



June 2016

# COAST GUARD

## Arctic Strategy Is Underway, but Agency Could Better Assess How Its Actions Mitigate Known Arctic Capability Gaps

Accessible Version

# GAO Highlights

Highlights of [GAO-16-453](#), a report to congressional requesters

## Why GAO Did This Study

The retreat of polar sea ice in the Arctic, as reported by the U.S. National Snow and Ice Data Center, combined with an expected increase in human activity, has heightened U.S. interests in the Arctic region. To supplement U.S. Arctic policy, the White House and federal agencies have issued Arctic strategies and plans. Since the Arctic region has a substantial maritime domain, the Coast Guard plays a significant role in Arctic policy implementation and enforcement. GAO was asked to examine the Coast Guard's responsibilities, capabilities, and plans for the Arctic. This report discusses, among other things, the extent to which the Coast Guard has (1) reported progress in implementing its Arctic strategy, (2) assessed its Arctic capabilities and taken actions to mitigate any identified gaps, and (3) reported being able to carry out polar icebreaking operations. GAO reviewed relevant laws and policies and Coast Guard documents that detail its Arctic plans. GAO conducted a site visit to Alaska and interviewed officials from the Coast Guard, state and local government entities, native village corporations, and private or nonprofit organizations. These observations are not generalizable, but provided insights on Coast Guard activities.

## What GAO Recommends

GAO recommends that the Coast Guard develop measures for assessing how its actions have helped to mitigate Arctic capability gaps, and design and implement a process to systematically assess its progress on this. DHS concurred with our recommendations.

View [GAO-16-453](#). For more information, contact Jennifer Grover at (202) 512-7141 [groverj@gao.gov](mailto:groverj@gao.gov).

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# Arctic Strategy Is Underway, but Agency Could Better Assess How Its Actions Mitigate Known Arctic Capability Gaps

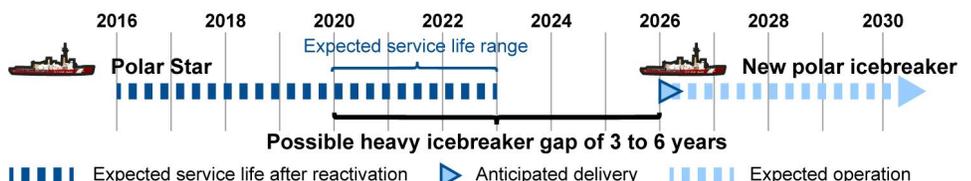
## What GAO Found

The U.S. Coast Guard, within the Department of Homeland Security, reported making progress implementing its Arctic strategy. For example, the Coast Guard reported conducting exercises related to Arctic oil spill response and search and rescue, and facilitating the formation of a safety committee in the Arctic, among other tasks in its strategy. To track the status of these efforts, the Coast Guard is developing a web-based tool and anticipates finalizing the tool in mid-2016.

The Coast Guard assessed its capability to perform its Arctic missions and identified various capability gaps—including communications, infrastructure, and icebreaking, and has worked to mitigate these gaps with its Arctic partners, such as other federal agencies. Specifically, Coast Guard officials stated that the agency's actions to implement the various Arctic strategies and carry out annual Arctic operations have helped to mitigate Arctic capability gaps. However, the Coast Guard has not systematically assessed the extent to which its actions agency-wide have helped to mitigate these gaps. Coast Guard officials attributed this, in part, to not being able to unilaterally close the gaps. While mitigating these gaps requires joint efforts among Arctic partners, the Coast Guard has taken actions in the Arctic that are specific to its missions and therefore has responsibility for assessing the extent to which these actions have helped to mitigate capability gaps. By systematically assessing and measuring its progress, the Coast Guard will better understand the status of these gaps and be better positioned to effectively plan its Arctic operations.

The Coast Guard has been unable to fulfill some of its polar icebreaking responsibilities with its aging icebreaker fleet, which currently includes two active polar icebreakers. In 2011 and 2012, the Coast Guard was unable to maintain assured, year-round access to the Arctic and did not meet 4 of 11 requests for polar icebreaking services. With its one active heavy icebreaker—which has greater icebreaking capability—nearing the end of its service life, the Coast Guard initiated a program in 2013 to acquire a new one and is working to determine the optimal acquisition strategy. However, the Coast Guard's efforts to acquire an icebreaker, whether by lease or purchase, will be limited by legal and operational requirements. In addition, current projections show that the Coast Guard is likely to have a 3- to 6-year gap in its heavy icebreaking capability before a new icebreaker becomes operational, as shown below. The Coast Guard is developing a strategy to determine how to best address this expected gap.

### Coast Guard's Heavy Icebreaker Availability and Expected Capability Gaps, Present until 2030



Source: GAO analysis of U.S. Coast Guard documents. | GAO-16-453

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### Abbreviations

AAR	after action report
AESC	Arctic Executive Steering Committee
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
DHS	Department of Homeland Security
DOC	Department of Commerce
DOD	Department of Defense
DOI	Department of the Interior
DOJ	Department of Justice
DOT	Department of Transportation
NOAA	National Oceanic and Atmospheric Administration
OMB	Office of Management and Budget

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June 15, 2016

The Honorable Duncan Hunter  
Chairman  
The Honorable John Garamendi  
Ranking Member  
Subcommittee on Coast Guard and Maritime Transportation  
Committee on Transportation and Infrastructure  
House of Representatives

The Honorable Rick Larsen  
House of Representatives

The Honorable Don Young  
House of Representatives

The United States, with the state of Alaska extending above the Arctic Circle, is one of eight Arctic nations.<sup>1</sup> The retreat of polar sea ice in the Arctic, as reported by the U.S. National Snow and Ice Data Center, combined with an expected increase in human activity there, has heightened U.S. and other nations' interests in the Arctic region in recent years. 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, resource exploitation (i.e., oil and gas exploration, mineral extraction), tourism, and commercial fishing. Growth in these commercial activities in the Arctic could also increase the risk of maritime accidents, such as ship collisions or oil spills. Growth in Arctic activity is also expected to increase demand for services such as search and rescue, and maritime navigation support, which can be a challenge to provide given the harsh and unpredictable weather and vast distances that responding agencies must travel to reach the Arctic. U.S. interest in the Arctic was further heightened in anticipation of the United States taking over the chairmanship of the Arctic Council—a voluntary

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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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intergovernmental forum—in 2015.<sup>2</sup> With this heightened focus, various Arctic strategies and policies have been released by the White House and other federal entities to supplement long-standing U.S. Arctic policy. For example, the White House issued an Arctic national strategy in 2013 and its corresponding implementation plan in 2014.<sup>3</sup> The U.S. Coast Guard, within the Department of Homeland Security (DHS), also plays a significant role in U.S. Arctic policy and thus has issued its corresponding Arctic strategy and implementation plan.<sup>4</sup>

We have previously examined emerging issues and challenges for the United States in the Arctic.<sup>5</sup> For example, in 2010, GAO reported that the Coast Guard faced several challenges operating in the Arctic—including limited maritime domain awareness and a lack of communication infrastructure—but was taking actions to address these challenges.<sup>6</sup> 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 U.S. Arctic maritime infrastructure

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<sup>2</sup>Established by the Ottawa Declaration in 1996, the Arctic Council is the intergovernmental forum for addressing issues related to the Arctic Region and operates on a basis of consensus. The members of the Arctic Council include the eight Arctic States plus six groups representing the indigenous people of the Arctic. The Council focuses its work on matters related to sustainable development, the environment, and scientific cooperation in the Arctic; its mandate explicitly excludes military security.

<sup>3</sup>White House, *National Strategy for the Arctic Region* (Washington, D.C.: May 10, 2013), and *Implementation Plan for the National Strategy for the Arctic Region* (Washington, D.C.: Jan. 30, 2014). The implementation plan was superseded in March 2016 by the *Implementation Framework for the National Strategy for the Arctic Region*.

<sup>4</sup>U.S. Coast Guard, *United States Coast Guard Arctic Strategy* (Washington, D.C.: May 2013) and *United States Coast Guard Arctic Strategy Implementation Plan* (Washington, D.C.: December 2015).

<sup>5</sup>GAO, *Arctic Planning: DOD Expects to Play a Supporting Role to Other Federal Agencies and Has Efforts Under Way to Address Capability Needs and Update Plans*, [GAO-15-566](#) (Washington, D.C.: June 19, 2015); *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.: Mar. 19, 2014); and *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.: Sept. 15, 2010).

<sup>6</sup>[GAO-10-870](#). Maritime domain awareness is the effective understanding of anything associated with the global maritime domain that could affect the United States' security, safety, economy, or environment.

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investments.<sup>7</sup> In that report, we analyzed the Committee on the Marine Transportation System's 2013 study which prioritized actions for developing U.S. Arctic maritime infrastructure.<sup>8</sup> Also in 2014, we assessed U.S. involvement in the Arctic Council to help clarify the direction of future U.S. participation and to position the United States for a successful Arctic Council chairmanship, which began in 2015.<sup>9</sup> In 2015, we reported that the Department of Defense (DOD) expects to play a supporting role to other federal agencies involved in the Arctic based on its assessments of a low level of military threat. We also reported that DOD is monitoring the security environment for changes, and is updating its regional plans and conducting analysis to determine future capability needs.<sup>10</sup>

As a result of anticipated changes in the Arctic and the recent issuance of additional Arctic strategies and plans, you asked us to examine the Coast Guard's responsibilities, capabilities, and plans for the Arctic. This report discusses (1) the progress the Coast Guard reported toward implementing its Arctic strategy, (2) the extent to which the Coast Guard has assessed its Arctic capabilities and taken actions to mitigate any identified gaps, (3) the factors that affect Coast Guard planning for Arctic operations, and (4) the extent to which the Coast Guard reported being able to carry out polar icebreaking operations, and what plans, if any, it has for maintaining this capability.

To gather information for all four objectives, we reviewed relevant laws, documents, and reports, and interviewed officials from various federal entities and stakeholders in Alaska. Specifically, we reviewed a 2009 national security presidential directive, which reflects U.S. Arctic policy, as well as other national strategies and policies that supplement this policy;<sup>11</sup>

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<sup>7</sup>[GAO-14-299](#). Maritime infrastructure includes (1) the marine transportation system (ports, navigable waterways, and port connectors such as roads and railways); (2) aids to maritime navigation (buoys and beacons); (3) mapping and charting; (4) weather and sea ice forecasts; and (5) polar icebreakers.

<sup>8</sup>U.S. Committee on the Marine Transportation System, *U.S. Arctic Marine Transportation System: Overview and Priorities for Action* (Washington, D.C.: 2013).

<sup>9</sup>[GAO-14-435](#).

<sup>10</sup>[GAO-15-566](#).

<sup>11</sup>White House, *Arctic Region Policy*, National Security Presidential Directive/NSPD-66 and Homeland Security Presidential Directive/HSPD-25 (Washington, D.C.: Jan. 9, 2009).

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Coast Guard Arctic strategy and planning documents—including reports on icebreaking capabilities and Arctic capabilities; GAO reports, and other entities’ Arctic-related reports.<sup>12</sup> We interviewed and obtained written responses from DHS and Coast Guard headquarters officials as well as field-based Coast Guard District and Sector officials responsible for all Coast Guard operations in the Arctic to obtain their perspectives for our objectives.<sup>13</sup> We also interviewed federal officials from the Department of Commerce’s National Oceanic and Atmospheric Administration (NOAA); the Department of the Interior’s Bureau of Ocean Energy Management and Bureau of Safety and Environmental Enforcement; DOD—including the U.S. Navy; and the National Science Foundation. We selected these federal agencies because of their involvement in Arctic activities, in particular, those activities that involved coordination with the Coast Guard. We interviewed these officials to obtain information regarding Arctic priorities and strategies, coordination efforts with the Coast Guard—including for icebreaking services—and Arctic activities and trends, among other issues. We also visited Alaska, where, in addition to Coast Guard field-based officials, we interviewed representatives from six state and local government entities; three private or nonprofit organizations representing various Arctic interests including those related to commercial activity and resource extraction; and two native village corporations.<sup>14</sup> The results of our interviews are not generalizable to all Arctic stakeholders, but they provided valuable information and perspectives on maritime activities in the U.S. Arctic.

To determine the progress the Coast Guard has made in implementing its Arctic strategy, in addition to the steps above, we reviewed the Coast

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<sup>12</sup>[GAO-15-566](#), [GAO-14-435](#), [GAO-14-299](#), [GAO-14-435](#), and [GAO-10-870](#).

<sup>13</sup>Coast Guard Sectors conduct all missions at the local and port level, such as search and rescue, port security, environmental protection, and law enforcement in ports and surrounding waters, and oversee a number of smaller Coast Guard units, including small cutters, small boat stations, and Aids to Navigation teams. Coast Guard Districts oversee Sectors, other Coast Guard units, such as Air Stations, and major buoy tenders, among other assets. Sector Anchorage has the largest geographic area of responsibility of all Coast Guard Sectors and includes the North Slope, Bering Sea, Chukchi Sea, Bristol Bay, Kodiak Island, Kenai Peninsula, and the Aleutian Islands.

<sup>14</sup>Some of the interviews took place by phone. We selected these interviewees to reflect a range of stakeholders in the Arctic region who had understanding and experience on Arctic issues, particularly those that may be involved in or affected by the Coast Guard’s Arctic Shield operations.

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Guard's Arctic Strategy and its implementation plan.<sup>15</sup> We also reviewed national strategies and plans that delineated Arctic-specific tasks to the Coast Guard and which the Coast Guard also considers to be binding, pursuant to available resources. As such, we analyzed the *National Ocean Policy Implementation Plan* and the White House's *National Strategy for the Arctic Region* and its implementation plan.<sup>16</sup> We also interviewed the U.S. Department of State's Special Representative for the Arctic to discuss U.S. strategic priorities in the Arctic. To determine the extent to which the Coast Guard has assessed its Arctic capabilities and taken actions to mitigate any identified gaps, we reviewed federal agency reports on capabilities, including the Coast Guard's mission analysis report and a joint DHS-DOD paper on Arctic capabilities—two key reports identified by the Coast Guard as being currently relevant. In addition, we compared how the Coast Guard monitors its efforts to help mitigate capability gaps with best practices for agency monitoring as detailed in *Standards for Internal Control in the Federal Government*.<sup>17</sup> To determine the extent to which the Coast Guard has utilized data to plan for Arctic operations, and what, if any, challenges it faces, we analyzed Coast Guard Arctic Shield planning documents, such as the annual Arctic Shield operations orders and after-action reports (AAR) from 2012 to 2015—all available reports since the Arctic Shield operation was formalized.<sup>18</sup> To determine the extent to which the Coast Guard is currently able to carry out polar icebreaking operations, and what plans, if any, it has for maintaining this capability, we analyzed the Coast Guard's reports related to mission needs in the Arctic and icebreaker acquisition and the number of internal and interagency requests received and fulfilled for polar icebreaking services. We also reviewed the statutes, presidential

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<sup>15</sup>U.S. Coast Guard, *United States Coast Guard Arctic Strategy* (Washington, D.C.: May 2013) and *United States Coast Guard Arctic Strategy Implementation Plan* (Washington, D.C.: December 2015).

<sup>16</sup>National Ocean Council, *National Ocean Policy Implementation Plan* (Washington, D.C.: April 2013), and White House, *National Strategy for the Arctic Region* (Washington, D.C.: May 10, 2013) and *Implementation Plan for the National Strategy for the Arctic Region* (Washington, D.C.: Jan. 30, 2014). In addition to the selected strategies and plans, the Coast Guard is a partner in various other strategies and plans related to the Arctic—including other agencies' Arctic strategies and the DHS Climate Change Adaptation report

<sup>17</sup>GAO, *Standards for Internal Control in the Federal Government*, [GAO/AIMD-00-21.3.1](#) (Washington, D.C.: November 1999).

<sup>18</sup>Arctic Shield is the name of the annual operation that the Coast Guard has conducted in the Arctic each year since 2012.

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directives, strategies, and interagency agreements on which the Coast Guard's polar icebreaking requirements are based.

We conducted this performance audit from December 2014 to June 2016 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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## Background

### Diminishing Ice Opens Potential for Increased 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>19</sup> 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 2015 was the fourth lowest in the satellite record, and 699,000 square miles less than the 1981 to 2010 average (see fig. 1).<sup>20</sup> Further, it also reported that the 10 lowest September ice extents on satellite record have all occurred in the last 10 years.<sup>21</sup> While much of the Arctic Ocean remains ice-covered for a

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<sup>19</sup>According to the Navy Arctic Roadmap, the average temperatures in the Arctic have increased at a rate almost twice that of the rest of the world. U.S. Navy, *Arctic Roadmap 2014-2030* (Washington, D.C.: February 2014). The Navy issued its first Arctic Roadmap in October 2009.

<sup>20</sup>App. I provides a non-interactive version of fig. 1. In addition, the University of Washington's Polar Science Center reported that September 2015 had the fifth lowest ice volume on record. Ice volume is an indicator of not only changes in ice extent but also ice thickness.

<sup>21</sup>Although higher than the September 2015 Arctic sea ice extent of 1.7 million square miles, January 2016 had the lowest sea ice extent (5.2 million square miles) on record for the month of January.

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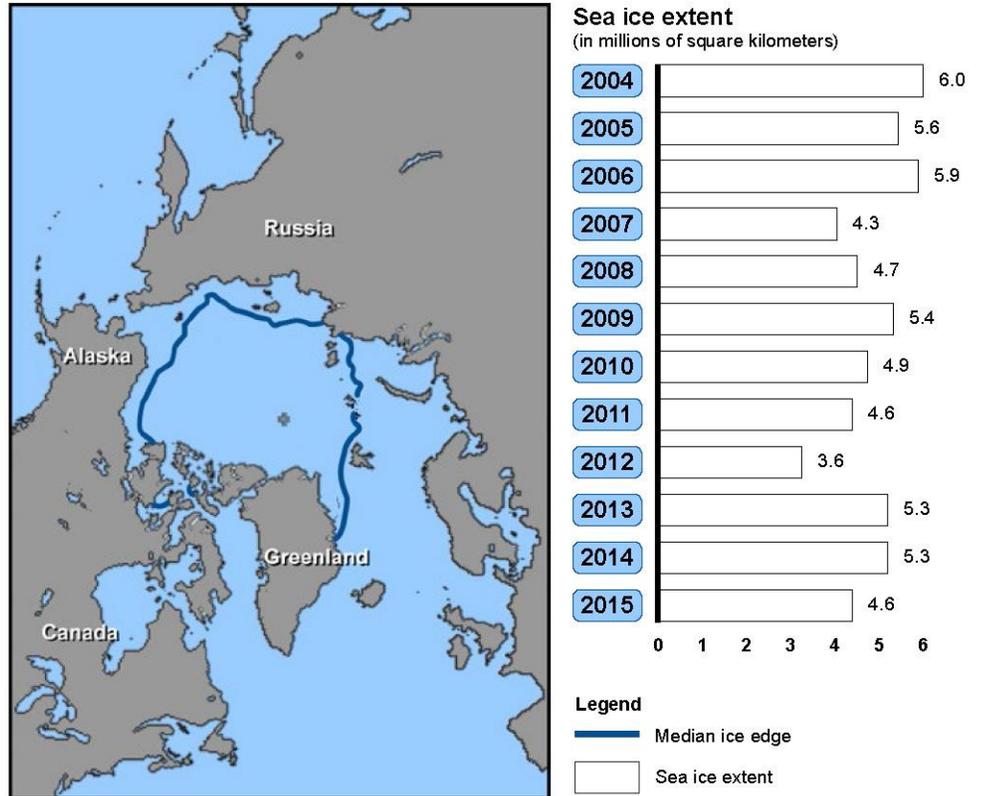
majority of the year, most scientific estimates predict there will be an ice-diminished Arctic Ocean in the summer in the next 20 to 40 years.<sup>22</sup>

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<sup>22</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.

**Interactive graphic** Figure 1: Change in Minimum Ice Extent from 2004 to 2015, Compared to the 1981-2010 Median Minimum Ice Extent

Roll over the year to view recorded ice extent. See appendix X for the printable, non-interactive version.



Source: National Snow and Ice Data Center. | GAO-16-453

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These Arctic environmental changes make maritime transit more feasible and are increasing the likelihood of further expansion of human activity including tourism, oil, gas, and mineral extraction, commercial shipping, and fishing. Melting ice could 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 travel between major trading blocs. Increased trans-Arctic use of the Northern Sea Route could particularly affect the U.S. Arctic because vessels may pass through the Bering Strait, a body of water about 50 miles wide at its narrowest point between Russia and the United States. Vessel data show that transits through the Bering Strait increased from about 220 in 2008 to about 540 in 2015, and Coast Guard officials stated that they anticipate this number to increase annually.<sup>23</sup>

Significant oil, gas, and mineral deposits in the Arctic, including 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 have also increased interest in exploration opportunities in the region. Cruise line interests in exploring the Arctic may also increase as evidenced by Crystal Cruise Lines’ planned 2016 Arctic voyage that is expected to be the largest cruise ship yet to traverse the Northwest Passage, a dynamic ice area with thick ice hazards usually present all summer.<sup>24</sup>

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## National Strategic Guidance and Policies Govern Arctic Operations

Various strategic guidance and policies govern U.S. operations in the Arctic region. These include overarching national policies as well as more specific maritime policies and authorities. A 2009 national security presidential directive reflects current U.S. Arctic policy and is key among

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<sup>23</sup>According to the Coast Guard, oil exploration in 2012 and 2015 boosted the yearly activity beyond the steady rise in Bering Sea traffic. Northern Sea Route traffic was down in 2014 which decreased the Bering Strait transit numbers that year but the overall number of vessels in the Arctic was up to 2012 levels. Coast Guard-reported data are obtained through the Marine Exchange of Alaska Automatic Identification System. The Marine Exchange of Alaska is a non-profit maritime organization established to serve the Alaska maritime community by providing information, communications and services to ensure safe, secure, efficient and environmentally responsible maritime operations.

<sup>24</sup>The Northwest Passage follows the northern coasts of Alaska and Canada, connecting the east coasts of Canada and Asia.

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U.S. policies.<sup>25</sup> The Coast Guard's role in the Arctic was implicated in this directive, which acknowledges the effects of climate change and increased human activity in the Arctic region; lays out specific policy objectives and federal partners; and addresses issues related to national security, international governance, international scientific cooperation, economic issues, environmental protection, and maritime transportation in the Arctic region.

Additional White House national strategies and plans supplementing existing Arctic policy have been issued since the 2009 presidential directive on the Arctic region. Specifically, in May 2013, the White House issued the *National Strategy for the Arctic Region* that 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.<sup>26</sup> The White House released an implementation plan for the *National Strategy for the Arctic Region* in January 2014 that sets forth the methodology, process, and approach for executing the strategy.<sup>27</sup> This plan was superseded in March 2016 by the *Implementation Framework for the National Strategy for the Arctic Region* which incorporated new priorities, among other things.<sup>28</sup> The Coast Guard and some other federal agencies have also issued their own strategies for the Arctic. For example, the Coast Guard issued its 10-year strategy in May 2013, which seeks to support national policy with three key objectives of improving awareness, modernizing governance, and broadening partnerships.<sup>29</sup> The Coast Guard issued its implementation plan for this strategy in December 2015.<sup>30</sup> While encompassing more than the Arctic region, the White

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

<sup>26</sup>White House, *National Strategy for the Arctic Region* (Washington, D.C.: May 10, 2013).

<sup>27</sup>White House, *Implementation Plan for the National Strategy for the Arctic Region* (Washington, D.C.: Jan. 30, 2014).

<sup>28</sup>White House, the *Implementation Framework for the National Strategy for the Arctic Region* (Washington, D.C.: Mar. 9, 2016).

<sup>29</sup>U.S. Coast Guard, *United States Coast Guard Arctic Strategy* (Washington, D.C.: May 2013).

<sup>30</sup>U.S. Coast Guard, *United States Coast Guard Arctic Strategy Implementation Plan* (Washington, D.C.: December 2015).

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House National Ocean Council issued the *National Ocean Policy Implementation Plan* in April 2013 which specifically identifies Arctic issues—such as the need for improvements to communications; navigation; and oil spill prevention, containment, and response to provide maritime safety and security in a changing Arctic.<sup>31</sup>

In an effort to coordinate the actions of federal entities involved in the Arctic, the White House established the Arctic Executive Steering Committee (AESC) in January 2015 and tasked it with shaping priorities, providing strategic direction, overseeing implementation of the *National Strategy for the Arctic Region*, and ensuring coordination of federal activities in the Arctic, among other things.<sup>32</sup> In addition, since the Arctic region has significant maritime domain area, existing U.S. strategic guidance relating to maritime areas continues to apply, such as the *Maritime Security Policy* issued by the President in December 2004.<sup>33</sup>

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<sup>31</sup>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. Exec. Order No. 13,547, 75 Fed. Reg. 43,023 (July 22, 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 on-the-ground actions.

<sup>32</sup>The AESC was established under Executive Order 13689, *Enhancing Coordination of National Efforts in the Arctic*. Exec. Order No. 13,689, 80 Fed. Reg. 4191 (Jan. 26, 2015). According to the order, the steering committee consists of: (i) the heads, or their designees, of the Office of Science and Technology Policy, the Council on Environmental Quality, the Domestic Policy Council, and the National Security Council; (ii) the Executive Officer of the Steering Committee, who shall be designated by the Chair of the Steering Committee (Chair); and (iii) the Deputy Secretary or equivalent officer from the Departments of State, Defense, Justice, the Interior, Agriculture, Commerce, Labor, Health and Human Services, Transportation, Energy, and Homeland Security; the Office of the Director of National Intelligence; the Environmental Protection Agency; the National Aeronautics and Space Administration; the National Science Foundation; the Arctic Research Commission; and the Office of Management and Budget; the Assistant to the President for Public Engagement and Intergovernmental Affairs, or his or her designee; and other agencies or offices as determined appropriate by the Chair. In general, the Coast Guard represents the Department of Homeland Security during these meetings. In addition, other interagency groups help to coordinate federal actions, as detailed in app. II.

<sup>33</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).

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## The Coast Guard Is the Primary Federal Maritime Agency in the Arctic, but Multiple Stakeholders Have Arctic Responsibilities

Given the Arctic region's extensive maritime domain, the Coast Guard plays a significant role in Arctic policy implementation and enforcement. The Coast Guard is a multimission, maritime military service that is responsible for maritime safety and security, environmental protection, and national defense, among other missions.<sup>34</sup> The Coast Guard has these same mission responsibilities in the Arctic Ocean as it does in other oceans. Therefore, as more navigable ocean water has emerged in the Arctic and human activity increases, the Coast Guard has faced, and will continue to face, expanding responsibilities in the region. Other DHS components and federal agencies—such as the Departments of Defense, Interior, and Commerce, and the National Science Foundation—as well as interagency groups, such as the AESC, also have responsibilities in the Arctic, as detailed in Appendix II.

State and local governments, Alaska Native tribal governments, Alaska Native corporations, and other Alaska Native entities, private industry, and nonprofit groups are also important Arctic stakeholders. State government is involved in, among other things, Arctic fishery enforcement, oil spill planning and response, emergency management, and economic development. Local governments, Alaska Native tribal governments, and Alaska Native entities are in some cases the closest stakeholders to activities taking place in the Arctic. Consequently, the responsibility for responding to Arctic incidents often falls to local governments. For example, the North Slope Borough, which encompasses about 89,000 square miles of northern Alaska, maintains its own search and rescue capabilities including fixed and rotary wing aircraft designed for shore-based response and a small boat for on the water response. Additionally, Alaska Native communities have inhabited the Arctic region for thousands of years and are particularly sensitive to

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<sup>34</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. The Coast Guard's 11 statutory missions are (1) ports, waterways, and coastal security; (2) migrant interdiction; (3) defense readiness; (4) drug interdiction; (5) other law enforcement; (6) search and rescue; (7) living marine resources; (8) aids to navigation; (9) ice operations; (10) marine environmental protection; and (11) marine safety. See 6 U.S.C. § 468(a). However, Coast Guard officials stated that they execute 9 of these missions in the Arctic region, with migrant interdiction and drug interdiction being the 2 missions that they currently do not carry out there. The Arctic strategies and plans have not created new missions for the Coast Guard or created a new geographic area of responsibility, but rather, they have led to an increase in the Coast Guard's presence, activities, and operational tempo in the Arctic.

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changes in the environment due to a subsistence way of life and culture revolving around marine ecosystems. Finally, private sector and nonprofit groups are also important Arctic stakeholders, and they represent a wide spectrum of interests, including resource extraction companies, cruise lines, vessel tracking organizations, and conservation groups, among others.

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## Coast Guard Arctic Operations

Presently, all of the Coast Guard's permanent assets are based well below the Arctic Circle, so Coast Guard operations above the Arctic Circle are constrained by several factors, including the time required for surface vessels and aircraft to travel vast distances to reach the Arctic Circle and the scarcity of physical infrastructure to support operations. Figure 2 compares the state of Alaska to the lower 48 states to illustrate the large distances between, for example, Kodiak (the Coast Guard's northernmost air station) and Point Barrow (the northernmost point of land in Alaska).

Figure 2: Map of the State of Alaska Superimposed on the Lower 48 States, Showing Travel Distances



Sources: National Oceanic and Atmospheric Administration, United States Coast Guard, Map Resources, and GAO. | GAO-16-453

Within the Coast Guard, District 17 and Sector Anchorage have primary responsibility for operations in the Arctic region. Since 2008, District 17 has conducted an annual operation in the Arctic (now known as Operation “Arctic Shield”).<sup>35</sup> Coast Guard officials stated that Arctic Shield

<sup>35</sup>The Coast Guard began seasonal operations in 2008 and formalized these operations into an annual operation in 2012, called Arctic Shield. Prior operations included Operation Crossroads and Salliq. Arctic Shield began as an outreach initiative, a mobile and seasonal operation with the objective of meeting Coast Guard statutory responsibilities in the Arctic region. Over the years, Arctic Shield built upon the experiences and lessons learned from the previous years’ activities.

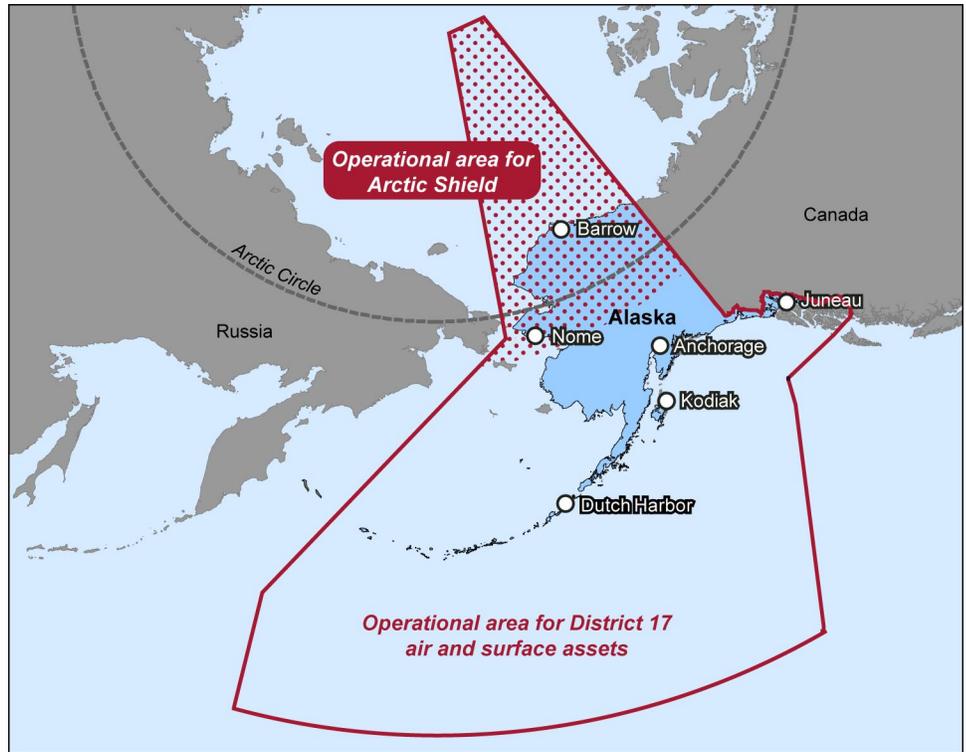
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is a seasonal surge operation designed to help the Coast Guard learn how to operate in this increasingly active area of responsibility. Arctic Shield is intended to provide the Coast Guard with the opportunity to (a) perform Coast Guard missions and activities, (b) advance maritime domain awareness, (c) broaden partnerships in support of Coast Guard Arctic operations, and (d) enhance and improve preparedness, prevention, and response capabilities in the Arctic. It is also the primary operation through which the Coast Guard carries out activities in the Arctic region and includes the deployment of aircraft, cutters, and personnel to the Arctic region. It is generally conducted between June and October—although some planning and outreach activities may take place before. The general area of operation for Arctic Shield each year is smaller than the Coast Guard’s District 17 area of operation, see figure 3.<sup>36</sup>

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<sup>36</sup>All Arctic stakeholders do not define the Arctic geographic area the same way. Federal law relating to Arctic research defines the Arctic as all U.S. and foreign territory north of the Arctic Circle and all U.S. territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwin Rivers [in Alaska]; all contiguous seas including the Arctic Ocean and the Beaufort, Bering, and Chukchi Seas; and the Aleutian Chain. The Arctic Research and Policy Act of 1984, Pub. L. No. 98-373, § 112, 98 Stat. 1242, 1248 (codified at 15 U.S.C. § 4111).

**Figure 3: Map of the Coast Guard's Arctic Area of Operation and Arctic Shield Operations**



Source: U.S. Coast Guard; MapInfo (map). | GAO-16-453

## History of the Polar Icebreakers

Under federal law, the Coast Guard has been responsible for carrying out the nation's polar icebreaking needs since 1965—when it assumed primary responsibility for the nation's polar icebreaking fleet.<sup>37</sup> In addition, the Coast Guard cites a variety of statutes, strategic policies, and

<sup>37</sup> 14 U.S.C. § 2 establishes that one of the Coast Guard's required primary functions is to maintain icebreaking facilities for use on the high seas and on waters subject to U.S. jurisdiction, as well as, pursuant to international agreements, to maintain icebreaking facilities on waters other than the high seas and on waters not subject to U.S. jurisdiction—specifically, the Antarctic region. Title 14 authorities do not prevent other agencies from owning or operating icebreakers or ice-capable vessels. For example, the ice-strengthened Research Vessel *Sikuliaq*, which was commissioned in March 2015 and operates in the Arctic Region, is owned by the National Science Foundation and operated by the University of Alaska Fairbanks. The *Sikuliaq*, however, is unsuitable for extended operation in the Arctic and can only operate in ice up to 2.5-foot thick.

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interagency agreements that drive the Coast Guard's employment of polar icebreakers. A summary of some of these provisions can be found in Appendix III.<sup>38</sup>

The Coast Guard's polar icebreaking fleet comprises three polar icebreakers—the *Polar Star*, *Polar Sea*, and *Healy*—of which, the *Polar Star* and *Healy* are currently active. See figure 4 for photographs of the Coast Guard's active icebreakers.

**Figure 4: U.S. Coast Guard's Icebreakers, the *Polar Star* and *Healy***



U.S. Coast Guard Cutter *Polar Star*



U.S. Coast Guard Cutter *Healy*

Source: U.S. Coast Guard. | GAO-16-453

Commissioned in 1976 and 1978, respectively, the *Polar Star* and the *Polar Sea* are heavy polar icebreakers and the world's most powerful non-nuclear icebreakers.<sup>39</sup> The third icebreaker, the *Healy*, is a medium icebreaker that primarily supports Arctic research. Although the *Healy* is

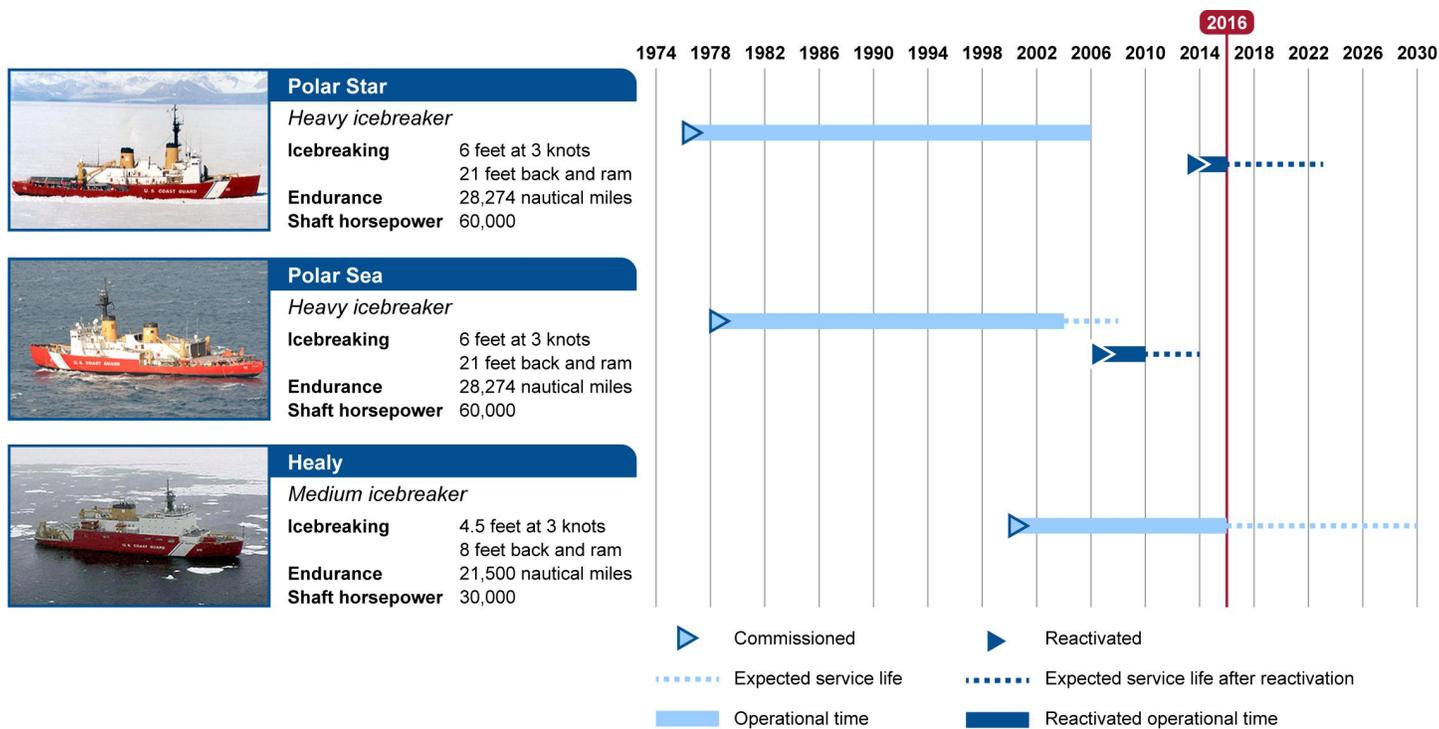
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<sup>38</sup>Besides icebreaking, polar icebreakers also serve as open-ocean command and control centers, providing an extended on-scene presence, and deploying rotary-wing aircraft. Although the Coast Guard's National Security Cutters can provide these capabilities in the Arctic, they are not designed to come into contact with ice and thus are not suitable for Arctic operation during winter or shoulder seasons.

<sup>39</sup>The Coast Guard defines a heavy icebreaker as a vessel (generally with at least 45,000 shaft horsepower) that can operate independently in polar environments with the presence of seasonal or multi-year ice. We used this definition for this report. While the Coast Guard's buoy tenders have limited ice breaking capability, only polar icebreakers are equipped to operate independently in existing and expected polar environments.

capable of carrying out a wide range of activities, it cannot operate independently in the ice conditions in the Antarctic or ensure timely access to some Arctic areas in the winter. Figure 5 details the history of the Coast Guard's current icebreaking fleet, including commission dates, expected service life, and re-activation dates.

**Figure 5: U.S. Coast Guard's Polar Icebreaker Fleet**



Source: GAO analysis of Coast Guard documents; U.S. Coast Guard (photographs). | GAO-16-453

Note: The *Polar Sea* went under extensive repair from 2004 to 2006 and was not operational. The repair resulted in the *Polar Sea's* service life being extended until 2014. However, it suffered major engine casualties in June 2010, and has not been active since.

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## The Coast Guard Reported Progress Implementing its Arctic Strategy

The Coast Guard has reported making progress implementing its Arctic strategy and addressing tasks in its implementation plan. The Coast Guard's May 2013 strategy aims to ensure safe, secure, and environmentally responsible maritime activity in the Arctic, while the related implementation plan, issued in December 2015, is intended to operationalize this strategy—within existing resources.<sup>40</sup> The implementation plan also incorporates tasks assigned to the Coast Guard from the *National Strategy for the Arctic Region*, its implementation plan, and the National Ocean Policy (see App. IV and V for more on these strategies and plans).<sup>41</sup> According to the Coast Guard, these national strategies and plans, as well as key presidential directives, executive orders, and other national strategies guided the development of its strategy.<sup>42</sup> In addition, Coast Guard officials stated that they factored in findings and recommendations from other studies into their strategy, such as the Committee on the Marine Transportation System's report on the Arctic Marine Transportation System.<sup>43</sup> For example, the Coast Guard included tasks such as completing a study on the Bering Strait port access route in its Arctic Strategy, which was also included in the committee report. According to the Coast Guard's implementation plan, the document is to be updated as new information is learned, and according to Coast Guard officials, expected timeframes for completion can be adjusted given funding and resources.

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<sup>40</sup>Coast Guard officials stated that they delayed issuing the implementation plan to incorporate changes and developments in national priorities.

<sup>41</sup>The Coast Guard Arctic Strategy Implementation Plan specifically details which strategies that each of its tasks is to concurrently fulfill. Of the 13 tasks, the Coast Guard links 9 of them the *National Strategy for the Arctic Region* or its implementation plan, and 1 to the National Ocean Policy.

<sup>42</sup>According to Coast Guard officials, the *National Strategy for the Arctic Region* and the Coast Guard's Arctic strategy were developed around the same time, and, as such, were highly coordinated and aligned.

<sup>43</sup>U.S. Committee on the Marine Transportation System, *U.S. Arctic Marine Transportation System: Overview and Priorities for Action* (Washington, D.C.: 2013). We previously reported on the efforts of the Committee on the Marine Transportation System's efforts to prioritize Arctic infrastructure, see [GAO-14-299](#). According to Coast Guard officials, while the final committee report was published 2 months after the Coast Guard's Arctic strategy, the Coast Guard was involved in the development of the committee report and was able to incorporate the ideas from the committee report into its Arctic strategy.

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The Coast Guard's implementation plan includes 13 tasks (or initiatives) and identifies lead Coast Guard components for each initiative.<sup>44</sup> Many of the tasks require the Coast Guard to research, coordinate, and evaluate Arctic issues—an indication that many of the Arctic efforts are planning-oriented and are to help agency officials better understand Arctic issues, and prepare the Coast Guard for increased Arctic operations. Coast Guard officials stated that the tasks in its strategy generally included actions that the Coast Guard was already planning to take in the Arctic, and new tasks were only agreed upon if resources permitted. The Coast Guard's implementation plan also states that appropriate metrics are to be applied to each of the tasks and associated next steps to ensure that they are on schedule and properly tailored for the operational and resource environments faced by the Coast Guard and the nation. Specifically, the implementation plan states that Coast Guard component leads for each task are to specify the desired outcomes to define success for each task and develop supporting plans that specify the scope, timeline, and resources needed across the 10-year plan, and highlight significant challenges. However, this information was not included in the implementation plan and according to Coast Guard officials, it was not included because they anticipate that the plan will be updated annually, and as such, they wanted to keep the plan flexible to such change. Coast Guard officials stated that each lead component has drafted plans that specify the desired outcome for success, scope, timeline, and resources needed, and anticipate finalizing them in August 2016. Officials also stated that they wanted to wait for the White House to release its March 2016 revised implementation plan for the national strategy before finalizing these efforts. The revised national implementation plan incorporated new priorities, and Coast Guard officials stated that better prioritization will help the Coast Guard in making decisions about what it needs to achieve in the Arctic given its limited resources.<sup>45</sup>

Coast Guard officials stated that they have made some progress on the 13 tasks established in the Coast Guard's implementation plan, as described in more detail in table 1.

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<sup>44</sup>The 13 tasks—as listed in table 1—also include 74 discrete next steps.

<sup>45</sup>Further, officials stated that they will continue to conduct all mandatory missions in the Coast Guard's Arctic operations, regardless of how Arctic priorities shift but it would be helpful if clarification of priorities were delivered along with additional or different resources to support those priorities.

**Table 1: Examples of Coast Guard Reported Progress in Implementing the Coast Guard Arctic Strategy Implementation Plan**

Task	Examples of Reported Progress, as of February 2016
1. Enhance Arctic Operations and Exercises	The Coast Guard and Department of Defense (DOD) held a search and rescue exercise in October 2015 in which seven Arctic nations participated, and they are planning a field training search and rescue exercise for August 2016.
2. Improve Maritime Domain Awareness	The Coast Guard expanded vessel carriage requirements to more vessels for the Automatic Identification System, which allows vessels carrying this system to transmit information such as the vessel name, its position, speed, course, and destination to receivers within range of its broadcast, allowing these vessels to be tracked when operating in coastal areas, inland waterways, and ports.
3. Ensure Arctic Surface and Air Capabilities with Associated Support Infrastructure	The President’s fiscal year 2017 budget request includes funding to accelerate production activities for a heavy icebreaker, and the Coast Guard has completed some acquisition documents.
4. Improve Arctic Communications Capabilities	The Coast Guard’s <i>Healy</i> icebreaker conducted communications capability testing while underway during Arctic Shield 2015.
5. Implement the Polar Code	The Coast Guard is evaluating the levels of national policy guidance that would be required and any changes to domestic regulations or Coast Guard enforcement policy that may be required.
6. Promote Arctic Waterways Management	The Coast Guard helped facilitate the formation of the Arctic Waterways Safety Committee—a non-governmental committee dedicated to addressing safety, security, subsistence, and environmental issues facing the Arctic. The committee was established in October 2014, and the committee adopted its bylaws in March 2015.
7. Support Arctic Council and U.S. Chairmanship	The Coast Guard has the lead role on exercises integral to the Arctic Ocean Safety, Security, and Stewardship pillar of the U.S. Chairmanship. The Coast Guard hosted a September 2015 oil pollution and response exercise.
8. Advance an Arctic Coast Guard Forum	The Arctic Coast Guard Forum was formally established in October 2015 by the coast guard agencies from each of the Arctic nations and is developing an information sharing site and operation and process guides.
9. Support a Center for Arctic Study and Policy	The Center for Arctic Study and Policy co-hosted a workshop in December 2015 on U.S.-Canada shared opportunities and is planning another in July 2016 on waterways management.
10. Establish an Arctic Policy Board	The Department of Homeland Security gave notional approval for Arctic Policy Board in 2014, and Coast Guard officials stated that it has taken no further action because it has been unable to identify a funding source for it.
11. Create an Arctic Fusion Center	No action taken. Coast Guard officials stated that action would occur, if warranted.
12. Create an Arctic Maritime Assistance Coordination Center	No action taken. Coast Guard officials stated that action would occur, if warranted.
13. Strengthen Marine Environmental Response in the Arctic	In 2015, at the direction of the Arctic Executive Steering Committee, the Coast Guard led an interagency task force to identify ways to strengthen emergency preparedness and response in the Arctic.

Source: GAO summary of Coast Guard information. | GAO-16-453

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To track its progress on the 13 tasks, the Coast Guard is in the process of developing a web-based site for its components to enter and track the status of implementation plan tasks, as well as the status of its Arctic-related responsibilities under other national strategies, presidential directives, and service directives. Information on this site is to include the responsible component, milestones, status, and percentage toward completion for each task or responsibility. The Coast Guard expects that the web-based site will be updated continually as tasks are completed to ensure the most accurate reporting. Coast Guard officials stated that they delayed finalizing this tool until they saw the revised implementation plan for the national strategy. Officials also stated that they anticipate finalizing the tool by mid-year 2016, but that system integration and resource constraints could create delays.

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## The Coast Guard Has Assessed Its Arctic Capabilities and Taken Actions to Mitigate Gaps but Has Not Systematically Assessed its Progress

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### The Coast Guard Assessed Its Capabilities in the Arctic and Identified Capability Gaps

In addition to taking actions to implement its Arctic strategy, the Coast Guard assessed its capability to perform its missions in the Arctic and identified various capability gaps, primarily through two key studies. Specifically, a November 2011 Coast Guard study identified both the Coast Guard's Arctic requirements and Arctic capability and capacity

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gaps.<sup>46</sup> Another study, issued by the DOD–DHS Arctic Capabilities Assessment Working Group in March 2012, consolidated the needed capabilities identified in various federal agency studies on the Arctic, and is intended to guide both departments’ investment priorities.<sup>47</sup> According to this study, the identified gaps lend themselves to further evaluation and investment consideration. The capability gaps identified in these two key reports include the following:<sup>48</sup>

- Communications: including the lack of communications architecture. Harsh weather conditions, high latitude disturbances, and geomagnetic storms combine to make communications in the Arctic difficult.
- Arctic maritime domain awareness: including limited nautical charting, inadequate navigation systems, and insufficient surveillance. Extremely limited operational assets and support infrastructure in the Arctic, as well as the harsh operating environment make achieving maritime domain awareness a challenge.
- Infrastructure: including limited aircraft infrastructure on the North Slope and limited logistical support. Facilities located below the Arctic Circle, and even those within Alaska, provide limited capability to support Arctic missions due to the long transits to the Arctic region.

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<sup>46</sup>U.S. Coast Guard, *High Latitude Study Mission Analysis Report* (Washington, D.C., November 2011). This report was created to inform key decision makers evaluating Coast Guard high-latitude operational requirements, as well as acquisition and sustainment decisions for forward operating locations, aircraft, communications systems, and ice-capable vessels. As the first step in the acquisition process, this report helps to address the Coast Guard Major Systems Acquisition Manual requirement that the Coast Guard determine (1) requirements—such as laws, orders, and agreements—that the Coast Guard must meet, (2) whether it has or will have adequate resources, and (3) if resource gaps exist, what combinations of material and non-material solutions meet the requirements to close those gaps.

<sup>47</sup>The Arctic Capabilities Assessment Working Group was chartered in May 2011 by the DOD and 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 DOD–DHS Arctic Capability Assessment White Paper focused on maritime capabilities and did not include an evaluation of air, subsurface, and cyber domains.

<sup>48</sup>GAO’s 2010 report highlighted similar gaps; see [GAO-10-870](#).

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No deepwater ports currently exist on the North Slope or near the Bering Strait that are capable of refueling and re-provisioning polar capable cutters. This forces polar capable cutters to expend significant time transiting long distances to and from replenishment ports. Development of infrastructure to support operations is challenging, in part, due to the high cost of transporting materials to the Arctic and short construction seasons.<sup>49</sup>

- Icebreaking: including limited icebreaking capacity given the Coast Guard's existing active inventory of one medium and one heavy polar icebreaker, as discussed later in this report.
- Training and exercise opportunities: including a limited pool of Arctic-trained and experienced Coast Guard personnel, and limited training, exercise, and educational opportunities to enhance Arctic skills among staff. According to Coast Guard officials, few opportunities exist to train in the Arctic, in part, because of limited Coast Guard icebreaking capacity.

Coast Guard officials confirmed that the capability gaps identified in these reports remain relevant today, and are highlighted in the Coast Guard's Arctic strategy.

According to Coast Guard officials, some of the gaps are complex and more long-term than its 10-year Arctic strategy, and some are not the sole responsibility of the Coast Guard to mitigate or do not impact its operations. For example, rather than building permanent infrastructure, which its current Arctic strategy does not support given existing resources, the strategy relies on the seasonal use of mobile assets to support current demand. In addition, the Coast Guard does not have sole responsibility for addressing all of the gaps identified in the two reports. For example, although the Coast Guard's Arctic strategy identifies nautical charting as a gap and one of the Coast Guard's critical enablers for future success, NOAA has lead responsibility for charting U.S. coastal

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<sup>49</sup>We previously reported on the efforts of the Committee on the Marine Transportation System to prioritize Arctic infrastructure, and on the actions taken by government entities in support of planning and developing U.S. Arctic maritime infrastructure; see [GAO-14-299](#). In addition, in April 2016, the Committee on the Marine Transportation System released its report on the prioritization of infrastructure in the U.S. Arctic. See U.S. Committee on the Marine Transportation System Arctic Marine Transportation Integrated Action Team, *A Ten-Year Prioritization of Infrastructure Needs in the U.S. Arctic* (Washington, D.C.: Apr. 15, 2016).

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waters, including those in the Arctic. Further, Coast Guard officials stated that the capability gaps identified above do not completely impair or eliminate the ability to perform operations. For example, while communications can be a challenge in remote regions, the risk of lost communications can be mitigated by, for example, using multiple assets working together to mitigate risk if lost communications are anticipated. In addition, Coast Guard officials stated that lack of infrastructure and logistical and communications challenges have been mitigated through the use of offshore cutter-based command and control platforms, shore-based mobile command and control platforms, and seasonal air and communications capabilities through leased facilities and deployable assets.

Coast Guard officials stated that, given its current activity levels, its Arctic presence being mobile and seasonal, and its ability to leverage partners' resources, it has had sufficient resources to fulfill current Arctic responsibilities. Specifically, according to Coast Guard officials, partnerships are key to achieving agency goals in the Arctic. For example, the North Slope Borough provides the Coast Guard with additional search and rescue capabilities year round, and DOD counterparts have provided the use of a DOD base to extend Coast Guard aircraft ranges during Arctic operations. However, all 11 of the Arctic stakeholders we interviewed in Alaska—who represented state and local governments, Alaska Native Corporations, private industry, and non-profits—expressed concerns that the Coast Guard lacks resources in the Arctic.<sup>50</sup> Specifically, three stakeholders stated concerns about the Coast Guard's ability to respond to its usual missions elsewhere in Alaska when its assets were deployed for Arctic operations. Coast Guard officials stated they will reassess their approach as Arctic activity and resulting mission requirements change over time, but if Arctic activity continues to increase, as anticipated, they may have insufficient resources to meet expanded Arctic requirements with current funding levels. Coast Guard officials also stated that federal efforts are underway to better understand capabilities and these efforts often include tasking or decision making outside of the Coast Guard. For example, Coast Guard officials stated that until national priorities are better articulated by the AESC, the Coast Guard will not be able to identify all of its Arctic requirements. However,

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<sup>50</sup>However, three stakeholders stated that because there is limited activity in the Arctic, they did not believe that the Coast Guard needed to have an increased presence in the Arctic at this time.

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the Coast Guard's Arctic strategy states that the agency is to continue to monitor evolving Arctic activities, and re-invest, where funding allows, to overcome potential gaps and shortfalls.

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**The Coast Guard Has Taken Actions to Help Mitigate Capability Gaps but Has Not Systematically Assessed Its Progress in this Effort**

The Coast Guard has worked with its Arctic partners—such as other federal agencies—to carry out actions to help mitigate Arctic capability gaps; however, it has not systematically assessed how its actions, across the agency, have helped to mitigate these gaps. According to Coast Guard officials, through the agency's role in implementing the tasks from the various Arctic strategies and implementation plans, the Coast Guard has taken actions, along with its Arctic partners, that have helped to mitigate capability gaps. For example, the Coast Guard is the lead agency for implementing the strategies' tasks related to enhancing Arctic maritime domain awareness—a capability gap identified in the previously noted reports. In another example, the National Ocean Policy directs the Coast Guard to work with other federal agencies to identify, analyze, rank, and implement the most cost-effective options to reduce communication gaps, and it has taken action that could affect these gaps. In addition, as discussed later in this report, the Coast Guard is also taking action to address the icebreaking capacity gap.

In addition to the implementing tasks from the Arctic strategies that can help mitigate capability gaps, Coast Guard officials reported that they utilize Arctic Shield as the primary operational method to better understand agency capabilities and associated gaps in the Arctic and to take actions to help mitigate them. The Coast Guard Research, Development, Test, and Evaluation Program has also helped to test Arctic capabilities, such as navigation systems—in part through Arctic Shield operations. The Coast Guard reported that upon the publication of the Coast Guard's Arctic Strategy, it aligned its Arctic Shield operations with the strategy's objectives. According to our review of the Coast Guard's Arctic Shield operational planning documents and AARs, among other actions, the Coast Guard executed select Coast Guard missions; tested a variety of equipment, technologies, and processes; conducted internal training exercises; and improved maritime domain awareness by conducting operations, research, and outreach to partners. For example, during Arctic Shield 2015, the Coast Guard tested communications equipment belonging to DOD, extending communications capabilities further north than previously possible. During Arctic Shield 2014, the Coast Guard tested response equipment and communications systems to assess capabilities and refine Arctic resource requirements. According to Coast Guard officials, they will continue with mobile and seasonal

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operations, which will provide them with opportunities to continue assessing and testing operational capabilities.

Although the Coast Guard has reported that these various actions have improved its Arctic capabilities, it has not systematically assessed the extent to which these actions have helped mitigate the identified capability gaps. *Standards for Internal Control in the Federal Government* provide that ongoing monitoring should occur in the course of normal operations and should help ensure that the findings of reviews, such as the capability gaps identified in the previously mentioned reports, are resolved.<sup>51</sup> This monitoring should be built into the Coast Guard's operations, performed continually, and be responsive to change. *Standards for Internal Control in the Federal Government* also calls for management to establish performance measures and indicators that help ensure that management's directives are carried out. Coast Guard officials stated that they have not systematically assessed their progress in mitigating capability gaps, or developed measures for them, because the Coast Guard cannot unilaterally mitigate these gaps, not all of them are easily measurable, and because not enough is known about them. However, while taking actions to help mitigate these capability gaps requires joint efforts among Arctic partners, the Coast Guard has taken actions in the Arctic that are specific to its missions and therefore has responsibility for assessing the extent to which its actions have helped to mitigate its part of these capability gaps. Assessing relevant information on how its actions have helped to mitigate these gaps could also increase agency knowledge about capabilities.

Coast Guard officials also stated that they track some of their Arctic activities through various mechanisms, but do not assess how these actions have helped to mitigate capability gaps. For example, the Coast Guard's AARs for Arctic Shield document information on activities that the Coast Guard has conducted during each annual operation, as well as any lessons learned, key observations, best practices, challenges, and recommendations. In addition, the Coast Guard reported it has efforts underway to track its progress in implementing the national and Coast Guard Arctic strategies which will help it to more systematically track Arctic activities, as discussed previously. But, it does not plan to assess how the completion of these activities will affect capability gaps. While the

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<sup>51</sup>[GAO/AIMD-00-21.3.1.](#)

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Coast Guard's various tracking efforts may inform the Coast Guard about its overall status in conducting Arctic activities, it does not provide a systematic assessment, across the agency, of how these actions have helped to mitigate the capability gaps—efforts which also help it determine resource needs. Systematically assessing the impact of its actions agency-wide—including using measures for gauging its progress, when feasible—is critical for the Coast Guard to be able to fully assess the status of its efforts to help mitigate the various Arctic capability gaps. By systematically assessing its own progress, the Coast Guard will better understand the status of the gaps and be better positioned to effectively plan its Arctic operations, including its allocation of resources and prioritization of activities to help mitigate them.

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## Several Factors Affect Planning for Arctic Shield Activities

Coast Guard officials stated several factors affect their Arctic Shield planning, including data limitations, uncertainty surrounding future Arctic activity, and limited resources. To carry out Arctic Shield, the Coast Guard manages a year-round process to plan, execute, and evaluate this annual operation. The Coast Guard also reported that this operation is to be scalable to match the level and type of threats and risks, opportunities, and mission responsibilities in the Arctic each year, and flexible to accommodate varying needs for Coast Guard services and the availability of resources. As part of its year-round planning process, Coast Guard officials hold a series of planning meetings with internal and external stakeholders, during which they finalize operational documents.<sup>52</sup> According to the Coast Guard's Arctic strategy implementation plan, outreach activities conducted during this planning process are to include regular engagement with tribal communities to ensure the operation does not interfere with tribal rights, interests, or subsistence activities. In addition, following each year's Arctic Shield operation, Coast Guard officials assess the operation, develop lessons learned, and propose changes for the next year's operation. The Coast Guard also produces an AAR each year, which describes the activities conducted during Arctic Shield that year and discusses challenges encountered and lessons learned.

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<sup>52</sup>The Coast Guard has taken steps to standardize its planning process by creating standardized planning documents that can be more easily updated annually. Specifically, in 2015, the Coast Guard moved from an annual planning document that had to be developed each year to an operations plan which only has to be updated each year.

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Coast Guard officials stated that when planning the size and scope of Arctic Shield operations they use information learned from prior operations, as well as review a wide variety of external sources that analyze present conditions and forecast future conditions. Specifically, these officials stated that they review commercial trends analyses, ice and weather forecasting, vessel tracking data, information on local fish stocks and subsistence hunting times, and law enforcement intelligence.<sup>53</sup> Because commercial activity is the primary determinant of Arctic maritime activity levels, Coast Guard officials stated that they also review analyses that predict trends in oil and gas, mining, tourism, shipping, and other commercial sectors.<sup>54</sup> Coast Guard officials reported that they discuss this information with various federal, state, industry, academic, and not-for-profit entities.<sup>55</sup>

Although Coast Guard officials reported using these data, they also stated that one factor affecting their planning for Arctic operations is the limited amount of data on regional activity, which they attributed to various factors. For example, because Arctic activity is limited, changes in year-to-year data do not always provide useful statistics. Further, the Coast Guard cannot always access some companies' proprietary information on Arctic commercial trends, which also limits the robustness of the Coast Guard's data sources. In addition, Coast Guard officials stated that recent commercial marine traffic in the Arctic has been variable rather than trending predictably, providing inconsistent data trends. As a result, Coast Guard officials stated that there are limited data to help them make planning decisions and as a result they are taking steps to improve their

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<sup>53</sup>Reported sources for this information include the Arctic Council's 2009 Arctic Marine Shipping Assessment, the National Oceanic and Atmospheric Administration's marine oil spill risk assessments, the Aleutian Islands Risk Assessment, Royal Dutch Shell's Arctic oil exploration plans, and cruise ship itineraries.

<sup>54</sup>Federal and state government agencies; industry, academic, and non-governmental organizations; and foreign governments produce these analyses. Coast Guard officials stated that they generally rely on these agencies to validate their data because these other entities are considered to be experts in their areas. However, Coast Guard officials stated that they are able to validate some data, such as vessel tracking data and ice forecasts.

<sup>55</sup>Although Coast Guard officials reported using various types of data for their Arctic planning and provided us with their Arctic Shield planning documents, these officials stated that the documents did not include the specific data source that was reviewed or analyzed so we were unable to verify the extent to which the Coast Guard used this data or how their data analyses affected operational plans.

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data collection on their own operations and as well as continuing to develop partnerships to collect external data. For example, during the course of our review, the Coast Guard began collecting data on its aircraft and cutter resource hours expended on 2015 Arctic Shield activities to improve its mission management and resource allocation.<sup>56</sup> The Coast Guard also established an Arctic Information Fusion Center as part of its 2015 Arctic Shield operation, which helped to track the number of deployed Coast Guard personnel. Further, Coast Guard officials reported that they are working toward more systematically documenting AAR information—including lessons learned, best practices, and recommended improvements—to better track the Coast Guard’s Arctic activities. Specifically, Coast Guard officials stated that they are starting to accomplish this through their Contingency Preparedness System, the Coast Guard’s web-based data management tool that links, among other items, after action reporting and corrective actions. Although the Coast Guard designed the Contingency Preparedness System as a tracking tool for discrete exercises, not large operations like Arctic Shield which incorporate multiple exercises, Coast Guard officials stated that they are determining how to best use this system—and have begun to enter data—to better track Arctic Shield activities and increase their senior leadership’s awareness of Arctic challenges and opportunities. Coast Guard officials reported that they are also identifying ways to work with other agencies to better collect data. For example, Coast Guard officials stated they participate in conference calls with Arctic stakeholders that provide information on subsistence hunting activities to help with their planning. Coast Guard officials stated they continue to look for opportunities to gain better information on Arctic activities.

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<sup>56</sup>A resource hour is measured as each hour that assets, such as cutters, patrol boats, and aircraft are used. Resource hours do not include such things as the time that the asset stands idle or the time that is spent maintaining it. According to Coast Guard officials, resource hours may be a less valuable metric for describing Arctic operations than it is for operations taking place further south because distances are so large in the Arctic, assets remain in the Arctic between missions rather than returning to port or transitioning to other missions, so the resource hours tracked will underrepresent the entire length of time that the asset remained in the north and could not be used for another mission. In addition, resource hours track a single mission, which does not accommodate the cross-mission nature of Arctic Shield. Despite these limitations, Coast Guard officials stated that tracking resource hours expended in the Arctic will support more effective Arctic planning. GAO reviewed the Coast Guard’s Standard Operational Planning Process—including its allocation of resource hours. See GAO, *Coast Guard: Actions Needed to Improve Strategic Allocation of Assets and Determine Workforce Requirements*, [GAO-16-379](#), (Washington, D.C.: May 24, 2016).

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The Coast Guard also faces inherent uncertainty surrounding drivers of future Arctic maritime activity and the potential corresponding increase in commercial activity in the region. These drivers of activity include the pace and effects of climate change in the Arctic and economic trends, and could affect the need for Coast Guard services.<sup>57</sup> Many projections about future Arctic activity look forward only 2 to 3 years because of this uncertainty. According to Coast Guard officials, the uncertainty of these drivers of maritime activity render long-term planning beyond the 10-year time frame particularly difficult, and as a result, the Coast Guard must remain flexible to adjust its planning as conditions change.

Limited resources is another factor that Coast Guard officials have reported affecting their Arctic planning process. Coast Guard officials stated that they must make tradeoffs on how to best deploy limited resources and among potential courses of action.<sup>58</sup> Further, officials noted that funding uncertainty has also affected Coast Guard planning and operations for Arctic Shield. For example, the Coast Guard was not able to establish its forward operating base in the preferred location because funding for Arctic Shield 2015 had not been secured before a private entity leased that space. As a result, the Coast Guard stationed aircraft for monitoring Arctic activity at an alternate location farther from active oil rigs, which increased its travel time to sites being monitored. Coast Guard officials stated that despite these challenges, they have received support from Coast Guard leadership and were able to achieve Arctic Shield objectives.

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<sup>57</sup>GAO reported that these issues have also affected DOD's planning in the Arctic; see [GAO-15-566](#).

<sup>58</sup>For this report we did not assess the Coast Guard's risk management process. GAO reviewed the Coast Guard's Standard Operational Planning Process—including the use of risk assessments in allocation of resources. See [GAO-16-379](#). Through this process the Coast Guard has committed major cutter days for Arctic Shield.

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## Coast Guard Has Been Unable to Fulfill All Polar Icebreaking Operations and Is Taking Steps to Begin Icebreaker Acquisition

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### The Coast Guard Has Been Unable to Reliably Fulfill Polar Icebreaking Responsibilities with Current Fleet

Various requirements drive the Coast Guard's icebreaking mission responsibilities, and since 2010 the Coast Guard has been unable to fulfill some of these responsibilities. The Coast Guard's icebreaking responsibilities are based in statute, presidential directive, strategies, and interagency agreements. Under statutory law, the Coast Guard has responsibility for operating the nation's polar icebreaker fleet, which supports the Coast Guard in carrying out its missions.<sup>59</sup> For example, the Coast Guard's icebreaker fleet supports scientific research as part of its Ice Operations mission and promotes maritime security as part of its Defense Readiness mission, according to a 2013 Coast Guard report.<sup>60</sup> In addition, the goals and activities set forth in the *National Strategy for the Arctic Region* and the 2009 presidential directive on the Arctic region drive the Coast Guard's need to maintain the ability to project a sovereign presence in the Arctic—a standard which requires the use of a polar icebreaker at certain times when seasonal ice covers large portions of the Arctic region.<sup>61</sup> The Coast Guard's icebreaking responsibilities are also derived from interagency agreements that commit it to providing icebreaking services to other departments and agencies in support of

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<sup>59</sup>See 14 U.S.C. § 2.

<sup>60</sup>Coast Guard, *Polar Icebreaker Recapitalization Project: Concept of Operations* (Washington, D.C.: June 8, 2013).

<sup>61</sup>White House, *National Strategy for the Arctic Region* (Washington, D.C.: May 10, 2013); 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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various strategic and scientific missions, including national defense.<sup>62</sup> For example, the Coast Guard assumed responsibility for the Navy's icebreaker fleet in 1965 and a memorandum of agreement first signed in 2008 identifies how the Coast Guard's icebreakers would be used to support DOD.<sup>63</sup> More recently, Coast Guard officials stated that the President's September 2015 announcement about national priorities in the Arctic further emphasized the importance of the nation's capability for year-round access to this region.<sup>64</sup> Appendix III provides a selection of the laws and policies that are cited as sources for the Coast Guard's need to maintain polar icebreaking capability.

Coast Guard officials reported being able to minimally complete agency polar icebreaking responsibilities, that is, carrying out the annual McMurdo Station resupply in the Antarctic region and scientific research in the Arctic, with two functional icebreakers.<sup>65</sup> However, when neither the *Polar Sea* nor the *Polar Star* was active in 2011 and 2012, the Coast Guard did not maintain assured, year-round access to both the Arctic and Antarctic, as the *Healy* cannot reach ice-covered areas with more than 4 ½ feet of ice. For these years, and in prior and subsequent years, the National Science Foundation chartered foreign icebreakers to support the

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<sup>62</sup>According to the Department of Defense's 2013 Arctic Strategy, "the United States needs assured access to support U.S. national interests in the Arctic. Although this imperative could be met by regular U.S. Government ships in open water up to the marginal ice zone, only ice-capable ships provide assured sovereign presence throughout the region and throughout the year. Assured access in areas of pack ice could also be met by other means, including submarines and aircraft."

<sup>63</sup>*Revised Memorandum of Agreement Between the Department of the Navy and the Department of the Treasury on the Operation of Icebreakers* (1965); DOD and DHS, *Memorandum of Agreement Between the Department of Defense and Department of Homeland Security on the Use of U.S. Coast Guard Capabilities and Resources in Support of the National Military Strategy* (May 23, 2008). All of the icebreakers that were transferred under this memorandum have been decommissioned.

<sup>64</sup>In September 2015, the President announced several key priorities for the Arctic, including the acquisition of icebreakers, after the August 2015 Conference on Global Leadership in the Arctic: Cooperation, Innovation, Engagement and Resilience.

<sup>65</sup>The United States Antarctic Program, which is managed by the National Science Foundation, requires an annual delivery of fuel and cargo to McMurdo Station. Because the tanker and cargo ships cannot access McMurdo Station independently, the National Science Foundation has typically relied on the Coast Guard's icebreaker fleet to open a channel for the tanker and cargo ships. The McMurdo Station operation occurs during the austral summer (i.e., in January or February when the ice is thinnest), which coincides with the Arctic winter.

resupply of the McMurdo Station, although National Science Foundation officials reported that this was challenging.<sup>66</sup> Coast Guard officials stated that a short-term charter would not meet the Coast Guard’s needs in the Antarctic region because a sovereign U.S. presence can only be established by a vessel that is available year-round, able to fly the U.S. flag, and perform Antarctic treaty inspections. Further, the Coast Guard has set a target of meeting 100 percent of its internal and interagency requests for polar icebreaking, and it annually calculates its success rate in meeting this target. In the last 6 years of available data (fiscal years 2010 through 2015), the Coast Guard reported that it failed to attain this target for 3 years—primarily when neither heavy icebreaker was operational. Specifically, the Coast Guard was unable to complete 5 out of 26 requests for polar icebreaking, including 4 out of 11 requests in 2011 and 2012 when both heavy icebreakers were unavailable.<sup>67</sup> These unfulfilled requests included support for the resupply of McMurdo Station, Arctic Shield activities, and an Arctic science deployment, some of which would have required weeks or months of icebreaker use. See Table 2 below for specific results.

**Table 2: Polar Icebreaking Fulfilled Requests and Total Requests, Fiscal Years 2010-2015**

Fiscal year	Fulfilled requests	Total requests	Operational Polar Icebreakers		
			<i>Polar Sea</i>	<i>Polar Star</i>	<i>Healy</i>
2010	3	3	Yes	No	Yes
2011	2	4	No	No	Yes
2012	5	7	No	No	Yes
2013	4	5	No	Yes	Yes
2014	4	4	No	Yes	Yes
2015	3	3	No	Yes	Yes
<b>Total</b>	<b>21</b>	<b>26</b>	—	—	—

Source: GAO analysis of U.S. Coast Guard information. | GAO-16-453

<sup>66</sup>The National Science Foundation and the Coast Guard have reported challenges relying on foreign charters. For example, the National Science Foundation had a 5-year agreement to charter the Swedish icebreaker *Oden* to conduct the McMurdo resupply, but the vessel was recalled by the government of Sweden and thus could not conduct the 2012 resupply.

<sup>67</sup>These data do not include requests for the *Healy* that were not funded by sponsoring agencies.

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Notes: The *Polar Sea* suffered major engine casualties in June 2010. The *Polar Star* reentered service in 2013, but did not conduct the McMurdo Station resupply operation in that year. According to Coast Guard officials, these data do not include icebreaking requests that were withdrawn because of time constraints on the *Healy* or requests that will be fulfilled in future years instead.

The Coast Guard reported in acquisition documentation that the addition of one heavy icebreaker would allow it to maintain current icebreaking capacity by replacing the *Polar Star* after its useful service life ends in 4 to 7 years. However, the Coast Guard reported that increased heavy icebreaking capacity is needed to fully meet requirements in the Arctic and Antarctic regions. Although record lows for recent summer and early autumn sea ice extent have made seasonal maritime navigation more feasible in the Arctic, the Coast Guard reported that polar icebreakers can still be necessary during these seasons to conduct research or to assist other vessels. Winter sea travel is also still severely limited due to extensive ice coverage across the Arctic region, necessitating heavy icebreaker assistance. Furthermore, although slightly decreased in 2015, the maximum ice extent in the Antarctic has expanded in recent years. The Coast Guard reported that a medium icebreaker, like the *Healy*, can complete many of the Coast Guard's Arctic missions, but cannot operate independently in the presence of thick ice. Even with melting Arctic ice, Coast Guard officials noted that it would be risky to assume that a medium icebreaker would be sufficient to provide year-round access to the Arctic. In addition, Coast Guard officials anticipate that heavy icebreaking capability may continue to be necessary in an operating environment with much less ice overall because ice sometimes piles up, creating thicker ice. Because only heavy polar icebreakers can provide assured, year-round access to both polar regions, the Coast Guard maintains that it must have heavy icebreaking capability to fully meet its responsibilities as outlined above and in Appendix III.

A 2010 Coast Guard-commissioned study found an even greater need for icebreakers, if the Coast Guard were to fully accomplish all of its polar icebreaking responsibilities.<sup>68</sup> Specifically, this study determined that at least six icebreakers—three heavy and three medium—would be required to carry out the Coast Guard's statutory missions. To carry out its statutory missions as well as fulfill all interagency responsibilities for defense readiness, the report states that the Coast Guard would need

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<sup>68</sup>ABS Consulting, *United States Coast Guard High Latitude Region Mission Analysis Capstone Summary*, prepared for the United States Coast Guard, (July 2010).

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four to six heavy and two to four medium icebreakers depending on various operational factors, such as whether the Coast Guard employs multiple crewing models and where the Coast Guard homeports the icebreakers. Recognizing the fiscal challenges posed by such a request, Coast Guard officials have stated that obtaining a minimum of two heavy icebreakers is needed to at least maintain the fleet's self-rescue capability in the event one vessel became beset in ice—a capability the Coast Guard does not currently have. In addition, without two or more heavy icebreakers, the Coast Guard reports that it may not be able to: (1) complete its polar icebreaking missions if one vessel suffered a disabling casualty, (2) conduct the McMurdo Station resupply and also ensure the continued ability to operate in the Arctic, or (3) conduct the McMurdo Station resupply if the mission required more than one icebreaker as it did in prior years.

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### The Coast Guard Has Initiated an Icebreaker Acquisition Program and Is Considering Various Strategies

To maintain polar icebreaking capability after the *Polar Star's* projected service life ends between 2020 and 2023, the Coast Guard initiated a program in 2013 to acquire a new heavy icebreaker and is currently working to determine the optimal acquisition strategy. From fiscal years 2013 to 2016, Congress directed that \$16 million of appropriated funds were for the Coast Guard to conduct early acquisition activities, and the President's budget has since requested \$150 million to continue pre-acquisition and design activities over multiple years starting in fiscal year 2017. As of May 2016, the acquisition program was in the Analyze/Select phase, during which the Coast Guard was establishing asset requirements, evaluating the feasibility of alternatives, and developing a cost estimate for the preferred acquisition strategy.<sup>69</sup> As part of this phase, the Coast Guard reports that it will identify the optimal acquisition strategy and will consider several options including new construction, parent craft, and parent craft design, as well as leasing arrangements.<sup>70</sup>

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<sup>69</sup>The five Coast Guard acquisition phases are Program Identification, Need, Analyze/Select, Obtain, and Produce/Deploy/Support. In the Program Identification phase, the Coast Guard is to identify a capability gap, and in the Need Phase the Coast Guard is to describe the functional capabilities required to address the specific capability gaps. In the Analyze/Select phase, the Coast Guard is to explore materiel solutions, evaluate feasibility of options, and develop a cost estimate. In the Obtain phase, the Coast Guard must demonstrate feasibility of the preferred alternative and refine the solution. In the Produce/Deploy/Support phase, the Coast Guard would deploy and maintain the asset.

<sup>70</sup>Parent craft design takes an existing, proven design and modifies the asset for Coast Guard operations.

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The President's fiscal year 2017 budget request outlined plans to accelerate the acquisition process, so that production activities commence by 2020.

The Coast Guard expects a new heavy icebreaker to cost approximately \$1.09 billion, according to a 2013 preliminary estimate, which included development, procurement, and Coast Guard facilities improvements for one vessel.<sup>71</sup> Although they have yet to complete a more detailed cost estimate, Coast Guard officials stated that they believe the primary construction cost drivers are likely to be the icebreaker's size, weight, and horsepower. While the Coast Guard's icebreaker fleet supports other federal agencies and departments, Coast Guard officials—as well as other federal officials—stated that these other agencies and departments do not require specific operational capabilities that would significantly increase the overall acquisition cost of an icebreaker.<sup>72</sup> Coast Guard officials also noted that it would be unreasonable to build an icebreaker that could operate in the Arctic but not the Antarctic because that would limit the type of operations it could conduct.

To move forward with the acquisition process, the Coast Guard would need to receive funding and ensure that a U.S.-based commercial shipyard would be able to build the vessel. However, the Coast Guard's annual acquisition budget—which averaged \$1.5 billion from fiscal year 2012 to fiscal year 2016—has primarily been allocated to other projects, such as the National Security and Fast Response cutters. The Coast Guard's fiscal year 2016 acquisition budget was \$1.945 billion—approximately 60 percent higher than the prior year, largely due to the

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<sup>71</sup>The Coast Guard based this estimate on project status, anticipated milestones, and estimated acquisition cost, which was initially developed in a 2011 report prepared for the Coast Guard.

<sup>72</sup>Officials from the DOD and the National Science Foundation stated that they do not have any additional operational requirements for the polar icebreaker that would add to the estimated acquisition cost. For example, officials from the National Science Foundation stated that researchers would bring aboard any necessary science equipment and would only require space onboard the icebreaker, which, according to the Coast Guard, would not significantly increase costs. Further, officials from other departments and agencies that rely on Coast Guard icebreaking services, such as the DOD and the National Science Foundation, have expressed concern about whether they have the funding in their budgets to help acquire an icebreaker. However, in May 2016, the Senate Committee on Appropriations reported a Department of Defense appropriations bill for fiscal year 2017 that would include \$1 billion for the first ship of the Polar Icebreaker Recapitalization Project. S. 3000 ( 114th Cong.).

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addition of a ninth National Security Cutter for which the Coast Guard had not planned. We previously found when reviewing the Coast Guard's acquisition portfolio in 2014 that the Coast Guard was further from fielding its planned fleet in 2014 than it was in 2009, in terms of the funding needed to complete these programs.<sup>73</sup>

The Coast Guard reported that it believes that the U.S. shipbuilding industry—which must be used to build all Coast Guard vessels unless the President has authorized a national security exception—is capable of building a heavy icebreaker.<sup>74</sup> Specifically, the Coast Guard reported that several U.S. shipyards responded to a March 2013 market survey and indicated that they have the ability or could make necessary infrastructure upgrades to build a vessel similar to the *Polar Star*. Coast Guard officials told us that the selected shipyard or shipyards would likely need to upgrade their facilities because of the size, weight, and complexity of an icebreaker and that facility upgrades represent a calculated risk on the part of the shipyard, particularly if the Coast Guard only orders one vessel. The Coast Guard met with industry representatives in March 2016 to learn about industry capabilities.

Prior GAO work on Navy and Coast Guard shipbuilding indicates that new icebreaker construction is likely to be an expensive and lengthy process because of cost growth associated with lead ships—that is, the first ship constructed in a class of ships, which the Coast Guard icebreaker would be.<sup>75</sup> In September 2014, we identified cost growth that totaled over 150 percent for the first two lead ships of the Navy's Littoral Combat Ship.<sup>76</sup> We also reported in May 2009 that lead ships often experience schedule

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<sup>73</sup>GAO, *Coast Guard Acquisitions: Better Information on Performance and Funding Needed to Address Shortfalls*, [GAO-14-450](#) (Washington, D.C.: June 5, 2014).

<sup>74</sup>According to 14 U.S.C. § 665, no Coast Guard vessel may be constructed in a foreign shipyard, unless the President authorizes an exception when it is in the national security interest of the United States to do so. Coast Guard officials stated that they believe that the U.S. private sector has the potential to place competitive bids based on inquiries made during initial acquisition phases.

<sup>75</sup>Coast Guard officials stated that nonrecurring costs, such as shipyard investments, will be greater than typical for Navy ships because the icebreaker is a once-in-a-generation ship, as the U.S. shipbuilding industry has not built a heavy icebreaker since the 1970s.

<sup>76</sup>GAO, *Littoral Combat Ship: Navy Complied with Regulations in Accepting Two Lead Ships, but Quality Problems Persisted after Delivery*, [GAO-14-827](#) (Washington, D.C.: Sept. 25, 2014).

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delays, such as the Navy's first San Antonio-class ship which was delivered 52 months late,<sup>77</sup> and in June 2008 we reported that the lead ship of the Coast Guard's National Security Cutter was delayed by approximately 2 years.<sup>78</sup> Thus, the potential for costly delays on lead ships has some precedent. The Coast Guard reported in 2015 that it will begin to plan for the acquisition of additional heavy icebreakers in line with the President's September 2015 announcement.

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### Several Factors Affect the Coast Guard's Options for Maintaining Icebreaking Capacity

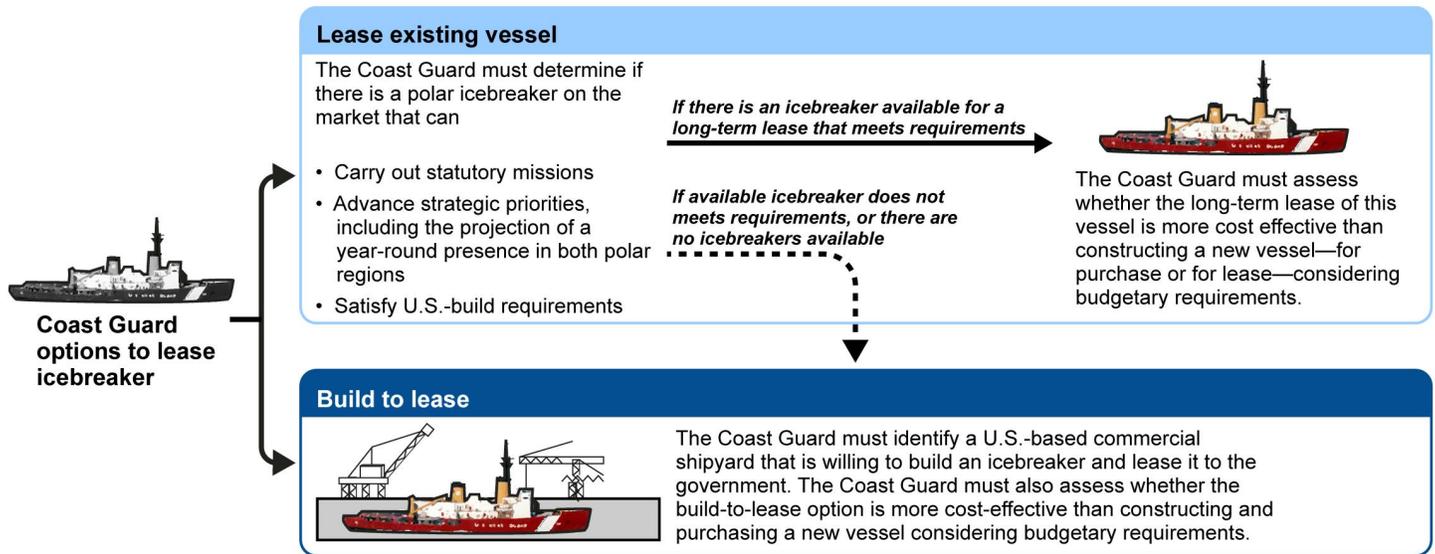
Various factors limit the options available to the Coast Guard to maintain, or increase, its icebreaker capacity, and the Coast Guard has reported that the long-term lease of a polar icebreaker is unlikely to result in cost savings when compared with a purchase. Specifically, as figure 6 depicts, two key factors limiting the Coast Guard's options are the lack of an available icebreaker for lease that meets agency and legal requirements, and the total cost associated with leasing.

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<sup>77</sup>GAO, *Best Practices: High Levels of Knowledge at Key Points Differentiate Commercial Shipbuilding from Navy Shipbuilding*, [GAO-09-322](#) (Washington, D.C.: May 13, 2009).

<sup>78</sup>GAO, *Coast Guard: Change in Course Improves Deepwater Management and Oversight, but Outcome Still Uncertain*, [GAO-08-745](#) (Washington, D.C.: June 24, 2008).

**Figure 6: Factors Affecting the Coast Guard’s Decision Whether to Lease a Polar Icebreaker**



Source: GAO. | GAO-16-453

**Availability.** The Coast Guard reported in October 2015 that no existing icebreakers were available to lease or purchase that met both its legal and operational requirements. First, with respect to legal requirements, the Coast Guard would need to either purchase or demise charter an icebreaker,<sup>79</sup> as legal requirements associated with several Coast Guard missions prohibit a short-term lease. Specifically, under federal law, to be capable of conducting all of its statutory missions, the Coast Guard must use a public vessel, which federal law defines as one that the United States owns or demise charters.<sup>80</sup> For example, federal law states that the Coast Guard’s Ports, Waterways, and Coastal Security Mission may be carried out with public vessels or private vessels tendered gratuitously for that purpose.<sup>81</sup> Similarly, for the Coast Guard to employ its law enforcement authorities in the conduct of certain missions, the icebreaker

<sup>79</sup>Under a demise charter, also known as a bareboat charter, the Coast Guard would take responsibility for the crewing, operation, and maintenance of the vessel, as described in 46 C.F.R. § 169.107.

<sup>80</sup>46 U.S.C. § 2101(24).

<sup>81</sup>33 U.S.C. § 1234

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would need to operate as a warship, and warships are necessarily sovereign immune, public vessels, according to Coast Guard officials.<sup>82</sup>

In addition, federal law also provides that no Coast Guard vessel may be constructed in a foreign shipyard.<sup>83</sup> According to the Coast Guard, besides the *Polar Star* and the *Polar Sea*, the only existing icebreakers that are powerful enough to meet the Coast Guard's operational requirements were built in and are owned by Russia, and, thus, would not comply with this legal requirement.<sup>84</sup> As a result of these constraints, that is, the lack of a U.S.-built icebreaker available to purchase or demise charter with sufficient horsepower to conduct all of the Coast Guard's missions, the Coast Guard's only procurement options are for a U.S.-based shipyard to agree to build a new icebreaker for the Coast Guard to lease or purchase outright. However, the Coast Guard has also reported that the long-term lease of a polar icebreaker built expressly for the Coast Guard is likely to be more costly than purchasing an icebreaker for several reasons.

**Budgeting and Total Cost.** Office of Management and Budget (OMB) guidelines require federal agencies to acquire assets in the manner least costly overall to the government. For a large acquisition like a heavy icebreaker, OMB Circular A-94 requires the Coast Guard to conduct a lease-purchase analysis based on total lifecycle costs.<sup>85</sup> To then proceed with a lease, the Coast Guard would need to show that leasing is preferable to direct government purchase and ownership. The purpose of

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<sup>82</sup>See 14 U.S.C. § 89; 46 U.S.C. § 2101(47). Under the Law of the Sea Convention, to exercise immunity on the high seas, a Coast Guard vessel must be a warship or government vessel on noncommercial service. See Law of the Sea Convention, Articles 95, 96. While the United States is not a party to the Convention, according to the *National Strategy for the Arctic Region*, the United States supports and observes principles of established customary international law reflected in the Convention. Although the Coast Guard stated that it needs an icebreaker to carry out its missions, most of its icebreakers' resource hours in fiscal year 2015 were allocated to the Ice Operations mission, since Coast Guard officials stated that they can only charge one mission at the same time. GAO reviewed the Coast Guard's Standard Operational Planning Process—including its resource hours. See [GAO-16-379](#).

<sup>83</sup>14 U.S.C. § 665.

<sup>84</sup>The Coast Guard reported that chartering foreign vessels would not satisfy other critical statutory responsibilities beyond Ice Operations.

<sup>85</sup>Office of Management and Budget Circular A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs* (1992).

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this requirement is to promote efficient resource allocation through well-informed decision-making by the federal government. Budget scorekeepers—specifically, OMB, the Congressional Budget Office, and the House and Senate Budget Committees—score purchases and capital leases at the outset of the acquisition. Based on scoring rules, the long-term lease of a polar icebreaker would not qualify as an operating lease, which is intended for short-term needs and would allow the costs to be recognized over time.<sup>86</sup> As a result, whether the Coast Guard purchased or leased an icebreaker, it would need full funding up front to enter into a legal obligation with a shipbuilder, unless the Coast Guard uses incremental funding, as was authorized in the Coast Guard Authorization Act of 2015.<sup>87</sup> With incremental funding authority, the Coast Guard would be able to proceed with the acquisition with only part of the estimated costs of a capital acquisition. However, we have previously discouraged the use of incremental funding, except in cases with especially high research and development costs, because incremental funding erodes future fiscal flexibility and limits cost transparency.<sup>88</sup>

The Coast Guard has also reported that the total cost of a long term lease is likely to exceed the total cost of a purchase. A 2011 preliminary cost analysis prepared for the Coast Guard indicated that the lease option would be more costly to the federal government over an icebreaker's expected 30-year service life. According to this analysis, the prospective ship owner's profit rate would increase the overall expense as this profit rate is priced into the lease, such that government ownership would be

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<sup>86</sup>Per OMB, operating leases must meet six criteria: (1) the ownership of the asset remains with the lessor and is not transferred to the government at or shortly after the lease, (2) the lease does not contain a bargain-price purchase option, (3) the lease term does not exceed 75 percent of the estimated economic life of the asset, (4) the present value of the lease payments does not exceed 90 percent of the fair market value, (5) the asset is a general-purpose asset and is not built to unique specifications of the government lessee, and (6) there is a private sector market for the asset. Otherwise, the lease is considered a capital lease. Office of Management and Budget, *Preparation Submission, and Execution of the Budget, Circular No. A-11, Appendix B: Budgetary Treatment of Lease-Purchases and Leases of Capital Assets* (2015).

<sup>87</sup>Pub. L. No. 114-120, § 207.

<sup>88</sup>GAO, *Budget Issues: Incremental Funding of Capital Asset Acquisitions*, [GAO-01-432R](#) (Washington, D.C.: Feb. 26, 2001). Further, according to the Office of Management and Budget Circular A-11, when capital projects are incrementally funded, without certainty if or when future funding will be available, it can result in poor planning, acquisition of assets not fully justified, higher acquisition costs, projects delays, cancellation of major projects, the loss of sunk costs, or inadequate funding to maintain and operate the assets.

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less costly in the long run. Moreover, because a demise charter requires the lessee to operate and maintain the vessel, the Coast Guard would not be able to outsource crewing or maintenance activities, actions which we previously reported could reduce ongoing operating costs.<sup>89</sup> According to a subsequent 2012 report prepared for the Coast Guard, legal and operational requirements render additional cost-benefit analysis of leasing unnecessary. Nevertheless, Coast Guard officials stated that they will consider leasing as a possible acquisition strategy in a forthcoming report, as directed by language in committee reports accompanying the fiscal year 2014 DHS appropriations bill.<sup>90</sup>

Previous GAO work on the question of leasing versus buying an icebreaker identified important assumptions in comparing the costs to the federal government and suggests that outright purchase could be a less costly alternative than a long-term vessel lease.<sup>91</sup> Assuming that the cost of building and operating the vessel was the same under both the buy and the lease scenarios, the cost advantage to government purchase over leasing in our previous work was based on two factors. First, the costs of private sector financing under a lease arrangement—which were higher than the government’s borrowing costs—could be expected to be passed on to the federal government in lease payments, thereby increasing the vessel’s financing costs over what they would be under outright government purchase. Second, under a lease arrangement, an additional profit would accrue to the lessor for services related to its retained ownership of the vessel. Separately, in multiple other reports we found that when other agencies sought to enter into long-term lease arrangements, they did so for reasons unrelated to cost, such as

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<sup>89</sup>Prior GAO work has found that in some cases DOD reduced operations and maintenance costs by outsourcing certain services. GAO, *Defense Budget: Trends in Operation and Maintenance Costs and Support Services Contracting*, [GAO-07-631](#) (Washington, D.C.: May 18, 2007).

<sup>90</sup>See S. Rep. No. 113-77, at 88-89 (2013). Coast Guard officials stated that they are evaluating this effort and will determine an estimated completion date for this report in the future.

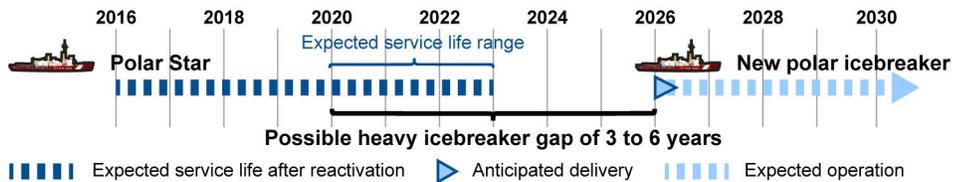
<sup>91</sup>GAO, *National Science Foundation: Need for Additional Icebreaking Research Vessel Not Demonstrated*, [GAO/RCED-95-77](#) (Washington, D.C.: May 12, 1995).

acquiring already-built aircraft sooner, and these explanations are not pertinent in this case.<sup>92</sup>

## The Coast Guard Is Developing a Bridging Strategy to Address Expected Heavy Icebreaker Service Gap

Anticipating a likely gap in heavy icebreaker capability between the end of the *Polar Star*'s service life and the deployment of a new icebreaker, the Coast Guard is developing a bridging strategy, as required by law, to determine how to address this expected gap.<sup>93</sup> Based on current projections, if the Coast Guard's icebreaker acquisition proceeds on schedule, the Coast Guard will likely lack heavy icebreaker capability for several years. Currently, the Coast Guard estimates that the *Polar Star*'s service life will likely extend until 2020 to 2023, while the Coast Guard's 2016 timeline for a new icebreaker indicates that it would not achieve its operational requirements until fiscal year 2026, leaving a potential gap in heavy icebreaking capability of 3 to 6 years. See Figure 7.

**Figure 7: The Coast Guard's Heavy Icebreaker Availability and Expected Capability Gaps, Present until 2030**



Source: GAO analysis of U.S. Coast Guard documents. | GAO-16-453

Note: This graphic does not incorporate additional acquisition or other proposed activities, such as reactivating the *Polar Sea*.

<sup>92</sup>In addition, in a body of work on federal real property, we have found that, as a general rule, building ownership options through construction or purchase are the least expensive ways to meet agencies' long-term requirements. GAO, *Military Aircraft: Observations on the Proposed Lease of Aerial Refueling Aircraft by the Air Force*, [GAO-03-923T](#) (Washington, D.C.: Sept. 4, 2003); *Defense Acquisitions: Historical Analyses of Navy Ship Leases*, [GAO/NSIAD-99-125](#) (Washington, D.C.: June 25, 1999); and *High-Risk Series: Federal Real Property*, [GAO-03-122](#) (Washington, D.C.: January 2003).

<sup>93</sup>Coast Guard and Maritime Transportation Act of 2012, Pub. L. No. 112-213, § 222, 126 Stat. 1540, 1560-1561, as amended by Howard Coble Coast Guard and Maritime Transportation Act of 2014, Pub. L. No. 113-281, § 505, 128 Stat. 3022, 3059-3060.

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The Coast Guard has not determined the cost-effectiveness of reactivating the *Polar Sea*, and reported that it was conducting a Bridging Strategy Alternatives Analysis that will assess and make recommendations on whether to reactivate the *Polar Sea* and whether to further extend the service life of the *Polar Star*. Coast Guard officials said that they have not established a completion date for this report, but do not anticipate a final decision on the *Polar Sea* before fiscal year 2017, after which they will evaluate the cost-effectiveness of extending the *Polar Star*'s life, if necessary.

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## Conclusions

Given the heightened interest in the Arctic, the Coast Guard has taken actions to implement its Arctic strategy, and conduct Arctic operations—both of which may help the Coast Guard better understand and mitigate identified Arctic capability gaps. In addition, the Coast Guard is tracking, or has plans to track, its various activities in the Arctic. For example, the Coast Guard reports on activities it conducts during its annual Arctic Shield operation in an AAR each year, and is in the process of developing a system that will track its Arctic actions taken to implement the various strategies and directives. However, the Coast Guard has not systematically assessed how its actions have helped to mitigate Arctic capability gaps. Such an assessment—which includes developing measures for gauging its progress, when feasible—is critical for the Coast Guard to be fully informed about its own progress in helping to mitigate these gaps. By systematically assessing and measuring how its actions have helped to mitigate capability gaps, the Coast Guard will better understand the status of these gaps and be better positioned to effectively plan its Arctic operations, including its allocation of resources and prioritization of activities to target the gaps.

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## Recommendations for Executive Action

To better position the Coast Guard to effectively plan its Arctic operations, we recommend that the Commandant of the Coast Guard take the following two actions:

- develop measures, as appropriate, for gauging how the agency's actions have helped to mitigate the Arctic capability gaps; and
- design and implement a process to systematically assess the extent to which actions taken agency-wide have helped mitigate the Arctic capability gaps for which it has responsibility.

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## Agency Comments and Our Evaluation

We provided a draft of this report to the Departments of Homeland Security, Commerce, Defense, and Interior and the National Science Foundation for comment. DHS provided written comments, which are summarized below and reproduced in full in appendix VI. In addition, components within the Departments of Commerce and Interior provided technical comments, which we incorporated as appropriate.

In its written comments, DHS concurred with and described actions it has planned to address our recommendation that the Coast Guard develop measures and design and implement a process for systematically assessing the extent to which its actions have helped to mitigate Arctic capability gaps. Specifically, DHS stated that the Coast Guard plans to develop specific measures for some of its Arctic activities which will be tracked on the web-based site that it has under development. DHS further stated that these measures will be used as part of the Coast Guard's annual review of its implementation plan for its Arctic strategy. Through this annual review, the Coast Guard plans to systematically assess how its actions have helped to mitigate the capability gaps for which the Coast Guard is the lead agency, per the *Implementation Framework for the National Strategy for the Arctic Region*. According to DHS, this review will begin in December 2016 and continue throughout calendar year 2017. We believe that these actions will help the Coast Guard better understand the status of these capability gaps and better position it to effectively plan its Arctic operations. However, we continue to believe that it is important for the Coast Guard to also systematically assess how its actions affect Arctic capability gaps for which it is not the lead as well. Although the Coast Guard may not be the lead for these gaps, its Arctic missions can still be affected by them, and thus, it remains important for the Coast Guard to be aware of its own progress in helping to mitigate its part of these gaps.

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As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to the appropriate committees and federal agencies. In addition, the report will be available at no charge on the GAO website at <http://www.gao.gov>.

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If you or your staff have any questions about this report, please contact me at (202) 512-7141 or [groverj@gao.gov](mailto:groverj@gao.gov). Contact points for our Office of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix VII.

A handwritten signature in black ink that reads "Jennifer Grover". The signature is written in a cursive, flowing style.

Jennifer Grover  
Director, Homeland Security and Justice Issues

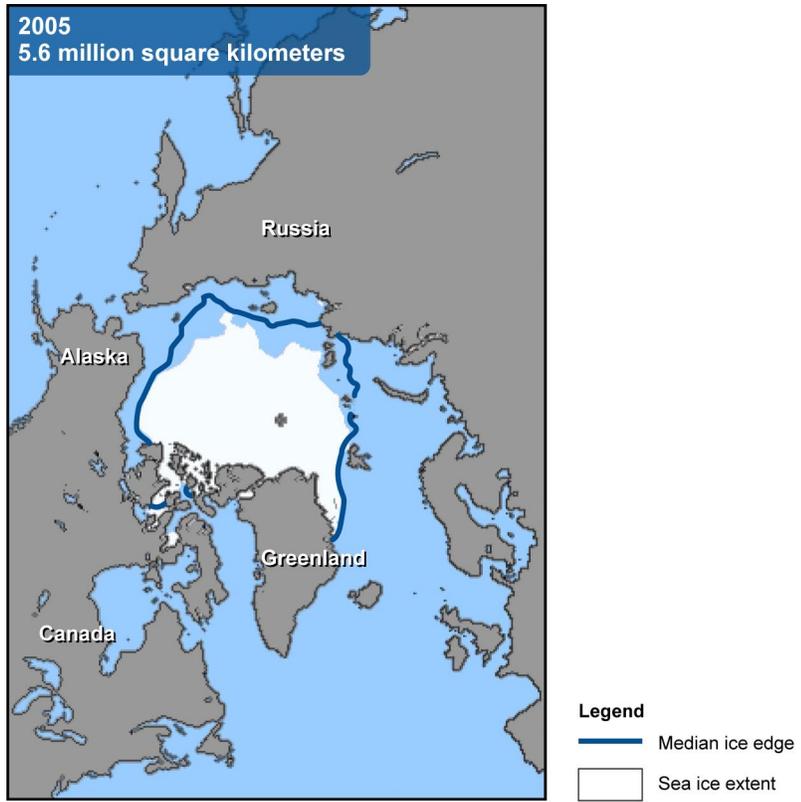
# Appendix I: Summer Minimum Ice Extent from 2004 to 2015, Compared with the 1981–2010 Median Minimum Ice Extent

Figure 8: Minimum Ice Extent from 2004 Compared with the 1981–2010 Median Minimum Ice



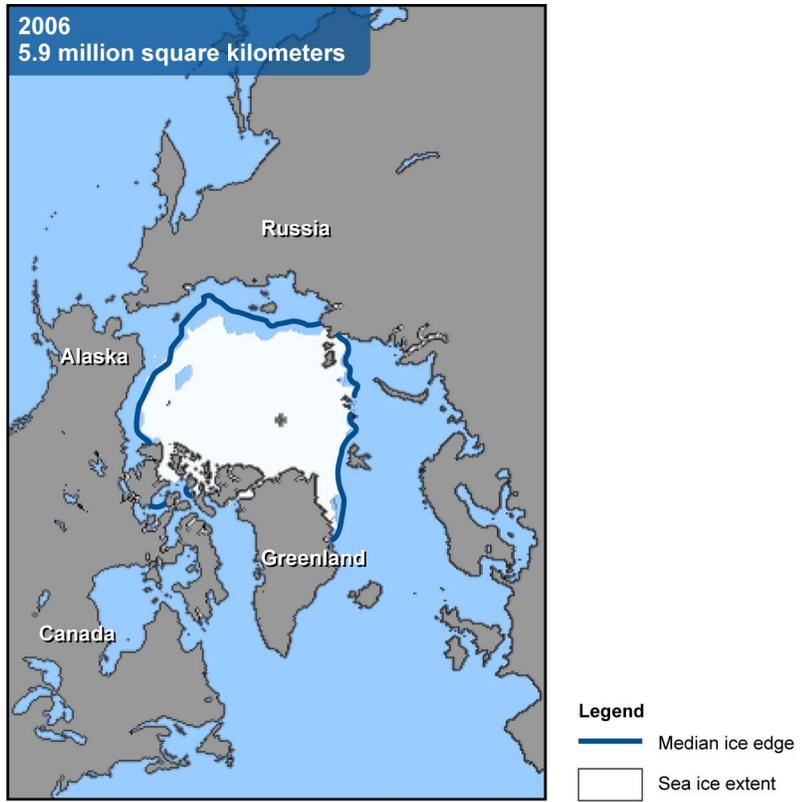
Source: National Snow and Ice Data Center. | GAO-16-453

Figure 9: Minimum Ice Extent from 2005 Compared with the 1981–2010 Median Minimum Ice



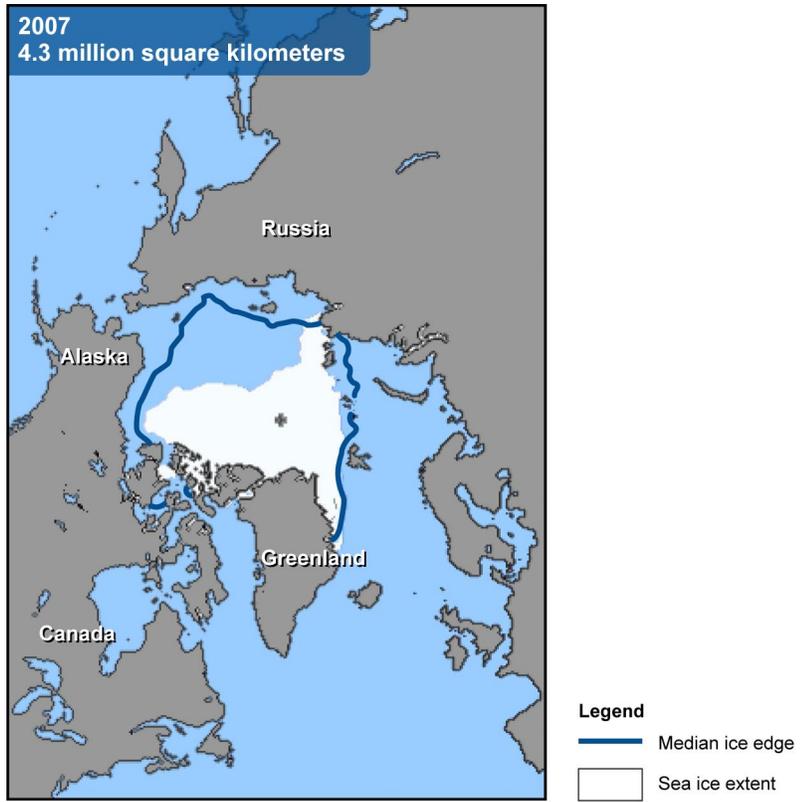
Source: National Snow and Ice Data Center. | GAO-16-453

Figure 10: Minimum Ice Extent from 2006 Compared with the 1981–2010 Median Minimum Ice



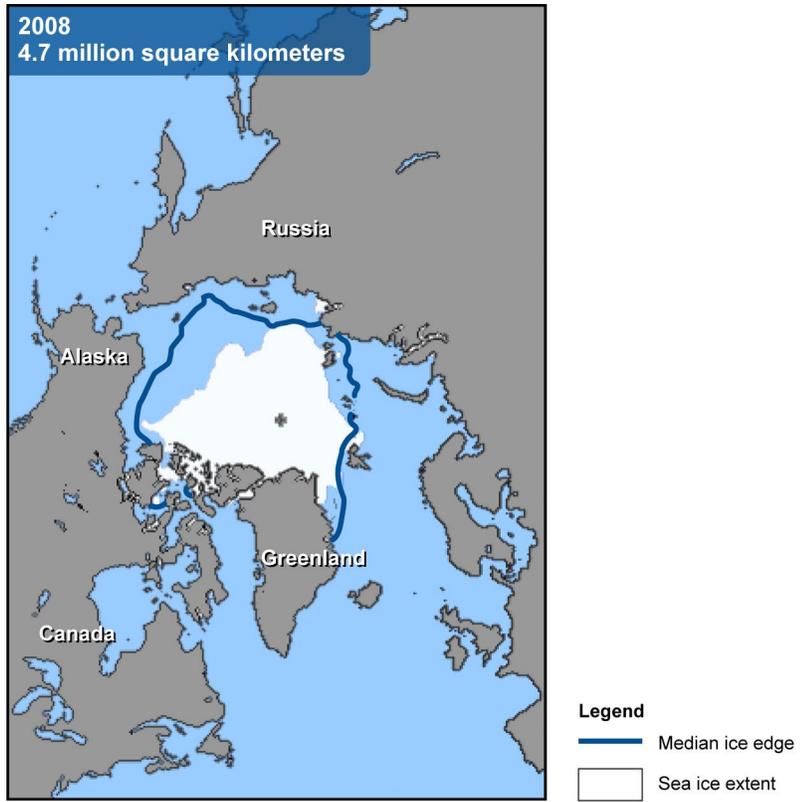
Source: National Snow and Ice Data Center. | GAO-16-453

Figure 11: Minimum Ice Extent from 2007 Compared with the 1981–2010 Median Minimum Ice



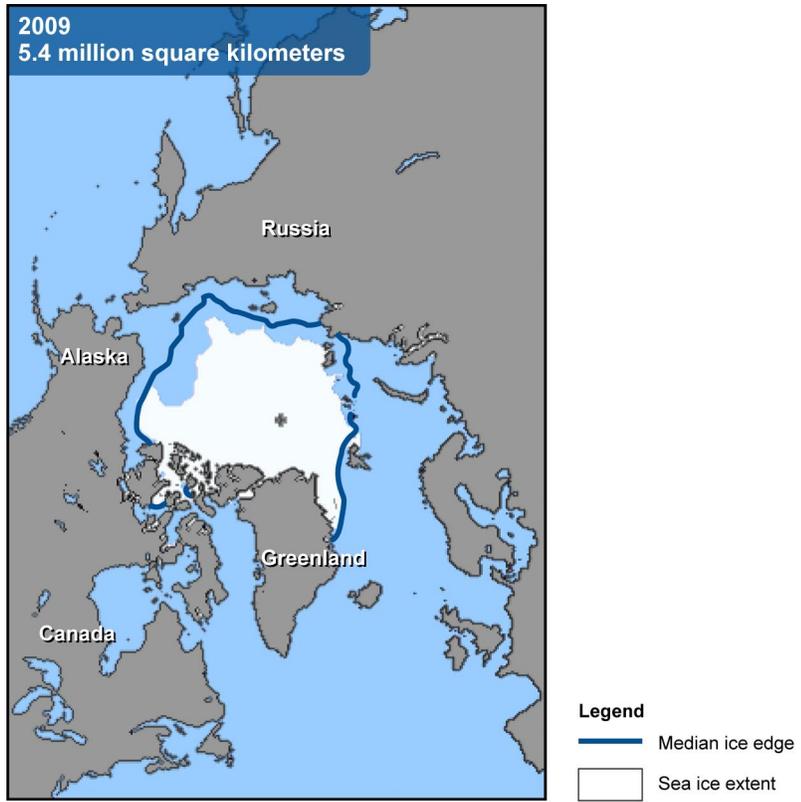
Source: National Snow and Ice Data Center. | GAO-16-453

Figure 12: Minimum Ice Extent from 2008 Compared with the 1981–2010 Median Minimum Ice



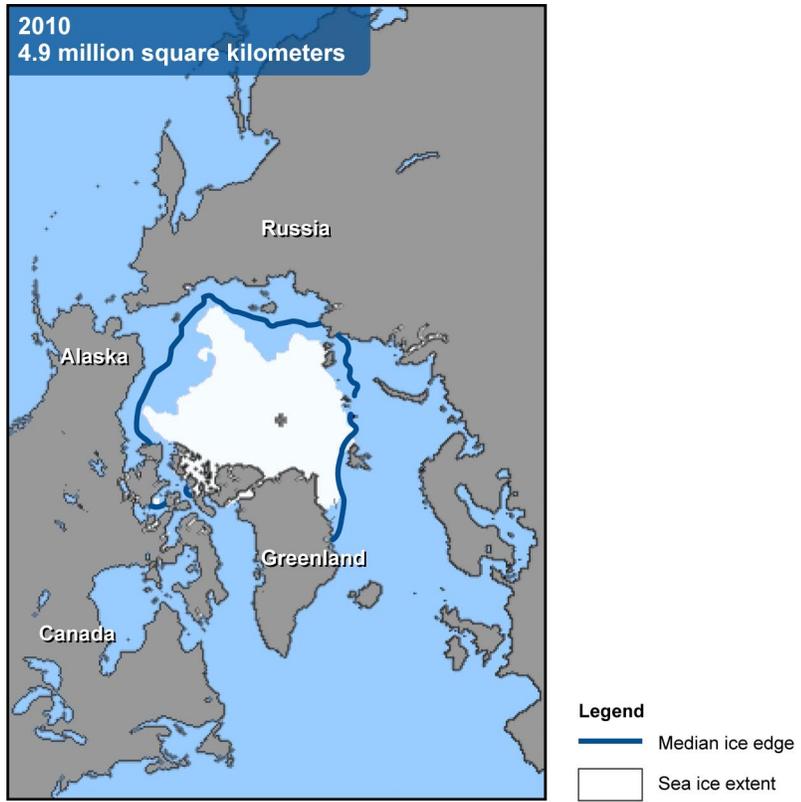
Source: National Snow and Ice Data Center. | GAO-16-453

Figure 13: Minimum Ice Extent from 2009 Compared with the 1981–2010 Median Minimum Ice



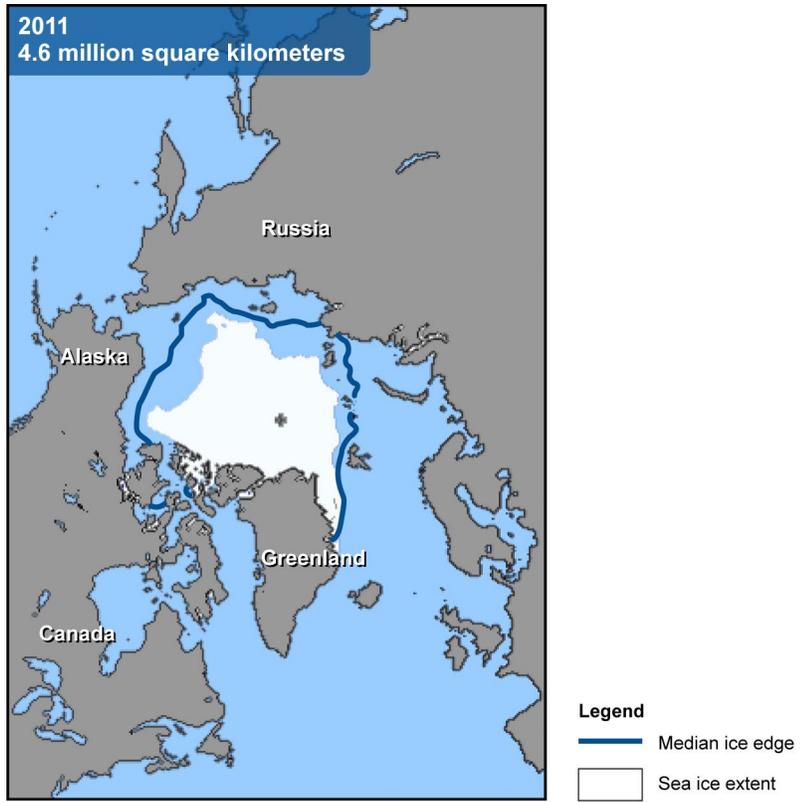
Source: National Snow and Ice Data Center. | GAO-16-453

Figure 14: Minimum Ice Extent from 2010 Compared with the 1981–2010 Median Minimum Ice



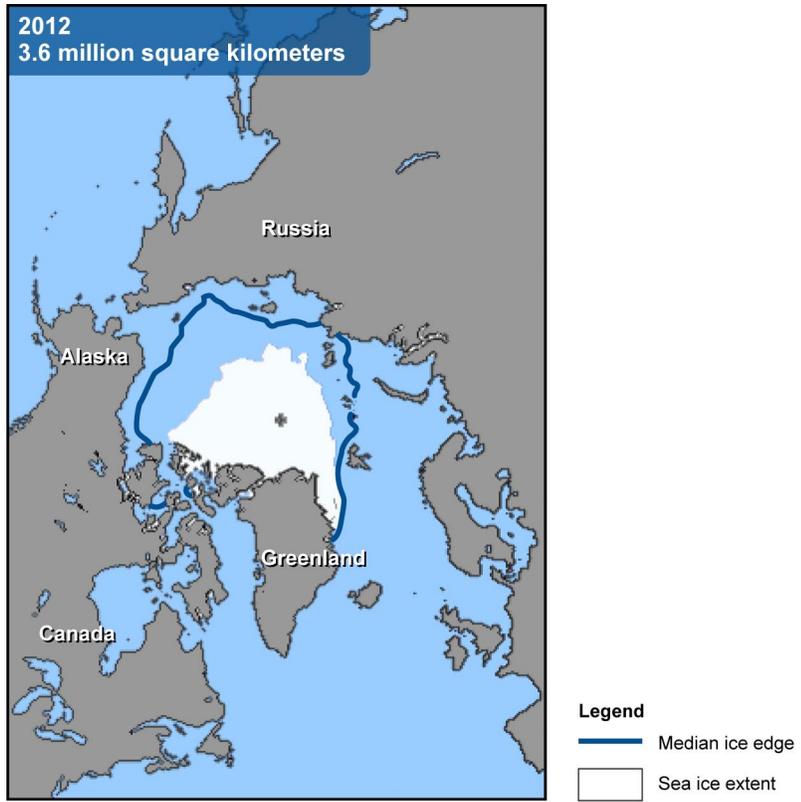
Source: National Snow and Ice Data Center. | GAO-16-453

Figure 15: Minimum Ice Extent from 2011 Compared with the 1981–2010 Median Minimum Ice



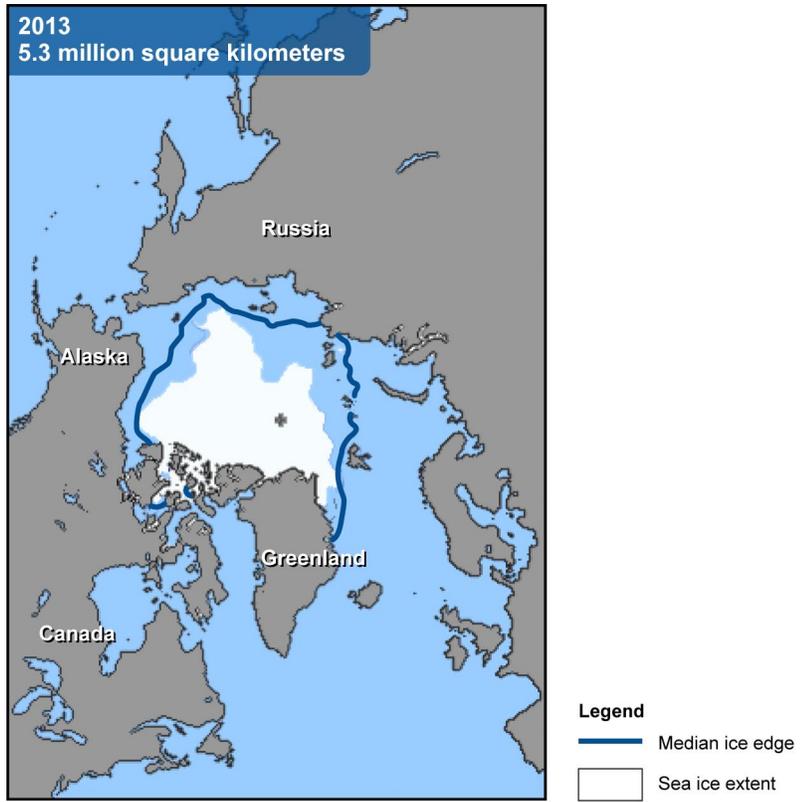
Source: National Snow and Ice Data Center. | GAO-16-453

Figure 16: Minimum Ice Extent from 2012 Compared with the 1981–2010 Median Minimum Ice



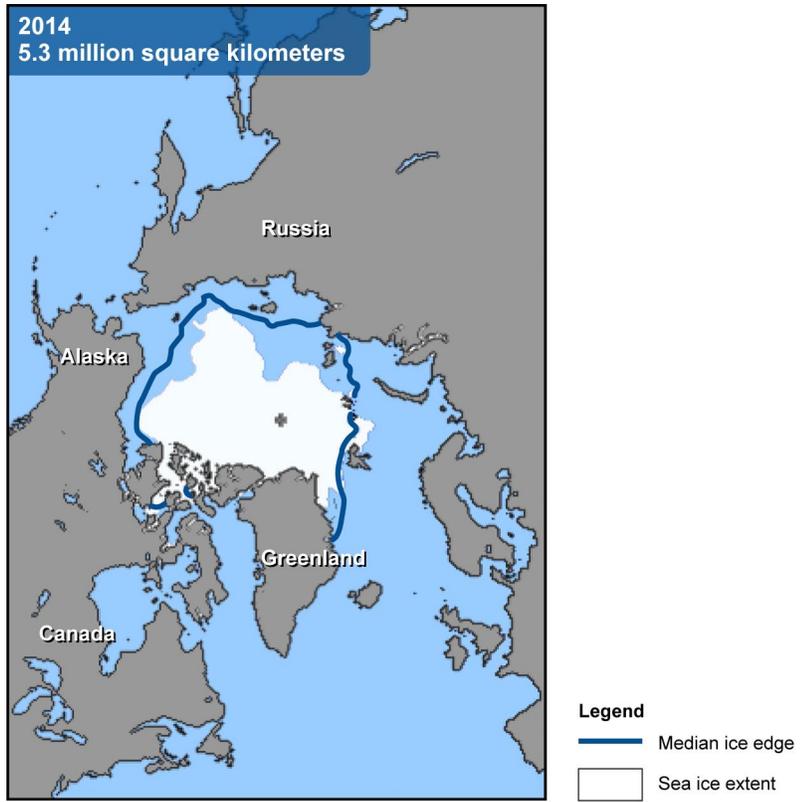
Source: National Snow and Ice Data Center. | GAO-16-453

Figure 17: Minimum Ice Extent from 2013 Compared with the 1981–2010 Median Minimum Ice



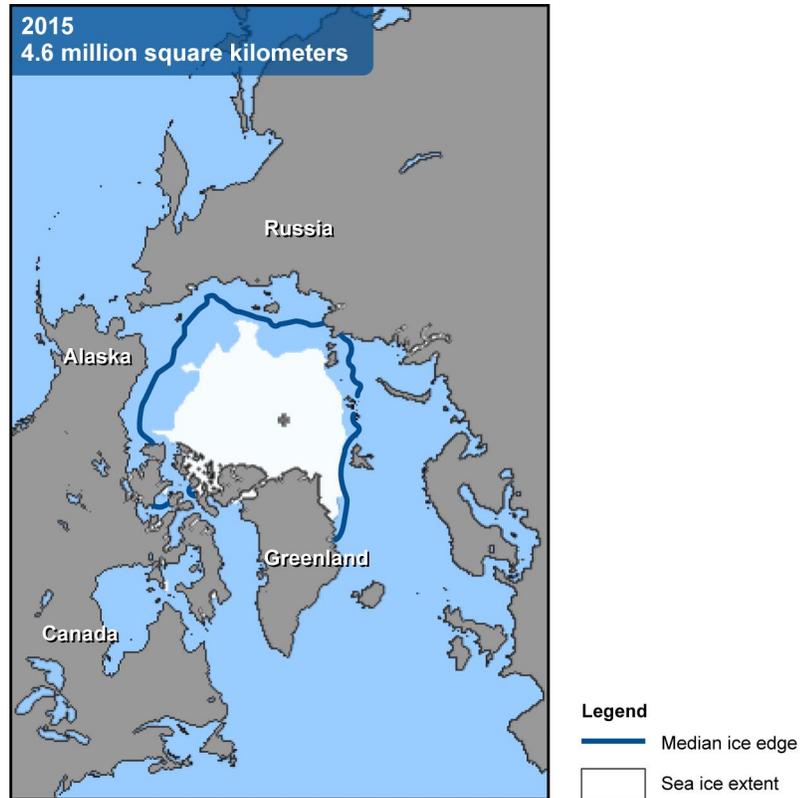
Source: National Snow and Ice Data Center. | GAO-16-453

Figure 18: Minimum Ice Extent from 2014 Compared with the 1981–2010 Median Minimum Ice



Source: National Snow and Ice Data Center. | GAO-16-453

**Figure 19: Minimum Ice Extent from 2015 Compared with the 1981–2010 Median Minimum Ice**



Source: National Snow and Ice Data Center. | GAO-16-453

**Data Table of Figure 1: Change in Minimum Ice Extent from 2004 to 2015, Compared to the 1981-2010 Median Minimum Ice Extent**

Year	Sea ice extent (in millions of square kilometers) <sup>1</sup>
2004	6.0
2005	5.6
2006	5.9
2007	4.3
2008	4.7
2009	5.4
2010	4.9
2011	4.6
2012	3.6

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**Appendix I: Summer Minimum Ice Extent from  
2004 to 2015, Compared with the 1981–2010  
Median Minimum Ice Extent**

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<b>Year</b>	<b>Sea ice extent (in millions of square kilometers)</b>
2013	5.3
2014	5.3
2015	4.6

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# Appendix II: Selected Federal Stakeholders and Interagency Groups with Arctic Responsibilities

Federal department or agency	Examples of Arctic responsibilities
Department of Homeland Security	The U.S. 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. Other departmental components also have Arctic responsibilities. For example, the National Protection and Programs Directorate protects critical infrastructure, and the Federal Emergency Management Agency has responsibility for disaster assistance that could increase with climate change.
Department of Commerce	The Department of Commerce's National Oceanic and Atmospheric Administration provides information on Arctic oceanic and atmospheric conditions, issues warnings for hazardous weather, issues weather and ice forecasts, provides fisheries management and enforcement, develops and maintains nautical charts, provides scientific support in the event of oil or other hazardous material spills, and operates the Search and Rescue Satellite Aided Tracking System, 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 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.
Department of the Interior	The Department of the Interior is responsible for management 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. Specifically, within the Department, the Bureau of Ocean Energy Management is responsible for managing development of offshore resources, and the Bureau of Safety and Environmental Enforcement enforces safety and environmental regulations.
Department of State	The Department of State is responsible for formulating and implementing U.S. policy on international issues concerning the Arctic and Antarctic, 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 Transportation	The Department of Transportation and its component agency, the Maritime Administration, is involved in marine transportation and shipping issues in the Arctic and elsewhere, among other things.
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. The National Science Foundation and Coast Guard also coordinate on the use of the Coast Guard's icebreakers for scientific research.
Other departments and agencies	Other federal departments and agencies also have a role in U.S. Government efforts in the Arctic, but were not discussed in this report. They include the Environmental Protection Agency, Department of Energy, Department of Health and Human Services, Federal Communications Commission, and National Aeronautics and Space Administration, among others.

**Appendix II: Selected Federal Stakeholders  
and Interagency Groups with Arctic  
Responsibilities**

<b>Federal group</b>	<b>Examples of Arctic responsibilities</b>
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 <i>National Strategy for the Arctic Region</i> 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.
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 the 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. The Coast Guard and the National Oceanic and Atmospheric Administration co-chair the Committee's Arctic Integrated Action Team with the Maritime Administration.
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.
Interagency Coordinating Committee on Oil Pollution Research	The Interagency Coordinating Committee on Oil Pollution Research coordinates federal oil pollution research activities and establishes oil pollution research priorities. The Committee is chaired by the Coast Guard with the National Oceanic and Atmospheric Administration, the Bureau of Safety and Environmental Enforcement, and the Environmental Protection Agency serving as rotating Vice Chairs.
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 the Interior, coordinates federal oversight of the development of energy resources and associated infrastructure in Alaska.
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.
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.
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.

Source: GAO analysis of federal agency, White House, and interagency group information. | GAO-16-453

# Appendix III: Selected Polar Icebreaking Authorities and Mandates

Table 3 identifies selected laws and policies that cite polar icebreaking capability.

**Table 3: Selected Polar Icebreaking Authorities and Mandates**

Federal laws	Description
14 U.S.C. § 2	Requires the Coast Guard to, in part, establish, develop, maintain, and operate icebreaking facilities on, under, and over the high seas and waters subject to the jurisdiction of the United States; and, pursuant to international agreements, requires the Coast Guard to develop, establish, maintain, and operate icebreaking facilities on, under, and over waters other than the high seas and waters subject to the jurisdiction of the United States.
14 U.S.C. § 87	Requires the President to facilitate planning for the design, procurement, maintenance, deployment, and operation of icebreakers as needed to support the statutory missions of the Coast Guard in the polar regions by allocating all funds to support icebreaking operations in such regions, except for recurring incremental costs associated with specific projects, to the Coast Guard.
14 U.S.C. § 93 14 U.S.C. § 94	Authorizes the Coast Guard to maintain icebreaking facilities. Requires the Coast Guard to conduct such oceanographic research, use such equipment or instruments, and collect and analyze such oceanographic data, in cooperation with other agencies of the government, or not, as may be in the national interest.
14 U.S.C. § 141	Authorizes the Coast Guard to provide and accept personnel and facilities, from other federal and state agencies, to perform any activity for which such personnel and facilities are especially qualified and as may be helpful in the performance of its duties, respectively.
16 U.S.C. § 2431  16 U.S.C. § 2441	Congress finds that the United States has important security, economic, and environmental interests in developing and maintaining a fleet of icebreaking vessels capable of operating effectively in the heavy ice regions of Antarctica. The Department of Homeland Security is required to facilitate planning for the design, procurement, maintenance, deployment, and operation of icebreakers needed to provide a platform for Antarctic research.
15 U.S.C. § 4101	Congress finds that the United States has important security, economic, and environmental interests in developing and maintaining a fleet of icebreaking vessels capable of operating effectively in the heavy ice regions of the Arctic.
Strategic policies	Description
<i>Implementation Framework for the National Strategy for the Arctic Region</i> (2016)	The Coast Guard is the lead agency for ensuring the United States maintains icebreaking capability with sufficient capacity to project an assured Arctic maritime access, supports U.S. interests in the polar regions, and facilitates research that advances the fundamental understanding of the Arctic.
National Security Presidential Directive 66/Homeland Security Presidential Directive 25 (NSPD-66/ HSPD-25): Arctic Region Policy (2009)	The Department of Homeland Security and other departments shall “[p]reserve the global mobility of United States military and civilian vessels and aircraft throughout the Arctic region” and “project a sovereign United States maritime presence in the Arctic in support of essential United States interests.”
Presidential Memorandum 6646: United States Antarctic Policy and Programs (1982)	The Departments of Defense and Transportation (now Department of Homeland Security) shall provide logistical support as requested by the National Science Foundation to support the United States Antarctic Program.

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**Appendix III: Selected Polar Icebreaking  
Authorities and Mandates**

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<b>Interagency agreements</b>	<b>Description</b>
Memorandum of Agreement between Department of the Navy and Department of the Treasury on the Operation of Icebreakers (1965)	Navy agreed to transfer all icebreakers to the Coast Guard, and the Coast Guard agreed, among other things, to maintain and operate the U.S. icebreaker fleet, to prepare for contingency or wartime operations in polar regions, to assign icebreakers to the Navy's operational control for seasonal polar deployments, and to support scientific programs to the extent possible.
Memorandum of Agreement between Coast Guard and National Science Foundation (2010)	The Coast Guard agreed to provide polar icebreaker support to conduct the resupply of McMurdo Station to support the U.S. Antarctic program and to conduct research in the Antarctic.
Memorandum of Agreement between the Department of Defense and Department of Homeland Security on the Use of U.S. Coast Guard Capabilities and Resources in Support of the National Military Strategy (2008/2010)	In ice-covered and ice-diminished waters, Coast Guard icebreakers are the only means of providing assured surface access in support of the Department of Defense missions.

Source: GAO analysis of relevant laws, policies, and agreements. | GAO-16-453

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# Appendix IV: Coast Guard-Led Actions to Implement the *National Strategy for the Arctic Region*

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The May 2013 *National Strategy for the Arctic Region* seeks to integrate the work of federal departments and agencies with the activities already underway in Alaska and at the international level. The Coast Guard is the lead for 7 of the 36 total tasks (or objectives) in the January 2014 implementation plan, and DHS and the Coast Guard support another 19.<sup>1</sup> Each task also has various, actionable next steps.<sup>2</sup> According to Coast Guard officials, the agency is responsible for coordinating the completion of tasks for which it has been identified as the lead agency, as funding and resources allow. To complete its tasks, the Coast Guard must coordinate with other agencies. As described in the implementation plan, federal departments and agencies are to report on their progress on the tasks, and the plan is to be revisited after 5 years to ensure that it still meets the intent and priorities of the nation. The implementation plan includes timeframes for some, but not all, next steps, and Coast Guard officials stated that tasks are being completed as resources permit. According to a March 2016 White House report describing federal agencies' progress on Arctic strategy tasks, the Coast Guard, along with supporting agencies, has taken action toward implementing all the strategy tasks for which the Coast Guard is assigned as the lead, as detailed in table 4.

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<sup>1</sup>The seven tasks are (1) enhance Arctic domain awareness; (2) sustain federal capability to conduct maritime operations in ice-impacted waters; (3) improve hazardous material spill prevention, containment, and response; (4) promote Arctic oil pollution preparedness, prevention, and response internationally; (5) enhance Arctic search and rescue; (6) expedite International Maritime Organization Polar Code development and adoption; and (7) promote Arctic waterways management.

<sup>2</sup>DHS is assigned as the lead for one of the seven tasks, but Coast Guard officials stated that this task has been delegated to the Coast Guard. Within the Coast Guard's 7 tasks, there are 26 next steps. For example, under the task of enhancing Arctic domain awareness, next steps include partnering with entities to evaluate and test different means of collecting Arctic data. In addition to assigning lead and supporting roles, the implementation plan details the following for each task: next steps, how success will be measured, and when certain steps are to be completed.

**Table 4: Reported Federal Progress on Coast Guard-Led Actions to Implement the *National Strategy for the Arctic Region***

Task/objective—including examples of associated next steps/activities and supporting entities	Examples of progress reported, as of March 2016
<p><b>1. Enhance Arctic domain awareness</b></p> <p><u>Next steps include:</u> Enhance national capacity for knowledge management of the maritime domain in the Arctic by improving appropriate capabilities and leveraging partnerships with domestic and international partners. Specific activities include partnering with these entities to evaluate and test different means of collecting Arctic data, such as Unmanned Aircraft Systems Long Range Identification and Tracking system, satellite, and Automatic Identification System. In addition, activities include the development of capabilities to receive, analyze, and disseminate Arctic data when collected.</p> <p><u>Supporting agencies:</u> Departments of Commerce (National Oceanic and Atmospheric Administration), Defense, and Transportation; National Aeronautics and Space Administration; and National Maritime Intelligence-Integration Office</p>	<p>Coast Guard and National Oceanic and Atmospheric Administration researchers are leveraging the University of Alaska Anchorage’s Arctic Domain Awareness Center and the Stevens Institute Center for Maritime Research to examine the use of unmanned aircraft systems in the Arctic to collect ship tracking, meteorological, oil spill, and hydrographic data.</p> <p>The Coast Guard continues to work with various academic and government entities to evaluate surface and submersible/semi-submersible unmanned systems to address gaps in data collection.</p> <p>The Coast Guard is coordinating with the Federal Aviation Administration as it assesses use of unmanned aircraft systems for operational missions.</p> <p>The Coast Guard is working with Arctic nations and the International Maritime Organization to enhance Long Range Identification and Tracking system capabilities in the Arctic.</p> <p>The Department of Defense is collaborating with the Coast Guard, National Oceanic and Atmospheric Administration, other governmental agencies, and Transport Canada, to improve communications and collection of environmental data by satellite.</p>
<p><b>2. Sustain federal capability to conduct maritime operations in ice-impacted waters</b></p> <p><u>Next steps include:</u> Ensure the United States maintains icebreaking and ice-strengthened ship capability with sufficient capacity to project a sovereign U.S. maritime presence, support U.S. interests in the polar regions and facilitate research that advances the fundamental understanding of the Arctic. Specific activities include the development of a document that lists the capabilities needed to operate in ice-impacted waters and long-term plans to sustain federal capability to physically access the Arctic.</p> <p><u>Supporting agencies:</u> Departments of Commerce (National Oceanic and Atmospheric Administration), Defense, State, and Transportation; and National Science Foundation</p>	<p>The Department of Homeland Security is leading an interagency effort to describe capabilities needed to operate in ice-impacted waters to support federal activities in the polar regions and sovereign responsibilities.</p> <p>The Coast Guard completed the Polar Icebreaker Operational Requirements Document which outlines the operating requirements needed to meet the Coast Guard’s polar mission gaps.</p> <p>The Coast Guard, working through the U.S. Maritime Administration, has awarded a preservation dry dock contract for the <i>Polar Sea</i> which will arrest any further deterioration of the ship, and will simultaneously allow the Coast Guard to conduct a material condition assessment to inform a future alternatives analysis for reactivation or decommission of the <i>Polar Sea</i>.</p>

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**Appendix IV: Coast Guard-Led Actions to  
Implement the National Strategy for the Arctic  
Region**

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**Task/objective—including examples of associated next steps/activities and supporting entities**

**3. Improve hazardous material spill prevention, containment, and response**

Next steps include: Federal agencies, in coordination with the State of Alaska, Alaska Native organizations, industry, academia, environmental groups, and other partners, will continue working to protect Arctic communities and ecosystems from potential spills and other pollution events, including: implementing lessons learned from tabletop and full scale exercises, completing oil dispersant plan and an Arctic spill response assessment, and completing the *National Ocean Policy Implementation Plan* milestones.

Supporting agencies: Environmental Protection Agency (co-lead), Departments and agencies of the United States National Response Team<sup>a</sup>

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**4. Promote Arctic oil pollution preparedness, prevention, and response internationally**

Next steps include: Implement international agreements consistent with domestic activities to reduce the risk of marine oil pollution while increasing global capabilities for preparedness and response to oil pollution incidents in the Arctic. Next steps in this process include international coordination on contingency plans and participation in joint international training and exercises.

Supporting agencies: Departments and agencies of the United States National Response Team

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**Examples of progress reported, as of March 2016**

The National Academy of Sciences published its Arctic Spill Response Assessment in August 2014.

The Coast Guard Research, Development, Test and Evaluation Program conducted demonstrations and exercises in the Arctic Ocean and Great Lakes to improve oil response capabilities in ice-impacted waters. Specifically, the program assessed the effectiveness of existing procedures and equipment as well as the application of alternative technologies, providing practical response experience in ice-impacted waters, and identifying gaps.

As part of ongoing effort to implement lessons learned from exercises simulating oil spills in the Arctic, the Coast Guard conducted a 2-day oil spill response exercise in Kotzebue, Alaska, in 2015.

The Alaska Regional Response Team is finalizing the new Dispersant Use Plan for Alaska and anticipates approval in early 2016 which will enhance region-wide dispersant use protocols, including reinstating preauthorization zones for high-risk transit areas, ensuring compliance with environmental laws.<sup>b</sup>

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A U.S. delegation led by the Coast Guard supported the Arctic Council Task Force on Oil Pollution Prevention in 2015. The task force developed a non-binding *Framework Plan for Cooperation on Prevention of Oil Pollution from Petroleum and Maritime Activities in the Marine Areas of the Environment*. The framework was accepted by the Arctic Council at the Ministerial meeting in April 2015.

The United States participated in a series of Canada-hosted exercises. The United States will build on the exercises during the U.S. Chairmanship of the Arctic Council by further exercising the *Agreement on Search and Rescue*.

The United States and Canada conducted a joint table-top exercise in September 2014 in Juneau, Alaska.

The United States led efforts to establish an Arctic Offshore Regulators Forum, an international group of oil and gas regulators who can share experience and expertise on how to increase the safety of operations and prevent oil pollution in the Arctic Ocean from petroleum activities. Department of the Interior's Bureau of Safety and Environmental Enforcement currently chairs the forum.<sup>c</sup>

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**Appendix IV: Coast Guard-Led Actions to  
Implement the National Strategy for the Arctic  
Region**

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**Task/objective—including examples of associated next steps/activities and supporting entities**

**Examples of progress reported, as of March 2016**

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**5. Enhance Arctic search and rescue**

Next steps include: Implement search and rescue agreements relevant to the Arctic region through information exchange, training, exercise participation, capacity building and the provision of mutual assistance as necessary. Next steps include institutionalizing international Arctic search and rescue exercises sponsored by the rotating chair of the Arctic Council and developing a comprehensive understanding of national, state, regional, and international resources.

Supporting agencies: Departments of Defense, State, and Transportation

In October 2015, the U.S. Northern Command, Alaskan Command, Department of State, and Coast Guard coordinated and sponsored Arctic Zephyr, an annual international search-and-rescue table-top exercise at the University of Alaska Anchorage. The exercise focused on a mass rescue operation scenario to test Arctic responsibilities, coordination nodes, and protocols laid out in the *Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic*, and to identify areas for improvement.

In October 2015, officials from the U.S. Coast Guard and the seven other Arctic nations' coast guards signed a joint statement establishing the international Arctic Coast Guard Forum which is an operationally focused, consensus-based organization that leverages collective resources to foster safe, secure, and environmentally responsible maritime activity in the Arctic.

**6. Expedite International Maritime Organization<sup>d</sup> Polar Code development and adoption**

Next steps include: Develop and implement a mandatory international code for ships operating in polar waters (Polar Code), which includes the full range of design, construction, equipment, operational, search and rescue, and environmental protection matters relevant to ships operating in the remote and inhospitable waters surrounding the two poles.

Supporting agencies: Departments of Commerce (National Oceanic and Atmospheric Administration), Defense, State, and Transportation (Maritime Administration); Environmental Protection Agency; and National Science Foundation

The United States continues to prepare for the International Maritime Organization's Polar Code to enter into effect. Both safety and environment-related provisions of the Polar Code—via amendments to the *International Convention for the Safety of Life at Sea* and the *International Convention for the Prevention of Pollution from Ships*—have been adopted by the International Maritime Organization. The safety and environmental amendments will enter into force in January 2017.

**7. Promote Arctic waterways management**

Next steps include: Develop Arctic waterways management regimes including traffic separation schemes, vessel tracking, and ship routing in cooperation with international partners to promote safe maritime transportation in the Arctic region. Next steps include completing an assessment to support decisions on the management of maritime traffic and a Bering Strait Port Access Route Study.

Supporting agencies: Departments of Commerce (National Oceanic and Atmospheric Administration), Defense, and Transportation

The Coast Guard completed an assessment of the North Slope and determined that no significant changes to the Aids to Navigation constellation were required. In addition, the Coast Guard facilitated the establishment of an Arctic Waterways Safety Committee which is a non-governmental committee that is to be dedicated to addressing safety, security, subsistence, and environmental issues facing the Arctic. The committee approved its governing by-laws in March 2015.

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Source: GAO summary of the January 2014 Implementation Plan for the *National Strategy for the Arctic Region*, January 2015 *National Strategy for the Arctic Region Implementation Report*, and the March 2016 *Progress Report on the Implementation of the National Strategy for the Arctic Region*. | GAO-16-453

<sup>a</sup>The U.S. National Response Team is responsible for coordinating emergency preparedness and response to oil and hazardous substance pollution incidents.

<sup>b</sup>The Alaska Regional Response Team is an advisory board to the Federal On Scene Coordinator and provides federal, state, and local governmental agencies with the means to participate in the response to pollution incidents.

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<sup>c</sup>Department of the Interior officials provided updated information on this forum in March 2016.

<sup>d</sup>The International Maritime Organization is a United Nations specialized agency with responsibility for the safety and security of shipping, and the prevention of marine pollution by ships.

In March 2016, the White House issued the *Implementation Framework for the National Strategy for the Arctic Region* which is to supersede its 2014 implementation plan.<sup>3</sup> The AESC led the efforts to develop the revised framework, which updates the 2014 implementation plan by (1) incorporating the Administration's new priorities into the existing lines of efforts, particularly placing greater importance on community sustainability and resilience;<sup>4</sup> (2) removing actions listed in the 2014 implementation plan that have been completed, or are no longer considered an actionable priority; (3) including factors to improve efficiency by reducing redundancies and closing interagency coordination gaps; and (4) increasing the importance of science by incorporating the entire Interagency Arctic Research Policy Committee Arctic Research Plan by reference into the Pursuing Responsible Arctic Region Stewardship line of effort. In addition, the revised framework assigned an overall coordination lead for each line of effort from the national strategy.<sup>5</sup> The 2016 framework includes 28 tasks that encompass various next steps and, unlike the 2014 plan, assigned a lead agency to each next step rather than to the overarching task. The Coast Guard was assigned to lead next steps that fall within 8 of the 28 tasks—7 of which it was also assigned as the lead in the 2014 plan.<sup>6</sup> For the additional 2016 task, the Coast Guard has the lead for one of the next steps, which involves the analysis and monitoring of illegal, unreported, and unregulated fishing in the Arctic. The 2016 framework is to be revisited in 5 years; however, the framework states that because the Arctic is undergoing changes, the

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<sup>3</sup>White House, the *Implementation Framework for the National Strategy for the Arctic Region* (Washington, D.C.: Mar. 9, 2016).

<sup>4</sup>In September 2015, the President announced several key priorities for the Arctic, including the acquisition of icebreakers, after the August 2015 Conference on Global Leadership in the Arctic: Cooperation, Innovation, Engagement and Resilience.

<sup>5</sup>The National Security Council was assigned the lead for advancing U.S. security interests, the Office of Science and Technology Policy was assigned the lead for pursuing responsible Arctic region stewardship, and the Department of State was assigned the lead for strengthening international cooperation.

<sup>6</sup>Specifically, within the 8 tasks in the 2016 framework, the Coast Guard is assigned the lead, or co-lead, for 24 next steps.

AESC may make adjustments before then. According to Coast Guard officials, the AESC's efforts to update the implementation plan's priorities are important because the tasks in the national strategy need to be balanced with new priorities announced by the President—some of which may be difficult to accomplish because they are evolving and may be planned further into the future than the 10-year national strategy.<sup>7</sup> Further, Coast Guard officials stated that better prioritization of the national efforts will help the Coast Guard in making decisions about what it needs to achieve in the Arctic given its limited resources.

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<sup>7</sup>The AESC also has several other efforts underway. For example, the AESC developed a taskforce to assess overlaps and gaps in Arctic activities; the taskforce presented recommendations to the AESC, which is reviewing these findings. Coast Guard officials have reported that through the AESC efforts, they were able to identify areas of potential overlap. For example, the Coast Guard learned that it was studying similar technologies as NOAA and was able to ensure proper coordination so that they were not duplicating efforts. The AESC has held several meetings and helped to set some priorities. Specifically, the AESC agreed upon short-term priorities during its initial meeting—and set up working groups to focus on these issues—including efforts related to oil spill prevention, preparedness, and response; coastal erosion; reliable and affordable energy; and the execution of an international summit on climate change. The AESC charged the Coast Guard with leading an interagency task force to develop Arctic-specific recommendations that strengthen the nation's ability to prevent and respond to oil spills in the Arctic, and is actively working with partners to implement the three high priority actions: (a) evaluate opportunities to revitalize Alaska's Area Committees as the primary means of enhancing Area Contingency Planning in the Arctic, (b) enhance collaboration on bilateral agreements with neighboring Arctic countries, and (c) strengthen support for joint international training.

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# Appendix V: Coast Guard-Involved Actions to Implement the National Ocean Policy

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The April 2013 *National Ocean Policy Implementation Plan* and its appendix—developed by the National Ocean Council—identify the Arctic as one of nine key objectives and include tasks for federal agencies consistent with their existing missions and activities. Although the plan does not assign designated leads for each task, the Coast Guard is charged with helping to implement three Arctic-specific tasks—which include various next steps.<sup>1</sup> The National Ocean Council developed and maintains a U.S. government-authorized, web-based site for federal agencies to report the status of the tasks under the National Ocean Policy. The Coast Guard, along with supporting agencies, has taken steps toward implementing all three of its assigned tasks, as detailed in table 5. For example, the National Ocean Council reported that the Coast Guard and its partners completed one task in its entirety, and that the two other tasks and related next steps were from 55 to 95 percent complete, as of December 2015. All of the Coast Guard’s tasks were to have been completed in either 2013 or 2014, but the Coast Guard reported to the National Ocean Council that funding and resource constraints challenged their ability to complete the tasks in their entirety.

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<sup>1</sup>The three tasks are (1) enhance communication systems in the Arctic to improve our capability to prevent and respond to maritime incidents and environmental impacts; (2) improve Arctic environmental incident prevention and response to ensure coordinated agency action, minimize the likelihood of disasters, and expedite response activities; and (3) improve Arctic sea ice forecasting to support safety at sea. These tasks include 11 next steps. According to Coast Guard officials, many of the steps are the same as or closely aligned with those in the *Implementation Plan for the National Strategy for the Arctic Region* and the *United States Coast Guard Arctic Strategy*. For each of the next steps, the plan indicates the planned expected year of completion.

**Table 5: Reported Federal Progress on Coast Guard-Involved Actions to Implement the National Ocean Policy**

1. Enhance communication systems in the Arctic to improve our capability to prevent and respond to maritime incidents and environmental impacts.	
<b>Next steps, initial year to be completed, and responsible entities, as listed in the <i>National Ocean Policy Implementation Plan Appendix</i></b>	<b>Examples of progress reported, as of December 2015</b>
<p>a. Complete inventory of existing Department of Defense (DOD), Department of Homeland Security (DHS), and partner communication capabilities (e.g., satellites, land-based systems, and submarine cables) in the Arctic region.</p> <p><u>To be completed:</u> 2013</p> <p><u>Entities responsible:</u> Coast Guard, DOD</p>	<p>DOD, DHS, and other partners have an understanding of the communications capabilities, limitations, and gaps in the region.</p> <p>DOD and the Coast Guard have worked together to identify communications gaps and assess telecommunications and land-based communications requirements.</p> <p>During 2015 Arctic summer operations, the Coast Guard assessed satellite connectivity in high latitudes, specifically from shipborne systems.</p> <p>However, more work still needs to be done to develop a complete inventory and to enhance communication capabilities in the Arctic region. Since communication capabilities can always be improved, implementation work related to this milestone is ongoing, but mostly completed.</p> <p>95% completed.</p>
<p>b. Establish and strengthen partnerships with industry, other governments, and Alaska Native organizations to build on existing and new Arctic communications solutions and capabilities.</p> <p><u>To be completed:</u> 2013</p> <p><u>Entities responsible:</u> Coast Guard, DOD, National Oceanic and Atmospheric Administration (NOAA)</p>	<p>Federal agencies have strengthened their communications partnerships with industry, other governments, and Alaska Native organizations. DOD and the Coast Guard have worked together to identify communications gaps and assessed telecommunications and other capabilities and requirements.</p> <p>Federal agencies also made progress in establishing and strengthening partnerships with industry, other governments, and Alaska Native organizations, particularly in the areas of search and rescue and oil spill response. However, more work still needs to be done to maximize the opportunities for improved partnerships. Since communication capabilities can always be improved, implementation work related to this milestone is ongoing.</p> <p>85% completed.</p>

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Appendix V: Coast Guard-Involved Actions to Implement the National Ocean Policy

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**1. Enhance communication systems in the Arctic to improve our capability to prevent and respond to maritime incidents and environmental impacts.**

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**Next steps, initial year to be completed, and responsible entities, as listed in the *National Ocean Policy Implementation Plan Appendix***

c. Identify, analyze, rank, and implement the most cost-effective options to reduce communication gaps and boost federal capabilities in the Arctic region, commensurate with available resources and user needs.

To be completed: 2014

Entities responsible: Coast Guard, DOD, NOAA, and Department of Transportation (DOT)

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**Examples of progress reported, as of December 2015**

DOD completed an assessment in 2013 that addressed the performance of air, surface, and available shorebased sensors and communications systems in the Arctic region.

The Department of Commerce's National Telecommunications and Information Agency submitted a Notice of Inquiry in the Federal Register regarding the availability of telecommunication services in the Arctic.

DOD and the Coast Guard have worked together to identify communications gaps, and assessed telecommunications and other capabilities and requirements.

The Coast Guard is working with interagency partners to grow the capability to receive information from diverse sources, analyze the information, and disseminate information to stakeholders.

DOD is working with the Coast Guard, NOAA, other governmental agencies, and Canada to collaborate on a system to improve communications and collection of environmental data by satellite.

More work still needs to be done to identify and implement the most cost-effective options to enhance communications capabilities in the Arctic region. Implementation work related to this milestone is ongoing.

70% completed.

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**2. Improve Arctic environmental incident prevention and response to ensure coordinated agency action, minimize the likelihood of disasters, and expedite response activities.**

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**Next steps, initial year to be completed, and responsible entities, as listed in the *National Ocean Policy Implementation Plan Appendix***

**Progress reported, as of December 2015**

a. Improve oil spill prevention, containment, and response infrastructure, plans, and technology for use in ice-covered Arctic seas, using all available sources, such as federal agencies, industry, academia, and international partners.

For more than 25 years, federal agencies have maintained a long-term research program dedicated to improving maritime oil-spill-response options. For example, DOI's Oil Spill Response Research program is a cooperative effort bringing together funding and expertise from research partners in government agencies, industry, and the international community. BSEE also maintains a specific focus on understanding and improving oil spill response in the Arctic, and funds research projects to improve mechanical recovery, non-mechanical response options, and remote sensing. NOAA and the Coast Guard are active participants on the Alaska Regional Response Team, which deals with the development of oil spill response plans.

To be completed: 2013

The Arctic Council and its member states are implementing the May 2013 *Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic*. The U.S. participated in a notification exercise series that Canada hosted to test that agreement and prepared and submitted lessons learned to the Arctic Council's Emergency Prevention, Preparedness and Response Working Group, now chaired by NOAA. The U.S. government is building on those exercises through a Coast Guard-led exercise in 2016 which will incorporate all Arctic Council nations to prepare for and agree upon options to minimize risk and adverse impacts in the event of an oil spill. BSEE is also serving as co-lead and funding several key initiatives to support improved offshore oil spill response including development of an Arctic response equipment database and a circumpolar response viability analysis, both of which will improve the quality and consistency of contingency planning by all Arctic nations.<sup>a</sup>

Entities responsible: Coast Guard, Department of the Interior (DOI)/Bureau of Safety and Environmental Enforcement (BSEE) , DOT, NOAA

The National Academy of Sciences published its Arctic Spill Response Assessment in August 2014. The Plan for Incorporation of National Academy of Sciences Arctic Spill Response assessment was completed in November 2014 by the National Response Team and the Interagency Coordinating Committee on Oil Pollution Research.

BSEE, along with BOEM, proposed regulations specific to drilling operations in the offshore Arctic, which address prevention and containment, incorporating requirements that were used with Shell during the 2012 and 2015 drilling seasons.<sup>a</sup>

80% completed.

Appendix V: Coast Guard-Involved Actions to Implement the National Ocean Policy

**2. Improve Arctic environmental incident prevention and response to ensure coordinated agency action, minimize the likelihood of disasters, and expedite response activities.**

**Next steps, initial year to be completed, and responsible entities, as listed in the *National Ocean Policy Implementation Plan Appendix***

**Progress reported, as of December 2015**

b. Initiate interagency research and integration of data to improve models for spill trajectory, oil fate, and weathering, and natural resource maps based on Arctic conditions to feed scenario development and risk assessment.

NOAA is working with Canada to improve oil in ice behavior and fate modeling with funds from BSEE. BOEM has over 15 research studies related to spill trajectory, fate, and weathering that are ongoing or completed in 2015.<sup>a</sup>

To be completed: 2013

BSEE completed a North Slope Coastal Imagery Initiative where high resolution georeference imagery has been made publicly available at: <http://northslopecoast.net>.

Entities responsible: Coast Guard, NOAA, DOI/BSEE, DOI/Bureau of Ocean Energy Management (BOEM)

More work needs to be done to understand the challenges. The Coast Guard, NOAA, BSEE, and BOEM, through the Interagency Coordinating Committee on Oil Pollution Research, have identified research priorities for Arctic oil spill modeling in its "Oil Pollution Research and Technology Plan – Fiscal Years 2015-2021."

80% completed.

c. Complete scientifically based field or test tank experiments and tests of response tools for U.S. Arctic marine waters.

The Coast Guard is developing equipment and techniques that can be used to detect, track and recover oil in ice filled waters in all conditions. The Coast Guard will test this equipment in the Great Lakes and the Arctic through scheduled demonstrations.

To be completed: 2013

BSEE sponsored tests that were completed in August 2013, and has other projects underway due to be completed in 2016.

Entities responsible: Coast Guard, DOI/BSEE, Environmental Protection Agency

75% completed.

d. Identify options to minimize and/or mitigate the risk associated with vessel use and carriage of heavy-grade fuel oil in the Arctic.

There have been ongoing efforts at the International Maritime Organization and the Arctic Council to identify and build upon the available information concerning risks associated with vessel activity involving heavy-grade fuel oil in the Arctic region—including the implementation of an international agreement on marine oil pollution preparedness and response, and the updating of conventions to implement the Polar Code.

To be completed: 2013

Entities responsible: Coast Guard, NOAA, DOT, Department of Justice (DOJ), Department of State

85% completed.

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**Appendix V: Coast Guard-Involved Actions to  
Implement the National Ocean Policy**

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**2. Improve Arctic environmental incident prevention and response to ensure coordinated agency action, minimize the likelihood of disasters, and expedite response activities.**

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**Next steps, initial year to be completed, and responsible entities, as listed in the *National Ocean Policy Implementation Plan Appendix***

**Progress reported, as of December 2015**

e. Participate in joint training and workshops with other Arctic nations on oil spill response activities in the Arctic, such as the use of mechanical recovery, dispersants, and in situ burning following major spill events.

NOAA participated in drills with Canada and with the Coast Guard during Arctic Shield operations. NOAA also participated in a tabletop drill with Russia.

Arctic Council representatives participated in the Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic exercise workshop held at Coast Guard Headquarters in September 2015.

To be completed: 2013

60% completed.

Entities responsible: Coast Guard, NOAA, DOI/BSEE, DOT

f. In cooperation with other Arctic countries, develop international guidelines for both spill prevention and for spill response activities in the Arctic, such as the provision of improved sea ice forecasts for mariners and the use of mechanical recovery, dispersants, and in situ burning following major spill events.

BSEE is co-lead with Norway on development of materials on international standards that affect the maritime and oil and gas industries. They are identifying gaps in standards concerning Arctic oil spill prevention.<sup>a</sup>

Through recommendations from the Arctic Council's Task Force on Oil Pollution Prevention, the United States has led efforts to establish the Arctic Offshore Regulators Forum in which oil and gas regulators will routinely share experience and expertise toward the shared goal of preventing oil pollution in the Arctic.<sup>a</sup>

To be completed: 2013

Arctic Council representatives participated in the Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic exercise workshop held at the Coast Guard Headquarters in September 2015.

The Coast Guard is leading an interagency workgroup to develop an Arctic Logistical Concept of Operation with the goal of outlining the federal government footprint, and conducting a regional gap analysis of logistical support needs during a Spill of National Significance in the Arctic region.

Follow-on implementation ongoing.

Entities responsible: Coast Guard, NOAA, DOI, DOD, DOJ, DOT, Department of State

95% completed.

**Appendix V: Coast Guard-Involved Actions to Implement the National Ocean Policy**

**2. Improve Arctic environmental incident prevention and response to ensure coordinated agency action, minimize the likelihood of disasters, and expedite response activities.**

**Next steps, initial year to be completed, and responsible entities, as listed in the *National Ocean Policy Implementation Plan Appendix***

**Progress reported, as of December 2015**

g. Identify Arctic resource and infrastructure shortfalls for high-risk scenarios and assess strategies to address those shortfalls. Complete a resource-neutral plan to address the significant logistical issues (e.g., housing and feeding personnel, staging and deploying equipment, and managing waste) that would be involved in a large-scale oil spill response in the Arctic during any season.

The Alaska Regional Response Team is currently working on plans to carry out this task. The team has developed a scenario and is now working on defining agency response based on the scenario and logistics required to execute the response.

Progress toward this objective slowed due to uncertainty associated with Shell's discontinuation of oil exploration in the Arctic.

To be completed: 2014

Entities responsible: Coast Guard, NOAA, DOI/BSEE, DOT, Alaska Regional Response Team<sup>b</sup>

55% completed.

**3. Improve Arctic sea ice forecasting to support safety at sea.**

**Next steps, initial year to be completed, and responsible entities, as listed in the *National Ocean Policy Implementation Plan Appendix***

**Progress reported, as of December 2015**

Deliver tactical-scale Arctic sea ice analysis and forecasts in Geographic Information System-enabled broad-scale format to meet Coast Guard requirements.

100 % completed.

To be completed: 2013

Entities responsible: Coast Guard, DOD, NOAA

Source: GAO summary of the April 2013 *National Ocean Policy Implementation Plan Appendix*, March 2015 *Report on the Implementation of the National Ocean Policy*, a December 2015 status report, and agency information. | GAO-16-453

Notes: Percent completion is reported by the National Ocean Council.

<sup>a</sup>Department of the Interior officials provided this information in March 2016.

<sup>b</sup>The Alaska Regional Response Team is an advisory board to the Federal On Scene Coordinator and provides federal, state, and local governmental agencies with means to participate in response to pollution incidents.

# Appendix VI: Comments from the Department of Homeland Security



May 27, 2016

Jennifer A. Grover  
Director, Homeland Security and Justice Issues  
U.S. Government Accountability Office  
441 G Street, NW  
Washington, DC 20548

Re: Draft Report GAO-16-453 "COAST GUARD: Implementation of Arctic Strategy is Underway, but Assessment of Arctic Capability Gaps is Insufficient"

Dear Ms. Grover:

Thank you for the opportunity to comment on this draft report. The U.S. Department of Homeland Security (DHS) appreciates the U.S. Government Accountability Office's (GAO) work in planning and conducting its review and issuing this report.

The United States is an Arctic Nation, and as the lead federal maritime agency in the Arctic, the United States Coast Guard (USCG) plays a significant leadership role. Addressing the gaps in Arctic capability, such as lack of infrastructure, inadequate domain awareness and communication gaps, is a national issue and requires leveraging national capacity, interagency partnerships, and leadership to meet mission demands. The Coast Guard has taken a leadership role where it has the authority and jurisdiction to do so.

The extreme environment, the lack of permanent infrastructure, and the vast distances in the Arctic create unique challenges for Coast Guard operations. Successful execution of operations in the region depends on assets with unique multi-mission capabilities, yearly re-evaluations of best practices, international and interagency partnerships, and collaboration with commercial entities to mitigate risks of proposed maritime activities in the Arctic region.

As the draft report notes, the Arctic Executive Steering Committee (AESC) has a primary role in shaping priorities, providing strategic direction, and overseeing implementation of the National Strategy for the Arctic Region via its associated Implementation Framework, which was most recently updated in March 2016. This framework assigns components responsibilities to study, monitor, and implement a national strategy as the region becomes more accessible. The Coast Guard intends to continue performing mobile and seasonal operations in the Arctic for the next ten years, however, the Service fully

recognizes that there are capabilities that are needed for increased operations as the region becomes more accessible and human activity increases.

The draft report contained two recommendations with which the Department concurs. Please see the attached for our detailed response to each recommendation.

Again, thank you for the opportunity to comment on this draft report. Technical comments were previously provided under separate cover. Please feel free to contact me if you have any questions. We look forward to working with you in the future.

Sincerely,



Jim H. Crumpacker, CIA, CFE  
Director  
Departmental GAO-OIG Liaison Office

**Attachment: DHS Management Response to Recommendations  
Contained in GAO-16-453**

GAO recommended that the Commandant of the Coast Guard:

**Recommendation 1:** Develop measures, as appropriate, for gauging how the agency's actions have helped to mitigate the Arctic capability gaps.

**Response:** Concur. As the draft report noted, the Director of Marine Transportation Systems (CG-5PW) has developed a project management tool to track its implementation plan initiatives and activities. Specific measures for some activities will be developed and included in the next update to the Coast Guard Arctic Implementation Plan, as appropriate. The formal, annual review of the plan will begin in December 2016 with an expected release of the update in early 2017. The recommended adjustments to the Arctic Implementation Plan will be incorporated during the remainder of the year. Estimated Completion Date (ECD): December 31, 2017.

**Recommendation 2:** Design and implement a process to systematically assess the extent to which actions taken agency-wide have helped mitigate the Arctic capability gaps for which it has responsibility.

**Response:** Concur. Through its annual review of its Coast Guard Arctic Strategy implementation plan, the USCG (CG-5PW) will systematically assess how Coast Guard actions mitigate the capability gaps where Coast Guard is the lead agency per the National Strategy for the Arctic Region Implementation Framework (for example, ice-breaking capacity, and some specific elements of maritime domain awareness). As previously mentioned, the formal review of the Arctic Implementation Plan will begin in December 2016 and continue throughout calendar year 2017. Additionally, the USCG will maintain its work with the Administration-led Arctic Executive Steering Committee (AESC) to provide data for their overall tracking and measurement of national capability and impacts in the Arctic. ECD: December 31, 2017.

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# Appendix VII: GAO Contact and Staff Acknowledgments

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## GAO Contact

Jennifer Grover, (202) 512-7141 or [groverj@gao.gov](mailto:groverj@gao.gov)

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## Staff Acknowledgments

In addition to the contact named above, Dawn Hoff (Assistant Director), Tracey Cross (Analyst-in-Charge), Jillian Schofield, Linda Collins, Eric Warren, Susan Hsu, Tracey King, Chuck Bausell, Jan Montgomery, Michele Fejfar, Eric Hauswirth, Katherine Trimble, Laurier Fish, Carol Henn, and John Crawford made key contributions to this work.

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# Appendix VIII: Accessible Data

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## Agency Comment Letter

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Text of Appendix VI:  
Comments from the  
Department of Homeland  
Security

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U.S. Department of Homeland Security

Washington, DC 20528

Homeland Security

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Jennifer A. Grover

Director, Homeland Security and Justice Issues

U.S. Government Accountability Office

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Page 2

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Jim H. Crumpacker, CIA, CFE

Director

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Departmental GAO-OIG Liaison Office

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Page 3

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Washington, DC 20548