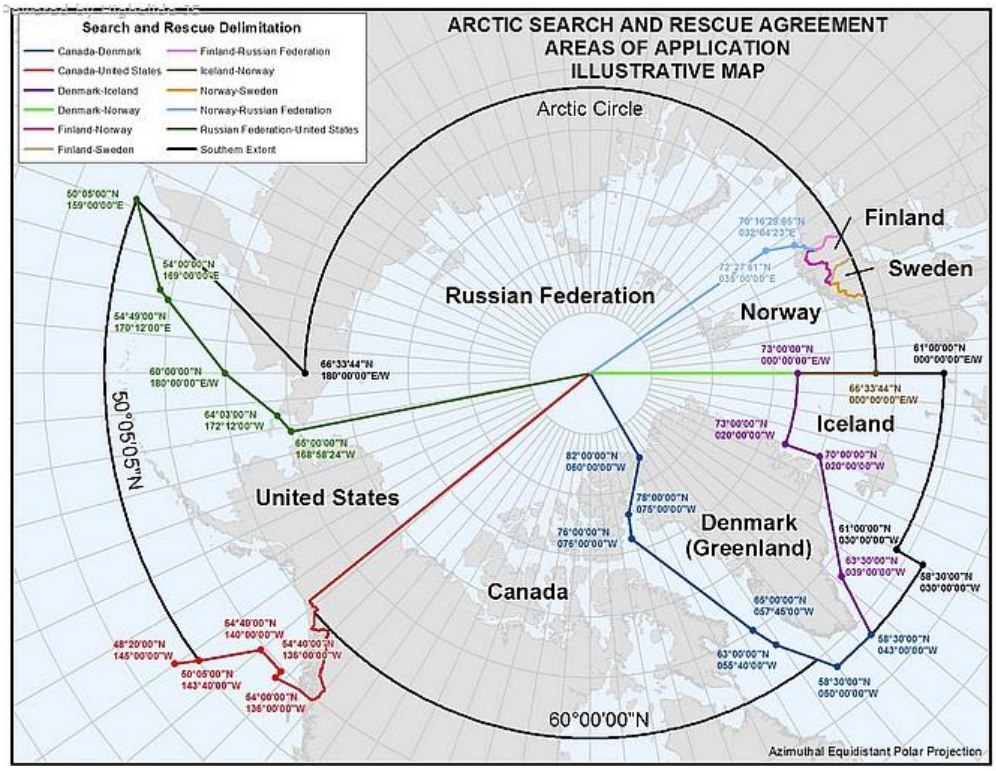
In 2010, at the instigation of the Clyde River Inuit Community, the Canadian government established the Ninginganiq National Wildlife Area. Located on the north-east coast of Baffin Island (Nunavut), this National Wildlife Area (NWA) is the largest in Canada (3360 km^2) and is comprised mainly of marine habitat. It provides a sanctuary for bowhead whales as well as a favorable habitat for healthy populations of polar bears, ringed seals and bird colonies. But the process of establishing other MPAs has proven more arduous than expected. Since 2009, the Canadian government has been attempting to establish the boundaries of the proposed Lancaster Sound National Marine Conservation area, thus far to no avail. Often referred to as the Serengeti of the Arctic, the protection of this exceptional area for marine mammals, such as seals, narwhal, beluga and bowhead whales, walrus and polar bears, bordered by some of the most important seabird breeding colonies in the Arctic, is of critical ecological importance and vital to Inuit communities. The uniqueness of the area from an ecological perspective would justify designating Lancaster Sound as an UNESCO World Heritage Site. Geographically, Lancaster Sound is the principal eastern entrance to the Northwest Passage. Its designation as an MPA would facilitate the introduction of shipping lanes, addressing both environmental and safety considerations at the same time. Shell Canada's June 2016 agreement to voluntarily contribute to Nature Conservancy Canada more than 8 - 625 km^2 of offshore exploratory permits in the waters of Baffin Bay near Lancaster Sound (which were subsequently released to the Government Canada), is an important step towards the establishment of this marine conservation area.

[51] 1995 UN Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks.

– **With "ownership" comes responsibilities**

The National and International Obligations of a Coastal State involve (i) boarder security, including maritime boundaries; (ii) control of the EEZ; (iii) compliance with IMO obligations, regulations and treaties; (iv) the provision of SAR and environmental protection; and (v) aids to navigation. Increasing sea and air traffic across the Arctic has heightened concerns with respect to search and rescue capabilities in the region. On May 12, 2011, at a meeting in Nuuk, Greenland, member states of the Arctic Council signed the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic. Figure 3 presents an illustrative map of the national areas of search and rescue responsibility of the Arctic coastal countries.

FIGURE 3: ILLUSTRATIVE MAP OF ARCTIC SAR AREAS AND ARCTIC SAR AGREEMENT
(Based on geographic coordinates listed in the Agreement)



Source : O'Rourke, Ronald, *Changes in the Arctic: Background and Issues for Congress*, Congressional Research Service, January 2016, p. 49.

In the Arctic, these responsibilities and obligations can only be met by the extensive use of technology, including powerful icebreakers, aircraft, and remote monitoring systems. The authoritative Arctic Marine Assessment 2009 Report (AMSA) has noted that except for areas along the Norwegian coast and northwest Russia, the lack of the following basic marine infrastructure and support services was a serious concern: navigation charts; radio and satellite communication systems; rescue ship; environmental response; icebreaker capacity, SAR and port services, including reception facilities for ship-generated waste. To date, Canada and the United States have sought to avoid premature investments rather than prepare for the future. They have neither acquired the equipment nor built the infrastructure necessary to adequately fulfill their responsibilities in the part of the northern Oceans under their jurisdictions.

Canada's Coast Guard fleet of icebreakers is of the older generation, few in number and limited capacity in Arctic waters.[52] The CCGC Diefenbaker, the only Polar Class icebreaker, will be available sometime after 2022;[53] it is expected to replace the aging CCGS Louis S. St-Laurent, the largest ship of the fleet, scheduled to be decommissioned in 2017. The CCGC Diefenbaker is not designed to operate in thick polar multi-year ice conditions

[52] In the summer of 2016, the Coast Guard operated a full complement of seven icebreakers to patrol Canada's Arctic.

[53] The CCGC John S. Diefenbaker is designed to break level ice with a thickness of 2.5 metres with a 30-centimetre (12 in) snow cover. In terms of icebreaking capability, this ranks her below the largest Russian nuclear-powered icebreakers.

year-round in the Arctic, only three seasons. Given that ice and navigation conditions are much more challenging in the Northwest Passage than on the Northern Sea Route, this shortfall in icebreaking capabilities is a cause for concern. Furthermore, the ability of the Canadian Coast Guard to respond to an emergency situation is significantly hindered by the fact that, with the exception of Churchill on the Hudson Bay, there is no other deep water port in the Canadian Arctic and the search and rescue air base are all located south of the 60th parallel. Similarly, the Royal Canadian Navy Arctic Offshore Patrols ships (AOPS) will have limited ice transiting capabilities which will reduce their effectiveness in Arctic operations.[54] Several reports examining the state of preparedness of the Canadian government agencies charged with SAR, disaster response, the management of marine oil spills from ships and from oil and gas developments, found that it was in serious need of improvement.[55] Noteworthy is that there are no response organization certified to respond to oil spills above the 60th parallel, which shifts the responsibility for spill preparedness and response in the Arctic to the Canadian Coast Guard.[56]

The U.S. government is in no better shape. Its icebreaking fleet currently consists of the Polar Star, a 40 year old heavy polar icebreaker and *The Healy*, a medium polar icebreaker which entered service in 1978. To adequately meet its mission demands, the U.S. Coast Guard would require a fleet composed of three heavy and three medium icebreakers.[57] The shortfall in equipment is compounded by the fact that the U.S. Coast Guard cutters and icebreakers are based outside the Arctic due to the shallow northern and northwestern coastlines of Alaska and the absence of a deep-draft port. Given their present location, it could take several hours for a U.S. Coast Guard aircraft and days for one of its ships to reach a vessel, rig or aircraft in distress in its SAR area. Response time being a critical factor in emergency situations, this state of affairs is of concern to many. A proposed solution, a deep-water port at Port Clarence on Alaska's west coast, and the procurement of new Polar Class icebreakers have yet to be funded.

The Russian "50 years of Victory", the world's most powerful icebreaker

The situation on the other Arctic Ocean coastlines is more satisfactory than in North America. Russia operates, and continues to expand, a fleet of *Rosatomflot* nuclear-powered and conventional icebreakers backed with medium and shallow draft icebreakers to assist in port access. With more than 40 icebreakers in its fleet and 11 more under construction, their icebreaking capacity and their availability for escort makes the Northern Sea Route much safer and enticing for international operators.[58] Moreover, Russia has a mature regulatory regime to manage shipping in the Northern Sea Route. Vessel transits bear this out.

A similar situation is found in the European Arctic waters. For instance, the Finnish multi-purpose icebreaker fleet counts eight vessels that are busy year round. One, Kontio, has a large oil recovery capacity and is equipped to conduct such operations in Arctic waters. Norway operates long-range helicopters off its five frigates and land-based SAR helicopters on Svalband and at Banak on the mainland close to the Barents Sea. It is in the process of adding sixteen new SAR helicopters to its fleet. Denmark operates a fleet of seven ice capable ships, with units stationed around Greenland and the Faroe Islands and, during summer, spread around their SAR area.

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[54] The AOPS are Polar Class 5 ships designed for year-round operations in one-metre first year ice with old ice inclusions. They will be equipped with facilities for commercial and military helicopters and will be cyclone capable. However, the AOPS will be less capable than Fednav's Umiak and Nunavik commercial ships which are Polar Class 4 (designed for year-round Arctic operation in thick first-year ice, with old ice inclusions).

[55] The Conference Board of Canada, *Changing Tides: Economic Development in Canada's Northern Marine Waters*, 2013.

[56] The Canadian Council of Academies, *Commercial Marine Shipping Accidents: Understanding the Risks in Canada*, 2016.

[57] Department of Homeland Security, *Polar Icebreaking Recapitalization Project Mission Need Statement, Version 1.0*, June 28, 2013.

[58] Milosz Reterski, *Breaking the Ice*, Foreign Affairs, December 11, 2014, https://www.foreignaffairs.com/article/united-states/2014-12-11/breaking ice.

Several factors explain Canada's and the United States' neglect to equip their agencies compared to European Arctic countries. The proximity and importance of their offshore activities is a key driver; however, the main factor stems from the fact that in Scandinavia the Arctic region is not a "frontier" region, but is an intrinsic component of the political, economic and social fabric of the nation.

– **Security issues**

The explicit exclusion from the ambit of the Arctic Council of "matters related to military security" may well have been a blessing. This provision included at the insistence of the United States reflects the remnants of the Cold War still alive at the time of the 1996 Ottawa Declaration establishing the Arctic Council. Unburdened by the tensions inherent in the establishment of military balance, the Arctic Council focused on other matters of great importance for the Arctic region and fostered the habit of cooperation between its members and with the indigenous people organizations.

Today, it is generally agreed that the risk of armed conflict in the region is benign. Much has been made in *certains milieux* of the military assets Russia has deployed in the Arctic in recent years. While it is always difficult to decipher whether or not there are ulterior motives, to a large extent the moves are warranted by the significant increases in oil and gas and shipping activities on its Arctic coast and the fact that since the dissolution of the Soviet Union its only window on the Atlantic is through Murmansk and other ice-free ports on the southwest coast of the Barents Sea. Other Arctic countries have also undertaken to augment and strengthen their military capabilities in the Far North in response to the environmental challenge. The impetus is the need to have the operational capability to protect a territory that is becoming more accessible, to cope with a wide spectrum of security situations, counter non-state threats such as drug trafficking, illegal immigration and terrorists infiltration, and give the country the means and platform support necessary to fulfil its search and rescue responsibilities and answer the need for disaster prevention and relief. It seems farfetched to suggest that an arms race is unfolding in the Arctic.

Times have changed. The most significant security threats in the Arctic involve non-state actors. The sheer size of the territory and the harsh and inhospitable climate and environmental conditions prevailing makes search and rescue operations, let alone disaster recovery, incredibly difficult and risky, particularly in the winter darkness. It requires a wide range of sophisticated and expensive equipment and well-trained personnel that exceeds the complement of coast guard agencies. Military establishments have, to various degrees, these assets under their command and are also the only organizations with the capabilities to operate in such a vast and inhospitable region. It is with no surprise that they have been, in one form or another, assigned to the task. Although necessary for the mission, it does not require that each Arctic state maintain the full range of ships, aircraft, satellites, monitoring stations and emergency supplies as long as protocols are in place to coordinate the deployment of the assets when needed.

Confronted with the challenges inherent in their new missions in the Arctic, the military leadership has quietly established the Arctic Security Forces Roundtable (ASFR) in 2011. Bringing together senior military officers from the eight members of the Arctic Council, as well as France, Germany, the Netherlands, and the United Kingdom, the ASFR focuses on issues such as physical infrastructure, the environment, joint exercises and training, marine domain awareness and on how to improve the communications infrastructure in the high north. The "Arctic militaries" have held annual joint exercises to hone the skills needed to function in the harsh environment and develop coordination. In May 2012, the Northern Chiefs of Defense Conference was formed to facilitate the discussion of Arctic issues between the military leaders of the eight Arctic states. In October 2015, the Coast Guards followed suit with the establishment of the Arctic Coast Guard Forum (ACGF).

The primary responsibility of the Arctic Council is to preserve the stability of the region. Militarization of the Arctic would needlessly fuel tensions. But the magnitude of the security challenges is such that the active participation of military institutions is necessary. The need to promote close cooperation to meet the requirements of the task is evidenced by the actions of the military leaders. The time may have come for the Arctic Council to redefine the meaning of "military security" in a way that facilitates close cooperation between the military establishments of the member states of the Arctic Council in matters than involve non-state threats, SAR, disaster relief and the enforcing of treaties and regional agreements in the area outside the jurisdiction of coastal countries in a manner that ensures that the region remains peaceful, stable and well-governed.

ON THE DOORSTEP OF THE AGE OF ANTHROPOCENE[59]

The transformation of the physical nature of the Arctic induced by climate change is happening here and now. Multiple influences interact, from the microscopic to the macroscopic levels, in feedback loops that compound and amplify the impact on people and ecosystems, presenting unprecedented challenges at the local and global levels.

Largely ignored in the past because its frozen barrier prevented access, climate change is now giving economic value to the Arctic region's enormous store of natural resources, as well as new options for marine transportation of goods and IT infrastructure. This, in turn, is bringing about the integration of the Arctic region into the global economy, with tremendous new opportunities for growth - at the risk of concomitant changes in its delicate geopolitical balance of regional and national interest. Social and ecological fragilities will also persist locally due to the historic remoteness of its communities and, in general, a reduced resilience to impacts in cold-weather environments.

Throughout history, the interaction of climate with human societies has led to a complex mix of challenges and responses about the evolution of ecosystems, technologies, and political, cultural and social systems. There is no escaping; a whole new regime for the Arctic that covers the full range of contentious issues will gradually emerge, brought about either through human ingenuity or by the forces of nature. Beset by local, national and international pressures, the Arctic Council will need to stand prepared to exert a counterweight to centrifugal forces, defuse tensions and channel competing interests in directions that ensure the harmonious development of this economically and strategically vital region, promote constructive interactions with the people who call the Arctic their home with the overarching objective of improving their economic and living conditions in a manner that does not jeopardize its fragile environment. The success of the Council in filling this leadership role will determine if the Arctic becomes an arena of jurisdictional disputes or a region of cooperation and prosperity. This demonstrates the importance of a long-term vision for the region.

For better or for worse, the Arctic is no longer a "place up there", isolated from the rest of the world by its inhospitable climate. It is becoming an intrinsic part of the world, inexorably linked to the interaction of events and processes unfolding within the region and elsewhere. Therein lies the crucial challenge for the inhabitants of the circumpolar region, the Arctic states and the rest of the world.

[59] The Anthropocene has been proposed as a new geological epoch, possibly replacing the Holocene, due to significant impact of human activity on the environment. In the continued debate on the significance of this change relative to the epochs (mass extinction of species, variations in atmospheric CO_2, etc.), and on a suitable start date (agricultural, industrial or atomic revolution), the Arctic has been increasingly offered as a prime example: it has been subject to accentuated environmental changes due to human activities on a global scale, which are also accelerating its own socio-economic development.


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NORWAY
SWEDEN