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COAST GUARD

Observations on Arctic
Requirements, Icebreakers,
and Coordination with
Stakeholders

Statement of Stephen L. Caldwell, Director
Homeland Security and Justice

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Highlights of [GAO-12-254T](#), a testimony before the Subcommittee on Coast Guard and Maritime Transportation, Committee on Transportation and Infrastructure, House of Representatives

Why GAO Did This Study

The gradual retreat of polar sea ice, combined with an expected increase in human activity—shipping traffic, oil and gas exploration, and tourism in the Arctic region—has increased the strategic interest that the United States and other nations have in the Arctic. As a result, the U.S. Coast Guard, within the Department of Homeland Security (DHS), has responsibilities in the Arctic, which are expected to increase. This testimony provides an update of: (1) the extent to which the Coast Guard has taken actions to identify requirements for future Arctic operations; (2) issues related to the U.S. icebreaking fleet; and (3) the extent to which the Coast Guard is coordinating with stakeholders on Arctic issues.

This statement is based on [GAO-10-870](#), issued in September 2010, and includes selected updates. For the selected updates, GAO analyzed Coast Guard, Department of Defense (DOD,) and other related documents on Arctic operations and capabilities. GAO also interviewed Coast Guard and DOD officials about efforts to identify Arctic requirements and coordinate with stakeholders.

What GAO Recommends

GAO is not making new recommendations in this statement. GAO previously recommended that the Coast Guard communicate with key stakeholders on the process and progress of its Arctic planning efforts. DHS concurred with this recommendation and is in the process of taking corrective action.

View [GAO-12-254T](#). For more information, contact Stephen L. Caldwell, (202) 512-9610, or caldwells@gao.gov.

December 1, 2011

COAST GUARD

Observations on Arctic Requirements, Icebreakers, and Coordination with Stakeholders

What GAO Found

The Coast Guard has taken a variety of actions—from routine operations to a major analysis of mission needs in the polar regions—to identify its Arctic requirements. The routine operations have helped the Coast Guard to collect useful information on the capability of its existing assets to operate in cold climates and strategies for overcoming logistical challenges presented by long-distance responses to incidents, among other things. Other operational actions intended to help identify Arctic requirements include the establishment of temporary, seasonal operating locations in the Arctic and seasonal biweekly Arctic overflights, which have helped the Coast Guard to identify performance requirements and test personnel and equipment capabilities in the Arctic. The Coast Guard's primary analytical effort to identify Arctic requirements is the High Latitude Study, a multivolume analysis that is intended to, in part, identify the Coast Guard's current Arctic capability gaps and assess the degree to which these gaps will impact future missions. This study also identifies potential solutions to these gaps and compares six different options—identified as Arctic force mixes—to a baseline representing the Coast Guard's current Arctic assets. However, given current budget uncertainty and the Coast Guard's recent acquisition priorities, it may be a significant challenge for the agency to acquire the assets that the High Latitude Study recommends.

The most significant issue facing the Coast Guard's icebreaker fleet is the growing obsolescence of these vessels and the resulting capability gap caused by their increasingly limited operations. In 2010, Coast Guard officials reported challenges fulfilling the agency's statutory icebreaking mission. Since then, at least three reports—by the DHS Inspector General and Coast Guard contractors—have further identified the Coast Guard's challenges to meeting its current and future icebreaking mission requirements in the Arctic with its existing polar icebreaker fleet. Prior GAO work and these reports also identify budgetary challenges the agency faces in acquiring new icebreakers. Given these issues and the current budgetary climate, it is unlikely that the Coast Guard will be able to fund the acquisition of new icebreakers through its own budget, or through alternative financing options. Thus, it is unlikely that the Coast Guard will be able to expand the U.S. icebreaker fleet to meet its statutory requirements, and it may be a significant challenge for it to just maintain its existing level of icebreaking capabilities due to its aging fleet.

In 2010, GAO reported the Coast Guard coordinates with various stakeholders on Arctic operations and policy, including foreign, state, and local governments, Alaskan Native governments and interest groups, and the private sector. GAO also reported that the Coast Guard coordinates with federal agencies, such as the National Science Foundation, National Oceanic and Atmospheric Administration, and DOD. More recently, the Coast Guard has partnered with DOD through the Capabilities Assessment Working Group—an interagency coordination group established in May 2011—to identify shared Arctic capability gaps as well as opportunities and approaches to overcome them, to include making recommendations for near-term investments. The establishment of this group helps to ensure collaboration between the Coast Guard and DOD addresses near-term capabilities in support of current planning and operations.

Chairman LoBiondo, Ranking Member Larsen, and Members of the Subcommittee:

I am pleased to be here today to discuss the Coast Guard's efforts to identify Arctic requirements and to coordinate with stakeholders on Arctic issues and operations. The retreat of sea ice, combined with an expected increase in human activity—shipping traffic and oil and gas exploration—has increased the strategic interest that the United States and other nations have in the Arctic region. For example, in 2011, northern shipping routes opened during the summer months, which permitted more than 40 vessels to transit between June and October 2011. As a result of these and other anticipated changes in the Arctic, the Coast Guard is expected to face increasing responsibilities in the waters off of Alaska's 44,000 miles of coast. In addition, the United States has developed national-level policies that guide the actions of the Coast Guard and other stakeholders. These policies indicate that the United States has an enduring interest in working collaboratively with other nations to address the emerging challenges arising from the effects of climate change and globalization in the Arctic, and they identify Arctic national security needs including protecting the environment, managing resources, and supporting scientific research.¹

Since the Arctic is primarily a maritime domain, the Coast Guard plays a significant role in Arctic policy implementation and enforcement. The Coast Guard is a multimission, maritime military service within the Department of Homeland Security (DHS) that has responsibilities including maritime safety, security, environmental protection, and national defense, among other missions.² As more navigable ocean water emerges in the Arctic and human activity increases, 9 of the Coast Guard's 11 statutory missions will take on additional importance, including Defense Readiness, Ice Operations, and Marine Environmental Protection.

¹National Security Presidential Directive 66 / Homeland Security Presidential Directive 25, *Arctic Region Policy* (Jan. 9, 2009); *National Security Strategy* (Washington, D.C.: May 2010).

²The Coast Guard's 11 statutory mission areas include: Aids to Navigation; Defense Readiness; Drug Interdiction; Ice Operations; Living Marine Resources; Marine Environmental Protection; Marine Safety; Migrant Interdiction; Other Law Enforcement; Ports, Waterways, and Coastal Security; and Search and Rescue.

The Coast Guard currently has limited capacity to operate in the waters immediately below the Arctic Circle, such as the Bering Sea. Increasing responsibilities in an even larger geographic area, especially in the harsh and remote conditions of the northern Arctic, will further stretch the agency's capacity. See appendix I for a map of the Arctic boundary and the Arctic Circle line of latitude.³

Presently, all of the Coast Guard's assets are based well below the Arctic Circle, so Coast Guard operations above the Arctic Circle are constrained by several factors, including long transit times for surface vessels and aircraft to cover vast distances to reach the Arctic Circle. When the Coast Guard is able to respond to an incident, its surface and air assets are also limited by fuel capacity and the distance to fuel sources. Figure 1 compares the State of Alaska to the lower 48 states to illustrate the large distances between Coast Guard assets and Point Barrow (the northernmost point of land in Alaska).

³Arctic stakeholders do not define the Arctic geographical area the same way. The Arctic Research and Policy Act of 1984 for example, defines the Arctic as all U.S. and foreign territory north of the Arctic Circle, all U.S. territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers, and all contiguous seas, including the Arctic Ocean and the Beaufort, Bering, and Chukchi Seas; and the Aleutian chain. Pub. L. No. 98-373, 98 Stat. 1242, 1248 (1984). For the purposes of this statement, we are limiting our analysis to a more specific definition of the Arctic—the more remote region above the Arctic circle.

Figure 1: Coast Guard Facilities and Assets in the State of Alaska Superimposed on the Lower 48 States



Source: Coast Guard.

My statement today discusses (1) the extent to which the Coast Guard has taken actions to identify and report on requirements for future Arctic operations; (2) issues related to the U.S. icebreaking fleet; and (3) the extent to which the Coast Guard is coordinating with stakeholders on Arctic issues.

This statement is based on our September 2010 report on the Coast Guard's coordination with stakeholders on Arctic policy and efforts to identify Arctic requirements and capability gaps, along with selected updates we obtained in November 2011.⁴ For our September 2010 report, we interviewed officials from the Coast Guard, other federal entities, and the International Maritime Organization, as well as state, local, and Alaska Native stakeholders. We also reviewed Coast Guard documents related to coordination with stakeholders on Arctic issues, efforts to plan

⁴GAO, *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).

for increased Arctic activity, and challenges and factors affecting the Coast Guard's Arctic operations. More detailed information on the scope and methodology for our September 2010 report can be found in that report. For the selected updates, we analyzed Coast Guard, Department of Defense (DOD,) and other related documents on Arctic operations and capabilities. We interviewed Coast Guard and DOD officials about efforts to identify Arctic requirements and coordinate with stakeholders. We also reviewed how a recent effort aligns with key practices we have identified for enhancing and sustaining interagency coordination.⁵ For new information that was based on work not previously reported, we obtained Coast Guard views on our findings and incorporated technical comments where appropriate. We conducted the performance audit work that supports this statement in accordance with generally accepted government auditing standards.

Background

Diminishing Ice Opens Potential for Increased Human Activity in the Arctic

Scientific research and projections of the changes taking place in the Arctic vary, but there is a general consensus that Arctic sea ice is diminishing and some scientists have projected that the Arctic will be ice-diminished for periods of time in the summer by as soon as 2040.⁶ As recently as September 2011, scientists at the U.S. National Snow and Ice Data Center reported that the annual Arctic minimum sea ice extent for 2011 was the second lowest in the satellite record, and 938,000 square miles less than the 1979 to 2000 average annual minimum. These environmental changes in the Arctic are making maritime transit more feasible and are increasing the likelihood of human activity including tourism, oil and gas extraction, commercial shipping, and fishing in the

⁵See GAO, *Results-Oriented Government: Practices That Can Help Enhance and Sustain Collaboration among Federal Agencies*, [GAO-06-15](#) (Washington, D.C.: Oct. 21, 2005).

⁶A 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 and the current and projected decline in Arctic sea ice is highly variable from year to year. The term "ice-diminished" refers to sea ice concentrations of up to 15 percent ice in the area.

region.⁷ Despite these changes, however, several enduring characteristics still provide challenges to surface navigation in the Arctic, including large amounts of winter ice and increased movement of ice from spring to fall. Increased movement of sea ice makes its location less predictable, which is likely to increase the risk for ships to become trapped or damaged by ice impacts.

Coast Guard Faces Challenges to Arctic Operations

As we reported in September 2010, the Coast Guard faces challenges to Arctic operations including limited maritime domain awareness, assets, and infrastructure.⁸ In a 2008 report to Congress, the Coast Guard stated that maritime domain awareness in the Arctic is critical to effective engagement in the Arctic as activity increases.⁹ However, several factors—including (1) inadequate Arctic Ocean and weather data, (2) lack of communication infrastructure, (3) limited intelligence information, and (4) lack of a physical presence in the Arctic—create challenges for the Coast Guard in achieving maritime domain awareness in the Arctic. The Coast Guard also faces limitations in assets and infrastructure in the Arctic. These include (1) an inadequate portfolio of small boats for Arctic operations, (2) the environmental impact of Arctic conditions on helicopters and airplanes, and (3) a lack of cutter resources for Arctic patrols.¹⁰

⁷In August 2011, the Department of the Interior approved preliminary plans for one operator to drill for oil and gas in the Arctic pending receipt of the operator's well containment plan and other requirements.

⁸[GAO-10-870](#).

⁹According to the Coast Guard, maritime domain awareness is an effort to achieve an understanding of anything in the maritime environment that can affect the security, safety, economy, or environment of the United States. The process of achieving maritime domain awareness includes: (1) collection of information, (2) fusion of information from different sources, (3) analysis through the evaluation and interpretation of information, and (4) dissemination of information to decision makers, with the goal of identifying risks and threats before they turn into catastrophic events.

¹⁰See [GAO-10-870](#) for a detailed discussion of these challenges to the Coast Guard's Arctic operations.

Coast Guard Is Identifying Arctic Requirements, but Funding Is Uncertain

Coast Guard's Efforts to Identify Arctic Requirements

The Coast Guard has taken a variety of actions to identify its Arctic requirements. As we reported in September 2010, these encompass a range of efforts including both routine mission operations and other actions specifically intended to help identify Arctic requirements. Through routine mission operations, the Coast Guard has been able to collect useful information on the capability of its existing assets to operate in cold climates, strategies for overcoming logistical challenges presented by long-distance responses to incidents, and the resources needed to respond to an oil spill in a remote and cold location, among other things.¹¹ We also reported that the Coast Guard had efforts underway specifically designed to inform its Arctic requirements, including the establishment of seasonal, temporary operating locations in the Arctic and biweekly Arctic overflights. The temporary operating locations were established during the summers of 2008 through 2010, and have helped the Coast Guard identify performance requirements and obstacles associated with the deployment of small boats, aircraft, and support staff above the Arctic Circle. The seasonal (March-November) biweekly Arctic overflights were initiated in October 2007 to increase the agency's maritime domain awareness, test personnel and equipment capabilities in the Arctic, and inform the Coast Guard's Arctic requirements, among other things.¹² As we reported in September 2010,¹³ these efforts addressed elements of three key practices for agencies to better define mission requirements

¹¹For more details on these efforts, see [GAO-10-870](#), app. V.

¹²For example, the Coast Guard has also partnered with the National Oceanic and Atmospheric Administration (NOAA) to track methane and carbon dioxide emissions over Alaska during Arctic domain awareness flights.

¹³[GAO-10-870](#).

and desired outcomes: (1) assessing the environment; (2) involving stakeholders; and (3) aligning activities, core processes, and resources.¹⁴

High Latitude Study Identifies Arctic Requirements

The Coast Guard's primary analytical effort to identify and report on Arctic requirements, the High Latitude Study (the Study), identifies the Coast Guard's responsibilities in the Polar regions, discusses the nature of the activities it must perform over the next 30 years, and concludes with a high-level summary of the Coast Guard's material and nonmaterial needs to meet the requirements.¹⁵ Specifically, the Study identifies the Coast Guard's current capability gaps in the Arctic and assesses the degree to which these gaps will impact future missions. Of the Coast Guard's 11 mission areas, 9 are expected to experience future demand in the Arctic region. The Study identifies several current capability gaps that affect the majority of these mission areas. Specifically, gaps in communications capabilities affect all 9 mission areas, while deficiencies in the information available about sea ice coverage in the Arctic affects 8 mission areas.¹⁶ The other major gaps that affect the majority of mission areas are related to the lack of polar icebreaking capacity, which will be discussed later in this statement.

Of the 9 mission areas that the Coast Guard will need to carry out in the Arctic, the Study identifies 7 mission areas expected to be significantly or moderately impacted by current capability gaps. In general, these missions all address the protection of important national interests in the Arctic or the safety of mariners and the environment. See appendix II for more detail

¹⁴GAO, *Executive Guide: Effectively Implementing the Government Performance and Results Act*, [GAO/GGD-96-118](#) (Washington D.C.: June 1996). For more information on how the Coast Guard's efforts addressed the three key practices, see [GAO-10-870](#).

¹⁵ABS Consulting, *High Latitude Study Mission Analysis Report*, prepared for the United States Coast Guard, (July 2010). The Coast Guard provided this study to Congress in July 2011. The High Latitude Study comprises three volumes: (1) Polar Icebreaking Needs (in both the Arctic and Antarctic regions); (2) Arctic Mission Area Needs; and (3) Antarctic Mission Area Needs. Volumes 1 and 2 are intended, in part, to provide decision-makers with options for meeting the Coast Guard's mission requirements in the Arctic. According to Coast Guard officials, the High Latitude Study was not a part of the formal acquisitions process, and would instead be used to inform a more detailed future analysis that will serve as the first step in the icebreaker acquisition process.

¹⁶The National Ice Center provides information about sea ice coverage to the Coast Guard, but the High Latitude Study notes that the products that the National Ice Center provides are not well-suited for Coast Guard use.

about the degree of impact that current capability and capacity gaps are expected to have on future Coast Guard mission performance.

The Study then identifies potential solutions to specifically address gaps in communications and electronic navigation capabilities, recommending that the Coast Guard acquire more than 25 additional communication or navigation facilities for Arctic operations. In addition to these capabilities, the Study compares six different options—identified as Arctic force mixes—to a baseline representing the Coast Guard's current Arctic assets. These force mixes add assets to the existing baseline force mix, and contain different combinations of cutters (including icebreakers), aircraft, and forward operating locations and are designed to mitigate the mission impacts caused by current capability gaps. See appendix III for a description of the assets included in each Arctic force mix.

The High Latitude Study also includes a risk analysis that compares the six Arctic force mixes in terms of the ability of each force mix to reduce the risk that is expected to exist in the future Arctic environment. Risk reduction is determined in part by (1) identifying a list of potential Arctic maritime incidents requiring Coast Guard support, such as maritime accidents resulting in multiple casualties or a major oil spill, or both; (2) quantifying the likelihood that these search and rescue and maritime environmental protection incidents could occur and the resulting impact should they occur; and (3) assessing the relative effectiveness, or risk reduction, of force packages the Coast Guard may employ to respond to those incidents.¹⁷ The intent of the analysis is to provide information on risk-reduction alternatives to inform the acquisition process. According to the Study, the baseline Arctic force mix reduces less than 1 percent of risk in the Arctic because this patrol capability cannot reasonably respond to northern area incidents, while the six other Arctic force mixes reduce between 25 and 92 percent of risk annually, though the amount of risk reduced varies by season. See appendix III for the amount of annual risk in the Arctic reduced by each force mix.

¹⁷The types of risk addressed by the analysis are those to public safety and property that are addressed by Coast Guard Search and Rescue and Marine Environmental Protection missions. Requirements under the Coast Guard's Defense Readiness mission area were excluded from the risk analysis, because identifying and assessing potential defense incidents was beyond the scope of the study.

Funding for Identified Arctic Requirements Is Challenging and Uncertain

As we reported in September 2010, administration budget projections indicated that DHS's annual budget was expected to remain constant or decrease over the next 10 years. Moreover, senior Coast Guard officials, based in Alaska, reported that resources for Arctic operations had already been reduced and were inadequate to meet existing mission requirements in Alaska, let alone expanded Arctic operations. These officials also reported a more than 50 percent year-to-year reduction between 2005 and 2009 in the number of large cutters available for operations in their region. Officials also expressed concern that the replacement of the 12 older high-endurance cutters with 8 new cutters may exacerbate this challenge. Given the reductions that have already taken place, as well as the anticipated decrease in DHS's annual budget, the long-term budget outlook for Coast Guard Arctic operations is uncertain. The challenge of addressing Arctic resource requirements in a flat or declining budget environment is further underscored by recent budget requests that have identified the Coast Guard's top priority as the recapitalization of cutters, aircraft, communications, and infrastructure—particularly with regard to its Deepwater program.¹⁸ Recent budget requests also have not included funding for Arctic priorities, aside from the annual operating costs associated with existing icebreakers.

This budget challenge is exacerbated when the costs of the High Latitude Study's proposed resource requirements are taken into account. Specifically, the Study estimates that the cost of acquiring the assets associated with each of the six Arctic force mixes would range from \$1.01 billion to \$6.08 billion, and their corresponding annual operating costs would range from \$72.3 million to \$411.3 million. See appendix III for the estimated acquisition cost of each Arctic force mix. Additionally, the estimated cost for the recommended communications and electronic navigation capabilities for Arctic operations is about \$23.4 million. Given current budget uncertainty and the Coast Guard's recent acquisition priorities, it may be a significant challenge for the Coast Guard to acquire the assets that the Study recommends.

¹⁸The Deepwater program is a long-term, multibillion-dollar acquisition program intended to replace or modernize the Coast Guard's aging vessels, aircraft, and some communications systems.

Coast Guard Continues to Face Challenges Related to Icebreakers

The most significant issue facing the Coast Guard's icebreaker fleet is the growing obsolescence of these vessels and the resulting capability gap caused by their increasingly limited operations. As we noted in our 2010 report, Coast Guard officials reported challenges fulfilling the agency's statutory icebreaking mission, let alone its standing commitment to use the icebreakers to support the Navy as needed.¹⁹ Since then, at least three reports have further identified the Coast Guard's challenges to meeting its current and future icebreaking mission requirements in the Arctic with its existing polar icebreaker fleet, as well as the challenges it faces to acquire new icebreakers. The Coast Guard's existing fleet includes three icebreakers that are capable of operating in the Arctic:

- *Polar Sea* (inoperative since 2010): The *Polar Sea* is a heavy icebreaker²⁰ commissioned in 1978 with an expected 30-year lifespan. A major service life extension²¹ project, completed in 2006, was expected to extend the *Polar Sea*'s service life through 2014. However, in 2010, the *Polar Sea* experienced major engine problems and is now expected to be decommissioned in 2011. According to a Coast Guard budget official, this will allow its resources to be redirected toward the ongoing service life extension of the *Polar Star*. Fig. 2 below shows the *Polar Sea* in dry dock.
- *Polar Star* (inoperative since 2006): The *Polar Star* is a heavy icebreaker commissioned in 1976 with an expected 30-year lifespan. The *Polar Star* is currently undergoing a \$62.8 million service life

¹⁹The Coast Guard and the Navy have a long-standing memorandum of agreement regarding the use of the nation's icebreakers—the Coast Guard operates the nation's icebreakers and uses them, when needed, to support the Navy. The 1965 U.S. Navy-U.S. Treasury Memorandum of Agreement was executed to permit consolidation of the icebreaker fleet under one agency. That rationale was reinforced by a 1982 Roles and Missions Study which stated that polar icebreakers should be centrally managed by one agency and that the Coast Guard was the appropriate one due to the multimission nature of polar ice operations. This memorandum of agreement was updated in 2008. The signatories were DOD and DHS and the agreement included an update on responsibilities for coastal security.

²⁰Icebreakers receive different classifications from the International Maritime Organization based on their icebreaking capabilities. A heavy icebreaker is classified as a Polar Class 1 vessel, and is capable of conducting year-round operations in the Arctic and Antarctic. A medium icebreaker is classified as a Polar Class 3 vessel, and is capable of operating in the Arctic region in the spring, summer, and fall.

²¹A service life extension is a rehabilitation effort involving extensive maintenance and repair conducted to extend the service life of an asset.

extension, and is expected to return to service in 2013. The ongoing service life extension is expected to extend the *Polar Star*'s service life through at least 2020.

- *Healy* (operative): The *Healy* is a medium icebreaker, commissioned in 2000, with an expected 30-year lifespan. The *Healy* is less capable than the heavy icebreakers and is primarily used for scientific missions in the Arctic. As a medium icebreaker, the *Healy* does not have the same icebreaking capabilities as the *Polar Sea* and *Polar Star*. Because of this, it cannot operate independently in the ice conditions in the Antarctic or ensure timely access to some Arctic areas in the winter.

Figure 2: *Polar Sea* in Dry Dock



Source: GAO.

Three Studies Detail Icebreaking Issues

Since we reported on Coast Guard's Arctic operations in September 2010, at least three reports have further identified the Coast Guard's challenges to meeting its current and future icebreaking mission requirements in the Arctic with its existing polar icebreaker fleet, as well as the challenges it faces to acquire new icebreakers.

- *DHS-OIG Report on the Coast Guard's Polar Icebreakers.*²² The DHS Office of the Inspector General (OIG) reported that the Coast Guard and other U.S. agencies are unable to meet their current Arctic mission requirements with existing icebreaking resources. This January 2011 report noted that the Coast Guard's icebreaking resources are unlikely to meet future demands as well, in part because the agency has not followed its life cycle replacement plan, which requires replacement of icebreaking ships after 30 years of service. Further, between fiscal year 2006 and fiscal year 2009, the National Science Foundation (NSF) had budgetary authority over the Coast Guard's icebreaker fleet. Among other things, the Inspector General reported that this funding arrangement resulted in deferred maintenance on the icebreakers, which has affected their long-term operability. The report concludes that without funding for new icebreakers or major service life extensions of existing ones, the U.S. will lose all polar icebreaking capabilities by 2029.²³ The OIG report included four recommendations related to the Arctic.²⁴
- *U.S. Polar Icebreaker Recapitalization Report.*²⁵ The Coast Guard provided a report to Congress²⁶ on the recapitalization of the U.S. Polar

²²DHS Office of the Inspector General, *The Coast Guard's Polar Icebreaker Maintenance, Upgrade, and Acquisition Program*, OIG-11-31 (Washington, D.C.: January 2011).

²³To determine the Healy's lifespan, the DHS-OIG report uses the date that the Healy was placed "In Commission, Special" status, whereas we report on the "In Commission, Active" date.

²⁴The OIG recommended that the Assistant Commandant for Marine Safety, Security, and Stewardship: (1) Request budgetary authority for the operation, maintenance, and upgrade of its icebreakers; (2) in coordination with DHS, request clarification from Congress to determine whether Arctic missions should be performed by Coast Guard assets or contracted vessels; (3) conduct the necessary analysis to determine whether the Coast Guard should replace or perform service-life extensions on its two existing heavy-duty icebreaking ships; and (4) request appropriations necessary to meet mission requirements in the Arctic and Antarctic.

²⁵ABS Consulting, *U.S. Polar Icebreaker Recapitalization: A Comprehensive Analysis and Its Impacts on U.S. Coast Guard Activities*, prepared for the United States Coast Guard, (October 2011).

icebreakers (Recapitalization report), which assessed options for recapitalizing its existing icebreaker fleet, including building new icebreakers, or reconstructing the *Polar Sea* and *Polar Star* to meet mission requirements, among other options.²⁷ This October 2011 report found that the most cost-effective option would be to build two new heavy icebreakers, while performing minimal maintenance to keep the existing icebreakers operational while construction is taking place. In addition to having the lowest acquisition cost of any option—at \$2.12 billion—this option also has the lowest risk due to the complexity (and therefore risk) associated with the other options of performing major service life extensions or reconstructing the *Polar Sea* and *Polar Star*. The risk associated with these options is driven by high levels of uncertainty in terms of cost, scheduling, and technical feasibility for reconstructing the existing fleet. Given the time frames associated with building new icebreakers, the Recapitalization report concluded that the Coast Guard must begin planning and budgeting immediately.

- *High Latitude Study*.²⁸ This report included a separate and broader analysis of the Coast Guard's icebreaker needs, while the findings of the first two reports were limited to an analysis of the existing Coast Guard polar class icebreakers. The Coast Guard provided the Study to Congress in July 2011. It found that the common and dominant contributor to the significant mission impacts in the Arctic discussed above is the gap in polar icebreaking capability, and that the existing icebreaker fleet is insufficient to meet the Coast Guard's statutory mission requirements in both the Arctic and Antarctic, even if two new icebreakers are built. To fulfill these mission requirements, the study found that the Coast Guard needs a minimum of six icebreakers (three heavy and three medium icebreakers). Further, if Navy presence requirements are taken into account, the Coast Guard would require three additional heavy icebreakers and one additional medium icebreaker for a total of ten icebreakers (six heavy and four

²⁶This report was developed pursuant to a provision in the Coast Guard Authorization Act of 2010 (Pub. L. No. 111-281, 124 Stat. 2905, 2928-29 (2010)) mandating, in general, that the Coast Guard require a non-governmental, independent third party to conduct a comparative cost-benefit analysis of the recapitalization of the existing fleet of polar icebreakers.

²⁷These options include performing major service life extensions on the *Polar Sea* and *Polar Star*, allowing the Coast Guard to defer new construction by five years, as well as long-term leasing options. All options include a major service life extension for the *Healy*.

²⁸ABS Consulting, *High Latitude Study Mission Analysis Report*.

medium icebreakers).²⁹ The Study does provide cost estimates for acquiring the recommended icebreakers, but it does not directly assess the feasibility of its recommendations.³⁰

Funding Limitations Remain the Main Challenge Related to Icebreakers

As mentioned above, the Coast Guard faces budget uncertainty and it may be a significant challenge for the Coast Guard to obtain Arctic capabilities, including icebreakers. Given our analysis of the challenges that the Coast Guard already faces in funding its existing acquisition programs, it is unlikely that the agency's budget could accommodate the level of additional funding (estimated by the High Latitude Study to range from \$4.14 billion to \$6.9 billion) needed to acquire new icebreakers or reconstruct existing ones. The Recapitalization report similarly concludes that the recapitalization of the polar icebreaker fleet cannot be funded within the existing or projected Coast Guard budget.³¹ All three reports reviewed alternative financing options, including the potential for leasing icebreakers, or funding icebreakers through the NSF or DOD. The Recapitalization report noted that a funding approach similar to the approach used for the *Healy*, which was funded through the fiscal year 1990 DOD appropriations, should be considered.³² However, the Coast Guard has a more immediate need than DOD to acquire Arctic capabilities, including icebreakers, making it unlikely that a similar funding approach would be feasible at this time. For more details on Coast Guard funding challenges and options specific to icebreakers, see appendix IV.

²⁹The High Latitude Study does not detail the icebreaking capability specifically required to meet statutory mission requirements in the Arctic. However, the Study does find that providing year-round icebreaking capability in the Arctic would require two heavy, two medium, and two light icebreakers. This capability would be necessary to meet at least one statutory mission requirement under the Coast Guard's Defense Readiness mission—assured access to ice-impacted waters through a persistent icebreaker presence in the Arctic.

³⁰For example, the High Latitude Study includes "Rough Order of Magnitude" estimates that it would cost \$4.14 billion to acquire the three heavy and three medium icebreakers required to meet the Coast Guard's mission requirements. When the Navy's presence requirements are taken into account, the estimated cost increases to \$6.9 billion.

³¹The report based its assessment on the Coast Guard's Capital Investment Plan through fiscal year 2016, and longer-term budget projections through fiscal year 2020 that assumed an increase of no greater than inflation. However, since the analysis took place, the Capital Investment Plan has been subject to downward revision.

³²Pub. L. No 101-165, 103 Stat. 1112, 1121 (1989).

Coast Guard Coordinates with Numerous Stakeholders on Arctic Operations

The Coast Guard continues to coordinate with various stakeholders on Arctic operations and policy, including foreign, state, and local governments, Alaskan Native governments and interest groups, and the private sector. In September 2010, we reported that the Coast Guard has been actively involved in both bilateral and multilateral coordination efforts such as the Arctic Council.³³ The Coast Guard also coordinates with state, local, and Alaskan Native governments and interest groups; however, some of these stakeholders reported that they lack information on both the Coast Guard's ongoing planning efforts and future approach in the Arctic. In response to these concerns, in 2010 we recommended that the Commandant of the Coast Guard ensure that the agency communicates with these stakeholders on the process and progress of its Arctic planning efforts.³⁴ The Coast Guard agreed with our recommendation and is in the process of taking corrective action. For example, in April 2011, the Coast Guard issued a Commandant Instruction that emphasizes the need to enhance partnerships with Arctic stakeholders. Additionally, in August 2011, the Commandant participated in a field hearing in Alaska which included discussion about the Coast Guard's Arctic capability requirements.

The Coast Guard also coordinates with federal agencies, such as the NSF, National Oceanic and Atmospheric Administration (NOAA), and DOD, and is involved with several interagency coordination efforts that address aspects of key practices we have previously identified to help

³³The Arctic Council is a high-level intergovernmental forum for promoting cooperation, coordination, and interaction among the Arctic States, with the involvement of the Arctic Indigenous communities and other Arctic inhabitants on common Arctic issues, in particular issues of sustainable development and environmental protection in the Arctic. The eight permanent member states include Canada, Denmark (representing also Greenland and Faroe Islands), Finland, Iceland, Norway, Russia, Sweden, and the United States.

³⁴For more information about the Coast Guard's coordination with these stakeholders, please see [GAO-10-870](#).

enhance and sustain collaboration among federal agencies.³⁵ For example, as discussed above, the Coast Guard collaborates with the NSF to manage the nation's icebreaker fleet, including scheduling icebreaker time for research activities,³⁶ while NOAA provides the Coast Guard with weather forecasts and warnings, as well as information about ice concentration and type. Additionally, the Coast Guard is involved with interagency efforts such as the Interagency Policy Committee on the Arctic, created in March 2010 to coordinate governmentwide implementation of National Security Presidential Directive 66 / Homeland Security Presidential Directive 25.³⁷

Since our September 2010 report, the Coast Guard has partnered with DOD on another interagency coordination effort, the Capabilities Assessment Working Group. DHS and DOD established the working group in May 2011 to identify shared Arctic capability gaps as well as opportunities and approaches to overcome them, to include making recommendations for near-term investments. DHS assigned the Coast Guard lead responsibility for the working group, which was directed to focus on four primary capability areas when identifying potential collaborative efforts to enhance Arctic capabilities, including near-term investments. Those capability areas include maritime domain awareness,

³⁵ [GAO-06-15](#) identifies eight key practices that federal agencies can engage in to enhance and sustain collaborative efforts. These key practices are: (1) define and articulate a common outcome; (2) establish mutually reinforcing or joint strategies; (3) identify and address needs by leveraging resources; (4) agree on roles and responsibilities; (5) establish means of operating across agency boundaries; (6) develop mechanisms to monitor, evaluate, and report on results; (7) reinforce agency accountability for collaborative efforts through agency plans and reports; and (8) reinforce individual accountability for collaborative efforts through performance management systems.

³⁶ Between fiscal years 2006 and 2009, the operation and maintenance of Coast Guard icebreakers was funded through the NSF's budget, which according to Coast Guard officials and a 2011 report from the OIG, presented challenges to maintaining the polar icebreaker fleet and ensuring Coast Guard crews are properly trained. Fiscal years 2010 and 2011 appropriations however, directed the transfer of the \$54 million icebreaker budget from the NSF to the Coast Guard. See, Consolidated Appropriations Act, 2010 (Pub. L. No. 111-117, 123 Stat. 3034, 3145 (2009)) and Full-Year Continuing Appropriations Act, 2011 (Pub. L. No. 112-10, 125 Stat. 38 (2011)). Additionally, the Coast Guard's fiscal year 2012 budget request included a request for \$39 million to fund the operational costs of the icebreakers.

³⁷ See [GAO-10-870](#), app. IV for descriptions of other select interagency coordination efforts and how they address key practices.

communications, infrastructure, and presence. The working group was also directed to identify overlaps and redundancies in established and emerging DOD and DHS Arctic requirements. This working group will address several of the key practices we have identified—articulating a common outcome; identifying and addressing needs by leveraging resources; and reinforcing agency accountability for the effort through a jointly developed report containing near-term investment recommendations. The establishment of the working group helps to ensure that collaboration between the Coast Guard and DOD is taking place to address near-term capabilities in support of current planning and operations; however, upon the completion of the report in January 2012, the working group is expected to be dissolved.

GAO is also conducting an ongoing review of DOD's May 2011 *Report to Congress on Arctic Operations and the Northwest Passage* that was directed by the House Committee on Armed Services³⁸ and will report on our results in January of next year. That report will assess the extent to which DOD's *Arctic Report* addressed congressional requirements and DOD's efforts to identify and prioritize the capabilities needed to meet national security objectives in the Arctic, including through collaboration with the Coast Guard.

Chairman LoBiondo, Ranking Member Larsen, and Members of the Subcommittee, this completes my prepared statement. I would be happy to respond to any questions you may have at this time.

GAO Contacts and Staff Acknowledgments

For information about this statement please contact Stephen L. Caldwell, Director, Homeland Security and Justice, at (202) 512-9610, or caldwells@gao.gov. Contact points for our Office of Congressional Relations and Public Affairs may be found on the last page of this statement. Other individuals making key contributions to this testimony include Dawn Hoff (Assistant Director), Elizabeth Kowalewski (Analyst-In-Charge), Christopher Currie, Katherine Davis, Geoffrey Hamilton, Adam Hoffman, John Pendleton, Timothy Persons, Steven Putansu, Jodie Sandel, David Schmitt, Amie Steele, Esther Toledo, and Suzanne Wren.

³⁸H. Rep. No. 112-78, at 291 (2011).

Appendix I: Map of the Arctic Boundary

This appendix provides a map of the Arctic boundary, as defined by the Arctic Research and Policy Act. As discussed in the report, the Coast Guard currently has limited capacity to operate in the waters immediately below the Arctic Circle, such as the Bering Sea. Increasing responsibilities in an even larger geographic area, especially in the harsh and remote conditions of the northern Arctic, will further stretch the agency's capacity.

Figure 3: Map of the Arctic Boundary as Defined by the Arctic Research and Policy Act



Source: Created by the National Science Foundation for the U.S. Arctic Research Commission.

Appendix II: Impact of Capability Gaps on Coast Guard Mission Performance

This appendix provides information on the degree to which the Coast Guard’s existing capability gaps in the Arctic are expected to impact future mission performance. Of the Coast Guard’s 11 mission areas, 9 are expected to experience future demand in the Arctic, and the degree to which existing capability gaps are expected to impact these missions has been classified as Significant, Moderate, or Low. Examples of how these gaps are expected to impact each mission are also included below.

Figure 4: Impact of Existing Capability Gaps on Future Coast Guard Mission Performance in the Arctic

Degree of impact on mission performance	Coast Guard mission area	Example of mission impact
Significant	Defense readiness	Arctic capability gaps limit the Coast Guard's ability to provide a surface presence and project sovereign power in the Arctic.
	Ice operations	The lack of icebreaker capability will limit the Coast Guard's ability to provide assistance to commercial oil and gas activities in extreme or unpredicted ice conditions.
	Marine environmental protection	The lack of Arctic assets will limit the Coast Guard's environmental inspection and compliance activities, as well as their ability to respond to a major environmental incident, such as an oil spill.
	Ports, waterways, and coastal security	The lack of a vessel tracking system hinders the Coast Guard's ability to identify ships in U.S. Arctic waters.
Moderate	Aids to navigation	Gaps in navigation capacity and the presence of ice, fog, wind, and high sea states in shallow water will threaten the safety of an increasing number of mariners.
	Search and rescue	The lack of icebreaker capability will limit the Coast Guard's ability to respond to an increasing need for emergency maritime search and rescue due to greater human activity.
	Other law enforcement	The lack of assets in the Arctic limits the Coast Guard's ability to close illegal fishing areas.
Low	Living marine resources	Gaps in Arctic capabilities limit the Coast Guard's ability to enforce fishing regulations and deter potential illegal fishing.
	Marine safety	The lack of assets in the Arctic limits the Coast Guard's ability to enforce the restriction or closure of waterways.

Source: Coast Guard, *High Latitude Study*.
 Note: Two Coast Guard missions – Drug Interdiction and Migrant Interdiction – are not expected to be impacted by capability gaps in the Arctic.

Appendix III: Arctic Force Mixes

This appendix provides information on potential solutions to the Coast Guard's existing capability gaps in the Arctic. The High Latitude Study compares six Arctic force mixes in terms of the ability of each force mix to reduce the risk that is expected to exist in the future Arctic environment. The force mixes add assets to the baseline force mix (which represents the Coast Guard's current Arctic assets) and include different combinations of cutters (including icebreakers), aircraft, and forward operating locations. The specific asset combinations for each force mix are described below. The estimated acquisition cost for each Arctic force mix and the percent of risk the force mix is expected to reduce in the Arctic is also shown below.

Figure 5: Arctic Force Mixes

Arctic Force Mix (estimated acquisition cost)	Percent of risk reduced in the Arctic	Icebreakers and cutters	Forward Operating Locations (FOL) with medium range helicopters
Baseline	1%	One high-endurance cutter deployed in the Bering Sea, carrying a short range helicopter	- Two medium range helicopters located at Kodiak in the Gulf of Alaska - Seasonal medium range helicopters at Cold Bay and St. Paul, Alaska
Each force mix below contains the baseline assets			
Force Mix 1 \$3.1 billion	58%	One icebreaker deployed North of Alaska, carrying two medium range helicopters	One forward operating location on the North Slope
Force Mix 2 \$3.1 billion	65%	One icebreaker deployed North of Alaska, carrying two medium range helicopters	One forward operating location in Northwest Alaska
Force Mix 3 \$3.17 billion	66%	One icebreaker deployed North of Alaska, carrying two medium range helicopters	- One forward operating location on the North Slope - One forward operating location in Northwest Alaska
Force Mix 4 \$3.1 billion	50%	One icebreaker deployed North of the Bering Strait, carrying two medium range helicopters	One forward operating location on the North Slope
Force Mix 5 \$1.01 billion	25%	—	- One forward operating location on the North Slope - One forward operating location in Northwest Alaska
Force Mix 6 \$6.08 billion	92%	- One icebreaker deployed North of the Bering Strait, carrying two medium range helicopters - One icebreaker deployed in the Chukchi Sea, carrying two medium range helicopters - One icebreaker deployed North of Alaska (in the Beaufort Sea), carrying two medium range helicopters	—

Source: Coast Guard, *High Latitude Study*.

Note: Risk and risk reduction vary by season, because winter ice coverage affects accessibility. For example, the cruise industry is responsible for most of the risk present in the Arctic in the spring, summer, and fall, but does not contribute any risk during the winter.

Appendix IV: Funding Limitations Related to Icebreakers

This appendix provides an overview of the funding challenges the Coast Guard faces related to icebreakers. These include limitations in the Coast Guard's existing and projected budget, as well as alternative financing options.

Coast Guard Budget Limitations

The Coast Guard faces overall budget uncertainty, and it may be a significant challenge for the Coast Guard to obtain Arctic capable resources, including icebreakers. For more than 10 years, we have noted Coast Guard difficulties in funding major acquisitions, particularly when acquiring multiple assets at the same time. For example, in our 1998 report on the Deepwater program, we noted that the agency could face major obstacles in proceeding with that program because it would consume virtually all of the Coast Guard's projected capital spending.¹ In our 2008 testimony on the Coast Guard budget, we again noted that affordability of the Deepwater acquisitions would continue to be a major challenge to the Coast Guard given the other demands upon the agency for both capital and operations spending.² In our 2010 testimony on the Coast Guard budget, we noted that maintaining the Deepwater acquisition program was the Coast Guard's top budget priority, but would come at a cost to operational capabilities.³ This situation, of the Deepwater program crowding out other demands, continued, and in our report of July this year we noted that the Deepwater program of record was not achievable given projected Coast Guard budgets.⁴ Given the challenges that the Coast Guard already faces in funding its Deepwater acquisition program, it is unlikely that the agency's budget could accommodate the level of additional funding (estimated by the High Latitude Study to range from \$4.14 billion to \$6.9 billion) needed to acquire new icebreakers or reconstruct existing ones.

¹GAO, *Coast Guard Acquisition Management: Deepwater Project's Justification and Affordability Need to be Addressed More Thoroughly*, [GAO/RCED-99-6](#) (Washington, D.C.: Oct. 26, 1998).

²GAO, *Coast Guard: Observations on the Fiscal Year 2009 Budget, Recent Performance, and Related Challenges*, [GAO-08-494T](#) (Washington, D.C.: March 6, 2008).

³GAO, *Coast Guard: Observations on the Fiscal Year 2011 Budget, Recent Performance, and Related Challenges*, [GAO-10-411T](#) (Washington, D.C.: February 25, 2010).

⁴GAO, *Coast Guard: Action Needed As Approved Deepwater Program Remains Unachievable*, [GAO-11-743](#) (Washington, D.C.: July 2011).

The *U.S. Polar Icebreaker Recapitalization Report* contains an analysis of the Coast Guard's budget which also concludes that the recapitalization of the polar icebreaker fleet cannot be funded within the existing or projected Coast Guard budget.⁵ This analysis examined the impact that financing a new polar icebreaker would have on Coast Guard operations and maintenance activities, among others. The report found that given the Coast Guard's current and projected budgets, as well as its mandatory budget line items, there are insufficient funds in any one year to fully fund one new polar icebreaker. Additionally, though major acquisitions are usually funded over several years, the incremental funding obtained from reducing or delaying existing acquisition projects would have significant adverse impact on all Coast Guard activities.

This means that it is unlikely that the Coast Guard will be able to expand the U.S. icebreaker fleet to meet its statutory requirements as identified by the High Latitude Study. As we reported in 2010,⁶ the Commandant of the Coast Guard has recognized these budgetary challenges, noting that the Coast Guard would need to prioritize resource allocations, while accepting risk in areas where resources would be lacking. Given that it takes 8-10 years to build an icebreaker, and the Coast Guard has not yet begun the formal acquisition process, the Coast Guard has already accepted some level of risk that its statutory mission requirements related to icebreakers will continue to go unmet.

Limitations on Alternative Financing Options

The three reports discussed earlier in this statement all identify funding as a central issue in addressing the existing and anticipated challenges related to icebreakers. In addition to the Coast Guard budget analysis included in the Recapitalization report, all three reports reviewed alternative financing options, including the potential for leasing icebreakers, or funding icebreakers through the National Science Foundation (NSF) or the Department of Defense (DOD). Although DOD has used leases and charters in the past when procurement funding levels were insufficient to address mission requirements and capabilities,

⁵The report based its assessment on the Coast Guard's Capital Investment Plan through fiscal year 2016, and longer-term budget projections through fiscal year 2020 that assumed an increase of no greater than inflation. However since the analysis took place, the Capital Investment Plan has been subject to downward revision.

⁶[GAO-10-870](#).

both the Recapitalization report and the High Latitude Study determined that the lack of existing domestic commercial vessels capable of meeting the Coast Guard's mission requirements reduces the availability of leasing options for the Coast Guard. Additionally, an initial cost-benefit analysis of one type of available leasing option included in the Recapitalization report and the High Latitude Study suggests that it may ultimately be more costly to the Coast Guard over the 30-year icebreaker lifespan. Another alternative option addressed by the Recapitalization report would be to fund new icebreakers through the NSF. However, the analysis of this option concluded that funding a new icebreaker through the existing NSF budget would have significant adverse impacts on NSF operations and that the capability needed for Coast Guard requirements would exceed that needed by the NSF.

The Recapitalization report noted that a funding approach similar to the approach used for the *Healy*, which was funded through the fiscal year 1990 DOD appropriations, should be considered.⁷ However, the report did not analyze the feasibility of this option. We have previously reported that because of the Coast Guard's statutory role as both a federal maritime agency and a branch of the military, it can receive funding through both the Department of Homeland Security (DHS) and DOD.⁸ For example, as we previously reported, although the U.S. Navy is not expressly required to provide funding to the Coast Guard, the Coast Guard receives funding from the Navy to purchase and maintain equipment, such as self-defense systems or communication systems, because it is in the Navy's interest for the Coast Guard systems to be compatible with the Navy's systems when the Coast Guard is performing national defense missions in support of the Navy. However, according to a Coast Guard budget official, the Coast Guard receives the majority of its funding through the DHS appropriation, with the exception of reimbursements for specific activities.⁹ Also, as the Recapitalization plan acknowledges, there is considerable strain on the DOD budget. A recent

⁷Pub.L.No 101-165, 103 Stat. 1112, 1121 (1989).

⁸GAO, *Homeland Security: Enhanced National Guard Readiness for Civil Support Missions May Depend on DOD's Implementation of the 2008 National Defense Authorization Act*, [GAO-08-311](#) (Washington, D.C.: Apr. 16, 2008).

⁹For example, NSF reimbursed the Coast Guard for polar icebreaker maintenance from 2006 to 2011, and the Coast Guard receives reimbursements for certain U.S. Navy related security operations.

DOD report on the Arctic¹⁰ also notes budgetary challenges, stating that the near-term fiscal and political environment will make it difficult to support significant new U.S. investments in the Arctic. Furthermore, DOD and the Coast Guard face different mission requirements and timelines. For example, DOD's recent report states that the current level of human activity in the Arctic is already of concern to DHS, whereas the Arctic is expected to remain a peripheral interest to much of the national security community for the next decade or more. As a result, the Coast Guard has a more immediate need than DOD to acquire Arctic capabilities, such as icebreakers. For example, with preliminary plans for drilling activity approved in 2011, the Coast Guard must be prepared to provide environmental response in the event of an oil spill. Similarly, as cruise ship traffic continues to increase, the Coast Guard must be prepared to conduct search and rescue operations should an incident occur. For these reasons, it is unlikely that an approach similar to the one that was used to build the *Healy* would be feasible at this time.

¹⁰DOD, *Report to Congress on Arctic Operations and the Northwest Passage*, (Washington, D.C.; May 2011).

Related GAO Products

Coast Guard: Action Needed As Approved Deepwater Program Remains Unachievable, [GAO-11-743](#), Washington, D.C.: July 28, 2011.

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

Coast Guard: Observations on the Requested Fiscal Year 2011 Budget, Past Performance, and Current Challenges, [GAO-10-411T](#), Washington, D.C.: February 25, 2010.

Coast Guard: Observations on the Fiscal Year 2010 Budget and Related Performance and Management Challenges, [GAO-09-810T](#), Washington, D.C.: July 7, 2009.

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