



June 2015

# 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

Accessible Version

# GAO Highlights

Highlights of [GAO-15-566](#), a report to congressional committees

## Why GAO Did This Study

Decreasing seasonal sea ice in the Arctic has made some Arctic waters navigable for longer periods and, as a result, may contribute to new economic opportunities in commercial shipping, oil exploration, and tourism. This could eventually increase the need for a U.S. military and homeland security presence in the Arctic, particularly in the maritime environment.

House Report 113-446, which accompanied a bill for the National Defense Authorization Act for Fiscal Year 2015, included a provision that GAO review DOD's Arctic capabilities.

This report discusses (1) the role of DOD in the Arctic based on recent strategic guidance and its assessment of the security environment in the region, (2) the actions taken by DOD to address near-term capability needs, and (3) the efforts DOD has under way to update plans for the Arctic and identify future capability needs.

GAO reviewed national, DOD, military service, and combatant command strategies; reviewed studies on near-term capabilities needed and examined efforts initiated to address those needs based on supporting documentation; reviewed Northern Command's regional plans that cover the Arctic and identified ongoing planning activities; and interviewed agency officials. GAO also issued a classified version of this report in June 2015 that includes details on the Arctic's security environment.

GAO is not making any recommendations in this report. DOD provided written technical comments, which we incorporated into the report as appropriate.

View [GAO-15-566](#). For more information, contact John Pendleton at (202) 512-3489 or [pendletonj@gao.gov](mailto:pendletonj@gao.gov)

June 2015

## 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

## What GAO Found

Recent strategic guidance on the Arctic issued by the 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 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 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.

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## Abbreviations

ARPA	Arctic Research and Policy Act of 1984
CG-5PW-D	Coast Guard Office of Marine Transportation Management
DHS	Department of Homeland Security
DOD	Department of Defense
Implementation Plan	Implementation Plan for the National Strategy for the Arctic Region
National Strategy	National Strategy for the Arctic Region
Northern Command J531	Northern Command Concepts and Initiatives Branch
Northern Command J8	Northern Command Director of Requirements, Analysis, and Resources
OPNAV N512	Navy Policy and Global Posture
Roadmap	Navy Arctic Roadmap 2014-2030

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June 19, 2015

Congressional Committees

The recent retreat of polar sea ice in the Arctic, combined with an expected increase in human activity there, has heightened the United States' and other nations' interests in the Arctic region. The United States, with the state of Alaska extending above the Arctic Circle, is one of eight Arctic nations.<sup>1</sup> Diminishing sea ice has made some Arctic waters navigable for longer periods and, as a result, may contribute to new economic opportunities in commercial shipping, oil and gas exploration, tourism, and commercial fishing. This could eventually increase the need for a U.S. military and homeland security presence in the Arctic. While the changing environment may create opportunities, operating in the Arctic region will continue to provide a number of challenges, including harsh and unpredictable weather, vast distances, and limited infrastructure.

In November 2013, the Department of Defense (DOD) issued its Arctic Strategy, which calls for 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. The strategy reflects the relatively low level of military threat in the Arctic and the stated commitment of the Arctic nations to work within a common framework of diplomatic engagement. It also identifies a number of investments that will need to be made over time as activity in the region increases, but the strategy states that desired investments in Arctic capabilities may not compete successfully against other requirements in the department's budget priorities.

We have previously examined emerging issues and challenges for the United States in the Arctic. In 2012 we assessed DOD's efforts to prioritize the capabilities needed to meet national security objectives in

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<sup>1</sup>The Arctic Circle latitude is 66° 33' 44" N. The eight Arctic nations are Canada, the Kingdom of Denmark (Denmark), Finland, Iceland, Norway, the Russian Federation (Russia), Sweden, and the United States. Of the eight Arctic nations, five border the Arctic Ocean: Canada, Denmark (on behalf of Greenland), Norway, Russia, and the United States.

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the Arctic.<sup>2</sup> We found that DOD had undertaken some efforts to assess capabilities needed in the Arctic, but it was unclear whether DOD would be in a position to provide needed capabilities in a timely and efficient manner. We recommended that DOD develop a risk-based investment strategy and timeline for developing Arctic capabilities needed in the near term and establish a forum with the U.S. Coast Guard to identify collaborative Arctic capability investments over the long term. In response, DOD took steps to identify and prioritize near-term Arctic capability needs, developed a timeline for addressing those needs, updated its investment plan, and established several collaborative forums with the Coast Guard. Additionally, in March 2014, we examined U.S. Arctic maritime infrastructure and the actions taken by federal, state, and local stakeholders to plan for future Arctic maritime infrastructure investments.<sup>3</sup> We found that commercial U.S. Arctic maritime activities are expected to be limited for the next 10 years, according to industry representatives. Although activity will likely be limited, federal, state, and local stakeholders have taken some actions to plan for future maritime-infrastructure investments. For example, the National Oceanic and Atmospheric Administration and the Alaska government are working to improve mapping, charting, and weather information for the U.S. Arctic. In 2013, we added the federal government's efforts to manage its fiscal exposure to the effects of climate change to our High-Risk List, noting that the federal government's role as a property owner exposes it to significant risk.<sup>4</sup> We include a list of related GAO products at the end of this report.

House Report 113-446,<sup>5</sup> which accompanied a bill for the National Defense Authorization Act for Fiscal Year 2015, included a provision that GAO review DOD's Arctic capabilities. This report discusses (1) the role DOD expects to play in the Arctic based on recent strategic guidance and its assessment of the security environment in the region; (2) the actions, if any, DOD has taken to address near-term capability needs; and (3) the

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<sup>2</sup>GAO, *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](#) (Washington, D.C.: Jan. 13, 2012).

<sup>3</sup>GAO, *Maritime Infrastructure: Key Issues Related to Commercial Activity in the U.S. Arctic over the Next Decade*, [GAO-14-299](#) (Washington, D.C.: Mar. 19, 2014).

<sup>4</sup>GAO, *High-Risk Series: An Update*, [GAO-13-283](#) (Washington, D.C.: February 2013).

<sup>5</sup>H.R. Rep. No. 113-446, at 123-124 (May 13, 2014), accompanying H.R. 4435.

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efforts DOD has under way to update plans for the Arctic and identify future capability needs. In addition, we report on DOD's efforts to collaborate with the Coast Guard in the Arctic since our January 2012 report in appendix I.<sup>6</sup> We also issued a classified version of this report in June 2015. That version includes an additional appendix, which provides a discussion of the Arctic's security environment.

In this report, we use the term Arctic to mean the areas as defined by the Arctic Research and Policy Act of 1984 (ARPA).<sup>7</sup> We focused our review on DOD's role in the Arctic as outlined in national and DOD strategic guidance and on the Navy because the changes in the Arctic primarily affect the maritime environment and the opening of the Arctic Ocean may affect the service's role and capability needs. Further, we focused on U.S. Northern Command as the command with primary responsibility for advocating for Arctic capabilities due to it having the only U.S. Arctic territory within its area of responsibility.<sup>8</sup>

To identify what role DOD expects to play in the Arctic based on recent strategic guidance and its assessment of the security environment in the region, we reviewed national, DOD, military service, and combatant command strategies and guidance that have been developed on the Arctic including the 2013 National Strategy for the Arctic Region, DOD's November 2013 Arctic Strategy, and the U.S. Navy's February 2014 Arctic Roadmap for 2014-2030, among others. To determine what actions, if any, DOD has taken to address near-term capability needs, we reviewed supporting documentation and testimonial evidence from DOD and Coast Guard officials and grouped actions initiated by DOD since our January 2012 report into the four capability areas established in the DOD and Department of Homeland Security (DHS) Arctic Capability

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<sup>6</sup>[GAO-12-180](#).

<sup>7</sup>Pub. L. No. 98-373 (1984) (codified at 15 U.S.C. § 4111). ARPA defines the Arctic as 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 island chain.

<sup>8</sup>Each of DOD's six geographic combatant commands has defined areas of operation and a distinct regional military focus. The five other geographic combatant commands are U.S. Africa Command, U.S. Central Command, U.S. European Command, U.S. Pacific Command, and U.S. Southern Command.

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Assessment Working Group White Paper.<sup>9</sup> To determine what efforts DOD has under way to update plans for the Arctic and identify future capability needs, we reviewed Northern Command's regional plans that cover the Arctic and interviewed officials to identify ongoing planning activities and analysis being conducted to determine future capability needs. Additionally, we reviewed observed sea ice levels from the National Snow and Ice Data Center and information on Arctic sea ice trends from various organizations and examined assessments of commercial and military activity in the Arctic region produced by departments and agencies with responsibilities for Arctic awareness.<sup>10</sup> We also interviewed DOD and Coast Guard officials to determine their collaboration to align Arctic initiatives and compared these activities with leading practices in collaboration.<sup>11</sup> For all of our objectives, we interviewed officials from the Office of the Secretary of Defense; Office of the Chairman of the Joint Chiefs of Staff; U.S. Northern Command and the North American Aerospace Defense Command; U.S. European Command, U.S. Pacific Command; and U.S. Army, Navy, Air Force, Marine Corps, and Coast Guard offices with Arctic responsibility. Further details on our scope and methodology can be found in appendix II.

We conducted this performance audit from July 2014 to June 2015 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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<sup>9</sup>[GAO-12-180](#).

<sup>10</sup>We did not validate the underlying data used in DOD's models and predictions.

<sup>11</sup>GAO, *Managing For Results: Key Considerations for Implementing Interagency Collaborative Mechanisms*, [GAO-12-1022](#) (Washington, D.C.: Sept. 27, 2012); and *Managing for Results: Implementation Approaches Used to Enhance Collaboration in Interagency Groups*, [GAO-14-220](#) (Washington, D.C.: Feb. 14, 2014).



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## Background

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### Diminishing Ice Opens Potential for Increased Human Activity in the Arctic

Scientific research on and projections of the changes taking place in the Arctic vary, but there is a general consensus that the Arctic is warming and sea ice is diminishing.<sup>12</sup> Scientists at the U.S. National Snow and Ice Data Center reported that the annual Arctic minimum sea ice extent—which typically occurs in September each year—for 2014 was the sixth lowest in the satellite record and 479,000 square miles less than the 1981 to 2010 average (see fig. 1).<sup>13</sup> Further, the 10 lowest September ice extents on satellite record have all occurred in the last 10 years. While much of the Arctic Ocean remains ice-covered for a majority of the year, most scientific estimates predict there will be an ice-diminished Arctic Ocean in the summer sometime in the next 20 to 40 years.<sup>14</sup>

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<sup>12</sup>Average temperatures in the Arctic have increased at a rate almost twice that of the rest of the world.

<sup>13</sup>App. III provides a noninteractive version of fig. 1.

<sup>14</sup>A joint Coast Guard/U.S. Navy statement on Arctic ice terminology supports usage of the term “ice-diminished” rather than “ice-free” because both agencies recognize that the region will continue to remain ice-covered during the wintertime through the end of this century. The term “ice-free” means that no ice of any kind is present. The term “ice-diminished” refers to sea ice concentrations of up to 15 percent ice in the area.

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**Figure 1: Change in Summer Minimum Ice Extent from 2004 to 2014, Compared with the 1981 to 2010 Median Minimum Ice Extent**

Interactive map graphic. Refer to Appendix III for the printable, non-interactive version.

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These environmental changes in the Arctic are making maritime transit more feasible and are increasing the likelihood of further expansion of human activity including commercial shipping and oil and gas extraction. For example, most commercial ship activity in the U.S. Arctic is currently destination—shipping into or out of the Arctic, mainly in support of commercial activity. However, melting ice could potentially increase the use of three trans-Arctic routes, the Northern Sea Route, Northwest Passage, and Transpolar Route, saving several thousands of miles and several days of sailing between major trading blocs. See figure 2 for locations of these shipping routes. Additionally, estimates of significant oil, gas, and mineral deposits in the Arctic have increased interest in exploration opportunities in the region. These resources include an estimated 13 percent of the world’s undiscovered oil, 30 percent of undiscovered gas, and some \$1 trillion worth of minerals including gold, zinc, nickel, and platinum.

Figure 2: Trans-Arctic Sea Routes



- Northern Sea Route
- Northwest Passage
- Transpolar Route

Sources: Office of Naval Intelligence; GAO; and Map Resources (map). | GAO-15-566

Despite the changing climate and growing interest in the region, several enduring characteristics still provide challenges to surface navigation in the Arctic, including large amounts of winter ice and increased movement of ice from spring to fall. Increased movement of sea ice makes its

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location less predictable, a situation that is likely to increase the risk for ships to become trapped or damaged by ice impacts.<sup>15</sup>

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## National Strategic Guidance Shapes DOD's and Other Stakeholders' Operations in the Arctic

Key strategic guidance details the United States' national security objectives and shapes DOD's and other stakeholders' operations in the Arctic. The administration issued National Security Presidential Directive 66 in January 2009, which establishes U.S. policy with respect to the Arctic region and tasks senior officials, including the Secretaries of Defense and Homeland Security, with its implementation.<sup>16</sup> This directive identifies specific U.S. national security and homeland security interests in the Arctic, including missile defense and early warning; deployment of sea and air systems for strategic sealift, maritime presence, and security operations; and ensuring freedom of navigation and overflight. To further the interests of the Arctic Region Policy, in May 2013 the president issued the National Strategy for the Arctic Region (National Strategy). This document articulates the administration's strategic priorities for the Arctic region and includes lines of effort related to (1) advancing U.S. security interests, (2) pursuing responsible Arctic region stewardship, and (3) strengthening international cooperation. It prioritizes lines of effort for federal agencies and builds upon existing initiatives by federal, state, local, and tribal authorities; the private sector; and international partners. Additionally, the administration released the Implementation Plan for the National Strategy for the Arctic Region (Implementation Plan) in January 2014, which sets forth the methodology, process, and approach for executing the strategy, including a framework to guide federal activities in the region. Finally, since the Arctic region is primarily a maritime domain, existing U.S. strategic guidance relating to maritime areas continues to apply, such as National Presidential Directive 41 issued by the president

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<sup>15</sup>These challenges are noted in the U.S. Coast Guard's *High Latitude Study*, which the Coast Guard provided to Congress in July 2011.

<sup>16</sup>White House, National Security Presidential Directive/NSPD-66 and Homeland Security Presidential Directive/HSPD-25, *Arctic Region Policy* (Jan. 9, 2009).

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in December 2004 and the National Ocean Policy Implementation Plan issued by the administration's National Ocean Council in April 2013.<sup>17</sup>

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## Multiple Federal Stakeholders Have Arctic Roles and Responsibilities

DOD is responsible in the Arctic and elsewhere for securing the United States from direct attack, securing strategic access and retaining global freedom of action, strengthening existing and emerging alliances and partnerships, and establishing favorable security conditions. As the maritime component of DOD, the Department of the Navy has global leadership responsibilities to provide ready forces for current operations and contingency response that include the Arctic Ocean. Additionally, U.S. Northern Command has primary responsibility for advocating for Arctic capabilities due to the command having the only U.S. Arctic territory within its area of responsibility. In this role, Northern Command is responsible for collaborating with the relevant combatant commands, Joint Staff, services, and defense agencies to identify and prioritize emerging Arctic capability needs and requirements. U.S. European Command and U.S. Pacific Command also play a role by fostering collaborative working relationships with partners in the Arctic. Further, the North American Aerospace Defense Command provides aerospace warning and control and maritime warning in the Arctic and will continue to play a role in DOD's ability to meet national security challenges in the region.<sup>18</sup>

Since the Arctic is primarily a maritime domain, the Coast Guard plays a significant role in Arctic policy implementation and enforcement. The Coast Guard is a multimission, maritime uniformed military service

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<sup>17</sup>White House, National Strategy for Maritime Security and National Security Presidential Directive 41 / Homeland Security Presidential Directive 13, *Maritime Security Policy* (Dec. 21, 2004). National Ocean Council, *National Ocean Policy Implementation Plan* (Washington, D.C.: April 2013). A *National Policy for the Stewardship of the Ocean, Our Coasts, and the Great Lakes* and the National Ocean Council were established by Executive Order 13547 on July 19, 2010. The council consists of 27 federal agencies, departments, and offices. The *National Ocean Policy Implementation Plan* was created to translate the *National Policy for the Stewardship of the Ocean, Our Coasts, and the Great Lakes* into actions.

<sup>18</sup>The North American Aerospace Defense Command is a binational U.S. and Canadian command established in 1958.

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typically within the Department of Homeland Security<sup>19</sup> that has responsibilities including maritime safety, security, environmental protection, and national defense, among other missions. Therefore, as more navigable ocean water emerges in the Arctic and human activity increases there, the Coast Guard will likely face expanding responsibilities in the region.<sup>20</sup>

In addition to DOD and the Coast Guard, a number of other federal departments and agencies, as well as interagency working groups, have Arctic responsibilities, ranging from scientific research to resource development, as shown in figure 3.<sup>21</sup>

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<sup>19</sup>Pursuant to section 3 of Title 14 of the United States Code, the Coast Guard is a service in the Department of Homeland Security, except when operating as a service in the Navy. The Coast Guard may be transferred to the Navy by the Congress in a declaration of war, or by Presidential direction.

<sup>20</sup>GAO is conducting a review of the Coast Guard's May 2013 *Arctic Strategy* and is expected to issue results early next year.

<sup>21</sup>App. IV provides a noninteractive version of fig. 3.

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**Figure 3: Federal Stakeholders and Interagency Working Groups with Arctic Responsibilities**

Interactive diagram. Refer to Appendix VI for accessible version.



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## DOD Expects to Play a Supporting Role to Other Federal Agencies Involved in the Arctic Based on a Low Level of Military Threat and Is Monitoring the Security Environment for Changes

Recent strategic guidance on the Arctic establishes a supporting role for DOD relative to other federal agencies, based on a low level of military threat expected in the region. However, DOD continues to monitor the security environment in the region and is tracking indicators that, depending on the outcomes, could change its threat assessment and affect the department's future role.

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## DOD Expects to Play a Supporting Role in the Arctic Based on a Low Level of Military Threat

In January 2014, the administration issued its Implementation Plan for the National Strategy that outlines 36 activities and identifies the lead and supporting agencies responsible for each implementation activity. DOD was designated as a supporting agency for 22 of the 36 activities in the plan, such as activities related to supporting aviation requirements, led by the Federal Aviation Administration, and sustaining federal capability to conduct maritime operations in ice-impacted waters, led by DHS. DOD was designated as the lead agency for one activity: to develop a framework of observations and modeling to support forecasting and prediction of sea ice. We discuss ongoing actions related to this activity later in this report.

Between the release of the National Strategy in May 2013 and the Implementation Plan in January 2014, DOD issued its Arctic Strategy in November 2013.<sup>22</sup> The strategy establishes the department's strategic approach to the Arctic and identifies the timeframes to be used for planning: near-term (present–2020), mid-term (2020–2030), and far-term (beyond 2030). The Arctic Strategy emphasizes that as sea ice diminishes and the Arctic opens to more activity, DOD may have an increased role supporting other federal agencies in the region. For example, DOD may

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<sup>22</sup>Department of Defense, *Arctic Strategy* (Washington, D.C.: November 2013).

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support the Coast Guard in safety-related missions or the Federal Emergency Management Agency in disaster relief and mitigation efforts. The Arctic Strategy notes that DOD has seldom been tasked to execute these missions in the Arctic, but it may be asked to do more in the coming decades given the expected increase in activity in the region.

DOD's determination of its supporting role in the Arctic is based on its assessment of a low level of military threat in the region. The Arctic Strategy states, for example, that there is a willingness and an ability among the Arctic nations to manage and resolve disputes through an established international framework. This framework is based on a commitment between the five nations bordering the Arctic Ocean (the United States, Russia, Canada, Norway, and Denmark on behalf of Greenland) to the international legal framework governing the sea, and to the orderly settlement of any possible overlapping territorial claims. Also, the Arctic Council serves as a voluntary intergovernmental forum that provides a means for promoting cooperation, coordination, and interaction among stakeholders with interests in the region, although the Council omits matters related to military security. In 2014, we assessed U.S. involvement in the Arctic Council and provided recommendations to help clarify the direction of future U.S. participation and to position the United States for a successful Arctic Council chairmanship beginning in 2015.<sup>23</sup>

To further its supporting role in the Arctic, the Arctic Strategy states that DOD plans to continue to build interagency and international partnerships to meet security and defense commitments. The department currently participates in a number of activities intended to prevent conflict and enhance the region's capability and capacity for multilateral security collaboration. For example, while the Arctic Council charter expressly

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<sup>23</sup>GAO, *Arctic Issues: Better Direction and Management of Voluntary Recommendations Could Enhance U.S. Arctic Council Participation*, [GAO-14-435](#) (Washington, D.C.: May 16, 2014). In that report we found that in collaborating on Arctic Council work, the federal agencies that participate in the council's working groups and task forces faced challenges from not having a clear direction or specific resources for their work. Additionally, we found that the Department of State did not review or track progress made on actions in response to the council's voluntary recommendations. We recommended that the Department of State work with relevant agencies to develop a strategy identifying direction for agency council participation and resource needs; develop a process to review and track progress on recommendations; and work with other Arctic nations to develop guidelines for clear and prioritized recommendations. The Department of State agreed with our recommendations. However, it has not yet acted to implement these recommendations.

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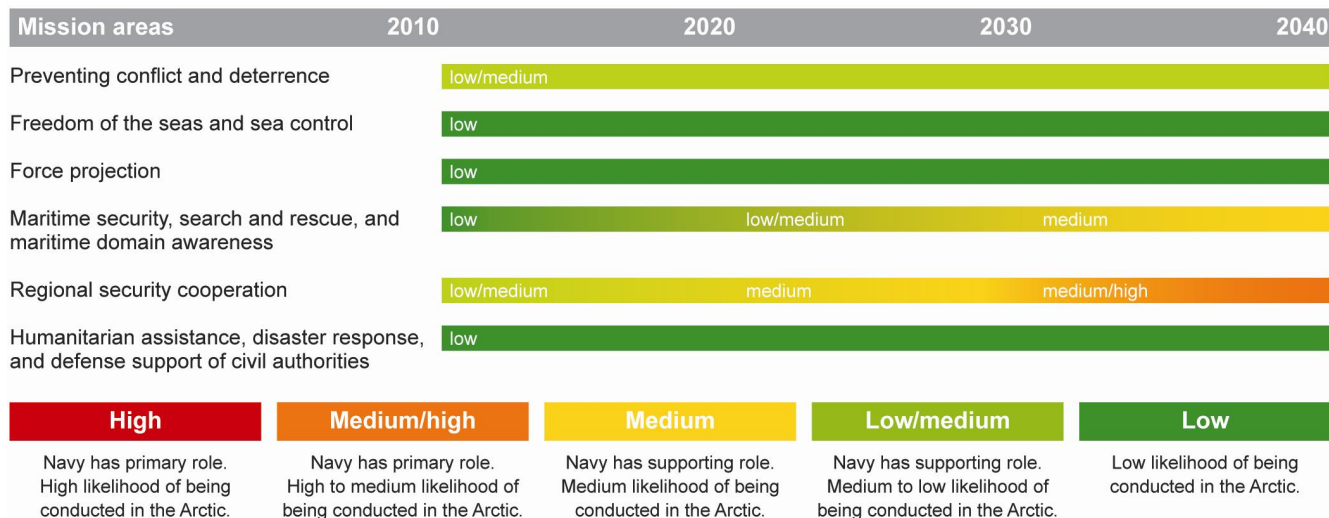
omitted matters related to military security, DOD participates in a number of international forums focused on military security cooperation. This includes the Arctic Security Forces Roundtable, an annual collaborative forum cohosted by DOD and the Norwegian Ministry of Defence. This senior-level event is aimed at building confidence and encouraging discussion of the Arctic among the security forces of Arctic and non-Arctic nations. The most recent event was held in May 2015 and included representatives from 11 countries—seven Arctic nations, as well as France, Germany, the Netherlands, and the United Kingdom. Issues discussed, among others, included the effects of climate change on the region, search and rescue operations, and disaster relief. Additionally, DOD participates in the Northern Chiefs of Defense conference—a meeting among the defense leaders of the Arctic nations to discuss emerging security issues in the region and ways they can work together to address them. The most recent meeting was held in June 2013 and covered developing a common operating picture of the region; identifying each country’s roles, capabilities, and ability to deploy to the region; and identifying joint training opportunities.

DOD also leads and is involved in a number of training exercises focused on the Arctic to build partner capacity in the region. For example, DOD leads the annual Arctic Zephyr exercise—a multilateral scenario-based exercise that focuses on search and rescue operations in the Arctic. The event is cohosted by U.S. Northern and European Commands and was most recently held in May 2014 with participation from various Arctic nations. Additionally, DOD participates in Arctic Shield, an annual Coast Guard–led operation in the Arctic that focuses on selected missions such as search and rescue and includes training opportunities. For example, DOD has provided logistical support, conducted joint planning with the Coast Guard, and provided air support for an oil spill response exercise during previous Arctic Shield training events. In addition to DOD, the operation typically includes participation from a number of stakeholders including Canada, the National Oceanic and Atmospheric Administration, and Arctic researchers, among others. Further, DOD participates in a number of foreign-led Arctic exercises. For example, in 2014, DOD participated in the Norwegian-led exercise Cold Response, a field training exercise involving maritime, land, and air forces, focused on combat operations in cold-weather conditions. The exercise involved approximately 660 U.S. servicemembers, and, overall, included 16,000 servicemembers from 16 nations.

The Navy also expects to have a continued role supporting other federal agencies and international partners as needed in the Arctic. Given that

the changes in the Arctic primarily affect the maritime environment, the Navy has updated its strategic guidance and has conducted a number of studies on operating in the region. In February 2014, the Navy issued its Arctic Roadmap 2014-2030 (Roadmap), which discusses the need for the Navy to develop strong cooperative partnerships with interagency and international Arctic stakeholders.<sup>24</sup> This includes pursuing bilateral and multilateral agreements with Arctic nations, expanding professional exchange programs, and increasing participation in Arctic-region exercises. To inform its Roadmap, the Navy developed an Arctic Mission Analysis in August 2011 that identified six anticipated mission areas and assessed the service’s role and the likelihood of these missions in the Arctic through 2040. Based on this assessment, the Navy anticipates an increase in the likelihood of supporting other federal agencies, specifically around regional security cooperation, led by the Department of State, and search and rescue missions, led by the Coast Guard. The Navy estimates a low likelihood that the remaining missions, such as ensuring freedom of the seas and sea control, will need to be performed in the Arctic through 2040, as shown in figure 4.

**Figure 4: Summary of Likelihood and Role of Navy Mission Areas in the Arctic through 2040**



Source: Navy. | GAO-15-566

<sup>24</sup>U.S. Navy, *Arctic Roadmap 2014-2030* (Washington, D.C.: February 2014). The Navy issued its first Arctic Roadmap in October 2009.

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## DOD Is Monitoring the Security Environment and Tracking Indicators That Could Change Its Threat Assessment

DOD is monitoring potential changes to the security environment in the Arctic and tracking indicators that could change its threat assessment of the region. A number of DOD assessments have identified potential causes for future conflict that could affect DOD's role in the region. For example, the Navy Roadmap states that boundary disputes may contribute to a possibility of localized episodes of friction between Arctic nations. There currently remain a number of boundary disputes over parts of Arctic territory, including between the United States and Russia over a disputed area in the Bering Sea. Additionally, increased interest by non-Arctic nations in exploration of natural resources—fish, sea floor minerals, oil and gas reserves—may be a possible cause for conflict. In recent years, non-Arctic nations, including India and China, have shown increased interest in the Arctic, and both countries have gained observer status in the Arctic Council.

However, as discussed above, the current relatively low level of military threat in the Arctic is expected to continue based on the commitment of Arctic nations to resolve disputes through an international framework and other collaborative forums. Given the desire for a peaceful opening of the Arctic, DOD's Arctic Strategy states that being too aggressive in addressing anticipated future security risks may create the conditions for mistrust and miscommunication under which such risks could materialize or lead to an "arms race" mentality that could lead to a breakdown of existing cooperative approaches to shared challenges. Therefore, the Arctic Strategy emphasizes building trust through transparency about the intent of military activities in the region and participation in military exercises and other engagements to mitigate this risk.<sup>25</sup>

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<sup>25</sup>Details on DOD's assessment of the security environment in the Arctic and the indicators that could change its threat assessment are classified.

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## DOD Has Taken Actions with Interagency Partners to Address Near-Term Capabilities Needed in the Arctic

DOD has taken a number of actions, along with interagency partners, to address the near-term capabilities needed in the Arctic. A number of studies and reports have been conducted by DOD and other agencies in recent years to identify capabilities the department needs to conduct operations in the Arctic in the near term.<sup>26</sup> For instance, in March 2012, the DOD–DHS Arctic Capabilities Assessment Working Group issued a white paper that was intended to consolidate the needed capabilities identified in these various studies, and serve as a guide to inform both departments’ investment priorities.<sup>27</sup> Based on the group’s analysis, four primary areas were identified as key enablers or capabilities required in the near term for increasing maritime access in the Arctic: (1) communications, (2) maritime domain awareness, (3) infrastructure, and (4) leveraging training and exercise opportunities.<sup>28</sup> DOD’s Arctic Strategy states that the current investment priority for the department will be focused on addressing these key enablers.

DOD is taking action in conjunction with other agencies to address these enablers, particularly around maritime domain awareness and communications. For instance, as discussed above, DOD was designated in the Implementation Plan as the lead agency to develop a framework of observations and modeling to support forecasting and prediction of sea ice, which is to enhance maritime domain awareness. In support of that effort, the Office of Naval Research leads an interagency Sea Ice Collaboration Team with officials from the National Oceanic and

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<sup>26</sup>Studies conducted by DOD include: Department of Defense, Report to Congress on Arctic Operations and the Northwest Passage (May 2011); U.S. Navy, Arctic Capabilities Based Assessment (Aug. 9, 2011); U.S. Navy, Navy Arctic Environmental Capabilities Based Assessment (Dec. 30, 2011); and U.S. European Command, Arctic Strategic Assessment (Apr. 2011). In [GAO-12-180](#), we discussed the capability gaps identified in these reports.

<sup>27</sup>The Arctic Capabilities Assessment Working Group was chartered in May 2011 by the DOD and Department of Homeland Security (DHS) Capabilities Development Working Group, established by the DOD Under Secretary for Acquisition, Technology and Logistics; the DHS Under Secretary for Science and Technology; and the DHS Under Secretary for Management. The Capabilities Development Working Group is a mechanism for improving cooperation and facilitating decision making on DOD–DHS capability development. The group’s charter states it will meet quarterly to discuss topics of mutual interest. The DOD–DHS Arctic Capability Assessment White Paper focused on maritime capabilities and did not include an evaluation of air, subsurface, and cyber domains.

<sup>28</sup>Maritime domain awareness refers to the effective understanding of anything associated with maritime activity that could affect the security, safety, economy, or environment of the United States.

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Atmospheric Administration, Department of Energy, and Department of Interior that is focused on better understanding environmental systems in the Arctic to improve modeling and prediction of sea ice.<sup>29</sup> The team has completed a number of actions including experiments on Arctic sea ice coverage using over 100 instruments and platforms, measuring sea ice thickness using overhead aircraft and radar, and testing updates to sea ice models for improved forecasting. In addition, DOD is identified as a supporting agency for a number of other activities identified in the implementation plan, including efforts focused on communications in the Arctic. For example, the National Telecommunications and Information Administration leads an effort to develop a communication infrastructure in the Arctic, with support from DOD and other agencies. In January 2015, the administration released a status report noting progress made by the federal government across these activities during 2014.<sup>30</sup> Among other actions, the report highlighted the establishment of an executive steering committee in January 2015 tasked with enhancing coordination of national efforts and identifying potential areas of overlap between and within agencies responsible for implementation of Arctic policy and strategic priorities, among other things.<sup>31</sup> According to DOD officials, for many of the activities where DOD has been designated as a supporting agency, the agencies identified are holding initial meetings and interagency working groups are starting to be established.

DOD has also begun efforts within the department to address identified capabilities needed in the Arctic. For example, the Navy's Roadmap prioritizes near-term actions necessary to enhance the Navy's ability to operate in the Arctic. The Roadmap includes an implementation plan and timeline for operations and training, science and technology, facilities, weapons and support equipment, and maritime domain awareness, among other capabilities. Additionally, Northern Command has conducted studies to identify capability solutions and support its advocacy role for

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<sup>29</sup>The Sea Ice Collaboration Team is part of the Interagency Arctic Research Policy Committee that was formally created by Executive Order 12501, *Arctic Research* (Jan. 28, 1985). Its activities have been coordinated by the National Science Foundation, with its Director as chair.

<sup>30</sup>White House, *National Strategy for the Arctic Region: Implementation Report* (January 2015).

<sup>31</sup>The executive steering committee was established by Executive Order 13689, *Enhancing Coordination of National Efforts in the Arctic* (Jan. 21, 2015).

the Arctic. This effort includes studies of DOD’s communication needs in the Arctic and analysis of its current domain awareness in the region. In addition, DOD has begun studying new communications systems in the Arctic. For example, in 2014 DOD tested a new communication system—the Mobile User Objective System—that is intended to provide a secure, ultra-high-frequency communication capability. See table 1 for a summary of the capabilities identified for increasing maritime access in the Arctic in the near term and various actions DOD has taken to address these capability needs.

**Table 1: Summary of Actions Taken by DOD to Address Identified Near-Term Capability Needs**

Capability need	Actions taken by the Department of Defense (DOD)
<p>1. Communications—Reliable high-capacity communication above 65 degrees north is limited due to the unique conditions in the Arctic including vast distances, lack of communications architecture, harsh weather conditions, and high-latitude disturbances.</p>	<ul style="list-style-type: none"> <li>• DOD has begun testing a new communication system—the Mobile User Objective System—to determine whether it can provide increased Arctic coverage.</li> <li>• DOD has participated in a Canadian assessment of a potential communication system to address Canada’s mission needs in the Arctic.</li> <li>• Northern Command issued an Arctic Communications Roadmap in 2014 that identifies various alternatives and key decision points for DOD between 2014 and 2027 and stresses the importance of the next 4 years, during which DOD will be addressing the satellite architecture for 2025–2030.</li> </ul>
<p>2. Maritime Domain Awareness—Achieving maritime domain awareness in the Arctic is challenging due to factors including (1) a vast majority of the Arctic region has not been surveyed to modern charting standards; (2) inadequate environmental forecasting and Global Positioning System performance; and (3) limited available systems to monitor movement of vessels.</p>	<ul style="list-style-type: none"> <li>• Based on a recent progress report, the Sea Ice Collaboration Team has completed a number of activities such as conducting surveys of sea ice product providers, issuing reports on sea ice outlooks, performing experiments to study Arctic sea ice, and holding workshops with stakeholders.</li> <li>• The Navy is part of the Arctic Regional Hydrographic Commission, an international organization focused on studying issues related to hydrographic surveying of the Arctic region, among other topics.<sup>a</sup> According to Navy officials, the commission has developed a methodology to survey areas of high interest, such as high-trafficked areas, in the Arctic.</li> <li>• Northern Command issued an Arctic Baseline Assessment for Domain Awareness report in 2013 that provides an analysis of current awareness capabilities in the Arctic and recommendations to enhance awareness in the Arctic across the air, land, and maritime domains, such as conducting a capability-based assessment to identify uncooperative vessels and aircraft in the North American Arctic.</li> </ul>
<p>3. Infrastructure—Facilities located below the Arctic Circle provide limited capability to support maritime Arctic missions due to the long transits required to reach the operating area.</p>	<ul style="list-style-type: none"> <li>• DOD’s 2011 study on Arctic operations assessed the department’s current defense infrastructure as being adequate to meet near- (present–2020) and mid-term (2020–2030) U.S. national security needs, stating that DOD does not anticipate a need to begin construction of additional bases or a deepwater port in Alaska before 2020.<sup>b</sup></li> <li>• The Navy Roadmap identified actions for studying the Navy’s need for installations and facilities in the Arctic. According to Navy officials, the Navy is in the first phase of identifying a baseline of existing infrastructure in the Arctic, including government-owned, private, and international facilities that can be used to support the Navy’s mission areas.</li> <li>• The U.S. Army Corps of Engineers, in collaboration with the state of Alaska, recently completed a draft study to identify potential port sites in the U.S. Arctic region and recommends that improvement be made to the current port in Nome, Alaska, to support a deepwater port.</li> </ul>



Capability need	Actions taken by the Department of Defense (DOD)
<p>4. Training/Exercise Opportunities—DOD currently has a limited pool of Arctic trained and experienced maritime personnel as a result of limited training, exercise, and educational opportunities. Additionally, the United States has few surface vessels that can operate in ice-affected waters including icebreakers and ice-strengthened ships.</p>	<ul style="list-style-type: none"> <li data-bbox="581 464 1520 625">• The Navy’s Arctic Roadmap calls for updated guidance and training requirements that evaluate Arctic training capabilities, address significant deficiencies that increase risk in near-term Arctic operations, and include Arctic material in training curriculums to improve the Navy’s understanding of the Arctic. The Roadmap also tasks Fleet Forces Command to develop a long-range training plan that increases participation in scheduled Arctic exercises.</li> <li data-bbox="581 632 1520 737">• The Navy Roadmap calls for identifying future platforms, including surface ships, that are to operate in the region around the mid-2020s. According to Navy officials, the Naval Sea Systems Command is working with international partners to study the basic capabilities and engineering requirements of ice-strengthened ships.</li> </ul>

Source: GAO analysis of DOD reports. | GAO-15-566

<sup>a</sup>Hydrographic surveying is the measure of water depths and detection of hazards to navigation such as rocks and other features that mariners should be aware of for safety.

<sup>b</sup>DOD, Report to Congress on Arctic Operations and the Northwest Passage (May 2011).

In addition to the actions discussed above, DOD is also coordinating with the Coast Guard on the Coast Guard’s preliminary phases of potentially acquiring a new heavy polar icebreaker. According to Coast Guard officials, an interagency team, including DOD, the National Science Foundation, and the National Oceanic and Atmospheric Administration, among others, is identifying the government’s operational requirements for the new icebreaker. While DOD’s near-term need for icebreaker support will continue to leverage the Coast Guard, commercial, and partner-nation icebreakers, DOD has reported that ice-strengthened vessels will become increasingly important to DOD mission areas in the mid- and far-term. The Coast Guard owns the current U.S. inventory of three polar icebreakers, while the Navy owns one ice-strengthened tanker.<sup>32</sup>

DOD and the Coast Guard have also established a number of collaborative working groups and forums to identify and address capabilities needed in the Arctic and enhance collaboration on Arctic operations. See appendix I for more details on their collaborative efforts.

<sup>32</sup>One of the Coast Guard’s heavy icebreakers, the *Polar Sea*, was placed in commissioned, inactive status in October 2011 after suffering an unexpected engine casualty.

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## DOD Is Updating Its Regional Plans for the Arctic and Conducting Analysis to Determine Future Capability Needs, but the Uncertain Pace of Climate Change and Commercial Activity May Affect Its Timelines

U.S. Northern Command—the DOD advocate for Arctic capabilities—is in the process of updating its regional plans based on recent DOD guidance and is conducting analysis to determine future capability needs. However, DOD’s planning timelines may be affected by uncertainty around the pace of climate change and commercial activity in the region.

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## DOD Is Updating Its Regional Plans for the Arctic and Conducting Analysis to Determine Future Capability Needs

DOD’s Arctic Strategy states that the department will periodically reevaluate requirements necessary to meet national security objectives as conditions change and the combatant commanders identify operational requirements for the Arctic in updates to their regional plans. In addition, the updated Guidance for Employment of the Force issued in February 2015 provides near-term guidance to the combatant commanders on updating their theater campaign plans and contingency plans in their regions.<sup>33</sup> Northern Command officials told us that the command is in the process of updating its regional plans and identifying its operational requirements for the Arctic based on this recent DOD guidance. These officials stated that a number of efforts have been completed or are ongoing that will be used to inform the updates to its regional plans and determine future capability needs. For example:

- In 2014, Northern Command and other DOD and Coast Guard stakeholders conducted an Arctic Maritime Mission Requirements analysis that identified maritime mission areas to be performed in the

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<sup>33</sup>Theater campaign plans are DOD’s planning documents used to operationalize the command’s theater or functional strategies. Campaign plans focus on the command’s steady-state activities, which include ongoing operations, military engagement, security cooperation, deterrence, and other shaping or preventive activities.

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Arctic to help inform the plans in the region. Additionally, this analysis identified a number of capability gaps and the corresponding maritime mission area that would be affected.

- 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. According to Northern Command officials, they received guidance from the new Commander—who assumed command in December 2014—about his vision for the Arctic in early May 2015, and are in the process of including his priorities for the region into the updated Commander's Estimate for the Arctic, which is expected to be completed in the summer of 2015.
- Northern Command is currently conducting a Maritime Homeland Defense study to evaluate the homeland defense missions and tasks in the Arctic, determine whether those missions are achievable, and, if DOD is not able to fully perform those missions, identify what capability requirements will be needed for mission success. Northern Command officials expect the first phase of this study to be completed in July 2015.
- Northern Command is reviewing other Arctic mission areas including maritime mine countermeasures, undersea surveillance, and maritime domain awareness. These studies are intended to help Northern Command identify future capability requirements and inform its advocacy role. Northern Command officials expect these studies to be completed in July 2015.

According to Northern Command officials, it may be too early for the command to fully identify the supporting operational requirements given the current state of the Arctic climate and level of activity. As conditions change in the region, officials stated the command will need flexibility to adjust its plans to meet any emerging threats and challenges. Accordingly, some of the analysis that is currently being conducted on Arctic mission areas, such as maritime mine countermeasures, will be used to inform future iterations of its regional plans—which typically cover the steady state of operations over a 2-year period.

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## Uncertainty around the Pace of Climate Change and Commercial Activity May Affect DOD's Planning Timelines

DOD's Arctic Strategy states that there is uncertainty surrounding its assumptions, particularly around the rate and extent of the effects of climate change and the potential corresponding increase in commercial activity in the region. The pace of these changes may affect the frequency and timing of DOD's activities in the region. For instance, as sea ice retreats and human activity expands, DOD could be called upon more often or sooner to support the Coast Guard in search and rescue operations. DOD's Arctic Strategy further states that the uncertainty around the pace of change creates a challenge for the department to balance the risk of having inadequate capabilities or insufficient capacity when required to perform these operations with the cost of making premature or unnecessary investments. According to the strategy, DOD will mitigate this risk by monitoring the changing Arctic conditions to determine the appropriate timing for future capability investments.

The Navy's current Arctic sea ice projections and planning time frames are based on analysis from a team of subject-matter experts convened for the Navy's development of the Arctic Roadmap. Based on their analysis, the Navy predicts that access to the Northwest Passage will continue to remain limited in the near and mid-term with an estimated 5 weeks of open water periods beginning in the 2030s.<sup>34</sup> However, Navy officials stated that there remains uncertainty around its predictions and continued challenges in planning for Arctic investments due to a number of factors including difficulty in developing accurate Arctic sea ice models and continued seasonal variability. According to officials from the Office of Naval Research, current Arctic sea ice models are not optimized to predict sea ice changes in the next few decades—the period DOD needs for its Arctic planning. Additionally, limited understanding of the complex interactions between Arctic sea ice, oceans, atmosphere, and land limits the ability of models to predict the rate and scope of future sea ice variations.

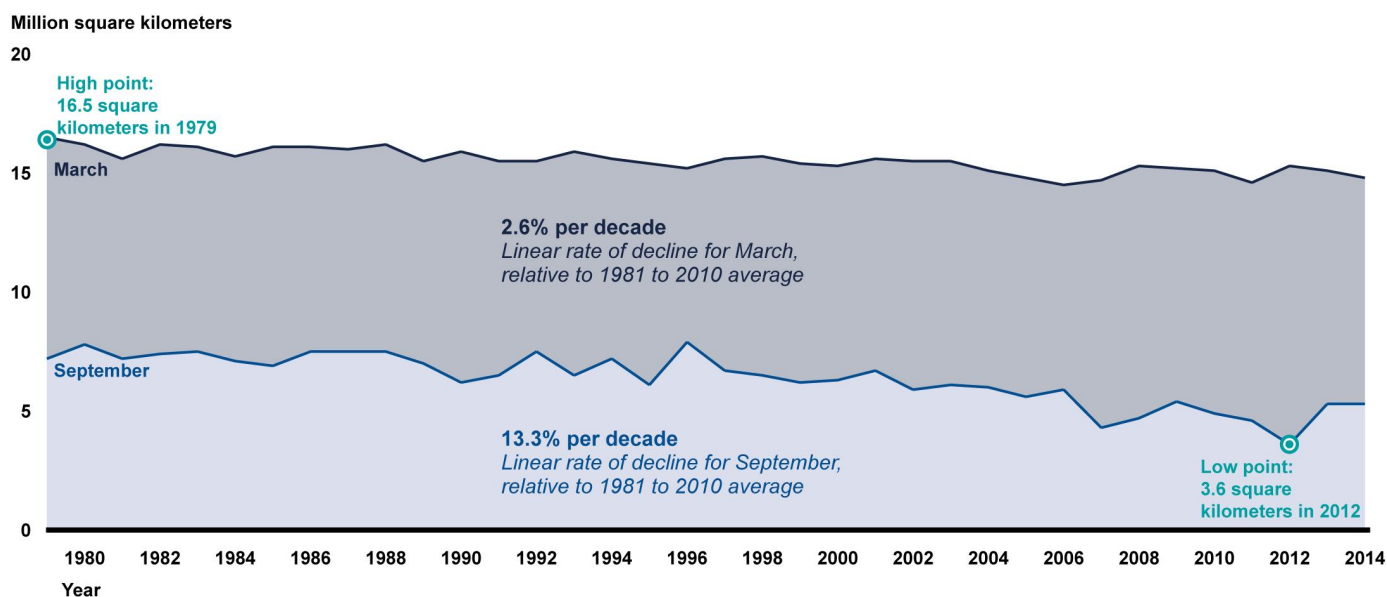
Further, DOD officials stated that there remains seasonal variability in the rate and extent of the change in Arctic sea ice. Sea ice can fluctuate significantly from year to year. For example, the minimum sea ice extent for 2012 was the lowest occurrence in the satellite record but it increased 47 percent in the following year. There is also significant variance in the

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<sup>34</sup>Open water indicates a large area of freely navigable water in which sea ice is present in concentrations of less than 10 percent and no ice of land origin is present.

sea ice extent throughout the year. According to data from the National Snow and Ice Data Center, summer sea ice is diminishing at a faster pace than winter sea ice, around 13 percent compared to around 3 percent, as shown in figure 5. This variable rate of change can affect DOD’s ability to plan for future conditions in the region. For instance, several relatively ice-free summers may be followed by unusually cold years during which sea ice remains throughout the year.

**Figure 5: Arctic Sea Ice Extent in Both March and September from 1979 to 2014**



Source: National Snow and Ice Data Center. | GAO-15-566

DOD also notes in its Strategy the uncertainty around future economic conditions and the pace at which commercial activity will increase in the region. According to a Navy study on the Arctic, economic viability of commercial ventures in the Arctic—oil and gas exploration, mineral extraction, tourism, and fishing—will be the dominant driver of the pace at which activity increases in the region.<sup>35</sup> The Navy estimates that activity will increase gradually and unevenly, driven by existing infrastructure, individual national policy decisions, and the self-interest of commercial

<sup>35</sup>U.S. Navy, *Navy Arctic Environmental Capabilities Based Assessment*.

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entities, among other factors. The study notes that despite the Arctic warming trend and reduced ice cover in the summer season, navigation in the Northwest Passage will remain hazardous. Ice melt patterns are not uniform and ships face considerable risk. A recent report on maritime activity in the U.S. Arctic projects that over the next 10 years traffic in the Bering Strait and North Slope of Alaska is likely to increase from 240 vessels in 2013 to between a low of 400 and a high of 1,120 vessels in 2025.<sup>36</sup> However, the report identifies several factors that may affect this projection including economic variables such as high insurance premiums and risk costs as well as changes in the shipping market through variables such as the opening of the Panama Canal expansion, which could make the Arctic routes commercially less viable.<sup>37</sup>

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## Agency Comments

We are not making any recommendations in this report. We provided a draft of our report to DOD and DHS for their review and comment. DOD provided written technical comments, which we incorporated into the report as appropriate. DHS did not have any comments on this report.

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<sup>36</sup>The International Council on Clean Transportation, *A 10-Year Projection of Maritime Activity in the U.S. Arctic Region* (Washington, D.C.: Jan. 1, 2015). This report was funded by the interagency Committee on Marine Transportation Systems.

<sup>37</sup>We previously found in a 2014 report that commercial U.S. Arctic maritime activities are expected to be limited for the next 10 years due to a variety of contributing factors, including general challenges related to operating in the Arctic such as geography, extreme weather, and hard-to-predict sea ice movement. See [GAO-14-299](#).

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We are sending copies of this report to the appropriate congressional committees. We are also sending copies to the Secretary of Defense and the Secretary of Homeland Security. In addition, this report will be available at no charge on our website at <http://www.gao.gov>.

If you or your staff have questions about this report, please contact John Pendleton at (202) 512-3489 or [pendletonj@gao.gov](mailto:pendletonj@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix V.

A handwritten signature in black ink that reads "John H. Pendleton". The signature is written in a cursive style with a long, sweeping underline.

John H. Pendleton, Director  
Defense Capabilities and Management

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*List of Committees*

The Honorable John McCain  
Chairman  
The Honorable Jack Reed  
Ranking Member  
Committee on Armed Services  
United States Senate

The Honorable Thad Cochran  
Chairman  
The Honorable Richard J. Durbin  
Ranking Member  
Subcommittee on Defense  
Committee on Appropriations  
United States Senate

The Honorable Mac Thornberry  
Chairman  
The Honorable Adam Smith  
Ranking Member  
Committee on Armed Services  
House of Representatives

The Honorable Rodney Frelinghuysen  
Chairman  
The Honorable Pete Visclosky  
Ranking Member  
Subcommittee on Defense  
Committee on Appropriations  
House of Representatives



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# Appendix I: Summary of DOD's Collaboration with the Coast Guard in the Arctic

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In January 2012, we found that the Departments of Defense (DOD) and Homeland Security (DHS) had not established a collaborative forum to address long-term Arctic capability gaps or identify opportunities for joint investments over the longer term.<sup>1</sup> We stated that DOD acknowledged the importance of collaboration with the U.S. Coast Guard over the long term in its 2010 Quadrennial Defense Review, which states that the department must work with the Coast Guard and DHS to develop Arctic capabilities to support both current and future planning and operations.<sup>2</sup> We recommended that the Secretary of Defense, in consultation with the Secretary of Homeland Security, establish a collaborative forum with the Coast Guard to fully leverage federal investments and help avoid overlap and redundancies in addressing long-term Arctic capability needs.

In response to our recommendation, DOD cited the establishment of a number of collaborative forums that are intended to address a variety of Arctic issues including Arctic strategy and policy, capabilities, and requirements. Officials we interviewed from DOD and the Coast Guard identified three working groups that have been established to enhance coordination between the two organizations: the Navy/Coast Guard Arctic Working Group, the Arctic Operational Working Group, and the Arctic Capability Advocacy Working Group. Additionally, officials from U.S. Northern Command told us that the Arctic Collaborative Workshop is another forum being used to bring together Arctic stakeholders, including the Coast Guard. Table 2 below provides a summary of the current structure and activities of each of these collaborative forums.

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<sup>1</sup>GAO, *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](#) (Washington, D.C.: Jan. 13, 2012).

<sup>2</sup>Department of Defense, *Quadrennial Defense Review Report* (February 2010).

**Table 2: Summary of DOD and Coast Guard Working Groups Addressing Issues Related to the Arctic Region**

Name	Structure and participants	Summary of working group's activities
Navy/Coast Guard Arctic Working Group established in April 2014	The Navy/Coast Guard Arctic Working Group is cochaired by the Branch Head of Navy Policy and Global Posture (OPNAV N512) and the Deputy Director of the Office of Marine Transportation Management (CG-5PW-D), while membership includes officer-level participation from various Navy and Coast Guard offices.	<p>The Navy/Coast Guard Arctic Working Group was established under the National Fleet Plan. According to its charter, the purpose of the Working Group is to create a formal partnership between the Navy and Coast Guard to examine aligned missions, requirements, and capabilities for operating in the Arctic. The Working Group has identified three short-term goals:</p> <ol style="list-style-type: none"> <li>1. Facilitate dialogue between the Navy and Coast Guard stakeholders and decision makers on a broad spectrum of mission-related areas in the Arctic.</li> <li>2. Facilitate interservice staffing efforts to accomplish action items in the Navy and Coast Guard Arctic strategies.</li> <li>3. Make recommendations to the National Fleet Board concerning potential areas of further collaboration.</li> </ol> <p>According to the charter, the group is expected to meet at least quarterly. Navy and Coast Guard officials told us that to date the group has held initial meetings and is currently working to define its approach and activities.</p>
Arctic Operational Working Group established in the fall of 2011	The Arctic Operational Working Group is led by Northern Command's Concepts and Initiatives Branch (J531) and includes participation from a number of organizations including all the Northern Command directorates, Alaska Command, Coast Guard Headquarters, Coast Guard District 17, and Canadian Joint Operations Command, among others. According to a Northern Command official, Coast Guard Headquarters' participation in the working group began within the past year.	<p>The Arctic Operational Working Group was established as 1 of 12 operational working groups supporting the Commander of Northern Command. According to participants from Northern Command, the working group is currently focused on four priorities:</p> <ol style="list-style-type: none"> <li>1. Finalize the transfer of Alaska Command from U.S. Pacific Command to Northern Command.</li> <li>2. Develop a Northern Command Arctic Strategy.</li> <li>3. Develop Arctic Partnerships.</li> <li>4. Identify capability requirements for the Arctic.</li> </ol> <p>In addition to the four near-term priorities, the Working Group has established a roadmap to guide its efforts that includes 22 ongoing and proposed initiatives. Northern Command officials told us that a charter for the Working Group is being drafted.</p>

**Appendix I: Summary of DOD's Collaboration  
with the Coast Guard in the Arctic**

Name	Structure and participants	Summary of working group's activities
Arctic Capability Advocacy Working Group established in July 2012	The Arctic Capability Advocacy Working Group is led by the North American Aerospace Defense Command and Northern Command Director of Requirements, Analysis and Resources (J8) and includes participants from numerous Arctic stakeholders including Coast Guard Headquarters, Coast Guard District 17, European Command, and Canadian Joint Operations Command, among others.	The Arctic Capability Advocacy Working Group meets periodically in support of the Commander of Northern Command in his role as advocate for Arctic capabilities. According to Northern Command officials, the main activity of the working group has been to develop "advocacy letters" that are signed by the Commander of Northern Command and sent to other DOD organizations, such as the military services or defense agencies, to advocate for their support on various Arctic initiatives. To date, the working group has produced five advocacy letters—four related to Arctic communications and one advocating capabilities related to the Arctic's northern approaches. Northern Command officials told us that the continued need for the working group is unclear. The group may dissolve or get folded into the Arctic Operational Working Group.
Arctic Collaborative Workshop, a biennial event most recently held in April 2014	The Arctic Collaborative Workshop is a North American Aerospace Defense Command and Northern Command–sponsored event that brings together Arctic stakeholders from private industry; partner nations; academia; and state and federal agencies, including the Coast Guard, with responsibilities in the Arctic.	The purpose of the Arctic Collaborative Workshop is to coordinate and collaborate among Arctic stakeholders on best practices, authorities, and capabilities for potential contingencies. The workshop supports the Northern Command's responsibility for advocating for DOD Arctic capabilities and strengthening Arctic partnerships. The most recent workshop was held at the University of Alaska–Fairbanks and included discussion-based scenarios to examine areas for increased cooperation between partners and identify solutions to close the capability gaps.

Source: GAO analysis of DOD information. | GAO-15-566

According to DOD and Coast Guard officials, there is currently no formal mechanism for the working groups to coordinate among each other. These officials told us that the number of people from each agency involved in Arctic issues is currently small, and in some cases, the same participants are involved across these working groups. Due to the familiarity with activities of the other groups, the members are able to share information on the activities among the working groups in order to avoid duplicative efforts. Additionally, Navy officials stated that some of these working groups were established in the last year and are still determining the focus of their efforts.

Given the small community involved in many of these Arctic working groups and the information-sharing activities described to us by DOD and Coast Guard officials, the current, informal process of collaboration among the working groups may be sufficient. As our prior work on key considerations for implementing interagency collaborative mechanisms

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has shown, at times it can be helpful to document key agreements related to collaboration.<sup>3</sup> Thus, moving forward, as the Arctic community of interest grows and the focus of the working groups are more fully defined, considering whether the working groups may benefit from a more formal written agreement, such as a memorandum of understanding that is continually revisited and updated to meet the needs of the participants, will be important.

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<sup>3</sup>GAO, *Managing For Results: Key Considerations for Implementing Interagency Collaborative Mechanisms*, [GAO-12-1022](#) (Washington, D.C.: Sept. 27, 2012); and *Managing for Results: Implementation Approaches Used to Enhance Collaboration in Interagency Groups*, [GAO-14-220](#) (Washington, D.C.: Feb. 14, 2014).

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# Appendix II: Objectives, Scope, and Methodology

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The objectives of this report are to determine (1) the role the Department of Defense (DOD) expects to play in the Arctic based on recent strategic guidance and its assessment of the security environment in the region, (2) the actions, if any, DOD has taken to address near-term capability needs, and (3) the efforts DOD has under way to update plans for the Arctic and identify future capability needs. In addition, we examined DOD's collaboration with the Coast Guard in the Arctic, which we report on in appendix I.

For this report, we use the term Arctic to mean the areas as defined by the Arctic Research and Policy Act of 1984 (ARPA), which includes "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, Kuskokwim, and Yukon Rivers in Alaska; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering, and Chukchi Seas; and the Aleutian chain." We focused our review on DOD's role in the Arctic as outlined in national and DOD policy and on the Navy because the changes in the Arctic primarily affect the maritime environment and the opening of the Arctic Ocean may affect the service's role and capability needs. Further, we focused on U.S. Northern Command as the command with primary responsibility for advocating for Arctic capabilities due to it having the only U.S. Arctic territory within its area of responsibility.

To obtain information on all of our objectives, we reviewed program documentation and written reports and interviewed knowledgeable officials from the Office of the Secretary of Defense; Office of the Chairman of the Joint Chiefs of Staff; U.S. Northern Command and the North American Aerospace Defense Command; U.S. European Command; U.S. Pacific Command; and U.S. Army, Navy, Air Force, Marine Corps, and Coast Guard offices with Arctic responsibility. To identify the role DOD expects to play in the Arctic based on recent strategic guidance and its assessment of the security environment in the region, we reviewed national, DOD, military service, and combatant command strategies and guidance that have been developed on the Arctic including the 2013 National Strategy for the Arctic Region, DOD's November 2013 Arctic Strategy, and the U.S. Navy's February 2014 Arctic Roadmap for 2014-2030, among others. Additionally, we examined intelligence assessments on military activity in the Arctic region produced by the Office of Naval Intelligence and other intelligence agencies with responsibilities for Arctic awareness. In June 2015, we issued a classified version of this report that includes detailed information on the security environment in the Arctic and indicators that may change DOD's threat assessment.

To determine the actions, if any, DOD has taken to address near-term capability needs, we reviewed the results of DOD and other agency studies on needed near-term Arctic capabilities including the May 2011 Report to Congress on Arctic Operations and the Northwest Passage, the March 2012 DOD and Department of Homeland Security (DHS) Arctic Capability Assessment Working Group White Paper, and the Navy's August 2011 Arctic Capabilities Based Assessment, among others. We identified plans and actions that have been initiated by DOD since our January 2012 report to address the capability needs based on review of supporting documentation and testimonial evidence from DOD and Coast Guard officials.<sup>1</sup> We grouped actions initiated by DOD into the four enabling capabilities established in the DOD and DHS Arctic Capability Assessment Working Group White Paper.

To determine the efforts DOD has under way to update plans for the Arctic and identify future capability needs, we reviewed Northern Command's regional plans that cover the Arctic including its theater campaign plan and contingency plans. We interviewed an official from the Office of the Under Secretary of Defense for Policy with responsibility for the Arctic to discuss relevant guidance over regional plans that cover the Arctic and interviewed Northern Command officials to identify ongoing planning activities. We also reviewed analysis conducted by Northern Command on its future maritime missions in the Arctic and interviewed officials to identify additional analysis being conducted to determine future capability needs. Additionally, we reviewed sea ice levels from the National Snow and Ice Data Center and information on Arctic sea ice trends from various organizations including the Navy and National Research Council and examined reports on commercial activity in the Arctic. We did not validate the underlying data used in DOD's models for sea ice predictions. We also interviewed Coast Guard officials and DOD officials from the Navy and Northern Command to determine their collaboration to align Arctic efforts.

We conducted this performance audit from July 2014 to June 2015 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our

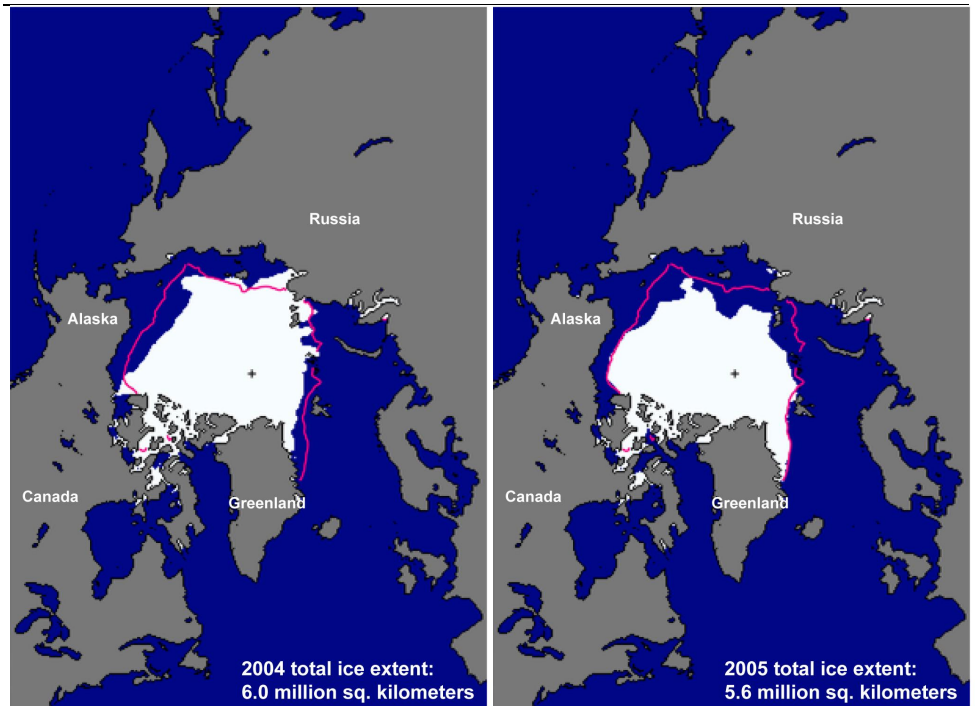
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<sup>1</sup>GAO, *Arctic Capabilities: DOD Addressed Many Specified Reporting Elements in Its 2011 Arctic Report but Should Take Steps to Meet Near- and Long-term Needs*, [GAO-12-180](#) (Washington, D.C.: Jan. 13, 2012).

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findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

# Appendix III: Change in Summer Minimum Ice Extent from 2001 to 2014, Compared with the 1981–2010 Median Minimum Ice Extent

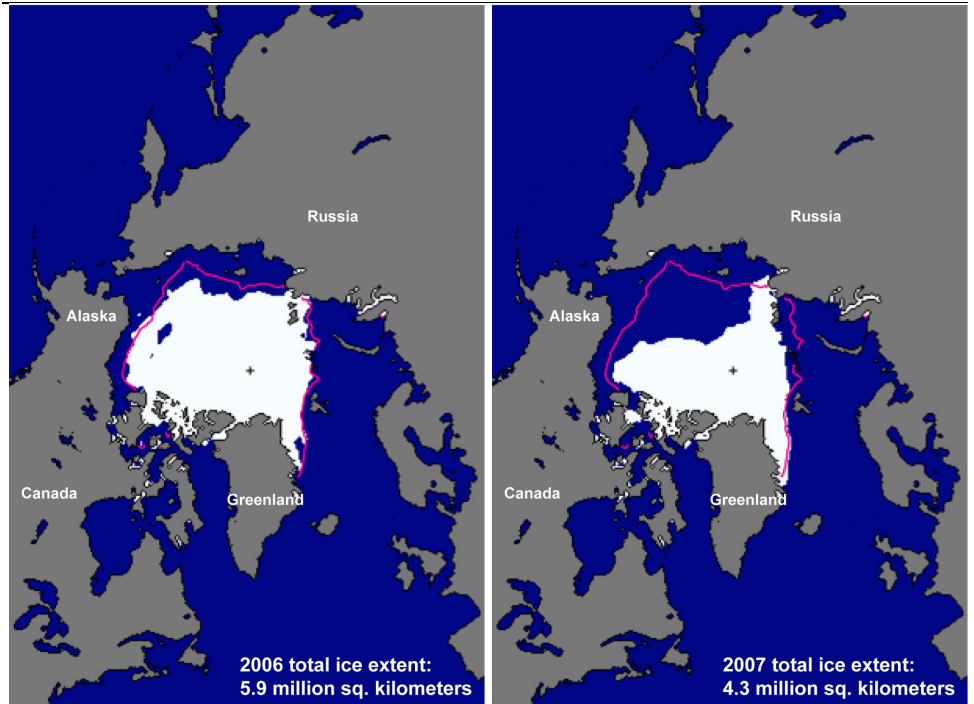


Source: National Snow and Ice Data Center. | GAO-15-566

Source: National Snow and Ice Data Center. | GAO-15-566



**Appendix III: Change in Summer Minimum Ice Extent from 2001 to 2014, Compared with the 1981–2010 Median Minimum Ice Extent**

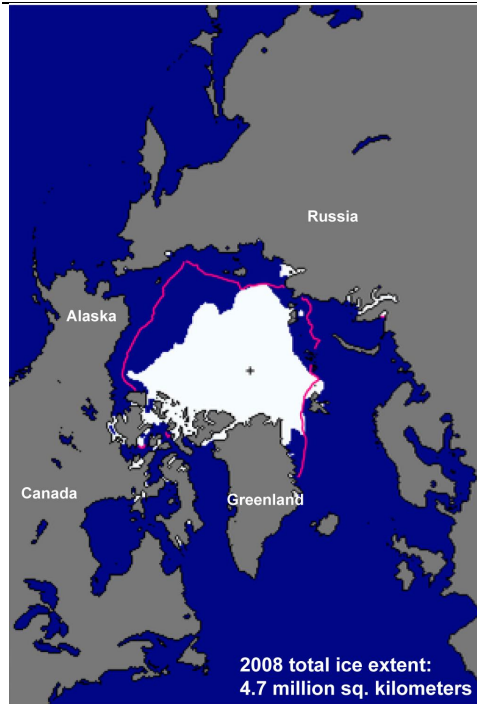


Source: National Snow and Ice Data Center. | GAO-15-566

Source: National Snow and Ice Data Center. | GAO-15-566

Note: The median ice edge displays the average annual minimum position of the ice edge.

**Appendix III: Change in Summer Minimum Ice Extent from 2001 to 2014, Compared with the 1981–2010 Median Minimum Ice Extent**



Source: National Snow and Ice Data Center. | GAO-15-566

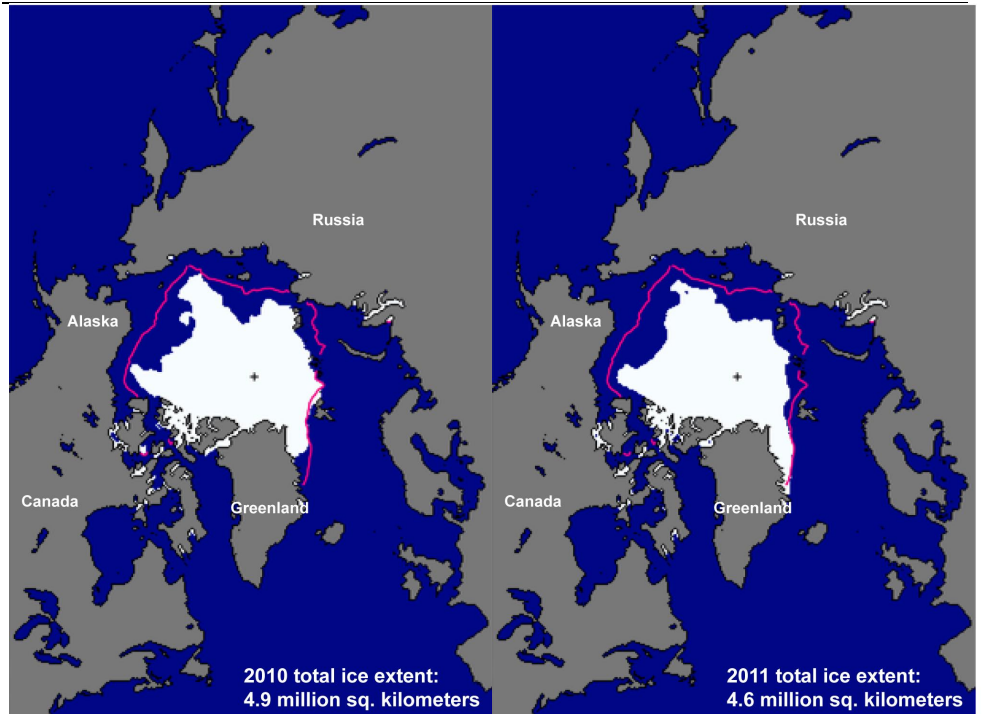


Source: National Snow and Ice Data Center. | GAO-15-566

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**Appendix III: Change in Summer Minimum Ice Extent from 2001 to 2014, Compared with the 1981–2010 Median Minimum Ice Extent**

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Source: National Snow and Ice Data Center. | GAO-15-566

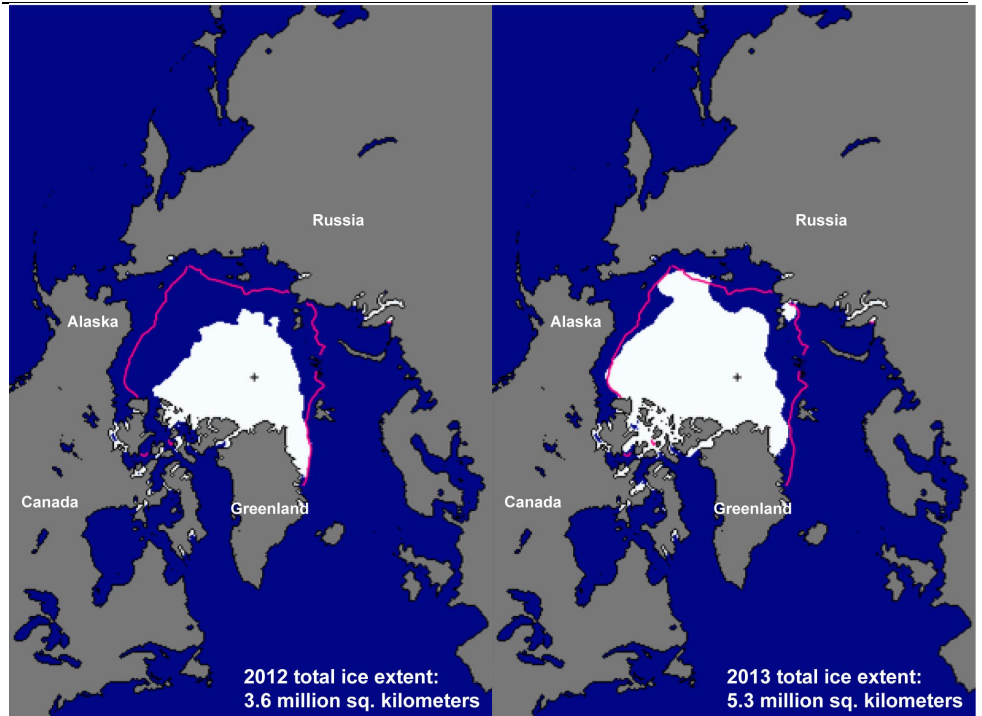
Source: National Snow and Ice Data Center. | GAO-15-566

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Note: The median ice edge displays the average annual minimum position of the ice edge.

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**Appendix III: Change in Summer Minimum Ice Extent from 2001 to 2014, Compared with the 1981–2010 Median Minimum Ice Extent**



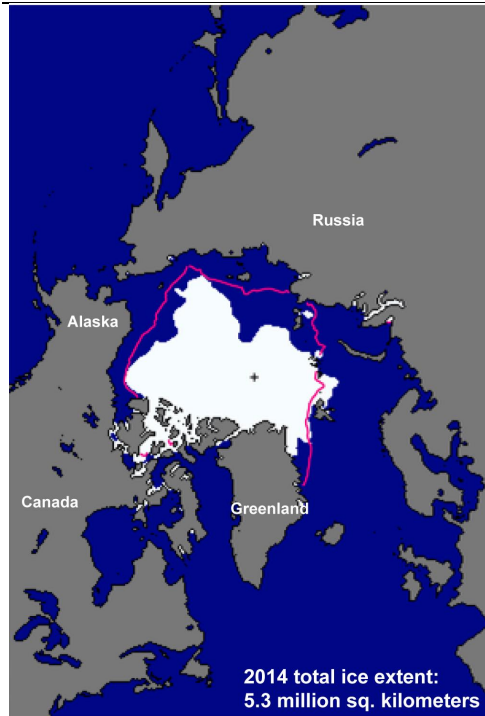
Source: National Snow and Ice Data Center. | GAO-15-566

Source: National Snow and Ice Data Center. | GAO-15-566

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**Appendix III: Change in Summer Minimum Ice Extent from 2001 to 2014, Compared with the 1981–2010 Median Minimum Ice Extent**

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Source: National Snow and Ice Data Center. | GAO-15-566

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Note: The median ice edge displays the average annual minimum position of the ice edge.

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# Appendix IV: Federal Departments and Agencies and Interagency Working Groups with Arctic Responsibilities (Noninteractive Version of Fig. 3)

Federal stakeholders	Arctic responsibilities
Department of Defense	The Department of Defense is responsible in the Arctic and elsewhere for securing the United States from direct attack; securing strategic access and retaining global freedom of action; strengthening existing and emerging alliances and partnerships; and establishing favorable security conditions.
U.S. Coast Guard	The Coast Guard is a multimission, maritime military service within the Department of Homeland Security that has responsibilities including maritime safety, security, environmental protection, and national defense, among other missions. As more navigable ocean water emerges in the Arctic and human activity increases, the Coast Guard expects to face expanding responsibilities in the region.
National Science Foundation	The National Science Foundation is responsible for funding U.S. Arctic research—including research on the causes and effects of climate change—and providing associated logistics and infrastructure support to conduct this research.
Department of State	The Department of State is responsible for formulating and implementing U.S. policy on international issues concerning the Arctic, leading the domestic interagency Arctic Policy Group, and leading U.S. participation in the Arctic Council. The department has also established a senior-level representative for the Arctic region to support efforts on increasing engagement with international partners.
Department of Commerce	The Department of Commerce's National Oceanic and Atmospheric Administration provides information on Arctic oceanic and atmospheric conditions and issues weather and ice forecasts, among other responsibilities. The National Telecommunications and Information Administration under the Department of Commerce is responsible for the telecommunication infrastructure in the Arctic.
Department of Transportation	The Department of Transportation and its component agency, the Maritime Administration, works on marine transportation and shipping issues in the Arctic and elsewhere, among other things.
Department of the Interior	The Department of the Interior is responsible for oversight and regulation of resource development in the U.S. Arctic region and coordinates with the Coast Guard on safety compliance inspections of offshore energy facilities and in the event of a major oil spill. The department's Bureau of Indian Affairs administers and funds infrastructure, natural and energy resources, among other programs for federally recognized American Indian and Alaska Native tribes and villages.
Other departments and agencies	Other departments and agencies also have a role in U.S. Government efforts in the Arctic including, the Environmental Protection Agency, Department of Energy, Department of Health and Human Services, Federal Communications Commission, and National Aeronautics and Space Administration, among others.
Federal interagency groups	Arctic responsibilities
Arctic Executive Steering Committee	The Arctic Executive Steering Committee provides guidance to federal departments and agencies and coordinates implementation of national Arctic policies and plans, such as the National Strategy for the Arctic Region and its implementation plan. The steering committee is chaired by the Director of the Office of Science and Technology Policy and consists of representatives from over 20 federal departments, agencies, and offices including the Departments of Defense, Homeland Security, State, and Commerce and the National Security Council, among others.

**Appendix IV: Federal Departments and Agencies and Interagency Working Groups with Arctic Responsibilities (Noninteractive Version of Fig. 3)**

Interagency Arctic Research Policy Committee	The Interagency Arctic Research Policy Committee helps set priorities for future Arctic research, works with the Arctic Research Commission to develop and establish national Arctic research policy, and promotes federal interagency coordination on Arctic research activities, among other things. The committee is chaired by the National Science Foundation and consists of representatives from over 15 departments, agencies, and offices, including the Department of Defense.
U.S. Arctic Research Commission	The U.S. Arctic Research Commission is responsible for, among other things, developing and establishing an integrated national arctic research policy that guides federal agencies in developing and implementing their Arctic research programs. The commission consists of representatives from the National Science Foundation, academic and research institutions, private industry, and indigenous residents of the U.S. Arctic.
Arctic Policy Group	The Arctic Policy Group is an informal interagency group led by the Department of State that shares Arctic-related information and oversees implementation of U.S. Arctic policy. The group consists of officials from numerous federal agencies and the state of Alaska Governor's and Lieutenant Governor's offices.
Committee on Marine Transportation System	The Committee on the Marine Transportation System is a federal interagency coordinating committee that assesses the adequacy of the marine transportation system and coordinates and makes recommendations on federal policies that affect the marine transportation system.
National Ocean Council	The National Ocean Council consists of representatives from 27 federal agencies, departments, and offices and is responsible for implementation of the National Ocean Policy. While the National Ocean Policy's implementation plan is broader than the Arctic region, it specifically identifies the need for improvements to communications, environmental response to marine pollution and oil spills, the ability to observe and forecast sea ice, and the accuracy of charts and maps of the region.
U.S. Extended Continental Shelf Task Force	The Extended Continental Shelf Task Force, led by the Department of State, coordinates the collection and analysis of relevant data and prepares the necessary documentation to establish the limits of the U.S. continental shelf in accordance with international law.
Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska	The Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska, led by the Department of Interior, coordinates federal oversight of the development of energy resources and associated infrastructure in Alaska.

Source: GAO, Department of State (State), White House, Department of the Interior (Interior), National Science Foundation, U.S. Arctic Research Commission, National Ocean Council, and the Coast Guard. | GAO-15-566

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# Appendix V: GAO Contact and Staff Acknowledgments

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## GAO Contact

John Pendleton, (202) 512-3489 or [pendletonj@gao.gov](mailto:pendletonj@gao.gov)

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## Staff Acknowledgments

In addition to the contact named above, Patricia Lentini, Assistant Director; Russell Bryan; Ji Byun; Michael Silver; Amie Steele; Erik Wilkins-McKee; and Michael Willems made key contributions to this report.



# Appendix VI: Accessible Data

**Data Table for Figure 4: Summary of Likelihood and Role of Navy Mission Areas in the Arctic through 2040**

Mission areas	2010	2020	2030	2040
Preventing conflict and deterrence	Low/Medium	Low/Medium	Low/Medium	Low/Medium
Freedom of the seas and sea control	Low	Low	Low	Low
Force projection	Low	Low	Low	Low
Maritime security, search and rescue, and maritime domain awareness	Low	Low/Medium	Medium	Medium
Regional security cooperation	Low/Medium	Medium	Medium/high	Medium/High
Humanitarian assistance, disaster response, and defense support of civil authorities	Low	Low	Low	Low

**Key:**

- High: Navy has primary role. High likelihood of being conducted in the Arctic.
- Medium/High: Navy has primary role. High to medium likelihood of being conducted in the Arctic.
- Medium: Navy has supporting role. Medium likelihood of being conducted in the Arctic.
- Low/Medium: Navy has supporting role. Medium to low likelihood of being conducted in the Arctic.
- Low: Low likelihood of being conducted in the Arctic.

Source: Navy. | GAO-15-566

**Data Table for Figure 5: Arctic Sea Ice Extent in Both March and September from 1979 to 2014**

Million square kilometers

Year	March	September
1979	16.5	7.2
1980	16.2	7.8
1981	15.6	7.2
1982	16.2	7.4
1983	16.1	7.5
1984	15.7	7.1
1985	16.1	6.9
1986	16.1	7.5
1987	16	7.5
1988	16.2	7.5
1989	15.5	7
1990	15.9	6.2

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Appendix VI: Accessible Data

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Year	March	September
1991	15.5	6.5
1992	15.5	7.5
1993	15.9	6.5
1994	15.6	7.2
1995	15.4	6.1
1996	15.2	7.9
1997	15.6	6.7
1998	15.7	6.5
1999	15.4	6.2
2000	15.3	6.3
2001	15.6	6.7
2002	15.5	5.9
2003	15.5	6.1
2004	15.1	6
2005	14.8	5.6
2006	14.5	5.9
2007	14.7	4.3
2008	15.3	4.7
2009	15.2	5.4
2010	15.1	4.9
2011	14.6	4.6
2012	15.3	3.6
2013	15.1	5.3
2014	14.8	5.3

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Source: National Snow and Ice Data Center. | Gao-15-566

Notes:

High point: 16.5 million square kilometers in 1979.

Low point: 3.6 million square kilometers in 2012.

Linear rate of decline for March, relative to 1981 to 2010 average: 2.6% per decade.

Linear rate of decline for September, relative to 1981 to 2010 average: 13.3% per decade.

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*Arctic Issues: Better Direction and Management of Voluntary Recommendations Could Enhance U.S. Arctic Council Participation.* [GAO-14-435](#). Washington, D.C.: May 16, 2014.

*Maritime Infrastructure: Key Issues Related to Commercial Activity in the U.S. Arctic over the Next Decade.* [GAO-14-299](#). Washington, D.C.: March 19, 2014.

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*Managing for Results: Key Considerations for Implementing Interagency Collaborative Mechanisms.* [GAO-12-1022](#). Washington, D.C.: September 27, 2012.

*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](#). Washington, D.C.: January 13, 2012.

*Coast Guard: Efforts to Identify Arctic Requirements Are Ongoing, but More Communication about Agency Planning Efforts Would Be Beneficial.* [GAO-10-870](#). Washington, D.C.: September 15, 2010.

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