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Changes in the Arctic: Background and Issues for Congress

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Summary

The diminishment of Arctic sea ice has led to increased human activities in the Arctic, and has heightened interest in, and concerns about, the region's future. The United States, by virtue of Alaska, is an Arctic country and has substantial interests in the region.

Record low extents of Arctic sea ice over the past decade have focused scientific and policy attention on links to global climate change and projected ice-free seasons in the Arctic within decades. These changes have potential consequences for weather in the United States, access to mineral and biological resources in the Arctic, the economies and cultures of peoples in the region, and national security.

The five Arctic coastal states—the United States, Canada, Russia, Norway, and Denmark (of which Greenland is a territory)—have made or are in the process of preparing submissions to the Commission on the Limits of the Continental Shelf regarding the outer limits of their extended continental shelves. The Russian submission includes the underwater Lomonosov Ridge, a feature that spans a considerable distance across the center of the Arctic Ocean.

The diminishment of Arctic ice could lead in coming years to increased commercial shipping on two trans-Arctic sea routes—the Northern Sea Route close to Russia, and the Northwest Passage—though the rate of increase in the use of these routes might not be as great as sometimes anticipated in press accounts. International guidelines for ships operating in Arctic waters have been recently updated.

Changes to the Arctic brought about by warming temperatures will likely allow more exploration for oil, gas, and minerals. Warming that causes permafrost to melt could pose challenges to onshore exploration activities. Increased oil and gas exploration and tourism (cruise ships) in the Arctic increase the risk of pollution in the region. Cleaning up oil spills in ice-covered waters will be more difficult than in other areas, primarily because effective strategies for cleaning up oil spills in ice-covered waters have yet to be developed.

Large commercial fisheries exist in the Arctic. The United States is currently meeting with other countries regarding the management of Arctic fish stocks. Changes in the Arctic could affect threatened and endangered species, and could result in migration of fish stocks to new waters. Under the Endangered Species Act, the polar bear was listed as threatened on May 15, 2008. Arctic climate change is also expected to affect the economies, health, and cultures of Arctic indigenous peoples.

Two of the Coast Guard's three polar icebreakers—*Polar Star* and *Polar Sea*—have exceeded their intended 30-year service lives, and *Polar Sea* is not operational. The Coast Guard has initiated a project to build up to three new heavy polar icebreakers. On May 12, 2011, representatives from the member states of the Arctic Council signed an agreement on cooperation on search and rescue in the Arctic.

Although there is significant international cooperation on Arctic issues, the Arctic is increasingly being viewed by some observers as a potential emerging security issue. Some of the Arctic coastal states, particularly Russia, have announced an intention or taken actions to enhance their military presences in the high north. U.S. military forces, particularly the Navy and Coast Guard, have begun to pay more attention to the region in their planning and operations.

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Introduction

The diminishment of Arctic sea ice has led to increased human activities in the Arctic, and has heightened interest in, and concerns about, the region's future. Issues such as Arctic territorial disputes; commercial shipping through the Arctic; Arctic oil, gas, and mineral exploration; endangered Arctic species; and increased military operations in the Arctic could cause the region in coming years to become an arena of international cooperation or competition.

The United States, by virtue of Alaska, is an Arctic country and has substantial political, economic, energy, environmental, and other interests in the region. Decisions that Congress makes on Arctic-related issues could significantly affect these interests.

This report provides an overview of Arctic-related issues for Congress, and refers readers to more in-depth CRS reports on specific Arctic-related issues. Congressional readers with questions about an issue discussed in this report should contact the author or authors of the section discussing that issue. The authors are identified by footnote at the start of each section.

This report does not track legislation on specific Arctic-related issues. For tracking of legislative activity, see the CRS reports relating to specific Arctic-related issues that are listed at the end of this report, just prior to **Appendix A**.

Background[1]

Definitions of the Arctic

There are multiple definitions of the Arctic that result in differing descriptions of the land and sea areas encompassed by the term. Policy discussions of the Arctic can employ varying definitions of the region, and readers should bear in mind that the definition used in one discussion may differ from that used in another. This CRS report does not rely on any one definition.

Arctic Circle Definition and Resulting Arctic Countries

The most common and basic definition of the Arctic defines the region as the land and sea area north of the Arctic Circle (a circle of latitude at about 66.34° North). For surface locations within this zone, the sun is generally above the horizon for 24 continuous hours at least once per year (at the summer solstice) and below the horizon for 24 continuous hours at least once per year (at the winter solstice).

The Arctic Circle definition includes the northernmost third or so of Alaska, as well as the Chukchi Sea, which separates that part of Alaska from Russia, and U.S. territorial and Exclusive Economic Zone (EEZ) waters north of Alaska. It does not include the lower two-thirds or so of Alaska or the Bering Sea, which separates that lower part of the state from Russia.

[1] Except for the subsection on the Arctic and the U.N. Convention on the Law of the Sea, this section was prepared by Ronald O'Rourke, Specialist in Naval Affairs, Foreign Affairs, Defense, and Trade Division.

The area within the Arctic Circle is about 14.5 million square kilometers, or about 5.6 million square miles.[2] This equates to about 2.8%, or about 1/36th, of the world's surface.[3] A total of about 4 million people, or about 0.05% of the world's population, live in the Arctic, of which roughly half (roughly 2 million) live in Russia's part of the Arctic.[4]

Eight countries have territory north of the Arctic Circle: the United States (Alaska), Canada, Russia, Norway, Denmark (by virtue of Greenland, a member country of the Kingdom of Denmark), Finland, Sweden, and Iceland. These eight countries are often referred to as the Arctic countries, and they are the member states of the Arctic Council, which is discussed further below. A subset of the eight Arctic countries are the five countries that are considered Arctic coastal states: the United States, Canada, Russia, Norway, and Denmark (by virtue of Greenland).

Definition in Arctic Research and Policy Act (ARPA) of 1984

Section 112 of the Arctic Research and Policy Act (ARPA) of 1984 (Title I of P.L. 98-373 of July 31, 1984)[5] defines the Arctic as follows:

> As used in this title, the term "Arctic" means all United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers [in Alaska]; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering, and Chukchi Seas; and the Aleutian chain.

This definition, which is codified at 15 U.S.C. 4111,[6] includes certain parts of Alaska below the Arctic Circle, including the Aleutian Islands and portions of central and western mainland Alaska, such as the Seward Peninsula and the Yukon Delta. **Figure 1** below shows the Arctic area of Alaska as defined by ARPA; **Figure 2** shows the entire Arctic area as defined by ARPA.

Other Definitions

Other definitions of the Arctic are based on factors such as average temperature, the northern tree line, the extent of permafrost on land, the extent of sea ice on the ocean, or jurisdictional or administrative boundaries.[7] A definition based on a climate-related factor could circumscribe differing areas over time as a result of climate change.

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[2] Source: Polar Discovery (Woods Hole Oceanographic Institution), "Arctic: Location and Geography," accessed October 24, 2018, at http://polardiscovery.whoi.edu/arctic/geography.html. This source states that 14.5 million square kilometers is equal to about 5.5 million square miles, but 14.5 million square kilometers equates to about 5.598 million square miles.

[3] The surface area of the world is approximately 510 million square miles. Source: Universe Today, "What is the Surface Area of the Earth?" February 10, 2017, accessed October 24, 2018, at https://www.universetoday.com/25756/surface-area-of-the-earth/.

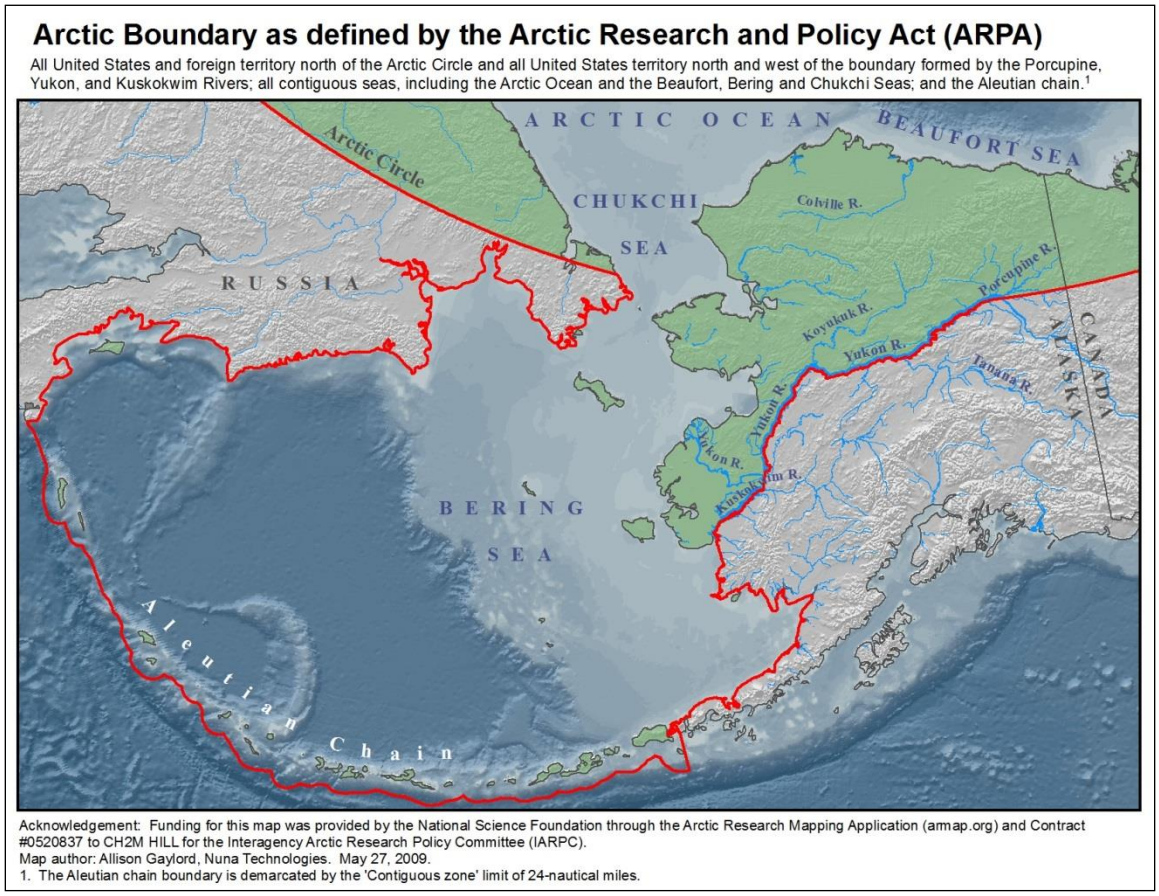
[4] Sources: National Snow & Ice Data Center, "Arctic People," accessed October 24, 2018, at https://nsidc.org/cryosphere/arctic-meteorology/arctic-people.html; and United Kingdom, House of Commons, Defence Committee, On Thin Ice: UK Defence in the Arctic, Twelfth Report of Session 2017–19, August 15, 2018 (Ordered by the House of Commons to be printed 19 July 2018), p. 6.

[5] Title II of P.L. 98-373 is the National Critical Materials Act of 1984.

[6] As codified, the definition reads, "As used in this chapter.... "

[7] For discussions and (in some cases) maps, see Susan Joy Hassol, *Impacts of a Warming Arctic* [Executive Summary]. Cambridge, Cambridge University Press, 2004, p. 4, available at http://amap.no/acia/; Oran R. Yong and Niels Einarsson, *Arctic Human Development Report*, Stefansson Arctic Institute, Akureyri, Iceland, 2004, pp. 17-18, available at http://www.svs.is/AHDR/AHDR%20chapters/English%20version/Chapters%20PDF.htm; and Hugo Ahlenius, editor in chief et al., *Vital Arctic Graphics, People and Global Heritage on Our Last Wild Shores*, UNEP/GRID-Arendal, Arendal, Norway, p. 6, available at http://www.grida.no/publications/vg/arctic/.

Figure 1. Arctic Area of Alaska as Defined by ARPA



Source: U.S. Arctic Research Commission (http://www.arctic.gov/maps/ARPA_Alaska_only_150dpi.jpg, accessed on December 23, 2011).

The 10° C isotherm definition of the Arctic defines the region as the land and sea area in the northern hemisphere where the average temperature for the warmest month (July) is below 10° Celsius, or 50° Fahrenheit. This definition results in an irregularly shaped Arctic region that excludes some land and sea areas north of the Arctic Circle but includes some land and sea areas south of the Arctic Circle. This definition currently excludes all of Finland and Sweden, as well as some of Alaska above the Arctic Circle, while including virtually all of the Bering Sea and Alaska's Aleutian Islands.[8]

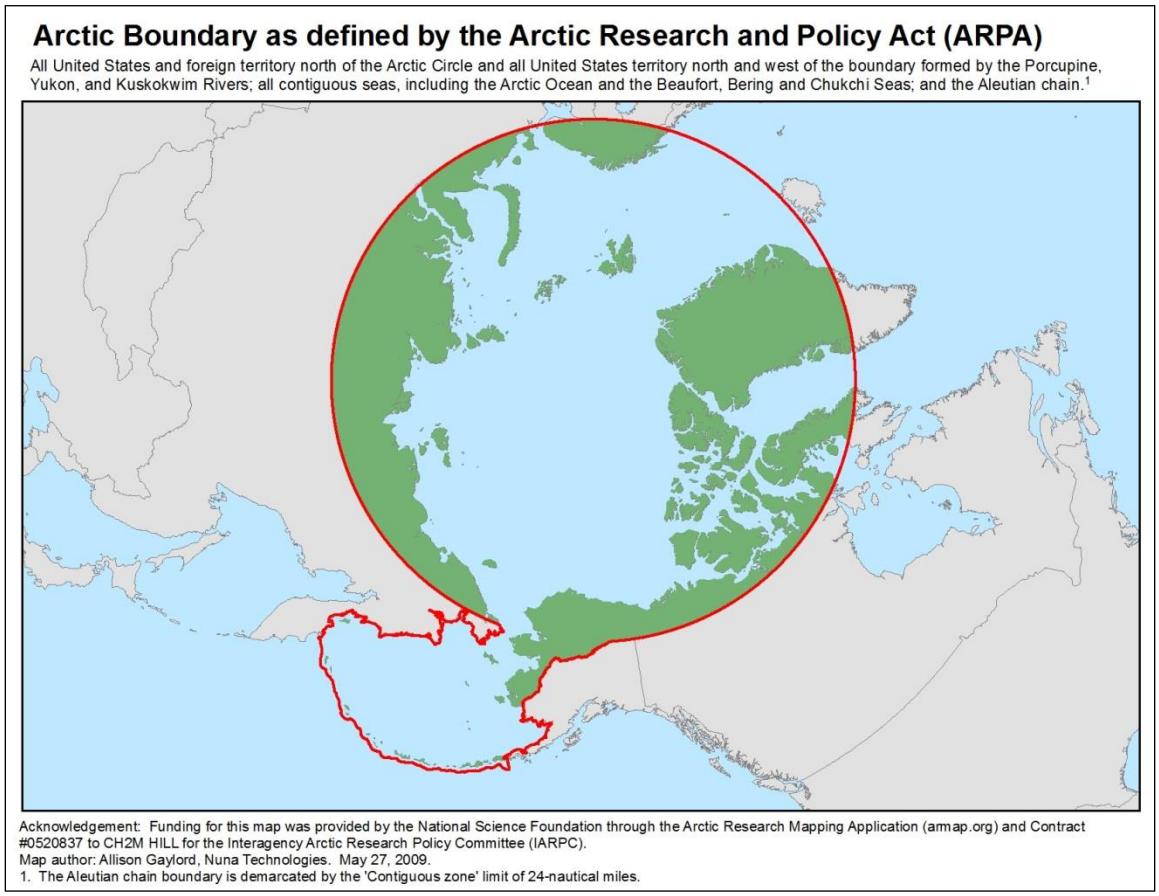
The definition of the Arctic adopted by the Arctic Monitoring and Assessment Programme (AMAP)—a working group of the Arctic Council—"essentially includes the terrestrial and marine areas north of the Arctic Circle (66°32' N), and north of 62° N in Asia and 60° N in North America, modified to include the marine areas north of the Aleutian chain, Hudson Bay, and parts of the North Atlantic, including the Labrador Sea." The AMAP website includes a map showing the Arctic Circle, 10o C isotherm, tree line, and AMAP definitions of the Arctic.

Some observers use the term "high north" as a way of referring to the Arctic. Some observers make a distinction between the "high Arctic"—meaning, in general, the colder portions of the Arctic that are closer to the North Pole—and other areas of the Arctic that are generally less cold

[8] A map showing the line that results from 10° isotherm definition is available at https://www.cia.gov/library/publications/the-world-factbook/reference_maps/pdf/arctic.pdf.

and further away from the North Pole, which are sometimes described as the low Arctic or the subarctic.

Figure 2. Entire Arctic Area as Defined by ARPA



Source: U.S. Arctic Research Commission (http://www.arctic.gov/maps/ARPA_Polar_150dpi.jpg, accessed on December 23, 2011).

U.S. Identity as an Arctic Nation

As mentioned earlier, the United States, by virtue of Alaska, is an Arctic country and has substantial political, economic, energy, environmental, and other interests in the region. Even so, Alaska is geographically separated and somewhat distant from the other 49 states, and relatively few Americans—fewer than 68,000 as of July 1, 2017—live in the Arctic part of Alaska as shown in **Figure 2**.[9] A November 8, 2018, research paper on the Arctic in U.S. national identity, based on data collected in online surveys conducted in October and December 2017, stated the following:

> We found that Americans on average continue mildly to disagree with the canonical assertion of U.S. Arctic identity and interests as articulated in government policy. On a

[9] Source for figure of fewer than 68,000: CRS analysis of data presented in Table 3.1, entitled Alaska Population by Region, Borough, and Census Area, 2017 to 2045, in Alaska Department of Labor and Workforce Development, Research and Analysis Section, *Alaska Population Projections: 2017 to 2045*, June 2018, p. 26. The table shows that of Alaska's estimated population as of July 1, 2017 of 737,080, a total of 589,680, of about 80%, resided in the Anchorage/Matanuska-Susitna region (401,649), the Fairbanks North Star Borough (97,738), the Kenai Peninsula Borough (58,024), and Juneau (32,269).

> scale from 1 to 7, with higher numbers indicating stronger agreement, Americans' average rating was 3.51, up slightly from 3.16 in 2015, but still below the scale midpoint [of 4.0]. A plurality of respondents (27%) answered with a score of one, indicating the strongest disagreement. Men and older individuals showed greater inclination to agree with the assertion of Arctic identity and interests than women or younger respondents, a pattern also observed in 2015. No region of the country showed particularly greater inclination to agree or disagree, except Alaskans[, who] showed substantially greater agreement.
>
> We also conducted a series of comparative surveys and found that Canadians, with an average rating of 4.87, had a much greater sense of being an Arctic nation than did Americans. American respondents, however, did register somewhat higher agreement than British and Australians in judging their country an Arctic nation with strong Arctic interests. In a separate comparative survey, Americans indicated a stronger sense of being a Pacific nation than an Arctic one.[10]

U.S. Arctic Research

Arctic Research and Policy Act (ARPA) of 1984, As Amended

The Arctic Research and Policy Act (ARPA) of 1984 (Title I of P.L. 98-373 of July 31, 1984)[11] "provide[s] for a comprehensive national policy dealing with national research needs and objectives in the Arctic."[12] The act, among other things

- made a series of findings concerning the importance of the Arctic and Arctic research;
- established the U.S. Arctic Research Commission (USARC) to promote Arctic research and recommend Arctic research policy;
- designated the National Science Foundation (NSF) as the lead federal agency for implementing Arctic research policy;
- established the Interagency Arctic Research Policy Committee (IARPC) to develop a national Arctic research policy and a five-year plan to implement that policy, and designated the NSF representative on the IARPC as its chairperson;[13] and
- defined the term "Arctic" for purposes of the act.

The Arctic Research and Policy Act of 1984 was amended by P.L. 101-609 of November 16, 1990. For the texts of the Arctic Research and Policy Act of 1984 and P.L. 101-609, see **Appendix A** and **Appendix B**, respectively.

[10] Zachary D. Hamilla, *The Arctic in U.S. National Identity (2017)*, Arctic Studio, November 8, 2018, p. 1. See also Yereth Rosen, "Americans Still Aren't Fully Embracing the Nation's Arctic Identity, a New Survey Finds," *Arctic Today*, November 13, 2018.

[11] Title II of P.L. 98-373 is the National Critical Materials Act of 1984.

[12] These words are taken from the official title of P.L. 98-373. (Arctic Research and Policy Act of 1984 is the short title of Title I of P.L. 98-373.) The remainder of P.L. 98-373's official title relates to Title II of the act, the short title of which is the National Critical Materials Act of 1984.

[13] The IARPC currently includes more than a dozen federal agencies, departments, and offices. Additional information on the IARPC is available at http://www.nsf.gov/od/opp/arctic/iarpc/start.jsp.

FY2019 NSF Budget Request for Arctic Research

NSF—the lead federal agency for implementing Arctic research policy—carries out Arctic research activities through its Office of Polar Programs (OPP), which operates as part of the Directorate for Geosciences (GEO). NSF is requesting a total of $534.5 million for OPP for FY2019, an increase of 30.6% over the $409.18 million requested for FY2018, and an increase of 14.3% over the $467.85 million actual for FY2017. Within the $534.54 million requested for OPP for FY2019 is $113.56 million for research in both the Arctic and Antarctic, an increase of 2.7% over the $110.58 million requested for FY2018, and a reduction of 4.6% from the $119.05 million actual for FY2017. Also within the $534.54 million requested for OPP for FY2019 is $39.33 million for Arctic research and support logistics, an increase of 8.9% over the $36.11 million requested for FY2018, and a reduction of 12.7% from the $45.06 actual for FY2017.[14]

NSF states in the overview of its FY2019 budget request that

> In 2019, NSF will support 10 Big Ideas, which are bold ideas that identify areas for future, long-term investment at the frontiers of science and engineering. With its broad portfolio of investments, NSF is uniquely suited to advance this set of cutting-edge research agendas and processes that will require collaborations with industry, private foundations, other agencies, science academies and societies, and universities and other education institutions. The Big Ideas represent unique opportunities to position our Nation at the frontiers—indeed to define the frontiers—of global science and engineering leadership and to invest in fundamental research that advances America's economic competitiveness and security.[15]

Among the 10 big ideas, NSF states in its overview that number 6 is

> **Navigating the New Arctic (NNA)**—Establishing an observing network of mobile and fixed platforms and tools across the Arctic to document and understand the Arctic's rapid biological, physical, chemical, and social changes.[16]

For FY2019, NSF is requesting $30.0 million for NNA under Integrative & Collaborative Education and Research (ICER) effort of GEO.[17] NSF states that

> a number of GEO programs contribute directly to NSF's overarching theme of Navigating the New Arctic (NNA).... As part of NNA, and in partnership with the other research directorates and offices, GEO will invest funds in its ICER division to support convergent activities that transcend the traditional disciplinary boundaries of individual NSF directorates and offices. These activities will enable pursuit of fundamental research in Arctic regions. While budget management and reporting for this investment will be the responsibility of GEO, the convergent activities will be overseen and managed collaboratively by the multi-directorate/office NNA leadership team.[18]

Regarding its FY2019 budget request for OPP, NSF states that

> The Office of Polar Programs (OPP) is the primary U.S. supporter of fundamental research in the polar regions. In the Arctic, NSF helps coordinate research planning as directed by

[14] National Science Foundation, *FY 2019 Budget Request to Congress*, February 28, 2018, p. OPP-1; National Science Foundation, *FY 2018 Budget Request to Congress*, May 23, 2017, p. OPP-1.

[15] National Science Foundation, *FY 2019 Budget Request to Congress*, February 28, 2018, p. Overview-3.

[16] National Science Foundation, *FY 2019 Budget Request to Congress*, February 28, 2018, p. Overview-3. Emphasis as in original.

[17] National Science Foundation, *FY 2019 Budget Request to Congress*, February 28, 2018, p. Summary Tables-8.

[18] National Science Foundation, *FY 2019 Budget Request to Congress*, February 28, 2018, p. GEO-1. See also p. GEO-7.

> the Arctic Research Policy Act of 1984, and the NSF Director chairs the Interagency Arctic Research Policy Committee (IARPC) created for this purpose....
>
> OPP supports investments in research and education and provides support for research infrastructure, such as permanent stations and temporary field camps in the Antarctic and the Arctic. OPP's FY 2019 Budget Request is influenced by three key priorities: (1) supporting critical facilities that enable frontier research in the Earth's polar regions; (2) maintaining strong disciplinary programs that provide a base for our investments in cross-disciplinary system science programs and; (3) maintaining U.S. research community activities in polar system science. As part of priority one, OPP will start the construction phase of the multi-year Antarctic Infrastructure Modernization for Science (AIMS) project. OPP will also prioritize investment in two of the Big Ideas: Navigating the New Arctic where OPP leads NSF efforts, and Windows on the Universe where OPP invests in underpinning activities. All of these priorities reflect opportunities for fundamental scientific discovery uniquely possible in polar regions, as well as studies to investigate the causes and future trajectory of environmental and ecosystem changes now being observed at the poles that could impact global systems. This work will implement the Foundation's lead-agency role in facilitating the Nation's investment in polar science.
>
> In addition to shared cross-directorate basic research objectives, OPP investments will be guided by recent sponsored studies to identify priority areas and ensure effective polar research programs:
>
> • For the Arctic, IARPC's *Arctic Research Plan: FY 2017-20211*, and the World Meteorological Organization's *Year of Polar Prediction Implementation Plan* inform science investment priorities. Efforts to build an integrated research capacity to address the potential opportunities and challenges of Arctic change for the Nation's security and economics and well-being of Arctic residents will continue.[19]

Regarding the $39.33 million requested for FY2019 for Arctic Research Support and Logistics within OPP, NSF states the following:

> The Research Support and Logistics program in the Arctic Sciences section of OPP responds to science supported by the section. Funding is provided directly to grantees or to key organizations that provide or manage Arctic research support and logistics. A contractor provides research support and logistics services for NSF-sponsored activities in the Arctic. Additional major support components include: access to USCG and other icebreakers, University-National Oceanographic Laboratory (UNOLS) vessels and coastal boats; access to fixed- and rotary-wing airlift support; assets at Toolik Field Station, University of Alaska Fairbanks' field station for ecological research on Alaska's North Slope; safety training for field researchers and funding for field safety experts; global satellite telephones for emergency response and improved logistics coordination; and development of a network of strategically placed U.S. observatories linked to similar efforts in Europe and Canada....
>
> Arctic Sciences personnel support merit-reviewed research proposals in social, earth systems, and a broad range of natural sciences; its Research Support & Logistics program responds to research by assisting researchers with access to the Arctic and sharing of plans and results with local Arctic communities.[20]

[19] National Science Foundation, *FY 2019 Budget Request to Congress*, February 28, 2018, p. OPP-1 to OPP-2.

[20] National Science Foundation, *FY 2019 Budget Request to Congress*, February 28, 2018, p. Facilities-48 to Facilities-49.

Major U.S. Policy Documents Relating to the Arctic

January 2009 Arctic Policy Directive (NSPD 66/HSPD 25)

On January 12, 2009, the George W. Bush Administration released a presidential directive establishing a new U.S. policy for the Arctic region. The directive, dated January 9, 2009, was issued as National Security Presidential Directive 66/Homeland Security Presidential Directive 25 (NSPD 66/HSPD 25). The directive was the result of an interagency review, and it superseded for the Arctic (but not the Antarctic) a 1994 presidential directive on Arctic and Antarctic policy. The directive, among other things,

- states that the United States is an Arctic nation, with varied and compelling interests in the region;
- sets forth a six-element overall U.S. policy for the region;
- describes U.S. national security and homeland security interests in the Arctic; and
- discusses a number of issues as they relate to the Arctic, including international governance; the extended continental shelf and boundary issues; promotion of international scientific cooperation; maritime transportation; economic issues, including energy; and environmental protection and conservation of natural resources.

For the text of NSPD 66/HSPD 25, see **Appendix C**.

May 2010 National Security Strategy

In May 2010, the Obama Administration released a national security strategy document that states the following:

> The United States is an Arctic Nation with broad and fundamental interests in the Arctic region, where we seek to meet our national security needs, protect the environment, responsibly manage resources, account for indigenous communities, support scientific research, and strengthen international cooperation on a wide range of issues.[21]

May 2013 National Strategy for Arctic Region

On May 10, 2013, the Obama Administration released a document entitled *National Strategy for the Arctic Region*.[22] The document appears to supplement rather than supersede the January 2009 Arctic policy directive (NSPD 66/HSPD 25) discussed above.[23] The executive summary of *National Strategy for the Arctic Region* begins by quoting the above statement from the May 2010 national security strategy document, and then states the following:

---

[21] *National Security Strategy*, Washington, May 2010, p. 50. The quoted sentence constitutes the entirety of the document's comments specifically on the Arctic. It is the final sentence of a section on "sustain[ing] broad cooperation on key global challenges" that includes longer discussions on climate change, peacekeeping and armed conflict, pandemics and infectious disease, transnational criminal threats and threats to governance, and safeguarding the global commons.

[22] *National Strategy for the Arctic Region*, May 2013, 11 pp.; accessed May 14, 2013, at https://obamawhitehouse.archives.gov/sites/default/files/docs/nat_arctic_strategy.pdf. The document includes a cover letter from President Obama dated May 10, 2013.

[23] *National Strategy for the Arctic Region* states on page 6 that the "lines of effort" it describes are to be undertaken "[t]o meet the challenges and opportunities in the Arctic region, and in furtherance of established Arctic Region Policy," at which point there is a footnote referencing the January 2009 Arctic policy directive.

The *National Strategy for the Arctic Region* sets forth the United States Government's strategic priorities for the Arctic region. This strategy is intended to position the United States to respond effectively to challenges and emerging opportunities arising from significant increases in Arctic activity due to the diminishment of sea ice and the emergence of a new Arctic environment. It defines U.S. national security interests in the Arctic region and identifies prioritized lines of effort, building upon existing initiatives by Federal, state, local, and tribal authorities, the private sector, and international partners, and aims to focus efforts where opportunities exist and action is needed. It is designed to meet the reality of a changing Arctic environment, while we simultaneously pursue our global objective of combating the climatic changes that are driving these environmental conditions. Our strategy is built on three lines of effort:

1. **Advance United States Security Interests** – We will enable our vessels and aircraft to operate, consistent with international law, through, under, and over the airspace and waters of the Arctic, support lawful commerce, achieve a greater awareness of activity in the region, and intelligently evolve our Arctic infrastructure and capabilities, including ice-capable platforms as needed. U.S. security in the Arctic encompasses a broad spectrum of activities, ranging from those supporting safe commercial and scientific operations to national defense.

2. **Pursue Responsible Arctic Region Stewardship** – We will continue to protect the Arctic environment and conserve its resources; establish and institutionalize an integrated Arctic management framework; chart the Arctic region; and employ scientific research and traditional knowledge to increase understanding of the Arctic.

3. **Strengthen International Cooperation** – Working through bilateral relationships and multilateral bodies, including the Arctic Council, we will pursue arrangements that advance collective interests, promote shared Arctic state prosperity, protect the Arctic environment, and enhance regional security, and we will work toward U.S. accession to the United Nations Convention on the Law of the Sea (Law of the Sea Convention).

Our approach will be informed by the following guiding principles:

• **Safeguard Peace and Stability** – Seek to maintain and preserve the Arctic region as an area free of conflict, acting in concert with allies, partners, and other interested parties. Support and preserve: international legal principles of freedom of navigation and overflight and other uses of the sea and airspace related to these freedoms, unimpeded lawful commerce, and the peaceful resolution of disputes for all nations.

• **Make Decisions Using the Best Available Information** – Across all lines of effort, decisions need to be based on the most current science and traditional knowledge.[24]

• **Pursue Innovative Arrangements** – Foster partnerships with the state of Alaska, Arctic states, other international partners, and the private sector to more efficiently develop, resource, and manage capabilities, where appropriate and feasible, to better advance our strategic priorities in this austere fiscal environment.

• **Consult and Coordinate with Alaska Natives** – Engage in a consultation process with Alaska Natives, recognizing tribal governments' unique legal relationship with the United States and providing for meaningful and timely opportunity to inform Federal policy affecting Alaskan Native communities.[25]

[24] A footnote in the document at this point states the following: "Traditional knowledge refers to a body of evolving practical knowledge based on observations and personal experience of indigenous communities over an extensive, multigenerational time period." (BOEM Ocean Science, Vol. 9, Issue 2, May/April/June 2012, page 4).

[25] *National Strategy for the Arctic Region*, May 2013, pp. 2-3.

For the main text of the document, see **Appendix D**.

January 2014 Implementation Plan for National Strategy for Arctic Region

On January 30, 2014, the Obama Administration released an implementation plan for the May 2013 national strategy for the Arctic region.[26] The plan states that it

> complements and builds upon existing initiatives by Federal, State, local, and tribal authorities, the private sector, and international partners, and focuses efforts where opportunities exist and action is most needed. The Implementation Plan reflects the reality of a changing Arctic environment and upholds national interests in safety, security, and environmental protection, and works with international partners to pursue global objectives of addressing climatic changes.
>
> This Implementation Plan follows the structure and objectives of the Strategy's three lines of effort and is consistent with the guiding principles. The lines of effort of the Strategy and the Implementation Plan are as follows:
>
> • Advance United States Security Interests
>
> • Pursue Responsible Arctic Region Stewardship
>
> • Strengthen International Cooperation
>
> These lines of effort and guiding principles are meant to be implemented as a coherent whole.[27]

The plan also states the following:

> Climate change is already affecting the entire global population, and Alaska residents are experiencing the impacts in the Arctic. To ensure a cohesive Federal approach, implementation activities must be aligned with the Executive Order on Preparing the United States for the Impacts of Climate Change[28] while executing the Strategy. In addition to the guiding principles, the following approaches are important in implementing the activities across all of the lines of effort:
>
> • Foster Partnerships with Arctic Stakeholders. As outlined in the Strategy, all lines of effort must involve Arctic partners, particularly the State of Alaska and Alaska Natives in the Arctic region. Federal agencies, the State of Alaska, tribal communities, local governments, and academia will work with other nations, industry stakeholders, non-governmental organizations, and research partners to address emerging challenges and opportunities in the Arctic environment. The Federal Government should strive to maintain the free flow of communication and cooperation with the State of Alaska to support national priorities.

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[26] *Implementation Plan for The National Strategy for the Arctic Region*, January 2014, 32 pp. The news release announcing the implementation plan is posted at http://www.whitehouse.gov/blog/2014/01/30/white-house-releases-implementation-plan-national-strategy-arctic-region. The document itself is posted at https://obamawhitehouse.archives.gov/sites/default/files/docs/implementation_plan_for_the_national_strategy_for_the_arctic_region_-_fi....pdf.

[27] *Implementation Plan for The National Strategy for the Arctic Region*, January 2014, p. 1.

[28] The passage contains a footnote at this point stating that this executive order was signed by the President on November 1, 2013. It is Executive Order 13653. The text of the order is posted at http://www.gpo.gov/fdsys/pkg/FR-2013-11-06/pdf/2013-26785.pdf and http://www.whitehouse.gov/the-press-office/2013/11/01/executive-order-preparing-united-states-impacts-climate-change. A fact sheet about it is posted at http://www.whitehouse.gov/the-press-office/2013/11/01/fact-sheet-executive-order-climate-preparedness.

> • Coordinate and Integrate Activities across the Federal Government. Multiple Federal bodies currently have authority for Arctic policy (e.g., the National Ocean Council (NOC), Arctic Policy Group, and Interagency Arctic Research Policy Committee (IARPC)). The National Security Council Staff will develop an Executive Order through the interagency process to maximize efficiency, align interagency initiatives, and create unity of effort among all Federal entities conducting activities in the Arctic.[29]

The plan outlines about 36 specific initiatives. For each, it presents a brief statement of the objective, a list of next steps to be taken, a brief statement about measuring progress in achieving the objective, and the names of the lead and supporting federal agencies to be involved.

On March 9, 2016, the Obama Administration released three documents discussing the implementation of the national strategy for the Arctic:[30] (1) a report entitled *2015 Year in Review—Progress Report on the Implementation of the National Strategy for the Arctic Region*;[31] (2) an appendix to that report entitled *Appendix A, Implementation Framework for the National Strategy for the Arctic Region*:[32] and (3) another appendix to that report entitled *Appendix B, Interagency Arctic Research Policy Committee 5-Year Plan Collaboration Teams: 2015 Summary of Accomplishments and 2016 Priorities*.[33]

January 2015 Executive Order for Enhancing Coordination of Arctic Efforts

On January 21, 2015, then-President Obama issued Executive Order 13689, entitled "Enhancing Coordination of National Efforts in the Arctic." The order states the following in part:

> As the United States assumes the Chairmanship of the Arctic Council, it is more important than ever that we have a coordinated national effort that takes advantage of our combined expertise and efforts in the Arctic region to promote our shared values and priorities.
>
> As the Arctic has changed, the number of Federal working groups created to address the growing strategic importance and accessibility of this critical region has increased. Although these groups have made significant progress and achieved important milestones, managing the broad range of interagency activity in the Arctic requires coordinated planning by the Federal Government, with input by partners and stakeholders, to facilitate Federal, State, local, and Alaska Native tribal government and similar Alaska Native organization, as well as private and nonprofit sector, efforts in the Arctic....
>
> There is established an Arctic Executive Steering Committee (Steering Committee), which shall provide guidance to executive departments and agencies (agencies) and enhance coordination of Federal Arctic policies across agencies and offices, and, where applicable,

[29] *Implementation Plan for The National Strategy for the Arctic Region*, January 2014, p. 4.

[30] For the text of the Obama Administration's announcement releasing these documents, see "Advancing Implementation of the National Strategy for the Arctic Region," March 9, 2016, accessed March 25, 2016, at https://www.whitehouse.gov/blog/2016/03/09/advancing-implementation-national-strategy-arctic-region.

[31] *2015 Year in Review—Progress Report on the Implementation of the National Strategy for the Arctic Region*, Prepared by the Arctic Executive Steering Committee, March 2016, 35 pp., accessed March 25, 2016, at https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/Progress%20Report%20on%20the%20Implementation%20of%20the%20National%20Strategy%20for%20the%20Arctic%20Region.pdf.

[32] *Appendix A, Implementation Framework for the National Strategy for the Arctic Region*, March 2016, 33 pp., accessed March 25, 2016, at https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/National%20Strategy%20for%20the%20Arctic%20Region%20Implementation%20Framework%20%28Appendix%20A%29%20Final.pdf.

[33] *Appendix B, Interagency Arctic Research Policy Committee 5-Year Plan Collaboration Teams: 2015 Summary of Accomplishments and 2016 Priorities*, undated, 13 pp., accessed March 25, 2016, at https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/Appendix%20B%20IARPC%202015%20Annual%20Report.pdf.

with State, local, and Alaska Native tribal governments and similar Alaska Native organizations, academic and research institutions, and the private and nonprofit sectors....

... the Steering Committee will meet quarterly, or as appropriate, to shape priorities, establish strategic direction, oversee implementation, and ensure coordination of Federal activities in the Arctic....

The Steering Committee, in coordination with the heads of relevant agencies and under the direction of the Chair, shall:

(a) provide guidance and coordinate efforts to implement the priorities, objectives, activities, and responsibilities identified in National Security Presidential Directive 66/Homeland Security Presidential Directive 25, Arctic Region Policy, the National Strategy for the Arctic Region and its Implementation Plan, and related agency plans;

(b) provide guidance on prioritizing Federal activities, consistent with agency authorities, while the United States is Chair of the Arctic Council, including, where appropriate, recommendations for resources to use in carrying out those activities; and

(c) establish a working group to provide a report to the Steering Committee by May 1, 2015, that:

(i) identifies potential areas of overlap between and within agencies with respect to implementation of Arctic policy and strategic priorities and provides recommendations to increase coordination and reduce any duplication of effort, which may include ways to increase the effectiveness of existing groups; and

(ii) provides recommendations to address any potential gaps in implementation....

It is in the best interest of the Nation for the Federal Government to maximize transparency and promote collaboration where possible with the State of Alaska, Alaska Native tribal governments and similar Alaska Native organizations, and local, private-sector, and nonprofit-sector stakeholders. To facilitate consultation and partnerships with the State of Alaska and Alaska Native tribal governments and similar Alaska Native organizations, the Steering Committee shall:

(a) develop a process to improve coordination and the sharing of information and knowledge among Federal, State, local, and Alaska Native tribal governments and similar Alaska Native organizations, and private-sector and nonprofit-sector groups on Arctic issues;

(b) establish a process to ensure tribal consultation and collaboration, consistent with my memorandum of November 5, 2009 (Tribal Consultation). This process shall ensure meaningful consultation and collaboration with Alaska Native tribal governments and similar Alaska Native organizations in the development of Federal policies that have Alaska Native implications, as applicable, and provide feedback and recommendations to the Steering Committee;

(c) identify an appropriate Federal entity to be the point of contact for Arctic matters with the State of Alaska and with Alaska Native tribal governments and similar Alaska Native organizations to support collaboration and communication; and

(d) invite members of State, local, and Alaska Native tribal governments and similar Alaska Native organizations, and academic and research institutions to consult on issues or participate in discussions, as appropriate and consistent with applicable law.[34]

[34] Executive order, "Enhancing Coordination of National Efforts in the Arctic," January 21, 2015, accessed January 21, 2015, at http://www.whitehouse.gov/the-press-office/2015/01/21/executive-order-enhancing-coordination-national-efforts-arctic.

U.S. Special Representative for the Arctic

On July 16, 2014, during the Obama Administration, then-Secretary of State John Kerry announced the appointment of retired Coast Guard Admiral Robert J. Papp Jr., who served as Commandant of the Coast Guard from May 2010 to May 2014, as the first U.S. Special Representative for the Arctic.[35] Under the Obama Administration, the duties of this position involved, among other things, interacting with ambassadors to the Arctic region from other countries. Papp served as the U.S. Special Representative until January 20, 2017, the final day of the Obama Administration and the first day of the Trump Administration; the position has gone unfilled since then.

Arctic Council[36]

Overview

A series of meetings initiated by Finland in 1989 led in 1996 to the creation of the Arctic Council via the Ottawa Declaration of September 19, 1996.[37] The council is "the leading intergovernmental forum promoting cooperation, coordination and interaction among the Arctic States, Arctic indigenous communities and other Arctic inhabitants on common Arctic issues, in particular on issues of sustainable development and environmental protection in the Arctic."[38] Specific issues addressed by the council include regional development, the environment, emergency response, climate change, and natural resource extraction.[39] The council states that its mandate, "as articulated in the Ottawa Declaration, explicitly excludes military security."[40] The council's standing Secretariat formally became operational in 2013 in Tromsø, Norway.

Eight Member States

The Arctic Council's membership consists of the eight countries that have sovereign territory within the Arctic Circle: the United States, Canada, Russia, Iceland, Norway, Sweden, Finland, and Denmark (by virtue of its territory Greenland). The council states that "decisions at all levels in the Arctic Council are the exclusive right and responsibility" of these eight states.[41]

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[35] See "Retired Admiral Robert Papp to Serve as U.S. Special Representative for the Arctic," Press Statement, John Kerry, Secretary of State, Washington, DC, July 16, 2014, accessed July 17, 2014, at http://www.state.gov/secretary/remarks/2014/07/229317.htm.

[36] This section includes some material originally prepared by Carl Ek, who was a Specialist in International Relations, Foreign Affairs, Defense, and Trade Division, until his retirement on April 30, 2014.

[37] See Arctic Council, "Ottawa Declaration (1996)," accessed July 23, 2018, at https://oaarchive.arctic-council.org/handle/11374/85.

[38] Arctic Council, "The Arctic Council: A Backgrounder," updated January 3, 2018, accessed July 23, 2018, at https://arctic-council.org/index.php/en/about-us.

[39] See also Arctic Council, "Thematic Work," accessed July 23, 2018, at https://arctic-council.org/index.php/en/our-work.

[40] Arctic Council, "The Arctic Council: A Backgrounder," updated January 3, 2018, accessed July 23, 2018, at https://arctic-council.org/index.php/en/about-us.

[41] Arctic Council, "The Arctic Council: A Backgrounder," updated January 3, 2018, accessed July 23, 2018, at https://arctic-council.org/index.php/en/about-us.

Indigenous Permanent Participants

In addition to the eight member states, "six organizations representing Arctic indigenous peoples have status as Permanent Participants. The category of Permanent Participant was created to provide for active participation and full consultation with the Arctic indigenous peoples within the council. They include: the Aleut International Association, the Arctic Athabaskan Council, Gwich'in Council International, the Inuit Circumpolar Council, Russian Association of Indigenous Peoples of the North and the Saami Council."[42]

Observers

Thirteen states have been approved as observers to the Arctic Council: Germany, the Netherlands, Poland, and the United Kingdom (approved in 1998); France (2000); Spain (2006); China, India, Italy, Japan, Singapore, and South Korea (2013); and Switzerland (2017). In addition, 13 intergovernmental and interparliamentary organizations and 13 nongovernmental organizations have been approved as observers, making for a total of 39 observer states or organizations.[43]

Working Groups

The Arctic Council's work is carried out primarily in six working groups that focus on Arctic contaminants; Arctic monitoring and assessment; conservation of Arctic flora and fauna; emergency prevention, preparedness and response; protection of the Arctic marine environment; and sustainable development. The council may also establish task forces or expert groups for specific projects.

Chairmanships

The council has a two-year chairmanship that rotates among the eight member states. The United States held the chairmanship from April 24, 2015, to May 11, 2017, a period which began during the Obama Administration and continued into the first 16 weeks of the Trump Administration.[44] The United States had previously held the chairmanship from 1998 to 2000, and will next hold it in 2031-2033. During the Obama Administration's portion of the period of U.S. chairmanship, the U.S. chairmanship team was led by then-Secretary of State John Kerry.[45] For a statement from the Obama Administration regarding U.S. goals for the Obama Administration's portion of the U.S. period of chairmanship, see **Appendix E**.

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[42] Arctic Council, "The Arctic Council: A Backgrounder," updated January 3, 2018, accessed July 23, 2018, at https://arctic-council.org/index.php/en/about-us.

[43] Arctic Council, "Observers," updated Jannuary 17, 2018, accessed July 23, 2018, at https://arctic-council.org/index.php/en/about-us/arctic-council/observers.

[44] See, for example, Yereth Rosen, "US Ends Arctic Council Chairmanship With Reluctance on Climate Action," *Alaska Dispatch News*, May 11, 2017.

[45] The State Department during the Obama Administration listed nine additional members of the team, including retired Coast Guard Admiral Robert J. Papp Jr., U.S. Special Representative for the Arctic. ("Meet the U.S. Chairmanship Team," accessed September 29, 2015, at http://www.arctic-council.org/index.php/en/about-us/arctic-council/u-s-chairmanship.) The other eight members of the team were the Honorable Fran Ulmer, Special Advisor to the U.S. Secretary of State on Arctic Science and Policy; Ambassador David Balton, Chair of the Senior Arctic Officials; Julia Gourley, U.S. Senior Arctic Official (SAO); Dr. Nikoosh Carlo, Senior Advisor to the SAO Chair; Dr. Adrianna Muir, Deputy Senior Arctic Official; Nomi Seltzer, Arctic Affairs Advisor; Erin Robertson, Arctic Press and Public Affairs Officer; and Matthew Kastrinsky, Administrative Officer.

On May 11, 2017, the chairmanship of the Arctic Council was transferred from the United States to Finland. A May 11, 2017, press report states the following: "Finland's chairmanship program emphasizes climate change and ways the Paris emissions targets can mitigate it, said Timo Soini, Finland's foreign minister. 'We recognize that global warming is the main driver of change in the Arctic,' Soini said."[46]

Senior Arctic Officials (SAOs)

Each member state is represented by a Senior Arctic Official (SAO), who is usually drawn from that country's foreign ministry. The SAOs hold meetings every six months. The council convenes ministerial-level meetings every two years, at the end of each chairmanship, while the working groups meet more frequently.

Limits of Arctic Council as a Governing Body

Regarding the limits of the Arctic Council as a governing body, the council states that it "does not and cannot implement or enforce its guidelines, assessments or recommendations. That responsibility belongs to each individual Arctic State." In addition, as mentioned earlier, the council states that "the Arctic Council's mandate, as articulated in the [1996] Ottawa Declaration [establishing the Council], explicitly excludes military security."[47]

The Arctic and the U.N. Convention on Law of the Sea (UNCLOS)[48]

Background to UNCLOS

In November 1994, the United Nations Convention on the Law of the Sea (UNCLOS) entered into force. UNCLOS establishes a treaty regime to govern activities on, over, and under the world's oceans. It builds on four 1958 law of the sea conventions to which the United States is a party, and sets forth a framework for future activities in parts of the oceans that are beyond national jurisdiction.[49] As of December 13, 2018, 168 nations were party to the treaty.[50] The 1982 Convention and its 1994 Agreement relating to Implementation of Part XI of the Convention were transmitted to the Senate on October 6, 1994.[51] In the absence of Senate advice and consent to adherence, the United States is not a party to the convention and agreement.

[46] Yereth Rosen, "US Ends Arctic Council Chairmanship With Reluctance on Climate Action," *Alaska Dispatch News*, May 11, 2017.

[47] Arctic Council, "The Arctic Council: A Backgrounder," updated January 3, 2018, accessed July 23, 2018, at https://arctic-council.org/index.php/en/about-us.

[48] This section prepared by Marjorie Ann Browne, who was a Specialist in International Relations, Foreign Affairs, Defense, and Trade Division until her retirement from CRS on October 10, 2015.

[49] The four conventions adopted in 1958 to which the United States is a party are the Convention on the Territorial Sea and the Contiguous Zone, the Convention on the High Seas, the Convention on the Continental Shelf, and the Convention on Fishing and Conservation of the Living Resources of the High Seas.

[50] Chronological lists of ratifications of, accessions and successions to the Convention and the related Agreements as of February 3, 2017, accessed December 13, 2018, at http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm#.

[51] Treaty Document 103-39.

Part VI of UNCLOS and Commission on Limits of Continental Shelf

Part VI of the convention, dealing with the Continental Shelf, and Annex II, which established a Commission on the Limits of the Continental Shelf, are most pertinent to the Arctic as it becomes more accessible ocean space, bordered by five coastal states.[52] The convention gives a coastal state sovereign jurisdiction over the resources, including oil and gas, of its continental shelf.[53] Under Article 76 of the convention, a coastal state with a broad continental margin may establish a shelf limit beyond 200 nautical miles. This jurisdiction is subject to the submission of the particulars of the intended limit and supporting scientific and technical data by the coastal state to the commission for review and recommendation.[54] The commission reviews the documentation and, by a two-thirds majority, approves its recommendations to the submitting state. Coastal states agree to establish the outer limits of their continental shelf, in accordance with this process and with their national laws. In instances of disagreement with the commission's recommendations, the coastal state may make a revised or new submission. The actions of the commission "shall not prejudice matters relating to delimitation of boundaries between States with opposite or adjacent coasts."[55] The "limits established by a coastal State on the basis of these recommendations shall be final and binding."[56]

Extended Continental Shelf and United States as a Nonparty to UNCLOS

The U.S. government's State Department-led interagency Extended Continental Shelf Project makes the following points regarding the extended continental shelf and the United States as a nonparty to UNCLOS:

- As a nonparty to UNCLOS, U.S. nationals may not serve as members of the Commission on the Limits of the Continental Shelf.
- The question of whether nonparties may make a submission to the commission has not been resolved.[57]

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[52] Other relevant provisions of the Convention, applicable depending on the extent of Arctic melting, relate to navigation, high seas freedoms, fisheries, and exclusive economic zones.

[53] The continental shelf is the under-sea extension of a coastal state's land territory. Article 76 of the Convention defines the continental shelf, *inter alia*, as "the seabed and subsoil of the submarine areas that extend beyond its [coastal state's] territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin."

[54] A coastal State party has 10 years from the entry into force of the Convention for submission of information on its proposed limits. In May 2001, the Meeting of States Parties to the Convention decided that for any State for which the Convention entered into force before May 13, 1999, the date of commencement of the 10-year time period for making submissions to the commission is May 13, 1999.

[55] Annex II, Article 9. Article 83 of the Convention provides that questions relating to these boundary delimitation disputes shall be resolved by agreement between the States or by the Dispute Settlement options set forth in Part XV of the Convention.

[56] Article 76, para. 8.

[57] The State Department states the following:

> Paragraph 8 of Article 76 (as well as the relevant provisions of Annex II) refers to "coastal States" making submissions. This differs from many other provisions of the Convention (e.g., the nomination of members of the Commission, noted above) that refer expressly to "States Parties". In brief, in 1997, the Commission posed to the Meeting of States Parties to the Law of the Sea Convention (SPLOS) the question of whether "the terms 'a coastal State' and 'a State' include a non-State party to the Convention, or do they only refer to a coastal State or a State which is a State Party to the Convention?" The matter was debated and but not resolved. It will likely not be settled until/unless a non-Party makes a submission, at which point the Commission will need to decide

- Becoming a party to UNCLOS would help the United States maximize international recognition and legal certainty regarding the outer limits of the U.S. continental shelf. Even for nonparties to UNCLOS, however, customary international law, as reflected in UNCLOS, confers on coastal states rights and obligations relating to the continental shelf. This view is well supported in international law. The International Court of Justice, for example, has already declared Article 76(1) to have the status of customary international law (Nicaragua v. Colombia, 2012). Article 76(1) provides that the continental shelf extends to "the outer edge of the continental margin or to a distance of 200 nautical miles," whichever is further. Paragraphs 2 through 7 of Article 76 set forth the detailed rules for determining the precise outer limits of the continental shelf in those areas where the continental margin extends beyond 200 nautical miles from shore. The United States, like other countries, is using these provisions to determine its continental shelf limits. As a matter of customary international law, the United States also respects the continental shelf limits of other countries that abide by Article 76.
- The commission is not a claims process, and continental shelf entitlement does not depend on going through this procedure. The mandate of the commission is instead to make "recommendations" on the "outer limits" of the continental shelf. The word "claim" does not appear in Article 76, Annex II, or the commission's rules. Article 77(3) and the case law of the International Court of Justice indicate that continental shelf rights exist as a matter of fact and do not need to be expressly claimed.
- Delineating the continental shelf is a very complex and technical exercise, and the commission's process is important for obtaining international recognition and legal certainty of the outer limits of the continental shelf.
- The United States has potentially overlapping extended continental shelf areas with two countries in the Arctic—Russia and Canada.
    - The United States and the Soviet Union (now Russia) agreed to a maritime boundary, including in the Arctic, in 1990. The treaty was approved by the U.S. Senate in 1991; it has not been approved by Russia's Duma. Pending the treaty's entry into force, the two countries continue to provisionally apply the terms of the treaty. In determining its extended continental shelf limits, Russia has respected this agreement. Russia has not asserted an extended continental shelf in any areas that might be considered part of the U.S. extended continental shelf. The Russian submission to the commission respects the U.S.-Russia maritime boundary.
    - Canada and the United States have not yet established a maritime boundary in the Arctic. The United States and Canada have cooperated extensively to collect the data necessary to define the continental shelf in the Arctic Ocean. The areas where the continental shelf of the United States and Canada overlap will not be fully known until both countries determine the extent of their extended continental shelf in the Arctic Ocean. Once those areas are

the matter (perhaps with input from States or other entities).

(Source: U.S. Department of State, Legal Counsel for U.S. Extended Continental Shelf Project, email to CRS dated January 20, 2016.)

> identified, the United States and Canada will address the maritime boundary on a bilateral basis at an appropriate time.[58]

Over the years, the United States has submitted observations on submissions to the commission made by other states, requesting that those observations be made available online and to the commission. In addition, since 2001, the United States has gathered and analyzed data to determine the outer limits of its extended continental shelf. Starting in 2007, this effort became the Extended Continental Shelf Project.[59]

Additional Points

Some observers have suggested that a separate international legal regime be negotiated to address the changing circumstances in the Arctic. They maintain that these changing circumstances were not envisioned at the time UNCLOS was negotiated. Other observers suggest that the Arctic region above a certain parallel be designated a wilderness area. As precedent, they cite Article 4 of the Antarctic Treaty, under which any current claims to sovereign territory are frozen and

> No acts or activities taking place while the present Treaty is in force shall constitute a basis for asserting, supporting or denying a claim to territorial sovereignty in Antarctica or create any rights of sovereignty in Antarctica. No new claim, or enlargement of an existing claim, to territorial sovereignty in Antarctica shall be asserted while the present Treaty is in force.

Supporters of UNCLOS maintain that changing circumstances in the Arctic strengthen their argument that the United States should become a party to the convention. In this way, they argue, the United States can be best situated to protect and serve its national interests, under both Article 76 and other parts of UNCLOS.[60]

The Obama Administration's January 2014 implementation plan for its national strategy for the Arctic region (see discussion above) includes, as one of its 36 or so initiatives, one entitled "Accede to the Law of the Sea Convention." Under this initiative, the State Department and other federal agencies are to "continue to seek the Senate's advice and consent to accede to the Law of the Sea Convention." The document states that "the [Obama] Administration is committed, like the last three Administrations, to pursuing accession to the Convention on the Law of the Sea and will continue to place a priority on attaining Senate advice and consent to accession."[61]

Senate Arctic Caucus

On March 4 and 5, 2015, Senator Lisa Murkowski and Senator Angus King announced the formation of a Senate Arctic Caucus "to spotlight this region and open up a wider conversation about the nation's future in the region as America prepares to accede to the Chair of the Arctic Council."[62]

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[58] Sources: U.S. Department of State, Legal Counsel for U.S. Extended Continental Shelf Project, email to CRS dated January 20, 2016, and the Extended Continental Shelf Project website at http://www.continentalshelf.gov/, accessed March 25, 2016.

[59] For more information, see http://www.continentalshelf.gov/.

[60] See, for example, Steve Haycox, "Why Signing the Law of the Sea Treaty Would Mean a Tougher U.S. Position in the Arctic," *Anchorage Daily News*, March 22, 2018; Ben Werner, "Zukunft: U.S. Presence in Arctic Won't Stop Chinese, Russian Encroachment Without Law of the Sea Ratification," *USNI News*, August 1, 2017; John Grady, "Senators Renew Call to Ratify Law of the Sea Treaty to Help Chart Future of the Arctic," *USNI News*, July 19, 2017.

[61] *Implementation Plan for The National Strategy for the Arctic Region*, January 2014, p. 29.

[62] Press release from the office of Senator Angus King, "King, Murkowski Announce U.S. Senate Arctic Caucus,"

Issues for Congress

Climate Change and Loss of Arctic Sea Ice[63]

Record low extents of Arctic sea ice in 2012 and 2007 have focused scientific and policy attention on climate changes in the high north, and on the implications of projected ice-free[64] seasons in the Arctic within decades. The Arctic has been projected by several scientists to be ice-free in most late summers as soon as the 2030s.[65] This opens opportunities for transport through the Northwest Passage and the Northern Sea Route, extraction of potential oil and gas resources, and expanded fishing and tourism (**Figure 3**).

More broadly, physical changes in the Arctic include warming ocean, soil, and air temperatures; melting permafrost; shifting vegetation and animal abundances; and altered characteristics of Arctic cyclones. All these changes are expected to affect traditional livelihoods and cultures in the region and survival of polar bear and other animal populations, and raise risks of pollution, food supply, safety, cultural losses, and national security. Moreover, linkages ("teleconnections") between warming Arctic conditions and extreme events in the mid-latitude continents are increasingly evident, identified in such extreme events as the heat waves and fires in Russia in 2010; severe winters in the eastern United States and Europe in 2009/2010 and in Europe in 2011/2012;[66] and Indian summer monsoons and droughts. Hence, changing climate in the Arctic suggests important implications both locally and across the Hemisphere.

March 4, 2015, accessed March 17, 2015, at http://www.king.senate.gov/newsroom/press-releases/king-murkowski-announce-us-senate-arctic-caucus. See also press release from the office of Senator Lisa Murkowski, "Senators Murkowski, King Announce U.S. Senate Arctic Caucus," March 5, 2015, accessed March 17, 2015, at http://www.murkowski.senate.gov/public/index.cfm/pressreleases?ID=1ce5edcb-540d-4c43-b264-56bdbb570755, which includes a similar phrase.

[63] This section prepared by Jane Leggett, Specialist in Energy and Environmental Policy, Resources, Science, and Industry Division.

[64] In scientific analyses, "ice-free" does not necessarily mean "no ice." The definition of "ice-free" or sea ice "extent" or "area" varies across studies. Sea ice "extent" is one common measure, equal to the sum of the area of grid cells that have ice concentration of less than a set percentage—frequently 15%. For more information, see the National Snow and Ice Data Center, http://nsidc.org/seaice/data/terminology.html.

[65] Muyin Wang and James E. Overland, "A Sea Ice Free Summer Arctic within 30 Years?," *Geophysical Research Letters* 36, no. L07502 (April 3, 2009): 10.1029/2009GL037820; Marika Holland, Cecilia M. Bitz, and Bruno Tremblay, "Future abrupt reductions in the summer Arctic sea ice," *Geophysical Research Letters* 33, no. L23503 (2006); But see also Julien Boé, Alex Hall, and Xin Qu, "Sources of spread in simulations of Arctic sea ice loss over the twenty-first century," *Climatic Change* 99, no. 3 (April 1, 2010): 637-645; I. Eisenman and J. S. Wettlaufer, "Nonlinear threshold behavior during the loss of Arctic sea ice," *Proceedings of the National Academy of Sciences* 106, no. 1 (January 6, 2009): 28-32; Dirk Notz, "The Future of Ice Sheets and Sea Ice: Between Reversible Retreat and Unstoppable Loss," *Proceedings of the National Academy of Sciences* 106, no. 49 (December 8, 2009): 20590-20595.

[66] Overland et al., state that "a warm Arctic-cold continent pattern represents a paradox of recent global warming: there is not a uniform pattern of temperature increases" due to a set of newly recognized processes described in Overland, J. E, K. R Wood, and M. Wang. "Warm Arctic-cold Continents: Climate Impacts of the Newly Open Arctic Sea." *Polar Research* 30 (2011). The authors raise a critical, unanswered question, "Is the observed severe mid-latitude weather in two adjacent years simply due to an extreme in chaotic processes alone, or do they included a partial but important Arctic forcing and connection due to recent changing conditions?" In other words, are recent patterns random anomalies, or might we expect more of the same?; among other examples, see also Lim, Young-Kwon, and Siegfried D. Schubert. "The Impact of ENSO and the Arctic Oscillation on Winter Temperature Extremes in the Southeast United States." *Geophysical Research Letters* 38, no. 15 (August 11, 2011): L15706.

Figure 3. Arctic Sea Ice Extent in September 2008, Compared with Prospective Shipping Routes and Oil and Gas Resources

Source: Graphic by Stephen Rountree at *U.S. News and World Report*, http://www.usnews.com/articles/news/world/2008/10/09/global-warming-triggers-an-international-race-for-the-artic/photos/#1.

Like the rest of the globe, temperatures in the Arctic have varied[67] but show a significant warming trend since the 1970s, and particularly since 1995.[68] The annual average temperature for the Arctic region (from 60° to 90° N) is now about 1.8° F warmer than the "climate normal" (the average from 1961 to 1990). Temperatures in October-November are now about 9° F above the seasonal normal. Scientists have concluded that most of the *global* warming of the last three decades is very likely caused by human-related emissions of greenhouse gases (GHG, mostly carbon dioxide); they expect the GHG-induced warming to continue for decades, even if, and after, GHG concentrations in the atmosphere have been stabilized. The extra heat in the Arctic is amplified by processes there (the "polar amplification") and may result in irreversible changes on human timescales.

The observed warmer temperatures along with rising cyclone size and strength in the Arctic have reduced sea ice extent, thickness, and ice that persists year-round ("perennial ice"); natural climate variability has likely contributed to the record low ice extents of 2007 and 2012. The 2007 minimum sea ice extent was influenced by warm Arctic temperatures and warm, moist winds blowing from the North Pacific into the central Arctic, contributing to melting and pushing ice toward and into the Atlantic past Greenland. Warm winds did not account for the near-record sea ice minimum in 2008.[69] In early August 2012, an unusually large storm with low pressure developed over the Arctic, helping to disperse the already weak ice into warmer waters and accelerating its melt rate. By August 24, 2012, sea ice extent had shrunk below the previous observed minimum of late September 2007.[70]

Modeling of GHG-induced climate change is particularly challenging for the Arctic, but it consistently projects warming through the 21st century, with annual average Arctic temperature increases ranging from +1° to +9.0° C (+2° to +19.0° F), depending on the GHG scenario and model used. While such warming is projected by most models throughout the Arctic, some models project slight cooling localized in the North Atlantic Ocean just south of Greenland and Iceland. Most warming would occur in autumn and winter, "with very little temperature change projected over the Arctic Ocean" in summer months.[71]

Due to observed and projected climate change, scientists have concluded that the Arctic will have changed from an ice-covered environment to a recurrent ice-free[72] ocean (in summers) as soon as the late 2030s. The character of ice cover is expected to change as well, with the ice being

[67] There was a regionally warm period in the Arctic from the mid-1920s to around 1940, which scientists have assessed to have been driven by natural climate variability. They have found that period to be distinctly different from the recent multi-decadal warming, in part because the early 20th century warming was concentrated in the northern high latitudes. See, for example, Figure 2, upper left graphic, in Geophysical Fluid Dynamics Laboratory, "Simulatoin of Early 20th Century Warming," at http://www.gfdl.noaa.gov/early-20th-century-global-warming.

[68] Steele, Michael, Wendy Ermold, and Jinlun Zhang. "Arctic Ocean Surface Warming Trends over the Past 100 Years." *Geophysical Research Letters* 35, no. 2 (January 29, 2008): L02614.

[69] J. Overland, J. Walsh, and M. Wang, *Arctic Report Card - Atmosphere* (NOAA Arctic Research Program, October 6, 2008), ftp://ftp.oar.noaa.gov/arctic/documents/ArcticReportCard_full_report2008.pdf.

[70] National Snow and Ice Data Center, "Arctic sea ice extent breaks 2007 record low" (August 27, 2012); Japanese Aerospace Exploration Agency, "A new record minimum of the Arctic sea ice extent was set on 24 August 2012"; Arctic ROOS (Norway), "Daily Updated Time series of Arctic sea ice area and extent derived from SSMI data provided by NERSC," at http://arctic-roos.org/observations/satellite-data/sea-ice/ice-area-and-extent-in-arctic.

[71] William L. Chapman and John E. Walsh, "Simulations of Arctic Temperature and Pressure by Global Coupled Models," *Journal of Climate* 20, no. 4 (February 1, 2007): 609-632.

[72] See footnote 64. Also, although one Canadian scientist has predicted that recurrent ice-free summers may begin sometime between 2013 and 2020, this is not consistent with other climate models' projections.

thinner, more fragile, and more regionally variable. The variability in recent years of both ice quantity and location could be expected to continue.

Extended Continental Shelf Submissions, Territorial Disputes, and Sovereignty Issues[73]

Extended Continental Shelf Submissions

Motivated in part by a desire to exercise sovereign control over the Arctic region's increasingly accessible oil and gas reserves (see "Oil, Gas, and Mineral Exploration"), the four Arctic coastal states other than the United States—Canada, Russia, Norway, and Denmark (of which Greenland is a territory)—have made or are in the process of preparing submissions to the Commission on the Limits of the Continental Shelf regarding the outer limits of their extended continental shelves. (For further discussion of the commission, see "Extended Continental Shelf and United States as a Nonparty to UNCLOS.")

Russia has been attempting to chart the Arctic Ocean's enormous underwater Lomonosov Ridge in an attempt to show that it is an extension of Russia's continental margin. The ridge spans a considerable distance across the Arctic Ocean. A 2001 submission by Russia was rejected as insufficiently documented. Canada views a portion of the ridge as part of its own continental shelf.[74]

In August 2007, a Russian submersible on a research expedition deposited an encased Russian Federation flag on the seabed of the presumed site of the North Pole. The action captured worldwide attention, but analysts note that it did not constitute an official claim to the Arctic seabed or the waters above it, that it has no legal effect, and that it therefore was a purely symbolic act.

At a May 2008 meeting in Ilulissat, Greenland, the five Arctic coastal states reaffirmed their commitment to the UNCLOS legal framework for the establishment of extended continental shelf limits in the Arctic.[75] (For further discussion, see "Extent of the Continental Margin" in "Oil, Gas, and Mineral Exploration.")

Territorial Disputes and Sovereignty Issues

In addition to this process, there are four unresolved Arctic territorial disputes:

- Scientists have forecast that in coming decades, global warming will reduce the ice pack in Canada's northern archipelago sufficiently to permit ships to use the trans-Arctic shipping route known as the Northwest Passage during the summer months (see "Commercial Sea Transportation"). The prospect of such traffic raises a major jurisdictional question. Ottawa maintains that such a passage would be an inland waterway, and would therefore be sovereign Canadian territory subject to Ottawa's surveillance, regulation, and control. The United States, the European Union, and others assert that the passage would constitute an international strait between two high seas.

[73] This section was prepared by Carl Ek, who was a Specialist in International Relations, Foreign Affairs, Defense, and Trade Division, until his retirement on April 30, 2014. For questions relating to this section, contact Derek E. Mix, Analyst in European Affairs, Foreign Affairs, Defense, and Trade Division.

[74] "Russia, Canada Make Competing Claims To Arctic Resources," *The Canadian Press*, September 16, 2010.

[75] "5 Countries Agree To Talk, Not Compete, Over the Arctic," *New York Times*, May 29, 2008.

- The United States and Canada are negotiating over a binational boundary in the Beaufort Sea.
- The United States and Russia in 1990 signed an agreement regarding a disputed area of the Bering Sea; the U.S. Senate ratified the pact the following year, but the Russian *Duma* has yet to approve the accord.
- Denmark and Canada disagree over which country has the territorial right to Hans Island, a tiny, barren piece of rock between Greenland and Canada's Ellesmere Island. Some analysts believe the two countries are vying for control over a future sea lane that might be created if the Arctic ice were to melt sufficiently to create a Northwest Passage. Others claim that the governments are staking out territorial claims in the event that future natural resource discoveries make the region economically valuable.[76]

In addition to these disputes, Norway and Russia had been at odds for decades over the boundary between the two in the so-called "Grey Zone" in the Barents Sea, an area believed to hold rich undersea deposits of petroleum. On September 15, 2010, Norwegian Prime Minister Jens Stoltenberg and Russian President Dmitry Medvedev signed an agreement in Murmansk, a Russian city near the Norwegian border. The accord awards roughly half of the 175,000-square-kilometer area to each country; it spells out fishing rights, and provides for the joint development of future oil and gas finds that straddle the boundary line. Some observers believe it is noteworthy that Russia would concede sovereignty over such a large, resource-rich area to a small, neighboring country. But others have noted that Moscow may be hoping for Norwegian cooperation in developing offshore resources, and eventually in winning approval when Russia makes its Article 76 UNCLOS submission.[77]

In August 2010, Canadian Foreign Minister Lawrence Cannon announced a new "Statement of Canada's Arctic Policy," which reaffirmed the government's commitment to Canada's sovereignty in the region, to economic and social development, to environmental protection, and to empowerment of the peoples in the north. The statement also emphasized the government's intention to negotiate settlements to its disputes with the United States over the Beaufort Sea boundary, and with Denmark over Hans Island. Minister Cannon declared that "making progress on outstanding boundary issues will be a top priority."[78] Also, despite their dispute over Hans Island, Canada and Denmark have been working together on Arctic issues. In May 2010, the two countries' military chiefs of staffs signed a memorandum of understanding on Arctic Defense, Security, and Operational Cooperation, committing the two countries to "enhanced consultation, information exchange, visits, and exercises."[79]

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[76] For additional information, see Natalie Mychajlyszyn, *The Arctic: Geopolitical Issues*, Canadian Library of Parliament, October 24, 2008.

[77] "Russia, Norway Sign Deal On Barents Sea Border, Seek More Development in Mineral-rich Arctic," *Associated Press*, September 15, 2010.

[78] Cannon quoted in "Canada Seeks To Settle Arctic Borders," *Agence France Presse*, August 20, 2010. For additional information concerning Canada's August statement on Arctic policy, see "Statement on Canada's Arctic foreign policy: Exercising sovereignty and promoting Canada's Northern Strategy abroad," Foreign Affairs and International Trade Canada website, http://www.international.gc.ca/polar-polaire/canada_arctic_foreign_policy-la_politique_etrangere_du_canada_pour_arctique.aspx?lang=eng.

[79] "Canada and Denmark Sign Arctic Cooperation Arrangement," *Targeted News Service*, May 17, 2010.

Commercial Sea Transportation[80]

Background

The search for a shorter route from the Atlantic to Asia has been the quest of maritime powers since the Middle Ages. The melting of Arctic ice raises the possibility of saving several thousands of miles and several days of sailing between major trading blocs.[81] If the Arctic were to become a viable shipping route, the ramifications could extend far beyond the Arctic. For example, lower shipping costs could be advantageous for China (at least its northeast region), Japan, and South Korea because their manufactured products exported to Europe or North America could become less expensive relative to other emerging manufacturing centers in Southeast Asia, such as India.[82] Melting ice could potentially open up two trans-Arctic routes (see **Figure 3**):[83]

- **The Northern Sea Route** (NSR, a.k.a. the "Northeast Passage"), along Russia's northern border from Murmansk to Provideniya, is about 2,600 nautical miles in length. It was opened by the Soviet Union to domestic shipping in 1931 and to transit by foreign vessels in 1991. This route would be applicable for trade between northeast Asia (north of Singapore) and northern Europe. In recent summers, less than a handful of large, non-Russian-flagged cargo ships have transited the NSR.[84] Russia reportedly seeks to reserve carriage of oil and gas extracted along the NSR to Russian-flagged ships.[85]
- **The Northwest Passage** (NWP) runs through the Canadian Arctic Islands. The NWP actually consists of several potential routes. The southern route is through Peel Sound in Nunavut, which has been open in recent summers and contains mostly one-year ice. However, this route is circuitous, contains some narrow channels, and is shallow enough to impose draft restrictions on ships. The more northern route, through McClure Strait from Baffin Bay to the Beaufort Sea north of Alaska, is much more direct and therefore more appealing to ocean carriers, but more prone to ice blockage.[86] The NWP is potentially applicable for trade between northeast Asia (north of Shanghai) and the northeast of North America, but it is less commercially viable than the NSR.[87] Cargo ship transits have been extremely rare but cruise vessel excursions and research vessels are more common.

[80] This section prepared by John Frittelli, Specialist in Transportation Policy, Resources, Science, and Industry Division.

[81] Extended daylight hours in the Arctic during the summer may also be an advantage.

[82] Presentation by Stephen Carmel, Senior Vice President, Maersk Line Ltd., Halifax International Security Forum, *Arctic Security: The New Great Game?* November 21, 2009, available at http://fora.tv/.

[83] A third but more remote possibility is a route directly over the North Pole.

[84] Northern Sea Route Information Office; http://www.arctic-lio.com/.

[85] The Independent Barents Observer, "Icebreaking Tankers Have Course for Russia's New Arctic LNG Plant, And They All Carry Foreign Flags," December 11, 2017; https://thebarentsobserver.com/en/industry-and-energy/2017/12/icebreaking-tankers-have-course-russias-new-arctic-lng-plant-and-they.

[86] This was the route pioneered by the *SS Manhattan*, an oil tanker modified for ice breaking in 1969 to carry Alaskan North Slope oil to the Atlantic. This was the first commercial passage through the NWP, but the building of the Alaskan pipeline was found to be the more economical means of transporting oil from the North Slope to the lower 48 states.

[87] Although the NWP is often compared to the alternative route through the Panama Canal in terms of distance and sailing days from Asia to the U.S. east coast, another alternative to consider is the shorter and faster transcontinental rail route across Canada or the United States.

Destination Traffic, Not Trans-Arctic Traffic

Most cargo ship activity currently taking place in the Arctic is to transport natural resources from the Arctic or to deliver general cargo and supplies to communities and natural resource extraction facilities. Thus, cargo ship traffic in the Arctic presently is mostly regional, not trans-Arctic. While there has been a recent uptick in Arctic shipping activity, this activity has more to do with a spike in commodity prices than it does with the melting of Arctic ice. Even so, fewer ships ply the Arctic seas now than in the past. The NSR continues to account for the bulk of Arctic shipping activity.

Unpredictable Ice Conditions Hinder Trans-Arctic Shipping

Arctic waters do not necessarily have to be ice free to be open to shipping. Multiyear ice can be over 10 feet thick and problematic even for icebreakers, but one-year ice is typically 3 feet thick or less. This thinner ice can be more readily broken up by icebreakers or ice-class ships (cargo ships with reinforced hulls and other features for navigating in ice-infested waters). However, more open water in the Arctic has resulted in another potential obstacle to shipping: unpredictable ice flows. In the NWP, melting ice and the opening of waters that were once covered with one-year ice has allowed blocks of multiyear ice from farther north and icebergs from Greenland to flow into potential sea lanes. The source of this multiyear ice is not predicted to dissipate in spite of climate change. Moreover, the flow patterns of these ice blocks are very difficult to forecast.[88] Thus, the lack of ice in potential sea lanes during the summer months can add even greater unpredictability to Arctic shipping. This is in addition to the extent of ice versus open water, which is also highly variable from one year to the next and seasonally.

The unpredictability of ice conditions is a major hindrance for trans-Arctic shipping in general, but can be more of a concern for some types of ships than it is for others. For instance, it would be less of a concern for cruise ships, which may have the objective of merely visiting the Arctic rather than passing through and could change their route and itinerary depending on ice conditions. On the other hand, unpredictability is of the utmost concern for container ships that carry thousands of containers from hundreds of different customers, all of whom expect to unload or load their cargo upon the ship's arrival at various ports as indicated on the ship's advertised schedule. The presence of even small blocks of ice or icebergs from a melting Greenland ice sheet requires slow sailing and could play havoc with schedules. Ships carrying a single commodity in bulk from one port to another for just one customer have more flexibility in terms of delivery windows, but would not likely risk an Arctic passage under prevailing conditions.

Ice is not the sole impediment to Arctic shipping. The region frequently experiences adverse weather, including not only severe storms, but also intense cold, which can impair deck machinery. During the summer months when sea lanes are open, heavy fog is common in the Arctic.

Commercial ships would face higher operating costs on Arctic routes than elsewhere. Ship size is an important factor in reducing freight costs. Many ships currently used in other waters would require two icebreakers to break a path wide enough for them to sail through; ship owners could reduce that cost by using smaller vessels in the Arctic, but this would raise the cost per container or per ton of freight.[89] Also, icebreakers or ice-class cargo vessels burn more fuel than ships

[88] S.E.L. Howell and J.J. Yackel, "A Vessel Transit Assessment of Sea Ice Variability in the Western Arctic, 1969-2002: Implications for Ship Navigation," *Canadian Journal of Remote Sensing*, vol. 30, no. 2, 2004.

[89] "Arctic Unlikely to See Major Shipping Growth," *New Zealand Transport and Logistics Business Week*, April 24, 2008.

designed for more temperate waters and would have to sail at slower speeds. The shipping season in the Arctic only lasts for a few weeks, so icebreakers and other special required equipment would sit idle the remainder of the year. None of these impediments by themselves may be enough to discourage Arctic passage but they do raise costs, perhaps enough to negate the savings of a shorter route. Thus, from the perspective of a shipper or a ship owner, shorter via the Arctic does not necessarily mean cheaper and faster.[90]

Basic Navigation Infrastructure Is Lacking

Considerable investment in navigation-related infrastructure would be required if trans-Arctic shipping were to become a reality. Channel marking buoys and other floating visual aids are not possible in Arctic waters because moving ice sheets will continuously shift their positions. Therefore, vessel captains would need to rely on marine surveys and ice charts. For some areas in the Arctic, however, these surveys and charts are out of date or not sufficiently accurate.[91] To remedy this problem, aviation reconnaissance of ice conditions and satellite images would need to become readily available for ship operators.[92] Ship-to-shore communication infrastructure would need to be installed where possible. Refueling stations may be needed, as well as, perhaps, transshipment ports where cargo could be transferred to and from ice-capable vessels at both ends of Arctic routes. Shipping lines would need to develop a larger pool of mariners with ice navigation experience. Marine insurers would need to calculate the proper level of risk premium for polar routes, which would require more detailed information about Arctic accidents and incidents in the past.

The U.S. Army Corps of Engineers, along with the state of Alaska, has studied the feasibility of a "deep-draft" port in the Arctic (accommodating ships with a draft of up to 35 feet). The northern and northwestern coastlines of Alaska are exceptionally shallow, generally limiting harbor and near-shore traffic to shallow-draft barges. Coast Guard cutters and icebreakers have drafts of 35 to 40 feet while NOAA research vessels have drafts of 16 to 28 feet, so at present these vessels are based outside the Arctic and must sail considerable distances to reach Arctic duty stations. Supply vessels supporting offshore oil rigs typically have drafts over 20 feet. A deep-draft port could serve as a base of operations for larger vessels, facilitating commercial maritime traffic in the Arctic.[93] The study concluded that the existing harbors of Nome or Port Clarence on Alaska's west coast may be the most suitable for deepening because of their proximity to the Bering Strait and deeper water.[94] However, at a July 2016 hearing, the Coast Guard indicated its preferred strategy was to rely on mobile assets (vessels and aircraft) and seasonal bases of operation rather than pursue a permanent port in the Arctic.[95]

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[90] Stephen M. Carmel, Senior Vice President, Maersk Line Ltd., "The Cold, Hard Realities of Arctic Shipping," *United States Naval Institute, Proceedings*; July 2013, pp. 38-41.

[91] In July and August 2010, NOAA surveyed the Bering Straits area in order to update its charts but stated that it will take more than 25 years to map the prioritized areas of navigational significance in U.S. Arctic waters. See http://www.noaanews.noaa.gov/stories2010/20100720_fairweather.html.

[92] Ice reporting that currently exists is intended for scientists not mariners.

[93] For further information, see http://www.poa.usace.army.mil/en/cw/AKPortsStudy.htm, and FY2013 USACE Budget Justification, p. POD-5.

[94] *Alaska Deep-Draft Arctic Port System Study*, March 2013; http://www.poa.usace.army.mil/Library/ReportsandStudies/AlaskaRegionalPortsStudy.aspx. The navigation channel at Nome presently ranges from 10 to 20 feet in depth. Much of the harbor at Port Clarence has a natural depth of 35 to 40 feet; http://www.charts.noaa.gov/OnLineViewer/AlaskaViewerTable.shtml.

[95] Oral testimony of Admiral Charles D. Michel, Coast Guard Vice Commandant, House Committee on Transportation and Infrastructure, Subcommittee on Coast Guard and Maritime Transportation, *Coast Guard Arctic Implementation*

The U.S. Committee on the Marine Transportation System, a Cabinet-level committee of federal agencies with responsibilities for marine transportation, identified a list of infrastructure improvements for Arctic navigation in a 2013 report.[96] The report prioritizes improvements to information infrastructure (weather forecasting, nautical charting, ship tracking) and emergency response capabilities for ships in distress.

Regulation of Arctic Shipping

Due to the international nature of the shipping industry, maritime trading nations have adopted international treaties that establish standards for ocean carriers in terms of safety, pollution prevention, and security. These standards are agreed upon by shipping nations through the International Maritime Organization (IMO), a United Nations agency that first met in 1959.[97]

Key conventions that the 168 IMO member nations have adopted include the Safety of Life at Sea Convention (SOLAS), which was originally adopted in response to the *Titanic* disaster in 1912 but has since been revised several times; the Prevention of Pollution from Ships (MARPOL), which was adopted in 1973 and modified in 1978; and the Standards for Training, Certification, and Watchkeeping for Seafarers (SCTW), which was adopted in 1978 and amended in 1995. It is up to ratifying nations to enforce these standards. The United States is a party to these conventions, and the U.S. Coast Guard enforces them when it boards and inspects ships and crews arriving at U.S. ports and the very few ships engaged in international trade that sail under the U.S. flag.

Like the United States, most of the other major maritime trading nations lack the ability to enforce these regulations as a "flag state" because much of the world's merchant fleet is registered under so-called "flags of convenience." While most ship owners and operators are headquartered in major economies, they often register their ships in Panama, Liberia, the Bahamas, the Marshall Islands, Malta, and Cyprus, among other "open registries," because these nations offer more attractive tax and employment regulatory regimes. Because of this development, most maritime trading nations enforce shipping regulations under a "port state control" regime—that is, they require compliance with these regulations as a condition of calling at their ports. The fragmented nature of ship ownership and operation can be a further hurdle to regulatory enforcement. It is common for cargo ships to be owned by one company, operated by a second company (which markets the ship's space), and managed by a third (which may supply the crew and other services a ship requires to sail), each of which could be headquartered in different countries.

New Arctic Polar Code

While SOLAS and other IMO conventions include provisions regarding the operation of ships in ice-infested waters, they were not specific to the polar regions. To supplement these requirements, a new IMO polar code went into effect on January 1, 2017.[98] The code applies to passenger and cargo ships of 500 gross tons or more engaged in international voyages. It does not apply to fishing vessels, military vessels, pleasure yachts, or smaller cargo ships. The polar requirements

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Capabilities, July 12, 2016.

[96] U.S. Committee on the Marine Transportation System, *U.S. Arctic Marine Transportation System: Overview and Priorities for Action*, 2013; http://www.cmts.gov/downloads/CMTS_Arctic_MTS_Report_Narrative.pdf.

[97] See http://www.imo.org/ for more information.

[98] http://www.imo.org/en/MediaCentre/HotTopics/polar/Pages/default.aspx.

are intended to improve safety and prevent pollution in the Arctic, and they include provisions on ship construction, ship equipment related to navigation, and crew training and ship operation. The code requires ships to carry fully or partially enclosed lifeboats. The code requires that the crew have training in ice navigation. Nations can enforce additional requirements on ships arriving at their ports or sailing through their coastal waters. For instance, U.S. Coast Guard regulations largely follow IMO conventions but mandate additional requirements in some areas. U.S. coastal states can require ships calling at their ports to take additional safety and pollution prevention safeguards.[99] Canada and Russia have additional pollution regulations for Arctic waters exceeding MARPOL. The U.S. Coast Guard has studied and has recommended a specific vessel traffic separation scheme for the Bering Strait between Alaska and Russia, which experiences over 400 transits per year.[100] The U.S. Coast Guard is seeking IMO approval of this routing scheme.

Oil, Gas, and Mineral Exploration[101]

Decreases in summer polar ice may alter options for oil, gas, and mineral exploration in certain offshore or onshore areas. Offshore of Alaska, the U.S. outer continental shelf (OCS) covers more than 1 billion acres,[102] including some areas with high oil and gas potential. Even with warmer temperatures, exploration and development in the Arctic are still subject to harsh conditions, especially in winter. This makes it costly and challenging to develop the infrastructure necessary to produce, store, and transport oil, gas, and minerals from newly discovered deposits. Severe weather poses challenges to several ongoing federally regulated offshore operations as well as to new exploration.

Offshore oil and gas exploration is also affected by efforts to map the margins of the U.S. OCS. Shrinking sea ice cover in the Arctic has intensified interest in surveying and mapping the continental margins of multiple countries with lands in the Arctic. Delineating the extent of the continental margins beyond the 200 nautical mile Exclusive Economic Zone (EEZ) could lead to consideration of development on substantial amounts of submerged lands. Mapping projects are underway, by individual countries and through cooperative government studies, to support submissions to the Commission on the Limits of the Continental Shelf, including for areas that may contain large amounts of oil, natural gas, methane hydrates, or minerals.

With respect to onshore development, shrinking glaciers could expose land containing economic deposits of gold, iron ore, or other minerals previously covered by glacial ice. At the same time, warming that causes permafrost to melt could pose challenges to exploration and development activities because ground structures, such as pipelines and other infrastructure that depend on footings sunk into the permafrost for support, could be compromised. In addition, warmer temperatures shorten the ice road transport seasons for oil, gas, and mineral development, creating transportation challenges.

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[99] For example, see Alaska State Legislature, HJR 19, Arctic Marine Safety Agreements; http://www.akleg.gov/basis/Bill/Detail/30?Root=HJR%2019.

[100] 82 *Federal Register* 11935, February 27, 2017.

[101] This section prepared by Laura Comay, Analyst in Natural Resources Policy, Resources, Science, and Industry Division; Peter Folger, Specialist in Energy and Natural Resources Policy, Resources, Science, and Industry Division; and Marc Humphries, Analyst in Energy Policy, Resources, Science, and Industry Division.

[102] This region includes some areas within the Arctic boundary as defined by the ARPA (15 U.S.C. 4111; see **Figure 1**), such as the Beaufort and Chukchi Seas, and some areas outside that boundary, such as Cook Inlet.

Offshore Oil and Gas Exploration

The shrinking Arctic ice cap, or conversely, the growing amount of ice-free ocean in the summertime, has increased interest in exploring for offshore oil and gas in the Arctic. Reduced sea ice in the summer means that ships towing seismic arrays[103] can explore regions of the Arctic Ocean, Chukchi Sea, Beaufort Sea, and other offshore regions for longer periods of time with less risk of colliding with floating sea ice. Less sea ice over longer periods compared to previous decades also means that the seasonal window for offshore Arctic drilling remains open longer in the summer, increasing the chances for making a discovery.

In addition to the improved access to larger portions of the Arctic afforded by shrinking sea ice, interest in Arctic oil and gas was fueled by a 2008 U.S. Geological Survey (USGS) appraisal of undiscovered oil and gas north of the Arctic Circle.[104] The USGS stated that the "extensive Arctic continental shelves may constitute the geographically largest unexplored prospective area for petroleum remaining on Earth."[105] In the report, the USGS estimated that 90 billion barrels of oil, nearly 1,700 trillion cubic feet of natural gas, and 44 billion barrels of natural gas liquids may remain to be discovered in the Arctic (including both U.S. and international resources north of the Arctic Circle).[106] A 2009 article in *Science* magazine indicated that 30% of the world's undiscovered natural gas and 13% of the world's undiscovered oil may be found north of the Arctic Circle.[107] In terms of U.S. resources specifically, DOI's Bureau of Ocean Energy Management (BOEM) estimated in 2015 that the Alaska portions of the U.S. OCS contain undiscovered, technically recoverable resources of approximately 27 billion barrels of oil and 131 trillion cubic feet of natural gas (although not all of these resources may be economically viable to recover).[108] A 2015 report by the National Petroleum Council stated that U.S. offshore oil and gas exploration in the Arctic over the next 35 years "would help sustain domestic supplies as production of U.S. shale oil and tight oil may decline."[109]

Despite the warming trend in the Arctic, severe weather and sea ice continue to pose challenges to exploration. In addition, any discovery of new oil and gas deposits far from existing storage, pipelines, and shipping facilities could not be developed until infrastructure is built to extract and transport the petroleum.

Some have expressed interest in expanding America's ocean energy portfolio in the region. Currently, among 15 federal planning areas in the region, the Beaufort and Chukchi Seas are the

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[103] A seismic array is typically a long string or streamer of geophones—acoustic devices used for recording seismic signals—towed behind a ship while the ship traverses a prospective oil and gas-bearing portion of the seafloor. The seismic signals are processed and interpreted to give a cross-section or three-dimensional image of the subsurface.

[104] See USGS Circum-Arctic Resource Appraisal website at http://energy.usgs.gov/arctic/; and USGS Fact Sheet 2008-3049, *Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle*, at http://pubs.usgs.gov/fs/2008/3049/, hereinafter referred to as "USGS 2008 Fact Sheet."

[105] USGS 2008 Fact Sheet.

[106] USGS 2008 Fact Sheet, p. 1.

[107] Donald L. Gautier et al., "Assessment of Undiscovered Oil and Gas in the Arctic," *Science*, vol. 324, no. 5931, pp. 1175-1179 (2009); see also Energy Information Administration, "Today in Energy: Arctic Oil and Natural Gas Resources," January 20, 2012, at http://www.eia.gov/todayinenergy/detail.cfm?id=4650.

[108] Bureau of Ocean Energy Management, *2017-2022 Outer Continental Shelf Oil and Gas Leasing Draft Proposed Program*, January 2015, pp. 5-9, at http://www.boem.gov/2017-2022-DPP/. The draft proposed program estimated a range of resources that would be economically recoverable under various oil and gas price points and cost conditions.

[109] National Petroleum Council, *Arctic Potential: Realizing the Promise of U.S. Arctic Oil and Gas Resources*, March 2015, at http://www.npc.org/reports/research.html. The report was commissioned by then-Secretary of Energy Ernest Moniz during the Obama Administration.

only two areas with federal leases, and only the Beaufort Sea has any producing wells in federal waters (from a joint federal-state unit).[110] The Trump Administration has stated its interest in promoting offshore development in the region, and has begun work on a five-year offshore oil and gas leasing program for 2019-2024. Current lease sales on the Alaska OCS are governed by the Obama Administration's leasing program for 2017-2022, which includes one lease sale in the Cook Inlet (scheduled for 2021).[111] Two additional Alaska sales that had been proposed in earlier versions of the program—one in the Beaufort Sea and one in the Chukchi Sea—were removed from the final version of the 2017-2022 program.[112]

Activities on existing federal leases in the Beaufort and Chukchi Seas have fluctuated as industry weighs changing oil prices, development costs, and regulations. In summer 2015, Shell Oil Company began exploratory drilling on a lease in the Chukchi Sea planning area. However, the company announced in late September 2015 that it would cease further exploration activity in offshore Alaska for the foreseeable future. Shell cited several reasons for the decision to halt its activity in the region, including insufficient indications of oil and gas at its Burger J well, the high costs associated with the project, and the "challenging and unpredictable" federal regulatory environment for offshore Alaska.[113] BOEM also reported that, between February and November 2016, companies relinquished more than 90% of leases they had held in the Beaufort and Chukchi Sea planning areas, in the midst of a slump in oil prices.[114] In November 2017, the Trump Administration approved an application for permit to drill (APD) on a lease in the Beaufort Sea held by the Eni U.S. Operating Company.[115]

The evolving federal regulatory environment for Arctic offshore activities has been shaped by concerns about industry's ability to respond to potential oil spills, given the region's remoteness and harsh conditions. The section of this report on "Oil Pollution Implications of Arctic Change" discusses this issue in greater detail. In July 2016, BOEM and the Bureau of Safety and Environmental Enforcement (BSEE) released final safety regulations for Arctic exploratory drilling that include multiple requirements for companies to reduce the risks of potential oil spills—for example, the requirement that companies have a separate rig available at drill sites to drill a relief well in case of a loss of well control.[116] Some Members of Congress and industry stakeholders have opposed the regulations as overly prescriptive and unnecessarily burdensome, while other Members and environmental organizations have asserted that the rules do not go far enough in protecting the region from potential environmental damage and addressing the

[110] Bureau of Ocean Energy Management, "BP Exploration (Alaska) (BPXA)—Northstar," at http://www.boem.gov/About-BOEM/BOEM-Regions/Alaska-Region/Leasing-and-Plans/Plans/BP-North-Star.aspx.

[111] Bureau of Ocean Energy Management, *2017-2022 Outer Continental Shelf Oil and Gas Leasing Proposed Final Program*, November 2016, at https://www.boem.gov/2017-2022-OCS-Oil-and-Gas-Leasing-PFP/, hereinafter cited as "BOEM 2017-2022 Proposed Final Program."

[112] For information on the earlier-proposed sales, see Bureau of Ocean Energy Management, *2017-2022 Outer Continental Shelf Oil and Gas Leasing Proposed Program*, March 2016, at http://www.boem.gov/2017-2022-Proposed-Program-Decision/.

[113] Royal Dutch Shell, PLC, "Shell Updates on Alaska Exploration," press release, September 28, 2015, at http://www.shell.com/global/aboutshell/media/news-and-media-releases/2015/shell-updates-on-alaska-exploration.html.

[114] BOEM 2017-2022 Proposed Final Program, p. S-3.

[115] Bureau of Safety and Environmental Enforcement (BSEE), "BSEE Approves New Drilling Operations in Arctic," press release, November 28, 2017, at https://www.bsee.gov/newsroom/latest-news/statements-and-releases/press-releases/bsee-approves-new-drilling-operations-in. The BSEE Director stated in the press release that "responsible resource development in the Arctic is a critical component to achieving American energy dominance."

[116] Department of the Interior, "Requirements for Exploratory Drilling on the Arctic Outer Continental Shelf," 81 *Federal Register* 46477, July 15, 2016.

potential contributions of Arctic oil and gas activities to climate change.[117] Legislation in the 115th Congress would repeal the Arctic regulations.[118]

Concerns about the impacts of oil and gas activities have led in the past to bans by both Congress and the President on leasing in certain Arctic Ocean areas deemed especially sensitive.[119] For example, congressional and presidential moratoria since the 1980s effectively banned federally regulated planning and permitting in the Bristol Bay area of the North Aleutian Basin. Congress allowed most statutory bans in the region to expire in 2004.[120] President Obama reinstated the moratorium in the North Aleutian Basin, indefinitely withdrawing acreage located in Bristol Bay from eligibility for oil and gas leasing.[121] Also, in December 2016, President Obama indefinitely withdrew from leasing disposition other large portions of the U.S. Arctic, including the entire Chukchi Sea planning area and almost all of the Beaufort Sea planning area.[122] President Obama separately withdrew from leasing consideration planning areas in the North Bering Sea.[123] In April 2017, President Trump issued Executive Order 13795, which modified President Obama's withdrawals so as to open all of these areas for leasing consideration except for the North Aleutian Basin.[124]

Extent of the Continental Margin

Increased interest in developing offshore resources in the Arctic has sparked efforts by nations bordering the Arctic Ocean to map the extent of their continental margins beyond the 200-mile EEZ limit. As discussed earlier (see "Extended Continental Shelf and United States as a Nonparty

[117] For differing congressional viewpoints, see U.S. Congress, House Committee on Natural Resources, Subcommittee on Energy and Mineral Resources, hearing on Arctic Resources and American Competitiveness, 114th Cong., 1st sess., June 16, 2015, at http://naturalresources.house.gov/calendar/eventsingle.aspx?EventID=398713.

[118] For example, H.R. 4239, the SECURE American Energy Act, would provide that the Arctic rule shall have no force or effect.

[119] Section 12(a) of the Outer Continental Shelf Lands Act (43 U.S.C. §1341(a)) authorizes the President to, "from time to time, withdraw from disposition any of the unleased lands of the outer Continental Shelf."

[120] FY2004 DOI Appropriations (P.L. 108-108). Furthermore, the Continuing Appropriations Resolution 2009 (P.L. 110-329) did not extend the annual congressional moratorium on oil and gas leasing activities in the lower 48 states. On March 11, 2009, the Omnibus Appropriations Act, 2009 (P.L. 111-8) was enacted without moratorium provisions, confirming that the congressional oil and gas development bans in federal waters along the Atlantic and Pacific coasts, parts of Alaska, and the Gulf of Mexico that had been in place since 1982 had not been restored in 2009 appropriations measures.

[121] Presidential Memorandum, "Withdrawal of Certain Areas of the United States Outer Continental Shelf from Leasing Disposition," December 16, 2014, at http://www.whitehouse.gov/the-press-office/2014/12/16/presidential-memorandum-withdrawal-certain-areas-united-states-outer-con. Earlier, President Obama had withdrawn the area from leasing for a time-limited period. Presidential Memorandum, "Withdrawal of Certain Areas of the United States Outer Continental Shelf from Leasing Disposition," March 31, 2010, at http://www.doi.gov/whatwedo/energy/ocs/upload/2010alaska-mem-rel.pdf.

[122] Presidential Memorandum, "Withdrawal of Certain Portions of the United States Arctic Outer Continental Shelf from Mineral Leasing," December 20, 2016, at https://www.whitehouse.gov/the-press-office/2016/12/20/presidential-memorandum-withdrawal-certain-portions-united-states-arctic. Earlier, President Obama had indefinitely withdrawn from leasing disposition certain smaller areas in the Beaufort and Chukchi Seas, including the Hanna Shoal region of the Chukchi Sea and other areas. Presidential Memorandum, "Withdrawal of Certain Areas of the United States Outer Continental Shelf Offshore Alaska from Leasing Disposition," January 27, 2015, at http://www.whitehouse.gov/the-press-office/2015/01/27/presidential-memorandum-withdrawal-certain-areas-united-states-outer-con.

[123] Executive Order 13754, "North Bering Sea Climate Resilience," December 9, 2016, at https://www.gpo.gov/fdsys/pkg/FR-2016-12-14/pdf/2016-30277.pdf.

[124] Executive Order 13795, "Implementing an America-First Offshore Energy Strategy," April 28, 2017, at https://www.gpo.gov/fdsys/pkg/FR-2017-05-03/pdf/2017-09087.pdf.

to UNCLOS"), under Article 76 of UNCLOS, nations can make a submission to the Commission on the Limits of the Continental Shelf (hereinafter referred to as the Commission) concerning the extent of their continental shelves. Under Article 76, the extent of the continental margin beyond the 200-mile limit depends on the position of the foot of the continental slope, the thickness of sediments, and the depth of water. Also, the continental margin could include geologic features that extend from the continent out to sea, which may include undersea ridges continuing for hundreds of miles offshore.

Arctic border countries have conducted complex investigations needed to support submissions to the Commission for an extended continental shelf in the Arctic. Submissions have been made by several countries, including the Russian Federation, which made its initial UNCLOS submission to a portion of the Arctic continental shelf in 2001.[125] Russia's 2001 submission included the Lomonosov Ridge, an undersea feature spanning the Arctic from Russia to Canada, as an extension of its continental margin. The submission demonstrated Russia's bid to extend activities in Arctic regions. The Russian Federation presented a revised submission in 2015 to the Commission that included not only the Lomonosov Ridge but also the Mendeleev Rise—another subsea feature claimed by Russia to be a natural part of their continental margin—as components of the extended Russian continental shelf.[126] The Commission has not rendered a decision on the revised Russian Federation submission as of early 2018.

The United States has started to gather and analyze data for a potential submission through an initiative called the Extended Continental Shelf (ECS) Project.[127] The U.S. ECS project has also assisted more than 30 countries with their efforts to delineate their extended continental shelves worldwide.[128] Canada and the United States share overlapping regions of the seabed as part of the extended continental margin of both nations. Much of the data to delineate the ECS for both countries was collected in a two-ship operation involving the U.S. Coast Guard Cutter *Healy* and the Canadian Coast Guard ship *Louis S. Saint Laurent*.[129] The two-ship operation collected more than 13,000 linear kilometers (about 8,078 miles) of seismic data over four field seasons in the Arctic beginning in 2007. The data collected will help each country delineate the extent of their own ECS, which should then enable the countries to determine the amount of overlap in the seabed and ultimately establish a maritime boundary in the Arctic.[130]

[125] United Nations, Division for Ocean Affairs and the Law of the Sea, http://www.un.org/depts/los/clcs_new/commission_submissions.htm. Denmark and Norway also submitted claims to portions of the Arctic continental shelf. In 2009, the Commission approved Norway's submission.

[126] United Nations, "Partial Revised Submission of the Russian Federation to the Commission on the Limits of the Continental Shelf in Respect of the Continental Shelf of the Russian Federation in the Arctic Ocean," 2015, http://www.un.org/Depts/los/clcs_new/submissions_files/rus01_rev15/2015_08_03_Exec_Summary_English.pdf.

[127] The purpose of the U.S. Extended Continental Shelf (ECS) Project is to establish the full extent of the continental shelf of the United States, consistent with international law. The work to delineate the ECS is coordinated by the ECS Task Force, located at the National Oceanic and Atmospheric Administration's (NOAA's) National Centers for Environmental Information in Boulder, CO. The Department of State, U.S. Geological Survey (USGS), and NOAA conduct the majority of work on the project. NOAA has the lead in collecting bathymetric data. USGS has the lead in collecting seismic data. For more information, see the project's website at https://www.state.gov/e/oes/ocns/opa/ecs/index.htm.

[128] U.S. ECS Project, https://www.state.gov/e/oes/ocns/opa/ecs/support/index.htm.

[129] Ibid.

[130] Ibid.

The United States also has potentially overlapping ECS areas with Russia. Russia (then the Soviet Union) and the United States agreed to a maritime boundary in 1990, and so far Russia has not asserted its ECS in any areas that might be considered part of the U.S. ECS.[131]

Onshore Mineral Development

A warming Arctic means new opportunities and challenges for mineral exploration and development onshore. Receding glaciers expose previously ice-covered land that could host economic mineral deposits that were previously undetectable and unmineable below the ice. Longer summers would also extend exploration seasons for areas that are not currently ice-covered but are only accessible for ground surveys during the warmer months. In some parts of the Arctic, such as Baffin Island, Canada, less sea ice allows ships to transport heavy equipment to remote locations, and to convey ore from mines to the market further south. Some railway and mining operators are considering developing railroads and other infrastructure to transport ore year-round.[132] As with onshore oil and gas development, however, mining infrastructure that depends on footings sunk into permafrost could become unstable if the permafrost melts in response to warmer temperatures. Also, as with oil and gas development, mineral deposits that may be technically recoverable with current technology may not be economically profitable.

Some industry commentators suggest that mining might offer better long-term economic development opportunities compared to oil and gas development because of a larger permanent workforce and project lifetimes of several decades.[133] Similar to oil and gas, however, industry observers note that uncertainties and knowledge gaps exist in the understanding of environmental change in the Arctic, and how to deal with the risks associated with significant Arctic industrial activity.[134]

One important part of the current infrastructure in the Arctic that supports oil, gas, and mineral development is the construction and use of ice roads—built and used during the winter, but not passable during the warmer months. Warmer temperatures are shortening the ice road transport seasons and creating transportation challenges. For example, the opening date for tundra roads in northern Alaska usually occurred in early November prior to 1991 and has shifted to January in recent years.[135]

[131] The Senate gave advice and consent to ratify the maritime boundary agreement in 1991. Although the Russian Duma has not approved the agreement, both countries continue to provisionally apply the boundary agreement. See U.S. Extended Continental Shelf Project, https://www.state.gov/e/oes/ocns/opa/ecs/support/index.htm.

[132] Carolyn Fitzpatrick, "Heavy Haul in the High North," *Railway Gazette International* (July 24, 2008), at http://www.railwaygazette.com/news/single-view/view/10/heavy-haul-in-the-high-north.html.

[133] Cecelia Jamasmie, "Melting Arctic is nothing but good news for the mining industry: Lloyd's/Chatham House," Mining.com, April 13, 2012, at http://www.mining.com/melting-arctic-is-nothing-but-good-news-for-the-mining-industry-lloydschatam-house/.

[134] Charles Emmerson and Glada Lahn, *Arctic Opening: Opportunity and Risk in the High North*, Chatham House, 2012, at https://www.chathamhouse.org/publications/papers/view/182839.

[135] See National Oceanic and Atmospheric Administration, "Arctic Change," at http://www.arctic.noaa.gov/detect/land-road.shtml?page=land.

Oil Pollution and Pollution Response[136]

Oil Pollution Implications of Arctic Change

Climate change impacts in the Arctic, particularly the decline of sea ice and retreating glaciers, have stimulated human activities in the region, many of which have the potential to create oil pollution. A primary concern is the threat of a large oil spill in the area. Although a major oil spill has not occurred in the Arctic region,[137] recent economic activity, such as oil and gas exploration and tourism (cruise ships), increases the risk of oil pollution (and other kinds of pollution) in the Arctic. Significant spills in high northern latitudes (e.g., the 1989 *Exxon Valdez* spill in Alaska and spills in the North Sea) suggest that the "potential impacts of an Arctic spill are likely to be severe for Arctic species and ecosystems."[138]

Risk of Oil Pollution in the Arctic

A primary factor determining the risk of oil pollution in the Arctic is the level and type of human activity being conducted in the region. Although climate changes in the Arctic are expected to increase access to natural resources and shipping lanes, the region will continue to present logistical challenges that may hinder human activity in the region. For example (as discussed in another section of this report),[139] the unpredictable ice conditions may discourage trans-Arctic shipping. If trans-Arctic shipping were to occur on a frequent basis, it would represent a considerable portion of the overall risk of oil pollution in the region. In recent decades, many of the world's largest oil spills have been from oil tankers, which can carry millions of gallons of oil.[140]

Although the level of trans-Arctic shipping is uncertain, many expect oil exploration and extraction activities to intensify in the region.[141] Oil well blowouts from offshore oil extraction operations have been a source of major oil spills, eclipsing the largest tanker spills. The largest unintentional oil spill in recent history was from the 2010 *Deepwater Horizon* incident in the Gulf of Mexico.[142] During that incident, the uncontrolled well released (over an 87-day period) approximately 200 million gallons of crude oil.[143] The second-largest unintentional oil spill in

[136] This section prepared by Jonathan L. Ramseur, Specialist in Environmental Policy, Resources, Science, and Industry Division.

[137] Arctic Council, Emergency Prevention, Preparedness and Response Working Group, *Guide to Oil Spill Response in Snow and Ice Conditions*, 2015, at https://oaarchive.arctic-council.org/handle/11374/403.

[138] Arctic Monitoring and Assessment Programme (AMAP), Arctic Oil and Gas 2007 (2008).

[139] See this report's section "Implications for Sea Transportation," by John Frittelli.

[140] For example, the *Exxon Valdez* spilled approximately 11 million gallons of oil, but its carrying capacity was approximately 60 million gallons.

[141] See this report's section "Implication of Changes in the Arctic for Oil, Gas, and Mineral Exploration and Development," by Peter Folger and Marc Humphries.

[142] Larger oil spills occurred during the 1991 Iraq War, but many of those spills were deliberate. A 1910-1911 onshore oil blowout in the California San Joaquin Valley is reported to have spilled 9.4 million barrels of crude oil (almost 400 million gallons).

[143] An estimated 17% of this oil did not enter the Gulf environment but was directly recovered from the wellhead by the responsible party (British Petroleum, BP). See the Federal Interagency Solutions Group, Oil Budget Calculator Science and Engineering Team, *Oil Budget Calculator: Deepwater Horizon-Technical Documentation*, November 2010; and CRS Report R42942, *Deepwater Horizon Oil Spill: Recent Activities and Ongoing Developments*, by Jonathan L. Ramseur.

recent history—the *IXTOC I*, estimated at 140 million gallons—was due to an oil well blowout in Mexican Gulf Coast waters in 1979.[144]

Until the 2010 *Deepwater Horizon* incident, the spill record for offshore platforms in U.S. federal waters had shown improvement from prior years.[145] A 2003 National Research Council (NRC) study of oil and gas activities on Alaska's North Slope stated "blowouts that result in large spills are unlikely."[146] Similar conclusions were made in federal agency documents regarding deepwater drilling in the Gulf of Mexico before the 2010 *Deepwater Horizon* event.[147] Some would likely contend that the underlying analyses behind these conclusions should be adjusted to account for the 2010 Gulf oil spill. However, others may argue that the proposed activities in U.S. Arctic waters present less risk of an oil well blowout than was encountered by the *Deepwater Horizon* drill rig, because the proposed U.S. Arctic operations would be in shallower waters (150 feet) than the deepwater well (approximately 5,000 feet) that was involved in the 2010 Gulf oil spill. In addition, Shell Oil has stated that the pressures in the Chukchi Sea (the location of Shell's recent interest) would be two to three times less than they were in well involved in the 2010 Gulf oil spill.[148] Regardless of these differences, even under the most stringent control systems, some oil spills and other accidents are likely to occur from equipment failure or human error.

Potential Impacts

No oil spill is entirely benign. Even a relatively minor spill, depending on the timing and location, can cause significant harm to individual organisms and entire populations. Regarding aquatic spills, marine mammals, birds, bottom-dwelling and intertidal species, and organisms in early developmental stages—eggs or larvae—are especially vulnerable. However, the effects of oil spills can vary greatly. Oil spills can cause impacts over a range of time scales, from only a few days to several years, or even decades in some cases.

Conditions in the Arctic may have implications for toxicological effects that are not yet understood. For example, oil spills on permafrost may persist in an ecosystem for relatively long periods of time, potentially harming plant life through their root systems. Moreover, little is known about the effects of oil spills on species that are unique to the Arctic, particularly, species' abilities to thrive in a cold environment and the effect temperature has on toxicity.[149]

The effects of oil spills in high-latitude, cold-ocean environments may last longer and cause greater damage than expected. Some recent studies have found that oil spills in lower latitudes have persisted for longer than initially expected, thus raising the concern that the persistence of

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[144] National Research Council (NRC) of the National Academies of Science, *Oil in the Sea III: Inputs, Fates, and Effects* (2003).

[145] See CRS Report RL33705, *Oil Spills: Background and Governance*, by Jonathan L. Ramseur; and Dagmar Etkin (Environmental Research Consulting), Analysis of U.S. Oil Spillage, Prepared for American Petroleum Institute, August 2009.

[146] National Research Council of the National Academies of Science, *Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope* (2003).

[147] See, for example, Minerals Management Service (MMS), Outer Continental Shelf Oil & Gas Leasing Program: 2007-2012, Final Environmental Impact Statement, April 2007, chapter 4; MMS, Proposed Gulf of Mexico OCS Oil and Gas Lease Sale 206, Central Planning Area, Environmental Assessment, October 2007.

[148] Letter from Marvin E. Odum, President, Shell Oil Company to S. Elizabeth Birnbaum, Minerals Management Service (May 14, 2010). Cited in a staff paper from the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling ("The Challenges of Oil Spill Response in the Arctic," January 2011).

[149] AMAP, *Arctic Oil and Gas 2007* (2008).

oil in the Arctic may be understated. In terms of wildlife, population recovery may take longer in the Arctic because many of the species have longer life spans and reproduce at a slower rate.[150]

Response and Cleanup Challenges in the Arctic Region

Climate changes in the Arctic are expected to increase human activities in the region, many of which impose a risk of oil pollution, particularly from oil spills. Conditions in the Arctic region impose unique challenges for personnel charged with (1) oil spill response, the process of getting people and equipment to the incident, and (2) cleanup duties, either recovering the spilled oil or mitigating the contamination so that it poses less harm to the ecosystem. These challenges may play a role in the policy development for economic activities in the Arctic.

Spill Response Challenges

Response time is a critical factor for oil spill recovery. With each hour, spilled oil becomes more difficult to track, contain, and recover, particularly in icy conditions, where oil can migrate under or mix with surrounding ice.[151] Most response techniques call for quick action, which may pose logistical challenges in areas without prior staging equipment or trained response professionals. Many stakeholders are concerned about a "response gap" for oil spills in the Arctic region.[152] A response gap is a period of time in which oil spill response activities would be unsafe or infeasible. The response gap for the northern Arctic latitudes is likely to be extremely high compared to other regions.[153]

According to a 2014 National Research Council (NRC) report, "the lack of infrastructure in the Arctic would be a significant liability in the event of a large oil."[154] The Coast Guard has no designated air stations north of Kodiak, AK, which is almost 1,000 miles from the northernmost point of land along the Alaskan coast in Point Barrow, AK.[155] Although some of the communities have airstrips capable of landing cargo planes, no roads connect these communities.[156] Vessel infrastructure is also limited. The nearest major port is in the Aleutian Islands, approximately 1,300 miles from Point Barrow. Two of the major nonmechanical recovery methods—in situ burning and dispersant application—may be limited (or "precluded") by the Arctic conditions and lack of logistical support: aircraft, vessels, and other infrastructure.[157]

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[150] AMAP, *Arctic Oil and Gas 2007* (2008).

[151] World Wildlife Fund, *Oil Spill: Response Challenges in Arctic Waters* (2007).

[152] Coastal Response Research Center, *Opening the Arctic Seas: Envisioning Disasters and Framing Solutions* (2009), partnership between the National Oceanic and Atmospheric Administration and the University of New Hampshire.

[153] Although the response gap in the Arctic has not been quantified, a recent estimate of Prince William Sound (PWS) may be instructive. A 2007 study found a response gap for PWS of 38% for the time of the study period (65% during the winter season). Note that PWS has existing infrastructure for response, while the more remote Arctic areas do not. Nuka Research and Planning Group, LLC, *Response Gap Estimate for Two Operating Areas in Prince William Sound, Alaska* (2007), Report to Prince William Sound Regional Citizens' Advisory Council.

[154] National Research Council (NRC) of the National Academies of Science, *Responding to Oil Spills in the U.S. Arctic Marine Environment*, 2014.

[155] U.S. Coast Guard, *Report to Congress: U.S. Coast Guard Polar Operations*, December 2008.

[156] A single road connects Deadhorse, Alaska and the Prudhoe Bay with central Alaska (Fairbanks). For more details and maps of the area, see Nuka Research and Planning Group, *Oil Spill Prevention and Response in the U.S. Arctic Ocean: Unexamined Risks, Unacceptable Consequences*, Commissioned by Pew Environment Group, November 2010.

[157] World Wildlife Fund, Oil Spill: Response Challenges in Arctic Waters (2007). For further discussion of issues relating to oil spills, see CRS Report RL33705, *Oil Spills: Background and Governance*, by Jonathan L. Ramseur.

A 2010 Government Accountability Office (GAO) report identified further logistical obstacles that would hinder an oil spill response in the region, including "inadequate" ocean and weather information for the Arctic and technological problems with communications.[158] A 2014 GAO report highlighted steps taken by some groups (e.g., the National Oceanic and Atmospheric Administration) to improve some of these logistical elements.[159]

Oil Spill Cleanup Challenges

The history of oil spill response in the Aleutian Islands highlights the challenges and concerns for potential spills in the Arctic region:

> The past 20 years of data on response to spills in the Aleutians has also shown that almost no oil has been recovered during events where attempts have been made by the responsible parties or government agencies, and that in many cases, weather and other conditions have prevented any response at all.[160]

The behavior of oil spills in cold and icy waters is not as well understood as oil spills in more temperate climates.[161] The 2014 NRC report highlights some recent advancements in understanding oil spill behavior in arctic climates. At the same time, the report recommends further study in multiple areas.

The 2014 NRC report states that in colder water temperatures or sea ice, "the processes that control oil weathering—such as spreading, evaporation, photo-oxidation, emulsification, and natural dispersion—are slowed down or eliminated for extended periods of time."[162] In some respects, the slower weathering processes may provide more time for response strategies, such as in situ burning or skimming. On the other hand, the longer the oil remains in an ecosystem, the more opportunity there is for exposure.

In addition, the 2014 report states the following:

> Arctic conditions impose many challenges for oil spill response—low temperatures and extended periods of darkness in the winter, oil that is encapsulated under ice or trapped in ridges and leads, oil spreading due to sea ice drift and surface currents, reduced effectiveness of conventional containment and recovery systems in measurable ice concentrations, and issues of life and safety of responders.

Existing Policy Framework

Considering both the recent increase in human activity in the region (and expectation of further interest) and the response and recovery challenges that an oil spill would impose in Arctic waters, many would assert that the region warrants particular attention in terms of governance. However, the existing framework for international governance of maritime operations in the Arctic region

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[158] Government Accountability Office, *Coast Guard: Efforts to Identify Arctic Requirements Are Ongoing, but More Communication about Agency Planning Efforts Would Be Beneficial*, GAO-10-870, September 2010.

[159] Government Accountability Office, *Key Issues Related to Commercial Activity in the U.S. Arctic over the Next Decade*, GAO-14-299, March 2014.

[160] Transportation Research Board of the National Academy of Sciences, *Risk of Vessel Accidents and Spills in the Aleutian Islands: Designing a Comprehensive Risk Assessment* (2008), Special Report 293, National Academies Press. Washington, DC.

[161] National Research Council (NRC) of the National Academies of Science, *Responding to Oil Spills in the U.S. Arctic Marine Environment*, 2014.

[162] National Research Council (NRC) of the National Academies of Science, *Responding to Oil Spills in the U.S. Arctic Marine Environment*, 2014.

lacks legally binding requirements. While the Safety of Life at Sea Convention (SOLAS) and other International Maritime Organization (IMO) conventions include provisions regarding ships in icy waters, the provisions are not specific to the polar regions. Although the IMO has "Guidelines for Ships Operating in Arctic," a 2009 NOAA report described the nonbinding IMO provisions as "inconsistent with the hazards of Arctic navigation and the potential for environmental damage from such an incident."[163]

In 2013, the member states of the Arctic Council signed an Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic.[164] The agreement's objective is to "strengthen cooperation, coordination, and mutual assistance ... on oil pollution preparedness and response in the Arctic."

In addition, the United States has separate bilateral agreements with Canada and Russia that address oil spill response operations. The agreement with Canada was established in 1974 for the Great Lakes and has been amended several times to add more geographic areas, including Arctic waters. According to the 2014 NRC report: "Formal contingency planning and exercises with Canada have enabled both the United States and Canada to refine procedures and legal requirements for cross-border movement of technical experts and equipment in the event of an emergency."

The U.S.-Russian agreement was made in 1989 and applies to oil spills in Arctic waters. However, the 2014 NRC report asserts that the agreement has not been tested to the same extent as the U.S.-Canada agreement.

Fisheries[165]

The effects of climate change such as increasing sea surface temperatures and decreasing permanent sea ice are altering the composition of marine ecosystems in the Arctic. These changes are likely to affect the ranges and productivity of living marine resources including species that support marine fisheries. Furthermore, as a greater portion of the waters in the central Arctic Ocean become open for longer periods, the region's resources will become more accessible to commercial fishing. 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.[166] As environmental changes occur, fisheries managers will be challenged to adjust management measures for existing fisheries. Uncertainties related to these changes and potential new fisheries in the central Arctic Ocean have prompted many fishery managers to support precautionary approaches to fisheries management in the region.

On June 1, 2008, Congress passed a joint resolution (P.L. 110-243) that directed "the United States to initiate international discussions and take necessary steps with other nations to negotiate an agreement for managing migratory and transboundary fish stocks in the Arctic Ocean." The joint resolution also supported establishment of a new international fisheries management organization or organizations for the region. International cooperation is necessary to manage

[163] Coastal Response Research Center, *Opening the Arctic Seas: Envisioning Disasters and Framing Solutions*, (2009), partnership between the National Oceanic and Atmospheric Administration and the University of New Hampshire.

[164] Available at http://www.arctic-council.org.

[165] This section was prepared by Harold Upton, Analyst in Natural Resources Policy, Resources, Science, and Industry Division.

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

Arctic resources because fish stocks are shared to some degree among the five adjacent jurisdictional zones of the Arctic rim nations. Further, a large portion of the central Arctic Ocean lies outside the Exclusive Economic Zones (EEZ) of these nations. Ideally, regional management would recognize the need to coordinate management for those fish populations that move among these national jurisdictional zones and high seas.

For waters under U.S. jurisdiction, in 2009, the National Marine Fisheries Service in the Department of Commerce's National Oceanic and Atmospheric Administration implemented the North Pacific Council's Fishery Management Plan for Fish Resources of the Arctic Management Area.[167] The management area includes marine waters in the U.S. EEZ of the Chukchi and Beaufort Seas.[168] The plan initially prohibits commercial fishing in the Arctic Management Area and moves the northern boundary of the Bering Sea/Aleutian Islands king and tanner crab fishery management plan out of the Arctic Management Area south to the Bering Strait. The plan takes a precautionary approach by requiring the collection of more information before developing commercial fisheries in the region.

On July 16, 2015, the five nations that surround the Arctic Ocean signed a declaration to prevent unregulated commercial fishing in the high seas portion of the central Arctic Ocean.[169] The five nations agree that a precautionary approach to fishing is needed because there is limited scientific knowledge of marine resources in the region. Currently, there is no commercial fishing in central Arctic Ocean and it is questionable whether existing fisheries resources could sustain a fishery. The declaration includes the following interim measures:

- to authorize our vessels to conduct commercial fishing in the high seas area only pursuant to one or more marine regional or subregional fisheries management organizations or arrangements that are or may be established to manage such fishing in accordance with recognized international standards;
- to establish a joint program of scientific research with the aim of improving understanding of the ecosystems of this area and promote cooperation with relevant scientific bodies;
- to promote compliance with these interim measures and with relevant international law, including by coordinating our monitoring, control, and surveillance activities in this area; and
- to ensure that any noncommercial fishing in this area does not undermine the purpose of the interim measures, is based on scientific advice and is monitored, and that data obtained through any such fishing is shared.

The declaration also recognizes the interests of indigenous peoples and the need to encourage other countries to take actions that are consistent with the interim measures. It appears that future management arrangements may include China, the EU, Iceland, Japan, and South Korea. Iceland has stated it regrets that although it has repeatedly asked to participate in the collaboration, the five states decided to keep Iceland outside consultations on the declaration.[170] It remains an open

[167] 74 *Federal Register* 56734-56746, November 3, 2009.

[168] The state of Alaska has jurisdiction over waters from 0-3 nautical miles from the baseline. The baseline generally follows the shoreline.

[169] The five nations include Canada, Denmark, Norway, the Russian Federation, and the United States. See https://www.regjeringen.no/globalassets/departementene/ud/vedlegg/folkerett/declaration-on-arctic-fisheries-16-july-2015.pdf.

[170] Ministry of Foreign Affairs, Iceland, "The Position of Iceland on the Consultation on Arctic Fishing," press release, July 24, 2015, http://arcticportal.org/library/press-releases/1524-the-position-of-iceland-on-the-consultation-on-arctic-

question as to whether an Arctic Ocean regional fishery management organization will be established, which countries would be included in such an arrangement, and if commercial fisheries will be developed in the central Arctic Ocean.

Protected Species[171]

Concern over development of the Arctic relates to how such development might affect threatened and endangered species. Under the Endangered Species Act (ESA, 16 U.S.C. §§1531-1543), the polar bear was listed as threatened on May 15, 2008. The failure by the Fish and Wildlife Service (FWS) to make a 90-day finding on a 2008 petition to list Pacific walrus led to submission of 60-days' notice of a future citizen suit. However, eventually walruses were listed as candidate species under ESA;[172] this status means that federal agencies carrying out actions that may affect the species must confer with FWS though they are not necessarily obliged to modify their actions. Both polar bears and walruses are heavily dependent during their life cycles on thick sea ice, making them especially susceptible to the shrinking Arctic ice cap.

On December 30, 2008, the National Marine Fisheries Service (NMFS) determined that a listing of ribbon seal as threatened or endangered was not warranted.[173] On October 22, 2010, NMFS listed the southern distinct population segment (DPS) of spotted seals as threatened.[174] Listing of two other DPS (Okhotsk and Bering Sea) had earlier been determined to not be warranted.[175] On December 10, 2010, NMFS proposed that (1) four subspecies of ringed seal be listed as threatened,[176] and (2) that two DPS of one subspecies of bearded seal be listed as threatened.[177]

In either terrestrial or marine environments, the extreme pace of change makes a biological response many times more difficult. For species with adaptations for a specific optimum temperature for egg development, or production of young timed to match the availability of a favored prey species, or seed dispersal in predictable fire regimes, etc., evolutionary responses may well not keep pace with the rate of change.[178] While species of plants and animals farther south might migrate, drift, or be transplanted from warming habitats to more northerly sites that may continue to be suitable,[179] once a terrestrial species reaches the Arctic Ocean, it is very literally at the end of the line. No more northern or colder habitat is available.

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fishing.

[171] Prepared by Lynne Corn and Eugene Buck, Specialists in Natural Resources Policy, Resources, Science, and Industry Division.

[172] Fish and Wildlife Service, "Endangered and Threatened Wildlife and Plants; Review of Native Species That Are Candidates for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petitions; Annual Description of Progress on Listing Actions; Proposed Rule," 76 *Federal Register* 66370-66439, October 26, 2001.

[173] 73 *Federal Register* 79822-79828.

[174] 75 *Federal Register* 65239-65248.

[175] 74 *Federal Register* 53683-58696, October 20, 2009.

[176] 75 *Federal Register* 77476-77495.

[177] 75 *Federal Register* 77496-77515.

[178] Among biologists, it is traditionally said that a species faced with extreme change can respond in three basic ways: "migrate, mutate, or die." When change is rapid enough, mutation (accompanied by natural selection of individuals within the population more suited to the changed environment) may not be able to occur fast enough, leaving migration and death as the only options. The problem of response rate is more severe for species that reproduce slowly (e.g., polar bears) and less severe for species that reproduce rapidly (e.g., algae).

[179] The efficacy and the effect of this tactic is often questioned, since natural migration is unlikely to involve the entire suite of species in an ecosystem (e.g., host plants might not move north (or up) as fast as their moth herbivores, nor as fast as the birds that depend on the moths). Moreover, the southerners will not find a land of sterile bare dirt—the

The Marine Mammal Protection Act (MMPA; 16 U.S.C. §§1361 et seq.) protects whales, seals, walruses, and polar bears. The MMPA established a moratorium on the "taking" of marine mammals in U.S. waters and by U.S. nationals on the high seas, including the Arctic. The MMPA protects marine mammals from "clubbing, mutilation, poisoning, capture in nets, and other human actions that lead to extinction." Under the MMPA, the Secretary of Commerce, acting through National Marine Fisheries Service, is responsible for the conservation and management of whales and seals. The Secretary of the Interior, acting through the Fish and Wildlife Service, is responsible for walruses and polar bears.[180] Despite the MMPA's general moratorium on taking, the MMPA allows U.S. citizens to apply for and obtain authorization for taking small numbers of mammals incidental to activities other than commercial fishing (e.g., offshore oil and gas exploration and development) if the taking would have only a negligible impact on any marine mammal species or stock, provided that monitoring requirements and other conditions are met.

Indigenous People Living in the Arctic[181]

People have been living in the Arctic for thousands of years, and indigenous peoples developed highly specialized cultures and economies based on the physical and biological conditions of the long-isolated region. However, with trade, the influx of additional populations especially since the 19th century, and ongoing physical changes in the Arctic, indigenous populations have already experienced substantial change in their lifestyles and economies. Over the past two decades, greater political organization across indigenous populations has increased their demands for international recognition and broader rights, as well as attention to the economic, health, and safety implications of climate change in the North.

Background

Seven of the eight Arctic nations have indigenous peoples,[182] whose predecessors were present in parts of the Arctic over 10,000 years ago, well before the arrival of peoples with European backgrounds.[183] Current Arctic indigenous peoples comprise dozens of diverse cultures and speak dozens of languages from eight or more non-Indo-European language families.[184]

Before the arrival of Europeans, Arctic indigenous peoples lived in economies that were chiefly dependent, in varying proportions, on hunting land and marine mammals, catching salt- and fresh-water fish, herding reindeer (in Eurasia), and gathering, for their food, clothing, and other

species that are already there may be threatened themselves by the competition from the new arrivals, perhaps tipping the balance and pushing still more species toward extinction.

[180] Under the MMPA, both NMFS and FWS have responsibility for additional marine mammal species (e.g., manatees, sea otters, dolphins) which are not currently found in the Arctic.

[181] This section was originally prepared by Roger Walke, who was a Specialist in American Indian Policy, Domestic Social Policy Division, until his retirement from CRS in October 2010. It has been updated by Jane A. Leggett, Specialist in Environmental and Energy Policy in CRS's Resources, Science and Industry Division.

[182] *Arctic Human Development Report*, ed. Joan Nymand Larsen et al. (Akureyri, Iceland: Stefansson Arctic Institute, 2004), p. 47; this report is subsequently cited in this section as *AHDR.* The seven countries are Canada, Denmark-Greenland, Finland, Norway, Russia, Sweden, and the United States.

[183] John F. Hoffecker, *A Prehistory of the North: Human Settlement of the Higher Latitudes* (New Brunswick, NJ: Rutgers University Press, 2005), pp. 8, 81, 112-115.

[184] *AHDR*, pp. 47, 53; David Crystal, *Cambridge Encyclopedia of Language*, 2nd ed. (Cambridge: Cambridge University Press, 1997), chap. 50; *Ethnologue: Languages of the World*, 16th ed., ed. M. Paul Lewis (Dallas: SIL International, 2009), available at http://www.ethnologue.com/. The number of languages and language families varies not only with definitions of the Arctic but with definitions of languages and language families.

products.[185] Indigenous peoples' interaction with and knowledge of Arctic wildlife and environments has developed over millennia and is the foundation of their cultures.[186]

The length of time that Arctic indigenous peoples were in contact with Europeans varied across the Arctic. As recorded by Europeans, contact began as early as the 9th century CE, if not before, in Fennoscandia[187] and northwestern Russia, chiefly for reasons of commerce (especially furs); it progressed mostly west-to-east across northern Asia, reaching northeastern Arctic Asia by the 17th century.[188] North American Arctic indigenous peoples' contact with Europeans started in Labrador in the 16th century and in Alaska in the 18th century, and was not completed until the early 20th century.[189] Greenland's indigenous peoples first saw European-origin peoples in the late 10th century, but those Europeans died out during the 15th or 16th century and Europeans did not return permanently until the 18th century.[190]

Contact led to significant changes in Arctic indigenous economies, political structures, foods, cultures, and populations, starting especially in the 20th century. For example, life expectancy among Alaska Natives has increased from 47 years in 1950 to over 69 years in 2000 (though it still lags behind that of U.S. residents overall, at 77 years).[191]

Also, at present, most Arctic indigenous peoples have become minorities in their countries' Arctic areas, except in Greenland and Canada. (One source estimates that, around 2003, about 10% of an estimated 3.7 million people in the Arctic were indigenous.)[192] While many Arctic indigenous communities remain heavily dependent on hunting, fishing, and herding and are more likely to depend on traditional foods than nonindigenous Arctic inhabitants,[193] there is much variation. Most Arctic indigenous people may no longer consume traditional foods as their chief sources of

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[185] Jim Berner et al., *Arctic Climate Impact Assessment* (Cambridge: Cambridge University Press, 2005), chapter 12; this report is subsequently cited in this section as *ACIA*.

[186] *ACIA*, pp. 654-655.

[187] Fennoscandia refers to the Scandinavian Peninsula, Finland, the Kola Peninsula of Russia, and certain parts of Russia bordering on Finland.

[188] Janet Martin, *Treasure in the Land of Darkness: The Fur Trade and Its Significance for Medieval Russia* (Cambridge: Cambridge University Press, 1986), pp. 41-42; James Forsyth, *A History of the Peoples of Siberia: Russia's North Asian Colony, 1581-1990* (Cambridge: Cambridge University Press, 1992), pp. 69-83, 102; Lassi K. Heininen, "Different Images of the Arctic and the Circumpolar North in World Politics," in *Knowledge and Power in the Arctic*, Proceedings at a Conference in Rovaniemi, April 16-18, 2007, Arctic Centre Reports 48, ed. Paula Kankaanpaa et al. (Rovaniemi, Finland: University of Lapland, Arctic Centre, 2007), p. 125.

[189] James W. VanStone, "Exploration and Contact History of Western Alaska," and David Damas, "Copper Eskimo," and J. Garth Taylor, "Historical Ethnography of the Labrador Coast," in *Handbook of North American Indian: Vol. 5, Arctic*, vol. ed. David Damas, gen. ed. William C. Sturtevant (Washington: Smithsonian, 1984), pp. 149-155, 408, 509-510.

[190] Inge Kleivan, "History of Norse Greenland," in *Handbook, Vol. 5, Arctic, op. cit.*, pp. 549-555; Finn Gad, "Danish Greenland Policies," in *Handbook of North American Indians: Vol. 4, History of Indian-White Relations*, vol. ed. Wilcomb E. Washburn, gen. ed. William C. Sturtevant (Washington: Smithsonian, 1988), p. 110.

[191] Parkinson, Alan J. The Arctic Human Health Initiative. Washington, DC: U.S. Department of Health and Human Services, 2006.

[192] *AHDR*, pp. 19, 29. Estimates of Arctic indigenous populations are complicated by varying definitions not only of the Arctic but also of indigenous peoples; for instance, Russia does not count some non-European Arctic ethnic groups, such as the Yakut, as "indigenous minorities" (see "Peoples of the Arctic: Characteristics of Human Populations Relevant to Pollution Issues," in *AMAP Assessment Report: Arctic Pollution Issues*, ed. Simon J. Wilson et al. (Oslo: Arctic Monitoring and Assessment Programme, 1998), pp. 167-169; this report is subsequently cited in this section as *AMAP 1998*.

[193] *AMAP 1998*, chapter 5; see also Birger Poppel et al., *SLiCA Results*, Survey of Living Conditions in the Arctic (Anchorage: Institute of Social and Economic Research, University of Alaska Anchorage, 2007), pp. 4-7, http://www.arcticlivingconditions.org.

energy and nutrition.[194] Major economic change is also relatively recent but ongoing.[195] Many Arctic indigenous communities have developed a mixture of traditional economic activities and wage employment.[196] The economics of subsistence and globalization will be key factors in the effects of climate change on Arctic indigenous peoples, and on their reactions to Arctic climate change.

Arctic indigenous peoples' current political structures vary, as do their relationships with their national governments. Some indigenous groups govern their own unique land areas within the national structure, as in the United States and Canada; others have special representative bodies, such as the Saami parliaments in Norway, Finland, and Sweden;[197] a few areas have general governments with indigenous majorities, such as Greenland (a member country of Denmark), Nunavut territory in Canada, and the North Slope and Northwest Arctic boroughs in Alaska.[198] Control of land, through claims and ownership, also varies among Arctic indigenous peoples, as do rights to fishing, hunting, and resources.[199] Arctic indigenous peoples' political relationships to their national and local governments, and their ownership or claims regarding land, are also significant factors in the responses to Arctic climate change by the indigenous peoples and by Arctic nations' governments.

Effects of Climate Change

Arctic climate change is expected to affect the economies, population, subsistence, health, infrastructure, societies, and cultures of Arctic indigenous peoples. Changes in sea ice and sea level, permafrost, tundra, weather, and vegetation distributions, as well as increased commercial shipping, mineral extraction, and tourism, will affect the distribution of land and sea mammals, of freshwater and marine fish, and of forage for reindeer. These will in turn affect traditional subsistence activities and related indigenous lifestyles.[200] Arctic indigenous peoples' harvesting of animals is likely to become riskier and less predictable, which may increase food insecurity, change diets, and increase dependency on outside, nontraditional foods.[201] Food cellars in many locations have thawed during summers, threatening food safety. Related health risks of diabetes, obesity, and mental illness have been associated with these changes.[202]

Sea, shoreline ice, and permafrost changes have damaged infrastructure and increased coastal and inland erosion, especially in Alaska, where GAO found in 2003 that "coastal villages are becoming more susceptible to flooding and erosion caused in part by rising temperatures."[203] In

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[194] Annika E. Nilson and Henry P. Huntington, *Arctic Pollution 2009* (Oslo: Arctic Monitoring and Assessment Programme, 2009), pp. 39-41; this report is subsequently cited in this section as *AMAP 2009*.

[195] *ACIA*, p. 1000.

[196] *SLiCA Results, op.cit.*, pp. v, 4-8.

[197] *AHDR*, p. 232.

[198] *AHDR*, chapter 4, and pp. 232-233.

[199] *AHDR*, chapters 6-7, and pp. 232-233.

[200] *ACIA*, pp. 1000-1001, 1004.

[201] *ACIA*, pp. 1000-1001, 1004.

[202] Parkinson, Alan J. *The Arctic Human Health Initiative*. Washington, DC: U.S. Department of Health and Human Services, 2006; Brubaker, Michael, James Berner, Raj Chavan, and John Warren. "Climate Change and Health Effects in Northwest Alaska." *Global Health Action* 4 (October 18, 2011).

[203] U.S. Government Accountability Office (GAO), *Alaska Native Villages: Villages Affected by Flooding and Erosion Have Difficulty Qualifying for Federal Assistance*, GAO-04-895T, June 29, 2004, p. i, http://www.gao.gov/new.items/d04895t.pdf. See also, Government Accountability Office, *Alaska Native Villages: Most Are Affected by Flooding and Erosion, but Few Qualify for Federal Assistance*, GAO-04-142, December 12, 2003, http://www.gao.gov/new.items/

response, Congress funded the U.S. Army Corps of Engineers to conduct a Baseline Erosion Assessment that identified and prioritized among the 178 communities identified at risk from erosion.[204] (Risks from flooding were not examined.) GAO concluded in 2009 that many Native villages must relocate, but even those facing imminent threats have been impeded by various barriers, including difficulties identifying appropriate new sites, piecemeal programs for state and federal assistance, and obstacles to eligibility for certain federal programs.[205] The Alaska Federation of Natives placed among its 2010 federal priorities a request to Congress to mitigate flooding and erosion in Alaska Native villages and to fund relocation of villages where necessary.[206] However, "the cost is extraordinary," acknowledges Senator Lisa Murkowski.[207]

Oil, gas, and mineral exploration and development are expected to increase, as are other economic activities, such as forestry and tourism, and these are expected to increase economic opportunities for all Arctic residents, including indigenous peoples.[208] Pressures to increase participation in the wage economy, however, may speed up changes in indigenous cultures. Increased economic opportunities may also lead to a rise in the nonindigenous population, which may further change the circumstances of indigenous cultures. Some representatives of Arctic indigenous people have related a "conflicting desire between combating climate change and embracing the potential for economic growth through foreign investment."[209]

Although important advances in public health have occurred in indigenous communities over past decades, some health problems may increase with continued Arctic climate change. Economic development may exacerbate Arctic pollution problems, including higher exposure to mercury, air pollution, and food contamination. The influx and redistribution of contaminants in the air, oceans, and land may change in ways that are now poorly understood.[210] Warmer temperatures and longer warm seasons may increase insect- and wildlife-borne diseases.[211] Climate change may lead to damage to water and sanitation systems, reducing protection against waterborne

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d04142.pdf.

[204] U.S. Army Corps of Engineers. Alaska Baseline Erosion Assessment (BEA), March 2009.

[205] GAO, *Alaska Native Villages: Limited Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion*, June 3, 2009.

[206] Alaska Federation of Natives, Human Resources Committee, *2010 Federal Priorities* (Anchorage: Alaska Federation of Natives, 2010), pp. 22-23, available at https://www.nativefederation.org/wp-content/uploads/2018/07/2010-afn-federal-priorities.pdf. See also, Government Accountability Office, *Alaska Native Villages: Limited Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion*, GAO-09-551, June 3, 2009, http://www.gao.gov/new.items/d09551.pdf. For a more detailed anecdote, see a 2012 interview with Brice Eningowuk, Shishmaref Erosion and Relocation Committee member at Shearer, Christine. "Climate Crisis: Alaskan Village Shishmaref Sinking Into the Sea." *Imagined Magazine*, July 8, 2012, http://imaginedmag.com/2012/07/climate-crisis-alaskan-village-shishmaref-sinking-into-the-sea/.

[207] Press Office of Senator Lisa Murkowski. "Murkowski Urges Greater Tribal Consultation from Administration; Senator Spotlights 'Monumental' Climate Struggles Faced by Alaska Natives, Coastal Communities," July 19, 2012.

[208] *ACIA*, pp. 1001, 1004.

[209] Aqqaluk Lynge, Chair, Inuit Circumpolar Council, quoted in Stephanie McFeeters, "Lynge talks future of Inuit people," *The Dartmouth*, February 8, 2012.

[210] See, for example, "Health: Increased Bacterial Loads in Potable Water Could Have Significant Health Effects on Indigenous People From the Arctic to Uganda, Says Vanier Scholar." National Aboriginal Health Organization (NAHO), February 17, 2012. http://www.naho.ca/blog/2012/02/17/health-increased-bacterial-loads-in-potable-water-could-have-significant-health-effects-on-indigenous-people-from-the-arctic-to-uganda-says-vanier-scholar/; or, Kallenborn et al., *Combined Effects of Selected Pollutants and Climate Change in the Arctic Environment*. Oslo, Norway: Arctic Monitoring and Assessment Programme (AMAP), Arctic Council, 2011.

[211] *AMAP Assessment 2009: Human Health in the Arctic*, ed. Simon J. Wilson and Carolyn Symon (Oslo: Arctic Monitoring and Assessment Programme, 2009), pp. 4-6, 143.

diseases.[212] Changes in Arctic indigenous cultures may increase mental stress and behavioral problems.[213]

The response to climate change by Arctic indigenous peoples has included international activities by Arctic indigenous organizations and advocacy before their national governments. As one report noted, "the rise of solidarity among indigenous peoples organizations in the region is surely a development to be reckoned with by all those interested in policy issues in the Arctic."[214] Six national or international indigenous organizations are permanent participants of the Arctic Council, the regional intergovernmental forum.[215] Due in part to advocacy by Arctic indigenous people, the United Nations General Assembly adopted in 2007 the Declaration on the Rights of Indigenous Peoples.[216] In April 2009, the Inuit Circumpolar Council (an organization of Inuit in the Arctic regions of Alaska, Canada, Greenland, and Russia) hosted in Alaska the worldwide "Indigenous Peoples Global Summit on Climate Change."[217] The conference report, forwarded to the Copenhagen Conference of the Parties of the U.N. Framework Convention on Climate Change (December 2009), noted "accelerating" climate change caused by "unsustainable development" and, among several recommendations, called for a greater indigenous role in national and international decisions on climate change, including a greater role for indigenous knowledge in climate change research, monitoring, and mitigation.[218]

Polar Icebreaking[219]

Polar Icebreaker Operations

Within the U.S. government, the Coast Guard is the U.S. agency responsible for polar icebreaking. The Coast Guard's polar ice operations support 9 of the service's 11 statutory missions.[220] The roles of U.S. polar icebreakers can be summarized as follows:

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[212] Brubaker, Michael, James Berner, Raj Chavan, and John Warren. "Climate Change and Health Effects in Northwest Alaska." *Global Health Action* 4 (October 18, 2011); John Warren, "Climate change could affect human health," *Mukluk Telegraph*, January/February 2005, pp. 5-6.

[213] John Warren, "Climate change could affect human health," *Mukluk Telegraph*, January/February 2005, pp. 5-6.

[214] *AHDR*, p. 235.

[215] See http://www.arctic-council.org/. The six organizations are the Aleut International Association, Arctic Athabaskan Council, Gwich'in Council International, Inuit Circumpolar Council, RAIPON (Russian Association of Indigenous Peoples of the North), and Saami Council.

[216] United Nations, Declaration on the Rights of Indigenous Peoples, Resolution A/RES/61/295, at http://www.un-documents.net/a61r295.htm.

[217] See http://www.indigenoussummit.com/servlet/content/home.html.

[218] K. Galloway-McLean et al., *Report of the Indigenous Peoples' Global Summit on Climate Change: 20-24 April 2009, Anchorage, Alaska* (Darwin, Australia: United Nations University—Traditional Knowledge Initiative, 2009), pp. 5-7; available at http://www.indigenoussummit.com/servlet/content/home.html.

[219] This section prepared by Ronald O'Rourke, Specialist in Naval Affairs, Foreign Affairs, Defense, and Trade Division. For more on the Coast Guard's polar icebreakers, see CRS Report RL34391, *Coast Guard Polar Security Cutter (Polar Icebreaker) Program: Background and Issues for Congress*, by Ronald O'Rourke.

[220] The nine missions supported by polar ice operations are search and rescue; maritime safety; aids to navigation; ice operations; marine environmental protection; living marine resources; other law enforcement (protect the exclusive economic zone [EEZ]); ports, waterways and costal security; and defense readiness. The two missions not supported by polar ice operations are illegal drug interdiction and undocumented migrant interdiction. (Department of Homeland Security, *Polar Icebreaking Recapitalization Project Mission Need Statement, Version 1.0*, approved by DHS June 28, 2013, p. 10.)

- conducting and supporting scientific research in the Arctic and Antarctic;
- defending U.S. sovereignty in the Arctic by helping to maintain a U.S. presence in U.S. territorial waters in the region;
- defending other U.S. interests in polar regions, including economic interests in waters that are within the U.S. exclusive economic zone (EEZ) north of Alaska;
- monitoring sea traffic in the Arctic, including ships bound for the United States; and
- conducting other typical Coast Guard missions (such as search and rescue, law enforcement, and protection of marine resources) in Arctic waters, including U.S. territorial waters north of Alaska.

Operations to support National Science Foundation (NSF) research activities in the Arctic and Antarctic have accounted in the past for a significant portion of U.S. polar icebreaker operations.[221] Supporting NSF research in the Antarctic has included performing an annual mission, called Operation Deep Freeze, to break through the Antarctic ice so as to resupply McMurdo Station, the large U.S. Antarctic research station located on the shore of McMurdo Sound, near the Ross Ice Shelf. In terms of the maximum thickness of the ice to be broken, the annual McMurdo resupply mission generally poses the greatest icebreaking challenge for U.S. polar icebreakers, though Arctic ice can frequently pose its own significant icebreaking challenges for U.S. polar icebreakers.

Although polar ice is diminishing due to climate change, observers generally expect that this development will not eliminate the need for U.S. polar icebreakers, and in some respects might increase mission demands for them. Even with the diminishment of polar ice, there are still significant ice-covered areas in the polar regions, and diminishment of polar ice could lead in coming years to increased commercial ship, cruise ship, and naval surface ship operations, as well as increased exploration for oil and other resources, in the Arctic—activities that could require increased levels of support from polar icebreakers, particularly since waters described as "ice free" can actually still have some amount of ice. Changing ice conditions in Antarctic waters have made the McMurdo resupply mission more challenging since 2000.[222]

Polar Icebreaker Fleet

The operational U.S. polar icebreaking fleet currently consists of one heavy polar icebreaker, *Polar Star*, and one medium polar icebreaker, *Healy*. In addition to *Polar Star*, the Coast Guard has a second heavy polar icebreaker, *Polar Sea*. *Polar Sea*, however, suffered an engine casualty in June 2010 and has been nonoperational since then. *Polar Star* and *Polar Sea* entered service in 1976 and 1978, respectively, and are now well beyond their originally intended 30-year service lives. The Coast Guard has used *Polar Sea* as a source of spare parts for keeping *Polar Star* operational.

The current condition of the U.S. polar icebreaker fleet, the DHS MNS, and concerns among some observers about whether the United States is adequately investing in capabilities to carry

[221] This passage, beginning with "The roles of…", originated in an earlier iteration of CRS Report RL34391, *Coast Guard Polar Security Cutter (Polar Icebreaker) Program: Background and Issues for Congress*, by Ronald O'Rourke, and was later transferred by the Government Accountability Office (GAO) with minor changes to Government Accountability Office, *Coast Guard[:]Efforts to Identify Arctic Requirements Are Ongoing, but More Communication about Agency Planning Efforts Would Be Beneficial*, GAO-10-870, September 2010, p. 53.

[222] National Research Council, *Polar Icebreakers in a Changing World, An Assessment of U.S. Needs*, Washington, 2007, pp. 6-7, 14, 63.

out its responsibilities and defend its interests in the Arctic, have focused policymaker attention on the question of whether and when to acquire one or more new heavy polar icebreakers as replacements for *Polar Star* and *Polar Sea*.

Polar Security Cutter (PSC) Program

A Department of Homeland Security (DHS) Mission Need Statement (MNS) approved in June 2013 states that "current requirements and future projections ... indicate the Coast Guard will need to expand its icebreaking capacity, potentially requiring a fleet of up to six icebreakers (3 heavy and 3 medium) to adequately meet mission demands in the high latitudes...."[223]

The Coast Guard initiated in its FY2013 budget a program to acquire three new heavy polar icebreakers, to be followed by the acquisition of up to three new medium polar icebreakers. The program was originally referred to as the polar icebreaker program but is now referred to as the Polar Security Cutter (PSC) program. The Coast Guard wants to begin construction of the first new heavy polar icebreaker in FY2019 and have it enter service in 2023. The PSC program has received about $359.6 million in acquisition funding through FY2018, including $300 million provided through the Navy's shipbuilding account and $59.6 million provided through the Coast Guard's procurement account. The Coast Guard's proposed FY2019 budget requests $750 million in the Coast Guard's procurement account for the program.

The acquisition cost of a new heavy polar icebreaker had earlier been estimated informally at roughly $1 billion, but the Coast Guard and Navy now believe that three heavy polar icebreakers could be acquired for a total cost of about $2.1 billion, or an average of about $700 million per ship. The first ship will cost more than the other two because it will incorporate design costs for the class and be at the start of the production learning curve for the class. When combined with the program's $359.6 million in prior-year funding, the $750 million requested for FY2019 would fully fund the procurement of the first new heavy polar icebreaker and partially fund the procurement of the second.

On March 2, 2018, the U.S. Navy, in collaboration with the U.S. Coast Guard under the polar icebreaker integrated program office, released a request for proposal (RFP) for the advance procurement and detail design for the Coast Guard's heavy polar icebreaker, with options for detail design and construction for up to three heavy polar icebreakers.

Issues for Congress for FY2019 for the PSC program include, inter alia, whether to approve, reject, or modify the Coast Guard's FY2019 acquisition funding request; whether to use a contract with options or a block buy contract to acquire the ships; whether to continue providing at least some of the acquisition funding for the PSC program through the Navy's shipbuilding account; technical, schedule, and cost risk in the PSC program; and whether to procure heavy and medium polar icebreakers to a common basic design.[224]

[223] Department of Homeland Security, *Polar Icebreaking Recapitalization Project Mission Need Statement, Version 1.0*, approved by DHS June 28, 2013, p. 9.

[224] For more on the polar icebreaker program, see CRS Report RL34391, *Coast Guard Polar Security Cutter (Polar Icebreaker) Program: Background and Issues for Congress*, by Ronald O'Rourke.

Search and Rescue (SAR)[225]

Overview

Increasing sea and air traffic through Arctic waters has increased concerns regarding Arctic-area search and rescue (SAR) capabilities.[226] **Table 1** presents figures on ship casualties in Arctic Circle waters from 2005 to 2014, as shown in the 2015 edition of an annual report on shipping and safety by the insurance company Allianz Global Corporate & Specialty.

Table 1. Ship Casualties in Arctic Circle Waters, 2005-2014

Ships of 100 gross tons or more

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Machinery damage/failure	2	3	5	13	14	16	12	13	20	27	125
Wrecked/stranded	1	4	10	11	14	9	9	8	10	14	90
Miscellaneous	0	0	5	1	4	4	2	6	5	5	32
Fire/explosion	0	0	3	1	2	6	6	1	4	2	25
Collision	0	0	0	1	4	10	4	4	2	0	25
Contact (e.g., harbor wall)	0	0	1	1	1	3	1	3	6	4	20
Hull damage	0	1	3	1	6	2	2	1	2	1	19
Foundered (i.e., sunk or submerged)	0	0	1	1	2	0	3	1	1	2	11
Total	**3**	**8**	**28**	**30**	**47**	**50**	**39**	**37**	**50**	**55**	**347**

Source: Allianz Global Corporate & Specialty, Safety and Shipping Review 2015, p. 28. (Table entitled "Arctic Circle Waters—All Casualties including Total Losses 2005–2014." The table includes its own source note, which states, "Source: Lloyd's List Intelligence Casualty Statistics Analyses: AGCS [Allianz Global Corporate & Specialty].")

Note: Of the 55 ship casualties in 2014, one ship (located near Iceland and Northern Norway) was a total loss.

Given the location of current U.S. Coast Guard operating bases, it could take Coast Guard aircraft several hours, and Coast Guard cutters days or even weeks, to reach a ship in distress or a downed aircraft in Arctic waters. In addition, the harsh climate complicates SAR operations in the region. Particular concern has been expressed about cruise ships carrying large numbers of civilian passengers that may experience problems and need assistance.[227] There have already been

[225] This section prepared by Ronald O'Rourke, Specialist in Naval Affairs, Foreign Affairs, Defense, and Trade Division.

[226] See, for example, Robbie Gramer, "Stretched Thin on Thin Ice; With the Arctic Melting and Norther Coast Guards Struggling to Keep Up, the Next Disaster Is a Matter of When, Not If," *Foreign Policy*, September 12, 2018; Edward Struzik, "As Ice Recedes, the Arctic Isn't Prepared for More Shipping Traffic," phys.org, September 5, 2018; Derek Minemyer, "Arctic Council Members Say Alaska Needs Search and Rescue in the Arctic, Now," *KTUU*, August 16, 2018; Timothy William James Smith, *Search and Rescue in the Arctic: Is the U.S. Prepared?* RAND Corporation, 2017, 148 pp. (Dissertation report RGSD-382.)

[227] See, for example, Brian Castner, "How to Rescue a Cruise Ship in the Northwest Passage," *Motherboard (Vice)*, October 24, 2017; Henry Fountain, "With More Ships in the Arctic, Fears of Disaster Rise," *New York Times*, July 23, 2017; Gwladys Fouche, "Uncharted Waters: Mega-Cruise Ships Sail the Arctic," *Reuters*, October 10, 2016; Abbie Tingstad and Timothy Smith, "Being Safer in the Arctic," *National Interest*, October 3, 2016.

incidents of this kind with cruise ships in recent years in waters off Antarctica, and a Russian-flagged passenger ship with 162 people on board ran aground on Canada's Northwest Passage on August 24, 2018.[228] Coast Guard officials have noted the long times that would be needed to respond to potential emergency situations in certain parts the Arctic. The Coast Guard is participating in exercises focused on improving Arctic SAR capabilities.[229]

Increasing U.S. Coast Guard SAR capabilities for the Arctic could require one or more of the following: enhancing or creating new Coast Guard operating bases in the region; procuring additional Arctic-capable aircraft, cutters, and rescue boats for the Coast Guard; and adding systems to improve Arctic maritime communications, navigation, and domain awareness.[230] It may also entail enhanced forms of cooperation with navies and coast guards of other Arctic countries.

2017 Arctic SAR Capabilities Survey

A 2017 survey of Arctic SAR capabilities conducted as part of the Finnish Border Guard's Arctic Maritime Safety Cooperation project in cooperation with the Arctic Coast Guard Forum stated the following:

> The key challenges for Arctic search and rescue identified in this survey include long distances, severe weather, ice and cold conditions, a poor communications network, lack of infrastructure and lack of resource presence in the region. In addition, the capacity to host patients, achieving situational awareness, and unsuitable evacuation and survival equipment pose major challenges for maritime safety and SAR in the Arctic.
>
> The Arctic SAR authorities have recognized a need to further develop advanced information sharing between coast guards, emergency authorities, and other stakeholders involved in SAR operations. In addition, joint training and systematic sharing of lessons learned, as well as technological innovation in communications networks and connections, navigation, survival and rescue equipment, and healthcare services are being called for in order to improve SAR capabilities in the Arctic.
>
> The survey recommends enhancing practical cooperation between various stakeholders involved in Arctic SAR such as coast guards, rescue centers, other authorities, industry groups, private operators, academia and volunteer organizations. It encourages further information sharing on infrastructure projects and resource assets, Automatic Identification System and weather data, emergency plans and standard operating procedures, as well as exercises and lessons learned via a common database. Furthermore, developing joint courses specifically intended for Arctic SAR and establishing a working group that

[228] Malte Humpert, "A Cruise Ship Runs Aground in Canada's Arctic Waters; The Akademik Ioffe's Sister Ship Was Nearby, and Together with Canadian Coast guard Ships, Was Able to Rescue All Passengers," *Arctic Today,* August 28, 2018.

[229] See, for example, Av Ragnhild Gronning, "Mass Exercise Tests Emergency Response in the Arctic," *High North News*, August 219, 2016; Julia Bergman, "Mass Rescue Exercise Tests Response Capabilities in Arctic," *New London Day*, August 24, 2016; Wendy Laursen, "Mass Arctic Rescue Exercise Begins," *Maritime Executive,* August 24, 2016; Tim Ellis, "Cruise-Ship Evacuation Exercise Begins as Luxury Liner Prepares for Arctic Ocean Transit," *KUAC (alaskapublic.org)*, August 23, 2016; Bill Colclough, "USCG to Participate with AK Command in Arctic Chinook Exercises," *Alaska Native News,* August 23, 2016.

[230] For a report assessing certain emergency scenarios in the Arctic, including search and rescue scenarios, see *Opening the Arctic Seas, Envisioning Disasters and Framing Solutions*, Coastal Response and Research Center, University of New Hampshire, report of January 2009, based on conference held March 18-20, 2008, at Durham, New Hampshire.

> examines new innovations and technological developments, are recommended as potential initiatives for improving practical international cooperation.[231]

May 2011 Arctic Council Agreement on Arctic SAR

On May 12, 2011, representatives from the member states of the Arctic Council, meeting in Nuuk, Greenland, signed an agreement on cooperation on aeronautical and maritime SAR in the Arctic. Key features of the agreement include the following:

- Article 3 and the associated Annex to the agreement essentially divide the Arctic into SAR areas within which each party has primary responsibility for conducting SAR operations, stating that "the delimitation of search and rescue regions is not related to and shall not prejudice the delimitation of any boundary between States or their sovereignty, sovereign rights or jurisdiction," and that "each Party shall promote the establishment, operation and maintenance of an adequate and effective search and rescue capability within its area."
- Article 4 and the associated Appendix I to the agreement identify the competent authority for each party. For the United States, the competent authority is the Coast Guard.
- Article 5 and the associated Appendix II to the agreement identify the agencies responsible for aeronautical and maritime SAR for each party. For the United States, those agencies are the Coast Guard and the Department of Defense.
- Article 6 and the associated Appendix III to the agreement identify the aeronautical and/or maritime rescue coordination centers (RCCs) for each party. For the United States, the RCCs are Joint Rescue Coordination Center Juneau (JRCC Juneau) and Aviation Rescue Coordination Center Elmendorf (ARCC Elmendorf).
- Article 12 states that "unless otherwise agreed, each Party shall bear its own costs deriving from its implementation of this Agreement," and that "implementation of this Agreement shall be subject to the availability of relevant resources."[232]

Figure 4 shows an illustrative map of the national areas of SAR responsibility based on the geographic coordinates listed in the Annex to the agreement.

An October 12, 2015, press report states the following:

> More people are wishing to explore icy environments, says Peter Hellberg, manager responsible for the SAR process at the Swedish Maritime Administration. Hellberg is part of an IMO/International Civil Aviation Organization (ICAO) working group that is re-evaluating search and rescue (SAR) operations in Polar waters as a result of this push.

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[231] Emmi Ikonen, *Arctic Search and Rescue Capabilities Survey: Enhancing International Cooperation 2017*, Finnish Border Guard, Arctic Maritime Safety Cooperation (SARC) project, August 2017, p. iv. See also Finnish Red Cross, *Red Cross Arctic Disaster Management Study*, August 2018, 71 pp.

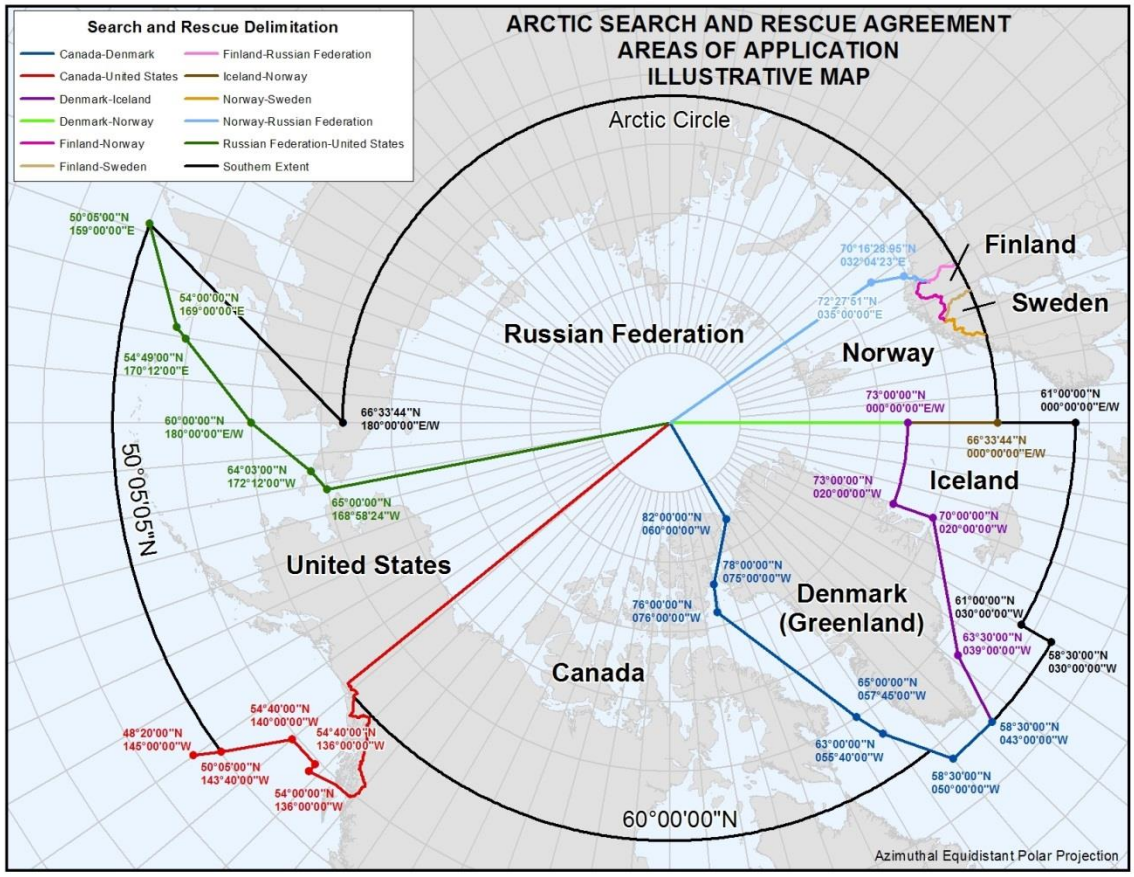
[232] Source: Text of final version of agreement made ready for signing and dated April 21, 2011, https://oaarchive.arctic-council.org/bitstream/handle/11374/531/EDOCS-1910-v1-ACMMDK07_Nuuk_2011_Arctic_SAR_Agreement_unsigned_EN.PDF?sequence=8&isAllowed=y. For a State Department fact sheet on the agreement, see "Secretary Clinton Signs the Arctic Search and Rescue Agreement with Other Arctic Nations," May 12, 2011, accessed October 2, 2015, at https://2009-2017.state.gov/r/pa/prs/ps/2011/05/163285.htm.

> The working group includes both a maritime and aeronautical perspective, and it has identified a need for more detailed guidance for SAR organizations which will be achieved through an update of the International Aeronautical and Maritime Search and Rescue Manual (IAMSAR) planned for 2019.
>
> While the IAMSAR manual is not mandatory, it is followed by most SAR organizations around the world. It provides the framework for setting up a multi-national SAR, giving different parties guidance on the necessary arrangements for Arctic areas.

The guidance will be expanded on based on the Polar Code and other recent IMO regulatory updates, and from an aeronautical perspective, from lessons learned after the disappearance of Malaysian Airlines' MH370.[233]

Figure 4. Illustrative Map of Arctic SAR Areas in Arctic SAR Agreement

(Based on geographic coordinates listed in the agreement)



Source: "Arctic Search and Rescue Agreement," accessed July 7, 2011, at http://www.arcticportal.org/features/features-of-2011/arctic-search-and-rescue-agreement.

[233] Wendy Laursen, "MH370, Polar Code Spark SAR Rethink," *Maritime Executive*, October 12, 2015.

John S. McCain National Defense Authorization Act for Fiscal Year 2019 (H.R. 5515/S. 2987)

The Senate Armed Services Committee, in its report (S.Rept. 115-262 of June 5, 2018) on S. 2987, states the following:

> **Arctic search and rescue**
>
> The committee is aware that growing international interest and changing environmental conditions in the Arctic have led to increased commercial and governmental activity in the High North. With this steady surge, the committee remains concerned by the limited capabilities of the United States to conduct search-and-rescue operations throughout the Arctic region. The committee notes that the Department of Defense's Report to Congress on Strategy to Protect United States National Security Interests in the Arctic Region, a report required in section 1068 of the National Defense Authorization Act for Fiscal Year 2016 (Public-Law 114–92), identified the need for additional personnel recovery capability in this region. Specifically, the report calls for "forward-deployed/based assets in a sustainable location and/or rapidly deployable air drop response/sustainment packages suitable to remote land, cold water, or ice pack operating environments." (Pages 139-140)
>
> The committee understands that the 176th Wing of the Alaska National Guard is the closest dedicated response force with the only refueling capability to respond to a search-and-rescue incident in the Arctic. The unit currently possesses two air-dropped, palletized Arctic Sustainment Packages (ASPs) to enable the survival of 50 individuals for 3 or more days in extreme Arctic conditions. The ASP is rapidly deployable over varied terrain, and allows personnel to survive and operate in the High North. Each ASP requires considerable resources for sustainability, demanding 500 man-hours to re-pack ASPs after testing and to continually keep contents viable. In light of the increased activity in this region, the committee believes that this capability could benefit from additional sustainment funding to maintain the two existing ASPs, and encourages the Secretary of Defense to prioritize its resourcing. (Pages 139-140)

Geopolitical Environment[234]

Shift to Era of Renewed Great Power Competition

A principal factor affecting the geopolitical environment for the Arctic is the shift that has occurred in recent years from the post-Cold War era that began in the late 1980s and early 1990s, also sometimes known as the unipolar moment (with the United States as the unipolar power), to a new and different international security environment that features, among other things, renewed great power competition with China and Russia and challenges by these two countries and others to elements of the U.S.-led international order that has operated since World War II.[235] This shift in the international security environment, combined with the diminishment of Arctic ice and the resulting increase in human activities in the Arctic, has several potential implications for the geopolitical environment for the Arctic, which are discussed in the following sections.

[234] This section was prepared by Ronald O'Rourke, Specialist in Naval Affairs, Foreign Affairs, Defense, and Trade Division. It incorporates some material from a previous version of this section that was prepared by Carl Ek, who was a Specialist in International Relations, Foreign Affairs, Defense, and Trade Division, until his retirement on April 30, 2014. For questions relating to the European and Canadian parts of this section, contact Derek E. Mix, Analyst in European Affairs, Foreign Affairs, Defense, and Trade Division. For questions relating to the Chinese part of this section, contact Susan V. Lawrence, Specialist in Asian Affairs, Foreign Affairs, Defense, and Trade Division.

[235] For more on this shift, see CRS Report R43838, *A Shift in the International Security Environment: Potential Implications for Defense—Issues for Congress*, by Ronald O'Rourke.

Arctic Tradition of Cooperation and Low Tensions

The shift in the international security environment has raised a basic question as to whether the Arctic in coming years will continue to be a region generally characterized by cooperation and low tensions, as it was during the post-Cold War era, or instead become a region characterized at least in part by competition and increased tensions, as it was during the Cold War. In this regard, the shift in the international security environment poses a potential challenge to the tradition of cooperation, low tensions, peaceful resolution of disputes, and respect for international law that has characterized the approach used by the Arctic states, particularly since the founding of the Arctic Council in 1996, for managing Arctic issues.[236]

Some observers argue that the Arctic states and other Arctic stakeholders should attempt to maintain the region's tradition of cooperation and low tensions, and work to prevent the competition and tensions that have emerged in Europe, Asia, and elsewhere in recent years from crossing over into the Arctic. These observers argue that the Arctic tradition of cooperation and low tensions has proven successful in promoting the interests of the Arctic states and other Arctic stakeholders on a range of issues, that it has served as a useful model for other parts of the world to follow, and that in light of tensions and competition elsewhere in the world, this model is needed more now than ever. [237]

Other observers could argue that, notwithstanding the efforts of Arctic states and other Arctic stakeholders to maintain the Arctic as a region of cooperation and low tensions, it is unreasonable to expect that the Arctic can be kept fully isolated from the competition and tensions that have arisen in other parts of the world. As a consequence, these observers could argue, the Arctic states and other Arctic stakeholders should begin taking steps to prepare for increased competition and higher tensions in the Arctic, precisely so that Arctic issues can continue to be resolved as successfully as conditions may permit, even in a situation of competition and increased tensions.

Still other observers might argue that a policy of attempting to maintain the Arctic as a region of cooperation and low tensions, though well-intentioned, could actually help encourage aggressive behavior by Russia or China in other parts of the world by giving those two countries confidence that their aggressive behavior in other parts of the world would not result in punitive costs being imposed on them in the Arctic. These observers might argue that maintaining the Arctic as a region of cooperation and low tensions in spite of aggressive Russian or Chinese actions elsewhere could help legitimize those aggressive actions and provide little support to peaceful countries elsewhere that might be attempting to resist them. This, they could argue, could facilitate a divide-and-conquer strategy by Russia or China in their relations with other countries, which in the long run could leave Arctic states with fewer allies and partners in other parts of the world for resisting unwanted Russian or Chinese actions in the Arctic.

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[236] See, for example, Melody Schreiber, "As the Arctic Changes, International Cooperation May Be Put to the Test," *Arctic Today*, July 25, 2018; Stephanie Pezard, Abbie Tingstad, and Alexandria Hall, *The Future of Arctic Cooperation in a Changing Strategic Environment*, RAND Europe (PE-268RC), 2018, 18 pp.; Geoff Ziezulewicz, "As Arctic Waters Open, Nations Plant Their Flags," *Navy Times*, April 8, 2018; James Stavridis, "Avoiding a Cold War in the High North," *Bloomberg*, May 4, 2018; Kristina Spohr, "The Race to Conquer the Arctic—the World's Final Frontier," *New Statesman*, March 12, 2018.

[237] See, for example, Kevin McGwin, "More Military Activity May Spoil the Arctic's Atmosphere of Collaboration, Warns a Danish Report," *Arctic Today*, December 6, 2018; Hsin Hsuan Sun, "Arctic Council Sells Itself As a Model for International Cooperation at the UN," *Arctic Today*, July 23, 2018; John Grady, "Panel: Cooperation, Not Conflict Key to Future of the Arctic," *USNI News*, April 9, 2018; Levon Sevunts, "Arctic Nations Develop Coast Guard Co-operation," *Barents Observer*, March 13, 2018; Doug Tsuruoka, "Despite US-Russia Tensions, Arctic Powers Eye Cooperation," *Asia Times*, March 29, 2017.

Still others might argue that there is merit in some or all of the above perspectives, and that the challenge is to devise an approach that best mixes the potential strengths of each perspective.

Arctic Governance

Spotlight on Arctic Governance and Limits of Arctic Council

The shift in the international security environment to a situation of renewed great power competition may put more of a spotlight on the issue of Arctic governance and the limits of the Arctic Council as a governing body.[238] As noted earlier in this report, regarding the limits of the Arctic Council as a governing body, the council states that it "does not and cannot implement or enforce its guidelines, assessments or recommendations. That responsibility belongs to each individual Arctic State." In addition, the council states that "the Arctic Council's mandate, as articulated in the [1996] Ottawa Declaration [establishing the Council], explicitly excludes military security."[239]

During the post-Cold War era—the period when the Arctic Council was established and began operating—the limits of the Arctic Council as a governing body may have been less evident or problematic, due to the post-Cold War era's general situation of lower tensions and reduced overt competition between the great powers. In the new situation of renewed great power competition, however, it is possible that these limits could become more evident or problematic, particularly with regard to addressing Arctic-related security issues.

If the limits of the Arctic Council as a governing body are judged as having become more evident or problematic, one option might be to amend the rules of the council to provide for some mechanism for enforcing its guidelines, assessments, or recommendations. Another option might be to expand the council's mandate to include an ability to address military security issues.

Supporters of such options might argue that they could help the council adapt to the major change in the Arctic's geopolitical environment brought about the shift in the international security environment, and thereby help maintain the council's continued relevance in coming years. They might also argue that continuing to exclude military security from the council's mandate risks either leaving Arctic military security issues unaddressed, or shifting them to a different forum that might have traditions weaker than those of the Arctic Council for resolving disputes peacefully and with respect for international law.

Opponents of such options might argue that they could put at risk council's ability to continue addressing successfully nonmilitary security issues pertaining to the Arctic. They might argue that there is little evidence to date that the council's limits as a governing body have become problematic, and that in light of the council's successes since its founding, the council should be viewed as an example of the admonition, "if it isn't broke, don't fix it."

Some relatively little-publicized multilateral discussions of Arctic security issues have taken place. For example, in mid-2011, the U.S. European Command (EUCOM), in cooperation with the Norwegian Ministry of Defense, established the Arctic Security Forces Roundtable (ASFR), consisting of high-ranking military officers from the eight members of the Arctic Council, plus France, Germany, the Netherlands, and the UK. Another newly formed venue at which military

[238] See, for example, John Grady, "Old Treaties Called Into Question as Arctic Competition Increases," *USNI News*, December 20, 2016.

[239] Arctic Council, "The Arctic Council: A Backgrounder," updated January 3, 2018, accessed July 23, 2018, at https://arctic-council.org/index.php/en/about-us.

leaders discuss Arctic issues is the Northern Chiefs of Defense conference, which held its first meeting in May 2012, with military representatives from the eight Arctic Council governments in attendance.[240]

China and Arctic Governance

The shift in the international security environment to a situation of renewed great power competition may put more of a spotlight on differing perspectives between China and the eight member states of the Arctic Council regarding Arctic governance. A July 6, 2018, press report states that Russia and China

> diverge on the fundamental question of who makes international law in the Arctic. For a long time, admittedly, China wasn't interested: Way back in 1925, the Nationalist government [of China] signed the critical Spitsbergen Treaty granting non-Arctic nations rights in the northern seas, [said Sun Yun, the Stimson's Center's China program director], but his Communist successors didn't actually realize they'd inherited those rights until 1991, [which was] "a pleasant surprise." In the '90s, however, the eight Arctic Council nations—the US, Canada, Iceland, Finland, Russia, Sweden, Norway, and Denmark, which owns Greenland—set up a system of governance that largely sidelined other states. 13 countries do rate observer status on the Council, including China as of 2013 (even stranger bedfellows include Italy, India, and Singapore). But the eight voting members are generally not keen on diluting their control.
>
> China, by contrast, sees itself as a rising global superpower with commensurate influence everywhere on earth. It declared itself a near-Arctic state in January [2018]—a term actually coined by Great Britain but not widely recognized. China wants non-Arctic nations, especially "near-Arctic" ones, to have greater influence and more rights in the Arctic, with binding international law based on the UN Convention on the Law of the Sea (UNCLOS) rather than the current patchwork of mostly voluntary regional arrangements. Indeed, said Sun, "what they would like to argue is the format and the content of the Arctic governance system currently is not effective."
>
> Naturally the Russians, US, Canada, and Nordics disagree. "The Arctic states would argue there is very little governance gap," said Norway-based expert Elana Wilson Rowe, as they did in 2008 when they rejected an Antarctica-style treaty regime. Though the key agreements up north are admittedly non-binding, she said, the Arctic has become "a fairly heavily governed landscape."[241]

An October 15, 2018, blog post states that

> … China's interest in the Arctic extends beyond the purely economic: it is also pressing for a greater role in its governance. Compared to the Antarctic—where governance is heavily institutionalized, governance of the Arctic is much less developed, largely due to their distinctly different natures….
>
> The legal framework [for the Arctic] is a patchwork affair, drawn from various treaties of global application (including the UN Charter and the UN Convention on the Law of the Sea), the Svalbard Treaty(recognizing Norway's sovereignty over the eponymous Arctic archipelago), as well as customary international law and general principles of law. So far,

[240] "General Natynczyk and Fellow Northern Chiefs of Defence Discuss Shared Arctic Interests," News release, Canadian National Defense web page, April 13, 2012, http://www.forces.gc.ca/site/news-nouvelles/news-nouvelles-eng.asp?id=4151 "Northcom Strives to Promote Safe, Secure Arctic," U.S. Department of Defense web page, December 17, 2012, http://www.defense.gov/news/newsarticle.aspx?id=118814.

[241] Sydney J. Freedberg Jr., "China & Russia In The Arctic: Axis Of Ambivalence," *Breaking Defense*, July 6, 2018. See also Nengye Liu and Michelle Lim, "How Arctic Governance Could Become a Testing Ground for Sino-US Relations," *The Conversation*, March 29, 2017.

> the Arctic Council has been the forum for the conclusion of only three legally binding agreements.
>
> China sees a gap for new ideas, rules and participants in this space. A white paper released by the government in January [2018] contains sophisticated and detailed analysis of the international legal framework applicable to the Arctic and demonstrates China's increasing knowledge and capability in this area, as reflected in the growing number of Chinese international lawyers specializing in Arctic matters.
>
> The white paper seeks to justify China's involvement in Arctic affairs as a 'near Arctic state', noting that the Arctic's climate, environment and ecology are of concern for all states. The white paper uses familiar phrases from China's vision for its foreign policy—such as the 'shared future of mankind' and 'mutual benefit'—to argue for a pluralist (i.e. global, regional and bilateral) approach to Arctic governance….
>
> … As an observer state, China has very limited rights in the council, but has been creatively using other routes to influence Arctic governance, including active engagement within the International Maritime Organization (IMO) and the International Seabed Commission.
>
> China participated in the formation of the IMO's Polar Code of January 2017, which sets out rules for ships operating in polar waters. China was also one of ten states involved in the recent adoption of the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean, which took place outside the umbrella of the Arctic Council.
>
> At a recent roundtable in Beijing co-hosted by Chatham House, Chinese experts noted China's aspirations to develop the international rule of law in the Arctic through playing an active role in developing new rules in areas currently under (or un-) regulated, for example, through a treaty to strengthen environmental protection in the region. It was also suggested that China may also seek to clarify the meaning of existing rules through its own practice.
>
> China also has ambitions to contribute to the research of the Arctic Council's Working Groups, which develop proposals for Arctic Council projects and rules. It remains to be seen to what extent Arctic states, protective of theirown national interests in an increasingly fertile area, will cede space for China to participate.
>
> China's push to be a rule shaper in the Arctic fits into a wider pattern of China seeking a more influential role in matters of global governance. This trend is particularly apparent in areas where the rules are still emerging and thus where China feels more confident than in areas traditionally dominated by Western powers.
>
> A similar assertiveness by China is increasingly visible in other emerging areas of international law, such as the international legal framework applicable to cyber operations and international dispute settlement mechanisms relating to trade and investment.
>
> China's approach to Arctic governance offers an interesting litmus test as to how far China intends to deploy international law to assert itself on governance issues with significant global economic, environmental, and security implications – along with the degree to which it will be perceived as acting in the common interest in doing so.[242]

A November 22, 2018, press report states:

> China has become a "rule maker" in the global governance of the Arctic, a blue paper said Thursday, calling on the country to "stay calm" and respond with action in the face of the hyped-up "China threat" theory.

[242] Harriet Moynihan, "China Expands Its Global Governance Ambitions in the Arctic," Chatham House, October 15, 2018.

> Jointly released by Beijing-based Social Sciences Academic Press and Qingdao-based Ocean University of China on Thursday, the blue paper said China's role in promoting global governance in the region cannot be ignored.
>
> In terms of global governance of the Arctic, China's role has shifted from a "rule follower" to a "rule maker," said the blue paper.
>
> China has led the governance philosophy and is taking the initiative in shaping the global governance agenda in the Arctic, it stressed.
>
> China is a "near-Arctic country" geographically. The natural conditions and changes in the Arctic have a direct impact on China' s climate system and ecological environment, which in turn affects China's economic interests in the fields of agriculture, forestry, fisheries and oceans, the blue paper said.
>
> Arctic countries also have concerns, of which China is aware, said the blue paper, stressing that maintaining regional security and promoting world peace has been the basic rule of China's diplomatic policies.
>
> The associate editor of the blue paper, Dong Yue, who is the deputy head of the Law School of Ocean University of China, told the Global Times on Thursday that the paper's call for China to "stay calm" means China won't take any "radical" action.
>
> The paper said that China holds the principle of respecting the sovereignty of Arctic states, not hurting their basic rights and guaranteeing the decision-making powers of the Arctic Council. China has been an observer member at the council since 2013.
>
> The "China threat theory" may mean other countries will unfairly raise the threshold for Chinese enterprises to become involved in the development of the Arctic, Zhang Xia, director of the Shanghai-based Polar Strategy Center at the Polar Research Institute of China, told the Global Times on Thursday.[243]

A November 29, 2018, statement to a committee of the Canadian parliament states that China

> is not the only non-Arctic state to develop an Arctic policy and look for a deeper commitment to the region. Most other observer states to the Arctic Council have an Arctic strategy, a polar strategy, or at least some official guidelines regarding their Arctic policy.… It remains to be seen whether, like China, these non-Arctic nations see themselves as "near Arctic states" that cannot leave the leadership of a strategic region to eight nations only; and whether they might find it advantageous to coalesce as a group of like-minded countries to seek more political and decisional weight both within the Arctic Council and in other international fora.
>
> So far, the approach of Arctic states has been to coopt non-Arctic states rather than exclude them. Most have been eventually accepted as observer states in the Arctic Council, and they are participating in the development of new rules for the Arctic.… Yet Arctic nations have made clear that the broader legal background for such development should remain the United Nations Convention on the Law of the Sea and other existing principles of international law. As stated in the 2008 Ilulissat Declaration, they reject the development of new international rules specifically for the Arctic—an equivalent of the Antarctica Treaty—as such a treaty would require painful negotiations and would likely be less advantageous for them than the current system.[244]

[243] Liu Caiyu, "China's Role in Arctic Governance 'Cannot Be Ignored,'" *Global Times*, November 22, 2018.

[244] Stephanie Pezard, The New Geopolitics of the Arctic, Russia's and China's Evolving Role in the Region, RAND (Testimony presented before the Standing Committee on Foreign Affairs and International Development of the Canadian House of Commons on November 26, 2018), p. 8.

Arctic and World Order

Another potential implication for the Arctic of the shift in the international security environment concerns the new environment's challenges to elements of the U.S.-led international order that has operated since World War II. One element of the U.S.-led international order that has come under challenge is the principle that force or threat of force should not be used as a routine or first-resort measure for settling disputes between countries. Another is the principle of freedom of the seas (i.e., that the world's oceans are to be treated as an international commons).[245] If either of these elements of the U.S.-led international order is weakened or overturned, it could have potentially major implications for the future of the Arctic, given the Arctic's tradition of peaceful resolution of disputes and respect for international law and the nature of the Arctic as a region with an ocean at its center that washes up against most of the Arctic states.

More broadly, some observers assess that the U.S.-led international order in general may be eroding or collapsing, and that the nature of the successor international order that could emerge in its wake is uncertain.[246] An erosion or collapse of the U.S.-led international order, and its replacement by a new international order of some kind, could have significant implications for the Arctic, since the Arctic's tradition of cooperation and low tensions, and the Arctic Council itself, can be viewed as outgrowths of the U.S.-led order.

Relative Priority of Arctic in U.S. Policymaking

The shift in the international security environment has raised a question concerning the priority that should be given to the Arctic in overall U.S. policymaking. During the post-Cold War era, when the Arctic was generally a region of cooperation and low tensions, there may have been less need to devote U.S. policymaker attention and resources to the Arctic. Given how renewed great power competition and challenges to elements of the U.S.-led international order might be expressed in the Arctic in terms of issues like resource exploration, disputes over sovereignty and navigation rights, and military forces and operations, it might be argued that there is now, other things held equal, more need for devoting U.S. policymaker attention and resources to the Arctic.

On the other hand, renewed great power competition and challenges to elements of the U.S.-led international order are also being expressed in Europe, the Middle East, the Indo-Pacific, Africa, and Latin America. As a consequence, it might be argued, some or all these other regions might similarly be in need of increased U.S. policymaker attention and resources. In a situation of constraints on total U.S. policymaker attention and resources, the Arctic would need to compete against these other regions for U.S. policymaker attention and resources.

U.S., Canadian, and Nordic Relations with Russia in Arctic

The shift in the international security environment to a situation of renewed great power competition raises a question for U.S., Canadian, and Nordic policymakers regarding the mix of cooperation and competition to pursue (or expect to experience) with Russia in the Arctic. In considering this question, geographic points that can be noted include the following:

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[245] For additional discussion, see CRS Report R43838, *A Shift in the International Security Environment: Potential Implications for Defense—Issues for Congress*, by Ronald O'Rourke, and, regarding the principle of freedom of the seas, CRS Report R42784, *China's Actions in South and East China Seas: Implications for U.S. Interests—Background and Issues for Congress*, by Ronald O'Rourke.

[246] For additional discussion, see CRS Report R44891, *U.S. Role in the World: Background and Issues for Congress*, by Ronald O'Rourke and Michael Moodie.

- Russia, according to one assessment, "has at least half of the Arctic in terms of area, coastline, population and probably mineral wealth."[247] Russia has numerous cities and towns in its Arctic, uses its coastal Arctic waters as a maritime highway for supporting its Arctic communities, is promoting the Northern Sea Route that runs along Russia's Arctic coast for use by others, and is keen to capitalize on natural resource development in the region, both onshore and offshore. In this sense, of all the Arctic states, Russia might have the most at stake in the Arctic in absolute terms.[248]
- Arctic ice is diminishing more rapidly or fully on the Russian side of the Arctic than it is on the Canadian side. Consequently, the Northern Sea Route along Russia's coast is opening up more quickly for trans-Arctic shipping than is the Northwest Passage through the Canadian archipelago.

On the one hand, the United States, Canada, and the Nordic countries continue cooperate with Russia on a range of issues in the Arctic, including, to cite just one example, search and rescue (SAR) under the May 2011 Arctic Council agreement on Arctic SAR (see "Search and Rescue (SAR)"). More recently, the United States and Russia cooperated in creating a scheme for managing two-way shipping traffic through the Bering Strait and Bering Sea.[249] A July 17, 2018, opinion piece states that

> It's likely that few, if any, of either [President Trump's or President Putin's] advisors, let alone commentators, are looking to the Arctic—yes, the Arctic—as a starting point for common ground and improving relations going forward….
>
> Yet, other than the International Space Station, the Far North is perhaps the only setting in which the United States and the Russian Federation cooperate today on a wide variety of issues.
>
> These two practical examples of cooperation might provide a foundation upon which both sides can regain some trust and positive momentum in their bilateral relationship (that is, if there is will on both sides to do so).
>
> If such momentum could be sustained over any meaningful period of time, it may create a more functional context to address other pressing and multilateral issues of global importance….
>
> Clearly the recent agreements on Central Arctic Ocean fishing and research provide pathways for cooperation. Perhaps a joint Arctic marine expedition in the remote Central Arctic Ocean in support of the new fisheries agreement could be proposed?

[247] "The Arctic: Special Report," *The Economist,* June 16, 2012, p. 11. As noted in the "Background" section of this CRS report, of the 4 million or so people who live above the Arctic circle, roughly half are in Russia.

[248] See also Stephanie Pezard, *The New Geopolitics of the Arctic, Russia's and China's Evolving Role in the Region*, RAND (Testimony presented before the Standing Committee on Foreign Affairs and International Development of the Canadian House of Commons on November 26, 2018), pp. 1-2.

[249] See, for example, U.S. Coast Guard, "U.S., Russia Propose Bering Strait Ship Traffic Routing Measures," January 25, 2018; Amy Midgett, "U.S., Russia Jointly Propose Bering Strait Routing Measures," *Coast Guard Maritime Commons*, January 25, 2018; Amy Midgett, "IMO Approves U.S.-Russian Federation Proposal for Bering Strait Routing Measures," *Coast Guard Maritime Commons*, May 25, 2018; Yereth Rosen, "With Marine Traffic Growing, International Shipping Agency Approves US-Russia Plan for Bering Strait Shipping Lanes," *Arctic Today*, May 26, 2018; Associated Press, "Maritime Organization Approves Two-Way Shipping Routes in Bering Strait," *CBC*, May 27, 2018; "U.S., Russia Propose Bering Strait Traffic Routing," *Maritime Executive*, May 27, 2018; Margaret Kriz Hobson, "Amid Ice Melt, New Shipping Lanes Are Drawn Up off Alaska," *E&E News (Scientific American)*, May 29, 2018.

> The U.S. and Russia could take the lead in the Arctic Coast Guard Forum (now chaired by Finland) in exploring enforcement issues with the new IMO International Code for Ships Operating in Polar Waters.
>
> Renewed military-to-military cooperation could be feasible if the joint meetings were to focus on Arctic emergency operations, something more likely as shipping and development activities increase.
>
> Presidents Trump and Putin could support renewed friendship flights and cultural exchanges between the indigenous communities that border our shared Bering and Chukchi Seas.[250]

On the other hand, as discussed later in this report, a significant increase in Russian military capabilities and operations in the Arctic in recent years[251] has prompted growing concerns among U.S., Canadian, and Nordic observers that the Arctic might once again become a region of military tension and competition, and to concerns about whether the United States, Canada, and the Nordic countries are adequately prepared militarily to defend their interests in the region.

In protest of Russia's forcible occupation and annexation of Crimea and its actions elsewhere in Ukraine, Canada announced that it would not participate in an April 2014 working-level-group Arctic Council meeting in Moscow. In addition, former Secretary of State Hillary Clinton, during whose tenure a "reset" in relations with Russia was sought, reportedly stated that Arctic cooperation may be jeopardized if Russia pursues expansionist policies in the high north.[252] More recently, economic sanctions that the United States imposed on Russia in response to Russian actions in Ukraine could impact Russian Arctic offshore oil exploration.[253]

Another potential concern for U.S. policymakers in connection with Russia in the Arctic relates to the Northern Sea Route. Russia considers certain parts of the Northern Sea Route to be internal Russian waters—a position that creates a potential source of tension with the United States, which may consider at least some of those waters to be international waters. A dispute over this issue could have implications not only for the Arctic, but for other parts of the world as well, since international law is universal in its application, and a successful challenge to international waters in one part of the world can serve as a precedent for challenging it in other parts of the world. A November 30, 2018, press report states:

> Russia plans to restrict the passage of foreign warships in the Arctic Ocean next year, a top defense official has said….
>
> On Friday [November 30], Defense Ministry spokesman Mikhail Mizintsev said that Russia's ministries were working on amending legislation that would require foreign warships to notify Russia before being able to pass through the Arctic.

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[250] Mike Sfraga and Lawson Brigham, "US, Russia Can Look North to the Arctic to Find Common Ground," The Hill, July 17, 2018.

[251] For citations regarding the increase in Russian military capabilities and operations in the Arctic in recent years, see footnote 294.

[252] Naval Exercise on Hold Due to Ukraine Tensions. *Navy Times*. March 13, 2014. Hillary Warns Against Russia in Arctic. Barents Observer. April 3, 2014. http://barentsobserver.com/en/arctic/2014/04/hillary-warns-against-russia-arctic-03-04 Canada Takes Principled Stand on Arctic Council Meetings. Ministry of Foreign Affairs, Trade, and Development Canada. April 15, 2014, http://www.international.gc.ca/media/arctic-arctique/news-communiques/2014/04/15a.aspx?lang=eng, Crimea Crises Changes Nordic Defense Perspective.

[253] See, for example, Reuters staff, "Expanded U.S. Sanctions May Affect Russia's Foreign Expansion in Oil and Gas" *Reuters*, November 19, 2017.

> The work will be completed by the time the waters are navigable in 2019, Mizintsev was cited by Interfax as saying at a conference on Friday.[254]

NATO, the EU, and the Arctic

The shift in the international security environment has led to a renewal of NATO interest in NATO's more northerly areas. During the Cold War, NATO member Norway and its adjacent sea areas were considered to be the northern flank of NATO's defensive line against potential aggression by the Soviet-led Warsaw Pact alliance. With the end of the Cold War and the shift to the post-Cold War era, NATO planning efforts shifted away from defending against potential aggression by Russia, which was considered highly unlikely, and toward other concerns, such as the question of how NATO countries might be able to contribute to their own security and that of other countries by participating in out-of-area operations, meaning operations in areas outside Europe.

With the ending of the post-Cold War era and the shift in the international security environment to a period of renewed great power competition, NATO is now once again focusing more on the question of how to deter potential Russian aggression against NATO countries.[255] As one consequence of that, Norway and its adjacent sea areas are once again receiving more attention in NATO planning.[256] A NATO exercise called Trident Juncture 18 that was held from October 25 to November 7, 2018, in Norway and adjacent waters of the Baltic and the Norwegian Sea, with participation by all 29 NATO members plus Sweden and Finland, was described as NATO's largest exercise since the Cold War, and featured a strong Arctic element, including the first deployment of a U.S. Navy aircraft carrier above the Arctic Circle since 1991.[257]

The question of NATO's overall involvement in the Arctic, however, has been a matter of debate within NATO. A 2012 report stated that "[t]here is currently no consensus within the alliance that NATO has any role to play in the Arctic, as Canada strongly opposes any NATO involvement on sovereignty grounds and other NATO members are concerned with negative Russian reaction."[258]

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[254] "Russia Will Restrict Foreign Warships in Arctic Ocean, Defense Official Says," *Moscow Times*, November 30, 2018.

[255] See, for example, CRS Report R44550, *NATO's Warsaw Summit: In Brief*, by Paul Belkin.

[256] See, for example, Teri Schultz, "NATO and Washington Worry About Russian Subs in the High North," *Deutsche Welle*, April 26, 2018.

[257] See, for example, Christopher Woody, "'We Can Do Better': The Navy's Newest Fleet Commander Says US Ships and Sailors got 'Beat Up' During NATO's Biggest Exercise Since the Cold War," *Business Insider*, December 4, 2018; Levon Sevunts, "NATO's Arctic Dilemma; Two Visions of the Arctic Collide as NATO and Russia Flex Muscles," *Radio Canada International*, December 3, 2018; Megan Eckstein, "Truman CSG: Arctic Strike Group Operations Required Focus on Logistics, Safety," *USNI News*, November 6, 2018; Mary Thompson-Jones, "NATO's Arctic Exercise is a Good Start to Standing Up to Russian Militarization of the High North," *National Interest*, November 6, 2018; Pierre-Henry Deshayes, "Antifreeze and Balaclavas: NATO Troops in cold War Games," *Military.com*, November 2, 2018; Vasco Cotovio and Frederik Pleitgen, "Submarines a Centerpiece of Russia's Navy," *CNN*, November 19, 2018; Shawn Snow, "The Corps' Armor Makes a Big Showing in Norway as Marines Test Future Force," *Marine Corps Times*, October 25, 2018; Terje Solsvik, "As Winter Comes, NATO Kicks Off Largest Maneuvers Since Cold War," *Reuters*, October 25, 2018; Kyle Rempfer, "US Breaches the Arctic with Marines, Fighter Jets and Aircraft Carriers," *Military Times*, October 23, 2018; Megan Eckstein, "Truman Carrier Strike Group Operating North of Arctic Circle; First Time for US Navy Since 1991," *USNI News*, October 19, 2018; Thomas Gooley, "HST Strike Group Enters Arctic Circle, Prepares for NATO Exercise," *DVIDS (Defense Visual Information Distribution Service)*, October 19, 2018; Thomas Nilsen, "US Marines Launch Exercise in Northern Norway Ahead of Trident Juncture," *Barents Observer*, October 15, 2018.

[258] Heather A. Conley et al, *A New Security Architecture for the Arctic: An American Perspective*, Center for Strategic and International Studies (CSIS), January 2012, p. 30.

A 2013 NATO Parliamentary Assembly report noted that "50% of the territory surrounding the Arctic Sea is a territory of a NATO member state," and suggested that "NATO could serve as a forum for dialogue on military issues.... "[259] The report argued that the alliance is well-equipped to play a key role in addressing security challenges that will likely emerge, particularly those that involve surveillance, search-and-rescue, and environmental cleanup. However, observers stated that the lack of unanimity over a NATO presence in the Arctic was reflected by the fact that the high north was not mentioned in either in NATO's 2010 strategic concept, nor in the final declaration of NATO's 2012 Chicago summit. On May 8, 2013, following a visit to Norway, then-NATO Secretary General Rasmussen stated that "at the present time," the alliance had "no intention of raising its presence and activities in the High North."[260]

In May 2017, it was reported that NATO "may revive a Cold War naval command to counter Moscow's increased submarine activity in the Arctic and protect Atlantic sea lanes in the event of a conflict, according to allied diplomats and officials briefed on the planning work."[261]

An April 4, 2018, press report states the following:

> Despite rising tensions with Russia in Eastern Europe, the Baltics and more recently in the United Kingdom, NATO would like to keep the Arctic an area of low tensions, the chief of the North Atlantic Alliance said Wednesday [April 4].
>
> "We used to say that in the High North we have low tensions," NATO Secretary General Jens Stoltenberg told reporters during a joint press conference with Prime Minister Justin Trudeau. "And I think we should continue to strive for avoiding an arms race and higher tensions in the High North."
>
> At the same time the alliance needs to respond to the increased Russian military presence in the North Atlantic and the Arctic regions with more of its own naval forces, said Stoltenberg who was in Ottawa for a two-day visit.
>
> "Therefore part of the adaptation of NATO is that we are also increasing our naval capabilities, including the High North," Stoltenberg said.[262]

Two observers state in a June 27, 2018, policy paper that

> The North Atlantic Treaty Organization (NATO) summit in Brussels on July 11 and 12 is an opportunity for the Alliance to finally focus on a region it has long ignored: the Arctic….
>
> NATO has no agreed common position on its role in the Arctic region. The [July 2016 NATO] Warsaw Summit Declaration did not mention the word Arctic, and neither does the Alliance's most recent Strategic Concept published in 2010.
>
> NATO has been internally divided on the role that the Alliance should play in the High North. Norway is the leading voice inside the Alliance for promoting NATO's role in the Arctic. It is the only country in the world that has its permanent military headquarters above the Arctic Circle, and it has invested extensively in Arctic defense capabilities.

[259] "Security in the High North: NATO's Role," NATO Parliamentary Assembly draft report, 071 PCTR 13 E, March 28, 2013.

[260] "NATO Won't Up Presence in the Arctic: Chief," *Agence France Presse,* May 8, 2013. "NATO Rejects Direct Arctic Presence," *Defense News,* May 27, 2013.

[261] Julian E. Barnes, "NATO Mulls Arctic and Atlantic Command to Counter Russia," Wall Street Journal, May 18, 2017.

[262] Levon Sevunts, "NATO Wants to Keep the Arctic An Area of Low Tensions, Stoltenberg," *Radio Canada International*, April 4, 2018.

> Canada has likewise invested heavily in Arctic defense capabilities. However, unlike Norway, Canada has stymied past efforts by NATO to take a larger role in the region. Generally speaking, there is a concern inside Canada that an Alliance role in the Arctic would afford non-Arctic NATO countries influence in an area where they otherwise would have none.[263]

A July 2, 2018, opinion piece by another observer stated the following:

> Since 2014, the alliance has adapted to focus on Russia's actions in eastern Europe, notably in the Baltic region and in Poland….
>
> But strengthening NATO's eastern flank is not enough. Little has been done to work out a coherent vision for how to protect NATO interests in the Arctic or in the Black Sea. This is worrying since Russia is emboldened in both regions, as seen through brinksmanship such as provocative air manoeuvring, an assertive force posture and constant military drilling….
>
> The Kremlin defined its Arctic strategy back in 2008 and named the High North a region of strategic importance in its 2017 naval doctrine….
>
> NATO by contrast lacks any comparable strategy for the High North: its 2010 Strategic Concept does not even mention the region and discussions on the North Atlantic do not automatically include the High North. The creation of a new NATO North Atlantic Joint Force Command this February, *without* a proper Arctic angle, proves this point. Furthermore, the 'GIUK gap' (Greenland, Iceland and the UK), connecting the North Atlantic to the Arctic region, is often overlooked.[264]

The European Union (EU) is also showing increased interest in the Arctic.[265]

China in the Arctic

China's Growing Activities in Arctic

China's activities in the Arctic have grown steadily in recent years. As noted earlier in this report, China was one of six non-Arctic states that were approved for observer status by the Arctic Council in 2013.[266] China in recent years has engaged in growing diplomatic activities with the Nordic countries, and has increased the size of its diplomatic presences in some of them. In April 2013, China and Iceland signed a free trade agreement—China's first such pact with a European government. China has also engaged in growing economic discussions with Greenland, a territory of Denmark that might be moving toward eventual independence.[267]

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[263] Luke Coffey and Daniel Kochis, "Brussels NATO Summit 2018: Time to Get Serious About the Arctic," Heritage Foundation, June 27, 2018 (Issue Brief 4875), p. 1.

[264] Mathieu Boulègue, "NATO Needs a Strategy for Countering Russia in the Arctic and the Black Sea," Chatham House (Royal Institute of International Affairs), July 2, 2018. A similar opinion piece was published as Mathieu Boulegue, "In Search of NATO's New Strategies: How to Counter Russia in the Arctic and the Black Sea," *EU Bulletin*, July 17, 2018. See also Daniel Goure, "U.S. & NATO Need and Arctic Strategy to Counter Russia," *Real Clear Defense*, November 8, 2017.

[265] Kevin McGwin, "Already Quietly Active in the Region, the EU Is Increasingly Stepping onto the Arctic Stage," *Arctic Today*, October 10, 2018; Kevin McGwin, "The Week Ahead: Bringing the Arctic to Brussels," *Arctic Today*, September 17, 2018.

[266] The other five were India, Italy, Japan, Singapore, and South Korea. For the full list of observers and when they were approved for observer status, see Arctic Council, "Observers," accessed July 20, 2018 at https://arctic-council.org/index.php/en/about-us/arctic-council/observers.

[267] See, for example, "Greenland Plans Office in Beijing to Boost Trade Ties with China," *Reuters*, July 18, 2018.

China has an Arctic-capable icebreaker, *Xue Long* (Snow Dragon), that in recent years has made several transits of Arctic waters—operations that China describes as research expeditions.[268] China is completing construction of its second Arctic-capable icebreaker (the first that China has built domestically), to be named *Xue Long 2*,[269] and has announced an intention to eventually build a 30,000-ton nuclear-powered icebreaker,[270] which would make China only the second country (along with Russia) to operate a nuclear-powered icebreaker. Like several other nations, China has established a research station in the Svalbard archipelago.

China in January 2018 released a white paper on China's Arctic policy that refers to China as a "near-Arctic state."[271] (China's northernmost territory, northeast of Mongolia, is at about the same latitude as the Aleutian Islands in Alaska, which, as noted earlier in this report, the United States includes in its definition of the Arctic for purposes of U.S. law.) The white paper refers to trans-Arctic shipping routes as the Polar Silk Road, and identifies these routes as a third major transportation corridor for the Belt and Road Initiative (BRI), China's major geopolitical initiative, first announced by China in 2013, to knit Eurasia and parts of Africa together in a Chinese-anchored or Chinese-led infrastructure and economic network.[272]

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[268] See, for example, "Icebreaker Sets Sail on China's 9th Arctic Research Expedition," *Xinhua*, July 20, 2018; "China Begins 9th Arctic Expedition to Help Build 'Polar Silk Road,'" *Global Times*, July 20, 2018.

[269] See "China Launches First Domestically Built Icebreaker," *People's Daily Online*, September 10, 2018.

[270] See Zhao Yusha, "China One Step Closer to Nuke-Powered Aircraft Carrier with Cutting-Edge Icebreaker Comes on Stream," ChinaMil.com, June 23, 2018; China Daily, "China's 1st Nuclear-Powered Icebreaker in the Pipeline," *People's Daily Online*, June 25, 2018; Kyle Mizokami, "China Is Planning a Nuclear-Powered Icebreaker," *Popular Mechanics*, June 25, 2018; *China Military Online*, "Why Is China Building a 30,000-Ton Nuclear-Powered Icebreaker?" ChinaMil.com, June 30, 2018.

[271] "Full Text: China's Arctic Policy," *Xinhua*, January 26, 2018, accessed July 20, 2018, at http://www.xinhuanet.com/english/2018-01/26/c_136926498.htm. The white paper states that "China is an important stakeholder in Arctic affairs. Geographically, China is a 'Near-Arctic State', one of the continental States that are closest to the Arctic Circle. The natural conditions of the Arctic and their changes have a direct impact on China's climate system and ecological environment, and, in turn, on its economic interests in agriculture, forestry, fishery, marine industry and other sectors. China is also closely involved in the trans-regional and global issues in the Arctic, especially in such areas as climate change, environment, scientific research, utilization of shipping routes, resource exploration and exploitation, security, and global governance. These issues are vital to the existence and development of all countries and humanity, and directly affect the interests of non-Arctic States including China."

Somewhat similarly, France's June 2016 national roadmap for the Arctic refers to France as a "polar nation." (Republique Francaise, Ministere des Affaires Etrangeres et du Developpement International, *The Great Challenge of the Arctic, National Roadmap for the Arctic*, June 2016, 60 pp.) The document states on page 9 that "France has established itself over the last three centuries as a polar nation, with a strong tradition of expeditions and exploration, and permanent research bases at the poles," and on page 17 that "[b]uilding on its long-standing tradition of exploration and expeditions in high latitudes, France has carved out its place as a polar nation over the last three centuries. France has permanent scientific bases in the Arctic and in Antarctica." It can also be noted that the northernmost part of mainland France, next to Belgium and across the Strait of Dover from England, is almost as far north as the more southerly parts of the Aleutian Islands.

Also somewhat similarly, a November 2018 UK parliamentary report refers to the UK as a "near-Arctic neighbour." The report states: "While the UK is not an Arctic state, it is a near-Arctic neighbour. The UK's weather system is profoundly affected by changes in the Arctic's climate and sea currents. The UK has been an Observer to the Arctic Council since 1998." (United Kingdom, House of Commons, Environmental Audit Committee, *The Changing Arctic, Twelfth Report of Session 2017-19*, November 29, 2018, p. 3. [Report, together with formal minutes relating to the report, Ordered by the House of Commons to be printed November 6, 2018]. See also pp. 6, 29, and 32.)

See also Eva Dou, "A New Cold War? China Declares Itself a 'Near-Arctic State,' *Wall Street Journal*, January 26, 2018; Grant Newsham, "China As A 'Near Arctic State'—Chutzpah Overcoming Geography," *Asia Times*, January 30, 2018.

[272] See, for example, Sabena Siddiqui, "Arctic Ambition: Beijing Eyes the Polar Silk Road," *Asia Times*, October 25, 2018. The BRI's other two main corridors, which were announced at the outset of the BRI, are a land corridor that runs

China appears to be interested in using the Northern Sea Route (NSR) linking Europe and Asia via waters running along Russia's Arctic coast to shorten commercial shipping times between Europe and China and perhaps also to reduce China's dependence on southern sea routes (including those going to the Persian Gulf) that pass through the Strait of Malacca—a maritime choke point that China appears to regard as vulnerable to being closed off by other parties (such as the United States) in time of crisis or conflict. China reportedly reached an agreement with Russia on July 4, 2017, to create an "Ice Silk Road,"[273] and in June 2018, China and Russia agreed to a credit agreement between Russia's Vnesheconombank (VEB) and the China Development Bank that could provide up to $9.5 billion in Chinese funds for the construction of select infrastructure projects, including in particular projects along the NSR.[274] In September 2013, the *Yong Shen, a* Chinese cargo ship, became the first commercial vessel to complete the voyage from Asia to Rotterdam via the NSR.[275]

China is interested in oil and gas exploration in the Arctic, and has made significant investments in Russia's Arctic oil and gas industry. In March 2013, it was announced that Russia and China had signed an agreement under which China would purchase oil from Russia in exchange for exploration licenses in the Arctic. China's investments in Russia's Arctic oil and gas industry include ownership stake of at least 20% in the Yamal natural gas megaproject located on Russia's Yamal Peninsula in the Arctic. The facility includes onshore and offshore natural gas wells, a deepwater port, liquefied natural gas (LNG) storage and feeder lines, permafrost-resilient support buildings, and rail lines.[276] In July 2018, an LNG shipment reportedly arrived in China from the Yamal LNG facility, via the NSR, for the first time.[277]

China is also interested in mining opportunities in the Arctic seabed and in Greenland.[278] Given Greenland's very small population, China may view Greenland as an entity that China can seek to engage using an approach similar to ones that China has used for engaging with small Pacific and Indian Ocean island states. China may also be interested in Arctic fishing grounds.

China's growing activities in the Arctic may also reflect a view that, as a major world power, China should be active in the polar regions for conducting research and other purposes. (China has recently increased the number of research stations in maintains in the Antarctic.) Particularly since China published its Arctic white paper in January 2018, observers have expressed curiosity

east to west across the middle of Eurasia—the "belt" in BRI—and a sea corridor called the Maritime Silk Road that passes through the South China Sea and the Indian Ocean to the Persian Gulf and the Mediterranean Sea—the "road" in BRI. For more on the BRI, see CRS In Focus IF10273, *China's "One Belt, One Road,"* by Susan V. Lawrence and Gabriel M. Nelson. See also Atle Staalesen, "Chinese Money for Northern Sea Route," *Barents Observer*, June 12, 2018. See also Lin Boqiang, "China Can Support Arctic Development as Part of B&R," *Global Times*, August 9, 2018.

[273] Xinhua, "China, Russia agree to jointly build 'Ice Silk Road,'" *Xinhuanet*, July 4, 2017.

[274] Atle Staalesen, Chinese Money for Northern Sea Route," *Barents Observer*, June 12, 2018.

[275] "Chinese Make First Successful North Sea Route Voyage," *The Arctic Journal*, September 12, 2013.

[276] See, for example, Jeremy Hodges, Anna Shiryaevskaya, and Dina Khrennikova, "Melting Ice in the Arctic is Opening a New Energy Trade Route," *Bloomberg*, September 4, 2018; Nadezhda Filimonova and Svetlana Krivokhizh, "China's Stakes in the Russian Arctic," *The Diplomat*, January 18, 2018.

[277] Hsin Hsuan Sun, "China Just Received Its First LNG Shipment to Arrive Directly from the Russian Arctic by Ship," *Arctic Today*, July 20, 2018.

[278] See, for example, Martin Breum, "China and the US Both Have Strategic Designs for Greenland," *Arctic Today*, October 17, 2018; Mia Bennett, "The Controversy over Greenland Airports Shows China Isn't Fully Welcome in the Arctic—Yet," *Arctic Today*, September 13, 2018; Miguel Martin, "China in Greenland: Mines, Science, and Nods to Independence," *China Brief*, March 12, 2018.

or concern about China's exact mix of motivations for its growing activities in the Arctic, and about what China's ultimate goals for the Arctic might be.[279]

Arctic States' Response

The shift in the international security environment to a situation of renewed great power competition underscores a question for the Arctic states regarding whether and how to respond to China's growing activities in the Arctic. China's growing activities in the Arctic could create new opportunities for cooperation between China and the Arctic states. They also, however, have the potential for posing challenges to the Arctic states in terms of defending their own interests in the Arctic.

For U.S. policymakers, a general question is how to integrate China's activities in the Arctic into the overall equation of U.S.-China relations, and whether and how, in U.S. policymaking, to link China's activities in the Arctic to its activities in other parts of the world. One specific question concerns potential areas for U.S.-Chinese cooperation in the Arctic.[280] Another specific question could be whether to impose punitive costs on China in the Arctic for unwanted actions that China takes elsewhere. As one hypothetical example of such a cost-imposing action, U.S. policymakers

[279] See, for example, Fermin Koop, "Reykjavik Meeting Seals China's Commitment to Arctic Expansion," *Chinadialogue Ocean,* November 21, 2018; Rebecca Pincus and Walter A. Berbrick, "Gray Zones in a Blue Arctic: Grappling with China's Growing Influence," *War on the Rocks*, October 24, 2018; Kevin McGwin, "Copenhagen Is Ignoring Russia, Chinese Activity in the Arctic, Lawmakers Warn," *Arctic Today,* October 17, 2018; Trym Aleksander Eiterjord, "The Growing Institutionalization of China's Polar Silk Road; China Is Building an Increasingly Mature Platform to Support Its Scientific and Commercial Interests in the Arctic," *Diplomat,* October 7, 2018; Claire Young, "What's China Up To in the Arctic?" *Strategist (ASPI)*, September 20, 2018; John Grady, "China Expanding Economic Influence niAmericas, Research in the Arctic," USNI News, September 14, 2018; Michael Peck, "Why Is China Building a Nuclear-Powered Icebreaker?" *National Interest*, September 14, 2018; Aaron Mehta, "How a Potential Chinese-Built Airport in Greenland Could Be Risky for a Vital US Air Force Base," *Defense News,* September 7, 2018; Qiyang Niu, "China's Evolving Arctic Policy: Two Geopolitical Threats—OpEd," *Eurasia Review,* August 3, 2018; Alexander Gran, "China's Arctic Future: A Sea Change," *The Diplomat*, July 18, 2018; Paul Goble, "China Pursuing Dominance of Northern Sea Route," *Eurasia Daily Monitor,* July 12, 2018; Richard Martyn-Hemphill, "What Is China Up To in the Arctic?" The Spectator, July 7, 2018; Rebecca Pincus, "China's Polar Strategy: A Emerging Gray Zone?" *The Diplomat*, July 6, 2018; Dermot Cole, "China's Arctic Plans Represent a New Way of Looking at World," *Arctic Today,* June 30, 2018; Bradley Nelson and Paul Ruiz, "China Races for Arctic Dominance," *The Fuse,* June 6, 2018; Sherri Goodman and Elisabeth Freese, "China's Ready to Cash In on a Melting Arctic," *Foreign Policy,* May 1, 2018; Mike Scrafton, "Grand Strategy: All Along the Polar Silk Road," *The Strategist,* April 27, 2018; Mark E. Rosen, "China's New Arctic Policy Needs Close Analysis," *IPP Review*, April 20, 2018; Ashley Feng, "China's Arctic Ambitions in Alaska," *The Diplomat*, April 20, 2018; Jenifer Loy, "Russia in the Arctic: Friend of Foe?" *Geopolitical Monitor*, April 19, 2018; John Grady, "Panel: China Making Aggressive Moves in the Arctic," *USNI News,* April 8, 2018; Julian Ryall, "Japan Concerned by China's Plan to Build 'Polar Silk Road' in Arctic," February 14, 2018; Paul Koring, "Canada Should Beware the Ice Dragon," *iPolitics*, February 9, 2018; Doug Tsuruoka, "'China's New Arctic Policy Is Defensive, Not Offensive,'" *Asia Times,* February 8, 2018; Donald Rothwell, "China Boards the Polar Express," *East Asia Forum*, February 7, 2018; Adam Minter, "Fears of China's Arctic Takeover Are Overblown," *Straits Times*, February 7, 2018; Jack Durkee, "China: The New 'Near-Arctic State,'" Wilson Center, February 6, 2018; Chris Arsenault, "Canada Welcomes China's Plan to Build a 'Polar Silk Road' in the Arctic," *Vice News,* February 1, 2018; Adam Minter, "Don't Fear China's Arctic Takeover," *Bloomberg*, January 30, 2018; Ting Shi, "China Infrastructure Push Reaches Arctic, Leaving Out U.S.," *Bloomberg*, January 28, 2018; Mia Bennett, "What Does China's Arctic Policy Actually Say?" *Maritime Executive,* January 28, 2018.

[280] See, for example, Alison McFarland, "Arctic Options: Why America Should Invest in a Future with China," *National Interest,* September 30, 2018.

could consider moving to suspend China's observer status on the Arctic Council[281] as a punitive cost-imposing measure for unwanted Chinese actions in the South China Sea.[282]

For Russia, the question of whether and how to respond to China's activities in the Arctic may pose particular complexities. On the one hand, Russia is promoting the NSR for use by others, in part because Russia sees significant economic opportunities in offering icebreaker escorts, refueling posts, and supplies to the commercial ships that will ply the waterway. In that regard, Russia presumably would welcome increased use of the route by ships moving between Europe and China.[283] More broadly, Russia and China have increased their cooperation on security and other issues in recent years, in no small part as a means of balancing or countering the United States in international affairs, and Russian-Chinese cooperation in the Arctic can contribute to that strategy.[284]

On the other hand, Russian officials are said to be wary of China's continued growth in wealth and power, and of how that might eventually lead to China becoming the dominant power in Eurasia, and to Russia being relegated to a secondary or subordinate status in Eurasian affairs relative to China. Increased use by China of the NSR could accelerate the realization of that scenario: As noted above, the NSR forms part of China's geopolitical Belt and Road Initiative (BRI). Some observers argue that actual levels of Sino-Russian cooperation in the Arctic are not as great as Chinese or Russian announcements about such cooperation might suggest.

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[281] Paragraph 37 of the Arctic Council's rules of procedure states the following:

> Once observer status has been granted, Observers shall be invited to the meetings and other activities of the Arctic Council unless SAOs [Senior Arctic Officials] decide otherwise. Observer status shall continue for such time as consensus exists among Ministers. Any Observer that engages in activities which are at odds with the Council's [Ottawa] Declaration [of September 19, 1996, establishing the Council] or these Rules of Procedure shall have its status as an Observer suspended.

Paragraph 5 of Annex II of the Arctic Council's rules of procedure—an annex regarding the accreditation and review of observers—states the following:

> Every four years, from the date of being granted Observer status, Observers should state affirmatively their continued interest in Observer status. Not later than 120 days before a Ministerial meeting where Observers will be reviewed, the Chairmanship shall circulate to the Arctic States and Permanent Participants a list of all accredited Observers and up-to-date information on their activities relevant to the work of the Arctic Council.
>
> (Arctic Council, *Arctic Council Rules of Procedure*, p. 9. The document was accessed July 26, 2018, at https://oaarchive.arctic-council.org/handle/11374/940.

Paragraph 4.3 of the Arctic Council's observer manual for subsidiary bodies states in part:

> Observer status continues for such time as consensus exists among Ministers. Any Observer that engages in activities which are at odds with the Ottawa Declaration or with the Rules of Procedure will have its status as an Observer suspended.
>
> (Arctic Council. *Observer Manual for Subsidiary Bodies*, p. 5. The document was accessed July 26, 2018, at https://oaarchive.arctic-council.org/handle/11374/939.)

See also Kevin McGwin, "After 20 years, the Arctic Council Reconsiders the Role of Observers," *Arctic Today*, October 24, 2018.

[282] For more on China's actions in the South China Sea and their potential implications for U.S. interests, see CRS Report R42784, *China's Actions in South and East China Seas: Implications for U.S. Interests—Background and Issues for Congress*, by Ronald O'Rourke.

[283] See, for example, Hu Weijia, "Arctic Shipping Routes Can Further Warm China-Russia Cooperation, Technological Development," *Global Times*, September 12, 2018.

[284] See, for example, Nicholas Groffman, "Why China-Russia Relations Are Warming Up in the Arctic," *South China Morning Post*, February 17, 2018.

A July 6, 2018, press report states the following:

> China and Russia are working together ever more closely in the Arctic, exploiting a policy vacuum in the US, an international panel of experts said here. But Sino-Russian cooperation is almost entirely commercial, focused on trade routes, offshore oil, telecommunications (most satellites don't cover the Arctic), and tourism. A military alliance is unlikely given Russia's deep ambivalence about China's growing influence in general and their very different views on who should run the Arctic in particular: the eight circumpolar countries alone—including both Russia and the US [through the Arctic Council]—or a larger group that includes self-declared "near-Arctic" nations like China.[285]

A July 12, 2018, press report states the following:

> China's actions both before and especially since [it published its Arctic white paper in January 2018] suggest that it is actually seeking not equality with others in the global frozen North, but rather a dominant position. And this prospect has already prompted some Russian commentators to suggest China wants to reduce Russia to the status of "a younger brother" in the Arctic….
>
> China's expansive moves in the region have, to date, taken three forms. First, it is increasing its share of orders for goods carried across Arctic waters by the ships of other countries—especially those of the Russian Federation—something that gives it clout in Moscow in particular…. Moreover, China is boosting its ownership stake in ships flying the Russian flag. Second, it has launched a program to build both ice breakers and ice-capable ships so that it will be able to carry more of the goods and raw materials it wants with its own vessels rather than having to rely on anyone else's. And third—and perhaps most dramatically in terms of Beijing's long-term goals—Chinese firms are establishing drilling platforms in areas of the Arctic Ocean that Moscow claims as part of its exclusive economic zone (EEZ). Similarly, it is building port facilities on Russian territory that are located far from China and that may soon eclipse Russian ones.
>
> All three of these developments merit close attention, both for what they say about China's intentions as well as Beijing's increasing upper hand regarding a region and waterway Moscow has long insisted are exclusively Russian.[286]

A November 7, 2018, press report states:

> An article published on October 5 by the Russian International Affairs Council (RIAC) discusses Russia's strategy in the Arctic region and the evolving role of China therein…. It frames the United States and the European Union as Russia's main regional competitor. But China is notably presented as a "strategic partner" for whom "the Arctic region is not a top strategic priority" and whose efforts to build up its naval strength are related to a desire to challenge the US, not Russia. The sentiments expressed in the above-mentioned RIAC article appear to reflect how Moscow views the prior concrete steps the Russian Federation and People's Republic of China (PRC) have been taking to strengthen bilateral cooperation in the Arctic…. Nonetheless, Chinese ambitions in the Arctic seem to extend beyond the level of such joint initiatives….
>
> … Russia's expectations in this matter are premised on three assumptions:
>
> – China will save Russia's stagnant north…
>
> – China has no alternatives but to work with Russia ….

[285] Sydney J. Freedberg Jr., "China & Russia In The Arctic: Axis Of Ambivalence," *Breaking Defense*, July 6, 2018.

[286] Paul Goble, "China Pursuing Dominance of Northern Sea Route," *Eurasia Daily Monitor*, July 12, 2018. See also Nengye Liu, "China-Russia Trouble on the Arctic Silk Road?" *The Diplomat*, July 21, 2017; Stephanie Pezard and Timothy Smith, "Friends if We Must: Russia and China in the Arctic," *War on the Rocks*, May 6, 2016.

> – China will be unable to "sideline" Russia (Topwar.ru, January 30, 2018), given Russia's dominant position in the Arctic and the nature of relations between Beijing and Moscow….
>
> However, these assumptions appear questionable at best:
>
> First, the NEP [Northeast Passage, aka Northern Sea Route] still requires a staggering amount of infrastructure investment—realistic estimates run in the trillions of US dollars—before it can start yielding profits…. Moreover, the facts do not bear out the Russian conviction that Beijing can choose only between the NEP and the NWP, with no available alternative….
>
> Second, Russia is not China's only potential partner in the Arctic. The PRC white paper clearly points to the fact that Chinese involvement there will be a multilateral, not a bilateral affair….
>
> Third, China is likely to ultimately sideline Russia. As rightfully pointed out by Dr. Pavel Gudev, a senior research fellow at the Institute of World Economy and International Relations (IMEMO), China's strategy in the Arctic region is dictated by the desire to "downplay exclusivity in relations between Arctic nations" and "internationalize the Arctic as much as possible," which "runs counter to Russia's national interests in the region"….
>
> And finally, international competition by other Arctic players may further outflank Russian efforts.[287]

A November 29, 2018, statement to a committee of the Canadian parliament states:

> So far, Arctic nations have cautiously welcomed China's willingness to play a larger role in the Arctic.…
>
> Arctic nations are also setting limits. In 2011, Iceland blocked the sale of a large plot of land to a Chinese investor; in 2016, Denmark declined to sell a vacant naval base in Greenland to a Chinese mining company; and in that same year, a projected Chinese resort in Svalbard, under Norwegian sovereignty, was canceled. Each Arctic state—often under public pressure—is setting its own limits when it comes to welcoming Chinese presence.
>
> Russia's approach toward China shows a similar mix of interest and caution. China is a key investor in Russia's Yamal LNG project, and Chinese funds are particularly welcome, as Russia has been shunned by some of its more traditional investors since its annexation of Crimea. Russia also welcomes Chinese interest in developing port infrastructure along the NSR. Yet Russia is also very much intent on keeping the NSR under its control. This may eventually create tensions with China, as China sees the NSR as one element of the Belt and Road Initiative and will resent obstacles to its free use of the route (the alternative route, the Northwestern Passage along the northern shore of Canada, is not considered a viable replacement because of poor navigation conditions and a lack of infrastructure). While Russia and China are formally allies through the Shanghai Cooperation Organization, Russia remains wary of China's military power on its southern border and, as an Arctic nation, is irritated by the intrusion in Arctic affairs of non-Arctic states, as evidenced by its long-standing reluctance to grant observer status to these countries in the Arctic Council.[288]

A policy paper released in December 2018 states:

> Since 2017, a series of events have raised optimism about the potential for Sino-Russian cooperation in the Arctic region, including unilateral and bilateral statements between

[287] Sergey Sukhankin, "China's 'Polar Silk Road' Versus Russia's Arctic Dilemmas," *Eurasia Daily Monitor*, November 7, 2018.

[288] Stephanie Pezard, *The New Geopolitics of the Arctic, Russia's and China's Evolving Role in the Region*, RAND (Testimony presented before the Standing Committee on Foreign Affairs and International Development of the Canadian House of Commons on November 26, 2018), p. 7.

> Beijing and Moscow about their shared vision for and commitment to joint development of the Arctic energy resources and shipping lane. China's economic interests in natural resources extractions and alternative transportation routes largely align with Russia's stated goals to revitalize its Arctic territory….
>
> Despite the rhetorical enthusiasm from the two governments, concrete, substantive joint projects on the Northern Sea Route are lacking, especially in key areas such as infrastructure development. A careful examination of Chinese views on joint development of the Northern Sea Route reveals divergent interests, conflicting calculations and vastly different cost-benefit analyses. From the Chinese perspective, the joint development of the Northern Sea Route is a Russian proposal to which China reacted primarily out of strategic and political considerations rather than practical economic ones. While China is in principle interested in the Northern Sea Route, the potential and practicality of this alternative transportation route remains tentative and yet to be realized. For China, their diverging interests, especially over what constitutes mutually beneficial compromises, will be the biggest obstacle to future progress. Moscow needs to demonstrate much more sincerity or flexibility in terms of improving China's cost-benefit spreadsheet. In this sense, expectations and assessments of the impact of Sino-Russian cooperation specifically on the Northern Sea Route should be focused on moderate, concrete plans rather than glorified rhetoric….
>
> Although the Chinese are fond of optimistically discussing the potential for Sino-Russian cooperation on the Northern Sea Route, they have been unable to reach an optimistic conclusion for its viability, feasibility, and practicality. China and Russia have identified their converging interests in such cooperation. However, their diverging interests, especially over what constitutes mutually beneficial compromises, will be the biggest obstacle to future progress. China's view of the economic practicality of the Northern Sea Route remains a lofty future ambition that is steeped in hopes of the project's potential. In the best-case scenario, few Chinese experts see the Northern Sea Route as a viable substitute/alternative to traditional shipping routes. Instead, the Northern Sea Route is seen primarily as a potential supplement. The unfavorable assessment of the economic practicality of the Northern Sea Route underscores the fact that there has been more discussion about development than actual projects on the ground.
>
> China has demonstrated greater interest in other areas of infrastructure cooperation, such as on the Primorye International Transportation Corridor and energy development projects. However, interest regarding joint development of the Northern Sea Route has been markedly less impressive or present. China's apparent enthusiasm on Northern Sea Route cooperation with Russia is motivated primarily by political and strategic considerations. Cooperation helps to pave China's entry into the otherwise relatively exclusive Arctic region and affords China an advantaged and prioritized position in the projects for which Russia is accepting or seeking international cooperation. Russia's options for other international partners might expand after international sanctions are lifted and/or if the United States identifies China as the biggest threat and Russia as a partner in the Sino-U.S.-Russian strategic triangle. However, such hypotheticals do not appear to be coming to fruition anytime soon.[289]

Linkages Between Arctic and South China Sea

Another potential implication of the shift in the international security environment to a situation of great power competition is a linkage that is sometimes made between the Arctic and the South China Sea relating to international law of the sea or the general issue of international cooperation

[289] Yun Sun, *The Northern Sea Route: The Myth of Sino-Russian Cooperation*, Stimson Center, undated, released December 5, 2018, pp. 1, 14-15.

and competition.[290] One aspect of this linkage relates to whether China's degree of compliance with international law of the sea in the South China Sea has any implications for understanding potential Chinese behavior regarding its compliance with international law of the sea (and international law generally) in the Arctic.

A second aspect of this linkage, mentioned earlier, is whether the United States should consider the option of moving to suspend China's observer status on the Arctic Council as a punitive cost-imposing measure for unwanted Chinese actions in the South China Sea.

A third aspect of this linkage concerns the question of whether the United States should become a party to UNCLOS: Discussions of that issue sometimes mention both the situation in the South China Sea[291] and the extended continental shelf issue in the Arctic (see "Extended Continental Shelf and United States as a Nonparty to UNCLOS").[292]

U.S. Military Forces and Operations[293]

Overview

During the Cold War, the Arctic was an arena of military competition between the United States and the Soviet Union, with both countries, for example, operating nuclear-powered submarines, long-range bombers, and tactical aircraft in the region. The end of the Cold War and the collapse of most elements of the Russian military establishment following the dissolution of the Soviet Union in December 1991 greatly reduced this competition and led to a reduced emphasis on the Arctic in U.S. military planning.

Renewed tensions with Russia following its seizure and annexation of Crimea in March 2014, combined with a significant increase in Russian military capabilities and operations in the Arctic in recent years,[294] have led to growing concerns among observers that the Arctic is once again

[290] See, for example, Justin D. Nankivell, "The Role of History and Law in the South China Sea and Arctic Ocean," *Maritime Awareness Project*, August 7, 2017; Sydney J. Freedberg, "Is The Arctic The next South China Sea? Not Likely," *Breaking Defense*, August 4, 2017; Caroline Houck, "The Arctic Could Be the Next South China Sea, Says Coast guard Commandant," *Defense One*, August 1, 2017; Daniel Thomassen, "Lessons from the Arctic for the South China Sea," Center for International Maritime Security, April 4, 2017.

[291] For further discussion of this situation, see CRS Report R42784, *China's Actions in South and East China Seas: Implications for U.S. Interests—Background and Issues for Congress*, by Ronald O'Rourke.

[292] See, for example, Ben Werner, "Zukunft: U.S. Presence in Arctic Won't Stop Chinese, Russia Encroachment Without Law of the Sea Ratification," *USNI News*, August 1, 2017.

[293] This section prepared by Ronald O'Rourke, Specialist in Naval Affairs, Foreign Affairs, Defense, and Trade Division.

[294] Regarding the increase in Russian military capabilities and operations in the Arctic, see, for example, Mark Episkopos, "How Russia Is Getting Ready for War in the Arctic; Or, At the Very Least, Increasing Its Military Capabilities," *National Interest*, December 1, 2018; Atle Staalesen, "First Division of New Missile System Ready for Arctic," *Barents Observer*, November 28, 2018; Tom O'Connor, "Russia Gets New Missiles Designed for War in Arctic as U.S. Military Looks North," *Newsweek*, November 26, 2018; Mary Thompson-Jones, "NATO's Arctic Exercise is a Good Start to Standing Up to Russian Militarization of the High North," *National Interest*, November 6, 2018; James Rothwell, "Russia Attempting to Provoke Dutch and Royal Marines in Arctic Circle," *Telegraph (UK)*, October 14, 2018; Thomas Nilsen, "Russia Flexes Northern Military Muscles Ahead of NATO Exercise," *Barents Observer*, October 3, 2018; Gwladys Fouche, "Russian Buildup Worries Norway Before Big NATO Military Exercise," Reuters, October 2, 2018; Atle Staalesen, "Former Defense Chief Sees a Serious Russian Threat Against Norway's Finnmark Region," *Barents Observer*, September 19, 2018; Tom Balmforth, "Russia Warships Held Drills in the Waters bwtween Alaska and Russia During Moscow's Biggest War Games Since the Cold War," *Business Insider*, September 14, 2018; Reuters, "Russian Warships Hold Drills in Bering Sea in Huge Military Exercise," *Arctic Today*, September 14, 2018; Atle Staalesen, "Russia Builds Another Military Base in East Arctic," *Barents Observer*,

becoming a region of military tension and competition,[295] and to concerns about whether the United States is adequately prepared militarily to defend its interests in the region.[296]

U.S. military officials, military officials from other Arctic states, and other observers have stressed the cooperative aspects of how the Arctic states have addressed Arctic issues, and have sometimes suggested that the competitive aspects of the situation have been exaggerated in some press accounts.[297] Some observers argue that that Russia's recent military investment in the Arctic is being exaggerated, or reflects normal modernization of aging capabilities, or is intended partly for domestic Russian consumption.[298] Even so, U.S. military forces (and U.S. intelligence agencies)[299] are paying renewed attention to the Arctic. This is particularly true in the case of the

September 3, 2018.

[295] See, for example, Gwladys Fouche and Terje Solsvik, "Russian Buildup Worries Norway Before Big NATO Military Exercise," *Reuters*, October 2, 2018; "Conservative British Politicians Warn Russia Over Its Military Expansion in the Arctic," *Reuters*, October 1, 2018; Kevin McGwin, "Copenhagen Is Ignoring Russia, Chinese Activityin the Arctic, Lawmakers Warn," *Arctic Today*, October 17, 2018; Malte Humpert, "U.S. Military Warns Against Russian Arctic Expansion," *High North News*, March 22, 2018; Kristina Spohr, "The Race to Conquer the Arctic—the World's Final Frontier," *New Statesman*, March 12, 2018; Alex Hollings, "Where America's Military Might Doesn't Reach: The Threat of Russian Dominance in the Arctic," *Sofrep*, February 28, 2018; "U.S. General Concerned About Russia's Arctic Military Buildup," *Radio Free Europe/Radio Liberty*, May 26, 2017; Gordon Lubold, "U.S. Fighters Intercept Russian Aircraft Again Near Alaska," *Wall Street Journal*, May 4, 2017; Stefan Becket, "U.S. Intercepts Russian Bombers, Fighter Jets Near Alaska," *CBS News*, May 4, 2017; Tegan Hanlon and Chris Klint, "Russian Military Planes Approach Alaska for 4 Straight Nights," *Arctic Sounder*, April 28, 2017; Callum Wood, "Russian Bombers Probe Alaska," *The Trumpet*, April 24, 2017.

[296] See, for example, Walter Berbrick, "10 Big Ideas to 'Up America's Game in the Arctic,'" *National Interest*, September 22, 2018; David Balton, Ross A. Virginia, and Kenneth Yalowitz, "America Must Act on the North and South Poles," *National Interest*, September 11, 2018; Elwood Brehmer, "Gaps in Arctic Strategy Leave Room for Trouble," *Alaska Journal of Commerce*, August 22, 2018; Cameron Mackintosh, "NORAD Commander Calls for 'Reinvigorated' Effort to Ensure Military Readiness in the Arctic," *KTUU*, August 16, 2018; Mathieu Boulegue, "NATO Needs a Strategy for Countering Russia in the Arctic and the Black Sea," Chatham House, July 2, 2018; Melody Schreiber, "Growing Security Concerns Make the Arctic Loom Larger in Washington, *Arctic Today*, June 29, 2018; Reuters Staff, "Mattis: 'America's Got to Up Its Game in the Arctic,'" *Reuters*, June 25, 2018; Jamie McIntyre, "The Next 'Cold' War: American May Be Missing the Boat in the Arctic," *Washington Examiner*, June 19, 2018; Adam Aton, "U.S. Still Lags Behind in Preparing for a Changing Arctic," *Scientific American*, June 8, 2018; John Vandiver, "EUCOM Chief: 'We Are Not Keeping Pace' with Russia in Balkans, Arctic," *Stars and Stripes*, March 8, 2018.

[297] See, for example, Martin Breum, "Why Russia Is Likely to Remain Cooperative in the Arctic," *Arctic Today*, November 22, 2018; John Grady, "Panel: Cooperation, Not Conflict Key to Future of the Arctic," *USNI News*, April 8, 2018; Levon Sevunts," NATO Wants to Keep the Arctic An Area of Low Tensions, Stoltenberg," *Radio Canada International*, April 4, 2018; Levon Sevunts, "Arctic Nations Develop Coast Guard Co-operation," *Independent Barents Observer*, March 13, 2018; John Grady, "Coast Guard: Russia and U.S. Working Well Together in the Bering Sea, Arctic," *USNI News*, November 29, 2017; Atle Staalesen, "Northern Fleet Takes on Key Role in Exercise Barents," *Independent Barents Observer*, June 1, 2017; Doug Tsuruoka, "Despite US-Russia Tensions, Arctic Powers Eye Cooperation," *Asia Times*, March 29, 2017; Andreas Kuersten, "The Battle For The Arctic," *National Interest*, November 3, 2016; Benjamin Schaller, "Deconstructing the Narrative of Arctic War," *World Policy Blog*, March 9, 2016. See also Stephanie Pezard et al., *Maintaining Arctic Cooperation With Russia: Planning for Regional Change in the Far North*, RAND Corporation, 2017, 81 pp. (Report RR-1731).

[298] See, for example, Stephanie Pezard, *The New Geopolitics of the Arctic, Russia's and China's Evolving Role in the Region*, RAND (Testimony presented before the Standing Committee on Foreign Affairs and International Development of the Canadian House of Commons on November 26, 2018), pp. 2-4 (which presents comments on both sides of the issue of whether other countries should be concerned by Russia's Arctic military capabilities); Thomas Nilsen, "New Weapons Testing Is Worrying, But Does Not Raise Tensions in the North, [Norway's] Defense Minister Says," *Barents Observer*, August 26, 2018; Lyle J. Goldstein, "Is Russia's Planned 'Combat Icebreaker' a Serious Threat?" *National Interest*, April 2, 2018; Adam Lajeunesse and Whitney Lackenbauer, "Russia's Arctic Militarization Is No Threat," *UPI.com*, March 21, 2017.

[299] See Brian Bennett and W.J. Hennigan, "US Builds Up Arctic Spy Network As Russia, China Increase Presence,"

Navy and Coast Guard, for whom diminishment of Arctic sea ice is opening up potential new operating areas for their surface ships. The U.S. Air Force, Army, and Marine Corps, too, are now focusing more on Arctic operations.[300] Canada, the UK, and the Nordic countries are taking or contemplating steps to increase their own military presence and operations in the region.[301]

DOD in General

2010 QDR (Submitted February 2010)

DOD's report on the 2010 QDR, submitted to Congress in February 2010, states the following:

> The effect of changing climate on the Department's operating environment is evident in the maritime commons of the Arctic. The opening of the Arctic waters in the decades ahead[,] which will permit seasonal commerce and transit[,] presents a unique opportunity to work collaboratively in multilateral forums to promote a balanced approach to improving human and environmental security in the region. In that effort, DoD must work with the Coast Guard and the Department of Homeland Security to address gaps in Arctic communications, domain awareness, search and rescue, and environmental observation and forecasting capabilities to support both current and future planning and operations. To support cooperative engagement in the Arctic, DoD strongly supports accession to the United Nations Convention on the Law of the Sea.[302]

Los Angeles Times, September 7, 2015.

[300] See, for example, Sean Snow, "No More Marine Rotations to the Black Sea. The Corps Is Focusing Here [the Arctic High North] Instead." *Marine Corps Times*, November 29, 2018; Andrew White, "USMC Eyes Improved Arctic Communications Systems, Procedures," *Jane's International Defence Review*, November 12, 2018; Megan Eckstein, "USNI News Video: High North Exercise Tests Cold-Weather Skills of Navy, Marine Corps," *USNI News*, October 23, 2018; Kyle Rempfer, "US Breaches the Arctic with Marines, Fighter Jets and Aircraft Carriers," *Military Times*, "October 23, 2018; Shawn Snow, "The Corps' Largest Rotational Deployment to Norway Kicks Off," *Marine Corps Times*, October 1, 2018; Shawn Snow, "With An Increasing Footprint in the Arctic, the Corps May Need a New Snow Vehicle," *Marine Corps Times*, September 28, 2018; Kevin McGwin, "US Defense Investments in Greenland Infrastructure Would Keep NATO In, China Out and Russia at Bay," *Arctic Today*, September 19, 2018; Teis Jensen, "United States Keen to Invest Strategically in Greenland," Reuters, September 17, 2018; United Kingdom, House of Commons, Defence Committee, On Thin Ice: UK Defence in the Arctic, Twelfth Report of Session 2017–19, August 15, 2018 (Ordered by the House of Commons to be printed 19 July 2018), 61 pp.; Reuters Staff, "More U.S. Marines to Train in Norway, Closer to Russia," *Reuters*, August 15, 2018; Christpher Woody, "The Marines Are Preparing for a Potential 'Big-Ass Fight,' and They May Soon Be Spending More Time in Alaska," *Business Insider*, August 10, 2018.

[301] See, for example, Kevin McGwin, "Britain Lacking Direction in Arctic, MPs Find," *Arctic Today*, November 30, 2018; Mary Thompson-Jones, "NATO's Arctic Exercise is a Good Start to Standing Up to Russian Militarization of the High North," *National Interest*, November 6, 2018; Alexandra Brzozowski, "NATO to Launch Exercises in Europe's North as Russia Tensions Grow," *Euractiv*, October 4, 2018; Andrew Chuter, "Britain to Bolster Arctic Defense, Military Drills to Counter Russian Presence," *Defense News*, October 1, 2018; "Defence Secretary Announces New Defence Arctic Strategy," *gov.uk*, September 30, 2018; Associated Press, "UK to Send 800 Troops to Arctic, Cites Concerns About Russia," *Washington Post*, September 30, 2018; Edward Malnick, "UK Sending 800 Troops to Arctic in Warning Shot to Russia," *Telegraph (UK)*, September 29, 2018; Gina Harkins, "Norway Confirms Plan to Double Number of Marines Near Russian Border," *Military.com*, August 16, 2018; Dominic Nicholls, "Defence Cuts, Skill Fade and lack of 'Intellectual Investment' in Arctic Threatens Britain's Northern Flank, Report Says," *Telegraph (UK)*, August 15, 2018; Robbin Laird, "Nordics Mobilize To Send Russians Clear Message: We Shall Not Be Cowed," *Breaking Defense*, July 3, 2018; Atle Staalesen, "5,000 Troops Train Winter War in Arctic Norway," *Independent Barents Observer*, March 7, 2018; Natalie Liu, "Norway Strengthens Ties With US as Arctic Heats Up," *VOA*, January 9, 2018.

[302] Department of Defense, *Quadrennial Defense Review Report*, February 2010, p. 86. The Arctic is also mentioned on pages 19, 57, and 62.

April 2011 Change to DOD Unified Command Plan

In April 2011, President Obama assigned responsibility for the Arctic to U.S. Northern Command. Previously, U.S. Northern Command, U.S. European Command, and U.S. Pacific Command had shared responsibility for the Arctic. The April 2011 change in DOD's Unified Command Plan also assigned Alaska to U.S. Northern Command. Previously, U.S. Northern Command and U.S. Pacific Command had shared responsibility for Alaska and adjacent waters.[303]

May 2011 DOD Report to Congress

In May 2011, DOD submitted a report to Congress on Arctic operations and the Northwest Passage that was prepared at congressional direction.[304] A January 2012 GAO report reviewed the May 2011 DOD report.[305]

November 2013 DOD Arctic Strategy

On November 22, 2013, DOD released a DOD strategy for the Arctic[306] that was subsequently updated by the December 2016 report to Congress on Arctic strategy discussed below.

January 2014 Implementation Plan for National Strategy for Arctic Region

The Obama Administration's January 2014 implementation plan for its national strategy for the Arctic region (see "Background") makes DOD the lead federal agency for one of the plan's 36 or so specific initiatives, and a supporting agency for 18 others.[307] The initiative for which DOD is designated the lead federal agency is entitled "Develop a framework of observations and modeling to support forecasting and prediction of sea ice."[308]

2014 Quadrennial Defense Review (QDR) (Submitted March 2014)

The Department of Defense's (DOD's) report on the 2014 Quadrennial Defense Review (QDR), submitted to Congress in March 2014, states the following:

> Climate change also creates both a need and an opportunity for nations to work together, which the Department will seize through a range of initiatives. We are developing new policies, strategies, and plans, including the Department's Arctic Strategy and our work in

[303] For an article discussing the change, see Jim Garamone, "Unified Command Plan Reflects Arctic's Importance," *American Forces Press Service*, April 7, 2011.

[304] Department of Defense, *Report to Congress on Arctic Operations and the Northwest Passage, OUSD (Policy)*, May 2011. The direction to submit the report was contained on page 337 of H.Rept. 111-491 of May 21, 2010, the House Armed Services Committee's report on H.R. 5136, the FY2011 National Defense Authorization Act.

[305] Government Accountability Office, Arctic Capabilities[:]DOD Addressed Many Specified Reporting Elements in Its 2011 Arctic Report but Should Take Steps to Meet Near- and Long-term Needs, GAO-12-180, January 2012. The direction to GAO to write the report was contained on page 291 of H.Rept. 112-78 of May 17, 2011, the House Armed Services Committee's report on H.R. 1540, the FY2012 National Defense Authorization Act.

[306] Department of Defense, *Arctic Strategy*, November 2013, 14 pp. The news release announcing the document is posted at http://www.defense.gov/Releases/Release.aspx?ReleaseID=16389. The document itself is posted at https://dod.defense.gov/Portals/1/Documents/pubs/2013_Arctic_Strategy.pdf.

[307] *Implementation Plan for The National Strategy for the Arctic Region*, January 2014, pp. 6-32.

[308] *Implementation Plan for The National Strategy for the Arctic Region*, January 2014, pp. 15-16.

> building humanitarian assistance and disaster response capabilities, both within the Department and with our allies and partners.[309]

2015 National Security Strategy

The February 2015 National Security Strategy mentions the Arctic three times, stating that "the present day effects of climate change are being felt from the Arctic to the Midwest. Increased sea levels and storm surges threaten coastal regions, infrastructure, and property." It also states that "we seek to build on the unprecedented international cooperation of the last few years, especially in the Arctic as well as in combatting piracy off the Horn of Africa and drug-smuggling in the Caribbean Sea and across Southeast Asia," and that "we will also stay engaged with global suppliers and our partners to reduce the potential for energy-related conflict in places like the Arctic and Asia."[310]

June 2015 GAO Report

A June 2015 Government Accountability Office (GAO) report states the following:

> Recent strategic guidance on the Arctic issued by the [Obama] administration and the Department of Defense (DOD) establish a supporting role for the department relative to other federal agencies, based on a low level of military threat expected in the region. In January 2014 the [Obama] administration issued the Implementation Plan to the National Strategy for the Arctic Region that designated DOD as having a largely supporting role for the activities outlined in the plan. Additionally, DOD's Arctic Strategy issued in November 2013 and the Navy's Arctic Roadmap 2014-2030 issued in February 2014 emphasize that, as sea ice diminishes and the Arctic Ocean opens to more activity, the department may be called upon more frequently to support other federal agencies and work with partners to ensure a secure and stable region. To further its role, DOD participates in a number of forums focused on military security cooperation in the Arctic, including the Arctic Security Forces Roundtable, a senior-level event aimed at encouraging discussion among the security forces of Arctic and non-Arctic nations. In addition, DOD leads training exercises focused on building partner capacity in the region, including Arctic Zephyr, a multilateral scenario-based exercise. DOD continues to monitor the security environment in the region and is tracking indicators that could change its threat assessment and affect DOD's future role.
>
> DOD has taken actions, along with interagency partners, to address some near-term capabilities needed in the Arctic, such as maritime domain awareness and communications. In recent years, DOD has conducted a number of studies to identify near-term capabilities the department needs to operate in the Arctic. The Implementation Plan to the National Strategy for the Arctic Region created an interagency framework and identified activities to address many of these needed capabilities. For example, as the lead agency for Arctic sea ice forecasting, DOD has established an interagency team to focus on improved sea ice modeling. DOD has also begun other efforts within the department to address capability needs. For example, the Navy's Arctic Roadmap prioritizes near-term actions to enhance its ability to operate in the Arctic and includes an implementation plan and timeline for operations and training, facilities, equipment, and maritime domain awareness, among other capabilities.
>
> U.S. Northern Command—the DOD advocate for Arctic capabilities—stated that it is in the process of updating its regional plans for the Arctic and is conducting analysis to

[309] Department of Defense, *Quadrennial Defense Review 2014*, p. 25. An electronic word search of the document shows that this is the only occurrence of the word *Arctic* in the document.

[310] Office of the President, *National Security Strategy*, February 2015, pp. 12, 13, and 16.

> determine future capability needs. For example, Northern Command is updating the Commander's Estimate for the Arctic, which establishes the commander's intent and missions in the Arctic and identifies near-, mid-, and long-term goals. Additionally, the command is conducting studies of various Arctic mission areas, such as maritime homeland defense and undersea surveillance, to identify future capability needs. However, according to DOD's Arctic Strategy, uncertainty remains around the pace of change and commercial activity in the region that may affect its planning timelines. Difficulty in developing accurate sea ice models, variability in the Arctic's climate, and the uncertain rate of activity in the region create challenges for DOD to balance the risk of having inadequate capabilities or insufficient capacity when required to operate in the region with the cost of making premature or unnecessary investments. According to its Arctic Strategy, DOD plans to mitigate this risk by monitoring the changing Arctic conditions to determine the appropriate timing for capability investments.[311]

June 2016 DOD Report on Funding for 2013 Arctic Strategy

A June 2016 DOD report to Congress on resourcing the Arctic Strategy states that DOD

> is making investments in research, military infrastructure, and capabilities to execute the 2013 Arctic Strategy and support the development of the Arctic as a secure and stable region where U.S. national interests are safeguarded, the U.S. homeland is protected, and nations work cooperatively to address challenges. Fiscal year (FY) 2017 investments focus mainly on capabilities, followed by long-term investments in research and development of next-generation capabilities. The Department's challenge is balancing the risk of being late-to-need with the opportunity cost of making Arctic investments for potential future contingencies at the expense of resourcing other urgent military requirements....
>
> Data provided by the Combatant Commands and Military Departments from the FY 2017 budget identifies about $6 billion of FY 2017 investments....[312]

The report includes a summary table showing that of $6.032 billion requested by DOD for FY2017 for implementing the Arctic strategy, about $461.3 million is for Army, Navy, and Air Force research and development work, $362.2 million is for Air Force military construction (MILCON) work, and about $5.209 billion is for Army, Navy, Air Force, defense-wide, and classified capabilities. Within the $5.209 billion figure, about 85% is accounted for by Air Force operations and maintenance (O&M), with about $2.281 billion, Air Force procurement, with about $1.109 billion, and Army military personnel (MILPERS) costs, with about $1.036 billion.[313]

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[311] Government Accountability Office, *Arctic Planning[:] DOD Expects to Play a Supporting Role to Other Federal Agencies and Has Efforts Under Way to Address Capability Needs and Update Plans*, GAO-15-566, June 2015, summary page.

[312] Department of Defense, *Report to Congress on Resourcing the Arctic Strategy*, June 2016, p. 2, accessed October 14, 2016, at https://dod.defense.gov/Portals/1/Documents/pubs/Report_to_Congress_on_Resourcing_the_Arctic_Strategy.pdf.

[313] Department of Defense, *Report to Congress on Resourcing the Arctic Strategy*, June 2016, p. 24. The report notes that it "excluded some investments, e.g., submarines, the nuclear triad, and satellites in polar orbit, due to the complexity of a-portioning the proportion of the capabilities' life-cycle costs that could be assigned specifically to the Arctic Strategy rather than to other national tasks over the service life of the capability. For that reason, some assets that might be relevant to future Arctic operations are not included in this report." (Page 2.)

December 2016 Report to Congress on Arctic Strategy

A December 2016 report to Congress on strategy to protect U.S. national security interests in the Arctic region that was required by Section 1068 of FY2016 National Defense Authorization Act (S. 1356/P.L. 114-92 of November 25, 2015) states the following (italics and bold as in original):

> The Department of Defense (DoD) remains committed to working collaboratively with allies and partners to promote a balanced approach to improving security in the Arctic region. DoD's strategy in the Arctic builds upon the 2009 National Security Presidential Directive 66/Homeland Security Presidential Directive 25, *Arctic Region Policy*, and the 2013 *National Strategy for the Arctic Region* (NSAR).
>
> DoD's 2013 *Arctic Strategy* nested under those two overarching national-level guidance documents. DoD's 2016 *Arctic Strategy* updates DoD's 2013 *Arctic Strategy* as required by Section 1068 of the National Defense Authorization Act for FY 2016 (P.L. 114-92) in light of significant changes in the international security environment. It refines DoD's desired end-state for the Arctic: **a secure and stable region where U.S. national interests are safeguarded, the U.S. homeland is defended, and nations work cooperatively to address challenges.** The two main supporting objectives remain unchanged: 1) Ensure security, support safety, promote defense cooperation; and 2) prepare to respond to a wide range of challenges and contingencies—operating in conjunction with like-minded nations when possible and independently if necessary—in order to maintain stability in the region. This update also adds a classified annex.
>
> In this strategy, near-term refers to the timeframe from the present to 2023, during which DoD will operate with current forces and execute resources programmed across the Future Years Defense Program (FYDP). The mid-term (2023-2030) and far-term (beyond 2030) are also addressed where relevant to global posture and force development. Timeframes are approximate due to uncertainty about future environmental, economic, and geopolitical conditions and the pace at which human activity in the Arctic region will increase.
>
> The 2016 *Arctic Strategy* also updates the ways and means DoD intends to use to achieve its objectives as it implements the NSAR. These include:
>
> -- Enhance the capability of U.S. forces to defend the homeland and exercise sovereignty;
>
> -- Strengthen deterrence at home and abroad;
>
> -- Strengthen alliances and partnerships;
>
> -- Preserve freedom of the seas in the Arctic;
>
> -- Engage public, private, and international partners to improve domain awareness in the Arctic;
>
> -- Evolve DoD Arctic infrastructure and capabilities consistent with changing conditions and needs;
>
> -- Provide support to civil authorities, as directed;
>
> -- Partner with other departments, agencies, and nations to support human and environmental security; and
>
> -- Support international institutions that promote regional cooperation and the rule of law.
>
> DoD's strategic approach is guided by its main objectives of ensuring security, supporting safety, and promoting defense cooperation as it prepares to respond to a wide range of challenges and contingencies in the Arctic in the years to come. Alliances and strategic partnerships remain the center of gravity in achieving DoD's desired end-state and ensuring that the Arctic remains a secure and stable region. Wherever possible, DoD will continue

> to seek innovative, cost-effective, small-footprint ways to achieve its objectives. DoD will also continue to apply the four overarching principles articulated in the NSAR: working with allies and partners to safeguard peace and stability; making decisions using the best available scientific information; pursuing innovative partnerships to develop needed capabilities and capacity over time; and following established Federal and DoD tribal consultation policy as applicable.[314]

FY2018 National Defense Authorization Act (H.R. 2810/P.L. 115-91)

Section 1054 of the conference version (H.Rept. 115-404 of November 9, 2017) of H.R. 2810/P.L. 115-91 of December 12, 2017, requires DOD to submit a report on steps DOD is taking to resolve Arctic security capability and resource gaps, and the requirements and investment plans for military infrastructure required to protect U.S. national security interests in the Arctic region.

2017 National Security Strategy

The December 2017 National Security Strategy mentions the Arctic once, stating that "a range of international institutions establishes the rules for how states, businesses, and individuals interact with each other, across land and sea, the Arctic, outer space, and the digital realm. It is vital to U.S. prosperity and security that these institutions uphold the rules that help keep these common domains open and free."[315]

2018 National Defense Strategy

The January 2018 unclassified summary of the 2018 National Defense Strategy[316] does not specifically mention the Arctic.

John S. McCain National Defense Authorization Act for Fiscal Year 2019 (H.R. 5515/S. 2987)

In the conference report (H.Rept. 115-874 of July 25, 2018) on H.R. 5515, Section 1071 states the following:

> SEC. 1071. REPORT ON AN UPDATED ARCTIC STRATEGY.
>
> (a) REPORT ON AN UPDATED STRATEGY.—Not later than June 1, 2019, the Secretary of Defense shall submit to the congressional defense committees a report on an updated Arctic strategy to improve and enhance joint operations.
>
> (b) ELEMENTS.—The report required by subsection (a) shall include the following:
>
> (1) A description of United States national security interests in the Arctic region.
>
> (2) An assessment of the threats and security challenges posed by adversaries operating in the Arctic region, including descriptions of such adversaries' intents and investments in Arctic capabilities.

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[314] Department of Defense, *Report to Congress on Strategy to Protect United States National Security Interests in the Arctic Region*, OUSD (Policy), December 2016, Executive Summary (pp. 2-3). See also Joel Gehrke, "Pentagon Updates Arctic Military Strategy," *Washington Examiner*, February 1, 2017.

[315] Office of the President, *National Security Strategy of the United States of America*, December 2017, p. 40.

[316] Department of Defense, Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge, January 2018, 11 pp.

> (3) A description of the roles and missions of each military service in the Arctic region in the context of joint operations to support the Arctic strategy, including—
>
> (A) a description of a joint Arctic strategy for sea operations, including all military and Coast Guard vessels available for Arctic operations;
>
> (B) a description of a joint Arctic strategy for air operations, including all rotor and fixed wing military aircraft platforms available for Arctic operations; and
>
> (C) a description of a joint Arctic strategy for ground operations, including all military ground forces available for Arctic operations.
>
> (4) A description of near-term and long-term training, capability, and resource gaps that must be addressed to fully execute each mission described in the Arctic strategy against an increasing threat environment.
>
> (5) A description of the level of cooperation between the Department of Defense, any other departments and agencies of the United States Government, State and local governments, and tribal entities related to the defense of the Arctic region.
>
> (c) FORM OF REPORT.—The report required by subsection (a) shall be submitted in unclassified form, but may include a classified annex.

H.Rept. 115-874 also states the following:

> The conferees direct the Secretary of Defense to submit a report to the congressional defense committees not later than 180 days after the date of enactment of this Act on current cold weather capabilities and readiness of the United States Armed Forces. The report shall contain the following elements:
>
> (1) A description of current cold weather capabilities and training to support United States military operations in cold climates across the joint force;
>
> (2) A description of anticipated requirements for United States military operations in cold and extreme cold weather in the Arctic, Northeast Asia, and Northern and Eastern Europe;
>
> (3) A description of the current cold weather readiness of the joint force, the ability to increase cold weather training across the joint force, and any equipment, infrastructure, personnel, or resource limitations or gaps that may exist;
>
> (4) An analysis of potential opportunities to expand cold weather training for the Army, the Navy, the Air Force, and the Marine Corps and the resources or infrastructure required for such expansion; and
>
> (5) An analysis of potential partnerships with State, local, Tribal, and private entities to maximize training potential and to utilize local expertise, including traditional indigenous knowledge. (Pages 835-836)

FY2019 DOD Appropriations Act (S. 3159)

The Senate Appropriations Committee, in its report (S.Rept. 115-290 of June 28, 2018) on S. 3159, states the following:

> *Arctic Broadband Infrastructure*.—The Committee is concerned that broadband infrastructure in the Arctic, particularly in northern Alaska and the Aleutian Islands, is not capable of supporting current military operations. Therefore, the Committee directs the Secretary of Defense to conduct an evaluation of broadband infrastructure in the United States Arctic and provide a report to the congressional defense committees not later than 180 days after enactment of this act. The report shall list an inventory of all existing broadband and communications infrastructure in the Aleutian Is land chain and Alaska's

northwest and northern slope communities, as well as present limitations and needs for the future. (Pages 35-36)

DOD Cooperation with Canada and Other Countries

DOD has been taking a number of steps in recent years to strengthen U.S.-Canadian cooperation and coordination regarding military operations in the Arctic.[317]

Navy and Coast Guard in General

The Navy and Coast Guard are exploring the potential implications that increased human activities in the Arctic may have for Navy and Coast Guard required numbers of ships and aircraft, ship and aircraft characteristics, new or enlarged Arctic bases, and supporting systems, such as navigation and communication systems. The Navy and Coast Guard have sponsored or participated in studies and conferences to explore these implications, the Coast Guard annually deploys cutters and aircraft into the region to perform missions and better understand the implications of operating such units there, and the Navy has deployed ships to the region.[318]

Points or themes that have emerged in studies, conferences, and deployments regarding the potential implications for the U.S. Navy and Coast Guard of diminished Arctic sea ice include but are not limited to the following:

- The diminishment of Arctic ice is creating potential new operating areas in the Arctic for Navy surface ships and Coast Guard cutters.
- U.S. national security interests in the Arctic include "such matters as missile defense and early warning; deployment of sea and air systems for strategic sealift, strategic deterrence, maritime presence, and maritime security operations; and ensuring freedom of navigation and overflight."[319]
- SAR in the Arctic is a mission of increasing importance, particularly for the Coast Guard, and one that poses potentially significant operational challenges (see "Search and Rescue (SAR)" above).
- More complete and detailed information on the Arctic is needed to more properly support expanded Navy and Coast Guard ship and aircraft operations in the Arctic.
- The Navy and the Coast Guard currently have limited infrastructure in place in the Arctic to support expanded ship and aircraft operations in the Arctic.

[317] See, for example, Geoff Ziezulewicz, "The Navy Sends a Carrier Back to Russia's Arctic Haunts," *Navy Times*, October 20, 2018; "Harry S. Truman Strike Group Enters Arctic Circle, Prepares for NATO Exercise," *Navy News Service*, October 19, 2018; Amy Bushatz, "The Navy Could Send More Sailors to Alaska," *Military.com*, August 16, 2018; Vivienne Machi, "United States, Canada studying Options to Replace Arctic Early Warning Radars," *National Defense*, July 27, 2018.

[318] See, for example, Yereth Rosen, US Coast Guard Settles into Kotzebue for the Summer," *Arctic Today*, July 2, 2018; David Axe, "Three U.S. and British Submarines Meet at the North Pole," *War Is Boring*, March 22, 2018; Kris Osborn, "The Navy Is Training for War with Russia in the Arctic," *National Interest*, March 20, 2018; Corey B. Barker, "Arctic-Deployed Navy Submarines Participate in Ice Exercise 2018," Defense.gov, March 13, 2018; Elizabeth McLaughlin, "Regular US Navy Arctic Submarine Exercise Takes On New Importance," *ABC News*, March 12, 2018; Submarine Force Pacific, "Navy's Arctic Ice Exercise Features Multinational Participation," Defense.gov, March 8, 2018.

[319] NSPD 66/HSPD 25, Section III B.

- Expanded ship and aircraft operations in the Arctic may require altering ship and aircraft designs and operating methods.[320]
- Cooperation with other Arctic countries will be valuable in achieving defense and homeland security goals.

Navy

November 2009 Navy Arctic Roadmap

The Navy issued its first Arctic roadmap on November 10, 2009.[321] The document, dated October 2009,[322] was intended to guide the service's activities regarding the Arctic for the period FY2010-FY2014. The document has now been succeeded by the 2014-2030 Navy Arctic roadmap (see discussion below).

August 2011 Navy Arctic Environmental Assessment and Outlook Report

In August 2011, the Navy released an Arctic environment assessment and outlook report.[323] The report states the following:

> As the Arctic environment continues to change and human activity increases, the U.S. Navy must be prepared to operate in this region. It is important to note that even though the Arctic is opening up, it will continue to be a harsh and challenging environment for the foreseeable future due to hazardous sea ice, freezing temperatures and extreme weather. Although the Navy submarine fleet has decades of experience operating in the Arctic, the surface fleet, air assets, and U.S. Marine Corps ground troops have limited experience there. The Navy must now consider the Arctic in terms of future policy, strategy, force structure, and investments.[324]

November 2013 DOD Arctic Strategy

The November 2013 DOD Arctic strategy (see discussion above in the section on DOD) states that "The Department of the Navy, in its role as DoD Executive Agent for Maritime Domain Awareness, will lead DoD coordination on maritime detection and tracking," and that "DoD will take steps to work with other Federal departments and agencies to improve nautical charts, enhance relevant atmospheric and oceanic models, improve accuracy of estimates of ice extent and thickness, and detect and monitor climate change indicators. In particular, the Department of the Navy will work in partnership with other Federal departments and agencies (e.g., DHS, the Department of Commerce) and international partners to improve hydrographic charting and oceanographic surveys in the Arctic."[325]

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[320] See, for example, Megan Eckstein, "CNO: Arctic Operations Limited Now, But Future Ship designs Should Consider Environment," *USNI News*, September 12, 2016.

[321] Memorandum for Distribution dated November 10, 2009, from Admiral J. W. Greenert, Vice Chief of Naval Operations, on the subject of the Navy Arctic Roadmap, accessed July 24, 2013, at http://www.navy.mil/navydata/documents/USN_artic_roadmap.pdf.

[322] U.S. Navy, *U.S. Navy Arctic Roadmap*, Washington, 2009, 29 pp. (October 2009, sponsored by Task Force Climate Change [and] Oceanographer of the Navy.)

[323] Department of the Navy, *Arctic Environmental Assessment and Outlook Report*, August 2011, 25 pp., accessed July 24, 2013, at http://greenfleet.dodlive.mil/files/2011/08/U.S.-Navy-Arctic-Environmental-Assessment.pdf.

[324] Department of the Navy, *Arctic Environmental Assessment and Outlook Report*, August 2011, p. v.

[325] Department of Defense, *Arctic Strategy*, November 2013, p. 9.

January 2014 Implementation Plan for National Strategy for Arctic Region

The Obama Administration's January 2014 implementation plan for its national strategy for the Arctic region (see "Background") mentions the Navy by name only once, as one of several agencies that will "collaborate to improve marine charting in the Arctic (Integrated Ocean and Coastal Mapping) and topographic mapping (Alaska Mapping Executive Committee)."[326] As noted above in the discussion of DOD in general, however, the January 2014 implementation plan makes DOD the lead federal agency for one of the plan's 36 or so specific initiatives and a supporting agency for 18 others.[327] The Navy will likely be a prominent participant in DOD's activities for a number of these 19 initiatives.

February 2014 Updated Navy Arctic Roadmap for 2014-2030

On February 24, 2014, the Navy released an updated Arctic roadmap intended to guide Navy activities regarding the Arctic for the period 2014-2030.[328] The document is the successor to the November 2009 Navy Arctic roadmap (see discussion above). The executive summary of the 2014-2030 Navy Arctic roadmap states the following:

> The United States Navy, as the maritime component of the Department of Defense, has global leadership responsibilities to provide ready forces for current operations and contingency response that include the Arctic Ocean. The Arctic Region remains a challenging operating environment, with a harsh climate, vast distances, and little infrastructure. These issues, coupled with limited operational experience, are just a few substantial challenges the Navy will have to overcome in the Arctic Region. While the Region is expected to remain a low threat security environment where nations resolve differences peacefully, the Navy will be prepared to prevent conflict and ensure national interests are protected....
>
> Navy functions in the Arctic Region are no different from those in other maritime regions; however, the Arctic Region environment makes the execution of many of these functions much more challenging....
>
> In support of National and Department of Defense aims, the Navy will pursue the following strategic objectives:
>
> • *Ensure United States Arctic sovereignty and provide homeland defense*;
>
> • *Provide ready naval forces* to respond to crisis and contingencies;
>
> • *Preserve freedom of the seas*; and
>
> • *Promote partnerships* within the United States Government and with international allies and partners....
>
> Resource constraints and competing near-term mission demands require that naval investments be informed, focused, and deliberate. Proactive planning today allows the Navy to prepare its forces for Arctic Region operations. This Roadmap emphasizes low-cost, long-lead activities that position the Navy to meet future demands. In the near to mid-term, the Navy will concentrate on improving operational capabilities, expertise, and capacity, extending reach, and will leverage interagency and international partners to

[326] *Implementation Plan for The National Strategy for the Arctic Region*, January 2014, p. 23.

[327] *Implementation Plan for The National Strategy for the Arctic Region*, January 2014, pp. 6-32. The activity entitled "Develop a Framework of Observations and Modeling to Support Forecasting and Prediction of Sea Ice" is presented on pages 15-16.

[328] U.S. Navy, *U.S. Navy Arctic Roadmap 2014 – 2030*, February 2014, 43 pp., accessed February 26, 2014, at http://www.navy.mil/docs/USN_arctic_roadmap.pdf.

> achieve its strategic objectives. The Roadmap recognizes the need to guide investments by prudently balancing regional requirements with national goals....
>
> This Roadmap provides direction to the Navy for the near-term (present-2020), mid-term (2020-2030), and far-term (beyond 2030), placing particular emphasis on near-term actions necessary to enhance Navy's ability to operate in the Arctic Region in the future. In the near-term, there will be low demand for additional naval involvement in the Region. Current Navy capabilities are sufficient to meet near-term operational needs. Navy will refine doctrine, operating procedures, and tactics, techniques, and procedures to guide future potential operations in the Arctic Region. In the mid-term, the Navy will provide support to the Combatant Commanders, United States Coast Guard, and other United States Government agencies. In the far-term, increased periods of ice-free conditions could require the Navy to expand this support on a more routine basis.[329]

Regarding "United States Navy Ways and Means for Near-Term, Mid-Term, and Far-Term Operations," the roadmap states the following:

> ***Near-term: Present to 2020.***
>
> The Navy will continue to provide capability and presence primarily through undersea and air assets. Surface ship operations will be limited to open water operations in the near-term. Even in open water conditions, weather factors, including sea ice, must be considered in operational risk assessments. During shoulder seasons, the Navy may employ ice strengthened Military Sealift Command (MSC) ships to conduct Navy missions.
>
> By 2020, the Navy will increase the number of personnel trained in Arctic operations. The Navy will grow expertise in all domains by continuing to participate in exercises, scientific missions, and personnel exchanges in Arctic-like conditions. Personnel exchanges will provide Sailors with opportunities to learn best practices from other United States' military services, interagency partners, and international allies and partners.
>
> The Navy will refine or develop the necessary strategy, policy, plans, and requirements for the Arctic Region. Additionally, the Navy will continue to study and make informed decisions on pursuing investments to better facilitate Arctic operations. The Navy will emphasize low cost, long-lead time activities to match capability and capacity to future demands. The Navy will update operating requirements and procedures for personnel, ships, and aircraft to operate in the Region with interagency partners and allies. Through ongoing exercises, such as Ice Exercise (ICEX) and Scientific Ice Expeditions (SCICEX) research, and transits through the region by Navy submarines, aircraft and surface vessels, the Navy will continue to learn more about the evolving operating environment. The Navy will focus on areas where it provides unique capabilities and will leverage joint and coalition partners to fill identified gaps and seams.
>
> ***Mid-term: 2020 to 2030.***
>
> By 2030, the Navy will have the necessary training and personnel to respond to contingencies and emergencies affecting national security. As the Arctic Ocean becomes increasingly ice-free, surface vessels will operate in the expanding open water areas. The Navy will improve its capabilities by participating in increasingly complex exercises and training with regional partners. While primary risks in the mid-term will likely be meeting search and rescue or disaster response mission demands, the Navy may also be called upon to ensure freedom of navigation in Arctic Ocean waters. The Navy will work to mitigate the gaps and seams and transition its Arctic Ocean operations from a capability to provide periodic presence to a capability to operate deliberately for sustained periods when needed.
>
> ***Far-term: Beyond 2030.***

[329] U.S. Navy, *U.S. Navy Arctic Roadmap 2014 – 2030*, February 2014, pp. 3-4. Italics as in original.

> In the far-term, Navy will be capable of supporting sustained operations in the Arctic Region as needed to meet national policy guidance. The Navy will provide trained and equipped personnel, along with surface, subsurface, and air capabilities, to achieve Combatant Commander's objectives. The high confidence of diminished ice coverage and navigable waterways for much of the year will enable naval forces to operate forward, ready to respond to any potential threat to national security, or to provide contingency response. Far-term risks include increased potential for search and rescue and DSCA [Defense Support of Civil Authorities], but may also require naval forces to have a greater focus on maritime security and freedom of navigation in the Region.[330]

Coast Guard

Overview—November 2015 Coast Guard Testimony

At a November 17, 2015, hearing on Arctic operations before two subcommittees of the House Foreign Affairs Committee, the Coast Guard testified that

> The Coast Guard has been operating in the Arctic Ocean since 1867, when Alaska was purchased from Russia. Then, as now, our mission is to enforce U.S. laws and regulations, conduct search and rescue, assist scientific exploration, and foster navigation safety and environmental stewardship. The Coast Guard uses mobile command and control platforms including large cutters and ocean-going ice-strengthened buoy tenders, as well as seasonal air and communications capabilities to execute these missions within more than 950,000 square miles of ocean off the Alaskan coast.
>
> Since 2008, the Coast Guard has conducted operations in the Arctic Region to assess our capabilities and mission requirements as maritime activity and environmental conditions warrant. These operations have included establishing small, temporary Forward Operating Locations along the North Slope to test our capabilities with boats, helicopters, and personnel. Each year from April to November we also fly aerial sorties to evaluate activities in the region. We will continue to deploy a suite of Coast Guard cutters to test our equipment, train our crews, and increase our awareness of Arctic activity.[331]

Coast Guard High Latitude Study Provided to Congress in July 2011

In July 2011, the Coast Guard provided to Congress a study on the Coast Guard's missions and capabilities for operations in high-latitude (i.e., polar) areas. The study, commonly known as the High Latitude Study, is dated July 2010 on its cover. The High Latitude Study concluded the following:

> [The study] concludes that future [Coast Guard] capability and capacity gaps will significantly impact four [Coast Guard] mission areas in the Arctic: Defense Readiness, Ice Operations, Marine Environmental Protection, and Ports, Waterways, and Coastal Security. These mission areas address the protection of important national interests in a geographic area where other nations are actively pursuing their own national goals. U.S. national policy and laws define the requirements to assert the nation's jurisdiction over its territory and interests; to ensure the security of its people and critical infrastructure; to participate fully in the collection of scientific knowledge; to support commercial enterprises with public utility; and to ensure that the Arctic environment is not degraded by increased human activity.

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[330] U.S. Navy, *U.S. Navy Arctic Roadmap 2014 – 2030*, February 2014, pp. 18-19.

[331] Testimony of Vice Admiral Charles D. Michel, Vice Commandant, U.S. Coast Guard, on "Arctic Operations," Before the House Foreign Affairs Committee—Western Hemisphere & Europe, Eurasia, and Emerging Threats Subcommittees, November 17, 2015, p. 1.

The Coast Guard's ability to support Defense Readiness mission requirements in the Arctic is closely linked to DoD responsibilities. The Coast Guard presently possesses the only surface vessels capable of operating in ice-covered and ice-diminished waters. The Coast Guard supports (1) DoD missions such as the resupply of Thule Air Base in Greenland and logistics support (backup) for McMurdo Station in Antarctica and (2) Department of State (DoS) directed Freedom of Navigation Operations. These unique Coast Guard capabilities have been noted by the Joint Chiefs of Staff, the Navy's Task Force Climate Change, and the recently issued Naval Operations Concept 2010.

The common and dominant contributor to these significant mission impacts is the gap in polar icebreaking capability....[332]

Other capability gaps contributing to the impact on Coast Guard ability to carry out its missions in the Arctic include

- Communications System Capability – Continuous coverage along Alaska's West Coast, the Bering Strait, and throughout the North Slope is required for exchanging voice and data communications with Coast Guard units and other government and commercial platforms offshore.
- Forward Operating Locations - No suitable facilities currently exist on the North Slope or near the Bering Strait with facilities sufficient to support extended aircraft servicing and maintenance. Aircraft must travel long distances and expend significant time transiting to and from adequate facilities. This gap reduces on-scene presence and capability to support sustained operations in the region.
- Environmental response in ice-covered waters - The technology and procedures for assessment and mitigation measures for oil spills in ice-covered waters are not fully developed or tested.

Capability gaps in the Arctic region have moderate impacts on [the Coast Guard's] Aids to Navigation (AtoN), Search and Rescue (SAR), and Other Law Enforcement (OLE) missions. Both AtoN and SAR involve the safety of mariners and will gain more importance not only as commerce and tourism cause an increase in maritime traffic, but as U.S. citizens in northern Alaska face more unpredictable conditions. Performance of OLE will be increasingly necessary to ensure the integrity of U.S. living marine resources from outside pressures....

In addition to the assessment of polar icebreaking needs, the Arctic mission analysis examined a set of theoretical mixes (force packages) of Coast Guard assets consisting of icebreakers, their embarked helicopters, and deployment alternatives using aviation forward operating locations in Arctic Alaska....

All [six] of the force mixes [considered in the study] add assets to the existing Coast Guard Alaska Patrol consisting of (1) a high-endurance cutter (not an icebreaker) deployed in the Bering Sea carrying a short range recovery helicopter, and (2) medium range recovery helicopters located at Kodiak in the Gulf of Alaska, and seasonally deployed to locations in Cold Bay and St. Paul Island....

These force packages and associated risk assessment provide a framework for acquisition planning as the Coast Guard implements a strategy for closing the capability gaps. By first recapitalizing the aging icebreakers, the Coast Guard provides a foundation for buildout of these force mixes. In addition to the cost of the icebreakers, the force packages require investment in forward operating locations and in medium range helicopters. The mission analysis reports developed rough order-of-magnitude cost estimates for forward operating locations at approximately $36M [million] each and for helicopters at $9M each....

[332] For additional discussion, see "Polar Icebreaking."

> The analysis shows that the current Coast Guard deployment posture is not capable of effective response in northern Alaska and that response may be improved through a mix of deployed cutters, aircraft, and supporting infrastructure including forward operating locations and communications/navigation systems.[333]

May 2013 Coast Guard Arctic Strategy

On May 21, 2013, the Coast Guard released a strategy document for the Arctic.[334] The executive summary of the document states the following in part:

> The U.S. Coast Guard, as the maritime component of the U.S. Department of Homeland Security (DHS), has specific statutory responsibilities in U.S. Arctic waters. This strategy outlines the ends, ways, and means for achieving strategic objectives in the Arctic over the next 10 years. The Coast Guard is responsible for ensuring safe, secure, and environmentally responsible maritime activity in U.S. Arctic waters. Our efforts must be accomplished in close coordination with DHS components, and involve facilitating commerce, managing borders, and improving resilience to disasters.
>
> The Coast Guard's current suite of cutters, boats, aircraft, and shore infrastructure must meet a number of near-term mission demands. The Coast Guard employs mobile command and control platforms such as large cutters and ocean-going ice-strengthened buoy tenders, as well as seasonal air and communications capabilities through leased or deployable assets and facilities. These mobile and seasonal assets and facilities have proven to be important enablers for front-line priorities in the region, including search and rescue operations, securing the maritime border, collecting critical intelligence, responding to potential disasters, and protecting the marine environment....
>
> Although winter sea travel is still severely limited due to extensive ice coverage across the region, recent summer and early autumn sea ice extent record lows have made seasonal maritime navigation more feasible. Economic development, in the forms of resource extraction, adventure tourism, and trans-Arctic shipping drives much of the current maritime activity in the region.
>
> [Oil and gas exploration] activities [in the region] bring risk, which can be mitigated through appropriate maritime governance. Additionally, tourism is increasing rapidly in the Arctic. Due to undeveloped shore-based infrastructure, much of the increased tourism is expected to involve transportation via passenger vessel, further increasing near- and offshore activities in Arctic waters.
>
> This document outlines three strategic objectives in the Arctic for the U.S. Coast Guard over the next 10 years:
>
> **• Improving Awareness**
>
> **• Modernizing Governance**
>
> **• Broadening Partnerships**
>
> ***Improving Awareness:*** Coast Guard operations require precise and ongoing awareness of activities in the maritime domain. Maritime awareness in the Arctic is currently restricted due to limited surveillance, monitoring, and information system capabilities. Persistent awareness enables identification of threats, information-sharing with front-line partners, and improved risk management. Improving awareness requires close collaboration within DHS, as well as with the Departments of State, Defense, Interior, the National Science Foundation and other stakeholders to enhance integration, innovation, and fielding of

[333] *United States Coast Guard High Latitude Region Mission Analysis Capstone Summary*, July 2010, pp. 10-11, 13-15.

[334] *United States Coast Guard Arctic Strategy*, Washington, May 2013, 47 pp.; accessed May 24, 2013, at https://www.uscg.mil/Portals/0/Strategy/cg_arctic_strategy.pdf.

emerging technologies. The Intelligence Community and non-federal partners are also vital stakeholders.

Modernizing Governance: The concept of governance involves institutions, structures of authority, and capabilities necessary to oversee maritime activities while safeguarding national interests. Limited awareness and oversight challenge maritime sovereignty, including the protection of natural resources and control of maritime borders. The Coast Guard will work within its authorities to foster collective efforts, both domestically and internationally, to improve Arctic governance. In so doing, the Coast Guard will review its own institutions and regimes of governance to prepare for future missions throughout the Arctic.

Broadening Partnerships: Success in the Arctic requires a collective effort across both the public and private sectors. Such a collective effort must be inclusive of domestic regulatory regimes; international collaborative forums such as the Arctic Council, International Maritime Organization (IMO), and Inuit Circumpolar Council; domestic and international partnerships; and local engagements in Arctic communities focusing on training and volunteer service. Success in the Arctic also depends upon close intergovernmental cooperation to support national interests, including working closely within DHS, as well as with the Department of State, Department of Interior and other Federal partners as the U.S. prepares to assume Chairmanship of the Arctic Council in 2015.

Beyond these three strategic objectives, there are a number of additional factors that will position the Coast Guard for long-term success. These factors include building national awareness of the Arctic and its opportunities, strengthening maritime regimes, improving public-private relationships through a national concept of operations, seeking necessary authorities, and identifying future requirements and resources to shape trends favorably. This strategy outlines a number of priorities, ranging from capabilities and requirements to advances in science and technology that will facilitate our Nation's success in the region. Specifically, the strategy advocates to leverage the entire DHS enterprise and component capabilities to secure our borders, prevent terrorism, adapt to changing environmental conditions, enable community resilience and inform future policy.

Operating in the Arctic is not a new venture for the Coast Guard. However, adapting to changing conditions will require foresight, focus, and clear priorities. This strategy will ensure we attain the aim of safe, secure, and environmentally responsible maritime activity in the Arctic by improving awareness, modernizing governance, and broadening partnerships to ensure long-term success.[335]

January 2014 Implementation Plan for National Strategy for Arctic Region

The Obama Administration's January 2014 implementation plan for its national strategy for the Arctic region (see "Background") makes "Department of Homeland Security (United States Coast Guard)" the lead federal agency for 6 of the plan's 36 or so specific initiatives, and a supporting agency for 13 others.[336] The six initiatives where the Coast Guard is designated the lead federal agency include

- enhance Arctic domain awareness;
- improve hazardous material spill prevention, containment, and response;
- promote Arctic oil pollution preparedness, prevention, and response internationally;
- enhance Arctic SAR;

[335] *United States Coast Guard Arctic Strategy*, Washington, May 2013, pp. 9-10. Emphasis as in original.

[336] *Implementation Plan for The National Strategy for the Arctic Region*, January 2014, pp. 7-31.

- expedite International Maritime Organization (IMO) Polar Code development and adoption; and
- promote Arctic waterways management.[337]

For the second initiative above—"Improve Hazardous Material Spill Prevention, Containment, and Response"—the Coast Guard shares lead-agency status with the Environmental Protection Agency (EPA), with the Coast Guard being the lead federal agency for open ocean and coastal spills, and EPA being the lead federal agency for inland spills.[338]

October 2015 Agreement on Arctic Coast Guard Forum (ACGF)

The Coast Guard, working with coast guards of other Arctic nations, in October 2015 established an Arctic Coast Guard Forum (ACGF). The Coast Guard states that

> The Arctic Coast Guard Forum (ACGF), modeled after the successful North Pacific Coast Guard Forum, is a unique maritime governance group where Principals of all eight Arctic countries discuss coordination of exercises, strengthen relationships, and share best practices. Complimentary to the Arctic Council, the chairmanship of the ACGF will reside with the country holding the rotating chair of the Arctic Council. The first "experts-level" meetings of the ACGF in 2014 garnered enthusiastic approval of the concept. Representatives of the eight Arctic nations finalized and agreed on a Terms of Reference document, determined working groups (Secretariat and Combined Operations), and drafted a Joint Statement. The first ever "Heads of Arctic Coast Guards" meeting took place on October 28-30, 2015 at the U.S. Coast Guard Academy, and the participating nations approved the Terms of Reference and released the Joint Statement.[339]

June 2016 GAO Report on Coast Guard Arctic Capabilities

A June 2016 GAO report on Coast Guard Arctic capabilities states the following:

> The U.S. Coast Guard, within the Department of Homeland Security, reported making progress implementing its Arctic strategy. For example, the Coast Guard reported conducting exercises related to Arctic oil spill response and search and rescue, and facilitating the formation of a safety committee in the Arctic, among other tasks in its strategy. To track the status of these efforts, the Coast Guard is developing a web-based tool and anticipates finalizing the tool in mid-2016.
>
> The Coast Guard assessed its capability to perform its Arctic missions and identified various capability gaps—including communications, infrastructure, and icebreaking, and has worked to mitigate these gaps with its Arctic partners, such as other federal agencies. Specifically, Coast Guard officials stated that the agency's actions to implement the various Arctic strategies and carry out annual Arctic operations have helped to mitigate Arctic capability gaps. However, the Coast Guard has not systematically assessed the extent to which its actions agency-wide have helped to mitigate these gaps. Coast Guard officials

[337] *Implementation Plan for The National Strategy for the Arctic Region*, January 2014, pp. 7-8, 13, 24, 25, 31, and 31, respectively.

[338] *Implementation Plan for The National Strategy for the Arctic Region*, January 2014, p. 13.

[339] Testimony of Vice Admiral Charles D. Michel, Vice Commandant, U.S. Coast Guard, on "Arctic Operations," Before the House Foreign Affairs Committee—Western Hemisphere & Europe, Eurasia, and Emerging Threats Subcommittees, November 17, 2015, p. 4. See also Bob Weber, "Eight Arctic Countries to Sign Historic Coast Guard Deal," *Metro News*, October 21, 2015; Levon Sevunts, "Arctic Nations Agree on Coast Guard Cooperation," *Alaska Dispatch News*, October 29, 2015; "Arctic Coast Guard Forum Ready for Action," *Maritime Executive*, October 30, 2015; Ronald A. LaBrec, "U.S. Coast Guard Unveils a New Model for Cooperation Atop the World," Council on Foreign Relations, November 2, 2015; Andreas Osthagen, "The Arctic Coast Guard Forum: Big Tasks, Small Solutions," Arctic Institute, November 3, 2015.

> attributed this, in part, to not being able to unilaterally close the gaps. While mitigating these gaps requires joint efforts among Arctic partners, the Coast Guard has taken actions in the Arctic that are specific to its missions and therefore has responsibility for assessing the extent to which these actions have helped to mitigate capability gaps. By systematically assessing and measuring its progress, the Coast Guard will better understand the status of these gaps and be better positioned to effectively plan its Arctic operations.
>
> The Coast Guard has been unable to fulfill some of its polar icebreaking responsibilities with its aging icebreaker fleet, which currently includes two active polar icebreakers. In 2011 and 2012, the Coast Guard was unable to maintain assured, year-round access to the Arctic and did not meet 4 of 11 requests for polar icebreaking services. With its one active heavy icebreaker—which has greater icebreaking capability—nearing the end of its service life, the Coast Guard initiated a program in 2013 to acquire a new one and is working to determine the optimal acquisition strategy. However, the Coast Guard's efforts to acquire an icebreaker, whether by lease or purchase, will be limited by legal and operational requirements. In addition, current projections show that the Coast Guard is likely to have a 3- to 6-year gap in its heavy icebreaking capability before a new icebreaker becomes operational.... The Coast Guard is developing a strategy to determine how to best address this expected gap.[340]

March 2017 Arctic Coast Guard Forum Joint Statement

A March 24, 2017, press report states the following:

> Coast guard leaders from the world's eight Arctic nations met in Boston Friday [March 24] to sign a joint statement for cooperation on emergency maritime response and combined operations in the high northern seas.
>
> U.S. Coast Guard Commandant Adm. Paul Zukunft joined leaders representing Canada, Denmark, Finland, Iceland, Norway, Sweden and the Russian Federation in the signing, and a ceremony handing off chairmanship of the group from the U.S. to the Finnish Border Guard.
>
> Maritime and environmental groups alike have stressed the need for closer international cooperation, as more Arctic shipping routes became navigable with retreating ice, opening access for shipping, energy and mineral exploration and commercial tourism.
>
> The statement adopts doctrine, tactics, procedures and information-sharing protocols for emergency maritime response and combined operations in the Arctic. It culminated two years of international collaboration, as working groups established strategies, objectives and tactics aimed towards achieving common operational goals in the region.
>
> So far, nation representatives have participated in table top exercises in Reykjavik, Iceland, and the District of Columbia. A live exercise in the Arctic is planned for later this year. Coast Guard officials describe the forum as "an operationally-focused, consensus-based organization with the purpose of leveraging collective resources to foster safe, secure and environmentally responsible maritime activity in the Arctic."
>
> "This forum — one of many ways in which the Coast Guard uses our unique roles to enhance our Nation's diplomacy — has quickly established itself as a premier platform for fostering safe, secure and environmentally responsible maritime activity in the Arctic," said Zukunft.

[340] Government Accountability Office, *Coast Guard[:] Arctic Strategy Is Underway, but Agency Could Better Assess How Its Actions Mitigate Known Arctic Capability Gaps*, GAO-16-453, June 2016, summary page.

> In testimony to U.S. senators earlier this week, Zukunft spoke of the need to engage with other Arctic nations, characterizing it as a clear preference for cooperation over competition. Nevertheless, he stressed the need for the U.S. to press forward with building a new fleet of three heavy and three medium icebreakers.[341]

FY2019 DHS Appropriations Act (S. 3109)

The Senate Appropriations Committee, in its report (S.Rept. 115-283 of June 21, 2108) on S. 3109, states the following:

> *Arctic Program Office*.—Recognizing the growing national security imperatives for an enhanced U.S. presence in the Arctic, the Committee is pleased that the Coast Guard has established an Arctic Strategy, an Arctic Strategy Implementation Plan, and an Arctic Program Office. This office has furthered the Nation's national defense and security interests in the Arctic through its extensive participation, coordination, and collaboration with other international, Federal, and SLTT partners to improve awareness, broaden partnerships, and modernize governance in the Arctic. Most recently, the office supported the completion of the Bering Strait Port Access Route Study, a study that resulted in a joint recommendation by the United States and the Russian Federation to the International Maritime Organization [IMO] to establish a common vessel traffic measure. Recently approved by the IMO, the traffic measure is the first IMO-approved measure for navigation safety in polar waters. The Coast Guard is to report to the Committee if additional resources are needed for the Arctic Program Office to further its important mission. (Pages 61-62)

CRS Reports on Specific Arctic-Related Issues

CRS Report RL34266, *Climate Change: Science Highlights*, by Jane A. Leggett

CRS Report RS21890, *The U.N. Law of the Sea Convention and the United States: Developments Since October 2003*, by Marjorie Ann Browne

CRS Report RL33872, *Arctic National Wildlife Refuge (ANWR): An Overview*, by M. Lynne Corn, Michael Ratner, and Laura B. Comay

CRS Report RL32838, *Arctic National Wildlife Refuge (ANWR): Votes and Legislative Actions Since the 95th Congress*, by M. Lynne Corn and Beth Cook

CRS Report RL34547, *Possible Federal Revenue from Oil Development of ANWR and Nearby Areas*, by Salvatore Lazzari

CRS Report RL33705, *Oil Spills: Background and Governance*, by Jonathan L. Ramseur

CRS Report RL33941, *Polar Bears: Listing Under the Endangered Species Act*, by Eugene H. Buck, M. Lynne Corn, and Kristina Alexander

CRS Report RL34391, *Coast Guard Polar Security Cutter (Polar Icebreaker) Program: Background and Issues for Congress*, by Ronald O'Rourke

CRS Report RL34342, *Homeland Security: Roles and Missions for United States Northern Command*, by William Knight

[341] Kirk Moore, "Arctic Coast Guard Forum Prepares for Joint Operations," *Work Boat*, March 24, 2017. See also "Arctic Coast Guard Forum Agrees Protocols," *Maritime Executive*, March 24, 2017; Levon Sevunts, "Arctic Nations Develop Coast Guard Co-operation," *Independent Barents Observer*, March 13, 2018.

Appendix A. Arctic Research and Policy Act (ARPA) of 1984 (Title I of P.L. 98-373)

The text of the Arctic Research and Policy Act (ARPA) of 1984 (Title I of P.L. 98-373 of July 31, 1984)[342] is as follows:

TITLE I – ARCTIC RESEARCH AND POLICY

SHORT TITLE

SEC. 101. This title may be cited as the "Arctic Research and Policy Act of 1984".

FINDINGS AND PURPOSES

SEC. 102. (a) The Congress finds and declares that-

(1) the Arctic, onshore and offshore, contains vital energy resources that can reduce the Nation's dependence on foreign oil and improve the national balance of payments;

(2) as the Nation's only common border with the Soviet Union, the Arctic is critical to national defense;

(3) the renewable resources of the Arctic, specifically fish and other seafood, represent one of the Nation's greatest commercial assets;

(4) Arctic conditions directly affect global weather patterns and must be understood in order to promote better agricultural management throughout the United States;

(5) industrial pollution not originating in the Arctic region collects in the polar air mass, has the potential to disrupt global weather patterns, and must be controlled through international cooperation and consultation;

(6) the Arctic is a natural laboratory for research into human health and adaptation, physical and psychological, to climates of extreme cold and isolation and may provide information crucial for future defense needs;

(7) atmospheric conditions peculiar to the Arctic make the Arctic a unique testing ground for research into high latitude communications, which is likely to be crucial for future defense needs;

(8) Arctic marine technology is critical to cost-effective recovery and transportation of energy resources and to the national defense;

(9) the United States has important security, economic, and environmental interests in developing and maintaining a fleet of icebreaking vessels capable of operating effectively in the heavy ice regions of the Arctic;

(10) most Arctic-rim countries, particularly the Soviet Union, possess Arctic technologies far more advanced than those currently available in the United States;

(11) Federal Arctic research is fragmented and uncoordinated at the present time, leading to the neglect of certain areas of research and to unnecessary duplication of effort in other areas of research;

(12) improved logistical coordination and support for Arctic research and better dissemination of research data and information is necessary to increase the efficiency and utility of national Arctic research efforts;

[342] Title II of P.L. 98-373 is the National Critical Materials Act of 1984.

(13) a comprehensive national policy and program plan to organize and fund currently neglected scientific research with respect to the Arctic is necessary to fulfill national objectives in Arctic research;

(14) the Federal Government, in cooperation with State and local governments, should focus its efforts on the collection and characterization of basic data related to biological, materials, geophysical, social, and behavioral phenomena in the Arctic;

(15) research into the long-range health, environmental, and social effects of development in the Arctic is necessary to mitigate the adverse consequences of that development to the land and its residents;

(16) Arctic research expands knowledge of the Arctic, which can enhance the lives of Arctic residents, increase opportunities for international cooperation among Arctic-rim countries, and facilitate the formulation of national policy for the Arctic; and

(17) the Alaskan Arctic provides an essential habitat for marine mammals, migratory waterfowl, and other forms of wildlife which are important to the Nation and which are essential to Arctic residents.

(b) The purposes of this title are-

(1) to establish national policy, priorities, and goals and to provide a Federal program plan for basic and applied scientific research with respect to the Arctic, including natural resources and materials, physical, biological and health sciences, and social and behavioral sciences;

(2) to establish an Arctic Research Commission to promote Arctic research and to recommend Arctic research policy;

(3) to designate the National Science Foundation as the lead agency responsible for implementing Arctic research policy; and

(4) to establish an Interagency Arctic Research Policy Committee to develop a national Arctic research policy and a five year plan to implement that policy.

ARCTIC RESEARCH COMMISSION

SEC. 103. (a) The President shall establish an Arctic Research Commission (hereafter referred to as the "Commission").

(b)(1) The Commission shall be composed of five members appointed by the President, with the Director of the National Science Foundation serving as a nonvoting, ex officio member. The members appointed by the President shall include-

(A) three members appointed from among individuals from academic or other research institutions with expertise in areas of research relating to the Arctic, including the physical, biological, health, environmental, social, and behavioral sciences;

(B) one member appointed from among indigenous residents of the Arctic who are representative of the needs and interests of Arctic residents and who live in areas directly affected by Arctic resource development; and

(C) one member appointed from among individuals familiar with the Arctic and representative of the needs and interests of private industry undertaking resource development in the Arctic.

(2) The President shall designate one of the appointed members of the Commission to be chairperson of the Commission.

(c)(1) Except as provided in paragraph (2) of this subsection, the term of office of each member of the Commission appointed under subsection (b)(1) shall be four years.

(2) Of the members of the Commission originally appointed under subsection (b)(1)-

(A) one shall be appointed for a term of two years;

(B) two shall be appointed for a term of three years; and

(C) two shall be appointed for a term of four years.

(3) Any vacancy occurring in the membership of the Commission shall be filled, after notice of the vacancy is published in the Federal Register, in the manner provided by the preceding provisions of this section, for the remainder of the unexpired term.

(4) A member may serve after the expiration of the member's term of office until the President appoints a successor.

(5) A member may serve consecutive terms beyond the member's original appointment.

(d)(1) Members of the Commission may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by section 5703 of title 5, United States Code. A member of the Commission not presently employed for compensation shall be compensated at a rate equal to the daily equivalent of the rate for GS-16 of the General Schedule under section 5332 of title 5, United States Code, for each day the member is engaged in the actual performance of his duties as a member of the Commission, not to exceed 90 days of service each year. Except for the purposes of chapter 81 of title 5 (relating to compensation for work injuries) and chapter 171 of title 28 (relating to tort claims), a member of the Commission shall not be considered an employee of the United States for any purpose.

(2) The Commission shall meet at the call of its Chairman or a majority of its members.

(3) Each Federal agency referred to in section 107(b) may designate a representative to participate as an observer with the Commission.

These representatives shall report to and advise the Commission on the activities relating to Arctic research of their agencies.

(4) The Commission shall conduct at least one public meeting in the State of Alaska annually.

DUTIES OF COMMISSION

SEC. 104. (a) The Commission shall-

(1) develop and recommend an integrated national Arctic research policy;

(2) in cooperation with the Interagency Arctic Research Policy Committee established under section 107, assist in establishing a national Arctic research program plan to implement the Arctic research policy;

(3) facilitate cooperation between the Federal Government and State and local governments with respect to Arctic research;

(4) review Federal research programs in the Arctic and suggest improvements in coordination among programs;

(5) recommend methods to improve logistical planning and support for Arctic research as may be appropriate and in accordance with the findings and purposes of this title;

(6) suggest methods for improving efficient sharing and dissemination of data and information on the Arctic among interested public and private institutions;

(7) offer other recommendations and advice to the Interagency Committee established under section 107 as it may find appropriate; and

(8) cooperate with the Governor of the State of Alaska and with agencies and organizations of that State which the Governor may designate with respect to the formulation of Arctic research policy.

(b) Not later than January 31 of each year, the Commission shall-

(1) publish a statement of goals and objectives with respect to Arctic research to guide the Interagency Committee established under section 107 in the performance of its duties; and

(2) submit to the President and to the Congress a report describing the activities and accomplishments of the Commission during the immediately preceding fiscal year.

COOPERATION WITH THE COMMISSION

SEC. 105. (a)(1) The Commission may acquire from the head of any Federal agency unclassified data, reports, and other nonproprietary information with respect to Arctic research in the possession of the agency which the Commission considers useful in the discharge of its duties.

(2) Each agency shall cooperate with the Commission and furnish all data, reports, and other information requested by the Commission to the extent permitted by law; except that no agency need furnish any information which it is permitted to withhold under section 552 of title 5, United States Code.

(b) With the consent of the appropriate agency head, the Commission may utilize the facilities and services of any Federal agency to the extent that the facilities and services are needed for the establishment and development of an Arctic research policy, upon reimbursement to be agreed upon by the Commission and the agency head and taking every feasible step to avoid duplication of effort.

(c) All Federal agencies shall consult with the Commission before undertaking major Federal actions relating to Arctic research.

ADMINISTRATION OF THE COMMISSION

SEC. 106. The Commission may-

(1) in accordance with the civil service laws and subchapter III of chapter 53 of title 5, United States Code, appoint and fix the compensation of an Executive Director and necessary additional staff personnel, but not to exceed a total of seven compensated personnel;

(2) procure temporary and intermittent services as authorized by section 3109 of title 5, United States Code;

(3) enter into contracts and procure supplies, services, and personal property; and

(4) enter into agreements with the General Services Administration for the procurement of necessary financial and administrative services, for which payment shall be made by reimbursement from funds of the Commission in amounts to be agreed upon by the Commission and the Administrator of the General Services Administration.

LEAD AGENCY AND INTERAGENCY ARCTIC RESEARCH POLICY COMMITTEE

SEC. 107. (a) The National Science Foundation is designated as the lead agency responsible for implementing Arctic research policy, and the Director of the National Science Foundation shall insure that the requirements of section 108 are fulfilled.

(b)(1) The President shall establish an Interagency Arctic Research Policy Committee (hereinafter referred to as the "Interagency Committee").

(2) The Interagency Committee shall be composed of representatives of the following Federal agencies or offices:

(A) the National Science Foundation;

(B) the Department of Commerce;

(C) the Department of Defense;

(D) the Department of Energy;

(E) the Department of the Interior;

(F) the Department of State;

(G) the Department of Transportation;

(H) the Department of Health and Human Services;

(I) the National Aeronautics and Space Administration;

(J) the Environmental Protection Agency; and

(K) any other agency or office deemed appropriate.

(3) The representative of the National Science Foundation shall serve as the Chairperson of the Interagency Committee.

DUTIES OF THE INTERAGENCY COMMITTEE

SEC. 108. (a) The Interagency Committee shall-

(1) survey Arctic research conducted by Federal, State, and local agencies, universities, and other public and private institutions to help determine priorities for future Arctic research, including natural resources and materials, physical and biological sciences, and social and behavioral sciences;

(2) work with the Commission to develop and establish an integrated national Arctic research policy that will guide Federal agencies in developing and implementing their research programs in the Arctic;

(3) consult with the Commission on-

(A) the development of the national Arctic research policy and the 5-year plan implementing the policy;

(B) Arctic research programs of Federal agencies;

(C) recommendations of the Commission on future Arctic research; and

(D) guidelines for Federal agencies for awarding and administering Arctic research grants;

(4) develop a 5-year plan to implement the national policy, as provided for in section 109;

(5) provide the necessary coordination, data, and assistance for the preparation of a single integrated, coherent, and multiagency budget request for Arctic research as provided for in section 110;

(6) facilitate cooperation between the Federal Government and State and local governments in Arctic research, and recommend the undertaking of neglected areas of research in accordance with the findings and purposes of this title;

(7) coordinate and promote cooperative Arctic scientific research programs with other nations, subject to the foreign policy guidance of the Secretary of State;

(8) cooperate with the Governor of the State of Alaska in fulfilling its responsibilities under this title;

(9) promote Federal interagency coordination of all Arctic research activities, including-

(A) logistical planning and coordination; and

(B) the sharing of data and information associated with Arctic research, subject to section 552 of title 5, United States Code; and

(10) provide public notice of its meetings and an opportunity for the public to participate in the development and implementation of national Arctic research policy.

(b) Not later than January 31, 1986, and biennially thereafter, the Interagency Committee shall submit to the Congress through the President, a brief, concise report containing-

(1) a statement of the activities and accomplishments of the Interagency Committee since its last report; and

(2) a description of the activities of the Commission, detailing with particularity the recommendations of the Commission with respect to Federal activities in Arctic research.

5-YEAR ARCTIC RESEARCH PLAN

SEC. 109. (a) The Interagency Committee, in consultation with the Commission, the Governor of the State of Alaska, the residents of the Arctic, the private sector, and public interest groups, shall prepare a comprehensive 5-year program plan (hereinafter referred to as the "Plan") for the overall Federal effort in Arctic research. The Plan shall be prepared and submitted to the President for transmittal to the Congress within one year after the enactment of this Act and shall be revised biennially thereafter.

(b) The Plan shall contain but need not be limited to the following elements:

(1) an assessment of national needs and problems regarding the Arctic and the research necessary to address those needs or problems;

(2) a statement of the goals and objectives of the Interagency Committee for national Arctic research;

(3) a detailed listing of all existing Federal programs relating to Arctic research, including the existing goals, funding levels for each of the 5 following fiscal years, and the funds currently being expended to conduct the programs;

(4) recommendations for necessary program changes and other proposals to meet the requirements of the policy and goals as set forth by the Commission and in the Plan as currently in effect; and

(5) a description of the actions taken by the Interagency Committee to coordinate the budget review process in order to ensure interagency coordination and cooperation in (A) carrying out Federal Arctic research programs, and (B) eliminating unnecessary duplication of effort among these programs.

COORDINATION AND REVIEW OF BUDGET REQUESTS

SEC. 110. (a) The Office of Science and Technology Policy shall-

(1) review all agency and department budget requests related to the Arctic transmitted pursuant to section 108(a)(5), in accordance with the national Arctic research policy and the 5-year program under section 108(a)(2) and section 109, respectively; and

(2) consult closely with the Interagency Committee and the Commission to guide the Office of Science and Technology Policy's efforts.

(b)(1) The Office of Management and Budget shall consider all Federal agency requests for research related to the Arctic as one integrated, coherent, and multiagency request which shall be reviewed by the Office of Management and Budget prior to submission of the President's annual budget request for its adherence to the Plan. The Commission shall, after submission of the President's annual budget request, review the request and report to Congress on adherence to the Plan.

(2) The Office of Management and Budget shall seek to facilitate planning for the design, procurement, maintenance, deployment, and operations of icebreakers needed to provide a platform for Arctic research by allocating all funds necessary to support icebreaking

operations, except for recurring incremental costs associated with specific projects, to the Coast Guard.

AUTHORIZATION OF APPROPRIATIONS; NEW SPENDING AUTHORITY

SEC. 111. (a) There are authorized to be appropriated such sums as may be necessary for carrying out this title.

(b) Any new spending authority (within the meaning of section 401 of the Congressional Budget Act of 1974) which is provided under this title shall be effective for any fiscal year only to such extent or in such amounts as may be provided in appropriation Acts.

DEFINITION

SEC. 112. As used in this title, the term "Arctic" means all United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering, and Chukchi Seas; and the Aleutian chain.

Appendix B. P.L. 101-609 of 1990, Amending Arctic Research and Policy Act (ARPA) of 1984

The Arctic Research and Policy Act (ARPA) of 1984 (see **Appendix A**) was amended by P.L. 101-609 of November 16, 1990. The text of P.L. 101-609 is as follows:

SECTION 1. Except as specifically provided in this Act, whenever in this Act an amendment or repeal is expressed as an amendment to, or repeal of a provision, the reference shall be deemed to be made to the Arctic Research and Policy Act of 1984.

SEC. 2. Section 103(b)(1) (15 U.S.C. 4102(b)(1)) is amended—

(1) in the text above clause (A), by striking out `five' and inserting in lieu thereof `seven';

(2) in clause (A), by striking out `three' and inserting in lieu thereof `four'; and

(3) in clause (C), by striking out `one member' and inserting in lieu thereof `two members'.

SEC. 3. Section 103(d)(1) (15 U.S.C. 4102(d)(1)) is amended by striking out `GS-16' and inserting in lieu thereof `GS-18'.

SEC. 4. (a) Section 104(a) (15 U.S.C. 4102(a)) is amended—

(1) in paragraph (4), by striking out `suggest' and inserting in lieu thereof `recommend';

(2) in paragraph (6), by striking out `suggest' and inserting in lieu thereof `recommend';

(3) in paragraph (7), by striking out `and' at the end thereof;

(4) in paragraph (8), by striking out the period and inserting in lieu thereof a semicolon; and

(5) by adding at the end thereof the following new paragraphs:

'(9) recommend to the Interagency Committee the means for developing international scientific cooperation in the Arctic; and

'(10) not later than January 31, 1991, and every 2 years thereafter, publish a statement of goals and objectives with respect to Arctic research to guide the Interagency Committee established under section 107 in the performance of its duties.'.

(b) Section 104(b) is amended to read as follows:

'(b) Not later than January 31 of each year, the Commission shall submit to the President and to the Congress a report describing the activities and accomplishments of the Commission during the immediately preceding fiscal year.'.

SEC. 5. Section 106 (15 U.S.C. 4105) is amended—

(1) in paragraph (3), by striking out `and' at the end thereof;

(2) in paragraph (4), by striking out the period at the end thereof and inserting in lieu thereof; and'; and

(3) by adding at the end thereof the following new paragraph:

'(5) appoint, and accept without compensation the services of, scientists and engineering specialists to be advisors to the Commission. Each advisor may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by section 5703 of title 5, United States Code. Except for the purposes of chapter 81 of title 5 (relating to compensation for work injuries) and chapter 171 of title 28 (relating to tort claims) of the United States Code,

an advisor appointed under this paragraph shall not be considered an employee of the United States for any purpose.'

SEC. 6. Subsection (b)(2) of section 108 (15 U.S.C. 4107(b)(2)) is amended to read as follows:

'(2) a statement detailing with particularity the recommendations of the Commission with respect to Federal interagency activities in Arctic research and the disposition and responses to those recommendations.'

Appendix C. January 2009 Arctic Policy Directive (NSPD 66/HSPD 25)

On January 12, 2009, the George W. Bush Administration released a presidential directive establishing a new U.S. policy for the Arctic region. The directive, dated January 9, 2009, was issued as National Security Presidential Directive 66/Homeland Security Presidential Directive 25 (NSPD 66/HSPD 25). The text of NSPD 66/HSPD 25 is as follows:

> SUBJECT: Arctic Region Policy
>
> I. PURPOSE
>
> A. This directive establishes the policy of the United States with respect to the Arctic region and directs related implementation actions. This directive supersedes Presidential Decision Directive/NSC-26 (PDD-26; issued 1994) with respect to Arctic policy but not Antarctic policy; PDD-26 remains in effect for Antarctic policy only.
>
> B. This directive shall be implemented in a manner consistent with the Constitution and laws of the United States, with the obligations of the United States under the treaties and other international agreements to which the United States is a party, and with customary international law as recognized by the United States, including with respect to the law of the sea.
>
> II. BACKGROUND
>
> A. The United States is an Arctic nation, with varied and compelling interests in that region. This directive takes into account several developments, including, among others:
>
> 1. Altered national policies on homeland security and defense;
>
> 2. The effects of climate change and increasing human activity in the Arctic region;
>
> 3. The establishment and ongoing work of the Arctic Council; and
>
> 4. A growing awareness that the Arctic region is both fragile and rich in resources.
>
> III. POLICY
>
> A. It is the policy of the United States to:
>
> 1. Meet national security and homeland security needs relevant to the Arctic region;
>
> 2. Protect the Arctic environment and conserve its biological resources;
>
> 3. Ensure that natural resource management and economic development in the region are environmentally sustainable;
>
> 4. Strengthen institutions for cooperation among the eight Arctic nations (the United States, Canada, Denmark, Finland, Iceland, Norway, the Russian Federation, and Sweden);
>
> 5. Involve the Arctic's indigenous communities in decisions that affect them; and
>
> 6. Enhance scientific monitoring and research into local, regional, and global environmental issues.
>
> B. National Security and Homeland Security Interests in the Arctic
>
> 1. The United States has broad and fundamental national security interests in the Arctic region and is prepared to operate either independently or in conjunction with other states to safeguard these interests. These interests include such matters as missile defense and early warning; deployment of sea and air systems for strategic sealift, strategic deterrence,

maritime presence, and maritime security operations; and ensuring freedom of navigation and overflight.

2. The United States also has fundamental homeland security interests in preventing terrorist attacks and mitigating those criminal or hostile acts that could increase the United States vulnerability to terrorism in the Arctic region.

3. The Arctic region is primarily a maritime domain; as such, existing policies and authorities relating to maritime areas continue to apply, including those relating to law enforcement.[1] Human activity in the Arctic region is increasing and is projected to increase further in coming years. This requires the United States to assert a more active and influential national presence to protect its Arctic interests and to project sea power throughout the region.

4. The United States exercises authority in accordance with lawful claims of United States sovereignty, sovereign rights, and jurisdiction in the Arctic region, including sovereignty within the territorial sea, sovereign rights and jurisdiction within the United States exclusive economic zone and on the continental shelf, and appropriate control in the United States contiguous zone.

5. Freedom of the seas is a top national priority. The Northwest Passage is a strait used for international navigation, and the Northern Sea Route includes straits used for international navigation; the regime of transit passage applies to passage through those straits. Preserving the rights and duties relating to navigation and overflight in the Arctic region supports our ability to exercise these rights throughout the world, including through strategic straits.

6. Implementation: In carrying out this policy as it relates to national security and homeland security interests in the Arctic, the Secretaries of State, Defense, and Homeland Security, in coordination with heads of other relevant executive departments and agencies, shall:

a. Develop greater capabilities and capacity, as necessary, to protect United States air, land, and sea borders in the Arctic region;

b. Increase Arctic maritime domain awareness in order to protect maritime commerce, critical infrastructure, and key resources;

c. Preserve the global mobility of United States military and civilian vessels and aircraft throughout the Arctic region;

d. Project a sovereign United States maritime presence in the Arctic in support of essential United States interests; and

e. Encourage the peaceful resolution of disputes in the Arctic region.

C. International Governance

1. The United States participates in a variety of fora, international organizations, and bilateral contacts that promote United States interests in the Arctic. These include the Arctic Council, the International Maritime Organization (IMO), wildlife conservation and management agreements, and many other mechanisms. As the Arctic changes and human activity in the region increases, the United States and other governments should consider, as appropriate, new international arrangements or enhancements to existing arrangements.

2. The Arctic Council has produced positive results for the United States by working within its limited mandate of environmental protection and sustainable development. Its subsidiary bodies, with help from many United States agencies, have developed and undertaken projects on a wide range of topics. The Council also provides a beneficial venue for interaction with indigenous groups. It is the position of the United States that the Arctic Council should remain a high-level forum devoted to issues within its current mandate and not be transformed into a formal international organization, particularly one with assessed

contributions. The United States is nevertheless open to updating the structure of the Council, including consolidation of, or making operational changes to, its subsidiary bodies, to the extent such changes can clearly improve the Council's work and are consistent with the general mandate of the Council.

3. The geopolitical circumstances of the Arctic region differ sufficiently from those of the Antarctic region such that an "Arctic Treaty" of broad scope—along the lines of the Antarctic Treaty—is not appropriate or necessary.

4. The Senate should act favorably on U.S. accession to the U.N. Convention on the Law of the Sea promptly, to protect and advance U.S. interests, including with respect to the Arctic. Joining will serve the national security interests of the United States, including the maritime mobility of our Armed Forces worldwide. It will secure U.S. sovereign rights over extensive marine areas, including the valuable natural resources they contain. Accession will promote U.S. interests in the environmental health of the oceans. And it will give the United States a seat at the table when the rights that are vital to our interests are debated and interpreted.

5. Implementation: In carrying out this policy as it relates to international governance, the Secretary of State, in coordination with heads of other relevant executive departments and agencies, shall:

a. Continue to cooperate with other countries on Arctic issues through the United Nations (U.N.) and its specialized agencies, as well as through treaties such as the U.N. Framework Convention on Climate Change, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the Convention on Long Range Transboundary Air Pollution and its protocols, and the Montreal Protocol on Substances that Deplete the Ozone Layer;

b. Consider, as appropriate, new or enhanced international arrangements for the Arctic to address issues likely to arise from expected increases in human activity in that region, including shipping, local development and subsistence, exploitation of living marine resources, development of energy and other resources, and tourism;

c. Review Arctic Council policy recommendations developed within the ambit of the Council's scientific reviews and ensure the policy recommendations are subject to review by Arctic governments; and

d. Continue to seek advice and consent of the United States Senate to accede to the 1982 Law of the Sea Convention.

D. Extended Continental Shelf and Boundary Issues

1. Defining with certainty the area of the Arctic seabed and subsoil in which the United States may exercise its sovereign rights over natural resources such as oil, natural gas, methane hydrates, minerals, and living marine species is critical to our national interests in energy security, resource management, and environmental protection. The most effective way to achieve international recognition and legal certainty for our extended continental shelf is through the procedure available to States Parties to the U.N. Convention on the Law of the Sea.

2. The United States and Canada have an unresolved boundary in the Beaufort Sea. United States policy recognizes a boundary in this area based on equidistance. The United States recognizes that the boundary area may contain oil, natural gas, and other resources.

3. The United States and Russia are abiding by the terms of a maritime boundary treaty concluded in 1990, pending its entry into force. The United States is prepared to enter the agreement into force once ratified by the Russian Federation.

4. Implementation: In carrying out this policy as it relates to extended continental shelf and boundary issues, the Secretary of State, in coordination with heads of other relevant executive departments and agencies, shall:

a. Take all actions necessary to establish the outer limit of the continental shelf appertaining to the United States, in the Arctic and in other regions, to the fullest extent permitted under international law;

b. Consider the conservation and management of natural resources during the process of delimiting the extended continental shelf; and

c. Continue to urge the Russian Federation to ratify the 1990 United States-Russia maritime boundary agreement.

E. Promoting International Scientific Cooperation

1. Scientific research is vital for the promotion of United States interests in the Arctic region. Successful conduct of U.S. research in the Arctic region requires access throughout the Arctic Ocean and to terrestrial sites, as well as viable international mechanisms for sharing access to research platforms and timely exchange of samples, data, and analyses. Better coordination with the Russian Federation, facilitating access to its domain, is particularly important.

2. The United States promotes the sharing of Arctic research platforms with other countries in support of collaborative research that advances fundamental understanding of the Arctic region in general and potential Arctic change in particular. This could include collaboration with bodies such as the Nordic Council and the European Polar Consortium, as well as with individual nations.

3. Accurate prediction of future environmental and climate change on a regional basis, and the delivery of near real-time information to end-users, requires obtaining, analyzing, and disseminating accurate data from the entire Arctic region, including both paleoclimatic data and observational data. The United States has made significant investments in the infrastructure needed to collect environmental data in the Arctic region, including the establishment of portions of an Arctic circumpolar observing network through a partnership among United States agencies, academic collaborators, and Arctic residents. The United States promotes active involvement of all Arctic nations in these efforts in order to advance scientific understanding that could provide the basis for assessing future impacts and proposed response strategies.

4. United States platforms capable of supporting forefront research in the Arctic Ocean, including portions expected to be ice-covered for the foreseeable future, as well as seasonally ice-free regions, should work with those of other nations through the establishment of an Arctic circumpolar observing network. All Arctic nations are members of the Group on Earth Observations partnership, which provides a framework for organizing an international approach to environmental observations in the region. In addition, the United States recognizes that academic and research institutions are vital partners in promoting and conducting Arctic research.

5. Implementation: In carrying out this policy as it relates to promoting scientific international cooperation, the Secretaries of State, the Interior, and Commerce and the Director of the National Science Foundation, in coordination with heads of other relevant executive departments and agencies, shall:

a. Continue to play a leadership role in research throughout the Arctic region;

b. Actively promote full and appropriate access by scientists to Arctic research sites through bilateral and multilateral measures and by other means;

c. Lead the effort to establish an effective Arctic circumpolar observing network with broad partnership from other relevant nations;

d. Promote regular meetings of Arctic science ministers or research council heads to share information concerning scientific research opportunities and to improve coordination of international Arctic research programs;

e. Work with the Interagency Arctic Research Policy Committee (IARPC) to promote research that is strategically linked to U.S. policies articulated in this directive, with input from the Arctic Research Commission; and

f. Strengthen partnerships with academic and research institutions and build upon the relationships these institutions have with their counterparts in other nations.

F. Maritime Transportation in the Arctic Region

1. The United States priorities for maritime transportation in the Arctic region are:

a. To facilitate safe, secure, and reliable navigation;

b. To protect maritime commerce; and

c. To protect the environment.

2. Safe, secure, and environmentally sound maritime commerce in the Arctic region depends on infrastructure to support shipping activity, search and rescue capabilities, short- and long-range aids to navigation, high-risk area vessel-traffic management, iceberg warnings and other sea ice information, effective shipping standards, and measures to protect the marine environment. In addition, effective search and rescue in the Arctic will require local, State, Federal, tribal, commercial, volunteer, scientific, and multinational cooperation.

3. Working through the International Maritime Organization (IMO), the United States promotes strengthening existing measures and, as necessary, developing new measures to improve the safety and security of maritime transportation, as well as to protect the marine environment in the Arctic region. These measures may include ship routing and reporting systems, such as traffic separation and vessel traffic management schemes in Arctic chokepoints; updating and strengthening of the Guidelines for Ships Operating in Arctic Ice-Covered Waters; underwater noise standards for commercial shipping; a review of shipping insurance issues; oil and other hazardous material pollution response agreements; and environmental standards.

4. Implementation: In carrying out this policy as it relates to maritime transportation in the Arctic region, the Secretaries of State, Defense, Transportation, Commerce, and Homeland Security, in coordination with heads of other relevant executive departments and agencies, shall:

a. Develop additional measures, in cooperation with other nations, to address issues that are likely to arise from expected increases in shipping into, out of, and through the Arctic region;

b. Commensurate with the level of human activity in the region, establish a risk-based capability to address hazards in the Arctic environment. Such efforts shall advance work on pollution prevention and response standards; determine basing and logistics support requirements, including necessary airlift and icebreaking capabilities; and improve plans and cooperative agreements for search and rescue;

c. Develop Arctic waterways management regimes in accordance with accepted international standards, including vessel traffic-monitoring and routing; safe navigation standards; accurate and standardized charts; and accurate and timely environmental and navigational information; and

d. Evaluate the feasibility of using access through the Arctic for strategic sealift and humanitarian aid and disaster relief.

G. Economic Issues, Including Energy

1. Sustainable development in the Arctic region poses particular challenges. Stakeholder input will inform key decisions as the United States seeks to promote economic and energy security. Climate change and other factors are significantly affecting the lives of Arctic inhabitants, particularly indigenous communities. The United States affirms the importance to Arctic communities of adapting to climate change, given their particular vulnerabilities.

2. Energy development in the Arctic region will play an important role in meeting growing global energy demand as the area is thought to contain a substantial portion of the world's undiscovered energy resources. The United States seeks to ensure that energy development throughout the Arctic occurs in an environmentally sound manner, taking into account the interests of indigenous and local communities, as well as open and transparent market principles. The United States seeks to balance access to, and development of, energy and other natural resources with the protection of the Arctic environment by ensuring that continental shelf resources are managed in a responsible manner and by continuing to work closely with other Arctic nations.

3. The United States recognizes the value and effectiveness of existing fora, such as the Arctic Council, the International Regulators Forum, and the International Standards Organization.

4. Implementation: In carrying out this policy as it relates to economic issues, including energy, the Secretaries of State, the Interior, Commerce, and Energy, in coordination with heads of other relevant executive departments and agencies, shall:

a. Seek to increase efforts, including those in the Arctic Council, to study changing climate conditions, with a view to preserving and enhancing economic opportunity in the Arctic region. Such efforts shall include inventories and assessments of villages, indigenous communities, subsistence opportunities, public facilities, infrastructure, oil and gas development projects, alternative energy development opportunities, forestry, cultural and other sites, living marine resources, and other elements of the Arctic's socioeconomic composition;

b. Work with other Arctic nations to ensure that hydrocarbon and other development in the Arctic region is carried out in accordance with accepted best practices and internationally recognized standards and the 2006 Group of Eight (G-8) Global Energy Security Principles;

c. Consult with other Arctic nations to discuss issues related to exploration, production, environmental and socioeconomic impacts, including drilling conduct, facility sharing, the sharing of environmental data, impact assessments, compatible monitoring programs, and reservoir management in areas with potentially shared resources;

d. Protect United States interests with respect to hydrocarbon reservoirs that may overlap boundaries to mitigate adverse environmental and economic consequences related to their development;

e. Identify opportunities for international cooperation on methane hydrate issues, North Slope hydrology, and other matters;

f. Explore whether there is a need for additional fora for informing decisions on hydrocarbon leasing, exploration, development, production, and transportation, as well as shared support activities, including infrastructure projects; and

g. Continue to emphasize cooperative mechanisms with nations operating in the region to address shared concerns, recognizing that most known Arctic oil and gas resources are located outside of United States jurisdiction.

H. Environmental Protection and Conservation of Natural Resources

1. The Arctic environment is unique and changing. Increased human activity is expected to bring additional stressors to the Arctic environment, with potentially serious consequences for Arctic communities and ecosystems.

2. Despite a growing body of research, the Arctic environment remains poorly understood. Sea ice and glaciers are in retreat. Permafrost is thawing and coasts are eroding. Pollutants from within and outside the Arctic are contaminating the region. Basic data are lacking in many fields. High levels of uncertainty remain concerning the effects of climate change and increased human activity in the Arctic. Given the need for decisions to be based on sound scientific and socioeconomic information, Arctic environmental research, monitoring, and vulnerability assessments are top priorities. For example, an understanding of the probable consequences of global climate variability and change on Arctic ecosystems is essential to guide the effective long-term management of Arctic natural resources and to address socioeconomic impacts of changing patterns in the use of natural resources.

3. Taking into account the limitations in existing data, United States efforts to protect the Arctic environment and to conserve its natural resources must be risk-based and proceed on the basis of the best available information.

4. The United States supports the application in the Arctic region of the general principles of international fisheries management outlined in the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of December 10, 1982, relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks and similar instruments. The United States endorses the protection of vulnerable marine ecosystems in the Arctic from destructive fishing practices and seeks to ensure an adequate enforcement presence to safeguard Arctic living marine resources.

5. With temperature increases in the Arctic region, contaminants currently locked in the ice and soils will be released into the air, water, and land. This trend, along with increased human activity within and below the Arctic, will result in increased introduction of contaminants into the Arctic, including both persistent pollutants (e.g., persistent organic pollutants and mercury) and airborne pollutants (e.g., soot).

6. Implementation: In carrying out this policy as it relates to environmental protection and conservation of natural resources, the Secretaries of State, the Interior, Commerce, and Homeland Security and the Administrator of the Environmental Protection Agency, in coordination with heads of other relevant executive departments and agencies, shall:

a. In cooperation with other nations, respond effectively to increased pollutants and other environmental challenges;

b. Continue to identify ways to conserve, protect, and sustainably manage Arctic species and ensure adequate enforcement presence to safeguard living marine resources, taking account of the changing ranges or distribution of some species in the Arctic. For species whose range includes areas both within and beyond United States jurisdiction, the United States shall continue to collaborate with other governments to ensure effective conservation and management;

c. Seek to develop ways to address changing and expanding commercial fisheries in the Arctic, including through consideration of international agreements or organizations to govern future Arctic fisheries;

d. Pursue marine ecosystem-based management in the Arctic; and

e. Intensify efforts to develop scientific information on the adverse effects of pollutants on human health and the environment and work with other nations to reduce the introduction of key pollutants into the Arctic.

IV. Resources and Assets

A. Implementing a number of the policy elements directed above will require appropriate resources and assets. These elements shall be implemented consistent with applicable law and authorities of agencies, or heads of agencies, vested by law, and subject to the availability of appropriations. The heads of executive departments and agencies with responsibilities relating to the Arctic region shall work to identify future budget, administrative, personnel, or legislative proposal requirements to implement the elements of this directive.

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[1] These policies and authorities include Freedom of Navigation (PDD/NSC-32), the U.S. Policy on Protecting the Ocean Environment (PDD/NSC-36), Maritime Security Policy (NSPD-41/HSPD-13), and the National Strategy for Maritime Security (NSMS).[343]

[343] Source for text: http://fas.org/irp/offdocs/nspd/nspd-66.htm. The text is also available at http://www.nsf.gov/od/opp/opp_advisory/briefings/may2009/nspd66_hspd25.pdf.

Appendix D. May 2013 National Strategy for Arctic Region

On May 10, 2013, the Obama Administration released a document entitled *National Strategy for the Arctic Region*.[344] The executive summary of the document is reprinted earlier in this report (see "May 2013 National Strategy for Arctic Region" in "Background"). This appendix reprints the main text of the document. The main text states the following:

Introduction

We seek an Arctic region that is stable and free of conflict, where nations act responsibly in a spirit of trust and cooperation, and where economic and energy resources are developed in a sustainable manner that also respects the fragile environment and the interests and cultures of indigenous peoples.

As the United States addresses these opportunities and challenges, we will be guided by our central interests in the Arctic region, which include providing for the security of the United States; protecting the free flow of resources and commerce; protecting the environment; addressing the needs of indigenous communities; and enabling scientific research. In protecting these interests, we draw from our long-standing policy and approach to the global maritime spaces in the 20th century, including freedom of navigation and overflight and other internationally lawful uses of the sea and airspace related to these freedoms; security on the oceans; maintaining strong relationships with allies and partners; and peaceful resolution of disputes without coercion.

To achieve this vision, the United States is establishing an overarching national approach to advance national security interests, pursue responsible stewardship of this precious and unique region, and serve as a basis for cooperation with other Arctic states[345] and the international community as a whole to advance common interests.

Even as we work domestically and internationally to minimize the effects of climate change, the effects are already apparent in the Arctic. Ocean resources are more readily accessible as sea ice diminishes, but thawing ground is threatening communities as well as hindering land-based activities, including access to resources. Diminishing land and sea ice is altering ecosystems and the services they provide. As an Arctic nation, the United States must be proactive and disciplined in addressing changing regional conditions and in developing adaptive strategies to protect its interests. An undisciplined approach to exploring new opportunities in this frontier could result in significant harm to the region, to our national security interests, and to the global good.

When implementing this strategy, the United States will proceed in a thoughtful, responsible manner that leverages expertise, resources, and cooperation from the State of Alaska, Alaska Natives, and stakeholders across the entire nation and throughout the international community. We will encourage and use science-informed decisionmaking to aid this effort. We will endeavor to do no harm to the sensitive environment or to Alaska native communities and other indigenous populations that rely on Arctic resources. Just as a common spirit and shared vision of peaceful partnership led to the development of an international space station, we believe much can be achieved in the Arctic region through

[344] *National Strategy for the Arctic Region*, May 2013, 11 pp.; accessed May 14, 2013, at https://obamawhitehouse.archives.gov/sites/default/files/docs/nat_arctic_strategy.pdf. The document includes a cover letter from President Obama dated May 10, 2013.

[345] A footnote in the document at this point states the following: "Arctic state is defined as one of the eight nations making up the permanent membership of the Arctic Council and includes the following nations: Canada, Denmark (including Greenland and the Faroe Islands), Finland, Iceland, Norway, Russia, Sweden, and the United States."

collaborative international efforts, coordinated investments, and public-private partnerships.

Structure of the Strategy

Through this National Strategy for the Arctic Region, we seek to guide, prioritize, and synchronize efforts to protect U.S. national and homeland security interests, promote responsible stewardship, and foster international cooperation.

This strategy articulates three priority lines of effort. It also identifies guiding principles as a foundation for Arctic region activities. Through a deliberate emphasis on the priority lines of effort and objectives, it aims to achieve a national unity of effort that is consistent with our domestic and international legal rights, obligations, and commitments and that is well coordinated with our Arctic neighbors and the international community. These lines of effort identify common themes where specific emphasis and activities will be focused to ensure that strategic priorities are met. The three lines of effort, as well as the guiding principles are meant to be acted upon as a coherent whole.

Changing Conditions

While the Arctic region has experienced warming and cooling cycles over millennia, the current warming trend is unlike anything previously recorded. The reduction in sea ice has been dramatic, abrupt, and unrelenting. The dense, multi-year ice is giving way to thin layers of seasonal ice, making more of the region navigable year-round. Scientific estimates of technically recoverable conventional oil and gas resources north of the Arctic Circle total approximately 13 percent of the world's undiscovered oil and 30 percent of the world's undiscovered gas deposits, as well as vast quantities of mineral resources, including rare earth elements, iron ore, and nickel.[346] These estimates have inspired fresh ideas for commercial initiatives and infrastructure development in the region. As portions of the Arctic Ocean become more navigable, there is increasing interest in the viability of the Northern Sea Route and other potential routes, including the Northwest Passage, as well as in development of Arctic resources.

For all of the opportunities emerging with the increasing accessibility and economic and strategic interests in the Arctic, the opening and rapid development of the Arctic region presents very real challenges. On the environmental front, reduced sea ice is having an immediate impact on indigenous populations as well as on fish and wildlife. Moreover, there may be potentially profound environmental consequences of continued ocean warming and Arctic ice melt. These consequences include altering the climate of lower latitudes, risking the stability of Greenland's ice sheet, and accelerating the thawing of the Arctic permafrost in which large quantities of methane – a potent driver of climate change – as well as pollutants such as mercury are stored. Uncoordinated development – and the consequent increase in pollution such as emissions of black carbon or other substances from fossil fuel combustion – could have unintended consequences on climate trends, fragile ecosystems, and Arctic communities. It is imperative that the United States proactively establish national priorities and objectives for the Arctic region.

Lines of Effort

To meet the challenges and opportunities in the Arctic region, and in furtherance of established Arctic Region Policy,[347] we will pursue the following lines of effort and

[346] A footnote in the document at this point states the following: "U.S. Geological Survey, "Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle," fact sheet, 2008, http://pubs.usgs.gov/fs/2008/3049/fs2008-3049.pdf."

[347] A footnote in the document at this point states the following: "National Security Presidential Directive-66/Homeland Security Presidential Directive-25, January 2009."

supporting objectives in a mutually reinforcing manner that incorporates the broad range of U.S. current activities and interests in the Arctic region.

1. Advance United States Security Interests

Our highest priority is to protect the American people, our sovereign territory and rights, natural resources, and interests of the United States. To this end, the United States will identify, develop, and maintain the capacity and capabilities necessary to promote safety, security, and stability in the region through a combination of independent action, bilateral initiatives, and multilateral cooperation. We acknowledge that the protection of our national security interests in the Arctic region must be undertaken with attention to environmental, cultural, and international considerations outlined throughout this strategy. As many nations across the world aspire to expand their role in the Arctic, we encourage Arctic and non-Arctic states to work collaboratively through appropriate fora to address the emerging challenges and opportunities in the Arctic region, while we remain vigilant to protect the security interests of the United States and our allies.

To accomplish this line of effort, the United States Government will seek to:

• **Evolve Arctic Infrastructure and Strategic Capabilities** – Working cooperatively with the State of Alaska, local, and tribal authorities, as well as public and private sector partners, we will develop, maintain, and exercise the capacity to execute Federal responsibilities in our Arctic waters, airspace, and coastal regions, including the capacity to respond to natural or man-made disasters. We will carefully tailor this regional infrastructure, as well as our response capacity, to the evolving human and commercial activity in the Arctic region.

• **Enhance Arctic Domain Awareness** – We seek to improve our awareness of activities, conditions, and trends in the Arctic region that may affect our safety, security, environmental, or commercial interests. The United States will endeavor to appropriately enhance sea, air, and space capabilities as Arctic conditions change, and to promote maritime-related information sharing with international, public, and private sector partners, to support implementation of activities such as the search-and-rescue agreement signed by Arctic states.

• **Preserve Arctic Region Freedom of the Seas** – The United States has a national interest in preserving all of the rights, freedoms, and uses of the sea and airspace recognized under international law. We will enable prosperity and safe transit by developing and maintaining sea, under-sea, and air assets and necessary infrastructure. In addition, the United States will support the enhancement of national defense, law enforcement, navigation safety, marine environment response, and search-and-rescue capabilities. Existing international law provides a comprehensive set of rules governing the rights, freedoms, and uses of the world's oceans and airspace, including the Arctic. The law recognizes these rights, freedoms, and uses for commercial and military vessels and aircraft. Within this framework, we shall further develop Arctic waterways management regimes, including traffic separation schemes, vessel tracking, and ship routing, in collaboration with partners. We will also encourage other nations to adhere to internationally accepted principles. This cooperation will facilitate strategic partnerships that promote innovative, low-cost solutions that enhance the Arctic marine transportation system and the safe, secure, efficient and free flow of trade.

• **Provide for Future United States Energy Security** – The Arctic region's energy resources factor into a core component of our national security strategy: energy security. The region holds sizable proved and potential oil and natural gas resources that will likely continue to provide valuable supplies to meet U.S. energy needs. Continuing to responsibly develop Arctic oil and gas resources aligns with the United States "all of the above" approach to developing new domestic energy sources, including renewables, expanding oil and gas production, and increasing efficiency and conservation efforts to reduce our

reliance on imported oil and strengthen our nation's energy security. Within the context of this broader energy security strategy, including our economic, environmental and climate policy objectives, we are committed to working with stakeholders, industry, and other Arctic states to explore the energy resource base, develop and implement best practices, and share experiences to enable the environmentally responsible production of oil and natural gas as well as renewable energy.

2. Pursue Responsible Arctic Region Stewardship

Responsible stewardship requires active conservation of resources, balanced management, and the application of scientific and traditional knowledge of physical and living environments. As Arctic environments change, increased human activity demands precaution, as well as greater knowledge to inform responsible decisions. Together, Arctic nations can responsibly meet new demands – including maintaining open sea lanes for global commerce and scientific research, charting and mapping, providing search-and-rescue services, and developing capabilities to prevent, contain, and respond to oil spills and accidents – by increasing knowledge and integrating Arctic management.[348] We must improve our ability to forecast future conditions in the Arctic while being mindful of the potential for unexpected developments.

To realize this line of effort, we will pursue the specific objectives outlined below:

• **Protect the Arctic Environment and Conserve Arctic Natural Resources** – Protecting the unique and changing environment of the Arctic is a central goal of U.S. policy. Supporting actions will promote healthy, sustainable, and resilient ecosystems over the long term, supporting a full range of ecosystem services. This effort will be risk-based and proceed on the basis of best available information. The United States in the Arctic will assess and monitor the status of ecosystems and the risks of climate change and other stressors to prepare for and respond effectively to environmental challenges.

• **Use Integrated Arctic Management to Balance Economic Development, Environmental Protection, and Cultural Values** – Natural resource management will be based on a comprehensive understanding of environmental and cultural sensitivities in the region, and address expectations for future infrastructure needs and other development-related trends. This endeavor can promote unity of effort and provide the basis for sensible infrastructure and other resource management decisions in the Arctic. We will emphasize science-informed decisionmaking and integration of economic, environmental, and cultural values. We will also advance coordination among Federal departments and agencies and collaboration with partners engaged in Arctic stewardship activities.

• **Increase Understanding of the Arctic through Scientific Research and Traditional Knowledge** – Proper stewardship of the Arctic requires understanding of how the environment is changing, and such understanding will be based on a holistic earth system approach. Vast areas of the Arctic Ocean are unexplored, and we lack much of the basic knowledge necessary to understand and address Arctic issues. The changes in the Arctic cannot be understood in isolation and must be viewed in a global context. As we learn more about the region, we have identified several key subcomponents of the Arctic that require

[348] A footnote in the document at this point states the following: "Much of this work is already underway including efforts under Executive Order 12501 (Arctic Research), Executive Order 13547 (Stewardship of the Ocean, Our Coasts, and the Great Lakes), and Executive Order 13580 (Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska). Entities under these Executive Orders are developing partnerships with Federal, state, local, tribal, territorial, public and private sector partners to ensure that natural resource decisions in the Arctic integrate economic, environmental, and cultural interests of the Nation."

The above-mentioned Executive Order 12501, which was issued January 28, 1985, implements The Arctic Research and Policy Act (ARPA) of 1984 (Title I of P.L. 98-373 of July 31, 1984) by, among other things, establishing the Arctic Research Commission and the Interagency Arctic Research Policy Committee. The text of Executive Order 12501 is available at http://www.archives.gov/federal-register/codification/executive-order/12501.html.

urgent attention: land ice and its role in changing sea level; sea-ice and its role in global climate, fostering biodiversity, and supporting Arctic peoples; and, the warming permafrost and its effects on infrastructure and climate. Better earth system-level knowledge will also help us meet operational needs such as weather and ice forecasting. We can make faster progress through a well-coordinated and transparent national and international exploration and research agenda that reduces the potential for duplication of effort and leads to better leveraging of resources.

• **Chart the Arctic region** – We will continue to make progress in charting and mapping the Arctic region's ocean and waterways, so long obscured by perennial ice, and mapping its coastal and interior lands according to reliable, modern standards. Given the vast expanse of territory and water to be charted and mapped, we will need to prioritize and synchronize charting efforts to make more effective use of resources and attain faster progress. In so doing, we will make navigation safer and contribute to the identification of ecologically sensitive areas and reserves of natural resources.

3. Strengthen International Cooperation

What happens in one part of the Arctic region can have significant implications for the interests of other Arctic states and the international community as a whole. The remote and complex operating conditions in the Arctic environment make the region well-suited for collaborative efforts by nations seeking to explore emerging opportunities while emphasizing ecological awareness and preservation. We will seek to strengthen partnerships through existing multilateral fora and legal frameworks dedicated to common Arctic issues. We will also pursue new arrangements for cooperating on issues of mutual interest or concern and addressing unique and unprecedented challenges, as appropriate.

U.S. efforts to strengthen international cooperation and partnerships will be pursued through four objectives:

• **Pursue Arrangements that Promote Shared Arctic State Prosperity, Protect the Arctic Environment, and Enhance Security** – We will seek opportunities to pursue efficient and effective joint ventures, based on shared values that leverage each Arctic state's strengths. This collaboration will assist in guiding investments and regional activities, addressing dynamic trends, and promoting sustainable development in the Arctic region.

Arctic nations have varied commercial, cultural, environmental, safety, and security concerns in the Arctic region. Nevertheless, our common interests make these nations ideal partners in the region. We seek new opportunities to advance our interests by proactive engagement with other Arctic nations through bilateral and multilateral efforts using of a wide array of existing multilateral mechanisms that have responsibilities relating to the Arctic region.

As appropriate, we will work with other Arctic nations to develop new coordination mechanisms to keep the Arctic region prosperous, environmentally sustainable, operationally safe, secure, and free of conflict, and will protect U.S., allied, and regional security and economic interests.

• **Work through the Arctic Council to Advance U.S. Interests in the Arctic Region** – In recent years, the Arctic Council has facilitated notable achievements in the promotion of cooperation, coordination, and interaction among Arctic states and Arctic indigenous peoples. Recent successes of the Council include its advancement of public safety and environmental protection issues, as evidenced by the 2011 Arctic Search-and-Rescue Agreement and by the 2013 Arctic Marine Oil Pollution Preparedness and Response Agreement. The United States will continue to emphasize the Arctic Council as a forum for facilitating Arctic states' cooperation on myriad issues of mutual interest within its current mandate.

• **Accede to the Law of the Sea Convention** – Accession to the Convention would protect U.S. rights, freedoms, and uses of the sea and airspace throughout the Arctic region, and strengthen our arguments for freedom of navigation and overflight through the Northwest Passage and the Northern Sea Route. The United States is the only Arctic state that is not party to the Convention. Only by joining the Convention can we maximize legal certainty and best secure international recognition of our sovereign rights with respect to the U.S. extended continental shelf in the Arctic and elsewhere, which may hold vast oil, gas, and other resources. Our extended continental shelf claim in the Arctic region could extend more than 600 nautical miles from the north coast of Alaska.

In instances where the maritime zones of coastal nations overlap, Arctic states have already begun the process of negotiating and concluding maritime boundary agreements, consistent with the Law of the Sea Convention and other relevant international law. The United States supports peaceful management and resolution of disputes, in a manner free from coercion. While the United States is not currently a party to the Convention, we will continue to support and observe principles of established customary international law reflected in the Convention.

• **Cooperate with other Interested Parties** – A growing number of non-Arctic states and numerous non-state actors have expressed increased interest in the Arctic region. The United States and other Arctic nations should seek to work with other states and entities to advance common objectives in the Arctic region in a manner that protects Arctic states' national interests and resources. One key example relates to the promotion of safe, secure, and reliable Arctic shipping, a goal that is best pursued through the International Maritime Organization in coordination with other Arctic states, major shipping states, the shipping industry and other relevant interests.

Guiding Principles

The U.S. approach to the Arctic region must reflect our values as a nation and as a member of the global community. We will approach holistically our interests in promoting safety and security, advancing economic and energy development, protecting the environment, addressing climate change and respecting the needs of indigenous communities and Arctic state interests. To guide our efforts, we have identified the following principles to serve as the foundation for U.S. Arctic engagement and activities.

• **Safeguard Peace and Stability** by working to maintain and preserve the Arctic region as an area free of conflict, acting in concert with allies, partners, and other interested parties. This principle will include United States action, and the actions of other interested countries, in supporting and preserving international legal principles of freedom of navigation and overflight and other uses of the sea related to these freedoms, unimpeded lawful commerce, and the peaceful resolution of disputes. The United States will rely on existing international law, which provides a comprehensive set of rules governing the rights, freedoms, and uses of the world's oceans and airspace, including the Arctic.

• **Make Decisions Using the Best Available Information** by promptly sharing – nationally and internationally – the most current understanding and forecasts based on up-to-date science and traditional knowledge.

• **Pursue Innovative Arrangements** to support the investments in scientific research, marine transportation infrastructure requirements, and other support capability and capacity needs in this region. The harshness of the Arctic climate and the complexity associated with developing, maintaining, and operating infrastructure and capabilities in the region necessitate new thinking on public-private and multinational partnerships.

• **Consult and Coordinate with Alaska Natives** consistent with tribal consultation policy established by Executive Order.[349] This policy emphasizes trust, respect, and shared responsibility. It articulates that tribal governments have a unique legal relationship with the United States and requires Federal departments and agencies to provide for meaningful and timely input by tribal officials in development of regulatory policies that have tribal implications. This guiding principle is also consistent with the Alaska Federation of Natives Guidelines for Research.[350]

Conclusion

We seek a collaborative and innovative approach to manage a rapidly changing region. We must advance U.S. national security interests, pursue responsible stewardship, and strengthen international collaboration and cooperation, as we work to meet the challenges of rapid climate-driven environmental change. The melting of Arctic ice has the potential to transform global climate and ecosystems as well as global shipping, energy markets, and other commercial interests. To address these challenges and opportunities, we will align Federal activities in accordance with this strategy; partner with the State of Alaska, local, and tribal entities; and work with other Arctic nations to develop complementary approaches to shared challenges. We will proactively coordinate regional development. Our economic development and environmental stewardship must go hand-in-hand. The unique Arctic environment will require a commitment by the United States to make judicious, coordinated infrastructure investment decisions, informed by science. To meet this challenge, we will need bold, innovative thinking that embraces and generates new and creative public-private and multinational cooperative models.[351]

[349] A footnote in the document at this point states the following: "See Executive Order 13175 – Consultation and Coordination with Indian Tribal Governments, November 2000."

[350] A footnote in the document at this point states the following: "Alaska Federation of Natives (AFN) (1996) *AFN Board Adopts Policy Guidelines for Research*. AFN, Anchorage. Alaska Natives Knowledge Network. Policy adopted in 1993, http://ankn.uaf.edu/IKS/afnguide.html."

[351] *National Strategy for the Arctic Region*, May 2013, pp. 4-11.

Appendix E. Obama Administration Statement Regarding U.S. Chairmanship of Arctic Council

This appendix presents the text of a statement from the Obama Administration regarding the two-year period of U.S. chairmanship of the Arctic Council that began in April 2015. The text of the statement is as follows:

> Given the increased strategic importance of the region, the next two years offers the United States an unprecedented opportunity to make significant progress on our Arctic policy objectives, which were first laid out in the National Strategy for the Arctic Region released by the White House in May 2013 and followed by an Implementation Plan in January 2014.
>
> The U.S. will be chairing the Arctic Council at a crucial moment when the effects of climate change are bringing a myriad of new environmental, human and economic opportunities and challenges to the Arctic. During the U.S. Chairmanship, the State Department will focus the Arctic work it carries out through the Arctic Council, various international scientific cooperation mechanisms and, in some cases, domestic initiatives led by U.S. states or other U.S. government agencies. The three thematic areas of the U.S. Chairmanship are: improving economic and living conditions in Arctic communities; Arctic Ocean safety, security and stewardship; and addressing the impacts of climate change. The theme of the U.S. Chairmanship of the Arctic Council is "One Arctic: Shared Opportunities, Challenges and Responsibilities," which recognizes the peaceful and stable nature of the Arctic. The U.S. chairmanship will conclude in spring 2017 with a Ministerial meeting in Alaska, at which point the United States will hand the chairmanship to Finland.
>
> To guide U.S. engagement on the Arctic during this crucial period, U.S. Secretary of State John Kerry appointed the former Commandant of the U.S. Coast Guard, Admiral Robert J. Papp, Jr., as the first-ever U.S. Special Representative for the Arctic in July 2014.
>
> The U.S. has developed an ambitious and balanced program for its Arctic Council Chairmanship that focuses on three crucial areas: improving economic and living conditions; Arctic Ocean safety, security and stewardship; and addressing the impacts of climate change.
>
> **1. Improving Economic and Living Conditions in Arctic Communities**
>
> Remote Arctic communities face a number of threats to the health and well-being of their citizens, including food and water security, safe water, sewer and sanitation, affordable and renewable energy, adequate mental health services, and the need to ensure the continued economic viability of their communities.
>
> Our work in this area will aim to:
>
> —Promote the development of **renewable energy** technology, such as modular micro-grid systems, to spur public-private partnerships and improve energy affordability;
>
> —Provide a better understanding of **freshwater security** in the Arctic, including through the creation of a Water Resources Vulnerability Index;
>
> —Coordinate an Arctic-wide **telecommunications infrastructure assessment** to promote the build-out of commercial infrastructure in the region;
>
> —Support **mental wellness**, including suicide prevention and resilience;
>
> —Harness the expertise and resources of the **Arctic Economic Council** to inform the Arctic Council's work on economic and living conditions;
>
> —Mitigate public health risks and reduce **black carbon output** in Arctic communities;

—Promote better **community sanitation and public health** by facilitation collaboration between industry, researchers and public policy experts to increase access to and reduce the operating costs of in-home running water and sewer in remote communities.

2. Arctic Ocean Safety, Security and Stewardship

The acceleration of maritime activity in the Arctic increases risk in an already harsh and challenging environment. U.S. Chairmanship priorities include building upon existing preparedness and response programs; enhancing the ability of Arctic states to execute their search and rescue responsibilities; and emphasizing safe, secure, and environmentally sound shipping as a matter of high priority. To ensure that future maritime development avoids negative impacts, particularly in areas of ecological and cultural significance, the Arctic Council is also continuing its work towards a network of marine protected areas and enhanced international cooperation in the Arctic Ocean. Ocean acidification is one of the most urgent issues facing the world's ocean today and the Arctic Council is responding by supporting research to improve the capability to monitor and track acidification in the Arctic Ocean.

Our work in this area will aim to:

—Better prepare those responsible to better address **search and rescue** challenges in the Arctic;

—Ensure marine environmental protection, including working toward the establishment of a network of **marine protected areas**;

—Explore the creation of a **Regional Seas Program** of the Arctic Ocean;

—Create a better understanding of **Arctic Ocean acidification** and its effects on Arctic organisms and the economies that rely on them;

—Encourage all parties take the steps necessary to allow for the proper implementation of the **Agreement on Cooperation on Marine Oil Pollution, Preparedness and response in the Arctic**.

3. Addressing the Impacts of Climate Change

The impacts of climate change affect the Arctic and the many people, wildlife, and plants that depend on the region for survival. The United States recognizes that we need to reduce black carbon (soot) and methane emissions, which disproportionally impact the Arctic. The Arctic Council is addressing the impacts of climate change by facilitating cooperation on action to reduce black carbon and methane emissions. Arctic Council activities to enhance access to adaptation and resilience tools, and promote the development of climate change indicators and high-resolution mapping are also priorities of the U.S. chairmanship that will increase scientists', communities', policymakers' and the public's understanding of the impacts of climate change.

Our work in this area will aim to:

—Target **short-lived climate pollutants** through reductions in black carbon and methane emissions;

—Support **Arctic climate adaptation and resilience** efforts including the creation of an Early Warning Indicator System;

—Create a **Pan-Arctic Digital Elevation Map** that will increase our understanding of the impacts of climate change on shorelines and surface areas in the Arctic.[352]

[352] "U.S. Chairmanship of the Arctic Council, One Arctic: Shared Opportunities, Challenges, and Responsibilities," accessed September 29, 2015, at http://www.state.gov/e/oes/ocns/opa/arc/uschair/index.htm. Emphasis as in original.

Author Information

Ronald O'Rourke, Coordinator
Specialist in Naval Affairs

Laura B. Comay
Analyst in Natural Resources

Peter Folger
Specialist in Energy and Natural Resources Policy

John Frittelli
Specialist in Transportation Policy

Marc Humphries
Specialist in Energy Policy

Jane A. Leggett
Specialist in Energy and Environmental Policy

Jonathan L. Ramseur
Specialist in Environmental Policy

Pervaze A. Sheikh
Specialist in Natural Resources Policy

Harold F. Upton
Analyst in Natural Resources Policy

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See also: Arctic Council chairmanship brochure, accessed September 29, 2015, at http://www.state.gov/documents/organization/241186.pdf, and Statement of Admiral Robert J. Papp Jr., Special Representative for the Arctic, U.S. Department of State, before the Committee on Energy and Natural Resources, U.S. Senate, March 5, 2015, pp. 4-6; Department of State, "Chairmanship Projects," October 29, 2015, accessed November 25, 2015, at http://www.state.gov/e/oes/ocns/opa/arc/uschair/248957.htm; Statement of Admiral Robert J. Papp Jr., Special Representative for the Arctic, U.S. Department of State, Before the Committee on Foreign Affairs, Subcommittees on Europe, Eurasia, and Emerging Threats, and Western Hemisphere, U.S. House of Representatives, November 17, 2015, pp. 4-7. See also Yereth Rosen, "US Pushes Ambitious Goals As Arctic Council Convenes in Anchorage," *Alaska Dispatch News*, October 19, 2015; Jeannette Lee Falsey, "In Anchorage, U.S. Holds First Meeting As chair of Arctic Council," *Alaska Dispatch News*, October 23, 2015; Monica Gokey, "Arctic Council Concludes 1st Meeting Under US Chairmanship," *Alaska Public Media*, October 23, 2015; Eilis Quinn, "Arctic Council Talks Climate, COP21, Suicide in North," *Radio Canada International*, October 23, 2015.